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APPLICATIONS OF COMMUNITY ANTENNA TELEVISION (CATV) SYSTEMS TO PUBLIC WEATHER DISSEMINATION

SOUTHERN REGION HEADQUARTERS
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ABSTRACT

This study was undertaken to examine the present and future potential of Community Antenna Television (CATV) systems for disseminating public weather information. The study reviews the development and growth of CATV and suggests some possible weather applications.

CATV started in the late 1940's as scattered, independent, local community enterprises to receive television programs from greater distances. By the end of 1967 it had grown to an industry estimated to consist of some 1,870 systems serving over 3 million homes and representing a capital investment of close to one hundred million dollars.

The major portion of today's CATV service is in areas outside the signal coverage of conventional TV broadcast stations. Approximately 30% of the operating CATV systems feature a separate channel continuously displaying current weather information, usually with background music, and display space for public announcements or advertising.

It is technically feasible, using commercial equipment, to feed alphanumeric and graphic weather information into cabel TV at the local CATV system level. If this technical capability is to be utilized in the future for disseminating weather information it poses questions on how best to develop future Weather Bureau product lines and distribution methods to reach the increasing number of homes for which CATV is the principal media entry.

While the growth rate of CATV has been depressed for the last year or two awaiting major decisions on government regulation and copyrights, the industry and manufacturers of equipment have planned their future activities in anticipation of a very substantial expansion of the service.

It is concluded that an all-weather channel on CATV holds considerable potential for providing the general public with a full-time weather information service. It is further concluded that general availability of such service to the public is dependent on growth of CATV market areas to make it economically feasible to support the cost of the weather service.

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R. O. Reinhold, WBO, Little Rock, Arkansas
Carl M. Reber, WBSRH, Fort Worth, Texas

INTRODUCTION

Each new public communications media has offered meteorologists new hope and challenge for dissemination of weather information to the public. Conventional television broadcasting has clearly demonstrated that graphic representations offer unique advantages for conveying weather information simply and effectively.

CATV is no exception to the search and utilization of new media. Particularly enticing is the fact that, through CATV, television programs are now brought into homes which, because of distance from television broadcasting stations or radio wave propogation conditions, would otherwise be without satisfactory reception.

The seed for modern CATV was sown in the early years of television broadcasting. Residents of towns in mountainous areas found the big city-originated TV signals blocked by intervening hills and mountains. Resourcefully, they pooled their efforts and built high-performance antenna systems on high sites to intercept these signals and then fed them to their TV sets in the valleys. Soon it became apparent this could be a commercial enterprise, not only to overcome the physiographic barriers to signal reception, but to "import" TV signals into communities which were beyond normal receiving range.

Today, CATV systems bring multi-channel reception into a great many towns and cities outside the normal signal coverage of TV broadcasting stations. Some also operate in cities where TV broadcasting stations are located, carrying local stations on a real-time basis and bringing in signals from other cities to expand the program selections for the subscriber.

The typical CATV system consists of high performance antennas sited for optimum receiving conditions and a local area cable distribution network for delivering these signals directly to the TV set in the home. Station selection usually is from three upwards to seven or eight, occasionally more. Nearly all CATV systems have the technical capability for local origination of displays such as weather and time, public service announcements, and advertising on a separate channel. Some have their weather "scanners" at an unattended antenna site and therefore feed to the subscriber only the intercepted signals, a weather dial display and "canned" background music. Customer service rates range from around $3.00 to $10.00 per month.

SCOPE OF CATV

As of the end of 1967 the CATV industry consisted of an estimated 1870 separate systems individually identified with a city or town, feeding more than 3,000,000 television equipped homes. These systems represent a capital investment of some $100,000,000.[1]

GROWTH OF CATV INDUSTRY
(Source: National Cable TV Association)

