DORIS Data delivery delay

DORIS Data format

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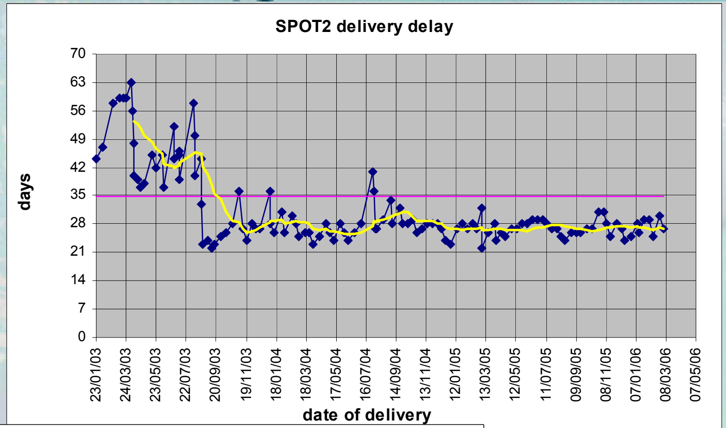
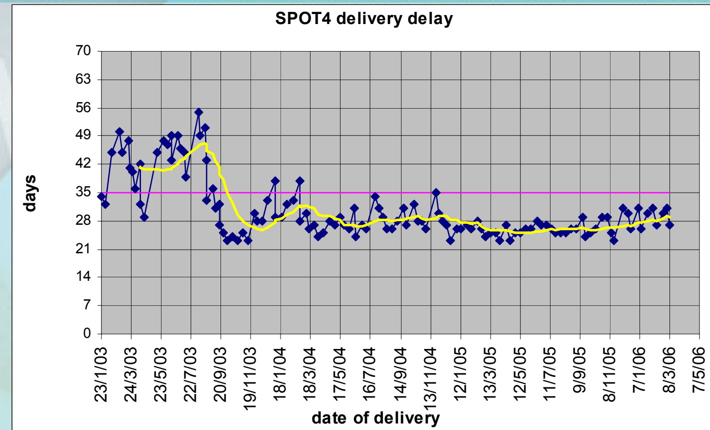
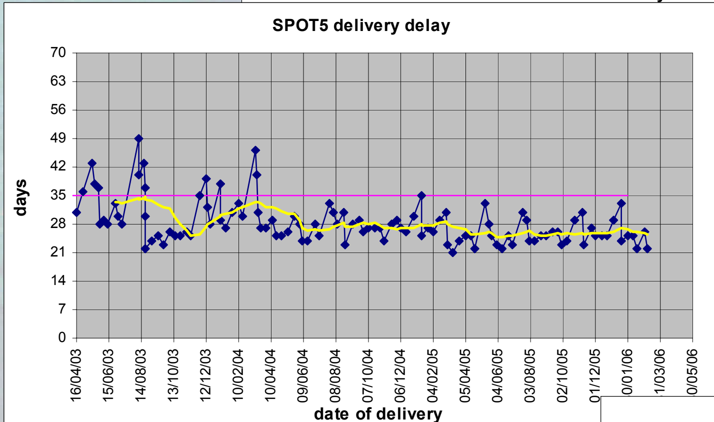
15 YEARS OF PROGRESS IN RADAR ALTIMETRY



