IDS REPORT 2018

IERS Directing Board Meeting

Vienna, AUSTRIA

April 8, 2018

IDS IERS members:
Hugues Capdeville (CLS)
Jean-Michel Lemoine (CNES)
Jérôme Saunier (IGN)

Guilhem Moreaux (CLS)
Pascale Ferrage (CNES)

DORIS Constellation Status - Current Missions (6)

6 DORIS missions in flight with DGXX(S) Receiver (7 channels)

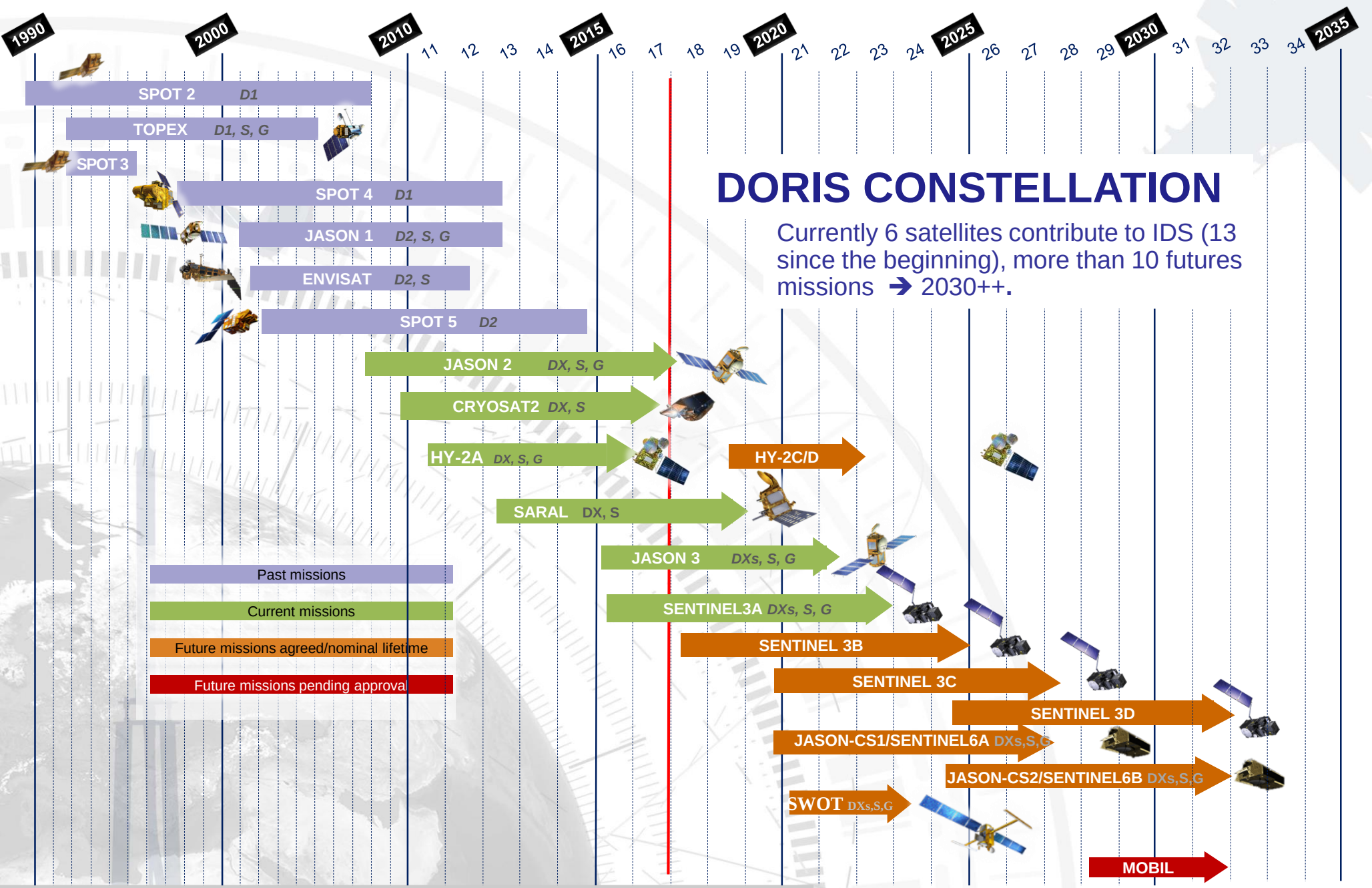
- ❑ SENTINEL-3-A (ESA): 814km, 98.65° — February 16, 2016 → 2023 (+LR)
- ❑ JASON3 (NASA/CNES): 1336km, 66° — January 17, 2016 → 2021 (+LR)
- ❑ SARAL (CNES/ISRO): 800km, 98.5° — February 2013 → 2018 (+LR)
- ❑ HY2-A (CNSA, NSOAS): 960km, 99° — August 2011 → as long as possible (+LRA+GPS)
- ❑ CRYOSAT-2 (ESA): 717 km, 92° — April 2010 → end 2019 (+ LRA)
- ❑ JASON-2 (NASA/CNES): 1336 km, 66° — June 2008 → 2019 (+LRA+GPS)

