International DORIS Service

Pascal Willis (1,2), Frank G. Lemoine (3)
(1)Institut Géographique National
(2)Institut de Physique du Globe de Paris
(3)NASA, Goddard Space Flight Center

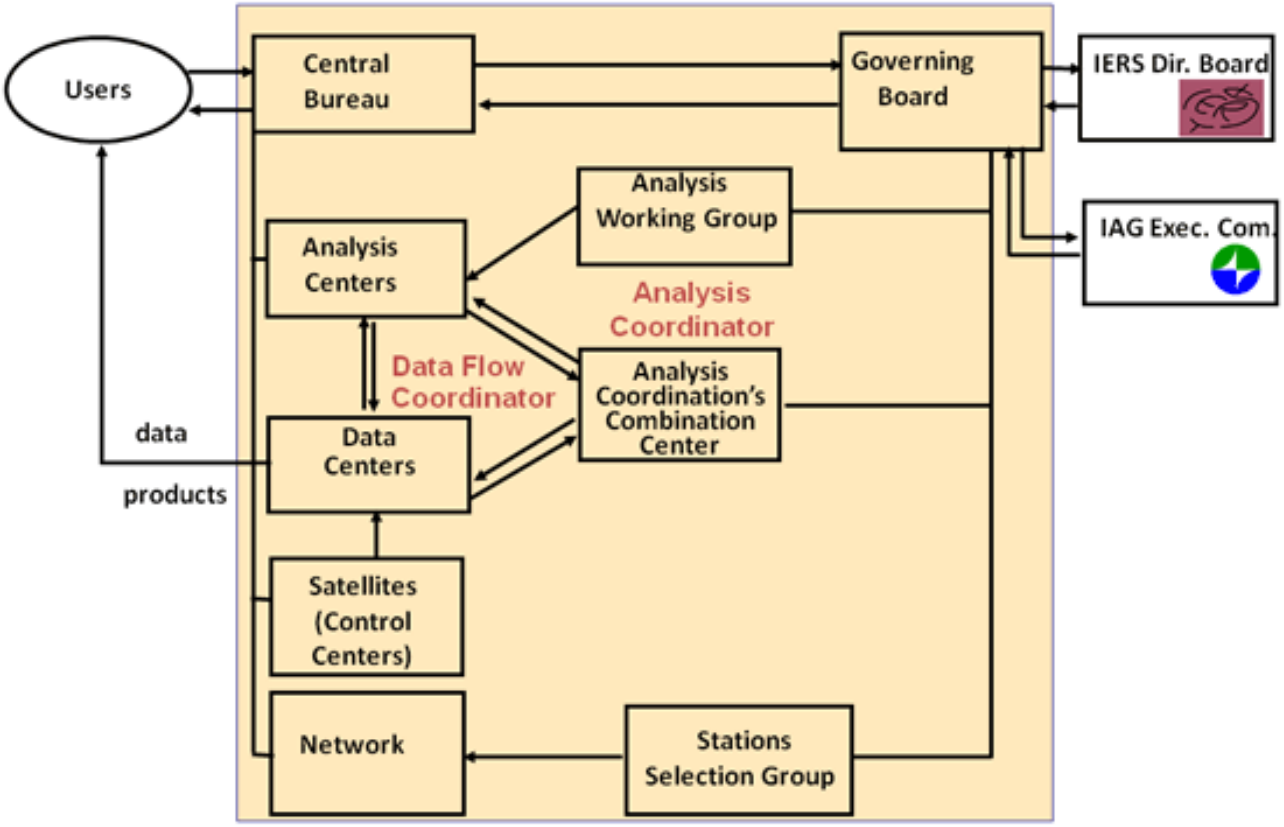
SUMMARY

- Historical considerations
  - Pilot project → IDS
- Recent achievements
  - 7 Analysis Centers
  - IDS-3 for ITRF2008
  - Orbit comparisons
- Possible ways for improvement
- Open issues

Historical considerations

- DORIS Pilot Project
  - IAG/CSTG, IAG Birmingham, 1999
- International DORIS Service
  - Official IAG Service, IUGG Sapporo, 2003

