

NOAA Program Update

(GEO, LEO, COSMIC, JASON & DSCOVR)

Briefing to the meeting of
the Expert Team on Satellite Systems (ET-SAT-9)
Geneva, 12-14 November 2014

Sid Ahmed Boukabara

NOAA/NESDIS

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U.S. Joint Center for Satellite Data Assimilation (JCSDA)

NOAA Inputs from: S. Goodman, M. Goldberg, L. Cucurul, L. Miller, P. Chang.



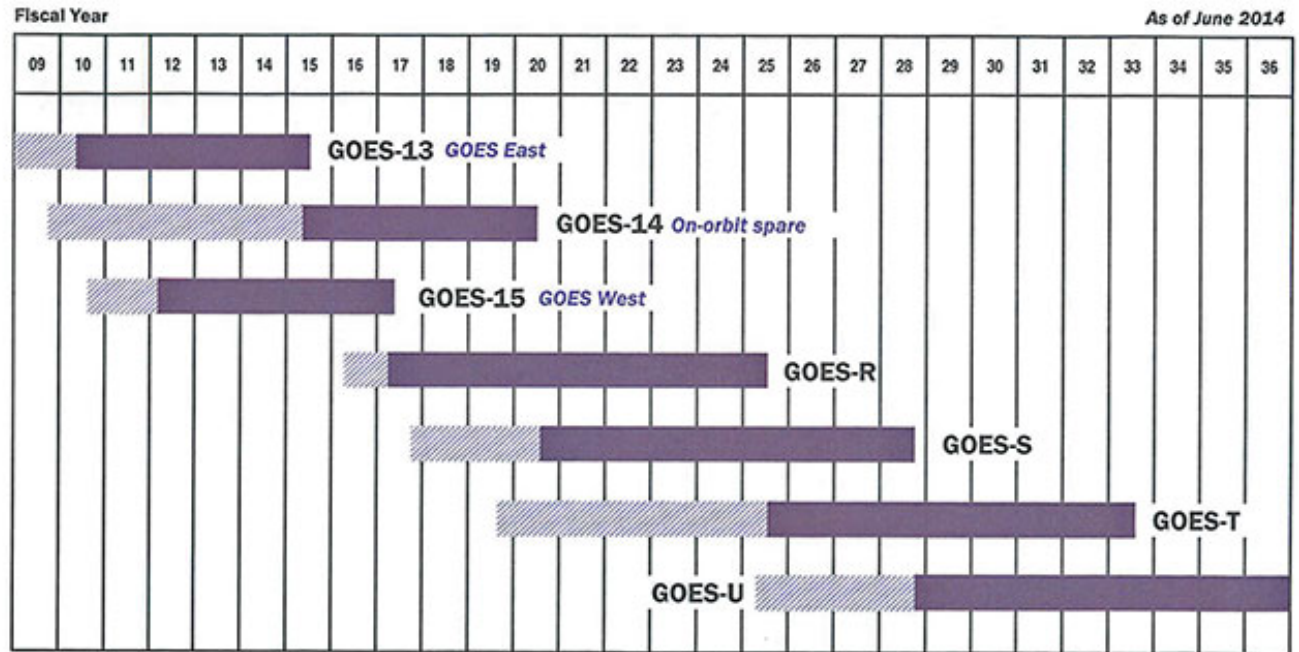
Overall planning of NOAA's satellite system (GEO)



Continuity of GOES Mission



The plan for NOAA's geostationary satellites as of June 2014



Approved: *Mary E. Lynn* JUN 06 2014
 Assistant Administrator for Satellite and Information Services

GOES: Geostationary Operational Environmental Satellite

- On-orbit storage
- Operational



GOES Operational Status

Spacecraft	Operational Status	Status
GOES-8 to 12	De-commissioned	RED
GOES 13	Operational East	GREEN
GOES 14	On-Orbit Storage	GREEN
GOES 15	Operational West	GREEN

As of November 4th 2014

Notes:

GOES-13 resumed GOES-East services on October 18, 2013

GOES-15 arrived 135.0W on 12/14/2011.



