EUMETSAT Commercial Radio Occultation Data Service

Christian Marquardt, Daniel Lee, Karolina Nikolova

JCSDA Workshop and IROWG-10

13 September 2024

Agenda

- EUMETSAT policy on commercial data
- Pilot procurement and the transition to a new contract
- Performance during the pilot
- Some thoughts (or – lessons learned?)

EUMETSAT policy towards commercial data procurements

- Procurement of commercial data should remain marginal compared to EUMETSAT own programmes.
- Technology should be European, and data procured on best value for money –EUMETSAT procurement rules apply.
- EUMETSAT acts as procurement agent on behalf of its 30 member states.
- Positive impact of the data must be demonstrated before the initiation of a procurement – made through studies performed by, e.g., ECMWF – and uptake by users needs to be prepared.
- Global licensing is preferred but value should be checked comparing market prices.
- Regular assessment of the (emerging) market in Europe is required.

EUMETSAT – Commercial RO data pilot procurement

On this basis:

- EUMETSAT initiated a pilot project in 2021 for procuring commercial RO data under a global licence until August 2024.
- EUMETSAT's Council has, in the meantime, agreed on a 2-year operational extension under the same licencing conditions until August 2026, with the option of three 1-year extensions.
- Both contracts were awarded to Spire .

- Global licence: Free distribution to all interested partners.
- Commercial RO data are shared on the WMO Global Telecommunications System (GTS) for free usage.
- Cooperation with NOAA and global license approach in this cooperation bring further value

Transition to operational contract

The follow-on operational contract was activated on 14 August 2024.

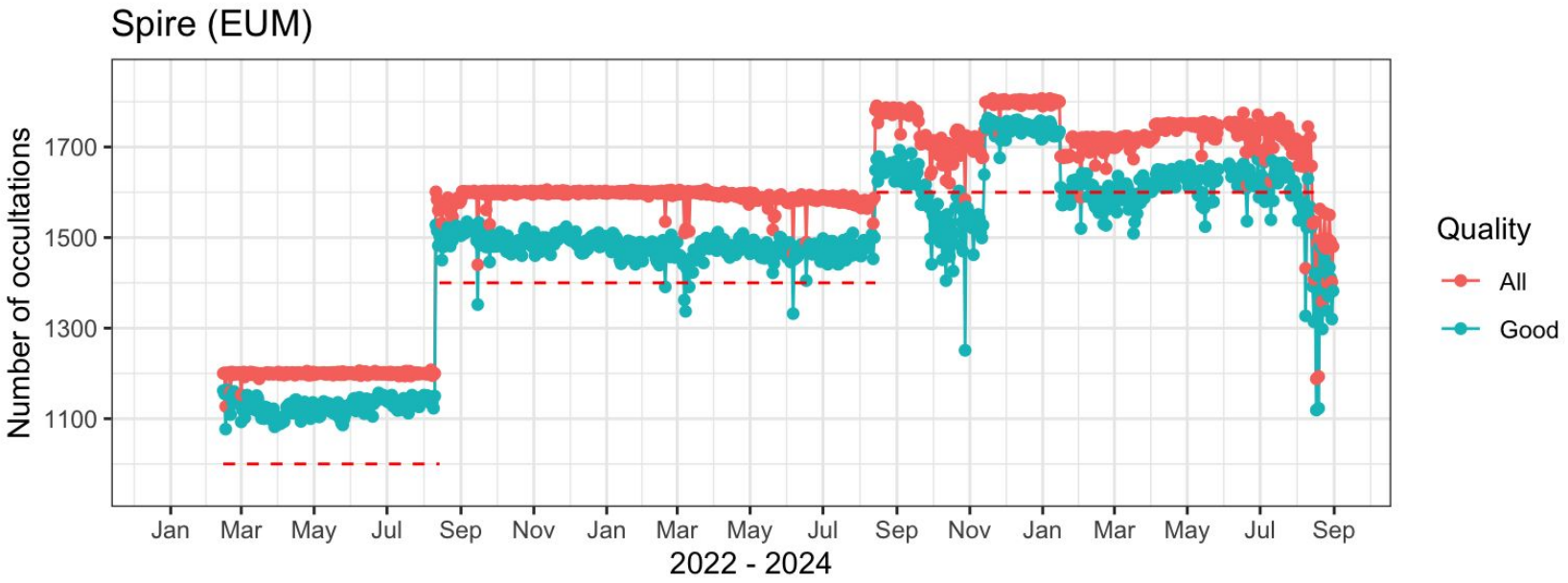
Operational contract from 14 August 2024:

