SENTINEL 6 / JASON-CS
STATUS UPDATE

JASON CS
CONTINUITY OF SERVICE

Sentinel-6/Jason-CS Partnership and responsibility sharing

EUMETSAT: System coordinator, development of ground segment, operations, Jason-CS A/B satellite co-funding, product dissemination

ESA: development of Sentinel-6/Jason-CS A, procurement of Sentinel-6/Jason-CS B, LEOP, Satellite IOV, L1B/L2 Ground Processor Prototypes.

NASA: Development of US payload, launcher, US ground segment, , AMR Ground Processor, support to operations, product dissemination

NOAA: ground station, network, operational products dissemination.

EU/ Copernicus: funding of operations for both satellites and co-funding of Jason-CS B.

CNES: expert support, instrument and system engineering, performance, L2P/L3 and POD services.

Joint responsibility of the Partners on mission performances, cal/val, science support.

Sentinel-6/Jason-CS High Level Mission Elements

Launch Vehicle
(Space X Falcon 9)

NASA Elements, NOAA Elements, European Elements (EUMETSAT, ESA, EC, CNES)

US X/S-band Ground Stations
(Fairbanks)

ESA ESTEC + NASA/JPL
(sat. dev) (US Payload)

ESA ESOC
(LEOP)

European X/S-band Ground Station

NOAA

(Alti – NRT,
RO NRT)

RO -NRT

NASA/JPL

RO product processing, US Payload Monitoring & Ops support, data dissemination & archiving

US Users
PO.DAAC (Altimetry products)

EUMETSAT

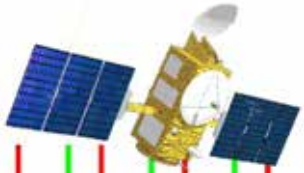
System, G/S development, product processing, Operations, dissemination & archiving

