JACOBS
ESSSA Group

Meteorological Support Interface Control Working Group Instrumentation, Data Format, and Networks Report

James Brenton

Jacobs ESSSA / MSFC Natural Environments

29 March 2017

Presentation to NE DOLWG, Contact: james.c.brenton@nasa.gov

Outline

- Introduction
- Instrumentation Overview
- Current and Proposed Data Formats
- Data Networks
- Summary

Introduction

- The Meteorological Support Interface Control Working Group (MSICWG) was formed to give a forum to meteorological data users from the Eastern Range (ER), Kennedy Space Center (KSC), Johnson Space Center (JSC), and Marshall Space Flight Center (MSFC) in support of the Shuttle program. The MSICWG has been carried onto the SLS program.
- The MSICWG provides an opportunity for users to discuss:
  - Status of instruments
  - Meteorological data and format
  - Networks between centers
- A report detailing the current status of these points was presented to the MSICWG for review. This report will be updated periodically and includes:
  - Updates to current and new instrumentation
  - Proposed changes to data formats
  - Changes to the servers, new software suites, and other updates to network infrastructure

Brenton, James, Meteorological Support Interface Control Working Group Instrumentation, Data Format, and Networks Report, ESSSA-FY17-903

Instrumentation Overview

- Weather Information Network Display System (WINDS)
  - A major upgrade to WINDS will begin later this year, introducing new instrumentation.
- KSC Tropospheric Doppler Radar Wind Profiler (TDRWP)
  - The full certification of the TDRWP for use by SLS is underway.
- 915-MHz DRWP
  - The ER is exploring options for potential replacement boundary layer profilers.
- ER C-Band Weather Radar
- AMPS Flight Elements (LRFE, HRFE, LW)
- Jimsphere
- Four Dimensional Lightning Surveillance System (4DLSS) and Cloud to Ground Lightning System (CGLSS)
- Mesoscale Eastern Range Lightning Information Network (MERLIN)
  - MERLIN will replace 4DLSS once operationally accepted.
- Launch Pad Lightning Warning System (LPLWS) – Field Mill and Rain Gauge Network
- Geostationary Operational Environmental Satellite R Series (GOES-R)

Current Data Formats

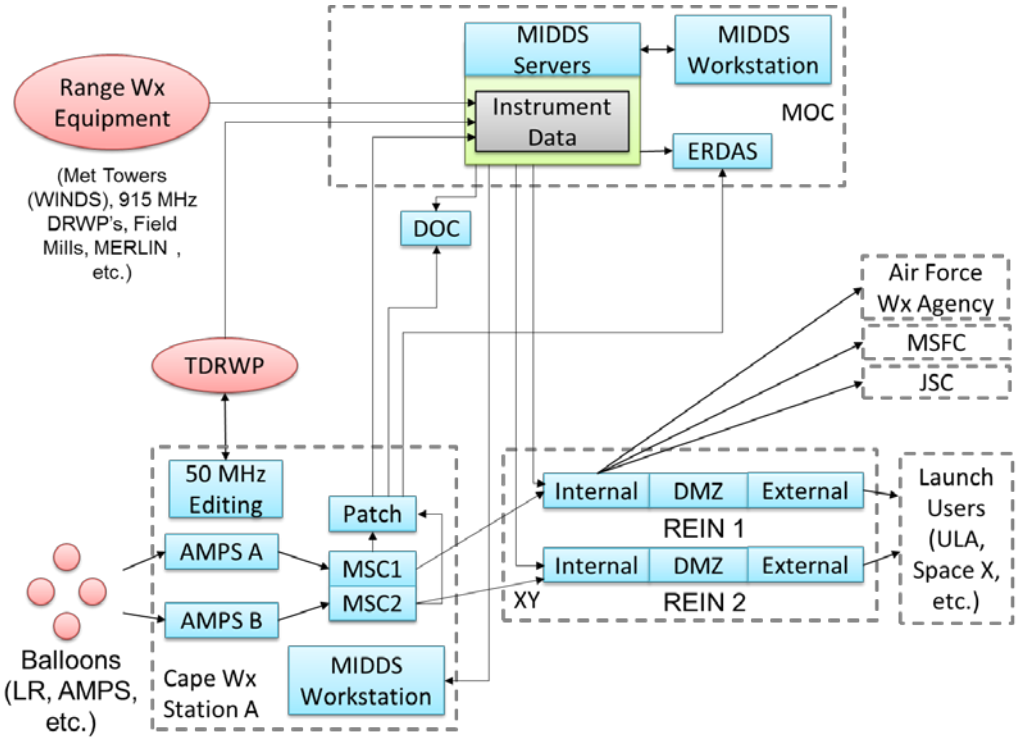
- Meteorological Data Transfer Format (MDTF):
  - Wind towers, LRFE, LW, HRFE, Jimsphere, TDRWP, 915 MHz DRWP
  - Data is available through REIN
- The previous MDTF documentation has been retired. The MSICWG report outlines the MDTF for all of the respective sources so that users can have a reference when using this format.
- 4DLSS, MERLIN, and LPLWS data is available for public use from the KSC Weather Archive.
- CGLSS data is available through REIN and the KSC Weather Archive, but is not in MDTF.
- While MDTF has been the NASA derived standard, there are several inconsistencies and limitations from source to source:
  - Some sources use a set header, while others do not,
  - Each source has a unique method of differentiating data fields (spaces, columns)
  - 915 MHz DRWP is not easily read without the help of documentation
  - Specific formats for new instrumentation does not exist
  - MDTF was developed for older technologies

