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Space For The Next Generation

NEMO-HD

High Definition Video and Multispectral Earth Imaging on a Microsatellite Platform

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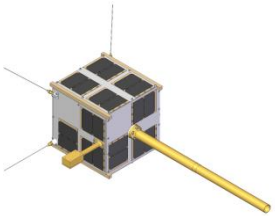
Outline

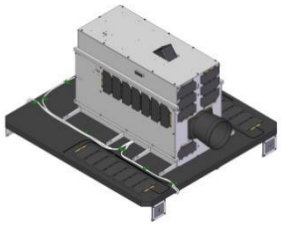
- Introduction to SFL
- Overview of NEMO-HD program
- Operational Scenarios
- NEMO-HD Spacecraft

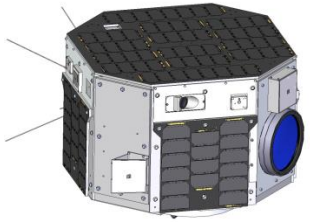
Space Flight Laboratory

- Develop high-performance nanosatellite, microsatellite, small satellite missions through enhanced microspace approach.
- 40+ years cumulative operational heritage in space.
- End-to-end capability:
  - mission concept → hardware design/manufacturing → assembly/verification → launch coordination → launch and on-orbit operations

SFL Spacecraft

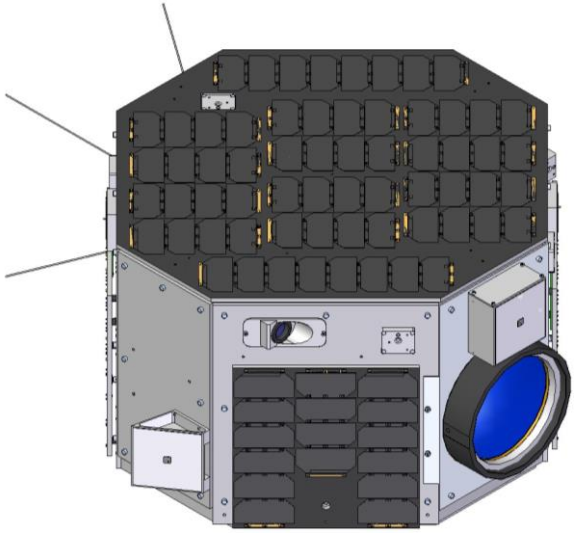






	GNB	NEMO	NEMO-150
S/C Mass (max. kg)	7	15	150
S/C Volume (cm)	20 x 20 x 20	20 x 20 x 40	60 x 60 x 60
Payload Mass (max. kg)	2	6	70
Payload Vol. (max. cm³)	1 700	8 000	108 000
S/C Peak Power (25°C BOL)	8	50	Up to 500
Payload Power (duty cycle)	3— 4W @ 100% 6W max	45W @min. 40% 65W max	50W or higher
AOCS Stability	2° (coarse) 60″ (fine)	2° (coarse) 60″ (fine)	2° (coarse) 15″ (fine)
Downlink	32k – 2Mbps	32k – 2Mbps	32k – 50Mbps

