Guide to

AMOS, RAMOS, and AUTOB Observations

Silver Springs, Md.
June 1981

U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service

Guide to

AMOS, RAMOS, and AUTOB Observations

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INTRODUCTION

The purposes of this publication are to provide a brief practical explanation of the AMOS, RAMOS, and AUTOB observations and the techniques employed in data acquisition and formulation, and to list the station locations and vital statistics.

For consistency, the basic format of the guide follows that of the automated reports. The few exceptions will be explained as they occur throughout the guide.

I. SYSTEMS' DESCRIPTIONS

This section will offer a brief description of the AMOS, AUTOB, and RAMOS systems.

The AMOS is described first because it serves as the foundation for the AUTOB and RAMOS. Although the fundamental principals on which the systems operate are the same, there are various differences which will be brought out in the discussion.

AMOS (Automatic Meteorological Observing System)

This system consists of an array of field sensors hardwired to a central processor that is installed in a nearby building. At unstaffed AMOS stations the processor is tied directly to the Federal Aviation Administration (FAA) Service A teletypewriter network. It transmits a weather report whenever the station is polled by the circuit.

Some AMOS stations are staffed parttime. At these sites the AMOS is hardwired to a Manual Entry Device (MED) that in turn is hardwired to Service A. The MED allows an observer to add visual elements, sea-level pressure, and remarks to the AMOS report. The AMOS portion of the data is automatically updated and displayed on the MED every 30 seconds. When the station is polled, the MED transmits both the manually entered data and the AMOS data if it has been instructed to do so by the observer (by pressing a Validate key on the MED keyboard). Otherwise, when the station is polled, only the latest AMOS portion of the report is transmitted.

AUTOB (AUTomatic OBserving station)

AUTOB is an AMOS station with the capability added to automatically report sky condition, visibility, and precipitation occurrence. It makes no special observations or reports of weather type. This system transmits a formulated weather message for the dissemination over the Service A network. Usually AUTOB is polled at 20-minute intervals and the current report is available briefly thereafter.

RAMOS (Remote Automatic Meteorological Observing System)

RAMOS consists of an array of sensors, a processor, and a communications device, all mounted on a single tower in the field. The system transmits its message whenever it receives its identifier using any one of four different modes: telephone, VHF-radio, satellite, or MED. The operation of the RAMOS depends on the type of communications used.

Telephone RAMOS, i.e., RAMOS/T, is interrogated once an hour by an Automatic Data Acquisition System (ADAS). The ADAS calls each RAMOS/T at approximately H+40, collects the data, reformats the data for use on Service A, and when polled by Service A on the hour, dumps all the reports into the FAA Weather Message Switching Center (WMSC) in Kansas City, Missouri. The reports are then relayed to the correct Service A circuits. The ADAS also exercises some quality control on the RAMOS data. If any of the data falls outside certain limits, it is replaced by a M in the Service A report and the erroneous datum is placed at the end of the report identified by a letter, e.g., T-99, H-98, etc.

Satellite RAMOS, RAMOS/S, is interrogated once an hour by the National Environmental Satellite Service (NESS) through their Geostationary Operational Environmental Satellite (GOES). The RAMOS/S message is received by the GOES where it is passed to the NESS Data Collection System in Silver Hill, Maryland. From there it is relayed into the same ADAS that collects the RAMOS/T reports. From this point on, the reports of RAMOS/S and RAMOS/T are treated the same.

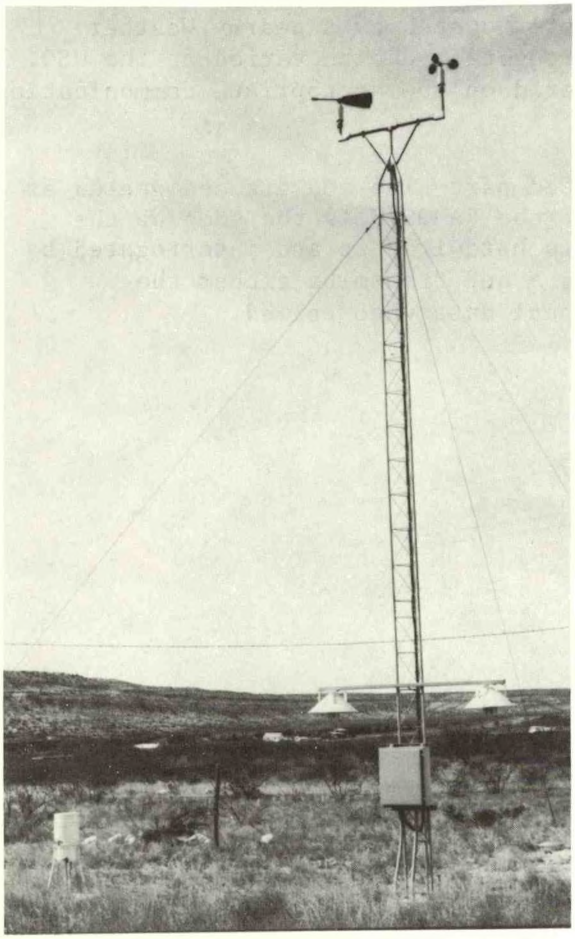
VHF-radio RAMOS, RAMOS/V, is automatically interrogated by a nearby Weather Service Office (WSO). The frequency of interrogation can be varied at the WSO. The reports are manually reformatted and entered on the appropriate communications circuits, usually at 3-hour intervals.

Some RAMOS systems are used at stations staffed part-time and are designated as RAMOS/M. At these locations the operation of the RAMOS/M is the same as the AMOS at staffed stations, i.e., the RAMOS/M is hardwired to and interrogated by the MED. The MED is hardwired to the Service A and transmits either the automatic data, or both the automatic and manual data when polled.

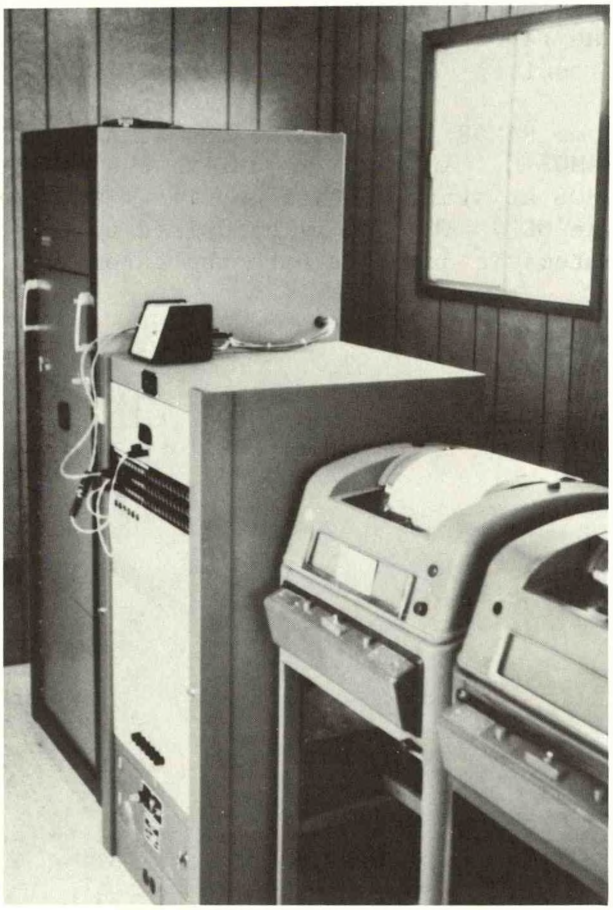
II. INSTRUMENT DESCRIPTION

The three stations employ various sensors which are capable of monitoring a specific atmospheric activity. This section will give a brief description of these sensors. The AMOS will be discussed first, followed by the AUTOB and RAMOS. Wherever possible, pictures and/or diagrams will be provided.

AMOS

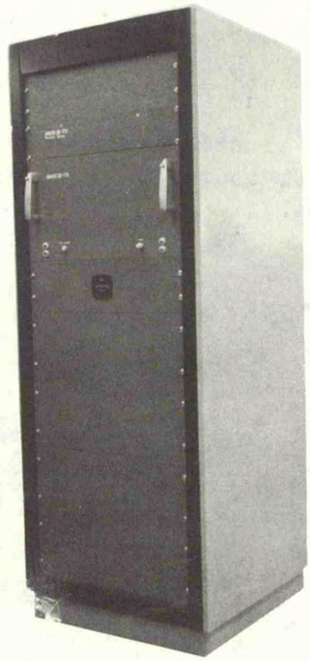


Field Site



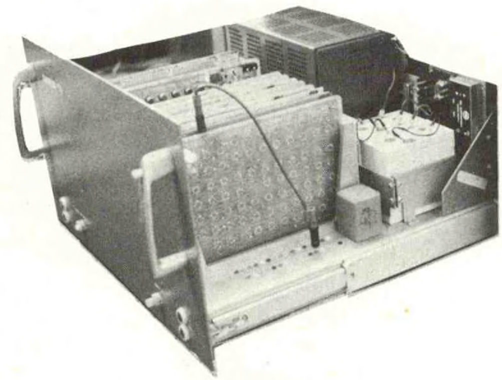
Mainframe and Communications Equipment

The Automatic Meteorological Observing System (AMOS) is a solid-state system capable of automatically observing temperature, dew-point, wind direction and speed, pressure (in the form of altimeter setting), precipitation accumulation, and peak wind speed. The system can operate at any location having 700W, 110VAC, 60Hz power, and telephone service. The AMOS transmits its message directly on Service A teletypewriter circuits. The pictures on page 4 show a typical AMOS site. The AMOS field site and sensors are shown on the left. The AMOS mainframe and communications equipment are shown on the right.



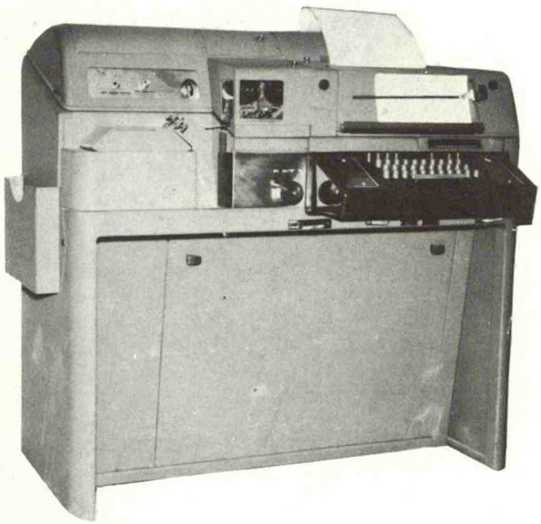
AMOS III-73 Mainframe

The AMOS III-73 Mainframe, shown above, consists of the Basic Electronics Unit and pressure sensor mounted in a standard (22 1/2 by 25 1/2 inches) equipment rack. This part of the AMOS must be located in a normal indoor environment.



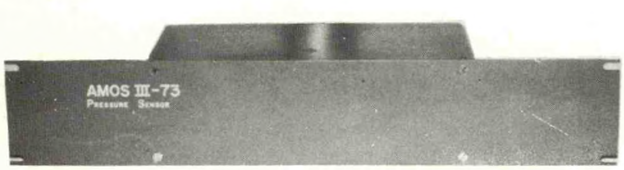
Basic Electronics Unit

The Basic Electronics Unit is comprised of integrated circuits mounted on plug-in circuit boards. One circuit board is provided for each meteorological element observed by the system.



