CETDP

DRAFT

Forecast of Distributed Spacecraft Technologies Supporting Code S Solar System Exploration

	Distributed Spacecraft Technologies			
SSE Roadmap Area	**Now**	**In 5 Years**	**In 10 Years**	**In 25 Years**
Operability: Autonomous, self-sufficient machines Autonomous, precision GN&C Autonomous pointing & feature tracking	• Ground based sequencing of open-loop formation • No capability •Image motion compensation	• On board sequencing of closed-loop formation • 2- vehicle autonomous precision GNC • Feature- based tracking	• on-board perception for multi vehicle •>5 vehicle 3D precision GNC for for formations • Autonomous feature recognition and tracking	•Self-organization and operation for fleets •Large fleets, constellations, and formation GNC • On board sensor fusion object • construction
Communications: Improved, low-mass telecom components New deep-space telecom capabilities In Situ communications technologies	•Low data rate capability •High latency •Limited range	•Miniature telecom •Moderate data rate, low latency •Greater than 10 km range	•Hi data rate (video BW) •Nano second latency •Greater than 1000Km range	•GPS type network around other planets •Evolveable networks •Short and long range heterogeneous communication systems
Transportation and Mobility: Autonomous GN&C for Aerobots GN&C Autonomy for Aerocapture Autonomous pointing& feature tracking	• Limited studies and demos •Limited GNC methodologies •Coarse pointing	•Trajectory control •Multi asset target recognition	•Coarse formation GNC •On board Sensor fusion	TBD
Mission Timeline		**Pluto Express, Mars Missions, Europa Lander, MUSES-CN**	**Mars, Venus Aerobots** **Outer Planet Missions** **Nepture Orbiter, Mars Orbiter**	