



**Western Region Technical Attachment
No. 91-11
March 19, 1991**

METEOROLOGICAL ALERT DISTRIBUTION SYSTEM (MADS)

Weather Service Nuclear Support Office

Introduction

The Weather Service Nuclear Support Office (WSNSO) in Las Vegas, Nevada conducts a broad meteorological program in support of the Department of Energy, Nevada Operations Office (DOE/NV) Nevada Test Site (NTS) activities. WSNSO services include furnishing meteorological observations, detailed forecasts, and watch/warning coverage for the NTS.

The Meteorological Alert Distribution System (MADS) was designed to permit the DOE/NV community multiple access options to WSNSO meteorological information through a variety of commonly available communications devices. MADS may be accessed five ways: touchtone telephone to digitized voice, cable television through a communications industry-standard character generator (ERNI), computer terminal with a telephone modem, facsimile machine hard copy, and personal telephone digital pager.

MADS provides a low cost, high quality dissemination capability to the NTS community for the WSNSO duty forecasters. Rapid delivery of short-fused WSNSO watch/warning products is reliably and efficiently achieved by MADS. Utilization of MADS frees duty forecasters from time-consuming, mechanical dissemination methods to permit forecasters to focus on crucial weather analysis and forecast duties during severe weather episodes. Additionally, MADS expands the diversity of weather information disseminated and permits a wider access to routine WSNSO weather products for the NTS community of users. The MADS microcomputer also functions as a secure gateway to the larger WSNSO AOS minicomputer network.

MADS Configuration

A 80386 Dell 310 microcomputer running the QNX operating system serves a dedicated host machine for MADS. The QNX operating system offers a streamlined multitasking/multiuser capability. QNX is a proprietary subset of the more familiar UNIX operating system. The 20 MHz Dell 310 is configured with four megabytes of RAM and a 90 megabyte hard disk with an ESDI controller. Additional enhancements include an intelligent RS-232 Microport adapter, two digital audio/telco voice boards, and a 9600 baud facsimile board. The MADS customized software was developed for WSNSO in the C programming language and QCL by John Friederich of Reynolds Engineering and Electronics Company (REECO).

MADS Processing Overview

Pre-selected AFOS alphanumeric files received from SMCC or generated by the WSNSO AFOS are transmitted asynchronously to WSNSO Data General MV-4000 minicomputers. The AOS MV-4000 minicomputers queue a batch process that delivers the original AFOS or AOS generated files to the MADS microcomputer. A MADS background task identifies, sorts, and stores the data files on the MADS hard disk.

The weather product data files are then immediately available for transmission, selected voice generation, to dial-in users, and on the NTS cable television channel. Weather products, such as lightning advisories, watches, and warnings, vital to the safety of NTS operations, are transmitted to facsimile machines, pagers, and computers located across the NTS and Las Vegas DOE/NV facilities. All MADS file transfers and calls are logged and stored on hard disk.

MADS User Services

The NTS user community may obtain MADS weather information by five different methods. The first, and quantitatively most common MADS access method, is the digital voice recording available on touchtone telephone. Weather information of general NTS interest such as the NTS, Las Vegas, and 3-5 day forecast, are made available for voice access via touchtone telephone. When a "flagged" voice recording file is received by MADS, both an audio and visual cue alerts WSNSO duty personnel that a voice recording update is required. The digital voice file is updated by reading the contents from the MADS monitor into a microphone connected to one of the voice boards in the MADS microcomputer. The analog voice is then digitized and stored to hard disk.

An individual user dialing the voice system is greeted with a brief introduction listing the menu selections and directed to press a touchtone keypad number corresponding to the desired weather product. There are currently two incoming voice recording telephone lines, expandable to six, on a rollover circuit. When the listed telephone number is busy, the rollover circuit automatically routes subsequent calls to the alternative circuit. The times and circuit number of all telephone calls are logged and stored to hard disk to appraise system utilization.

All NTS watch/warnings, advisories, and special weather statements take first priority in the voice queue and are automatically presented to the caller before the MADS menu. Strictly formatted alphanumeric products, such as surface observations and daily extreme temperature summaries, are automatically updated by MADS using full-text concatenation directly to digital voice generation. The direct text to digital voice eliminates the need for voice recording by WSNSO personnel and ensures timely temperature updates every fifteen minutes for the NTS.

The second MADS access method employs the existing NTS cable television distribution system. Pre-selected weather products are transmitted for distribution to a character generator located at the Mercury REEC Co communications facility. Any NTS television set has ready access to forecasts, watches/warnings, observations, and other weather-related messages.

Selected fifteen minute, automatic NTS weather station observations of temperature and wind velocity are displayed as one line "crawler" information along the bottom of the display screen. Weather watches/warnings and forecasts roll in "round-robin" fashion across the remainder of the screen.

The third method involves modem calls from either a terminal or microcomputer by select callers with valid MADS password access. Once logged onto the MADS bulletin board, the user can download pertinent meteorological information to support their particular NTS operation. In turn, certain privileged callers can upload weather data sets to WSNSO that are unavailable through conventional NWS circuits. Two voice grade lines for modem access are currently utilized on a rollover system. The current MADS configuration can be expanded to support a total of six lines without any hardware upgrades.

The MADS facsimile board, the fourth MADS access method, has proven to be an ideal means of rapidly distributing weather products to NTS operational facilities equipped with either a facsimile machine or another microcomputer with a facsimile board. The total transaction time from dial, transmission, to event log takes less than 30 seconds. The current MADS configuration includes only one facsimile board. However, the QNX multitasking capability could easily support several facsimile boards.

The final method of MADS weather product dissemination is telephone pager notification to NTS personnel for all WSNSO watches/warnings. Whenever a WSNSO watch, warning, or special statement is issued for the NTS, MADS transmits an abbreviated text notification to several hundred NTS digital pager users. The 80-character message states the type of alert issued and directs the digital pager user to call the MADS voice board number for further information.

Conclusion

The WSNSO MADS was conceived and implemented as a flexible "front-end" communications device to relieve WSNSO personnel of labor-intensive watch/warning distribution, accelerate weather product dissemination, and serve a broader NTS user community. Presently, WSNSO personnel manually record certain products available to touchtone telephone users. Future enhancements include an ASCII text-to-digital voice module for all weather products, making MADS fully automatic.

MADS can readily be reconfigured for use in a WSFO or WSO environment to perform telephone weather information dissemination or to support the NOAA Weather Radio. Watch/warning products that require immediate transmission to multiple addresses could be delivered by facsimile or dial-out modem. NWS NAWAS messages would only have to be recorded once, and facsimile hard copy provided emergency service agencies.

The demand for more specific, high quality NWS products will likely increase through the NWS MAR transition era. A low-cost, flexible dissemination mechanism, such as MADS, can reduce or prevent "communications-overload" on NWS field personnel when they can least afford it.

MADS System Drawing

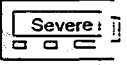
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 R.F. - - - - -

NTS
Automated
Weather
Stations

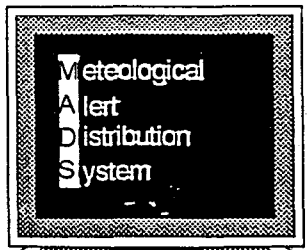
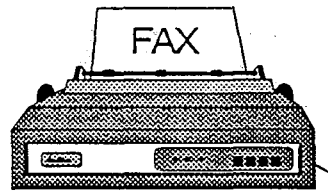
AOS
WSNSO

AFOS
WSNSO

NTS/MNO
Digital Pagers



Input to MADS



NTS

Cable TV

Cable TV

ASCII to NTSC Character Generator