2040 Timeline GOES Planning (GOES V/W)

- Preliminary internal discussions (not for public release yet) about upgrades/altern.
- High level meeting in November to discuss early operations for GOES-R (in lieu of storage) and extended validation period.
- Decision on GOES-R placement in east or west decision expected post launch depending on health of the constellation.
- Study underway on possible additional Mode 3a for extended CONUS coverage (21% larger E-W, 30% larger N-S).
- **Options considered:**
 - Geo IR sounder,
 - Ocean color,
 - Evolved ABI with additional bands,
 - GLM with higher spatial resolution,
 - Space weather,
 - Tundra orbit
- **OSSE studies being undertaken (in NOAA) to support decision:**
 - To assess impact of Geo-based hyperspectral infrared Sensor
 - To assess impact of a Geo-based Microwave sensor



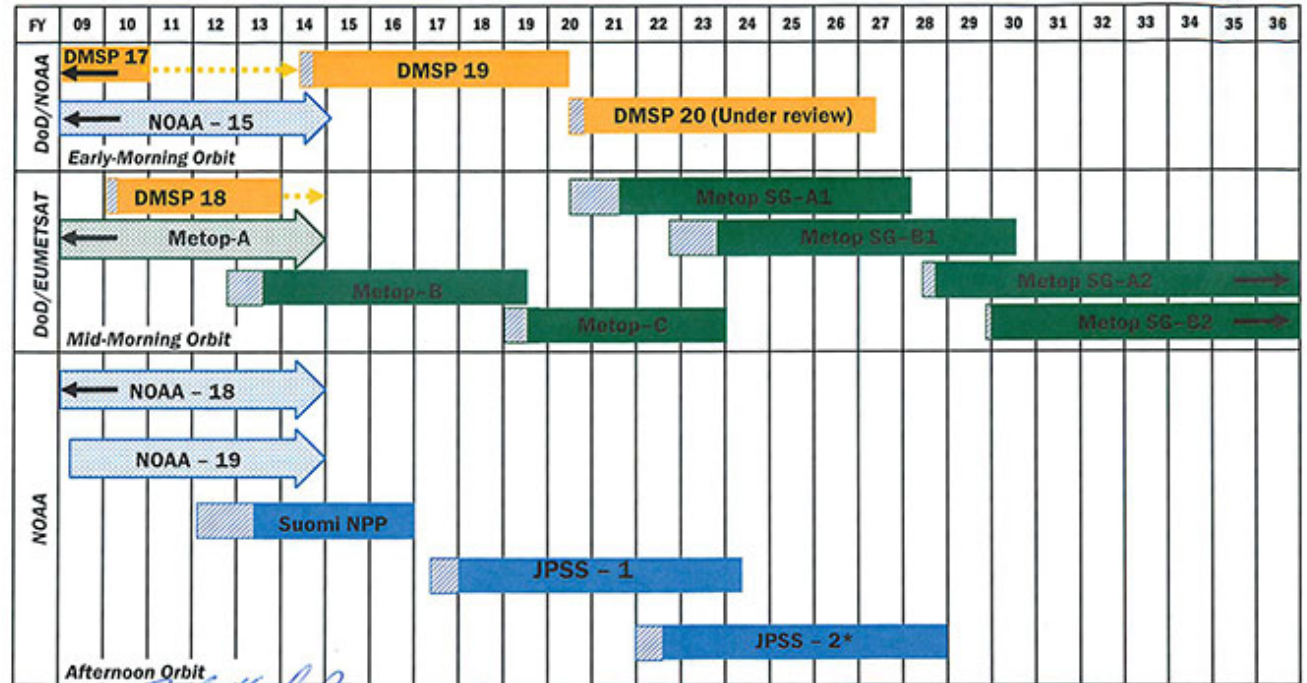
Overall planning of NOAA's satellite system (LEO)



NOAA & Partner Polar Weather Satellite Programs Continuity of Weather Observations



As of August 2014



Approved: 
Assistant Administrator for Satellite and Information Services

* Follow-on funding required for operations in FY 2025 and beyond.

Note: Extended and secondary mission life extension predictions will be updated in early FY 2015

DMSP: Defense Meteorological Satellite Program
JPSS: Joint Polar Satellite Program
Suomi NPP: Suomi National Polar-orbiting Partnership
Metop SG: Metop Second Generation

-  Post Launch Test
-  Operational based on design life
-  Secondary Status
-  Operational beyond FY 2036
-  In Extended Mission
-  Launched before Oct 2008

The plan for NOAA's polar satellites as of June 2014.



