Aquarius: Active/Passive L-band

Possible Soil Moisture Measurements as Precursor to SMAP

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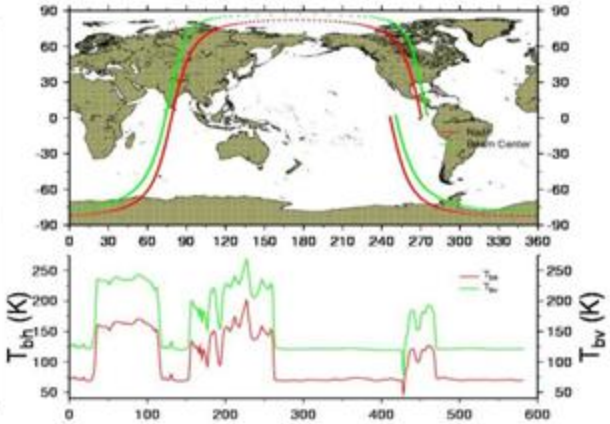
Aquarius

- Combination active/passive L-band microwave instrument
- Primary goal is to map the surface salinity field of the oceans
- Part of Aquarius/SAC-D mission
  - USA space agency (NASA)
  - Argentine space agency (CONAE)
  - Launch scheduled for May, 2010
- Aquarius will
  - Collect data continuously including over land and snow/ice
  - Provide the first simultaneous active/passive (radar/radiometer) data at L-band from space
  - Be a resource for transitioning from land/aircraft based observations of soil moisture to an active/passive L-band mission in space such as SMAP.

Aquarius Instrument

Orbit		Antenna	
Altitude: 657 km		Main Reflector: 2.5 m offset	
Sun-synchronous		3 beams: Swath = 390 km	
6 pm ascending		Local incidence (deg)	
Inclination: 98 deg		28.7, 37.8, 45.6	
		Resolution (km)	
		76x94, 84x120, 96x156	
Radiometer		**Scatterometer**	
Frequency	1.413 GHz	Frequency	1.26 GHz
Polarization	TV, TH, T3	Polarization	HH, VH, HV, VV
Sample interval	10 ms	PRF	100 Hz
Integration time/sample	9 ms	Pulse width	0.98 ms
NEDT (5.76 sec)	0.08K	Calibration	0.1 dB
Calibration Stability	0.13K/week		

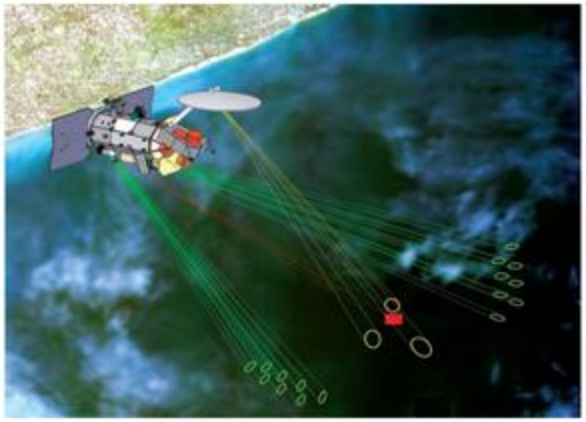
Land and Ocean



SAC-D Instruments

Instrument	Objective	Description	Resolution	Source
MWR: Microwave Radiometer	Precipitation; Wind speed; sea ice	23.8 and 37 GHz 390 km swath	40 km	CONAE
NIRST: New Infrared Sensor Technology	Fires, Sea Surface Temp	3.8, 10.7, 11.7 µm 180 km swath	350 m	CONAE
HSC: High Sensitivity Camera	Urban lights; Fire detection	450-900 µm 700 km swath	200-300 m	CONAE
DCS: Data collection System	Environmental data collection	401.55 MHz uplink	2 contact/day 200 platforms	CONAE
ROSA: Radio Occultation Sounder for Atmosphere	Atmospheric Temp & humidity profiles	GPS occultation	300 km	ASI (Italy)
CARMEN 1: ICARE & SODAD	Effects of Radiation space µ-particles & debris	Si/Li detectors and SMOS sensors		CNES (France)

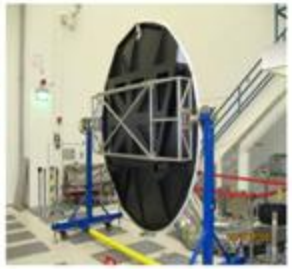
Aquarius & MWR Imaging



Aquarius Today

EMC/EMI Testing August 2008

Reflector: Installation Oct 2008



Aquarius is currently in I&T at JPL. Thermal vacuum testing and integration of the antenna are scheduled for October-November. Aquarius will be ready early in 2009.