# Mid-term Progress Review Aims

- Review the progress reports
  - Sea-State WP
  - Sea Surface Height WP
  - Orbit WP
- Review preliminary conclusions, and make suggestions for final reports
- Review the plan for future activities in 2003
- Discuss potential scenarios to be considered within Gamble
- Make any recommendations for 2003 activities with respect to Gamble objectives and timetable

# WP 8: CONSTELLATION OPTIMIZATION (1)

- **Objective:** Provide system requirements based on GAMBLE multi-satellite configurations
- **Due time:** August 2003
- **Contributions** from CNES (leading), SOS, DUT, SOC, CLS, ASPI, CETP, SHOM, LEGOS, SSTL, LEGI, NERSC
- **Inputs**: Deliverables from WP 2,3,4,5, i.e. mission science and operational requirements along with error budgets
  - SSH recommendations => accuracy, space-time sampling, data coverage and repetitivity, continuity...Coastal and tide applications much more demanding in terms of space-time resolution and accuracy
  - Orbit recommendations with respect to expected accuracy and sampling => inclination/altitude, tracking system, satellite mass/area ratio, near-real time orbits, alternative ways of reducing orbit errors, repetitivity….
  - SWH recommendations => accuracy and space-time sampling, continuity and cross-calibration, usefulness of additional spectrum infos and models to compensate unsufficient space-time resolution...
  - User operational applications requirements => ground system, data processing, data delay delivery,

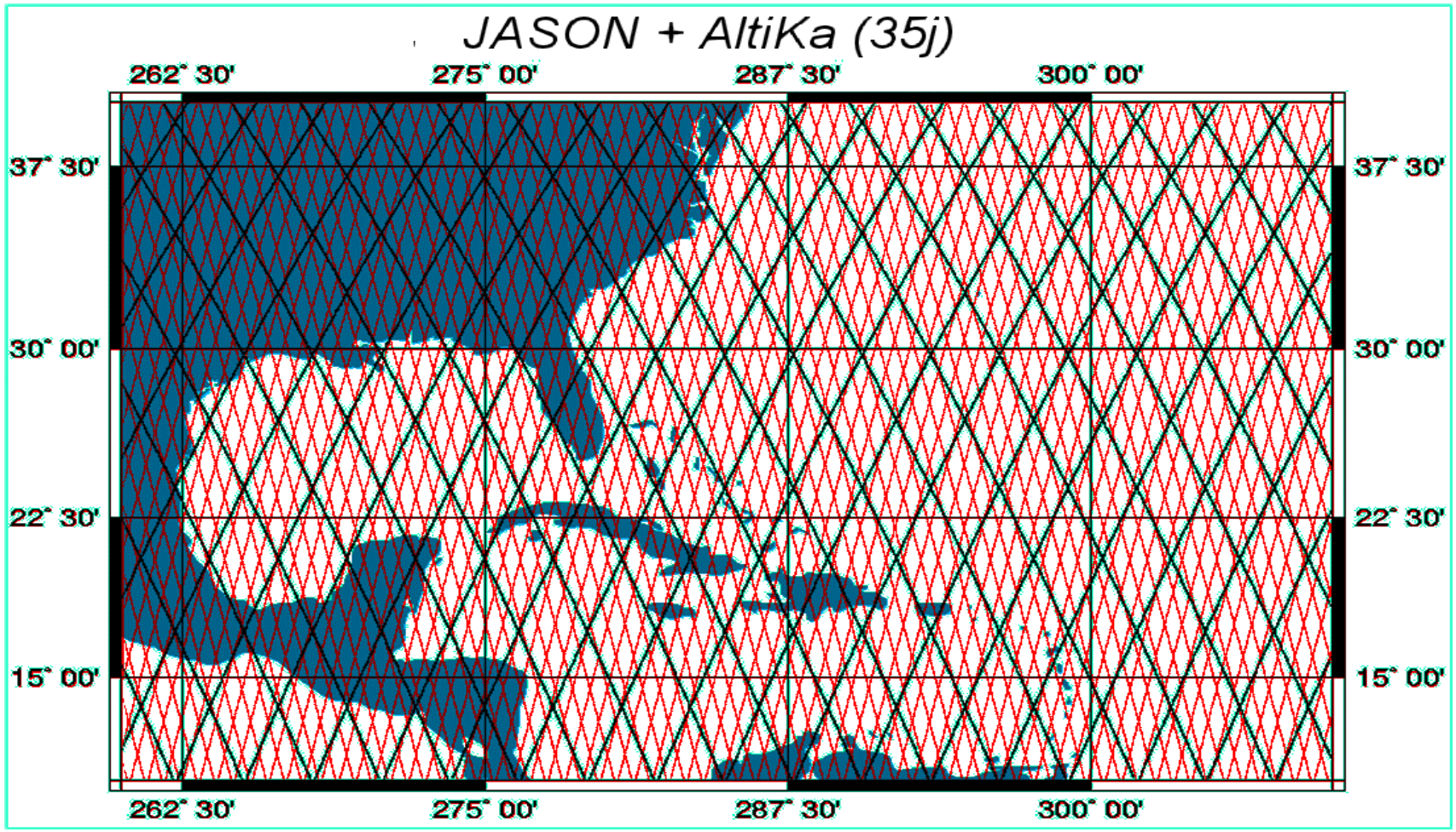
# WP 8: CONSTELLATION OPTIMIZATION (2)

