VEXAG 2009 Feb. 25

Present Status of Japanese Venus Climate Orbiter　2009

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VCO (Planet-C) Project Team

- *VCO will be the first Japanese Venus mission*
- *It is dedicated to the meteorological survey*
- *It will be launched in May 2010 and arrive at Venus in December 2010*
- *Nominal mission life is 2 years*
- *It has 5 cameras (UV, Visible, NIRx2, LIR) to investigate the*

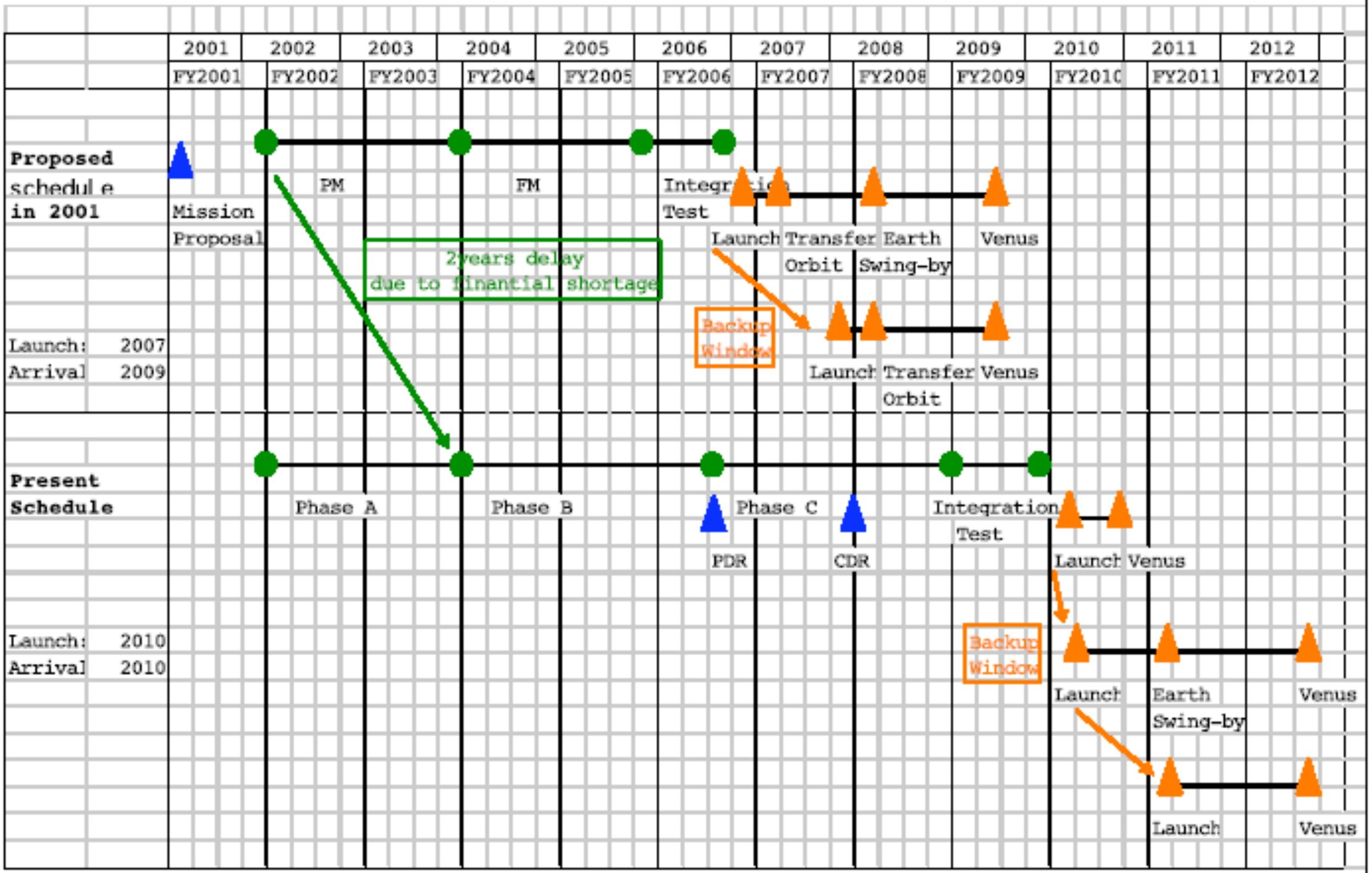
Current status of VCO development:

Critical Design Review has been carried out through Dec. 2007 to March 2008 and the mission has successfully been phased up.

The flight model is being manufactured with minor modifications from the mechanical and thermal models.

Pre-integration test was performed in late 2008.

