Packaged Literature Search 86-1

Doppler Radar

Second Edition

Washington, D.C.
February 1986

U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Environmental Satellite, Data and Information Service

THE PACKAGED SEARCH SERIES

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METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS (MGA), 1970-1985
NATIONAL TECHNICAL INFORMATION SERVICE (NTIS), 1964-1985

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U.S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary
National Oceanic and Atmospheric Administration
Anthony J. Calio, Administrator
National Environmental Satellite, Data, and Information Service
William P. Bishop, Acting Assistant Administrator

INTRODUCTION

This Packaged Search is an update of Packaged Literature Search 81-1, Doppler Radar, and was compiled by Bruce Keck of the Library and Information Services Division, Seattle, Washington, Facility. It contains citations from the databases, METEOROLOGICAL and GEOASTROPHYSICAL ABSTRACTS (MGA) and NATIONAL TECHNICAL INFORMATION SERVICE (NTIS).

Covered are, for MGA, all relevant citations placed in the database for the period 1980 through November 1985, and for NTIS, those published in 1980 through approximately mid 1985. For older material, the user is referred to the First Edition.

The retrieval philosophy has been a broad one. For MGA, all records containing the phrase "Doppler Radar", or "Next Generation Radar", or "NEXRAD" in either the title or index fields have been retrieved. For NTIS, materials were additionally limited to broad meteorological areas. Consequently, this search deals with the technology of Doppler Radar as well as observations made with it.

The general characteristics of the Packaged Search series, as well as the attributes of the databases employed in this search, are explained on the inside front and back covers of this publication.

DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

33050054 ID NO.- MGA33050054
Attenuation problems associated with a 5-cm radar.
Allen, Robert H.; Burgess, Donald W.; Donaldson, Ralph J., Jr.
Air Weather Serv., Scott AFB., IL.; Natl. Severe Storms Lab., Norman, OK; Air Force Geophys. Lab., Hanscom AFB, MA.
American Meteorological Society, Boston, Bulletin, 62(6): 807-810, June 1981. Refs. DAS, DLC (QC851.A6)
CTRY OF PUBL: US
The reflectivity pattern from a 5-cm Doppler radar is compared to that from a colocated 10-cm Doppler radar to determine the relative attenuation of the 5-cm signal. Maximum attenuation occurred on April 10, 1979, during the alignment of two severe thunderstorms on the same radar azimuth. During alignment, the near- range storm caused total attenuation of the 5-cm signal from the far-range storm. Maximum attenuation in the far-range storm was in excess of 23 dB and was on the order of 30 dB. Characteristics of the two storms are presented, along with the rainfall rate (maximum of 6.4 in. hr SUPER - SUPER 1) of the near-range storm, a reflectivity contour analysis for each radar, and difference fields showing the attenuation of the 5- cm signal in both storms. Some operational problems associated with a 5-cm radar in an attenuating environment include degradation of peak values and distortion of severe weather indicators, as well as the possibility of the loss of the capability to detect severe storms.
DESCRIPTORS: Radar wave attenuation; Doppler radar observation of severe storms; Doppler radar observation of rainfall

32020254 ID NO.- MGA32020254
Drop-size distributions and vertical air motions in a thunderstorm as inferred from Doppler radar observations at vertical incidence.
Amayenc, P.; Hauser, D.
Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 13(4): 313, Oct./Dec. 1979. Abstract 4- 1.1. (Conference Internationale, VIII SUPER e , sur la Physique des Nuages, Clermont-Ferrand, 15-19 juillet 1980, Resumes).
CTRY OF PUBL: FR
On July, 18, 1978, the two Doppler radars of the RONSARD system, involved in an experiment aimed at studying convective storms in Switzerland, gathered data, during 20 min, in a thunderstorm advected along the radars' baseline direction. Drop-size distributions and vertical air motions were determined by using Doppler spectra from one vertically pointed radar, R1. These results were replaced within the moving storm cell structure obtained from radar, R2, which performed scans within a space volume, including the vertical sounding zone of R1. The cores of precipitating water content, M, and reflectivity factor, Z, maxima are found to correspond and to be related to updraft regions in the vertical plane containing the two radars. An analysis of the associated structures of raindrop size distributions (characterized by the N SUB O and LAMBDA parameters, when using the exponential form assumption) is presented. Classical relationships between Z, LAMBDA , N SUB O , M, D SUB O (median volume diameter), and R (rainfall rate) are established, discussed, and compared with relevant results.
DESCRIPTORS: Thunderstorm studies; Doppler radar thunderstorm measurements; Vertical motion in thunderstorms; Raindrop size distribution; Switzerland

33010308 ID NO.- MGA33010308
Doppler radar measurements of clear air atmospheric turbulence at 1290 MHz.
Balsley, Ben; Peterson, Vern L.
Aeronomy Lab., NOAA, Boulder, CO.; Centennial Sci., Inc., Colorado Springs, CO.
Journal of Applied Meteorology, Boston, 20(3): 266-274, March 1981. Refs. DAS, DLC
CTRY OF PUBL: UA
The authors present Doppler radar observations for the refractivity turbulence structure constant, C SUB N SUPER 2 , obtained with the Chatanika Radar Facility, near Fairbanks, Alaska, during a 7-day observing period in Oct. 1976. It is found that 1) C SUB N SUPER 2 typically decreases with altitude above 10 km at a rate of APPROX. 1.3 dB km SUPER - SUPER 1 ; this is considerably less rapid than at low latitudes; 2) patches of irregularities appear to be advected with the wind; 3) azimuthal variations of C SUB N SUPER 2 show no aspect sensitivity with regard to either the topography or the wind direction; and 4) radar echoes do not show evidence of specular reflection at this frequency, in contrast to findings at lower frequencies.
DESCRIPTORS: Clear air turbulence measurement techniques; Doppler radar observation of turbulence; Chatanika, Alaska

35030058 ID NO.- MGA35030058
10 cm dual-frequency Doppler weather radar, Pt. 2, Quality assurance/fault location network.
Banis, Kenneth J.
United States. Air Force Geophysics Lab., Hanscom AFB, MA., Instrumentation Papers, No. 313(11), Oct. 25, 1982. 31 p. Figs. For abstract of Pt. 1, see Met. Abs., 35.2-46. (AFGL-TR-0321(11)). DLC
CTRY OF PUBL: US
A functional description of an automatic radar system performance monitoring network is presented. A network of microprocessor-controlled monitoring units were interfaced to various sensors at key areas in a Doppler weather radar to collect system status information and display it at a central point near the operator's console. This status information is displayed on a color terminal that permits the systems operator to verify the proper operation of the radar with just a cursory glance at the terminal. Fault location and fault tolerant techniques were used to provide the system user with quality-assured data.

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DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

DESCRIPTORS: Doppler radar; Radar equipment

31120237 ID NO.- MGA31120237
Observations of two Colorado thunderstorms by means of a zenith-pointing Doppler radar.
Battan, Louis J.
Inst. of Atmos. Phys., Univ. of AZ., Tucson
Journal of Applied Meteorology, Boston, 19(5): 580-592, May 1980. Refs. DAS, DLC
CTRY OF PUBL: US
A description is given of the distributions of radar reflectivity, mean Doppler velocity, vertical air velocity, and Doppler velocity variance in two thunderstorms over eastern Colorado. A zenith-pointing Doppler radar was used to obtain data at height intervals of 152 m. It is shown that the storms were composed of a series of turbulent updrafts resembling those observed in hailstorms in southeastern Arizona. On the basis of similarities with thunderstorms observed elsewhere, it is speculated that radar reflectivities and updrafts are a characteristic feature of most thunderstorms and that they contribute significantly to the highly variable nature of hail.
DESCRIPTORS: Doppler radar thunderstorm measurements; Vertical motion in thunderstorms; Colorado, United States

31010041 ID NO.- MGA31010041
Case for Doppler radars along our hurricane affected coasts.
Baynton, Harold W.
Natl. Ctr. for Atmos. Res., Boulder, CO.
American Meteorological Society, Boston, Bulletin, 60(9): 1014-1023, Sept. 1979. Refs., figs. DAS, DLC (QC851.A6)
CTRY OF PUBL: US
Hurricanes cause sporadic devastation along the Gulf and Atlantic coasts, despite intensive research and a warning system that integrates satellite surveillance, aircraft reconnaissance, and a network of coastal radars. Part of the devastation must be attributed to inadequate public preparation and response and part to the limits of weather predictability, but a part must be attributed to the use of an outmoded radar system. Although there now exist Doppler radars that provide real-time, colored displays of the wind structure in storms, the radars that comprise the last line of defense in the national hurricane warning service provide no wind information. To support the contention that the coastal network should consist of Doppler radars, the paper develops a scenario in which a hurricane is approaching Galveston. A Doppler radar is imagined to be located at Galveston. The hurricane is assigned an average wind structure from which the field of wind components directed toward the radar is computed. After color coding the entire wind field, the corresponding color-coded radar display is obtained for a plausible distribution of radar echoes. The analysis shows that the radar would provide valuable data on the location and intensity of the hurricane- force winds.
DESCRIPTORS: Doppler radar observation of hurricanes; Hurricane warning improvements; Eastern U.S.

35020046 ID NO.- MGA35020046
10-cm dual frequency Doppler weather radar, Pt. 1, Radar system.
Bishop, Alexander W.; Armstrong, Graham M.
United States. Air Force Geophysics Lab., Hanscom AFB, MA., Instrumentation Papers, No. 313(1), Oct. 25, 1982. 42 p. Refs., figs. (AFGL-TR-82-0321(1)). DLC
CTRY OF PUBL: US
Design concepts and test results are summarized for a Doppler weather radar system suitable for precipitation measurements over a wide span of radial velocities and slant ranges, even in the presence of ground clutter. The radar transmits two uniform pulse trains at 2.710 and 2.760 GHz. Uniformly spaced pulses permit ground clutter cancellation of up to 50 dB to be achieved with a three-pole elliptic filter. Pulse spacing at one frequency is consistent with long-range coverage in reflectivity, whereas spacing of the second is consistent with a wide, unambiguous velocity measurement span.
DESCRIPTORS: Doppler radar; Doppler radar observation of rainfall; Radar precipitation measurement techniques

35110196 ID NO.- MGA35110196
Joint Agency Turbulence Experiment in interim report.
Bohne, Alan R.
United States. Air Force Geophysics Lab., Hanscom AFB, MA., Environmental Research Papers, No. 844, July 13, 1983. 65 p. Refs., figs. (AFGL-TR-83-0180). DLC, DAS (A QC 807.5 U55)
CTRY OF PUBL: US
Doppler radar data acquired during the 1981 Joint Agency Turbulence Experiment are presented. Pulse-pair-processed reflectivity factor and Doppler spectrum mean data collected during volume scan periods are displayed over constant height surfaces at aircraft penetration level. Time histories of tracking-gate Doppler spectrum mean and variance data collected during aircraft storm penetration periods are also presented. These data show the Doppler spectrum variance to be poorly correlated with gradients of the radial wind, suggesting turbulence is the dominant contributor to Doppler spectrum variance. The data show that areas of moderate to heavy turbulence are distributed throughout the storms. Estimations of turbulence severity are obtained through structure function and Doppler spectrum variance methods. Qualitative results suggest that for observations taken at moderate to long range, storm structure wind shear can strongly bias structure function estimates of turbulence severity, but generally have little influence on estimates from variance methods. The effective turbulence outer scale, the maximum eddy size when the turbulence field is represented by the Kolmogorov inertial subrange law, is typically <2 km.
DESCRIPTORS: Turbulence intensity measurement techniques; Turbulence measurements in flight; Doppler radar observation of turbulence

DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

34080169 ID NO.- MGA34080169
Radar detection of turbulence in precipitation environments.
Bohne, Alan R.
Air Force Geophys. Lab., Hanscom AFB, MA.
Journal of the Atmospheric Sciences, Boston, 39(8): 1819-1837, Aug. 1982. Refs. DAS, DLC
CTRY OF PUBL: US
Imperfect particle tracer response is incorporated into the relations describing the turbulent air motion contribution to Doppler radar spectrum mean and variance. Tracer effects on radar estimates of the eddy dissipation rate (EPSILON) increase with decreasing range and decreasing turbulence outer scale (LAMBDA SUB O). Exclusion of imperfect tracer effects can lead to moderate underestimates (LESS OR EQUAL 30%) of EPSILON . These precipitation effects, however, may be dwarfed by the sensitivity of the EPSILON estimate to the estimate of maximum eddy size. Nonetheless, good radar estimates of the turbulence severity index (EPSILON SUPER 1 SUPER / SUPER 3) can be achieved with only a reasonable estimate of LAMBDA SUB O .
DESCRIPTORS: Turbulence detection; Turbulence observation techniques; Doppler radar observation of turblence

33080299 ID NO.- MGA33080299
Radar detection of turbulence in thunderstorms.
Bohne, Alan R.
United States. Air Force Geophysics Lab., Hanscom AFB, MA., Environmental Research Papers, No. 736, March 31, 1981. 62 p. Refs., figs. (AFGL-TR-81-0102). DLC, DAS (A QC 807.5 U55)
CTRY OF PUBL: US
Theoretical investigations are undertaken to relate intensity of turbulent air motion to Doppler radar spectrum mean and variance in precipitation environments. Examples of theoretical radar-derived turbulence power density spectra and total precipitation motion variance show that effects of imperfect particle response are significant for turbulence scale lengths <250 m. Doppler spectrum variance and estimated eddy dissipation rate ( ) are found to be strongly dependent upon precipitation environment for ranges less than 20 km and for cases where the turbulence outer scale length (LAMBDA SUB o) is <0.5 km. They are found to be essentially independent of LAMBDA SUB o when the maximum pulse volume dimension is <1/2 LAMBDA SUB o and independent of range but strongly dependent upon LAMBDA SUB o at ranges where the maximum pulse volume dimension is > LAMBDA SUB o . Estimation of by radar is shown to be unreliable until a method of remotely determining LAMBDA SUB o is found. Nevertheless, classification of turbulent severity (index = SUPER 1 SUPER / SUPER 3) is possible with only a reasonable guess of LAMBDA SUB o . Analyses of aircraft gust velocity data indicate that thunderstorm turbulence is localized into discrete patches and that such localization must be accounted for when aircraft gust velocity data undergo power spectrum analysis.
DESCRIPTORS: Radar turbulence detection; Doppler radar observation of turbulence; Thunderstorm turbulence

36040301 ID NO.- MGA36040301
Analysis of aircraft hydrometeor spectra and differential reflectivity (Z SUB D SUB R) radar measurements during the Cooperative Convective Precipitation Experiment.
Bringi, V. N.; Seliga, T. A.; Cooper, W. A.
Dept. of Electrical Engr., CO. State Univ., Ft. Collins; Atmos. Sci. Program, Ohio State Univ., Columbus; Dept. of Atmos. Sci., Univ. of WY., Laramie
Radio Science, Wash., D.C., 19(1): 157-167, Jan./Feb. 1984. Refs., figs. (Paper 3S0821). Reprint available from American Geophysical Union, Wash., D.C. 20009. DAS, DLC
CTRY OF PUBL: US
Radar measurements of Z SUB D SUB R are compared with Z SUB D SUB R deduced from aircraft graupel spectra during the Cooperative Convective Precipitation Experiment. On Aug. 4, 1981, the University of Wyoming's Super King Air made two penetrations (at altitudes of 3 and 1.8 km a.m.s.l.) through a convective cell located 90 km northeast of the CHILL radar. The aircraft was equipped with two two-dimensional PMS probes located orthogonally to view the falling hydrometeors along their symmetry axis (V probe) and along an axis orthogonal to it (H probe). Elliptical raindrop images were observed below cloud base (1.8-km altitude), and conical graupel images were observed at 3-km altitude. Because of beam blockage at the lowest elevation scans, radar data were not available in the rain region. Aircraft raindrop spectra were analyzed, and it is shown that Z SUB D SUB R deduced from such spectra should be an excellent estimator of D SUB O , provided the correct form for the drop size distribution is assumed. Z SUB D SUB R and Z SUB H deduced from the graupel spectra are shown to be in the range measured by the radar.
DESCRIPTORS: Airplane investigation of hydrometeors; Hydrometeor observation techniques; Doppler radar observation of raindrops; Doppler radar observation of graupel

33040281 ID NO.- MGA33040281
Multiple Doppler radar analysis of severe thunderstorms: designing a general analysis system.
Brown, R. A.
Natl. Severe Storms Lab., Norman, OK.
United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., Norman, OK., Technical Memorandum (NOAA TM NSSL-92), June 1981. 18 p. Refs., figs. DAS (A QC 807.5 U6 N7)
CTRY OF PUBL: US
Synthesis and analysis of data acquired by multiple Doppler radars proceed in stages of editing, data interpolation to grid points, synthesis of data for definition of three-dimensional flow, calculation of kinematic parameters, and display of analyzed data. The authors describe the procedure for designing such an analysis system. System design is based on many years of experience with NSSL's Multiple Radar Analysis (RADAN) System. A key feature of the system is its modular nature, which permits individual components to be

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modified without affecting the rest of the system.
DESCRIPTORS: Doppler radar observation of severe storms; Severe thunderstorms; Radar data processing

35090176 ID NO.- MGA35090176
Improved severe storm warnings using Doppler radar.
Brown, Rodger A.; Wood, Vincent T.
Natl. Severe Storms Lab., Norman, OK.
National Weather Digest, Temple Hills, MD., 8(3): 17-27, Aug. 1983. Refs., figs. DAS (A QC 851 N423)
CTRY OF PUBL: US
Research data collected by the National Severe Storms Laboratory's Doppler radars and operational tests conducted during the Joint Doppler Operational Project reveal the severe storm detection capability of 10-cm-wavelength Doppler radars. Severe storm identification is based on the presence of the Doppler velocity signature of a mesocyclone-a circulation that appears on conventional radar scopes as a hook echo.
DESCRIPTORS: Doppler radar observation of severe storms; Severe storm detection; Severe storm warnings

31010080 ID NO.- MGA31010080
Joint Doppler Operational Project (JDOP), 1976-1978, final report.
Burgess, Don
Natl. Severe Storms Lab., Norman, OK.
United States National Oceanic and Atmospheric Administration. Environmental Research Labs., Norman, OK., Technical Memorandum (NOAA TM ERL NSSL-86), March 1979. 84 p. Refs., appendices. DAS (A QC 807 5 U6 N7)
CTRY OF PUBL: US
Results of operational tests by the Joint Doppler Operational Project during 1977 and 1978 illustrate the marked improvement Doppler radar offers for early accurate identification of thunderstorm hazards, especially tornadoes and squall lines. Design characteristics are given for a Doppler radar system, suggested as a next generation weather radar system, to meet the integrated requirements of the NOAA National Weather Service, U.S. Air Force Air Weather Service, and Federal Aviation Administration.
DESCRIPTORS: Doppler radar; Doppler radar observation of severe storms

32020402 ID NO.- MGA32020402
Behaviour of a frontal precipitation band as observed with a dual Doppler radar network.
Campistron, B.
Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 13(4): 324, Oct./Dec. 1979. Abstract 5- 2.3. (Conference Internationale, VIII SUPER e , sur la Physique des Nuages, Clermont-Ferrand, 15-19 juillet 1980, Resumes).
CTRY OF PUBL: FR
In the course of an experimental program in the Paris area during the fall of 1977, a frontal system accompanied by several precipitation bands on the large mesoscale was observed by using a K-band radar, two high-frequency radiosondes, varied ground instrumentation, and a dual Doppler network (the RONSARD system). In particular, the surface cold front was marked by an echo band which, in spite of its small vertical extent, generated occasionally intense rain. Also, the small-scale structure within the band was quasi periodic. The evolution of the phenomenon is described and possible origins of precipitation are discussed, as well as available information about the fields of dynamic and thermodynamic quantities.
DESCRIPTORS: Frontal rainbands; Doppler radar observation of fronts; Paris, France

32020255 ID NO.- MGA32020255
Severe winter squall line.
Carbone, R. E.; Serafin, R. J.; Moore, J. A.
Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 13(4): 324-325, Oct./Dec. 1979. Abstract 5-2.4. (Conference Internationale, VIII SUPER e , sur la Physique des Nuages, Clermont-Ferrand, 15-19 juillet 1980, Resumes).
CTRY OF PUBL: FR
An intense squall line, associated with a Pacific cold front, was observed by means of triple Doppler radar in Feb. 1978 near Sacramento, CA. Synthesis of triple Doppler data has yielded detailed, three-dimensional vector wind fields of the storm and its environs. Various supporting measurements fully substantiate the Doppler radar analysis. The squall line was composed of a two-dimensional updraft and downdraft couplet that was in a steady state throughout most of the period of observations. Typical maximum updraft speed was 15-20 m sec SUPER - SUPER 1 , at 1.2-1.8 km above the surface. Maximum downdrafts were typically 10-15 m sec SUPER - SUPER 1 . Strong horizontal shear and convergence of the horizontal wind across the frontal surface created cyclonic shear and positive vorticity values in excess of 10 SUPER - SUPER 2 sec SUPER - SUPER 1 . Average rainfall rates were measured to be 100 mm hr SUPER - SUPER 1 in the squall line. Soundings reveal that the convection was not driven buoyantly but was mechanically forced in the boundary layer. Precipitation efficiency calculations show that the squall line proper was 60% efficient and the frontal precipitation band, as a whole, was 90% efficient. Physical explanations for the intense forcing are given, and microphysical implications are discussed.
DESCRIPTORS: Squall line analysis; Doppler radar observation of squall lines; Sacramento, California

32030071 ID NO.- MGA32030071
Doppler radar hail sensor.
Carte, A. E.
Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 13(4): 334, Oct./Dec. 1979. Abstract 6- 3.4.
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DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

(Conference Internationale, VIII SUPER e , sur la Physique des Nuages, Clermont-Ferrand, 15-19 juillet 1980, Resumes).
CTRY OF PUBL: FR
A small, inexpensive Doppler radar (10 GHz, 15 MW, 30-deg beam) was adapted to record hailfalls. The radar points vertically upward onto a slightly sloping Perspex sensing surface (30 MULTIPLIED BY 30 cm), 40 cm directly above. A particular hailstone gives a frequency shift that is proportional to its fallspeed, from which its size can be inferred. The Doppler frequency shifts caused by hailstones within the beam are recorded with an ordinary audio tape recorder. The record is digitized and transferred to computer-compatible tape. A Fourier analysis is then performed to given the spectrum of frequencies. The size distribution of the hailstones and their spatial concentration can be deduced by including only those that impact on the sensing surface and, thereby, undergo an abrupt change in velocity.
DESCRIPTORS: Doppler radar; Doppler radar observation of hail

31110015 ID NO.- MGA31110015
Precision of tropospheric-stratospheric winds measured by the Chatanika radar.
Chang, Norman J. F.
SRI Internatl., Menlo Park, CA.
Radio Science, Wash., D.C., 15(2): 371-382, March-April 1980. Refs. DAS, DLC
CTRY OF PUBL: US
A method for reducing tropospheric-stratospheric radar backscatter measurements to wind components and for relating uncertainties in these components to uncertainties in Doppler backscatter moments estimation is described. The centroid of the Doppler spectrum is used to estimate the wind component along the radar line of sight, whereas the variance of this estimator is used to judge the precision that can be attached to the measurement. Error estimates are given in geographical coordinates, so that errors in resolved velocities can be related directly to radar measurements. To assess the validity of the procedure, wind profiles derived from Chatanika radar measurements are compared with wind profiles obtained from a series of 12 windsondes. These windsondes were launched nearby (at APPROX. 45-min intervals) on April 6 and 7, 1978. Radar measurements include selected horizontal wind profiles (from APPROX. 4- to 14-km altitude) and winds at 9.05 km, extending over 15 hr. Windsonde and radar-derived velocities generally agree within the precision of the measurements, but, in regions of strong wind shear, differences exceeding the calculated error bars are found. These discrepancies are shown to be caused by several independent scattering layers that often exist within the scattering volume. When these layers have sufficiently different velocities, causing multiple peaks to appear in the Doppler spectrum, and when the relative strengths of these spectral peaks change with azimuth, the centroid no longer accurately reflects the mean motion of the scatterers. Thus, significant errors in resolved velocities can occur. Because regions of high reflectivity apparently exist in thin layers separated by regions of low reflectivity, radar backscatter will provide an accurate sampling of the wind field only if the scattering layers can be accurately located. To overcome these limitations in accuracy, radars that are used to measure tropospheric-stratospheric winds should have range resolutions comparable to the thickness of the scattering layers.
DESCRIPTORS: Upper air wind measurement techniques; Doppler radar wind measurement; Chatanika, Alaska

32040253 ID NO.- MGA32040253
Electrical and dynamical description of a convective storm, deduced from LANDES 79 experiment.
Chauzy, S.
Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 13(4): 311, Oct./Dec. 1979. Abstract 3- 3.5. (Conference Internationale, VIII SUPER e , sur la Physique des Nuages, Clermont-Ferrand, 15-19 juillet 1980, Resumes).
CTRY OF PUBL: FR
The LANDES 79 experiment was performed in Lugos (Gironde, France) by several French groups (CESTA, CNET, DRSW, EERM, LMD, LPA, and ONERA) to obtain thermodynamic, dynamic, and electrical descriptions of convective cells. Some preliminary results concerning the conjoined analyses of dual Doppler radars (RONSARD system) data and electric field measurements that were obtained by using an airborne balloon sensor are presented. The Doppler radars were used, either with COPLAN scannings, which allow the restitution of reflectivity and three-dimensional wind field, or with vertical-incidence soundings, which provide hydrometeor size distributions and vertical air velocities. The electric field in situ data were collected by telemetry. The sensor measured the electric-field vertical component by using a double-shutter field mill and the horizontal component by using a cylindrical field mill. An automatic tracking system provided precise data on each sensor trajectory. About 10 soundings were performed, along with radar observations. The localization of the charged regions within the storm was deduced from the electric field sounding and related to the Doppler radar data (i.e., reflectivity and/or three-dimensional wind field).
DESCRIPTORS: Thunderstorm studies; Thunderstorm dynamics; Thunderstorm electric field measurements; Doppler radar thunderstorm measurements; Gironde, France

32020263 ID NO.- MGA32020263
Mesoscale flow, small-scale motions, and microphysics of precipitations within a warm front: a dual-Doppler radar observation.
Chong, M.
Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 13(4): 325, Oct./Dec. 1979. Abstract 5- 2.6. (Conference Internationale, VIII SUPER e , sur la Physique des Nuages, Clermont-Ferrand, 15-19 juillet 1980, Resumes).

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DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

CTRY OF PUBL: FR
Observations of well-characterized warm fronts near Paris on Nov. 2, 1977, by a dual-Doppler radar system (RONSARD system) are presented. Doppler radar data were collected during six consecutive hours in a widespread precipitation area ahead of the surface front. Three scanning types were used: conical scanning (VAD), coplanar scanning, and vertical incidence soundings, permitting a study of the front system at various scales. Several rawinsondes were launched, defining the vertical structure of temperature and moisture. Thus, this experiment provided a simultaneous description of the mesoscale dynamic and thermodynamic field and of the small-scale motions. The mesoscale flow is characterized by a static stability, a pronounced cross-front circulation, and the existence of an intense shear. The small-scale motions exhibit a wavelike structure, LAMBDA EQUALS APPROX. 5 km, organized normally to the maximum shear. From vertical incidence soundings, the deduced hydrometeor size distributions and small-scale vertical motions (using a new method) are found to be compatible with thermal and hygrometric conditions of the atmosphere as well as with wind field characteristics.
DESCRIPTORS: Warm front analysis; Doppler radar observation of fronts; Warm frontal rain; Rain microphysics; Paris, France

34100056 ID NO.- MGA34100056
Three-dimensional air motion from dual-Doppler radar data.
Chong, M.; Roux, F.; Testud, J.
Ctr. for Res. in the Phys. of the Terrestrial and Planetary Environ.,France;
Atmospheric Technology, Boulder, CO., No. 13, 1981. p. 72-86. Refs., figs.
CTRY OF PUBL: US
This article describes a system of data processing which filters turbulent motions and considers advection. A dual-Doppler radar system is discussed with the assumption that it is operated according to the coplane methodology described by Miller and Strauch (1974); i.e., at each instant, the two radars, R SUB 1 and R SUB 2 , are steered to scan a common plane along the R SUB 1 R SUB 2 axis and are inclined at an angle to the horizontal. Volume scanning is obtained by varying ALPHA between 0 and 20 deg. The main advantage of this methodology lies in the fact that the data obtained in each plane can be considered quasi-simultaneous since the scanning time of an individual plan does not exceed 10 sec (which corresponds to an advection interval of generally <0.1 km).
DESCRIPTORS: Airflow measurement techniques; Doppler radar observation of airflow

35070029 ID NO.- MGA35070029
Three-dimensional wind field analysis from dual-Doppler radar data, Pt. 3, Boundary condition: an optimum determination based on a variational concept.
Chong, M.; Testud, J.
CNET-CNRS, Centre de Recherches en Phys. de l'Environ. Terrestre etPlanetaire, Issy-les-Moulineaux, France
Journal of Climate and Applied Meteorology, Boston, 22(7): 1227-1241, July 1983. Refs. For abstract of Pt. 2, see Met. Abs., 35.7-28. DAS, DLC
CTRY OF PUBL: US
The choice of the boundary condition when integrating the air mass continuity equation is a major problem of the 3D wind field analysis from dual- or multiple-Doppler radar data. A zero vertical velocity at ground level seems the most natural boundary condition. Unfortunately, it is known that the integration process is unstable with regard to this condition: it leads to errors amplifying exponentially with height. In order to overcome this difficulty, various solutions have been proposed, the most recent ones using the variational analysis: 1) integrating from storm top level, 2) integrating from storm top level while constraining the height-integrated divergence to be as small as possible (Ziegler, 1978), and 3) constraining the direct estimates of the 3D wind field to satisfy the continuity equation (Ray et al., 1980). The analysis proposed in this paper is also based upon a variational concept, but it differs in its principle from those previously cited. It consists in adjusting the boundary condition field at ground level in order to optimize the mathematical regularity of the vertical velocity field, followed by upward integration of the continuity equation. In such a formulation, the boundary condition at ground level is floating (i.e., not specified). However, it is possible to require, as a subsidiary condition of the variational problem, that the vertical velocity at ground level fluctuate about zero with a specified variance SIGMA SUB 0 SUPER 2 (thus, the condition W SUB 0 =0 at ground level is statistically verified). The optimum choice of SIGMA SUB 0 is established from considerations of statistical theory. It should be noted that the horizontal divergence (or coplane divergence) profile is unadjusted and that the equation of continuity is integrated upward from the optimum lower boundary condition to obtain W. An application to simulated or real data helps to appreciate the improvements brought by the present variational approach with regard to standard methods of integration: 1) the random errors are as small as in the case of an integration from storm top level, but here the boundary condition W SUB 0 =0 at ground level is statistically preserved; and 2) for the integration paths where SIGMA SUB 0 cannot be specified (lack of data at low level), the analysis automatically generates a boundary condition that realizes the best regularity of W with regard to the neighboring paths. This variational analysis can be easily implemented on a computer from the program prepared for the standard integration, and it requires a short additional computation time.
DESCRIPTORS: Wind field analysis; Doppler radar wind measurements

DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

35070028 ID NO.- MGA35070028
Three-dimensional wind field analysis from dual-Doppler radar data, Pt. 2, Minimizing the error due to temporal variation.
Chong, M.; Testud, J.; Roux, F.
CNET-CNRS, Centre de Recherches en Phys. de l'Environ. Terrestre etPlanetaire, Issy-les-Moulineaux, France;
Journal of Climate and Applied Meteorology, Boston, 22(7): 1216-1226, July 1983. Refs. For abstract of Pt. 3, see Met. Abs., 35.7-29. DAS, DLC
CTRY OF PUBL: US
One of the major problems in three-dimensional wind field analysis from dual- or multiple-Doppler radar data resides in the nonstationarity of the observed airflow within the volume sampling time which ranges typically from 2 to 5 min. Part 2 is focused on this problem. Most often, the storm moves horizontally at a speed of 5-25 m sec SUPER - SUPER 1 . Therefore, the temporal variation for a fixed observer at ground level results from the superposition of two effects: 1) the intrinsic temporal variation (or variation seen in a frame moving with the storm), and 2) the effect of horizontal advection. The first contribution of the paper concerns the development of an algorithm for correcting for the advection effect in the case of a dual-Doppler radar observation. This algorithm, which provides a mathematically exact solution to the problem of correcting for advection, can be easily implemented in a computer program. The second contribution deals with the errors that may arise from an inaccurate (or a lack of) evaluation of the advective velocity, or from an intrinsic temporal variation in the moving frame. A spectral decomposition of the 3D wind field is considered, making it possible to study the dependence of the error upon the scale of the motion. Specific conclusions are drawn about the requirements necessary to achieve a given accuracy in the vertical velocity field, i.e., admissible uncertainty in the advective velocity, and characteristic time of intrinsic temporal variation. An example of application to actual Doppler radar data is presented. The results obtained from nonadvected and advected analyses are compared and discussed.
DESCRIPTORS: Wind field analysis; Doppler radar wind measurements

32070023 ID NO.- MGA32070023
Errors in wind fields derived from multiple-Doppler radars: random errors and temporal errors associated with advection and evolution.
Clark, T. L.; Harris, F. I.; Mohr, C. G.
Natl. Ctr. for Atmos. Res., Boulder, CO.;
Journal of Applied Meteorology, Boston, 19(11): 1273-1284, Nov. 1980. Refs. DAS, DLC
CTRY OF PUBL: US
Simulations from a time-dependent model of moist convection were used to assess magnitudes of errors in the estimates of wind fields derived from the synthesis of data from a network of Doppler radars. The two types of error considered are 1) those resulting from temporal changes in the scales of deep convection resolved by the model and 2) those caused by the random contributions of radial velocity estimates by scales smaller than model resolution (noise). Because of the coarse spatial resolution of the model, much of the assumed noise error results from spatial scales between the model's resolution (APPROX. 1 km) and the Doppler radar sampling problem. The results presented in this paper must be interpreted only in terms of wind estimates derived by using radar sample volumes comparable to the model's resolution. Much higher spatial resolution experiments with the model are necessary to delineate clearly the differences between temporal and noise errors for scales larger than the typical radar sampling volumes. The temporal errors for the resolved scales of the model that uses a 3-min scan time were found to be less than those caused by noise and, in general, tolerable in magnitude for three or more radars. A dual-Doppler analysis in x, y, z Cartesian space (as opposed to x, y, elevation angle coplane analysis) was considered. In this case, the derived errors (in the steady state) were found to be significantly large. The effects of scan time and number of radars were assessed, and two methods of reducing temporal errors were investigated.
DESCRIPTORS: Wind measurement errors; Doppler radar wind measurement

35080071 ID NO.- MGA35080071
Doppler weather radar principles.
Covey, Daryl L.
NWSTC, Kansas City, MO.
United States. National Oceanic and Atmospheric Administration, National Weather Service, Kansas City, MO., Training Paper NWS TC-1, Jan. 1983. 19 p. Figs. DAS (H QC 869 N58)
CTRY OF PUBL: US
This practical training guide for meteorologists makes it possible 1) to distinguish between Doppler weather radar and conventional weather radar in terms of basic design theory and major operational components; 2) to describe major operating advantages and limitations of existing Doppler weather radars as compared to conventional NWS network radars; and 3) to cite basic characteristics of Doppler velocity spectra and the properties of radar and target which affect spectrum shape. The discussion, including diagrams and graphs, covers radar coherency; Doppler shift; basic Doppler components; range and velocity design limitations in pulsed Doppler radar; Doppler spectra; spectral shape; effect of target and radar characteristics on spectral shape; Doppler weather radar operating characteristics; and operational Doppler weather radar advantages and limitations.
DESCRIPTORS: Doppler radar; Doppler radar applications

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DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

35010026 ID NO.- MGA35010026
Radar analysis for severe weather detection and tracking.
Crane, R. K.
United States. Dept. of Transportation, Systems Research & Development Service, Wash., D.C., Report No. DOT/FAA/RD-82/64, July 1982. 83 p. Refs., figs. Available from NTIS, Springfield, VA. 22161.
CTRY OF PUBL: US
The cell detection and tracking algorithms were refined to incorporate Doppler-radar-derived estimates of tangential shear in the tracking process without significantly increasing the tracking error and the number of detected cell clusters. The Doppler data were subjected to a number of processing steps designed to minimize the false cell and cluster problem (false alarm rate). The revised thunderstorm hazard detection algorithm uses spatially filtered tangential shear data with a 10-dB minimum signal-to-noise ratio. Shear cell continuity in time is required to establish a volume cell in the absence of a reflectivity cell. National Severe Storms Laboratory Doppler radar data were analyzed to evaluate the refined algorithms. Tangential shear and Doppler spread (spectrum width) data were used separately for the detection of potentially hazardous regions. Intercomparison between isolated volume cells simultaneously detected by the Norman and Cimarron radars showed that both the shear and spread observations were aspect sensitive (anisotropic). The incorporation of Doppler (shear) data produced more than twice the number of volume cells, only slightly increased the number of clusters, and only slightly increased the r.m.s. tracking error. The Doppler data were implemented to develop an augmented set of attributes potentially useful for hazard detection.
DESCRIPTORS: Doppler radar thunderstorm detection; Doppler radar thunderstorm tracking; Thunderstorm detection; Thunderstorm tracking

36080178 ID NO.- MGA36080178
Determination of the vertical neutral temperature and wind profiles using EISCAT and HF Doppler radar.
Crowley, G.
Phys. Dept., Univ. of Leicester, Eng.
Journal of Atmospheric and Terrestrial Physics, Oxford, 46(6/7): 501-507, June/July 1984. Refs. DAS, DLC
CTRY OF PUBL: UK
Simultaneous observations by EISCAT and an HF Doppler system of a TID are presented. Cross-spectral analysis of the data permits the vertical variation of the neutral temperature and horizontal wind in the thermosphere to be determined.
DESCRIPTORS: Thermospheric temperature determination; Thermospheric wind determination; Radar thermospheric investigations

31020033 ID NO.- MGA31020033
Dual-Doppler radar coverage area as a function of measurement accuracy and spatial resolution.
Davies-Jones, Robert P.
Natl. Severe Storms Lab., NOAA, Norman, OK.
Journal of Applied Meteorology, Boston, 18(9): 1229-1233, Sept. 1979. Refs. DAS, DLC
CTRY OF PUBL: US
The area effectively covered by dual-Doppler radars is presented as a function of spatial resolution and accuracy of horizontal velocity measurement. Implications of this relationship for the spacing of a dual-Doppler network for tornadic storm research are discussed.
DESCRIPTORS: Dual-Doppler radar; Doppler radar observation of tornadoes

34120033 ID NO.- MGA34120033
FM-CW Doppler radar observations.
Detman, T.
In: Goddard, Earl E. (ed.), Boulder Upslope Cloud Observation Experiment. United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., June 1982. p. 89-99. DAS (H QC 921.377 C6 B7)
CTRY OF PUBL: US
During the Boulder Upslope Cloud Observation Experiment of March-May 1982, observations were made with FM-CW Doppler radar to 1) measure the profile of the radar reflectivity factor and its temporal variability in combination with the microwave radiometer; 2) obtain the spatial distribution of liquid water density in upslope storm systems; 3) monitor the melting level (bright band) in order to delineate the height domain of the liquid water phase in the cloud system; 4) measure, by means of Doppler capability, the drop fall speed spectra and total precipitation rate and compare with rain gage for verification; 5) determine the temporal and spatial distribution of liquid water in different cloud events; 6) determine the horizontal spatial spectra of cloud density and liquid water; and 7) measure drop-size spectra and their variation with storm evolution. The equipment installation and scanning modes are described briefly. A data summary for upslope events is presented.
DESCRIPTORS: Cloud studies; Cloud physics studies; Doppler radar observation of clouds; Boulder, Colorado

33040042 ID NO.- MGA33040042
Joint agency Doppler technology tests.
Donaldson, Ralph J., Jr.; Glover, Kenneth M.
United States. Air Force Geophysics Lab., Hanscom AFB, MA., Environmental Research Papers, No. 720, Nov. 21, 1980. 31 p. Refs. (AFGL-TR-80-0357). DLC, DAS (A QC 807.5 U55)
CTRY OF PUBL: US
The Joint Doppler Operational Project was a cooperative interagency program directed toward the evaluation of recent advances in Doppler weather radar technology for operational applications by the participating agencies. The first 2 yr of testing demonstrated the decisive superiority of Doppler techniques, in comparison with conventional methods, for

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reliable identification and early warning of tornadoes and other severe thunderstorm hazards. During the final year, the program evaluated the format and effectiveness of manually aided automatic display products transmitted in near-real time to operational agencies remotely located from the radar. Experiences of operating personnel using these new techniques provide input toward system definition of NEXRAD, the Next Generation Weather Radar network now under development. One of the most encouraging examples of the enhanced warning capability realized by the remote transmission of the automated Doppler format was the successful forecast of severe weather for an Air Force Base, which was a crucial factor in saving a fleet of aircraft from severe hail damage.
DESCRIPTORS: Doppler radar; Doppler radar applications

31070031 ID NO.- MGA31070031
Note on dual Doppler radar observations of the clear air planetary boundary layer.
Doviak, R. J.
NOAA, Natl. Severe Storms Lab., Norman, OK.
American Geophysical Union, Wash., D.C., EOS: Transactions, 59(12): 1089, Dec. 1978. Abstract only. (Fall Meeting Program, San Francisco, Dec. 4-8, 1978). DAS, DLC
CTRY OF PUBL: US
The authors present an example of research conducted in cloud-free planetary boundary layers, using wind fields synthesized from radial velocities obtained by the National Severe Storms Laboratory's two Doppler radars located in central Oklahoma. Spectral analysis of unsmoothed field showed a dominant wavelength of APPROX. 4 km in the direction perpendicular to the mean flow over a 1-hr collection period. A band pass filter was applied to emphasize this feature for visual display. A low pass filter was applied in the direction along the mean flow where no dominant wavelength was noted. Vertical velocities were derived by integrating the continuity equation through use of wind fields from the six horizontal surfaces. Readily apparent are counter-rotating vortices (roll vortices) of approximately 4-km wavelength whose maximum vertical velocities are of the order of PLUS OR MINUS 1 m sec SUPER - SUPER 1 . Data for these fields were collected on an optically clear day with strong vertical shear in the lower PBL. Models by Kuettner (1971) and Gossard and Moninger (1975) and others predict roll vortices in this type of environment with a horizontal spacing of APPROX. 2.8 times their depth. The observed rolls seem to verify these models.
DESCRIPTORS: Airflow measurement techniques; Doppler radar applications; Oklahoma, United States

31110203 ID NO.- MGA31110203
Turbulence and waves in the optically clear planetary boundary layer resolved by dual Doppler radars.
Doviak, Richard J.; Berger, Myron
Natl. Severe Storms Lab., Norman, OK.
Radio Science, Wash., D.C., 15(2): 297-317, March-April 1980. Refs. DAS, DLC
CTRY OF PUBL: US
Dual Doppler radars provide a unique method of resolving the spatial structure of planetary boundary layer (PBL) air motions. Both the wave and turbulent fluctuations of air in the convectively unstable PBL are revealed from synthesis of the Doppler velocities of echoes (from atmospheric intrinsic scatterers) returned to two spaced (40-km) radars. The smaller turbulent scales follow closely the two-thirds law-of-similarity theory, whereas the observed 4-km wave is compared with those from theoretical models. Power spectra derived from Fourier space analysis of Doppler-synthesized wind are compared to those obtained from time-space conversion of Fourier time analysis applied to wind measurements on a 500-m tower. It is shown that turbulent eddies move with the mean wind and maintain an identity for APPROX. 60 min. Larger wind variance is observed in the cross-wind component than in the along-wind component. Error variances are in agreement with estimates from theoretical studies. Comparisons of refractive index structure constants, C SUB n SUPER 2 , deduced by radar and aircraft, are within 1 dB.
DESCRIPTORS: Turbulence observation techniques; Atmospheric wave observation techniques; Doppler radar measurements

34100045 ID NO.- MGA34100045
Weather radar.
Doviak, Richard J.; Sirmans, Dale; Zrnic', Dusan
In: Kessler, Edwin (ed.), Thunderstorms: a social, scientific, and technological documentary, Vol. 3, Instruments and techniques for thunderstorm observation and analysis. Wash., D.C., U.S. National Oceanic and Atmospheric Administration, Environmental Research Labs., April 1982. p. 181-239. Refs., figs.
CTRY OF PUBL: US
The principles of weather are presented, and the radar parameters and signal characteristics are related to the meteorological properties of the target. The physical bases of radar are discussed with the aid of the relevant mathematical equations by considering electromagnetic waves, Doppler radar transmitting aspects, target attenuation, Doppler radar receiving aspects, and radar measurement limitations. The weather echo signals are described on the basis of the echo sample, the definition of echo power, and the weather radar equation, which relates the sample time average of echo power to the radar parameters and target section; and the signal-to-noise ratio for weather targets is expressed mathematically. A mathematical treatment of the Doppler spectrum of weather radar is presented, whereby the estimation of Doppler power spectra and the velocity spectrum width, shear, and turbulence are considered. The principles of radar observation of weather are surveyed with examples, and the authors discuss Doppler dual radar (reconstruction of wind field, observations of a tornadic storm); single Doppler radar, including linear wind measurements (velocity, azimuth display, severe-storm cyclone observations and presentations,
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Doppler spectra of tornadoes, and application of Doppler radar in the National Weather Service); and pulsed radar observations of clear- air fields.
DESCRIPTORS: Radar meteorology; Weather radar; Doppler radar applications

31020034 ID NO.- MGA31020034
Continuous measurement of upper atmospheric winds and turbulence using a VHF Doppler radar: preliminary results.
Ecklund, W. L.; Carter, D. A.; Balsley, B. B.
Aeronomy Lab., NOAA, Boulder, CO.;
Journal of Atmospheric and Terrestrial Physics, Oxford, 41(9): 983-994, Sept. 1979. Refs. DAS, DLC
CTRY OF PUBL: UK
Preliminary results of a VHF radar experiment designed to monitor atmospheric winds and turbulence continuously over periods of many days are reported. The radar system used in this experiment is a prototype of a larger system under development, and it uses an average transmitted power of APPROX. 200 W and a 100 MULTIPLIED BY 100-m dipole array. With this system, it is possible to observe winds and turbulence parameters regularly to APPROX. 19 km by using a height resolution of 2.2 km. Similar results are reported for mesospheric heights between 73 and 82 km.
DESCRIPTORS: Upper air wind measurement techniques; Upper air turbulence measurement techniques; Doppler radar applications

34120369 ID NO.- MGA34120369
Investigation of clear air convective structures in the PBL using a dual Doppler radar and a Doppler sodar.
Eymard, L.; Weill, A.
CNET/CNRS/CRPE, Issy-les-Moulineaux, France
Journal of Applied Meteorology, Boston, 21(12): 1891-1906, Dec. 1982. Refs., figs., tables. DAS, DLC
CTRY OF PUBL: US
In Aug. 1979, the dual Doppler radar (Ronsard system) and the Doppler sodar system of CNET were simultaneously used during an experiment on clear air convection. This provided the opportunity to develop a method for the spatial study of atmospheric structures in the PBL: the mean characteristics of the flow structures at scales larger than one kilometer (wind velocity and variance profiles, and one-dimensional velocity spectra) are studied. Spatial properties of the atmosphere are investigated, showing a heterogeneity of the horizontal wind field inside the observed area. A predominant alignment of the convective cells along the same direction is found in every case.
DESCRIPTORS: Convection observation techniques; Doppler radar observation of convective cells; Sodar observation of convective cells

