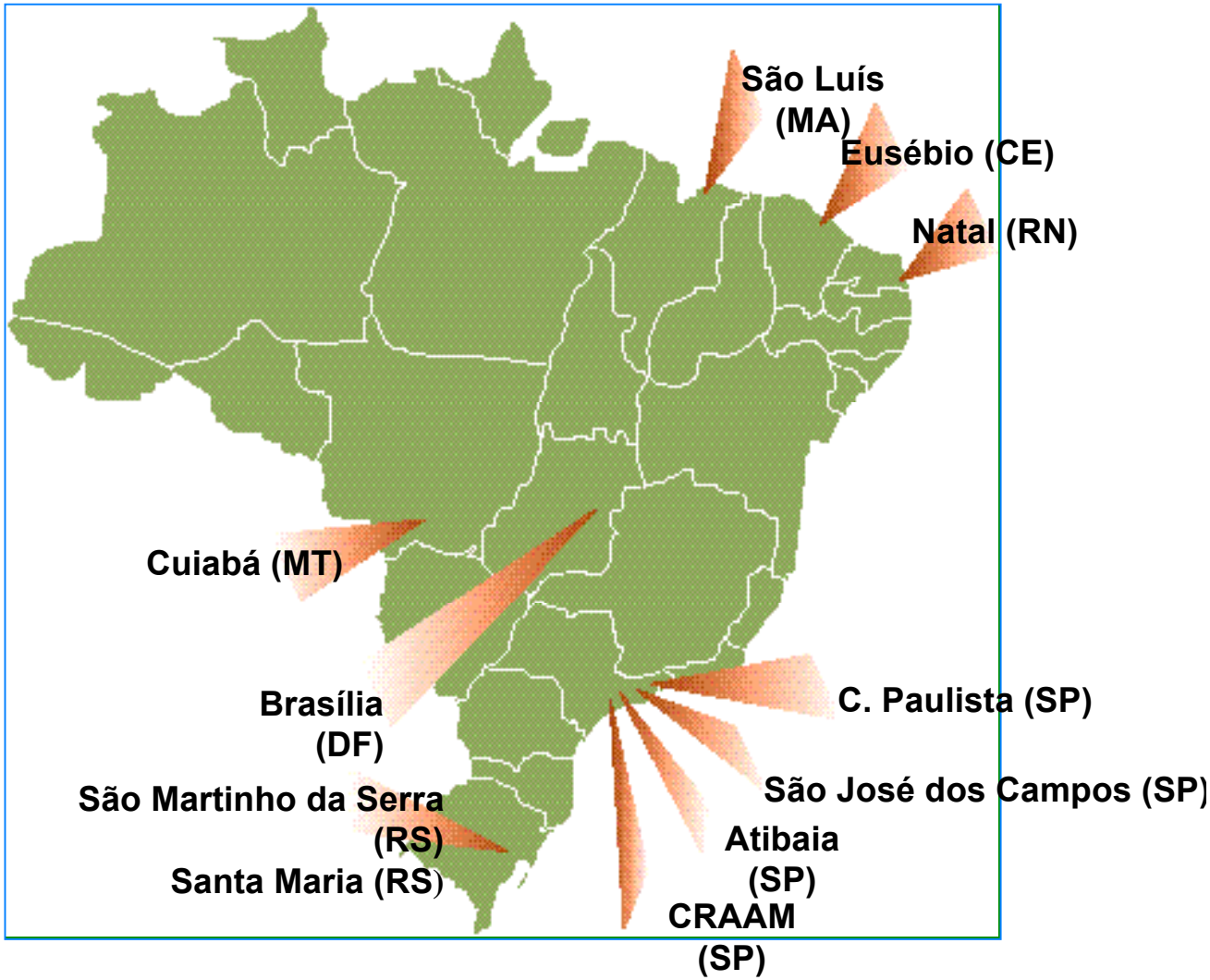
MINISTÉRIO DA CIÊNCIA E TECNOLOGIA
INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS

A Brazilian GPM Satellite Proposal

Marco Antonio Chamon

Mar/2008

Sites

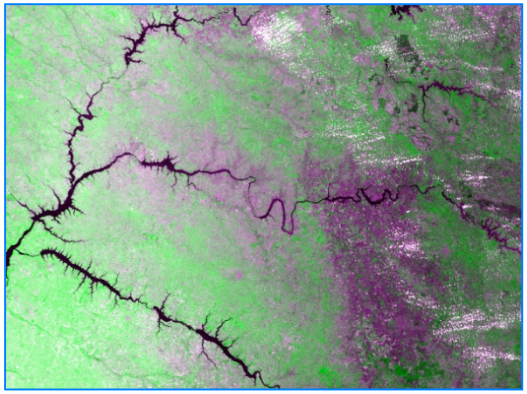

São Luís (MA)
Eusébio (CE)
Natal (RN)
Cuiabá (MT)
Brasília (DF)
C. Paulista (SP)
São José dos Campos (SP)
São Martinho da Serra (RS)
Atibaia (SP)
Santa Maria (RS)
CRAAM (SP)