Schedule


2001
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2007
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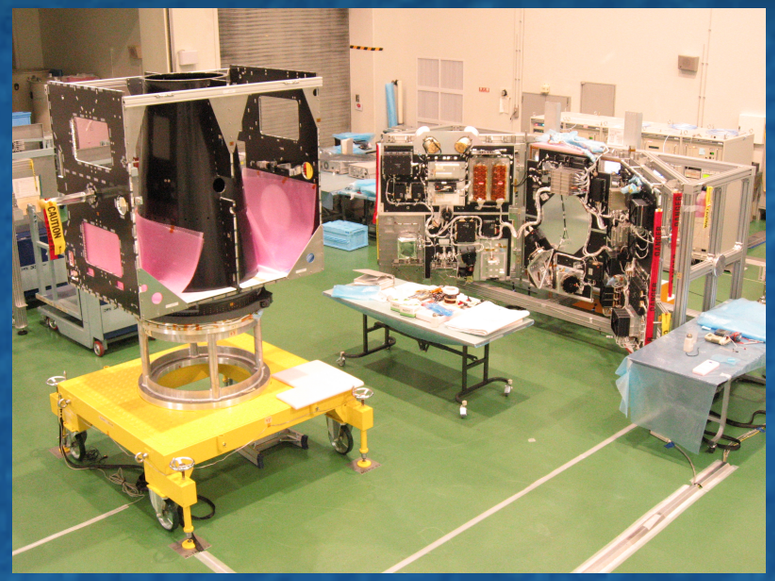
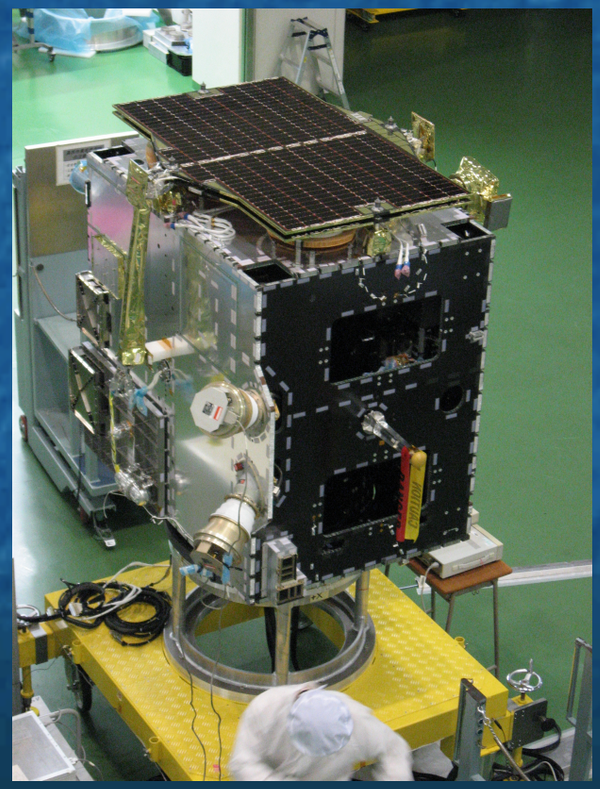
2009
2010
2011
2012
FY2001
FY2002
FY2003
FY2004
FY2005
FY2006
FY2007
FY2008
FY2009
FY2010
FY2011
FY2012
Proposed schedule in 2001
Mission Proposal
PM
FM
Integration Test
2years delay due to financial shortage
Launch
Transfer Orbit
Earth Swing-by
Venus
Backup Window
Launch
Transfer Orbit
Venus
Launch: 2007
Arrival 2009
Present Schedule
Phase A
Phase B
PDR
Phase C
CDR
Integration Test
Launch
Venus
Backup Window
Launch
Earth Swing-by
Venus
Launch
Venus
Launch: 2010
Arrival 2010

Pre-integration test

1. Electrical Compatibility
- Electrical Compatibility of components
- Functional check of components
- Functional check of the system
- Electromagnetic compatibility
- The power consumption of components