DORIS Constellation Status - Future Missions

- ❑ SENTINEL-3B (ESA) , 3C, 3D — April 25 2018, 2020, 2025 (7 years + 3)
- ❑ HY-2-C, 2-D (CNSA, NSOAS): 960km, 99° — 2019, 2020 (3 years)
- ❑ JASON-CS1/SENTINEL-6A (EUMETSAT/NOAA) : 1336 km, 66° — end 2020 (7 years)
  - *JASON-CSB/SENTINEL-6B:* — *2025 (7 years)*
- ❑ SWOT (NASA/CNES) : 970km, 78° — post 2021 (3 years)
- ❑ Mission MOBIL (gravimetry + geodesy 4 technics) submitted to EOEP — post 2028

DORIS CONSTELLATION

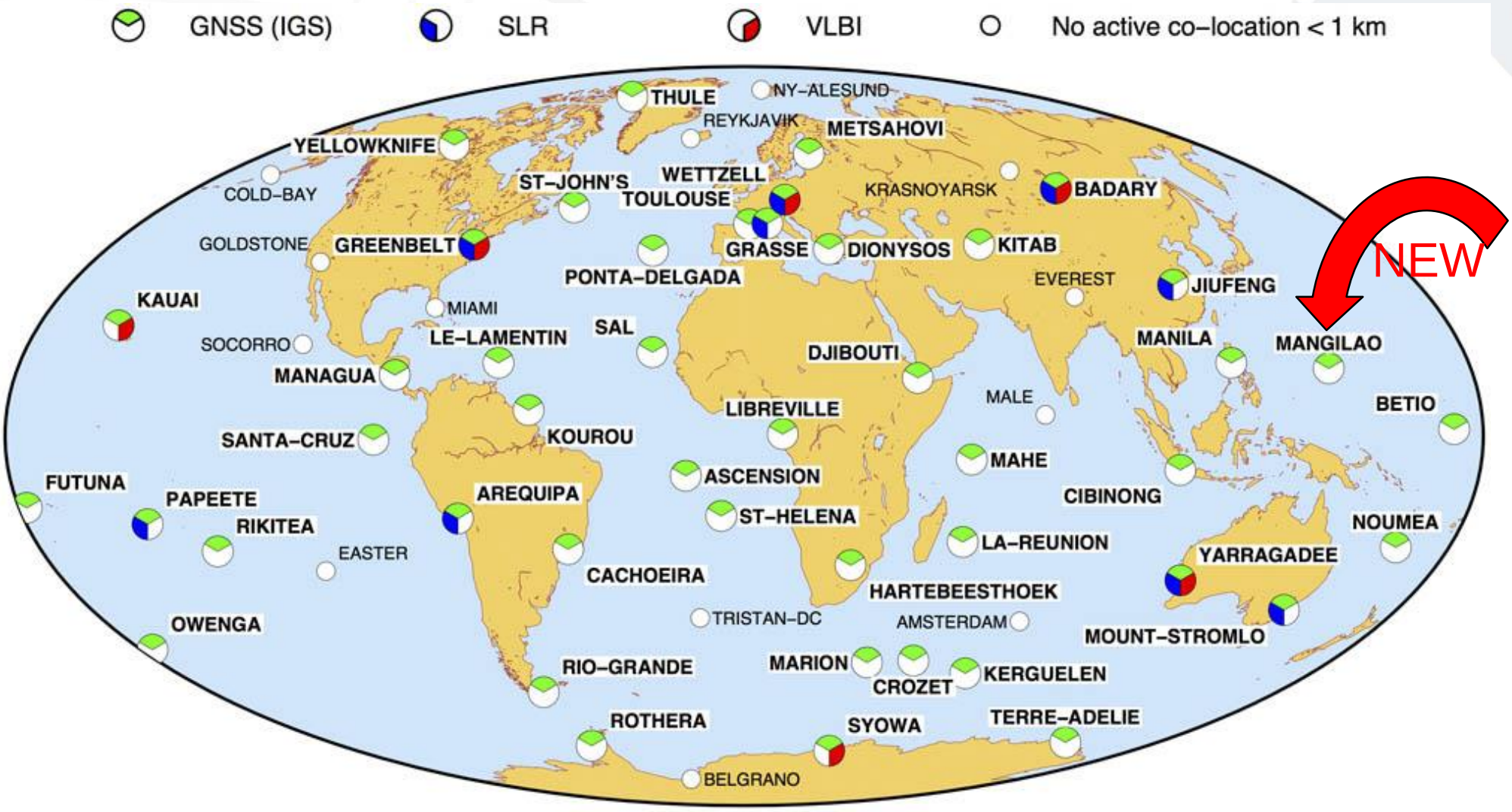
Currently 6 satellites contribute to IDS (13 since the beginning), more than 10 futures missions ➔ 2030++.