Aerial view of INPE in S. J. Campos

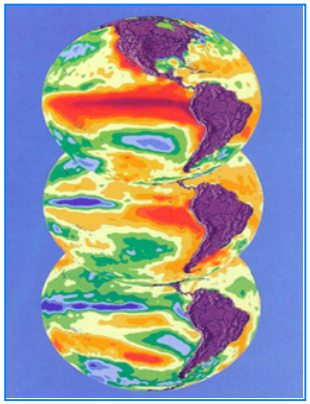
Main Areas of Activity

Space and Atmospherics Sciences

Earth Observation



Weather Forecast and Climate Studies



Space Engineering and Technology

Spatial Technology Labs

Integration and Test Facility

Satellite Tracking and Control Center

Regional Units

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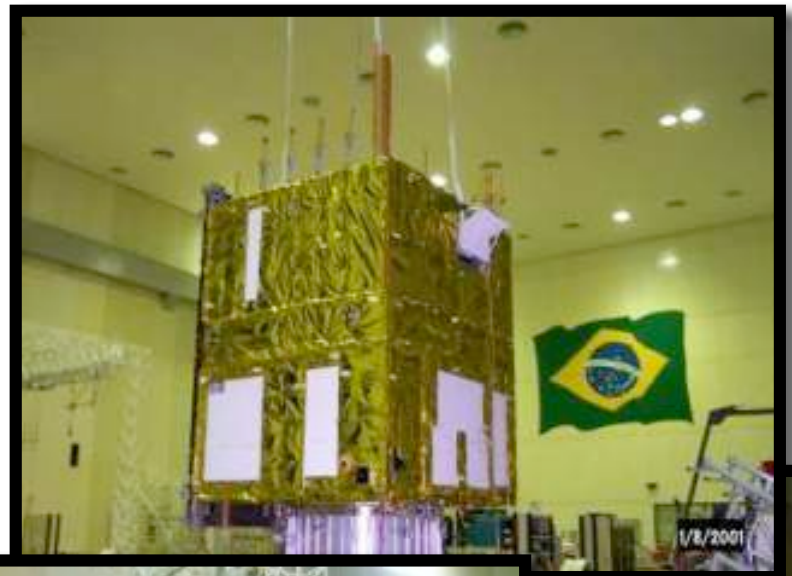
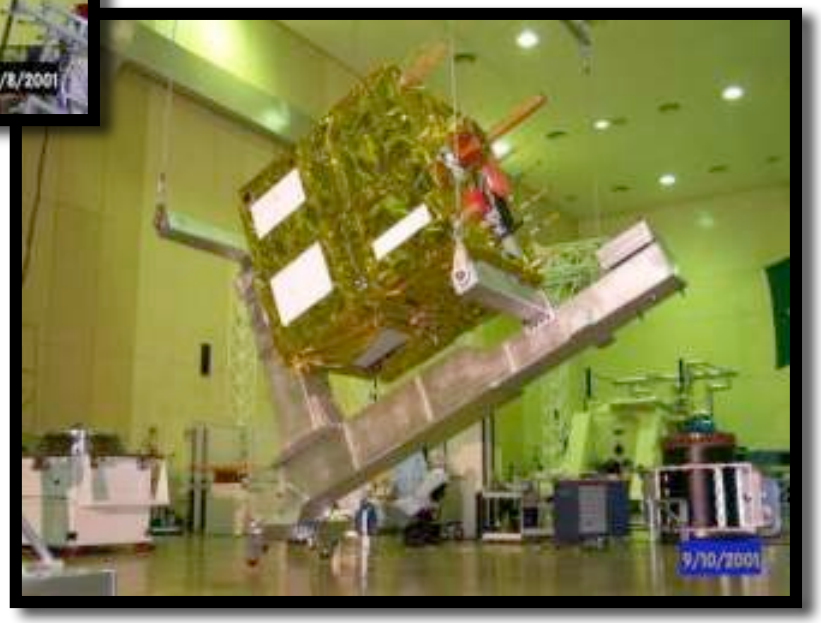
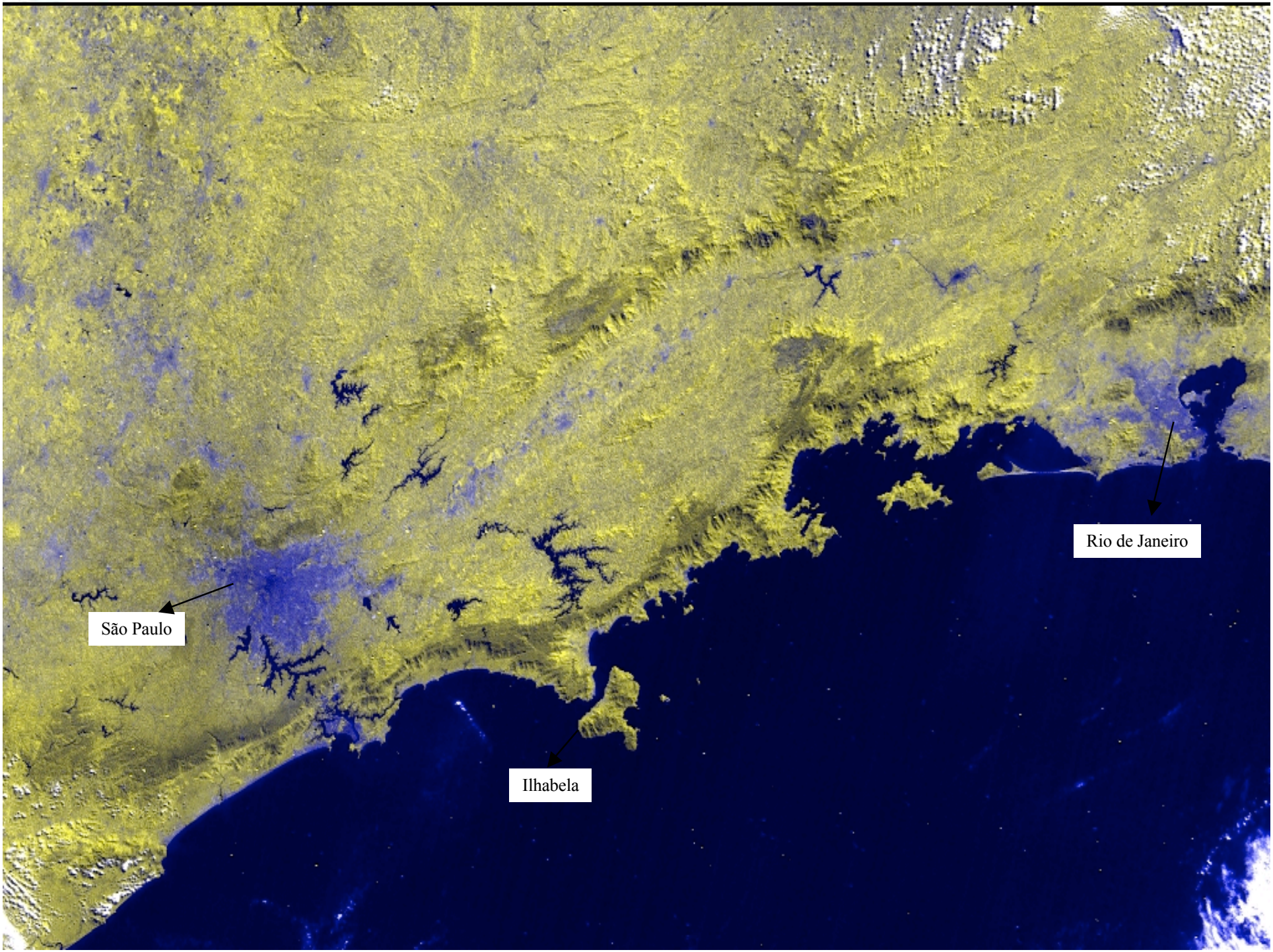
Satellite Technology