Current IDS organisation



Coordination:
Frank Lemoine (NASA)
Combination:
Jean-Jacques Valette (CLS)

7 Analysis Centers
France (2)
USA (1)
Germany (1)
Czech Rep. (1)
Russia (1)
Australia (1)

2 Data Centers
NASA
IGN

http://ids-doris.org

Recent Achievements

- 7 SINEX time series of station coordinates + EOPs
- 1 SINEX combined time series for ITRF2008

- Orbit tests (intercomparisons between AC's)

- Discussion on orbit modelling (AWG + IDS Forum) (Implementation of improvements benefited ITRF2008)
- Time series of station coordinates

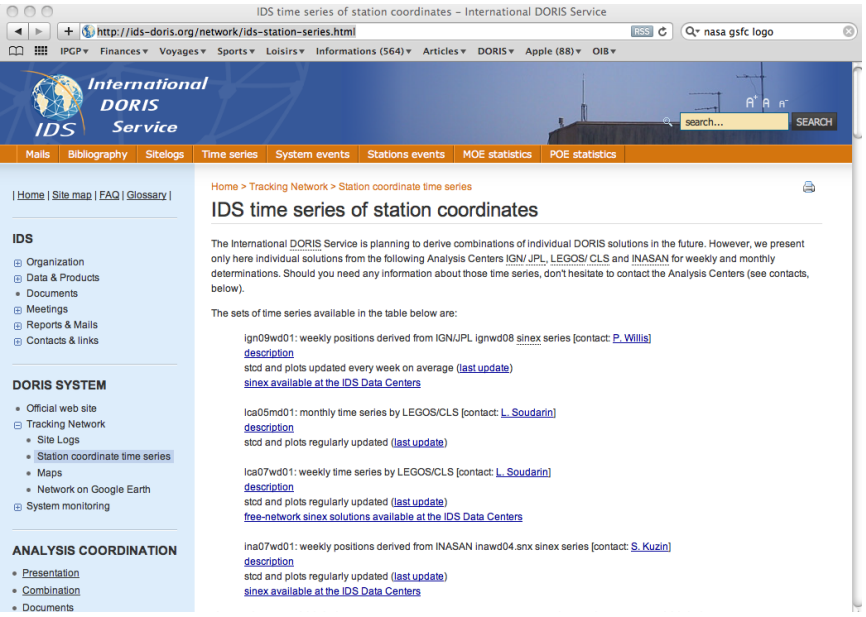
Orbit comparisons

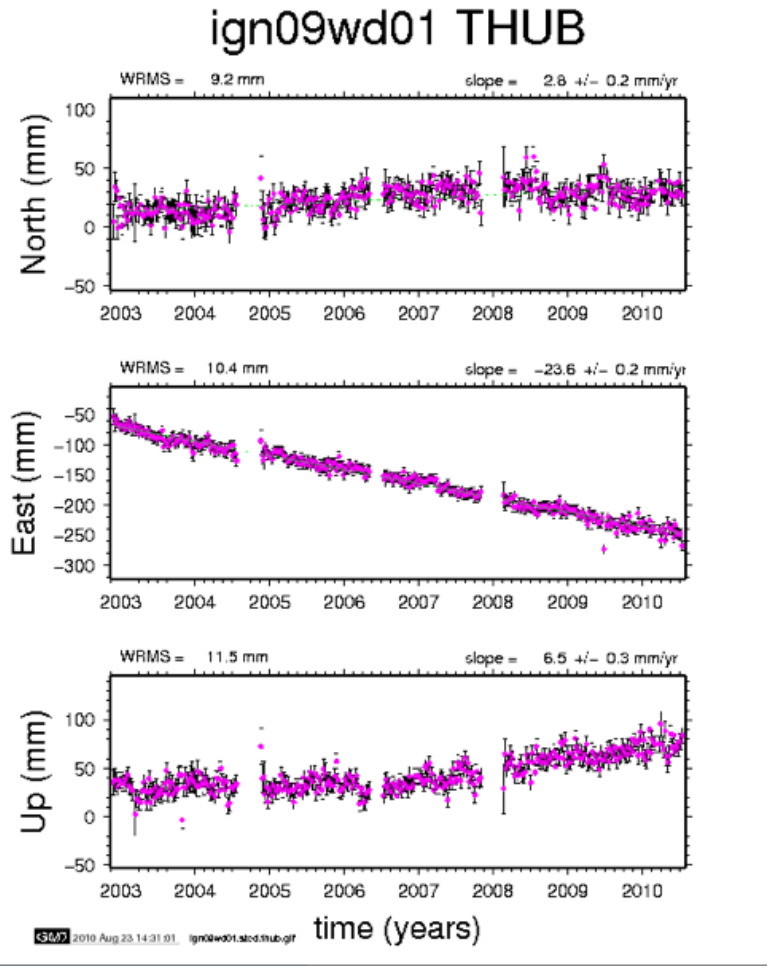
SPOT2

Orbit 1	Software 1	Orbit 2	Software 2	Number of comparisons	Radial (mm)	Cross-track (mm)	Along-track (mm)
GAU-5	GEODYN	GSC-base	GEODYN	43	5.7	25.2	38.3
GAU-5	GEODYN	IGN-2	GIPSY/OASIS	311	13.5	55.5	43.8
GOP	Bernese	GSC-10deg	GEODYN	20	19.2	51.3	82.2
GOP	Bernese	IGN-2	GIPSY/OASIS	19	21.3	49.9	73.2
IGN-2	GIPSY/OASIS	GSC-base	GEODYN	347	13.4	39.3	55.2
IGN-2	GIPSY/OASIS	INA-2	GIPSY/OASIS	344	9.1	21.1	22.3
INA-2	GIPSY/OASIS	GSC-10deg	GEODYN	333	15.5	44.7	57.6
LCA	GINS/DYNAMO	GSC-base	GEODYN	95	10.2	31.6	46.4

Time series of station coordinates

http://ids-doris.org/network/ids-station-series.html





Possible path for improvements (operational aspects)

- Analysis Centers
  - Better documentation
  - Improvements wrt. ITRF2008 submissions & models.
  - Up-to-date solutions (continuous data processing)
  - Inclusion of Jason-2 in operational products.
  - Submit all products :
    - Time series of station coordinates, geocenter, EOPs
- Combination Centers
