



Ka and Broadband
Communications
Conference

COMMUNICATIONS AND NAVIGATION TECHNOLOGY GAPS PLENARY 2

Co-Chairs:

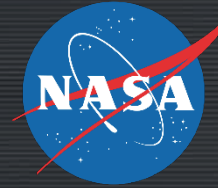
- **Richard Morgan-Owen**
Chief, Tracking, Telemetry, & Control &
Payload Data Transmission Section, ESA,
The Netherlands
- **Dr. Jason W. Mitchell**
Director, Advanced Communications &
Navigation Technology Division, SCan
Program, NASA, USA

Panelists:

- **Dr. Rajeev Gopal**, Vice President,
Hughes Advanced Systems, USA
- **David Israel**, Chief Architect,
Exploration and Space
Communications Projects Division,
NASA GSFC, USA
- **Pietro Giordano**, Radionavigation
Engineer, Directorate of Technology
Engineering & Quality, ESA, The
Netherlands
- **Dr. Naoto Kadowaki**, Vice
President, National Institute of
Information & Communications
Technology, Japan
- **Marco Lanucara**, ESA, The
Netherlands
- **David Gomez Otero**,
Moonlight/LCNS Technical Lead,
ESA, The Netherlands



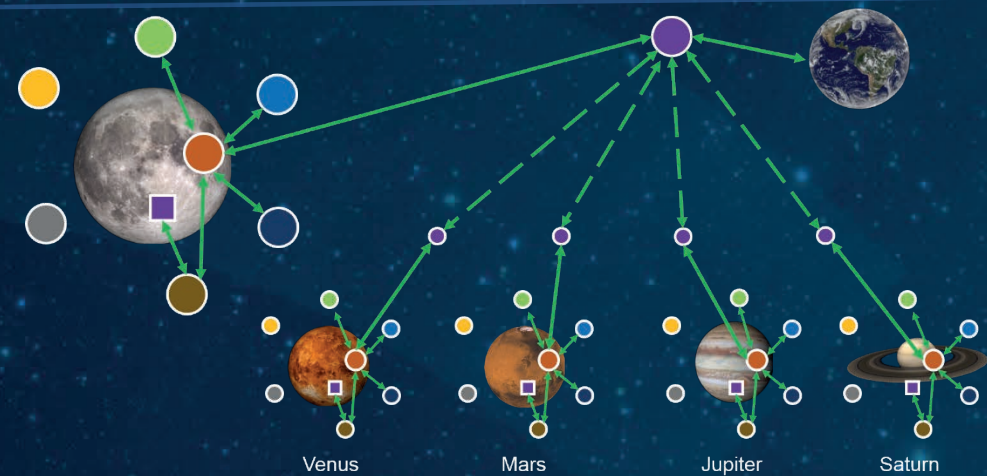
LunaNet Concept



- A flexible scalable architecture for providing communications and navigation services to all lunar missions
- Disaggregated approach allows for phased implementation of infrastructure as driven by user needs and technology developments
- Architecture implementation comprised of NASA, International, and Commercial interoperable lunar surface, lunar orbiting, and earth-based elements
- Incorporates in-situ capabilities to detect events and distribute situational alerts
- Is fully compatible with future deployments at Mars or any other destination

LunaNet Service Types

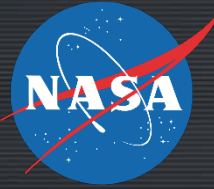
1. **Communications Services (Com):** Data transfer services capable of moving addressable and routable data units between nodes in a single link or over a multi-node, end-to-end path via communications or networking services.
2. **Position, Navigation, and Timing Services (PNT):** Services for position and velocity determination, and time synchronization and dissemination. This includes search and rescue location services.
3. **Detection and Information Services (Det):** Services providing detection of events in order to generate timely alerts for human and asset safety and protection. These services publish other beneficial information to users as well.
4. **Science (Sci):** Services that use the RF and/or optical capabilities of the node as a science instrument or part of an instrument.



Just as the Internet and GPS have transformed our lives on Earth, LunaNet will transform lunar science and exploration. 2



Additional LunaNet Information



- NASA Lunar Communications Relay and Navigation Services RFI (LunaNet)
 - <https://bit.ly/LunaNetRFI2020>
- NASA LunaNet Interoperability Specification
 - <https://bit.ly/LunaNetInterOp>