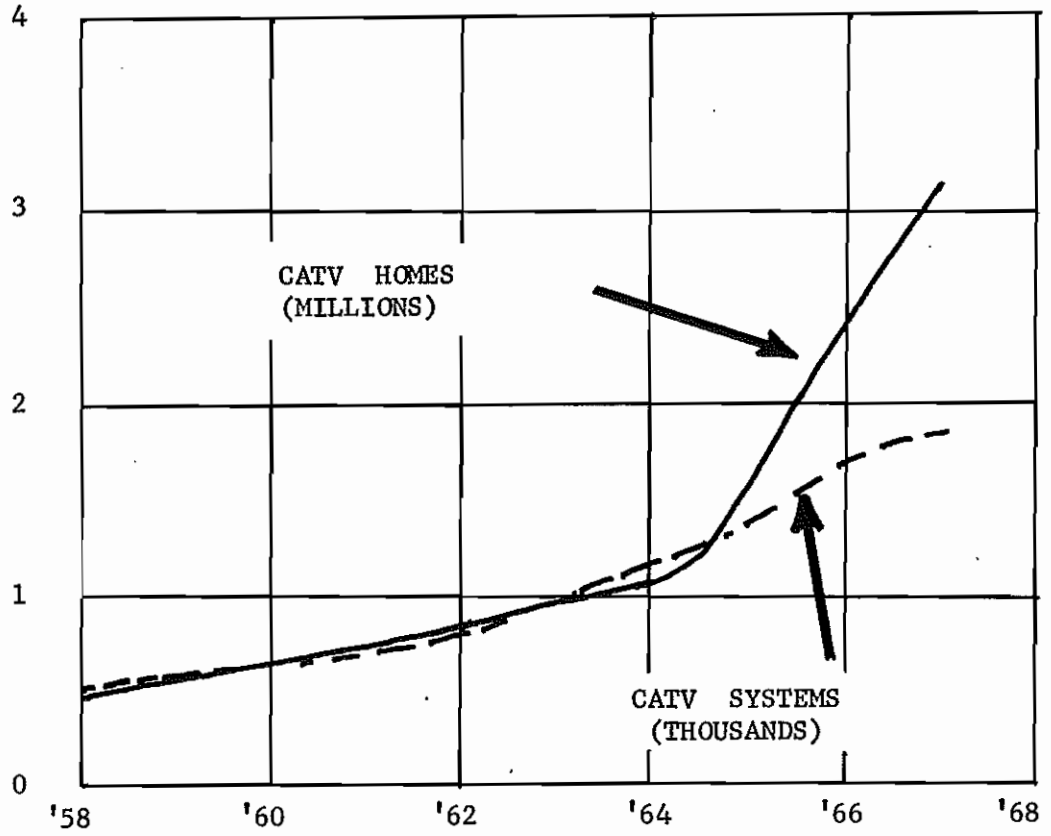

Figure 1

The growth of CATV and numbers of subscribers is illustrated in Figure 1. At the end of 1967 CATV was estimated by the National Cable TV Association to be serving 5.6% of the television equipped homes in the United States. Small as this percentage may seem, it represents a threefold increase in only four years.

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[1] Sources: National Cable TV Association and Motorola, Inc.

The CATV industry has experienced a slowdown in its growth rate during the last several years. This is attributed to unresolved questions concerning extent of FCC authority to regular CATV, applicability of copyrights, and relationship of CATV operations to existing common carrier landline communications companies. Despite these questions it is clear from the amount and capability of new CATV equipment being shown by manufacturers that there is much confidence in a vastly expanded field ahead for local program origination by CATV and for expansion of CATV service areas.