- **WP 8Action:** Convert these mission requirements into system requirements, i.e. payload, orbit, number of satellite, respective phasing….
  - Some key elements to define:
    - Constellation geometry: number of satellites
    - Orbit: inclination, repetitivity, respective phasing between satellites
    - Payload: dual or single frequency altimeter, orbit tracking system, additional instruments (radiometer, laser retroreflector…)
- **Baseline:** Consider almost decided missions, i.e.Jason 2/OSTM, NPOESS, plus « conventional » proposed Altika/Gander/Wittex, and/or Wide Swath new concepts, i.e. WSOA and SWIMSAT,
  - Propose different scenarios and different mission definitions for each scenario
  - Work on an AltiKa/Gander joint venture
  - Define an a-priori error budget for each scenario
  - Define an optimum and a minimum configuration(s) capable of satisfying at the best the different objectives, SSH and sea-state, « the convergent view »
- **Question**: Consider the timing, the cost constraints?

# WP 8: CONSTELLATION OPTIMIZATION (3)

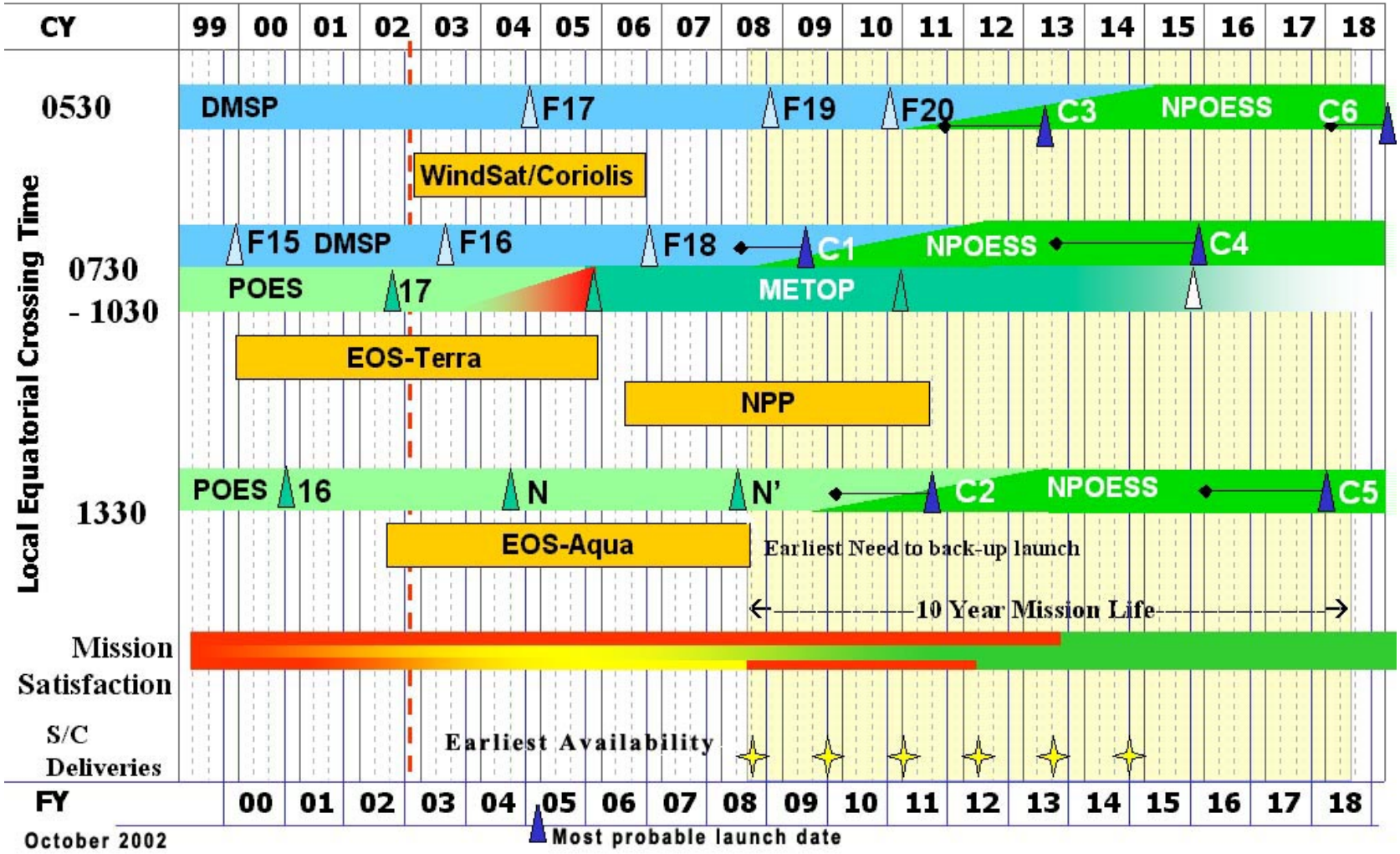
- **Recommend an optimized convergent strategy for both SSH and Sea-State Objectives**
- **Possible mission scenarios to be evaluated**
  - Take the reference missions Jason 2/OSTM (2007) and...
    - NPOESS, but the first one C3 is scheduled in 2011, the second one C6 in 2018
    - NPOESS free-flyer? Still an option?
  - ENVISAT is designed for a 5 year life-time => 2007-2011 a big « risk » of having only one satellite in-flight (Jason2)
  - **=>Mid-term objective (2007-2011): to maintain (and complete) the present ENVISAT/Jason-1 configuration,**
    - Absolute need to fill the potential gap in 2007-2011
    - with « conventional » altimetry, i.e. AltiKa/Gander constellation, 1 is a minimum, 3 is much more adapted to various SSH and Sea-State objectives => define multiple mission scenarios to see how they satisfy the different objectives/mission requirements
  - **Long term objective (> 2011), Jason follow-on and NPOESS with Wide Swath Altimeters**
    - WSOA, should be demonstrated on-board Jason2 => potentialy operational in 2011
    - SWIMSAT proposed to ESA in 2002, ranked first on the waiting list, good chance for the new ESA AO in 2005-2006 ?