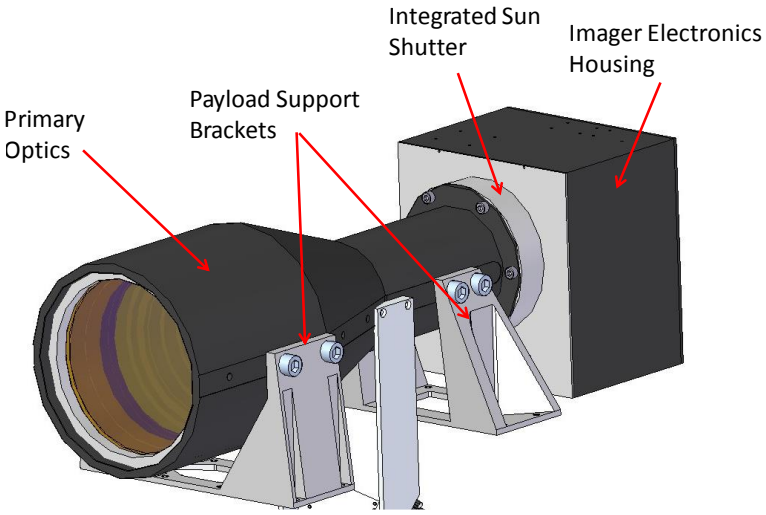
NEMO-HD Program



- Collaboration with SPACE-SI
- Mission Objective
  - High resolution multispectral imaging and real-time interactive control (**HD** Video)
- SFL-designed spacecraft and instrument
- Space-SI
  - experimental payload
  - Experimental technologies
- Primary Instrument
  - Pan-sharpened, 4-channel Multispectral imager with HD video
  - Ground Sampling Distance: 2.8 m (HRS-PAN/HR-HD), 5.8 m (HRS-MS1/2/3/4)
  - Swath: 10.8 km (HRS-PAN), 5.4 km (HR-HD), 11.9 km (HRS-MS1/2/3/4)
- Secondary low resolution (40m) HD imager

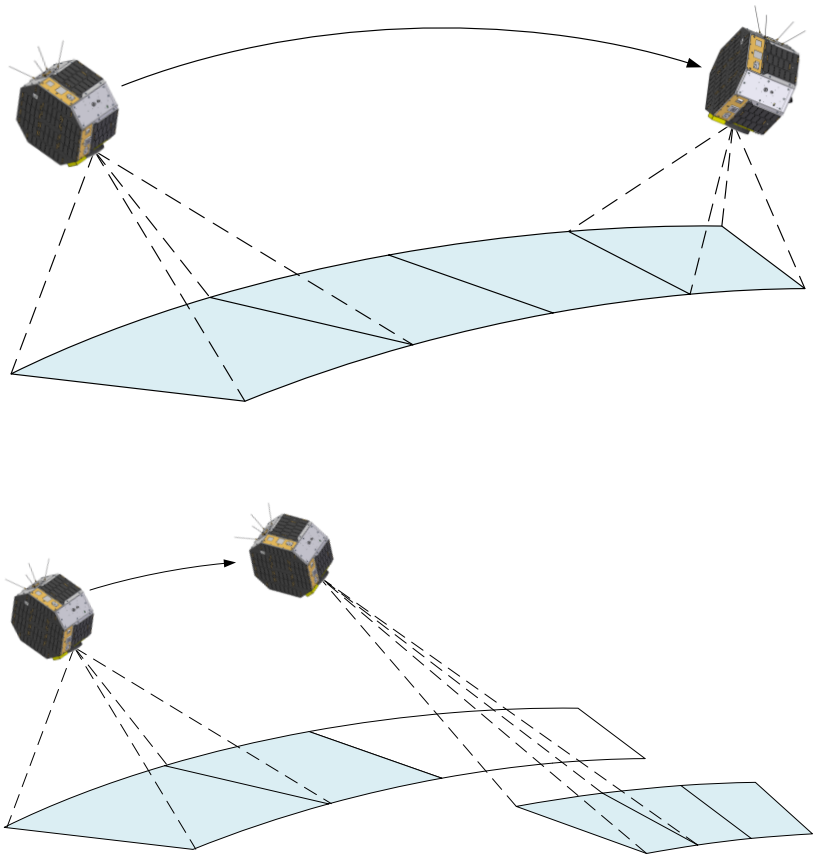
NEMO-HD Instrument

- 155 mm f/2.3 front end
- 300 lp/mm resolution provides 2.8m GSD
- Back-end optics
  - Pan/HD – 400-900 nm
  - MS1 - 420-520 nm
  - MS2 - 535-607 nm
  - MS3 - 634-686 nm
  - MS4 - 750-960 nm



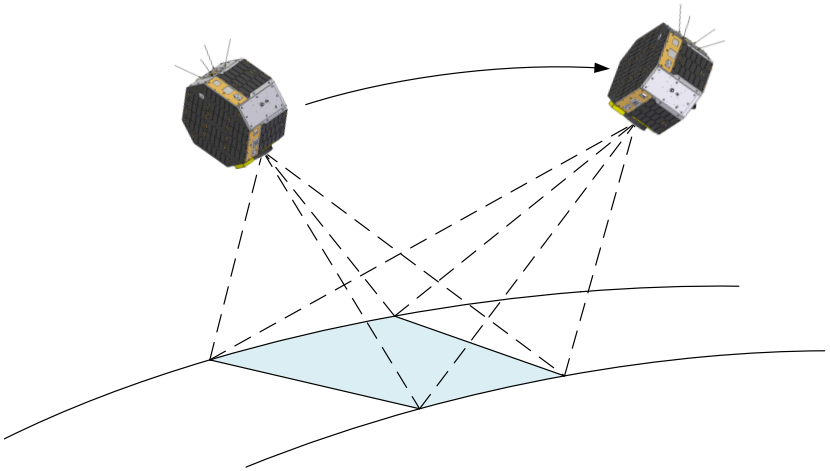
Operational Scenarios

- Nadir pointing capability with 30 degree cross-track look capability
- Simultaneous collection of real-time video and high resolution imaging

