
# Determination of the absolute bias for Jason using the Gavdos facility

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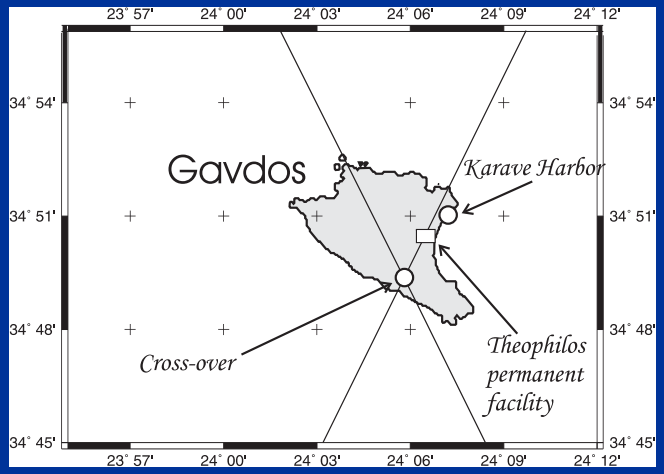
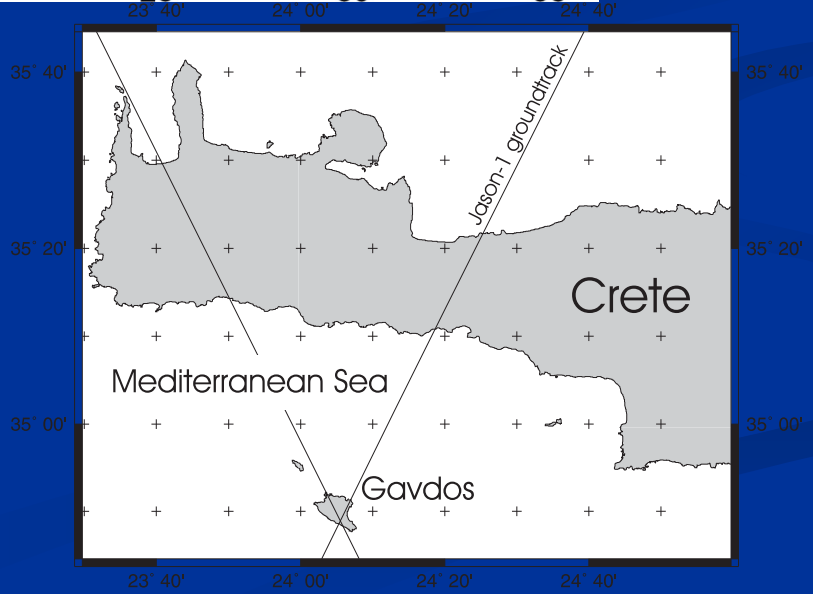
*Laboratory of Geodesy and Geomatics Engineering*

# Gavdos/Crete Cal/Val site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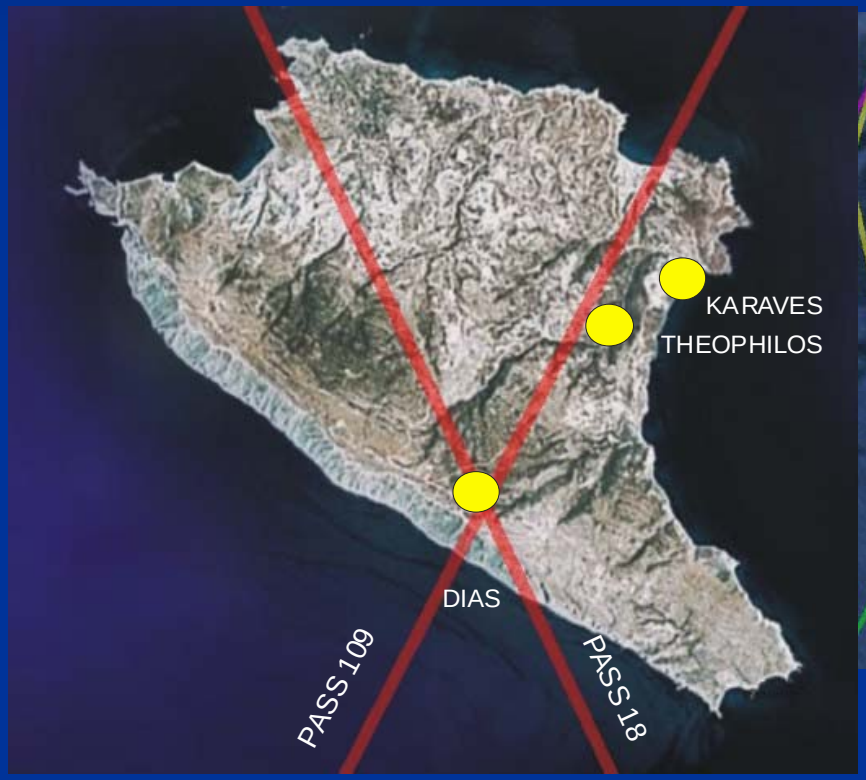
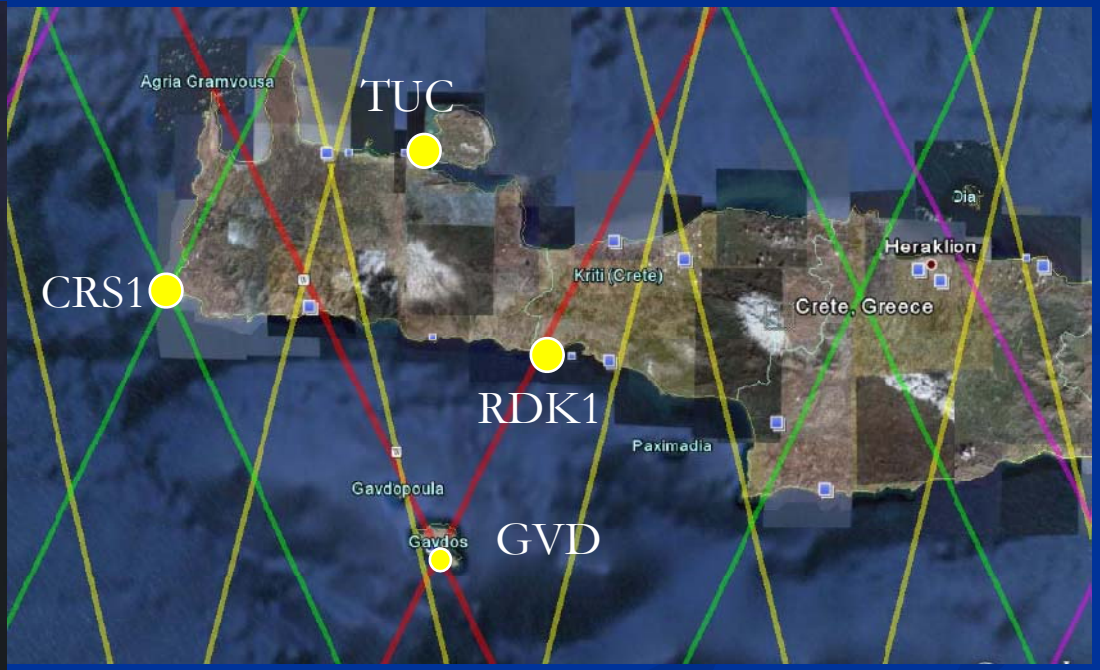
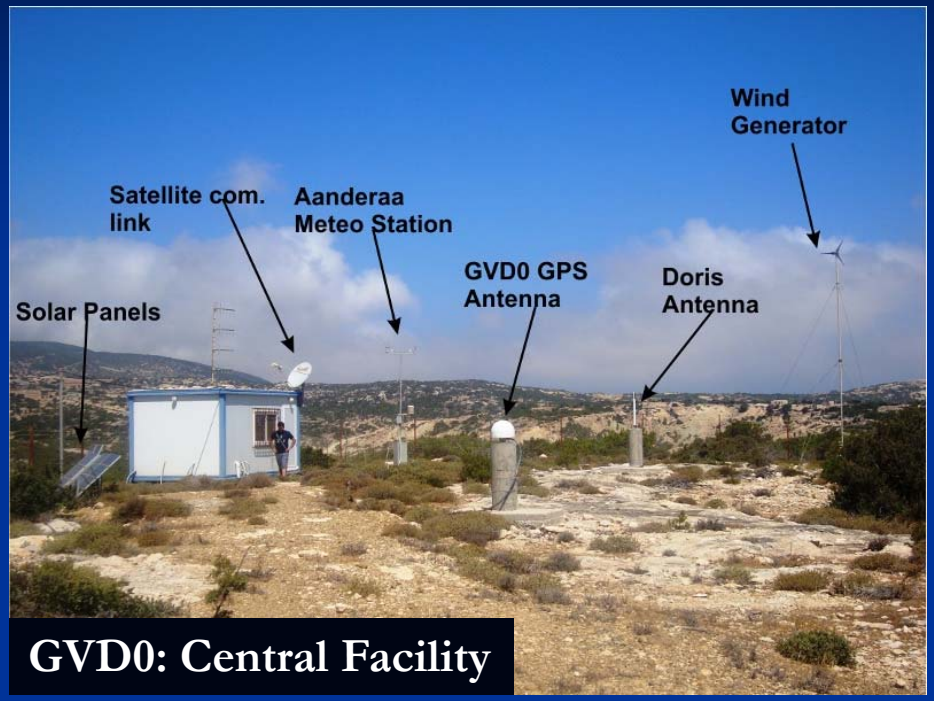
# Jason, Envisat and GFO tracks