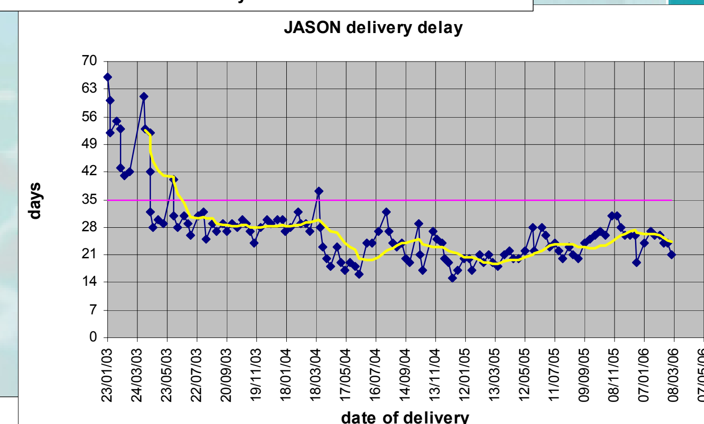


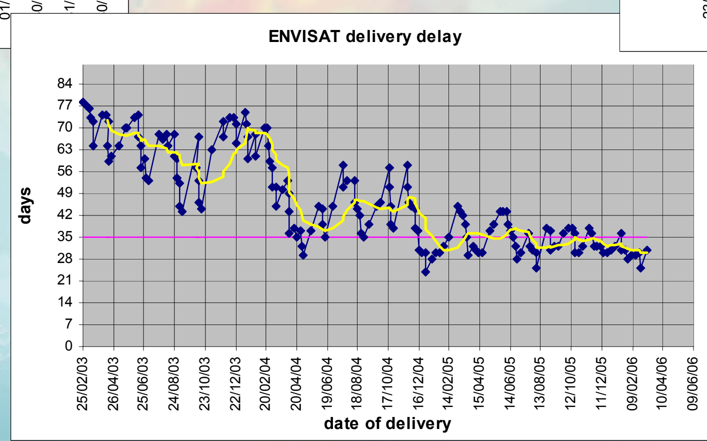


Data

Delivery Delay

To CDDIS





Potsdam, October 10-11, 2005, IERS Combination Workshop, propositions

Product Type	Main Parameters	Generation Cycle	Maximum Latency	Based on
Multi-Year	ITRF EOPs ICRF	Yearly	1 Year	Reprocessed high-accuracy combined long term intra-technique series
Weekly « Final »	EOPs Station Coordinates	Weekly	3 weeks	Based on the « final » routine intra-technique combined products and the multi-year solutions
Daily « Rapid »	EOPs Station Coordinates (Near real-time monitoring)	Daily	1 day	VLBI Intensive and IGS Rapid Products and, possibly SLR & DORIS
Daily « Predicted »	EOPs	Daily	1 day	Combined daily rapid IERS products

CPP Milestones

2006-04-05, Vienna

Progress Meeting of Combination Pilot Project,

2006-07-01

Start of routine production of combined weekly final IERS products

How do or will IDS comply with IERS CPP requirements ?

DORIS Data format

Last DORIS Receivers evolution

The next generation of DORIS receivers (DGXX) will implement 7 channels (UT) in order to allow more beacons to be tracked. They will also perform more accurate and more complete phase, delta-phase and pseudo-range measurements

Product 1B evolution ?

DORIS Data Exchange Format
Version 2.2(November 2005)
Standard Exchange Format for Range-Rate Observations

Columns	Subset	Description
1-7		Satellite identification
8-9		Measurement type
		39 = DORIS Doppler (up link, on board receiver)
10-11		Time system indicators
	10	0 = ground received time
		1 = satellite transponder/transmitter time
		2 = ground transmitted time
		3 = satellite received time
	11	0 = UT0
		1 = UT1
		2 = UT2
		3 = UTC (USNO)
		4 = A-1 (USNO)
		5 = TAI (BIPM)
		6 = A-S (Smithsonian)
		7 = UTC (BIPM)
		8 = GPS
		9 = station dependent correction required
12-16		Station ID
		Fourth letter indicates Alcatel(A) or Starec(B) antenna

Columns	Subset	Description
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17-32		Time observation (beginning of count)
	17-18	Time of observation (beginning of count)
		Year minus 1900 if greater than 90
		Year minus 2000 if less than or equal 90
	19-21	Day of year (January 1 = Day 1)
	22-26	Seconds from midnight
	27-32	Fractional part of seconds (microseconds)
33-35		Preprocessing indicators
	33	0 = ionosphere correction applied
		1 = ionosphere correction not applied
	34	0 = troposphere correction applied
		1 = troposphere correction not applied
	35	0 = point considered to be good
		1 = point edited during pre-processing
		2 = point edited during post-processing
		3 = 3.0 beacon in restart mode (frequency not stable)
		4 = near zero Doppler shift (risk of error)
36-45		Count interval in 0.1 microseconds
46-56		Range rate in micrometers/second