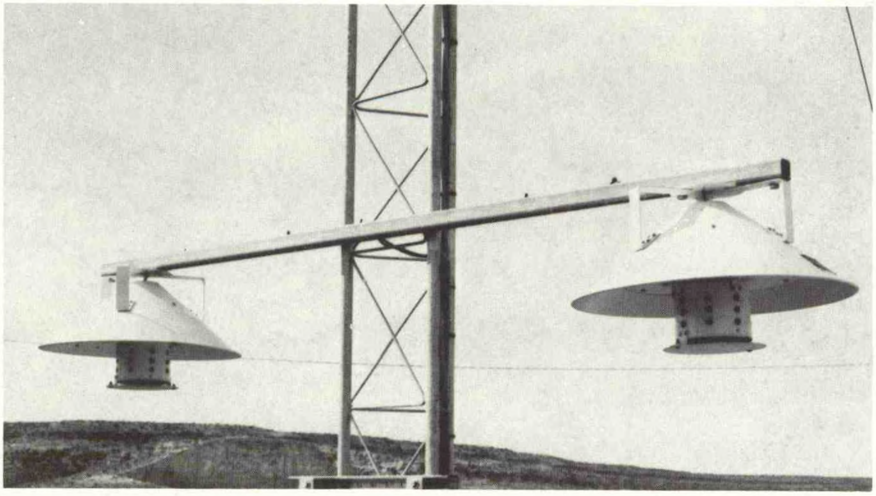
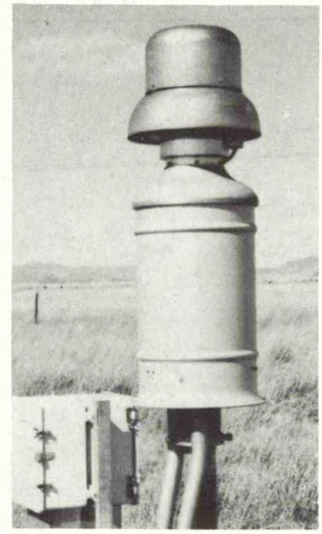
ASR 28 Teletypewriter

The ASR 28 Teletypewriter is the instrument used by AMOS for communications. It interfaces AMOS with the FAA's aviation weather circuit Service A.



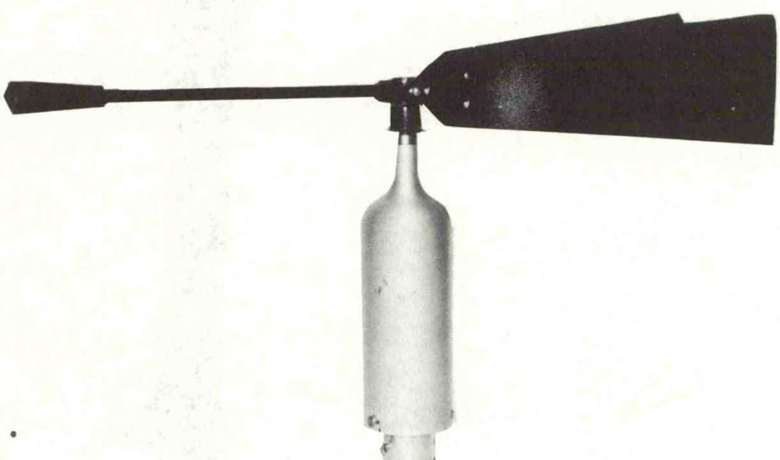
Pressure Sensor Unit

The Pressure Sensor Unit has an aneroid cell to sense pressure which is then electronically converted to altimeter setting.

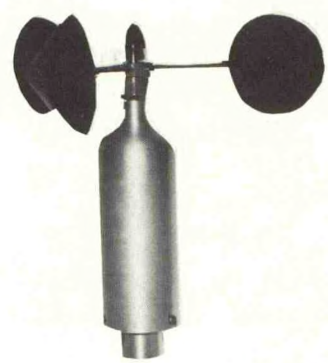



Hygrothermometer

Two different Hygrothermometers are used in AMOS systems. One uses a thermistor, and the other a liquid expansion system for sensing the temperature, and both use a lithium chloride dew cell for sensing the dew-point temperature. The system shown above is naturally aspirated and is damped to provide a nominal 5-minute average. The system on the right is motor aspirated.



Wind Direction Sensor

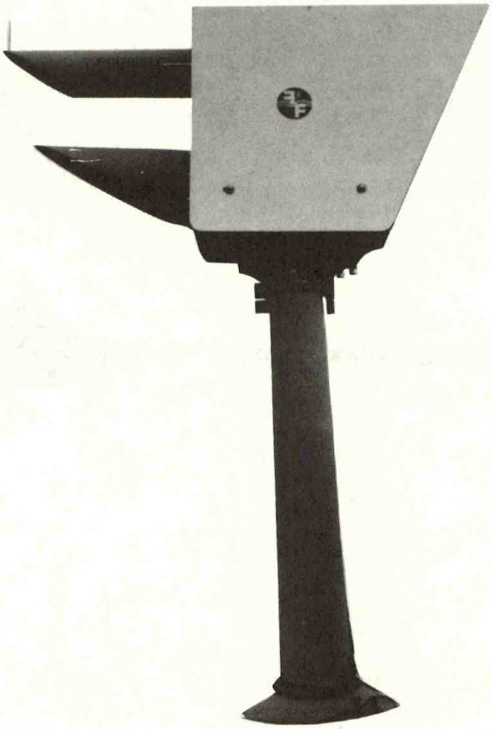


Wind Speed Sensor

The Wind Direction and Speed Sensors are designed to give nominal 1-minute average direction and speed. The direction sensor is a viscous damped vane. The speed sensor is a 3-cup anemometer using a light chopper to measure speed.

Precipitation Sensor

The Precipitation Sensor is an electrically heated tipping-bucket rain gage. It has a 12-inch orifice. The gage sends a pulse to the AMOS for every 0.01 inch of liquid precipitation that falls.

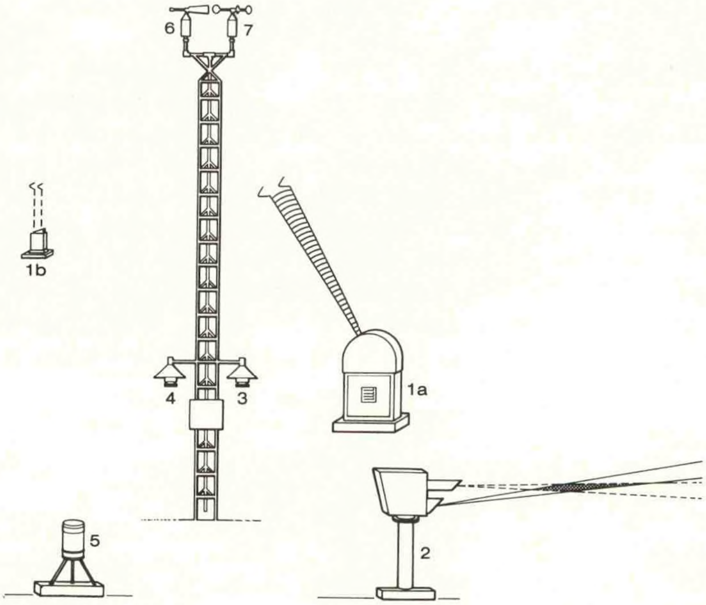


Video Backscatter Meter
(add on module)

The add-on module is available to enable AMOS to report a measure of visibility. The sensor used is a Videograph Backscatter Meter. It is a single-ended instrument that determines opacity of the atmosphere by the amount of light that is reflected back into the detector by particles in the air.

Manual Entry Device

The Manual Entry Device is used with AMOS systems at manned locations. It displays AMOS data and provides a means for the observer to add visual elements and remarks to the AMOS report. Where used, it interfaces AMOS to the Service A communications circuit.



AUTOB Instrument Grouping

Instruments:

1. Ceilometer (rotating beam, RBC):

    1a. Projector,

    1b. Detector.

2. Visibility sensor (backscattering).

3. Hygrothermometer (dry-bulb temperature).

4. Hygrothermometer (dew-point temperature).

5. Rain gage (heated tipping bucket).

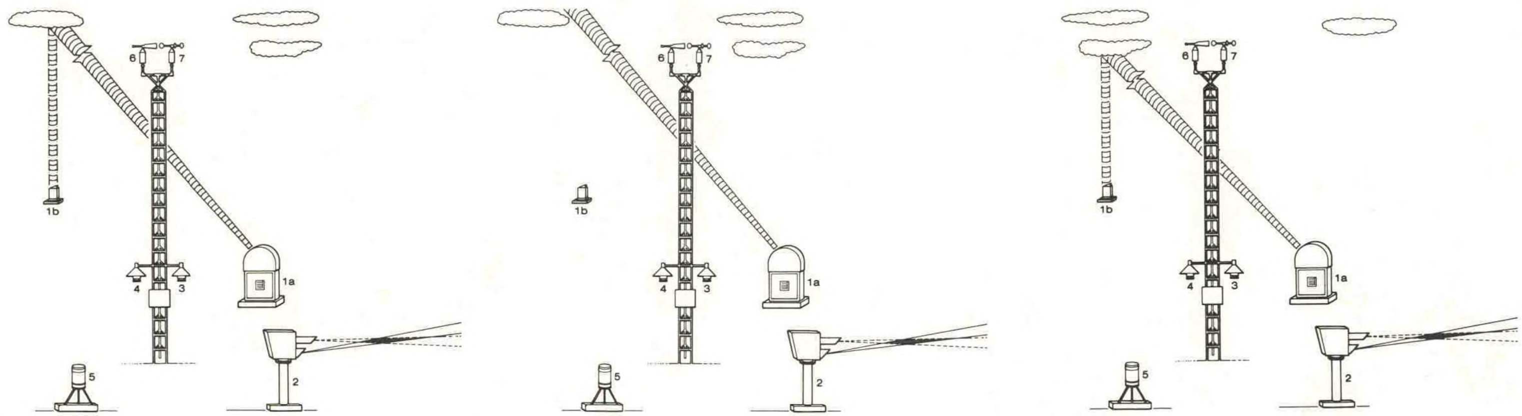
6. Wind direction sensor (wind vane). (The tower is 30 feet tall.)

7. Wind speed sensor (cup anemometer). (The tower is 30 feet tall.)

Notes on cloud and visibility measurement:

1. Cloud height measurements using the RBC are made using the triangulation principle over a 30-minute period. The detector and projector are separated by several hundred feet. Rotation of a projected beam from 0° to 90°, measured from the horizontal, allows determination of varying cloud heights. A portion of one sample beam is shown by the solid lines. The detector senses light reflected back into its reception cylinder, a portion of which is shown by the dashed lines. The axis of the reception cylinder is perpendicular to the horizontal and only clouds directly overhead the detector will be sensed. The complete action is shown in the figure on page 11.

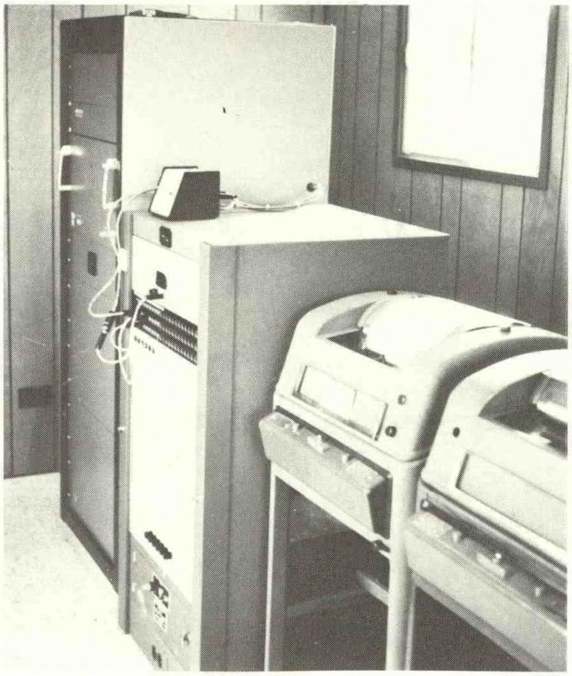
2. The videograph projector (see AUTOB Instrument Grouping, page 9) emits a narrow-beamed pulse of light. This light cone is represented by the slightly inclined solid lines. The detector senses light scattered back into its narrow reception cone, shown by the dashed lines. The shaded area to the right of the visibility meter, which is the intersection of the projector and detector beams, is the small fixed backscattering volume of the instrument. This is the portion of the atmosphere from which the instrument determines visibility. The variable characteristics of atmospheric particles in this volume determines the amount of return. Fog, for example, would mean a great deal of backscattering (return) and low visibility.



