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Mars Network Node
(DESCANSO Symposium)

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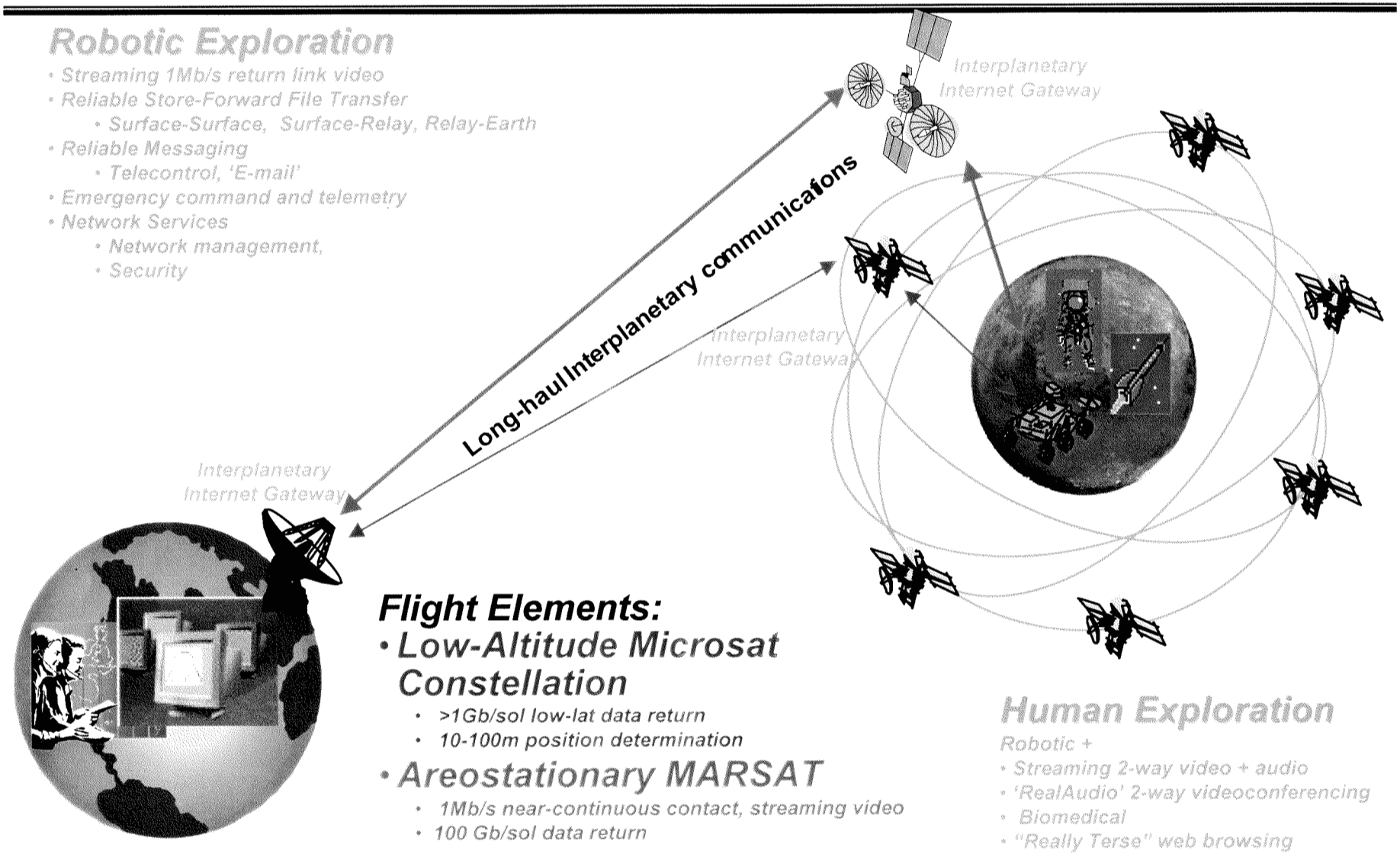
Mars Network Overview

Robotic Exploration

- Streaming 1Mb/s return link video
- Reliable Store-Forward File Transfer
  - Surface-Surface, Surface-Relay, Relay-Earth
- Reliable Messaging
  - Telecontrol, 'E-mail'
- Emergency command and telemetry
- Network Services
  - Network management,
  - Security



Flight Elements:

- Low-Altitude Microsat Constellation
  - >1Gb/sol low-lat data return
  - 10-100m position determination
- Areostationary MARSAT
  - 1Mb/s near-continuous contact, streaming video
  - 100 Gb/sol data return

Human Exploration

Robotic +

- Streaming 2-way video + audio
- 'RealAudio' 2-way videoconferencing
- Biomedical
- "Really Terse" web browsing

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What is Mars Network Node?

