U.S. ARMY TEST AND EVALUATION COMMAND
WHITE SANDS TEST CENTER

A Brief History of the Range Commanders Council Meteorology Group

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Outline

- What is the Range Commanders Council Meteorology Group?
- Focus of the RCC-MG over its history
- Recent areas of interest in the RCC-MG
- Tidbits from the RCC-MG minutes

Range Commanders Council (RCC)

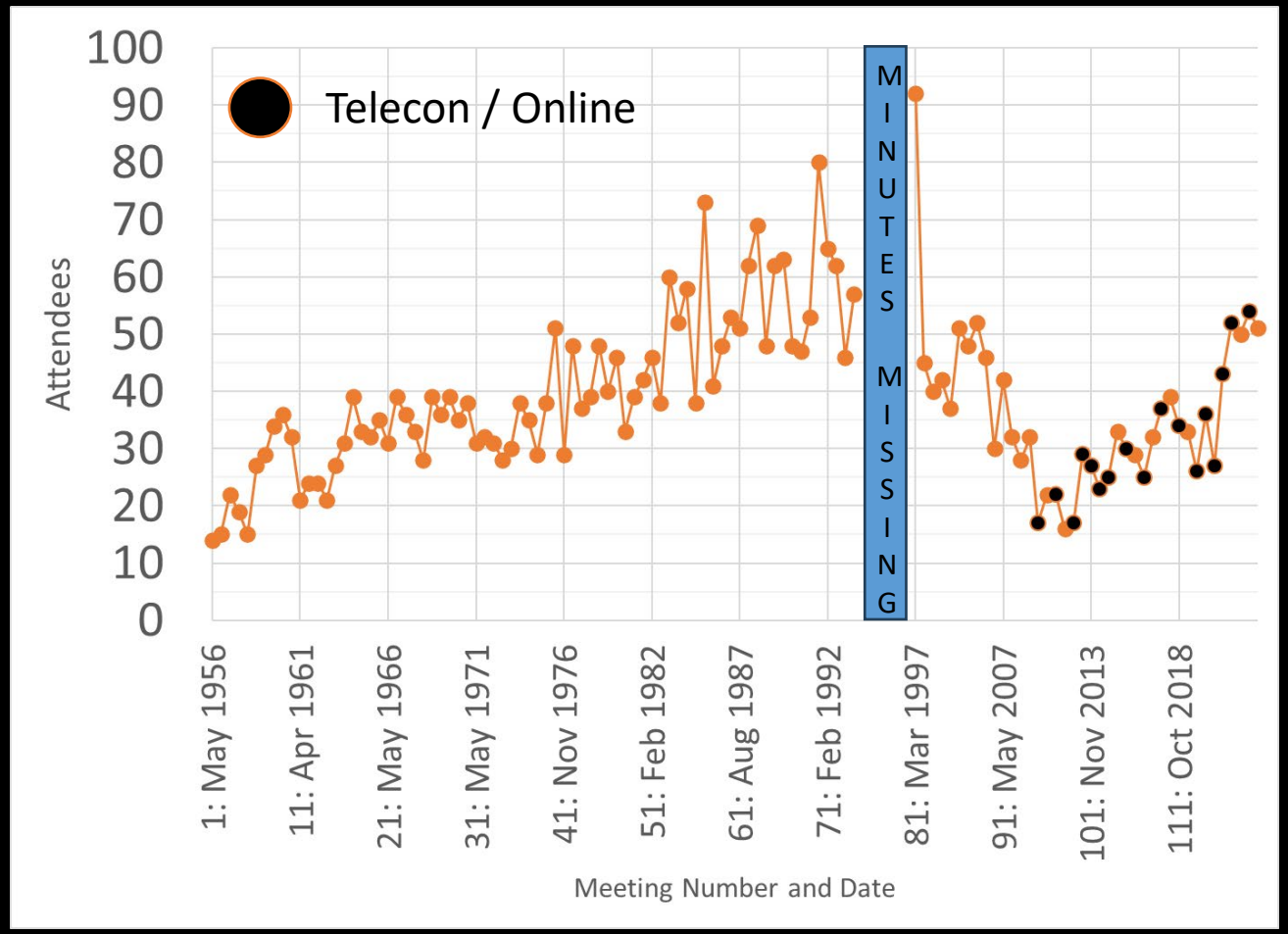
- Consortium of 19 United States military and NASA test, training, and operational ranges
- Serves the ranges through the identification of common needs, establishment of technical standards, and assessment of advanced concepts and technical innovations for potential future application
- Formed in 1951
- 12 standing groups (as of January 2024)

RCC Meteorology Group (RCC-MG)

- The RCC-MG seeks to improve the capability of range meteorological agencies to define the effects of environmental parameters on marine, missile, and aerospace systems, and works to better the instrumentation and techniques used to measure and predict these effects.
- First meeting held 22-24 May 1956 at China Lake, CA
  - Six member ranges and six associate members
  - Agenda included discussion on range meteorological services, future needs, suggested improvements, and research projects as well as a range facilities tour
  - Recommendation: “Weather groups on these ranges are supporting tests involving a tremendous amount of money and should have the green light to obtain the best equipment and expendables available to give the best service.”