36070417 ID NO.- MGA36070417
Radar analysis of a tropical convective boundary layer with shallow cumulus clouds.
Eymard, Laurence
C.N.E.T./C.N.R.S./C.R.P.E., Issy-les-Moulineaux, France
Journal of the Atmospheric Sciences, Boston, 41(8): 1380-1393, April 15, 1984. Refs., figs. DAS, DLC
CTRY OF PUBL: US
A situation of fair weather cloudy convection is examined by using a dual Doppler radar, environmental measurements, and cloud photogrammetry. The convective layer is characterized by the interaction between the northward monsoon wind at low levels and the easterly wind above; a convective organization is found to be related to the shear between both flows. Moreover, at the convective scale, properties of the convective layer below clouds and in clear air are considered. They show significant differences in buoyancy and entrainment effects but similar effects of the shear on variances and momentum production profiles.
DESCRIPTORS: Convective boundary layer; Doppler radar observation of convective activity

35030344 ID NO.- MGA35030344
Case study of a hailstorm in Colorado, Pt. 3, Airflow from triple-Doppler measurements.
Foote, G. Brant; Frank, Harold W.
Convective Storms Div., Natl. Ctr. for Atmos. Res., Boulder, CO.
Journal of the Atmospheric Sciences, Boston, 40(3): 686-707, March 1983. Refs. DAS, DLC
CTRY OF PUBL: US
Triple-Doppler measurements are presented for a hailstorm of moderate intensity which occurred over the High Plains of northeastern Colorado, and an airflow model is synthesized. The storm had a number of persistent features similar to previous descriptions of supercells; however, its evolution is shown to be intermediate in a certain sense between classical multicell and supercell models. A new model based on the Doppler observations, termed weak evolution, emphasizes gradual changes in the structure of a long-lived updraft. The new airflow model explains the periodic echo intensifications noted for this storm and seems to apply well to other storms discussed in the literature.
DESCRIPTORS: Hailstorm studies; Hailstorm development; Airflow in hailstorms; Doppler radar observation of hailstorms ; High Plains, Colorado

35040083 ID NO.- MGA35040083
Automatic gain control for an HF Doppler radar receiver.
Forberg, J. D.; Weber, B. L.
United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., Boulder, CO., Technical Memorandum (NOAA TM ERL WPL-104), Nov. 1982. 27 p.
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Refs., appendix. DAS (H QC 807.5 U6W6)
CTRY OF PUBL: US
The automatic gain control (AGC) algorithm is used to adjust the sensitivity of the HF receiver of the HF Doppler radar system for measuring remotely the surface currents and ocean waves. The HF receiver must have a large dynamic range of sensitivity. The AGC concept is that the output of the receiver must be examined if its sensitivity needs to be altered. If necessary, a gain change is computed and then introduced into the receiver automatically under computer control. Hence, the AGC procedure is a feedback loop analogous to those in some common circuits. The AGC cannot be implemented when echo data are collected for Doppler processing and the receiver sensitivity must be held constant. The AGC is, therefore, implemented briefly at the beginning of data collection and disabled after the gain has been set to suitable values. Because of the use of a pulsed-ground-wave propagation HF signal and the consequent dynamic variation of the sea echoes with time after pulse transmission is initiated, the receiver sensitivity must be increased with time delay after the pulse is transmitted. Furthermore, the sensitivity at any given time delay must be repeated exactly for every pulse. A description is given of the software algorithm with the aid of a diagram, including initialization, signal measurement, new gain estimate, history or storage of information for each range cell (since new gains must be estimated from previous areas), filter, and averaging. Practical problems are discussed.
DESCRIPTORS: Doppler radar equipment; Doppler radar observation of ocean currents; Doppler radar observation of ocean waves

34070599 ID NO.- MGA34070599
Extraction of two-directional parameters of sea waves spectrum from HF Doppler radar sea echo.
Forget, P.; Broche, P.
L.S.E.E.T.-Univ. de Toulon, France
In: COSPAR/SCOR/IUCRM Symposium on Oceanography from Space, Venice, Italy, May 26-30, 1980, Oceanography from space: Proceedings. N.Y., Plenum Press, 1981. p. 657-661. Refs. (Marine Science, Vol. 13). DLC (GC10:4.A87C67)
CTRY OF PUBL: US
The mean parameters typifying directional properties of the sea surface extracted from the Doppler spectrum of the radar sea echo at HF are inferred from the use of the first-order sea echo appearing in the Doppler spectra in the form of two lines of amplitude, A SUPER + and A SUPER - , located at opposite frequencies PLUS OR MINUS f SUB B . Their theoretical expressions are A SUPER + = C BULLET S(f SUB B , PI - THETA SUB O) = C BULLET S @ (f SUB B) g (PI - THETA SUB O) and A SUPER - = C BULLET S(f SUB B , THETA SUB O) = C BULLET S @ (f SUB B) g (THETA SUB O), where S(F, THETA) is the wave height directional spectrum, generally written as a product of the omnidirectional frequency spectrum S(F) and of a directional factor, g(THETA); THETA SUB O is the mean direction of propagation of the waves in relation to the radar direction; and C is a coefficient including antenna gains, propagation losses, etc. A method is developed for improved derivation of THETA SUB O and S, the parameters of the LCS model, from the use of the amplitudes A SUPER + and A SUPER - , whereby for a given model of g(THETA), the wind direction can be deduced from the ratio of rectified amplitudes A SUPER + /A SUPER - equal to g(PI - THETA SUB O)/g(THETA SUB O).
DESCRIPTORS: Ocean wave spectra determination; Doppler radar observation of ocean waves

33080576 ID NO.- MGA33080576
Sea state frequency features observed by ground wave HF Doppler radar.
Forget, P.
Lab. de Sondages Electromagnetiques de l'Environ. Terrestre, Univ. deToulon, France
Radio Science, Wash., D.C., 16(5): 917-925, Sept./Oct. 1981. Refs. (Paper 1S0450). Reprint available from American Geophysical Union, Wash., D.C. 20009. DAS, DLC
CTRY OF PUBL: US
This paper investigates the relationship between the frequency features of the directional spectrum of ocean waves (cutoff frequency and peak frequency of wind waves, frequency of quasi-monochromatic swell) and the properties of the spectrum of the sea echo obtained by HF Doppler radar. A theoretical analysis is performed to check the validity of a simple result that states that, at upper HF, a long-wave spectral feature at frequency F SUB O affects the radar echo at frequencies PLUS OR MINUS f SUB B PLUS OR MINUS F SUB O on either side of the Bragg lines at PLUS OR MINUS f SUB B , corresponding to resonant backscattering of radio waves with a given wavelength by half-wavelength ocean waves. An experiment using both radar and standard in situ measurements for several weeks at different times of the year shows that this relationship can be used to formulate a method for estimating the frequency features of the sea with suitable accuracy.
DESCRIPTORS: State of sea measurement techniques; Radar observation of state of sea

32020583 ID NO.- MGA32020583
New technique for measuring tidal currents by using a two-site, HF Doppler radar system.
Frisch, A. S.; Weber, B. L.
NOAA/ERL/Wave Propagation Lab., Boulder, CO.
Journal of Geophysical Research, Wash., D.C., 85(C1): 485-493, Jan. 20, 1980. Refs., figs. (Paper 9C1354). Reprint available from American Geophysical Union, Wash., D.C. 20009. DAS, DLC
CTRY OF PUBL: US
Surface currents were measured by using a newly developed,
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high-frequency (HF) Doppler radar technique. The system was operated in lower Cook Inlet, Alaska, in July 1977. During one particular day, July 13, radar data collected every 30 min for 24 hr were analyzed. By least squares fitting these data to two of the dominant tidal periods, 12.31 and 24.6 hr, the spatial distribution of the tidal currents for each of these two periods was found. The spatial distribution of the mean surface currents for this 24-hr period was determined. Analysis of this data shows that, near Kachemak Bay, there is a distinct difference of the E-W component of tidal flow in comparison with regions farther from Kachemak. Longer period components for which the period cannot be determined were observed. These components exhibited gyrelike spatial patterns. The results demonstrate the use of HF radar techniques for resolving spatial and temporal currents that affect the nearshore environment.
DESCRIPTORS: Tidal current measurement techniques; Radar observation of ocean currents; Cook Inlet, Gulf of Alaska

34090239 ID NO.- MGA34090239
Winds measured by a UHF Doppler radar and rawinsondes: comparisons made on 26 days (August-September 1977) at Arecibo, Puerto Rico.
Fukao, Shoichiro
Dept. of Electrical Engr., Kyoto Univ., Japan
Journal of Applied Meteorology, Boston, 21(9): 1357-1363, Sept. 1982. Refs. DAS, DLC
CTRY OF PUBL: US
Vertical profiles of horizontal winds in the lower stratosphere and upper troposphere were measured by the UHF Doppler radar at Arecibo, Puerto Rico (18.35"N, 66.75"W), on 26 days in Aug. and Sept. 1977. By comparing these with horizontal winds measured by routine rawinsonde balloons launched APPROX. 80 km east of Arecibo, fairly good agreement of every wind profile can be seen. Most of the difference between the two sets of measurements in the lower stratosphere is shown to be caused by the experimental error of the rawinsonde, while the spatial and/or temporal variations in the wind field seem to dominate the difference in the upper troposphere.
DESCRIPTORS: Upper air wind measurement technique comparisons; Arecibo, Puerto Rico

34100046 ID NO.- MGA34100046
Recent advances in Doppler radar probing of the clear atmosphere.
Gage, K. S.; Balsley, B. B.
NOAA Aeronomy Lab., Boulder, CO.
Atmospheric Technology, Boulder, CO., No. 13, 1981. p. 3-21. Refs., figs.
CTRY OF PUBL: US
The authors present a broad overview of the measurement capabilities of MST and stratosphere-troposphere (ST) radars operating over the very-high-frequency (VHF) range (30-300 MHz) and the ultrahigh-frequency (UHF) range (300-3000 MHz) and at various geographic locations. The development of these radars is put in historical perspective, and their application to diverse areas of meteorological research is considered. These radars could become an integral part of future remote sounding systems. Possible configurations for automated land- and sea-based operations are discussed.
DESCRIPTORS: Radar meteorology; Weather radar applications; History of radar meteorology; Doppler radar applications

31110299 ID NO.- MGA31110299
Use of Doppler radar for the measurement of atmospheric turbulence parameters from the intensity of clear air echoes.
Gage, K. S.; Green, J. L.; vanZandt, T. E.
Aeronomy Lab., NOAA, Boulder, CO.
Radio Science, Wash., D.C., 15(2): 407-416, March-April 1980. Refs. DAS, DLC
CTRY OF PUBL: US
Doppler radars measure the refractivity turbulence structure constant, C SUB n SUPER 2 , in a straightforward manner. The authors explore the relationship between C SUB n SUPER 2 and the intensity of atmospheric turbulence as parameterized by the eddy dissipation rate, . Tentative relations are developed between mean C SUB n SUPER 2 and mean within the framework of inertial range turbulence theory by taking into consideration the intermittent nature of atmospheric turbulence. These relations permit the estimation of mean from radar observations alone. The analysis is applied to the determination from sunset radar data of vertical profiles and time-height contours of mean .
DESCRIPTORS: Turbulence observation techniques; Doppler radar observation of turbulence

32020264 ID NO.- MGA32020264
Dual-Doppler radar observation of a mesoscale vortex associated with a cold front.
Gaillard, C.; Gilet, M.
Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 13(4): 325-326, Oct./Dec. 1979. Abstract 5-2.8. (Conference Internationale, VIII SUPER e , sur la Physique des Nuages, Clermont-Ferrand, 15-19 juillet 1980, Resumes).
CTRY OF PUBL: FR
Data collected in the region of Paris on March 16, 1978, during the Fronts-78 experiment are discussed. The synoptic situation is analyzed, together with additional radiosounding and radar reflectivity data. Observations were made on a small, but active, cold front. Dual Doppler wind fields were synthetized for a period of one hour inside the front. The fields can be considered stationary in the front's movement coordinate system, but they are not bidimensional. The frontal surface is associated with a strong cyclonic vortex (10 SUPER - SUPER 3 sec SUPER - SUPER 1). The vorticity structure is consistent with the movements of reflectivity cores. Temperature gradients are estimated from the Doppler wind

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fields, which give a description of the three- dimensional structure of the vortex and show the relative positions of warm and cold air at small scale. A zone of penetration of warm air under the cold air can be observed, which seems to correspond to a breaking of the front. This zone is associated with a maximum of radar reflectivity and vertical velocity, which shows an increase of the convective activity. These observations show that cold front descriptions, which may be acceptable on the synoptic scale, are not always applicable to the mesoscale.
DESCRIPTORS: Cold front mesostructure; Mesoanalysis of fronts; Doppler radar observation of fronts; Paris, France

34120368 ID NO.- MGA34120368
Effects of volume averaging on the line spectra of vertical velocity from multiple-Doppler radar observations.
Gal-Chen, Tzvi; Wyngaard, John C.
Dept. of Met., Univ. of MD.; Natl. Ctr. for Atmos. Res., Boulder, CO.
Journal of Applied Meteorology, Boston, 21(12): 1881-1890, Dec. 1982. Refs., figs. DAS, DLC
CTRY OF PUBL: US
The fidelity of one-dimensional spectra of vertical velocity derived from multiple-Doppler radar observations is examined. For analytical tractability, the following assumptions are used: 1) the turbulent atmosphere has infinite horizontal dimensions and a vanishing vertical velocity at x SUB 3 = H (because of elevated inversion or a tropopause) and at the surface; 2) the turbulence is isotropic and has a Kolmogorov spectrum; 3) the combined effect of pulse-volume averaging and objective analysis is to replace point measurements by a volume integral; and 4) for the purpose of estimating the horizontal velocities, multiple nonorthogonal radars may be replaced by two equivalent orthogonal radars. For equal-resolution radars, the relative response decreases monotonically with wavenumber. Above the cutoff wavenumber, the relative response is close to zero, while below APPROX. 0.1 of the cutoff wavenumber, an asymptotic value less than unity is obtained. This asymptotic value is found to be a function of the vertical resolution. The use of unequal resolution to resolve some small-scale features should be pursued with caution. Depending upon the vertical resolution, the wavenumber, and the direction of the line along which the spectrum is taken, some useful small-scale information can be retained; but for some parameter values, unequal resolution can lead to erroneous conclusions. Theory and experiment indicate that, for flows of finite depth, the attenuation can depend not upon the dimensional vertical resolution DELTA z, but upon the number of vertical levels that can be resolved by the radars, i.e., upon the nondimensional vertical resolution.
DESCRIPTORS: Vertical velocity measurement techniques; Doppler radar observation of vertical velocity

34100047 ID NO.- MGA34100047
Errors in fixed and moving frame of references: applications for conventional and Doppler radar analysis.
Gal-Chen, Tzvi
Dept. of Met., Univ. of MD., College Park
Journal of the Atmospheric Sciences, Boston, 39(10): 2279-2300, Oct. 1982. Refs., appendix. DAS, DLC
CTRY OF PUBL: US
Procedures for the estimation and correction of advection effects with single and multiple conventional and Doppler radars are developed. In the case of scalars or Cartesian vectors, the essence of the method is finding a moving frame of reference where (in the least squares sense) the observations are as stationary as possible. It is shown that this is different from the more traditional correlation techniques. In the case of non-Cartesian vector (e.g., radial velocities from Doppler radars), different criteria are derived. For a single Doppler radar, the author looks for a frame of reference where INTEGRAL [DIFFERENTIAL SUPER 2 / DIFFERENTIAL t SUPER 2 (UPSILON SUB r r)] SUPER 2 is a minimum; UPSILON SUB r is the radial velocity, t is time, and r is the distance of the observed point from the radar. In the multiple Doppler case, it is shown that, in a frame of reference moving with the advection speed,
DESCRIPTORS: Radar echo interpretation; Radar data correction

34100057 ID NO.- MGA34100057
Retrieving buoyancy and pressure fluctuations from Doppler radar observations: a status report.
Gal-Chen, Tzvi; Hane, Carl E.
NASA, Goddard Lab. for Atmos. Sci., Greenbelt, MD.; NOAA, Natl. Severe Storms Lab., Norman, OK.
Atmospheric Technology, Boulder, CO., No. 13, 1981. p. 98-104. Refs.
CTRY OF PUBL: US
The combined use of the equations of fluid dynamics and the three-dimensional kinematic fields derived from multiple-Doppler radar observations permits deduction of pressure and density fluctuations. In order for the method to work, several conditions must be satisfied: high-quality wind data that permit calculations of spatial and temporal first and second derivatives; sufficiently fast scanning rate to capture the temporal evolution of the spatial scale resolved by the radars; and a good fluid dynamics model of the phenomenon under study. Apparently, pressure fluctuations can be retrieved with 30% accuracy. Retrieved temperature and pressure data demonstrate the importance of nonhydrostatic pressure gradients in convective dynamics and appear to display continuity and coherence.
DESCRIPTORS: Doppler radar applications; Temperature measurement techniques; Pressure measurement techniques; Airflow measurement techniques

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36070402 ID NO.- MGA36070402
Opredeleniye vetra v pogranichnom sloye atmosfery s pomoshch'yu nepreryvnykh doplerovskikh sistem. [Wind determination in the atmospheric boundary layer with the aid of continuous Doppler systems.]
Gorelik, A. G.; Sterlyadkin, V. V.
Vsesoyuznyy Zaochnyy Mashinostroitel'nyy Inst.
Meteorologiya i Gidrologiya, Moscow, No. 4, April 1984. p. 46-52. Refs. English and Russian summaries. Transl. into English in corresponding issue of Meteorology and Hydrology, Wash., D.C. Available from NTIS, Springfield, VA. 22161. DAS, DLC
LANGUAGE: en
CTRY OF PUBL: UR
The possibilities and techniques of applying Doppler systems with a continuous nonmodulated emission for determining the vertical profile of wind in the lower atmospheric layers are demonstrated. Results of wind field measurements with the aid of a Doppler radar station are compared with data of simultaneous pilot-balloon measurements. Methods of applying multiwave Doppler systems for studying the wind field in the lower layers of the atmosphere are shown.
DESCRIPTORS: Wind profile measurement techniques; Doppler radar wind measurements

35090031 ID NO.- MGA35090031
Radar observation of clear air and clouds.
Gossard, E. E.; Strauch, R. G.
NOAA/ERL Wave Propagation Lab., Boulder, CO.
Amsterdam, Elsevier Science Publishers, 1983. 280 p. Refs., figs., tables, appendices. (Developments in Atmospheric Science, Vol. 14). DAS (H QC 973.5 G67), DLC (QC973.5.G67)
CTRY OF PUBL: NL
The author presents a systematic treatment of the potential of the new radars for studying storms in their early evolutionary stage where only small cloud particles are present, and for studying clear-air structure and wind profiles. Classical radar meteorology is summarized. The individual chapters discuss 1) radar returns from hydrometeors and clear-air returns, including refractive index of the clear atmosphere, air masses, and elevated layers; 2) physical effects of the atmosphere on radar waves; 3) a review of the fundamentals of cloud physics; 4) radar reflectivity and cloud characteristics; 5) radar attenuation and cloud observation; 6) polarization and scatterer characterization; 7) Doppler radar observations of clouds and storms; 8) biological targets and their role in radar backscatter; 9) boundary layer structure and radar refraction, ducting, and scattering; 10) boundary layers undergoing modification; 11) radar data processing systems; and 12) various radars and their potential for cloud and clear-air sounding. Appendices include the fundamental radar equations; relationships between N and PHI ; tables of incomplete gamma functions; relationship between Doppler spectral width and turbulence; various spectral forms and constants; and the energy balance equations.
DESCRIPTORS: Radar meteorology textbooks; Weather radar; Doppler radar

34010139 ID NO.- MGA34010139
Use of ground-based Doppler radars to measure gradients, fluxes, and structure parameters in elevated layers.
Gossard, E. E.
NOAA/ERL/Wave Propagation Lab., Boulder, CO.
Journal of Applied Meteorology, Boston, 21(2): 211-226, Feb. 1982. Refs. DAS, DLC
CTRY OF PUBL: US
The use of ground-based, clear-air Doppler radars to observe the structure of elevated atmospheric layers and associated flux quantities is described. Case studies in which radar and balloon data were available are analyzed. Doppler second-moment (velocity variance) data are used to calculate turbulent kinetic energy dissipation rate, EPSILON . Velocity variance, refractive index structure parameter, and wind shear are used to estimate the refractive index gradient across elevated weather-frontal interfaces. A case is analyzed in which both acoustic-sounder and radar-sounder data are available, so profiles of structure parameter of both temperature and humidity can be deduced and used to calculate the fluxes of heat and moisture within the frontal interface. The fluxes deduced from radar data are compared with corresponding in situ measurements made by aircraft in other geographical regions. The relationship between the turbulent Prandtl number and the Richardson number emerges as very important to the generalization of the technique to the whole stable atmosphere.
DESCRIPTORS: Vertical distribution of meteorological elements; Atmospheric structure measurements; Doppler radar measurements

36070031 ID NO.- MGA36070031
Capability of surface-based clear-air Doppler radar for monitoring meteorological structure of elevated layers.
Gossard, Earl E.
CIRES, Univ. of CO., Boulder
Journal of Climate and Applied Meteorology, Boston, 23(3): 474-485, March 1984. Refs., figs. DAS, DLC
CTRY OF PUBL: US
Radars and acoustic sounding systems sense properties of the turbulence structure of the atmosphere. If atmospheric turbulence can be related to the mean gradient parameters, Doppler radars and acoustic sounders can provide information on height profiles of quantities such as temperature, refractive index, and wind in stable regions of the atmosphere. Turbulent and mean quantities were measured on the 300-m meteorological tower at the Boulder Atmospheric Observatory near Erie, CO., and the relationships between the turbulent and mean gradient quantities were examined to evaluate hypotheses for simplifying the kinetic energy balance and refractive index variance equations. FM-CW radar measurements of backscattered power and Doppler spectral width were also made for comparison with tower-measured refractive

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index spectra and Doppler velocity spectra. Height distributions of the turbulent dissipation rate within stable layers are shown and viscous cutoff radar wavelengths calculated.
DESCRIPTORS: Atmospheric sounding systems; Doppler radar applications; Erie, Colorado

34110036 ID NO.- MGA34110036
Capability of surface-based clear-air Doppler radar for monitoring refractive index gradients aloft.
Gossard, Earl E.
Wave Propagation Lab., Boulder, CO.
United States. National Oceanic and Atmospheric Administration, Environmental Research Lab., Boulder, CO., Technical Memorandum (NOAA TM ERL WPL-102), Sept. 1982. 33 p. Refs., figs. DAS (H QC 807.5 U6 W6)
CTRY OF PUBL: US
There is theoretical reason to believe that gradients of refractive index in stable elevated layers can be measured by surface-based, clear-air Doppler radars, sensing backscattered power (C SUB n SUPER 2), height gradients of the mean horizontal wind, and width of the Doppler velocity spectrum. In this paper, the approach was to measure turbulent and mean quantities on the 300-m meteorological tower at the Boulder Atmospheric Observatory (BAO) at Erie, CO., and to examine the relationships between the turbulent and mean gradient quantities in order to evaluate assumptions for simplifying the kinetic energy and temperature balance equations. Radar measurements of Doppler spectral width were also compared with tower measurements of velocity spectra. On Feb. 10, 1982, an event occurred in which an interface between cold, dry air and relatively warm, moist air ascended across the tower at a time when the radar and all sensors (including a Lyman- ALPHA humidiometer) were operating and when the carriage was positioned midway between the 150- and 200-m levels on the tower. Data were being recorded at a 10-Hz rate. Thus, this case provided an almost ideal data set. For the Feb. 10 event, the crucial simplifying assumptions concerning the relationships between the turbulence parameters and the mean gradients of properties were verified within the range of observational uncertainty of the tower measurements and the range of uncertainty of the universal constants of the turbulence theory. It remains to be demonstrated that radars can remotely sense turbulence dissipation rate adequately by measuring the width of the Doppler spectrum. Sometimes there was good agreement between radar and tower-measured values, but sometimes they differed substantially. This was, at least partly, a result of physical separation of the radar and the tower, which was APPROX. 550 m.
DESCRIPTORS: Turbulence observation techniques; Doppler radar observation of turbulence; Tower turbulence measurements ; Erie, Colorado

32020022 ID NO.- MGA32020022
Optical spectral processing of weather radar echo signals.
Grachev, A. A.
Gor'ki Sci. Res. Radio-Phys. Inst.
Izvestiya, Academy of Sciences, U.S.S.R., Atmospheric and Oceanic Physics, Wash., D.C., 15(4):270-275, Nov. 1979. Refs. DAS. Transl. from corresponding Russian issue of Akademiya Nauk SSSR, Moscow, Izvestiya, Fizika Atmosfery i Okeana, 1979. DAS, DLC
LANGUAGE: en
CTRY OF PUBL: US
Certain statistical characteristics of the echo signals of pulsed Doppler radar are investigated experimentally with the aid of optical spectral processing in noncoherent light. It is shown that multichannel optical processing in real time makes possible the preliminary indication of various meteorological processes, including hail foci.
DESCRIPTORS: Radar data processing; Doppler radar

33090027 ID NO.- MGA33090027
Operational Doppler radar: is it worth it?
Grebe, Robert
National Weather Digest, Temple Hills, MD., 6(1): 48-52, Feb. 1981. DAS (A QC 851 N423)
CTRY OF PUBL: US
This paper presents the paraphrased responses of an interview with leading experts 1) on the value of Doppler radar as a tool in tornado warning, as compared to conventional radar; 2) on the limitations of Doppler radar; and 3) on the difficulty of its operation and the time required for training operators.
DESCRIPTORS: Doppler radar

36040266 ID NO.- MGA36040266
Identification of hydrometeors and other targets by dual-polarization radar.
Hall, Martin P. M.; Goddard, John W. F.; Cherry, Stephen M.
Rutherford Appleton Lab., Oxfordshire, Eng.;
Radio Science, Wash., D.C., 19(1): 132-140, Jan./Feb. 1984. Refs. (Paper 3S0824). Reprint available from American Geophysical Union, Wash., D.C. 20009. DAS, DLC
CTRY OF PUBL: US
Whereas different hydrometeor types cannot be readily distinguished by using radar reflectivity alone, the authors show that the differential reflectivity available from dual-polarization radars can be used as an indicator of hydrometeor type (when supported by reflectivity factor also) and that the spatial variability of differential reflectivity is a useful addition. Various hydrometeor types, ground targets, and burnt chaff from straw fires may be identified, whereas conventional radar reflectivity measurement alone would require considerable pattern recognition to make the same distinctions.

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DESCRIPTORS: Hydrometeor observation techniques; Precipitation-type determination; Doppler radar observation of hydrometeors

34120028 ID NO.- MGA34120028
Observations by the WPL 3-cm and 8-mm radars.
Hanchett, J.
In: Gossard, Earl E. (ed.), Boulder Upslope Cloud Observation Experiment. United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., June 1982. p. 100-110. Figs. DAS (H QC 921.377 C6 B7)
CTRY OF PUBL: US
Observations with the 3-cm wavelength Doppler radar and the 8-mm radar were made during the Boulder Upslope Cloud Experiment of 1982 in support of other measurement programs, in order to provide the depth and spatial extent of cloud layers and to measure wind profiles through clouds and precipitation. The operation of the instruments is described briefly, and a data summary of upslope events is given.
DESCRIPTORS: Radar meteorological studies; Doppler radar measurements; Boulder, Colorado

34100251 ID NO.- MGA34100251
HF Doppler observations of gravity waves during the 16 February 1980 solar eclipse.
Hanuise, C.; Broche, P.; Ogubazghi, Ghebrebrhan
Lab. de Sondages Electromagnetiques de l'Environ. Terrestre, Univ. ofToulon, France; Geophys. Obs., Addis Ababa Univ., Ethiopia
Journal of Atmospheric and Terrestrial Physics, Oxford, 44(11): 963-966, Nov. 1982. Refs. DAS, DLC
CTRY OF PUBL: UK
Observations by the HF Doppler technique of the ionospheric effects of the Feb. 16, 1980, solar eclipse in Africa are presented. Some oscillations that were detected at two stations can be attributed to a travelling coherent structure. Its characteristics are consistent with a gravity wave generated by the eclipse.
DESCRIPTORS: Eclipse effects on ionosphere; Ionospheric gravity waves; Doppler radar observation of ionosphere; Solar eclipse, Feb. 1980; Africa

33050256 ID NO.- MGA33050256
Drop size distributions and vertical air motions in a thunderstorm as inferred from Doppler radar observations at vertical incidence.
Hauser, D.; Amayenc, P.
Ctr. de Recherches en Phys. de l'Environ., CNET-CNRS,Issy-les-Moulineaux, France
Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 14(3/4): 439-455, July/Dec 1980. Refs. English and French summaries. (Conference Internationale, VIII SUPER e , sur la Physique des Nuages, Clermont- Ferrand, 15-19 juillet 1980, Papers). DAS, DLC
CTRY OF PUBL: FR
On July 18, 1980, the two Doppler radars of the Ronsard system, involved in an experiment to study convective storms in Switzerland, gathered data, during APPROX. 20 min, in a thunderstorm advected along the baseline direction of the radars. Drop size distributions and vertical air motions were determined by using Doppler spectra from one vertically pointing radar R SUB 2 . These results were replaced within the moving storm structure obtained from radar R1, which performed low-elevation angle scans in a sector including the vertical sounding zone of radar R2. The cores of precipitating water content, M, and reflectivity factor, Z maxima, are found to correspond and to be related to convectively active regions in the vertical plane, including R1 and R2. An analysis of the associated space structures of raindrop size distributions is presented. Some of the classical relationships between Z and LAMBDA , N SUB o (parameters of an equivalent exponential size distribution), M, and R (rainfall rate) are established and discussed.
DESCRIPTORS: Thunderstorm studies; Vertical motion in thunderstorms; Raindrop size distribution measurements; Doppler radar thunderstorm measurements; Switzerland

36040304 ID NO.- MGA36040304
Raindrop size distributions and vertical air motions as inferred from zenith-pointing Doppler radar with the RONSARD system.
Hauser, D.; Amayenc, P.
Centre de Recherches en Phys. de l'Environ. Terrestre et Planetaire,CNET-CNRS, Issy-les-Moulineaux, France
Radio Science, Wash., D.C., 19(1): 185-192, Jan./Feb. 1984. Refs. (Paper 3S0855). Reprint available from American Geophysical Union, Wash., D.C. 20009. DAS, DLC
CTRY OF PUBL: US
The authors deal with results of raindrop size distributions and vertical air motions aloft within a cold front rainband, as inferred from vertical incidence Doppler spectra gathered with one radar of the RONSARD system. These results are obtained by using a new method recently proposed by the authors, assuming exponentially shaped raindrop size distributions. Comparison of the radar results with in situ measurements of raindrop size distributions aboard an aircraft indicates that the method provides satisfactory estimates of the precipitating water content and of the median volume diameter of raindrops, although the values of the raindrop size distribution parameters N SUB O or LAMBDA , deduced from the two techniques, are found to be significantly different. It is also found that this method produces values of the deduced parameters with high time and space variability. Because of this variability, the rainfall bulk parameters are found to be accurately connected only by means of three-parameter relationships. These characteristics are similar to those already depicted within another stratiform precipitation by using the same approach.

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DESCRIPTORS: Raindrop size distribution measurement techniques; Vertical motion measurement techniques; Doppler radar observation of drop size distribution; Doppler radar observation of vertical motion

35080424 ID NO.- MGA35080424
Exponential size distributions of raindrops and vertical air motions deduced from vertically pointing Doppler radar data using a new method.
Hauser, Daniele; Amayenc, Paul
CNET-CNRS, Ctr. de Recherche en Phys. de l'Environ.,Issy-les-Moulineaux, France
Journal of Climate and Applied Meteorology, Boston, 22(3): 407-418, March 1983. Refs., figs. DAS, DLC
CTRY OF PUBL: US
Raindrop size distributions and vertical air motions are deduced from vertically pointing C-band Doppler radar data by using a new method (described in Hauser and Amayenc, 1981) which assumes that the raindrop sizes are exponentially distributed [N SUB O exp(- LAMBDA D)]. Results gathered in stratiform rain precipitation after the passage of a cold front are presented and compared with those obtained by using the well-known Rogers approach. The new method, which does not a priori require the knowledge of N SUB O values, is more capable of detecting spatial and temporal variations than the Rogers method. By considering this variability, the authors make it possible to obtain relationships involving three rainfall parameters with good accuracy.
DESCRIPTORS: Raindrop size distribution measurement techniques; Vertical motion measurement techniques; Doppler radar observation of drop size distribution; Doppler radar observation of vertical velocity

33030294 ID NO.- MGA33030294
New method for deducing hydrometeor-size distributions and vertical air motions from Doppler radar measurements at vertical incidence.
Hauser, Daniele; Amayenc, Paul
C.N.E.T./C.N.R.S., Ctr. de Recherche en Physique de l'Environ.,Issy-les-Moulineaux, France
Journal of Applied Meteorology, Boston, 20(5): 547-555, May 1981. Refs. DAS, DLC
CTRY OF PUBL: US
By using the hypothesis of an exponential hydrometeor-size distribution characterized by the two classical intercept (N SUB O) and slope (LAMBDA) parameters, a model is presented for deducing N SUB O , LAMBDA , and the vertical air velocity, w, simultaneously from a Doppler spectrum measured at vertical incidence. It is based upon a least squares fitting of a theoretical spectrum depending upon N SUB O , LAMBDA , and w, which are the adjusted parameters, to the measured one. The principle, sensitivity, and limitations of the method are discussed. This method applies mainly to the case of stratiform rain.
DESCRIPTORS: Raindrop size distribution measurement techniques; Vertical velocity measurement techniques; Doppler radar applications

33110030 ID NO.- MGA33110030
Reducing the effects of Doppler radar ambiguities.
Hennington, Larry
Natl. Severe Storms Lab., Norman, OK.
Journal of Applied Meteorology, Boston, 20(12): 1543-1546, Dec. 1981. Refs. DAS, DLC
CTRY OF PUBL: US
The ambiguities associated with range and velocity aliasing of Doppler data fields can be reduced significantly with simple techniques. A variable two-PRT (pulse repetition time) system and the associated software are used to range de-alias Doppler velocity displays in real time. Velocity aliasing is reduced by subtracting the radial component of the environmental wind. These techniques have been used for several years in a real-time environment, and a general evaluation of their usefulness is described in this paper.
DESCRIPTORS: Doppler radar

31040029 ID NO.- MGA31040029
Doppler radar study of a warm frontal region.
Heymsfield, Gerald M.
Lab. for Atmos. Probing, Dept. of Geophys. Sci., Univ. of Chicago,IL.
Journal of the Atmospheric Sciences, Boston, 36(11): 2093-2107, Nov. 1979. Refs. DAS, DLC
CTRY OF PUBL: US
A case study of the structure of a warm frontal region as deduced from Doppler radar observations is presented. The precipitation occurring ahead of the surface warm front was banded. The dominant precipitation bands were oriented transverse to the mid-level winds, and they were spaced APPROX. 110 km apart. It is suggested that these bands were formed by highly organized vertical circulations in a 2.5-km thick layer just above the warm frontal zone. The precipitation bands extended from this layer down to the surface. Near the surface, additional circulations were produced by pressure perturbations resulting from cooling associated with melting snow. Some diagnostic calculations of ageostrophic winds, frontogenesis, and vorticity production are presented. The frontogenesis calculation gives approximately a 2-4-hr doubling time of the horizontal potential temperature gradient associated with the warm front, at mid-levels. The highly organized band- associated circulations suggest the importance of their inclusion in diagnostic calculations.
DESCRIPTORS: Warm fronts; Doppler radar observation of fronts; Frontal precipitation bands

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35050288 ID NO.- MGA35050288
On the extraction of atmospheric turbulence parameters from radar backscatter Doppler spectra, Pt. 1, Theory.
Hocking, W. K.
Max Planck Inst. fur Aeronomie, Katlenburg-Lindau, W. Germany
Journal of Atmospheric and Terrestrial Physics, Oxford, 45(2/3): 89-102, Feb./March 1983. Refs., appendix. For abstract of Pt. 2, see Met. Abs., 35.5-289. DAS, DLC
CTRY OF PUBL: UK
A theory is developed for the extraction of r.m.s. velocities of scatterer motions from spectra measured with a Doppler backscatter radar. The effects of finite beam widths, finite pulse lengths, beam broadening, shear broadening, and other such spectral contaminants are considered. These contaminants can play a major role in determining the measured spectral widths (and, equivalently, the signal fading time) and, thus, must be properly considered if the spectral widths are to be used to extract the r.m.s. motions of the scatterers. These r.m.s. motions can be used to estimate turbulence intensities in cases where turbulence is the dominant cause of the scatterer motions.
DESCRIPTORS: Turbulence observation techniques; Doppler radar observation of turbulence

35050046 ID NO.- MGA35050046
New VHF Doppler radar experiment at Showa Station, Antarctica.
Igarashi, K.
Japan. National Institute of Polar Research, Tokyo, Memoirs, Special Issue, No. 22, Sept. 1982. p. 258-267. Refs. Abstracted in Current Antarctic Literature, Wash., D.C., No. 125, Jan. 1983, p. 11-12, abstract I-27441. DLC
CTRY OF PUBL: JA
A new VHF Doppler radar with a minicomputer for real-time processing and radar control became operational in 1982 at Showa Station in order to study E-region irregularities and neutral wind motions. This project, one of the ground-based study programs in Antarctica for the Middle Atmosphere Program (MAP, 1982-1985), attempts to clarify how the middle atmosphere in the 80-110-km altitude region behaves in response to the energy flow from the magnetosphere into the polar ionosphere, especially during a substorm. The radar has three operation modes; spectrum mode, double-pulse mode, and meteor mode. The spectrum mode provides Doppler spectra of back-scattered signals from which characteristics of the plasma turbulence resulting from auroral activity can be investigated. Mean drift velocities of the irregularities are derived from the double-pulse mode. The drift velocity obtained by this mode ultimately can be related to the ionospheric electric field. In the meteor mode, wind motions in the 80-110-km altitudes are investigated by using meteor trails.
DESCRIPTORS: Doppler radar; Doppler radar ionospheric investigations; Showa Station, Antarctica.

33110128 ID NO.- MGA33110128
Simultaneous observations of aurora with a Doppler-radar and sounding rockets.
Igarashi, K.
Japan. National Institute of Polar Research, Tokyo, Memoirs, Special Issue, No. 18, March 1981. p. 391-402. Refs. Abstracted in Current Antarctic Literature, Wash., D.C., No. 112, Dec. 1981, p. 22, abstract K-25451. DLC
CTRY OF PUBL: JA
A 50-MHz auroral Doppler radar was operated at Showa Station in 1978 in cooperation with sounding rocket experiments during the International Magnetospheric Study. E-region irregularity drift was measured by the radar while electric field, electron density fluctuation, and other parameters were measured by the rockets. Electric field components perpendicular to the radar wave vector, which were derived from the Doppler shifts of echoes, are compared with in situ electric field measurement to find a qualitative agreement between both results. Sharp peaks caused by the two-stream instability were found in echo spectra. The radar echo intensity seems to be dependent upon the drift velocity of irregularities.
DESCRIPTORS: Ionospheric investigations; Auroral ionosphere Rocket ionospheric investigations; Doppler radar observation of ionosphere; Showa Station, Antarctica

35100281 ID NO.- MGA35100281
Radiolokatsiyonnye issledovaniya divergentsii polya vetra v konvektivnykh oblakakh. [Radar investigation of wind field divergence in convective clouds.]
Ivanov, A. A.; Mel'nichuk, Yu. V.; Morgoyev, A. K.
Tsentral'naya Aerologicheskaya Obs.;
Akademiya Nauk SSSR, Moscow, Izvestiya, Fizika Atmosfery i Okeana, 19(6): 576-585, June 1983. Refs. English and Russian summaries. DAS, DLC. Transl. into English in corresponding issue of Izvestiya, Atmospheric and Oceanic Physics, Wash., D.C. DAS, DLC
LANGUAGE: en
CTRY OF PUBL: UR
The experimental results of dual Doppler radar investigations of wind field divergence in cumulonimbus clouds are presented. The average relationship between divergence components measured in horizontal plane is found, which means the local horizontal homogeneity of air motion in cumulonimbus. The vertical flow speed increments computed from the data of one- and two-dimensional measurements are compared, and conclusions are presented on the possible use of the single Doppler radar for wind structure observations in cumulonimbus clouds.
DESCRIPTORS: Airflow in clouds; Doppler radar observation of airflow

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31010042 ID NO.- MGA31010042
Velocity distributions within Oklahoma severe storms.
Johnson, Brenda.C.; Stokes, Judith; Ray, Peter S.
Natl. Severe Storms Lab., Norman, OK.;
Journal of Applied Meteorology, Boston, 18(8): 1081-1083, Aug. 1979. Refs., figs. DAS, DLC
CTRY OF PUBL: US
Optimum design of a Doppler radar system for operation in a severe storm environment will depend upon the maximum unambiguous velocity. Radial velocities of severe storms are examined from four Doppler radars over several hours on May 20, 1977. The probability of a radial velocity occurrence for a given, pulse repetition, frequency-wavelength combination is presented.
DESCRIPTORS: Doppler radar observation of severe storms; Airflow in severe storms; Oklahoma, United States

35070062 ID NO.- MGA35070062
Feasibility test of an airborne pulse-Doppler meteorological radar.
Jorgensen, David P.; Hilderbrand, Peter H.; Frush, Charles L.
NOAA/AOML/Natl. Hurricane Res. Lab., Coral Gables, FL.; Natl. Ctr. for Atmos. Res., Boulder, CO.
Journal of Climate and Applied Meteorology, Boston, 22(5): 744-757, May 1983. Refs. DAS, DLC
CTRY OF PUBL: US
A vertically scanning, airborne pulse-Doppler radar is described. Data processing methods to yield pseudo-dual-Doppler horizontal winds are presented. Results of an intercomparison with a ground-based dual-Doppler network are presented and discussed. These results indicate that the accuracy of the Doppler estimates is not seriously degraded by the aircraft's motion in a nonturbulent environment. Reasonable wind velocities were obtained in a stratiform precipitation (pre-warm-frontal) regime despite relatively long time periods for data gathering (APPROX. 20 min). Potential error sources are discussed, with the principal conclusion being that the uncertainty in the airborne Doppler mean velocity estimates are slightly larger than would be expected for a ground-based Doppler. However, the time period over which data are gathered is much longer than for a ground-based dual-Doppler network. Potential modifications to the antenna and data system to improve data quality are discussed.
DESCRIPTORS: Doppler radar wind measurement; Airborne Doppler radar

34100396 ID NO.- MGA34100396
Single Doppler radar study of horizontal-roll convection in a lake-effect snowstorm.
Kelly, Robert D.
Cloud Phys. Lab., Univ. of Chicago, IL.
Journal of the Atmospheric Sciences, Boston, 39(7): 1521-1531, July 1982. Refs. DAS, DLC
CTRY OF PUBL: US
The boundary layer structure and circulation over Lake Michigan were probed with a Doppler radar and an aircraft during a lake-effect snowstorm on Dec. 9, 1978. Evidence is presented that observed wind-parallel echo bands and satellite cloud bands resulted from horizontal-roll convection in the boundary layer. The organization of precipitation within the roll field is discussed, and the roll geometry is compared with cases of dry horizontal-roll convection reported in the literature.
DESCRIPTORS: Convective vortices; Doppler radar observation of snowstorms; Lake Michigan, Great Lakes

35120340 ID NO.- MGA35120340
Accurate determination of vertical air velocities in rain by Doppler radar.
Klaassen, Wim
IMOU, Rijksuniv, Utrecht, Netherlands
Journal of Climate and Applied Meteorology, Boston, 22(10): 1788-1793, Oct. 1983. Refs., figs. DAS, DLC
CTRY OF PUBL: US
Vertical air velocity in rain is calculated from the minima in the reflectivity profile of the Doppler velocity spectra between succeeding range cells. The reflectivity minimum is converted to, air velocity by assuming a negative exponential drop size distribution. The scatter in the observed reflectivity minima can be lowered considerably by representing the reflectivity profile around the minima with a best-fit second- order polynomial. A statistical method is developed to express the observed scatter in true fluctuations of the air velocity and a measurement error. In this way, the accuracy of the method can be calculated and compared with other methods. Experimental verification has been made during a steady rain with a vertically directed FM-CW Doppler radar. This type of radar is suitable for this kind of measurement because of its high sensitivity and range resolution. High-quality pulse Doppler radars may also be used. Accuracies in the mean vertical air velocity of a few cm sec SUPER - SUPER 1 have been obtained. However, just below the bright band, larger errors were found as a result of deviations from the assumed drop size distribution by some large, partly melted snowflakes. Turbulent fluctuations of the vertical air velocity in a space volume of 60MULTIPLIED BY20MULTIPLIED BY20 m and a sampling time of 3 sec were determined with a r.m.s. accuracy of 0.11 m sec SUPER - SUPER 1 . Even in the stratiform rain, this measurement error appeared smaller than the scatter in the true air velocity and the errors that should be made by estimating the air velocity from the mean fall velocity. It is expected that these differences will be even more pronounced in turbulent precipitation.
DESCRIPTORS: Vertical motion in rain; Vertical motion measurement techniques; Doppler radar observation of vertical velocity

DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

34010207 ID NO.- MGA34010207
Intense, quasi-steady thunderstorm over mountainous terrain, Pt. 3, Doppler radar observations of the turbulent structure.
Knupp, Kevin R.; Cotton, William R.
Dept. of Atmos. Sci., CO. State Univ., Ft. Collins
Journal of the Atmospheric Sciences, Boston, 39(2): 359-368, Feb. 1982. Refs. For abstract of Pt. 2, see Met. Abs., 34.1-206. DAS, DLC
CTRY OF PUBL: US
The evolution of the turbulent structure of an intense, quasi-steady thunderstorm is examined by using Doppler radar estimates of turbulent kinetic energy dissipation rates (EPSILON) and radial shears of raw radial velocity (DELTA V SUB r / DELTA R). A comparison of turbulent patterns with mean storm airflow is made. Observations taken during the quasi-steady mature stage reveal that turbulent intensity and activity peaked at mid- to-upper storm levels. The primary storm updraft was nearly turbulence-free at low levels, but exhibited increasingly turbulent activity at higher levels, indicating a transition from quasi-laminar flow to bubblelike flow. Comparison of EPSILON and DELTA V SUB r / DELTA R patterns with environmental parameters such as equivalent potential temperature and momentum suggests that buoyancy and wind shear acted together to generate turbulent eddies, some >500 m in size, at middle storm levels. At mid-to-upper storm levels, patterns of EPSILON and DELTA V SUB r / DELTA R exhibited considerable spatial and temporal variability, and maximum estimated dissipation rate estimates approached 0.15 m SUPER 2 sec SUPER - SUPER 3 . During one particular time period, 11 local EPSILON maxima were estimated, some with magnitudes exceeding 0.07 m SUPER 2 sec SUPER - SUPER 3 .
DESCRIPTORS: Airflow in thunderstorms; Thunderstorm turbulence; Doppler radar observation of thunderstorms

34010206 ID NO.- MGA34010206
Intense, quasi-steady thunderstorm over mountainous terrain, Pt. 2, Doppler radar observations of the storm morphological structure.
Knupp, Kevin R.; Cotton, William R.
Dept. of Atmos. Sci., CO. State Univ., Ft. Collins
Journal of the Atmospheric Sciences, Boston, 39(2): 343-358, Feb. 1982. Refs. For abstract of Pt. 3, see Met. Abs., 34.1-207. DAS, DLC
CTRY OF PUBL: US
An analysis of an intense, quasi-steady thunderstorm that developed over mountainous terrain is presented. This storm, extensively analyzed by using multiple Doppler radar and surface mesonet data, formed within an environment having strong low-level wind shear. The evolution and characteristics of the mesoscale systems prior to storm formation are presented in Part 1 (Cotton et al., 1982). Such an environment was responsible for several unique storm features, including a quasi-steady primary updraft circulation and movement 50 deg to the left of the cloud layer (2-8 km a.g.l.) environmental winds. Several interactions were observed or inferred near and within the storm. Vertical transport of northerly low-level momentum within the updraft imparted a significant blocking on midlevel flow having southerly momentum. Such a blocking affected the movement and characteristics of adjacent, less organized storms. Additional storm-environment interactions produced an organized recirculation of precipitation particles from the midlevel updraft to the low-level updraft. It is concluded that the steadiness of the storm depended upon two factors: 1) the introduction of low-level flow, which was directed opposite to mid-level flow and 2) formation of persistent downdrafts of sufficient magnitude to sustain an active gust front.
DESCRIPTORS: Thunderstorm analysis; Airflow in thunderstorms ; Doppler radar observation of thunderstorms

34010208 ID NO.- MGA34010208
Statistical considerations in the estimation of divergence from single-Doppler radar and application to prestorm boundary-layer observations.
Koscielny, Albert J.; Doviak, R. J.; Rabin, R.
Environ. Data and Information Serv., Natl. Climatic Ctr., Asheville,N.C.; Environ. Res. Labs., NOAA, Natl. Severe Storms Lab., Norman, OK.
Journal of Applied Meteorology, Boston, 21(2): 197-210, Feb. 1982. Refs. DAS, DLC
CTRY OF PUBL: US
Methods of statistical regression have been applied to single-radar radial velocity fields to map certain mesoscale (20-100-km) kinematic properties (e.g., divergence) of the convective boundary layer (CBL). Several previous methods were found to produce estimates that were biased or whose variances were too large. When wind fields are linear on the meso- or larger scale, then single-Doppler velocity accuracies permit the estimation of horizontal divergence with an accuracy of about 4 MULTIPLIED BY 10 SUPER - SUPER 5 sec SUPER - SUPER 1 and a resolution of APPROX. 30 km, which may be sufficient to sense prethunderstorm convergence. A case study for June 19, 1980, suggests that single-Doppler weather radars of modest sensitivity can map the mesoscale divergence patterns within the cloud-free CBL. For this day, convergence zones to the northeast seem to precede cloud development by 1-2 hr, and those to the west precede thunderstorms by 3-4 hr.
DESCRIPTORS: Convergence and divergence; Thunderstorm physics; Doppler radar wind measurement

36040268 ID NO.- MGA36040268
Circular depolarization ratio and Doppler velocity measurements with a 35-GHz radar during the Cooperative Convective Precipitation Experiment.
Kropfli, R. A.; Moninger, W. R.; Pasqualucci, F.
Wave Propagation Lab., NOAA, Boulder, CO.;
Radio Science, Wash., D.C., 19(1): 141-147, Jan./Feb. 1984. Refs., figs. (Paper 3S0826). Reprint available from American Geophysical Union, Wash., D.C. 20009. DAS, DLC

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DIALOG INFORMATION SERVICES, INC.

DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

CTRY OF PUBL: US
All aspects of atmospheric convection on the North American High Plains were studied during the Cooperative Convective Precipitation Experiment. This 3-mo experiment conducted near Miles City, MT, during the summer of 1981 made use of 14 instrumented aircraft and a network of seven Doppler radars. One of these radars, the National Oceanic and Atmospheric Administration/Wave Propagation Laboratory K-band (35-GHz) radar had dual-polarization capability. The circular depolarization ratio (CDR) from the log receiver of this radar was measured in many different meteorological situations, including nonprecipitating clouds, convective storms with light precipitation, and severe hailstorms. The analysis discussed focuses on measurements near the melting layer, where a sharp peak in the CDR profile was observed. A method for classifying particles on the basis of their fall speeds is related to measurements of CDR near this level for a >1-hr period. Preliminary aircraft data are used as an aid in the interpretation.
DESCRIPTORS: Hydrometeor observation techniques; Precipitation-type determination; Doppler radar observation of hydrometeors; Miles City, Montana

32090079 ID NO.- MGA32090079
Dual-Doppler radar.
Kropfli, R. A.
NOAA/ERL/Wave Propagation Lab., Boulder, CO.
In: Kaimal, J. C.; Baynton, H. W.; Gaynor, J. E. (eds.) Boulder Low-Level Intercomparison Experiment: preprint of WMO report. Boulder, CO., June 1980. p. 50-58. Refs., figs. DAS (A QC 851 B6)
CTRY OF PUBL: US
The dual-Doppler technique for measuring three-dimensional wind fields and for making intercomparisons among wind fields from different in situ measurements is discussed, and a sample of the flow fields obtained during the recent PHOENIX experiment at the Boulder Atmospheric Observatory are presented. A description of the experiment is given with a diagram of the installation of the radars, a diagram of the COPLAN scanning method, and a summary of the radar scan characteristics. The results of intercomparison, including the eddy flow patterns, horizontal wind fields, wind components derived from Doppler data, etc., are presented. Flow visualization in the planetary boundary layer is illustrated.
DESCRIPTORS: Wind measurement techniques; Doppler radar wind measurement; Boulder, Colorado

31110019 ID NO.- MGA31110019
Three-dimensional wind measurements in the optically clear planetary boundary layer with dual Doppler radar.
Kropfli, R. A.; Hildebrand, P. H.
NOAA/ERL/Wave Propagation Lab., Boulder, CO.; Natl. Ctr. for Atmos. Res., Boulder, CO.
Radio Science, Wash., D.C., 15(2): 283-296, March-April 1980. DAS, DLC
CTRY OF PUBL: US
Radar-derived, three-dimensional wind fields were obtained near the Boulder Atmospheric Observatory tower during a planetary boundary layer (PBL) experiment called Phoenix in Sept. 1978. A pair of closely spaced (12.3- km) Doppler radars observed the entire depth of the daytime PBL (APPROX. 2 km) over an area of APPROX. 100 km SUPER 2 , with hundreds of velocity samples per km SUPER 3 , a radar resolution volume size of 150 m in all dimensions at the tower, and volume scan intervals of 50-180 sec. The radar measurements obtained are compared with in situ measurements on aircraft and on the instrumented tower, and with other surface wind data. Preliminary results indicate that these data resolve wavelengths as small as 600 m and that the measurements are repeatable at each grid point to within 0.3 m/sec. The radar-derived wind fluctuations agreed with anemometer data on the tower to within 0.5 m/sec and with data from an aircraftborne anemometer to within 1.0 m/sec.
DESCRIPTORS: Wind measurement techniques; Doppler radar wind measurement; Boulder, Colorado

34100058 ID NO.- MGA34100058
VHF and UHF Doppler radars as tools for synoptic research.
Larsen, M. F.; Rottger, J.
School of Electrical Engr., Cornell Univ., Ithaca, N.Y.; EISCAT Sci. Assoc., Kiruna, Sweden
American Meteorological Society, Boston, Bulletin, 63(9): 996-1008, Sept. 1982. Refs., figs. DAS, DLC (QC851.A6)
CTRY OF PUBL: US
Applications of VHF and UHF Doppler radars to research in synoptic meteorology are reviewed. It is found that these radars show great potential for studies of large scales, but the area of research where the instruments really excel is in studying the interaction between the synoptic scale and the mesoscale. Several examples of results in both of these areas are presented. The potential for operational use of the radar systems is discussed.
DESCRIPTORS: Doppler radar applications

35120023 ID NO.- MGA35120023
Can a VHF Doppler radar provide synoptic wind data? A comparison of 30 days of radar and radiosonde data.
Larsen, Miguel Folkmar
School of Electrical Engr., Cornell Univ., Ithaca, N.Y.
Monthly Weather Review, Boston, 111(10): 2047-2057, Oct. 1983. Refs. DAS, DLC
CTRY OF PUBL: US
A number of experiments have shown that UHF and VHF Doppler radars can make clear air wind measurements in the troposphere and lower stratosphere, even in the presence of clouds and precipitation. Past comparisons of radar and rawinsonde profiles for a single day have shown good agreement between the two within the limitations imposed by the spatial

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separation between the two measurements. However, the accuracy of the measurement does not insure that the data are synoptically significant. A comparison of 30 days of radiosonde geopotential height and wind data and radar data from Alaska was conducted to determine the applicability of the radar data to synoptic meteorology. Rawinsonde and radar wind time series at six heights from 3.79 to 14.79 km were compared, and the r.m.s. differences calculated. The two independent wind measurements were also compared with the geostrophic wind obtained from the geopotential height fields generated by applying the Cressman objective analysis scheme to data from five radiosonde stations surrounding the radar site. The two independent wind measurements were most similar, with a difference of 3-4 m sec SUPER - SUPER 1 . The radar and balloon winds both differed from the geostrophic winds by 5-6 m sec SUPER - SUPER 1 . The r.m.s. differences decreased when the radar winds were averaged over longer time intervals. The cross correlation between the measured and geostrophic winds was found to be APPROX. 0.75 and was essentially independent of height over the altitude range studied.
DESCRIPTORS: Upper air wind measurement technique comparisons; Doppler radar wind measurement; Alaska, United States

33090350 ID NO.- MGA33090350
Doppler radar research and application to aviation flight safety, 1977-1979.
Lee, J. T.
United States. Dept. of Transportation, Federal Aviation Administration, Systems Research and Development Service, Wash., D.C., Report No. DOT/FAA/RD-81/79, June 1981. 37 p. Refs., figs., tables. Available from NTIS, Springfield, VA. 22161.
CTRY OF PUBL: US
Thunderstorm turbulence detection and the display of the turbulence location offer a significant advance toward improvement in flight safety and use of critical air space. A cooperative program involving the Federal Aviation Administration, the U.S. Air Force Aeronautical Systems Command, and the National Severe Storms Laboratory of the National Oceanic and Atmospheric Administration has been conducted under a code name of ''rough rider.'' An F-4-C aircraft instrumented to record turbulence, temperature, and wind during thunderstorm penetrations has been used to obtain in situ measurements of these parameters concurrently with Doppler and conventional weather radar observations. The results of this program indicate that the Doppler-measured radial wind component's spectral width holds promise as a turbulence indicator. Turbulence of severe or greater nature was always accompanied by spectral widths greater than 4 m sec SUPER - SUPER 1 . A second part of the program was to display forenoted Doppler radar data in real time at a Radar Approach Control office and at an Air Route Traffic Control Center. This display provided an insight into requirements for an operational system.
DESCRIPTORS: Turbulence detection; Turbulence effects on airplanes; Thunderstorm turbulence; Doppler radar observation of turbulence

34080364 ID NO.- MGA34080364
Doppler radar observations of triggered lightning.
Lhermitte, Roger
Univ. of Miami, Rosenstiel School of Marine & Atmos. Sci., FL.
Geophysical Research Letters, Wash., D.C., 9(6): 712-715, June 1982. Refs. (Paper 2L0693). Reprint available from American Geophysical Union, Wash., D.C. 20009.
CTRY OF PUBL: US
A vertically pointing Doppler radar was installed APPROX. 50 m from an instrumented platform where lightning is constrained to strike and where the lightning current is recorded. The experiments were designed to study the effect of lightning on the surrounding precipitation, but no discernable disturbance of the precipitation particle velocity or radar reflectivity was ever detected in any of the 39 radar-observed events. However, well- defined Doppler spectra attributed to transient lightning channel echoes were occasionally observed. These data suggest that a sustained lightning continuing current is required to permit a persistent radar return from the channel and, therefore, the observation of a well-defined Doppler spectrum. The sidebands observed in the lightning Doppler spectrum can be interpreted in terms of a modulation of the radar echo associated with the time variations of the continuing current noticeable in the recordings.
DESCRIPTORS: Lightning currents; Doppler radar observation of lightning

34110278 ID NO.- MGA34110278
Diagnostic study of the tornadic storm based on dual-Doppler wind measurements.
Lin, Yeong-jer; Pasken, Robert
Dept. of Earth and Atmos. Sci., St. Louis Univ., MO.
In: Symposium on Cloud Dynamics, Hamburg, W. Germany, Aug. 17-28, 1981, Proceedings. Dordrecht, Holland, D. Reidel Publ. Company, 1982. p. 315-328. Refs., figs. (Advances in Earth and Planetary Sciences). DLC (QC921.6.C65C56)
CTRY OF PUBL: NL
Dual-Doppler data for a tornadic storm were used to derive the three-dimensional wind field at 12 analysis levels within the storm. A grid spacing of 1 km covering the domain of 26 MULTIPLIED BY 26 MULTIPLIED BY 12 km was used. The three wind components were then used as input to the three momentum equations for recovering the perturbation fields of pressure, density, and virtual temperature within the storm. The solution obtained was smoothed by using a nine-point smoother horizontally and a three-point smoother vertically. Results show that the recovered thermodynamic fields are in good agreement with the storm's updraft-downdraft structure.
DESCRIPTORS: Tornado structure; Airflow in tornadoes;
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Doppler radar observation of tornadoes
36020269 ID NO.- MGA36020269
VHF Doppler radar observations of buoyancy waves associated with thunderstorms.
Lu, Daren; VanZandt, T. E.; Clark, W. L.
Aeronomy Lab., NOAA, Boulder, CO.;
Journal of the Atmospheric Sciences, Boston, 41(2): 272-282, Jan. 1984. Refs. DAS, DLC
CTRY OF PUBL: US
The Platteville VHF Doppler radar, located on the Colorado piedmont near Platteville, CO., continuously measured the vertical wind velocity during a 12-day period in late July and early Aug. 1981. Measurements were made every 2.5 min on the average with range gates centered at 3.3, 5.7, 8.1, 10.5, 12.9, 15.3, 17.7, and 20.1 km a.s.l. Periods of active thunderstorms were identified from the PPI maps from the National Weather Service 10-cm weather radar at Limon, CO. When no thunderstorm activity was present, the vertical velocity fluctuations were small and erratic. But a few hours after strong thunderstorm activity began, large quasi-sinusoidal wave trains with periods of APPROX. 40 min were observed. Power spectra of the vertical velocity time series showed enhancements at all frequencies during thunderstorm activity. For periods longer than 30 min, the enhancements were larger, particularly for the midtropospheric range gates from 5.7 to 12.9 km. Some of the implications of these observations on the relations between thunderstorms and buoyancy waves in the free atmosphere are discussed.
DESCRIPTORS: Thunderstorm-vertical motion relationships; Doppler radar observation of vertical velocity; Platteville, Colorado; Limon, Colorado

36060037 ID NO.- MGA36060037
Acoustic Doppler radar for measuring wind.
Lu, Nai-ping
Inst. of Atmos. Phys., Academia Sinica
Scientia Atmospherica Sinica, Peking, 6(4): 413-421, Dec. 1982. Refs., figs. In Chinese; English and Chinese summaries. DLC, DAS (H PER QC851.T222)
LANGUAGE: ch
CTRY OF PUBL: CH
The fundamental principle and detecting method of acoustic Doppler radar for measuring wind are discussed. The phase-locking technique can measure the Doppler frequency shift precisely. By using the observation data of acoustic Doppler radar, the horizontal velocity, wind direction, and vertical velocity are calculated and compared with those obtained by direct measurement on the tower. The results show that the mean value of horizontal velocity and wind direction are close, but the vertical velocity detected by acoustic Doppler radar is slightly greater than that measured by direct measurements. On the basis of continuous observation data measured by acoustic radar, the spectrum of vertical velocity is calculated. At the height of 240 m, the spectra of vertical velocity obtained by these two methods are compared. In a convective boundary layer, the distribution of energy spectrum of vertical velocity with height is obtained. In lower frequency range, the power spectrum distribution fits the law of fp(f) VARIATION f SUPER + SUPER 1 .
DESCRIPTORS: Wind measurement techniques; Vertical velocity measurement techniques; Acoustical wind sounding; Acoustical sounding of vertical velocities

34080014 ID NO.- MGA34080014
Acoustic Doppler radar for measuring wind velocity.
Lu, Naiping
Inst. of Atmos. Phys., Acad. Sinica, Peking, C.P.R.
Kexue Tongbao, Peking, 27(8): 853-858, Aug. 1982. Refs.
CTRY OF PUBL: CH
The measurement of wind velocity in the boundary atmosphere is important for the study of atmospheric turbulent flow, atmospheric diffusion, air pollution, and other problems. The wind shear in the lower atmosphere has a direct effect on aviation. Acoustic Doppler radar for measuring wind velocity was developed and applied widely in the 1970s. On the basis of monostatic acoustic radar, the acoustic Doppler radar was developed and some preliminary results were obtained. The detecting height for vertical velocities can usually reach 500-600 m, and the horizontal velocities and wind directions can also be measured with the bistatic acoustic Doppler radar.
DESCRIPTORS: Wind measurement techniques; Acoustical wind sounding

36070278 ID NO.- MGA36070278
Airborne Doppler radar observations in Hurricane ''Debby''.
Marks, Frank D., Jr.; Houze, Robert A., Jr.
Hurricane Res. Div., Atlantic Ocean. and Met. Lab., NOAA, Miami, FL.; Dept. of Atmos. Sci., Univ. of WA., Seattle
American Meteorological Society, Boston, Bulletin, 65(6): 569-582, June 1984. Refs., figs. DAS, DLC (QC851.A6)
CTRY OF PUBL: US
A pulse-Doppler radar onboard a National Oceanic and Atmospheric Administration (NOAA) WP-3D research aircraft has been used to map the wind field in the vicinity of the developing eye wall of Hurricane ''Debby,'' which occurred in 1982. The Doppler-derived winds in the eyewall region compare favorably with winds measured aboard the aircraft. The Doppler radar permitted the wind field to be documented in more detail than has been possible in previous hurricane studies. The maximum winds were found radially, just inward of the band of maximum radar reflectivity, and were concentrated in two mesoscale maxima. A mesoscale trough associated with the developing eye wall sloped upwind and radially outward through the 1-5-km layer. The trough was best defined at 2-3 km, where it contained a closed mesocyclonic circulation.
DESCRIPTORS: Hurricane ''Debby'' (1982); Hurricane eye walls ; Hurricane wind measurements; Hurricane wind observation techniques; Doppler radar wind measurements

DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

31050322 ID NO.- MGA31050322
Doppler radar measurements of the airflow within a mesoscale cold frontal rainband.
Matejka, Thomas J.; Houze, Robert A., Jr.
Dept. of Atmos. Sci., Univ. of WA., Seattle
Washington (State). Univ., Seattle, Dept. of Atmospheric Sciences, Contributions from Cloud Physics Group: Collection of Reprints, Vol. 21, [1978?]. [n.p.] Refs. Reprinted from Conference on Radar Meteorology, 18th, Atlanta, GA., March 28-31, 1978, Preprints. Boston, American Meteorological Society, 1978. p. 17-22. Refs. DAS
CTRY OF PUBL: US
The detailed airflow in a vertical cross section through a mesoscale cold frontal band of precipitation is analyzed. The NCAR CP-3 Doppler radar was used to deduce fields of divergence and vertical velocity and the airflow in a cross-sectional plane. Two regions of ascent were identified: at and above the windshift line accompanying the frontal passage at the surface, air from the boundary layer of the warm sector of the cyclone rose sharply, with vertical velocities reaching 1 m sec SUPER - SUPER 1 , in a column 4 km in width; associated with this small-scale intense updraft was an intense convective-scale downdraft. Behind the surface front, less vigorous widespread ascent occurred above the cold front aloft. The mesoscale cold frontal band possessed a substructure consisting of several embedded subbands, which are associated with details of the airflow pattern.
DESCRIPTORS: Frontal rainbands; Airflow in frontal rainbands ; Doppler radar observation of fronts

34120034 ID NO.- MGA34120034
Use of a single Doppler radar in short-range forecasting and real-time analysis of extratropical cyclones.
Matejka, Thomas J.; Hobbs, Peter V.
Atmos. Sci. Dept., Univ. of WA., Seattle
In: Washington (State). Univ., Seattle, Dept. of Atmospheric Sciences, Contributions from the Cloud and Aerosol Research Group: Collection of Reprints, Vol. 25. Seattle, WA. [1981]. 6 p. Refs. Reprinted from IAMAP Symposium on Nowcasting, Hamburg, W. Germany, Aug. 25-28, 1981, Proceedings. [Hamburg], June 1981, p 177-182. (ESA SP-165)
CTRY OF PUBL: US
A single Doppler radar, which provides information on precipitation and wind fields, is a valuable tool for frontal-scale and mesoscale analysis, nowcasting, and short-range forecasting. A methodology for the use of a Doppler for these purposes is presented with illustrative examples.
DESCRIPTORS: Doppler radar applications; Doppler radar observation of cyclones; Radar applications to forecasting

32120216 ID NO.- MGA32120216
Airport wind shear detection and warning system using Doppler radar: a feasibility study.
McCarthy, John; Blick, Edward F.; Elmore, Kim L.
MCS, Inc., Boulder, CO.;
United States. National Aeronautics and Space Administration, Wash., D.C., Contractor Report CR-3379, Jan, 1981. 86 p. Refs., figs., tables. DAS (A TL 521.3 C6A3)
CTRY OF PUBL: US
A feasibility study was conducted to determine whether ground-based Doppler radar can measure the wind along the path of an approaching aircraft with sufficient accuracy to predict aircraft performance. A severe storm research program, Severe Environmental Storms and Mesoscale Experiment (SESAME, 1979), provided the tools for this test, including two instrumented research aircraft, a Sabreliner and Queen Air from NCAR, a Doppler radar at NSSL, and an Air Force PAR unit for precision approaches to the Doppler radar. Forty-three PAR approaches were conducted, with 16 examined in detail. In each, Doppler-derived longitudinal winds were compared with aircraft-measured winds; in approximately 75% of the cases, the Doppler and aircraft winds were in acceptable agreement. In the remaining cases, errors may have been due to a lack of Doppler resolution, a lack of colocation of the two sampling volumes, the presence of eddy or vortex-like disturbances within the pulse volume, or the presence of point targets in antenna side lobes. The authors further concluded that shrouding techniques would have reduced the side lobe problem. The work left little doubt that a ground-based Doppler radar operating in the optically clear air would provide the appropriate longitudinal winds along an aircraft's intended flight path. The study attempted to test whether, given the winds along the intended approach path, taken immediately prior to the start of an approach, a fixed stick numerical simulation model can predict aircraft performance. Most of the test cases occurred in extremely weak wind shear conditions, and the resulting model calculation was unable to quantify precisely the aircraft performance in terms of shear conditions. For the four approaches identified by an independent pilot assessment to be most severe, the model was more successful. This led to the conclusion that, as the shear became more severe, the model's capability improved. This was not verified. Some field results indicated that a high-performance jet transport (Sabreliner) was more adversely affected by shear than was a light piston transport (Queen Air), presumably operating in similar conditions.
DESCRIPTORS: Wind shear detection; Wind shear effects on aircraft; Doppler radar wind measurement

35090034 ID NO.- MGA35090034
Polarization diversity radar data processor.
Metcalf, James I.; Armstrong, Graham M.
United States. Air Force Geophysics Lab., Hanscom AFB, MA., Instrumentation Papers, No. 318, April 28, 1983. 27 p. Refs., figs. (AFGL-TR-83-0111). DLC
CTRY OF PUBL: US
A real-time data processor has been designed for use with the AFGL 10-cm Doppler weather radar, which is to be operated

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with alternating transmission of horizontally and vertically polarized signals. In this mode of operation, the reception of backscattered signals of polarizations identical to those of the transmitted signals permits the computation of the differential reflectivity between the two polarizations, in addition to the absolute reflectivity and the Doppler mean velocity and variance. The switching of transmitted polarization introduces difficulties in the estimation of the autocovariance of the received signals, from which the Doppler velocity parameters are derived. The processor design and the permitted modes of radar operation circumvent these difficulties. This report describes the processing algorithms theoretically and presents details of the implementation of these algorithms in hardware.

DESCRIPTORS: Radar data processors; Doppler radar data processing

35100238 ID NO.- MGA35100238

Dynamical-microphysical evolution of a convective storm in a weakly sheared environment, Pt. 2, Airflow and precipitation trajectories from Doppler radar observations.

Miller, L. Jay; Dye, James E.; Martner, Brooks E.

NCAR, Boulder, CO.; Dept. of Atmos. Sci., Univ. of WY., Laramie

Journal of the Atmospheric Sciences, Boston, 40(9): 2097-2109, Sept. 1983. Refs., figs. For abstract of Pt. 1, see Met. Abs., 35.10-236. DAS, DLC

CTRY OF PUBL: US

Measurements from three Doppler radars of air motion and observations of the environment and storm reflectivity structure, supplemented by aircraft measurements of precipitation and cloud particles, are used to establish the dynamical framework for precipitation development in a convective storm that grew in a weakly sheared wind environment. The moderately intense, evolving storm consisted of a series of cells that developed in late afternoon on July 25, 1976, in southeastern Wyoming. The storm, which moved along the subcloud wind direction, had a persistent but unsteady updraft region on its right forward flank. This updraft region consisted of several small convective elements with two or more intense updraft cores evident at all times. Middle-level flow around the updraft region eventually resembled obstacle flow with downdrafts located on the flanks and in the wake of the updraft. This stormwide, organized circulation apparently permitted precipitation particles to reenter an updraft and grow for periods longer than would have been possible if all their growth had occurred in a single ascent within an updraft core of 10-20-m sec SUPER - SUPER 1 speeds. Such vertical motions would have carried particles to cloud top in 5-10 min, a growth period too short to explain the observed millimeter-size particles in the updraft. This storm lasted >1 hr and produced hail particles as large as 9 mm in diameter which were observed at cloud base by aircraft.

DESCRIPTORS: Convective storm development; Airflow in convective storms; Precipitation formation; Precipitation particle growth; Wyoming, United States

35070042 ID NO.- MGA35070042

Design and development of a radar control program for the NOAA/WPL pulse-Doppler radars.

Moninger, W. R.

NOAA/ERL/Wave Propagation Lab., Boulder, CO.

Journal of Climate and Applied Meteorology, Boston, 22(5): 859-862, May 1983. Refs. DAS, DLC

CTRY OF PUBL: US

Development of a computer program to control and acquire data with meteorological research radars is described. The performance goals for the program are enumerated, and the implementation techniques to achieve these goals are discussed. Possible improvements to the program, suggested by experiences during a 4-mo field experiment with the program, are noted.

DESCRIPTORS: Radar data processing; Doppler radar data processing; Electronic computer programs

32080029 ID NO.- MGA32080029

Doppler radar studies during the Sierra Cooperative Pilot Project.

Moninger, W. R.

United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., Boulder, CO., Technical Memorandum (NOAA TM ERL WPL-50), Jan. 1980. 99 p. Refs., figs., appendices. DAS (A QC 807.5 U6W6)

CTRY OF PUBL: US

Winter storm studies and transport and diffusion studies by multi-Doppler radar in the Sierra Nevada foothills were performed as a part of the Sierra Cooperative Pilot Project sponsored by the Water and Power Resources Service. Two case studies of frontal winter storms, Feb. 6 and March 2, 1978, revealed that 1) a low-level, high-speed jet moving toward the NNW, parallel to the foothills, was present ahead of both fronts; 2) both storms were highly complex, having a substructure of up- and downdrafts oriented nearly perpendicular to the frontal surface; and 3) these storms differed in the following ways from typical high plains storms: the strongest updrafts and greatest condensation rates occurred in the lowest 1-2 km above cloud base, and updrafts corresponded generally to regions of high radar reflectivity factor, downdrafts to low reflectivity. These results suggest that storms such as these will be difficult to seed effectively on a routine basis. Two transport and diffusion case studies conducted in conjunction with the University of Wyoming aircraft on Feb. 8 and 24, 1978, revealed that 1) large-scale variations in wind flow, such as vertical shear of the mean horizontal wind and upslope mountain winds induced by differential heating, play a dominant role in diffusing seeding material, at least under conditions of weak turbulence, and 2) Doppler radars can successfully measure eddy dissipation rates that yield good agreement with aircraft in situ sensors.

DESCRIPTORS: Doppler radar observation of storms; Winter

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DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

storms; Storm seeding; Diffusion of seeding materials; Sierra Nevada, North America

33070034 ID NO.- MGA33070034
Final report: Doppler radar data analysis during fiscal year 1980.
Moninger, W. R.; Dineen, R.; Becker, T.
NOAA/ERL/Wave Propagation Lab., Boulder, CO.;
United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., Boulder, CO., Technical Memorandum (NOAA TM ERL WPL-70), March 1981. 40 p. Refs., figs. DAS (A QC 807.5 U6W6)
CTRY OF PUBL: US
Two triple Doppler radar case studies are discussed: 1) a postfrontal band was observed as it moved up the foothills of the Sierra Nevada Mts; the band structure was primarily helical, with inflow from the right front of the band at low levels, an updraft slightly behind the reflectivity core of the band, and outflow toward the left front; the band structure was similar to, but smaller in scale than, bands observed in the Sacramento Valley; and 2) a weak frontal passage followed by a strong squall line passage; the squall was intense enough to have an associated tornado but was quite shallow; reflectivity in the squall line was a maximum of 52 dBZ at 0.6-km m.s.l., dropping <20 dBZ above 5.1-km m.s.l.
DESCRIPTORS: Doppler radar observation of fronts; Doppler radar observation of squall lines; Sierra Nevada, North America

32060043 ID NO.- MGA32060043
Master system: an interactive Doppler radar data processing system.
Moninger, W. R.; Sanders, M.
United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., Boulder, CO., Technical Memorandum (NOAA TM ERL WPL-55), April 1980. 55 p. Refs., figs. DAS (A QC 807.5 U6W6)
CTRY OF PUBL: US
A system of two interactive computer programs for processing data from meteorological Doppler radars is discussed. Program MASTER permits a user to view the radar data, edit them, correct for Doppler velocity aliasing, threshold data based upon returned-signal strength, and interpolate data onto a Cartesian grid. Program SKYWAY converts data that were processed with MASTER into a form that may be used by existing, noninteractive, radar data processing programs at NOAA and NCAR.
DESCRIPTORS: Radar data processing; Electronic computer applications to radar data processing; Electronic computer programs

36040269 ID NO.- MGA36040269
Scattering properties of hydrometeors as measured by dual-polarization Doppler radar during CCOPE.
Moninger, W. R.; Kropfli, R. A.; Pasqualucci, F.
Wave Propagation Lab., NOAA, Boulder, CO.;
Radio Science, Wash., D.C., 19(1): 149-156, Jan./Feb. 1984. Refs.., figs. (Paper 3S0828). Reprint available from American Geophysical Union, Wash., D.C. 20009. DAS, DLC
CTRY OF PUBL: US
An 8.6-mm-wavelength, dual-polarization Doppler radar was operated by the Wave Propagation Laboratory during the Cooperative Convective Precipitation Experiment. The complex cross correlation between the two received polarization channels (left- and right-handed circular) provided information on the degree of common alignment and the scattering properties of the observed hydrometeors. The data show four distinct layers in a lightly precipitating stratiform cloud: 1) a subcloud layer consisting of raindrops and some non-Rayleigh-scattering graupel particles; 2) a narrow depolarization band containing highly non-Rayleigh particles that are ice and ice-water mixtures; 3) a main cloud region consisting of small ice particles; and 4) a cloud top region consisting of substantially larger particles than were found in the main cloud.
DESCRIPTORS: Hydrometeor observation techniques; Doppler radar observation of hydrometeors

34100059 ID NO.- MGA34100059
Multiple-Doppler radar derived vertical velocities in thunderstorms, Pt. 1, Error analysis and solution techniques.
Nelson, Stephan P.; Brown, Rodger A.
United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., Norman, OK., Technical Memorandum (NOAA TM ERL NSSL-94), Oct. 1982. p. 1-10. Refs., figs. Also: by Brown, Rodger A.; Nelson, Stephan P., Pt. 2, Maximizing a real extent of vertical velocities. Ibid., p. 11-21. Refs., figs. DAS (A QC 807.5 U6 N7)
CTRY OF PUBL: US
A detailed error analysis is performed on the problems associated with using multiple Doppler radar data and the continuity equations to solve for the vertical component of motion in deep convective storms. The errors considered are those resulting from either incorrect boundary values or errors encountered in integrating the horizontal divergence with height. Data show that errors in the integrated horizontal divergence are larger than previously thought, indicating that previously ignored effects of bias values may be an important error source. A simple vertical velocity adjustment technique is presented which yields fairly accurate results under most conditions. In the unusual case of reinforcing bias errors (e.g., excessive convergence in low levels, capped by excessive divergence), the unadjusted profile obtained by downward integration yields better results at most levels than the adjusted profile. The effects of

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boundary errors on both adjusted and unadjusted vertical velocity profiles are also examined.
DESCRIPTORS: Doppler radar observation of vertical velocity Vertical velocities in thunderstorms

35010173 ID NO.- MGA35010173
STARE system and some of its applications.
Nielsen, Erling
Max Planck Inst. fur Aeronomie, Katlenburg-Lindau, W. Germany
In: Russell, C. T.; Southwood, D. J. (eds.), IMS source book: guide to the International Magnetospheric Study data analysis. Wash., D.C., American Geophysical Union, 1982. p. 213-224. Refs., figs. DAS (H QC 809 M35I47), DLC (QC809.M35I47)
CTRY OF PUBL: US
The STARE (Scandinavian Twin Auroral Radar Experiment) makes possible the measurement of ionospheric electric fields over a large area with high spatial and temporal resolution. It consists of coherent pulse Doppler radars. The essence of the STARE system is the estimation of the ionospheric electric field through measurement of the phase velocity of electrostatic waves. The author describes in detail the STARE system, outlines its operation during the IMS (International Magnetospheric Study), and illustrates the application of observations to problems in the following areas of geophysics: convection, discontinuities, substorm phenomena, and pulsations.
DESCRIPTORS: Ionospheric electric field measurements; Auroral ionosphere; Doppler radar observation of ionosphere

36040305 ID NO.- MGA36040305
Drop size distribution measurements in convective storms with a vertically pointing 35-GHz Doppler radar.
Pasqualucci, F.
Wave Propagation Lab., ERL, NOAA, Boulder, CO.
Radio Science, Wash., D.C., 19(1): 177-183, Jan./Feb. 1984. Refs., figs. (Paper 3S0829). Reprint available from American Geophysical Union, Wash., D.C. 20009. DAS, DLC
CTRY OF PUBL: US
Measurements at vertical incidence in convective storms with a 35-GHz pseudonoise-coded high-resolution radar at Johannesburg, South Africa, are discussed. The radar is bistatic and has the capability to measure targets at very short ranges (19 m). This capability is used to derive an accurate experimental mean velocity-reflectivity (UPSILON -Z) relationship in convective storm systems. It is shown that, at an altitude of 19 m, the standard deviation of the data points from the mean UPSILON -Z relationship is APPROX. 0.25 m sec SUPER - SUPER 1 , indicating that the contribution of the vertical air velocity at the low altitude of 19 m is APPROX. LESS PLUS OR MINUS 0.5 m sec SUPER - SUPER 1 (95% confidence limit). The experimental UPSILON -Z relationship is then used to derive drop size distributions from the measured Doppler spectra in convective rainfall with high time resolution (10 sec). Some of the measured drop size distributions are discussed and related to specific kinematic features of the storm under study. For example, drop size distributions measured in a severe squall line show a large abundance of smaller drops (<1.5 mm in diameter) in regions of wind shear near the edges of the main downdraft core. A possible explanation of this large concentration of smaller drops is sorting of the hydrometeors caused by shear in the horizontal wind that is generated by the divergence of the downdraft at the ground. These observations show the usefulness of this radar measurement technique to detect features of drop size distributions in convective systems and relate them to storm structure and kinematics.
DESCRIPTORS: Raindrop size distribution measurements; Raindrop size distribution measurement techniques; Doppler radar observation of drop size distribution; Johannesburg, South Africa

32030031 ID NO.- MGA32030031
Millimeter radar observations of vertical velocities in nonprecipitating cumulus clouds.
Pasqualucci, F.
Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 13(4): 335, Oct./Dec. 1979. Abstract 6- 3.10. (Conference Internationale, VIII SUPER e , sur la Physique des Nuages, Clermont-Ferrand, 15-19 juillet 1980, Resumes).
CTRY OF PUBL: FR
The author discusses radar measurements of the height profiles of vertical air velocity in a growing cumulus cloud. The radar used is a 35-GHz pseudo-noise coded bistatic Doppler system located in Johannesburg, S. Africa. The measurements show the presence of downdrafts in the top part of the cloud, where overlying dry air is entrained and descends because of evaporative cooling of the mixed-in cloud water. These findings are consistent with a cloud structure having an inflow at the top and bottom and outflow around the middle. The measurements show the space and time evolution of the vertical air velocity profiles, and the values of the maximum updrafts are well correlated with the rate of growth of the cloud as indicated by the height of the cloud echo top. The above results show the importance of vertical mixing, as suggested by Warner (1955) and Squires (1958), and they are consistent with some of the aircraft measurements by Telford and Wagner (1974) around small cumulus clouds which show a net divergent flow near the middle of the cloud. The results are also in agreement with cloud models suggested by Squires (1958), and more recently by Raymond (1979), and they demonstrate the usefulness of millimeter-wave Doppler radars in studying the early stages of cloud development and evolution.
DESCRIPTORS: Vertical velocities in clouds; Vertical motion in convective clouds; Doppler radar observation of vertical velocity; Johannesburg, South Africa

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DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

35070063 ID NO.- MGA35070063
Millimeter-wavelength dual-polarization Doppler radar for cloud and precipitation studies.
Pasqualucci, F.
NOAA/ERL/Wave Propagation Lab., Boulder, CO.
Journal of Climate and Applied Meteorology, Boston, 22(5): 758-765, May 1983. Refs. DAS, DLC
CTRY OF PUBL: US
A pulse Doppler radar system operating at 35 GHz and having full polarization (linear and circular) diversity capability is described. Separate antennas are used for the transmitter and the receiver because this permits better overall radar sensitivity. The transmitter operates in the double-pulse mode to optimize the unambiguous Doppler velocity measurable with the system. A polarizer capable of handling about 200 kW of peak power when pressurized with sulfur hexafluoride (SF SUB 6) at 25 psi was developed for the transmitter. The radar system has built-in test sequences for checking the gain and alignment of the transmitter and receiver antennas. The dual-polarization intermediate frequency (IF) receiver has a total of six analog channels. A flexible data acquisition and processing system has been developed to allow both coherent and incoherent dual-polarization measurements to be performed; the system includes a microprocessor-controlled pulse-pair processor and a minicomputer with associated peripherals. The radar was operated successfully in Montana during the 1981 Cooperative Convective Precipitation Experiment (CCOPE). Preliminary results on the observed variation of the circular depolarization ratio (CDR) are shown and related to the storm and cloud structure.
DESCRIPTORS: Doppler radar equipment

33050352 ID NO.- MGA33050352
Millimeter radar observations of vertical velocities in nonprecipitating cumulus clouds.
Pasqualucci, Fausto
CIRES, Univ. of CO., Boulder
Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 14(3/4): 517-521, July/Dec. 1980. Refs. English and French summaries. (Conference Internationale, VIII SUPER e , sur la Physique des Nuages, Clermont- Ferrand, 15-19 juillet 1980, Papers). DAS, DLC
CTRY OF PUBL: FR
Radar measurements of the height profiles of vertical air velocity in Johannesburg, South Africa, show the presence of downdrafts in the top part of the cloud where overlying dry air is entrained and descends because of evaporative cooling of the mixed-in cloud water. This finding is consistent with a cloud structure having an inflow at the top and the bottom and outflow around the middle. The measurements show the space and time evolution of the vertical air velocity profiles, and are consistent with aircraft measurements around small cumulus clouds that show a net divergent flow near the middle of the cloud. The results are in agreement with suggested cloud models and demonstrate the usefulness of millimeter wave Doppler radars in the study of the early stages of cloud development and evolution.
DESCRIPTORS: Vertical motion in clouds; Doppler radar observation of vertical velocity; Johannesburg, South Africa

34100053 ID NO.- MGA34100053
Millimeter-wave radar applications in meteorology.
Pasqualucci, Fausto
NOAA, Wave Progation Lab.
Atmospheric Technology, Boulder, CO., No. 13, 1981. p. 46-57. Refs., figs.
CTRY OF PUBL: US
Radars operating at millimeter wavelengths can detect smaller particles (from a few micrometers to precipitation size) which can provide valuable data during the earliest stages of cloud and precipitation formation. The millimeter portion of the electromagnetic spectrum of interest for meteorological radar applications spans the range of frequencies from 30 to 300 GHz (wavelengths from 10 to 1 mm). The possibilities of using polarization diversity techniques in millimeter-wave radars to study the microphysics of clouds, and Doppler to study their kinematics and dynamics, have prompted NOAA to develop a dual-polarized, 35- GHz Doppler radar. The system uses two separate 1.2-m antennas for transmitting and receiving. All parameters are controlled by a microprocessor.
DESCRIPTORS: Radar meteorology; Weather radar applications; Doppler radar; Doppler radar applications

34080272 ID NO.- MGA34080272
Variation of drop-size distribution in convective storms: a comparison between theory and radar measurements.
Pasqualucci, Fausto
NOAA/ERL/Wave Propagation Lab., Boulder, CO.
Geophysical Research Letters, Wash., D.C., 9(8): 839-841, Aug. 1982. Refs. (Paper 2L1083). Reprint available from American Geophysical Union, Wash., D.C. 20009.
CTRY OF PUBL: US
Drop size distribution measurements in a squall line storm were made with a vertically pointing Doppler radar operating at 35 GHz. The measured drop size distributions are parameterized to an exponential distribution, and the parameters N SUB O and LAMBDA are calculated. These two parameters are then related to the measured liquid water content, W, and the results show that, for W values exceeding 1.2 g m SUPER - SUPER 3 , LAMBDA becomes a constant and independent of W, while N SUB O increases with increasing W. These results are in excellent agreement with collisional breakup theories, and they permit a more accurate modelling of the physical processes involved in the formation and evolution of clouds and precipitation.
DESCRIPTORS: Raindrop size distribution measurements; Doppler radar observation of drop size distribution

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DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

32070047 ID NO.- MGA32070047
New aspect of the vertical incidence Doppler radar spectrum of ice particle fall speeds.
Passarelli, Richard E., Jr.; Srivastava, Ramesh C.
MIT, Cambridge; Univ. of Chicago, IL.
Journal of Applied Meteorology, Boston, 19(11): 1318-1322, Nov. 1980. Refs. DAS, DLC
CTRY OF PUBL: US
Unlike raindrops, ice particles of the same mass can have different fall speeds because of variations in the particle shape and bulk density. (This is an extension of the popular axiom that no two snowflakes are alike.) This is an additional source of variance for vertical incidence Doppler (VID) spectra taken in snow, which has been neglected in previous studies that assume a one-to-one fall speed-mass relationship. The total VID spectral variance caused by the dispersion of ice particle fall speeds can be divided into two components; i.e., that caused by the mean fall speed-mass relationship and that caused by fluctuations about the mean. Existing data on ice particle fall speeds are not adequate for a thorough evaluation but indicate that these two sources of fall speed variance can be of the same order. These results suggest that the task of deducing snow-size spectra from VID measurements is more difficult than has been recognized.
DESCRIPTORS: Snowflake fall velocity; Doppler radar observation of snow

35070043 ID NO.- MGA35070043
Parametric estimation of Doppler spectral moments: an alternative ground clutter rejection technique.
Passarelli, Richard E., Jr.
Dept. of Met. and Physical Ocean., MIT, Cambridge
Journal of Climate and Applied Meteorology, Boston, 22(5): 850-857, May 1983. Refs. DAS, DLC
CTRY OF PUBL: US
The theory of parametric techniques for recovery of Doppler spectral moments from ground-clutter-contaminated measurements of the radar autocorrelation function is presented. Seven algorithms for the mean velocity are given as examples and are evaluated by using simulated gaussian weather and measured ground clutter signals. Some algorithms can provide accurate estimates of the mean velocity at clutter-to-signal power ratios of >10 dB, and one performs well at 20 dB. An example in actual precipitation is also presented.
DESCRIPTORS: Doppler radar data processing

31050056 ID NO.- MGA31050056
Clear air Doppler radar measurements of the vertical component of wind velocity in the troposphere and stratosphere.
Peterson, Vern L.; Balsley, Ben B.
Centennial Sci., Inc., Colorado Springs, CO.; Aeron. Lab., NOAA, Boulder, CO.
Geophysical Research Letters, Wash., D.C., 6(12): 933-936, Dec. 1979. Refs., figs. (Paper 9L1215). Reprint available from American Geophysical Union, Wash., D.C. 20009.
CTRY OF PUBL: US
The authors discuss three techniques for using a Doppler radar to deduce the vertical component of the wind velocity in the optically clear atmosphere. These techniques involve operating the radar antenna in three different modes: 1) scanning along almucantar circles (azimuth scans), 2) scanning along vertical circles (elevation scans), and 3) leaving the antenna fixed at the zenith. Results obtained from the Chatanika, Alaska, radar facility are presented which show that, below about 5-km altitude, all three methods give essentially the same results. Above this altitude, the first two methods become increasingly subject to errors arising from the effect of large-scale atmospheric inhomogeneities and, thus, give less reliable vertical velocities. The zenith method gives accurate vertical velocities for all altitudes within its range.
DESCRIPTORS: Vertical velocity measurement techniques; Doppler radar observation of vertical velocity; Chatanika, Alaska

34070256 ID NO.- MGA34070256
First measurements of size and velocity of a violent tornado.
Purrett-Carroll, Louise
Weatherwise, Wash., D.C., 35(3): 127-130, June 1982. DAS, DLC
CTRY OF PUBL: US
Researchers with NOAA were able to obtain the first radar measurements of the size and wind velocity of a violent tornado. It is reported that the tornado, which plowed through farmland north of Binger, OK., on May 22, 1981, averaged a half-mile in width and had winds of 196 mi/hr. The funnel was tossing out debris at a velocity of 43 m/hr. The measurements were made with specially equipped Doppler radar that can measure not only the location but also the velocity of distant moving objects, such as windborne precipitation or debris.
DESCRIPTORS: Tornado studies; Tornado wind velocities; Doppler radar observation of tornadoes; Binger, Oklahoma

34030351 ID NO.- MGA34030351
Doppler radar observations of momentum flux in a cloudless convective layer with rolls.
Rabin, R. M.; Doviak, R. J.; Sundara Rajan, A.
Natl. Severe Storms Lab., Norman, OK.; Cooperative Inst. for Mesoscale Met. Studies, Univ. of OK.
Journal of the Atmospheric Sciences, Boston, 39(4): 851-863, April 1982. Refs. DAS, DLC
CTRY OF PUBL: US
Dual Doppler radars are used to obtain momentum flux and turbulence intensities in the cloudless convective boundary layer (CBL) containing roll vortices. Momentum flux for small scales unresolved by the radar is determined from the
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difference between the measured flux and the flux implied by the velocity defect profile. While the small-scale flux indicates a reasonable eddy diffusivity profile, the measured flux is of the opposite sign expected from K theory. Two terms in the turbulent kinetic energy budget-the shear production and the divergence of the energy flux-are calculated for measurable scales. It is proposed that the tilting of convective roll circulations by cross-shear produces the observed flux in the upper part of the CBL.

DESCRIPTORS:. Momentum flux; Momentum flux measurement techniques; Boundary layer turbulence; Doppler radar applications

33060281 ID NO.- MGA33060281

Project Severe Environmental Storms and Mesoscale Experiment: SESAME 1979 Doppler radar logs.

Ray, Peter S.

United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., Boulder, CO., Aug. 1980. 79 p. Tables, figs. DAS (A QC 941 P46)

CTRY OF PUBL: US

This report constitutes a Doppler radar summary for SESAME '79. The contents include radar parameters and data peculiarities of the CP-3 and CP-4 radar, SESAME '79 Doppler radar sites, radar characteristics; radar scan summaries, and common Doppler radar exchange format.