# Minimum altimeter sampling

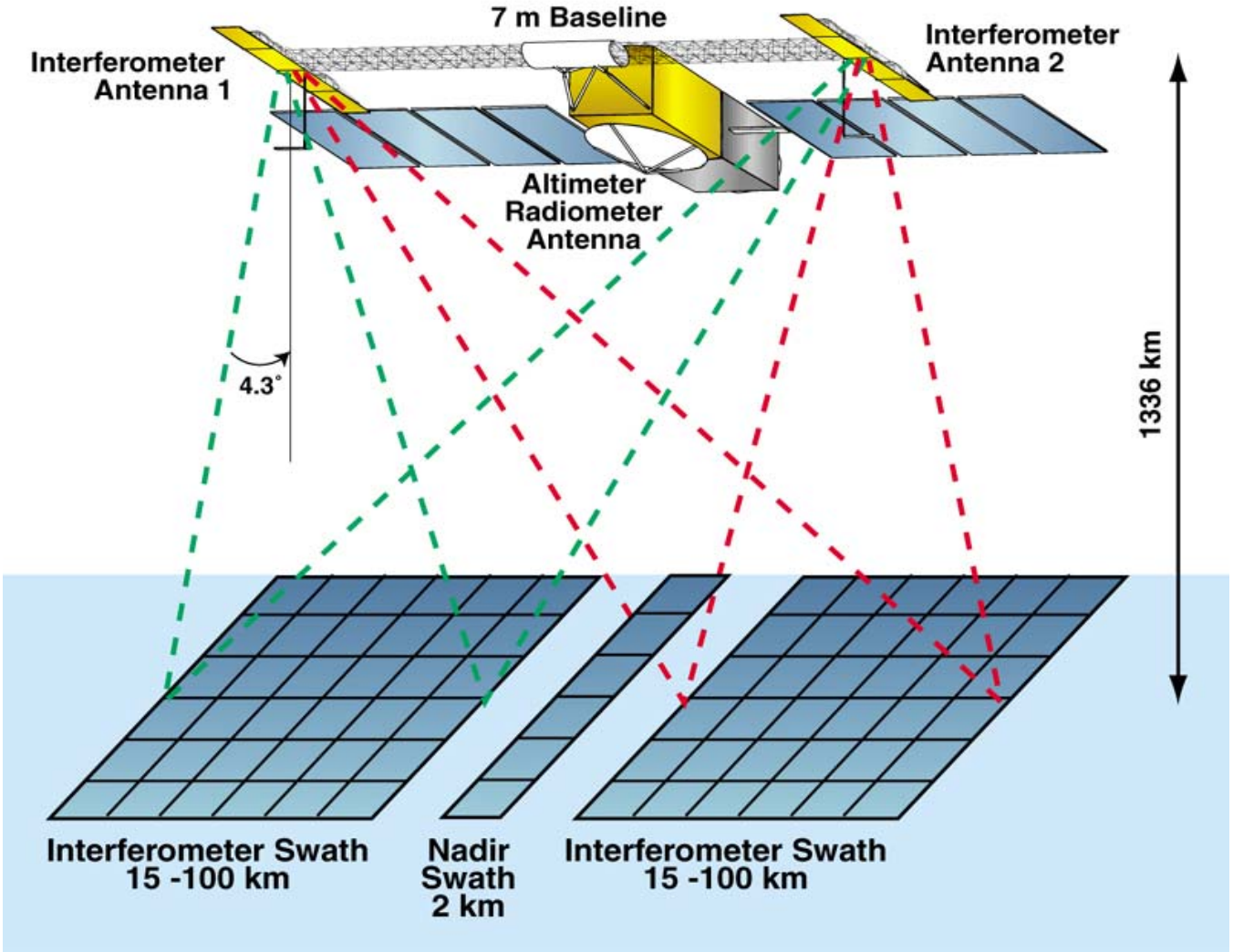


The Jason-2/OSTM mission, to be launched in 2007
(CNES/NASA/EUMETSAT/NOAA)