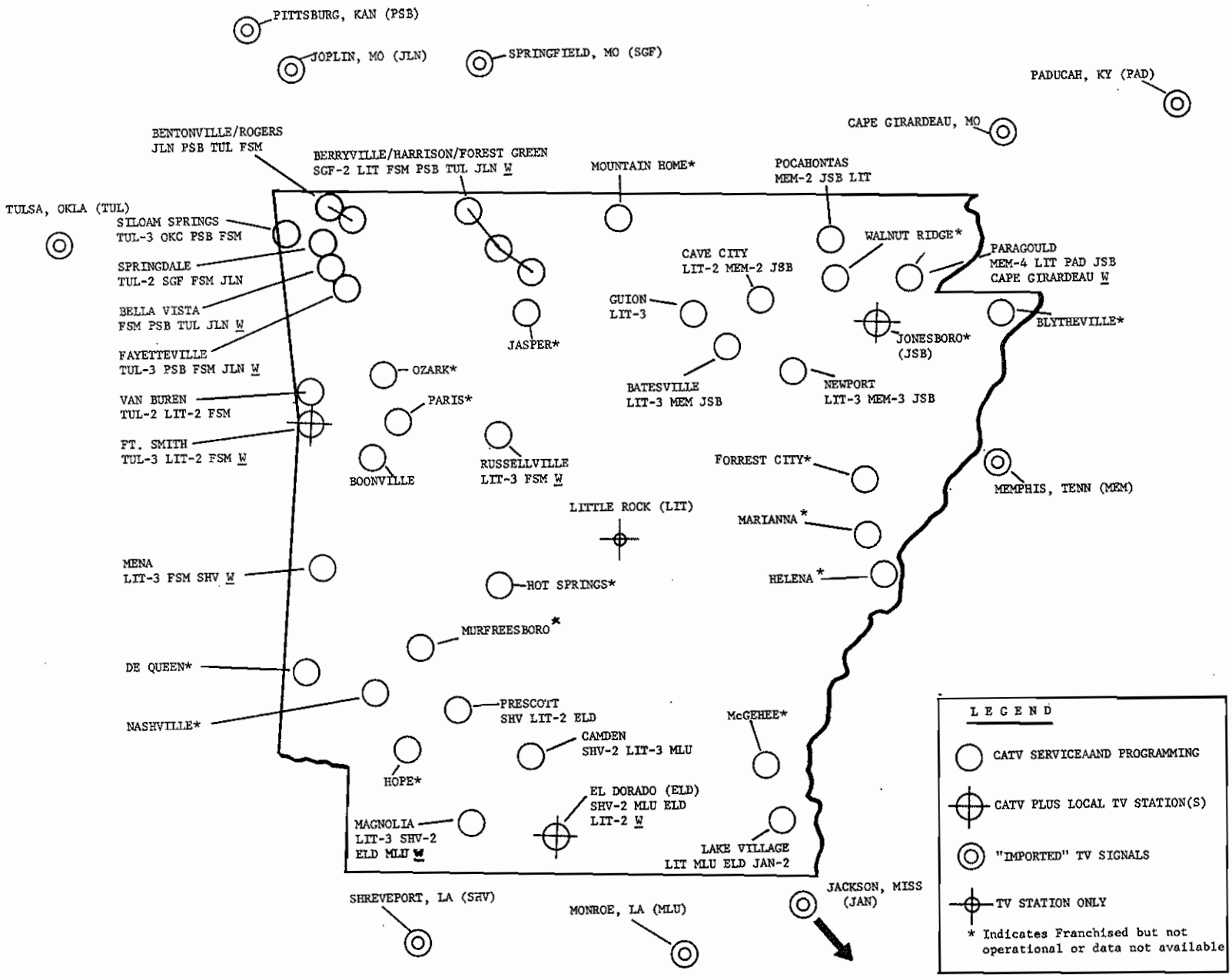
In 1965 the Federal Communications Commission requested of all CATV companies a report on their service and other activities. This FCC census (reported in TELEVISION MAGAZINE, March 1967) is the basis for most of the information in this study concerning CATV system locations and service offered. It is the most complete and reliable single source of information available at this time on the total scope of CATV service. The FCC census on total number of CATV systems operating and total numbers of subscribers yielded figures somewhat lower than those determined by the National Cable TV Association. But, this difference is reconcilable for the most part because some CATV operators did not respond to the FCC questionnaire and reporting criteria were not identical.

The total numbers of systems and subscribers in the Southern Region states as shown in the FCC census, are listed in Table I.

TABLE I

STATE	SYSTEMS	SUBSCRIBERS	POPULATION OF PRESENT SERVICE AREA
Alabama	28	48,220	530,687
Arkansas*	28	27,909	250,132
Florida	28	61,360	746,526
Georgia	25	32,374	541,351
Louisiana	18	19,367	356,699
Mississippi	29	51,182	476,077
New Mexico	20	30,303	293,089
Oklahoma	39	35,053	269,445
Tennessee	29	25,338	250,936
Texas	114	140,430	1,597,724
	358	471,536	5,312,666

* Up-dated as of January 1, 1968 to include 36 systems with 30,377 subscribers



CATV SERVICE IN ARKANSAS AS OF JAN 1, 1968

Figure 2

Figure 2 shows CATV system locations and respective station selections in Arkansas, up-dated through January 1, 1968. This coverage and selection is typical of that in other Southern Region states. The FCC survey shows no CATV service for Puerto Rico but lists one small system in the Virgin Islands.

