3.2 UPDATE ON THE IMPLEMENTATION OF THE NATIONAL WEATHER SERVICE'S RADIOSONDE REPLACEMENT SYSTEM

Joseph Facundo*
National Weather Service/Office of Systems Operations
Silver Spring, Maryland

1. INTRODUCTION

The National Weather Service (NWS) is developing the Radiosonde Replacement System (RRS) to replace its antiquated Microcomputer Automatic Radiotheodolite (MicroART) system, which has been in operation since the late 1980s. The RRS is comprised of a new Global Positioning System (GPS) tracking antenna referred to as the telemetry receiving system or TRS, 1680 MHz GPS radiosondes and Signal Processing System (SPS), and a new NT-based workstation. In addition to the deployment of the RRS, a new surface weather observing system called the Radiosonde Surface Observing Instrumentation System (RSOIS), and precision digital barometers will be deployed at most of the approximately 85 locations from the Caribbean to Guam and from Alaska to Pago Pago, American Samoa in the Southern Hemisphere.

The strategy for deploying RRS to individual NWS upper air sites and commissioning these systems will be discussed in this paper.

2. CURRENT NWS NETWORK

Figure 1 delineates the types of systems in use today including the MicroART system (variants of the Automatic Radiotheodolite for the Ground Meteorological Device or GMD, and the Weather Bureau Radiotheodolite or WBRT), and the W9000® system purchased from Sippican® which can operate with either GPS or LORAN radiosondes.

Figure 2 lists the types of radiosondes flown in the NWS network including the Sippican B2®, MARK II® variety, and the Vaisala RS 80®. These radiosondes will be phased out of the NWS upper air network with the introduction of the new GPS radiosondes. Two radiosonde vendors, Sippican and Intermet®, have developed radiosondes of this new design.

3. RRS SYSTEM TRANSITION

The RRS will be deployed in a phased approach starting with first article production units and followed by full production to the remaining 91 locations. NWS will be conducting an Operational Acceptance Test (OAT) at selected sites with the first article units. The purpose of OAT will be to validate system installation, evaluate system performance, and determine if any critical problems exist before full deployment commences.