Columns	Subset	Description
57-66		Meteorological data
	57-60	Surface pressure (millibars)
	61-63	Surface temperature (degrees kelvin)
	64-66	Relative humidity (percent)
67-72		Observation standard deviation (micrometers/second)
73-80		Ionospheric refraction correction (micrometers/second)
81-87		Tropospheric refraction correction (micrometers/second)
88-90		Meteorological data source, beacon type
	88	Beacon type 1 = permanent network 2 = field experiment 3 = others
	89	Meteorological data source 0 = measured parameter 1 = pressure from a model 3 = temperature from a model 4 = pressure and temperature from a model 5 = humidity from a model 6 = pressure and humidity from a model 8 = temperature and humidity from a model 9 = pressure, temperature, and humidity from a model
	90	Channel indicator (1, 2, etc.)

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57-66		Meteorological data
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	88	Beacon type
		1 = permanent network
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		3 = others
	89	Meteorological data source
		0 = measured parameter
		1 = pressure from a model
		3 = temperature from a model
		4 = pressure and temperature from a model
		5 = humidity from a model
		6 = pressure and humidity from a model
		8 = temperature and humidity from a model
		9 = pressure, temperature, and humidity from a model
	90	Channel indicator (1, 2, etc.)
91-96		Center of mass correction (micrometers/second) including both effects: satellite and beacon

Specifications on the DORIS data format:

Time for DORIS = beginning of count interval
Range rate has been commputed using the following equation:

$$Vr = c / f(bea) [(f(bea) - f(sat)) – D / dt]$$
$$= [c / f(bea)] [f(bea) - f(sat)] + [c / f(bea)] [-D / dt] \qquad (1)$$

with
- Vr = range rate (m/s)
- dt = count interval (s)
- D = cycle count
- c = 299792458 (m/s)
- f(bea) = nominal beacon frequency (change from Version 1)
- f(sat) = best estimate of the actual satellite frequency
  - long term on-board frequency drift taken into account
  - consistent with transformation from on-board time to TAI
  - relativity contribution included

Because the true frequency offset between f(bea) and f(sat) will be slightly different from the nominal value, a bias is typically estimated for each station pass.

The corresponding processing equation is

$$Vr = c [df(bea) / fbea)] + [\{1 + df(bea)\} / f(bea)] [-Dr / dt] \quad (2)$$

$$= bias + [-Dr / dt] + [df(bea) / f(bea)] [-Dr / dt]$$

where df(bea) = difference between actual beacon frequency and the nominal value used to generate the data

Dr = difference in range between end and beginning of count

Important note for Versions 2.x processing: In Version 1.0, the beacon frequency used to generate data was the best available estimate of the actual frequency.
In Versions 2.x, the nominal value of the beacon frequency is used instead.
For beacons where the offset between the actual and nominal frequency is large, the last term in Eq. 2 may not be negligible. This term must be explicitly included in the processing, with df(bea) / fbea determined from the pass frequency bias estimate.
When df(bea) is small, as in the case of Version 1.0 data, this term will have no significant effect. It is thus recommended to use the above expression to process all DORIS data regardless of format version.
All corrections (ionosphere, troposphere, and center of mass) should be added to observed values or subtracted from computed values.

Is it necessary to improve 1B product for taking into account the DGXX evolutions ?

Data Format

Working Group

Chaired by : John Ries	Univ. of Texas, CSR	USA
Members :		
Jean-Paul Berthias	CNES	France
Werner Gurtner	Univ. of Berne	Switzerland
Carey Noll	NASA, GSFC	USA
Pascal Willis	JPL/IGN	France
Jean-Jacques Valette	CLS	France