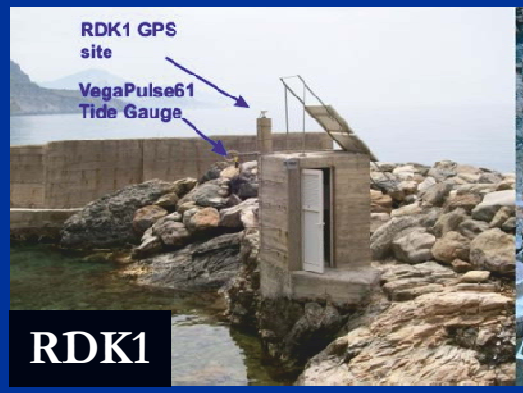



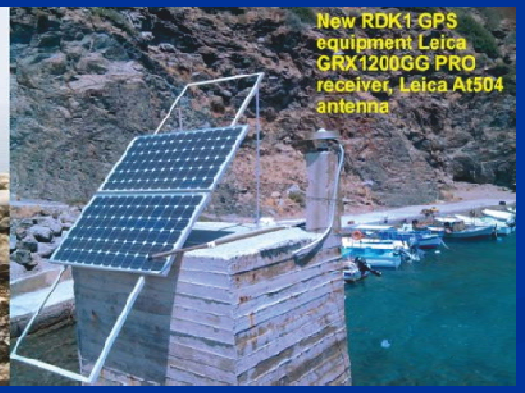
# Cal/Val Facilities: Gavdos, Crete



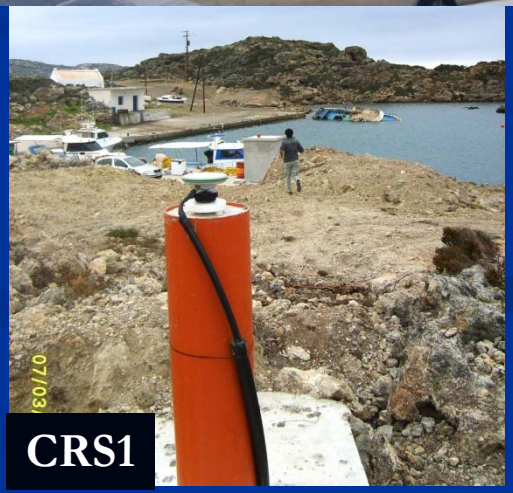

GVD0: Central Facility


GVD7&8




RDK1



CRS1

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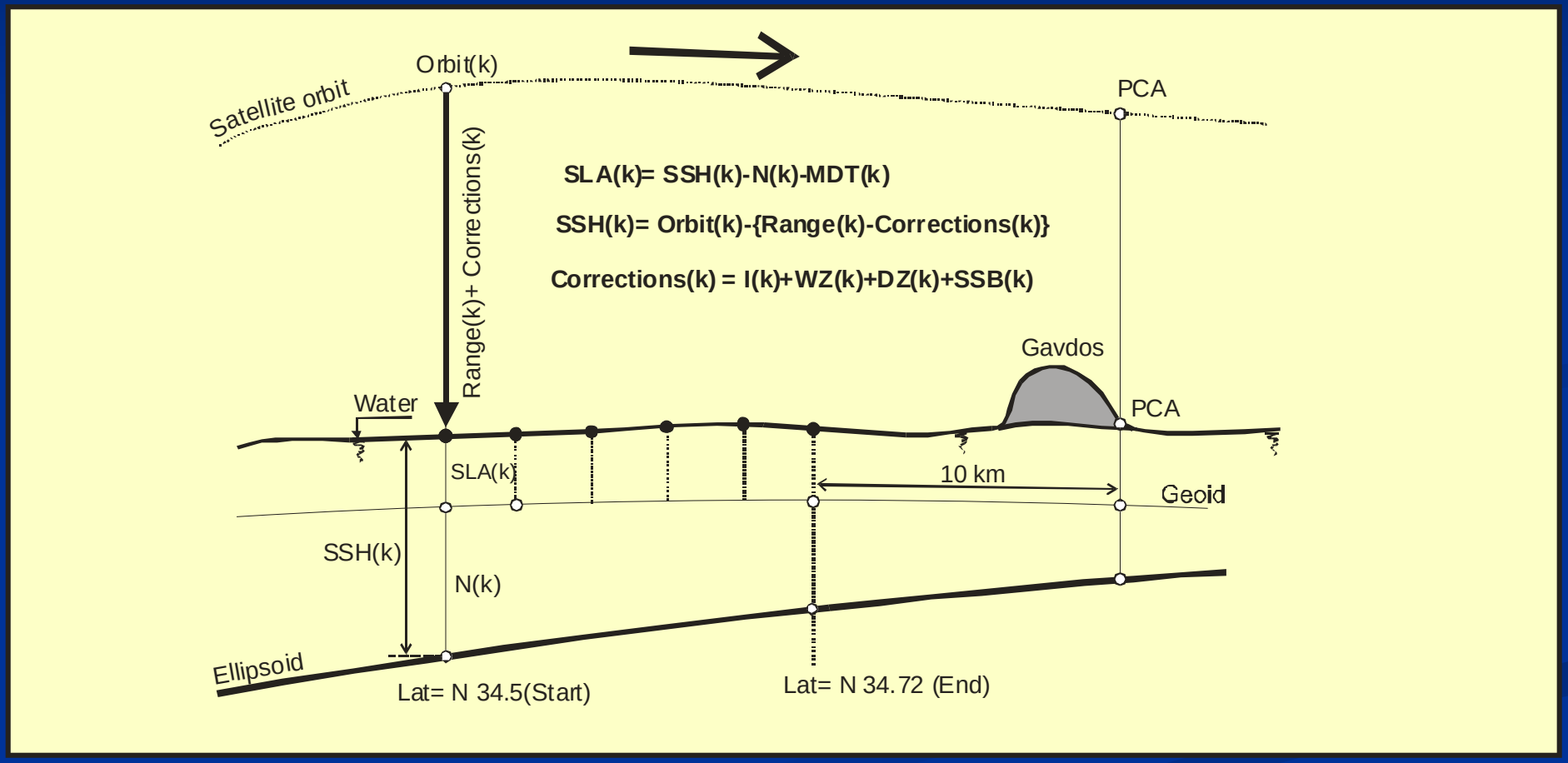
# Transponder site @ cross-over