POES Operational Status

Spacecraft	Operational Status	Status
NOAA 11, 12, 14, 16, 17	De-commissioned	RED
NOAA 15	AM Secondary	GREEN
NOAA 18	PM Secondary	GREEN
NOAA 19	PM Primary	GREEN
SNPP (NASA/NOAA)	(Operational, PM)	GREEN

As of November 4th 2014

Notes:

Following sensors **Not operational**: NOAA15 (AMSU-B, HIRS), NOAA-18 (HIRS, SBUV)



Near-Term JPSS Official Launch Dates

- The JPSS shall have a total program life cycle through planned FY 2025.
- The JPSS missions shall meet the following launch dates:

JPSS-1 Launch	NLT 2nd Qtr FY 2017
JPSS-2 Launch Readiness	1st Qtr FY 2022



Long-term NOAA Polar Satellites (JPSS-2 and Beyond)

- Planning for post-J2 on-going
- Workshop held in October 2014 to discuss user requirements and alternatives
- J3 and J4 will likely be similar to J2.
 - Small changes are being discussed – for example, adding water vapor channel to VIIRS, filling in spectral gaps in CrIS....
- Significant changes, if needed, after “J4”
 - Plan to have an extensive user assessment similar to process used by EUMETSAT. This will begin in a couple of years.
- Preliminary internal discussions (not for public release yet)



Requirements for new observations will be based on application need

- Process includes defining the goal, constructing the hypothesis to achieve the goal, and finally testing the hypothesis
- Example
 - Define the Goal:
 - To improve the accuracy of the 7-day forecast to the current 5-day forecast accuracy
 - Construct the hypothesis and thread analysis to achieve that goal.
 - Global data assimilation requires global temperature, water vapor, wind information at a given vertical resolution, spatial resolution, temporal resolution, accuracy, precision.
 - To improve the 7-day forecast spatial resolution of global models will need to improve to 2 – 6 km range. The current spatial resolution of infrared and microwave observations should be consistent with the spatial resolutions of the models. Also to increase the yield of infrared observation from ~5% to 50% over land, the spatial resolution of the infrared should be between 1 – 5 km, co-aligned with imagery data to get accurate surface temperatures for more cloud screening. The instrumental noise should be
 - Test the hypothesis
 - OSSEs, data density analysis (yield)



Program highlights (Leo and Geo)

Geo:

- GOES-13 operations were resumed. East
- GOES-14 On-orbit storage
- GOES-15 Operational. West
- GOES-R, S, T, U launches on schedule
- GOES-V/W Possible Upgrades discussed (for 2040). Internal discussions at this stage. *[OSSE studies being undertaken to help support the decision-making process]*

Leo:

- Currently 3 PM satellites (N18, N19 and SNPP)
- Possibility of 'Design Life' Data gap between SNPP and JPSS1
- All SNPP instruments are performing exceptionally well.
- SNPP extended operations planned until 2022 before de-orbiting
- Two years of design life overlap is planned. Extended life operation is 4 years (e.g. JPSS-1 = 7 (design life) + 4 years (extended) = 11 years total)
- Data Gap Impact Assessment Study (OSE) being undertaken
- JPSS1, 2 scheduled for 2017 and 2022
- Beyond JPSS2, discussion is on-going regarding possible upgrades and/or alternatives



Overall Planning and Status of COSMIC

The COSMIC2 (FORMOSAT-7) is a collaboration between Taiwan (NSPO) and the US (NOAA, AF, NASA/JPL).

Budget constraints might have an impact on these schedules.