China-Brazil Earth Resources Satellite - CBERS

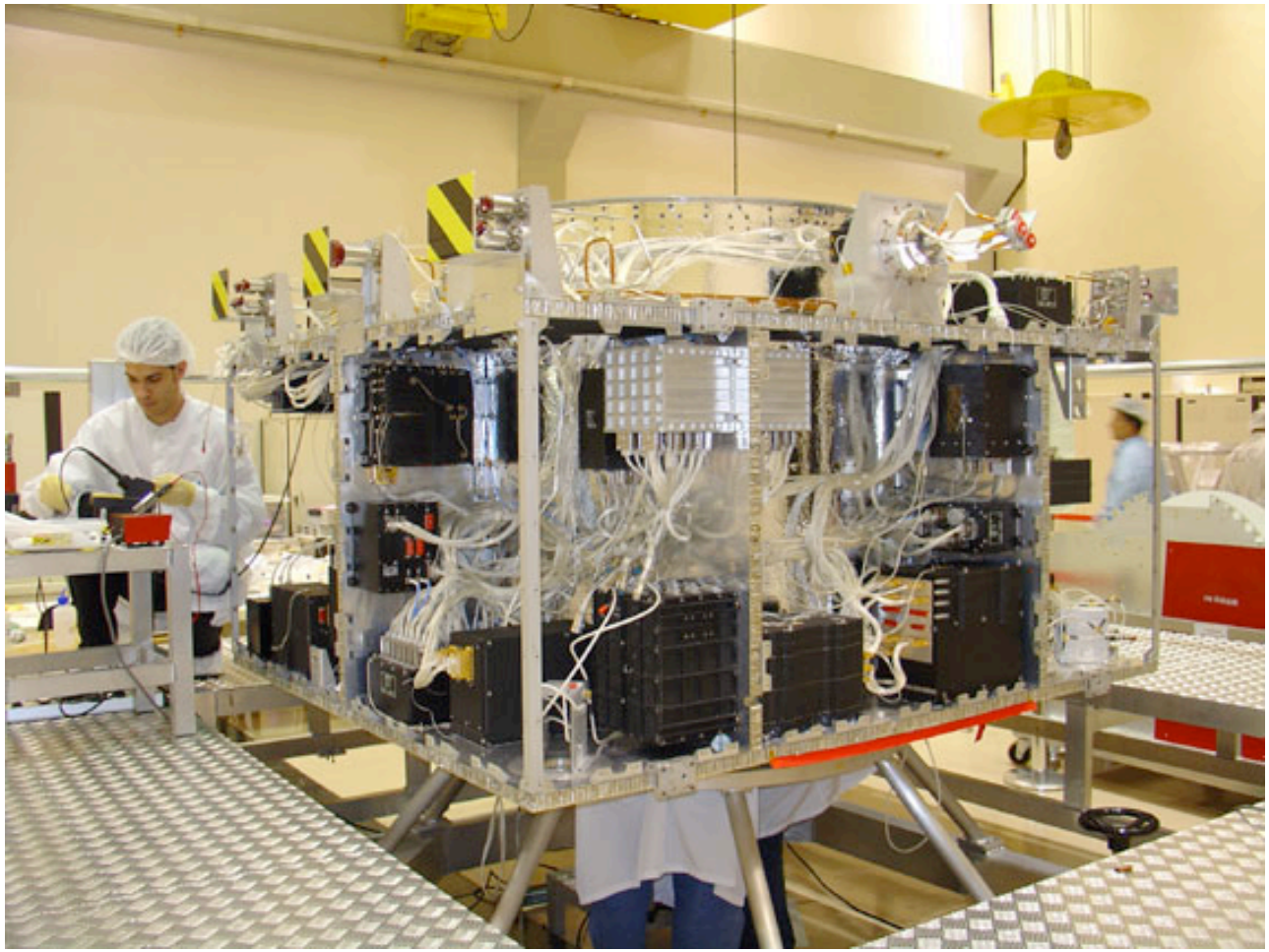




CBERS 2B – Launching

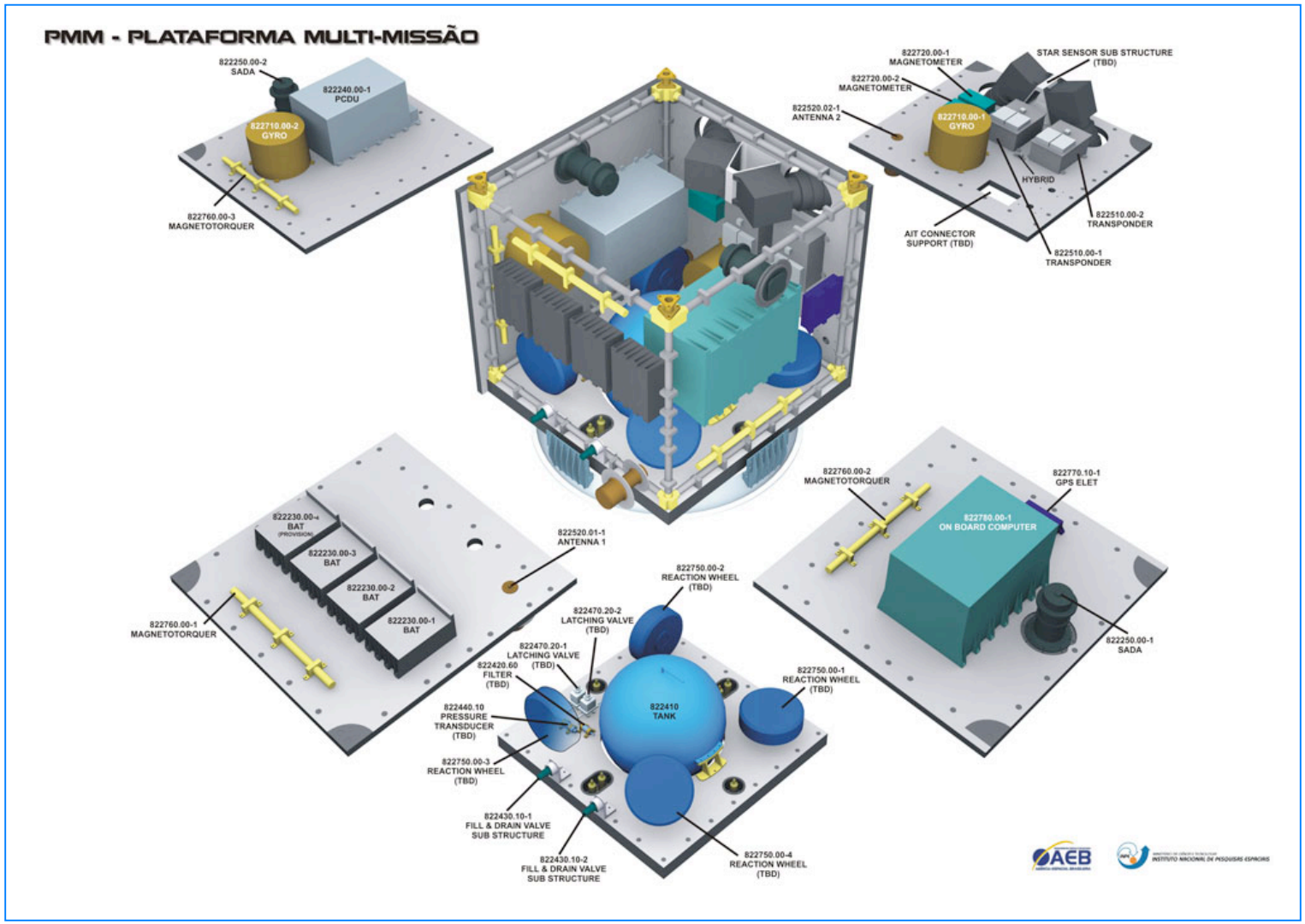

São Paulo
Ilhabela
Rio de Janeiro

CBERS – 2B

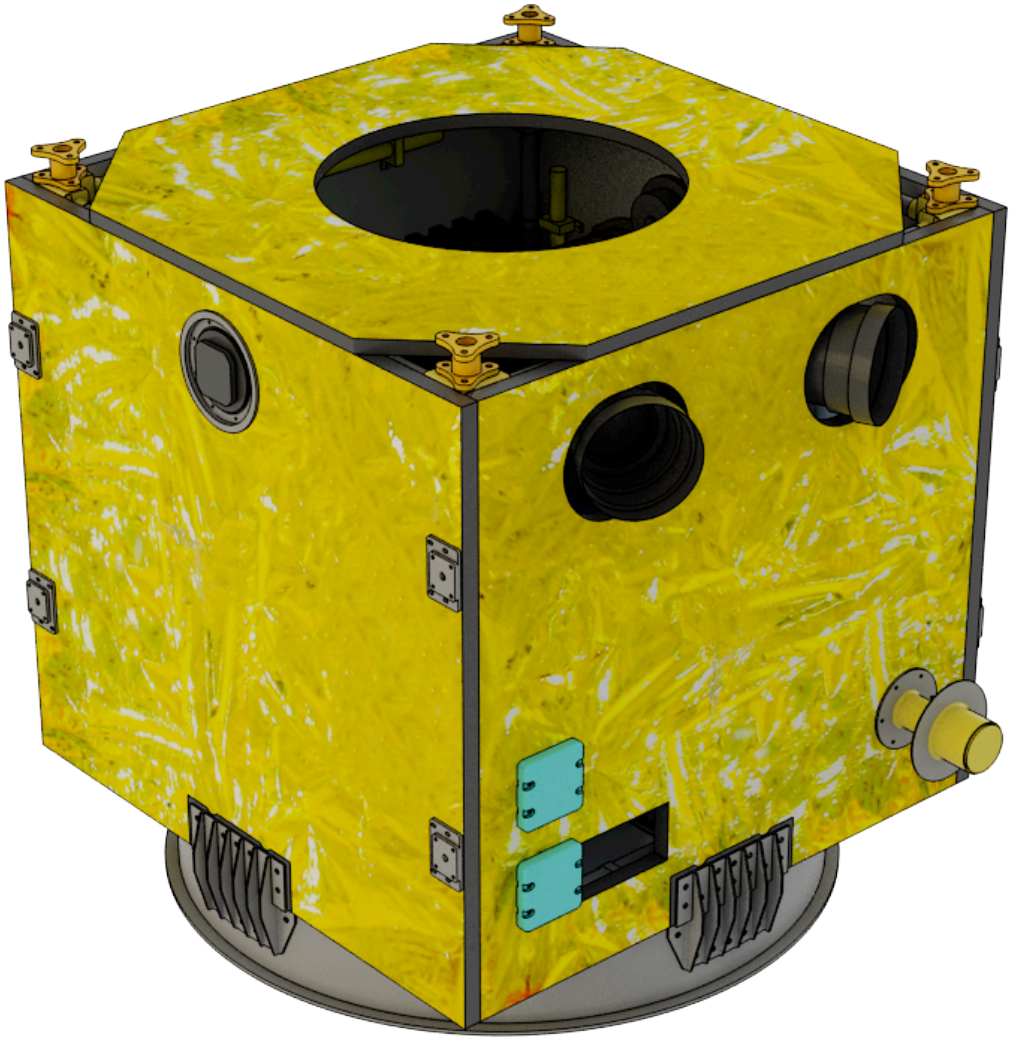


CBERS – 2B

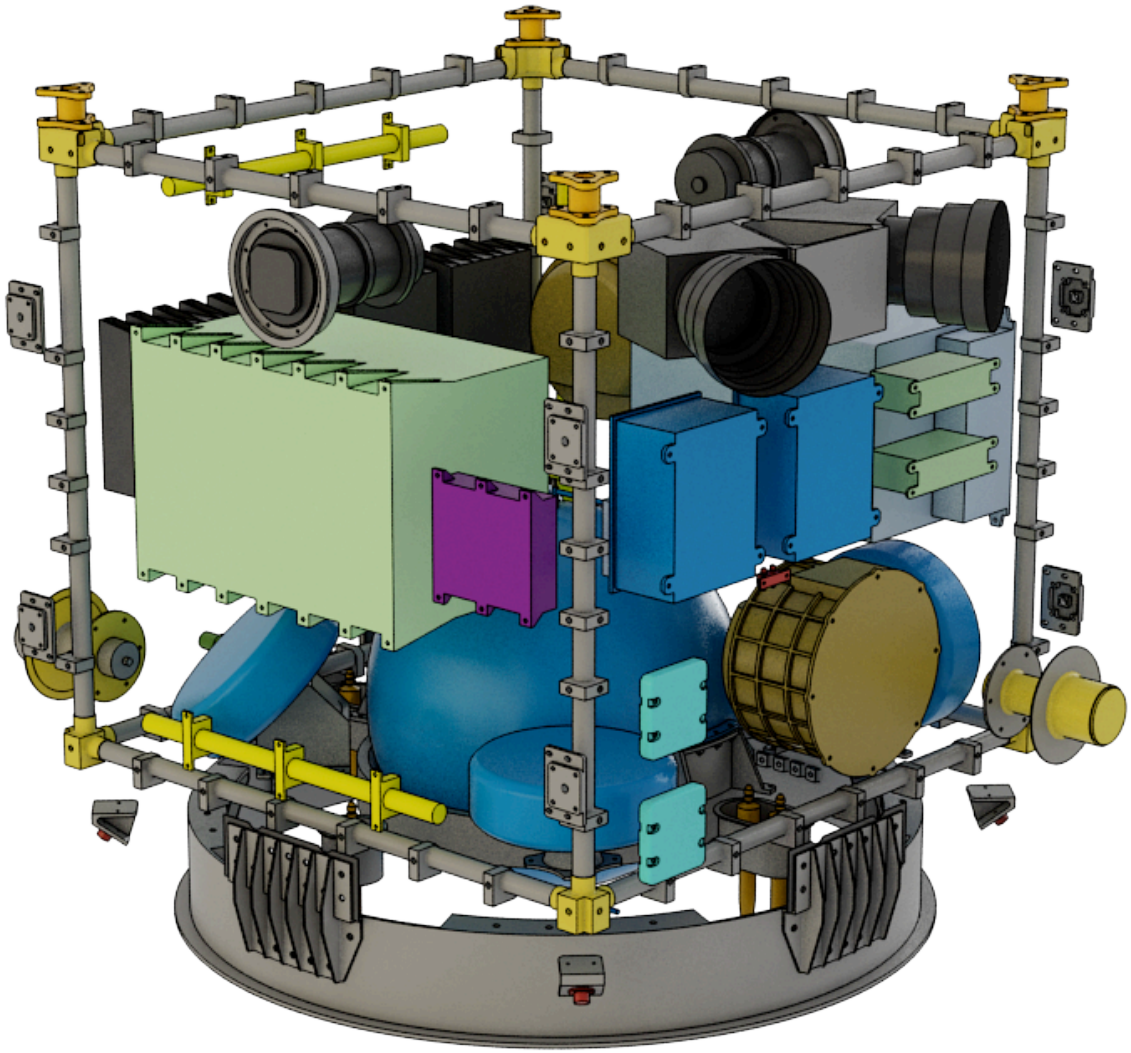
