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IDS Analysis Working Group Virtual Meeting April 7, 2021



- 1. STC/NTC Configuration
- 2. First Comparisons to Orbits from ESOC
  - 3. Clocks Analysis

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## 1. STC/NTC Configuration

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#### Operational processing

- POE-F dynamic and measurements standards (e.g., same as Sentinel-3A/B and Jason-3).
- Nominal attitude (negligible impact of measured quaternions).
- Updated Solar Radiation Pressure macromodel (IDS box-wing) with respect to ESA/ESTEC Sentinel-6 POD Context.



FIGURE : Daily CR estimates from ESOC.

# Operational processing

- STC/NTC DORIS+GPS reduced-dynamic orbits (Galileo not used in the operational orbits).
  - No fixing of GPS ambiguities (not yet possible with the operational RINEX files).
  - Adjusted GPS PCO in all three directions (no PCV map).
  - Updated DORIS PCO : +10 mm in Y and +32 mm in Z directions (w/o solving for station heights).  $\Rightarrow$  Similar SRP mismodeling signature observed in Y (common X and Z signals to be explained).



FIGURE : Daily estimated Galileo (left) and 10-day estimates of DORIS (right) PCO.

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# 2. FIRST COMPARISONS TO ORBITS FROM ESOC

Comparisons to independent GPS+Galileo solutions from ESOC (Cycle 001)







FIGURE : CY001 CNES POE-F DORIS+GPS - ESOC GPS+Galileo.

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# 2. FIRST COMPARISONS TO ORBITS FROM ESOC

## Comparisons to independent GPS+Galileo solutions from ESOC (Cycle 002)







FIGURE : CY002 CNES POE-F DORIS+GPS - ESOC GPS+Galileo.



#### SLR validations (Cycles 001-002)

- \*8-station Core-Network (CN) : Yarragadee, Graz, Greenbelt, Matera, Maui, Herstmonceux, Hartebeesthoek, Zimmerwald.
- > \*\*RMS of SLR CN residuals above 70 degree elevation.

Orbit solutions	SLR CN* residuals (RMS)		High-elevation** SLR residuals (RMS)	
	CY001	CY002	CY001	CY002
ESOC Galileo	1.26 cm	1.39 cm	1.20 cm	1.58 cm
ESOC GPS+Galileo	1.04 cm	1.32 cm	1.01 cm	1.48 cm
ESOC GPS	0.90 cm	1.24 cm	0.67 cm	1.46 cm
CNES POE-F DORIS+GPS	0.77 cm	1.25 cm	0.45 cm	1.20 cm

FIGURE : SLR residuals RMS for CNES POE-F DORIS+GPS and ESOC GPS/Galileo.



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## Context

- > Analysis of the Sentinel-3A, Sentinel-3B and Sentinel-6A clock behavior :
  - o for the SAA effect (clock and/or frequency),
  - o for the altimeter processing (Sentinel-6A case, comparison with DORIS frequency estimations).



#### Sentinel-3A



FIGURE : Sentinel-3A's clock as seen by GPS.



#### Sentinel-3B



FIGURE : Sentinel-3B's clock as seen by GPS.



#### Sentinel-6A



FIGURE : Sentinel-6A's clock as seen by GPS.

#### Sentinel-6A





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#### ILRS SLR mission support

- 15 SLR stations *interleaved* since the beginning of the Sentinel-6a/Jason-3 tandem phase.
- Frank Lemoine (NASA/GSFC) sent a message to the ILRS stations on March 02, 2021 reminding them of the need to interleave tracks and to otherwise alternate whole tracks, pass-by-pass.



SLR station 7090 interleaving passes

FIGURE : Yarragadee SLR station interleaving beween Jason-3 and Sentinel-6a.

- Hemispherical orbit/altimeter bias between Sentinel-6a and Jason-3?
  - > High-elevation interleaving SLR residuals could help identifying the origin of this bias.



#### Residual difference of SSHA recomputed with iono gim Jason-3 Irm - Sentinel-6A Irm

FIGURE : Residual difference of SSH between Jason-3 and Sentinel-6a.



## SLR (at orbit level) versus tide gauges (at sea level)

- > Only 7 stations interleave at high elevations.
- > Yarragadee only has enough passes above  $70^{\circ}$  elevation angle  $\Rightarrow$  no clear systematic differences between Jason-3 and Sentinel-6a CNES POE-F orbits.