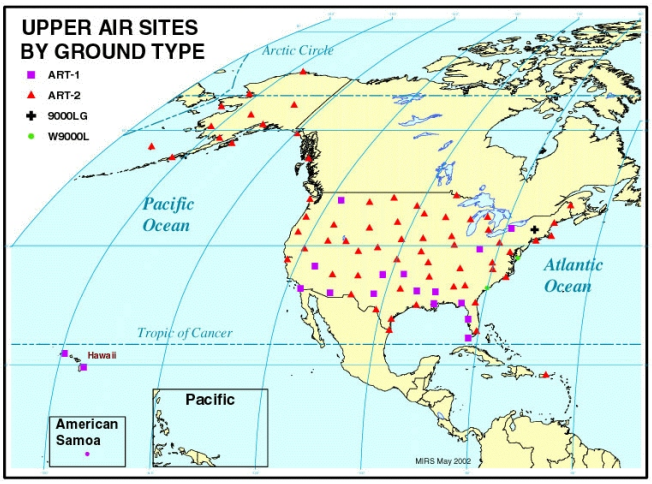

Figure 1. Types of Upper Air Systems in use at NWS Locations

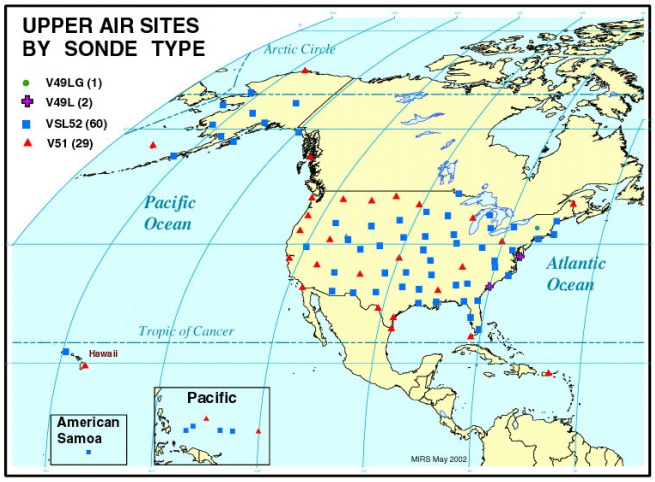

Figure 2. Types of Radiosondes used at NWS Locations

For each site, a sequence of events (as illustrated in Figure 3) will transpire leading to the commissioning of the system. The first step in the process is the delivery of the RRS workstation, along with software, and training materials, approximately 60-90 days ahead of the delivery of the ground system. This package, when set up and activated, will serve as the training computer for the field staff. Later, another package will arrive with the GPS base station, repeater equipment, and radiosondes.

Before the equipment arrives, a series of activities needs to be completed. These include training of the electronics staff at the NWS Training Center, completing a facilities checklist to verify that the facility

*Corresponding author address: Joseph Facundo, National Weather Service 1325 East-West Highway, Room 4348, Silver Spring, MD 20910; e-mail: joseph.facundo@noaa.gov.