CATV system station selections usually include programs broadcast by stations up to several hundred miles away. An extreme example of this is at Santa Fe, New Mexico where the CATV system carries programs received via microwave from five different Los Angeles TV stations. Imagine what would happen if Santa Fe carried a Los Angeles announcement of a Tsunami Warning! Certainly it points out the need for adequate identification of warning source and area affected.

Of the 358 CATV systems operating in the Southern Region, approximately 36% have a separate channel for continuous display of weather instruments. Background music is transmitted on this same channel. The typical "weather scanner" is a display of current local temperature, wind, humidity, and pressure. Usually included is a time display, and one or more small panels suitable for public service announcements or advertising material. Figures 3 and 4 show two types of commercially available weather scanners. Also available commercially are several models of sequentially operated display equipment suitable for most any kind of copy. (Figures 5a and 5b)

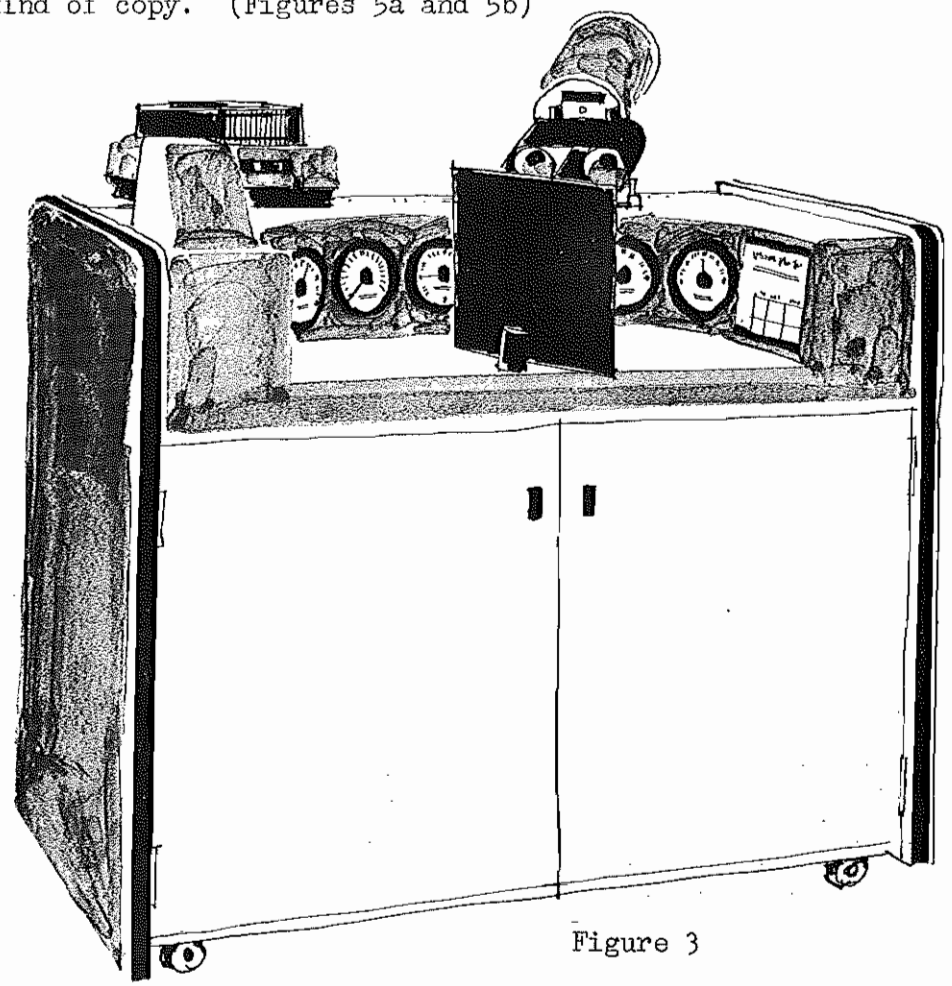


Figure 3

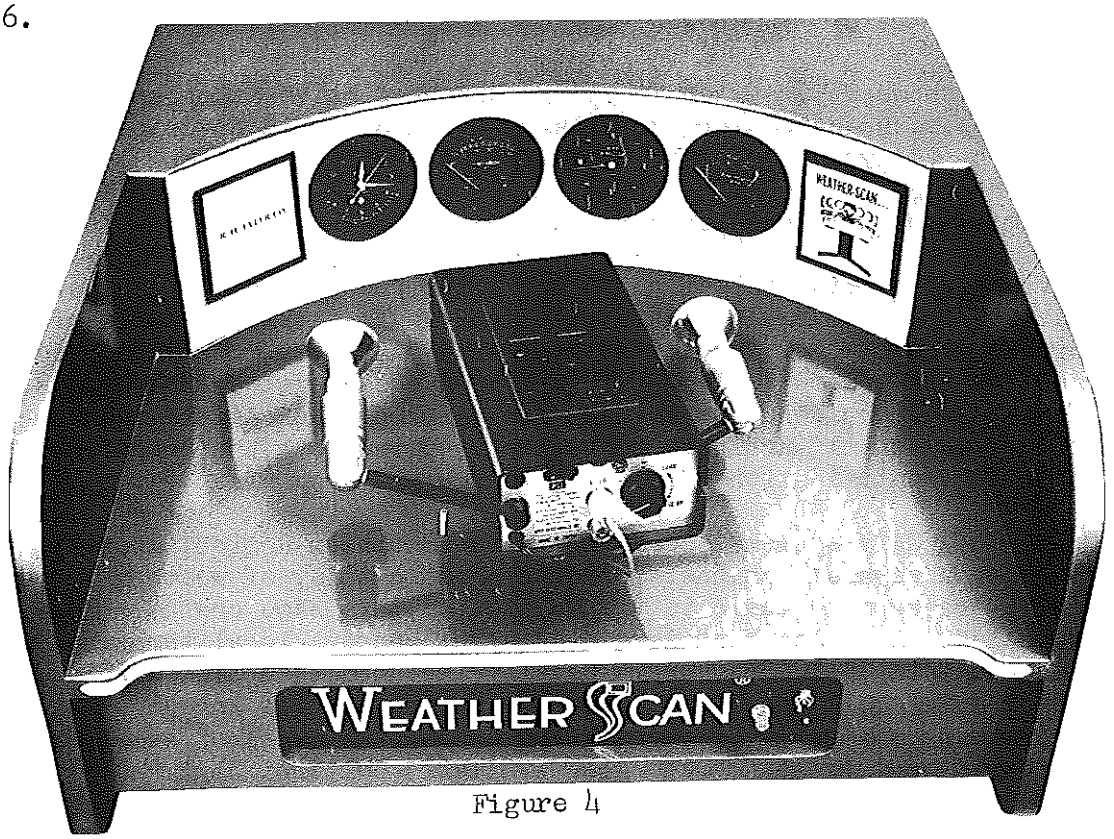


Figure 4

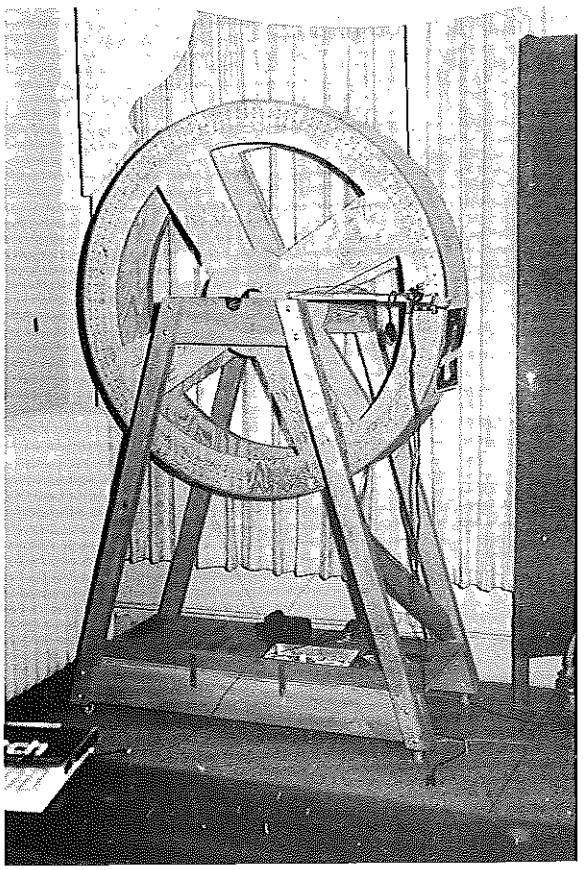


Figure 5a

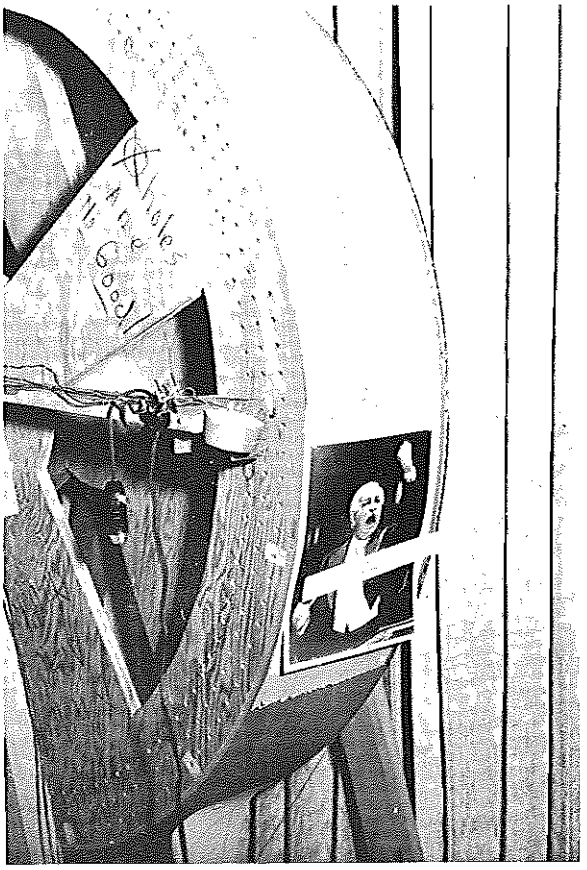