(a) (b) (c)

Cloud motions over the detector allow determination of cloud amount

In (a) a cloud is directly overhead the detector and a return with a cloud height is measured. In (b) there is a clear sky over the detector and no return is measured. In (c) a return is detected, the height being lower than (a). Cloud heights and amounts are determined by clustering a 30-minute sequence of cloud returns.



AUTOB Mainframe and communications equipment

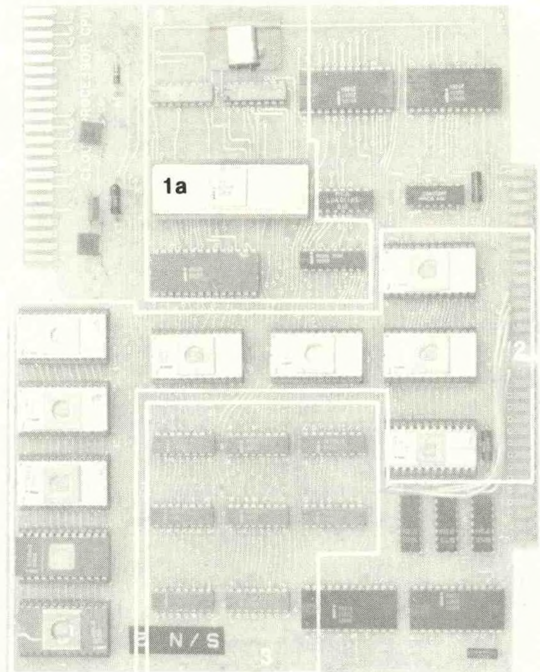
The AUTOB Mainframe (tall cabinet to the back) and communications equipment (three shorter pieces of equipment to the right) are located in a temperature-controlled environment.

One drawer of the AUTOB Mainframe performs the cloud return clustering, determines the 10-minute average visibility, monitors precipitation occurrence, and codes the sensor data for transmission on the Service A teletypewriter system.

Mounted in another drawer of the AUTOB Mainframe is the pressure sensor unit.

The communications equipment is composed of the teletypewriters (two sloped-top pieces of equipment; one is a spare) and the switchboard (in between the Mainframe and the teletypewriters).

Located on top of the switchboard is the local readout box that allows an AUTOB weather message to be printed locally.



Cloud height processor (CPU) module

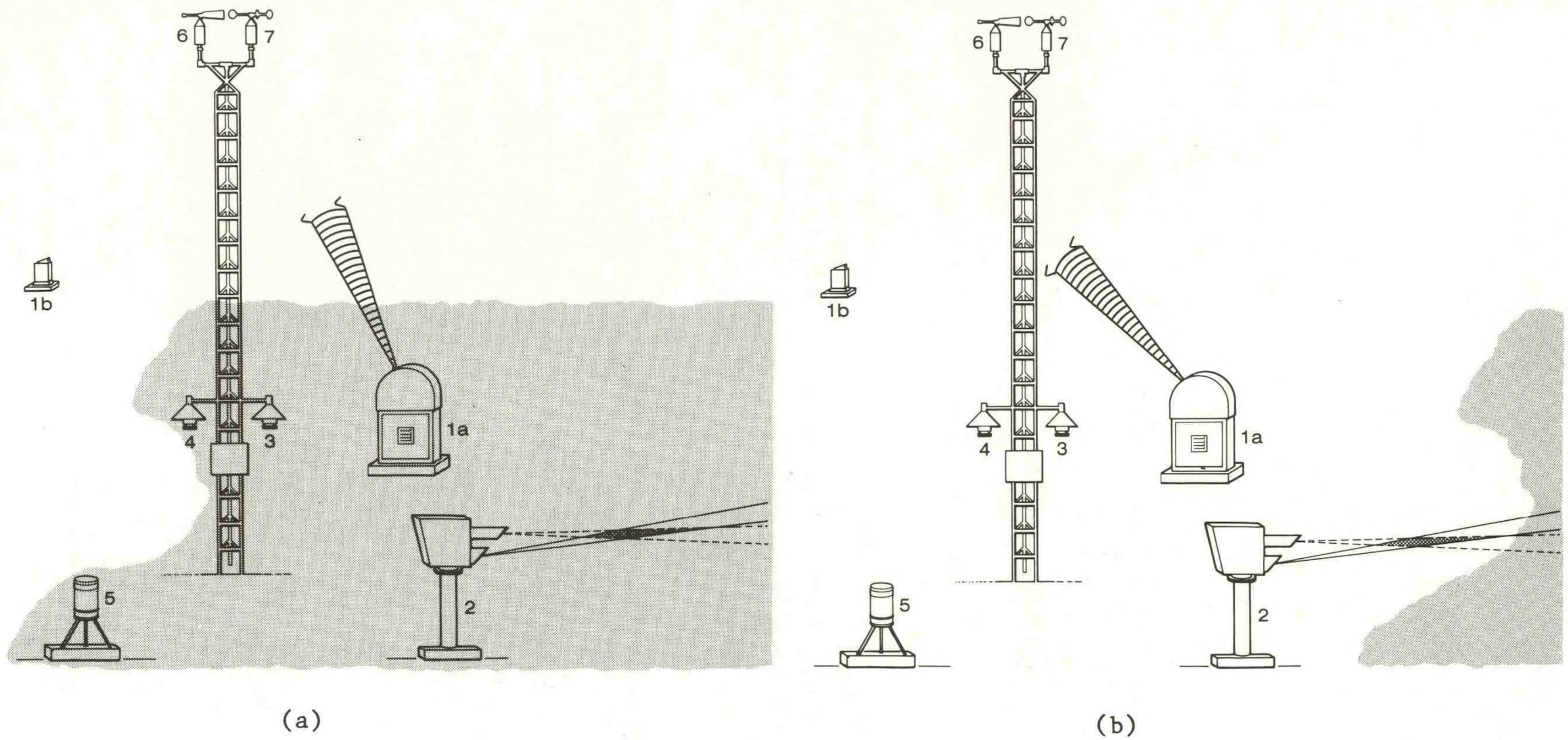
This module (microprocessor system) receives 30 minutes of digitized RBC data, clusters them, and prepares the cloud height and amount portion of the AUTOB message. Clustering is performed every 5 minutes and new cloud information is readied. When AUTOB is interrogated, cloud information is output from this module.

Major sections of the module are:

1. The central processing unit that contains the microprocessor (1a) and is the controlling unit of the system,

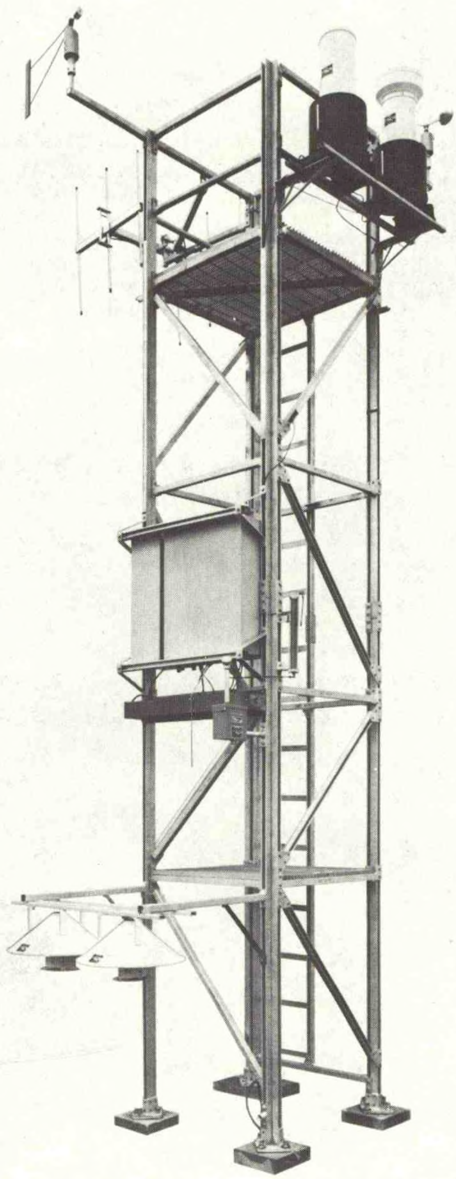
2. the programmable read-only memory (PROM, 2.5 K bytes) that contains the AUTOB algorithm, and

3. the random access memory (RAM, 1 K byte) that temporarily stores data and calculations.



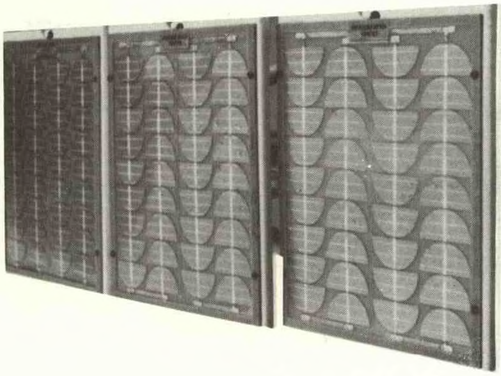
Example of Backscatter Visibility Meter Limitations

A patchy ground fog situation is illustrated above. The sky is clear. As shown in (b), the current visibility is high. However, within the 10 minutes prior to this current observation, the visibility has been much less as shown in (a).



RAMOS

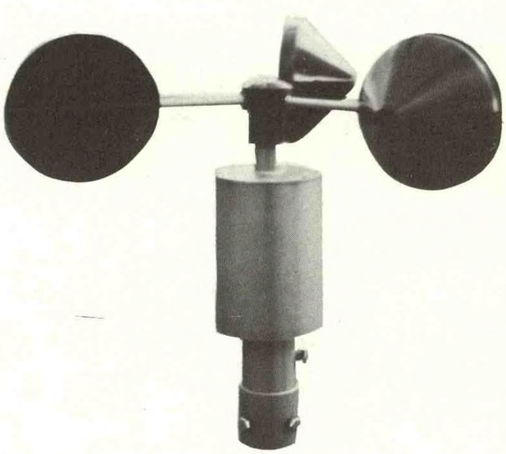
The Remote Automatic Meteorological Observing System (RAMOS) is a versatile system. The Field Station (pictured above) does all elementary processing of the data. The RAMOS operates on commercial or solar power. It also can employ a variety of communication modes. It can transmit its message via satellite, radio, telephone, or dedicated lines.

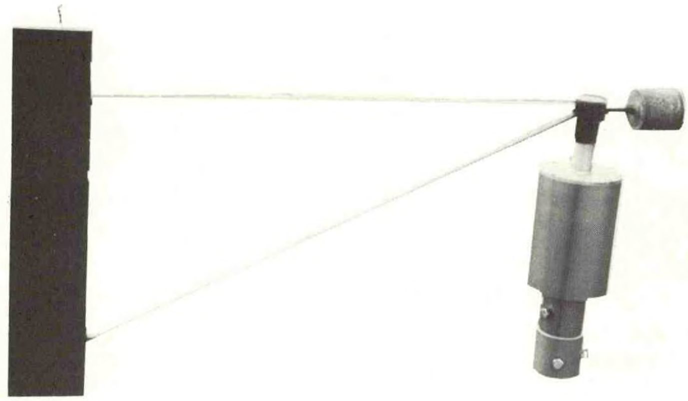


The basic RAMOS is powered either by commercial power or by solar panels (shown at left).