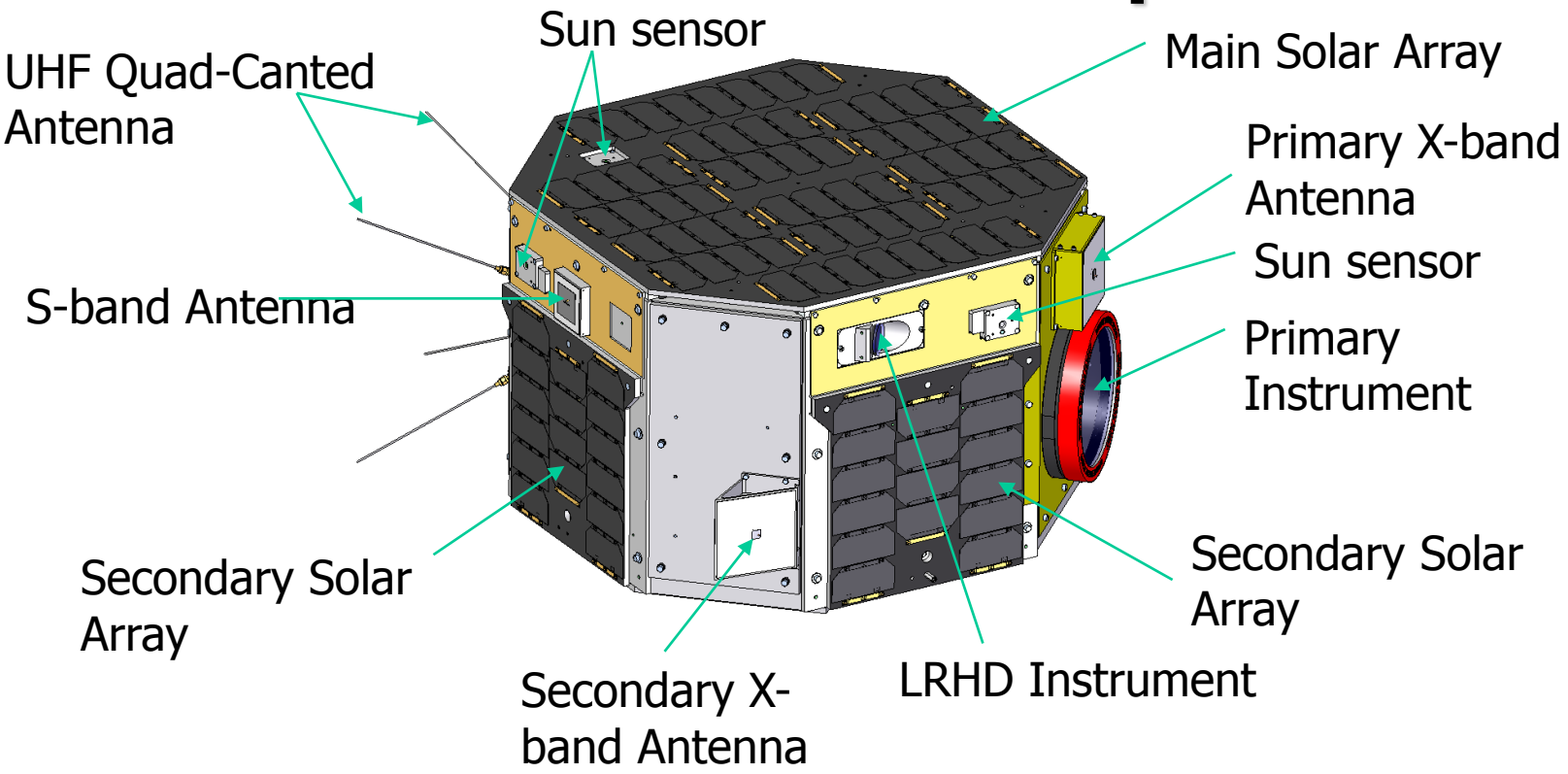


Operational Scenarios

- Capable of Automated Target Tracking
  - Multiple look angles
  - Stereo imaging
- Experimental Mode
  - LR video used for real time control
  - HR image selection based on LR video feedback