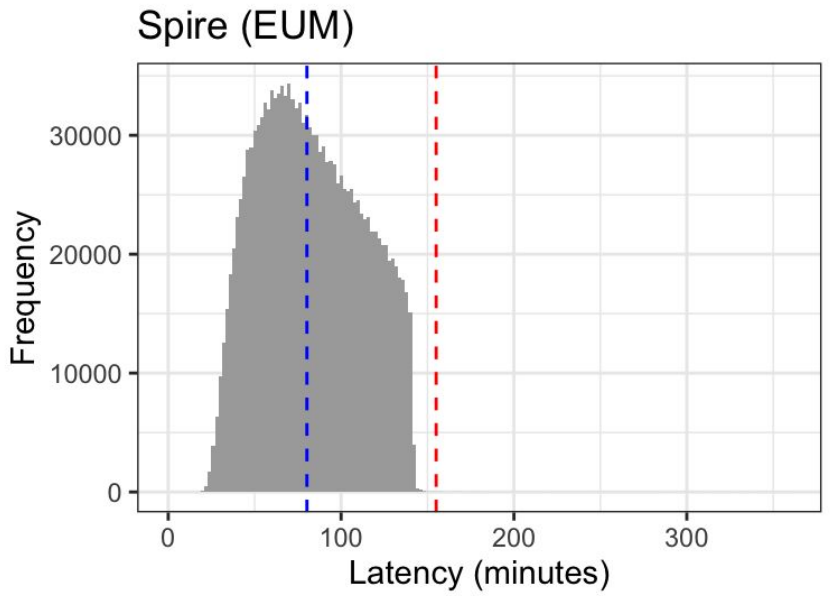
- 1400 occultations/day during 2-year baseline
- 1000 occultations/day in optional extensions
- 1-year delivery orders
- “Global” license for data distribution

No changes to data reception, processing, and access:

- Reception of raw L0 data and L1 products
- EUMETSAT near real-time processing and data distribution
- EUMETSAT archival of raw and processed data

