

ESA's Activities in the area Earth-Orientation-Parameter - Status Update

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ESA/ESOC Navigation Support Office

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ESA/ESOC's Navigation Support Office



The Navigation Support Office is responsible for providing the Geodetic reference for ESA missions

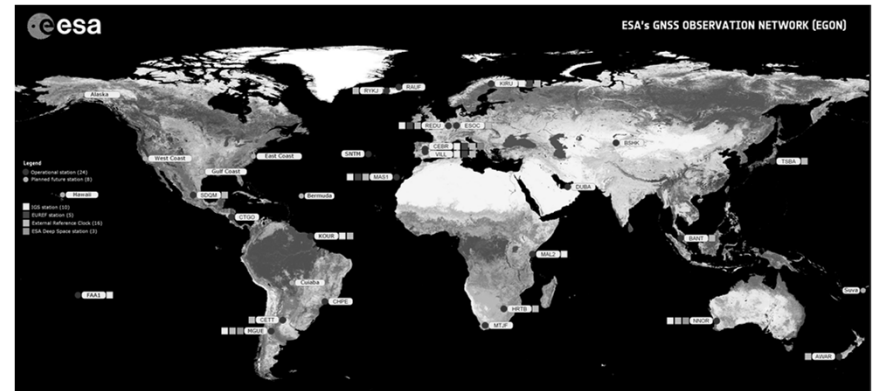
It further acts as Coordinator of the Galileo Reference Service Provider (GRSP) to provide the Geodetic reference and corresponding EOP's to Galileo.

ESA operates Ground Infrastructure

- ESA'S GNSS Observation Network (EGON)
- ESA/Europe is building up SLR stations
- European Space Tracking network (ESTRACK)

ESA operates Data Centres

- GNSS Science Support Centre (GSSC)



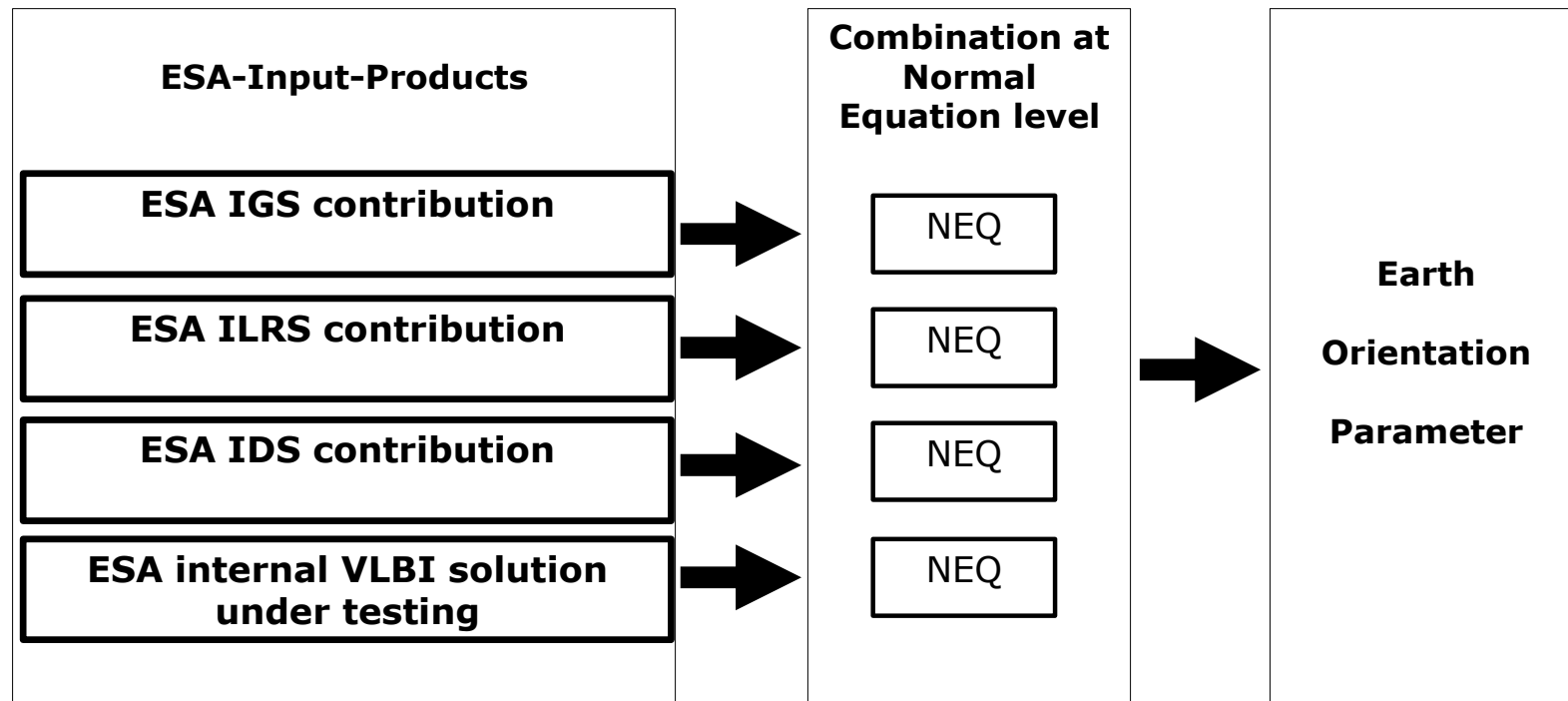
ESA generates all the geodetic products required for the computation of EOPs.

