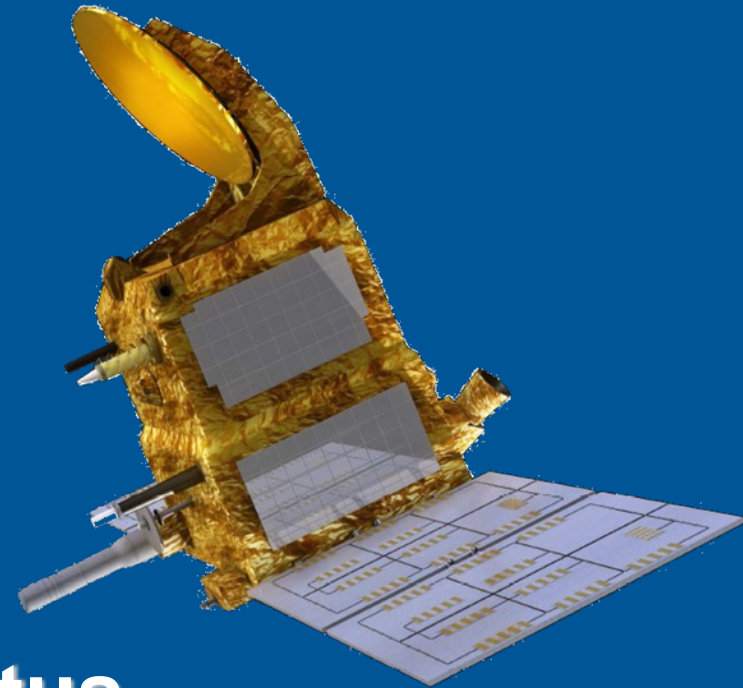
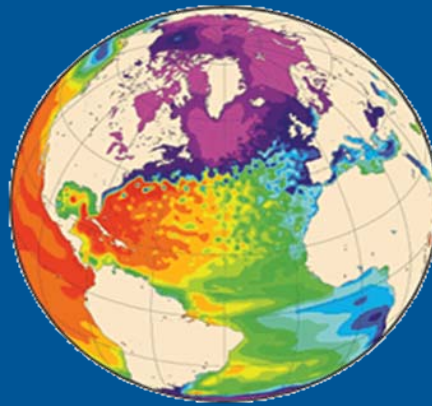


