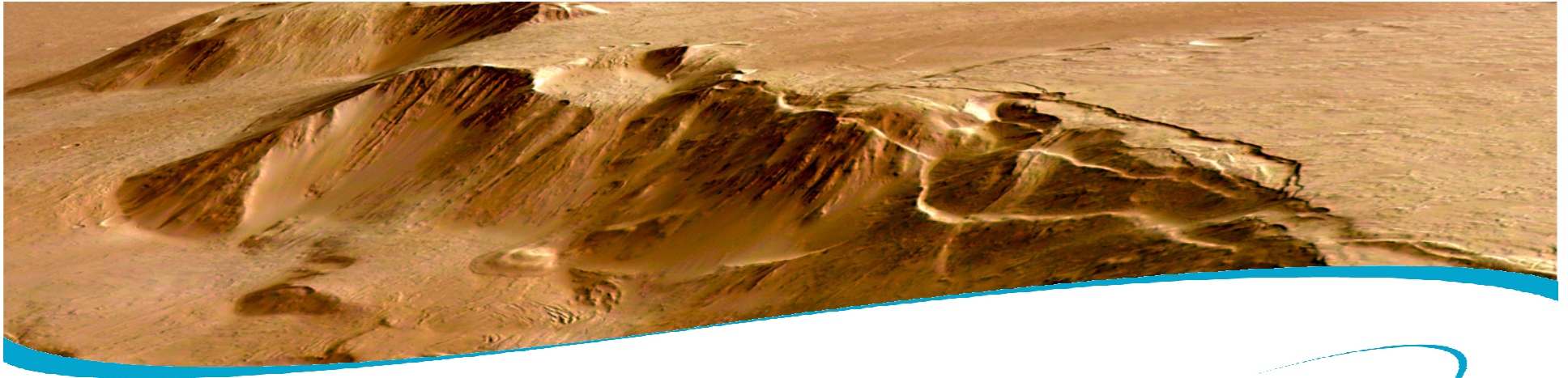
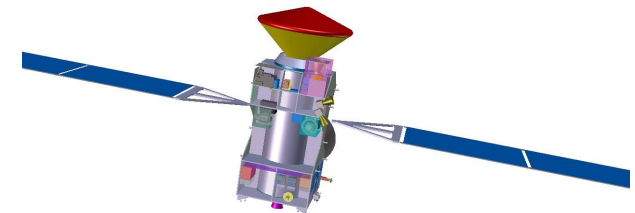




Exomars Orbiter Module Bus OMB



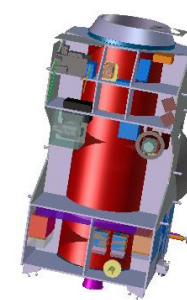
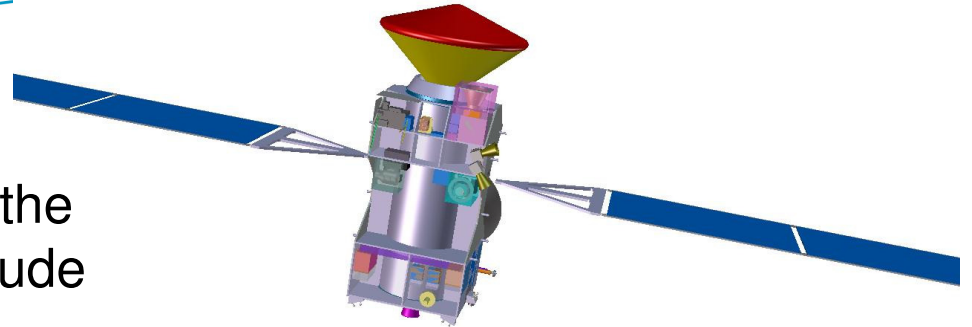
TAS-F – 23rd Sept 2010

Exomars Industrial day- Turin

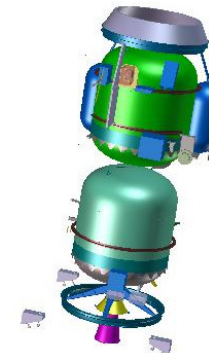
THALES

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- ❑ Exomars OMB will:
 - ❑ serve as a carrier to deliver the EDM at the right landing latitude in the 2016 Mission
 - ❑ carry the five science payloads provided by JPL and stay around Mars for about 5.5 years
 - ❑ Provide data relay capability in UHF to all Mars landed assets from Jan 2019 up to end 2022