Multimission Platform



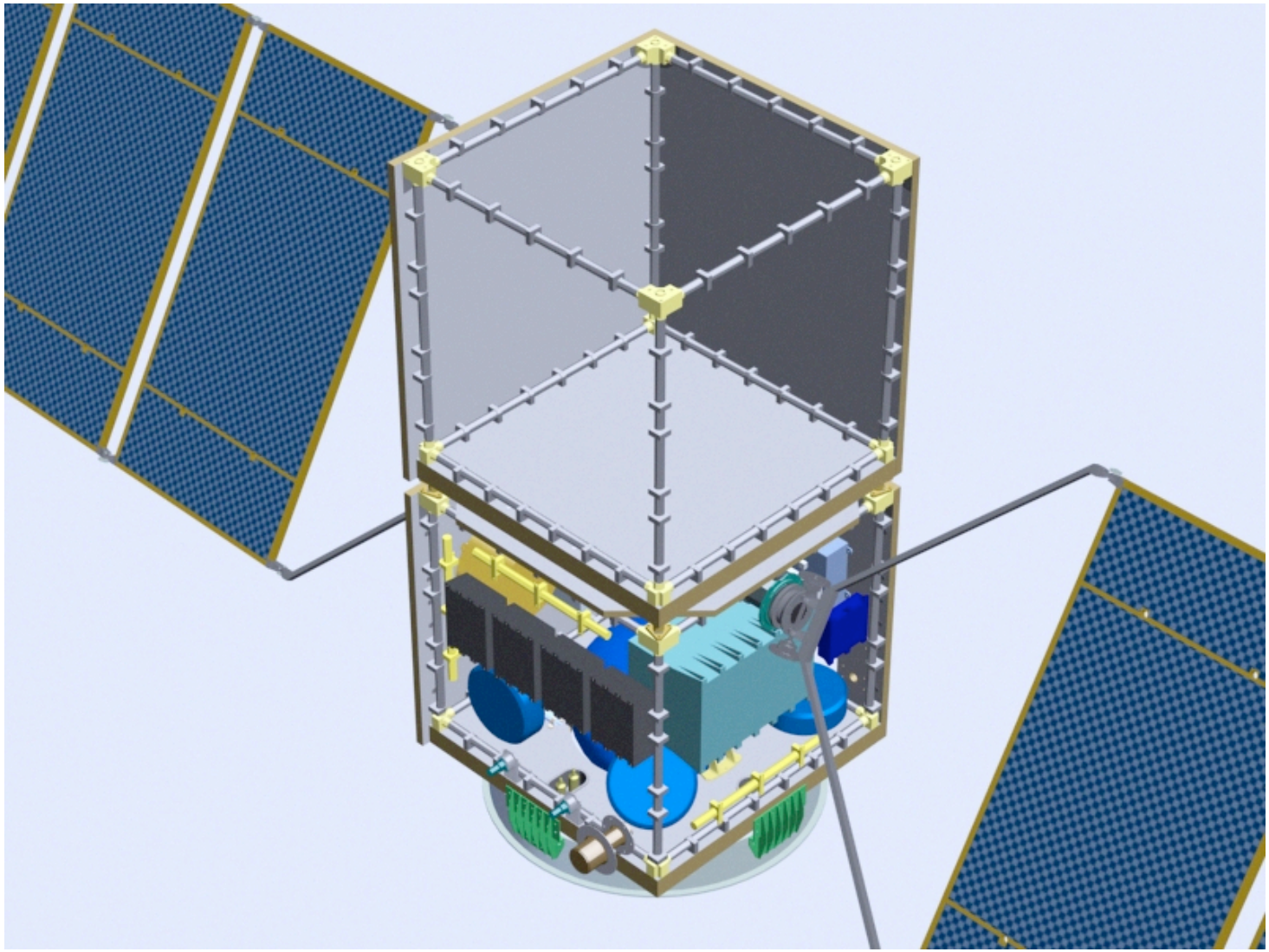
Multimission Platform - MMP



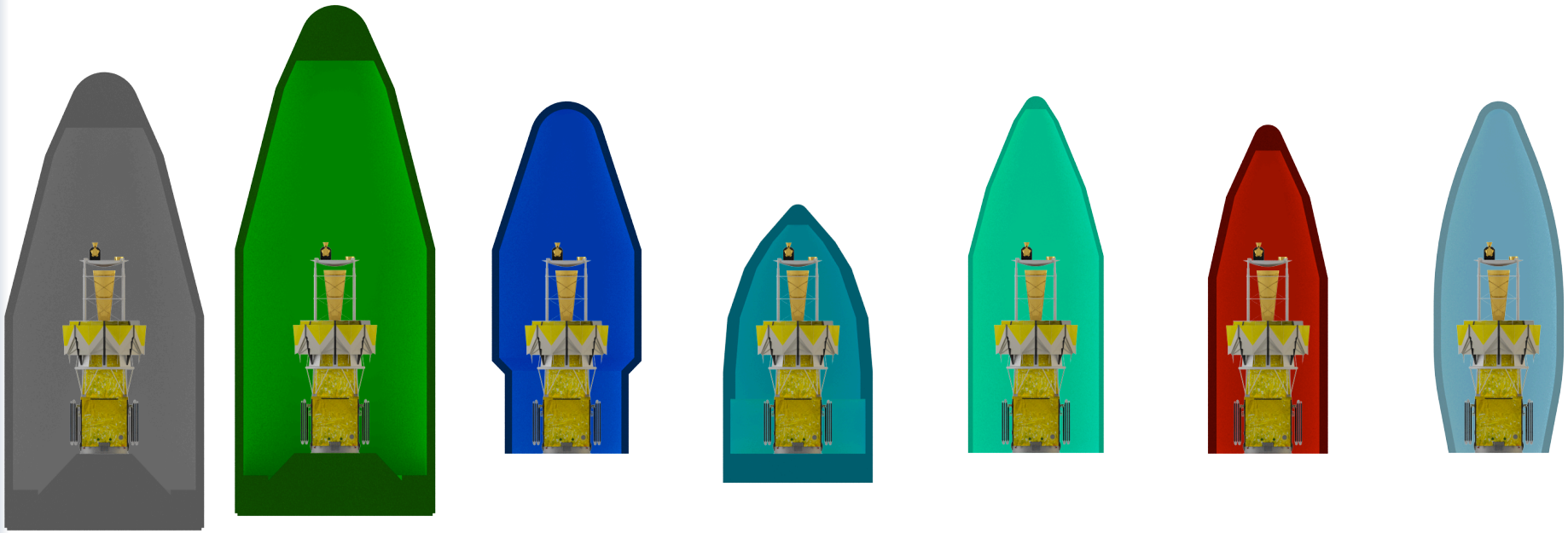
Multimission Plataform - MMP



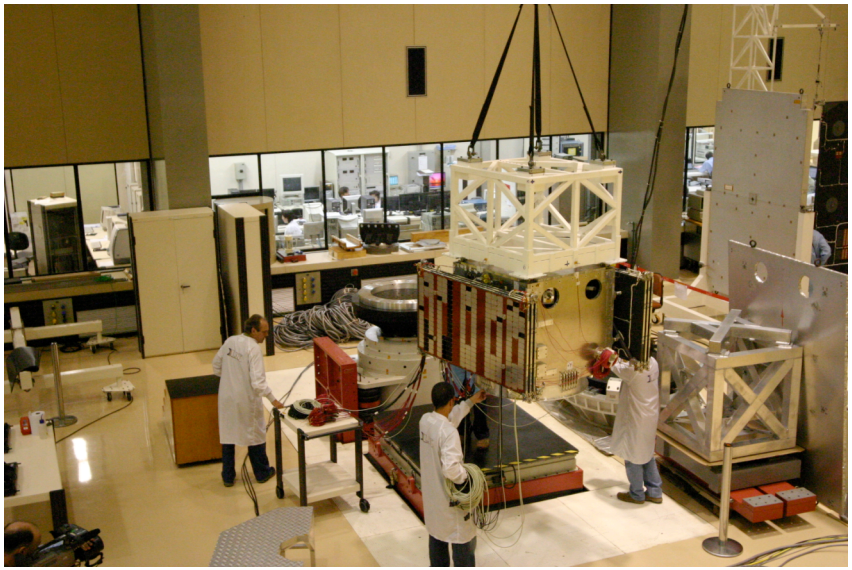
Multimission Plataform - MMP



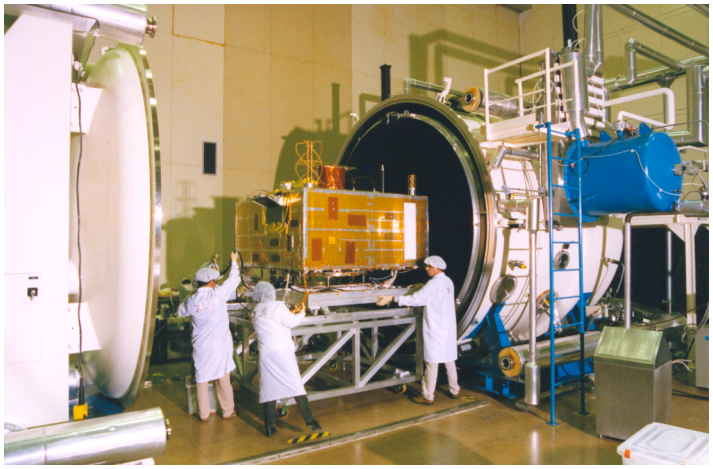