Future Data Formats

- The MSICWG has proposed several replacement formats for the current data formats (WINDS Towers, TDRWP, 915 MHz DRWP, and AMPS Flight Elements). The proposed changes are a point of reference for when new instruments, software, and/or networks are installed that require changes to the data formats.
- These proposed changes include:
  - Remove 80 character line limit
  - Either white space or commas for delimiters
  - “No data” flags rather than white space
  - LPLWS Field Mills and Rain Gauge data have been requested to be disseminated through REIN with the newest WINDS upgrade.
  - Fields for data from new instruments in the WINDS Towers (diffuse solar radiation, reflected solar radiation, soil moisture, etc.)
  - Text in 915 MHz DRWP header provides description of data fields
  - LRFE data format includes rise rate, all AMPS flight elements include latitude and longitude
  - TDRWP data format includes fields for the four beam configuration
- MSICWG at this time does not have any proposed replacement formats for 4DLSS, CGLSS, MERLIN and ER C-Band Radar.

Networks: ER MIDDS and REIN

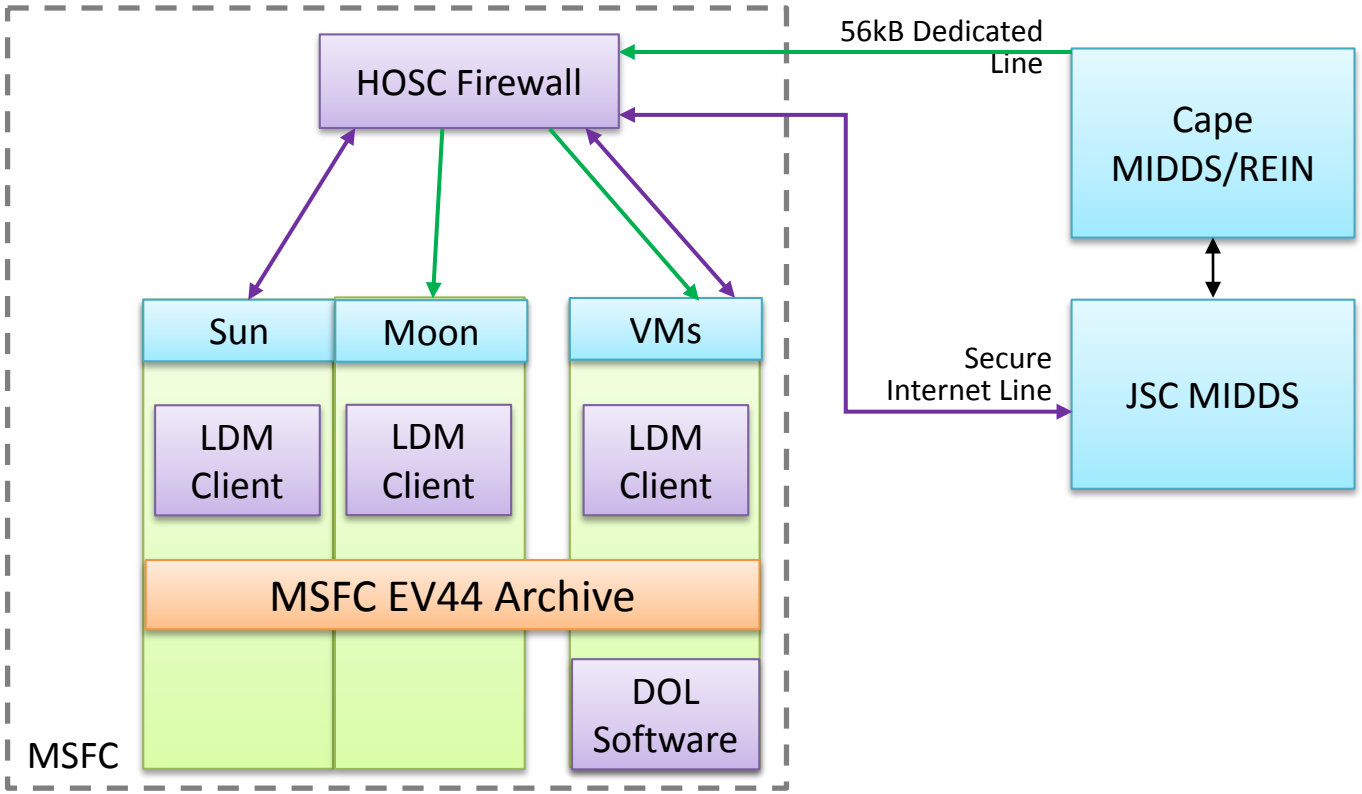
- The ER MIDDS and REIN network collects data from ER and KSC instrumentation and distribute it to KSC, JSC, MSFC, and commercial users.
- When the WINDS upgrade is completed, the LPLWS data will be included in the MIDDS and REIN network .
- The WINDS upgrade will also provide the ER with access to receive GOES-R data.