  - Continuous data processing (regular basis not ITRF-driven)
  - Provide derived products:
    - Time series of station coordinates, geocenter, EOPs

Recent Improvements in Data Processing

- Solar pressure handling
  - Z-geocenter + altitude of high-latitude station + polar motion

  (tuning of Cr; Adjustment of macromodel parameters; Special models like ANGARA (Envisat) or UCL (Jason1, Envisat))
- Atmospheric drag estimation

  (more frequent parameterization)
  - Station coordinates & EOP
- Troposphere modelling
  - GMF (mapping function) & GPT (apriori met data)

Possible Path for Improvements

- Adopt ITRF2008 as a priori.
- Tuned UCL-like models for all DORIS satellites (Jason2, SPOT?).
- Provide combined DORIS+Laser (+GPS) solutions for satellites such as TOPEX, Envisat, Jason-2
  (better coordinates but possible drawback towards IERS/ITRF requirements)
- New models required (gravity field, solar radiation pressure, verification of phase center corrections, PCV?)
- Improved Troposphere modelling (VMF, gradients; ECMWF apriori?)
- SAA Effect on SPOT-5 (P. Stepanek)?
- Detailed station analyses (multipath at Fairbanks? P. Yaya).
- Test/discuss new products :
  - Combined orbit for altimeter mission? For remote sensing/SPOT?
  - Troposphere for calibration purposes?

CONCLUSIONS

- IDS : recent improvements
- Need for a more operational Service
  - ITRF-driven → regular operation
  - Provide all products (starting with time series of station coordinates for all ACs + from IDS-3)
- Need to prepare/develop possible new products
  - DORIS/SLR solutions
  - Combined orbits