MP - Launchers

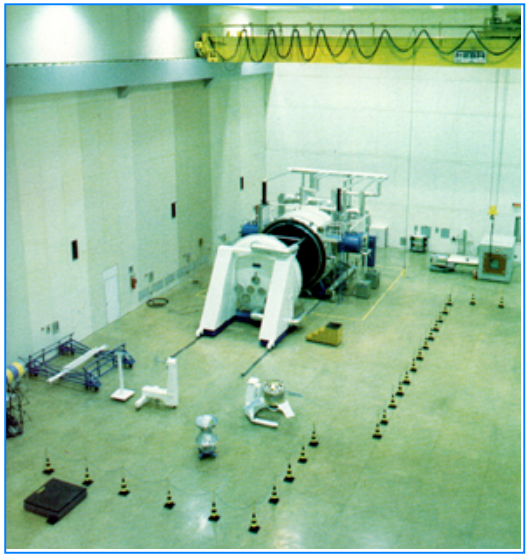


MMP – Qualification Test



Integration and Test Facilities





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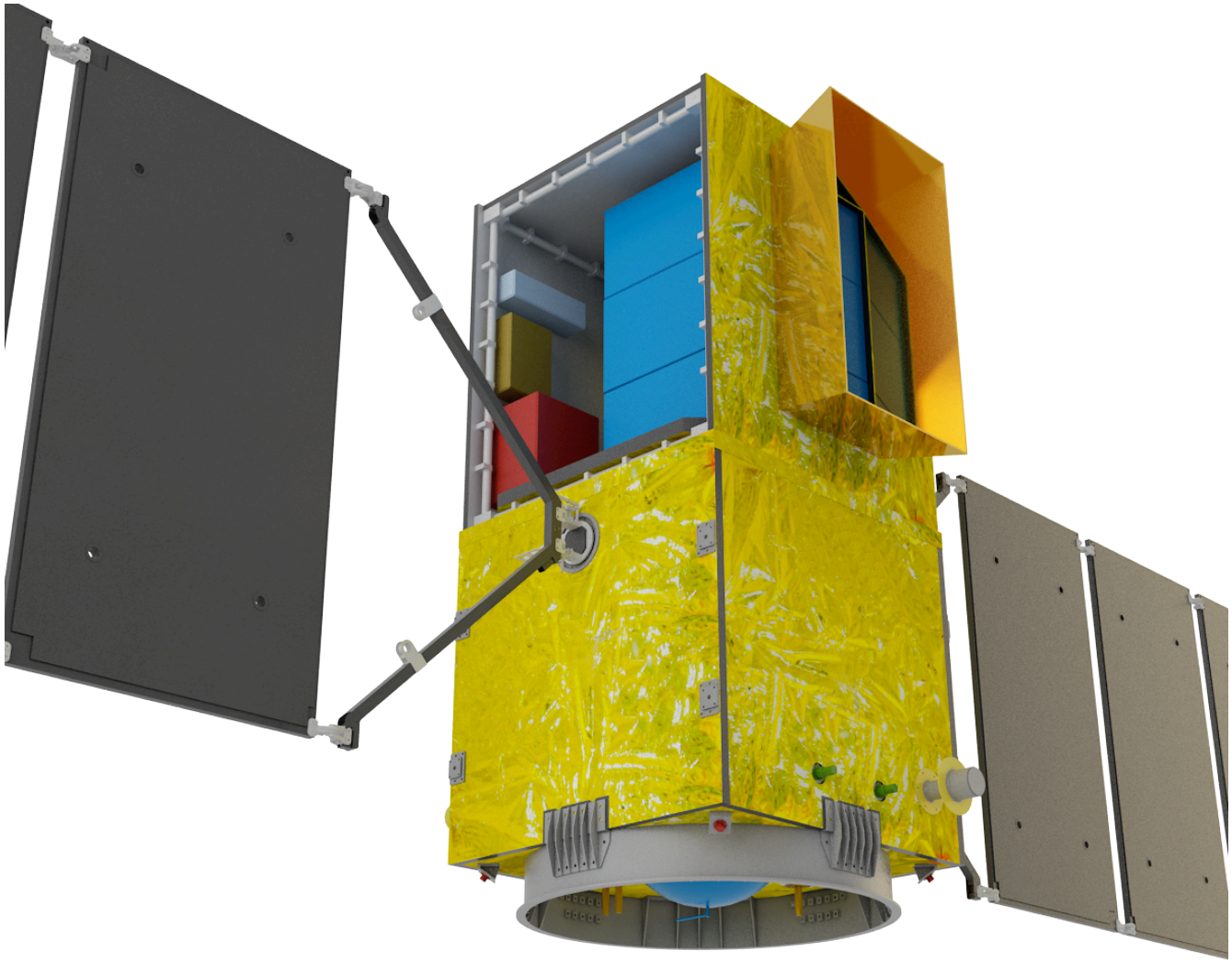
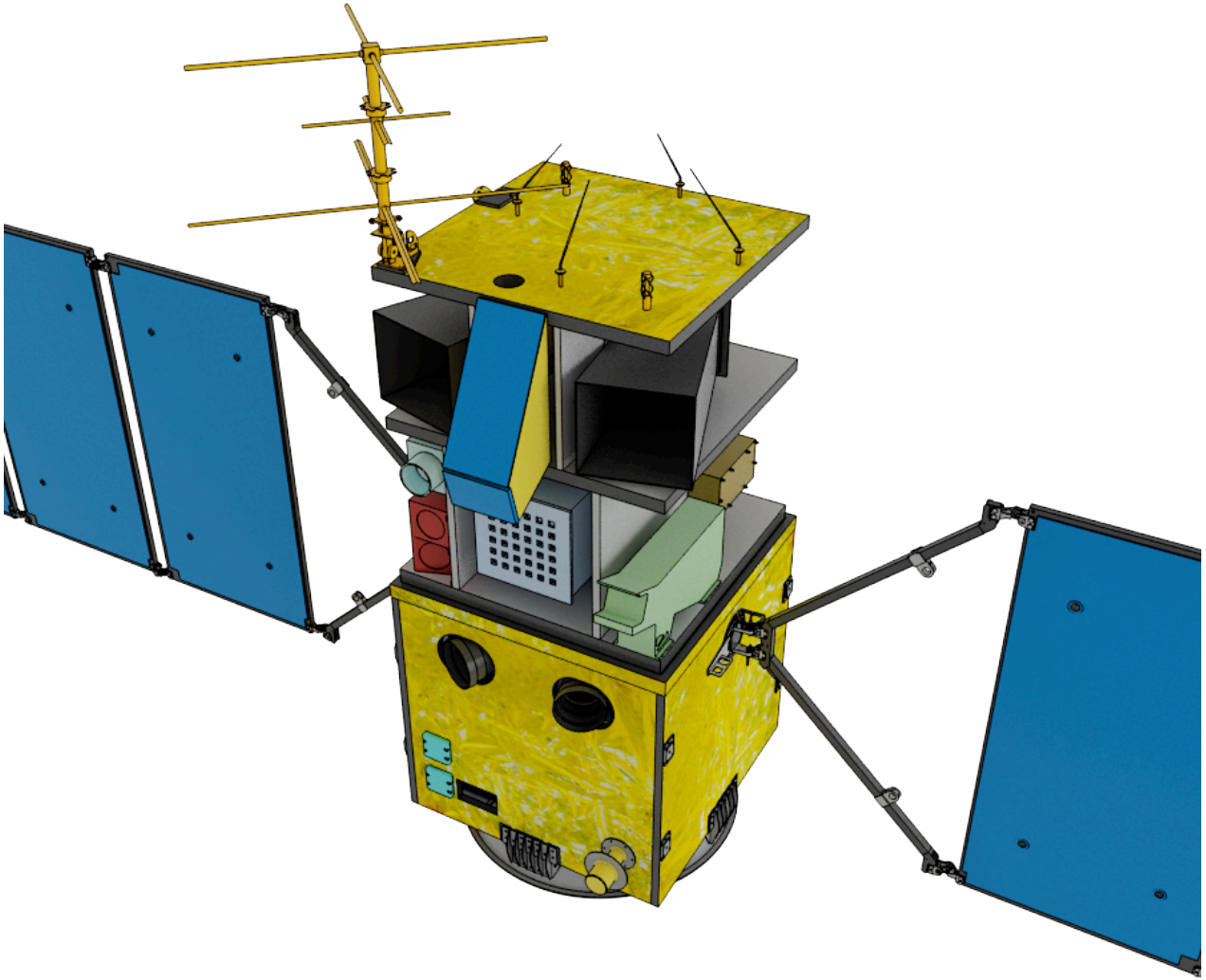
Future