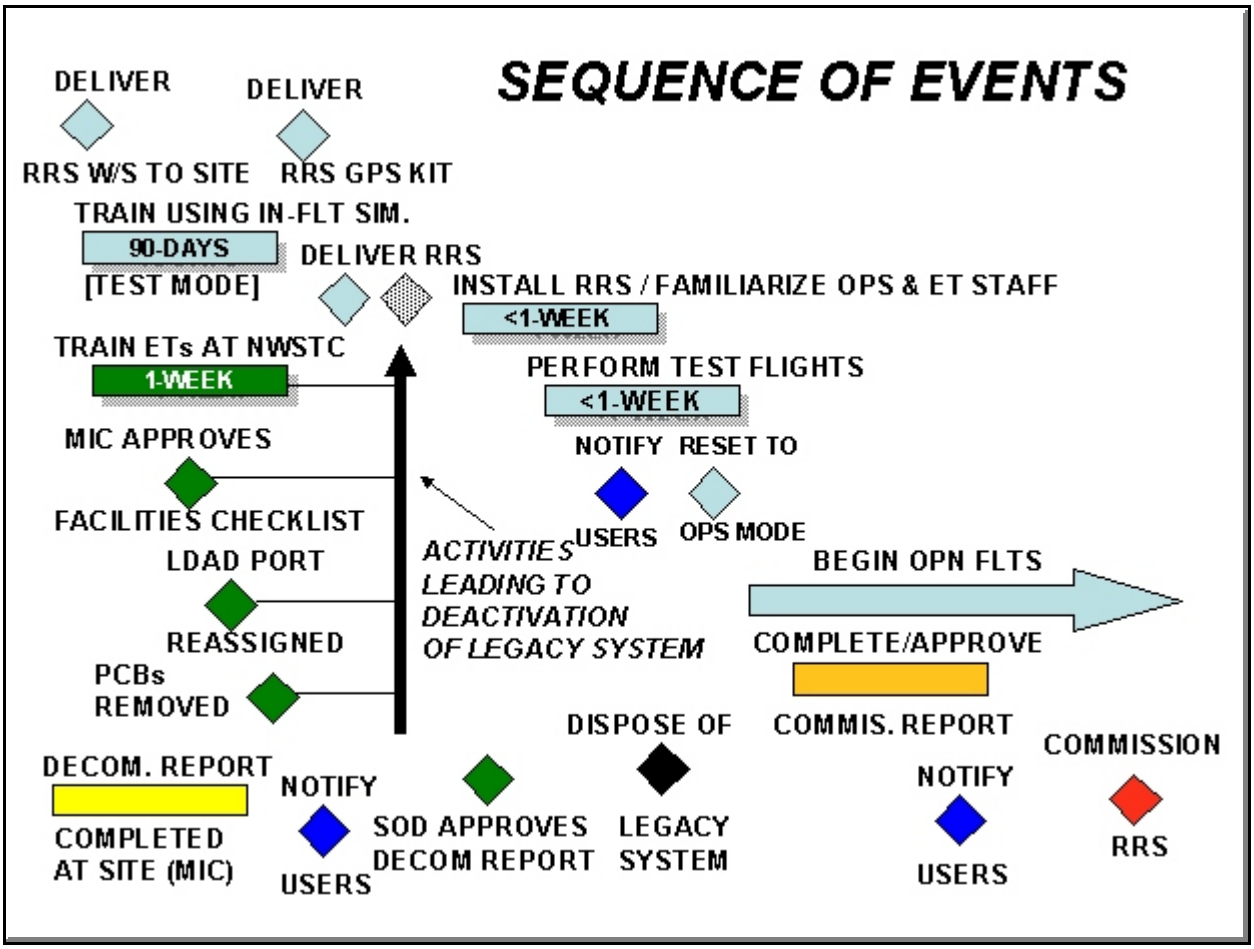

Figure 3. Sequence of Events for Transitioning to RRS Operations

is ready for the new system, and reconfiguring the Local Data Acquisition and Dissemination (LDAD) portion of the Advanced Weather Interactive Processing System (AWIPS) for handling the new RRS telecommunications protocol.

Other activities occurring in this same time frame are the deactivation and decommissioning of the legacy system at the field site. (Refer to Section 2 of this paper.) These activities must be conducted in preparation for installation and checkout prior to the RRS ground system arrival. A message will be issued over NWS telecommunications notifying NWS customers of the legacy system deactivation.

4. RRS INSTALLATION AND CHECKOUT

The delivery of the ground system will be handled by Intermet Systems of Grand Rapids, Michigan. A number of activities will take place at this time, including the installation of the TRS on top of the inflation building or other structure, stringing of cables to the field office and connecting them to the RRS workstation along with RSOIS. Note, the RSOIS and GPS repeaters inside the office environment will have already been installed at all locations before the start of this activity. Delivery of the new GPS radiosondes will also occur about this time.

After system installation, which should only take a few days, the field staff will become familiar with the RRS, while the deployment team is testing the system. A series of non-synoptic test flights will be conducted and the telecommunications checked for verifying the throughput of upper air products to NWS offices and customers. This activity should conclude in less than a week. After testing is completed, the station is authorized to begin use of the RRS for synoptic observations. A message will be issued over NWS telecommunications notifying NWS customers of the RRS activation.

In Alaska, the deployment of RRS will be predicated on the time of year, since winter is too severe for outdoor work. During the non-winter months, RRS will be deployed and continue until all sites shown in Figure 1 are completed.

For the Pacific sites shown in Figure 4, the greatest difficulty is the vast size of this region and the effort required to reach many of the sites.

5. COMMISSIONING PLANS

The commissioning process for RRS will commence with the first upper air synoptic observation. The plan is to have the station follow the commissioning

criteria established under NWS policy (refer to Section 7) and to commission systems about 30-45 days after installation. An RRS is commissioned when all the criteria have been evaluated satisfactorily. A message will be issued over NWS telecommunications notifying NWS customers of the system commissioning.

6. CONCLUSION

The planning effort delineated in this paper is meant to educate the reader about the general NWS plans for deploying and commissioning the RRS. The commissioning process is used extensively within the agency to better prepare field units for the implementation of RRS in field operations and allow for a smoother transition by addressing operational issues and impacts ahead of time. When implemented properly, the commissioning process has been very successful in deploying other technologies used by the NWS in meeting these goals.