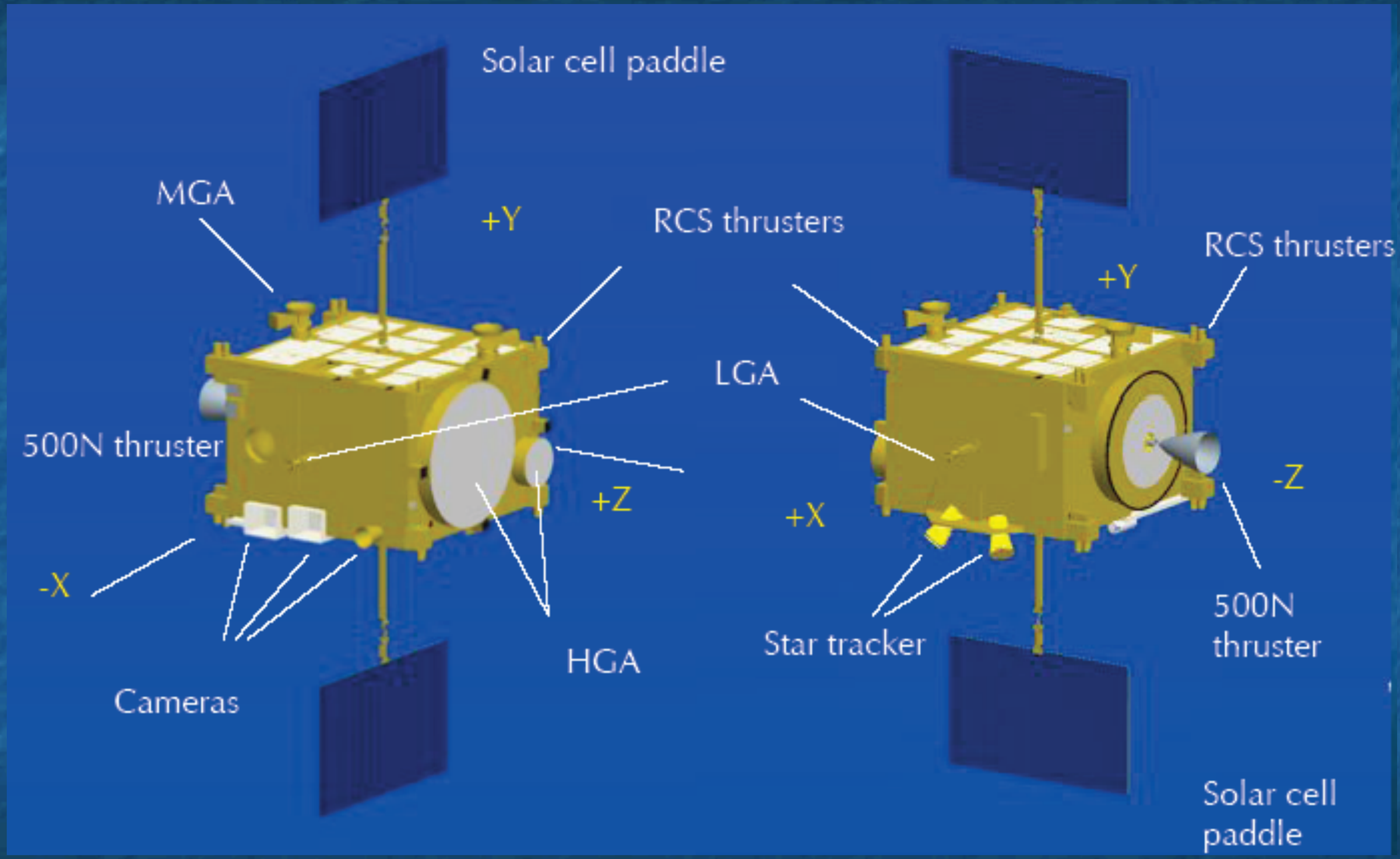


2. Mechanical Compatibility
- Mechanical Compatibility of components
- The check of an assembly procedure
- Mass properties