DESCRIPTORS: Project SESAME; Doppler radar; Doppler radar observation of severe storms

32080030 ID NO.- MGA32080030

Single- and multiple-Doppler radar observations of tornadic storms.

Ray, Peter S.

Natl. Severe Storms Lab., Norman, OK.

Monthly Weather Review, Boston, 108(10): 1607-1625, Oct. 1980. Refs. DAS, DLC

CTRY OF PUBL: US

The use of one, two, three, or more Doppler radars has become increasingly common in research programs. The advantage in increasing the number of radars is in the increased area covered and the accuracy with which wind estimates may be obtained. Although multiple radar systems can yield special quantitative insight, a great deal of information can still be determined in real time from a single radar. It should be noted that the interpretation of radial velocity estimates from a single radar are not always unambiguous. Color displays of single-Doppler radial velocity patterns aid in the real-time interpretation of the associated reflectivity fields and can reveal important features not evident in the reflectivity structures alone. Such a capability is of particular interest in the identification and study of severe storms. A display using a 5-cm Doppler radar is used to illustrate the patterns seen from several tornadic storms that occurred in central Oklahoma on May 20, 1977. Interpretation of some complicated or ambiguous features is added by including data from additional radars. Additional explanations on such structure are given from an analysis based upon a new dual-Doppler analysis technique for one of 16 tornadic storms that occurred on May 20, 1977. Several alternative analysis schemes for two to four Doppler radars are also demonstrated and compared. These illustrate the major differences found in error propagation, use of information, and in difference quantities, such as divergence. It is shown that an analysis that specifies boundary values for w is not strongly dependent upon the number of radars.

DESCRIPTORS: Tornado observation techniques; Doppler radar observation of tornadoes; Oklahoma, United States

33040236 ID NO.- MGA33040236

Clear-air roll vortices and turbulent motions as detected with an airborne gust probe and dual-Doppler radar.

Reinking, R. F.; Doviak, R. J.; Gilmer, R. O.

Journal of Applied Meteorology, Boston, 20(6): 678-685, June 1981. Refs. DAS, DLC

CTRY OF PUBL: US

A case study comparison is made of simultaneous airborne gust probe and dual-Doppler radar measurements of motions associated with roll vortices in the optically clear planetary boundary layer. Intercomparison of the cross-roll component of motion is emphasized. Similarities and differences in the data obtained with the two systems are discussed. Despite the differences in measurement techniques, agreement is good among the independent depictions of the roll structure, quantitative determinations of the intensities, and the predominant scales of eddy motion. The observed roll vortices fit descriptions and cause-effect relationships from certain models and other observations.

DESCRIPTORS: Roll vortices; Boundary layer turbulence

36040263 ID NO.- MGA36040263

Review of multiparameter radar observations of precipitation.

Rogers, R. R.

Dept. of Met., McGill Univ., Montreal, Canada

Radio Science, Wash., D.C., 19(1): 23-36, Jan./Feb. 1984. Refs. (Paper 3S0898). Reprint available from American Geophysical Union, Wash., D.C. 20009. DAS, DLC

CTRY OF PUBL: US

From the earliest years of radar meteorology, efforts have been devoted to multiparameter observations: the measurement of one or more signal properties, ordinarily in addition to the signal intensity, to give added information on the precipitation. Studies using variable polarization or Doppler frequency measurement were among the first such techniques and, over the years, have proved fruitful in terms of the information provided. During the past decade, there has been such an increase in the use of Doppler radar in meteorological research that radar-measured wind fields are becoming nearly

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as routine as reflectivity fields. Research has continued in variable polarization techniques, which appear to provide a means of distinguishing remotely between various precipitation types. Investigations of the correlation between the copolarized and cross- polarized components of the received signal have given new insight into the falling behavior of precipitation particles. A great deal of new information will evidently be made available by combining coherent signal processing techniques with variable polarization measurements.

DESCRIPTORS: Radar observation of precipitation; Doppler radar observation of precipitation; Radar precipitation studies

32030347 ID NO.- MGA32030347

Three-dimensional motions, fields of pressure and temperature gradients within a convective cell from dual Doppler radar observations.

Roux, R.; Chong, M.; Testud, J.

Journal de Recherches Atmospheriques, Clermont-Ferrand, France, 13(4): 336, Oct./Dec. 1979. Abstract 6- 3.12. (Conference Internationale VIII SUPER e , sur la Physique des Nuages, Clermont-Ferrand, 15-19 juillet 1980, Resumes).

CTRY OF PUBL: FR

The RONSARD dual Doppler radar system was used to determine the internal structure of a convective cell, as observed near Paris on Oct. 6, 1977. Data were gathered within a warm and strongly sheared southwest flow. The computed three-dimensional wind field shows that the main feature is an instability developed between the altitudes of 2 and 5 km. The ability of the data processing method to provide velocities that are stable with respect to the first-order derivatives makes it possible to estimate the contributions of pressure and gravity forces, deduced by means of the equation of motion. The obtained horizontal pressure gradients are explained in terms of interaction between vertical motions and horizontal wind shear. As far as the vertical air acceleration is concerned, a method is developed in order to separate the respective contributions of the vertical pressure force and the graviational forces (buoyancy and liquid water loading). They are shown to have effects opposing each other in their contributions to the motion.

DESCRIPTORS: Convective cells; Doppler radar observation of convective cells; Paris, France

36020117 ID NO.- MGA36020117

Small-scale structure of layered clouds during PEP (1981), deduced from millimeter-wave Doppler radar analysis.

Sauvageot, H.

Inst. et Obs. de Phys. du Globe du Puy de Dome, Centre de RecherchesAtmos., Campistrous, Lannemezan, France

World Meteorological Organization, Weather Modification Programme, Geneva, Precipitation Enhancement Project, PEP Report No. 20, Jan. 1983. p. 59-73. DAS (A QC 926.6 P7)

CTRY OF PUBL: SZ

The purpose of the millimeter-wave RABELAIS radar observations in the PEP experiment was to provide measurements of the distributions of vertical air motion and radar reflectivity in layered clouds. This work was done to obtain a better quantitative interpretation of the radar measurements and to obtain simultaneous information on microphysical spectra and air motion. In addition, measurements of the raindrop size distribution at the ground were performed with a disdrometer.

DESCRIPTORS: Precipitation Enhancement Project (PEP); Cloud seeding potentialities; Radar investigation of cloud seeding potentialities; Doppler radar observation of clouds; Duero River Basin, Spain

31030057 ID NO.- MGA31030057

Meteorological radar signal.

Serafin, R. J.; Strauch, R.

Natl. Ctr. for Atmos. Res., Boulder, CO.; NOAA/Environ. Res. Labs., Wave Propagation Lab., Boulder

American Society for Testing and Materials, Philadelphia, PA., Special Technical Publication 653, 1978. p. 159-182. Refs. (NCAR Reprint No. 3105)

CTRY OF PUBL: US

Modern meteorological Doppler radar has applications related to measurements of precipitation intensities and kinematics in convective storms, widespread stratiform precipitating systems, winter frontal and cyclonic storm systems, and other cloud systems. In addition, air velocities may be measured in the optically clear atmosphere from backscatter caused by refractive index perturbations or from dispersed chaff tracers. To derive the maximum scientific benefit from Doppler radar, it is necessary to process vast quantities of data in real time at rates in excess of 1 MHz. Fortunately, current integrated circuit technology permits such processing; however, this ability to process data rapidly also produces data rapidly and results in large data sets that must be stored and processed further for outputs of maximum meteorological significance to be derived. Even when data compression ratios of 100:1 are achieved in real time, modern meteorological Doppler radar can produce 9-track, 732-m (2400-ft) tapes at the rate of two per hour. This paper describes the chain of processing from real-time processing and acquisition, to displaying processed single and multiple Doppler radar data. The meteorological significance of the work is also described.

DESCRIPTORS: Doppler radar applications; Radar data processing

35040038 ID NO.- MGA35040038

Correlation analysis of Doppler radar data and retrieval of the horizontal wind.

Smythe, Glenn R.; Zrnic', Dusan S.

Systems and Applied Sci., Corp., Lexington, MA.; Natl. Severe Storms Lab./NOAA, Norman, OK.

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Journal of Climate and Applied Meteorology, Boston, 22(2): 297-311, Feb. 1983. Refs., figs., appendix. DAS, DLC
CTRY OF PUBL: US
A technique for tracking patterns of radial velocity and reflectivity data obtained with a single-Doppler radar is described. Application of the technique to two different scans of the same spatial region may lead to the extraction of a field of wind vectors with both radial and azimuthal components. This is accomplished by displacing, in range and azimuth, small volumes or boxes of data from the earlier scan and then correlating them with boxes of equal dimensions from the later scan. The displacements at which correlation coefficients maximize are assumed to be due to the advection of patterns existing at scales up to the box dimensions. Correlation coefficients of radial velocities are shown, for the clear air cases analyzed, to be higher than those of reflectivity [dB(Z)]. Winds retrieved by correlating velocities and reflectivities independently are compared with each other and with winds synthesized from dual-Doppler radar data. Winds from radial velocity correlations agree better with the dual-Doppler winds than do winds from reflectivity correlations. Convective rolls spaced APPROX. 5 km apart are revealed in the planetary boundary layer.
DESCRIPTORS: Wind observation techniques; Doppler radar wind measurement

33070035 ID NO.- MGA33070035
Applications of meteorological Doppler radar for weather surveillance near air terminals.
Strauch, Richard G.
NOAA, ERL, Wave Propagation Lab., Boulder, CO.
In: United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., Wave Propagation Lab., Boulder, CO., Collected reprints, 1979. May 1981. p. 390-397. Refs. DAS (A QC 865 W38). Reprinted from IEEE Transactions on Geoscience Electronics, N.Y., No. 17, Oct. 1979. p. 105-112.
CTRY OF PUBL: US
Meteorological Doppler radar, heretofore a tool for research, can be considered for operational applications. One important application is to provide data for air traffic controllers to identify weather that may be hazardous to aircraft in terminal areas. Its use at large commercial airports may be justified both by safety and by savings in fuel and operating costs that should result from more precise definitions of hazardous atmospheric conditions. Five measurement tasks are proposed for an airport Doppler radar. The first two, measurement of radar reflectivity in precipitation systems and measurement of the vertical profile of horizontal winds, were shown to be ready for operational implementation. Preliminary evidence shows that two others, identification of shear or turbulence in thunderstorms and identification of wind shear hazards along approach paths, can provide warning of dangerous wind, but work remains to tie the radar measurements to aircraft hazards. The last suggested use, identification and tracking of wake vortex turbulence, has not yet been demonstrated. An airport Doppler radar can certainly provide some data that will increase flight safety; if it proves capable of all the above, it would be in demand.
DESCRIPTORS: Doppler radar applications; Airport meteorological equipment

31070460 ID NO.- MGA31070460
Lightning echoes from 10-cm radar.
Szymanski, Edwin W.; Rust, W. David
NOAA, Natl. Severe Storms Lab., Norman, OK.
American Geophysical Union, Wash., D.C., EOS: Transactions, 59(12): 1089, Dec. 1978. Abstract only. (Fall Meeting Program, San Francisco, Dec. 4-8, 1978) DAS, DLC
CTRY OF PUBL: US
Radar echoes from lightning were observed during the summer of 1978 by using the 10-cm Doppler radar facility at the National Severe Storms Laboratory. The lightning echoes were detected at ranges varying from APPROX. 20 to 180 km and had spatial extents varying from several hundred meters to 45 km. Typical echo durations were several hundred milliseconds. For the first time, radar video from the lightning echoes was simultaneously recorded with electric field and electric field change data on a wide bandwidth recorder for comparison and correlation.
DESCRIPTORS: Radar echoes from lightning; Doppler radar observation of lightning

31060039 ID NO.- MGA31060039
Doppler radar observation of a cold front: three-dimensional air circulation, related precipitation system, and associated wavelike motions.
Testud, J.
Ctr. de Recherche en Phys. de Environ. Terrestre et Planetaire,Issy-les-Moulineaux, France
Journal of the Atmospheric Sciences, Boston, 37(1): 78-98, Jan. 1980. Refs. DAS, DLC
CTRY OF PUBL: FR
This paper is based upon the observation of a cold front using a C-band Doppler radar. The extent of the precipitation system associated with the front permitted collection of Doppler radar data during 12 consecutive hours. The methodology used for data acquisition is conical scanning. The data analysis was extended to the case of a nonuniform distribution of tracers. The air circulation is presented in a reference frame moving at the speed of the front. A pronounced cross-frontal circulation is found to be associated with significant cross-frontal acceleration. The thermal structure across the front is reconstructed by means of the equations of motion. From the vertical velocity field, an estimate of the height-integrated condensation rate is made. It is found to agree with the rainfall rate inferred from the radar reflectivity data. Large-amplitude, small-scale motions are detected and identified as a well characterized atmospheric
(cont. next page)

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wave. Theoretical considerations support the explanation that it is the manifestation of a dynamical instability of the shear flow within the frontal zone.

DESCRIPTORS: Doppler radar observation of fronts; Airflow in frontal zones; Cold front precipitation studies

35070030 ID NO.- MGA35070030

Three-dimensional wind field analysis from dual-Doppler radar data, Pt. 1, Filtering, interpolation, and differentiating the raw data.

Testud, J.; Chong, M.

CNET-CNRS, Centre de Recherches en Phys. de l'Environ. Terrestre dePlanetaire, Issy-les-Moulineaux, France

Journal of Climate and Applied Meteorology, Boston, 22(7): 1204-1215, July 1983. Refs. For abstract of Pt. 2, see Met. Abs., 35.7-28. DAS, DLC

CTRY OF PUBL: US

This paper is the first of three dealing with the three-dimensional wind field analysis from dual-Doppler radar data. Part 1 contains the first step of the analysis, which consists in interpolating and filtering the raw radial velocity fields within each coplane (or common plane simultaneously scanned by the two radars). To carry out such interpolation and filtering, a new method is proposed, based on the principles of numerical variational analysis described by Sasaki (1970): the filtered representation of the observed field should be close to the data points (in a least squares sense) and verify some imperative of mathematical regularity. Any method for interpolating and smoothing data is inherently a filtering process. The proposed variational method makes it possible to control this filtering. The presented method is developed for any function of two variables, but could be extended to the case of three or more variables. Numerical simulations substantiate the theoretically predicted filtering characteristics and show an improvement on other filtering schemes. It is found, compared to the classical filtering accomplished by using the Cressman weighting function, that the variational method brings a substantial improvement of the gain curve (in the sense of a steeper cutoff), when the regularity of the second-order derivatives is imposed. This improvement is achieved without increasing the computing time. It is emphasized that an elaborate numerical differentiation scheme should be used to estimate the divergence, otherwise the gain curve for this parameter may be different from that for the Cartesian coplane velocities (which may induce distortion in the final three-dimensional wind field).

DESCRIPTORS: Wind field analysis; Doppler radar wind measurements

34030063 ID NO.- MGA34030063

Evaluation of a meteorological airborne pulse Doppler radar.

Trotter, B. L.; Strauch, Richard G.; Frush, C. L.

Weather Modification Program Off., Boulder, CO.; Wave Propagation Lab.; Natl. Ctr. for Atmos. Res.

United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., Boulder, CO., Technical Memorandum (NOAA TM ERL WMPO-45), July 1981. 57 p. Refs., graphs, tables. DAS (A QC 807.5 U6W5)

CTRY OF PUBL: US

The characteristics of the airborne Doppler radar, which is a modified version of the X-band radar installed in the tail section of the WP3D aircraft, and a block diagram of the radar system are presented. The error sources of the Doppler airborne radar are examined, i.e., transmitting and receiving system instabilities and requirements for internal and external stability. Tests are described which were performed on the Doppler radar to determine whether the transmitter and oscillators are sufficiently stable for Doppler measurements; whether the stability can be maintained in an aircraft environment; and how well the Doppler, when installed in an aircraft, can measure the radial velocities in light-to-heavy precipitation and in nonturbulent-to-turbulent meteorological situations. The observation of a fixed target revealed some instability in the system, but the amount did not prohibit measuring radial velocities. The base-line noise level in the system increased whenever video returns were present, but at no time during the testing was it found that the system noise was masking a target whose radial velocities were to be measured. The system can definitely be used in an airborne environment, but limitations exist in its use which must be considered. The airborne Doppler can determine vertical velocities comparable to those that would be measured by a ground-based Doppler radar.

DESCRIPTORS: Airborne Doppler radar; Doppler radar observation of vertical velocity

31110078 ID NO.- MGA31110078

Preliminary tests of an airborne meteorological pulse Doppler radar.

Trotter, B. L.; Strauch, R. G.; Frush, C. L.

NOAA/ERL/Weather Modification Program Off., Boulder, CO.; NOAA/ERL/Wave Propagation Lab., Boulder, CO.; Natl. Ctr. for Atmos. Res., Boulder, CO.

Geophysical Research Letters, Wash., D.C., 7(5): 361-364, May 1980. Refs. (Paper 80L0405). Reprint available from American Geophysical Union, Wash., D.C. 20009.

CTRY OF PUBL: US

An X-band Doppler radar in the tail of a WP-3D research aircraft was used to conduct tests in order to demonstrate that technology developed for ground-based Doppler radar can be applied to an airborne system. Doppler spectra of meteorological targets and chaff were measured with the airborne radar; these measurements compared favorably with data obtained by wind sensors on the aircraft and with measurements made by using a ground-based Doppler radar. This paper describes the airborne Doppler radar and the preliminary test results.

DESCRIPTORS: Airborne Doppler radar; Doppler radar applications

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DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

36070210 ID NO.- MGA36070210
Determination of velocity vectors of thermospheric wind from dispersion relations of TIDs observed by an HF Doppler array.
Tsutsui, Minoru; Horikawa, Takashi; Ogawa, Toru
Radio Atmos. Sci. Ctr., Kyoto Univ., Uji, Japan;
Journal of Atmospheric and Terrestrial Physics, Oxford, 46(5): 447-462, May 1984. Refs. DAS, DLC
CTRY OF PUBL: UK
A method of determining horizontal velocity vectors and temperature of thermospheric winds from azimuthally different OMEGA -k diagrams derived from the data of traveling ionospheric disturbances (TIDs) observed by an HF Doppler array has been developed. In this method, an analogous property between the Brunt-Vaisala frequency in the atmospheric oscillations and the plasma frequency in the plasma oscillations is applied to the analysis of the observed data. A declination of the resonance branches of the Brunt-Vaisala frequency in the OMEGA -k diagrams resulting from a Lorentz transformation is used for the estimation of the velocity vector of the thermospheric wind. This method makes it possible to separate the velocity vector of the thermospheric wind and the propagating directions of the TIDs from the azimuthally different OMEGA -k diagrams. Several results of the velocity vectors during the daytime data are consistent with the results obtained by incoherent scatter radars and theoretical results. A typical dispersion curve that agrees well with those of the acoustic gravity waves derived from the linear perturbation theory under the isothermal atmospheric condition has been obtained also.
DESCRIPTORS: Thermospheric wind determination; Doppler radar ionospheric investigations

32060216 ID NO.- MGA32060216
''Araks'' Doppler radar measurements of the ionospheric effects of artificial electron beam in the North Hemisphere.
Uspenskiy, M. V.; Timofeyev, Ye. Ye.; Sverdlov, Yu. L.
Polar Geophys. Inst., Acad. of Sci., Murmansk, U.S.S.R.;
Annales de Geophysique, Paris, 36(3): 303-312, July/Sept. 1980. Refs. English and French summaries. DAS, DLC (QC801.A64)
CTRY OF PUBL: FR
The results of Doppler radar measurements made during the two flights of the Araks experiments are presented. The possibility of radar detection of artificial electron beam injection from a magnetically conjugated region is proved. The scattering spectrum is shown to have a double peak structure. Different characteristics of each component are described. Possible physical mechanisms of such scattering and its connection with the beam parameters are discussed.
DESCRIPTORS: Ionospheric processes; Electron effects on ionosphere; Doppler radar observation of ionosphere

33080019 ID NO.- MGA33080019
Measurement of the horizontal wind velocity using a fan-beam Doppler radar.
Uyeda, Hiroshi; Yagi, Tsuruhei
Natl. Res. Ctr. for Disaster Prevention, Japan
Japan. National Research Center for Disaster Prevention, Tokyo, Research Notes, No. 42, June 1980. 24 p. Refs., figs. In Japanese; English summary. DAS (A GB 5000 R4)
LANGUAGE: other
CTRY OF PUBL: JA
Observations of the horizontal wind velocity were made by using a fan-beam Doppler radar at Mitaka, Tokyo, from Sept. 10 to Oct. 10, 1979. The horizontal wind velocity was calculated from the combination of two radial components of wind velocity, measured at several selected points within the radar echoes of the rainfall. For the calculation, an assumption was made that the horizontal wind velocities were uniform around the two measuring points for each combination. The horizontal wind velocities measured by the Doppler radar are similar to each other for all series of measurements made within APPROX. 1 hr; they are also similar to the upper mean wind velocity obtained from the routine rawinsonde observation of the Aerological Observatory at Tateno. From these results it is seen that the horizontal wind velocity can be measured easily by using a fan-beam Doppler radar.
DESCRIPTORS: Wind velocity measurement techniques; Doppler radar wind measurement; Mitaka, Japan

34080138 ID NO.- MGA34080138
Life cycle of thunderstorm gust fronts as viewed with Doppler radar and rawinsonde data.
Wakimoto, Roger M.
Dept. of the Geophys. Sci., Univ. of Chicago, IL.
Monthly Weather Review, Boston, 110(8): 1060-1082, Aug. 1982. Refs., appendix. DAS, DLC
CTRY OF PUBL: US
The author presents the time-dependent analysis of the thunderstorm gust front with the use of Project NIMROD data. RHI cross sections of reflectivity and Doppler velocity are constructed to determine the entire vertical structure. The life cycle of the gust front is divided into four stages: 1) the formative stage; 2) the early mature stage; 3) the late mature stage; and 4) the dissipation stage. A new finding is a horizontal roll detected in the reflectivity pattern resulting from airflow that is deflected upward by the ground, while carrying some of the smaller precipitation ahead of the main echo core of the squall line. This feature is called a precipitation roll. As determined from rawinsonde data, the cold air behind the gust front is responsible for the observed surface pressure rise. Calculations confirm that the collision of two fluids produces a nonhydrostatic pressure at the leading edge of the outflow. The equation governing the propagation speed of a density current accurately predicts the movement of the gust front.
DESCRIPTORS: Gust fronts; Airflow in thunderstorms

DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

34120032 ID NO.- MGA34120032
Observations by the NCAR CP-2 radar system.
Wilson, J.
Natl. Ctr. for Atmos. Res., Boulder, CO.
In: Goddard, Earl E. (ed.), Boulder Upslope Cloud Observation Experiment. United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., June 1982. p. 88. DAS (H QC 921.377 C6 B7)
CTRY OF PUBL: US
This article presents radar weather information, collected during upslope periods from CP-2 and CP-3 radar systems, and coordinated dual Doppler data, collected by CP-2 and CP-3 radar systems in support of various tasks of the Boulder Upslope Cloud Observation Experiment (BUCOE).
DESCRIPTORS: Radar meteorological studies; Doppler radar measurements; Boulder, Colorado

34100060 ID NO.- MGA34100060
Forecasting applications of Doppler radar.
Wilson, James
NCAR
Atmospheric Technology, Boulder, CO., No. 13, 1981. p. 105-118. Refs., figs.
CTRY OF PUBL: US
This paper illustrates the use of a single Doppler radar as a nowcasting and forecasting tool for diverse weather situations. In widespread precipitation, the vertical profile of the horizontal wind can be measured and monitored easily. Divergence, vertical velocity, area average precipitation, atmospheric waves, and turbulence about the radar can also be estimated. Frontal boundaries associated with wind shifts can be located and their future position forecasted. In addition to issuing tornado warnings associated with mesocyclones, Doppler radar can be used to identify regions along strong shear lines where gust-front-type tornadoes may form. A frequent application should be locating gust fronts and downbursts and estimating the wind speeds associated with them.
DESCRIPTORS: Doppler radar applications; Radar weather forecasting; Radar applications to forecasting

32060044 ID NO.- MGA32060044
Operational application of meteorological Doppler radar.
Wilson, James
Natl. Ctr. for Atmos. Res., Boulder, CO.
American Meteorological Society, Boston, Bulletin, 61(10):1154-1168, Oct. 1980. Refs., figs. DAS, DLC (QC851.A6)
CTRY OF PUBL: US
Single Doppler weather radar velocity and reflectivity fields were obtained with the National Center for Atmospheric Research (NCAR) 5-cm radars for a wide variety of weather situations. Among those weather features that can be identified by means of color displays are the vertical variation of wind with height in widespread precipitation, frontal boundaries, gust fronts, downbursts, tornadoes, hurricane winds, wind shears dangerous to aircraft, and winds in the boundary layer in clear air. It is concluded that, even though a Doppler radar observes only the radial component of the wind, a wide variety of weather features of great importance to weather forecasters can easily be identified with a single radar. For operational applications, a national network of Doppler radars seems justified. It is recommended, particularly in regions of the country where severe storms or high rainfall rates are relatively frequent, that these be 10-cm wavelength radars with a beam width of 1°, and that automatic procedures for removing velocity and range ambiguities be incorporated.
DESCRIPTORS: Doppler radar; Doppler radar applications

35040094 ID NO.- MGA35040094
Nowcasting applications of Doppler radar.
Wilson, James W.; Wilk, Kenneth E.
Natl. Ctr. for Atmos. Res., Boulder, CO.; Natl. Severe Storms Lab., Norman, OK.
In: Symposium on Nowcasting, Hamburg, W. Germany, Aug. 25-28, 1981, Proceedings. London, Academic Press, Inc., Limited, 1982. p. 87-105. Refs., figs. (ESA SP-165). DAS (H QC 995 N58)
CTRY OF PUBL: UK
The use of Doppler radar as a major input in nowcasting and very-short-range forecasting is described. The following are considered: 1) Doppler radar measurement of profiles of wind velocity in widespread precipitation, with the technique producing velocity-azimuth display and the identification of sharp wind shifts associated with frontal boundaries on the color velocity display, leading to the location of fronts, and 2) the use of Doppler radar to obtain velocity measurements in clear air; in the detection of convective storms, including tornadoes, gust fronts, and downbursts; and in connection with aircraft safety involving detection of wind shear and turbulence.
DESCRIPTORS: Very-short-range forecasting; Nowcasting; Doppler radar applications to forecasting

31060408 ID NO.- MGA31060408
Study of mesoscale vertical currents in precipitation.
Yefremov, V. N.; Mel'nichuk, Yu. V.
Central Aerological Obs.
Izvestiya, Academy of Sciences, U.S.S.R., Atmospheric and Oceanic Physics, Wash., D.C., 12(7): 424-427, Feb. 1977. Refs., figs. DAS. Transl. from corresponding Russian issue of Akademiya Nauk SSSR, Moscow, Izvestiya, Fizika Atmosfery i Okeana, 1976. p. 696-702. DAS, DLC
LANGUAGE: en
CTRY OF PUBL: US
The divergence of the wind field and the averaged vertical transport in precipitation with liquid and solid elements were studied with a Doppler radar. Measurements in the lower 3-km

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DIALOG File 29: MET/GEOASTRO ABSTRACTS - 70-85/SEP

layer yielded altitude-time cross sections of the divergence and vertical currents with a resolution of 10-30 km; they indicated that the vertical volocity field has an inhomogeneous structure in steady precipitation. The ascending and descending vertical currents had cell sizes of 30-60 km with vertical velocities as large as 10-15 cm/sec. The maximum values of the vertical fluxes averaged on scales of 10-30 km ranged to 20-40 cm/sec. The wind divergences and the vertical motions in precipitation associated with the passage of fronts are compared with similar data obtained in clear weather during the development of nonfrontal processes.
DESCRIPTORS: Vertical motion in rain; Doppler radar observation of vertical velocity

33050549 ID NO.- MGA33050549
Radar determination of the mobility of sediments in a flow.
Zheleznyakov, G. V.; Terent'yev, N. V.
Soviet Hydrology: Selected Papers, Wash., D.C., 17(3): 169-173, 1978, [pub. 1980]. Refs. DAS. Transl. of original Russian in Leningrad. Gosudarstvennyy Gidrologicheskiy Institut, Trudy, No. 235, 1978. p. 42-51. DAS (A GB 651 L38), DLC
LANGUAGE: en
CTRY OF PUBL: US
Radar measurements of the speed of particles moving in a duct, based on the Doppler effect, have significant advantages. The essence of the Doppler effect is that the difference between direct and reflected electromagnetic signals is directly proportional to the speed of an object. A block diagram shows a radar set for determining the speed of particles, consisting of a Doppler signal pickup, a Doppler frequency amplifier, antennas, a klystron generator, a detector unit, a slot bridge, a power supply, and a measuring transformer. Results of experiments are tabulated and analyzed.
DESCRIPTORS: River sediment transport measurement techniques ; Doppler radar observation of river sediment transport

32100255 ID NO.- MGA32100255
Wind speeds in two tornadic storms and a tornado, deduced from Doppler spectra.
Zrnic, Dusan; Istok, Michael
Natl. Severe Storms Lab., Norman, OK.
Journal of Applied Meteorology, Boston, 19(12): 1405-1415, Dec. 1980. Refs. DAS, DLC
CTRY OF PUBL: US
Doppler spectra of a tornado were collected with a radar having a large unambiguous velocity range, PLUS OR MINUS 91 m sec SUPER - SUPER 1 . Thus, for the first time, a presentation of nonaliased spectra was possible, showing direct measurement of radial velocities. By fitting the tornado model spectrum to data, the radius of maximum winds and tornado center location are deduced. Tornado spectral signature is defined as a double peak, symmetric with regard to the mean wind spectrum. Histograms of maximum measured wind speeds (from spectrum skirts) for two tornadic storms are obtained, and the histograms of velocity difference (between the left and right spectrum skirt) suggest that smaller scale turbulence (<500 m) is principally responsible for spectrum broadness.
DESCRIPTORS: Tornado wind velocities; Doppler radar observation of tornadoes

33050098 ID NO.- MGA33050098
Doppler radar.
Zrnic', Dusan S.
United States. National Oceanic and Atmospheric Administration, Environmental Research Labs., Norman, OK., Technical Memorandum (NOAA TM ERL NSSL-90), March 1981. p. 3-21. Figs. DAS (A QC 807.5 U6 N7)
CTRY OF PUBL: US
Since 1973, the Atomic Energy Commission (AEC) provided major support for the development of improved Doppler capability of the National Severe Storms Laboratory (NSSL) radar. NSSL's first real-time Doppler velocity processor (phase-change counter) produced velocity contour maps of mesocyclone signatures during the spring of 1973. A second generation radar real-time display, necessary in defining vortex characteristics, was developed at NSSL in 1974. Tornado characteristics deduced from Doppler spectra are tabulated for three storms: Union City, OK. (May 24, 1973), Stillwater, OK. (June 13, 1975), and Del City, OK. (May 20, 1977). Engineering studies of tornado damage were performed by the Institute for Disaster Research (IDR), Texas Tech University; a complete history will be contained in a separate IDR report.
DESCRIPTORS: Doppler radar; Doppler radar observation of severe storms; Doppler radar observation of tornadoes

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

1979975 N85-31362/5/XAB
Etude de Brouillage de Doris Par les Faisceaux Hertziens a 2 Ghz (Study of the Interferences of 2 Ghz Radio BEAMS with a Doris System)
Aguttes, J. P.
Centre National d'Etudes Spatiales, Toulouse (France).
Corp. Source Codes: 059105000; CL469024
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: CNES-CT/DRT/TIT/RL-84/140-T
20 Feb 84 25p
In French; English Summary.
Languages: French
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8523; STAR2320
Country of Publication: France
Potential jamming of Doppler receivers by ground transmitters was studied. A statistical evaluation of the number of transmitters in sight of the spaceborne receiver is made. The permanent induced noise density level and the probability of fugitive jamming by discrete signals are given.
Descriptors: Accuracy; *Electromagnetic interference; *Microwave transmission; Orbit calculation; *Signal reception *Spacecraft communication; Doppler navigation; Doppler radar; Signal distortion; Signal to noise ratios
Identifiers: *Foreign technology; NTISNASAE
Section Headings: 17B (Navigation, Communications Detection, and Countermeasures--Communications); 17D (Navigation, Communications Detection, and Countermeasures--Electromagnetic and Acoustic Countermeasures); 45C (Communication--Common Carrier and Satellite); 63B (Detection and Countermeasures--Electromagnetic and Acoustic Countermeasures)

1047877 PB84-165224
Profs' Doppler Radar Data Processing System. Part 1. Design and Implementation with Application to Nexrad Algorithms
Alberty, R. L. ; Holitza, F. J. ; Ackley, M. H. ; Smart, J. R. ; Lipschutz, R. C.
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Sciences Group.
Corp. Source Codes: 031828060
Report No.: NOAA/TM/ERL/ESG-3; NOAA-84030702
Sep 83 157p
Languages: English
NTIS Prices: PC A08/MF A01 Journal Announcement: GRAI8410
Country of Publication: United States
The Program for Regional Observing and Forecasting Services (PROFS) has designed and implemented a processing and display system for Doppler radar data. This system processes a set of meteorological algorithms developed from algorithm descriptions provided by the Next Generation Weather Radar (NEXRAD) Joint System Program Office (JSPO). The methodology used to develop this system is discussed, and details of the computer hardware and software are given.
Descriptors: *Data processing; *Weather forecasting; *Storms ; Doppler radar; Meteorological radar; Storm tracks; Algorithms; Cyclones; Fortran; Warning systems; Accuracy; Meteorological satellites; Hail; Radar echoes; Computer systems programs
Identifiers: NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 9B (Electronics and Electrical Engineering--Computers); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1115695 AD-A150 856/3/XAB
Air Force Geophysics Laboratory's (AFGL) Mobile CO2 Doppler Lidar
Alejandro, S. B. ; Fitzgerald, D. R.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-85-0010
28 Jan 85 5p
Presented at the Conference on 'Optical Remote Sensing of the Atmosphere', 15-18 Jan 85 at Incline Village, NV.
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8511
Country of Publication: United States
Contract No.: 7670; 16
A mobile, pulsed, coherent, Doppler CO2 lidar is being developed at Air Force Geophysics Lab. The system will be used to develop real-time techniques for determining wind field structures and evaluating aerosol backscatter measurements over path lengths of 1 km to 20 km range.
Descriptors: *Optical radar; *Doppler radar; Carbon dioxide lasers; Aerosols; Measurement; Real time; Backscattering; Wind
Identifiers: Atmospheric transmissivity; Remote sensing; NTISDODXA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17E (Navigation, Communications Detection, and Countermeasures--Infrared and Ultraviolet Detection); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1054118 AD-D010 914/0
Factored Matched Filter/FFT (Fast Fourier Transform) Radar Doppler Processor
(Patent Application)
Andrews, G. A. ; Sheller, S. L.
Department of the Navy, Washington, DC.
Corp. Source Codes: 001840000; 110050
Report No.: PAT-APPL-6-575 608
Filed 31 Jan 84 44p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.
Languages: English Document Type: Patent
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8413

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DIALOG INFORMATION SERVICES, INC.

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

Country of Publication: United States
The present Invention relates generally to novel radar processors and, more particularly, to radar Doppler processors which exhibit maximum clutter rejection and low minimum detectable velocity with minimal loss. Presently available radar Doppler processing techniques to distinguish moving from fixed targets include moving target indicator processors (MTI), weighted fast Fourier transform processors (FFT), and cascaded MTI and FFT processors. The criteria used to evaluate the performance. of a particular Doppler processor are the improvement factor (IF) which is a measure of the clutter rejection capability, the signal processing loss which is a measure of the loss in signal to noise ratio from the ideal, and the minimum detectable velocity (MDV) which is a measure of the ability to detect low velocity targets or targets whose velocity vector is nearly tangential to the direction of the radar.
Descriptors: *Patent applications; *Matched filters; *Radar clutter; *Signal processing; *Fast fourier transforms; *Moving target indicators; *Doppler radar; Rejection; Radar targets; Signal to noise ratio; Low velocity; Targets; Losses; Radar; Stationary; Processing; Inventions
Identifiers: Coherent filters; MDV(Minimum Detectable Velocity); Integration filters; Radial velocity; Factored filters; Fourier processors; Weighted fourier transforms; IF(Improvement Factor); NTISGPN
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 90F (Government Inventions For Licensing--Electrotechnology); 63H (Detection and Countermeasures--Radiofrequency Detection)

1118659 AD-A151 533/7/XAB
Developments in Radar Imaging
(Journal article)
Ausherman, D. A. ; Kozma, A. ; Walker, J. L. ; Jones, H. M. ; Poggio, E. C.
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Corp. Source Codes: 009875001; 207650
Sponsor: Electronic Systems Div., Hanscom AFB, MA.
Report No.: JA-5586; ESD-TR-84-320
Jul 84 40p
Pub. in IEEE Transactions on Aerospace and Electronic Systems, vAES-20 n4 p363-400 Jul 84.
Languages: English Document Type: Journal article
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8512
Country of Publication: United States
Contract No.: F19628-80-C-0002; 649L
Using range and Doppler information to produce radar images is a technique used in such diverse fields as air-to-ground imaging of objects, terrain, and oceans and ground-to-air imaging aircraft, space objects, and planets. A review of the range-Doppler technique is presented along with a description of radar imaging forms including details of data acquisition and processing techniques.
Descriptors: *Doppler radar; *Radar images; Signal processing; Data acquisition; Range finding
Identifiers: *Range doppler imaging; NTISDODXR; NTISDODAF
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 63H (Detection and Countermeasures--Radiofrequency Detection)

0977949 AD-A125 886/2
10 cm Dual Frequency Doppler Weather Radar. Part II. A Quality Assurance/Fault Location Network
(Final rept.)
Banis, Kenneth J.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-82-0321(II); AFGL-IP-313(II)
25 Oct 82 32p
See also Part 1, AD-A125 885.
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8315
Country of Publication: United States
Contract No.: 6670; 06
A functional description of an automatic radar system performance monitoring network is presented. A network of microprocessor controlled monitoring units were interfaced to various sensors at key areas in a Doppler weather radar in order to collect system status information and display it at a central point near the operator's console. This status information is displayed on a color terminal in a way that allows the systems operator to verify the proper operation of the radar with just a cursory glance at the terminal. Fault location and fault tolerant techniques were employed to provide the system user with quality assured data.
Descriptors: *Meteorological radar; *Faults; Position(Location); Detection; Monitors; Display systems; Radar transmitters ; Radar antennas; Microprocessors; Doppler radar
Identifiers: *Fault location; Fault tolerance; NTISDODXA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

818692 AD-A092 318/5
Digital Doppler Radial Velocity Data Compared Objectively with Digital Reflectivity Radar Data
(Master's thesis)
Beaver, Thomas Foster
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Corp. Source Codes: 000805000; 012200
Report No.: AFIT-CI-80-11T
May 80 124p
Languages: English Document Type: Thesis
NTIS Prices: PC A06/MF A01 Journal Announcement: GRAI8107
Country of Publication: United States
An investigation was conducted to determine the feasibility
(cont. next page)

of objectively analyzing digital Doppler radial velocity data at constant altitudes. Data were supplied by the National Severe Storms Laboratory at Norman, Oklahoma. The study area was a 96 km by 116 km box surrounding the Chickasha, Oklahoma, synoptic network. A computer program, initially developed by Greene in 1971 and subsequently modified, was used as the basis for this computer program development. This research demonstrated that mesocyclones could be located using constant altitude radial velocity maps (CAVM) on a 2-km horizontal and a 1-km vertical grid scale without correcting for storm motion. However a 1-km horizontal and vertical grid scale was found to be 'optimum' for location and study of mesocyclones. Constant altitude velocity maps (CAVM) were then compared with constant altitude reflectivity maps (CAZM). This comparison, using two different storms, demonstrated that CAVM analysis was superior to CAZM analysis for the detection of severe storm areas.

Descriptors: *Meteorological radar; *Doppler radar; *Synoptic meteorology; *Computer programs; Digital systems; Reflectivity; Detection; Constants; Motion; Altitude; Storms; Maps

Identifiers: CAVM(Constant Altitude Velocity Maps); Program listings; Severe storms; Radial velocities; NTISDODXA

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 9B (Electronics and Electrical Engineering--Computers); 63H (Detection and Countermeasures---Radiofrequency Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1142009 AD-A156 058/0/XAB

Multi-Channel Radar Receiver

(Instrumentation papers)

Bishop, A. W. ; Metcalf, J. I.

Air Force Geophysics Lab., Hanscom AFB, MA.

Corp. Source Codes: 054815000; 409578

Report No.: AFGL-TR-85-0006; AFGL-IP-328

7 Jan 85 16p

Languages: English

NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8521

Country of Publication: United States

Contract No.: 6670; 16

A radar receiver design is presented that yields logarithmic and coherent signals of two orthogonal polarizations derived from each of two S-band transmitted frequencies. The radar is to be used for measuring Doppler velocity and polarization parameters of meteorological backscatter. The receiver design goals include phase and amplitude balance of 5 degrees and 0.5 dB between signals of opposite polarization. The logarithmic amplifiers are specified to have linearity of + or - 0.5 dB over a dynamic range of 90 dB. High-power ferrite switching devices are to be used to alternate the polarization of transmitted signals between orthogonal states on a pulse-to-pulse basis and to permit reception of co-polarized and cross-polarized signal components. Keywords include: Doppler weather radar; Dual frequency radar; Dual polarization radar; Multi-channel radar receiver, and Polarization diversity radar.

Descriptors: *Doppler radar; *Meteorological radar; *Radar receivers; Amplitude; Balance; Coherence; Cross polarization; Dual mode; Dynamic range; Ferrites; Frequency; High power; Logarithm functions; Logarithmic amplifiers; Multichannel; Parameters; Parts; Polarization; Radar; Receivers; S band; Signals; Yield

Identifiers: NTISDODXA

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

0977948 AD-A125 885/4

10 cm Dual Frequency Doppler Weather Radar. Part I. The Radar System

(Final rept.)

Bishop, Alexander W. ; Armstrong, Graham M.

Air Force Geophysics Lab., Hanscom AFB, MA.

Corp. Source Codes: 054815000; 409578

Report No.: AFGL-TR-82-0321(I); AFGL-IP-313(I)

25 Oct 82 41p

See also Part 2, AD-A125 886.

Languages: English

NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8315

Country of Publication: United States

Contract No.: 6670; 06

Design concepts and test results are summarized for a Doppler weather radar system suitable for precipitation measurements over a wide span of radial velocities and slant ranges, even in the presence of ground clutter. The radar transmits two uniform pulse trains at 2.710 and 2.760 GHz. Uniformly spaced pulses permit ground clutter cancellation of up to 50 dB to be achieved with a three-pole elliptic filter. Pulse spacing at one frequency is consistent with long-range coverage in reflectivity, while spacing of the second is consistent with a wide unambiguous velocity measurement span.

Descriptors: *Meteorological radar; Doppler radar; S band; Dual channel; Ground clutter; Reduction; Pulse trains; Radar transmitters; Transmission lines; Radar receivers; Radar antennas

Identifiers: NTISDODXA

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

DIALOG INFORMATION SERVICES, INC.