RAMOS temperature and dew point sensors are the same as those used with the AMOS III-73. The RAMOS does not automatically record pressure.

The RAMOS Wind Speed Sensor uses a DC generator driven by a three-cup rotor to measure wind speed.





RAMOS Wind Direction Sensor

The RAMOS Wind Direction Sensor shown here uses a potentiometer to vary voltage as an analog of direction. Wind direction is given in tens of degrees.

Precipitation Gage

The Precipitation Gage used in RAMOS is a tipping bucket gage used to measure accumulation and to indicate precipitation occurrence. It tips for every 0.01 inch of precipitation. The gage can be heated by propane or electricity.

III. DESCRIPTION OF DATA

Sky Condition

AUTOB cloud amount and height measurements are taken only directly overhead the detector to a vertical height of 6,000 feet. (See AUTOB Instrument Group, page 9.) The data reported, i.e., amount and height, are weighted averages of the conditions that occurred over the ceilometer in the 30 minutes before the report was generated. AUTOB cloud measurements are averaged over the 30-minute period with the last 10 minutes of this period given double averaging weight. (See figure on page 11.) The sampling period is long enough that there is a good chance that a representative portion of the sky cover will have passed over the detector. The double averaging weight given to the last 10 minutes makes AUTOB responsive to recent changes. The average is generally representative of conditions in the vicinity of the station. The result is a balance between responsiveness and accuracy.

Cloud amounts are accurate to ± 0.3. The accuracy of the cloud heights are dependent on the baseline of the ceilometer as follows:

ACCURACY OF AUTOB CLOUD HEIGHTS

Cloud Heights (feet)	Baseline of Ceilometer (feet) 400	800	1,000
1,000	±100	±100	±100
1,500	±200	±100	±100
2,000	±200	±200	±200
3,000	±400	±300	±200
4,000	±600	±400	±300
5,000	±900	±500	±400
6,000	±1,300	±700	±600

AUTOB will, in general, report more layers than a human because of the manner in which the cloud measurements are made and analyzed. The microprocessor stores a 30-minute sequence of cloud returns and their heights. It is programmed to mathematically group those cloud returns into cloud layers using a technique called clustering. Clustering combines cloud returns separated by small vertical height distances such that the sum of the variabilities of these clusters is minimized. Clustering stops when the sum of the variabilities of these clusters reaches a predetermined limit. Because of the overhead-only sampling, AUTOB measures only the vertical projection of the cloud cover onto the ground surface and is not influenced by the vertical extent of the clouds. In addition, the transparency of cloud cover is not measured and layers are not classified as thin.

Visibility

The visibility is determined by a backscatter sensor that samples a volume of air extending about 100 feet in front of the sensor.

The AUTOB visibility meter emits a nearly horizontal beam of light and measures the amount backscattered by atmospheric particles. (See figure on page 9.) The amount of return is converted into visibility, using an empirical relationship to human visibility. This is called an index of visibility and is neither prevailing nor sector visibility. The index of visibility is coded into a group with the letters BV (Backscatter Visibility) at the beginning. The BV preface alerts the user to expect differences. The visibility meter samples only a small volume of the atmosphere. (The volume is large enough to smooth out minor fluctuations.) The return from beyond 100 feet is small. In addition, the orientation (line of sight), the height off the ground, and the location of the visibility meter are fixed.

It is possible for AUTOB to miss an obstruction to vision. Motionless fog may exist a short distance away and not be detected by the visibility backscatter meter. (See page 14.)

Interaction of Sky Condition and Visibility

AUTOB may indicate no clouds in either a clear situation or during an inability to penetrate a surface-based obstruction. To distinguish the two, the present visibility is used. If the visibility is less than 1 1/2 miles, then either a partial obscuration (-X) or indefinite obscuration (WX) is reported. A -X implies some cloud returns in the last 10 minutes and a WX implies less than a predetermined number of cloud returns in the last 10 minutes. (See foldout, Sky Cover Parameter, for a summary.) Note that vertical visibility is not reported because the rotating beam ceilometer does not measure this. Therefore, WX appears rather than, for example, W5X, which would be an indefinite ceiling of 500 feet with the sky obscured. When the visibility is greater than 1 1/2 miles and no cloud returns are detected, a CLR BLO 60 would be output indicating a clear sky below 6,000 feet. Further, with the visibility greater than 1 1/2 miles and with no cloud returns, a SCT, BKN, or OVC will appear depending on the amount of these returns.

Pressure

An aneroid device is used to measure the atmospheric pressure. The value reported is a nominal 1-minute average and has an accuracy of $\pm$0.04 inch/Hg.

Temperature

A thermistor is used to sense the ambient temperature. The reported values are nominal 5-minute averages and have accuracies of about $\pm$1.0°F between -58°F and 120°F.

Dewpoint

A lithium chloride dew cell is used to sense the dew point. The reported values are nominal 5-minute averages. The accuracy varies from +2.0°F at 86°F to $\pm$4.0°F at -30°F.

Wind Speed

AMOS and AUTOB systems use a three-cup anemometer to measure speed and electronically provide a 1-minute average wind speed with an accuracy of $\pm$2 knots or 5 percent, whichever is greater. RAMOS uses a DC Generator driven by a three-cup rotor to measure wind speed.

Wind Direction

The RAMOS arrives at the 1-minute average electronically. The direction is accurate to $\pm$5 degrees. The RAMOS system uses a potentiometer to vary voltage as an analog of direction. AMOS and AUTOB systems use a vane to sense the direction. The AMOS and AUTOB vanes are viscous damped to provide a 1-minute average.

Peak Wind Speed

The data from the wind speed sensor are used to determine peak wind speed. The speeds reported are 1-second averages with the same accuracy as the speed above.

Temperature Extremes

The maximum and minimum temperatures found in the RAMOS reports at 0000, 0600, 1200, and 1800 GMT are the highest or lowest temperatures (as appropriate) reported in the hourly observations collected by the ADAS. It is likely that higher or lower temperatures occurred at the site. If an E prefixes the reported value, it means that at least once during the appropriate time period the ADAS failed to get a report from the RAMOS making the record for that period incomplete.

Precipitation Accumulation

A tipping-bucket rain gage is used to measure the accumulation of precipitation. The bucket tips for every 0.01 inch of rain it catches. Where necessary, the gages are electrically heated to melt and measure solid precipitation. The accuracy of the gage is $\pm$0.02 inch or 10 percent, whichever is greater.

The counters in the AMOS and AUTOB systems automatically reset to zero at 0000, 0600, 1200, and 1800 GMT. The RAMOS-S counter is not reset at all. For RAMOS-T, the ADAS computes the 24-hour accumulation by noting the change in count between consecutive 1200 GMT reports. If the RAMOS counter is mistakenly reset to zero, as sometimes happens during maintenance, large accumulations will be reported until the next measuring cycle begins.

Precipitation Occurrence

The accumulation sensor is used to determine the occurrence of precipitation. If the tipping-bucket tipped in the 10 minutes prior to the observation, precipitation is reported as occurring.

IV. DECODED AUTOMATED REPORTS

The automatic stations render reports at given intervals. All of the reports follow the same basic format. There are, however, some differences in these reports which give information on sky condition or certain other parameters that are manually entered with a MED or directly recorded by personnel at a local station. An example of each format is given with a brief explanation of each reported parameter.

DECODING OBSERVATIONS FROM STAFFED AMOS STATIONS

SMP SP 0056 AMOS-X M20 BKN 7/8L-FK 046/66/65/2723/967 PK WND 36 027/ VSBY S 1/4

MANUALLY OBSERVED

- **STATION IDENTIFICATION**: (Stampede Pass, WA) Identifies report using FAA identifiers.
- **TYPE OF REPORT**: (Special) SA = RECORD
- **TIME OF REPORT**: GMT.
- **AUTOMATIC STATION IDENTIFIER** (Omitted at other stations)
- **SKY & CEILING**: (Partly obscured sky, ceiling measured 2000 ft. broken) Figures are height in 100s of feet above ground. Number preceding an X is vertical visibility into obscuration in 100s of feet. Symbol after height is amount of sky cover (Table 2). Letter preceding height indicates ceiling height and method used to determine height (Table 3).
- **PREVAILING VISIBILITY**: (Seven-eights statute miles)
- **WEATHER & OBSTRUCTIONS TO VISION**: (Light drizzle, Fog, & Smoke) Symbols used are given in Table 1. Algebraic signs indicate intensity (see Table 1).
- **SEA-LEVEL PRESSURE**: (1004.6 millibars) Only the tens, units, and tenths digits are reported.
- **TEMPERATURE**: (66 degrees F.) Minus sign indicates sub-zero temperatures.
- **DEW POINT**: (65 degrees F.) Minus sign indicates sub-zero temperatures.
- **WIND**: (270 degrees true at 23 knots) Direction is first two digits and is reported in tens of degrees. To decode, add a zero to first two digits. The last digits are speed; e.g., 2524= 250 degrees at 24 knots.
- **ALTIMETER SETTING**: (29.67 inches) **The tens digit and decimal** are omitted from report. To decode prefix a 2 to code if it begins with an 8 or 9. Otherwise prefix a 3; e.g., 982=29.82, 017=30.17.
- **PEAK WIND SPEED**: (36 knots) Reported speed is highest detected since last hourly observation.
- **PRECIPITATION ACCUMULATION**: (0.27 inches) Amount of precipitation since last synoptic time (00, 06, 12, 1800 GMT).
- **MISCELLANEOUS REMARKS & NOTAMS**: (Visibility to South ¼ mile) Remarks are given using contractions.

DECODING OBSERVATIONS FROM UNSTAFFED AMOS STATION

MDO AMOS 33/29/3606/975 PK WND 08 001

- STATION IDENTIFICATION: (Middleton Island, AK) Identifies report using FAA identifiers.
- AUTOMATIC STATION IDENTIFIER
- TEMPERATURE: (33 degrees F.) Minus sign indicates sub-zero temperatures.
- DEW POINT: (29 degrees F.) Minus sign indicates sub-zero temperatures.
- WIND: (360 degrees true at 6 knots) Direction is first two digits and is reported in tens of degrees. To decode, add a zero to first two digits. The last digits are speed; e.g., 2524= 250 degrees at 24 knots.
- ALTIMETER SETTING: (29.75 inches) The tens digit and decimal are omitted from report. To decode prefix a 2 to code if it begins with an 8 or 9. Otherwise prefix a 3; e.g., 982=29.82, 017=30.17.
- PEAK WIND SPEED: (8 knots) Reported speed is highest detected since last hourly observation.
- PRECIPITATION ACCUMULATION: (0.01 inches) Amount of precipitation since last synoptic time (00, 06, 12, 1800 GMT).