3. Integration test
- Power systems
- Telecommunications
- Attitude control
- Observation programs

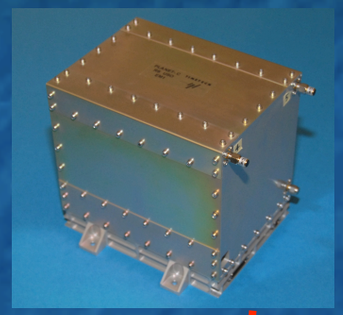
Appearance

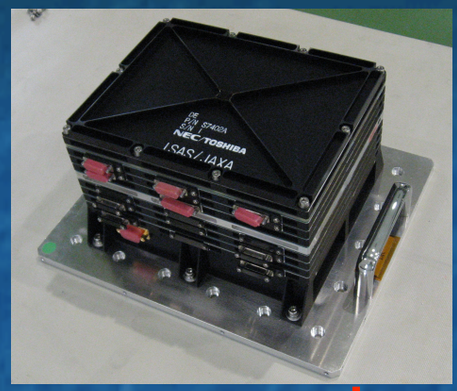


M. Nakamura et,al.

Mission instruments inside the spacecraft

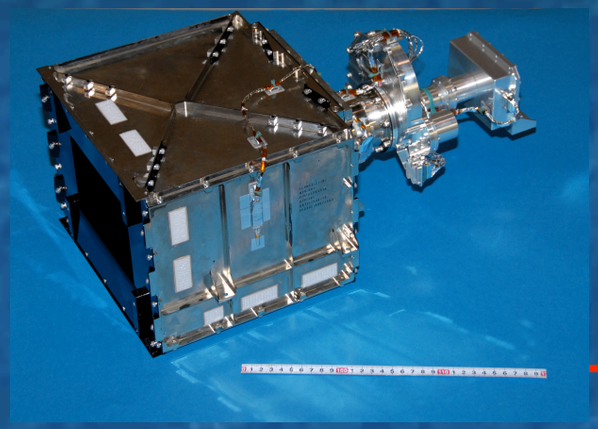
Ultra Stable Oscillator
（USO）

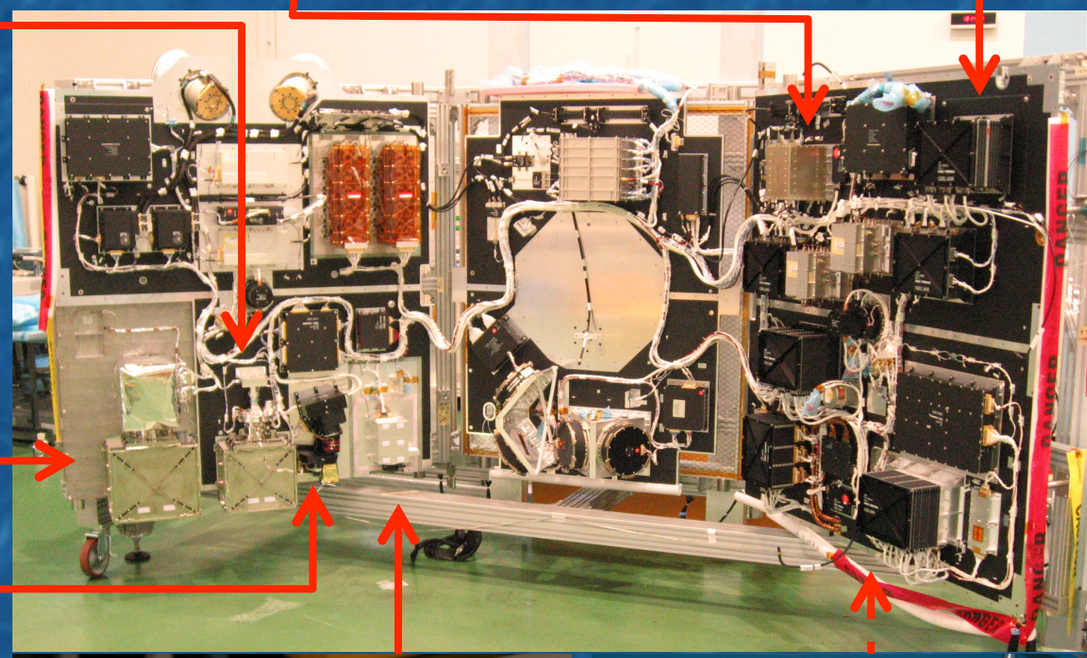




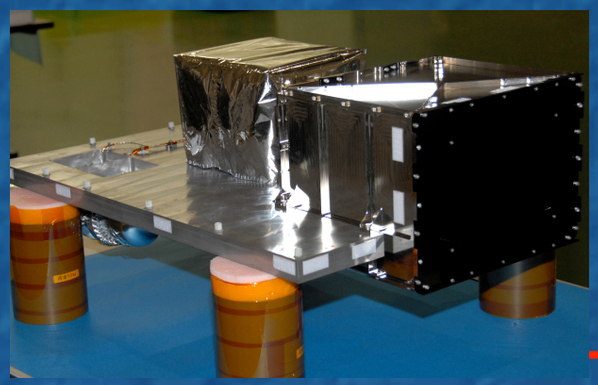
Digital
Electronics
（DE）

1μm Camera
（IR1）

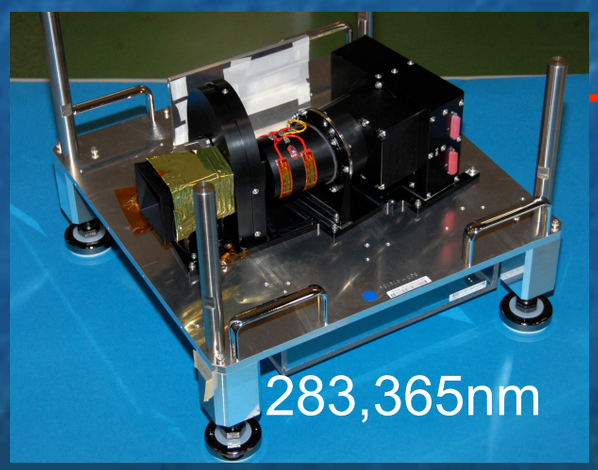


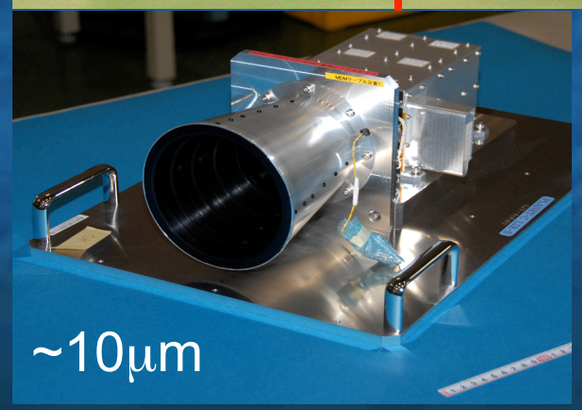


2μm Camera
（IR2）

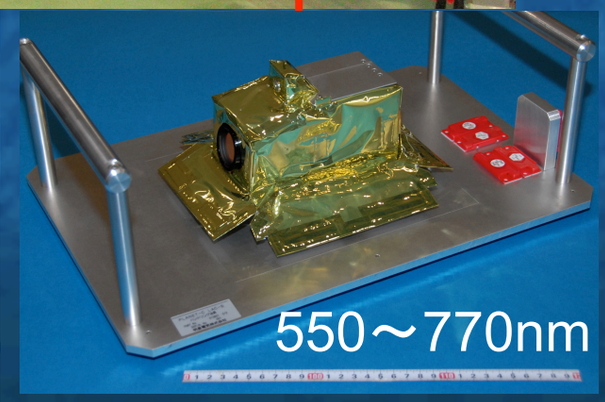


Ultraviolet
Imager
（UVI）





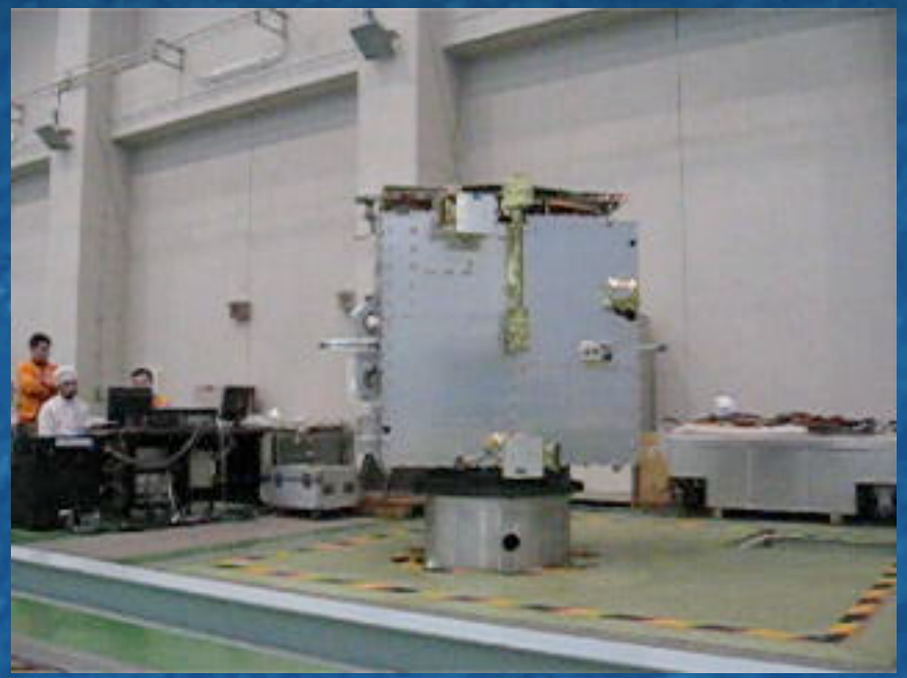
Longwave InfraRed
camera (LIR)