RCC-MG Membership over the Years

RCC-MG Meeting Attendance



Date	Member Organizations	Associate Member Organizations
May 1956	6	6
May 1966	9	21
Apr 1976	9	19
Feb 1986	15	20
Mar 1997	14	16
Apr 2006	19	Unknown
Oct 2018	16	4
May 2023	16	4

Historical Focus of the RCC-MG

- Upper air measurements
- Development and assessment of instrumentation
- Range support capabilities

Meteorological Rockets (Rocketsondes)

- First mentioned in MG-2 (Nov 1956) to get data to 150,000 ft
- Formal MG committee Oct 1959-Apr 1968
- MG-20 Nov 1965: “One of the quickest and most frequently repeated criticisms is that the data are not being used but are being filed away in some moldy archives.”
- MG-69 Feb 1991: “Workload is such now that the rocketsonde expertise is rapidly deteriorating and once gone could be very difficult or nearly impossible to reinstate.”
- Sep 1998: NASA deleted rocketsonde requirement for Space Shuttle support
- Last rocketsonde in Eastern Range Feb 2002 and Kwajalein Apr 2006

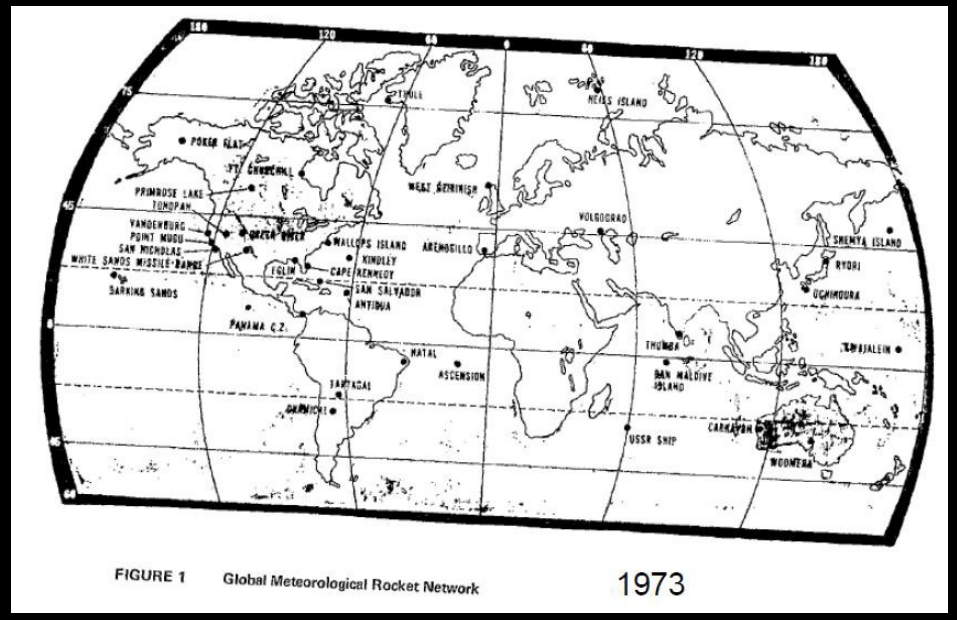
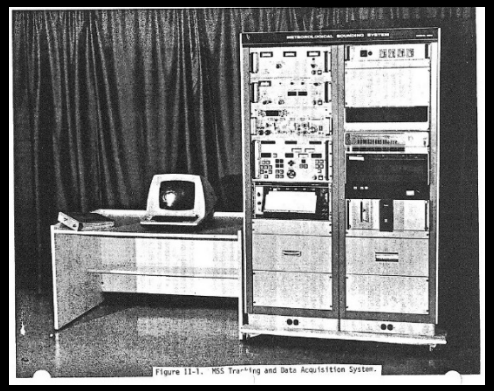


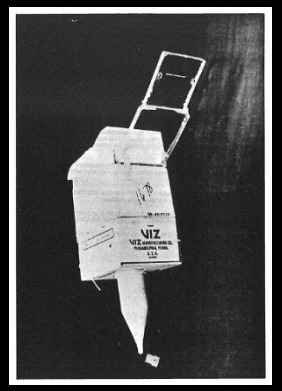
FIGURE 1 Global Meteorological Rocket Network 1973