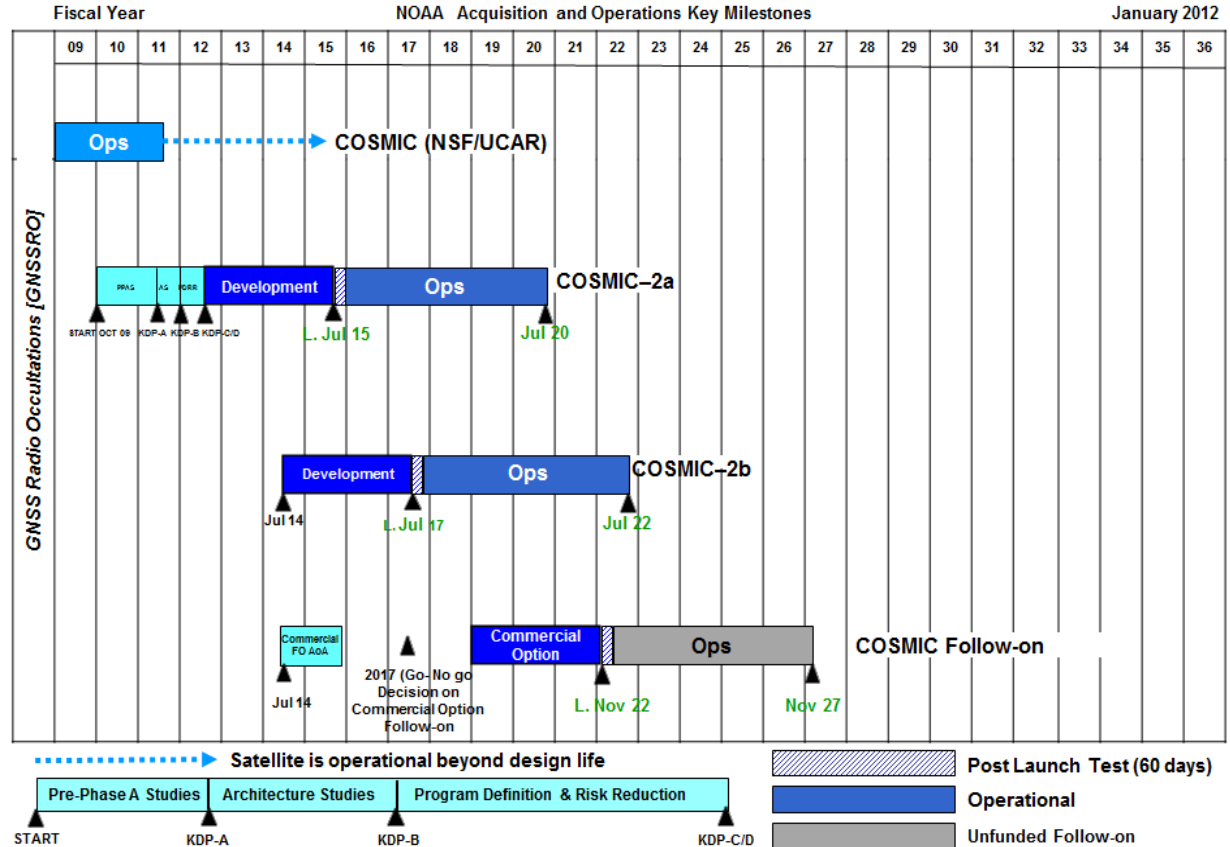
Notes:

- COSMIC-2 (equatorial launch in 2016;
- Polar launch planned for (2018-2019), pending securing funding.



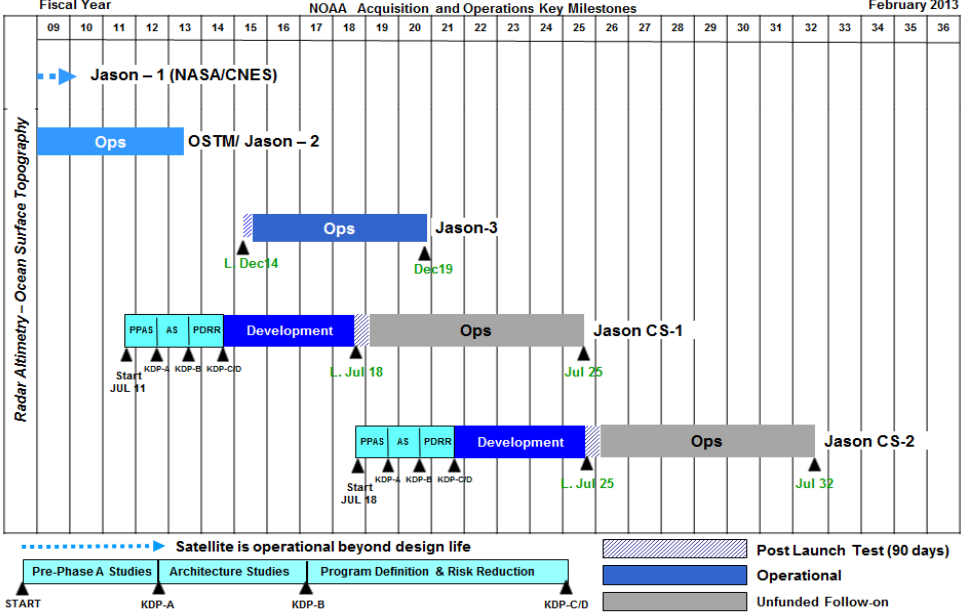
Research-to-Operations

GNSS Radio Occultation's [GNSSRO]



Overall planning & Status of (JASON-2,3)