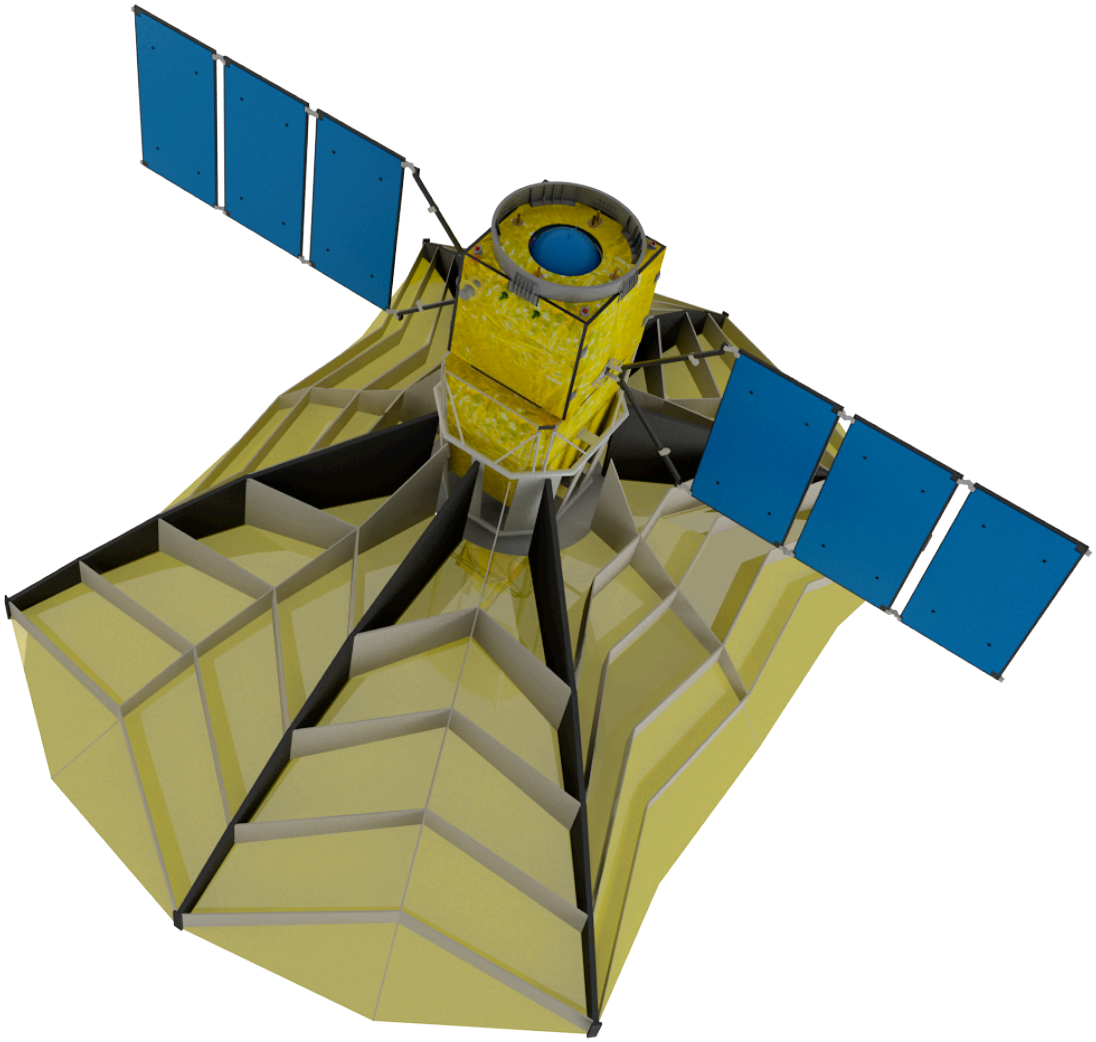
Satellites in Development - AMAZÔNIA



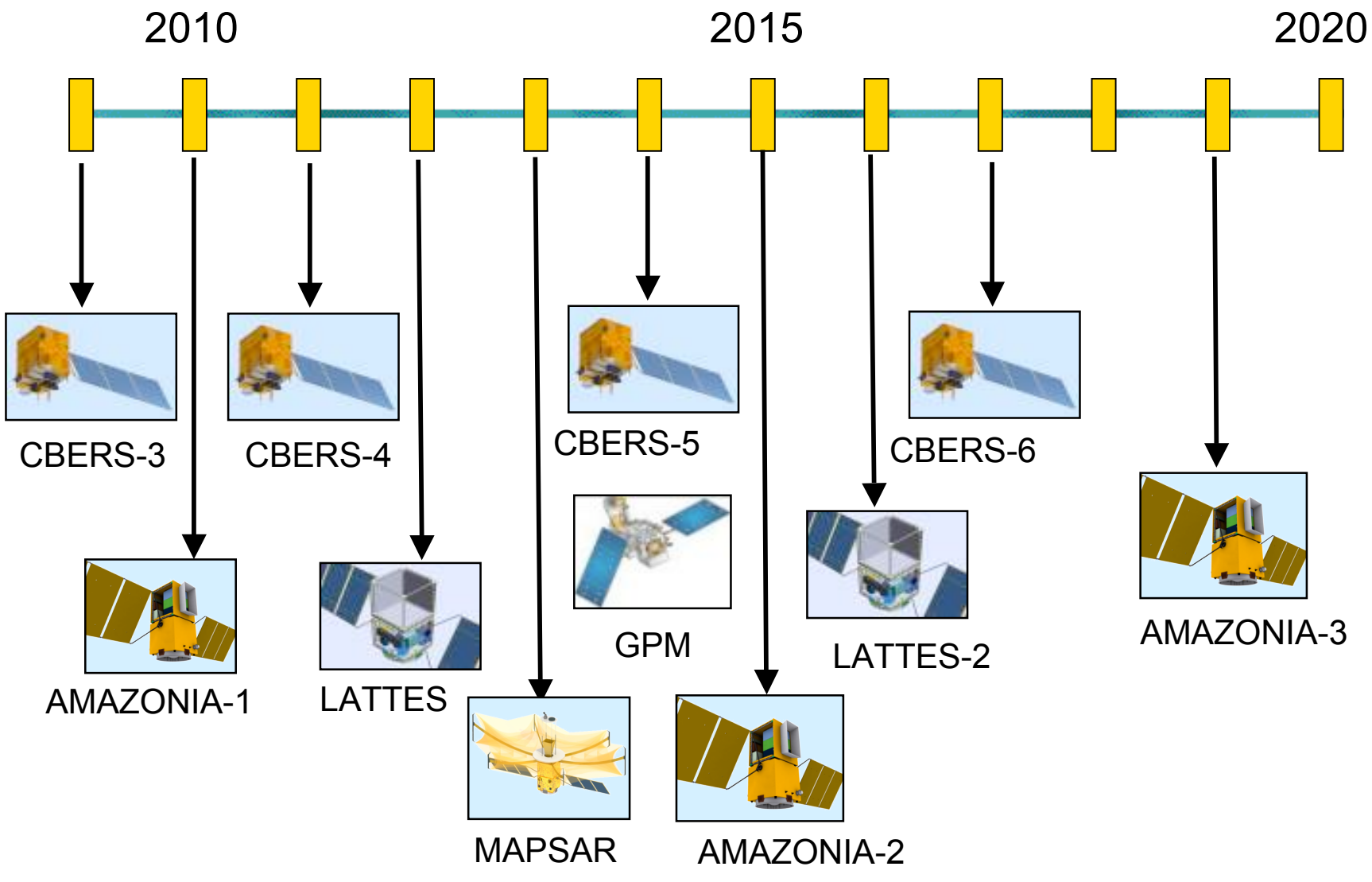
Satellites in Development - LATTES



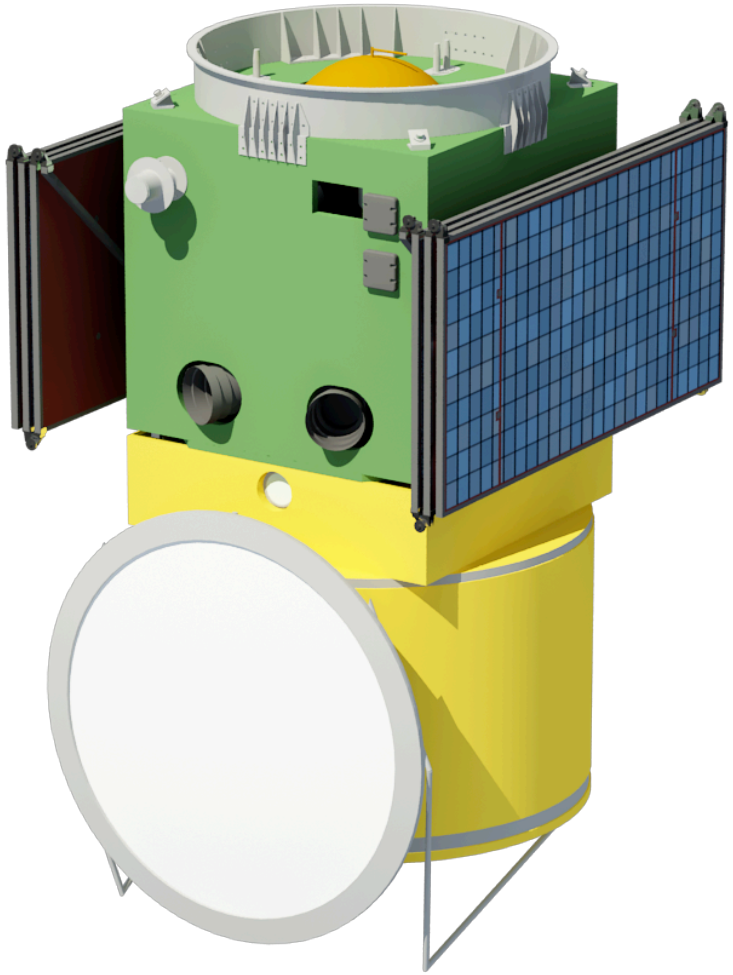
Satellites in Development - MAPSAR

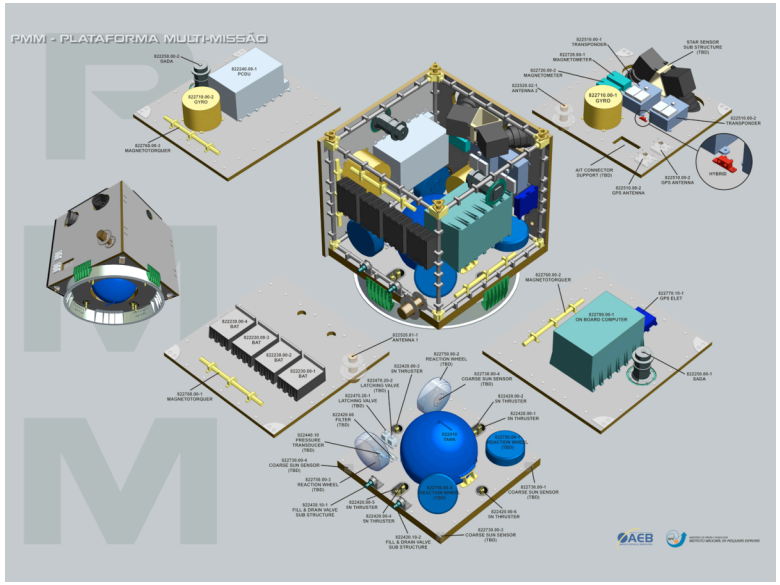


Brazilian Space Program - 2020