Central tube
& primary
structure

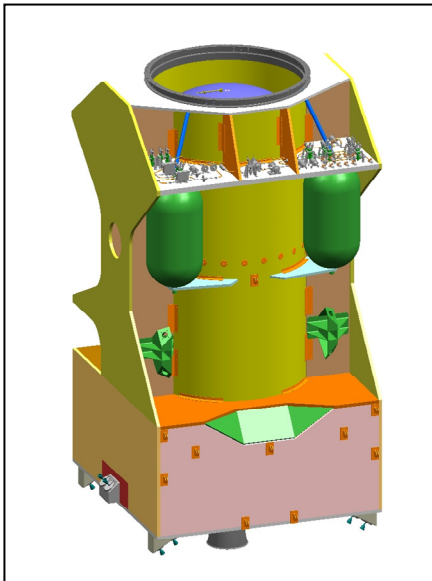


Propellant
tanks &
Helium
tanks

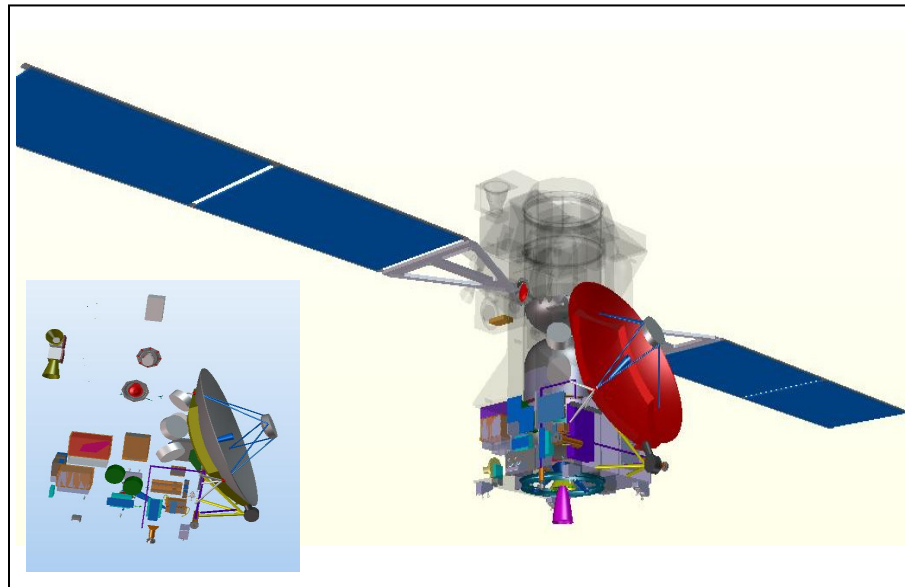
THALES

- ❑ TAS-F is Prime of the Orbiter Module Bus Prime
- ❑ The OMB is composed of :
 - ❑ Mechanical, Thermal & Propulsion (MTP) : OHB responsibility
 - ❑ Avionics, Electrical & Radio-frequency (AER) : TAS-F responsibility