European,
Copernicus (EC)
and WMO Users

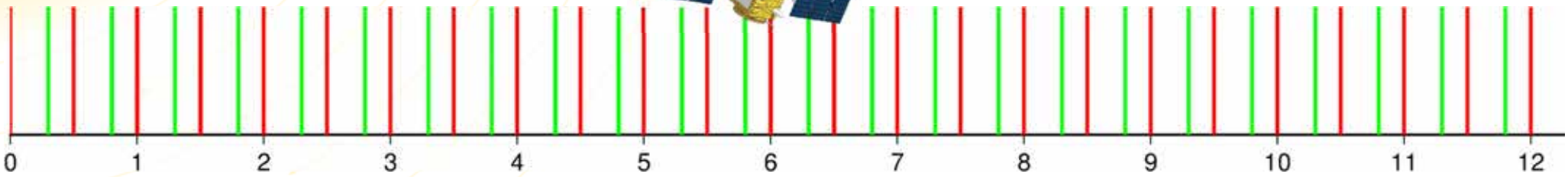
CNES

Development and operations Support, L2P/L3 and POD Services

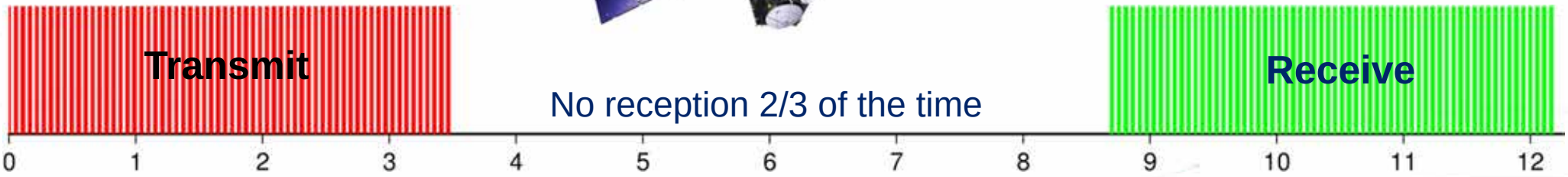
Altimeter Chronograms



Low Resolution, PRF ~ 2 kHz, continuous



SAR closed and open loop, PRF ~ 20 kHz, burst



SAR Interleaved, PRF ~ 9 kHz, continuous

milliseconds

Sentinel-6/Jason-CS Product Baseline

Product	Latency	Format	User Data Access		
			EUMETCast	GTS	Archive
ALT Low Resolution (LRM)	**NTC**	NetCDF	–	–	L1b, L2*, *L2P, L3*
	STC	NetCDF	*L2P*	–	L1b, L2*, *L2P, L3*
	NRT	NetCDF	L2*, *L2P*	–	L0, L2*, *L2P*
		BUFR	L2	L2	L2
ALT High Resolution (SAR)	**NTC**	NetCDF	–	–	L1a, L1b, L2*, L2P, L3
	STC	NetCDF	L2P	–	L1a, L1b, L2*, L2P, L3
	NRT	NetCDF	L2*, L2P	–	L0, L2*, L2P
		BUFR	L2	L2	L2
MWR	**NTC**	NetCDF	–	–	L2
	STC	NetCDF	–	–	L2
	NRT	NetCDF	–	–	L2

ALT Level 2 NetCDF products: reduced (1-Hz only) and standard (1-Hz and 20-Hz)
L2P and L3 products have slightly different latency; for LRM TBD.
MWR products have not yet been incorporated into the EURD and SRD
Detailed Access to archive product under analysis

Summary of System Level Activities

- 3 Multi partner working groups active
  - Mission Performance Working Group (MPWG) looking at mission performance requirements, allocation and budget. Also initiating Cal/Val plan, based on past Jason's heritage and focusing on the new drift requirement and elements of advanced instruments evolution.
  - System Engineering Working Group (SEWG) looking at Requirements elaboration, flow down and apportionment and traces. Also now preparing verification matrices and establishing system Integration, Verification, Validation approach and plans.
  - Radio Occultation Working Group (ROWG) looking at all aspects related to the secondary radio occultation mission.

- Mission Advisory Group (MAG) constituted. First meeting held in June at ESTEC

- System technical budget developed and being further consolidated. High resolution product timeliness requires further detailed analysis

- Operation preparation activities (schedule and scope of satellite/ground system test, definition of operational scenario also to be used during validation, etc…)

Sentinel-6/Jason-CS

OSTST 2017
ESA status update

Pierrik Vuilleumier

Satellite status

- The satellite CDR was successful last June.
    - Closeout report due in November.
- The equipment hardware is in production.
- The software development is progressing very well.
    - Re-use of Sentinel-2 avionics.
    - AOCS software tested.
    - Software running on the test bench (and into the PISA delivered to JPL)
- The satellite AIT will commence in November.
    - Installation in the clean room, then installation of the harness.
    - Environmental test campaign 2nd half 2019.
- The series of SVT's to verify interfaces to ground will start in October 2018.

Altimeter status

- All the steps in ASICs development at the heart of the POS-4 technology step have been successful so far.
    - Chips are available.
    - Next step is to confirm the full performance in EM.