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

854730 AD-A100 236/9
An Automated Real-Time Storm Analysis and Storm Tracking Program (WEATRK)
(Final rept.)
Bjerkaas, Carlton L. ; Forsyth, Douglas E.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-80-0316; AFGL-ERP-715
1 Oct 80 114p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Languages: English
NTIS Prices: PC A06/MF A01 Journal Announcement: GRAI8121
Country of Publication: United States
Contract No.: 6670; 07
The evolution of the WEATRK system is described from the original software obtained under contract in 1977, to the present software configuration. The various portions of the software are discussed with emphasis on the algorithms used to determine storm significance and establish the storm track. Results of the two-year development effort and operational tests show the usefulness of assimilating large amounts of complex data and generating a computer-synthesized product easily used in forecast applications. The error analysis performed on the storm track forecast accuracy suggests that few of the errors encountered are due to meteorological effects but they are largely due to parameters such as beam width, pulse width, antenna rotation rate and rounding errors. The non-meteorological errors appear to average out over large data sets; that is, the longer the storm track the smaller the forecast error. Although the program now uses a three-dimensional analysis, very little analysis is performed on the velocity and variance fields. The usefulness of these fields along with other improvements are considered.
Descriptors: *Storms; *Radar tracking; Weather forecasting; Warning systems; Real time; Automation; Error analysis; Corrections; Doppler radar; Data reduction; Computer programming; Flow charting
Identifiers: *Radar meteorology; WEATRK program; NTISDODXA; NTISDODXA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 9B (Electronics and Electrical Engineering--Computers); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

775103 AD-A084 296/3
Operational Test of a Three-Dimensional Echo Tracking Program
Bjerkaas, Carlton L. ; Forsyth, Douglas E.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-80-0132
1980 6p
Pub. in Conference on Radar Meteorology, n19 p244-247, 15-18 Apr 80.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8018
Country of Publication: United States
Contract No.: 6670; 07
No abstract available.
Descriptors: *Meteorological radar; *Doppler radar; Warning systems; Reprints
Identifiers: Weather cells; Cell tracking; NTISDODXR
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 63H (Detection and Countermeasures--Radiofrequency Detection)

1114908 PB85-155216/XAB
Pilot Tests of Automated Speed Enforcement Devices and Procedures
(Final rept. Jun 80-Feb 84)
Blackburn, R. R. ; Glauz, W. D.
Midwest Research Inst., Kansas City, MO.
Corp. Source Codes: 018262000
Sponsor: National Highway Traffic Safety Administration, Washington, DC.
Report No.: DOT-HS-806 573
Feb 84 168p
Languages: English
NTIS Prices: PC A08/MF A01 Journal Announcement: GRAI8510
Country of Publication: United States
Contract No.: DOT-HS-8-02030
This report concerns the identification of technologies applicable to speed enforcement and an assessment of their potential utility in the United States. The study emphasizes technologies in common use in Europe and elsewhere, but relatively unknown in the United States. The most common non-United States technology utilizes Doppler radar aimed diagonally across the road, rather than down the road as is the case with American systems, giving it a number of technical advantages. This, and several other technologies identified, can be used with a camera to obtain photographic evidence or operate automatically without an office in attendance. The findings reported on these automated speed enforcement (ASE) devices reflect information from literature; personal visits to foreign law enforcement agencies and manufacturers; engineering and preliminary law enforcement field tests of selected ASE devices in the United States; a quantitative rating system; and a cost-effectiveness evaluation of selected ASE devices and their deployment strategies. It is concluded that ASE devices are technically much superior to systems presently used in the United States and, although more expensive, offer potential cost-effectiveness advantages.
Descriptors: *Highway transportation; Doppler radar; Roads; Europe; Automation; Cost effectiveness; Evaluation; Technology
Identifiers: *Speed limits; *Enforcement; Automated speed inforcement devices; NTISDOTHTS

(cont. next page)

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Section Headings: 13B (Mechanical, Industrial, Civil, and Marine Engineering--Civil Engineering); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 85D (Transportation--Transportation Safety); 85H (Transportation--Road Transportation); 63H (Detection and Countermeasures--Radiofrequency Detection); 43G (Problem Solving Information for State and Local Governments--Transportation)

1040676 AD-A137 167/3
Joint Agency Turbulence Experiment
(Environmental research papers)
Bohne, A. R.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-83-0180; AFGL-ERP-844
13 Jul 83 67p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8409
Country of Publication: United States
Contract No.: 6670; 15
Doppler radar data acquired during the 1981 Joint Agency Turbulence Experiment are presented. Pulse-pair processed reflectivity factor and Doppler spectrum mean data collected during volume scan periods are displayed over constant height surfaces at aircraft penetration level. Time histories of tracking-gate Doppler spectrum mean and variance data collected during aircraft storm penetration periods are also presented. These data show the Doppler spectrum variance to be poorly correlated with gradients of the radial wind, suggesting turbulence is the dominant contributor to Doppler spectrum variance. The data show that areas of moderate to heavy turbulence are distributed throughout the storms. Estimations of turbulence severity are obtained through structure function and Doppler spectrum variance methods. Qualitative results suggest that for observations taken at moderate to long range, storm structure wind shear can strongly bias structure function estimates of turbulence severity, but generally have little influence on estimates from variance methods. The effective turbulence outer scale, the maximum eddy size when the turbulence field is represented by the Kolmogorov inertial subrange law, is typically less than 2 km.
Descriptors: *Turbulence; *Radar reflections; Storms; Wind; Doppler radar; Spectra; Statistical analysis
Identifiers: NTISDODXA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55B (Atmospheric Sciences--Dynamic Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection)

892906 AD-A109 636/1
Estimation of Turbulence Severity in Precipitation Environments by Radar
Bohne, Alan R.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-81-0344
1981 10p
Pub. in Conference on Radar Meteorology (20th), p446-457, 30 Nov-3 Dec 81.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8210
Country of Publication: United States
Contract No.: 6670; 07
No abstract available.
Descriptors: *Doppler radar; Turbulence; Precipitation; Velocity; Particles; Experimental data; Reprints
Identifiers: NTISDODXR
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55B (Atmospheric Sciences--Dynamic Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

952036 AD-A120 760/4
Radar Detection of Turbulence in Precipitation Environments
Bohne, Alan R.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-82-0287
17 Jul 81 20p
Pub. in Jnl. of the Atmospheric Sciences, v39 n8 p1819-1837 Aug 82.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8307
Country of Publication: United States
Contract No.: 6670; 15
No abstract available.
Descriptors: *Doppler radar; *Meteorological radar; *Precipitation; *Turbulence; *Eddy currents; *Radar deception Clouds; Storms; Wind velocity; Backscattering; Reprints; Clear air turbulence
Identifiers: CAT(Cloudy Air Turbulence); NTISDODXR
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

888919 AD-A108 679/2
Radar Detection of Turbulence in Thunderstorms
(Environmental research papers)
Bohne, Alan R.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-81-0102; AFGL-ERP-736
31 Mar 81 64p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8208
Country of Publication: United States
Contract No.: 6670; 06
Theoretical investigations are undertaken to relate intensity of turbulent air motion to Doppler radar spectrum mean and variance in precipitation environments. Examples of theoretical radar derived turbulence power density spectra and total precipitation motion variance show that effects due to imperfect particle response are significant for turbulence scale lengths less than 250 m. Doppler spectrum variance and estimated eddy dissipation rate (epsilon) are found strongly dependent upon precipitation environment for ranges less than about 20 km, and for cases where the turbulence outer scale length (lambda) is less than 0.5 km. They are also found to be essentially independent of lambda when the maximum pulse volume dimension is less than 1/2 lambda, and independent of range but strongly dependent on lambda at ranges where the maximum pulse volume dimension is greater than lambda. Estimation of epsilon by radar is shown to be unreliable until a method of remotely determining lambda is found. Nevertheless, classification of turbulence severity (index = cube root of epsilon is possible with only a reasonable guess of lambda. Analyses of aircraft/gust velocity data indicate that thunderstorm turbulence is localized into discrete patches, and that such localization must be accounted for when aircraft gust velocity data undergo power spectrum analysis.
Descriptors: *Turbulence; Thunderstorms; Atmospheric precipitation; Particles; Motion; Detection; Doppler radar; Radar reflections; Eddies(Fluid mechanics); Dissipation; Power spectra; Analysis of variance; Aircraft; Gusts; Wind velocity
Identifiers: Spectral variations; NTISDODXA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1983181 N85-32466/3/XAB
Middle Atmosphere Program. Handbook for MAP. Volume 14. URSI/SCOSTEP Workshop on Technical Aspects of MST Radar
Bowhill, S. A. ; Edwards, B.
International Council of Scientific Unions, Urbana, IL. Scientific Committee on Solar-Terrestrial Physics.
Corp. Source Codes: 081501001; IW839742
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NAS 1.26:176085; MAP-HANDBK-14; NASA-CR-176085
Dec 84 381p
Sponsored in part by UNESCO. Workshop held in Urbana, IL., 22-25 May 1984.
Languages: English Document Type: Conference proceeding
NTIS Prices: PC A17/MF A01 Journal Announcement: GRAI8524; STAR2321
Country of Publication: United States
Contract No.: NASW-3805
No abstract available.
Descriptors: *Antennas; *Atmospheric circulation; *Atmospheric turbulence; *Conferences; *Doppler radar; *Gravity waves; *Meteorological radar; *Middle atmosphere; Radar measurement; *Radar networks; Weather; Algorithms; Coherent radar; Computer programs; Data processing; Stratosphere; Troposphere; Velocity measurement
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55B (Atmospheric Sciences--Dynamic Meteorology)

875182 PB82-114117
Multiple Doppler Radar Analysis of Severe Thunderstorms: Designing a General Analysis System
(Technical memo.)
Brown, R. A. ; Safford, C. R. ; Nelson, S. P. ; Burgess, D. W. ; Bumgarner, W. C.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000
Report No.: NOAA-TM-ERL-NSSL-92; NOAA-81081905
Jun 81 34p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8202
Country of Publication: United States
Synthesis and analysis of data acquired by multiple Doppler radars proceeds in stages of editing, data interpolation to grid points, synthesis of data for definition of three-dimensional flow, calculation of kinematic parameters, and display of analyzed data. The procedure for designing such an analysis system is described in the report.
Descriptors: *Doppler radar; *Thunderstorms; Data processing ; Three dimensional flow; Radar echoes; Kinematics; Flow charts; Systems engineering
Identifiers: *Severe storms; Multiple Radar Analysis System NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

1099527 AD-D011 425/6/XAB
Gain Restoration after Doppler Filtering
(Patent Application)
Bryant, S. M.
Department of the Air Force, Washington, DC.
Corp. Source Codes: 000260000; 109850
Report No.: PAT-APPL-6-656 845
Filed 2 Oct 84 17p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.
Languages: English Document Type: Patent
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8505
Country of Publication: United States
Automatic gain control in a pulse doppler radar receiver is provided after doppler filtering by a gain restoration system which embodies dynamic correction based on variable returns from clutter and targets. The radar uses a digital fast automatic gain control (FAGC) with a technique known as block adaptive signal regulation (BASR). This technique evaluates all the time samples in a range gate before they enter the fast Fourier transform (FFT) circuit. The invention of this disclosure feeds the information regarding the number of BASR shifts, N, forward to the output of the FFT as a function of range gate. In this way the gain-corrected amplitudes are available for target centroiding. The concept of dynamic FAGC correction based upon the amplitude of clutter and target returns avoids the problems encountered when the system is used in an urban area or with a narrow clutter notch filter. In the past, such operation has resulted in a loss of detectability on small targets in the presence of large targets. However, the gain restoration system described herein feeds the information regarding the number of BASR shifts, N, forward to the output of the FFT as a function of range gate.
Descriptors: *Patent applications; *Automatic gain control; *Doppler radar; *Radar receivers; Radar clutter; Doppler systems; Radar targets; Fast fourier transforms; Sampling; Urban areas; Corrections; Amplitude; Gates(Circuits); Time; Radar; Inventions; Pulses; Targets; Functions; Dynamics; Feeding; Clutter; Filters
Identifiers: BASR(Block Adaptive Signal Regulators); Target processors; FAGC(Fast Automatic Gain Control); Range gates; Small targets; Doppler filters; NTISGPAF
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 90F (Government Inventions For Licensing--Electrotechnology); 63H (Detection and Countermeasures--Radiofrequency Detection)

1077467 AD-D011 159/1
Bulk Acoustic Resonator Tracking Filter
(Patent Application)
Buchalter, M. S.
Department of the Air Force, Washington, DC.
Corp. Source Codes: 000260000; 109850
Report No.: PAT-APPL-6-615 502
Filed 30 May 84 16p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.
Languages: English Document Type: Patent
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8422
Country of Publication: United States
This invention is directed to a narrow band filter for eliminating out-of-band noise in the oscillator signal of a doppler radar system. It provides a very high Q filter derived from a Bulk Acoustic Resonator's (BAR) high Q, L-Band response and uses thermal feedback to lock the BAR's response band onto the input frequency. The BAR is a very narrow band filter with a Q near 40,000 and a comblike frequency response having passbands occurring every 5 MHz, approximately. The comblike response of the BAR shifts down 60 KHz for every 1 c rise in temperature. In this invention a frequency sensitive heater is used to move the response comb of the BAR up or down in accordance with changes in the frequency of the incoming signal. The input frequency can be allowed to drift and the heat source will produce more heat or less heat, keeping the response right at the input frequency. (Author)
Descriptors: *Patent applications; *Resonators; *filters; *tuning devices; *Thermal stability; *Doppler radar; Oscillators; Frequency response; Narrowband; Heat; Sensitivity ; Input; Signals; L band; Inventions; Frequency; Sources
Identifiers: BAR(Bulk Acoustic Resonators); Tracking filters ; Tunable filters; Frequency tracking; Comb response; High Q's ; Acoustic resonators; NTISGPAF
Section Headings: 9E (Electronics and Electrical Engineering--Subsystems); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 49B (Electrotechnology--Circuits); 63H (Detection and Countermeasures--Radiofrequency Detection)

1107904 AD-P004 374/5/XAB
Development of the F-20 Nose Radome
Cain, E. L. ; Tulyathan, P.
Northrop Corp., Hawthorne, CA. Aircraft Group.
Corp. Source Codes: 008157013; 410275
1984 10p
This article is from the Proceedings of the Symposium on Electromagnetic Windows (17th) Held at Georgia Institute of Technology, Engineering Experiment Station, Atlanta, GA. on 25-27 July 1984, AD-A149 125, p225-234.
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8508
Country of Publication: United States
Northrop's newest fighter aircraft, the F-20 Tigershark, is based on the successful aerodynamic design and size of the F-5 Tiger II aircraft. It has a single engine providing 80 percent more thrust than that of the twin-engine Tiger II, digital avionics, and a newly designed AN/APG-67 (V) X-band radar. This coherent pulse-doppler radar provides both look-up and look-down target detection and tracking. Successful operation

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

of this radar necessitated an antenna/radome system which provides low RMS side-lobe levels to minimize false alarm rate in the look-down mode, and high antenna gain/low radome loss to maximize radar range. These system requirements prompted a redesign of the F-5 'Shark Shape' nose section which had been aerodynamically configured to improve the post-stall handling qualities of the Tiger II aircraft. The design change included (1) provisions for a larger radar antenna, (2) a clean radome, i.e., no pitot-static probe, air lines or heater wires, and (3) a blunted radome shape, designed to preserve aerodynamic handling qualities and provide the required electrical characteristics.

Descriptors: *Radomes; Aerodynamics; Antennas; Coherent radar; Doppler radar; Radar pulses; Electrical properties; Fighter aircraft; High gain; Radar antennas; Aircraft; Avionics; Digital systems; False alarms; Heaters; Wire; Shape Engines; Radar; X band; Range(Distance); Level(Quantity); Sidelobes; Tracking

Identifiers: Component Reports; NTISDODXA

Section Headings: 9E (Electronics and Electrical Engineering--Subsystems); 49A (Electrotechnology--Antennas); 51E (Aeronautics and Aerodynamics--Avionics)

818800 AD-A092 426/6

Low Elevation Angle Wind Measurements by FM-CW Radar

Campbell, W. C. ; Chadwick, R. B. ; Earnshaw, K. B. ; Moran, K. P.

Air Force Geophysics Lab., Hanscom AFB, MA.

Corp. Source Codes: 054815000; 409578

Report No.: AFGL-TR-80-0310

1980 6p

Pub. in Conference on Radar Meteorology (19th), p722-726, 15-18 Apr 80.

Languages: English Document Type: Journal article

NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8107

Country of Publication: United States

Contract No.: 6670; 06

No abstract available.

Descriptors: *Meteorological radar; *Wind shear; *Doppler radar; Continuous wave radar; Frequency modulation; Ground clutter; Reprints

Identifiers: PSI(Plan Shear Indicator); Low angles; Frequency modulation radar; Low elevations; NTISDODXR

Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55B (Atmospheric Sciences--Dynamic Meteorology)

888489 AD-A108 236/1

Development of a Clear Air Radar to Detect Meteorological Hazards at Airports

(Final rept. 1 Oct 78-21 Sep 81)

Chadwick, R. B. ; Moran, K. P. ; Campbell, W. C. ; Earnshaw, K. B. ; Detman, T. R.

National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.

Corp. Source Codes: 031828046; 406292

Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA.

Report No.: AFGL-TR-81-0268

21 Sep 81 113p

Languages: English

NTIS Prices: PC A06/MF A01 Journal Announcement: GRAI8208

Country of Publication: United States

Contract No.: 6670; 06

To be useful in detecting meteorological hazards such as low-level wind shear near airports, a radar must be able to: (1) detect backscatter from both clear air and rain; (2) operate at short ranges and low elevation angles; and (3) measure Doppler frequencies caused by air motion. The development of a radar with these characteristics is described and the results of testing this radar at airports are presented. Special emphasis is placed on the problems of low elevation angle operation and clutter suppression. The importance of proper siting is pointed out. In addition, it is demonstrated that the radar can readily detect the turbulent wakes of large jet aircraft. (Author)

Descriptors: *Meteorological radar; *Doppler radar; *Continuous wave radar; *Wind shear; *Aviation safety; Frequency modulation; Low altitude; Radar clutter; Short range(Distance); Low angles; Ground clutter; Low elevation; Meteorology; Vortices; Suppression; Turbulence; Clutter; Airports; Operation; Radar; Wake; Motion; Hazards; Air; Rain

Identifiers: CAR(Clear Air Radar); Clutter suppressors; NTISDODXA; NTISDODAF

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 1B (Aeronautics--Aeronautics); 17G (Navigation, Communications Detection, and Countermeasures--Navigation and Guidance); 63H (Detection and Countermeasures--Radiofrequency Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

1137919 N85-27463/7/XAB

Analysis of the NASA/MSFC Airborne Doppler Lidar Results from San Gorgonio Pass, California

(Contractor rept., 1 Oct 82-31 Dec 84)

Cliff, W. C. ; Skarda, J. R. ; Renne, D. S. ; Sandusky, W. F.

Battelle Pacific Northwest Labs., Richland, WA.

Corp. Source Codes: 048335000; PA826082

Sponsor: National Aeronautics and Space Administration, Washington, DC.

Report No.: NAS 1.26:3901; M-489; NASA-CR-3901

May 85 71p

Languages: English

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8519; STAR2316
Country of Publication: United States
Contract No.: NAS8-34733
The NASA/MSFC Airborne Doppler Lidar System was flown in July 1981 aboard the NASA/Ames Convair 990 on the east side of San Gorgonio Pass California, near Palm Springs, to measure and investigate the accelerated atmospheric wind field discharging from the pass. At this region, the maritime layer from the west coast accelerates through the pass and spreads out over the valley floor on the east side of the pass. The experiment was selected in order to study accelerated flow in and at the exit of the canyon. Ground truth wind data taken concurrently with the flight data were available from approximately 12 meteorological towers and 3 tala kites for limited comparison purposes. The experiment provided the first spatial data for ensemble averaging of spatial correlations to compute lateral and longitudinal length scales in the lateral and longitudinal directions for both components, and information on atmospheric flow in this region of interest from wind energy resource considerations.
Descriptors: *Atmospheric turbulence; *Doppler radar; *Flow characteristics; *Optical radar; *Wind measurement; Airborne equipment; Atmospheric circulation; Global atmospheric research program; Mesoscale phenomena; Storms (Meteorology)
Identifiers: Palm Springs(California); NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1125106 N85-21873/3/XAB
Analysis of the NASA/MSFC Airborne Doppler Lidar Results from San Gorgonio Pass, California
(Final rept.)
Cliff, W. C. ; Skarda, J. R. ; Renne, D. S. ; Sandusky, W. F.
Battelle Pacific Northwest Labs., Richland, WA.
Corp. Source Codes: 048335000; PA826082
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NAS 1.26:171355; NASA-CR-171355
Dec 84 70p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8514; STAR2312
Country of Publication: United States
Contract No.: NAS8-34733
Two days during July of 1981 the NASA/MSFC Airborne Doppler Lidar System (ADLS) was flown aboard the NASA/AMES Convair 990 on the east side of San Gorgonio Pass California, near Palm Springs, to measure and investigate the accelerated atmospheric wind field discharging from the pass. The vertical and horizontal extent of the fast moving atmospheric flow discharging from the San Gorgonio Pass were examined. Conventional ground measurements were also taken during the tests to assist in validating the ADLS results. This particular region is recognized as a high wind resource region and, as such, a knowledge of the horizontal and vertical extent of this flow was of interest for wind energy applications. The statistics of the atmospheric flow field itself as it discharges from the pass and then spreads out over the desert were also of scientific interests. This data provided the first spatial data for ensemble averaging of spatial correlations to compute longitudinal and lateral integral length scales in the longitudinal and lateral directions for both components.
Descriptors: *Atmospheric circulation; California; Doppler radar; *Fluid dynamics; Optical radar; Airborne equipment; Flow distribution; Ground truth; Spatial distribution; Windpower utilization
Identifiers: *San Gorgonio Pass; NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 10A (Energy Conversion (Non-propulsive)--Conversion Techniques); 55B (Atmospheric Sciences--Dynamic Meteorology); 97A (Energy--Reserves); 97D (Energy--Miscellaneous Energy Conversion and Storage)

865475 AD-A103 008/9
Thunderstorm Turbulence Hazard Detection
(Final rept. Jan 78-Jun 80)
Crane, R. K.
Environmental Research and Technology, Inc., Concord, MA.
Corp. Source Codes: 056171000; 391776
Report No.: ERT-P-2832-F
Jun 80 139p
Languages: English
NTIS Prices: PC A07/MF A01 Journal Announcement: GRAI8125
Country of Publication: United States
Contract No.: DOT-FA77WAI-806
This report documents the development and testing of a viable aircraft hazard detection scheme which operates as well employing conventional radar data as it does employing Doppler radar data. The detection scheme was evaluated using aircraft penetrations into the most turbulent regions of hail storms. These regions are of interest when verifying that turbulence can be detected but are not optimum for evaluating the detection technique under realistic operating conditions. If, in the latter case, higher false alarm rates can be expected, more development will be necessary to utilize more effectively the available information before the hazard detection procedure can be incorporated into an air traffic control environment. The recommended program to develop the automatic hazard detection system include: refine the cell and cluster detection algorithms to reduce the effect of the statistical uncertainties in the estimation of velocity perturbations; refine the cell significance algorithms using cell age location in the development pattern, apparent vertical transport of horizontal momentum and similar parameters to provide and indication of the intensity of the turbulence; and

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develop a graphical display of the cell, cluster and contour data that can be provided both to meteorologists for the development of short range forecasts.
Descriptors: *Radar; *Warning systems; *Turbulence; *Thunderstorms; Atmospheric motion; Radar tracking; Doppler radar; Convection(Atmospheric); Hazards; Wind shear; Aviation safety; Automation; Air traffic control terminal areas
Identifiers: Radar meteorology; NTISDODXA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 1B (Aeronautics--Aeronautics); 55B (Atmospheric Sciences--Dynamic Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 85D (Transportation--Transportation Safety)

946814 AD-A121 297/6
Radar Analysis for Severe Weather Detection and Tracking
(Final rept. Jul 80-Jun 81)
Crane, Robert K.
Environmental Research and Technology, Inc., Concord, MA.
Corp. Source Codes: 056171000; 391776
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: ERT-P-A579-F; DOT/FAA/RD-82/64
Jul 82 93p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8305
Country of Publication: United States
Contract No.: DTFA01-81-Y-10521; NA80RAC00110
The cell detection and tracking algorithms, were refined to incorporate Doppler radar derived estimates of tangential shear in the tracking process without significantly increasing the tracking error and the number of detected cell clusters. The Doppler data were subjected to a number of processing steps designed to minimize the false cell and cluster problem (false alarm rate). The revised thunderstorm hazard detection algorithm employs spatially filtered tangential shear data with a 10 dB minimum signal-to-noise ratio. Shear cell continuity in time is required to establish a volume cell in the absence of a reflectivity cell. National Severe Storms Laboratory Doppler radar data were analyzed to evaluate the refined algorithms. Tangential shear and Doppler spread (spectrum width) data were used separately for the detection of potentially hazardous regions. Intercomparison between isolated volume cells simultaneously detected by the Norman and Cimarron radars showed that both the shear and spread observations were aspect sensitive (anisotropic). The incorporation of Doppler (shear) data produced more than twice the number of volume cells, only slightly increased the number of clusters, and only slightly increased the rms tracking error. The Doppler data were used to develop an augmented set of attributes potentially useful for hazard detection. (Author)
Descriptors: *Thunderstorms; *Meteorological radar; Doppler radar; Cells; Detection; Radar tracking; Radar signals; Signal processing; Algorithms; Wind; Turbulence; Shear properties
Identifiers: NTISDODXA; NTISDOTFAA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

772635 AD-A083 866/4
Gust Front Structure Observed by Doppler Radar
Donaldson, Jr., Ralph J. ; Bjerkaas, Carlton L.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-80-0137
1980 7p
Pub. in Conference on Radar Meteorology, n19 p157-161 15-18 Apr 80. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8017
Country of Publication: United States
Contract No.: 6670; 07
No abstract available.
Descriptors: *Meteorological radar; *Doppler radar; Fronts(Meteorology); Reprints
Identifiers: Gust fronts; Front structures; NTISDODXR
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

854702 AD-A100 208/8
Joint Agency Doppler Technology Tests
(Final rept.)
Donaldson, Jr., Ralph J. ; Glover, Kenneth M.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-80-0357; AFGL-ERP-720
21 Nov 80 33p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8121
Country of Publication: United States
Contract No.: 6670; 07
The Joint Doppler Operational Project was a cooperative inter-agency program directed toward the evaluation of recent advances in Doppler weather radar technology for operational applications by the participating agencies. The first two years of testing demonstrated the decisive superiority of Doppler techniques, in comparison with conventional methods, for reliable identification and early warning of tornadoes and

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other severe thunderstorm hazards. During the final year, the program evaluated the format and effectiveness of manually aided automatic display products transmitted in near-real time to operational agencies remotely located from the radar. Experiences of operating personnel utilizing these new techniques provide input toward system definition of NEXRAD, the Next Generation Weather Radar network now under development. One of the most encouraging examples of the enhanced warning capability realized by the remote transmission of the automated Doppler format was a successful forecast of severe weather for an Air Force Base which was a crucial factor in saving a fleet of aircraft from severe hail damage. (Author)

Descriptors: *Doppler radar; *Meteorological radar; *Early warning systems; Real time; Warning systems; Doppler systems; Air force facilities; Hazards; Tornadoes; Radar; Reliability; Networks; Damage; Identification; Airports; Hail

Identifiers: NTISDODXA; NTISDODXA

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 63H (Detection and Countermeasures--Radiofrequency Detection)

1076868 PB84-222223

Spring Program Summary, 1983

Dooley, J. T. ; Davies-Jones, R. P. ; Fredrickson, S. ; Hane, C. ; Lee, J. T.

National Severe Storms Lab., Norman, OK.

Corp. Source Codes: 019612000

Report No.: NOAA-TM-ERL-NSSL-96; NOAA-84071101

Apr 84 66p

See also PB82-244757.

Languages: English

NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8421

Country of Publication: United States

The National Severe Storms Laboratory (NSSL) is involved both with the collection of data and its analysis. Principal objectives of the 1983 observation program were to (1) acquire a dual Doppler data set from a tornadic and/or supercell status storm, (2) increase the data base of the Storm Electricity Group, (3) support other groups in experiments related to the electric field inside and around thunderstorms, (4) measure the structure of wind and reflectivity in clear air, (5) measure gust gradients in adverse meteorological conditions with special emphasis on airport approach and departure flight paths, (6) obtain tornado proximity data with the Totable Tornado Observatory (TOTO) and (7) measurement of parameters related to the boundary layer.

Descriptors: *Lightning; *Tornadoes; *Storms; Mapping; Doppler radar; Thunderstorms; Gusts; Precipitation(Meteorology); Radiosondes; Turbulence; Electric fields; Aviation safety

Identifiers: Severe storms; WSR-57 radar; NTISCOMNOA

Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55E (Atmospheric Sciences--Physical Meteorology)

864694 PB81-234940

Spring Program Summary, 1980

(Technical memo.)

Doviak, R. J.

National Severe Storms Lab., Norman, OK.

Corp. Source Codes: 019612000

Report No.: NOAA-TM-ERL-NSSL-91; NOAA-81052901

Apr 81 142p

See also report dated 1977, PB-284 953.

Languages: English

NTIS Prices: PC A07/MF A01 Journal Announcement: GRAI8124

Country of Publication: United States

A program summary is presented to inform data analysts, both inside and outside of the National Severe Storms Laboratory (NSSL). Principal objectives of the 1980 observations were: (1) to emphasize coordination of storm electricity measurements made by the recently formed Storm Electricity Group at NSSL, (2) to observe the prestorm environment with NSSL's Doppler radars modified for this purpose, (3) to support data collection for FAA and NASA experiments on storm hazards to aircraft, and (4) to support the hail collection experiment.

Descriptors: *Meteorological data; *Doppler radar; *Storms; United States; Radar mapping; Meteorological radar; Hail; Spring season; Diurnal variations; Lightning; Synoptic meteorology; Hazards; Tables(Data); Aviation safety; Oklahoma

Identifiers: NTISCOMNOA

Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

912301 N82-21687/0

Observation of the Earth by Radar

Elachi, C.

National Aeronautics and Space Administration, Washington, DC.

Corp. Source Codes: 011249000; NC452981

Report No.: NASA-TM-76830; NAS 1.15:76830

Feb 82 33p

Transl. Into English from la Recherche (France), V. 12, No. 128, Dec. 1981 p 1366-1375. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By French Petroleum Inst.

Languages: English Document Type: Translation

NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8217; STAR2012

Country of Publication: France

Contract No.: NASW-3542

Techniques and applications of radar observation from Earth satellites are discussed. Images processing and analysis of these images are discussed. Also discussed is radar imaging from aircraft. Uses of this data include ocean wave analysis, surface water evaluation, and topographic analysis.

Descriptors: *Image processing; *Meteorology; *Oceanographic

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parameters; *Radar imagery; *Satellite observation; *Topography; *Water resources; Doppler radar; Ground water; Image reconstruction; Landsat satellites; Radar antennas; Radar signatures; Sea ice; Seasat satellites; Synthetic aperture radar
Identifiers: *Foreign technology; Translation; NTISNASAT
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 9B (Electronics and Electrical Engineering--Computers); 63H (Detection and Countermeasures--Radiofrequency Detection); 63F (Detection and Countermeasures--Optical Detection)

1137923 N85-27467/8/XAB
Influence of Coherent Mesoscale Structures on Satellite-Based Doppler Lidar Wind Measurements
(Progress rept.)
Emmitt, G. D.
Simpson Weather Associates, Charlottesville, VA.
Corp. Source Codes: 076719000; SL698353
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NAS 1.26:175853; NASA-CR-175853
May 85 14p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8519; STAR2316
Country of Publication: United States
Contract No.: NAS8-35597
The influence of coherent mesoscale structures on satellite based Doppler lidar wind measurements was investigated. Range dependent weighting functions and the single shot SNR of scan angle are examined and a space shuttle lidar experiment which used a fixed beam and rotating shuttle is simulated.
Descriptors: *Doppler radar; *Mesoscale phenomena; *Optical radar; *Periodic variations; *Satellite doppler positioning; *Wind measurement; Meteorological parameters; Radar equipment Satellite imagery; Wind (Meteorology)
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 14B (Methods and Equipment--Laboratories, Test Facilities, and Test Equipment); 55B (Atmospheric Sciences--Dynamic Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

0992708 N83-25265/0
Summary Proceedings of a Wind Shear Workshop
Enders, J. H. ; Melvin, W. W. ; Frost, W. ; Camp, D. W.
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Corp. Source Codes: 019043002; ND736801
Report No.: NAS 1.55:2270; NASA-CP-2270
Apr 83 20p
Workshop Held at Tennessee Univ. Space Inst., Tullahoma, Tenn., 25 Oct. 1982.
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8319; STAR2114
Country of Publication: United States
A number of recent program results and current issues were addressed: the data collection phase of the highly successful Joint Airport Weather Study (JAWS) Project and the NASA-B5f7B Gust Gradient Program, the use of these data for flight crew training through educational programs (e.g., films) and with manned flight training simulators, methods for post-accident determination of wind conditions from flight data recorders, the microburst wind shear phenomenon which was positively measured and described the ring vortex as a possible generating mechanism, the optimum flight procedure for use during an unexpected wind shear encounter, evaluation of the low-level wind shear alert system (LLWSAS), and assessment of the demonstrated and viable application of Doppler radar as an operational wind shear warning and detection system.
Descriptors: *Aircraft safety; *Computerized simulation; *Doppler radar; *Flight crews; *Flight training; *Vortex generators; *Warning systems; *Wind shear; Aerodynamic stalling; Aerodynamics; Airspeed; Data acquisition; Flight recorders; Meteorology; Pilot performance
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 1B (Aeronautics--Aeronautics); 55B (Atmospheric Sciences--Dynamic Meteorology); 51B (Aeronautics and Aerodynamics--Aeronautics) 85D (Transportation--Transportation Safety)

1978281 AD-A157 093/6/XAB
Weather Radar Studies
(Quarterly technical summary rept. 1 Oct-31 Dec 84)
Evans, J. E.
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Corp. Source Codes: 009875001; 207650
Sponsor: Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.
Report No.: DOT/FAA/PM-85-09
31 Dec 84 48p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8523
Country of Publication: United States
Contract No.: DT-FA01-80-Y-10546
THe test-bed Doppler weather radar integration testing continued in Olive Branch, Mississippi after the lightning strike damage was repaired. Preliminary tests indicate that the objective of 50-dB clutter suppression is being obtained in the field and that the system sensitivity is very close to the NEXRAD specification. Installation of an improved lightning protection system neared completion. The Lincoln mesonet continued to obtain useful data throughout October and November. A strong microburst with peak winds so 68 mph was recorded in the immediate vicinity of Memphis International Airport on 20 October. The mesonet and LLWSAS data from Memphis, and Doppler weather radar data from the National

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Center for Atmospheric Research JAWS program and the National Severe Storms Laboratory, are being analyzed to develop low-altitude wind shear detection algorithms. Clutter measurements were carried out at Eglin Air Force Base/Ft. Walton Beach Airport, the Memphis Airport, and the Olive Branch, Mississippi test site. Work continued on the development of weather radar products for the Central Weather Processor. This work focused on tracker refinement studies and NEXRAD-compatible processing of the existing reflectivity-only weather radars. Keywords: Weather radar; Low-altitude wind shear; NEXRAD; Central weather processor; Aviation weather products; and Turbulence.

Descriptors: *Meteorological radar; Weather; Doppler radar; Damage; Lightning; Mississippi; High rate; Intensity; Aeronautics; Clutter; Measurement; Protection; Low altitude; Wind shear; Mississippi; Test facilities; Peak values; Wind; Storms; Sensitivity; Turbulence; Refining; Tracking

Identifiers: JAWS Project(Meteorology); NTISDODXA; NTISDOTFAA

Section Headings: 4B (Atmospheric Sciences--Meteorology); 1B (Aeronautics--Aeronautics); 55B (Atmospheric Sciences--Dynamic Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms); 51B (Aeronautics and Aerodynamics--Aeronautics)

1123872 AD-A152 563/3/XAB

Weather Radar Studies

(Quarterly technical summary rept. 1 Jul-30 Sep 84)

Evans, J. E.

Massachusetts Inst. of Tech., Lexington. Lincoln Lab.

Corp. Source Codes: 009875001; 207650

Sponsor: Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.

Report No.: DOT/FAA/PM-85-03

30 Sep 84 37p

Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Languages: English

NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8514

Country of Publication: United States

Contract No.: F19628-85-C-0002; DOT-FA01-80-Y-10546

The test-bed Doppler weather radar was moved to the Olive Branch, Mississippi test site in early July. System integration and testing at Olive Branch commenced in mid-July. In late August, two lightning strikes damaged the mount electronics, computers, and signal-processing electronics. Most of September was spent in assessing and repairing the damage as well as installing an improved lightning protection system. The other principle weather measurement sensors (Lincoln mesonet, Memphis airport LLWSAS, and University of North Dakota C-band weather radar) obtained useful data in the July to September time period. These data and data from the National Center for Atmospheric Research JAWS program and the National Severe Storms Laboratory are being analyzed to determine wind-shear detection algorithms. Clutter measurements were carried out at the Dallas-Ft. Worth airport. Work continued on development of Doppler-radar-derived weather products for the Central Weather Processor. This work focused on optimization for algorithms for producing layered reflectivity and turbulence fields, and products for depicting the three-dimensional structure of storm fields.

Descriptors: *Meteorological radar; C band; Lightning; Protection; Mississippi; Test facilities; Algorithms; Detection; Wind shear; Doppler radar

Identifiers: JAWS project; NTISDODXA; NTISDOTFAA

Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

961514 N83-13702/6

Msfc Doppler Lidar Science Experiments and Operations Plans for 1981 Airborne Test Flight

Fichtl, G. H. ; Bilbro, J. W. ; Kaufman, J. W.

National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.

Corp. Source Codes: 019043002; ND736801

Report No.: NAS 1.15:85160; NASA-TM-85160

Apr 81 120p

Languages: English

NTIS Prices: PC A06/MF a01 Journal Announcement: GRAI8309; STAR2104

Country of Publication: United States

The flight experiment and operations plans for the Doppler Lidar System (DLS) are provided. Application of DLS to the study of severe storms and local weather penomena is addressed. Test plans involve 66 hours of flight time. Plans also include ground based severe storm and local weather data acquisition.

Descriptors: *Doppler radar; *Optical radar; *Storms (Meteorology); *Weather forecasting; Data acquisition; Ground based control; Remote sensing; Wind measurement

Identifiers: NTISNASA

Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 17H (Navigation, Communications Detection, and Countermeasures--Optical Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 63H (Detection and Countermeasures--Radiofrequency Detection); 63F (Detection and Countermeasures--Optical Detection)

890620 AD-A109 011/7

Modular Radar Analysis Software System (MRASS)

Forsyth, Douglas E. ; Bjerkaas, Carlton ; Petrocchi, Pio

Air Force Geophysics Lab., Hanscom AFB, MA.

Corp. Source Codes: 054815000; 409578

Report No.: AFGL-TR-81-0343

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1981 6p
Pub. in Preprint Volume, Conference on Radar Meteorology (20th), p696-699, 30 Nov-3 Dec 81, Boston, MA.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8209
Country of Publication: United States
Contract No.: 6670; 07
No abstract available.
Descriptors: *Meteorological radar; *Doppler radar; *Warning systems; Radar tracking; Hail; Real time; Experimental data; Computer programs; Storms; Reprints
Identifiers: MRASS(Modular Radar Analysis Software System); SAM(Special Analysis Modules); Storm tracking; NTISDODXR
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 9B (Electronics and Electrical Engineering--Computers); 63H (Detection and Countermeasures--Radiofrequency Detection)

1117862 PB85-163681/XAB
Airborne Research Meteorological Data Collected by the National Hurricane Research Laboratory (Hurricane Research Division/AOML) during the 1982-1983 Hurricane Seasons--Inventory and Availability
(Data rept.)
Friedman, H. A. ; Arnhols, C. A. ; Dorst, N. M. ; Nelson, C. J. ; Brown, W. J.
National Oceanic and Atmospheric Administration, Miami, FL. Atlantic Oceanographic and Meteorological Labs.
Corp. Source Codes: 031711003
Report No.: NOAA-DR-ERL-AOML-3
Nov 84 168p
Languages: English
NTIS Prices: PC A08/MF A01 Journal Announcement: GRAI8511
Country of Publication: United States
;Contents: The hurricane research division/AOML; Data collection and inventory.
Descriptors: *Meteorological data; *Hurricanes; History; Data processing; Inventories; Field tests; Storm tracks; Meteorological satellites; Doppler radar; Equipment; Flight paths
Identifiers: Hurricane Alicia; Hurricane Barry; Hurricane Dean; Hurricane Raymond; Hurricane Tico; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 9B (Electronics and Electrical Engineering--Computers); 55B (Atmospheric Sciences--Dynamic Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1070693 N84-25223/8
Facilities for Meteorological Research at NASA Goddard/Wallops Flight Facility
(Final Report)
Gerlach, J. C. ; Carr, R. E.
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Corp. Source Codes: 013129001; NC999967
Report No.: NAS 1.15:84422; NASA-TM-84422
Jun 84 6p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8419; STAR2215
Country of Publication: United States
The technical characteristics of the Atmospheric Sciences Research Facility, the improvements being made to the instrumentation there which will enhance its usefulness in atmospheric research, and several of the on-going research programs are described. Among the area of atmospheric research discussed are clouds and precipitation, lightning, ozone, wind, and storms. Meteorological instruments including Doppler radar, spectrophotometers, and ozone sensors are mentioned. Atmospheric research relevant to aircraft design and COMSTAR communication satellites is briefly discussed.
Descriptors: *Lightning; *Meteorological instruments; *Ozone ; *Precipitation (Meteorology); *Storms (Meteorology); *Wind (Meteorology); Aircraft design; Atmospheric turbulence; Clouds ; Comstar satellites; Doppler radar; Meteorological radar; Precipitation particle measurement; Spectrophotometers; Thunderstorms; Wind profiles
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 4A (Atmospheric Sciences--Atmospheric Physics); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms) ; 55E (Atmospheric Sciences--Physical Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55B (Atmospheric Sciences--Dynamic Meteorology)

1104858 AD-A147 929/4/XAB
Multiple Channel Adaptive Filtering Using a Fast Orthogonalization Network: An Application to Efficient Pulsed Doppler Radar Processing
(Interim rept.)
Gerlach, K.
Naval Research Lab., Washington, DC.
Corp. Source Codes: 000927000; 251950
Report No.: NRL-8840
28 Sep 84 21p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8504
Country of Publication: United States
Contract No.: F12141; XF12141100
A numerically efficient algorithm is developed for adaptively filtering multiple input channels into desired multiple output channels. The algorithm is a type of adaptive lattice filter which employs a Fast Orthogonalization Network (FON) algorithm for numerical efficiency. Past researchers have concentrated on developing efficient lattice algorithms for the processing of stationary input channels; i.e., the input covariance matrix is Toeplitz in form. The algorithm developed in this report is designed to adaptively filter
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nonstationary input channels. Various implementations of the FON algorithm are given, and a performance measure based on the number of operations is formulated. An application of the technique to adaptive doppler processing presented. (Author)
Descriptors: *Mathematical filters; Algorithms; *Doppler radar; *Radar pulses; *Signal processing; Orthogonality; Network flows; Adaptive filters; Adaptive systems; Multichannel
Identifiers: NTISDODXA
Section Headings: 9D (Electronics and Electrical Engineering--Information Theory); 17B (Navigation, Communications Detection, and Countermeasures--Communications); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 62E (Computers, Control, and Information Theory--Information Theory); 45G (Communication--Communication and Information Theory); 63H (Detection and Countermeasures--Radiofrequency Detection)

1071558 AD-A142 357/3
Computer Model for a Multiple High PRF Pulse Doppler Radar
(Memorandum rept.)
Gerlach, K. ; Mitchell, T. B.
Naval Research Lab., Washington, DC.
Corp. Source Codes: 000927000; 251950
Report No.: NRL-MR-5332
7 Jun 84 26p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8420
Country of Publication: United States
Contract No.: F12141; XF12141100
A computer model which simulates a Multiple High PRF Pulse Doppler radar has been developed. The model has the capability of computing the system parameters for Post Detection Processing necessary to achieve given desired probabilities of detection and false alarm. A variety of parameters such as range resolution, number of PRF bursts, number of doppler bins, and Swerling model are inputted. Output measures of effectiveness include the required signal-to-noise power ratio per pulse burst, average number of arithmetic operations, and ghosting probabilities. (Author)
Descriptors: *Doppler radar; *Computerized simulation; *Pulse rate; Signal to noise ratio; Systems analysis; Doppler systems; False alarms; Probability; Operation; Parameters; Pulses; Detection; Resolution; Output; Arithmetic
Identifiers: Post processing; Doppler bins; NTISDODXA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 9B (Electronics and Electrical Engineering--Computers); 63H (Detection and Countermeasures--Radiofrequency Detection)

1021658 N83-34494/5
Investigation of Turbulent Scatter from the Mesosphere as Observed by Coherent-Scatter Radar
Gibbs, K. P. ; Bowhill, S. A.
Illinois Univ. at Urbana-Champaign. Aeronomy Lab.
Corp. Source Codes: 034597076; IB647432
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NAS 1.26:173001; UILU-ENG-83-2502; NASA-CR-173001
1 Apr 83 248p
Languages: English
NTIS Prices: PC A11/MF A01 Journal Announcement: GRAI8402; STAR2122
Country of Publication: United States
Contract No.: NSG-7506; NSF ATM-78-21765
Turbulent scatter from the mesosphere is observed using the Urbana coherent-scatter radar. The variation in signal-to-noise ratio as a function of time-of-day is examined. The origin of scattering regions is investigated by comparing the variations in scattered power and Doppler velocity. Nighttime echoes are shown for periods of enhanced electron concentration. The spectrum of the returned signal is studied with a resolution of ten seconds. Spectral information is used to increase altitude resolution and observe the motion of scatterers. The expected variation in signal-to-noise ratio with solar flux is observed. It is found that variations in the scattered power generally do not correspond to the gravity waves which are simultaneously observed. Turbulent layers are observed at altitudes with high shear in the horizontal velocity and at altitudes with low shear. The ten-second resolution is necessary to distinguish meteor echoes from echoes produced by the advection of a scattering layer through the radar beam.
Descriptors: *Atmospheric turbulence; *Coherent radar; *Coherent scattering; *Mesosphere; Doppler radar; Gravity waves; Meteoroids; Shear properties; Signal to noise ratios; Spectral resolution
Identifiers: NTISNASA
Section Headings: 4A (Atmospheric Sciences--Atmospheric Physics); 55A (Atmospheric Sciences--Aeronomy); 55B (Atmospheric Sciences--Dynamic Meteorology)

890621 AD-A109 012/5
A Dual Frequency 10 CM Doppler Weather Radar
Glover, Kenneth M. ; Armstrong, Graham M. ; Bishop, Alexander W. ; Banis, Kenneth J.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-81-0341
1981 8p
Pub. in Preprint Volume, Conference on Radar Meteorology (20th), 30 Nov-3 Dec 81, p738-743, Boston, MA.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8209
Country of Publication: United States
Contract No.: 6670; 06
No abstract available.
Descriptors: *Meteorological radar; *Doppler radar;
(cont. next page)

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

*Polyfrequency radar; Radar pulses; Range finding; Radar clutter; Ground clutter; Reprints
Identifiers: Velocity channels; Range channels; Pulse doppler radar; Ambiguities; NTISDODXR
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms); 63H (Detection and Countermeasures--Radiofrequency Detection)

954182 PB83-147140
Capability of Surface-Based Clear-Air Doppler Radar for Monitoring Refractive Index Gradients Aloft
(Technical memo.)
Gossard, Earl E. ; Chadwick, Russell B. ; Detman, Thomas ; Gaynor, John
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Corp. Source Codes: 031828046
Sponsor: Naval Ocean Systems Center, San Diego, CA.
Report No.: NOAA-TM-ERL-WPL-102; NOAA-82121307
Sep 82 42p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8307
Country of Publication: United States
Contract No.: N66001-82-M-P-0008
There is theoretical reason to believe that gradients of refractive index in stable elevated layers can be measured by surface-based, clear-air Doppler radars, sensing backscattered power (C sub n, sup 2), height gradients of the mean horizontal wind, and width of the Doppler velocity spectrum. In this paper the approach was to measure turbulent and mean quantities on the 300 m meteorological tower at the Boulder Atmospheric Observatory (BAO) at Erie, Colorado, USA and to examine the relationships between the turbulent and mean gradient quantities in order to evaluate assumptions for simplifying the kinetic energy and temperature balance equations. Radar measurements of Doppler spectral width were also made for comparison with tower-measured velocity spectra.
Descriptors: *Atmospheric refraction; *Doppler radar; Remote sensing; Measurement; Atmospheric motion
Identifiers: *Refractive index; NTISCOMNOA
Section Headings: 4A (Atmospheric Sciences--Atmospheric Physics); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55E (Atmospheric Sciences--Physical Meteorology)

908123 PB82-192592
Radar Applications in Cloud and Clear-Air Studies
(Technical memo.)
Gossard, Earl E. ; Strauch, Richard G.
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Corp. Source Codes: 031828046
Report No.: NOAA-TM-ERL-WPL-87; NOAA-82022204
Nov 81 275p
Languages: English
NTIS Prices: PC A12/MF A01 Journal Announcement: GRAI8215
Country of Publication: United States
Following a review and discussion on radar returns from hydrometeors and clear-air radar returns, separate chapters are devoted to: physical effects of the atmosphere on radar waves; various radars and their potential for cloud and air detection; radar reflectivity and cloud characteristics; radar attenuation and cloud observation; polarization and scatterer characterization; Doppler radar observation of clouds and clear-air.
Descriptors: *Meteorological radar; *Clouds(Meteorology); Clear air turbulence; Remote sensing; Radar echoes; Backscattering; Weather; Boundary layer; Refraction; Reflection; Air masses; Doppler radar
Identifiers: NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

944506 PB83-114454
An Outline of Severe Local Storms with the Morphology of Associated Radar Echoes
(Technical memo)
Grebe, Robert
National Weather Service Training Center, Kansas City, MO.
Corp. Source Codes: 076709000
Report No.: NOAA/TM/NWS/TC-1; NOAA-82090201
Jun 82 93p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8303
Country of Publication: United States
This outline focuses on the interpretation of conventional radar data for the identification of severe local storms. Most of the radar research work in severe local storms accomplished in the 1970's was done with Doppler radar. Doppler is conventional radar plus 'more'. The 'more', velocity derived fields, has increased our understanding of storm structure and the morphology of precipitation related echoes.
Descriptors: *Weather forecasting; *Storms; Identifying; Meteorological radar; Doppler radar; Radar echoes; Precipitation(Meteorology); Thunderstorms; Fronts(Meteorology); Lightning; Hail; Squalls; Tornadoes; Ice; Wind(Meteorology)
Identifiers: *Severe storms; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

779818 AD-A085 293/9
Weather Radar Canceller Design
Groginsky, Herbert L. ; Glover, Kenneth M.
Raytheon Co., Sudbury, MA.
Corp. Source Codes: 024422000; 298250
Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA
Report No.: AFGL-TR-80-0154
1980 9p
Pub. in Proceedings of the Conference on Radar Meteorology (19th), p192-198, 15-18 Apr 80, Miami, FL.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8019
Country of Publication: United States
Contract No.: F19628-76-C-0297; 6672; 06
No abstract available.
Descriptors: *Meteorological radar; *Doppler radar; Signal processing; Reprints
Identifiers: Clutter rejection; Elliptic filters; NTISDODXR NTISDODAF
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