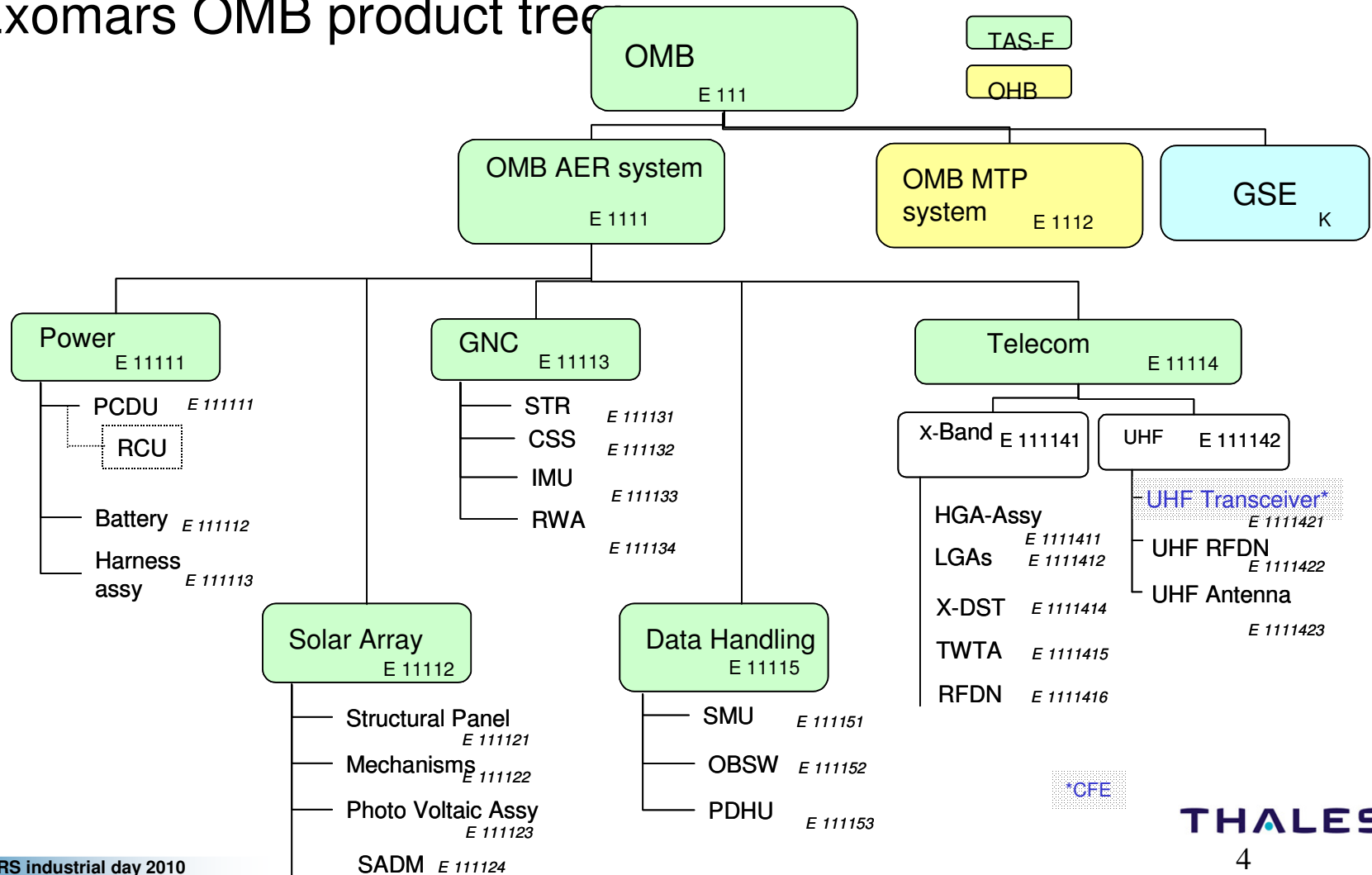
MTP



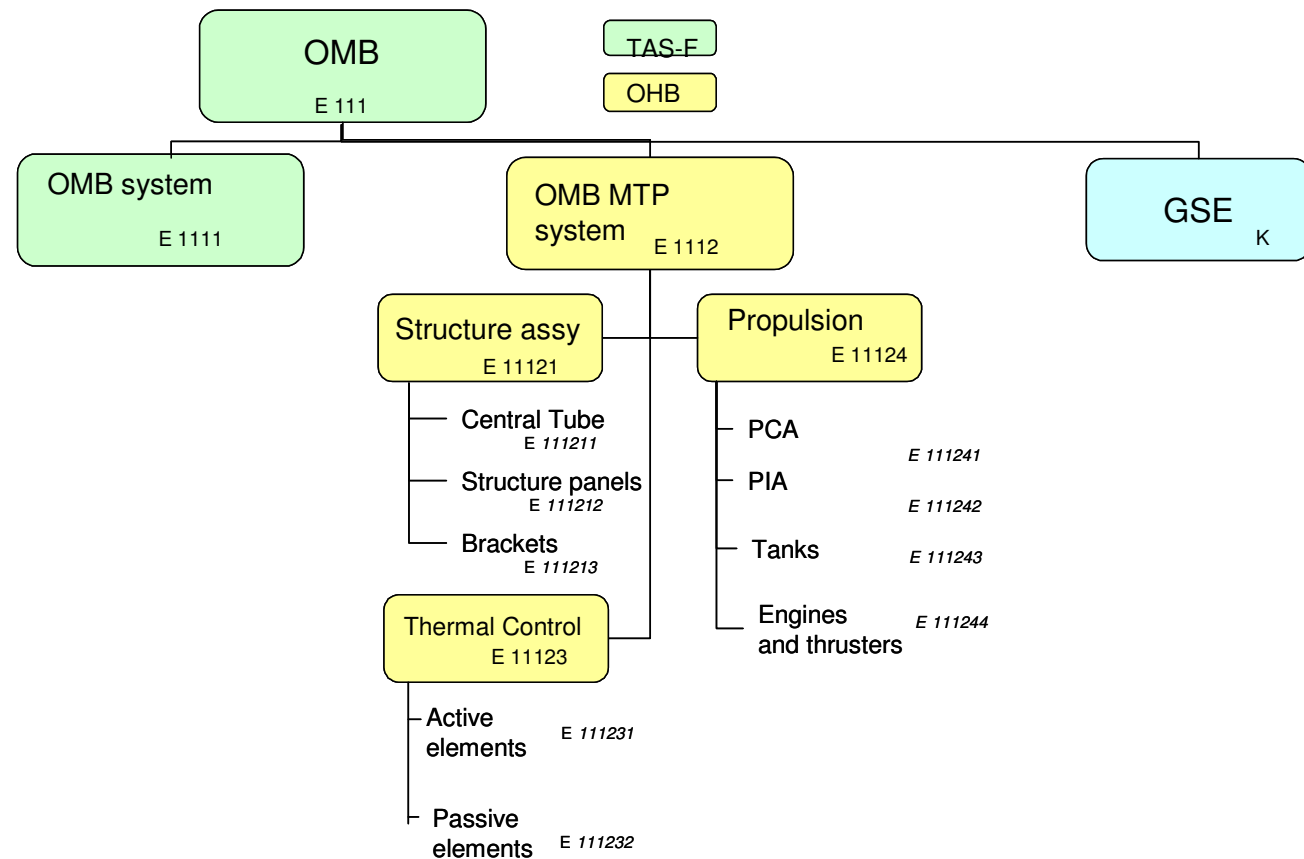
AER



□ Exomars OMB product tree

