TOTAL OPERATIONAL WEATHER READINESS – SATELLITES (TOWR-S) PROJECT

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Motivation & Methodology

Evaluate the operational viability of next-generation satellite data and systems in support of NWS forecast and warning missions.

User Readiness for GOES-R and JPSS is dynamic and involves several activities, including:

- **AWIPS-II development**
- **NWS Integrated Dissemination Program development**
- **NESDIS data processing and dissemination changes**
- **WFO/National Center forecaster training**

Approach: Begin with the forecaster and work backward to satellites

NWS forecast and warning mission areas are defined in the NWS Directives. A representative sample of Use Cases were extracted from 267 documents and categorized by Mission Service Areas for integration into the TOWR-S project. TOWR-S partners are located country-wide and represent a broad NWS forecaster base.

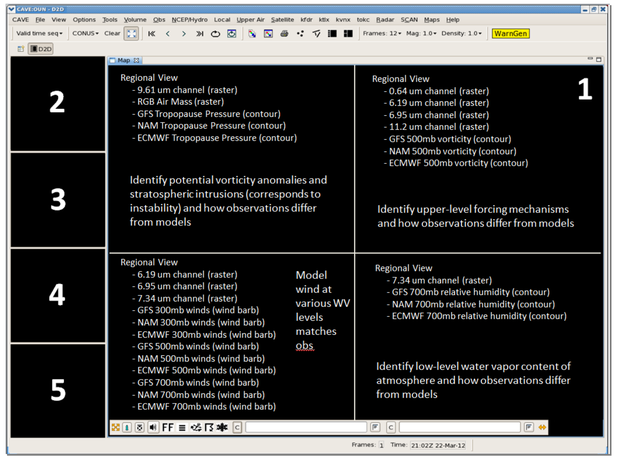
Because of organizational diversity within each mission area, the NWS Virtual Lab is TOWR-S' primary coordination tool.

Use Case	Satellite	MSA	NWS Partner
Severe Thunderstorm Warning	GOES-R	Severe Weather	WFO Charleston
Red Flag Warning	GOES-R / JPSS	Fire Weather	WFO Eureka
Hurricane Warning	GOES-R / JPSS	Hurricanes and Tropical Storms	National Hurricane Center
Volcanic Ash Advisory	GOES-R / JPSS	Aviation Weather and Volcanic Ash	Washington Volcanic Ash Advisory Center
Deterministic Hydrologic Forecast	GOES-R / JPSS	Hydrology and Water Resources	West Gulf River Forecast Center
Dust Storm Warning	GOES-R / JPSS	Severe Weather	WFO Albuquerque
High Seas Forecast	GOES-R / JPSS	Marine Weather & Coastal Events	Ocean Prediction Center
Terminal Aerodrome Forecast (TAF)	GOES-R / JPSS	Aviation Weather and Volcanic Ash	WFO Honolulu
Convective Sigmet	GOES-R	Aviation Weather and Volcanic Ash	Aviation Weather Center
Severe Thunderstorm Watch	GOES-R / JPSS	Severe Weather	Storm Prediction Center
Mesoscale Precipitation Discussion	GOES-R / JPSS	Severe Weather	Weather Prediction Center

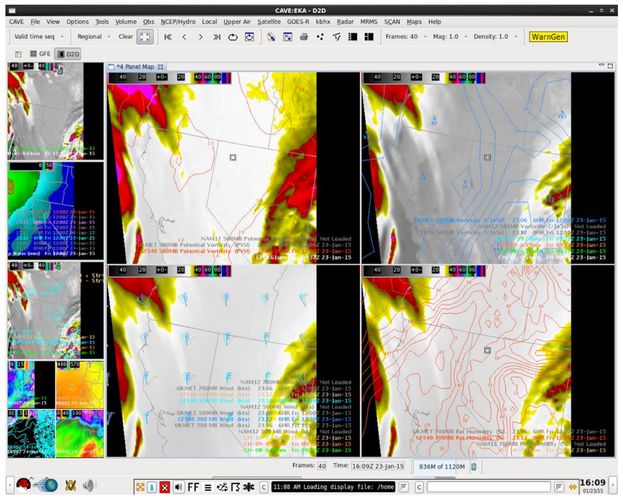
List of TOWR-S use cases

Test Development Activities

TOWR-S partners at various WFOs/RFCs and National Centers create mock AWIPS-II diagrams incorporating GOES-R and JPSS imagery and derived products, in addition to model/radar data, that will enable them to best execute their forecast and warning Use Case. TOWR-S turns these diagrams into notional AWIPS-II procedures.



Notional AWIPS-II D2-D diagram for Red Flag Warning Use Case



4-panel display of a notional AWIPS-II D2-D procedure containing RaFTR-generated GOES-R data

The Resample and Format: Timed Release (RaFTR) GOES-R simulator software was created to send simulated GOES-R NetCDF files to AWIPS-II. 16 bands of imagery are created by the University of Wisconsin using the WRF model over CONUS and the GFS model elsewhere. RaFTR formats the data to be compliant with the GOES-R Ground Segment to AWIPS ICD, and interpolates the data to the cadence (in real-time) that GOES-R will sample Earth. *RaFTR data is suitable for some GOES-R training at the synoptic scale*.

Results & Future Plans

In July 2016, a joint NWS/GOES-R validation test called Data Operations Exercise – Four (DOE-4) will occur with the following objectives:

- ✓ **Ingest cloud and moisture imagery at the Wallops Command and Data Acquisition Center (WCDAS) and flow it through the NWS National Control Facility (NCF)**
- ✓ **Create derived products at the NOAA Satellite Operations Facility (NSOF) and flow them through the NCF via Product Distribution and Access (PDA)**
- ✓ **Send data over the NWS Satellite Broadcast Network (SBN) to individual AWIPS-II terminals at WFOs & National Centers**
- ✓ **Evaluate the use of GOES-R and JPSS products in AWIPS-II via forecaster surveys**
- ✓ **Include representative operational NOAA personnel in 30 day operational test**

Event	Date	Purpose	Status
Ground Readiness Exercises Data Operations 1 - 3	Various dates in Oct 2015 – May 2016	Full end-to-end data flow test from GOES-R Ground Segment to AWIPS-2 terminals at participating stakeholder locations (WFOs, National Centers, etc.)	Ongoing
Continuous RaFTR Dataflow	November 2015 – December 2016	Simulated GOES-R SCMI imagery flowing over the SBN	Ongoing
DOE-4	18 July – 26 August 2016	GOES-R and JPSS validation event involving WFOs, National Centers, and NESDIS satellite operations	Planned
GOES-R Launch Planning Date	14 October 2016	Launch of Satellite	Planned
GOES-R Post-Launch Testing	October 2016 – April 2017	GOES-R system calibration and product testing	Planned
JPSS Launch	December 2016	Launch of satellite	Planned
GOES-R Pre-Operational	Spring - October 2017	GOES-R data flows to NWS sites while in Center (89.5°) position	Planned
GOES-R Operational	October 2017	GOES-R is moved to either the East or West position and is declared operational	Planned

Schedule of GOES-R and JPSS events

The TOWR-S project provides a unique user readiness opportunity for NWS by tracing dataflow back from a particular NWS forecast and warning mission. The GOES-R/JPSS satellites represent a paradigm shift in operational satellite meteorology that requires infrastructure coordination and forecaster training to ensure user readiness. This need is being facilitated by the TOWR-S project.