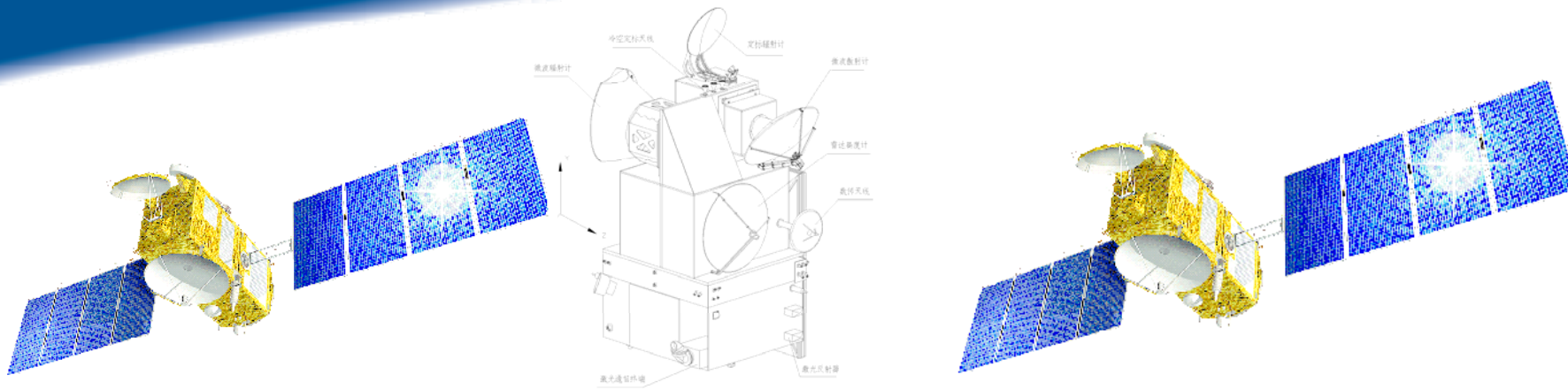


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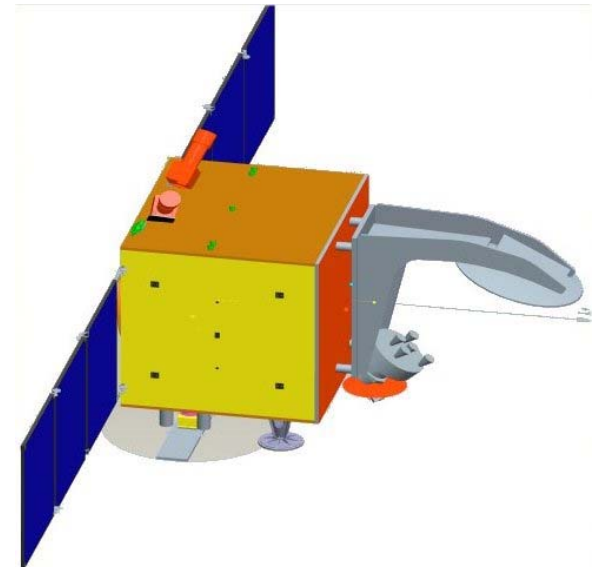
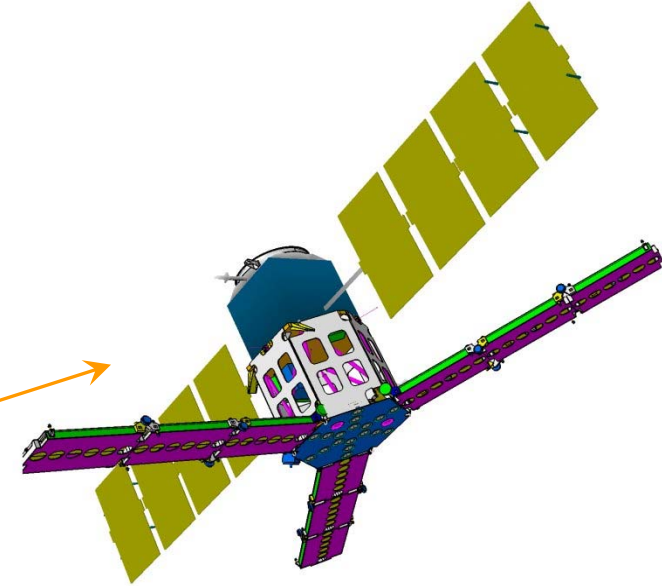


CNES program status

E. Thouvenot, CNES
October, 2010



- **Contribute to operational outcome of altimetry :**
 TOPEX/POSEIDON => JASON1 => JASON2/OSTM => JASON3
 ERS 1 & 2 => ENVISAT => SENTINEL3
 + CORIOLIS, MERCATOR/COO...
- **Continue research activities for future altimetry missions/instruments (AltiKa, WSOA, Water/SWOT,...)**
- **Contribute to space measurements of other ocean physical parameters :**
 - salinity : SMOS, CNES contribution to ESA project
 - directional wave spectrum (SWIM/CFOSAT)
 - ocean colour (SSO or GEO)



Complementing mission mesoscale, ice

ERS-1 (ESA)
Altimeter algorithm

ERS-2 (ESA)

ENVISAT (ESA)
DORIS
Altimeter Processing
Archive & distrib.

HY-2A (CNSA)
DORIS

ALTIKA/SARAL
(CNES/ISRO)
Altimeter, radiometer,
DORIS, Lra
Process, archive & distrib.