ESA routinely contributes as an official AC to IGS, ILRS and IDS and as associated AC to the IVS

**Although all the required input geodetic products are generated by ESA,
ESA and its customers are still relying on an external provider for EOPs.**



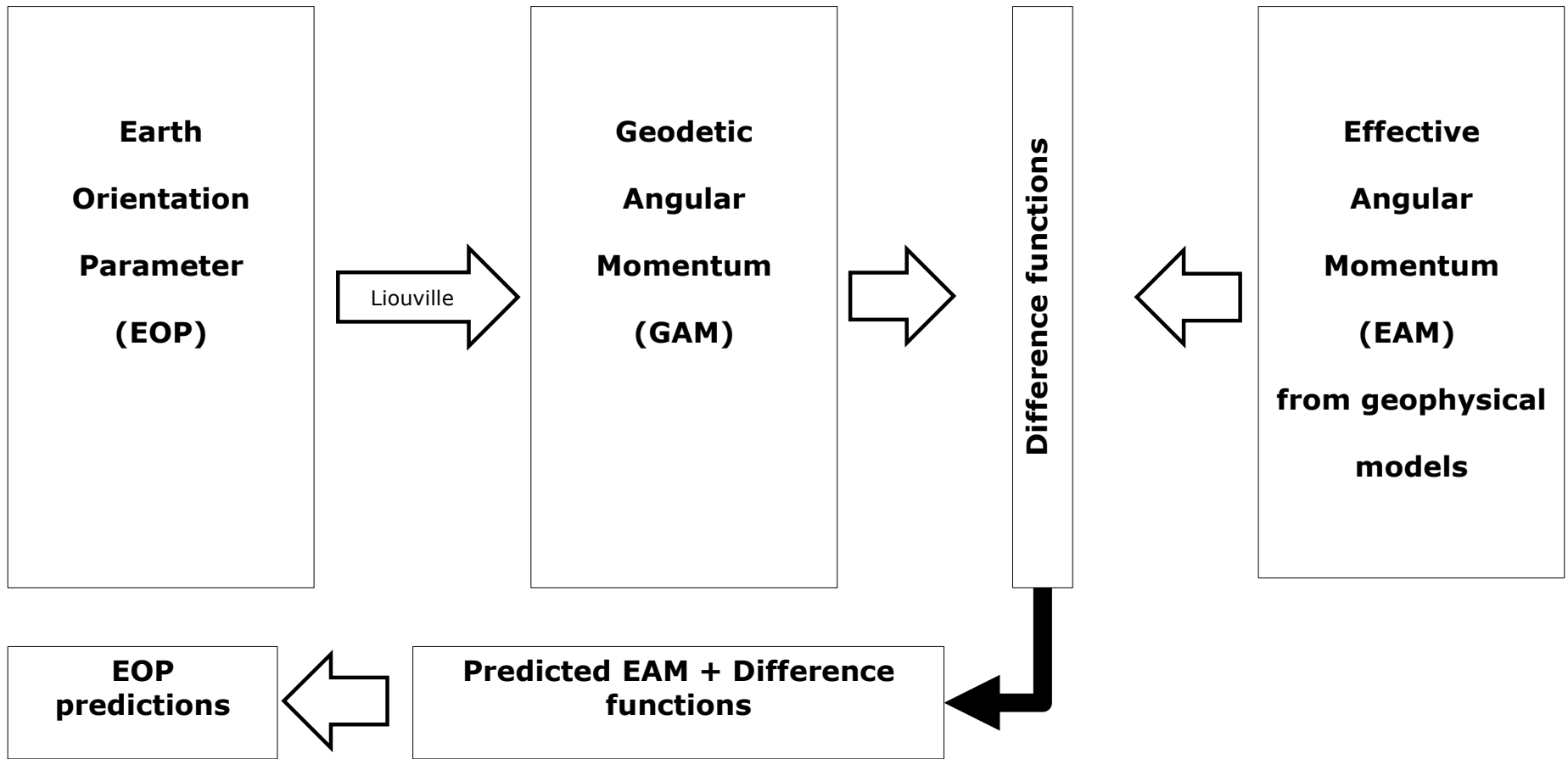