892788 AD-A109 517/3
Detection and Tracking Algorithm Refinement
(Final technical rept.)
Gustafson, G. B. ; Crane, R. K.
Environmental Research and Technology, Inc., Concord, MA.
Corp. Source Codes: 056171000; 391776
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: ERT-P-B035; FAA/RD-81/80
Oct.81 194p
Languages: English
NTIS Prices: PC A09/MF A01 Journal Announcement: GRAI8210
Country of Publication: United States
Contract No.: DTFA01-81-Y-10521
A previous aircraft hazard detection algorithm shown to have high detectability but with a high false alarm rate has been modified to improve reliability for aircraft warnings. The derived Doppler parameter tangential (or radial) shear is incorporated as a radar cell attribute and used in the determination of significant hazard. Further modifications to the processing structure allow for radar operation in a non-automatic mode, thereby accomodating arbitrary changes in PRF, integrator type or scan geometry. A revised output format provides a sorted hierarchical list of derived meteorological structures in a form readily adapted to a graphics display. (Author)
Descriptors: *Aviation safety; *Hazards; *Storms; *Warning systems; *Algorithms; Tracking; Detection; Computerized simulation; Computer programs; Radar scanning; Computer graphics; Doppler radar; Reliability; Lagrangian functions; All weather aviation
Identifiers: VAX 11/780 computers; NTISDODXA; NTISDOTFAA
Section Headings: 1B (Aeronautics--Aeronautics); 9B (Electronics and Electrical Engineering--Computers); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety); 63H (Detection and Countermeasures--Radiofrequency Detection)

1100730 PB85-132884/XAB
Phased Antenna Array for Wind Profiling Applications
(Patent Application)
Hogg, D. C.
Department of Commerce, Washington, DC.
Corp. Source Codes: 001948000
Report No.: PAT-APPL-6-666 594
Filed 31 Oct 84 25p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.
Languages: English Document Type: Patent
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8505
Country of Publication: United States
The invention relates to a phased antenna array for use with radar apparatus for wind profiling based on Doppler frequency shift measurements. More specifically, the invention relates to a diagonally-shaped or diamond-shaped, phased array of individual antenna elements oriented to be uniformly polarized in a predetermined direction which is at a 45 degree angle to the principal planes of the array such that the radiation patterns are similar and geometrically tapered in the principal planes.
Descriptors: *Phased arrays; Doppler radar; Meteorological radar; Wind(Meteorology)
Identifiers: Wind profiles; NTISGPCOM
Section Headings: 9E (Electronics and Electrical Engineering--Subsystems); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 49A (Electrotechnology--Antennas); 90F (Government Inventions For Licensing--Electrotechnology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1980091 N85-31729/5/XAB
Comparison of Wind and Turbulence Measurements from Doppler Lidar and Instrumented Aircraft
(Final rept. 14 Sep 84-14 May 85)
Huang, K. H. ; Frost, W. ; Ringnes, E. A.
FWG Associates, Inc., Tullahoma, TN.
Corp. Source Codes: 056183000; F9832078
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NAS 1.26:171535; NASA-CR-171535
(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

18 Jun 85 59p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8523; STAR2320
Country of Publication: United States
Contract No.: NAS8-36188
Wind fields were measured with the ground based lidar, NOAA Wave Propagation Laboratory and with the NASA B-57B instrumented aircraft. The remotely sensed winds are compared with the in situ aircraft measurements. Three flight plans were carried out during the two different field programs. At NASA/MSFC the aircraft circled while the lidar scanned conically and the aircraft flew 6 deg approach path along the fixed lidar beam. The aircraft flew an approach along the lidar beam directed south-north (parallel to the mountain range) and a climbout along the lidar beam which alternately shifted east-west (perpendicular to the mountain range). Turbulence intensities and spectra were calculated from the temporal fluctuations in the lidar-measured radial wind speed component. These field tests provided unique sets of data to examine the mean wind and turbulence measurements made by remote sensing instruments. The comparison of aircraft measured turbulence intensities and spectra with lidar time histories of radial wind speed were in good agreement.
Descriptors: *Atmospheric turbulence; Doppler radar; Optical radar; *Radar measurement; *Wind velocity; Carbon dioxide lasers; Remote sensing; Spectrum analysis; Velocity distribution; Wind direction; Wind measurement
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 14B (Methods and Equipment--Laboratories, Test Facilities, and Test Equipment); 55B (Atmospheric Sciences--Dynamic Meteorology)

1120922 AD-A151 846/3/XAB
Investigation of a Failure Detection/Identification System for a Tactical Aircraft Navigation System
(Master's thesis)
Johnston, G. R.
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Corp. Source Codes: 000805002; 012225
Report No.: AFIT/GE/ENG/84D-36
Dec 84 312p
Languages: English Document Type: Thesis
NTIS Prices: PC A14/MF A01 Journal Announcement: GRAI8513
Country of Publication: United States
The purpose of this thesis was to develop a suitable filter model and failure detection/identification (FDI) processor as a basis for a fully simulated adaptive tactical navigation (ATN) system. A 52-state truth error model was developed from which a 26-state filter error model was derived. The measurement process uses a six measurement satellite positioning system (three velocity measurements and three position measurements), a three measurement Doppler radar, and a terrain correlation system. The filter residuals for the different measurement processes are then used in N-step likelihood function computations to observe the residual behavior. Two different testing criteria have been developed for failure declaration. Simple threshold establishment and the tracking of the likelihood function N-step characteristics are used for this purpose. Based on the statistics of the observed failure characteristics, an isolation processor isolates the fault and makes the correct identification.
Descriptors: *Tacan; *Tactical aircraft; Behavior; Theses; Position(Location); Tracking; Adaptive systems; Terrain; Doppler radar; Velocity; Statistics; Detection; Failure; Filters; Models; Computations; Functions(Mathematics); Processing equipment; Measurement; Failure; Identification systems; Residuals; Isolation; Kalman filtering
Identifiers: NTISDODXA
Section Headings: 17G (Navigation, Communications Detection, and Countermeasures--Navigation and Guidance); 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components)

798149 PB80-217201
The Boulder Low-Level Intercomparison Experiment. Preprint of WMO Report
Kaimal, J. C. ; Baynton, H. W. ; Gaynor, J. E.
Boulder Atmospheric Observatory, CO.
Corp. Source Codes: 068882000
Report No.: BAO-2; NOAA-80071614
Jun 80 200p
Languages: English Document Type: Conference proceeding
NTIS Prices: PC A09/MF A01 Journal Announcement: GRAI8025
Country of Publication: United States
In preparing this report for the World Meterological Organization (WMO) Commission for Instruments and Methods of Observation (CIMO), the editors have aimed at providing adequate coverage of all three aspects of the Boulder Low-Level Intercomparison Experiment (BLIE): the workshop preceding the experiment, the experiment itself, and the results of the intercomparison. Papers presented at the workshop form the first part of the report, Chapters 1-23. The description of the experiment in chapter 24 reflects the perspective of the three members of the organizing committee who planned and directed the experiment. Chapter 25, prepared by the same three authors, described the results and includes comments from participants on the performance of their sensors and explanations for possible discrepancies in their results. The experiment to improve the present understanding of low-level sounding techniques, was conducted in August and September 1979 at the Boulder Atmospheric Observatory (BAO), located 25 km east of Boulder, Colorado. Eleven member nations of WMO participated in the experiment with equipment or as observers.
Descriptors: *Atmospheric sounding; *Meteorological data; *Meetings; Remote sensing; Wind(Meteorology); Anemometers; Towers; Aircraft; Meteorological radar; Doppler radar;
(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

Radiosondes; Acoustic detection; Performance evaluation; Meteorological balloons; Boundary layers; Profiles; Electroacoustic transducers; Aerodynamics; Continuous wave radar; Weather stations; Runways
Identifiers: XONDAR; SODAR; SAM; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 4A (Atmospheric Sciences--Atmospheric Physics); 14B (Methods and Equipment--Laboratories, Test Facilities, and Test Equipment) 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

813818 N81-10637/9
First Scientific Working Group Meeting of Airborne Doppler Lidar Wind Velocity Measurement Program
Kaufman, J. W.
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Corp. Source Codes: 019043002; ND736801
Report No.: NASA-CP-2161
Oct 80 135p
Meeting Held in Huntsville, Ala., 25-26 Aug. 1980.
Languages: English Document Type: Conference proceeding
NTIS Prices: PC A07/MF A01 Journal Announcement: GRAI8105; STAR1901
Country of Publication: United States
No abstract available.
Descriptors: *Conferences; *Doppler radar; *Laser applications; *Meteorological flight; *Wind measurement; Computerized simulation; Convection clouds; Optical radar; Precipitation (Meteorology); Storms (Meteorology)
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1074970 AD-P003 492/6
Four-Dimensional Thunderstorm Model for Flight Simulators
Klehr, J. T.
Singer Co., Binghamton, NY. Link Flight Simulation Div.
Corp. Source Codes: 065409002; 392688
16 Nov 83 4p
This article is from 'Proceedings of the Interservice/Industry Training Equipment Conference (5th) Held at Washington, DC on November 14-16, 1983. Volume 1', AD-A142 774, p335-338.
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8421
Country of Publication: United States
The recent airliner crash at New Orleans indicates that windshears due to thunderstorm downbursts challenge the most experienced and well-trained pilots. Much controversy exists as to the correct flight procedures for takeoff and landing under downburst windshear conditions. Flight simulators provide a safe environment to test procedures and train pilots for hazardous flight situations, but in the past, flight simulators have been unable to realistically duplicate the complex changes that occur temporally and spatially in real-world thunderstorms. A thunderstorm model based upon real-world data has now been developed for flight simulators, which provides twelve meteorological flight parameters which change in three-dimensional space and over a thirty-minute time span with color weather radar representations of the storm coordinated in time and space. The storm data set (representing a 20nm x 20nm x 3200-ft volume) is based upon multiple Doppler radar analyses of a 1978 Illinois thunderstorm. This data has been supplemented by a well-documented, fine resolution, downdraft model to provide realistic values in the hazardous regions of the sudden downdraft and its resulting turbulent gust front.
Descriptors: *Flight simulation; *Thunderstorms; *Flight simulators; Models; Four dimensional; Flight training; Pilots Wind shear; Meteorological data; Flight; Parameters; Meteorological radar; Doppler radar; Resolution; Hazards; Fronts(Meteorology); Gusts; Data bases
Identifiers: *Thunderstorm models; Component Reports; NTISDODXA
Section Headings: 5I (Behavioral and Social Sciences--Personnel Selection, Training, and Evaluation); 4B (Atmospheric Sciences--Meteorology); 1B (Aeronautics--Aeronautics); 92A (Behavior and Society--Job Training and Career Development); 55B (Atmospheric Sciences--Dynamic Meteorology) 51B (Aeronautics and Aerodynamics--Aeronautics)

894560 PB82-158791
Case Studies on Convective Storms, Case Study 9, 13 June 1974: Mature Storm Study A Small, Isolated, 'Steady State' Convective Storm
(Technical note)
Knight, Charles A.
National Center for Atmospheric Research, Boulder, CO. Convective Storms Div.
Corp. Source Codes: 013970006
Sponsor: National Science Foundation, Washington, DC.
Report No.: NCAR/TN-163
Feb 81 77p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8210
Country of Publication: United States
Contract No.: NSF-ATM77-23757
An unusually isolated storm that had a relatively constant intensity for at least an hour travelled into the NHRE observing network on 13 June 1974, and dissipated therein. The complement of observations of the storm included vertically pointing Doppler radar, time-lapse photography, and aircraft circumnavigations. The storm appeared to maintain itself by travelling along a convergence zone somehow induced by the storm's own wake. Virtually no outflow features were detected

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in the ground measurements within the mesonetwork, and therefore the storm maintenance mechanism did not involve surface outflow. While little precipitation managed to reach the ground, the storm extended to the tropopause.
Descriptors: *Thunderstorms; *Storms; Doppler radar; Radar echoes; Storm tracks; Cloud physics; Atmospheric sounding; Precipitation(Meteorology); Atmospheric temperature; Wind(Meteorology); Wyoming; Nebraska; Colorado
Identifiers: NTISNSFCAR
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1065916 N84-22820/4
Doppler Radar Having Phase Modulation of Both Transmitted and Reflected Return Signals
(Patent)
Kobayashi, H. S. ; Shores, P. W. ; Rozas, P.
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Corp. Source Codes: 019042004; ND052615
Report No.: PATENT-4 439 766; PAT-APPL-6-266 687,NASA-CASE-MSC-18675-1
Filed 22 May 81 patented 27 Mar 84 8p
Supersedes PAT-APPL-6-266 687, N81-29312.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231, $1.00.
Languages: English Document Type: Patent
NTIS Prices: Not available NTIS Journal Announcement: GRAI8417; STAR2213
Country of Publication: United States
A microwave radar signal is generated for transmission through an antenna. Before transmission, the signal is phase modulated by 0 deg or 90 deg amounts during each alternate half-cycles of an intermediate frequency (IF) clock signal. After transmission and return, the signal is again phase modulated the same amounts during each alternate half-cycles. The return phase modulated signal is mixed with a leakage signal component of the microwave signal, leaving an IF Doppler. The IF Doppler signal may then be amplified, removing any requirement that direct current level signals be amplified and also removing the effect of detector noise from the Doppler signal.
Descriptors: *Patents; *Doppler radar; *Microwaves; *Phase modulation; *Signal transmission; Amplifier design; Amplifiers ; Antennas; Oscillators
Identifiers: PAT-CL-343-9R; PAT-CL-343-17.5; NTISGPNASA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 90F (Government Inventions For Licensing--Electrotechnology); 63H (Detection and Countermeasures--Radiofrequency Detection)

842553 N81-20664/1
Analysis of the Inversion Monitoring Capabilities of a Monostatic Acoustic Radar in Complex Terrain
(Final Report)
Koepf, D. ; Frost, W.
Tennessee Univ. Space Inst., Tullahoma.
Corp. Source Codes: 028691000; T0185909
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NASA-CR-3401
Apr 81 61p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8116; STAR1911
Country of Publication: United States
Contract No.: NAS8-32031
A qualitative interpretation of the records from a monostatic acoustic radar is presented. This is achieved with the aid of airplane, helicopter, and rawinsonde temperature soundings. The diurnal structure of a mountain valley circulation pattern is studied with the use of two acoustic radars, one located in the valley and one on the downwind ridge. The monostatic acoustic radar was found to be sufficiently accurate in locating the heights of the inversions and the mixed layer depth to warrant use by industry even in complex terrain.
Descriptors: *Acoustic sounding; *Atmospheric sounding; *Doppler radar; *Temperature inversions; *Tennessee valley (Al-ky-tn); Aerial reconnaissance; Atmospheric temperature; Rawinsondes; Transmitter receivers
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1061583 AD-A140 558/8
Real Time Divergence Measurement from Single Doppler Radar
(Final technical rept. 1 Jul-30 Sep 82)
Koscielny, A. J.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000; 244670
Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA.
Report No.: AFGL-TR-83-0299
1 Sep 83 45p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8416
Country of Publication: United States
Contract No.: ESD-2-0950; 2781; 01
Mesoscale convergence is throught to influence development of convective storms. Convergence can be measured with a single Doppler radar if the wind field is approximately spatially linear. The algorithm for measuring convergence from radial velocities is presented. The algorithm is feasible for
(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

real time application to two elevation angles of a tilt sequence of five or more elevation angles. This convergence measurement technique is applied to widespread convective precipitation in central Oklahoma on April 9, 1978. Analysis results and the suitability of the spatial linearity assumption are discussed. (Author)
Descriptors: *Doppler radar; Real time; Algorithms; Atmospheric precipitation; Wind velocity; Weather; Radial velocity; Convection(Atmospheric); Thunderstorms; Computerized simulation
Identifiers: NTISDODXA; NTISDODAF
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 63H (Detection, and Countermeasures--Radiofrequency Detection)

1054071 AD-A139 579/7
Range-Doppler Moving Target Indicator (MTI) Analysis and Assessment
(Interim rept.)
Kretschmer, Jr., F. F. ; Lewis, B. L. ; Lin, F. L. C.
Naval Research Lab., Washington, DC.
Corp. Source Codes: 000927000; 251950
Report No.: NRL-8789
20 Mar 84 22p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8413
Country of Publication: United States
Contract No.: F12131; SF12131691
The concept of a new moving target indicator (MTI) based on the range-doppler coupling properties of chirp, step-chirp, and certain polyphase codes is discussed. The principal feature of the range-doppler coupled MTI is that target blind speeds are eliminated. The polyphase codes must by symmetric for proper operation in a range-doppler coupled MTI. The performance of this MTI is evaluated, and its limitations are identified. (Author)
Descriptors: *Moving target indicators; *Signal processing; *Radar pulses; *Pulse compression; *Chirp radar; *Doppler radar; Range(Distance); Coding; Radar clutter; Pulse rate; Coupling(Interaction); Range finding; Doppler systems; Velocity; Gain; Targets
Identifiers: Range clutter; RDC(Range Doppler Coupling); Velocity response; NTISDODXA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 63H (Detection and Countermeasures--Radiofrequency Detection)

964893 AD-A123 876/5
FAA Weather Surveillance Requirements in the Context on NEXRAD
(Project rept.)
Laird, Bruce G. ; Evans, James E.
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Corp. Source Codes: 009875001; 207650
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: ATC-112; FAA-RD-81-111
19 Nov 82 184p
Languages: English
NTIS Prices: PC A09/MF A01 Journal Announcement: GRAI8311
Country of Publication: United States
Contract No.: F19628-80-C-0002; DTFA01-80-Y-10546
The Federal Aviation Administration (FAA), National Weather Service and Air Force Weather Service are currently engaged in a program to develop a next generation of weather radars (NEXRAD) capable of satisfying (to the greatest extent possible) the common weather information needs of these agencies. This report identifies the unique FAA weather radar surveillance requirements and examines the technical issues that arise in attempting to meet these requirements with the NEXRAD strawman radar sensors and siting. Current air traffic control (ATC) weather data usage and statistics of aviation weather hazards and system efficiency are used to prioritize products needed for ATC. The strawman NEXRAD capability is then reviewed in the context of the identified weather products and factors such as: (1) effects of front end noise and weather return statistics, (2) resolution and low altitude coverage constraints, (3) the clutter environment associated with various siting options, and (4) data quality required for real time automated display of hazardous weather regions to ATC controllers. It is concluded that significant problems will arise in attempting to simultaneously provide terminal and en route weather surveillance by a single radar as envisioned in the NEXRAD strawman. An analytical/experimental research and development program is described to resolve the identified technical uncertainties in the NEXRAD strawman design for FAA applications.
Descriptors: *Meteorological radar; *Airport radar systems; *Weather stations; *Weather communications; *Information processing; Doppler radar; Radar tracking; Requirements; Management planning and control; Data acquisition; Air traffic control terminal areas; Information systems; Systems engineering; Safety; Literature surveys
Identifiers: NEXRAD(Next Generation Weather Radar); NTISDODXA; NTISDOTFAA
Section Headings: 4A (Atmospheric Sciences--Atmospheric Physics); 1E (Aeronautics--Air Facilities); 9B (Electronics and Electrical Engineering--Computers); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 85A (Transportation--Air Transportation) ; 85D (Transportation--Transportation Safety)

1028525 AD-A135 357/2
Can a VHF Doppler Radar Provide Synoptic Wind Data. A Comparison of 30 Days of Radar and Radiosonde Data
Larsen, M. F.
Cornell Univ., Ithaca, NY. School of Electrical Engineering.
Corp. Source Codes: 000607065; 098850
Sponsor: Air Force Office of Scientific Research, Bolling
(cont. next page)

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

AFB, DC.
Report No.: AFOSR-TR-83-1018
Apr 83 10p
Pub. in Symposium on Meteorological Observations and Instrumentation (5th), p183-190 Apr 83.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8405
Country of Publication: United States
Contract No.: AFOSR-80-0020; 2310; A1
No abstract available.
Descriptors: *Doppler radar; *Wind velocity; Refractive index; Atmospheric refraction; Very high frequency; Alaska; Reprints
Identifiers: Synoptic data; Rawinsonde winds; Profileometers ; NTISDODXR; NTISDODAF
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms) ; 55B (Atmospheric Sciences--Dynamic Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection)

0981258 AD-A127 023/0
Analysis of NOAA/ALASKAN MST Radar Data
(Final rept.)
Larsen, M. F. ; Kelley, M. C. ; Farley, D. T.
Cornell Univ., Ithaca, NY. Dept. of Electrical Engineering.
Corp. Source Codes: 000607161; 411091
Sponsor: Air Force Office of Scientific Research, Bolling AFB, DC.
Report No.: AFOSR-TR-83-0236
Nov 82 64p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8316
Country of Publication: United States
Contract No.: AFOSR-80-0020; 2310; A1
Beginning in 1979 Cornell University was funded for the purpose of analyzing the high time-resolution measurements provided by the Poker Flat VHF Doppler radar. The research emphasized applications of the technique to investigations of synoptic and mesoscale dynamics. The primary research areas included determining the characteristics of mesoscale turbulence in the range of periods from a few hours to several days and determining the extent to which the geostrophic balance condition is satisfied at time scales of a day or less. (Author)
Descriptors: *Doppler radar; *Mesosphere; *Stratosphere; *Troposphere; *Wind; *Turbulence; Atmospheric physics; Very high frequency; Ultrahigh frequency; Geostrophic wind; Synoptic meteorology; Radiosondes; Alaska
Identifiers: Poker flat radar; Geostrophic balance; Mesoscale turbulence; Turbulence spectra; Synoptic dynamics; Atmospheric turbulence; NTISDODXA; NTISDODAF
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4A (Atmospheric Sciences--Atmospheric Physics); 63H (Detection and Countermeasures--Radiofrequency Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

0981339 AD-A127 104/8
VHF (Very High Frequency) and UHF (Ultrahigh Frequency) Doppler Radars as Tools for Synoptic Research
(Technical rept.)
Larsen, M. F. ; Roettger, J.
Cornell Univ., Ithaca, NY. School of Electrical Engineering.
Corp. Source Codes: 000607065; 098850
Sponsor: Air Force Office of Scientific Research, Bolling AFB, DC.
Report No.: AFOSR-TR-83-0215
Sep 82 15p
Pub. in Bulletin of the American Meteorological Society, v63 n9 p996-1008 Sep 82.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8316
Country of Publication: United States
Contract No.: AFOSR-80-0020; 2310; A2
No abstract available.
Descriptors: *Doppler radar; *Atmospheric physics; Gravity waves; Wind; Experimental data; Ultrahigh frequency; Very high frequency; Colorado; Reprints
Identifiers: Synoptic scales; Mesoscales; Platteville; NTISDODXR; NTISDODAF
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4A (Atmospheric Sciences--Atmospheric Physics); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

893115 AD-A109 845/8
Doppler Radar-Research and Application to Aviation Flight Safety, 1977-1979
(Final rept.)
Lee, J. T.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000; 244670
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: FAA/RD-81-79
Jun 81 45p
Original contains color plates: All DTIC/NTIS reproductions will be in black and white.
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8210
Country of Publication: United States
Contract No.: DOT-FA77WAI-808
Thunderstorm turbulence detection and the display of the turbulence location offer a significant advance toward improvement in flight safety and utilization of critical air

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

space. A cooperative program involving the Federal Aviation Administration, U.S. Air Force's Aeronautical Systems Command, and the National Oceanic and Atmospheric Administration's National Severe Storms Laboratory has been conducted under a code name of 'Rough Rider'. An F-4-C aircraft instrumented to record turbulence, temperature and wind during thunderstorm penetrations has been used to obtain in situ measurements of these parameters concurrently with Doppler and conventional weather radar observations. The results of this program indicate that the Doppler measured radial wind component's spectral width holds promise as a turbulence indicator. Turbulence of the severe or greater nature was always accompanied by spectral widths greater than 4 m/s. A second part of the program was to display forenoted Doppler radar data in real time at a Radar Approach Control office and at an Air Route Traffic Control Center. This display provided an insight into requirements for an operational system. (Author)
Descriptors: *Meteorological radar; *Doppler radar; *Thunderstorms; *Aviation safety; Control centers; Position(Location); United States Government; Air space; Real time; Traffic; Penetration; Radar; Width; Turbulence; Control Indicators; Spectra; Approach; Detection; Aeronautics
Identifiers: Rough Rider project; NTISDODXA; NTISDOTFAA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

924213 AD-A115 447/5
Field Program Operations - Turbulence and Gust Front Studies
(Final rept. Mar-Dec 80)
Lee, J. T. ; Doviak, R. J.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000; 244670
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: DOT/FAA/RD-81-108
Nov 81 43p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8220
Country of Publication: United States
Contract No.: DT-FA01-80-Y-10524
The 1980 Spring Observation Program extended from April 15 to June 19 at the National Severe Storms Laboratory, Norman, Oklahoma. Aircraft, rawinsonde network, mesoscale surface network, low-level wind shear alert system at Will Rogers World Airport, 444 m instrumented tower and satellite observations augmented a conventional weather radar and a new, dual Doppler weather radar system to obtain concurrent data on weather hazards to aircraft. Storm days and data acquired are detailed. An objective for the spring program was to determine the characteristics and detectability of turbulence, wind shear and other aircraft operational weather hazards using indirect (radar) probes. The South Dakota School of Mines T-28 aircraft and the National Aeronautics and Space Administration's F-106 aircraft made thunderstorm penetrations during Doppler radar and lightning operations. Data obtained are discussed, and the analysis of a turbulence case and two gust front cases are presented. These indicate the Doppler radar's potential use to detect and dimensionalize aviation weather hazards both in-cloud and in optically clear air. These studies and additional ones now in progress will provide material for guideline development as to siting and uses of the Next Generation Radar (NEXRAD) in aviation-related situations. (Author)
Descriptors: *Turbulence; *Gusts; *Fronts(Meteorology); Wind shear; Thunderstorms; Meteorological instruments; Ground level ; Low altitude; Airborne; Meteorological radar; Doppler radar Radar reflections; Research facilities; Oklahoma
Identifiers: *Gust fronts; NTISDODXA; NTISDOTFAA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

859253 PB81-220162
Summary of AEC-ERDA-NRC Supported Research at NSSL 1973-1979
(Technical memo.)
Lee, J. T. ; Zrnic', Dusan S. ; Davies-Jones, Robert P. ; Golden, Joseph H.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000
Report No.: NOAA-TM-ERL-NSSL-90; NOAA-81043004
Mar 81 110p
Languages: English
NTIS Prices: PC A06/MF A01 Journal Announcement: GRAI8122
Country of Publication: United States
In 1973, the mutual interest in tornado wind and pressure structure witnessed the formation of a cooperative research program between the National Oceanic and Atmospheric Administration's (NOAA) National Severe Storms Laboratory at Norman, Oklahoma and the Atomic Energy Commission (AEC) with its successor organization the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission (NRC). This report presents an overview of the research and results generated through the coordinated effort. This research proceeded along several lines - direct observations such as radar and photographic, indirect observations such as damage inferred wind flows, and modeling.
Descriptors: *Storms; *Tornadoes; Wind(Meteorology); Mathematical models; Vortices; Pressure; Doppler radar
Identifiers: *Severe storms; Waterspouts; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

961517 N83-13706/7
Nasa Airborne Doppler Lidar Program: Data Characteristics of 1981
(Final Technical Report)
Lee, R. W.
Lassen Research, Manton, CA.
Corp. Source Codes: 040181000; LF986253
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NAS 1.26:170667; FTR-1; NASA-CR-170667
Apr 82 122p
Languages: English
NTIS Prices: PC A06/MF A01 Journal Announcement: GRAI8309; STAR2104
Country of Publication: United States
Contract No.: NAS8-34768
The first flights of the NASA/Marshall airborne CO2 Doppler lidar wind measuring system were made during the summer of 1981. Successful measurements of two-dimensional flow fields were made to ranges of 15 km from the aircraft track. The characteristics of the data obtained are examined. A study of various artifacts introduced into the data set by incomplete compensation for aircraft dynamics is summarized. Most of these artifacts can be corrected by post processing, which reduces velocity errors in the reconstructed flow field to remarkably low levels.
Descriptors: *Carbon dioxide; *Doppler radar; *Flow distribution; *Flow measurement; *Optical radar; *Two dimensional flow; *Wind measurement; Aerodynamic configurations; Aircraft configurations; Data acquisition; Data processing; Data reduction; Error correcting devices
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 17H (Navigation, Communications Detection, and Countermeasures--Optical Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 63H (Detection and Countermeasures--Radiofrequency Detection); 63F (Detection and Countermeasures--Optical Detection)

1086773 N84-31552/2
Research Study: Organization and Development of Organized Convection in the Boundary Layer
(Monthly Progress Report)
Lee, R. W.
Lassen Research, Manton, CA.
Corp. Source Codes: 040181000; LF986253
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NAS 1.26:171115; MPR-19; NASA-CR-171115
1 May 84 2p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8425; STAR2221
Country of Publication: United States
Contract No.: NAS8-34773
The status of a study to investigate the convective structures found in Doppler lidar windfield data is reported. Projected research is mentioned briefly.
Descriptors: *Atmospheric boundary layer; *Convection; *Wind (Meteorology); Algorithms; Contract management; Doppler radar Optical radar; Project planning; Research management
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55E (Atmospheric Sciences--Physical Meteorology)

930376 N82-22851/1
Research Study: Severe Storms Doppler Lidar Signal Processing
(Final Report)
Lee, R. W.
Lassen Research, Manton, CA.
Corp. Source Codes: 040181000; LF986253
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NASA-CR-161995; NAS 1.26:161995
10 Mar 82 5p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8218; STAR2013
Country of Publication: United States
Contract No.: NAS8-33834
Four tasks related to the signal processing aspects of the severe-storms Doppler lidar program are discussed. The development of algorithms for windfield retrieval from Doppler lidar measurements are discussed. Signal processor installation on a CV-990 aircraft is discussed.
Descriptors: *Doppler radar; *Meteorological radar; *Optical radar; *Signal processing; *Storms (Meteorology); Advection; Airborne/spaceborne computers; Algorithms; Computerized simulation; Cv-990 aircraft; Error analysis; Least squares method; Wind velocity measurement
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

961516 N83-13705/9
Severe Storms Doppler Lidar Signal Processing
(Final Report)
Lee, R. W.
Lassen Research, Manton, CA.
Corp. Source Codes: 040181000; LF986253
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NAS 1.26:169557; NASA-CR-169557
1 Oct 82 4p
Languages: English

(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8309; STAR2104
Country of Publication: United States
Contract No.: NAS8-34768
The recommended algorithm for the correction of higher order data errors in severe storms doppler lidar signal processing is discussed.
Descriptors: *Algorithms; *Doppler radar; *Errors; *Optical radar; *Signal processing; *Storms; Least squares method; Mean square values; Time series analysis
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17H (Navigation, Communications Detection, and Countermeasures--Optical Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 63F (Detection and Countermeasures--Optical Detection)

807581 N80-33123/4
Windfield Retrieval from Doppler Lidar Observations
(Interim Technical Report)
Lee, R. W.
Lassen Research, Manton, CA.
Corp. Source Codes: 040181000; LF986253
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NASA-CR-161572; ITR-1
Jun 80 20p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8103; STAR1823
Country of Publication: United States
Contract No.: NAS8-33389
An approach to the retrieval of a vector wind field from Doppler lidar observations is developed in general terms. The field of radial velocity measurements from each look angle is modeled by a smooth surface, the parameters of the model being determined from the data by least squares techniques. The vector wind field and higher-order fields are obtained from the two modeled surfaces. Estimated measurement errors are taken into account, and error estimates are available for all output data sets.
Descriptors: *Doppler radar; *Optical radar; *Wind measurement; Algorithms; Data smoothing; Error analysis; Inversions; Radial velocity; Random errors; Scalars; Vectors (Mathematics)
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

773914 N80-22679/8
Development of Tunable High Pressure CO2 Laser for Lidar Measurements of Pollutants and Wind Velocities
(Contractor Report, Oct. 1977 - Jan. 1979)
Levine, J. S. ; Guerra, M. ; Javan, A.
Laser Development Corp., Lexington, MA.
Corp. Source Codes: 066749000; LF971604
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NASA-CR-3274
Apr 80 24p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8017; STAR1813
Country of Publication: United States
Contract No.: NAS1-14885
The problem of laser energy extraction at a tunable monochromatic frequency from an energetic high pressure CO2 pulsed laser plasma, for application to remote sensing of atmospheric pollutants by Differential Absorption Lidar (DIAL) and of wind velocities by Doppler Lidar, was investigated. The energy extraction principle analyzed is based on transient injection locking (TIL) at a tunable frequency. Several critical experiments for high gain power amplification by TIL are presented.
Descriptors: *Carbon dioxide lasers; *Optical radar; *Pollution monitoring; *Pulsed lasers; *Remote sensors; *Tunable lasers; *Wind velocity measurement; Doppler radar; Frequency stability; High gain; Oscillators; Power amplifiers
Identifiers: NTISNASA
Section Headings: 20E (Physics--Masers and Lasers); 4B (Atmospheric Sciences--Meteorology); 17E (Navigation, Communications Detection, and Countermeasures--Infrared and Ultraviolet Detection); 46C (Physics--Optics and Lasers); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms); 68A (Environmental Pollution and Control--Air Pollution and Control); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection)

1128617 AD-A153 550/9/XAB
Atmospheric Probing by Active Millimeter Wave System
(Final rept. 15 Mar-14 Jul 84)
Lhermitte, R.
Rosenstiel School of Marine and Atmospheric Science, Miami, FL.
Corp. Source Codes: 044778000; 405515
Sponsor: Army Research Office, Research Triangle Park, NC.
Report No.: ARO-18627.2-GS
Mar 85 19p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8516
Country of Publication: United States
Contract No.: DAAG29-82-K-0082
The objectives of the contract are to design, assemble, and
(cont. next page)

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test a W-band Doppler radar operating at a frequency of 94 GHZ (lambda = 3.3 mm). The ultimate goal of the project is to use the radar in a cloud physics research program. The radar design is based on an MTI scheme in which the transmitter RF pulse produced by an Extended Interaction Oscillator phase-locks a Coho IF signal. A gunn diode oscillator phase-locked on a crystal oscillator signal provides the STALO input to the mixers. The radar is equipped with two separate transmitter and receiver antenna having a 3-foot diameter. The receiver mixer noise figure is 6.5 dB DSB and the transmitter power s 1.2 kW. Pulse width can be adjusted between 0.1 to 2 microns, and Pulse Repetition Rate between 2.5 to 20 KHZ. The radar is completed and tested. Test results indicate that the Doppler operation is satisfactory and that the minimum range at which the radar can operate is approximately 60 m (400 ns), as primarily limited by the IF amplifier recovertie. The Doppler radar is equipped with an on-line signal processor for real-time evaluation of mean Doppler frequency and mean signal intensity.

Descriptors: *Cloud physics; *Doppler radar; Antennas; Cloud physics; Crystal oscillators; Doppler effect; Doppler radar; Doppler systems; Frequency; Gunn diodes; Intensity; Mean; Millimeter waves; Moving target indicators; On line systems; Operation; Oscillators; Phase locked systems; Pulse rate; Pulse transmitters; Radar; Radiofrequency pulses; Real time; Receivers; Repetition rate; Signal processing; Signals; Test and evaluation

Identifiers: NTISDODXA; NTISDODA

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4A (Atmospheric Sciences--Atmospheric Physics); 63H (Detection and Countermeasures--Radiofrequency Detection); 55E (Atmospheric Sciences--Physical Meteorology)

1118567 AD-A151 441/3

Millimeter Wave Radar for Meteorological Observations

Lhermitte, R. ; Frush, C.

Miami Univ., FL.

Corp. Source Codes: 011335000; 387505

Sponsor: Army Research Office, Research Triangle Park, NC.

Report No.: ARO-18627.1-GS

Sep 84 5p

Pub. in Conference on Radar Meteorology (22nd) p228-231 10-13 Sep 84 (No copies furnished by DTIC/NTIS).

Languages: English Document Type: Journal article

NTIS Prices: Not available NTIS Journal Announcement: GRAI8512

Country of Publication: United States

Contract No.: DAAG29-82-K-0082

A short wavelength, low power radar was selected for use in a cloud physics research effort and this paper presents the millimeter wave Doppler which was designed and assembled for this project. Contents: Choice of Wavelength; General Radar Design; Transmitter; Receiver; System Performance; Signal Processing; Conclusion.

Descriptors: *Doppler radar; *Meteorological radar; Cloud physics; Low power; Millimeter waves; Signal processing; Reprints; Radar transmitters; Radar receivers

Identifiers: *Millimeter wave radar; NTISDODXR; NTISDODA

Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 63H (Detection and Countermeasures--Radiofrequency Detection)

817341 N81-11596/6

An Airborne System for Detection of Volcanic Surface Deformations

Lunine, J.

California Inst. of Tech., Pasadena. Div. of Geological and Planetary Sciences.

Corp. Source Codes: 005100113

Sponsor: National Aeronautics and Space Administration, Washington, DC.

20 Aug 80 21p

Sponsored by NASA Prepared for Lunar and Planetary Inst., Houston, Tex.

Languages: English

NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8106; STAR1902

Country of Publication: United States

A technique is proposed for measuring volcanic deformation on the order of centimeters per day to centimeters per year. An airborne multifrequency pulsed radar, tracking passive ground reflectors spaced at 1 kilometer intervals over a 50 square kilometer area is employed. Identification of targets is accomplished by Doppler and range resolution techniques, with final relative position measurements accomplished by phase comparison of multifrequency signals. Atmospheric path length errors are corrected by an airborne refractometer, meteorological instruments, or other refractive index measuring devices. Anticipated system accuracy is 1-2 cm, with measuring times on the order of minutes. Potential problems exist in the high intrinsic data assimilation rate required of the system to overcome ground backscatter noise.

Descriptors: *Airborne surveillance radar; *Doppler radar; *Earth surface; *Target acquisition; *Volcanoes; Airborne equipment; Geodetic surveys

Identifiers: NTISNASA

Section Headings: 8K (Earth Sciences and Oceanography--Seismology); 48F (Natural Resources and Earth Sciences--Geology and Geophysics)

942065 AD-A119 855/5

Considerations for Optimum Siting of NEXRAD to Detect Convective Phenomena Hazardous to Terminal Air Navigation. Part 1

(Final rept. Oct 80-Feb 82)

(cont. next page)

DIALOG INFORMATION SERVICES, INC.

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

Mahapatra, Pravas R. ; Zrnic, D. S. ; Doviak, R. J.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000; 244670
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: DOT/FAA/RD-82/56
May 82 39p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8303
Country of Publication: United States
Contract No.: DTFA01-81-Y-10521
The aviation community has been concerned for some time about the number of aircraft accidents during terminal flight in which weather has been identified as the cause or a contributing factor. The next generation weather radar (NEXRAD), for which final specifications are being worked out on a multi-service basis, offers the possibility of dedicated and detailed surveillance of hazardous weather in the terminal airspace. This report outlines considerations for choosing a site for a NEXRAD installation to fulfill this role in an optimum manner. It is shown that the detection of low level wind shear without precipitation imposes the most severe constraints on NEXRAD siting. Three general siting areas are considered (1) within the airport area, (2) within the terminal area, but outside the airport area, (3) outside the terminal area. When a single NEXRAD radar must cover all hazardous phenomena over the terminal area, siting within the airport area appears to be the best choice. Under certain conditions, a case exists for siting the NEXRAD outside the terminal area.
Descriptors: *Meteorological radar; *Doppler radar; *Airport radar systems; Terminal flight facilities; Hazards; Aeronautics; Navigation; Sites; Precipitation; Low level; Accidents; Convection; Specifications; Communities; Flight; Radar; Air space; Optimization; Weather; Wind shear; Surveillance; Detection; Aircraft; Airports
Identifiers: NEXRAD(Next Generation Weather Radar); NTISDODXA; NTISDOTFAA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 1B (Aeronautics--Aeronautics); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms); 63H (Detection and Countermeasures--Radiofrequency Detection); 85D (Transportation--Transportation Safety)

0996784 AD-A130 072/2
Scanning Strategies for Next Generation Weather Radars. A Study Based on Lifetimes of Convective Atmospheric Phenomena Hazardous to Aviation
(Final rept.)
Mahapatra, Pravas R. ; Zrnic, Dusan S.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000; 244670
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: DOT/FAA/RD-82/69
Jul 82 95p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8321
Country of Publication: United States
Contract No.: DTFA01-80-Y-10524
This report presents the methodology and results of a study to estimate the lifetimes of significant features in typical storm phenomena. These results are expected to help in deciding the scan strategy of NEXRAD radars. In particular, the question of the adequacy of a 5-minute information update rate for NEXRAD in its aviation weather surveillance role has been addressed. Two methods are used for the lifetime study: photo-interpretive and computer-based correlation. The basis and program steps of the correlation method are discussed. Several storms are studied using both methods. It is found that the storms studied contain no feature that might have been missed by a 5-minute scan cycle provided that data from all the three-moment fields (reflectivity, radial velocity, and Doppler spectrum width) at several elevations are utilized in the detection of hazardous phenomena. (Author)
Descriptors: *Meteorological radar; *Radar scanning; Time; Storms; Doppler radar; Display systems; Radar images; Life expectancy(Service life); Evolution(General); Correlation; Velocity; Reflectivity; Radar reflections; Spectra; Width; Cycles
Identifiers: NEXRAD(Next Generation Radar); Features; NTISDODXA; NTISDOTFAA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1074918 AD-D011 139/3
Pulsed Laser Radar Apparatus
(Patent)
Marcus, S. ; Quist, T. M.
Department of the Air Force, Washington, DC.
Corp. Source Codes: 000260000; 109850
Report No.: PAT-APPL-6-274 698; PATENT-4 447 149
Filed 17 Jun 81 patented 8 May 84 6p
Supersedes PAT-APPL-6-274 698, AD-D008 879.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $1.00.
Languages: English Document Type: Patent
NTIS Prices: Not available NTIS Journal Announcement: GRAI8421
Country of Publication: United States
No abstract available.
Descriptors: *Patents; *Optical radar; *Pulsed lasers; Local oscillators; Doppler radar; Radar equipment; Infrared lasers; Carbon dioxide; Q switching; Detection; Light pulses

(cont. next page)

DIALOG INFORMATION SERVICES, INC.

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

Identifiers: Laser doppler systems; Homodyne laser receivers ; PAT-CC-356-5; NTISGPAF
Section Headings: 17E (Navigation, Communications Detection, and Countermeasures--Infrared and Ultraviolet Detection); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection); 90H (Government Inventions For Licensing--Optics and Lasers); 90G (Government Inventions For Licensing--Instruments)

928590 AD-A114 116/7
S-Band Radar Pulse Densities in the Los Angeles Area
(Final rept.)
Matheson, R. J. ; Smilley, J. D. ; Lawrence, V. S.
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Corp. Source Codes: 058755001; 410937
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: DOT/FAA/RD-82/17
Aug 81 85p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8218
Country of Publication: United States
Contract No.: DTFA01-81-Y-10535
This report contains results of spectrum occupancy measurements made of the 2700-3100 MHz radar bands in the Los Angeles, CA, area. Approximately 500 sets of measurements were made, which included peak pulse amplitude, as well as the number of pulse counts at three threshold levels measured in 1 MHz frequency increments. These measurements have been combined and are displayed in this report in graphs showing the maximum, average, and minimum amplitude and pulse counts in 1 MHz frequency increments (400 samples). These measurements were made for the Federal Aviation Administration (FAA) by the Institute for Telecommunication Sciences (ITS) using the Radio Spectrum Measurement System, a computer-controlled spectrum analyzer system. The measurements will be used to quantify the S-band electromagnetic environment expected to be encountered with NEXRAD, a doppler weather radar currently under development. (Author)
Descriptors: *Radar interference; *Meteorological radar; *Electromagnetic environments; *Radar pulses; *Spectrum analyzers; Los Angeles(California); Doppler radar; Counting methods; Density; Peak values; Frequency; Spectra; S band; Telecommunications; Measurement; Radiofrequency; Pulses; Graphics; Control; California
Identifiers: Pulse doppler radar; NTISDODXA; NTISDOTFAA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 63H (Detection and Countermeasures--Radiofrequency Detection)

831564 N81-16681/1
An Airport Wind Shear Detection and Warning System Using Doppler Radar: A Feasibility Study
Mccarthy, J. ; Blick, E. F. ; Elmore, K. L.
MCS, Inc., Boulder, CO.
Corp. Source Codes: 072446000; MQ583885
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NASA-CR-3379
Jan 81 95p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8112; STAR1907
Country of Publication: United States
Contract No.: NAS8-33458
A feasibility study was conducted to determine whether ground based Doppler radar could measure the wind along the path of an approaching aircraft with sufficient accuracy to predict aircraft performance. Forty-three PAR approaches were conducted, with 16 examined in detail. In each, Doppler derived longitudinal winds were compared to aircraft measured winds; in approximately 75 percent of the cases, the Doppler and aircraft winds were in acceptable agreement. In the remaining cases, errors may have been due to a lack of Doppler resolution, a lack of co-location of the two sampling volumes, the presence of eddy or vortex like disturbances within the pulse volume, or the presence of point targets in antenna side lobes. It was further concluded that shrouding techniques would have reduced the side lobe problem. A ground based Doppler radar operating in the optically clear air, provides the appropriate longitudinal winds along an aircraft's intended flight path.
Descriptors: *Aircraft performance; *Airports; *Doppler radar; *Feasibility analysis; *Wind shear; Aircraft safety; Approach
Identifiers: NTISNASA
Section Headings: 1E (Aeronautics--Air Facilities); 4B (Atmospheric Sciences--Meteorology); 85A (Transportation--Air Transportation); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms); 85D (Transportation--Transportation Safety)

881170 AD-A106 767/7
Precipitation Field and Intrastorm Flow of Supercell Convective Storms
(Doctoral thesis)
McMorrow, Daniel James
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Corp. Source Codes: 000805000; 012200
Report No.: AFIT-CI-81-45D
Aug 81 286p
Languages: English Document Type: Thesis
NTIS Prices: PC A13/MF A01 Journal Announcement: GRAI8205
Country of Publication: United States
Single-Doppler radar data, when supplemented by surface and upper-air information, provides good estimates of the intrastorm kinematic structure of supercell storms. Spatially derived fields of radial velocity, defined as radial

(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

stretching and cross-beam shear, can be used to identify and track major intrastorm kinematic features. These fields can be computed quickly and require neither storm motion information nor a favorable beam-flow alignment. Comparisons between multi-Doppler analyses (and numerical simulation) and the single-Doppler fields show good correlations of the updraft and downdraft zones as well as storm inflow and outflow areas. Changes in surface precipitation rates, from isolated and squall line supercells, are reflected in changes in the intrastorm flow inferred from single-Doppler data. This offers a new technique for single-Doppler radar analyses. In addition, a detailed study of the changes in supercell surface rainfall rates, over a high-resolution raingage network, suggests that a simple linear relationship exists between the maximum point rainfall rate and the areal coverage of threshold rates of 25 mm/hr and 55 mm/hr. Point-area statistical models are presented for individual rain cores, the storm rainfall, and for rainfall over a 4000 sq. km. watershed. This investigation is the first known detailed study of single-Doppler data and surface rainfall observed over a short time interval.

Descriptors: *Thunderstorms; *Doppler radar; *Rainfall; Measurement; Wind velocity; Rainfall intensity; Cells; Wind shear; Cross flow; Radial velocity; Time studies; Kinematics; Correlation techniques; Theses

Identifiers: *Radar meteorology; NTISDODXA

Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

881155 AD-A106 752/9

Precipitation Field and Intrastorm Flow of Supercell Convective Storms

(Final rept.)

McMorrow, Daniel James

Texas A and M Univ., College Station. Dept. of Meteorology.

Corp. Source Codes: 004736018; 400161

Sponsor: Air Force Office of Scientific Research, Bolling AFB, DC.