# Principle of operation Pass 109

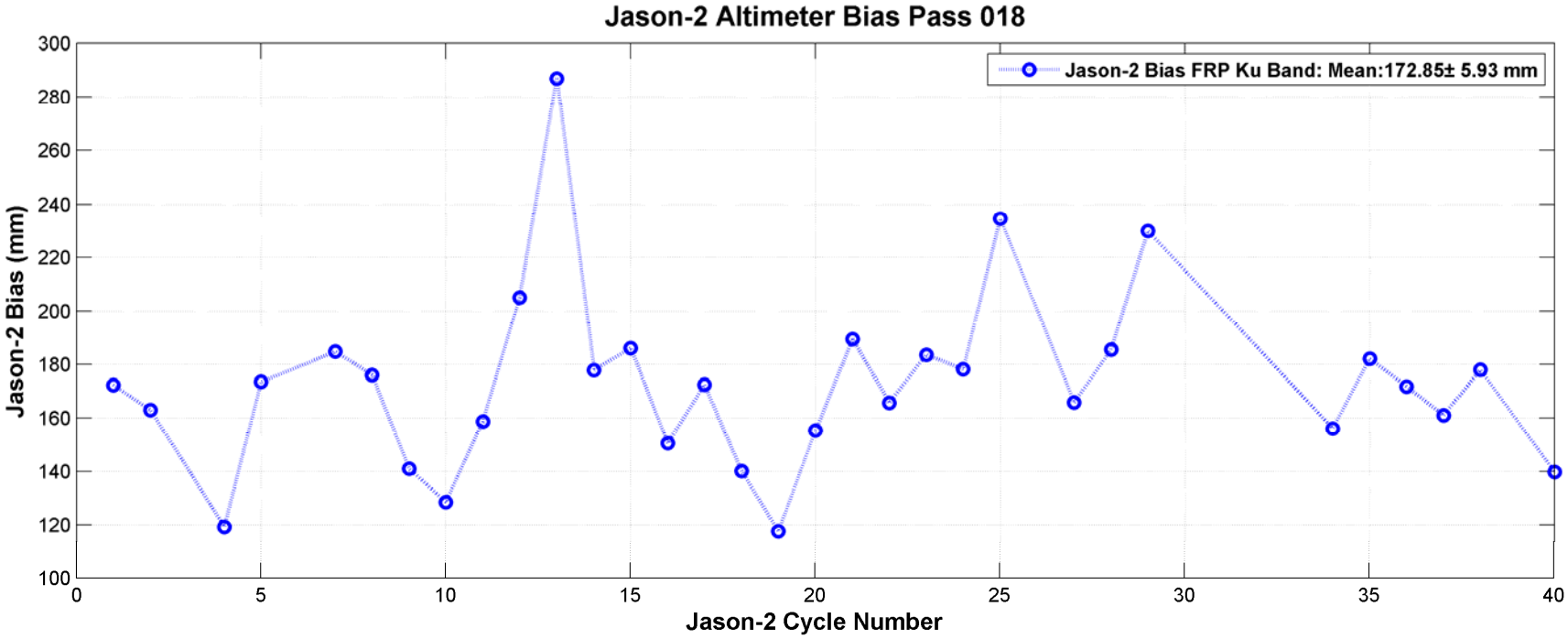


# Calibration regions

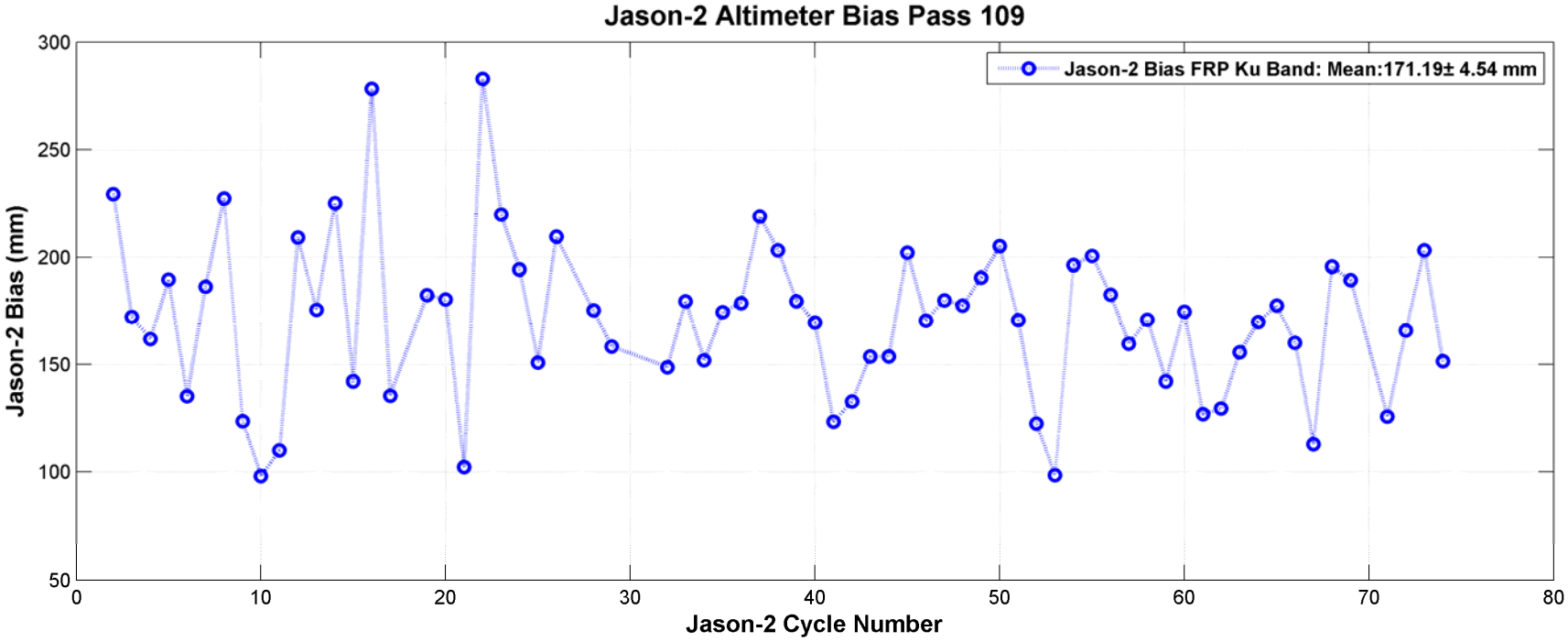
# Geophysical Correction Models

| Correction type | Pass No 109 | | Models Employed |
|---|---|---|---|
| PCA | Satellite's Point of Closest Approach to the tide gauge | | |
| Calibration Area | South Leg (12-21 Km) | North Leg (10-25 Km) | |
| | | | |
| Iono | [-21 to -1] sec from PCA | [2 to 5] sec from PCA | Average |
| Dry | [-10 to +2] sec from PCA | [2 to 5] sec from PCA | Linear fit |
| Wet | [-15 to -5] sec from PCA | [2 to 5] sec from PCA | Linear fit |
| SSB | [-10 to +1] sec from PCA | [2 to 5] sec from PCA | Cubic polynomial Fit |
| MDT | | | RioMed |
| N (Geoid) | | | Local geoid campaigns |
| MSS | | | MSS_CNES_CLS_10 |
| GNSS Coordinates | | | ITRF2005 |

