PACE 2012

Study Summary

Team Lead

May 8, 2012

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Presentation schedule

Start	Min	Topic
9:00	5	Welcome and Opening – Team Lead
9:05	20	System Overview – Systems Engineer
9:25	10	Mechanical Layout
9:35	10	Thermal
9:45	10	Flight Dynamics
9:55	10	Attitude Control
10:05	10	Propulsion
10:15	10	Reliability
10:25	10	Orbital Debris
10:35	10	Break
10:45	10	Launch Vehicle
10:55	10	Avionics
11:05	10	Flight Software
11:15	10	Communications
11:25	10	Electrical Power
11:35	10	Integration and Test
11:45	10	Mission Operations
11:55	5	Radiation
12:00	5	Closing – Team Lead

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PACE 2012 Mission Summary

- **MDL developed a mission concept that met the requirements of the PACE customer team**
  - Results captured in this set of presentations
  - Corrections will be made and a final set of presentations delivered to the customer team at a later date
  - Costing information to be delivered at a later date

- **Suggested areas for future work are captured in subsystem presentations**

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Mission Summary – Final version

Orbit parameters – Near-noon sun-synchronous polar:

- 700 ± 10 km circular, Sun-synchronous
- Orbit Inclination: 98.1928°
- Descending node crossing time: 12 PM ± 10 minutes
- Orbit Period: 98.77 minutes

LV – TBD by the MDL; recommendation is Antares

Launch date – October 1, 2019

Mission Lifetime – 3 year minimum, 5 desired (size consumables for 5 years)

Mass estimate –

payload: OCE CBE: 301 kg (1 assembly)
Polarimeter CBE: 60 kg total (in 2 assemblies)

mission: TBD

Power estimate –

payload: OCE CBE: 515 W avg., 648W pk
OCE Survival Heater Power CBE: 244 W avg., 349 W pk
Polarimeter CBE: 70 W observing plus 15 W operational heater;
15 W when not imaging plus 15 W op. heater;
100 W peak

Mission class – C

Disposal plans – TBD by the MDL; recommendation is controlled reentry

Study name: PACE 2012
WBS: 304029.01.04.13.01.04 "MDL PACE 2012" in remarks

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Mission Summary – Day Two

Orbit parameters – Near-noon sun-synchronous polar, 11 AM to 1 PM equatorial crossing (noon is optimal), ~700 km

LV – TBD by the MDL

Launch date – October 1, 2019

Mission Lifetime – 3 year minimum, 5 desired (size consumables for 5 years)

Mass estimate –

- payload: OCE CBE: 301 kg (1 assembly)
  Polarimeter CBE: 60 kg total (in 2 assemblies)
- mission: TBD

Power estimate –

- payload: OCE CBE: 515 W avg., 648W pk
  OCE Survival Heater Power CBE: 244 W avg., 349 W pk
  Polarimeter CBE: 70 W observing plus 15 W operational heater; 15 W when not imaging plus 15 W op. heater; 100 W peak

Mission class – C

Disposal plans – TBD by the MDL

Study name: PACE 2012
WBS: 304029.01.04.13.01.04 "MDL PACE 2012" in remarks

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Mission Summary – Day One

Orbit parameters – Near-noon sun-synchronous polar, 11 AM to 1 PM equatorial crossing (noon is optimal), ~700 km
LV – not specified
Launch date – October 1, 2019
Mission Lifetime – 3 year minimum, 5 desired (size consumables for 5 years)
Mass estimate –
    payload: TBS
    mission: TBD
Power estimate –
    payload: TBS
Mission class – C
Disposal plans – TBD

Study name: PACE 2012
WBS: 304029.01.04.13.01.04 "MDL PACE 2012" in remarks

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MDL Areas of Concentration/ Study Drivers

- **Define mission capable of meeting requirements**
- **Assume commercial bus (out of house)**
- **Develop ROM for Science Operations Center (SOC) costs**
- **Potential options for consideration by MDL, time permitting:**
  - Tilt mechanism on instrument vs. tilting S/C
  - Thermal design impacts of 11AM – 1:30 PM orbit (baseline is noon)
  - What is recommendation for Earth shield on instrument? (will be tracked on instrument MEL)
  - Determine potential RSDO S/C
    - Is the design maxing out the capabilities, or is there any left over capability (mass, power, volume)?
    - Evaluate cost of going to next larger class to have capability for secondary payload
  - What are impacts of adding a Data Broadcast capability (power, thermal, processor, flight software)?

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Study Plan for the week

- **Monday**
  AM: review study expectations and identify key issues
  PM: 1) define ConOps
  2) discuss derived subsystem requirements and ask questions

- **Tuesday**
  AM: System drivers – TBD subsystems
  PM: Rest of subsystems

- **Wednesday**
  AM: I&T Flow, Mission Ops
  PM: Presentation preparation

- **Thursday**
  AM: Check presentations for consistency
  PM: Finish presentations

- **Friday**
  Presentation with customers, including remote customer team

- **Monday following**
  1) Lessons learned, process improvements, lab status, etc.
  2) Finalize presentations and wrap up the study

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