ESA approach to ERP estimation



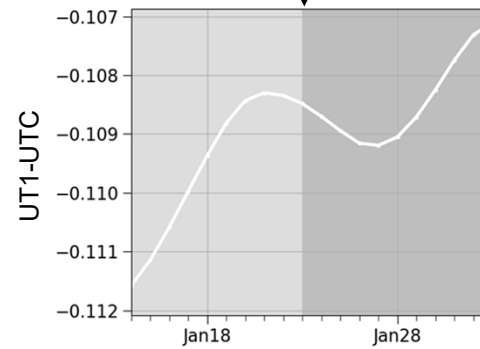
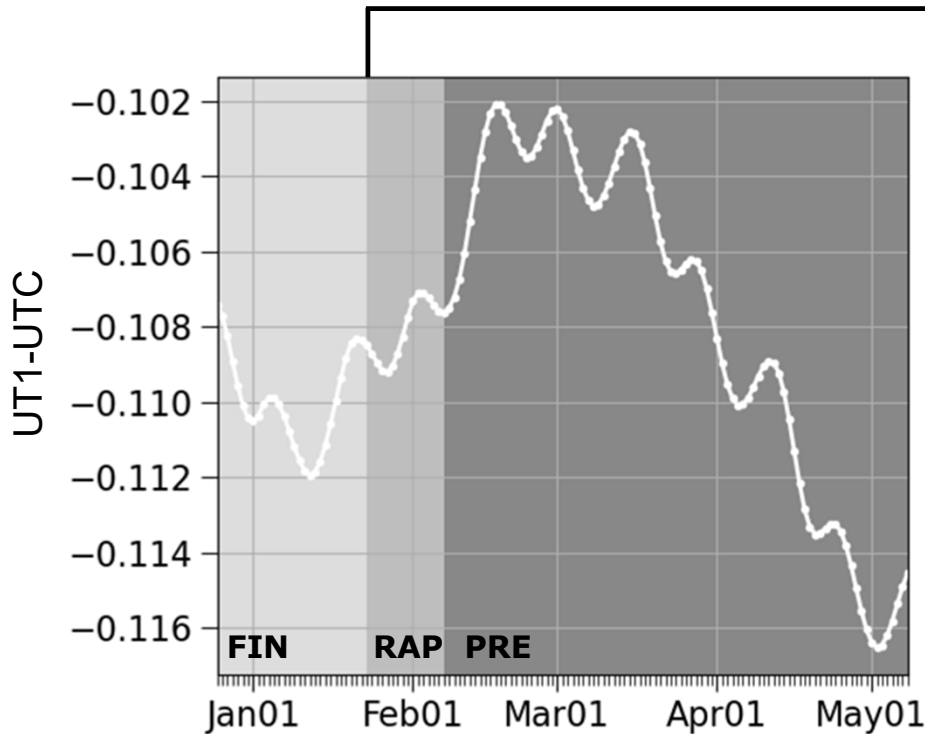
Advantages:

- Highest consistency: same software and models used in the data analysis
- The combination at Normal Equation Stacking level allows to take correlations into account