# Bias: Descending Pass No.18



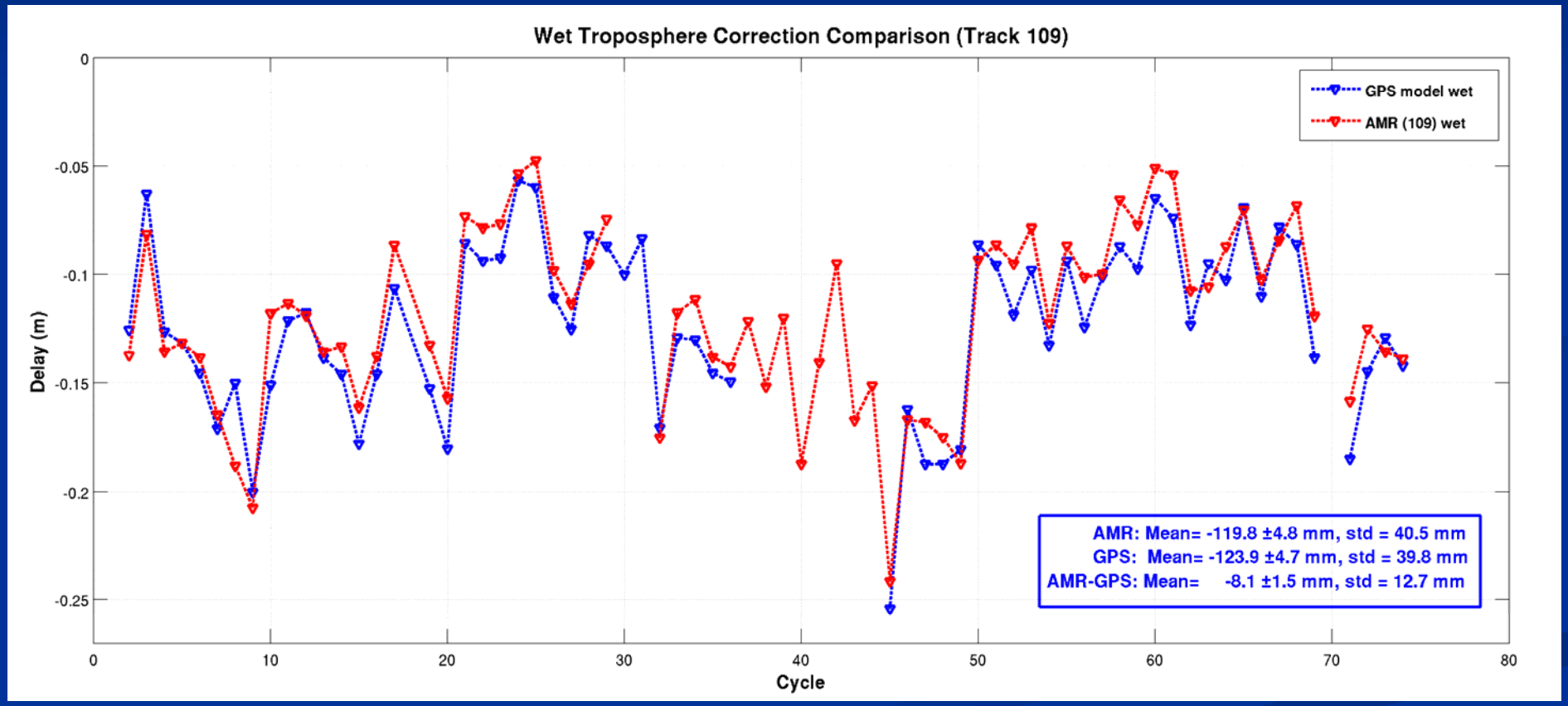
# Bias: Ascending Pass No.109



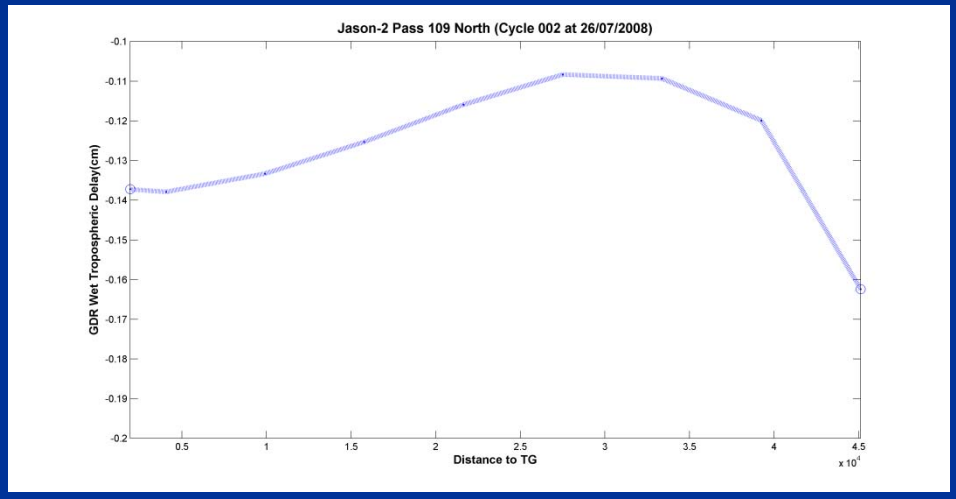

Cycles 30, 31 excluded, because no tide-gauge data were available.

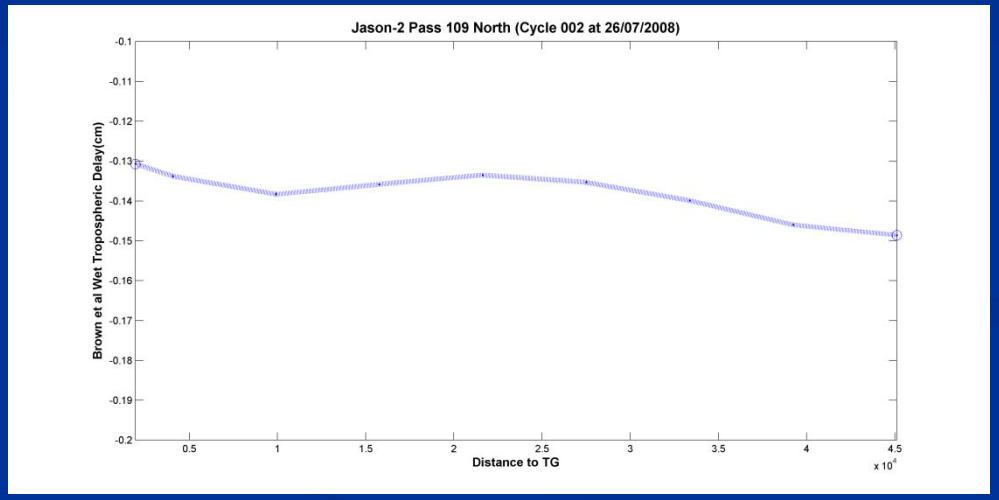
Cycle 18, 27 excluded because of sigma bloom.