GPM - Proposal





MMP- Performance

ACDH:

- Pointing: $< 0.05^{o}$ (3 σ)
- Stability(*Drift*): $< 0.001^{o}/s$
- Jitter: $< 0.0001^{0}$
- Atittude det: $< 0.005^{o}$ (3 σ)
- Agility: 30° in 180 s

MMP- Performance

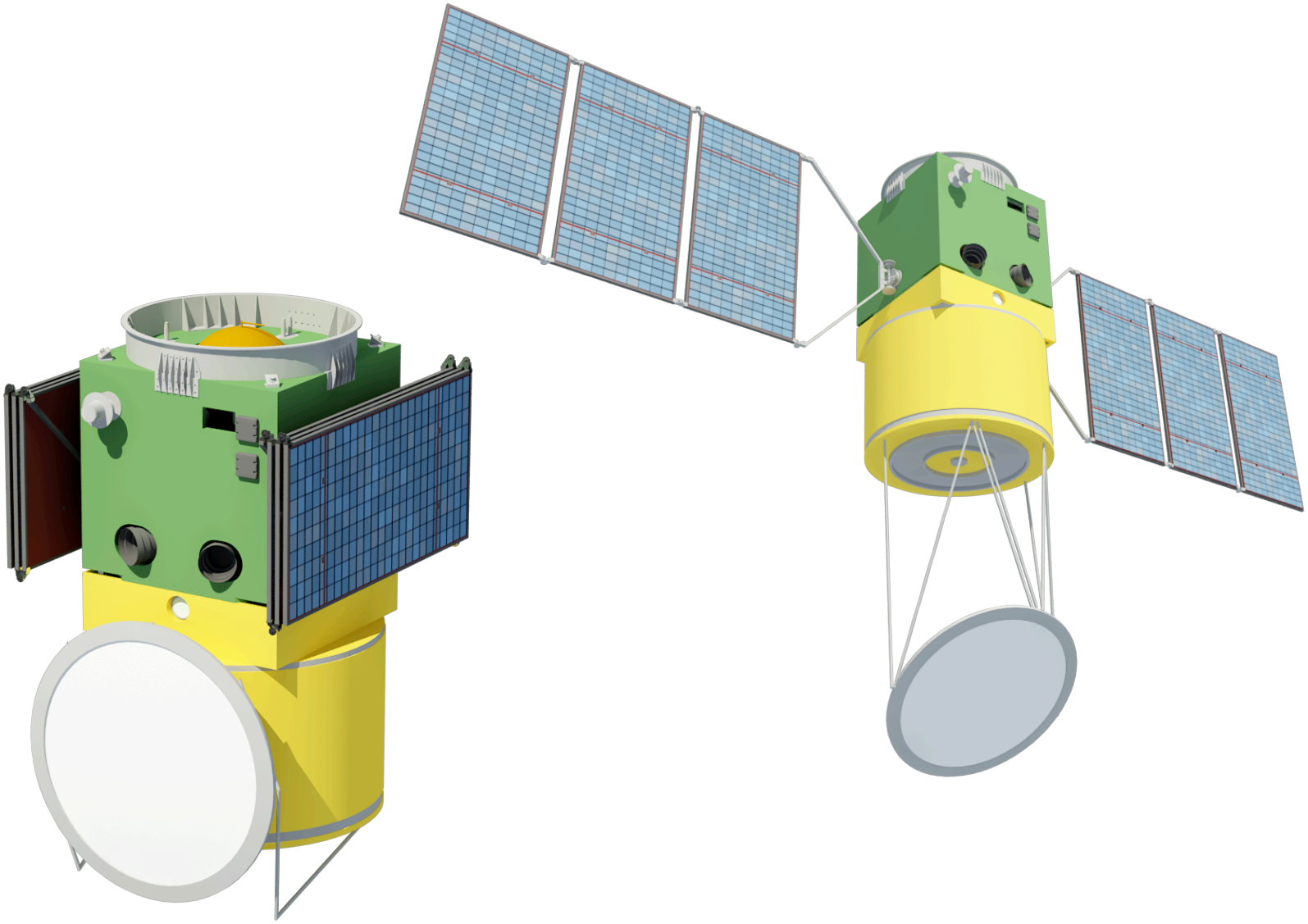
Payload

- Mass: 280 kg
- Volume: 1 m3
- Power: 225 W avg.