JACOBS
ESSSA Group

Networks: MSFC Natural Environments

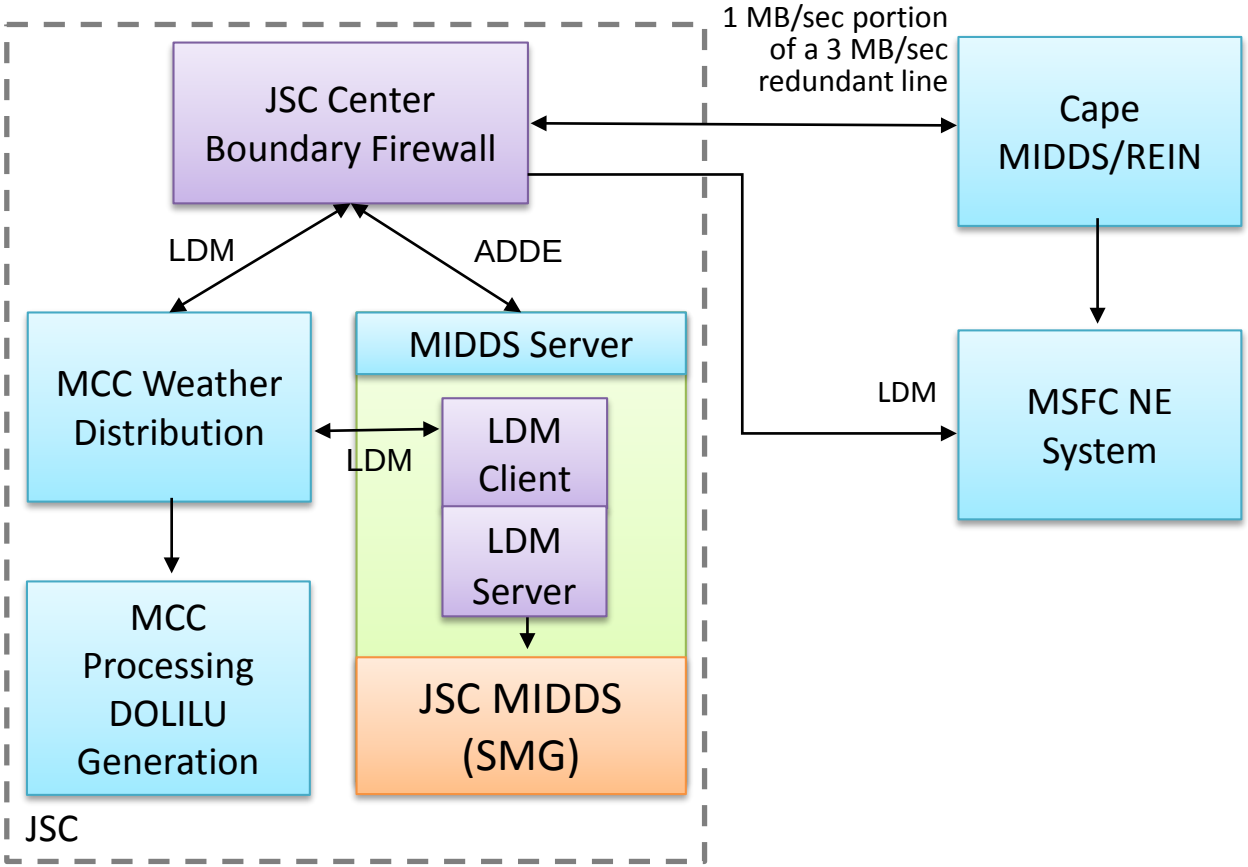
- MSFC collects data from REIN and JSC to build databases for vehicle design and day of launch support.
- MSFC will be introducing virtual machines (VM) to replace the current systems. A development and testing VM has already been created.



JACOBS ESSSA Group

Networks: JSC MIDDS

- JSC gets data from REIN and is distributed to both MCC and SMG for analysis and forecasting.



JACOBS ESSSA Group

Summary

- The MSICWG meets once a month to discuss the on-going status of these instruments, formats, and networks.
- The report will updated as needed to detail new instruments, formats, and/or network changes.
- Please contact MSFC Natural Environments for a hard copy.