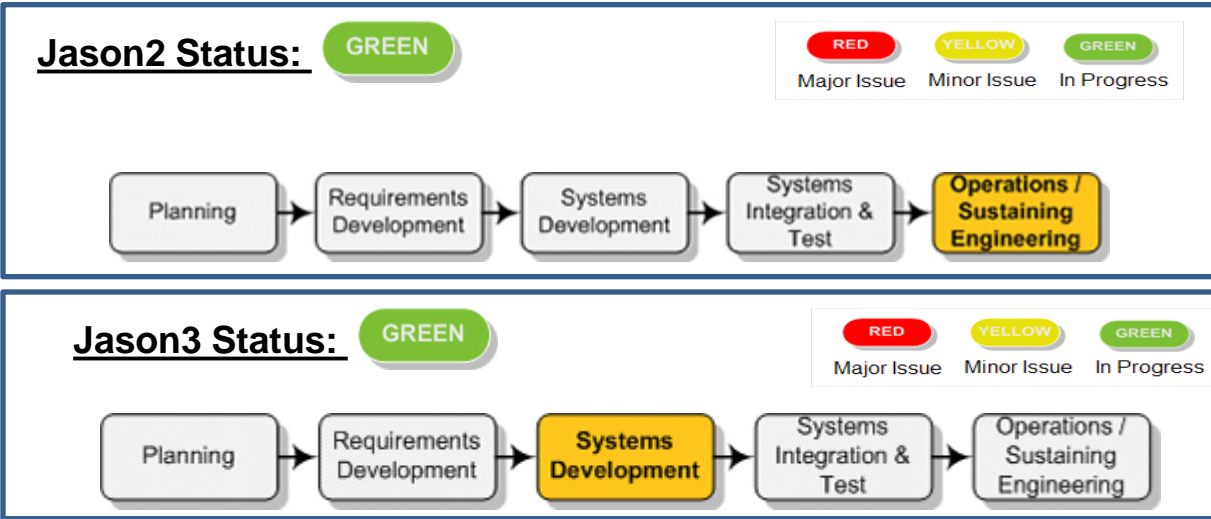
Research-to-Operations Radar Altimetry – Ocean Surface Topography



The JASON-2,3 program is led by multiple organizations: NOAA, CNES, NASA/JPL and EUMETSAT

The Jason-2 satellite mission launched successfully on June 20, 2008

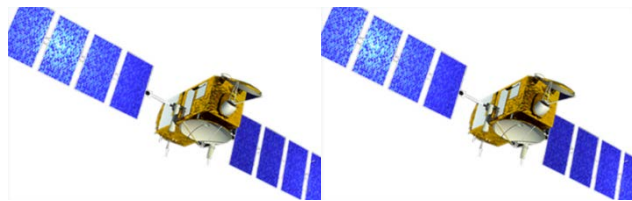
The Jason-3 satellite scheduled for 2015



NOAA Jason-3 Program Status

- NOAA internal ground segment acceptance testing completed
- 4-Partner (NOAA, EUMETSAT, NASA, CNES) ground segment operational qualification testing progressing well.
- NOAA will control and down-link telemetry for both Jason-2/OSTM and Jason-3 at Fairbanks, Barrow, Wallops, Usingen-1 & Usingen-2 ground stations.

- Scheduled March 31st (2015) launch unchanged.



NOAA Jason-CS Program Status

- 5-partner (NOAA, EUMETSAT, ESA, NASA, & CNES) ground operations planning meeting hosted at NOAA/NSOF, July 2014. Follow-on planned for January 2015.
- Level 1 requirements document in final stages of review.
- NOAA participating in Phase B and System Requirement Reviews
- JPL, on behalf on NOAA, continuing development of AMR-C radiometer, including external calibrator.
- Advanced planning for GPS Radio Occultation (RO) secondary mission underway.
- Radio Occultation will provide ~1000 vertical atmospheric profiles of temperature & humidity per day for use in operational numerical weather prediction models.
- NOAA FY16 Jason-CS budget initiative in preparation.



DSCOVR

- The Deep Space Climate Observatory (DSCOVR) mission is a partnership between NOAA, NASA and the U.S. Air Force.
- Launch scheduled early 2015.
- Successor of NASA's ACE
- NOAA will operate DSCOVR from the NOAA Satellite Operations Facility and process data at the agency's Space Weather Prediction Center for distribution to users within the United States and around the world.
- The data will be archived at NOAA's National Geophysical Data Center.
- The instruments onboard DSCOVR will measure the magnetic field intensity and direction and the distribution of incoming ions and electrons in the solar wind plasma, according to their energies.
- Other NASA-sponsored Earth Science Instruments on DSCOVR
- DSCOVR will allow NOAA to provide accurate warnings of one type of solar storm, a geomagnetic storm.



BACKUP Slides