Figure 5b

In Texas, Brownwood Cable Television Service, Inc. has been experimenting with putting weather forecasts and related information on the cable system.

CATV IN ARKANSAS

At the end of 1967 there were 36 CATV systems in operation in Arkansas. Nine of them were operating weather scanners. In addition, 12 other cities had received CATV franchises but the systems were not yet operational. Table II provides further detail on CATV service in Arkansas.

The majority of weather scanners in operation in Arkansas are of the type shown in Figures 3 and 4. These units are compact and need little attention. A small TV camera scans four to six flood-lighted indicator dials and a clock. On one model the camera oscillates over about a 30 degree arc to scan the dials. On another the camera is mounted stationary and a mirror oscillates to reflect the image into the camera lens.

Two Arkansas CATV outlets have made a special effort to display weather information. However, both have virtually discontinued the practice and their experiences are characteristic of both the advantages and complications involved.

The CATV installation at Russellville, Arkansas was made in 1964 and operates in the same building with Radio Station KXRJ, an ESSA Weather Wire subscriber. Arkansas EWWS material was shared between the radio and CATV facilities and forecasts were displayed on the weather scanner.

An ambitious program of live weather shows was begun in late summer. Using the weather channel (in most cases Channel 13) a local college student was secured and a daily (6:00 P.M.) TV weather show was offered. Blackboard maps were used with the aid of Arkansas EWWS material. After about three months the program reverted to a conventional weather scanner. Obtaining sponsorship for the program proved to be difficult.

At Fayetteville, Arkansas the CATV system operates in conjunction with FM Radio Station KNWA. There, a University of Arkansas instructor built a wooden "ferris wheel" that turns at the rate of 12 inches per minute making one revolution in 15 minutes. (Figures 5a and b) News, weather announcements, and photos were attached on the periphery of the wheel. The wheel was constantly scanned by a vidicon camera. The video picture alternated between the material displayed on the wheel and the weather scanner dials. It was found necessary to retype press wire copy for the wheel display using a large-type typewriter in order to have an image of acceptable size and scale. Also, the field of view of the weather scanner cameras made it necessary to limit the width of display material to about eight inches.