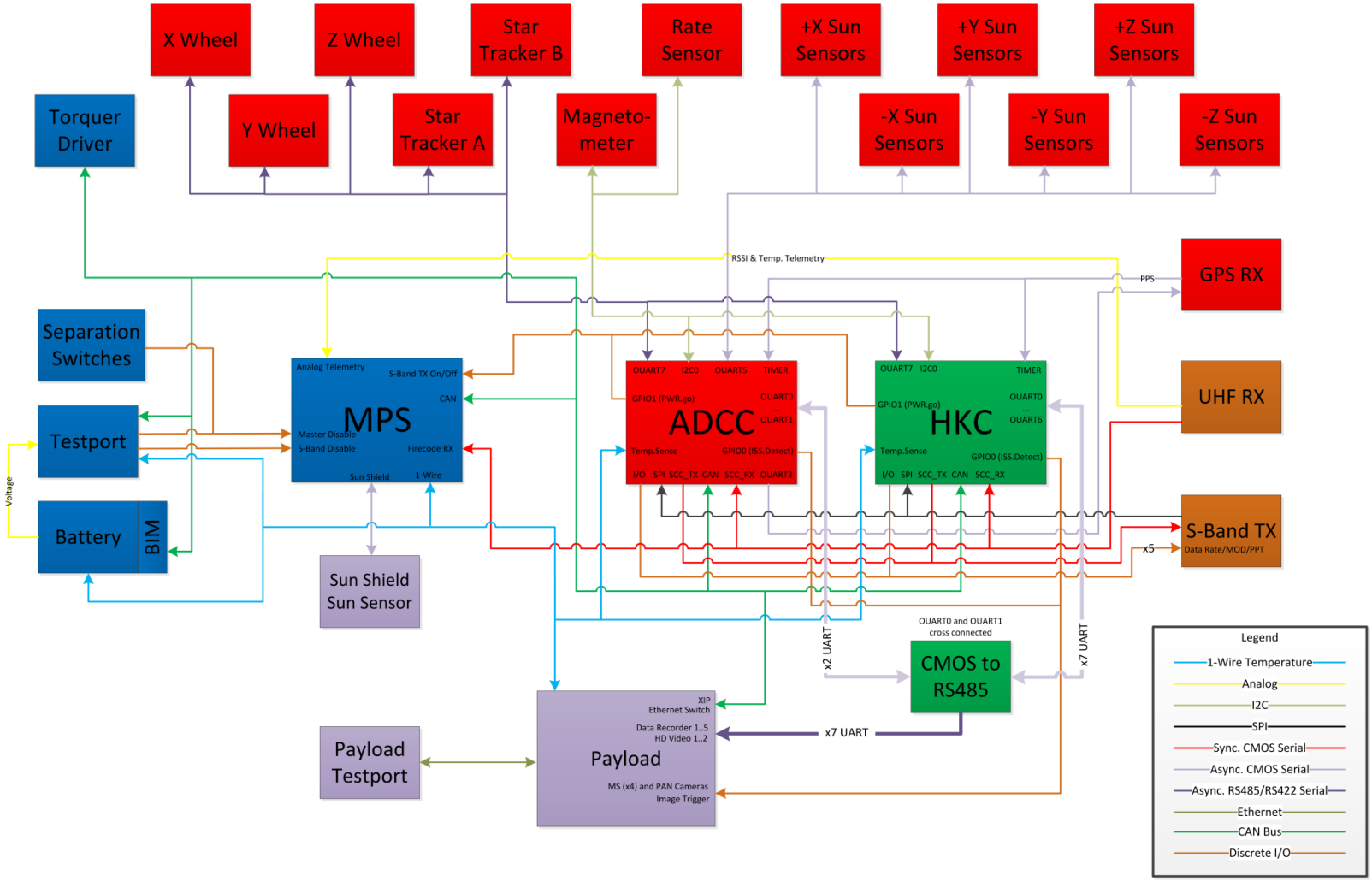
NEMO-HD Spacecraft



- 72 kg
- 600x600x300mm
- UHF/ S-band TTC

- 50 Mbps X-band data downlink
- 200W payload peak power
- 3 axis attitude control