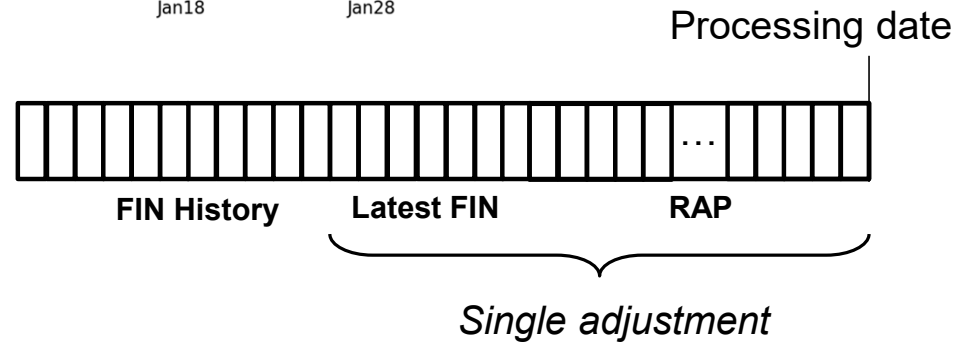
ESA approach to EOP predictions



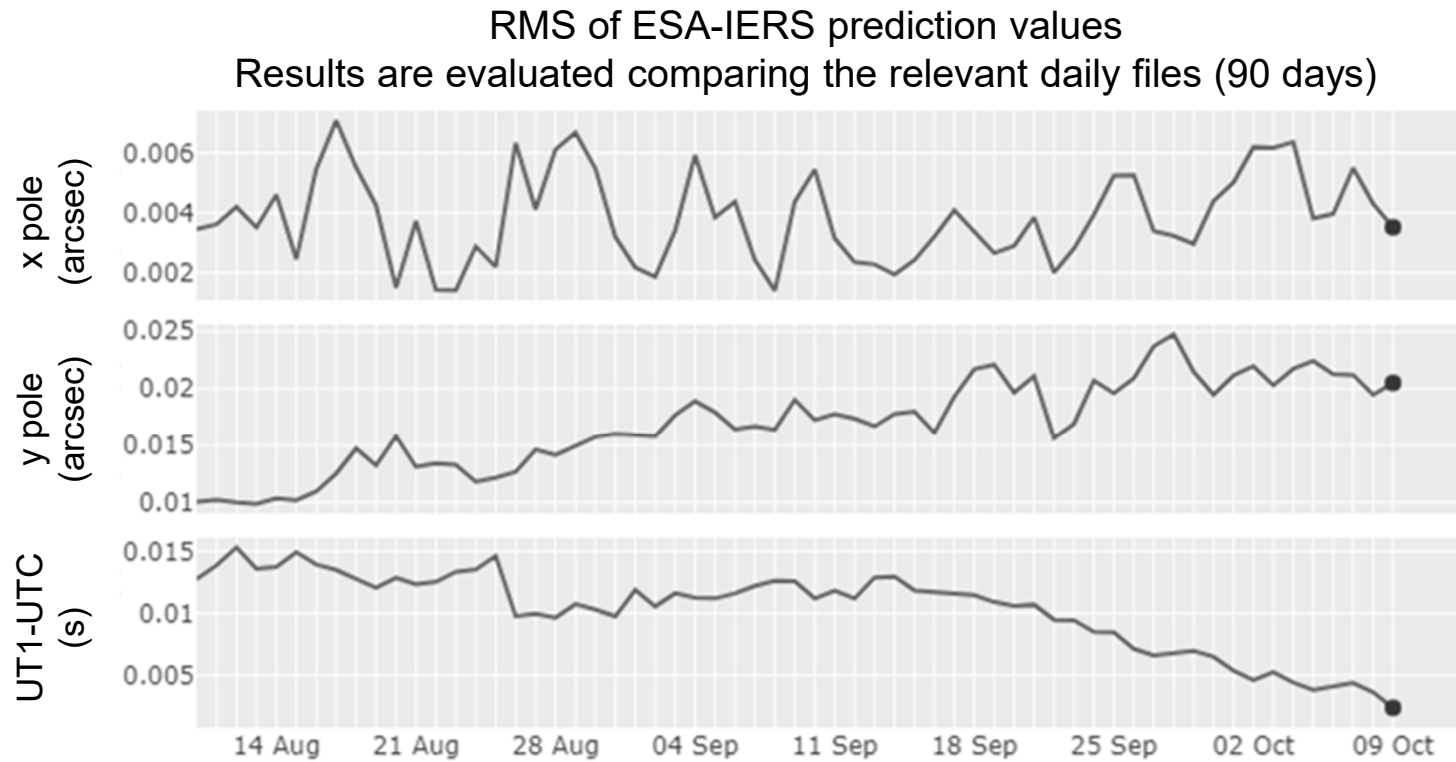
Smooth transition between final and rapid estimates