Sentinel-3A&B (ESA)
DORIS, + altim. expertise

Reference mission Ocean Large scale

TOPEX/POSEIDON
(CNES/NASA)
Launcher
DORIS & POSEIDON
Mission Center

Jason-1 (CNES/NASA)
Satellite bus
DORIS & POSEIDON
Control & Mission Center

Jason-2 / OSTM
(CNES/NASA/EUMETSAT/NOAA)
Satellite bus
DORIS & POSEIDON
Control & Mission Center

Jason-3
(EUMETSAT/NOAA/CNES/NASA)
Same as Jason-2
(on behalf of Eumetsat)

Jason-CS
(ESA/EUMETSAT/EC/(NOAA?))
TBD

Earth reference system

SPOT2 (CNES)
DORIS

SPOT3 (CNES)
DORIS

SPOT4 (CNES)
DORIS

SPOT5 (CNES)
DORIS

~~**CRYOSAT (ESA)**
DORIS~~

PLEIADES (CNES)
DORIS

CRYOSAT2 (ESA)
DORIS

1990

2000

2010

2015

experiment

operational

SALP : Altimetry and precise positioning service

MERCATOR : assimilation, forecast
(CNES) / SHOM / METEOFRACTANCE / IFREMER / CNRS / IRD

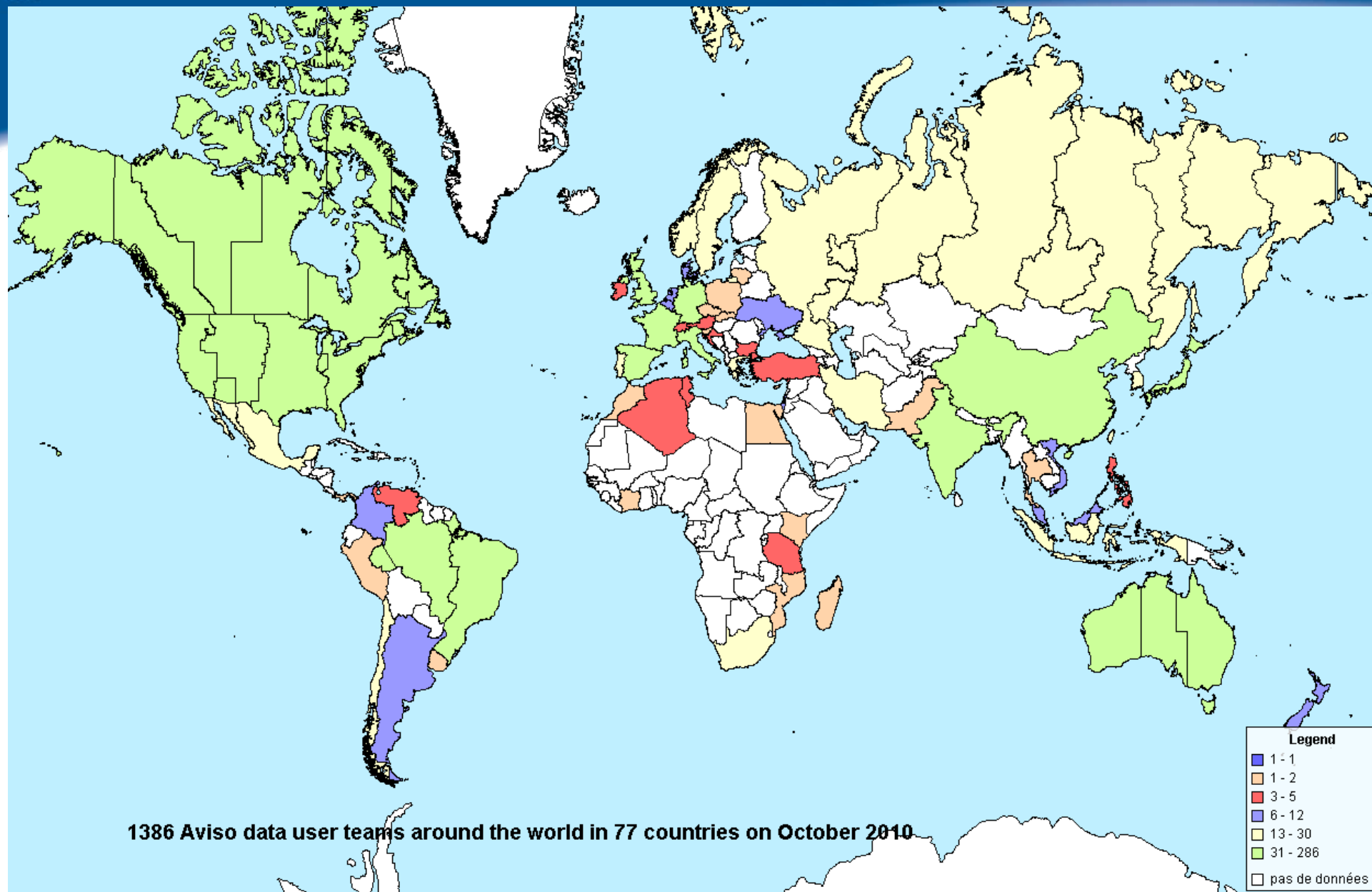


DORIS
20th
anniversary



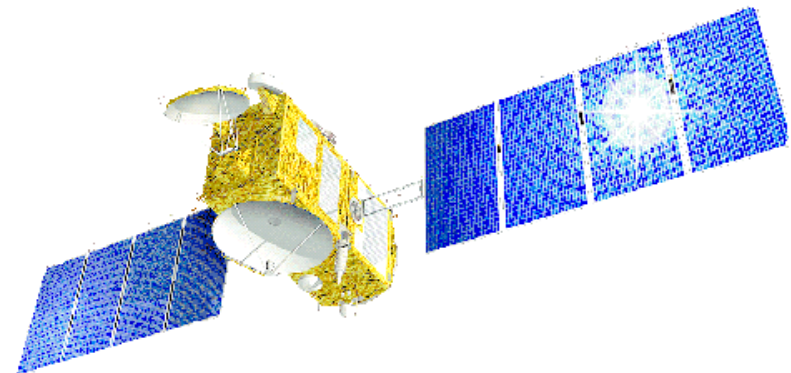
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- **Jason1: in extended mission, operational**
- **Jason2 : fully operational**
- **Jason3 : under development**
- **ENVISAT**
 - ◆ excellent synergy with Jason1
 - ◆ orbit change underway
- **DORIS**
 - ◆ 6 DORIS receivers simultaneously in flight
- **MERCATOR**
 - ◆ inter Agency structure for the implementation of an oceanographic forecasting center in Europe in the mid term (GMES Marine Core Service); leader of MyOcean (EC-FP7 program)
 - ◆ CNES is not a member of the new MERCATOR-OCEAN company
- **AltiKa/SARAL : in development phase.**
- **SALP/SSALTO/AVISO : multi-mission ground segment**
- **Sentinel3A & B : agreement with ESA to embark DORIS**
- **HY-2A : agreement with CNSA to embark DORIS**
- **Next Step : possible contribution to SWOT (TBD)**



- Operational mission underway
- Products distributed routinely
- CNES operations funded through SALP
- Required lifetime : 3 years (achieved in december, 2004)
- Extended mission: 5 years (achieved in december, 2006)
- Extension agreement for 5 more years of operation signed between CNES & NASA on december, 2006

- « End-Of Life » working group
 - ◆ See dedicated presentation



■ Cooperative Framework between NOAA/NASA/EUMETSAT/CNES

- ◆ Core mission : continuation of Jason1
- ◆ Technological passengers to enhance DORIS performance (CARMEN2/LPT, T2L2)