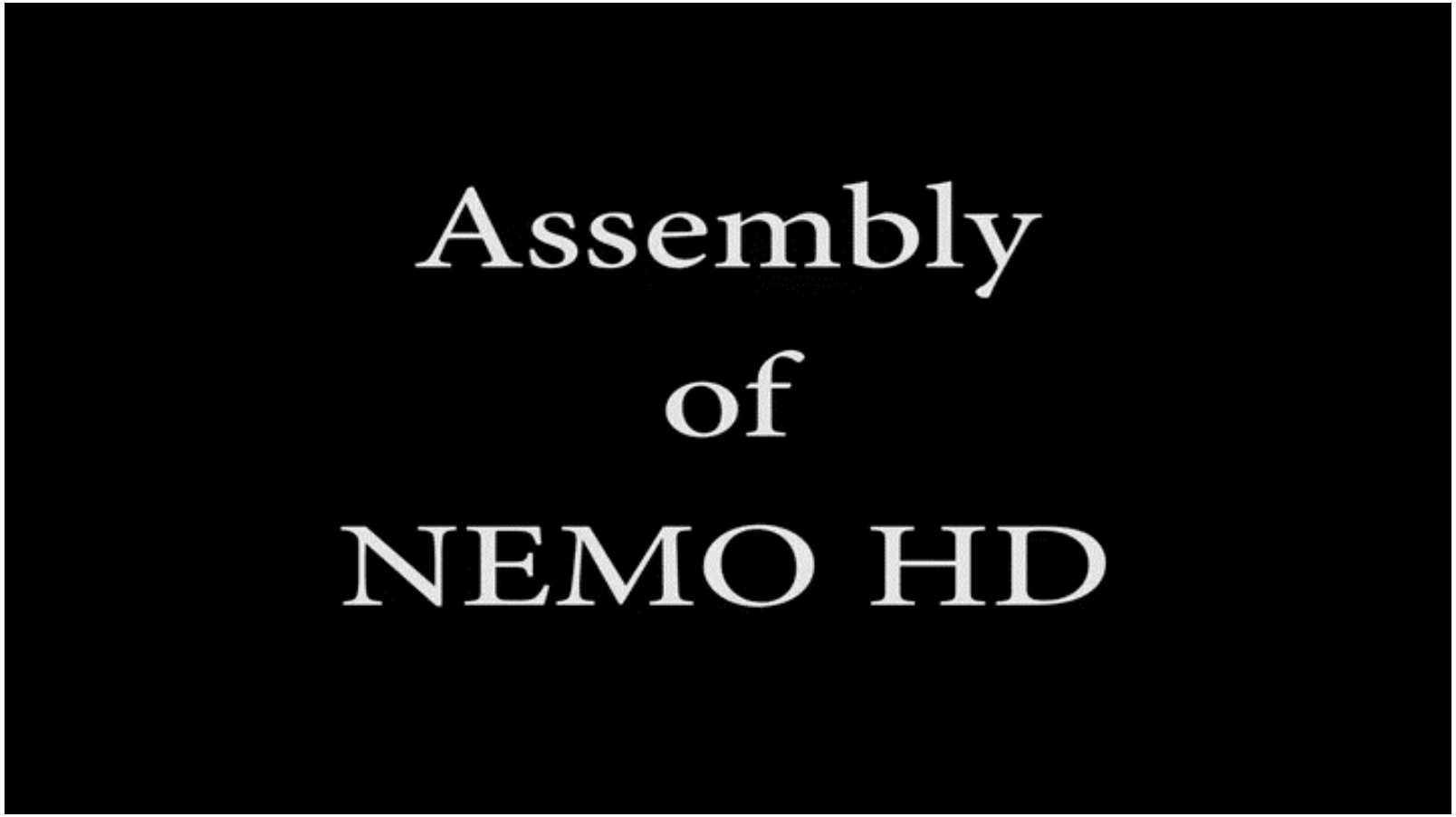
System Block Diagram



NEMO-HD Status

- Instrument in final assembly and test
- Spacecraft final assembly in progress
- Instrument – spacecraft integration Sept 2015
- Environmental test October-November 2015
- Launch contract in progress

Preliminary Spacecraft Assembly



Conclusion

- NEMO-HD provides simultaneous high and low resolution real-time HD video and high resolution pan-sharpened multispectral imagery
- Versatile platform capability wide range of imaging modes
- Versatile satellite platform capable of host a variety of EO payloads

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