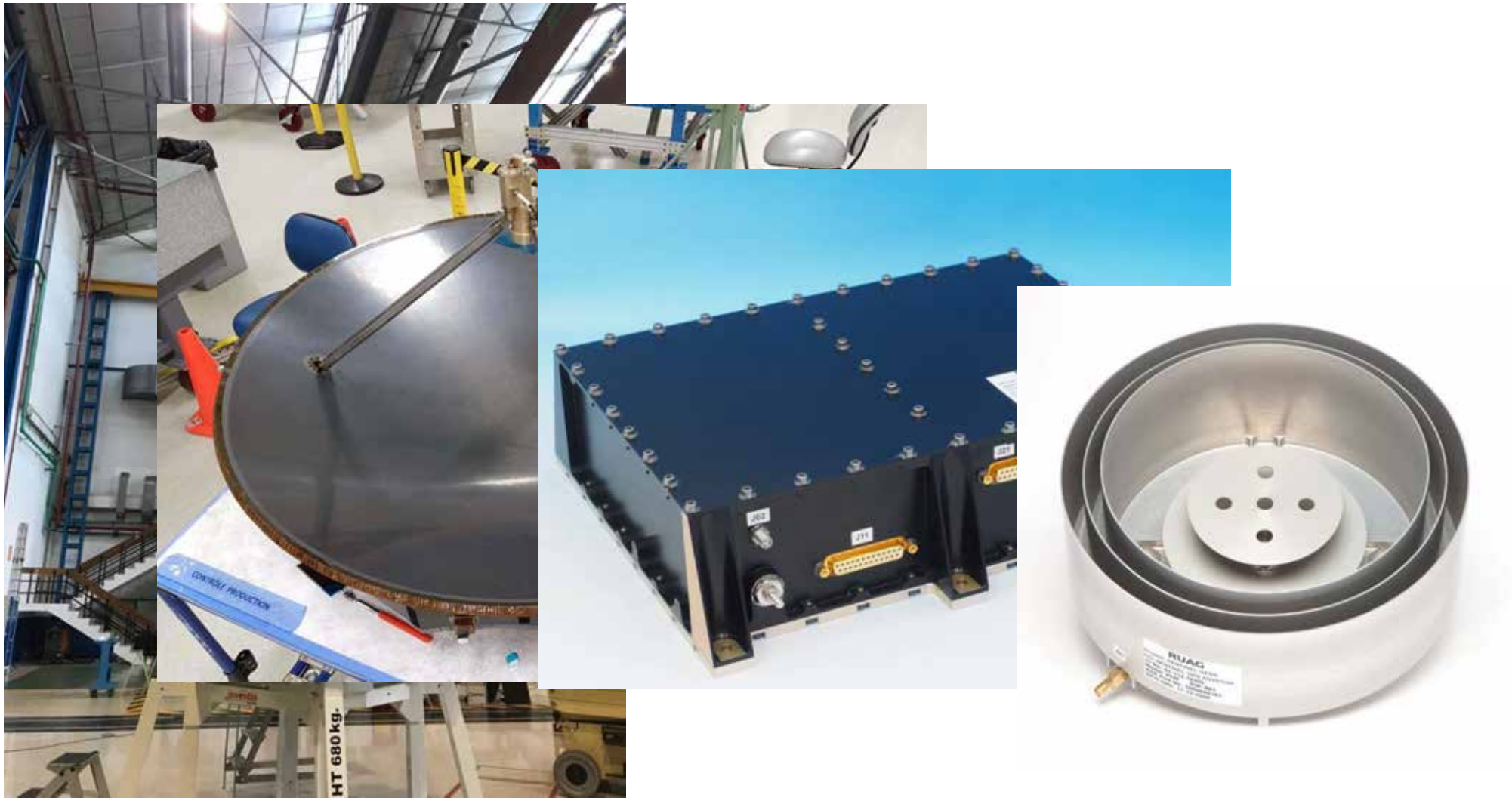
- The instrument CDR is planned end December.
    - lower level CDR's have been completed.

- The antenna PFM is delivered. FM2 under acceptance testing.
- The delivery schedule is maintained but tight
    - Q1 2019

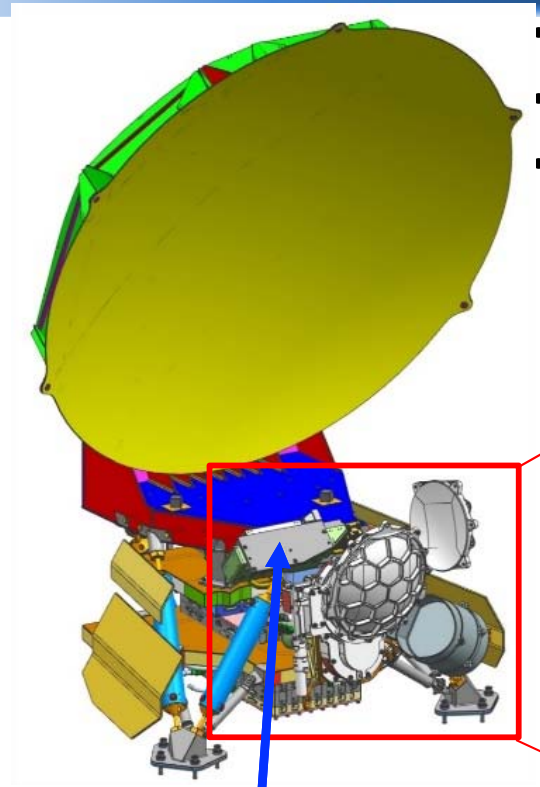
POD package status

- The GNSS-POD for S6 is identical to the receivers of S123CD.
  - GPS + Galileo.
  - A swap with the S1CD units has been agreed to keep the schedule
  - The delivery to S6 is planned in Q2 2018.

