

ANSI Commercial Space Industry Standardization Coordination: NASA Opportunities

National Aeronautics and
Space Administration



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A partnership between International Space Station Agencies

International Deep Space Interoperability Standards

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International Deep Space Interoperability Standards *(Draft)*



<https://www.internationaldeepspacestandards.com/>



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International Deep Space Interoperability Standards



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Avionics



Communications



Environmental Control
and Life Support Systems
(ECLSS):



Power



Rendezvous



Robotics



Thermal

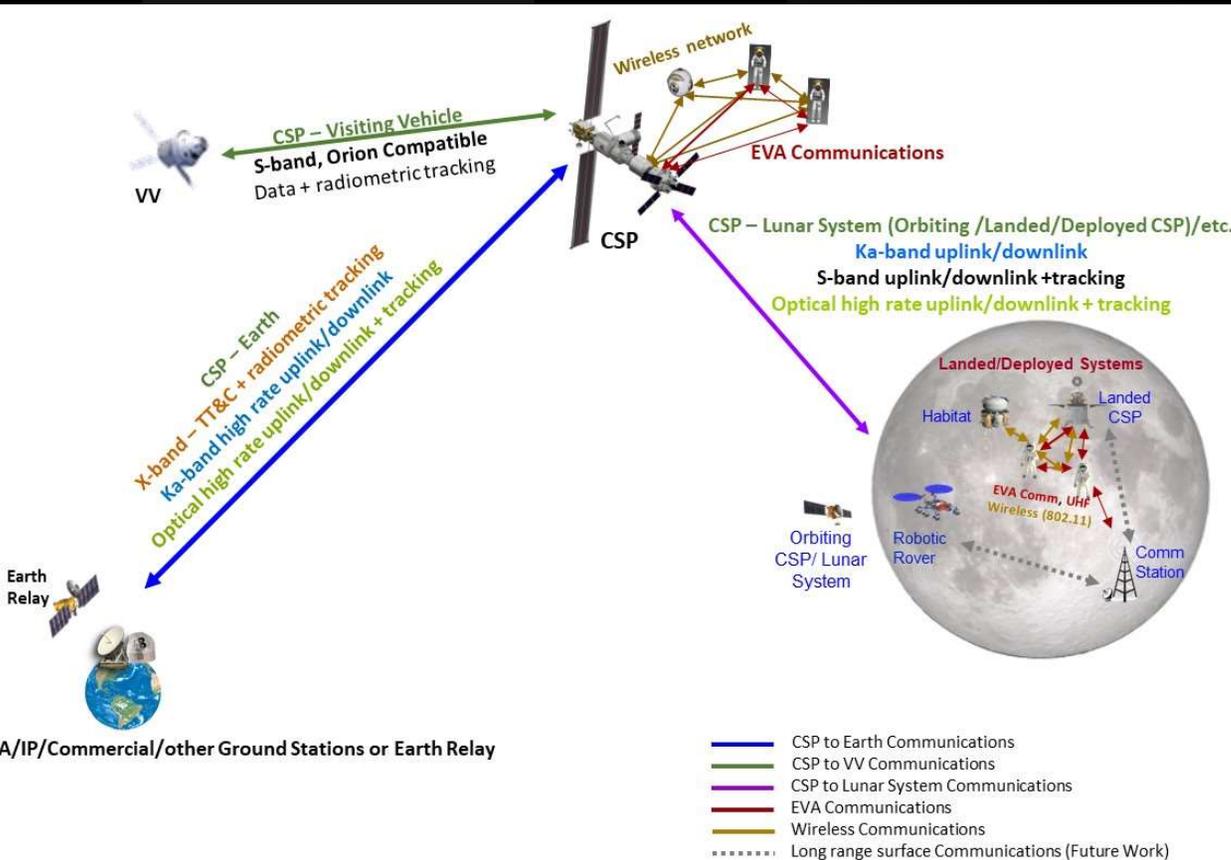


Software



International Communication System Interoperability Standard (ICSIS)

ICSIS defines the “minimum” standards and protocols for communications between a Cislunar Space Platform (CSP) and ground stations, visiting vehicles, lunar systems, EVAs, payloads, robotic cameras, sensors, etc.