On board instruments:

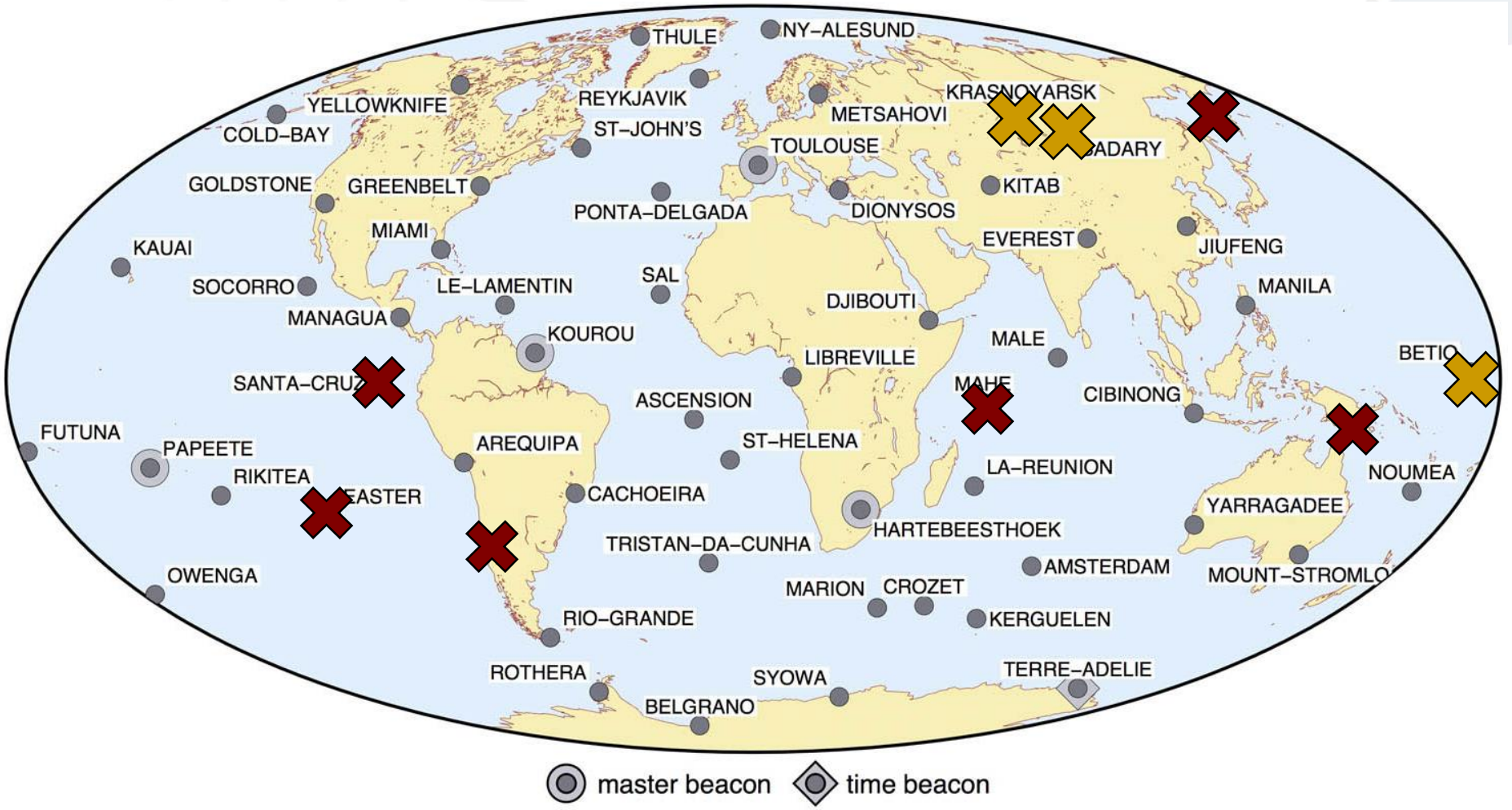
D1, D2, DX, DXs: DORIS/versions, **S**:SLR, **G**:GNSS