Report No.: AFOSR-TR-81-0699

Aug 81 280p

Languages: English Document Type: Thesis

NTIS Prices: PC A13/MF A01 Journal Announcement: GRAI8205

Country of Publication: United States

Contract No.: AFOSR-80-0063; 2310; A1

Single-Doppler radar data, when supplemented by surface and upper-air information, provides good estimates of the intrastorm kinematic structure of supercell storms. Spatially derived fields of radial velocity, defined as radial stretching and cross-beam shear, can be used to identify and track major intrastorm kinematic features. These fields can be computed quickly and required neither storm motion information nor a favorable beam-flow alignment. Comparisons between multi-Doppler analyses (and numerical simulation) and the single-Doppler fields show good correlations of the updraft and downdraft zones as well as storm inflow and outflow areas. Changes in surface precipitation rates, from isolated and squall line supercells, are reflected in changes in the intrastorm flow inferred from single-Doppler data. This offers a new technique for single-Doppler radar analyses. In addition, a detailed study of the changes in supercell surface rainfall rates, over a high-resolution raingage network, suggests that a simple linear relationship eixsts between the maximum point rainfall rate and the areal coverage of threshold rates of 25 mm hr-1 and 55 mm hr-1. Point-area statistical models are presented for individual rain cores, the storm rainfall, and for rainfall over a 4000 km2 watershed. This investigation is the first known detailed study of single-Doppler data and surface rainfall observed over a short time interval. Temporal changes in supercell kinematic structure are related to changes in surface rainfall rates. Supercell rainfall in several different environments are presented. The results suggest that changes in surface rainfall rates are related to changes in intrastorm kinematic flow. (Author)

Descriptors: *Thunderstorms; *Rainfall intensity; *Radar reflections; Patterns; Convection(Atmospheric); Rain; Rainfall ; Fronts(Meteorology); Wind shear; Radial velocity; Doppler radar; Comparison; Kinematics; Theses

Identifiers: *Radar meteorology; NTISDODXA; NTISDODAF

Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1084868 AD-A144 907/3

Interpretation of the Autocovariances and Cross-Covariance from a Polarization Diversity Radar

Metcalf, J. I.

Air Force Geophysics Lab., Hanscom AFB, MA.

Corp. Source Codes: 054815000; 409578

Report No.: AFGL-TR-84-0207

13 Sep 84 7p

Pub. in Conference on Radar Meteorology, n22 p387-392, 10-13 Sep 84.

Languages: English Document Type: Conference proceeding: Journal article

NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8425

Country of Publication: United States

Contract No.: 6670; 16

No abstract available.

Descriptors: *Doppler radar; *Coherent radar; Cross correlation; Pulse rate; Radar receivers; Backscattering; Power spectra; Symposia; Rain; Ice; Scattering; Reprints

Identifiers: Polarization diversity; Dual receivers; Cross covariance; Velocity domain; Media; NTISDODXR

Section Headings: 17I (Navigation, Communications Detection,

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

and Countermeasures--Radar Detection); 63H (Detection and Countermeasures--Radiofrequency Detection)

1014999 AD-A132 622/2
Simulation and Interpretation of Polarization Diversity Radar Spectral Functions
(Environmental research papers)
Metcalf, James I.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-83-0110; AFGL-ERP-835
28 Apr 83 52p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8401
Country of Publication: United States
Contract No.: 6670; 16

A numerical model was developed to simulate the power spectra, cross-spectrum, and derived functions obtainable from a coherent polarization diversity radar. The model was used to investigate the effects of air velocity variance, differential propagation, and noise on the spectral functions. Input parameters include radar wavelength, elevation angle, air velocity variance, rainfall rate, propagation distance, fraction of scatterers having a preferred orientation, and relative noise level. Results of calculations for 8.6 mm and 7.5 cm wavelengths are illustrated. These are compared with the functional forms obtained from theory and discussed in terms of the meteorological information derivable from them. The forms of the spectral power ratio and the cross-spectral amplitude ratio are strongly affected by air velocity variance and by noise. However, it appears possible to derive a good estimation of the Doppler air velocity from the power spectra. The cross-spectral amplitude ratio may be of more general value in analysis than previously thought, because its Doppler velocity domain is greater than that of the spectral power ratio in the presence of radar system noise. The absolute error of the propagation term estimated from the cross-spectral amplitude ratio is not strongly dependent on the rainfall rate or propagation distance.

Descriptors: *Diversity radar; *Doppler radar; *Wind velocity; *Coherent radar; *Meteorological radar; Noise(Radar); Mathematical models; Power spectra; Air flow; Meteorological data; Rainfall intensity; Propagation; Orientation(Direction) Polarization; Parameters; Simulation; Variations; Spectra; Power; Input; Range(Distance); Ratios; Elevation; Velocity; Rates; Functions; Angles; Errors

Identifiers: Polarization diversity; NTISDODXA

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1023227 AD-A134 011/6
Polarization Diversity Radar Data Processor
(Instrumentation papers)
Metcalf, James I. ; Armstrong, Graham M.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-83-0111; AFGL-IP-318
28 Apr 83 29p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8403
Country of Publication: United States
Contract No.: 6670; 16

A real time data processor has been designed for use with the AFGL 10-cm Doppler weather radar which is to be operated with alternating transmission of horizontally and vertically polarized signals. In this mode of operation the reception of backscattered signals of polarizations identical to those of the transmitted signals allows the computation of the differential reflectivity between the two polarizations in addition to the absolute reflectivity and the Doppler mean velocity and variance. The switching of transmitted polarization introduces difficulties in the estimation of the autocovariance of the received signals, from which the Doppler velocity parameters are derived. The processor design and the allowed modes of radar operation circumvent these difficulties. This report describes the processing algorithms theoretically and presents details of the implementation of these algorithms in hardware. (Author)

Descriptors: *Diversity radar; *Doppler radar; *Meteorological radar; *Processing equipment; *Radar signals; Polarization; Data processing equipment; Horizontal orientation; Vertical orientation; Algorithms; Orthogonality; Real time; Backscattering; Operation; Velocity; Reflectivity; Transmittance; Parameters; mean; Doppler systems; Signals

Identifiers: Polarization diversity; Absolute reflectivity; Circular polarization; Linear polarization; Differential reflectivity; NTISDODXA

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 9B (Electronics and Electrical Engineering--Computers); 63H (Detection and Countermeasures---Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1017991 AD-A133 464/8
Polarization Diversity Radar Data Processor
Metcalf, James I. ; Armstrong, Graham M.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-83-0249
Sep 83 9p
Pub. in Conference on Radar Meteorology (21st), p339-345 19-23 Sep 83.
Languages: English Document Type: Journal article

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8402
Country of Publication: United States
Contract No.: 6670; 16
No abstract available.
Descriptors: *Diversity radar; *Doppler radar; *Meteorological radar; *Processing equipment; Polarization; Horizontal orientation; Vertical orientation; Orthogonality; Backscattering; Velocity; Reflectivity; Radar signals; Reprints
Identifiers: Polarization diversity; Circular polarization; Differential reflectivity; Linear polarization; NTISDODXR
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 9B (Electronics and Electrical Engineering--Computers); 63H (Detection and Countermeasures---Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

778933 PB80-191455
Doppler Radar Studies during the Sierra Cooperative Pilot Project
Moninger, W. R.
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Corp. Source Codes: 031828046
Report No.: NOAA-TM-ERL-WPL-50; NOAA-80050711
Jan 80 110p
Languages: English
NTIS Prices: PC A06/MF A01 Journal Announcement: GRAI8018
Country of Publication: United States
Winter storm studies and transport and diffusion studies by multi-Doppler radar in the Sierra Nevada foothills were performed as a part of the Sierra Cooperative Pilot Project, sponsored by the Water and Power Resources Service. Two case studies of frontal winter storms, 6 Feb. 1978 and 2 March 1978, revealed the following: (1) a low-level high-speed jet moving toward the NNW, parallel to the foothills, was present ahead of both fronts; (2) both storms were highly complex, having a substructure of up- and downdrafts oriented nearly perpendicular to the frontal surface; (3) these storms differed in significant ways from typical high plains storms; (a) the strongest updrafts and greatest condensation rates occur in the lowest 1-2 km above cloud base, (b) updrafts correspond generally to regions of high radar reflectivity factor, downdrafts to low reflectivity.
Descriptors: *Cloud seeding; *Storms; *Sierra Nevada Mountains; Meteorological radar; Doppler radar; Winter; Radar echoes; Fronts(Meteorology); Turbulence; Condensation nuclei; Atmospheric diffusion; Wind(Meteorology); Aerial reconnaissance; Colorado
Identifiers: Sierra Cooperative Pilot Project; Updrafts; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55F (Atmospheric Sciences--Weather Modification); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

861733 PB81-225476
Doppler Radar Data Analysis during Fiscal Year 1980
(Final rept.)
Moninger, W. R. ; Dineen, R. ; Becker, T.
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Corp. Source Codes: 031828046
Report No.: NOAA-TM-ERL-WPL-70; NOAA-81051409
Mar 81 46p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8123
Country of Publication: United States
Two triple Doppler radar case studies are discussed. The first is of a post frontal band observed as it moved up the foothills of the Sierra Nevada mountains. The band structure was primarily helical, with inflow from the right front of the band at low levels, an updraft slightly behind the reflectivity core of the band, and outflow toward the left front. The band structure was similar to but smaller in scale than bands observed in the Sacramento Valley. The second case is of a weak frontal passage followed by a strong squall line passage. The squall was intense enough to have an associated tornado, but was quite shallow. Reflectivity in the squall line was a maximum of 52 dBZ at 0.6 km msl, dropping to below 20 dBZ above 5.1 km msl.
Descriptors: *Doppler radar; *Storms; *Weather observations *Sierra Nevada Mountains; Data processing; Squalls; Tornadoes Reflectivity
Identifiers: NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55B (Atmospheric Sciences--Dynamic Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

798006 PB80-215163
The Master System - An Interactive Doppler Radar Data-Processing System
(Technical memo.)
Moninger, W. R. ; Sanders, M.
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Corp. Source Codes: 031828046
Report No.: NOAA-TM-ERL-WPL-55; NOAA-80071703
Apr 80 60p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8025
Country of Publication: United States
A system of two interactive computer programs for processing data from meteorological Doppler radars is discussed. Program

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MASTER allows a user to view the radar data, edit them, correct for Doppler velocity aliasing, threshold data based on returned signal strength, and interpolate data onto a Cartesian grid. Program SKYWAY converts data that have been processed with MASTER into a form that may be used by currently existing non-interactive radar data processing programs at NOAA and NCAR.
Descriptors: *Data processing; *Meteorological data; Doppler radar; Meteorological radar
Identifiers: Computer applications; Master computer program SKYWAY computer program; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 9B (Electronics and Electrical Engineering--Computers); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1086895 N84-31896/3
Doppler-Radar Observation of the Evolution of Downdrafts in Convective Clouds
Motallebi, N.
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Corp. Source Codes: 006665012; CU102466
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NAS 1.26:173874; ASP-355; NASA-CR-173874
1982 145p
Languages: English
NTIS Prices: PC A07/MF A01 Journal Announcement: GRAI8425; STAR2221
Country of Publication: United States
Contract No.: NSG-5011; NSF ATM-76-83361
A detailed analysis of the 20 July 1977 thunderstorm complex which formed and evolve over the South Park region in Central Colorado is presented. The storm was extensively analyzed using multiple Doppler radar and surface mesonet data, developed within an environment having very weak wind shear. The storm owed its intensification to the strength of the downdraft, which was nearly coincident with the region where the cloud had grown. The noteworthy features of this storm were its motion to the right of the cloud-level winds, its multicellular nature and discrete propagation, its north-south orientation, and its relatively large storm size and high reflectivity factor (55 dBZ). This scenario accounts for the observed mesoscale and cloud-scale event. A line of convergence was generated at the interface between the easterly upslope winds and westerly winds. During stage II, the convergence line subsequently propagated down the slopes of the Mosquito Range, and was the main forcing mechanism for the development of updraft on the west flank of the storm. The formation of downdraft on the eastern side of updraft blacked surface inflow, and created a detectable gust front. As the original downdraft intensified, the accumulation of evaporatively-chilled air caused the intensification of the mesohigh, which likely destroyed the earlier convergence line and created a stronger convergence line to the east, which forced up-lifting of the moist, westerly inflow and caused the formation of updraft to the east. An organized downdraft circulation, apparently maintained by precipitation drag and evaporational cooling, was responsible in sustaining a well-defined gust front. The storm attained its highest intensity as a consequence of merging with a neighboring cloud. The interaction of downdrafts or gust fronts from two intense cells appeared to be the primary mechanism of this merging process as suggested by Simpson et al. (1980). The merging process coincided with more rain than occurred in unmerged echoes.
Descriptors: *Convection clouds; *Doppler radar; *Mesoscale phenomena; *Meteorological parameters; *Meteorological radar; *Thunderstorms; *Wind (Meteorology); Colorado; Meteorological instruments; Rocky mountains (North america); Vorticity; Wind shear
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55E (Atmospheric Sciences--Physical Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

937878 AD-A119 172/5
The Platteville Radar Profiler as a Meteorological and Communications Engineering Tool
(Technical note)
Nastrom, Gregory D.
Air Weather Service, Scott AFB, IL.
Corp. Source Codes: 000659000; 014670
Sponsor: Shared Bibliographic Input.
Report No.: AWS/TN-82/003; SBI-AD-E850 178
Jan 82 18p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8301
Country of Publication: United States
The basic operating principles and capabilities of the VHF pulsed Doppler radar located at Platteville, Colorado are discussed. Examples of horizontal and vertical wind speed measurements are presented, and the metorological uses of these data are briefly outlined. The radar backscattered power is used to compute the refractivity turbulence stucture constant. New results on the variability of the refractivity turbulence structure constant from about 5-15 km are given. Especially interesting is the large diurnal change of the constant in the upper atmosphere.
Descriptors: *Doppler radar; *Colorado; *Stratosphere; Meteorological radar
Identifiers: Stratosphere troposhpere radar; Atmospheric Turbulence; Atmospheric sounding; Platteville; NTISDODXA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4A (Atmospheric Sciences--Atmospheric Physics); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

Sciences--Meteorological Instruments and Instrument Platforms)
1091526 AD-D011 268/0/XAB
Adaptive Mutual Interference Suppression Method
(Patent Application)
O'Donnell, B. N.
Department of the Air Force, Washington, DC.
Corp. Source Codes: 000260000; 109850
Report No.: PAT-APPL-6-624 568
Filed 26 Jun 84 27p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.
Languages: English Document Type: Patent
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8501
Country of Publication: United States
A method is described which provides automatic self synchronization (in time) between multiple pulse repetition frequency (PRF), pulse doppler radars. The synchronization technique time aligns data within a coherent look transmission (a group of pulses - typically milliseconds). This technique substantially eliminates sensitivity losses associated with blanking false alarms or detection from interfering radars transmitting (in time) at pulse repetition intervals (PRI) different than the host radar. An implementation of this method for a 2 PRF radar waveform is described although the technique may be extended to more than 2 PRF's. The technique provides an alternative approach to pulse shaping or multiple (different) frequencies to control MI but may be used in conjunction with these techniques to minimize sensitivity losses due to interference blanking.
Descriptors: *Patent applications; *Doppler radar; *Pulse rate; Radar signals; Transmittance; Synchronization(Electronics); Frequency; Adaptive systems; Shape; Repetition rate; Synchronism; Waveforms; Losses; Coherence; Suppressors; Approach; Detection; Time; Control; Sensitivity; Pulses; Automatic
Identifiers: Interference blanking; NTISGPAF
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 90F (Government Inventions For Licensing--Electrotechnology); 63H (Detection and Countermeasures--Radiofrequency Detection)

806226 AD-A090 111/6
Test and Evaluation of the Airport Surveillance Radar (ASR)-8 Wind Shear Detection System (Phase II). Revision
(Interim rept. Apr-Dec 79)
Offi, D. L. ; Lewis, W. ; Lee, T. ; DeLaMarche, A.
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Corp. Source Codes: 015213000; 411863
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service
Report No.: FAA-CT-80-17-A; FAA-RD-80-21-A
Aug 80 40p
Supersedes report dated May 80, AD-A086 045. See also Rept. no. FAA-NA-78-59-LR.
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8103
Country of Publication: United States
A wind shear detection system developed by the Wave Propagation Laboratory (WPL) to operate with the Federal Aviation Administration (FAA) Airport Surveillance Radar (ASR)-8 was installed and is being tested at the FAA technical Center. Initial efforts, previously reported in Report NA-78-59-LR, were directed toward hardware and software shakedown and feasibility determination. Second phase tests compared radar with aircraft and tower winds, evaluated the wind shear measurement capability under various weather conditions, and investigated the effectiveness of a simple two-azimuth pointing strategy and system capabilities and limitations. Results showed the system to be compatible with and to operate satisfactorily with the ASR-8. The processing and spectral display of clear air and precipitation returns is feasible. The accuracy of agreement between radar-measured winds and components of the aircraft-measured winds in both radially oriented flights and runway offset flights, using a two-azimuth pointing technique, was examined. Radar versus tower wind agreement was also examined. Potentially dangerous wind shears associated with weather during these tests were detectable. Certain system limitations also have been defined and considered. It is recommended that tests continue to complete definition of and demonstrate capabilities in all weather situations, to optimize performance, and to provide information to specify system design for possible development of a prototype model. (Author)
Descriptors: *Meteorological radar; *Wind shear; *Search radar; *Doppler radar; Radar antennas; Fast fourier transforms ; Flight paths; Airport control towers; Accuracy; Runways; Airborne; Airport radar systems; Prototypes; Flow charting; Test and evaluation; Graphs; Tables(Data)
Identifiers: *Wind shear radar; ASR(Airborne Surveillance Radar); NTISDODXA; NTISDOTFAA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 1E (Aeronautics--Air Facilities); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms); 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 63H (Detection and Countermeasures--Radiofrequency Detection)

785009 AD-A086 045/2
Test and Evaluation of the Airport Surveillance Radar (ASR)-8 Wind Shear Detection System (Phase II)
(Interim rept. Apr-Dec 79)
Offi, D. L. ; Lewis, W. ; Lee, T. ; DeLaMarche, A.
National Aviation Facilities Experimental Center, Atlantic City, NJ.
Corp. Source Codes: 015247000; 240550
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service
(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

Report No.: FAA-NA-80-17; FAA/RD-80/21
May 80 40p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8021
Country of Publication: United States
A wind shear detection system developed by the Wave Propagation Laboratory to operate with the Federal Aviation Administration (FAA) Airport Surveillance Radar (ASR)-8 was installed and is being tested at the FAA Technical Center. Second phase tests compared radar with aircraft and tower winds, evaluated the wind shear measurement capability under various weather conditions, and investigated the effectiveness of a simple two-azimuth pointing strategy and system capabilities and limitations. Results showed the system to be compatible with and to operate satisfactorily with the ASR-8. The processing and spectral display of clear air and precipitation returns is feasible. The accuracy of agreement between radar-measured winds and components of the aircraft-measured winds in both radially oriented flights and runway offset flights, using a two-azimuth pointing technique, was examined. Radar versus tower wind agreement was also examined. Potentially dangerous wind shears associated with weather during these tests were detectable. Certain system limitations also have been defined and considered. It is recommended that tests continue to complete definition of and demonstrate capabilities in all weather situations.
Descriptors: *Meteorological radar; *Wind shear; *Search radar; *Doppler radar; Radar antennas; Fast fourier transforms ; Flight paths; Airport control towers; Air; Accuracy; Runways ; Airborne
Identifiers: Wind shear radar; ASR(Airborne surveillance radar); Shear measurement; Offset flights; Terminal radar; Precipitation spectra; Clear air spectra; NTISDODXA; NTISDOTFAA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms) ; 63H (Detection and Countermeasures--Radiofrequency Detection); 85A (Transportation--Air Transportation)

906178 AD-A112 663/0
Test and Evaluation of the Airport Radar Wind Shear Detection System
(Final rept. Mar 78-May 81)
Offi, Dominick L. ; Lewis, William ; Lee, Tai ; DeLaMarche, Alfred
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Corp. Source Codes: 015213000; 411863
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: DOT-FAA-CT-81-63; FAA/RD-81/85
Feb 82 39p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8215
Country of Publication: United States
A wind shear detection system, developed by the Wave Propagation Laboratory (WPL) to operate with the Federal Aviation Administration (FAA) Airport Surveillance Radar ASR-(8), was installed and tested at the FAA Technical Center. Initial tests consisted of hardware and software shakedown and feasibility determinations. Second phase tests compared radar with aircraft and tower winds, evaluated the wind shear measurement capability under various weather conditions, and investigated the effectiveness of a simple two-azimuth pointing strategy. Final efforts consisted of observations in all-weather regimes and tests of a modified velocity-azimuth display (VAD) and a glide slope scan. Results showed the system to be compatible with and to operate satisfactorily with the ASR-8. The processing and spectral display of clear air and precipitation returns is feasible. The accuracy of agreement between radar-measured winds and components of the aircraft-measured winds in both radially oriented flights and runway offset flights using a two-azimuth pointing technique, a glide slope scan, and a modified VAD was examined. Radar versus tower wind agreement was also examined. Potentially dangerous wind shears associated with weather during these tests were detectable. Certain system limitations were also defined and considered. (Author)
Descriptors: *Meteorological radar; *Wind shear; *Search radar; *Doppler radar; Test and evaluation; Computer programs Wind velocity; Wave propagation; Weather; Limitations; Measurement; Precipitation; Towers; Accuracy; Aircraft; Wind; Agreements; Radar; Air
Identifiers: ASR(Airport Surveillance Radar); NTISDODXA; NTISDOTFAA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms); 63H (Detection and Countermeasures--Radiofrequency Detection)

1081528 N84-29079/0
HF Omnidirectional Spectral CW Auroral Radar (HF-Oscar) at Very High Latitude. Part 1: Technique
Olesen, J. K. ; Jacobsen, K. E. ; Stauning, P. ; Henriksen, S.
Danish Meteorological Inst., Copenhagen.
Corp. Source Codes: 007383000; DB531900
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: DMI-GEOPHYS-PAPERS-R-67; ISBN-87-7478-205-3
1983 33p
Sponsored by Danish Technical Science Foundation and Danish Space Research Board.
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8423; STAR2219
Country of Publication: Denmark
(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

An HF system for studies of very high latitude ionospheric irregularities was described. Radio aurora from field-aligned E-region irregularities of the Slant E Condition type were discussed. The complete system combines an ionosonde, a 12 MHz pulse radar and a 12 MHz bistatic CW Doppler-range set-up. The two latter units use alternately a 360 deg rotating Yagi antenna. High precision oscillators secure the frequency stability of the Doppler system in which the received signal is mixed down to a center frequency of 500 Hz. The Doppler shift range is max + or - 500 Hz. The received signal is recorded in analog form on magnetic tape and may be monitored visually and audibly. Echo range of the CW Doppler signal is obtained by a 150 Hz amplitude modulation of the transmitted signal and phase comparison with the backscattered signal.

Descriptors: *Auroral zones; *Backscattering; *Continuous wave radar; *E region; High frequencies; *Ionospheric disturbances; *Meteorological radar; *Polar regions; *Radio auroras; Data processing; Doppler effect; Ionosondes; Pulse doppler radar; Radar scattering; Radar signatures

Identifiers: *Foreign technology; NTISNASAE

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4A (Atmospheric Sciences--Atmospheric Physics); 63H (Detection and Countermeasures--Radiofrequency Detection); 55A (Atmospheric Sciences--Aeronomy)

849273 AD-A098 789/1

A New Aspect of the Vertical Incidence Doppler Radar Spectrum of Ice Particle Fallspeeds

Passarelli, Jr., Richard E. ; Srivastava, Ramesh C.

Massachusetts Inst. of Tech., Cambridge.

Corp. Source Codes: 001450000; 220000

Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA.

Report No.: AFGL-TR-81-0123

5 Jun 80 8p

Prepared in cooperation with Chicago Univ., IL. Sponsored in part by Grant NSF-ATM77-27634. Pub. in Jnl. of Applied Meteorology, v19 n11 p1318-1322 Nov 80.

Languages: English Document Type: Journal article

NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8119

Country of Publication: United States

Contract No.: F19628-80-C-0021; NSF-ATM78-01011; 2310; G5

No abstract available.

Descriptors: *Meteorological radar; *Doppler radar; Ice; Snow; Velocity; Density; Particles; Reprints

Identifiers: VID(Vertical Incidence Doppler); NTISDODXR; NTISDODAF; NTISNSFG; NTISDODXR; NTISDODAF; NTISNSFG

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4A (Atmospheric Sciences--Atmospheric Physics); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1073849 PB84-207521

Operational Evaluation of 5 CM Doppler Radar - Two Contributions: Review of WSR-74C Doppler Radar Operations at WSO Montgomery, Alabama (April 1982 - August 1983). The Johnson-Effect - Resolving Ambiguous Doppler Velocities

Pettit, P. E. ; Johnson, W. N.

National Weather Service, Fort Worth, TX. Southern Region.

Corp. Source Codes: 045661002

Report No.: NOAA-TM-NWS-SR-110; NOAA-84061406

May 84 28p

Languages: English

NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8420

Country of Publication: United States

Researchers have been experimenting for many years with Doppler radar systems, looking for more reliable methods to gather and process more useful radar data (e.g., Lemon, Donaldson and Burgess, 1977). The National Weather Service (NWS) is rapidly moving forward with plans to replace the aging WSR-57 (10cm wavelength) radar network (Bonewitz, 1981; Ray and Colbert, 1982). It has become apparent through these and other research efforts and more recent radar technology, that any new network of meteorological radars must have Doppler capability (NSSL Staff, 1979). The NWS office in Montgomery, Alabama has been interested in this 'new radar technology' for several years and a working relationship with Enterprise Electronics Corp. (EEC) has provided their office with a look at some of the newer advances in meteorological radar equipment. In April, 1982, a request was made by Enterprise Electronics Corp. to the NWS for permission to install a Doppler add-on package to the WSR-74C (5cm) located at Montgomery, Alabama. The installation was to be on a loan basis with no designated termination date. It must be made clear that the prototype add-on equipment was by no means the ultimate in Doppler radar. However, later advances led to a more advanced system which was installed at Montgomery in July of 1983.

Descriptors: *Doppler radar; *Meteorology; *Weather forecasting; Operating; Display devices; Performance evaluation; Design criteria; Sites; Alabama

Identifiers: Johnson effect; NTISCOMNOA

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1091317 AD-A146 605/1/XAB

Fiber-Coupled External-Cavity Semiconductor High Power Laser

(Progress rept. Jan-Dec 83)

Rediker, R. H. ; Schloss, R. P. ; Hakimi, F.

Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.

Corp. Source Codes: 001450082; 304050

Jan 84 7p

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

Pub. in RLE Progress Report, n126 p123-124 Jan 84.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8501
Country of Publication: United States
Contract No.: N00014-80-C-0941
No abstract available.
Descriptors: Laser cavities; *Semiconductor lasers; Fiber optics; Doppler radar; High power; Gain; Reprints
Identifiers: NTISDODXR
Section Headings: 20E (Physics--Masers and Lasers); 46C (Physics--Optics and Lasers)

1034888 N84-12695/2
Radar Meteorology in Cloud Physics and Radio Wave Propagation Research
Schroth, A.
European Space Agency, Paris (France).
Corp. Source Codes: 062987000; E6854803
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: ESA-TT-808; DFVLR-MITT-82-09
Sep 83 368p
Transl. Into English of ''Radarmeteorol. In der Wolkenphys. U. Ausbreitungsforsch. Mit Radiowellen'' Rept. Dfvlr-Mitt-82-09 Dfvlr, Oberpfaffenhofen, West Germany, Jun. 1982. Original Report in German Previously Announced as N83-21717.
Languages: English Document Type: Translation
NTIS Prices: PC A16/MF A01 Journal Announcement: GRAI8406; STAR2203
Country of Publication: France
The task of a weather radar in meteorology and radio wave propagation research is discussed, and the most important development stages are presented, from the standard weather radar to the coherent polarization diversity radar. The basic design, measurement applications and the limitations of the individual devices are investigated. The theory on which the system design of a coherent polarization diversity radar is based is described, and used to interpret measured data. The main parameters and their effect on the design of such a device are outlined. A production proposal is made, and the values of the significant radar parameters are given.
Descriptors: *Cloud physics; *Meteorological radar; *Radio transmission; *Wave propagation; Coherent radar; Doppler radar ; Functional design specifications; Radar scattering
Identifiers: *Foreign technology; Translations; NTISNASAT
Section Headings: 4B (Atmospheric Sciences--Meteorology); 4A (Atmospheric Sciences--Atmospheric Physics); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55E (Atmospheric Sciences--Physical Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection)

1006574 N83-28314/3
Planning of a C-Band Pulse Doppler Radar with Polarization Diversity for Atmospheric Research in the Mesoscale Range
Schuster, H.
European Space Agency, Paris (France).
Corp. Source Codes: 062987000; E6854803
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: ESA-TT-750; DFVLR-MITT-81-28
Dec 82 61p
Transl. Into English of ''Plannung Eines C-Band-Puls-Doppler-Radars MIT Veraenderbarer Polarisation fuer die Atmosphaerenforschung im Mesoskaligen Bereich'' Rept. Dfvlr-Mitt-81-28 Dfvlr, Oberpfaffenhofen, West Germany, Sep. 1981. Original Report in German Previously Announced as Esa-98017.
Languages: English Document Type: Translation
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8323; STAR2117
Country of Publication: Other
Radar system specifications for cloud physics studies are outlined. A semimobile system, comprising computer controlled pulse Doppler radar and digitized signal processing is recommended. Design requirements arising from the need to collect data on type of precipitation, precipitation intensity and distribution, drop spectrums, distribution of ice and water particles within clouds, wind fields, and turbulence factors are discussed. Data must be determined with a high degree of space and time resolution for the initialization and proving of mesoscale and convective models.
Descriptors: *C band; *Equipment specifications; *Mesoscale phenomena; *Polarization characteristics; *Pulse doppler radar ; Antenna design; Meteorological parameters; Radar receivers; Radar transmitters
Identifiers: *Foreign technology; Translations; NTISNASAT
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 4A (Atmospheric Sciences--Atmospheric Physics); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55E (Atmospheric Sciences--Physical Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection)

907316 N82-19445/7
Planning of a C-Band Pulse Doppler Radar with Polarization Diversity for Atmospheric Research in the Mesoscale Range
Schuster, H.
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
Corp. Source Codes: 028684000; D0699060
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: DFVLR-MITT-81-28; ESA-TT-750
Sep 81 49p

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-750).
Languages: German
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8215; STAR2010
Country of Publication: Germany, Federal Republic of
A radar system was defined, suitable for research in cloud physics requiring measured values of meteorological parameters relevant to a complete model of the behavior of the observed object in space and time. This problem can be solved using remote sensing methods, especially radar measuring methods. A semimobile system, comprising computer controlled pulse Doppler radar with polarization diversity and digitized radar signal processing is recommended. The fundamental attributes of the radar system are summarized.
Descriptors: *C band; *Cloud physics; *Mesoscale phenomena; *Polarization characteristics; *Pulse doppler radar; *Radar equipment; *Signal processing; Digital radar systems; Meteorological parameters; Numerical control
Identifiers: *Foreign technology; NTISNASAE
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4A (Atmospheric Sciences--Atmospheric Physics); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

901642 NUREG/CR-2556
Lidar Velocity Measurements of Waterspouts and an Onshore Wind
(Final rept. Jul 75-Sep 81)
Schwiesow, Ronald L.
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Corp. Source Codes: 031828046
Sponsor: Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Regulatory Research.
Feb 82 88p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8213
Country of Publication: United States
The focus of this project is remotely-sensed measurement of the wind fields in waterspout vortices. The research used infrared CW Doppler lidars with both airborne and groundbased platforms. The study was expanded to explore the change in wind profile caused by a change in terrain and roughness at a sea shore, and to investigate the applicability of the lidar sensing technique to the flow field in the wake of large structures. The peak velocity observed by the lidar in 21 waterspout data sets ranged from 4.2 mps to 33.6 mps and visible funnel diameters from 6.6 m to 90 m for data taken at altitudes between 675 m and 95 m. A horizontal resolution of 0.75 m between data points across the funnel revealed a large azimuthal asymmetry and mixing with the ambient flow and some showing multiple concentric vortex shells. A change of terrain affects the wind profile upwind of the change by at least 200 m in the experiment. Downwind, the increased roughness reduces the mean velocity at low levels, increases turbulence, and causes acceleration, convergence, or both at higher levels. Studies of building wakes require a larger aerosol backscatter coefficient or an improved system compared to the feasibility test conducted.
Descriptors: *Wind velocity; *Velocity measurement; Optical radar; Atmospheric refraction; Vortices; Turbulence; Flow distribution; Remote sensing; Radar tracking; Doppler radar
Identifiers: *Waterspouts; NTISNUREG
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology)

1142424 AD-A156 477/2/XAB
Sub-Cloud Layer Motions from Radar Data Using Correlation Techniques
(Scientific technical rept.)
Smythe, G. R. ; Harris, F. I.
Systems and Applied Sciences Corp., Vienna, VA.
Corp. Source Codes: 079875000; 393816
Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA.
Report No.: SCIENTIFIC-5; AFGL-TR-84-0272
15 Oct 84 25p
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8521
Country of Publication: United States
Contract No.: F19628-82-C-0023; 6670; 00
Acquisition of a new system of Doppler weather radars (NEXRAD, Next Generation Weather Radar) will necessitate availability of appropriate automated weather analysis algorithms. In this report one such algorithm for obtaining small-scale motions from radar data by pattern recognition is evaluated. Two variations that correlate reflectivity data from scan to scan, one of which utilizes Doppler velocities, are applied to data of tow intense thunderstorms. From theses analyses it is found that resolution typical of most weather radars is too coarse to allow consistently reliable reconstruction of motions with temporal lags short enough to preclude discernible effects of propagation. Additional keywords: Wind estimation algorithm; Oklahoma; Colorado. (Author)
Descriptors: *Atmospheric motion; *Doppler radar; *Meteorological radar; Algorithms; Automation; Colorado; Correlation techniques; Estimates; Oklahoma; Pattern recognition; Propagation; Velocity; Weather; Wind
Identifiers: *Radar Meteorology; NTISDODXA; NTISDODAF
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

1103170 AD-A149 022/6/XAB
Projectile Motion in a Flexible Gun Tube
(Final rept. 15 Nov 82-15 Mar 84)
Soifer, M. T. ; Becker, R. S.
S and D Dynamics, Inc., Huntington, NY.
Corp. Source Codes: 077444000; 408713
Sponsor: Ballistic Research Labs., Aberdeen Proving Ground, MD.; Shared Bibliographic Input.
Report No.: ARO-19888.2-EG; BRL-CR-536; SBI-AD-F300 524
Oct 84 85p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8507
Country of Publication: United States
Contract No.: DAAG29-83-C-0004; 1L162618AH80
A general, six degree-of-freedom model of a projectile of finite geometry and inertia traveling in a flexible, rifled or smoothbore gun tube has been developed. The model accommodates projectile spin, mass eccentricity, projectile/bore interfacial friction, elastic/plastic deformation of the projectile rotating band, and balloting--including bourrelet impact and rebound with the bore. The model is unrestricted regarding gun tube motion, and provides the ability to assess the mutual effects of projectile/gun-tube interaction when solved simultaneously with the equations of a compatible gun dynamics simulation, such as DYNACODE-G. The basic formulation has been compared with other projectile in-bore motion formulations and descriptions appearing in recent literature, and is considered to be the most general developed to date. In addition, the model has been correlated with experimental in-bore radar doppler data obtained from firings of a specially designed 37mm weapon, and has demonstrated excellent theoretical/experimental agreement.
Descriptors: *Interior ballistics; *Gun barrels; *Projectiles; *Computerized simulation; Balloting(Interior ballistics); Spinning(Motion); Degrees of freedom; Rotating bands; Plastic deformation; Equations of motion; Velocity; Yaw ; Pitch(Motion); Acceleration; Gun chambers; Pressure measurement; Doppler radar; Firing tests(Ordnance)
Identifiers: 37-MM Guns; Bourrelets; Dynacode-G computer code; 37-MM Projectiles; NTISDODXA; NTISDODA
Section Headings: 19D (Ordnance--Explosions, Ballistics, and Armor); 79E (Ordnance--Detonations, Explosion Effects, and Ballistics)

848258 PB81-188393
Impact of NEXRAD User Requirements - Summary
(Final rept. Oct 80-Jan 81)
Stevenson, Lloyd ; Bloom, Philip ; Rempfer, Paul
Transportation Systems Center, Cambridge, MA.
Corp. Source Codes: 039664000
Sponsor: National Weather Service, Silver Spring, MD.
Report No.: DOT-TSC-VV-81-1
Feb 81 43p
Sponsored in part by National Weather Service, Silver Spring, MD.
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8118
Country of Publication: United States
This report summarizes the results of an analysis of the impact of data acquisition rate and spacial data resolution, conducted for the NEXRAD Joint System Program Office. The analysis also includes results from investigation of the NEXRAD Radar Data Acquisition subsystem's availability, reliability, and maintainability.
Descriptors: *Meteorological radar; User needs; Data acquisition; Availability; Reliability; Maintainability
Identifiers: Next generation weather radar; NEXRAD radar; NTISDOTTSC; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms) ; 63H (Detection and Countermeasures--Radiofrequency Detection)

1105154 AD-P004 107/9/XAB
Reference Systems for the Evaluation of Dead-Reckoning Navigation Equipment
Stokes, R. F. ; Smith, S. G.
Royal Aircraft Establishment, Farnborough (England).
Corp. Source Codes: 013778000; 310450
Jul 84 17p
This article is from the Proceedings of the Flight Mechanics Panel Symposium Held in Lisbon, Portugal on 2-5 Apr 84, AD-A147 625, p10-1 - 10-17.
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8504
Country of Publication: United Kingdom
Aircraft dead-reckoning navigation systems present particular problems in their assessment, and diagnosis in development where a continuous measurement of their error pattern is required. The inherent accuracy of modern inertial and Doppler equipment is such that there are few direct methods of measuring the system errors to the required precision. Need for long range, long duration flights over both land and sea with a continuous high accuracy reference led RAF to develop an integrated navigation system in which the outputs of a number of inertial navigation systems are recorded in parallel with those of Doppler radar, DME, Decca, Loran C and Omega. The recorded data is processed post-flight in a Kalman filter which is used to estimate the inertial system errors. The final reference is formed by compensating the inertial outputs for these errors and has the properties of high accuracy, low noise, and continuous availability. Although simple in concept, implementation of such a scheme is complex. The major problem lies in constructing suitable mathematical models of the various equipments. The second difficult area is that of obtaining the statistical information regarding the performance of the equipments in a form suitable for inclusion in the models. Although the

(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

reference is produced off-line the techniques can be implemented on-line.
Descriptors: *Navigation reference; *Navigational aids; Integrated systems; Errors; Data acquisition; Kalman filtering ; Error analysis; Compensation; Inertial navigation; Dead reckoning; Doppler radar; Radar navigation; LORAN; Hyperbolic navigation; Distance measuring equipment; Omega navigation; Mathematical models; Accuracy
Identifiers: *Foreign technology; Decca navigation; NATO furnished; Component Reports; NTISDODXA
Section Headings: 17G (Navigation, Communications Detection, and Countermeasures--Navigation and Guidance); 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components)

1128224 PB85-185486/XAB
Radar Wind Profilers in the Colorado Network
(Technical memo.)
Strauch, R. G. ; Merritt, D. A. ; Moran, K. P.
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Corp. Source Codes: 031828046
Report No.: NOAA-TM-ERL-WPL-120
Mar 85 78p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8515
Country of Publication: United States
Radar systems used to measure vertical profiles of the horizontal wind in nearly all weather conditions can use frequencies between about 40 and 1000 MHz. This report describes three radar systems that measure wind profiles continuously and automatically. They operate at different frequencies (approximately equals 50 MHz, 405 MHz, and 915 MHz) but are designed with a common philosophy and use many identical subsystems. Descriptions of hardware, software, and data processing are included.
Descriptors: *Radar equipment; *Wind(Meteorology); *Profilometers; Radar transmitters; Radar receivers; Radar antennas; Data processing; Ultrahigh frequencies; Profiles; Portable equipment; Layout; Diagrams; Mathematical models; Pulse modulation; Doppler radar; Signal to noise ratio; Computers; Power spectra
Identifiers: NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 14B (Methods and Equipment--Laboratories, Test Facilities, and Test Equipment); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 9B (Electronics and Electrical Engineering--Computers); 55B (Atmospheric Sciences--Dynamic Meteorology)

802753 AD-A088 576/4
Wind Shear Detection with Pulse Doppler Radar
(Final rept. Sep 77-Sep 79)
Strauch, R. G. ; Sweezy, W. B.
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Corp. Source Codes: 031828046; 406292
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service
Report No.: FAA-RD-80-26
Jan 80 65p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8101
Country of Publication: United States
Contract No.: DOT-FA76WAT-622
Measurement of wind profiles and wind shear near air terminals in all weather regimes may be possible with pulse Doppler radar. The use of radar for solving the airport wind shear problem was investigated experimentally and with computer simulations. Radar tests are continuing. A single Doppler device cannot measure the complex three-dimensional wind field that exists in some weather events. In Phase I of this project a computer simulation showed that a radar with a 150 m pulse length and a 1.5 degree beamwidth could resolve low level wind profiles. The computer simulation program has been expanded so that the radar measured radial velocity profile and the field of radial velocities could be calculated and displayed for any analytic or numerical input wind model. Various output displays are available. Both the location of the radar and the volume that is scanned can be chosen relative to the input coordinate system. The program can also accept input wind models expressed relative to the approach path. Effects of antenna beamwidth and radar range resolution can be simulated. The program is useful for studying the expected observations for any radar (or laser) Doppler system. Radar reflectivity is assumed constant but the program could readily accommodate reflectivity gradients. Thus the program should prove valuable for studying the utility of single Doppler radar observations in any situation. The simulation results, using wind models that can cause problems for landing aircraft, show that the radial velocity field of a single Doppler radar depicts wind shear by a change in the orientation of contours of constant velocity. (Author)
Descriptors: *Airport radar systems; *Doppler radar; *Radar pulses; *Wind shear; *Meteorological radar; Aviation safety; Warning systems; Computerized simulation; Radial velocity; Plan position indicators; Microwave equipment; Atmospheric refraction; Turbulent boundary layer; Wind velocity
Identifiers: Pulse doppler radar; Wind profiles; Shear warning systems; Velocity fields; Contours(Velocity); Isovelocity contours; NTISDODXA; NTISDOTFAA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 1E (Aeronautics--Air Facilities); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 63H (Detection and Countermeasures--Radiofrequency Detection); 85D (Transportation--Transportation Safety)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

1120951 AD-A151 876/0/XAB
Radar Turbulence Estimates. Effects of Wind Shear and Reflectivity Factor Gradients
(Master's thesis)
Sycuro, S. J.
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Corp. Source Codes: 000805000; 012200
Report No.: AFIT/CI/NR-85-31T
Feb 85 72p
Languages: English Document Type: Thesis
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8513
Country of Publication: United States
Analysis of Doppler radar spectral width provides an estimate of the turbulence eddy dissipation rate (epsilon), which in turn can be correlated to atmospheric turbulence. The width of the Doppler spectrum provides an overestimate of the turbulence eddy dissipation rate. This overestimate may be corrected to some extent by the removal of wind shear and reflectivity factor gradients from the Doppler spectrum variance. Reflectivity factor gradients and radial velocity shears in three directions (azimuthal, vertical, and radial) are computed for points along an aircraft track. The gradient and shear effects are removed from the Doppler variance and the turbulence eddy dissipation rate is estimated using both the total and the corrected variances. Both radar estimates of the turbulence dissipation rates are then correlated with estimates of eddy dissipation rates derived from in-situ aircraft measurements. Results indicate that the only gradients significantly affecting the radar estimates are those of radial velocity shear components along the vertical or azimuthal directions. Corrections for these effects result in some improvements in the radar turbulence estimate, but the improvements are very small at the short ranges observed here. Results suggest that the gradient effects may be minor when compared to the other sources of error in the estimate of turbulence dissipation rates.
Descriptors: *Reflectivity; *Wind shear; Aircraft; Doppler effect; Doppler radar; Spectra; Width; Variations; Dissipation ; Eddy currents; Rates; Gradients; Atmospheric motion; Doppler systems; Measurement; Radial velocity; Removal; Errors; Sources; Dissipation; Eddy currents; Azimuth; Vertical orientation
Identifiers: NTISDODXA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 1B (Aeronautics--Aeronautics); 55B (Atmospheric Sciences--Dynamic Meteorology); 51B (Aeronautics and Aerodynamics--Aeronautics)

1028971 AD-P002 164/2
Lightning Activity Observed in Upper and Lower Portions of Storms and Its Relationship to Storm Structure from VHF (Very High Frequency) Mapping and Doppler Radar
Taylor, W. L. ; Rust, W. D. ; MacGorman, D. R. ; Brandes, E. A.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000; 244670
1983 9p
This article is from 'International Aerospace and Ground Conference on Lightning and Static Electricity (8th): 'Lightning Technology Roundup,' held at Fort Worth, Texas on 21-23 June 1983,' AD-A135 100, p4-1 thru 4-9.
Languages: English
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8405
Country of Publication: United States
Space-time mapping of VHF sources reveals lightning processes for cloud-to-ground (CG) and for large intracloud (IC) flashes are confined to an altitude below about 10 km and closely associated with the central high reflectivity region of a storm. Another class of IC flashes has been identified that produces a splattering of small sources within the main electrically active volume of a storm and also within a large divergent wind canopy at the top of a storm. There is no apparent temporal association between the small high altitude IC flashes occurring almost continuously and the large IC and CG flashes sporadically occurring in the lower portions of storms. (Author)
Descriptors: *Lightning; Thunderstorms; Flashes; Sources; Radio waves; Very high frequency; Mapping
Identifiers: Component reports; NTISDODXA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

915383 PB82-244757
Spring Program Summary, 1981
(Technical memo.)
Taylor, William L. ; Burgess, Donald W. ; Davies-Jones, Robert P. ; Doviak, Richard J. ; Johnson, Leonard A.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000
Report No.: NOAA-TM-ERL-NSSL-93; NOAA-82062404
Mar 82 116p
See also report for 1980, PB81-234940.
Languages: English
NTIS Prices: PC A06/MF A01 Journal Announcement: GRAI8223
Country of Publication: United States
The 1981 Spring Program of the National Severe Storms Laboratory was patterned closely after the 1980 program. Principal objectives of the 1981 observations were to collect high quality data from a large array of simultaneously active sensors to: (1) enhance the data base of the Storm Electricity Group engaged in determining lightning hazards, lightning characteristics, and the relationships between the various storm electrical phenomena; (2) support efforts sponsored by other agencies to examine severe storm and other meteorological phenomena; capture data on the tornadic storms that occur very infrequently within the dual mapping area; (4) observe the wind fields and convection; and (5) support other specific experiments as storm situations warranted.
Descriptors: *Lightning; *Tornadoes; *Storms; Doppler radar Hazards; Thunderstorms; Tornadoes; Wind pressure; Experimental

(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

data; Aviation safety; Operations; Mapping; Turbulence; United States
Identifiers: *Severe storms; WSR-57 radar; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1066781 AD-A141 474/7
Comparison of Airborne Turbulence-Indicating Doppler Radar Systems with Ground-Based Doppler Radar Systems
(Final rept. 15 May 81-15 Mar 82)
Trotter, B. L.
National Oceanic and Atmospheric Administration, Boulder, CO. Weather Modification Program Office.
Corp. Source Codes: 031828047; 414785
Sponsor: Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.
Report No.: DOT/FAA/PM-84/3
13 Jan 83 54p
Includes errata sheet dated 16 May 84. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8418
Country of Publication: United States
Contract No.: DTFA01-81-Y-10557
To promote air safety, FAA has undertaken the task of maintaining current knowledge of the state of the design of turbulence-indicating weather radars. The airborne turbulence-indicating radar is a translation of ground-based radar technology to the airborne environment. Comparisons are made between data sets of the airborne turbulence-indicating radars and a ground-based Doppler radar with turbulence (second moment) capabilities. No comparison is intended between the airborne systems. (Author)
Descriptors: *Doppler radar; *Meteorological radar; Aviation safety; Turbulence; Ground level; Data bases; Doppler systems Airborne; Moments
Identifiers: NTISDODXA; NTISDOTFAA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

