Working with the IGS: The ESA/ESOC experience

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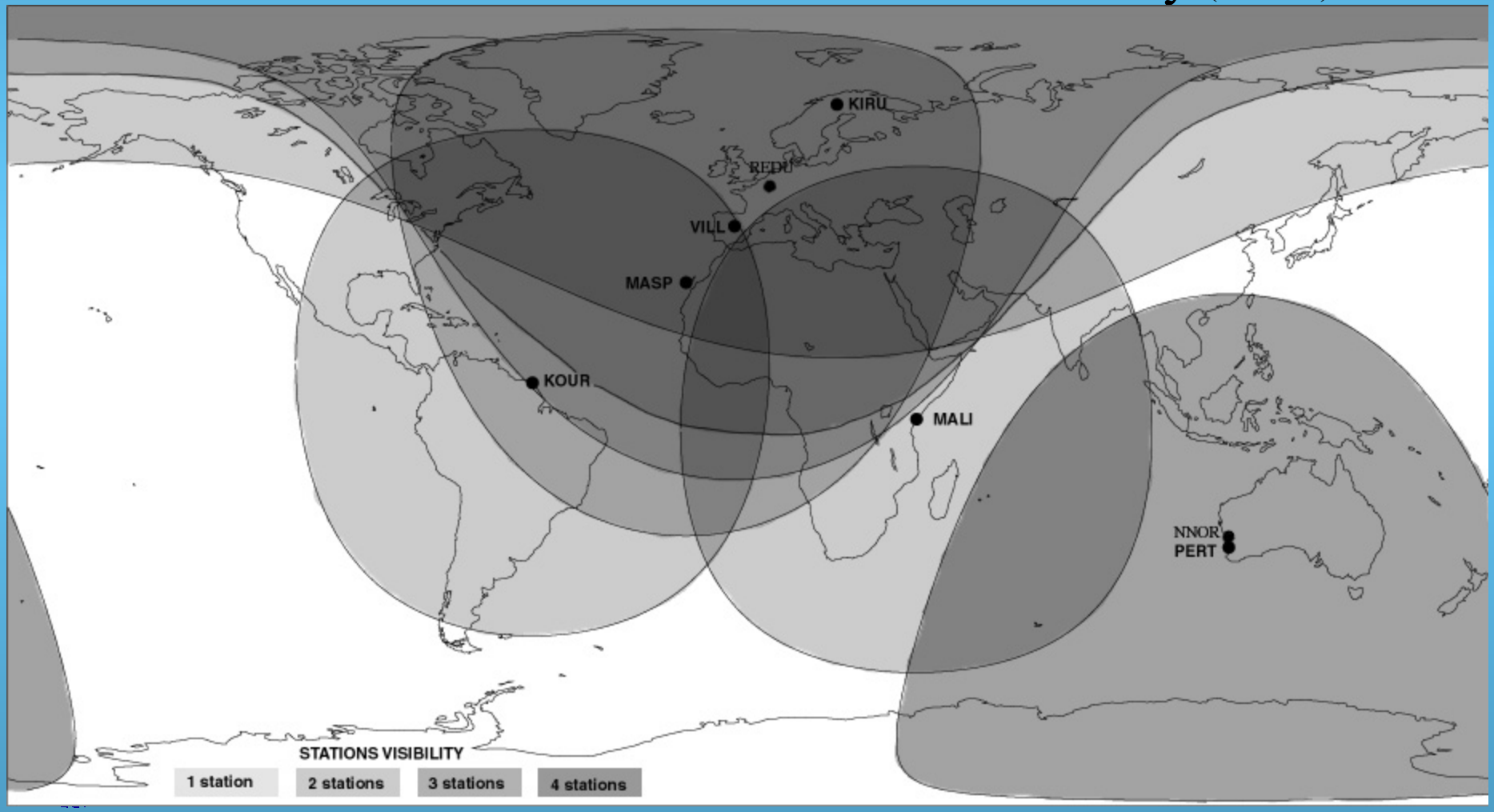
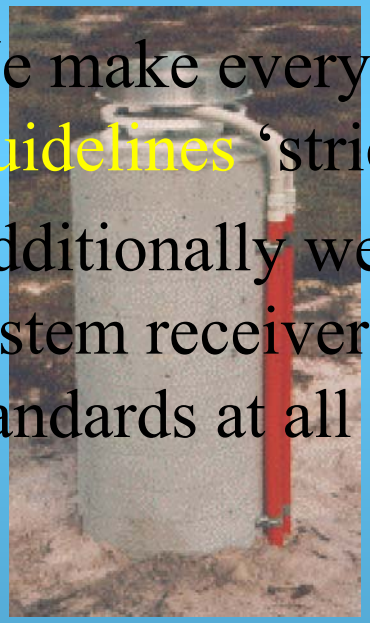
ESA/ESOC IGS Contributions