Current DORIS tracking network



46 co-locations out of 58 DORIS sites

Network Operational Status



9 beacons are currently out of order (6 for over a year)

Reliable service of the network on the whole despite coverage gaps in Pacific and Russia

Network Evolution

- **Recent network events**
  - *Dec. 2017: Cibinong, ID: restarting a year after being out of active service (beacon replacement)*
  - *Feb. 2018: Rothera, Antarctic, UK: relocating 70 m away (site refurbishment)*
  - *Apr. 2018: Mangilao, Guam Island, US: new station (under commissioning)*

- **Short term (2018):**
  - *San Juan, AR: new station installation in place of Santiago (3 techniques site)*
  - *Ny-Ålesund, Spitzberg, Norway: relocating (new 4 techniques site)*
  - *Easter Island, Chile: relocating (hosting migration)*

- **Longer term:**
  - *Katherine, AS: new station installation in place of Port-Moresby (3 techniques site) TBC*
  - *Changchun, CN: new station installation in place of Yuzhno-Sakhalinsk*
  - *Reykjavik, IS: relocating to improve performance*
  - *Papenoo, Tahiti, FR: new 4 techniques site TBC*

Analysis Update

Processing routine

- *6 DORIS Analysis Centers (ESA, GOP, GSC, IGN, INA, GRG) provide their SINEX solution to IDS CC*
- *IDS Combined series available online until end of third quarter of 2017*
- *Last quarter of 2018 is on the way by IDS Combination Center*
- *DPOD2014 v3:*
  Start of the process with observations from 1993.0 to 2018.0
  Delivery is expected by June 2018

Work in progress

- *Implement DORIS RINEX data processing*

(since the launch of Jason-3, Sentinel-3A DORIS data is only delivered in RINEX-like format)

- *Introduction of Jason-3 and Sentinel-3A in the IDS combined solution*
- *DORIS scale issue*
  DORIS scale increase in 2012 can be removed
  ACs have to do their own pre-processing when using doris2.2 data
  High scale level of HY-2A significantly reduced when the new position of the CoM given by the Chinese Project is used
- *Minimize the SAA effect on Jason-2 and Jason-3 USOs*
  While awaiting a more precise DORIS data corrective model adopt a strategy proposed by AC to minimize the SAA effect on the orbit and also and in particular on the station position estimation

Next work

- *Implementation and validation of the new standards/models recommended by the IDS/IERS*
- *DORIS orbit comparison campaign by Analysis Coordinators*

IDS reprocessing preparation for the next ITRF

- **DORIS specificity: Systematic errors and others**
  - *Attempt to mitigate the non-conservative force model error on Topex/Jasons serie (draconitic signal at 117 days)*

  Tests in progress and some IDS recommendations will be made (by using quaternions for both the s/c body and solar array)
  - *Minimize the SAA effect on Jason series and Spot-5 USOs*

  Some IDS recommendations have been made recently and will be made at the same time as IERS recommendations (by using SAA models and by applying SAA strategy)
  - *Implement RINEX DORIS processing (crucial topic to take into account the DORIS data of the last satellites)*

  In progress but currently only 3 ACs can do that
  - *Reduce HY-2A scale factor by using the last spacecraft CoM position*

  In progress, recommendations made by the IDS Analysis Coordinators recently
  - *Remove the scale jump in 2012 by making their own preprocessing when using DORIS2.2 data*

  In progress, recommendations made by the IDS Analysis Coordinators recently
  - *Resolve the scale sawtooth pattern of SPOT-5*

  Not yet understood
  - *Implement any new phase law for ground antenna (STAREC, ALCATEL, …)*

- **Adopt and evaluate the new standards/models recommended by IERS**

- **IDS position for the next ITRF**
  - *When all the new standards/models will be validated, it will take at least 6-8 months for ACs to reprocess the full history of DORIS observations.*
  - *From the IDS Combination Center point view, to do the evaluation and to elaborate the combination will take between 9 to 12 months.*
  - *So, for these reasons the IDS proposes an ITRF2020. The reprocessing could start in the second half of 2019.*

IDS News

- Next IDS AWG meeting in Toulouse, 11-12 June 2018, in conjunction with POD QWG Sentinel-3A
- IDS Retreat 13-14 June near Toulouse, to define the activities of the service for the next 5-10 years.
- Next IDS workshop in Ponta Delgada 24-29 September 2018 (in conjunction with the Symposium on "25 Years of Pro-gress in Radar Altimetry")

❑ New Network display tool: velocity vectors+ plate contours + earthquakes (soon available)

❑ New plot of the residuals of the cumulative solution

http://ids-doris.org