TABLE II

TOWN	SUBSCRIBERS PRESENT/POTENTIAL	WEATHER SCANNER	POPULATION SERVICE AREA	MONTHLY CHARGE
Batesville	1,438/2,000		7,129	$ 4.50
Bella Vista	200/NA		NA	4.75
Bentonville	202/500		4,015	4.75
Berryville	175/NA		2,017	4.00
Camden	1,060/2,500		15,823	4.75
Cave City	33/100		540	4.75
Clarksville	391/1,000	X	3,919	5.00
Crossett	100/NA		5,370	5.00
De Queen	345/600		2,859	4.95
Dermott	97/NA		3,665	4.95
El Dorado	2,000/NA	X	25,292	5.00
Eureka Springs	110/NA		1,438	4.00
Fayetteville(Greenland)	6,591/7,500	X	20,401	4.00
Fort Smith	4,325/9,000	X	66,000	4.45
Green Forest	90/NA			
Guion	34/NA		222	NA
Harrison	1,800/2,000		7,015	4.00
Hoxie	350/700	X	5,433	4.95
Huntsville	NA/NA		1,050	NA
Jasper	80/120		273	4.00
Lake Village	97/375		2,963	4.95
Magnolia	350/1,800	X	10,651	5.00
McGehee	632/800		4,448	4.95
Mena	975/1,200		4,200	4.25
Mountain Home	700/1,000		2,105	4.95
Murfreesboro	100/175		1,096	4.95
Newport	1,382/2,000		7,450	4.95
Ozark	225/400		1,965	4.85
Paragould	404/2,500	X	10,731	4.95
Pocahontas	288/500		4,391	4.95
Prescott	235/NA		3,533	NA
Rogers	1,320/1,750		5,700	4.95
Russellville	334/1,500	X	10,252	5.00
Siloam Springs	534/1,200		3,953	3.20
Springdale	1,800/3,000		11,895	4.75
Van Buren	580/900		8,000	4.90
	30,377/45,120		265,794	

Franchises granted but systems not in operation: Blytheville, Booneville, Conway, Forrest City, Helena, Hope, Hot Springs, Jonesboro, Little Rock, Marianna, Nashville, and Paris

TABLE III

ADAPTABILITY OF TYPICAL WEATHER INFORMATION TO CATV PRESENTATION

Information	Source	Presentation	Needs
Current Local Readings	Local Sensors	Dial Display	Commercial equipment at CATV Studio or antenna site. Should show sensor location identification
Hourly Weather (Local & area)	EWWS (Hrly + Roundups)	Alpha/Numeric	Requires re-typing from present EWWS copy
Local/Zone Fcst	EWWS (Zones)	Alpha/Numeric	Requires re-typing from present EWWS copy
Area or Regional Forecast	EWWS	Alpha/Numeric or Graphic	Requires re-typing from present EWWS copy or, for graphics, meteorological technician skills
Severe Weather WATCH	EWWS (WW)	Graphic	Reasonable plotting skill required
Severe Weather WARNING	EWWS	Alpha/Numeric or Graphic	Requires re-typing from present EWWS copy, or for graphic, minimum plotting skill and copy familiarity
Hurricane ADVISORY OR BULLETIN	EWWS	Graphic	Requires reasonable plotting skill and minimum meteorological technician knowledge. Will not tell whole story but very effective for indicating affected areas.
Radar Weather	EWWS or Radar Repeater	Graphic	EWWS. Requires minimum meteorological technician skills for adequate interpretation.
Ag. & Recreational Forecasts	EWWS	Alpha/Numeric	Requires re-typing from present EWWS copy; could be supplemental panel following basic forecast display.
River Stages & Forecasts	EWWS	Tabular or map form	Re-type from EWWS copy, or simple map with data indicated at gaging points.
Tide Data (Astro.tides)	EWWS	Tabular	None

KNWA, Fayetteville, found the work involved took a large share of one stenographer's time and that some journalistic ability and judgment were needed.

An Arkansas manufacturer of CATV equipment has been experimenting with combining the audio of the low frequency continuous aviation broadcasts with the video of the weather scanner display.