■ Launched on june 20, 2008

■ Close tandem mission with Jason-1 for Cal/Val until begin. 2009

■ Excellent performance

■ Improved mission on coast & land areas thanks to new tracking modes

■ Combined J1/J2 mission phase since feb, 2009



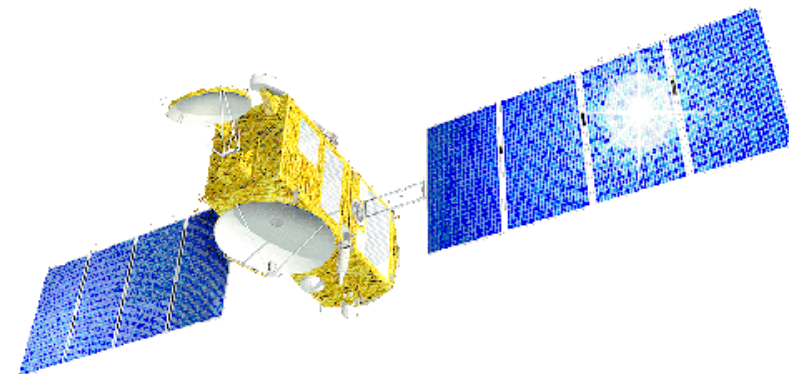
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- Same partners as Jason2/OSTM, however Eumetsat and NOAA have taken the lead
- Same responsibilities for Cnes (some of them “on behalf of Eumetsat”).
- Same requirements=> recurrent satellite (changes in US contribution : new radiometer, new GPS, new launcher)
- Launch : second semester, 2013
- Same cal/val (tandem) strategy as for Jason2/OSTM (TBC)
- *Role/funding of OST-ST : to be further discussed with partners*



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■ Program approved on december, 2005

- ◆ Altimetric Gap filler between ENVISAT & SENTINEL3
- ◆ Research oriented mission :
 - new, higher frequency, greater performance
 - potential new applications on ice, land, coastal areas
- ◆ ...but with a consolidated architecture : conventional altimeter