Close up on the transition between FIN and RAP values



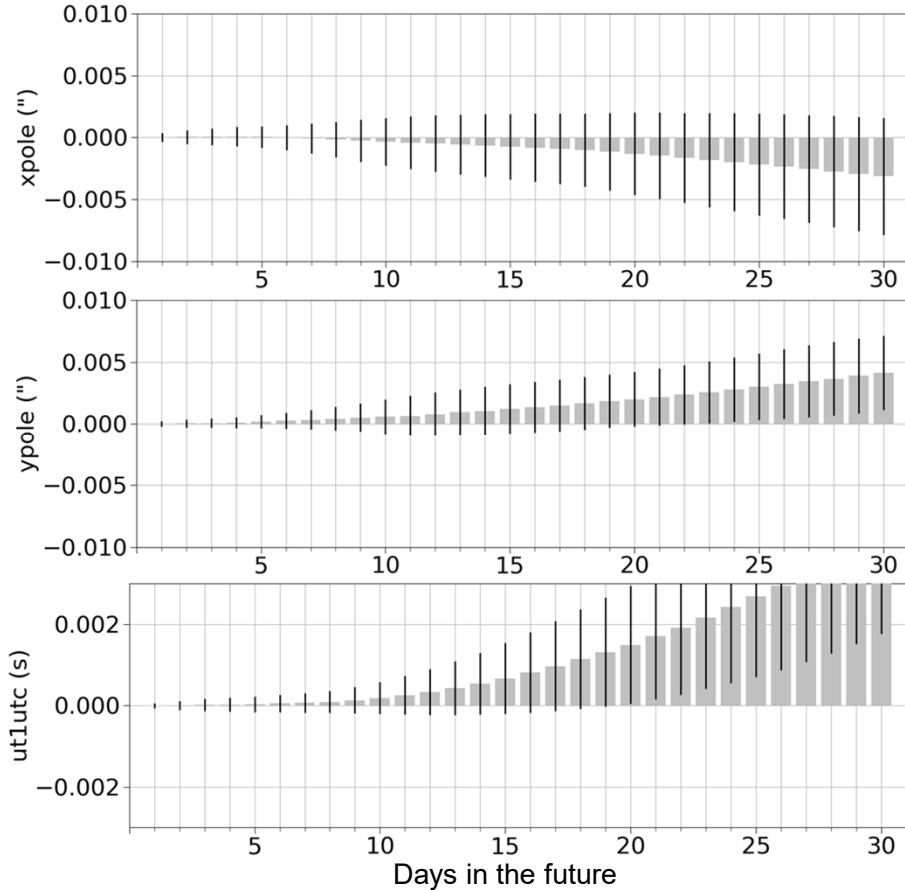
Comparison of ESA and Bulletin A Prediction



ESA EOP predictions



ESA Prediction vs ESA Final estimates (30 day latency)



Histogram bars: average discrepancy between predicted and estimated values for predictions up to 30 days into the future

Whiskers: standard deviation of the discrepancies

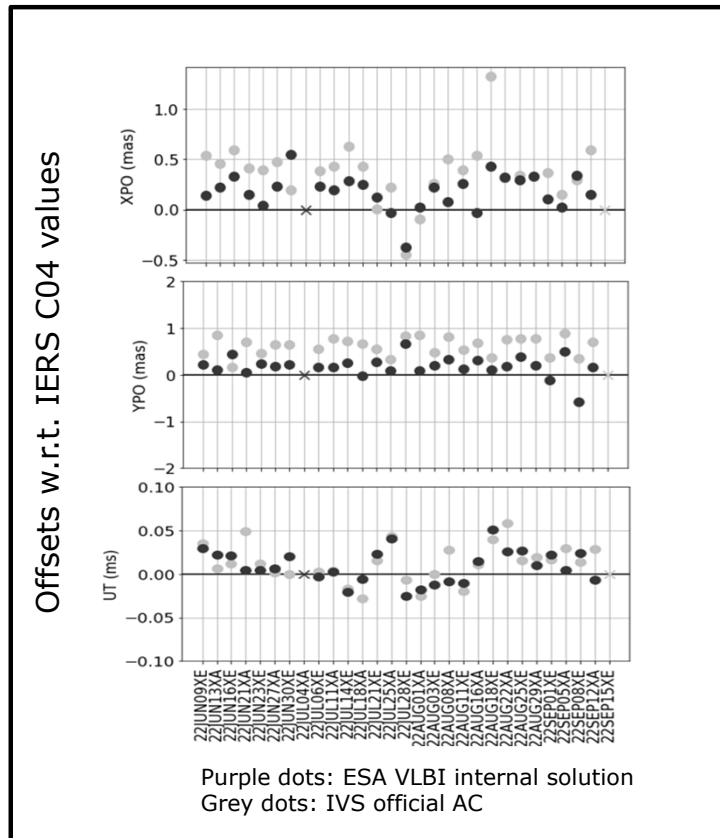
Statistics are based on the results generated up to Oct 10 2022. Results may vary over time.