DECODING OBSERVATIONS FROM RAMOS STATIONS

P67 RAMOS SA 2356 046/66/65/2723/967 PK WND 36 0002 027 83 20043

- STATION IDENTIFICATION: (Lidgerwood, ND) Identifies report using FAA identifiers.
- AUTOMATIC STATION IDENTIFIER
- TYPE OF REPORT: (Record) SP = SPECIAL
- TIME OF REPORT: GMT.
- SEA-LEVEL PRESSURE: (1004.6 millibars) Only the tens, units, and tenths digits are reported.
- TEMPERATURE: (66 degrees F.) Minus sign indicates sub-zero temperatures.
- DEW POINT: (65 degrees F.) Minus sign indicates sub-zero temperatures.
- WIND: (270 degrees true at 23 knots) Direction is first two digits and is reported in tens of degrees. To decode, add a zero at first two digits. The last digits are speed; e.g., 2524 = 250 degrees at 24 knots.
- ALTIMTER SETTING: (29.67 inches) The tens digit and decimal are omitted from report. To decode prefix a 2 to code if it begins with an 8 or 9. Otherwise prefix a 3; e.g., 982=29.82, 017=30.17.
- PEAK WIND SPEED: (36 knots) Reported speed is highest detected since last hourly observation.
- THREE-HOUR PRESSURE CHANGE: (Rising then falling, 0.02 millibars higher now than three hours ago.)
- PRECIPITATION ACCUMULATION: (0.27 inches) Amount of precipitation since last synoptic time (00, 06, 12, 1800 GMT).
- TEMPERATURE (MAX OR MIN) MAX at 00d06Ƶ, MIN at 12 & 18 Ƶ
- PRECIPITATION ACCUMULATION IN PAST 24 HOURS: (00.43 inches)

DECODING OBSERVATIONS FROM AUTOB STATIONS

ENV AUTOB E25 BKN BV7 P 33/29/3606/975 PK WND 08 001

STATION IDENTIFICATION: (Wendover, UT) Identifies report using FAA identifiers.

AUTOMATIC STATION IDENTIFIER

SKY & CEILING: (Estimated 2500 ft. broken) Figures are height in 100s of feet above ground. Contraction after height is amount of sky cover (Table 2). Letter preceding height indicates ceiling (Table 3). WX reported if visibility is less than 1½ miles and no clouds are detected. NO CLOUDS REPORTED ABOVE 6000 FEET

BACKSCATTER VISIBILITY IN PAST 10 MINUTES: Reported in whole miles from 1 to 7.

PRECIPITATION OCCURRENCE: (P=precipitation in past 10 minutes).

TEMPERATURE: (33 degrees F.) Minus sign indicates sub-zero temperatures.

DEW POINT: (29 degrees F.) Minus sign indicates sub-zero temperatures.

WIND: (360 degrees true at 6 knots) Direction is first two digits and is reported in tens of degrees. To decode, add a zero to first two digits. The last digits are speed; e.g., 2524 = 250 degrees at 24 knots.

ALTIMETER SETTING: (29.75 inches) The tens digit and decimal are omitted from report. To decode prefix a 2 to code if it begins with 8 or 9. Otherwise prefix a 3; e.g., 982=29.82, 017=30.17.

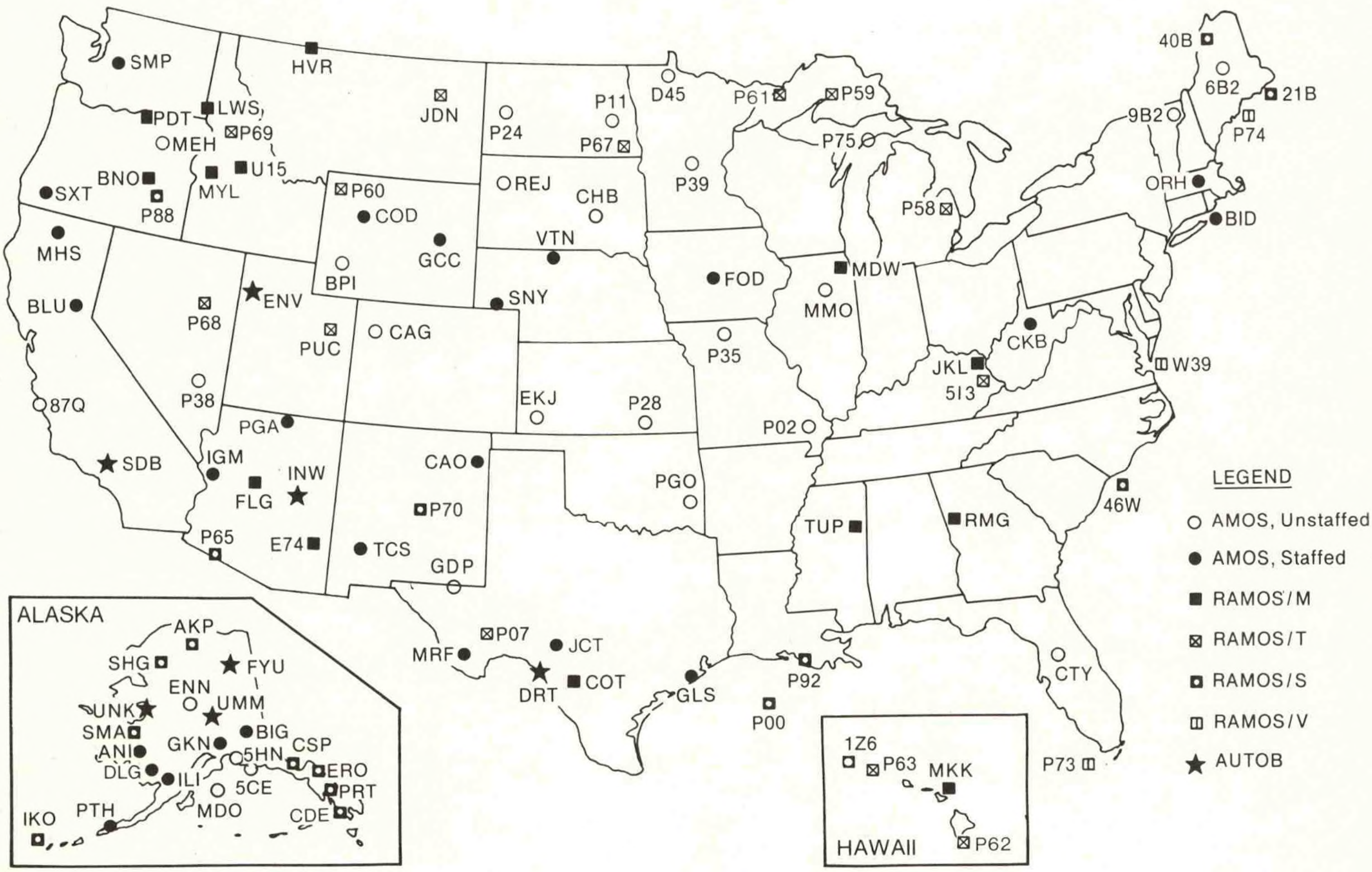
PEAK WIND SPEED: (8 knots) Reported speed is highest detected since last hourly observation.

PRECIPITATION ACCUMULATION: (0.01 inches) Amount of precipitation since last synoptic time (00, 06, 12, 1800 GMT).

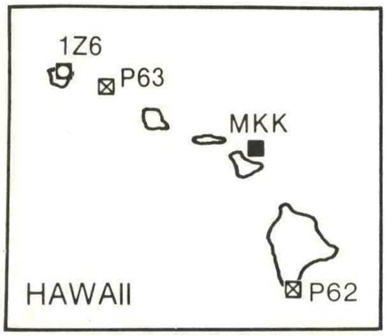
NOTE: If no clouds are detected below 6,000 feet and the visibility is greater than 1½ miles, the reported sky condition will be CLR BLO 60.

V. AUTOMATIC STATION LOCATIONS

The following maps show the approximate location of each of the automatic stations. The legend is provided to indicate what type of station is operating at each site. Currently, there is a total of 105 stations: 51 AMOS, 7 AUTOB, and 47 RAMOS.



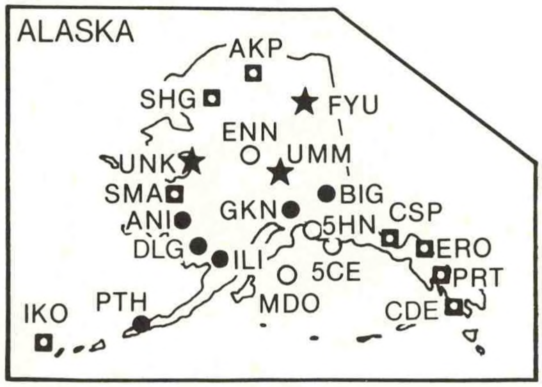
PACIFIC REGION



RAMOS Stations

Molokai, HI	MKK
Kilauea, HI	P63
South Point, HI	P62
French Frigate Shoals, HI	IZ6

ALASKA REGION



RAMOS Stations

Anaktuvak Pass, AK	AKP
Andreafski, AK	SMA
Cape Decision, AK	CDE
Cape Spencer, AK	CSP
Eldred Rock, AK	ERO
Nikolski, AK	IKO
Point Retreat, AK	PRT
Shungnak, AK	SHG

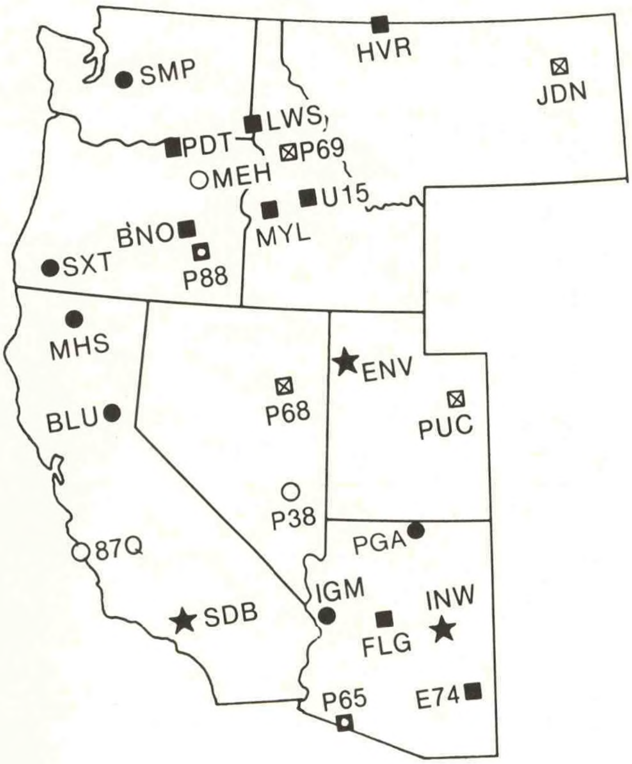
AMOS Stations

Aniak, AK	ANI
Big Delta, AK	BIG
Cape Hinchinbrook, AK	5HN
Cape St. Elias, AK	5CE
Dillingham, AK	DLG
Gulkana, AK	GKN
Iliamna, AK	ILI
Middleton Island, AK	MDO
Nenana, AK	ENN
Point Heiden, AK	PTH

AUTOB Stations

Fort Yukon, AK	FYU
Summit, AK	UMM
Unalakleet, AK	UNK

WESTERN REGION



<u>RAMOS Stations</u>

Burns, OR	BNO
Challis, ID	U15
Elk City, ID	P69
Eureka, NV	P68
Flagstaff, AZ	FLG
Havre, MT	HVR
Jordan, MT	JDN
Lewiston, ID	LWS
Lukeville, AZ	P65
McCall, ID	MYL
Pendleton, OR	PDT
Price, UT	PUC
Rome, OR	P88
Safford, AZ	E74