  900 W peak
- Orbits: quasi-equatorial & polar

  600 -1200km altitude

GPM - Proposal



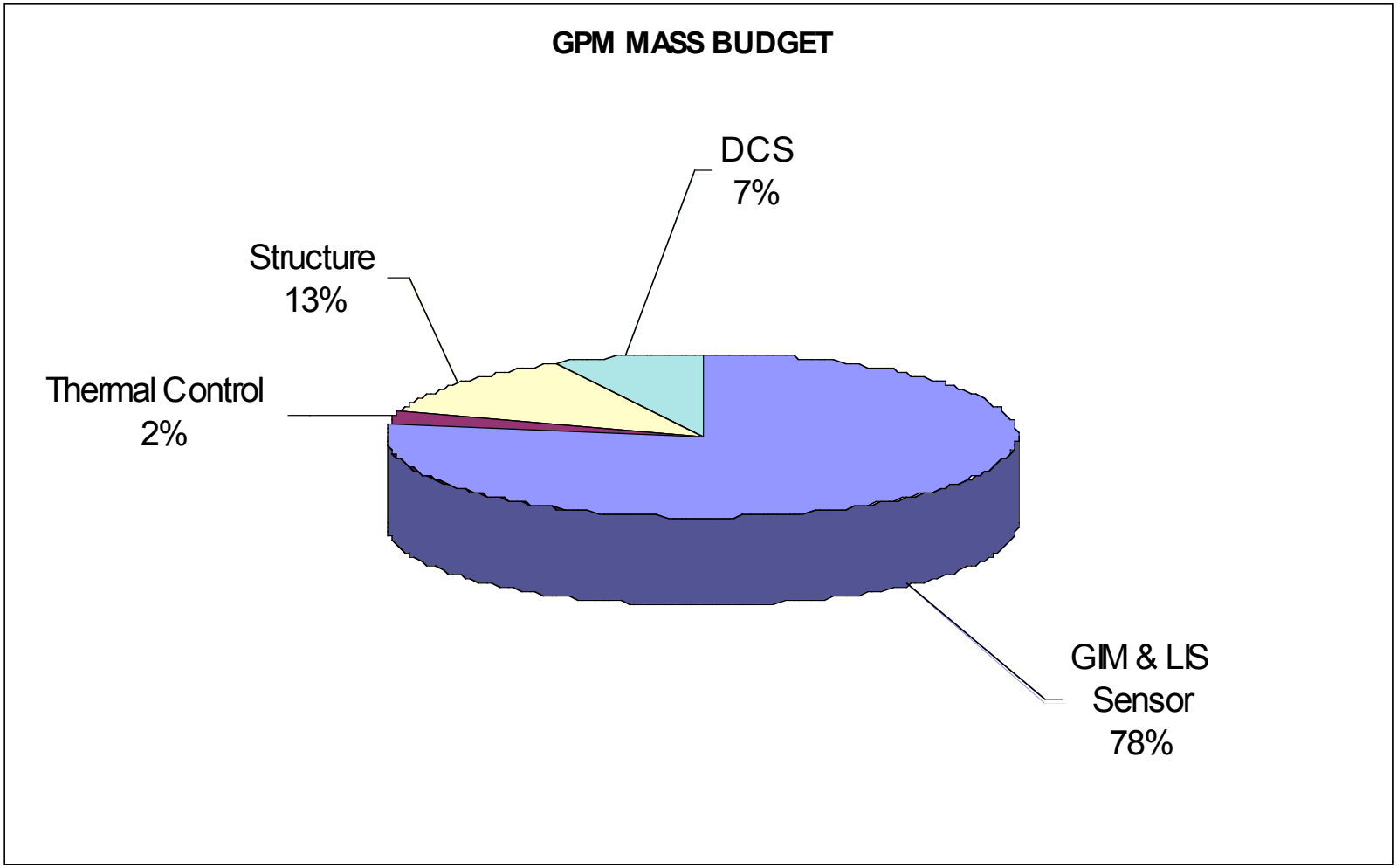
GPM – Mass Budget

GPM MASS BUDGET

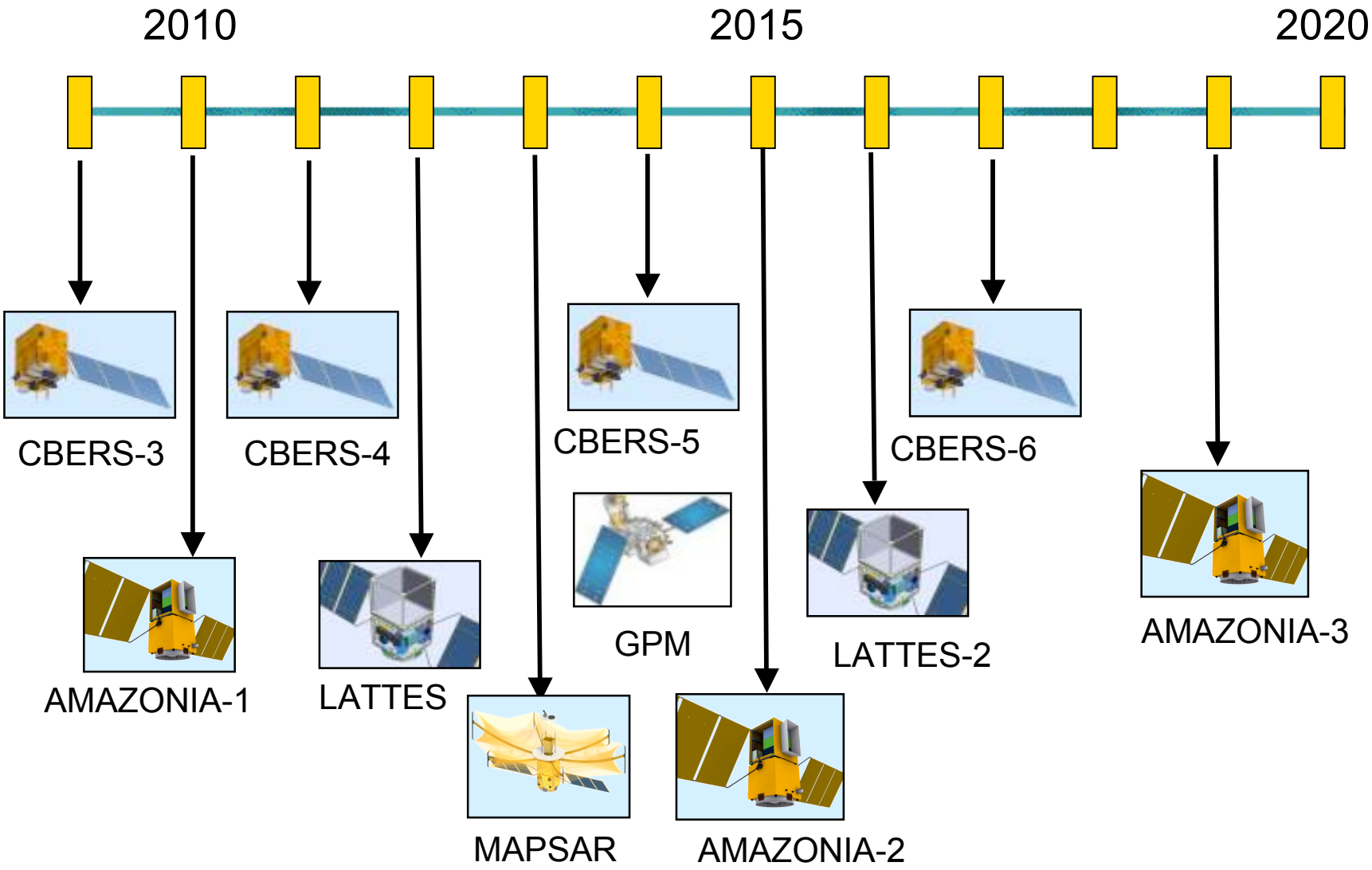
PROD. TREE REF. NB.	SUB-SYSTEM	MASS (kg)	UNCERTY. (kg)
	STRUCTURE	23.00	-3.27
	THERMAL CONTROL	4.00	-0.49
	GIM & LIS-LIGHT PAYLOAD	138.00	-25.10
	DCS	13.20	-0.78

TOTAL		178.20	-29.64
NOMINAL LAUNCH MASS		280.00	
MARGINS:	Nominal	101.80	(36.4%)
		72.16	(26%)

GPM – Mass Budget



GPM – Power Budget

SUBSYSTEMS	STAND-BY	IMAGING	RECORDING	PLAYBACK	Data Uncertainty (%)	Qty	STAND-BY	IMAGING	RECORDING	PLAYBACK
GMI	155.00	155.00	155.00	155.00	10	1.00	170.50	170.50	170.50	170.50
Data Collecting Sub (RBL) (off the shelf)	18.20	18.20	18.20	18.20	5	1.00	19.11	19.11	19.11	19.11
LIS LIGHT (off the shelf)	16.00	16.00	16.00	16.00	5	1.00	16.80	16.80	16.80	16.80
TOTAL	**189.20**	**189.20**	**189.20**	**189.20**			**206.41**	**206.41**	**206.41**	**206.41**
Heater WFI (max 23w)	19	w								
payload operation time	15	min			E(Estimated):	20%	uncertainty			
					C(Computed):	10%	uncertainty			
Results					M(Measured):	5%	uncertainty			
Mean power (Imaging/Stby)	206.41	w								
Mean power (Playback)	206.41	w								
Mean power (Recording)	206.41	w								
Mean Power(PB /Stby/Rec/Stby)	206.41	w								

GPM – Schedule