- Spectrum defined for space-space and space-ground links
- Standards and protocols defined for different levels of the stack (physical, data-link, network, ...)
- Elements/space systems can implement additional capabilities in their systems as needed, – but if they want to “play with CSP”, they need to be compliant with the ICSIS
- Lunar network architecture is designed to become the Mars network architecture with minimal change

Shift Toward Commercial Communications Services



- Government desire is to encourage growth of commercial space communications services following an open architecture based on industry standards with a multi-customer market capable of sustaining several service providers
- Deep space: Policy change now requires NASA to assess the market for commercial deep space services annually and direct companies requesting DSN service to use commercial networks as first choice. DSN service will only be provided if the requester can demonstrate there is no acceptable commercial alternative.
- Near Earth: NASA is expects to shift its balance from 50/50 use of commercial / NASA-owned ground stations to 90% use of commercial by the end of 2020.
- Communication Services Program: Under a new program start, NASA will be evaluating the use of commercial space relays to provide service similar to what is provided today by TDRSS.

LEO: Transition to Commercial Space Stations & Services



Objectives

Current/Near-Term

- Support NASA's R&D needs and ISS National Laboratory needs
- Leverage ISS capabilities to stimulate demand and catalyze new markets
- Meet International Partner (IP) Intergovernmental Commitments
- Collaborate with IPs on new market development

Mid-Term

- Support NASA's R&D needs and ISS National Laboratory needs
- Incorporate IP commercial needs
- Initiate phased transition from ISS to Commercial with attached (initially) and/or free flyers
- Stimulate global demand and catalyze new markets

Long-Term

- Turn over LEO operations to the private sector
- Purchase NASA's needed R&D Services from commercial provider at lower cost than ISS
- Shift NASA/IP focus and resources towards exploration



Activities

- Document and share with industry NASA's comprehensive approach for global Commercial LEO Development:
 - 1) Establish ISS commercial use and pricing policy
 - 2) Enable private astronaut missions to ISS
 - 3) Initiate process for commercial development of LEO destinations
 - 4) Seek out and pursue opportunities to stimulate demand
 - 5) Quantify NASA's long-term needs for activities in LEO

- Partner with industry to develop and demonstrate new LEO destinations
- Initiate phased transition to acquire needed services from commercial destinations rather than ISS
- Avoid competition from ISS
- Seek out and pursue opportunities to stimulate demand both domestic and international
- Initiate transition of ISS assets while still satisfying IP agreements

- Complete transition of ISS assets at end of life
- Conduct NASA's needed R&D on commercial destinations in LEO
- Purchase 'LEO National Lab' services from commercial provider?



Orbital Debris Management

- NPR 8715.6, NASA Procedural Requirements for Limiting Orbital Debris and Evaluating the Meteoroid and Orbital Debris Environments, requires NASA spacecraft and launch vehicles to limit the generation of orbital debris
- NASA-STD-8719.14, Process for Limiting Orbital Debris, provides technical requirements for limiting orbital debris and methods to comply with the NASA requirements for limiting orbital debris generation
- NASA-HDBK-8719.14, Handbook for Limiting Orbital Debris, contains the background and reference materials to aid in understanding the foundation and science for predicting and limiting orbital debris
- Consistent with U.S. National Space Policy, U.S. Government Orbital Debris Mitigation Standard Practices, Inter-Agency Space Debris Coordination Committee (IADC) Space Debris Mitigation Guidelines, Space and Missile Center Orbital Debris Handbook, and the space debris mitigation guidelines of the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS)
- Debris Design OPR: Jer-Chyi (J.-C.) Liou, (281) 483-5313, jer-chyi.liou-1@nasa.gov