



# GANDER

- Proposed as a mission to provide operational near real time monitoring of global sea state
- Service specifications
  - Significant wave height and wind speed.
  - Every 6 hours.
  - Within 200 km of any ocean location.
- Primary Customers
  - Offshore Industry



# GANDER

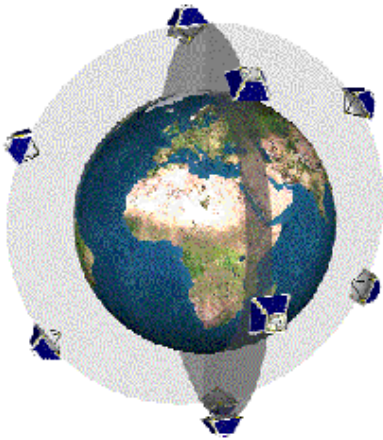
- Mission and satellite specifications tailored to service requirements.
- Sea surface height not in service specification.
- Original mission specification included significant commercial component.
  - Economically feasible solution required - hence a priority is to keep costs low.
  - No need to optimise data accuracy / reliability beyond service specification.



# GANDER - Specifications

- These specifications from a feasibility study completed in 2000

## Constellation / Orbits



### Configuration

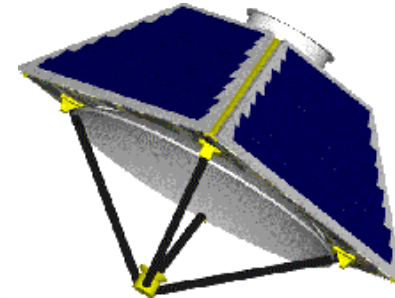
2 planes spaced  $90^\circ$  in RA  
5 equally spaced operational spacecraft per plane  
10 orbital slots of  $\pm 5^\circ$ ,  
 $18^\circ$  plane cross over margin

### Orbits

650km circular orbit,  
inclined at 80 degrees  
Non-Sun-synchronous



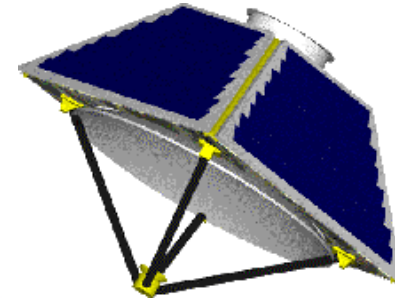
# GANDER - Spacecraft



- **Wet mass** 85kg
- **Volume** Truncated pyramidal shape, 0.55m tall, 0.4x0.4m and 1.0x1.0m facets
- **Attitude** 3-axis momentum bias mode,  
3 Earth horizon sensors, 2 x 3-axis magnetometers  
2 momentum wheels, 2x 3-axis magnetorquers
- **GNC** Ranging and NORAD
- **OBC** Dual OBC386 processor, dual 8Mbyte data recorder
- **Power** 28V Peak Power Tracking system, 7Ah NiCd battery.  
4 body-mounted Si panels delivering 85W peak power.
- **Propulsion** 1x0.1N cold gas thruster, total  $\Delta v=15\text{m/s}$
- **TM/TC** Dual redundant Control Area Network (CAN ISO-11898)  
S-band, omni-directional antennas  
Uplink 64kbps  
Downlink 64kbs
- **Redundancy** Single point failure tolerant. Largely dual redundant
- **Reliability** 90% for 7 years



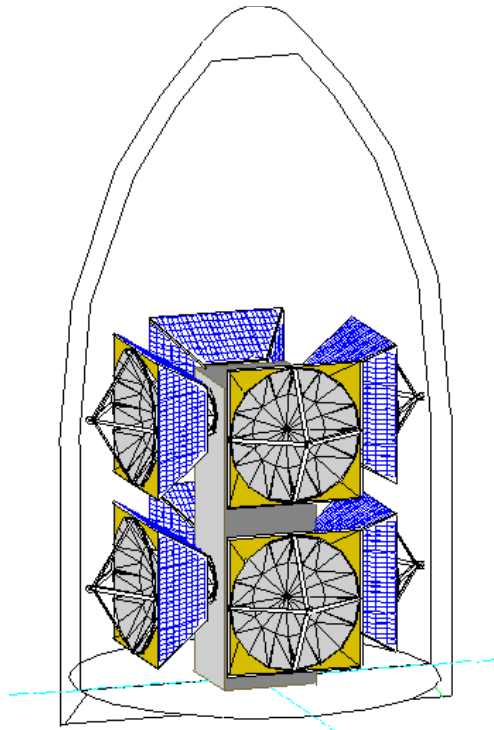
# GANDER - Altimeter



- **Frequency** Ku band
- **Mode** Pulse limited
- **Antenna** 1m diameter, Cassegrain parabolic dish
- **Products** 1Hz  
Significant Wave Height (accurate to 0.5m or 10%)  
Wind Speed (accurate to 2m/s or 10%)
- **Power** <50W Orbit Average (>70% duty cycle)
- **Specifications** PRF 500 Hz  
Sigma-0 accuracy of 0.7dB with 6-20dB range  
Data rate 2kbps nominal, 1Mbps raw rate for diagnostics



# GANDER - Launch



2 launches with 8 spacecraft  
each on a custom dispenser