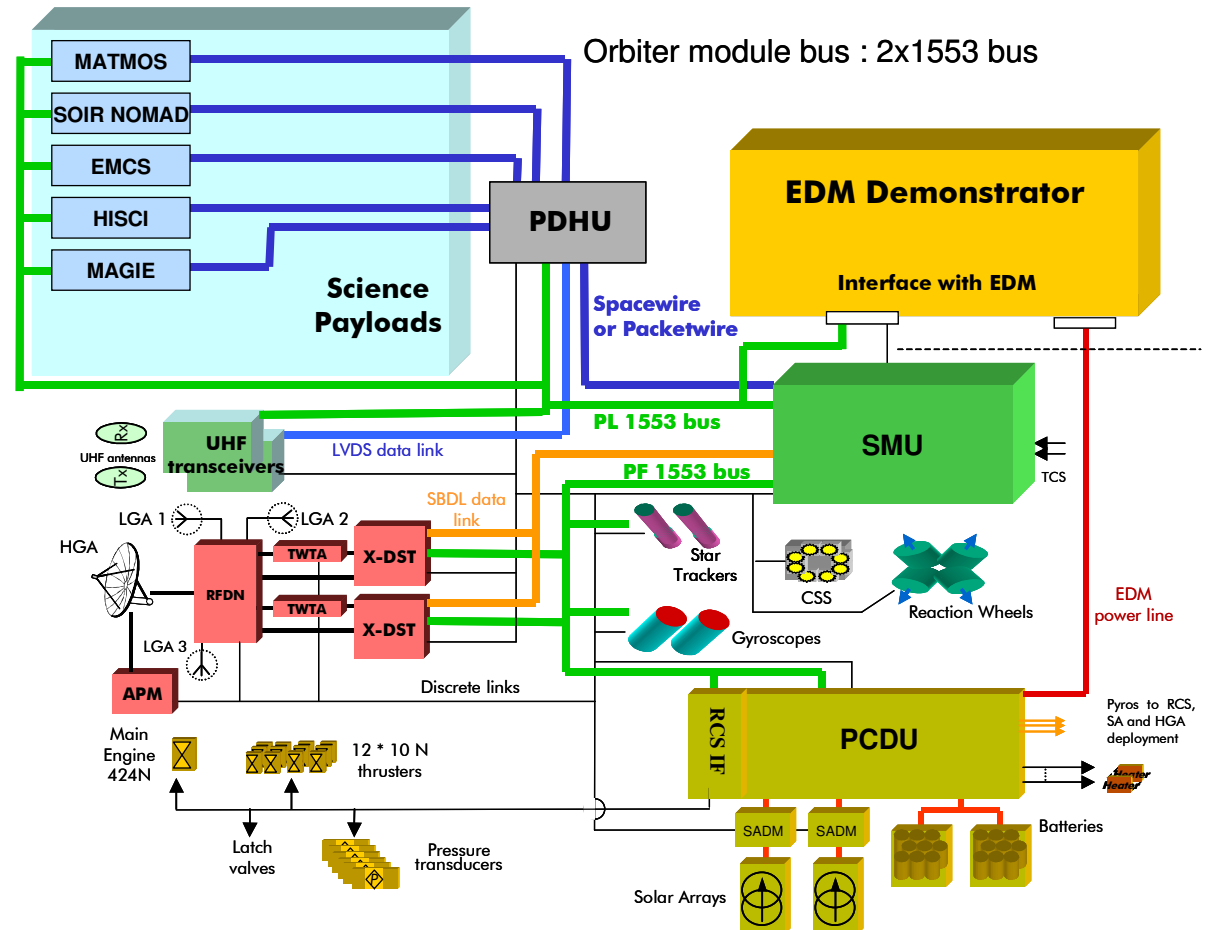


□ Exomars OMB / MTP product tree (See OHB presentation)