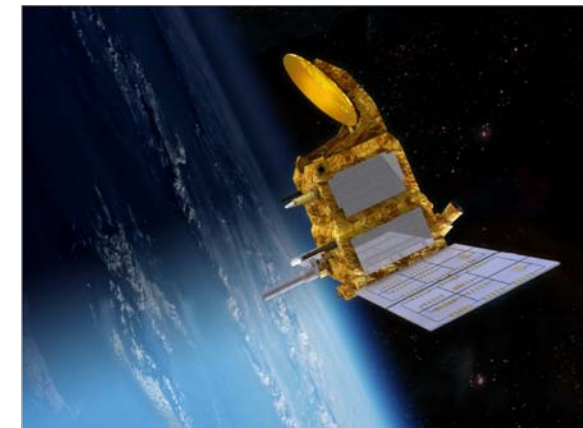
■ Cooperative framework : CNES/ISRO

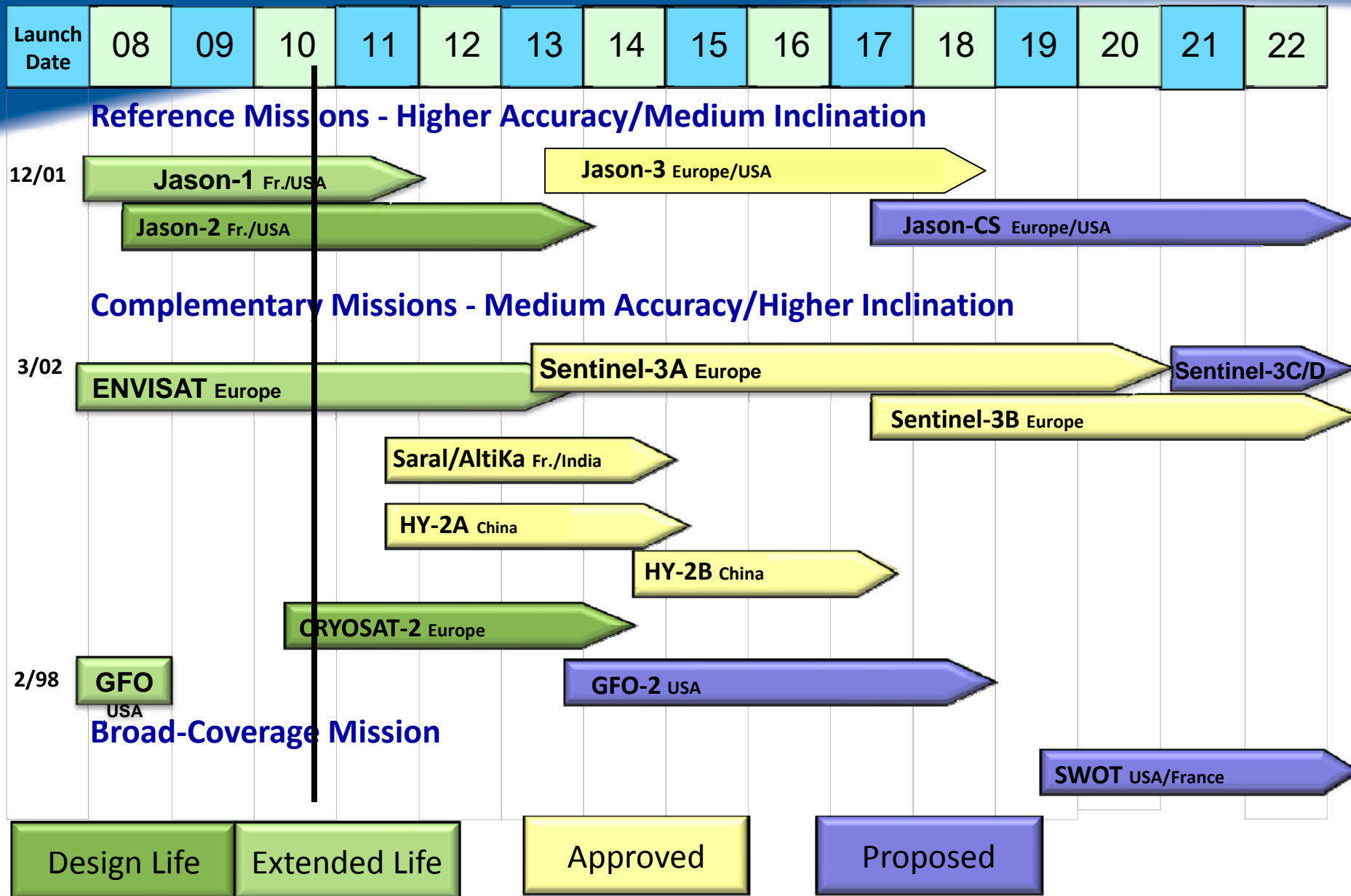
- ◆ Confirmation of CNES&ISRO cooperation on this new baseline obtained on December 2006 : SARAL mission (Satellite with ARGOS & ALTIKA)
- ◆ CNES/ISRO MOUs signed in february, 2007
- ◆ Payload module (CNES) : integrated, tested, ready to be exported
- ◆ Platform (ISRO) : ?
- ◆ Launch date : not before second semester, 2011



■ Science :

- ◆ PI selection process from november, 2009 to april, 2010
=> 64 teams selected
- ◆ Cal/val plan and science plan drafted
- ◆ International workshop planned in 2011 in India (TBC by ISRO)





Operating

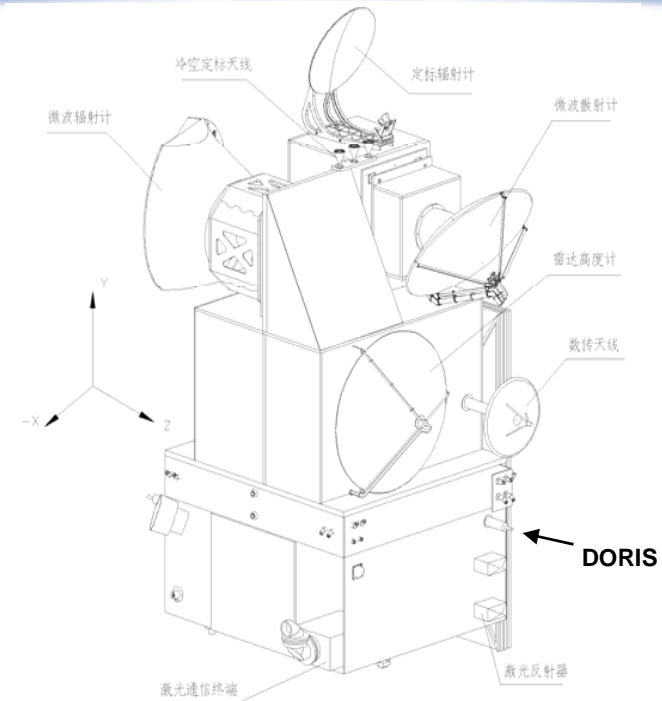
■ HY-2A : CNSA program with CNES contribution