897036 PB82-156860
Evaluation of a Meteorological Airborne Pulse Doppler Radar
(Technical memo.)
Trotter, B. L. ; Strauch, R. G. ; Frush, C. L.
National Oceanic and Atmospheric Administration, Boulder, CO. Weather Modification Program Office.
Corp. Source Codes: 031828047
Report No.: NOAA-TM-ERL-WMPO-45; NOAA-81103011
Jul 81 65p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8211
Country of Publication: United States
How well can the Doppler, when installed in the aircraft, measure the radial velocities in light to heavy precipitation and in non-turbulent to turbulent meteorological situations. The first question was adequately answered via the ground tests. The observation of a fixed target did show that some instability was present in the system but the amount of instability did not prohibit measuring radial velocities. The base line noise level in the system did increase whenever video returns were present. The minimum detectable signal at the system output was approximately minus 100 dBm. At no time during the testing was it found that the system noise was making a target whose radial velocities were to be measured. The results of the test have shown that the system can indeed be used in an airborne environment. There are some limitations that must be considered when it is being used. Errors in velocity measurements will occur if the exact antenna spacial pointing angle is not known. The magnitude of error in the measurement is a function of the error in the known antenna position and the ground speed of the aircraft.
Descriptors: *Meteorological radar; Airborne radar; Pulse doppler radar; Evaluation
Identifiers: NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms); 63H (Detection and Countermeasures--Radiofrequency Detection); 51E (Aeronautics and Aerodynamics--Avionics)

818650 AD-A092 276/5
Evaluation of a Meteorological Airborne Pulse Doppler Radar
(Final rept. Oct 77-Jul 80 on Phase 1)
Trotter, B. L. ; Strauch, R. G. ; Frush, C. L.
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Research Labs.
Corp. Source Codes: 031828001; 406502
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: FAA-RD-80-98
Jul 80 44p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8107
Country of Publication: United States
Contract No.: DOT-FA78WAI-877
An X-Band airborne radar has been modified to provide a Doppler radar capability. The Doppler radar has been tested to prove the system concept usable. Tests were conducted at Norman, Oklahoma, from May 30 to June 9 of 1978 and in Miami, Florida, on December 1 through December 5, 1979. Optimally the tests would have used meteorological targets for measurement of radial velocities, however, most tests had to be conducted with chaff and ground returns. The tests did show that the

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airborne Doppler radar will measure velocities that are comparable to those measured by a ground based Doppler radar and those that can be computed by a high accuracy inertial navigation system. The error in the measured radial velocities, when compared to other sensors, is much less than the estimated RMS error of 2 meters/second. (Author)
Descriptors: *Meteorological radar; *Doppler radar; X band; Airborne; Radial velocity; Wind velocity; Accuracy; Calibration; Inertial navigation; Rain; Clouds; Chaff
Identifiers: Block diagrams; NTISDODXA; NTISDOTFAA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

813817 N81-10636/1
Pilot-Aircraft System Reponse to Wind Shear
(Interim Report)
Turkel, B. S. ; Frost, W.
FWG Associates, Inc., Tullahoma, TN.
Corp. Source Codes: 056183000; F9832078
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NASA-CR-3342
Nov 80 98p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8105; STAR1901
Country of Publication: United States
Contract No.: NAS8-33458
The nonlinear aircraft motion and automatic control model is expanded to incorporate the human pilot into simulations of aircraft response to wind to wind shear. The human pilot is described by a constant gains lag filter. Two runs are carried out using pilot transfer functions. Fixed-stick, autopilot, and manned computer simulations are made with an aircraft having characteristics of a small commuter type aircraft flown through longitudinal winds measured by a Doppler radar beamed along the glide slope. Simulations are also made flying an aircraft through sinusoidal head wind and tail wind shears at the phugoid frequency to evaluate the response of manned aircraft in thunderstorm wind environments.
Descriptors: *Aerodynamics; *Flight simulation; *Pilot performance; *Wind shear; Automatic control; Doppler radar
Identifiers: NTISNASA
Section Headings: 1A (Aeronautics--Aerodynamics); 4B (Atmospheric Sciences--Meteorology); 14B (Methods and Equipment--Laboratories, Test Facilities, and Test Equipment) 51A (Aeronautics and Aerodynamics--Aerodynamics); 55B (Atmospheric Sciences--Dynamic Meteorology); 92A (Behavior and Society--Job Training and Career Development)

889330 N82-13621/9
Feasibility Study of a Procedure to Detect and Warn of Low Level Wind Shear
(Final Report)
Turkel, B. S. ; Kessel, P. A. ; Frost, W.
FWG Associates, Inc., Tullahoma, TN.
Corp. Source Codes: 056183000; F9832078
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NASA-CR-3480; M-365
Nov 81 82p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8208; STAR2004
Country of Publication: United States
Contract No.: NAS8-33458
A Doppler radar system which provides an aircraft with advanced warning of longitudinal wind shear is described. This system uses a Doppler radar beamed along the glide slope linked with an on line microprocessor containing a two dimensional, three degree of freedom model of the motion of an aircraft including pilot/autopilot control. The Doppler measured longitudinal glide slope winds are entered into the aircraft motion model, and a simulated controlled aircraft trajectory is calculated. Several flight path deterioration parameters are calculated from the computed aircraft trajectory information. The aircraft trajectory program, pilot control models, and the flight path deterioration parameters are discussed. The performance of the computer model and a test pilot in a flight simulator through longitudinal and vertical wind fields characteristic of a thunderstorm wind field are compared.
Descriptors: *Aircraft safety; *Clear air turbulence; *Doppler radar; *Three dimensional motion; *Wind shear; Computerized simulation; Degrees of freedom; Doppler effect; Flight simulation
Identifiers: NTISNASA
Section Headings: 1B (Aeronautics--Aeronautics); 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 51B (Aeronautics and Aerodynamics--Aeronautics); 55B (Atmospheric Sciences--Dynamic Meteorology); 85D (Transportation--Transportation Safety)

1016868 N83-33494/6
NASA/MSFC FY-83 Atmospheric Processes Research Review
Turner, R. E.
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Corp. Source Codes: 019043002; ND736801
Report No.: NAS 1.55:2281; M-417; NASA-CP-2281
Aug 83 163p
Program Review Held at Huntsville, Ala., 24-25 May 1983.
Languages: English Document Type: Conference proceeding
(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

NTIS Prices: PC A08/MF A01 Journal Announcement: GRAI8401; STAR2121
Country of Publication: United States
The atmospheric processes research program was reviewed. Research tasks sponsored by the NASA Office of Space Science and Applications, Earth Sciences and Applications Division in the areas of upper atmosphere, global weather, and mesoscale processes are discussed. The are: the research project summaries, together with the agenda and other information about the meeting.
Descriptors: *Conferences; *Doppler radar; *Lightning; *Mesoscale phenomena; *Storms (Meteorology); *Upper atmosphere ; *Weather; *Wind (Meteorology); Atmospheric & oceanographic inform sys; Global atmospheric research program; Meteorological parameters; Weather forecasting
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55B (Atmospheric Sciences--Dynamic Meteorology)

1024643 N83-36587/4
Nasa/Msfc FY-83 Atmospheric Research Review
Turner, R. E. ; Camp, D. W.
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Corp. Source Codes: 019043002; ND736801
Report No.: NAS 1.55:2288; NASA-CP-2288
Oct 83 34p
Rev. Held in Huntsville, Ala., 24-25 May 1983.
Languages: English Document Type: Conference proceeding
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8403; STAR2124
Country of Publication: United States
No abstract available.
Descriptors: *Aircraft hazards; *Airports; *Gusts; *Meteorology; *Wind shear; Clear air turbulence; Conferences; Doppler radar; Fog dispersal; Meteorological radar; Research facilities; Risk
Identifiers: NTISNASA
Section Headings: 1B (Aeronautics--Aeronautics); 4B (Atmospheric Sciences--Meteorology); 51B (Aeronautics and Aerodynamics--Aeronautics); 85D (Transportation--Transportation Safety); 55B (Atmospheric Sciences--Dynamic Meteorology)

1137743 N85-26687/2/XAB
Comparison of Wind Velocity in Thunderstorms Determined from Measurements by a Ground-Based Doppler Radar and an F-106B Airplane
Usry, J. W. ; Dunham, R. E. ; Lee, J. T.
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Corp. Source Codes: 019041001; ND210491
Report No.: NAS 1.15:86348; L-15875; NASA-TM-86348
Apr 85 39p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8519; STAR2316
Country of Publication: United States
As a part of the NASA Storm Hazards Program, the wind velocity in several thunderstorms was measured by an F-106B instrumented airplane and a ground-based Doppler radar. The results of five airplane penetrations of two storms in 1980 and six penetrations of one storm in 1981 are given. Comparisons were made between the radial wind velocity components measured by the radar and the airplane. The correlation coefficients for the 1980 data and part of the 1981 data were 0.88 and 0.78, respectively. It is suggested that larger values for these coefficients may be obtained by improving the experimental technique and in particular by slaving the radar to track the airplane during such tests.
Descriptors: *Doppler radar; F-106 aircraft; *Thunderstorms *Wind velocity; Comparison; Correlation coefficients; Nasa programs; Tracking (Position)
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 14B (Methods and Equipment--Laboratories, Test Facilities, and Test Equipment); 1C (Aeronautics--Aircraft); 55B (Atmospheric Sciences--Dynamic Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1142013 AD-A156 062/2/XAB
Polarization Diversity Addition to the 10 Centimeter Doppler Weather Radar
(Final rept. 1 Apr 82-31 Jul 84)
Ussailis, J. S. ; Bassett, H. L.
Georgia Tech Research Inst., Atlanta.
Corp. Source Codes: 063499000; 388700
Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA.
Report No.: A-3226; AFGL-TR-84-0239
Aug 84 81p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8521
Country of Publication: United States
Contract No.: F19628-82-K-0038; 6670; 16
The research performed was that of providing antenna modifications for a polarization diversity addition to the; AFGL 10 centimeter DOPPLER WEATHER RADAR. Described within are the ANTENNA FEED DESIGN (POTTER HORN), the conversion of the antenna form a prime focus to a Cassegrain Configuration, the results of the feed horn RF measurements, the construction of the POLARIZER ASSEMBLY, and the installation and testing of the antenna system. Keywords include: Polarization; Potter horn; Weather radar; Polarized unit; and Antenna testing.
Descriptors: *Doppler radar; *Meteorological radar; *Diversity reception; Antenna feeds; Antennas; Antenna configurations; Cassegrain antennas; Addition; Polarization; Assembly; Polarizers; Modification; Test methods; Conversion; Horn antennas; Measurement; Radiofrequency; Focusing

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Identifiers: NTISDODXA; NTISDODAF
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

952168 AD-A121 666/2
Analysis of a Polarization Diversity Weather Radar Design
(Final rept. 1 Oct 80-30 Jun 82)
Ussailis, J. S. ; Leiker, L. A. ; Goodman, IV , R. M. ; Metcalf, J. I.
Georgia Tech Research Inst., Atlanta.
Corp. Source Codes: 063499000; 388700
Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA.
Report No.: AFGL-TR-82-0234
2 Jul 82 112p
Languages: English
NTIS Prices: PC A06/MF A01 Journal Announcement: GRAI8307
Country of Publication: United States
Contract No.: F19628-81-K-0027; 6781; 00
This report focuses not only on a design for a pulse-to-pulse polarization diversity modification of the Air Force Geophysics Laboratory (AFGL) S-band Doppler weather radar, but also upon the meteorological and technical requirements of such a radar. The theoretical aspects of and physical limitations imposed by the polarization diversity requirement are presented independently of this design and as a result are applicable towards the development of any similar system. The antenna modification could also be applied towards the general case, excepting the condition imposed in this design that the present twenty-four foot diameter reflector be retained. Formulae are developed to demonstrate the various uncertainties for the system as a whole and the antenna in particular. Tradeoffs between the various meteorological measurement goals vs available and constructible radio frequency components are presented.
Descriptors: *Meteorological radar; *Diversity radar; *Coherent radar; *Doppler radar; Radar antennas; S band; Polarization; Measurement; Modification; Limitations; Modification; Physical properties; Parts; Pulses; Radar; Radio equipment; Requirements; Radiofrequency; Meteorology; Antennas
Identifiers: Polarization diversity; Circular diversity; Linear diversity; NTISDODXA; NTISDODAF
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1018029 AD-A133 502/5
Analysis of a Polarization Diversity Meteorological Radar Design
Ussailis, James S. ; Metcalf, James I.
Georgia Tech Research Inst., Atlanta.
Corp. Source Codes: 063499000; 388700
Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA.
Report No.: AFGL-TR-83-0251
Sep 83 9p
Pub. in Conference on Radar Meteorology (21st), p331-338 Sep 83.
Languages: English Document Type: Journal article
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8402
Country of Publication: United States
Contract No.: F19628-82-K-0038; 6781; 6670; 00; 16
No abstract available.
Descriptors: *Meteorological radar; *Diversity radar; Doppler radar; Cross polarization; Modification; Reprints
Identifiers: Polarization diversity; NTISDODXR; NTISDODAF
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1975702 AD-A156 723/9/XAB
Automatic Detection of Gust Fronts
(Final rept.)
Uyeda, H. ; Zrnic', D. S.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000; 244670
Sponsor: Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.
Report No.: DOT/FAA/PM-85/11
Apr 85 66p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8522
Country of Publication: United States
Contract No.: DTFA01-80-Y-10524
Early displays of Doppler spectral moments demonstrated that many hazardous weather features produce characteristic signatures that human observers can readily interpret. Although recognition of these signatures by by trained human observers is not complicated, there are strong reasons to develop automated techniques that would help or in some cases even replace the human operator. We have developed a procedure that detects and tracks gust fronts automatically. It does not rely on a single method but requires simultaneous operation of two related algorithms. The convergence algorithm measures radial convergence and hence only gusts propagating along radials can be readily detected. The mesocyclone-shear algorithm measures azimuthal shear and is suitable for detecting gusts parallel with radials as well as low level vortices. Long shear lines that these algorithms detect are classified as gusts whereas symmetric shear features are rejected if their shear and momentum are insignificant; otherwise they are classified as low level vortices. To track gusts we use second order polynomials in the range-azimuth

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plane. It is shown that predicted gust locations from simple linear projections of the least square fitted curves agree very well with actual gust locations. Keywords: Storms; Gust fronts; Automatic tracking algorithm; NEXRAD(Next Generation Weather Radar).
Descriptors: *Automatic tracking; Detection; *Fronts(Meteorology); *Gusts; Algorithms; Automatic; Least squares method; Low level; Momentum; Operation; Polynomials; Position(Location); Shear properties; Storms; Symmetry; Synchronism; Vortices; Convergence; Wind shear
Identifiers: NEXRAD(Next Generation Weather Radar); Mesocyclone algorithm; NTISDODXA; NTISDOTFAA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1095641 N84-34829/1/XAB
NASA/MSFC FY-84 Atmospheric Processes Research Review
Vaughan, W. W. ; Porter, F.
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Corp. Source Codes: 019043002; ND736801
Report No.: NAS 1.55:2329; M-458; NASA-CP-2329
Sep 84 223p
Rev. Held in Huntsville, Ala., 30 Apr. And 2-3 May 1984.
Languages: English Document Type: Conference proceeding
NTIS Prices: PC A10/MF A01 Journal Announcement: GRAI8502; STAR2224
Country of Publication: United States
No abstract available.
Descriptors: *Atmospheric circulation; *Atmospheric models; *Atmospheric sounding; *Backscattering; *Baroclinic instability; *Clouds (Meteorology); *Conferences; *Cyclones; *Doppler radar; *Earth atmosphere; *Lightning; *Mesoscale phenomena; *Optical radar; *Precipitation (Meteorology); *Thunderstorms; *Wind measurement; Atmospheric general circulation experiment; Atmospheric moisture; Climatology; Convection; Data base management systems; Data correlation; Geophysical fluid flow cells; Goes satellites; Microwave radiometers; Nowcasting; Satellite sounding; Tiros n series satellites; Turbulence; Visible infrared spin scan radiometer
Identifiers: NTISNASA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1080239 AD-D011 187/2
Stepped Frequency Radar Target Imaging
(Patent)
Wehner, D. R. ; Prickett, M. J.
Department of the Navy, Washington, DC.
Corp. Source Codes: 001840000; 110050
Report No.: PAT-APPL-6-268 501; PATENT-4 450 444
Filed 29 May 81 patented 22 May 84 13p
Supersedes PAT-APPL-6-268 501.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $1.00.
Languages: English Document Type: Patent
NTIS Prices: Not available NTIS Journal Announcement: GRAI8423
Country of Publication: United States
An apparatus is disclosed by which radar targets can be imaged in two dimensions for identification at full radar range using relatively moderate speed data processing. Images of targets are found in range and cross-range dimensions from the time history of the targets' wide-band spectral response obtained by a frequency stepping radar. A frequency synthesizer generates a series of N identical signal bursts, each burst comprising n pulses and each of said n pulses being a different frequency. The radar echos from this series of bursts is separated into n-phase and quadrature phase components. These components are processed to calculate and store the relative amplitude of each echo signal relative to the phase of the corresponding transmitted pulse.
Descriptors: *Patents; *Radar images; *Range finding; *Radar targets; *Doppler radar; *Echoes; Rotation; Frequency synthesizers; Spectra; Signals; Range(Distance); Data processing; Response; Orthogonality; Scalers; Broadband; Amplitude; Pulses; Targets; Parts; Images
Identifiers: PAT-CL-343-5; Target rotation; Crossrange finding; Spectral response; Frequency stepping radar; Aspect rates; Range cells; NTISGPN
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 90F (Government Inventions For Licensing--Electrotechnology); 63H (Detection and Countermeasures--Radiofrequency Detection)

1134072 AD-A154 968/2/XAB
Real-Time Automated Detection of Mesocyclones and Tornado Vortex Signatures
(Technical rept.)
Wieler, J. G.
Systems and Applied Sciences Corp., Vienna, VA.
Corp. Source Codes: 079875000; 393816
Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA.
Report No.: SCIENTIFIC-6; AFGL-TR-84-0282
20 Oct 84 39p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8518
Country of Publication: United States
Contract No.: F19628-82-C-0023; 6670; 00
An algorithm incorporating resolution-dependent shear and velocity thresholds for the detection of mesocyclones and tornado vortex signatures in real-time is presented. The algorithm identifies both cyclonic and anti-cyclonic shear
(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

areas, and characterizes them into six categories. Also, the three-dimensional average of each feature's rotational kinetic energy, momentum and horizontal and vertical extent are computed. Algorithm performance is discussed for four case studies. The results, verified by ground observations and output from the Tornado Vortex Signature algorithm, are very encouraging. Originator supplied keywords: Doppler radar; Mesocyclone; Tornado vortex signature; Shear threshold Angular momentum; Resolution dependence; Rotational kinetic energy.
Descriptors: *Cyclones; *Radar signatures; *Tornadoes; Algorithms; Doppler radar; Ground level; Observation; Automation; Radar detection; Real time; Signatures; Vortices; Shear properties; Case studies; Momentum; Kinetic energy; Rotation
Identifiers: Mesocyclones; Meteorological radar; NTISDODXA; NTISDODAF
Section Headings: 4B (Atmospheric Sciences--Meteorology); 14B (Methods and Equipment--Laboratories, Test Facilities, and Test Equipment); 55B (Atmospheric Sciences--Dynamic Meteorology)

0996800 AD-A130 088/8
Evaluation of an Automatic Cell Detection and Tracking Algorithm
(Environmental research papers)
Wieler, James G. ; Harris, F. Ian ; Snapp, Michael R.
Air Force Geophysics Lab., Hanscom AFB, MA.
Corp. Source Codes: 054815000; 409578
Report No.: AFGL-TR-82-0368; AFGL-ERP-811
3 Nov 82 52p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8321
Country of Publication: United States
Contract No.: 2781; 278101
A storm tracking algorithm designed to detect and track fine structure in digitized radar data is evaluated. These fine structures are defined by regions containing values within 3 dB of peaks in reflectivity factor. The algorithm describes storm structure and evolution by correlating these peak regions in time and space. The evaluation consists of a comparison of the algorithm output with raw data and with output from an AFGL algorithm which detects and tracks three-dimensional reflectivity weighted centroids defined by a preselected threshold. It is concluded that the algorithm cannot reliably detect and track significant structures within storms when applied to data sets with a temporal resolution of aprox. 6 min and a spatial resolution of 1.0 deg in azimuth and 0.7 deg in elevation. The significance of tracking 3 dB peaks is questioned and the implication of defining a larger peak threshold is discussed. The algorithm does track the large features of storms with results similar to the AFGL algorithm. However, it does not run in real time and is not modular, unlike the AFGL algorithm. (Author)
Descriptors: *Meteorological radar; *Radar tracking; Doppler radar; Storms; Radar reflections; Contours; Cells; Detection; Radar scanning; Algorithms; Statistical analysis; Automatic
Identifiers: NEXRAD(Next Generation Radar); NTISDODXA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

0993900 AD-A129 309/1
Preliminary Cost Benefit Assessment of Systems for Detection of Hazardous Weather. Volume II. Appendices
Willis, John T. ; Bromley, Jr., Edmund ; Connolly, John W.
Sonicraft, Inc., Alexandria, VA.
Corp. Source Codes: 078426000; 413731
Sponsor: Federal Aviation Administration, Washington, DC. Office of Aviation Policy and Plans.
Report No.: FAA-APO-81-8-VOL-2
Jul 81 129p
See also Volume 1, AD-A129 308.
Languages: English Document Type: Bibliography
NTIS Prices: PC A07/MF A01 Journal Announcement: GRAI8320
Country of Publication: United States
Contract No.: DTFA01-80-Y-30550
Contents: Today's Weather Radar System; Weather Radar-Concepts and Some Experimental Results; Selected Case Studies; NEXRAD Performance Estimates; Radar Types, Characteristics, and Cost Estimates; Calculation and Results--Investment Analysis; Bibliography.
Descriptors: *Meteorological radar; *Weather; Hazards; Detection; Case studies; Doppler radar; Cost estimates; Bibliographies
Identifiers: *NEXRAD(Next Generation Radar); NTISDODXA; NTISDOTFAA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

0993899 AD-A129 308/3
Preliminary Cost Benefit Assessment of Systems for Detection of Hazardous Weather. Volume I
Willis, John T. ; Bromley, Jr., Edmund ; Connolly, John W.
Sonicraft, Inc., Alexandria, VA.
Corp. Source Codes: 078426000; 413731
Sponsor: Federal Aviation Administration, Washington, DC. Office of Aviation Policy and Plans.
Report No.: FAA-APO-81-8-VOL-1
Jul 81 129p
See also Volume 2, AD-A129 309.
Languages: English
NTIS Prices: PC A07/MF A01 Journal Announcement: GRAI8320
Country of Publication: United States
Contract No.: DTFA01-80-Y-30550

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

Radar information on the location, intensity, and movement of hazardous weather activity, is required by the Departments of Transportation, Defense, and Commerce. The three agencies have combined to develop a common, new radar system called NEXRAD for NEXt generation RADar. The current system lacks capability to detect wind related weather phenomena, and the new system is expected to use Doppler techniques, solid state technology, and improved processing. This report makes a preliminary assessment of costs and benefits of the NEXRAD program, concluding that the program is cost beneficial, but that not enough is known about the new system's capability to discriminate among alternative numbers and sophistication of radars in the system. Data on losses are reported for nine separate weather hazards: floods, tornadoes, thunderstorms, hurricanes, windstorms, severe winter storms, turbulence, icing, and hail. Estimates are made of those losses avoidable with the new system. (Author)

Descriptors: *Meteorological radar; *Weather; Hazards; Detection; Costs; Benefits; Flooding; Tornadoes; Hurricanes; Storms; Ice; Hail; Doppler radar; Networks

Identifiers: *NEXRAD(Next Generation Radar); NTISDODXA; NTISDOTFAA

Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

1099143 AD-A148 275/1/XAB

Microburst Wind Structure and Evaluation of Doppler Radar for Wind Shear Detection

(Final rept.)

Wilson, J. W. ; Kessinger, C. ; Roberts, R. D. ; McCarthy, J.

National Center for Atmospheric Research, Boulder, CO.

Corp. Source Codes: 013970000; 241200

Sponsor: Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.

Report No.: DOT/FAA/PM-84/29

Oct 84 43p

Languages: English

NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8505

Country of Publication: United States

Contract No.: DTFA01-82-Y-10513

Doppler weather radar data from the Joint Airport Weather Studies (JAWS) Project are used to determine the horizontal and vertical structure of airflow within microbursts. Typically, the associated downdraft is about 1 km wide and begins to spread horizontally at a height below 1 km. The median time is 5 min from initial divergence at the surface to maximum different wind velocity across the microburst. The height of maximum differential velocity is 75 m. The median velocity different is 22 m/s over an average distance of 3.1 km. The outflow is assymetric, averaging twice as strong along the maximum shear axis compared to the minimum axis. Doppler radar could be an effective means for identifying microbursts and warning aircraft of wind shear hazards. For microburst detection such a radar must be able to measure wind velocities in clear air as well as heavy rain and hail. Scan update rates should be approximately every 2 min and the lowest few hundred meters of the atmosphere must be observed. Ground clutter must be considerably reduced from levels typically obtained with present Doppler radars.

Descriptors: *Wind velocity; *Doppler radar; Air flow; Velocity; Ground clutter; Rain; Meteorological radar; Horizontal orientation; Structural properties; Vertical orientation; Airports; Weather; Atmospheres

Identifiers: NTISDODXA; NTISDOTFAA

Section Headings: 4B (Atmospheric Sciences--Meteorology); 1B (Aeronautics--Aeronautics); 55B (Atmospheric Sciences--Dynamic Meteorology); 51B (Aeronautics and Aerodynamics--Aeronautics)

1105067 AD-A148 139/9/XAB

Automatic Weather Station Network for Low-Altitude Wind Shear Investigations

(Project rept.)

Wolfson, M. M. ; DiStefano, J. T. ; Klingle, D. L.

Massachusetts Inst. of Tech., Lexington. Lincoln Lab.

Corp. Source Codes: 009875001; 207650

Sponsor: Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.

Report No.: ATC-128; DOT/FAA/PM-84/13

18 Sep 84 67p

Languages: English

NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8504

Country of Publication: United States

Contract No.: F19628-80-C-0002; DTFA01-80-Y-10546

During the summer of 1983 an experimental network of automatic weather stations (a mesonet) was operated in the vicinity of Hanscom Field, northwest of Boston, as part of a larger effort to collect Doppler radar and meteorological data on thunderstorms and other potentially hazardous weather events in this area. This report describes the mesonet system used and presents in detail the data collected on 21-22 July 1983. Conclusions about the limitations and the future use of the mesonet system are also included. (Author)

Descriptors: *Wind shear; *Low altitude; *Weather stations; *Doppler radar; Pilots; Air traffic controllers; Data acquisition; Automation; Warning systems

Identifiers: MESONET(Mescosacle network); NTISDODXA; NTISDOTFAA

Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

1044970 PB84-155779
Single Doppler Velocity Signatures: An Atlas of Patterns in Clear Air/Widespread Precipitation and Convective Storms
(Technical memo.)
Wood, V. T. ; Brown, R. A.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000
Report No.: NOAA-TM-ERL-NSSL-95; NOAA-84020702
Nov 83 81p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8409
Country of Publication: United States
A variety of single Doppler velocity patterns that simulate those observed in the atmosphere are presented. Measurements in optically clear air/wide-spread precipitation are simulated using horizontally uniform wind fields that change with height. Measurements of horizontal flow fields within thunderstorms are simulated using a combination of simple rotation, divergence/convergence and uniform flow models. Simulations are compared with actual Doppler velocity measurements to test the veracity of the simulations.
Descriptors: *Wind(Meteorology); *Thunderstorms; Maps; Precipitation(Meteorology); Doppler radar; Wind velocity; Wind direction; Profiles; Tornadoes; Convergence; Flow distribution ; Divergence; Mathematical models; Wind shear; Maps
Identifiers: *Severe storms; Patterns; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology)

888506 AD-A108 253/6
R&D Equipment Information Report. Fault Tolerant Weather Radar Processor
(Final rept. 1 Jun 78-16 Oct 80)
Young, Michael J. ; Jagodnik, Jr, Anthony J.
Raytheon Co./Autometric, Wayland, MA. Equipment Div.
Corp. Source Codes: 072174001; 388201
Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA.
Report No.: ER81-4053; AFGL-TR-81-0086
Mar 81 348p
Languages: English
NTIS Prices: PC A15/MF A01 Journal Announcement: GRAI8208
Country of Publication: United States
Contract No.: F19628-78-C-0113; 6670; 06
A programmable signal processor which achieves fault tolerance and modularity through distribution of tasks among a number of identical programmable Common Elements including spares, is described. This processor's design and usage in a meteorological Doppler radar signal processing application is discussed at several levels of detail covering hardware firmware, operating system software, user software, and development aids. (Author)
Descriptors: *Meteorological radar; *Doppler radar; *Signal processing; *Wind velocity; *Radar pulses; Computer programs; Modular construction; Computer programming; User needs; Tolerance; Faults
Identifiers: Distributed processing; NTISDODXA; NTISDODAF
Section Headings: 4B (Atmospheric Sciences--Meteorology); 9B (Electronics and Electrical Engineering--Computers); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1066859 AD-A141 552/0
Investigation of the Detectability and Lifetime of Gust Fronts and Other Weather Hazards to Aircraft
(Final rept. Feb 82-Oct 83)
Zrnic, D. S. ; Lee, J. T.
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000; 244670
Sponsor: Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.
Report No.: DOT/FAA/PM-83/33
Oct 83 60p
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8418
Country of Publication: United States
Contract No.: DTFA01-81-Y-10521
Low-altitude wind shear associated with diverging outflows has been related to several aircraft accidents. We examine several gust fronts using Doppler radar data and measurements from surface stations and tall tower. We present radar-derived parameters such as reflectivity, height, maximum shear, peak velocity, distance of the front from the producing storm and the nearest 30 dBZ contour for several gust fronts within 60 km of the radar during 1980 to 1982. For all orientations of the front, even along the radial direction, the forntal discontinuity was evident in both mean velocity and spectrum width fields. Thus, while detection is practical with a single Doppler radar, accurate estimation of shear magnitudes is more difficult when the frontal discontinuity is aligned along the radial. Several downdrafts of different sizes are present simultaneously behind some of the fronts and the maximum measured shear of radial velocities produced by one downdraft was .02/s. A more typical value of 100/s was observed at several locations. Maximum azimuthal shear of 470/s occurred at the wave crest.
Descriptors: *Gusts; *Fronts(Meteorology); Thunderstorms; Radar reflections; Meteorological radar; Doppler radar; Wind velocity; Wind shear; Measurement; Oklahoma
Identifiers: *Gust fronts; NTISDODXA; NTISDOTFAA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology)

0973231 AD-A125 854/0
Automatic Recognition of Mesocyclones from Single Doppler Radar Data
(Final rept. 1 Jul-30 Sep 82)
Zrnic, Dusan S. ; Hennington, Larry D. ; Skelton, Julie
National Severe Storms Lab., Norman, OK.
(cont. next page)

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DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

Corp. Source Codes: 019612000; 244670
Sponsor: Air Force Geophysics Lab., Hanscom AFB, MA.
Report No.: AFGL-TR-82-0291
7 Oct 82 47p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8314
Country of Publication: United States
Contract No.: ESD-2-0949; 2781; 01

An algorithm to automatically detect mesocyclonic shear from radial velocity data of a Doppler radar is developed. The algorithm searches for azimuthally increasing velocities. Runs of increasing velocities are stored and the resulting shears are compared to mesocyclonic shear thresholds. Also, products of velocity differences are multiplied with the corresponding arc lengths and then compared to momentum thresholds. Those runs that pass a set of such thresholds and are spatially close are identified as belonging to a region of mesocyclonic shears or a shear line. The algorithm requires simultaneous storage and operation on two consecutive radials of data, and thus is suitable for real time implementation. Flow charts and performance on two data sets are presented.

Descriptors: *Meteorological radar; *Cyclones; *Mesosphere; *Doppler radar; Automatic; Meteorological data; Detection; Pattern recognition; Thunderstorms; Shear properties; Algorithms; Searching; Wind velocity

Identifiers: Mesocyclones; Shear line; Doppler radar data; Doppler radar meteorology; NTISDODXA; NTISDODAF

Section Headings: 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology)

892894 AD-A109 624/7

Considerations for the Design of Ground Clutter Cancelers for Weather Radar

(Interim rept. Apr 80-Feb 81)
Zrnic', Dusan S. ; Hamidi, Said
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000; 244670
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: FAA/RD-81/72
Feb 81 85p
Languages: English
NTIS Prices: PC A05/MF A01 Journal Announcement: GRAI8210
Country of Publication: United States
Contract No.: DTFA01-80-Y-10524

Study of the ground clutter problem at the Norman site indicates that clutter cross sections of 40 to 50 dB below 1 sq. m/sq. m are typical. Doppler spectrum width, Tau sub c, of the clutter signal is between 0.1 and 1 m/s with the mean value of 0.25 m/s at an antenna rotation rate of 10 deg/s. The design of clutter filters is very much dependent on this width and for proper cancellation the passband cutoff velocity v sub p must be larger or equal to 4.8 Tau sub c. Several canceling schemes are investigated, and the most efficient one is with a third order recursive filter. This filter achieves a 50 dB rejection in the stop band with total annihilation of DC. One dB ripple is in the passband, and the ratio of passband cutoff v sub p to stop band cutoff v sub s is about 3.5. The filter operates best in steady state, but it can also be made to operate in transient by properly initializing its memory elements. Performance on 64 simulated and real time samples show that no more than 10 dB loss in effective canceling over steady state occurs if the filter is initialized. To minimize weather signal loss, canceling is recommended only in regions that contain clutter. Therefore, the range extent over which canceling is performed should vary with elevation. Also the antenna rotation at the two lowest angles should be slower. (Author)

Descriptors: *Meteorological radar; *Doppler radar; *Radar antennas; *Ground clutter; Steady state; Frequency bands; Recursive filters; Doppler effect; Memory devices; Real time; Cross sections; Weather; Value; Filters; Losses; Rates; Mean; Elevation; Signals; Width; Antennas; Ratios; Clutter; Spectra Rotation

Identifiers: Clutter cancelers; NTISDODXA; NTISDOTFAA

Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 63H (Detection and Countermeasures--Radiofrequency Detection); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

959711 AD-A122 835/2

Considerations for the Design of Ground Clutter Cancelers for Weather Radar

(Final rept. Feb 81-Jan 82)
Zrnic', Dusan S. ; Hamidi, Said ; Zahrai, Allen
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000; 244670
Sponsor: Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Report No.: DOT/FAA/RD-82/68
Jan 82 36p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8309
Country of Publication: United States
Contract No.: DTFA01-80-Y-10524

Effects of the ground clutter ring in the second trip area for velocity estimation are investigated. Besides unfavorable effects on weather signal due to range square advantage, the clutter poses a new problem when interlaced samples for assigning correct ranges to velocity estimates are used. The problem arises because signals that generate reflectivity estimates for power comparisons cannot be filtered in the same manner as signals from which velocity estimates are generated. Therefore, comparison of powers in the reflectivity and velocity channels is required. Performance of a third order recursive elliptic filter is analyzed. The filter operates best in steady state, but it can also be made to operate in transient by properly initializing its memory elements. Performance on 8 simulated time samples shows that about 10 dB

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of clutter to signal margin is lost for power and 20 dB for mean velocity estimation; with such a small number of samples, the width estimate is useless. (Author)
Descriptors: *Meteorological radar; *Doppler radar; *Radar antennas; *Ground clutter; Doppler effect; Radar pulses; Steady state; Frequency bands; Recursive filters
Identifiers: Clutter cancelers; NTISDODXA; NTISDOTFAA
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 4B (Atmospheric Sciences--Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms); 63H (Detection and Countermeasures--Radiofrequency Detection)

1064202 PB84-867753
Doppler Radar: Aviation Safety. 1972-May, 1984 (Citations from the International Aerospace Abstracts Data Base)
(Rept. for 1972-May 84)
National Technical Information Service, Springfield, VA.
Corp. Source Codes: 055665000
Jun 84 57p
Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.
Languages: English Document Type: Bibliography
NTIS Prices: PC N01/MF N01 Journal Announcement: GRAI8416
Country of Publication: United States
This bibliography contains citations concerning the utilization of doppler radar methods and equipment for the detection of wind shear and other aviation-related meteorological phenomena. Topics include development efforts by the Federal Aviation Administration, system descriptions and evaluations, and test results. Airborne and control facility systems are discussed. (Contains 58 citations fully indexed and including a title list.)
Descriptors: *Bibliographies; *Doppler radar; *Aviation safety; *Wind shear; Radar tracking; Meteorological instruments
Identifiers: NTISPSIAA; NTISNERACD
Section Headings: 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 1B (Aeronautics--Aeronautics); 4B (Atmospheric Sciences--Meteorology); 85D* (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 63H (Detection and Countermeasures--Radiofrequency Detection); 51B (Aeronautics and Aerodynamics--Aeronautics); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1061574 PB84-866623
Doppler Radar: Meterological Applications. 1970-April, 1984 (Citations from the Engineering Index Data Base)
(Rept. for 1970-Apr 84)
National Technical Information Service, Springfield, VA.
Corp. Source Codes: 055665000
May 84 81p
Languages: English Document Type: Bibliography
NTIS Prices: PC N01/MF N01 Journal Announcement: GRAI8415
Country of Publication: United States
This bibliography contains citations concerning the utilization of doppler radar methods and equipment in meteorological mapping and forecasting. Topics include theoretical studies and technological reviews, data analysis methods, sensitivity and error analyses, and applications in aviation safety. The mapping of storm and prestorm structures and dynamics is also included. (Contains 107 citations fully indexed and including a title list.)
Descriptors: *Bibliographies; *Doppler radar; *Meteorological radar; Radar; Meteorolical instruments; Meteorology
Identifiers: NTISNTISI; NTISNERACD
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 63H (Detection and Countermeasures--Radiofrequency Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

1081768 PB84-226729
Environmental Research Laboratories (of the National Oceanic and Atmospheric Administration) Programs and Plans: FY 1983 Programs and FY 1984 Plans
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Research Labs.
Corp. Source Codes: 031828001
Report No.: NOAA-84072601
Dec 83 223p
See also PB83-241802.
Languages: English
NTIS Prices: PC A10/MF A01 Journal Announcement: GRAI8423
Country of Publication: United States
The Environmental Research Laboratories (ERL) are organized within NOAA's Research and Development arm and have their headquarters in Boulder, Colo. The ERL program is a broad one, embracing studies relating to the oceans and Great Lakes, the lower and upper atmosphere, and the solar-terrestrial environment. Studies and activities have focus in eight subject areas: Weather observation and prediction; Cloud physics research and technology development; Air quality research and technology development; Climate research; Solar-terrestrial research and services; Marine observation and prediction; Marine assessment research and services; Marine resources research and services.
Descriptors: *Research projects; *Atmospheric sciences; *Weather; Wind(Meteorology); Ocean waves; Storm surges; Air pollution; Clouds(Meteorology); Tropical regions; Heat transfer; Ice; Meteorological radar; Doppler radar; Fisheries Stratosphere; Water vapor; Laboratories
Identifiers: *Severe storms; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 8J (Earth Sciences and Oceanography--Physical Oceanography); 8C (Earth Sciences and Oceanography--Dynamic Oceanography); 55C

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(Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55E (Atmospheric Sciences--Physical Meteorology); 47B (Ocean Technology and Engineering--Dynamic Oceanography); 47C (Ocean Technology and Engineering--Physical and Chemical Oceanography)

1068171 PB84-196781
Mitsubishi Denki Giho, Volume 57, Number 8, 1983
Mitsubishi Electric Corp., Tokyo (Japan).
Corp. Source Codes: 076350000
1983 43p
See also PB84-196799 through PB84-196856 and PB84-195891. Text in Japanese.
Languages: Japanese
NTIS Prices: PC E04/MF E01 Journal Announcement: GRAI8418
Country of Publication: Japan
This issue contains articles on subjects such as: Trends in the Technology and Marketing of Small Business Computers and the MELCOM 80 Office Land Computer System Series; An Electrodeposited Mica-Insulation System for Traction Motors; Application Systems for the MELCOM 80 Office Land Series; An Electromagnetic Ultrasonic Testing Device; A Meteorological Doppler-Radar System.
Descriptors: *Computers; *Electrodeposited coatings; *Electrical insulation; Marketing; Meteorology; Doppler radar Traction; Mica; Motors; Ultrasonics; Pulse doppler radar; Office equipment
Identifiers: Melcom-80 systems; Business computers; NTISDFMIT
Section Headings: 9B (Electronics and Electrical Engineering--Computers); 11C (Materials--Coatings, Colorants, and Finishes); 4B (Atmospheric Sciences--Meteorology); 9C (Electronics and Electrical Engineering--Electronics and Electrical Engineering); 62A (Computers, Control, and Information Theory--Computer Hardware); 49G (Electrotechnology--Resistive, Capacitive, and Inductive Components); 49C (Electrotechnology--Electromechanical Devices); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

964223 PB83-152553
Multiple Doppler Radar Derived Vertical Velocities in Thunderstorms. Part I. Error Analysis and Solution Techniques. Part II. Maximizing Areal Extent of Vertical Velocities
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000
Report No.: NOAA-TM-ERL-NSSL-94; NOAA-82122001
Oct 82 35p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8310
Country of Publication: United States
A detailed error analysis is performed on the problems associated with using multiple Doppler radar data and the continuity equation to solve for the vertical component of motion in deep convective storms. The errors considered are those due to either incorrect boundary values or errors encountered in integrating the horizontal divergence with height. Data show that errors in the integrated horizontal divergence are much larger than previously thought--indicating the previously ignored effects of bias values may be an important error source. A simple vertical velocity adjustment technique is presented which yields fairly accurate results under most conditions.
Descriptors: *Thunderstorms; Doppler radar; Wind(Meteorology); Atmospheric motion; Errors; Convection; Divergence; Boundary layer; Equations
Identifiers: Updrafts; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 17I (Navigation, Communications Detection, and Countermeasures--Radar Detection); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1138561 PB85-211092/XAB
National Severe Storms Laboratory Annual Report - Fiscal Year 1984, October 1, 1983-September 30, 1984
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000
Mar 85 53p
See also PB83-102293.
Languages: English
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8519
Country of Publication: United States
;Contents: Organizational chart; Personnel statistics; Budget and funding; Program areas (Meteorological research, doppler radar and storm electricity research, computer and engineering support and development, Cooperative Institute for Mesoscale Meteorological Studies); Administrative group; Grants and contracts; Publications and reports of the laboratory, FY 1984; Personnel of the National Severe Storms Laboratory.
Descriptors: *Management; *Storms; *Weather; Laboratories; Personnel; Budgeting; Financing; Doppler radar; Tornadoes; Lightning; Thunderstorms; Hazards; Electricity; Storm tracks; Wind velocity; Aviation safety; Meteorological radar; Grants; Contracts
Identifiers: *Severe storms; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 5A (Behavioral and Social Sciences--Administration and Management); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55B (Atmospheric Sciences--Dynamic Meteorology); 70F (Administration and Management--Public Administration and Government)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

939391 PB83-102293
National Severe Storms Laboratory Annual Report - Fiscal Year 1981, October 1, 1980-September 30, 1981
National Severe Storms Lab., Norman, OK.
Corp. Source Codes: 019612000
Report No.: NOAA-82062305
Dec 81 50p
See also PB82-124645.
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8301
Country of Publication: United States
The report provides information on the organizational chart, personnel statistics, fiscal year 1982 funding, administration, research grants and contracts, publications and reports of the laboratory, personnel of the National Severe Storms Laboratory. The program areas described are: Meteorological research; Doppler radar and storm electricity research; Engineering support and development; Computing and data processing; and Cooperative Institute for Mesoscale Meteorological Studies.
Descriptors: *Storms; *Research projects; Doppler radar; Thunderstorms; Storm tracks; Tornadoes; Dissipating; Lightning ; Turbulence; Ground clutter; Data processing
Identifiers: *Severe storms; NTISCOMNOA
Section Headings: 4B (Atmospheric Sciences--Meteorology); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

1016822 N83-33288/2
The German-Austrian Doppler Campaign die Deutsche-Oesterreichische Dopplerkampagne
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
Corp. Source Codes: 012825000; IH504968
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: SER-B-260-MITT-164; ISSN-0071-9196
1982 130p
Text in German.
Languages: German
NTIS Prices: PC A07/MF A01 Journal Announcement: GRAI8401; STAR2121
Country of Publication: Germany, Federal Republic of
No abstract available.
Descriptors: *Austria; *Doppler radar; *Satellite observation; *West germany; Computer programming; Data processing; Data reduction; Geodetic coordinates; Mapping; Radar receivers; Triangulation; Weather stations
Identifiers: *Foreign technology; NTISNASAE
Section Headings: 8E (Earth Sciences and Oceanography--Geodesy); 48F (Natural Resources and Earth Sciences--Geology and Geophysics)

914917 N82-26641/2
Transverse Velocity Measurement
(Final Report, 1 Mar. - 21 May 1982)
Technology Development Corp., Huntsville, AL.
Corp. Source Codes: 070182000; TJ758406
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Report No.: NASA-CR-162036; NAS 1.26:162036
21 May 82 27p
Languages: English
NTIS Prices: PC A03/MF A01 Journal Announcement: GRAI8223; STAR2017
Country of Publication: United States
Contract No.: NAS8-34745
Carbon dioxide (CO2) laser Doppler lidar systems are employed in the remote measurement of wind velocities. The cross velocity component is measured utilizing an appropriate detector array configuration. This allows determination of the three dimensional characteristics of the wind with conventional Doppler lidar systems.
Descriptors: *Cross flow; *Three dimensional flow; *Transverse acceleration; *Wind velocity measurement; Carbon dioxide lasers; Doppler radar; Mercury cadmium tellurides; Photodiodes; Preamplifiers; Spectrum analysis
Identifiers: NTISNASA
Section Headings: 14B (Methods and Equipment--Laboratories, Test Facilities, and Test Equipment); 4B (Atmospheric Sciences--Meteorology); 55B (Atmospheric Sciences--Dynamic Meteorology); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

902387 PB82-177007
University of Wyoming Contributions to the SCPP (Sierra Cooperative Pilot Project) in 1981 - Collection of Reprints
(Technical rept)
Wyoming Univ., Laramie. Dept. of Atmospheric Science.
Corp. Source Codes: 018045028
Sponsor: Bureau of Reclamation, Denver, CO.
Report No.: AS134
Dec 81 53p
Languages: English Document Type: Journal article
NTIS Prices: PC A04/MF A01 Journal Announcement: GRAI8213
Country of Publication: United States
Contract No.: DI-7-07-83-V0001
This report contains a collection of reprints of articles concerning research conducted for the Sierra Cooperative Pilot Project by University of Wyoming scientists in 1981. Topics covered include: Microphysical cloud seeding signatures, numerical diagnostic model of orographic airflow, hydrometeor spectra in rainbands, secondary ice-crystal production in stable orographic clouds, turbulent diffusion, scenario for an exploratory seeding experiment, and Doppler radar observations of rainbands.
Descriptors: *Cloud physics; *Weather modification; Ice
(cont. next page)

DIALOG File 6: NTIS - 64-85/ISS25 (Copr. NTIS)

formation; Cumulus clouds; Atmospheric circulation; Turbulent diffusion; Doppler radar; Cloud seeding; Wyoming; Sierra Nevada Mountains; Reprints

Identifiers: Sierra Cooperative Pilot project; NTISDIBR

Section Headings: 4B (Atmospheric Sciences--Meteorology); 55F (Atmospheric Sciences--Weather Modification); 55E (Atmospheric Sciences--Physical Meteorology)

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