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THE INCEPTION OF NOAA'S NEW ENVIRONMENTAL SATELLITE ARCHITECTURE

Abstract

The National Oceanic and Atmospheric Administration (NOAA) conducted a study, titled the NOAA Satellite Observing System Architecture (NSOSA) study, from 2014 to 2018 to plan for the next generation of weather satellites beyond the current Joint Polar Satellite System (JPSS) and the Geostationary Operational Environmental Satellite (GOES) – R Series of satellites. The NSOSA study provided an opportunity to design a modern architecture with no pre-conceived notions regarding instruments, platforms, orbits, etc., but driven by user needs. This paper will discuss how NOAA is starting to implement the recommendations from the NSOSA study and formulate our next generation satellite systems. NOAA considered numerous satellite and constellation options for Low Earth Orbit (LEO), Geostationary Orbit (GEO), and space weather orbits and study results showed that there could be improvements made in each orbital domain. As an example, we will show that in LEO, disaggregating measurements, such as high availability global real-time soundings, can be better achieved by separating this function from other mission elements, such as imagery. Sounding-only instruments would be collocated on smaller satellites and would allow for a more rapid refresh of sounding capability. Other, lower availability, instruments would be manifested on their own spacecraft. In GEO, there was significant value to providing new data sources such as persistent imagery over Alaska and the northern polar region. For space weather, the study indicated significant value in making coronal measurements at both along the earth-sun axis and well off the earth-sun axis (e.g., at Lagrange point 5). NOAA has started to implement a number of the results from the NSOSA study. In 2019 NOAA issued a Broad Agency Announcement to seek proposals for geostationary and extended orbits (GEO-XO) mission, which includes space weather, and instrument concepts and for a LEO sounder instrument and sounder-only mission concepts based on the NSOSA recommendations described previously. Contracts were awarded to the most relevant studies and are expected to be completed in the fall of 2020. These studies are expected to inform NOAA regarding new ideas and capabilities that 1) can be quickly inserted into the current constellation in LEO and 2) will form the basis of the operational environmental satellite systems to follow GOES-R in GEO and space weather.