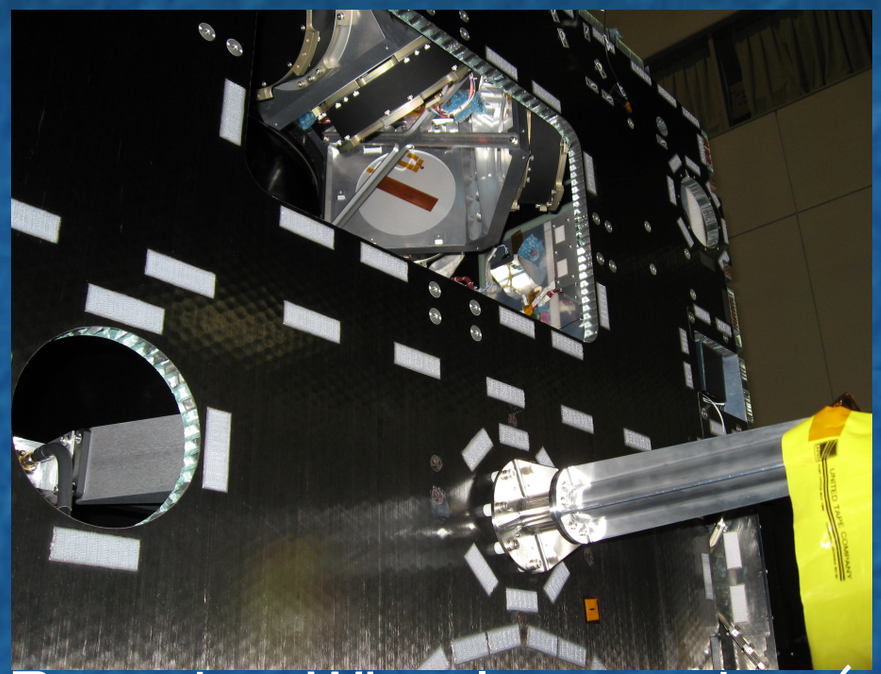
Lightning and Airglow
Camera（LAC）

Spacecraft Assembly

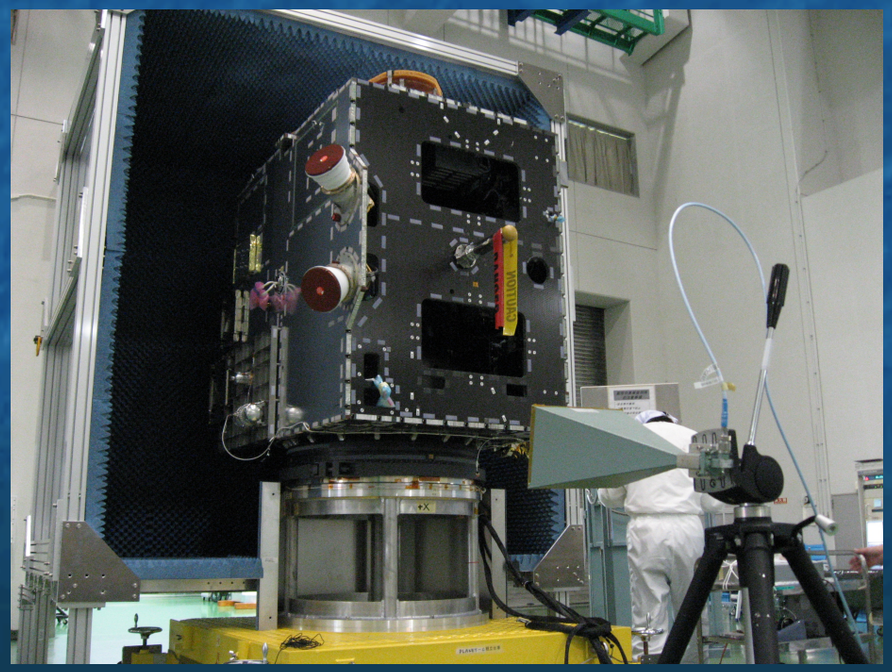
Pre-integration test



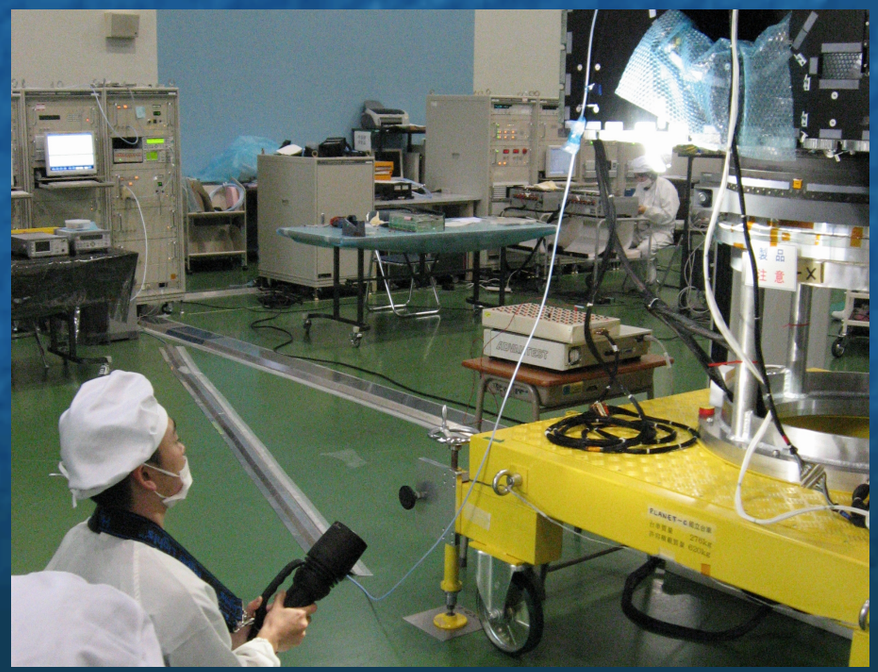
Mass Center Calibration



Reaction Wheal operation (not seen from outside)

