

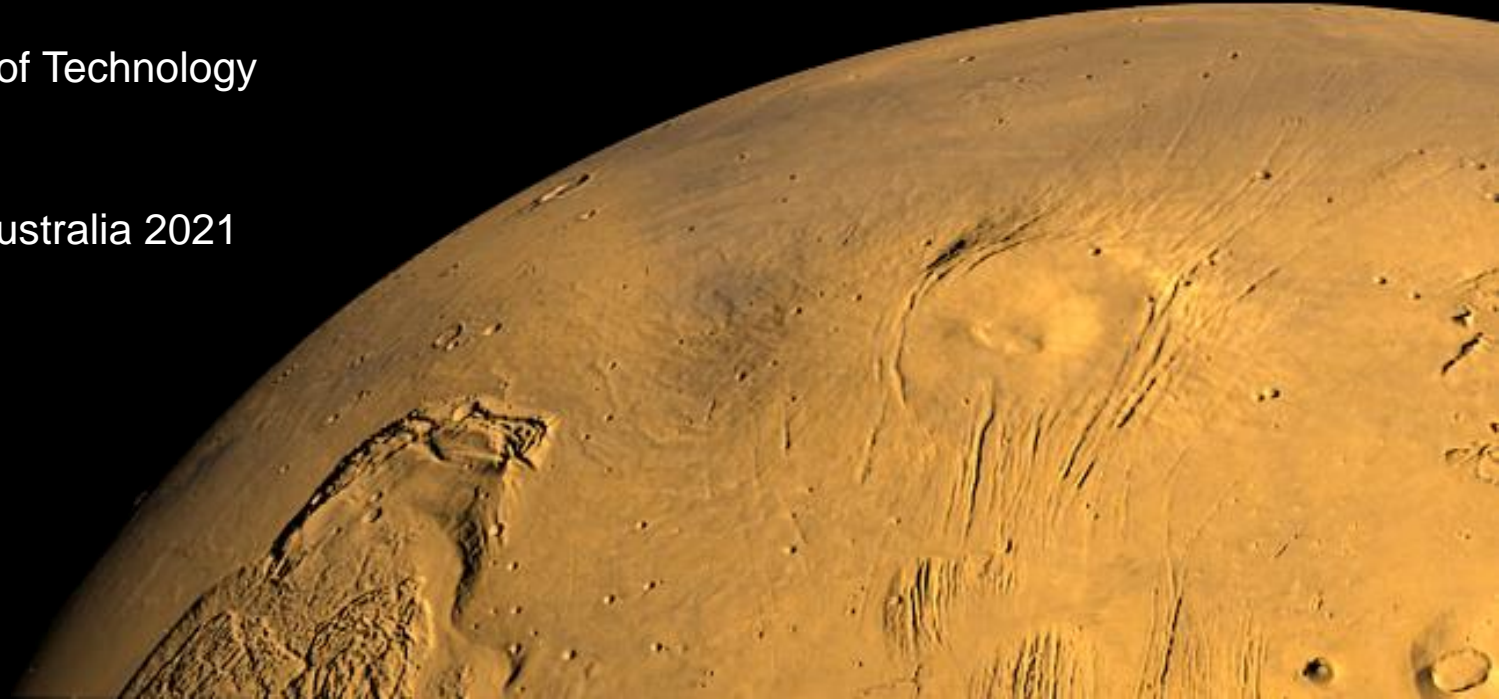


Jet Propulsion Laboratory  
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# Next-Generation Relay Capabilities for Future Robotic and Human Mars Exploration

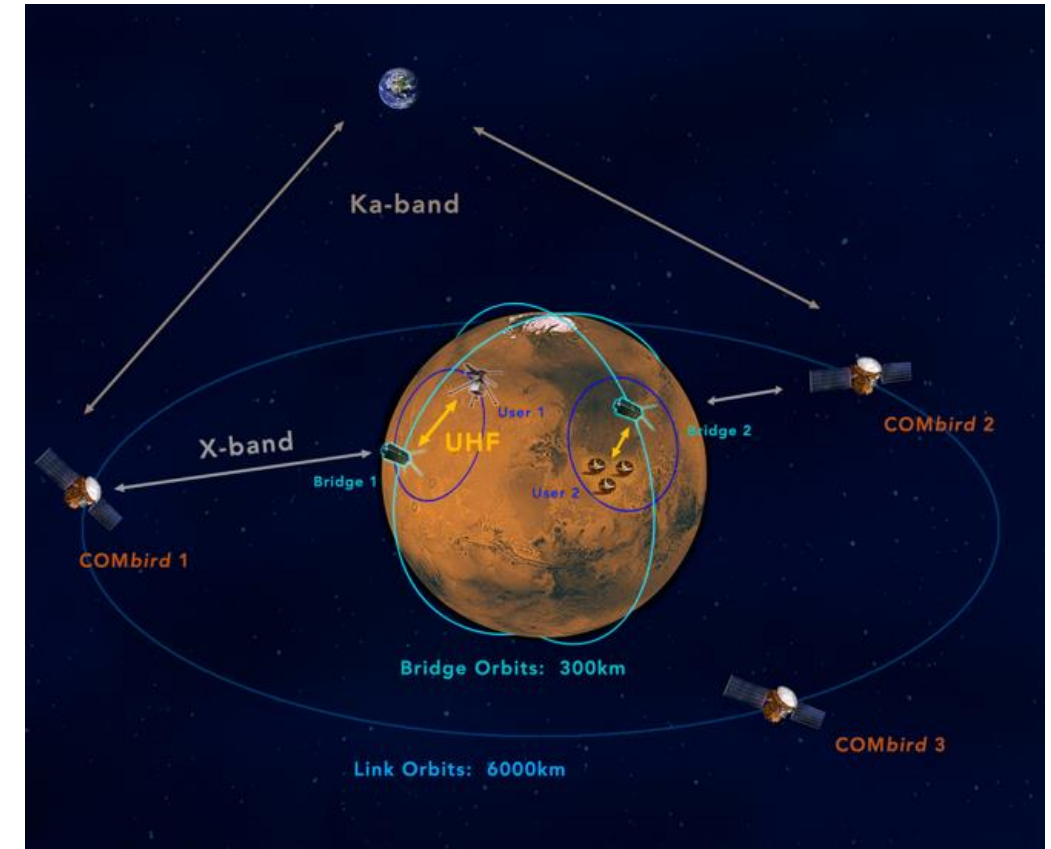
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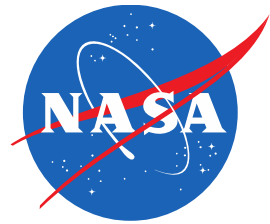
# Key Features of a Next-Generation Mars Relay Network

- **Greatly increased contact time/service availability**
  - Three orbiters in higher-altitude (~6000 km) relay orbits
- **Greatly increased data return**
  - High-rate directional X-band proximity links (in addition to legacy UHF omni links)
  - Ka-band DTE links on relay orbiters to handle high-rate long-haul “trunk line” back to Earth
- **Relay support to both landers and orbiters**
  - Smallsat/cubesat-class orbiters can achieve MRO-class data return



Notional concept for Next-Generation Mars Relay Network

Relay User	Relay Data Return	
	Current Relay Network	Next-Gen Relay Network
Science Orbiter	No relay service available	>1 Tb/day (>> MRO's 30 Gb/day)
Curiosity-class Lander/Rover	~1 Gb/sol	200 Gb /sol



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