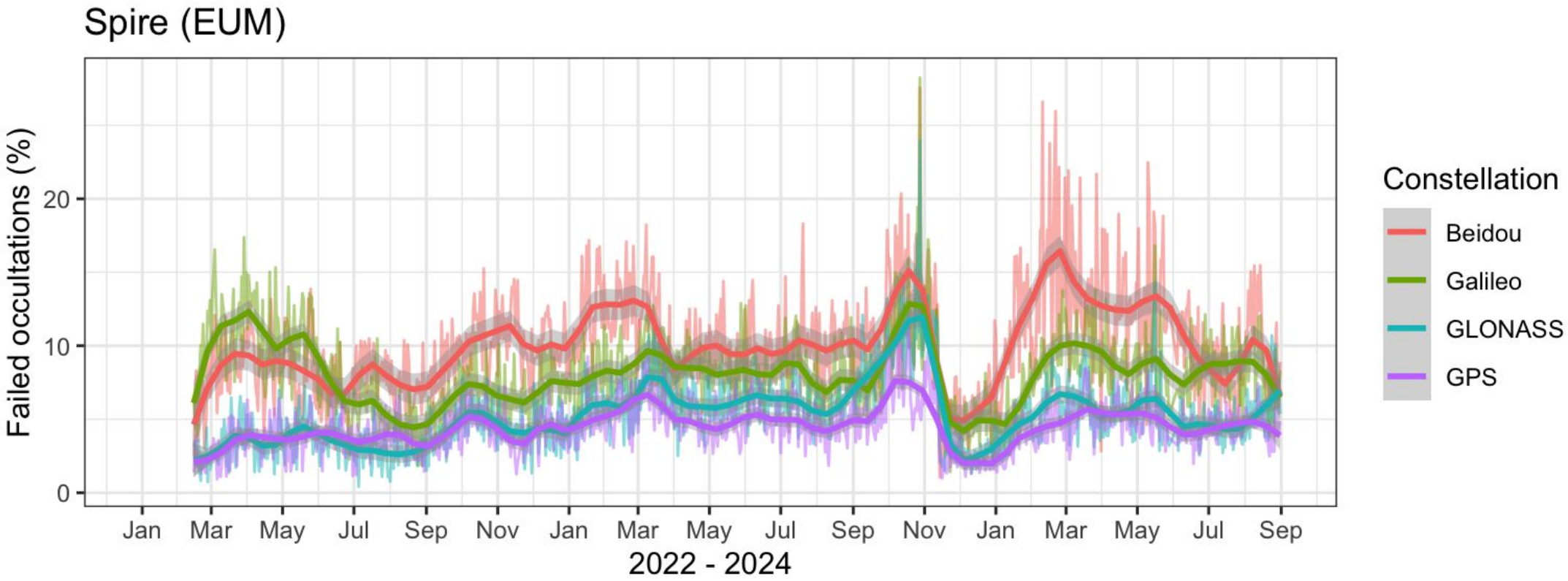
Daily occultation numbers





- Spire consistently overfilled their Service Level Agreement, although the margins become somewhat smaller recently.
- Latency (L1b generation): Median 80 mins, 100% < 155 mins

Quality control rejection rates



- EUMETSAT's QC rejection rates vary with time and, for Spire, depend on the GNSS constellation.

Thoughts – or lessons learnt

- Implementing an operational data service based on commercial RO data is feasible and provides value to our Member States.
  - Users confirmed the positive impact the commercial data had in their systems.
  - Users have noted the value of consistent processing, quality control and monitoring, as well as the added value of the L2 processing performed by the ROM SAF.

- Commercial data buys require expertise.
  - Pre-procurement evaluations (with ESA and NOAA) provided time to implement scientific processing and gain experience with data characteristics.
  - Preparation and validation phase provided time to implement operational environments and monitoring, and to build confidence in contractor's ability to deliver.
  - Changes within the data provider's satellite fleet create the need for higher-frequency updates to end-to-end operational chain, incl. processor configuration and quality control, and frequent data evaluations.

Thoughts – or lessons learnt (cont'd)

- Transparency is a potential issue as not all information on instruments, data selection and vendor-side QC are available up-front.
  - Spire provided complete documentation on data products and contents, as well as ATBD-style documentation for their higher-level processing (including their QC process).
  - Detailed technical documentation of receivers and their inner working was, however, lacking.
  - In practice, Spire provided all technical information required to understand and process their data whenever requested.
  - The contract obliges Spire to provide information necessary to interpret the data and allows EUMETSAT to share this information with users.

- Maneuvering around transparency issues is possible to a certain degree if
  - Data providers are willing to do so;
  - Sufficient expertise exists on the customer side to ask the relevant questions.

Thoughts – or lessons learnt (cont'd)

- Users repeatedly pointed out that changing data providers or satellites on short notice pose significant problems for them:
  - Newly introduced satellites – and significant changes in onboard software – require validation of the resulting data.
  - Traditionally, NWP centres perform 3-6 months of passive monitoring before they let new data into their operational systems.

- In EUMETSAT's RO procurement, we work around this by
  - Requiring test data in advance;
  - Performing at least some minimum validation;
  - Sharing results with European users, at least if hardware changes;
  - Only accepting new data/satellites if data characteristics remain unchanged.

- Dealing with the short notification times, e.g. when NOAA changes providers, is difficult.

Summary

- In line with policies on commercial data procurements as defined by its Member States:
  - EUMETSAT conducted a pilot procurement of commercial RO data (2021 – 2024)…
  - …and recently extended the contract for 2+3 years (2024 – 2026 plus optional years).
- Member States confirmed the value of an operational data service based on commercial RO data.

- Spire Global consistently fulfilled its Service Level Agreement with EUMETSAT;
- Technical information was provided swiftly and completely whenever needed or requested;
- There were a few anomalies only; in each case, they were resolved quickly.

- That said, external events impacted the composition and number of data being delivered

Summary (cont'd)

- Processing and monitoring are crucial to ensuring consistent data characteristics and quality control procedures across multiple RO missions (commercial and public).
  - The commercial RO service was extended to the processing of NOAA-procured commercial RO data to offer EUMETSAT Member States consistent RO data from the US data buys.

- Building an operational data service based on commercial data requires expertise on the customer side:
  - To build, maintain and evolve processing and quality control systems, ensuring consistent data characteristics across satellites and even providers;
  - To mitigate potential transparency issues;

Summary (cont'd)

- Changing providers of commercial data – especially when they deliver data for the first time – and introducing new satellites – especially when technology and algorithms evolve – pose significant challenges for users.
  - Intermediate organisations like EUMETSAT and NOAA should make test data and validation results for new data providers public to speed up the adoption of new data in operational systems.
  - Commercial data providers should support the quick uptake of their data, e.g. by making test data from new satellites available to the community early on.
  - Operational users could help by defining their minimum requirements for the validation of new data sets.

Thank you!

Questions are welcome.