# NPOESS sun-synchronous satellite schedule

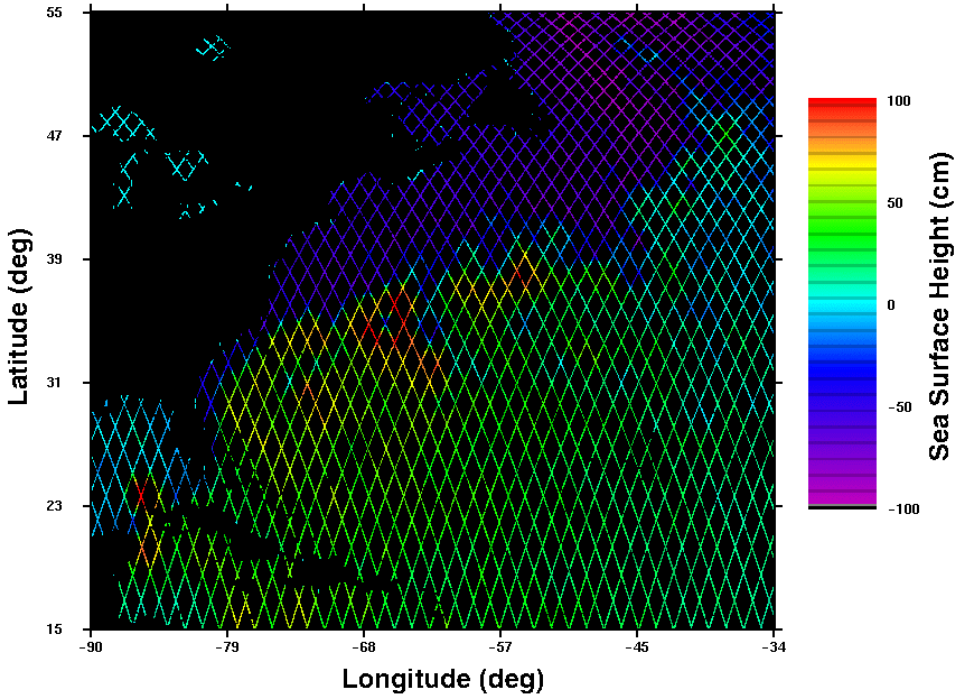


# WSOA geometry

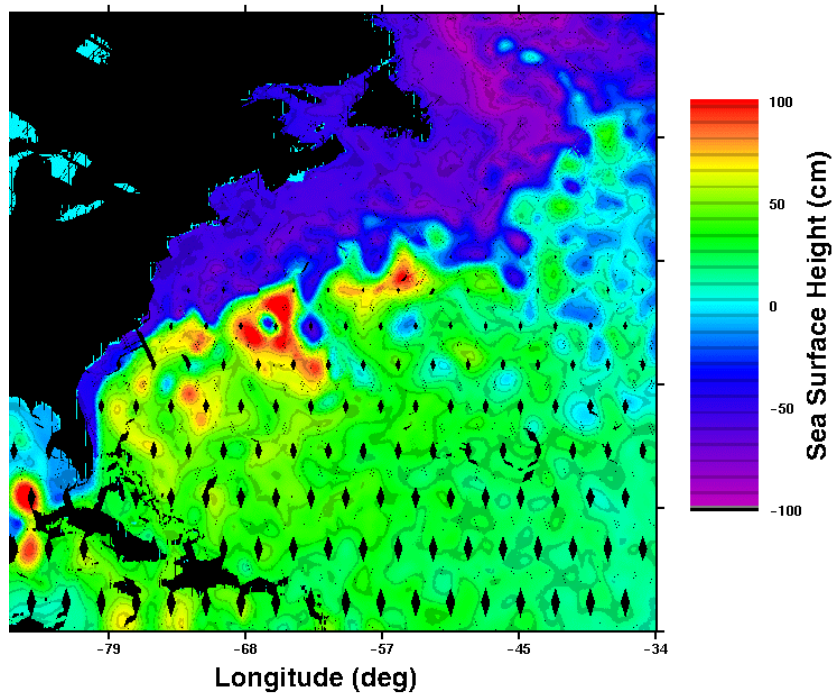


# WSOA Science Rationale

**Topex Orbit, 2 Altimeters:**
**150km equatorial spacing, 10 day repeat**




**Topex Orbit, 1 satellite, fixed yaw coverage**
**Wide-Swath altimeter, 10 day repeat**




**High resolution ocean topography measurements requires several coordinated nadir altimeters. A better coverage from a single platform can be obtained using an instrument which can image a swath instantaneously.**

# SWIMSAT Geometry