Title: **NPOESS Satellites are Designed to Support Multiple Environmental Observation Missions**

Authors: **Derrick Day, MaryAnn Chory, Jim Nelson, Michael Perz and Stan Schneider**

Northrop Grumman Aerospace Sector (NGAS) is the system prime contractor for the **N**ational **P**olar-orbiting **O**perational **E**nvironmental **S**atellite **S**ystem (NPOESS), the U.S. next generation operational weather and climate monitoring system. This system is being developed for and is managed by NOAA and the US Air Force with NASA as a key partner. Northrop Grumman is building a multi-mission satellite with a common design for the afternoon 1330 LTAN and the late afternoon 1730 orbits for this polar orbiting environmental mission. Both spacecraft are designed to accommodate a common sensor suite consisting of MIS, VIIRS, CrIS, ATMS, SESS (to include SEM-N), SARSAT, and A-DCS. The 1330 satellite accommodates APS and OMPS which require the mid-day solar illumination. The 1730 spacecraft has the capacity to accommodate the TSIS and an altimeter that meets the Navy's ocean altimetry requirements. Recent studies show the potential for manifest options to include moving TSIS to the C3 satellite in the 1330 orbit to provide more efficient mission continuity with the TSIS on C1. Other manifest options include potentially replacing the altimeter with a LIDAR supporting the Earth Science Decadal mission and returning the GPS occultation sensor. These options are enabled by allocation of spacecraft resources for pre-planned product improvement (P3I) that include up to 325 watts, 365 kg, 100 Kbps on a 1553 data interface and the potential for over 1 Mbps on the 1394 data interface and over 1 m^2 of deck space on the 1730 satellite

Flying the sensors together takes advantage of the satellites very rigid structure that enables precise sensor to sensor co-alignments. This allows for simplification of some sensor designs, such as APS, which can use complementary data, such as VIIRS, for calibration. VIIRS also provides a simultaneous cloud mask to support data analysis for other missions.

Re-manifesting or adding sensors to the NPOESS satellites also enables the following:

- saves each agency the cost of procuring additional satellites
- saves the cost and use of precious US launch capacity.
- leverages the NPOESS 7 year satellite design life reducing replenishment costs
- users can receive sensor data with very high availability (99.995) and low latency (most data received by a weather central in 15 min)

This poster shows the current and potential sensor manifests in the 1330 LTAN and 1730 LTAN orbits to include the manifest in the below table:

Sensor	C1 (1330)	C2 (1730)	C3 (1330)	C4 (1730)
VIIRS	Manifest	Manifest	Manifest	Manifest
CrIS	Manifest	A	Manifest	A
ATMS	Manifest	A	Manifest	A
OMPS-Nadir	Manifest		Manifest	
MIS		Manifest	Manifest	Manifest
CERES/ERBS	Manifest		A	
SARSAT	Manifest	Manifest	Manifest	Manifest
A-DCS	Manifest	Manifest	Manifest	Manifest
SEM	Manifest	A	Manifest	A
OMPS-Limb	A		A	
TSIS	Manifest	A	TBD	A
APS	A		A	
ALT		A		A
SUS	A	A	A	A
SESS	A	A	A	A

De-manifested

Not compatible with orbit

A Accommodation technically feasible

TBD Accommodation under evaluation

* Number of EDRs to be determined based on acquisition

Summary: Each NPOESS satellite is designed to accommodate ten or more sensors to acquire science data for weather and climate measurements.