- ◆ Payload : Dual frequency altimeter, nadir 3-frequency radiometer, 5-frequency scanning radiometer, scanning scatterometer, +DORIS/GPS/LRA
- ◆ Orbit : SSO 6am-6pm, 14 days (after 1-year geodetic mission)
- ◆ Launch : June 2011

■ JASON-CS : (Cnes position)

- ◆ ESA/EC/EUMETSAT(/NOAA ?) led mission
- ◆ Partial CNES funding through CNES contribution to ESA
- ◆ Possible contribution from CNES (under discussion with ESA):
 - Support to specification (system & instrument level)
 - Support to performance evaluation and error budgets
 - POD
- ◆ Launch(es) : TBD

■ and contributions to ESA/EC missions : Cryosat2, Sentinel3A&B



- Mission combining research needs associated to hydrology and oceanography :
 - mapping of water level for rivers, lakes, and oceans (including coasts)

- Principle : Wide-swath interferometric, Ka-band altimeter

- Recommended by the US Decadal Survey

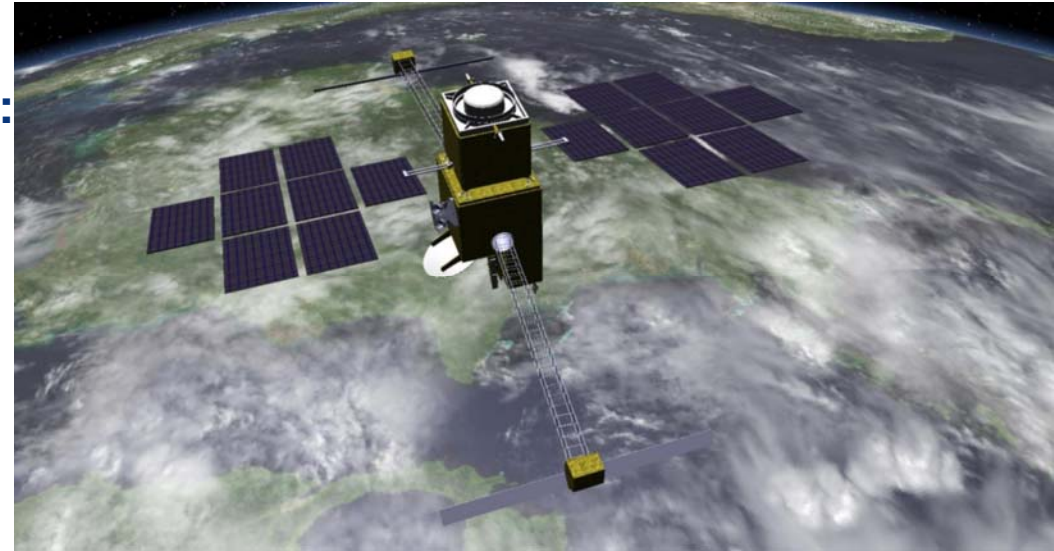
- Recommended in the frame of the Cnes Scientific Prospective Seminar (March, 2009)

- Cooperation scheme between NASA & CNES : approved

- Phase A underway at CNES

- Launch possible in ~2020

⇒ See dedicated presentation in « Ocean and Hydrology applications workshop »



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