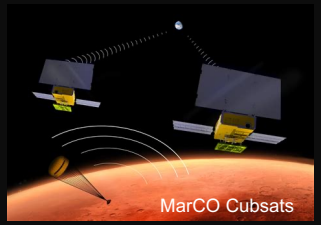
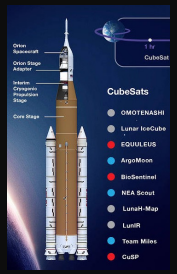
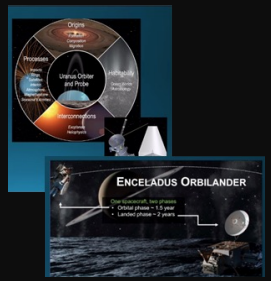
A Demand Access System for Deep Space Operations

Motivation:

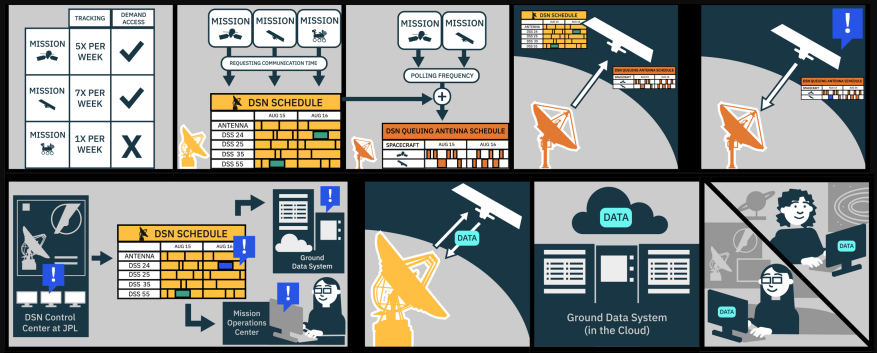
- Future deep space mission suite is diverse: Constellations/fleets of smallsats, new outer planet missions, lunar exploration.
- We expect the DSN to support more missions than ever before.







New Technology: Ground support is provided to missions upon request from the spacecraft, which is placed via a smaller (and cheaper) queuing antenna.



Benefits:

- The mission and/or science operations team can get updates on the high-level state of the vehicle(s) more often, even for constellations or fleets of spacecraft.
- DSN (and ground data system) time can be allocated in response to engineering and/or scientific events that are unknown or unpredictable during activity planning and command sequencing.
- Service can be provided across the entire solar system despite using a smaller queuing antenna.
- Operational costs can be significantly reduced: Cost of the queuing antenna is up to 50% lower than cost of DSN tracking time.

Technology Maturity:

- Request mechanism is based on technology already flight-proven by the DSN, and available in most deep space radios (e.g., JPL's IRIS radio, APL's Frontier radio).
- Flight software libraries (e.g., core Flight System) provide modules that can be leveraged/adapted for demand access operations.
- Interfaces between the DSN and the mission are based on the same technologies and procedures used today.
- JPL has conducted prototyping effort during FY21 and FY22 to mature the concept and prototype/test the required technical capabilities.
- We are interested in conducting flight technology demonstrations in the near future.