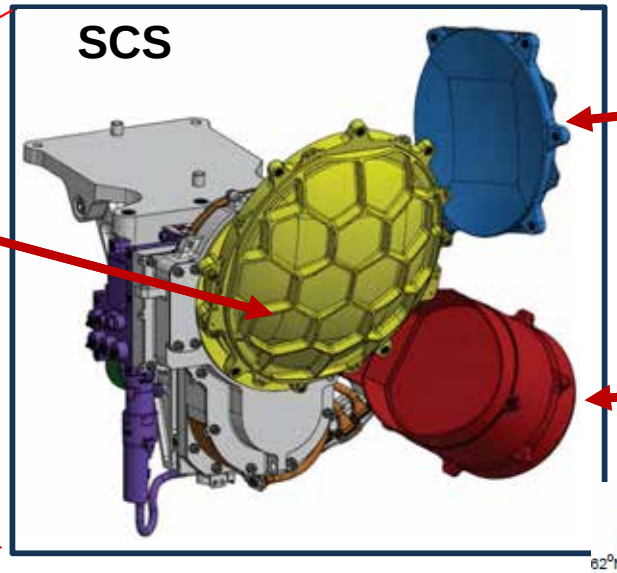
- DORIS progressing to plan.
  - Mini-USO qualified and FM's under production.
  - Crystals have been subject to low radiation dose rate characterisation.
    - Lesson learned from Jason-3
  - Modification introduced to drive the GNSS from the DORIS USO
    - Done for S3 and requested by OSTST for S6.


HT 680 kg.

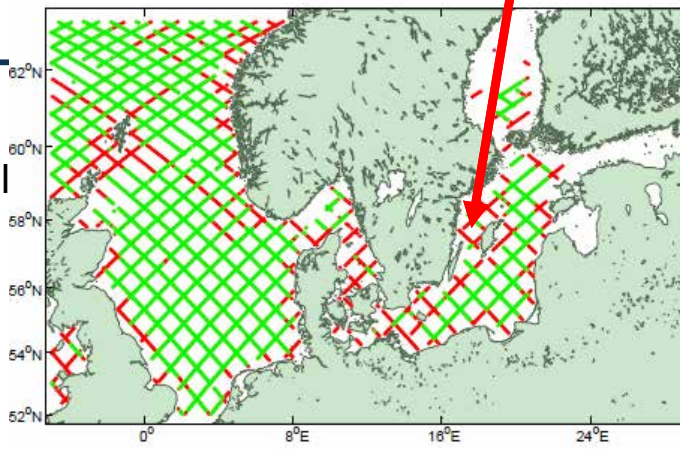
NASA/JPL - Advanced Microwave Radiometer Climate Quality (AMR–C)



- Provides wet tropospheric path delay (Pd) correction
- Same basic performance as Jason-3 with 18.7, 23.8 and 34.0 GHz bands
- New On-board calibrator (SCS) redirects beam to provide 2-point (warm,cold) stable reference to meet new requirement to maintain path delay drift correction to less than 0.7 mm/year (was a goal for Jason-3)



HRMR new measurement coverage



High Resolution Microwave Radiometer (HRMR) ***All new***

- **HRMR** demonstrates capability of high-frequency radiometer channels for extending the wet path del measurement into the coastal zone
- Add-on experimental high frequency channels (90,130,168 GHz)
- Complements the High Res Alt SAR mode