7. REFERENCES

U.S. Department of Commerce, NOAA: NWS National Directives System, NDS 80-2, Systems Commissioning and Decommissioning Policy.

National Weather Service, RRS Deployment Plan, V9.4, June 2003.

8. ACKNOWLEDGMENTS

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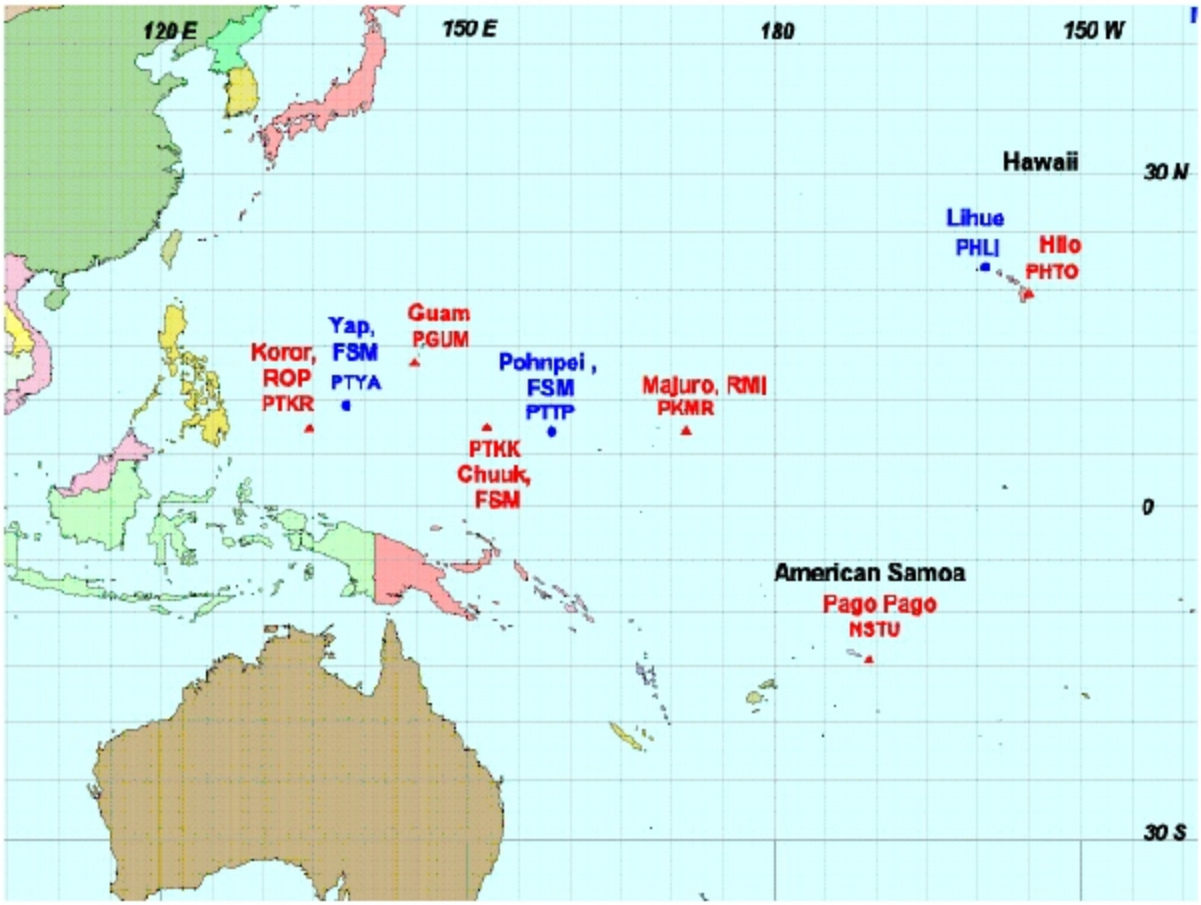

Figure 3. Pacific upper air locations. Sites in red are designated as part of the Global Upper Air Network.