STATUS OF
ERS-2 SAR & ENVISAT ASAR
INSTRUMENTS AND
PRODUCTS

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SUMMARY OF ERS SAR STATUS

Nominal operations.

Nominal data quality
- still possible high Doppler Centroid Frequency
  - alignment with ENVISAT ASAR products

• Yaw routinely derived from Scatt data & used at ESOC for attitude control monitoring (yaw values within +/- 2 deg.)

• ERS Doppler information on data catalogue not available since the loss of tape recorder in June 2003.

• New strategy available based on the systematic processing of ERS SAR IMM products. Expected to be operational early 2006.
Operational ERS SAR Processor based on PF-ASAR implemented and in operations since summer 2005.

New processor ensures compatibility with former VMP products and with new ASAR products.

Progressive replacement of ERS SAR VMP processor on-going.

Complete information about new products available on-line:
http://earth.esa.int/pub/ESA_DOC/SAR/VMP_PGS_products.pdf
SUMMARY OF ENVISAT ASAR STATUS

Availability close to 100%

All modes operational with nominal performance

Azimuth miss-location of AP Level-1 products detected. Products can be corrected a-posteriory (see http://earth.esa.int/pcs/envisat/asar/disclaimer/). Processor patch developed and tested. Expected in operations early 2006.

Antenna status: Few TRM failures with no impact on performance
An “ALIVE” Antenna

Few TRMs failures since launch:

1 PSU failure (4 TRMs) in Tx (HH & VV): Apr. 2002
1 complete PSU failure (Tx & Rx, HH & VV): Feb. 2003

Total of: 10 TRMs failures in Tx-H and 11 in Tx-V
4 TRMs failures in Rx in each polarisation

Design allows for 6% of TRM failures (19 TRMs) before there is an impact in performance (optimisation needed)
An “ALIVE” Antenna

TRMs gain & phase drift in time

The drift is monitored on a daily basis

TRMs gain & phase drift can be fully corrected
A first major correction performed on 14&16 September 2005.
Antenna TRMs gain & phase maintenance

A significant **antenna maintenance activity** was undertaken on 14-16 Sep. 2005, to correct as much as possible, the existing TRMs gain & phase drifts.

This results in small changes in the antenna patterns and in the int. cal. pulse levels: re-calibration campaign undertaken.
Exploiting the system beyond the original requirements

**WS-WS burst synchronisation was not a design requirement for ASAR but it is found to be higher than expected (beyond 30%)**

WS-WS interferometry is therefore feasible and it has been successfully demonstrated.

WS-IM interferometry can be performed with same constraints as classical interferometry (IM-IM), increasing the number of InSAR opportunities.

A new WS SLC product (WSS) developed (based on a phase preserving prototype from Polimi/Poliba) and implemented in the operational ASAR processor.

**ASA_WSS_1P products available to users since Aug.2005**
ASA_WSS_1P: Main product characteristics

Basic strategy followed in the new ESA WSS standard product:

• 5 different measurement data sets, one per sub-swath
• burst are processed individually and provided sequentially
• processing is phase preserving
• data is sampled in a common grid both in range and in azimuth.
• standard product is 60 sec long with 80 m azimuth pixel spacing and 1/Fs pixel spacing in range

The WSS product introduces also new information:

• Doppler Grid ADS:
  - introduced in response to ocean currents application requirements
  - provides a grid of Doppler fine estimates in range and azimuth
ScanSAR Interferometry: some examples

BAM, IM-IM

BAM, WS-WS

BAM, WS-IM
**Recommendation Fringes’03:**
Consider remedies to overcome 2 GByte file size limit for ENVISAT products (also WS-SLC compromises perhaps needed with 2 GByte).

- File size limit of 2 Gbyte is still applicable.
- Porting of ENVISAT IPFs to Linux on-going (but for ASAR). Porting PF-ASAR to Linux is under analysis.

**However...this limit is not an obstacle...**

- An IM Level-0 segment of 2 Gbyte covers up to ~600-700 Km
- The ASA_WSS_1P product is sampled such as one standard scene (~400 Km x 400 Km) is < 2 Gbytes
**Recommendation Fringes’03:**
ESA should implement a method for identifying cooperative pairs for WS interferometry and, if possible, a strategy for instrument timing that encourages WS-WS cooperation.

- A stand-alone tool to check the % of synchronisation between series of interferometric WS pairs implemented (Aresys) and verified.

- Extension of the strategy for deriving the % of synchronisation between any WS acquisition and a reference pass is being prepared.

- Derived % of synchronisation w.r.t. a reference pass will be input to the on-line data catalogue (EOLI-SA), already prepared to provide the % of burst synchronisation between a WS pair resulting from an interferometric query.

- A new planning strategy (based on forcing the start of acquisition segments at pre-defined locations around the orbit) to favour the WS synchronisation is being investigated.
Recommendation Fringes’03:
Provide timely information on Envisat and ERS-Envisat interferometric baselines (in progress).

✓ Strategy to routinely derive ERS-ENVISAT baselines has been defined.

✓ Generation of “baseline converter” is on-going.

✓ ERS-ENVISAT baseline expected to be available in the next EOLI-SA version (Jan. 2006)
Recommendation Fringes’03:
Very precise orbit knowledge required to increase measurement reliability. More precise orbit control in future will help to increase number of possible interferograms for stacking and measuring small signals.

- PF-ASAR updated to use most accurate orbit files available for processing (up to DOR_VOR)

- PDS re-configuration on going to allow operational on-demand processing of ASAR data using DORIS orbits. Expect to be operational by early 2006.