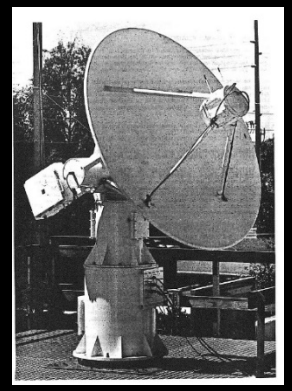
Photo: NASA

Involvement in Upper Air Measurements

- 1970s-2000s: Range Meteorological Sounding System (RMSS)
  - Advanced tracking device designed to measure atmospheric parameters to a high degree of accuracy to meet high priority major range and test facility requirements.[1]
  - Track and acquire data from meteorological radiosondes, rocketsondes, windsondes, meteorological satellites, and remotely piloted vehicles.[2]







- 1991: RCC-MG involved in first feasibility studies for using GPS in radiosondes

[1]*Kennedy, B.W., A. Kinghorn, and B.R. Hixon, 1979: Engineering Flight Tests of Range Meteorological Sounding System Radiosonde. US Army Electronics Research and Development Command Atmospheric Sciences Laboratory Document ASL-TR-0022. Available at https://apps.dtic.mil/sti/pdfs/ADA067430.pdf*

[2]*Range Commanders Council Meteorology Group, 1984: Meteorological Sounding System (MSS) Standard Operating Procedures. RCC Document 355-84.*

MG Interest in UAS Applications

- MG-18 Nov 1964: Studies being conducted using a model airplane to carry a modified radiosonde to measure temperature at low levels. Plane would fly into exhaust cloud of a Static Booster Test Firing to determine the exhaust gases or cloud temperature.
- 2016-2020: UAS MET Applications committee in place

PROPOSED TASK

METEOROLOGY GROUP

1. TITLE: Remotely Piloted Vehicle (RPV) for Meteorological Measurements

2. SCOPE AND SPECIFIC OBJECTIVES:

a. With the advent of ultralight airframes and microminiature data retrieval and guidance systems, a new Range support capability is available for making meteorological measurements. This task would convert an appropriately selected lightweight airframe to an RPV configuration for use as a platform in making meteorological measurements.

b. Standard off-the-shelf components are available and will be used to keep developmental efforts at a minimum.

c. The RPV platform will be capable of carrying modularized sensor packages that can easily be changed out for a variety of missions.

d. Emphasis will be on satisfying those requirements that have a commonality among participating ranges.

e. A technical assessment and four-phase test program is proposed (see milestones).

3. UTILITY OF THE END PRODUCT:

a. The RPV Program will provide a standard platform for use on National Ranges that will solve many spatiotemporal problems currently existing in making meteorological measurements. The vehicle can be remotely controlled into the area of interest, gather required meteorological data at the time needed, and either record or telemeter the data back to the ground station.

b. The RPV has potential application in optics, surveillance, radar calibrations, and safety areas.

Recent RCC-MG Focus Areas

- Wet bulb globe temperature (WBGT)
- Upper air measurements
  - Increasing use of surface-based remote sensing (radar wind profilers and LIDARs)
  - Increased interest in measurements at heights above current balloon capabilities
    - High-powered LIDAR? Return of the rocketsonde?
- Evaluation of meteorological sensors, software, and systems
- Submission of 100 terms from rescinded RCC Glossary to AMS for consideration for its glossary

First RCC-MG Task

MG-02 Nov 1956:

- “Investigate and report on the feasible and economical methods of instrumenting the first 5,000 feet of missile trajectory with regard to weather forcing functions, including surface winds.”
- Unanimously agreed that task assignment as stated was extremely ambitious
- Steering Committee did not contact any MG members prior to the task assignment

A Different Time…

- MG-3 Apr 1957**:** Field trip over White Sands Proving Ground in a C-47 aircraft
- MG-5 Apr 1958 (at Salton Sea): “Excellent quarters were available at the Test Base. Almost all of the comforts of home were provided, with most attention going to the swimming pool, billiard tables, shuffleboard, etc. All participants took advantage of the comparative isolation of the Base to enjoy a very relaxing visit.”
- MG-37 Apr 1974: “In the meeting wrap-up, the Chairman expressed the thanks of the MG Members, Associates, and Guests to Mr. Titus for the splendid job he had done of acting as host of the 37th meeting. It was noted that at each meeting more of the wives are coming along, the present contingent of 14 being the largest so far. It was hoped that this meant that MG activities of the members and associates are finally becoming accepted at home.” (Charlotte, NC area)

Relationships with Other Organizations

- MG-14 Nov 1962: Information news type item to AMS for publication in the Bulletin of the AMS following each meeting
- Very close connections with the US Weather Bureau (later NOAA / National Weather Service) through the 1980s
- Current associate member organizations
  - Air Force Life Cycle Management Center (AFLCMC)
  - National Center for Atmospheric Research (NCAR)
  - Federal Aviation Administration (FAA)
  - National Weather Service Sterling Field Support Center (NWS SFSC)

Thanks for your attention!

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