# Wet Tropo wrt GPS



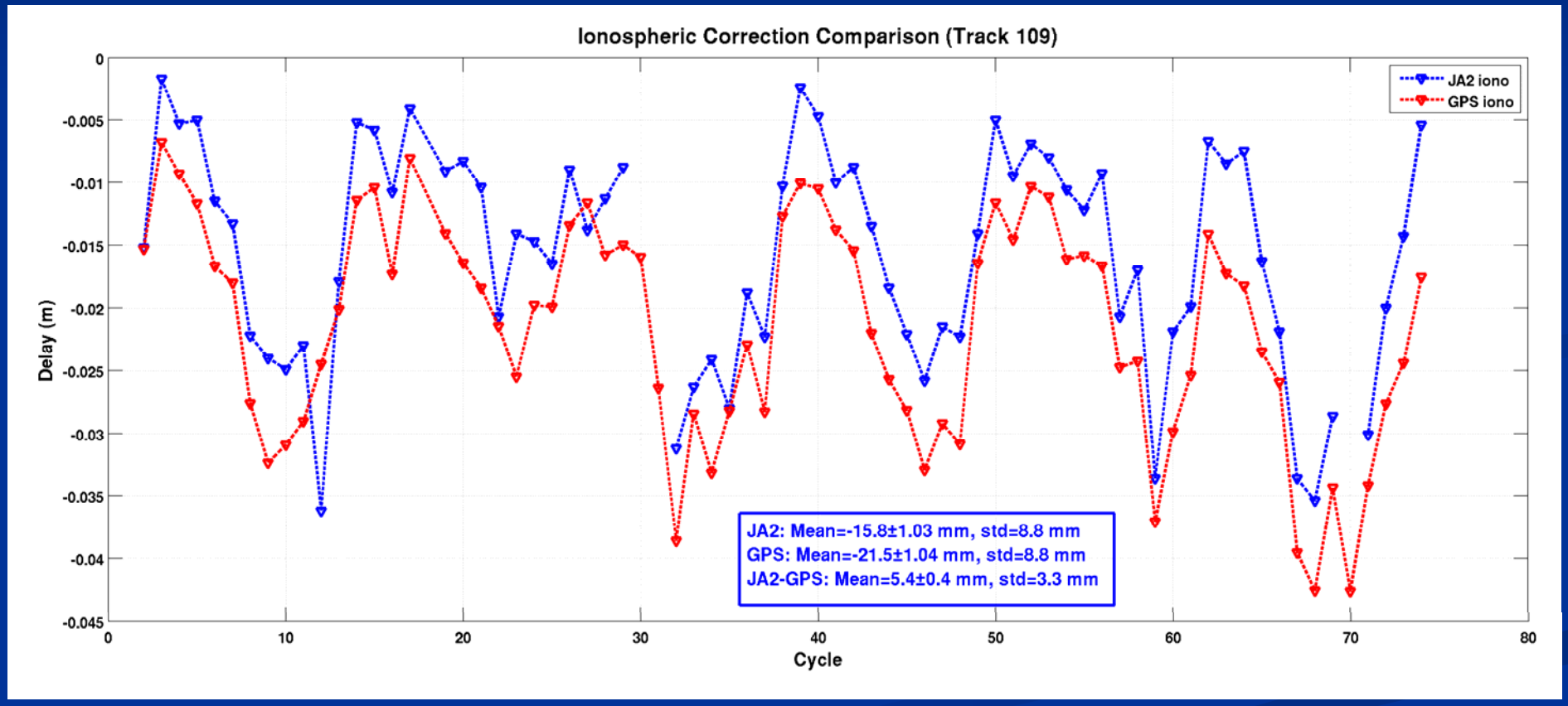
# Wet Tropo wrt coast



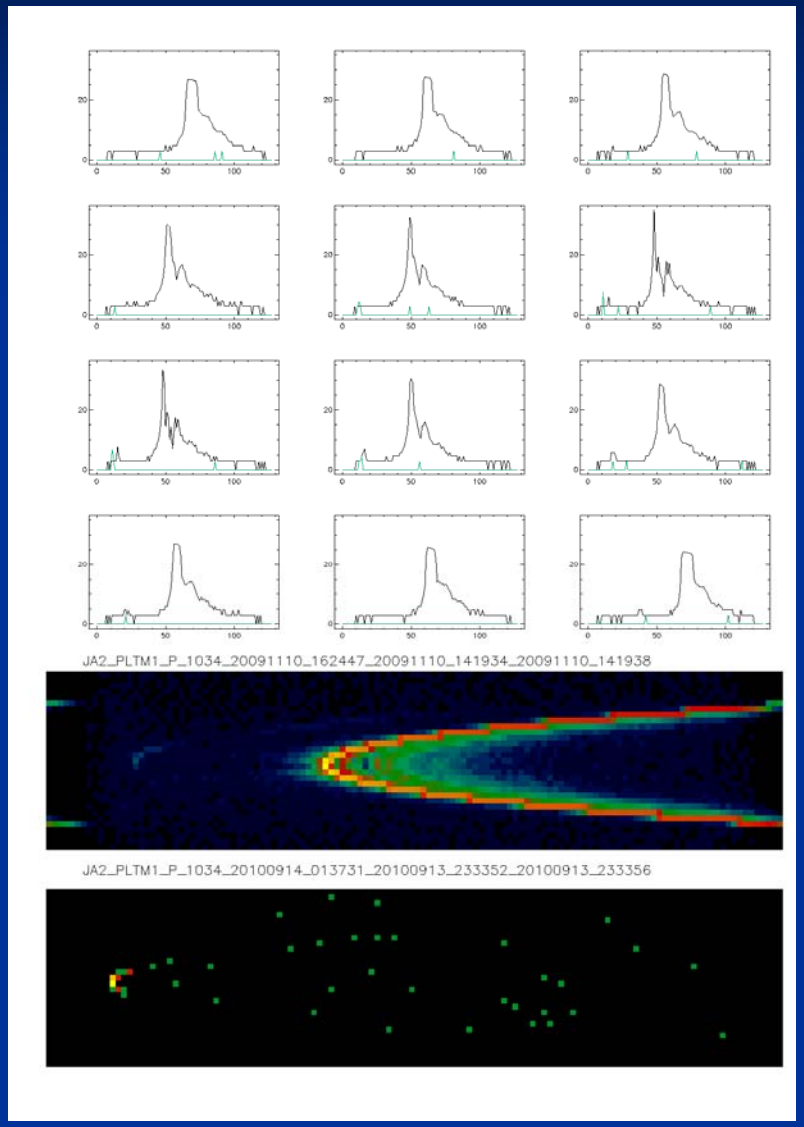




The Brown model (right) for the wet tropospheric delay along the north leg of pass No. 109 and closer to the coastline.