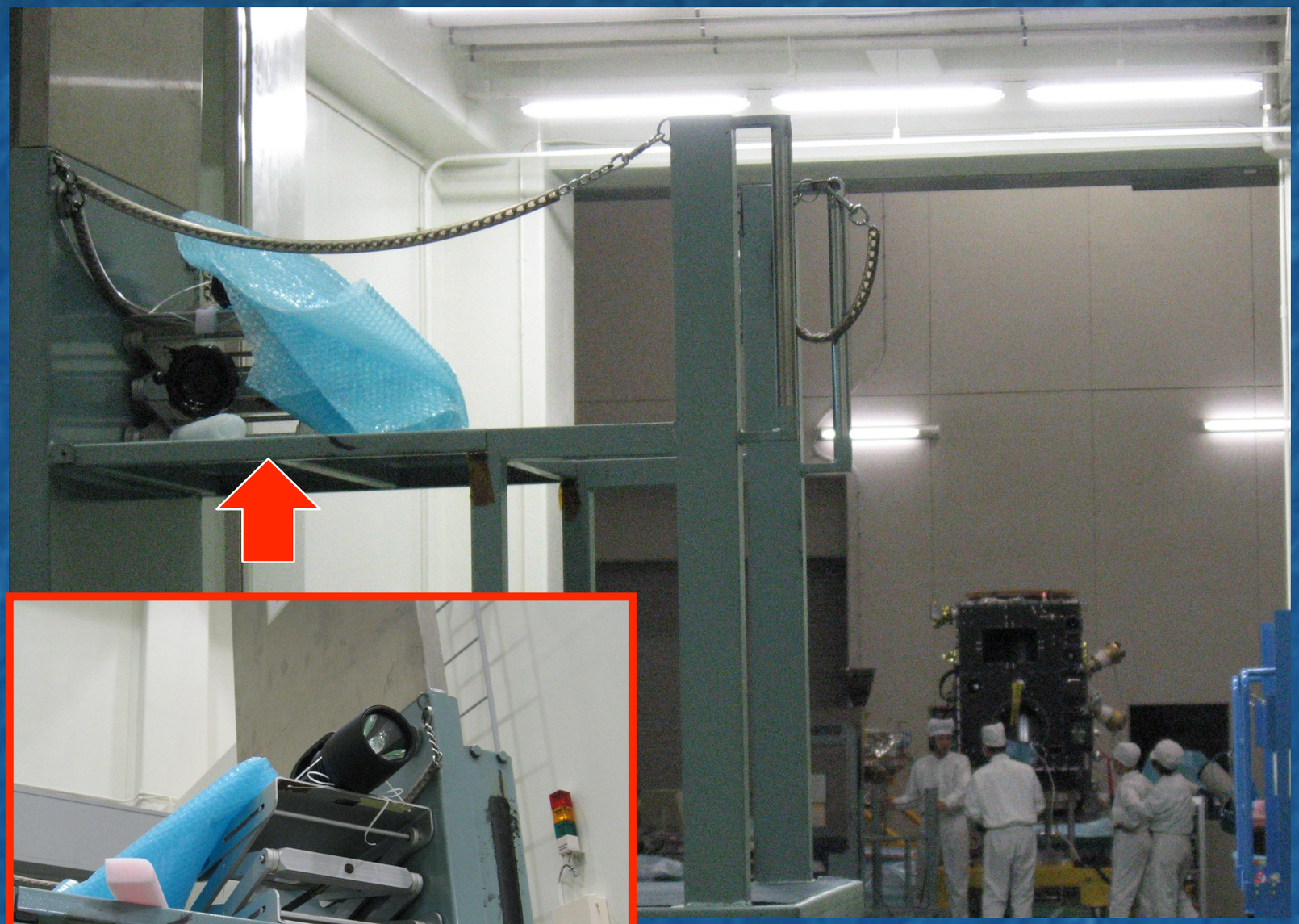


Test of the Transmitter



Calibration of the CSAS

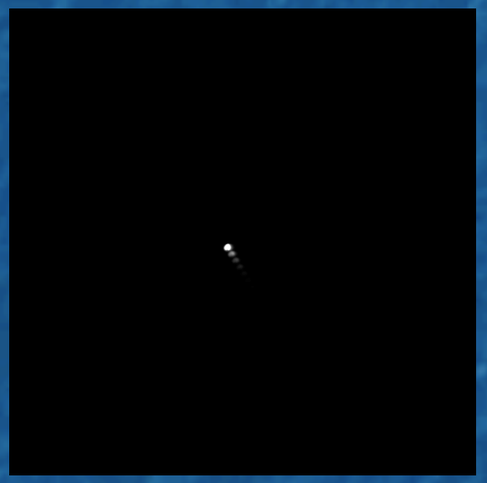
The test of observation programs



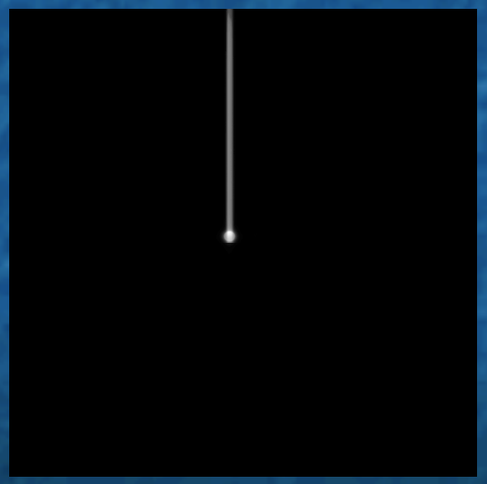
Target for Observation test

LIR

UVI



IR1



Verified items in Pre-integration test (1)

No.	Items	Component	Science Instruments										Struc.	Therm	Communication										
			IR1	IR2	IR-	LIR	LIR	UVI	UVI	DE	LA(	LA(	STF	MIN	HCI	TIN	XH(	XL(	XM	XT\	SSF	XTF	XS\	XH'	XDI	CIR	US(
	Electrical Compatibility																										
1	Electrical Compatibility of components		●	●	●	●	●	●	●	●	●	●	–	–	●	–	●	●	●	●	●	●	●	●	●	●	●
2	Functional check of components		●	●	●	●	●	●	●	●	●	●	–	–	●	–	●	●	●	●	●	●	●	●	●	●	●
3	Performance check of components		●	●	●	●	●	●	●	●	●	●	–	–	●	–	●	●	●	●	●	○	●	●	●	●	△
4	Functional check of the system		●	●	●	●	●	●	●	●	●	●	–	–	●	–	●	●	●	●	●	●	●	●	●	●	●
5	Performance check of the system		●	●	●	●	●	●	●	●	●	●	–	–	●	–	●	●	●	●	●	○	●	●	●	●	△
6	Electromagnetic compatibility		●	●	●	●	●	●	●	●	●	●	–	–	△	–	●	●	●	●	●	●	●	●	●	●	△
7	The power consumption of component		●	●	●	●	●	●	●	●	●	●	–	–	●	–	●	●	●	●	●	●	●	●	●	●	△
	Mechanical Compatibility																										
1	review of ICD		●	●	●	●	●	●	●	●	●	●	●	●	●	△	●	●	●	●	●	●	●	●	●	●	△
2	Mechanical Compatibility of componer		●	●	●	●	●	●	●	●	●	●	●	●	●	△	●	●	●	●	●	●	●	●	●	●	△
3	Instrumentation		●	●	●	●	●	●	●	●	●	●	●	●	●	△	●	●	●	●	●	●	●	●	●	●	●
4	An assembly procedure		●	●	●	●	●	●	●	●	●	●	●	●	●	△	●	●	●	●	●	●	●	●	●	●	△
5	Mass properties		●	●	●	●	●	●	●	●	●	●	●	●	●	△	●	●	●	●	●	●	●	●	●	●	△
	Thermal Control																										
1	The attachment check of MLI		●	●	–	△	–	△	–	–	△	–	△	△	–	△	△	△	△	–	–	–	–	–	–	–	–
	Pre-integration test																										
1	Observation programs		●	●	●	●	●	●	●	●	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2	Power systems		–	–	–	–	–	–	–	●	–	–	–	–	●	–	–	●	–	–	●	●	●	●	●	–	–