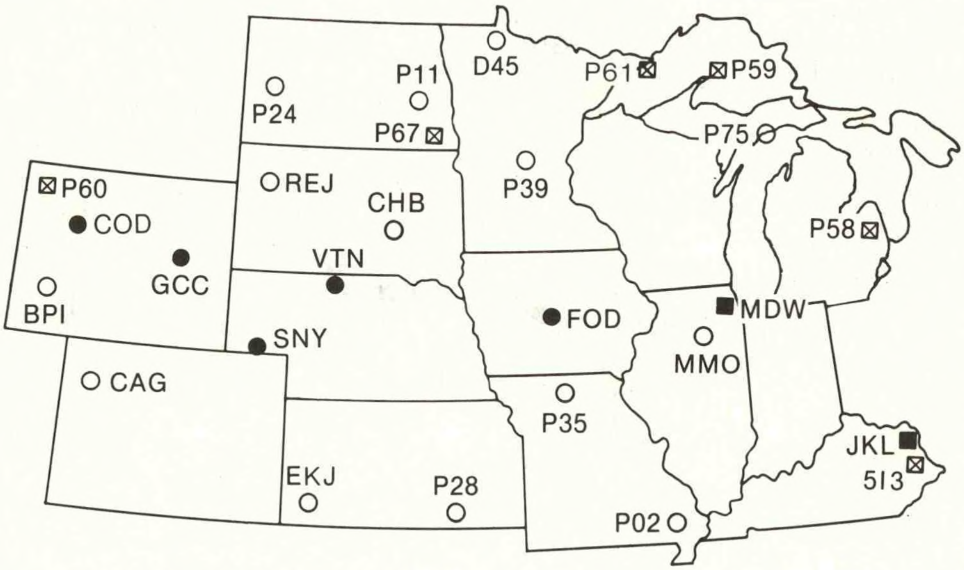
<u>AMOS Stations</u>

Blue Canyon, CA	BLU
Caliente, NV	P38
Kingman, AZ	IGM
Meacham, OR	MEH
Mt. Shasta, CA	MHS
Page, AZ	PGA
Piedras Blancos, CA	87Q
Sexton Summit, OR	SXT
Stampede Pass, WA	SMP

<u>AUTOB Stations</u>

Sandberg, CA	SDB
Wendover, UT	ENV
Winslow, AZ	INW

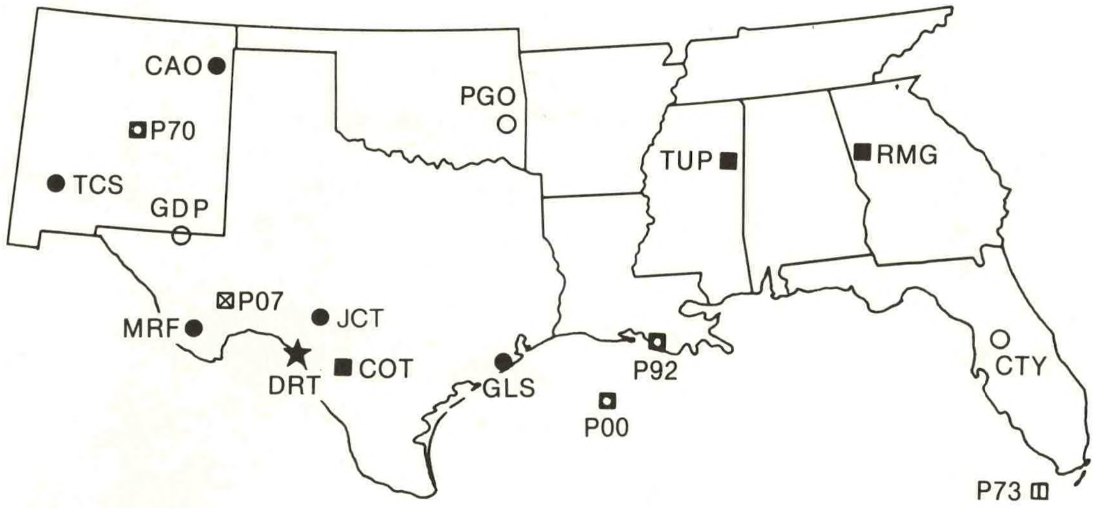
CENTRAL REGION



AMOS Stations	
Big Piney, WY	BPI
Chamberlain, SD	CHB
Cody, WY	COD
Craig, CO	CAG
Devils Lake, ND	P11
Elkhart, KS	EKJ
Ft. Dodge, IA	FOD
Gillette, WY	GCC
Marseilles, IL	MMO
Medicine Lodge, KS	P28
Pequot Lake, MN	P39
Poplar Bluff, MO	PØ2
Redig, SD	REJ
Roseglen, ND	P24
Seul Choix Pt., MI	P75
Sidney, NE	SNY
Spikard, MO	P35
Valentine, NE	VTN
Warroad, MN	D45

RAMOS Stations	
Chicago, IL	MDW
Copper Harbor, MI	P59
Grand Marais, MN	P61
Jackson, KY	JKL
Lidgerwood, ND	P67
Pikeville, KY	5I3
Port Hope, MI	P58
Yellowstone, WY	P60

SOUTHERN REGION

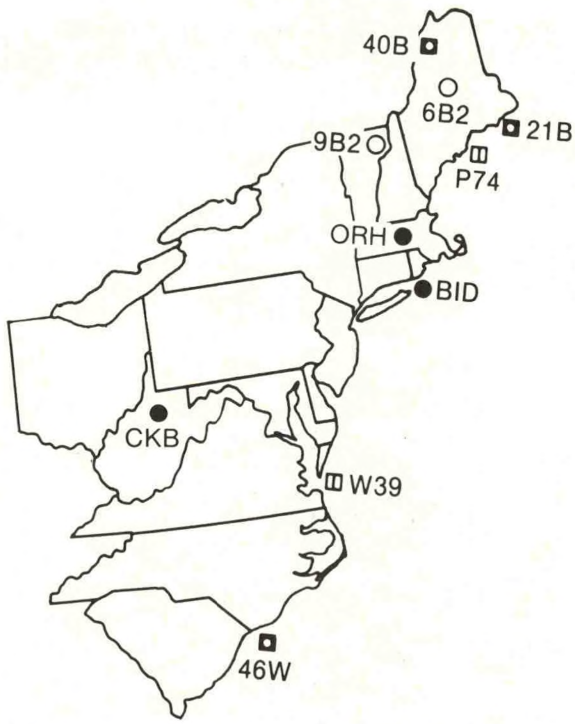


AMOS Stations		RAMOS Stations	
Clayton, NM	CAO	Clines Corner, NM	P7Ø
Cross City, FL	CTY	Cotulla, TX	COT
Galveston, TX	GLS	Dry Tortugas, FL	P73
Guadaloupe Pass, TX	GDP	Rome, GA	RMG
Junction, TX	JCT	Salt Point, LA	P92
Marfa, TX	MRF	Sanderson, TX	PØ7
Rich Mountain, OK	PGO	Tenneco O.P., LA	PØØ
Truth or Consequences, NM	TCS	Tupelo, MS	TUP

AUTOB Station

Del Rio, TX DRT

EASTERN REGION



AMOS Stations

Block Island, RI	BID
Clarksburg, WV	CKB
Greenville, ME	6B2
St. Johnsbury, VT	9B2
Worcester, MA	ORH

RAMOS Stations

Chesapeake, L.S., VA	W39
Clayton Lake, ME	40B
Frying Pan Shoals, NC	46W
Halfway Rock, ME	P74
Mt. Desert Rock, ME	21B

VI. VITAL STATISTICS ON AUTOMATIC STATIONS

The following tables give data on the automatic stations. In the "Data Reported" columns the X's indicate data that are collected and reported automatically. The O's indicate data that are entered by the observer via a MED and are, therefore, available only when an observer is on duty.

				Location					Data recorded														
										Visibility			Precipitation		Pressure			Temperature			Wind		
FAA ID	RAMOS ID	Station Name & State	Station ID AMOS-M; AUTOB-U; RAMOS-R	Lat.	Long.	Elev. (ft)	DCPRS ID or Tele. No.	Type Power	Sky Condition	Prevailing	Index-of	Present Weather	Accumulation	Occurrence	Sea-Level	Altimeter Setting	Change (app)	Current	Extremes	Dewpoint	Direction	Speed	Peak Speed
AKP	J	Anaktuvak Pass, AK	R	68°08'N	151°45'W	2100	15CFB1D6	AC					X					X		X	X	X	X
ANI		Aniak, AK	M	61°35'N	159°32'W	86		AC	O	O		O	X			X		X		X	X	X	X
BID		Block Island, RI	M	41°10'N	71°35'W	118		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
BIG		Big Delta, AK	M	64°00'N	145°44'W	1274		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
BLU		Blue Canyon, CA	M	39°17'N	120°42'W	5283		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
BNO	O	Burns, OR	R	43°35'N	119°03'W	4170		AC	O	O		O	X	X				X	O	X	X	X	X
BPI		Big Piney, WY	M	42°32'N	110°07'W	6820		AC					X			X		X		X	X	X	X
CAO		Clayton, NM	M	36°27'N	102°09'W	4972		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
CDE	R	Cape Decision, AK	R	56°00'N	134°08'W	50	15D56172	Solar					X					X		X	X	X	X
CHB		Chamberlain, SD	M	43°48'N	99°19'W	1740		AC					X			X		X		X	X	X	X
CKB		Clarksburg, WV	M	39°18'N	80°14'W	1256		AC	O	O		O				X		X		X	X	X	X
COD		Cody, WY	M	44°31'N	109°01'W	5096		AC	O	O		O	X			X		X		X	X	X	X
COT		Cotulla, TX	R	28°27'N	99°13'W	479		AC	O	O		O	X	X				X		X	X	X	X
CSP	C	Cape Spencer, AK	R	58°12'N	136°38'W	88		AC					X					X	O	X	X	X	X
CTY		Cross City, FL	M	29°37'N	83°06'W	42		AC					X			X		X		X	X	X	X
DLG		Dillingham, AK	M	59°03'N	158°03'W	86		AC	O	O		O	X			X	O	X	O	X	X	X	X
DRT		Del Rio, TX	U	29°22'N	100°55'W	1027		AC	X		X		X	X		X		X		X	X	X	X
D45		Warroad, MN	M	48°56'N	95°20'W	1071		AC					X			X		X		X	X	X	X
EKJ		Elkhart, KS	M	37°00'N	101°53'W	3616		AC					X			X		X		X	X	X	X
ENN		Nenana, AK	M	64°33'N	149°05'W	368		AC					X			X		X		X	X	X	X
ENV		Wendover, UT	U	40°44'N	114°02'W	4239		AC	X		X		X	X		X		X		X	X	X	X
ERO	E	Eldred Rock, AK	R	58°58'N	135°13'W	55	15CF4152	Solar										X		X	X	X	X
E74	O	Safford, AZ	R	32°49'N	109°41'W	2954		AC	O	O		O	X	X				X		X	X	X	X
FLG	O	Flagstaff, AZ	R	35°08'N	111°40'W	7018		AC	O	O		O	X	X				X	O	X	X	X	X
FOD		Fort Dodge, IA	M	42°33'N	94°11'W	1162		AC	O	O		O	X			X		X		X	X	X	X
FYU		Fort Yukon, AK	U	66°34'N	145°16'W	431		AC	X		X		X	X		X		X		X	X	X	X
GCC		Gillette, WY	M	44°21'N	105°32'W	4363		AC	O	O		O	X			X		X		X	X	X	X
GDP		Guadaloupe Pass, TX	M	31°50'N	104°48'W	5460		AC					X			X		X		X	X	X	X
GKN		Gulkana, AK	M	62°09'N	145°27'W	1579		AC	O	O		O	X			X		X	o	X	X	X	X
GLS		Galveston, TX	M	29°18'N	94°48'W	54		AC	O	O		O	X			X		X		X	X	X	X