# Ionosphere wrt GPS



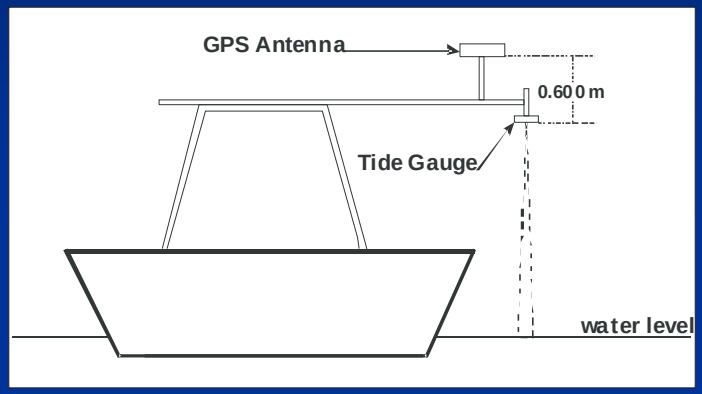
# Transponder calibration

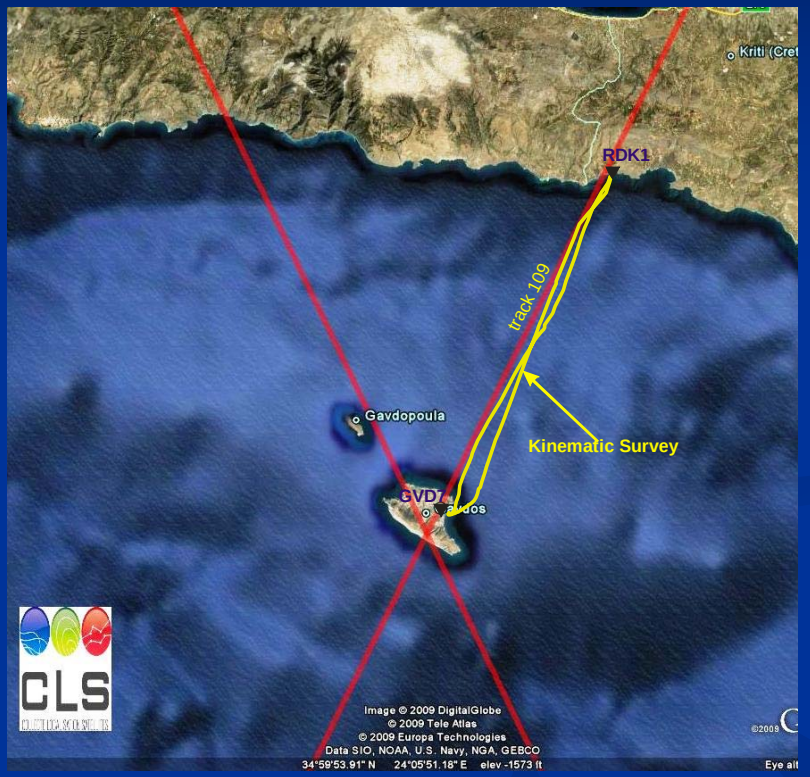



- Altimeter calibration with transponder after 1-Jan-2010 over pass No.18;
- Collaboration with CNES (France) to set the altimeter to calibration mode;

- Experiment Date: 2010/09/13 23:33:53, Pass No. 18;
- X-axis: Range window with 128 bins of time (bin= 3.125 ns);
- Y-axis: Power return;
- Bin No. 46 preset to closet approach to the distance between satellite-transponder;