3	Telecommunications		–	–	–	–	–	–	–	–	–	–	–	–	–	–	●	●	●	●	●	△	●	●	●	●	△
4	Attitude control		–	–	–	–	–	–	–	●	–	–	–	–	●	–	–	●	–	–	●	●	●	●	●	–	–

●	verified in Pre-integration test	▲	verified
○	partially verified in Pre-integration test	△	to be verified
		–	N/A

Verified items in Pre-integration test (2)

No.	Items	Component	Electrical Power						Data			Attitude											
			BAT	PCU	SSR	SBD	SAP	SAD	DHU	TCIU	PIM	AOC	FSS	CSA	SPS	DRV	IRU	ACM	RW/	STT	RCS	IG-E	WHS
	Electrical Compatibility																						
1	Electrical Compatibility of components		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	△	●	△
2	Functional check of components		●	●	●	●	●	●	○	●	●	○	●	●	●	○	●	●	●	●	○	●	●
3	Performance check of components		●	●	●	●	●	●	●	●	●	○	●	●	●	○	○	○	●	○	△	●	●
4	Functional check of the system		●	●	●	●	●	△	○	●	●	○	●	●	●	○	●	●	●	●	△	●	●
5	Performance check of the systems		●	●	●	●	–	△	●	●	●	○	●	●	●	○	○	○	●	○	△	●	●
6	Electromagnetic compatibility		●	●	●	●	●	△	●	●	●	●	●	●	●	△	○	●	●	●	△	●	●
7	The power consumption of components		●	●	●	●	–	△	●	△	●	●	●	●	●	△	△	●	●	●	△	●	●
	Mechanical Compatibility																						
1	review of ICD		●	●	●	●	●	●	●	●	●	●	●	●	●	△	△	●	●	●	▲	●	●
2	Mechanical Compatibility of components		●	●	●	●	●	●	●	●	●	●	●	●	●	△	△	●	●	●	△	●	△
3	Instrumentation		●	●	●	●	●	●	●	●	●	●	●	●	●	△	△	●	●	●	△	●	●
4	An assembly procedure		●	●	●	●	●	●	●	●	●	●	●	●	●	△	△	●	●	●	▲	●	●
5	Mass properties		●	●	●	●	●	●	●	●	●	●	●	●	●	△	△	●	●	●	△	●	●
	Thermal Control																						
1	The attachment check of MLI		▲	–	–	–	▲	–	–	–	–	–	△	△	–	–	–	–	–	△	△	–	△
	Pre-integration test																						
1	Observation programs		–	–	–	–	–	–	●	–	●	–	–	–	–	–	–	–	–	–	–	–	●
2	Power systems		●	●	●	●	–	●	●	●	–	–	–	–	●	–	–	–	–	–	–	–	●
3	Telecommunications		–	–	–	–	–	–	●	●	–	–	–	–	–	–	–	–	–	–	–	–	●
4	Attitude control		–	●	●	–	–	△	●	●	–	●	●	●	–	●	●	●	●	●	△	–	●