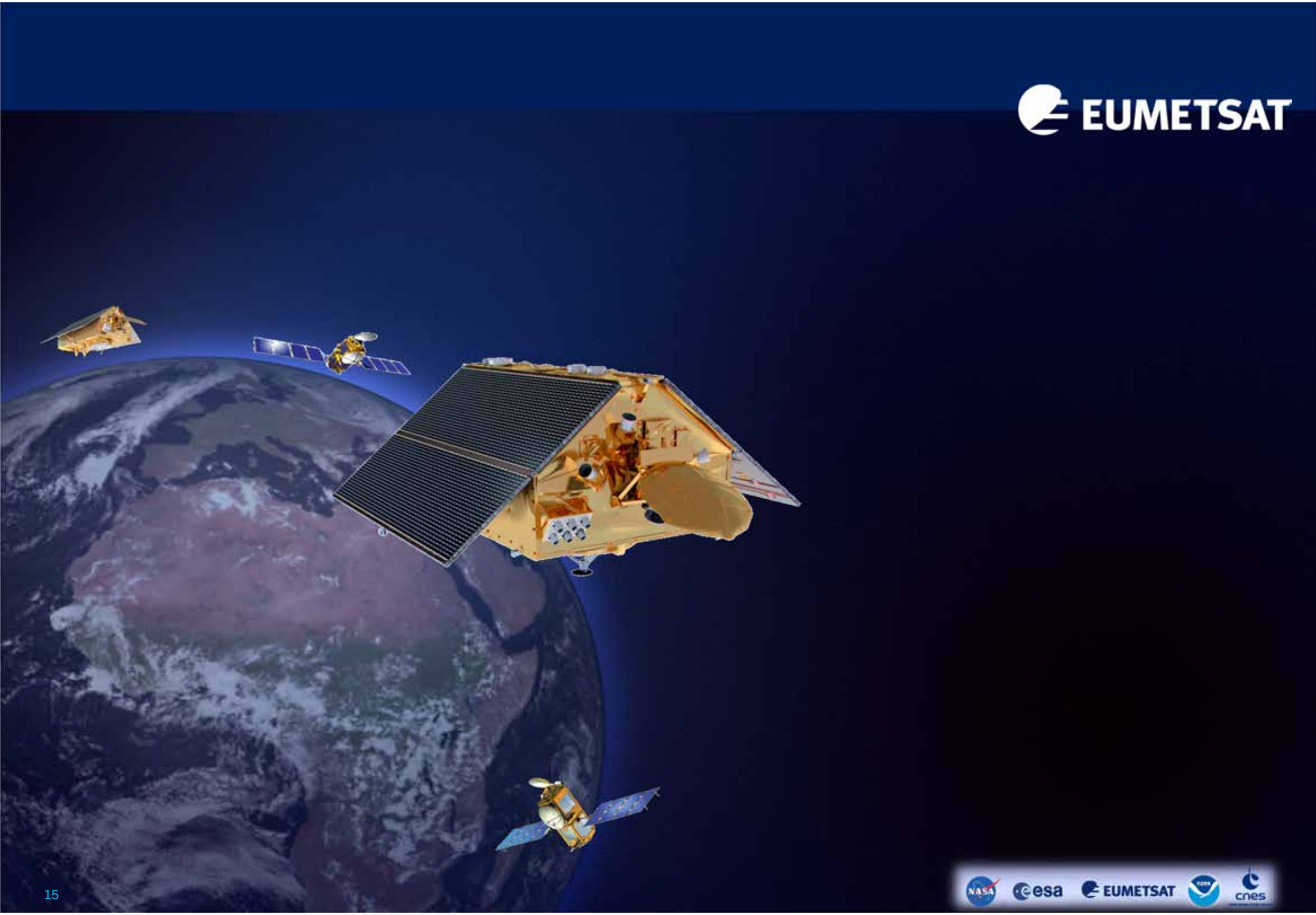
Ground Segment development status

- At EUMETSAT, 3 main elements
  - Mission Operation Center (MOC)
    - Planning to fully leverage EUMETSAT Sentinel 3 MOS that is fully operational with very limited delta development for S6.
  - Multi Mission Element (MME) covering Infrastructure, Monitoring, Archive, Dissemination, network etc..
    - Here again, re use of existing assets with limited delta development
  - Payload Data Acquisition and Processing (PDAP) hosting all altimetry mission processing elements (from L0 to L2) as well as the European Ground station and its interfaces.
    - New procurement
    - Contractor under selection and requiring approval by EUMETSAT Council in December 2017. Kick off in January 2018 as planned.
- Other partners ground segment development also initiated
  - At JPL for RO processing and US instruments operations
  - At NOAA for the US Ground station and NRT product dissemination
  - At CNES for POD and L2P and L3 products

Schedule

- Last year milestones
  - System PDR
  - Satellite CDR
- Next milestones
  - EUMETSAT Ground segment PDR in November
  - System check point in April 2018
- Launch date of satellite A in November 2020

Programme in full speed development by all partners with a lot of activities running on in parallel with objective to continues reference mission with enhanced performances


EUMETSAT
NASA
esa
EUMETSAT
cnes