	PRE-FIN mean and std for n days into the future		
	n=1	n=7	n=30
x pole (arcsec)	3.5E-05	1.3 E-04	-3.1 E-03
	3.2 E-04	1.0 E-03	5.9 E-03
y pole (arcsec)	6.8 E-06	5.1 E-04	4.9 E-03
	2.5 E-04	8.2 E-04	3.7 E-03
UT1-UTC (s)	2.1 E-05	1.7 E-04	3.4 E-03
	6.9 E-05	2.4 E-04	1.5 E-03

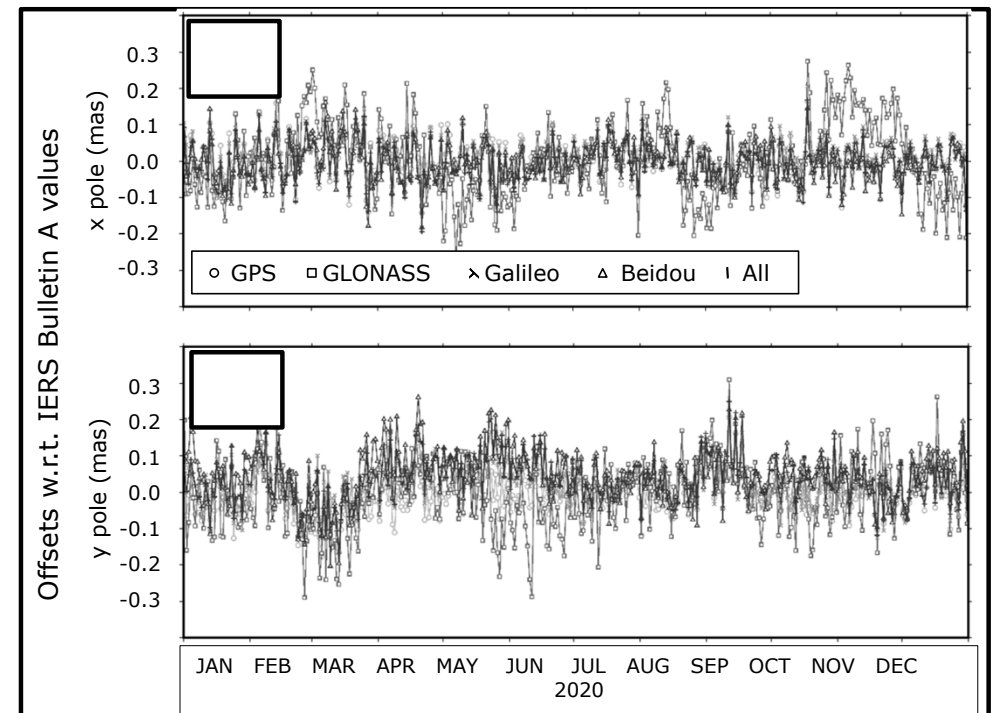


Future perspectives

- Once operational, make use of ESA VLBI solution



- Make use of ESA multiGNSS solution



Conclusions



- The processing will soon include also the ESA VLBI solution, to ensure the highest possible consistency among all geodetic input products.
- ESA's EOP service provides excellent initial results. The accuracy of 1-day predictions is better than
 - 0.5 milli arcsec for x_{pole} and y_{pole}
 - 50 μs for UT1-UTC.
- ESA/ESOC's Navigation Support Office intends to provide independent products and services for Earth Rotation Parameters by the end of 2022.
- ESA's independent EOP products and services will ensure the unrestricted access to space for ESA, EC and European industry.



**Thank you very much
for your attention!**

Point of contact

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ESA/ESOC Navigation Support Office

<http://navigation-office.esa.int>