EXPANDED WEATHER COVERAGE ON CATV

Certain types of weather information -- for example, Severe Weather "boxes", temperature and rainfall maps, large-scale weather features and radar data -- are better adapted to graphic representation on TV than the written or spoken word. Other types of information, such as local forecasts or local climatological data usually are better adapted to alpha-numeric form. Thus, any full scale weather service designed to serve CATV should accomodate both methods.

A well rounded service providing users with sufficient information for decision making might divide out as shown in Table III.

If the weather service is to be anything beyond a display of readings from local sensors, CATV staff support is required. Stenographic skills would make possible continuous coverage on hourly weather, local, zone, and large-area forecasts, agricultural, recreational, or other special forecasts, as well as hydrological and tide information, without significant risk of losing the meaning expressed in the product as originated by the Weather Bureau. Severe Weather WATCHES, Hurricane ADVISORIES, and radar data can not be handled effectively without increasing the skills to include careful plotting and meteorological interpretations such as we might expect of a meteorological technician.

The geographic coverage of a severe weather WATCH could be shown very effectively with a simple "box" plot and notation of valid times, requiring no more than reasonable skill in plotting a simple geometric figure. However, to graphically show the extent of coastal storm or hurricane warnings, and the coverage expected by gale force or hurricane force winds, would become more complex and would require some interpretive skill. Yet, such a presentation would add something which is difficult to convey in the written advisory; that is, areal extent of dangerous winds, and would accomplish a desirable de-emphasis on eye locations. Of course, EWWS would be a necessary facility to achieve comprehensive coverage.

A balanced weather information service supplied on a separate CATV channel could be of sufficient scope to attract large numbers of CATV subscribers for answers to their general interest or specific needs for weather information. On the other hand, its effectiveness in alerting the public to the existence of a severe weather WATCH or WARNING could be expected to be quite low - - they would need to be

motivated to switch to the weather channel. Most likely this motivation would come first through the normal radio or TV news channels or perhaps in some cases caused by threatening appearance of local weather conditions. In any event, the likelihood of substantial numbers of CATV-equipped homes first becoming quickly aware of a severe weather WATCH or WARNING issuance through a separate CATV weather channel would be very low.

In the case of Hurricane BULLETINS the gradual peaking of public interest as the storm approaches and the greater time tolerance would allow for a very effective service via CATV.

A full service of the nature discussed in the foregoing would require substantial financial support. At a minimum it would require a connection to EWWS and a trained staff. When one considers that the FCC census showed the average CATV system served only about 1200 subscribers the prospects of developing such a service appear dim. But, the picture is not so bleak. On the high end of the scale we find companies with large numbers of subscribers. For example, a company in Cumberland, Maryland with 16,663 subscribers; another in El Cajon, California with more than 19,000 subscribers.

There has been a strong trend toward CATV system consolidations. The FCC census showed that 28% of the CATV systems were owned wholly or in part by parties having financial interests in broadcasting. Also, mergers of smaller companies are taking place. This suggests that with the growth of CATV an increasing number of companies will have a market area sufficiently large to support a sponsored weather service on a separate CATV channel.

Also, CATV is presently operating in a number of large cities where the Weather Bureau has offices and where there is at least one local commercial TV station. Examples are: Huntsville, Ala., Fort Smith, Ark., Tallahassee, Florida; Lake Charles, La. At such locations, staffing permitting, and with a sufficiently large audience to justify the effort, copy prepared at the Weather Bureau could be placed before a scanner system and made available equally to all interested parties.

CONCLUSIONS

1. The greatest potential for CATV for dissemination of public weather information lies in the fact that a separate "all weather" channel would be available full time for any CATV service subscriber to turn to when he has interest in or need for weather information. Likely the public would accept a complete CATV weather service as a primary source of progress information on severe weather conditions.

2. With the exception of a few densely populated areas, CATV is not yet sufficiently developed in terms of numbers of subscribers and economic market areas to support the cost of providing a full weather service on a separate CATV channel.

3. CATV does possess the technical features to provide a weather service of sufficient scope to meet the weather information needs and interests of the great majority of subscribers except for the ability to positively alert a CATV subscriber to the issuance of a severe weather WATCH or WARNING. No doubt it is possible to engineer in this capability but the economic feasibility is undetermined at this time.

4. The growth and development of the CATV industry should be monitored closely to take advantage of all reasonable opportunities to work with the industry and equipment manufacturers to foster full-time weather channels on CATV.