- 8 worldwide stations in 4 continents operating at 1Hz with RT data transmission back to ESOC + 1 daily (KOU1).



ESA/ESOC sites

- Are located at tracking stations used for ESA satellites, in some cases sharing comms.
- The monumentation standard is very strictly adhered to.
- We make every attempt to satisfy all the IGS Site Guidelines 'strictly required characteristics' (Section 2.1)
- Additionally we have one MET station (vill) one dual-system receiver (kou1), and we have external frequency standards at all sites.



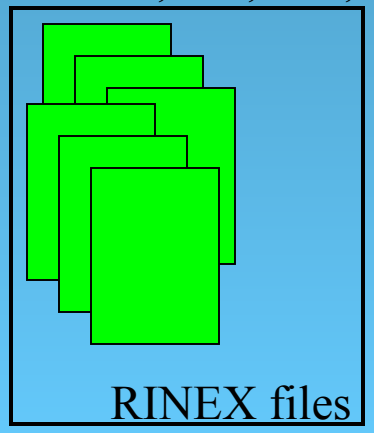
Handling ESA/ESOC data/metadata

- ESOC has moved with significant effort from 30 second data once a day to 1Hz data every 15 minutes over the last 5/6 years.
- ESOC maintain all the data modes for all the stations (30sec daily and hourly, 15min 1Hz data).
- Metadata is updated by hand. RINEX submissions are automatically cross-checked (receiver, antenna, etc).
- There is always confusion when our stations are out for long periods of time. Our SIFs do not get updated until the station returns to operation.

Open ➔

Handling the IGS data/metadata

CDDISA, SIO, IGN, …



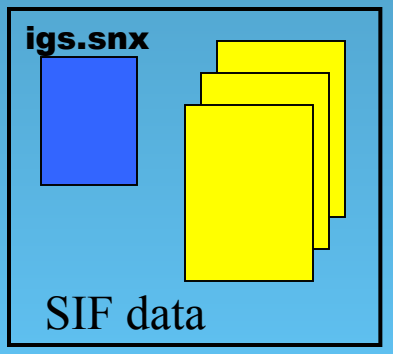
•The RINEX data is continuously being downloaded, checked and windowed with ***teqc*** before available for processing.

Open
The repository is difficult to update with resubmissions

ESOC RINEX **data repository** Available for POD

•The SIF data is downloaded daily (if needed), and used to an internal

Open
New stations are now seldom included unless very attractive



• New coordinate file generated as needed: (new itrf or antenna changes)

Station information file:
Relating antenna, receiver, internal numbering, Coordinate source, eccentricity, domes, …

igs_01.pcv

Coord.: Coordinate file for all the defined stations

IGb00
ITRF00
IGS97

The use of IGS Data

- ESOC products require the use of the IGS data and metadata to supplement our own stations.
- There is currently no internal consistency check between the IGS RINEX file headers and the SIFs (under consideration)
- Problematic information either at the data or metadata level (antenna mismatching, incorrect data formats, etc) cause serious problems for the ESOC processing.
- Some of the problems have been reported to the SIF contacts or to the IGS, but results are very mixed, so we end up excluding the problematic stations.