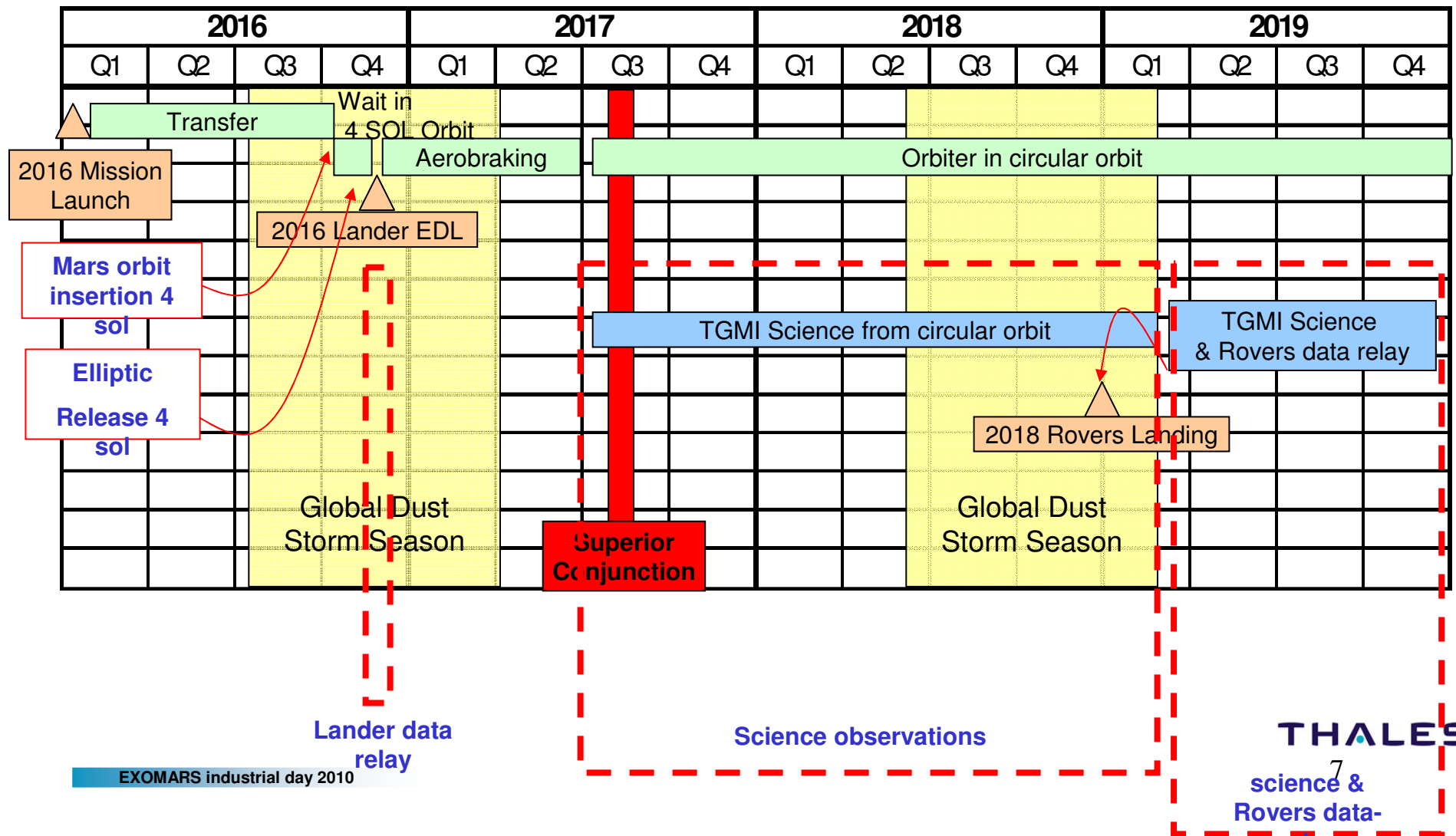


- Exomars avionic architecture makes extensive use of 1553 bus for TM/TC of all units

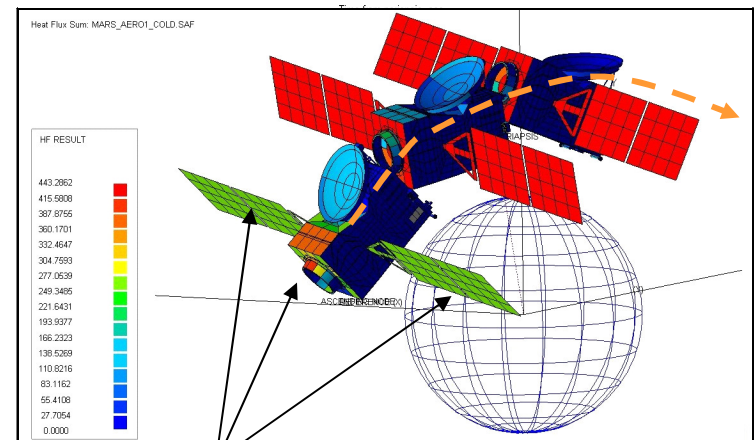
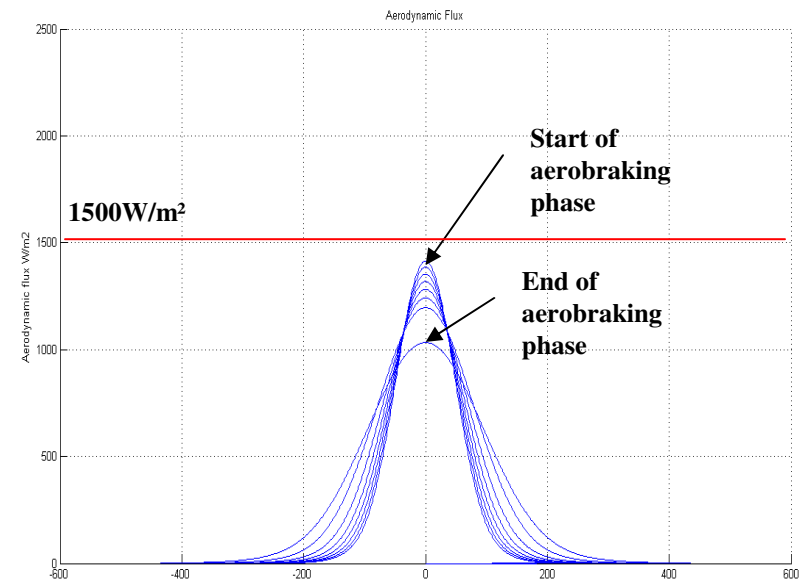
- Spacewire and LVDS bus used for science & Rover data transfer via PDHU



