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# FORMOSAT-7/COSMIC-2 – An Advanced Small Satellite Constellation Platform for Numerical Weather Prediction

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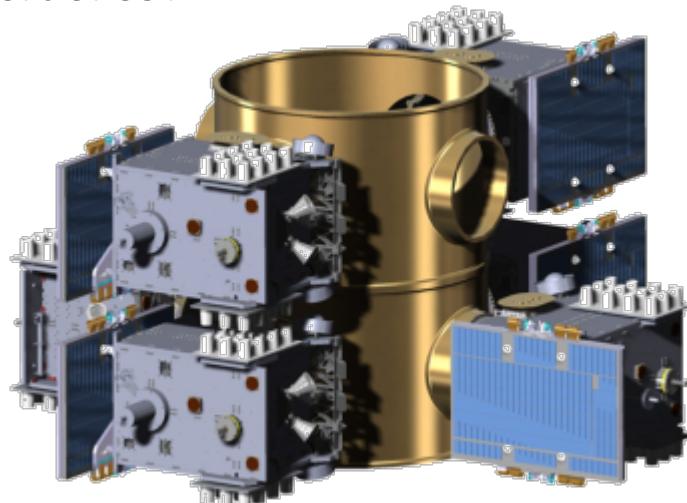
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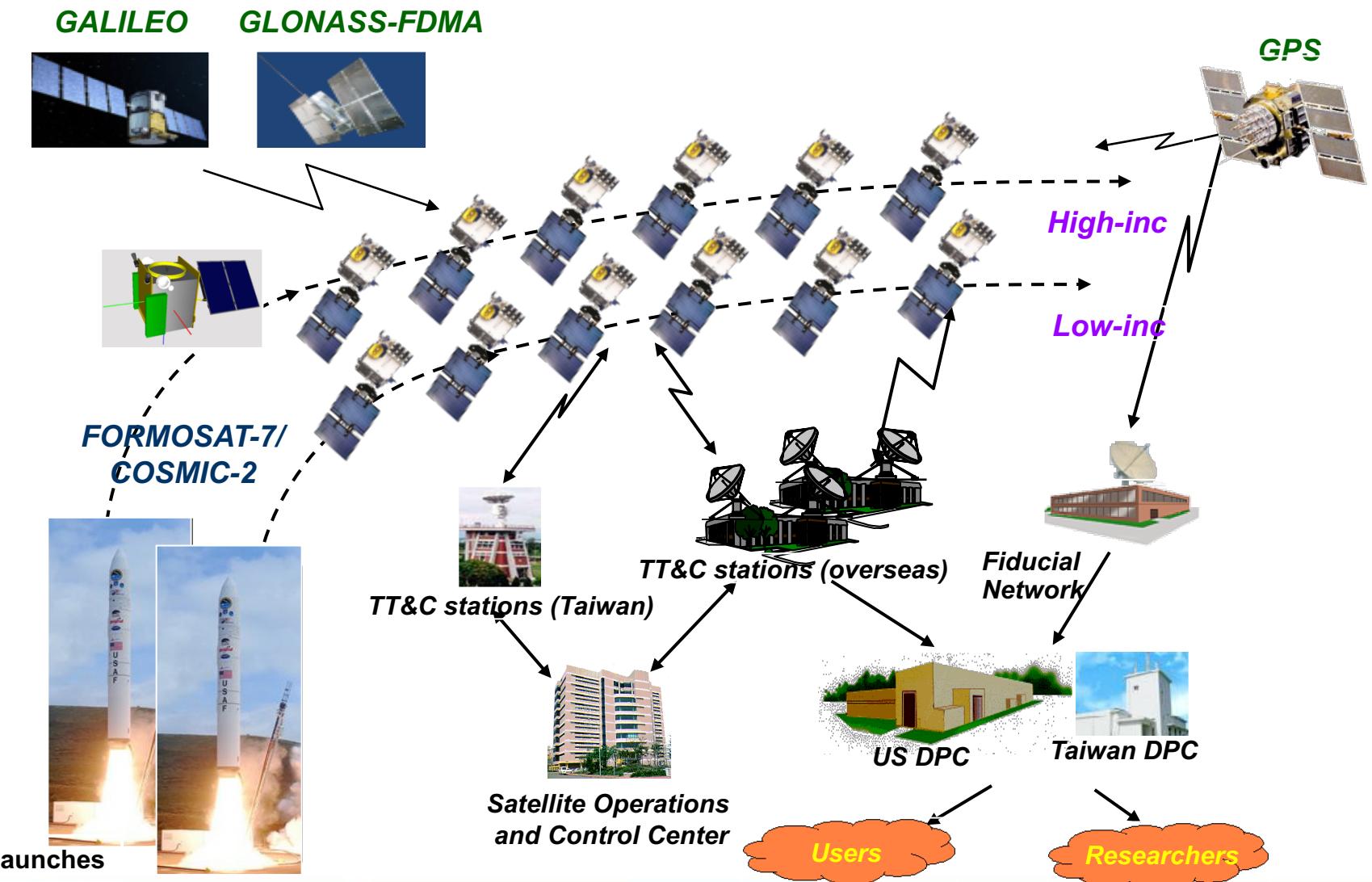


# INTRODUCTION

- FORMOSAT-7 (COSMIC-2) will collect atmospheric and ionospheric data primarily for operational weather forecasting and space weather monitoring as well as meteorological, climate, ionospheric, and geodetic research.
- The FORMOSAT-7 spacecraft has been designed by SSTL using heritage avionics and it has been assembled both at the SSTL's cleanroom facilities in the United Kingdom and NSPO's facility in Taiwan
- The payloads for the spacecraft are being supplied by NSPO's mission partner, the National Oceanic and Atmospheric Administration (NOAA) in the United States. These have been integrated to the platforms in Taiwan where a full set of spacecraft system tests are being performed with the support of SSTL



# MISSION SYSTEMS ARCHITECTURE



# Highlights

- How small satellite have become reliable tools for a range of applications?
- How the FORMOSAT-7 helped stimulate the development of updated state-of-the-art instruments – something that would have been difficult by government to achieve if the mission was commercial (i.e. to distinguish FS-7 from the commercial initiatives of SPIRE, PlanetIQ and GeoOptics)?
- How the FORMOSAT-7 mission helped carry a range of compatible hosted payloads, in addition to the main mission payload – something that would also not be considered on a purely commercial mission?
- How FORMOSAT-7 (free) data stimulates new science and applications – something that would be much harder if the data were only available commercially.

# CONCLUSION

- The FORMOSAT-7 missions demonstrate that small satellites can play a significant role in operational meteorology.
- The system also demonstrates the concept of a highly integrated distributed system, as the ground network and space system must be carefully designed in order to meet the tight operational constraints of the mission.
- The system also completely relies on the availability of another group of constellations of the Global Navigation Satellite Systems, in order to support the sensor.
- FORMOSAT-7 will only meet its objectives as a complete system, covering both planned orbit planes. Without the second batch in orbit in time there will be no high latitude coverage.
- The FORMOSAT-7 spacecraft bus design is well suited for other constellations or single satellite missions, provides very high payload mass fraction, and exceptional power fractions for the size of the spacecraft.