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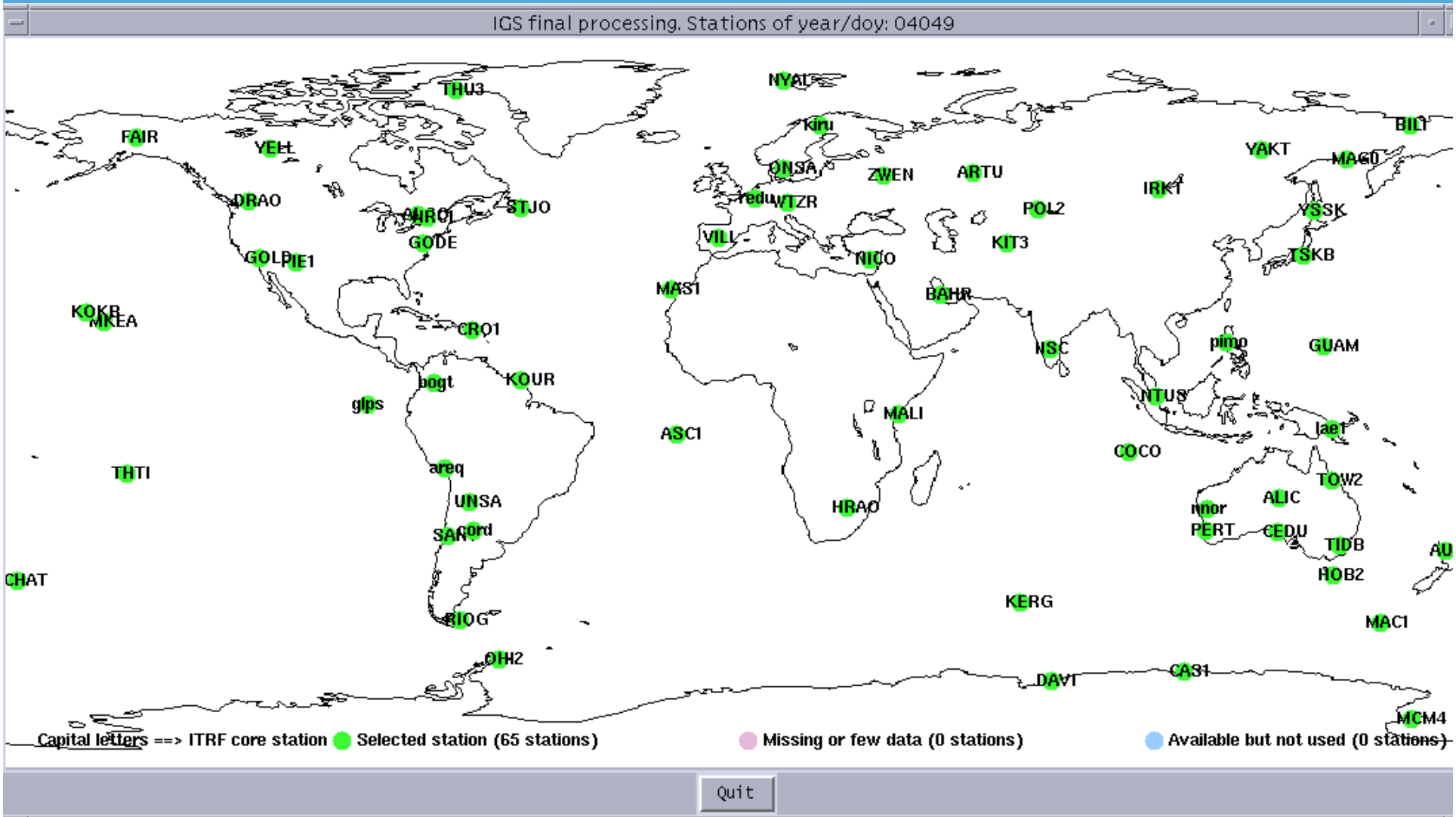
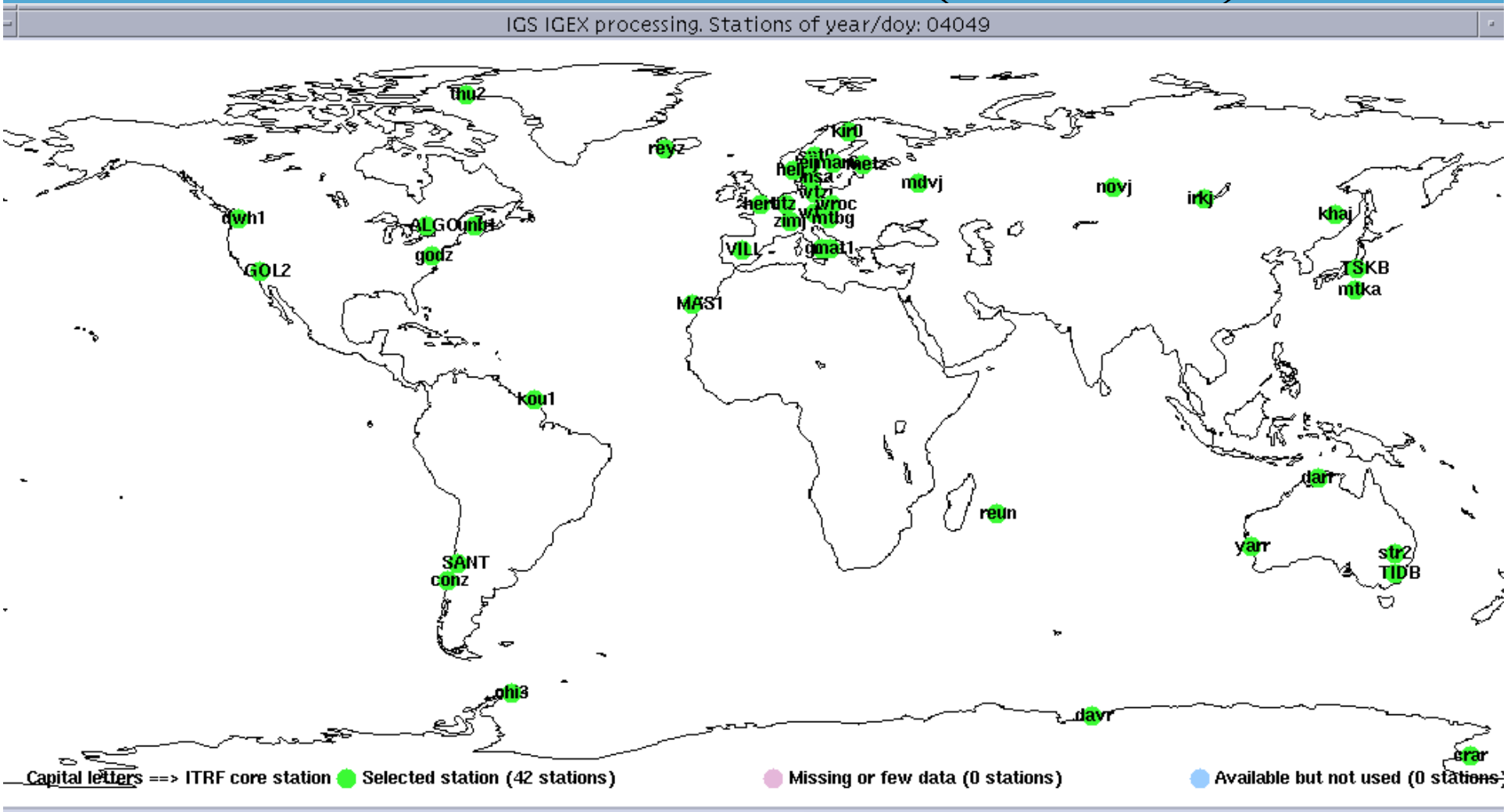
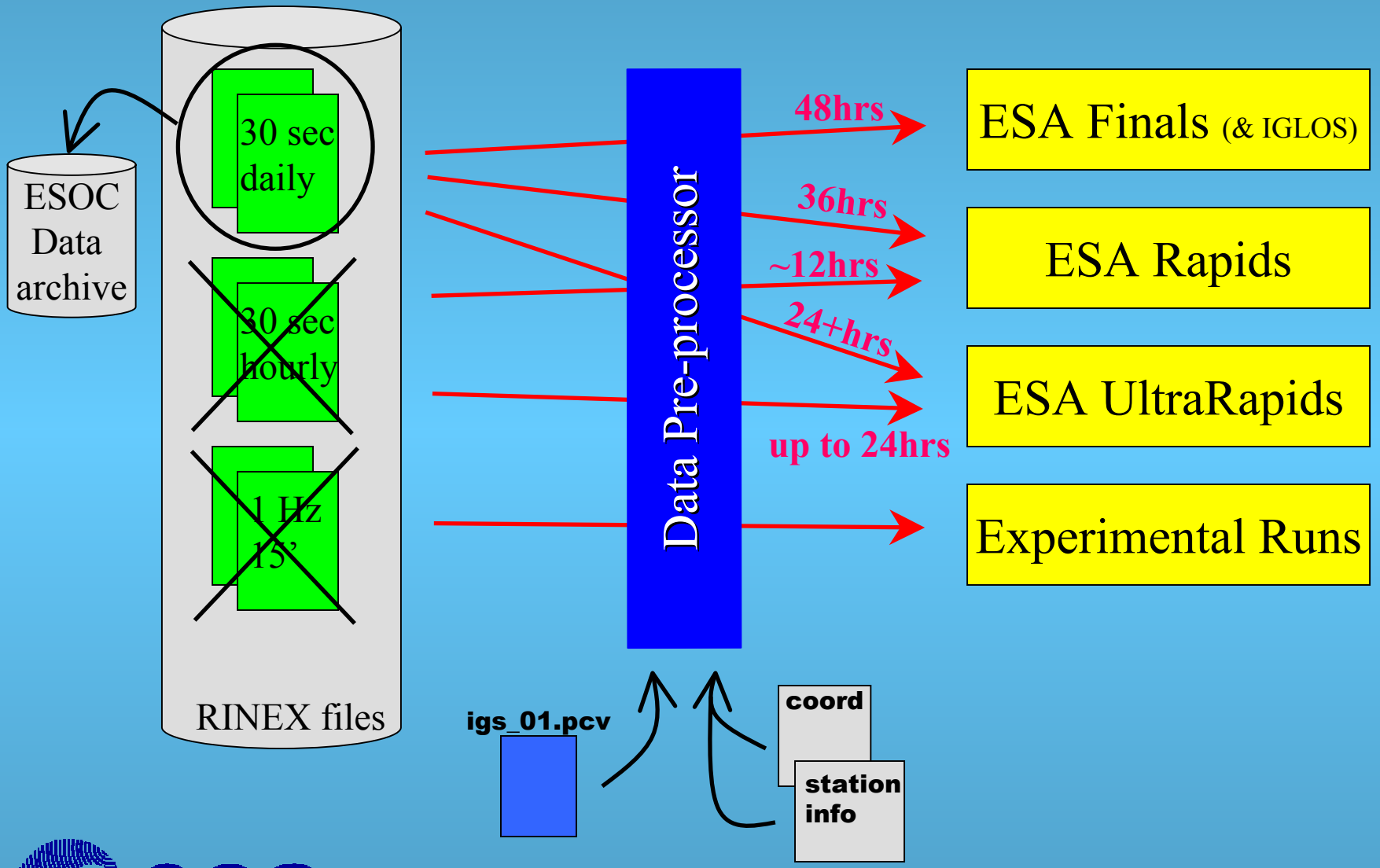
IGS Stations used (Finals)



IGS stations used (IGLOS)



IGS data uses at ESOC



Some of the IGS improvements

(over last ~five years)

- The number of dual-frequency stations has increased beyond our processing (we use 60-70 max).
- Data Centres are providing much improved service (certain CDDIS failures used to stop everything, situation is much better now with SIO).
- The data is available faster and is much more reliable, thus pushing the current processing.
- The Metadata (SIF, igs.snx) have improved and are reliable, and very necessary for our processing.
- The resubmission of data from both sides (originator/user) is still unclear.

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Conclusions

- Working with the IGS has become easier and more worry-free:
  - There is plenty of dual-frequency data from a well characterised and long standing set of stations.
  - The stations are well described via SIFs and a stable and coherent ITRF with a large number of core stations.

Next Steps

- The improvements are now incremental:
  - Data resubmissions …
  - Feedback to station operators …
  - Notifying planned/unplanned station outages …
- The ACs will help the IGS to anticipate user needs so we can stay as the world-wide reference for GNSS data and products.