● verified in Pre-integration test ▲ verified – N/

○ partially verified in Pre-integration test △ to be verified

Action Items

-Some software bugs must be corrected.
[DE, PCU, IR, XTRP, DRV]

-Mechanical Compatibility of some components must be improved. [WHS, WG, LGA, HGA, STR, IR, LAC, SAP, LIR]

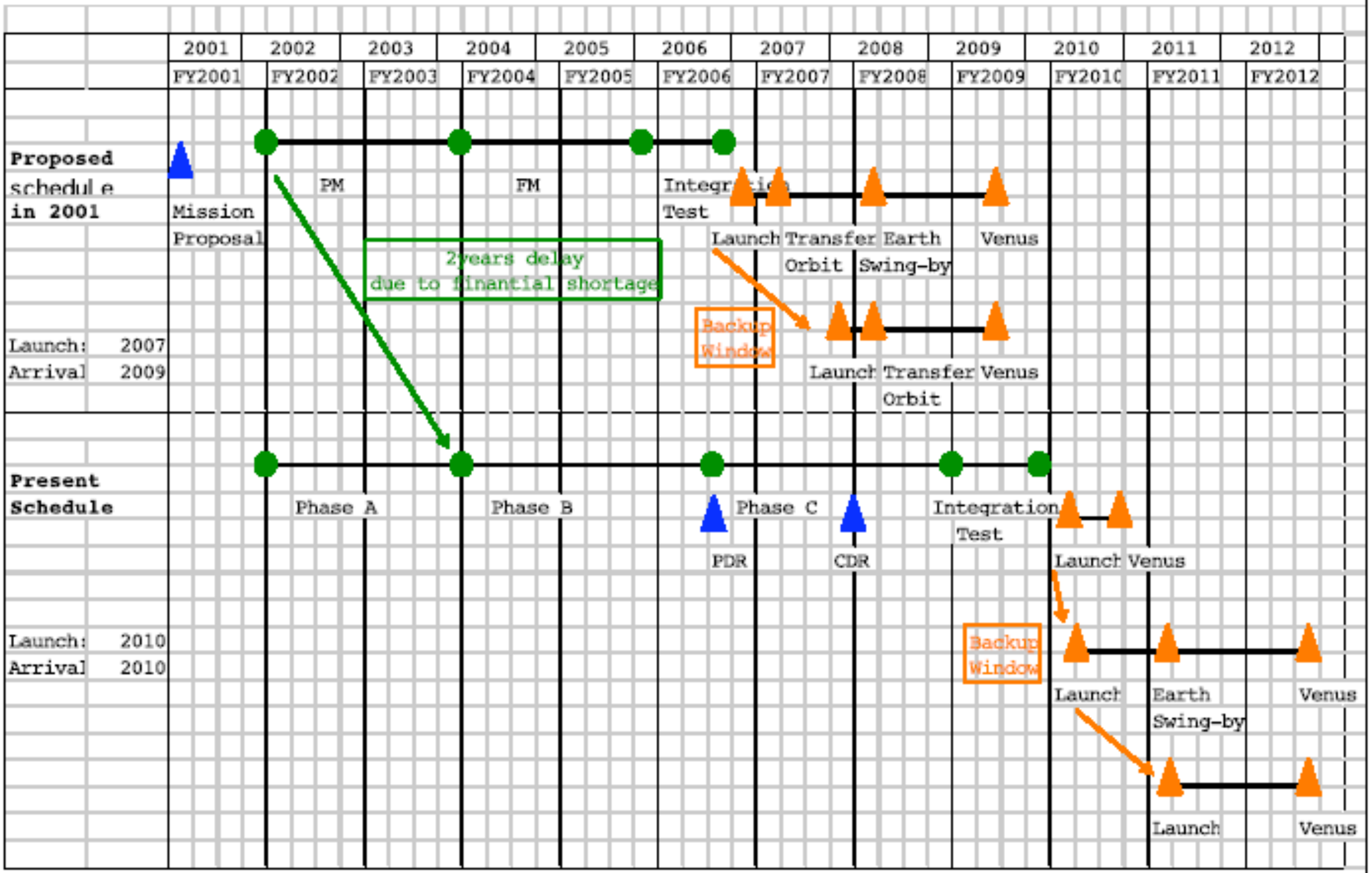
-Handling ability of some components should be improved. [UVI, BAT, LAC,]

-An improvement of a circuit is required for some components. [PCU, LAC, EPS]

Integration test in 2009

- Mechanical Compatibility of Propulsion
- The attachment check of Multi-layer insulation
- Electrical Compatibility of Thermal control system
- The definition of an operation mode
- Integration test for DHU Automation programs
- Integration test for Command Signal Selector
- integration test for Observation programs

Schedule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