□ ESA-NASA 2016 mission timeline



- ❑ Cruise phase : travel from Earth to Mars (10 months) – Stable attitude (only one face exposed to the sun)
- ❑ Aerobraking phase : 8 months of repetitive passes in Mars atmosphere to reach a circular orbit
- ❑ Primary mission : science mission July 2017- August 2019. Stable 2 hour orbit
- ❑ Secondary Mission : Jan 2019 – Dec 2022 : UHF data-relay . Same orbit as science orbit with different inclination.



+X
face

□ Exomars OMB / AER procurement approach EPS & GNC

S/S	Item	Baseline approach	ITT/RFQ Out	KOM	Comments
POWER	PCDU	ITT	15/09/2010	20/12/2010	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July) / ITT converted in RFQ / Release date planned on 15/09/2010 Closing date to be changed to 29/10/2010.
POWER	Battery	ITT	18/02/2011	29/06/2011	
POWER	Harness Assembly	ITT	03/03/2011	12/07/2011	
GNC	IMU	RFQ	17/11/2010	01/03/2011	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
GNC	STR	ITT	18/11/2010	01/03/2011	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
GNC	CSSA	RFQ	27/05/2011	07/10/2011	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
GNC	RWS	RFQ	27/04/2011	07/09/2011	

□ Exomars OMB / AER procurement DHSS and on-board

S/S	Item	Baseline approach	ITT/RFQ Out	KOM	Comments
Data Handling	SMU	ITT	21/09/2010	17/12/2010	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
Data Handling	PDHU	ITT	08/12/2010	22/04/2011	
Data Handling	OBSW (OBSW modules)		24/06/2011	02/11/2011	several modules of the OMB OBSW are proposed to be subject to ITT (as per TAS-F proposal / 19th July 2010) - need date is aligned with OBSW V2 development start
	OMB Thermal control (OMB)	ITT			Applicative SW implementing the thermal control law of OMB units during the all the phase
	EDM Thermal control (EDM)				applicative SW implementing the thermal control law of EDM units during the Cruise phase
	OMB EPS management (EPS ASW)				applicative SW controlling the PCDU heaters switches in function of the main bus voltage and also taking over the SA power management when necessary (MPPT clamping)
	OMB Antenna pointing control (APM)				Management of the HGA pointing mechanisms (HGA APM ASW)
	UHF TTC (Electra transceiver)				Managing of the RF equipments (power-on/off, configuration, monitoring, ...)
	PDHU Management (PDHU Mangt)				applicative SW managing the PDHU (power on/off, configuration, monitoring), download/upload of science data to/from ground, communication with electra.
	Science instruments management				applicative SW setting the operating mode of each science payload on each orbit, performing monitoring, context storage, DH TM packets acquisition
	EDM management				applicative SW in charge of setting the EDM units (CTPU, RTPU) during the Cruise phase.