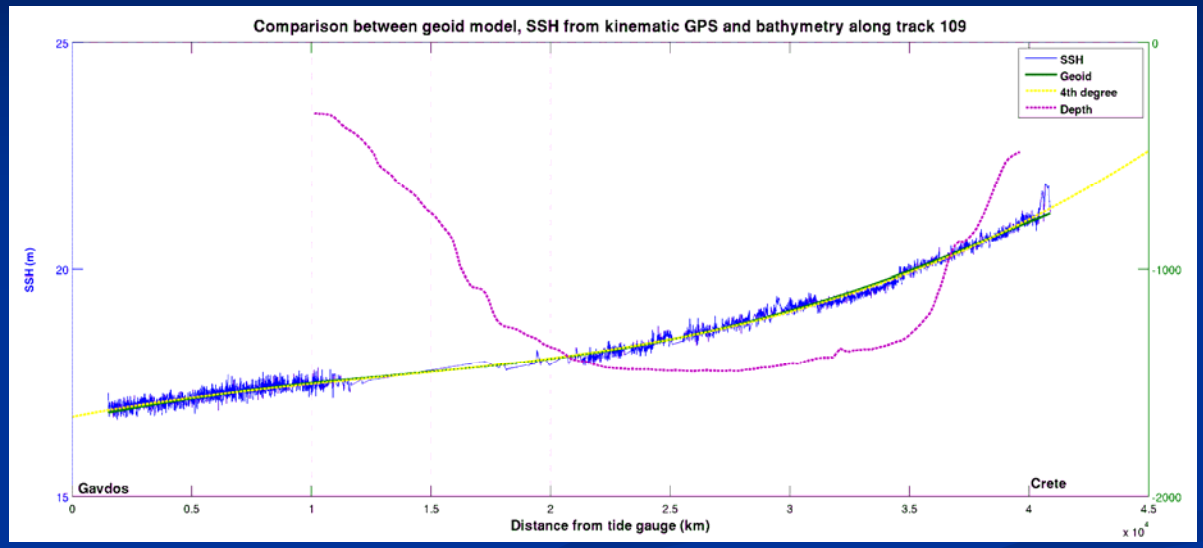
# GPS Kinematic Surveys



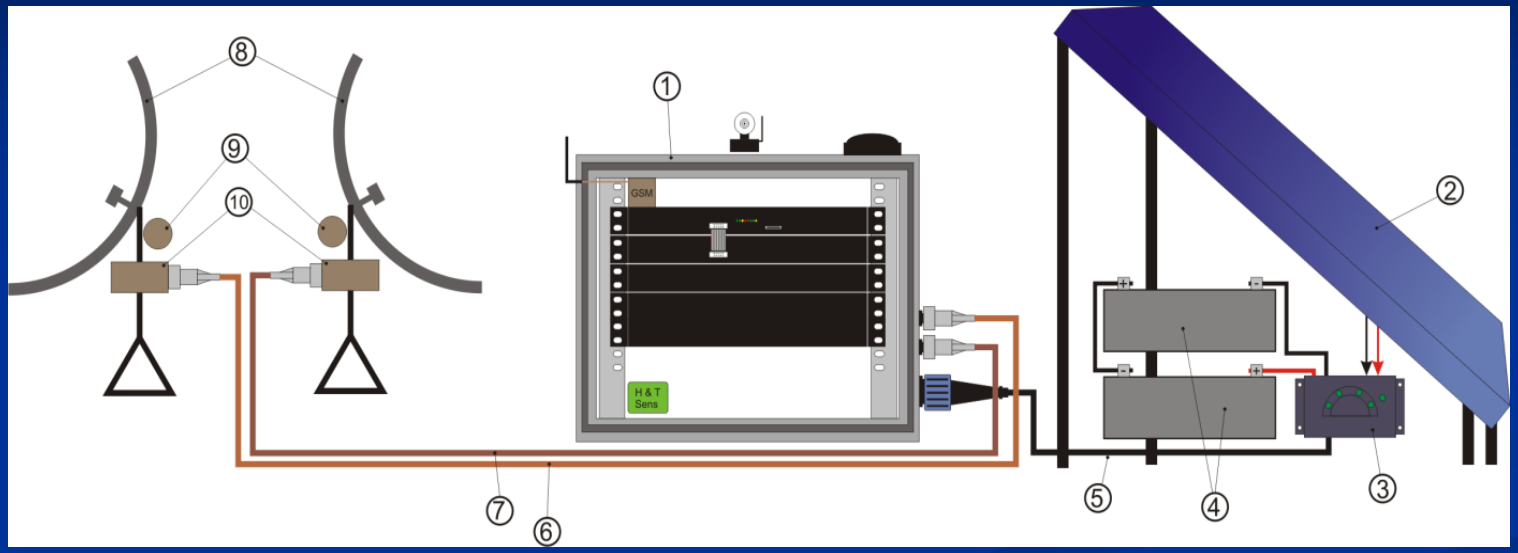




- Calibrate satellite with GPS buoys;
- Two GPS buoys;
- Vessel for field campaigns;
- Kinematic surveys carried out in Aug and September 2010 along passes No. 18 and No. 109;

# GPS Buoy & field campaigns

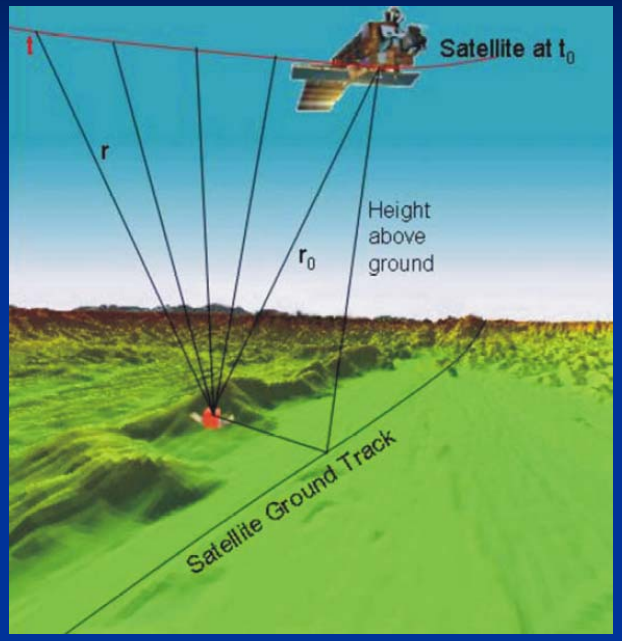


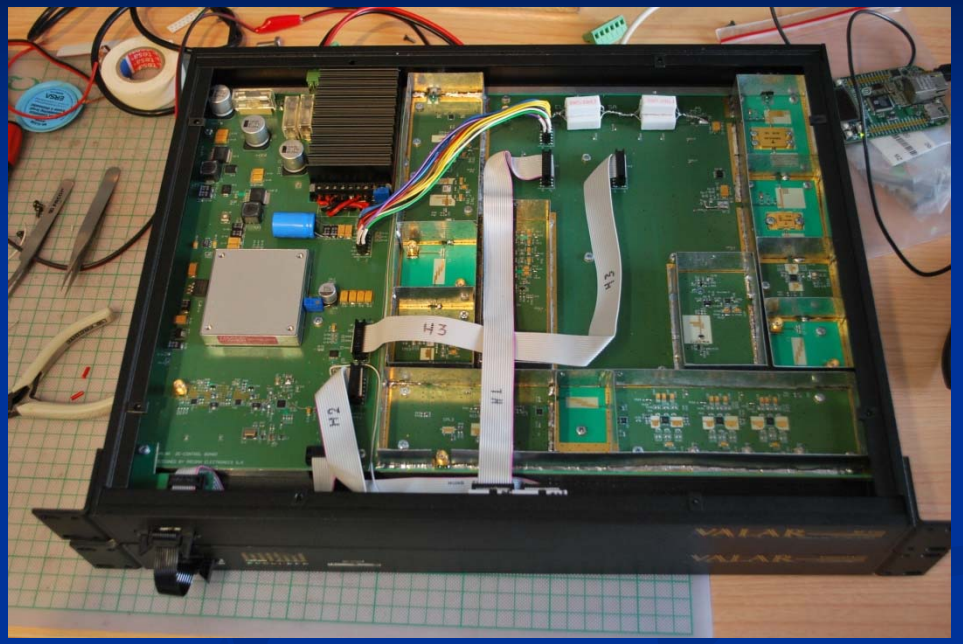

# New transponder




- Central frequency 13.575 GHz, bandwidth = 350 MHz;
- Polarization: Circular;
- Mobile (for new locations) and modular (for other frequencies).
- Capable for record incoming & outgoing signal at the transponder;
- Controlled remotely through control computer using communication links.
- Capable for monitoring internal delays (± 1mm);

# New transponder



- Constructed under the ESA specs and supervision;
- Ready be delivered in 2010;
- Easily transferred to new locations in Crete;
- Add module for new satellites (AltiKa: 35.75 GHz, 500 MHz)

# Summary

- The absolute bias for the Jason-2 altimeter has been determined as
  - B= +171.19 ± 4.5 mm (Ascending Pass No.109, Cycle 2-74)
  - B= +172.85 ± 6.0 mm (Descending Pass No. 18, Cycle 1-40);
  - 20-Hz, in the Ku-Band;
- Altimeter bias with the MSS (B=+151.68 mm, No. 109, CLS01).
- GPS buoys deployed as the satellite flies over. Processing on-going.
- Field sea-surface campaigns have been performed along satellite ground tracks to validate the used geoid models.
- Currently, analyzing transponder data collected as of July 2009.
- A new transponder is being developed to:
  - Calibrate satellite altimeters and determine bias, and;
  - Determine the orientation of the satellite interferometer baseline.

# Co-authors, contributors

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- University of Aegean, Greece:
  - V. Zervakis.
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