FAA ID	RAMOS ID	Station Name & State	Station ID AMOS-M; AUTOB-U; RAMOS-R	Location Lat.	Location Long.	Elev. (ft)	DCPRS ID or Tele. No.	Type Power	Sky Condition	Visibility: Prevailing	Visibility: Index-of	Present Weather	Precipitation: Accumulation	Precipitation: Occurrence	Pressure: Sea-Level	Pressure: Altimeter Setting	Pressure: Change (app)	Temperature: Current	Temperature: Extremes	Temperature: Dewpoint	Wind: Direction	Wind: Speed	Wind: Peak Speed
HVR	O	Havre, MT	R	48°33'N	109°46'W	2599		AC	O	O		O	X	X				X	O	X	X	X	X
IGM		Kingman, AZ	M	35°15'N	113°56'W	3389		AC					X			X		X		X	X	X	X
IKO	N	Nikolski, AK	R	52°57'N	168°51'W	70	15D01022	AC					X					X		X	X	X	X
ILI		Iliamna, AK	M	59°45'N	154°55'W	160		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
INW		Winslow, AZ	U	35°01'N	110°44'W	4883		AC	X		X		X	X		X		X		X	X	X	X
JKL	O	Jackson, KY	R	37°36'N	83°19'W	1340		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
JCT		Junction, TX	M	30°30'N	99°46'W	1713		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
JDN	O	Jordan, MT	R	47°20'N	106°50'W	2663	(406) 557-2347	AC					X	X				X	X	X	X	X	X
LWS	O	Lewiston, ID	R	46°23'N	117°01'W	1436		AC	O	O		O	X					X	O	X	X	X	X
MDO		Middleton Island, AK	M	59°26'N	146°20'W	45		AC					X			X		X		X	X	X	X
MDW	O	Chicago (Midway), IL	R	41°47'N	87°45'W	623		AC	O	O		O				X		X		X	X	X	X
MEH		Meacham, OR	M	45°30'N	118°24'W	4056		AC					X			X		X		X	X	X	X
MHS		Mount Shasta, CA	M	41°19'N	122°19'W	3587		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
MKK	O	Molokai, HI	R	21°09'N	157°06'W	451		AC	O	O		O	X	X				X		X	X	X	X
MMO		Marseilles, IL	M	41°22'N	88°41'W	733		AC					X			X		X		X	X	X	X
MRF		Marfa, TX	M	30°22'N	104°01'W	4858		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
MYL	O	McCall, ID	R	44°53'N	116°00'W	5023		AC	O	O		O	X			X		X		X	X	X	X
ORH		Worcester, MA	M	42°16'N	71°52'W	1017		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
PDT	O	Pendleton, OR	R	45°41'N	118°51'W	1495		AC	O	O		O	X					X	O	X	X	X	X
PGA		Page, AZ	M	35°56'N	111°27'W	4279		AC	O	O		O	X			X		X		X	X	X	X
PGO		Rich Mountain, OK	M	34°41'N	94°37'W	2896		AC					X					X		X	X	X	X
PRT	I	Point Retreat, AK	R	58°24'N	134°57'W	20	15CE87B6	Solar										X		X	X	X	X
PTH		Port Heiden, AK	M	56°57'N	158°37'W	95		AC	O	O		O	X			X		X		X	X	X	X
PUC	Q	Price, UT	R	39°37'N	110°45'W	5901	(801) 637-5447	AC					X	X		X		X		X	X	X	X
PØØ	F	Tenneco O.P., LA	R	28°00'N	93°00'W	100	15CFA2AO	AC					X	X				X		X	X	X	X
PØ2		Popular Bluff, MO	M	36°46'N	90°28'W	330	72330	AC				X	X	X		X		X		X	X	X	X
PØ7	I	Sanderson, TX	R	30°10'N	102°25'W	2838	(915) 345-2212	AC					X	X		X		X		X	X	X	X
P11		Devil's Lake, ND	M	48°06'N	98°52'W	1455		AC						X		X		X		X	X	X	X
P24		Roseglen, ND	M	47°45'N	101°50'W	2047		AC						X		X		X		X	X	X	X
P28		Medicine Lodge, KS	M	37°18'N	98°35'W	1530		AC						X		X		X		X	X	X	X

FAA ID	RAMOS ID	Station Name & State	Station ID AMOS-M; AUTOB-U; RAMOS-R	Location Lat.	Location Long.	Elev. (ft)	DCPRS ID or Tele. No.	Type Power	Sky Condition	Visibility: Prevailing	Visibility: Index-of	Present Weather	Precipitation: Accumulation	Precipitation: Occurrence	Pressure: Sea-Level	Pressure: Altimeter Setting	Pressure: Change (app)	Temperature: Current	Temperature: Extremes	Temperature: Dewpoint	Wind: Direction	Wind: Speed	Wind: Peak Speed
P35		Spickard, MO	M	40°15'N	93°43'W	885		AC					X			X		X		X	X	X	X
P38		Caliente, NV	M	37°37'N	114°31'W	4381		AC					X			X		X		X	X	X	X
P39		Pequot Lake, MN	M	46°35'N	94°19'W	1280		AC					X			X		X		X	X	X	X
P58	G	Port Hope, MI	R	43°40'N	82°32'W	600	(517) 428-4400	AC					X	X				X		X	X	X	X
P59	A	Copper Harbor, MI	R	47°28'N	87°52'W	610	(906) 289-4553	AC					X	X				X		X	X	X	X
P6Ø	N	Yellowstone, WY	R	44°33'N	110°25'W	8000	(307) 242-7301	AC					X	X				X		X	X	X	X
P61	L	Grand Marais, MN	R	47°35'N	90°50'W	610	(218) 387-2793	AC					X	X				X		X	X	X	X
P62	B	South Point, HI	R	18°55'N	155°43'W	305	(808) 929-9277	Solar					X	X				X		X	X	X	X
P63	A	Kilauea, HI	R	22°14'N	159°24'W	180	(808) 828-1443	AC					X	X				X		X	X	X	X
P65	A	Lukeville, AZ	R	31°52'N	112°52'W	1665	15CF24B4	AC					X	X				X		X	X	X	X
P67	J	Lidgerwood, ND	R	46°06'N	97°09'W	1150	(701) 538-4147	AC					X	X				X	X	X	X	X	X
P68	E	Eureka, NV	R	39°30'N	115°58'W	7000	(702) 237-5226	AC					X	X				X	X	X	X	X	X
P69	D	Elk City, ID	R	45°49'N	115°26'W	4097	(208) 842-2310	AC					X	X				X	X	X	X	X	X
P7Ø	B	Clines Corners, NM	R	34°55'N	105°35'W	6876	15CEA051	Solar					X	X				X		X	X	X	X
P73	C	Dry Tortugas, FL	R	24°38'N	82°55'W	4		Solar					X	X				X		X	X	X	X
P74	C	Halfway Rock, ME	R	43°20'N	70°05'W	18		Solar					X	X				X		X	X	X	X
P75		Seul Choix Point,	M	45°55'N	85°55'W	685		AC					X			X		X		X	X	X	X
P88	R	Rome, OR	R	42°50'N	117°53'W	4220	15D02B8	Solar					X	X				X		X	X	X	X
P92	H	Salt Point, LA	R	29°17'N	91°18'W	12	15D0C64A	AC					X	X				X		X	X	X	X
REJ		Redig, SD	M	45°16'N	103°32'W	3035		AC					X			X		X		X	X	X	X
RMG	O	Rome, GA	R	34°21'N	85°10'W	643		AC	O	O		O	X	X				X	O	X	X	X	X
SDB		Sandberg, CA	U	34°45'N	118°44'W	4523		AC	X		X		X	X		X		X		X	X	X	X
SHG	Y	Shungnak, AK	R	62°52'N	157°09'W	145	15D591F6	AC					X					X		X	X	X	X
SMA	D	Andreafski, AK	R	62°03'N	163°10'W	302	15CF844C	AC					X					X		X	X	X	X
SMP		Stampede Pass, WA	M	47°17'N	121°20'W	3967		AC	O	O		O	X		O	X	O	X	O	X	X	X	X

FAA ID	RAMOS ID	Station Name & State	Station ID AMOS-M; AUTOB-U; RAMOS-R	Location Lat.	Location Long.	Elev. (ft)	DCPRS ID or Tele. No.	Type Power	Sky Condition	Visibility: Prevailing	Visibility: Index-of	Present Weather	Precipitation: Accumulation	Precipitation: Occurrence	Pressure: Sea-Level	Pressure: Altimeter Setting	Pressure: Change (app)	Temperature: Current	Temperature: Extremes	Temperature: Dewpoint	Wind: Direction	Wind: Speed	Wind: Peak Speed
SNY		Sidney, NE	M	41°06'N	102°59'W	4306		AC	O	O		O	X			X	O	X		X	X	X	X
SXT		Sexton Summit, OR	M	42°37'N	123°22'W	3841		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
TCS		Truth or Consequences, NM	M	33°14'N	107°16'W	4858		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
TUP	O	Tupelo, MS	R	34°16'N	88°46'W	361		AC	O	O		O	X	X				X		X	X	X	X
UMM		Summit, AK	U	63°20'N	149°08'W	2405		AC	X		X		X	O		X		X		X	X	X	X
UNK		Unalakleet, AK	U	63°53'N	160°48'W	21		AC	X		X		X	O		X		X		X	X	X	X
U15	O	Challis, ID	R	44°31'N	114°13'W	5071		AC	O	O		O	X	X				X	O	X	X	X	X
VTN		Valentine, NE	M	42°52'N	100°33'W	2598		AC	O	O		O	X		O	X	O	X	O	X	X	X	X
W39	K	Chesapeake, L.S., VA	R	36°54'N	75°43'W	100		AC					X	X				X		X	X	X	X
1Z6	X	French Frigate Shoals, HI	R	23°52'N	166°17'W	6		Solar					X	X				X	X	X	X	X	X
CAG		Craig, CO	M	40°31'N	107°33'W	6283		AC					X			X		X		X	X	X	X
5CE		Cape St. Elias, AK	M	59°48'N	144°36'W	58		AC								X					X	X	X
5HN		Cape Hinchinbrook, AK	M	60°14'N	146°39'W	185		AC								X					X	X	X
5I3	P	Pikeville, KY	R	37°29'N	82°31'W	900	(606) 432-5911	AC					X	X				X	X	X	X	X	X
6B2		Greenville, ME	M	45°28'N	69°35'W	1038		AC					X			X		X		X	X	X	X
9B2		St. Johnsbury, VT	M	44°25'N	72°01'W	711		AC					X			X		X		X	X	X	X
21B	M	Mt. Desert Rock, ME	R	43°58'N	68°08'W	35	15DOA3AC	AC					X	X				X	X	X	X	X	X
4ØB	W	Clayton Lake, ME	R	46°37'N	69°32'W	1060	15D57204	AC					X	X				X	X	X	X	X	X
46W	T	Frying Pan Shoals, NC	R	33°29'N	77°35'W	100	15D4F6EA	AC										X	X	X	X	X	X
87Q		Piedras Blancas,	M	35°40'N	120°17'W	69		AC					X			X		X		X	X	X	X

X - Datum available at all times.

O - Datum available only when station is staffed.

VII. ALTERNATIVE COMMUNICATIONS FOR RAMOS REPORTS

It is possible to get reports in addition to the routine hourly reports from RAMOS/S, RAMOS/T, and RAMOS/V systems using the following procedures. HOWEVER, DO NOT -- UNDER ANY CIRCUMSTANCES -- INTERROGATE THE SITES BETWEEN H+35 and H+55. (Doing so will interfere with the central data collection system.)