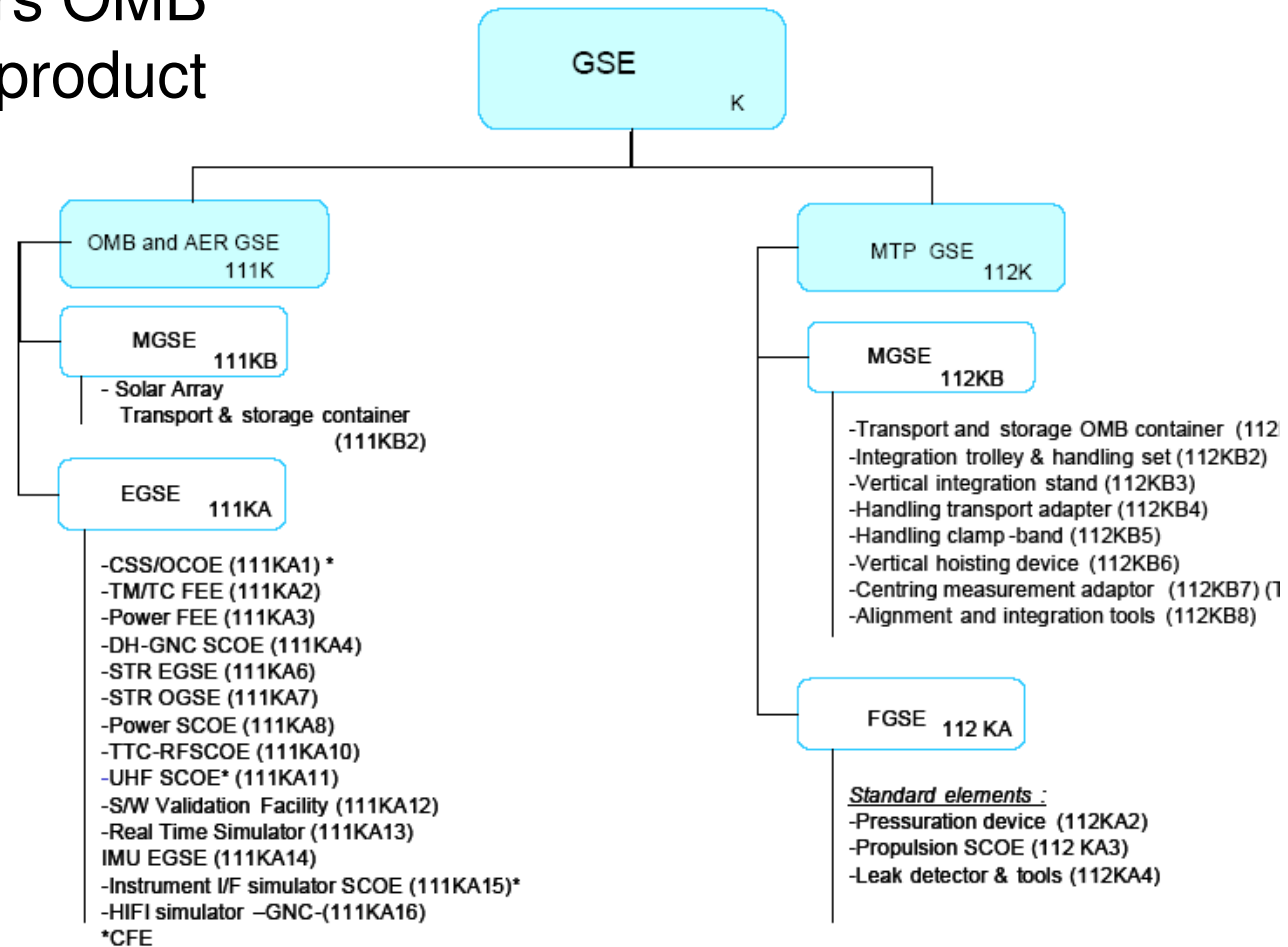
□ Exomars OMB / AER procurement approach Solar Array Assembly

S/S	Item	Baseline approach	ITT/RFQ Out	KOM	Comments
SA	Structural Panel	ITT	22/11/2010	01/04/2011	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
SA	Photo Voltaic Assy (PVA)	ITT	25/05/2011	04/10/2011	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
SA	SADM	ITT	18/02/2011	29/06/2011	

□ Exomars OMB / AER procurement approach Telecom

S/S	Item	Baseline approach	ITT/RFQ Out	KOM	Comments
Telecom	X band RFDN	ITT	01/02/2011	09/06/2011	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
Telecom	X band LGA	ITT	03/08/2011	09/12/2011	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
Telecom	X band DST	ITT	12/11/2010	01/04/2011	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
Telecom	X band TWTA	ITT	17/01/2011	26/05/2011	
Telecom	X band HGA Assembly	ITT	17/12/2010	06/05/2011	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
Telecom	UHF RFDN	ITT	08/02/2011	16/06/2011	updated kick-off date based on AIV/schedule optimisation meeting EXM-MS-MIN-AI-0857 (8th July)
Telecom	UHF LGA	ITT	31/05/2011	07/10/2011	

