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Author: Mr. Henrique Candeias
N3O – NEWSPACE EARTH OBSERVATION ORBITAL OBJECTS, LDA, Portugal

Mr. Andre Oliveira
Ceiia - Centro De Engenharia, Portugal

DESIGNING NEWSPACE VERY-HIGH RESOLUTION (VHR) CONSTELLATIONS: OPTICAL HIGH PERFORMANCE EARTH OBSERVATION (EO) SMALL SATELLITES OPPORTUNITIES

Abstract

The emergence of NewSpace initiatives has revolutionized the landscape of space and satellite technology, in particular for the Earth Observation (EO) domain. The advent of Very-High Resolution (VHR) optical small satellites for Low Earth Orbits, presents an opportunity within the Atlantic Constellation, a concept evolved from a Portuguese idea, currently being developed as a joint collaborative effort between Portugal and Spain, with new countries and private entities expected to join.

The mission's goal remains focused on utilizing optical high-performance EO small satellites, with the VHR satellites, to unlock exceptional opportunities for agile, cost-effective, and high-resolution imaging.

The design and deployment of VHR constellations represent an innovative approach to EO satellite architecture. By leveraging its compact footprint, these systems achieve Ground Sample Distances (GSD) below 50cm on the visible spectrum, an accomplishment previously reserved for larger, more conventional platforms.

Key to the success of VHR constellations is the integration of market-available subsystems, facilitating an optimized system design that balances performance, cost-efficiency, and reliability. This approach not only expedites development timelines but also ensures the scalability and sustainability of the constellation over its operational lifetime.

Furthermore, full compatibility and interoperability within the Atlantic Constellation ecosystem are guaranteed. By complying to standardized protocols and communication interfaces, VHR satellites continuously integrate into the larger network, enhancing the collective capabilities and operational versatility of the constellation as a whole.

In summary, the design and implementation of VHR constellations within the NewSpace paradigm present unparalleled opportunities for advancing EO capabilities. Through the synergistic combination of high agility, sub-50cm GSD, optimized subsystem integration, and seamless constellation interoperability, these satellites trigger a new era of precision Earth observation, poised to revolutionize our understanding of the planet's dynamics and facilitate actionable insights across numerous domains.