RAMOS/S

All RAMOS/S reports received by the Data Collection System (DCS) in the past several hours can be retrieved by calling the DCS and using a data terminal such as TI 700. Set the machine on high speed, full duplex, even parity, and dial (301) 899-6595. The DCS will respond by asking for the USER ID. The appropriate ID's for RAMOS data are: NWSBLM for RAMOS's in Alaska, NWSRFF for RAMOS's in Hawaii, and NWSRAM for all other RAMOS systems. If, instead of the response DSR-USER ID, the terminal prints what looks like noise, it is likely that the DCS transmission speed of 300 bytes per second is too high for your terminal. If this is the case, type in the ASCII character D and hit the return key. This will slow the DCS transmission rate to 100 bytes per second and the DCS will again come back and ask for the USER ID. At this point, enter the appropriate ID as shown above. The DCS will log you into the system, tell you the data and time of the last dissemination of the RAMOS you're calling, and then print ENTER: MSG, RLT, DIS, or STOP. At this point, you have two options. You can get all the RAMOS reports in the file (under the USER ID) or you can get a printout of one particular RAMOS (in that file). To get all the RAMOS reports in the file, type in RLT,dddhhmmss, and then hit the return key. To get a particular RAMOS, type in RLT,aaaaaa,dddhhmmss, and then hit the return key. In the above entries, aaaaaa is the first six digits of the platform address of the RAMOS you want, ddd is the Julian date (always use three digits), hh is the hour of the earliest report you want to see (GMT), and mm and ss are the minutes and seconds of the earliest report you want to see. The following are several examples of the different communications procedures. The data in parentheses are the data entered by the DCS.

```
(DCS - ENTER ID.)  NWSBLM
(NWSBLM SIGNON AT 095130752)
(NUMBER OF UNDISSEMINATED MESSAGES 0000)
(TIME OF LAST DISSEMINATION 095105343)
(ENTER:  MSG, RLT, DIS, OR STOP)  RLT,094120000
```

Following the above entries the DCS will printout all RAMOS reports in the NWSBLM file that were received after 3 April, 120000 GMT. The reports will be in the format shown at the end of this section.

```
(DCS - ENTER ID.)  NWSBLM
(NWSBLM SIGNON AT 095133024)
(NUMBER OF UNDISSEMINATED MESSAGES 0000)
(TIME OF LAST DISSEMINATION 095125401)
(ENTER:  MSG, RLT, DIS, OR STOP)  RLT/15DØ1Ø, 095000000
```

Following the above entries, the DCS will printout all RAMOS reports received from Nikolski, Alaska (platform address 15D01022), since 4 April, 000000 GMT.

The above procedure will give you all the past routine reports. It will not give you extra reports. You can get extra reports on an emergency basis by calling (301) 763-8351. This will give you the DCS operator. Identify yourself to the operator and ask the operator to interrogate the platform you are interested in. Use the platform address to identify the RAMOS. You can then get the new report by calling the DCS as described above, or have the operator read the message to you on the telephone.

RAMOS/T

Using a terminal (such as a TI 700) with an acoustic coupler, you can call any RAMOS/T and get a current report. To do this, set the machine on low speed, full duplex, and even parity. Dial the telephone number of the RAMOS/T you are interested in. When you get a carrier from the RAMOS, transmit the RAMOS ID letter. The RAMOS will report the conditions at that time, using the format shown below.

RAMOS/V

To get additional reports from RAMOS/V sites, call the Weather Service Office that interrogates the RAMOS you are interested in. These are:

Chesapeake L.S., Va.: WSO Norfolk - (804) 853-0553

Dry Tortugas, Fla.: WSO Key West - (305) 296-2741

Halfway Rock, Maine: WSO Portland - (207) 780-3406

FORMAT OF RAW RAMOS REPORTS

15CE86B6?094131957ZIT42H38W35/11G017P001A992RNOQ091C358V273

Platform Address (not in messages from RAMOS/T and RAMOS/V)

Indicates parity error (Normal with RAMOS/S using Magnavox)

Time of interrogation

Indicates power failure since last interrogation

RAMOS Identifier

Temperature (T42 = 42°F)

Dewpoint (H38 = 38°F)

Wind direction (W35 = 350° True)

Battery voltage (V273= 27.3 volts) seen only on a few systems

Current from solar array (C358 = 3.58 amps) seen only on a few systems

Cumulative precipitations (Q091 = 0.91 inch)

Precipitation occurrence (RNO = no occurrence in past 10 minutes)

Altimeter setting (A992 = 29.92 inches)

Station pressure (P001 = 30.01) not found on reports with altimeter setting

Peak wind speed (G017 = 17 knots since last interrogation)

Wind speed (/11 = 11 knots)

Table 1.--The Weather Message

ENV AUTOB 1 SCT E7 BKN 10 OVC BV352P 34/33/2302/950 PK WND 03 004 HIR CLDS DETECTED

AUTOMATIC STATION TO WHICH INFO. APPLIES	PARAMETER	UNITS	EQUIPMENT TYPE	OPERATING RANGE	CODE	FORMAT	AVERAGING TIME	EXAMPLE	INTERPRETATION	SENSOR MALFUNCTION* The following number or letters will be generated to alert user to sensor malfunction or power failure. MISSING (DISCONNECTED)	SHORTED	POWER FAILURE
MUR	Time (not reported)	Hour, Minute, Second. (hr, min, s)	Mechanical clock									
MUR	Automatic station type				AUTOB	AUTOB		AUTOB	Automatic Observation alerts user to expect differences			
U	Cloud height #	Foot, (ft)	Rotating Beam Ceilometer, (RBC) with discriminator and one lamp modification (uses only one lamp of two at a time)	Cloud algorithm uses data from 50 - 6,000 ft	100s of ft	FOR BOTH CLOUD HEIGHT & COVER: Up to 3 layers can be output	FOR BOTH CLOUD HEIGHT & COVER: Present 30-min avg., double weight given to last 10 min	1 SCT E7 BKN 10 OVC	100 ft SCT 700 ft BKN (E indicates ceiling) 1,000 ft OVC	FOR BOTH CLOUD HEIGHT AND COVER: If one lamp is out, L will appear at the end of the report. It two lamps are out, there will be no cloud height or cover and a TL will follow the report. EXAMPLE: ...PK WND 03 004 TL		
U	Sky cover #	%	RBC	Samples 50-6,000 ft Definitions of areal coverage from comparison of actual returns to the number possible. Summation principle used.	Clear, scattered, broken, overcast, partial obscurration # or indefinite obscuration # (CLR, SCT, BKN, OVC, -X, WX) CLR<5% 5%<SCT<55% 55%≤BKN<87% 87%≤OVC≤100% Ceiling designator (E). E signals user to different manner of determination.		Program recycled every 5 min			Following a power failure, 30 min of data must be present for a cloud height and cover to be generated		

Legend:
M - AMOS
U - AUTOB
R - RAMOS

OUTPUTTING OF -X AND WX

The visibility measurement is used to determine whether a -X or WX should be output. The relationship is as follows:

VISIBILITY NEAR 1 1/2 STAT MI AND ITS AFFECT ON THE CLOUD OUTPUT		
>1 1/2 stat mi	<1 1/2 stat mi with 5 or more hits in last 10 min	<1 1/2 stat mi with less than 5 hits in last 10 min
NO X or -X will appear. CLR, SCT, BKN, or OVC can be output.	Reports -X and adds 20% to first layer above.	Automatically reports WX (vertical visibility is not reported with a WX).

* These sensor malfunction indications apply to self detection. If a service card is placed in the AUTOB system then an M may appear as the indication of disconnection, rather than a number.

Table 1.--The Weather Message (continued)

SENSOR MALFUNCTION *
The following numbers or letters will be generated to alert user to sensor malfunction or power failure.

ENV AUTOB 1 SCT E7 BKN 10 OVC BV352P 34/33/2302/950 PK WND 03 004 HIR CLDS DETECTED

AUTOMATIC STATION TO WHICH INFO. APPLIES	PARAMETER	UNITS	EQUIPMENT TYPE	OPERATING RANGE	CODE	FORMAT	AVERAGING TIME	EXAMPLE	INTERPRETATION	MISSING (DISCONNECTED)	SHORTED	POWER FAILURE
U	Index of visibility	Statute mile, (stat mi)	Backscatter visibility meter, (BV) Note: Categories 0, 1, 2, 3, and 8 differ from FMH #1 visibility ranges.				The present visibility is a 3-min avg.	BV5	Present visibility is 3 mi.	If the visibility meter fails, cloud height and cover and the sky group will also end. The BV group will appear as BV M and a TL will end the report		
MUR	Precipitation occurrence	Inch, (in.)	Heating tipping bucket rain gage		Presence or absence of a P. A P indicates precipitation occurred in the last 10 min. (The bucket tipped at least once. The bucket tips when 0.01 in. of precipitation water equivalent is accumulated.)	1 space allowed 0 or 1 space used.	Present 10-min period	P	Precipitation occurred during the present 10 min and is likely at observation time.			
MUR	Temperature	Degree Fahrenheit, (°F)	Hygrothermometer	-80 to 120°F	Whole °F, - sign is used when necessary	3 spaces allowed 1, 2, or 3 spaces used	Present 5-min average	34	34°F	-99		
MUR	Dew point Temperature	°F	Hygrothermometer	-30 to 86°F	Whole °F, - sign is used when necessary	3 spaces allowed 1, 2, or 3 spaces used	Present 5-min average	33	33°F	-96		141
MU	Wind direction	Degree (°)	Wind vane	1 to 360° (see code for 0°)	10's of degrees, measured clockwise from true north, indicating direction wind blowing from 36 = north 00 = calm (wind speed should = 00 also)	2 spaces allowed 2 spaces used	Present 1-min average	23	230°	M		
R			Wind direction sensor (particular to RAMOS)		Wind direction is given in tens of degrees. Uses a potentiometer to vary voltage as an analog of direction.	2 spaces allowed 2 spaces used		23	230°	M		
MU	Wind speed	Knot, (kt)	Cup anemometer	0 to 125 kt	Whole kt	3 spaces allowed 3 spaces used	Present 1-min average	02	2 kt	M		
R			Wind speed sensor	0 to 125 kt	Whole kt Uses a DC generator driven by a three-cup rotor to measure wind speed.	3 spaces allowed 3 spaces used		02	2 kt	M		
MUR	Altimeter setting	Inch of Mercury, (in. hg.)	Aneroid barmometer	Each transducer has a range of 4 in. Hg., 10 are available spanning range 18.5 to 31.5 in. Hg.	Units, tenths, and hundredths output. User adds 2 or 3 whichever is closer to 30.00 in. Hg.	3 spaces allowed 3 spaces used.	Present	950	29.50 in. Hg.	781		
MU	Peak wind speed, (PK WND)	kt	Cup anemometer	0 to 125 kt	Whole kt	PK WND, space, with 4 following spaces allowed. 2, 3, or 4 spaces used.	Highest 1-s avg. since last hourly.	PK WND 03	PK WND is 3 kt since last hourly.	00	E An E will appear if power failure occurs within the hour implying estimation of PK WND: PK WND E18	
MUR	Precipitation accumulation	in.	Heating tipping bucket rain gage	from 0.00 in. with no maximum limit (see format)	Units, tenths, and hundredths output	3 spaces allowed 3 spaces used A 999 readout is maximum in 6 hr (9.99 in. of water in 6 hr)	Precipitation accumulates over 6-hr period; resets at synoptic times (0000, 0600, 1200, 1800 GMT)	004	0.04 in. of precipitation (water equivalent) have accumulated since last synoptic time.	M		
U	**Remark**				HIR CLDS DETECTED	HIR CLDS DETECTED		HIR CLDS DETECTED	Clouds detected above overcast (but less than 6,000 ft)			

NO	INDEX OF VIS, stat mi	NO	INDEX OF VIS, stat mi
0	0 to 15/16	5	4 1/2 to 5 1/2
1	15/16 to 1 15/16	6	5 1/2 to 6 1/2
2	1 15/16 to 2 7/8	7	6 1/2 to 7 1/2
3	2 7/8 to 3 1/2	8	above 7 1/2
4	3 1/2 to 4 1/2		

Note: During normal power failures battery power will maintain the 6-hour precipitation accumulation function.