- **Mars Network Node is envisioned to service various users**
  - Lander/Rover
  - Canister
  - Aerobots
  - Probes (eg. DS-2)
  - Precision landing of incoming spacecraft
- **Provide autonomy to the users**
  - Multiple access: Earth Scheduled ---> Autonomous access scheme
  - Navigation: Earth Based ---> In-situ user positioning
- **Software re-configurable architecture to provide communication and navigation services to Mars in-situ users**
  - Signal structures
  - Access Schemes/Protocols
  - Autonomy/Post processing algorithms

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Roadmap of Mars Network Node

Increase in Capability w/ Re-use of Re-configurable Software Architecture

2003

* Simultaneous users (2)
* Residual/Suppressed
* BPSK (xmt/rcv)
* FDMA
* Doppler/Range extrct
* On-Board navigation proc
  - Canister Doppler extrct

2005

* Simultaneous users (4)
* Residual/Suppressed
* BPSK (xmt/rcv)
* FSK (xmt)
* TDMA/FDMA/CDMA
* Phase/Doppler/Range extrct
* Navigation processing
  - User state determination
* Navigation range beacon

2007

* Simultaneous users (8)
* Residual/Suppressed
* BPSK,QPSK (xmt/rcv)
* FSK (xmt)
* Support Mars In-situ relay
* TDMA/FDMA/CDMA
* Doppler/Range extrct
* Navigation processing
  - User state determination
* Navigation range beacon

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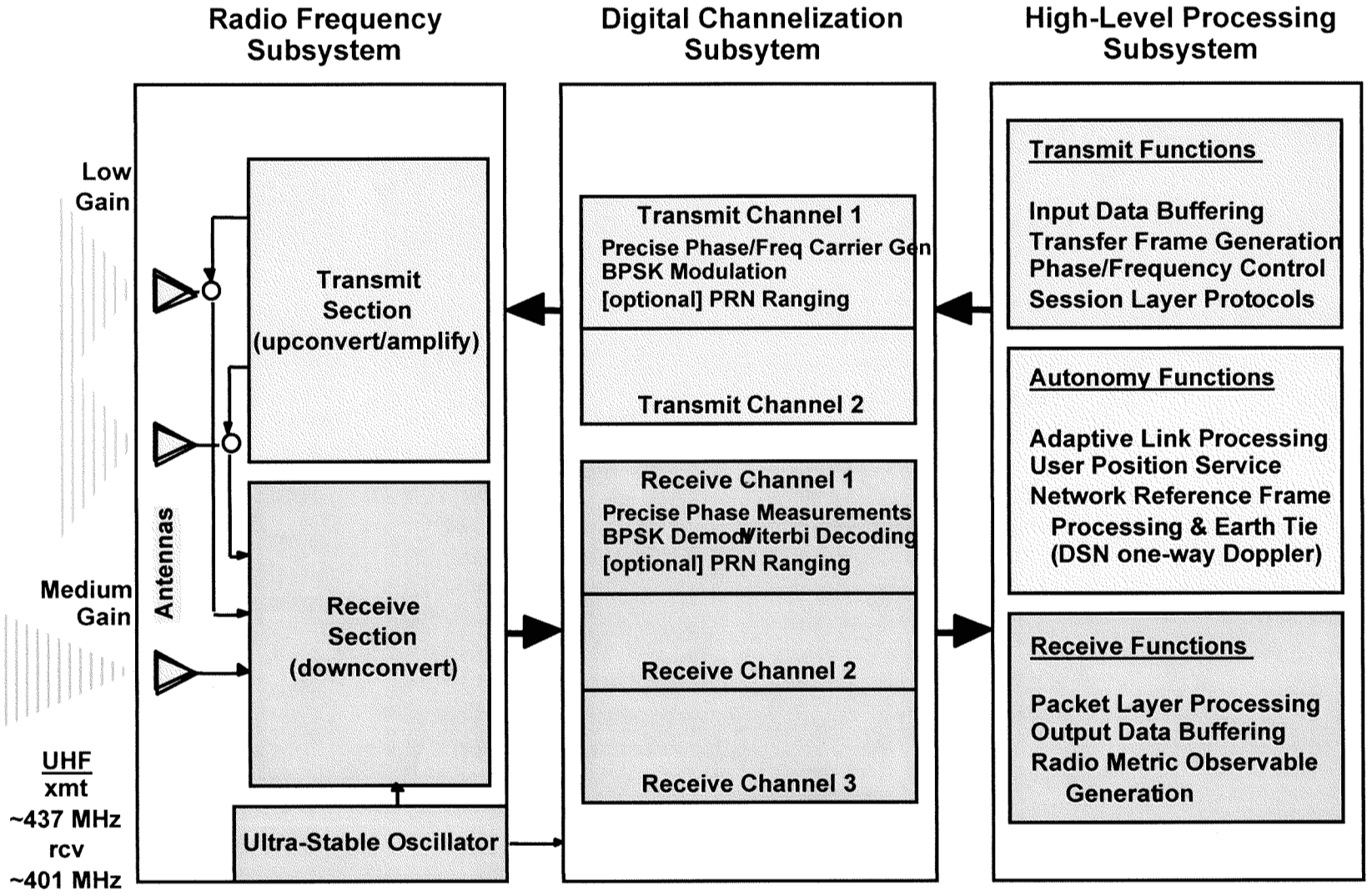
Mars Network Node Functional Diagram



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