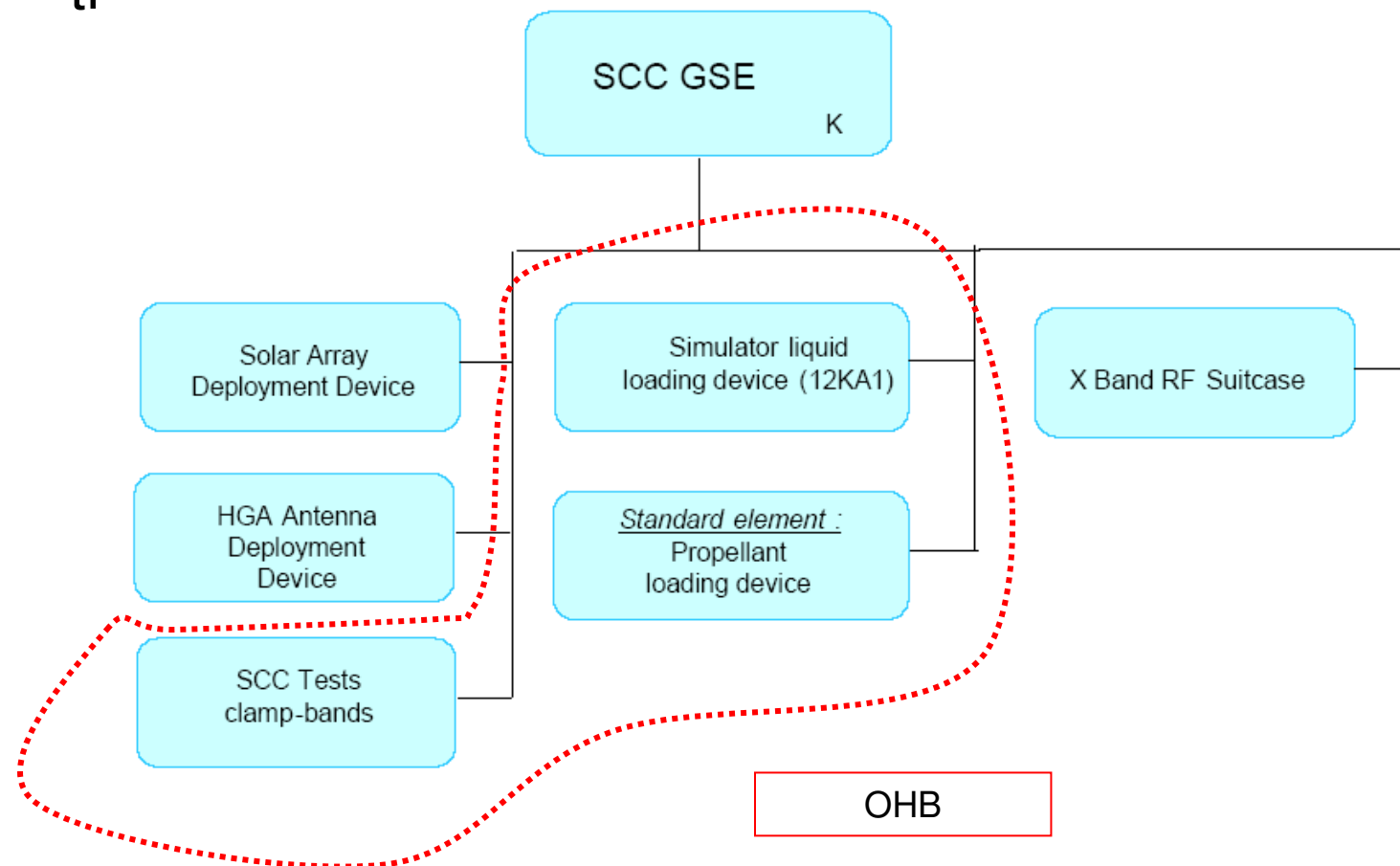
□ Exomars OMB
/GSEs product
tree



□ Exomars OMB /EGSEs procurement approach

	item	Baseline approach	ITT/RFQ Out	KOM	Comments
EGSE	CCS				CFI from TAS-I
EGSE	X-band RF SCOE	ITT	19/01/2011	30/05/2011	
EGSE	RTS SCOE (HW)	ITT	02/05/2011	12/09/2011	ITT limited to HW
EGSE	DH_GNC SCOE (HW)	ITT	02/05/2011	12/09/2011	ITT limited to HW
EGSE	Power SCOE	ITT	24/11/2010	06/04/2011	
EGSE	TM/TC FEE (HW)	ITT	02/05/2011	12/09/2011	ITT limited to HW
EGSE	POWER FEE (HW)	ITT			ITT limited to HW
EGSE	STR EGSE				as part of STR ITT
EGSE	STR OGSE				as part of STR ITT
EGSE	IMU EGSE				as part of SIMU ITT
EGSE	UHF-band RF SCOE				CFI from JPL

□ Exomars OMB /SCC GSEs product tree



□ Exomars OMB /SCC GSEs procurement approach

SCC GSE	HGA Deployment device				as part of HGA ITT
SCC GSE	SCC Test Clamp Bands	OHB			note 1) this item is now procured by OHB due to the new model philosophy (mechanical qualification at MTP level on PFM)
SCC GSE	Simulant liquid loading device	OHB			
SCC GSE	Propellant loading device	OHB			
SCC GSE	X Band RF SuitCase	ITT	04/01/2013	16/05/2013	ITT limited to HW
SCC GSE	Instrument I/F Simulators				CFI from JPL
SCC GSE	OMB simulator (need TBC)	M			ITT limited to HW. Note : need date and content to be defined by TAS-I in OMB SOW