A Potential Capability for Imaging Coastal Waters with GOES-R

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GOES-R

- NOAA is planning the next generation of Geostationary Operational Environmental Satellites – GOES-R
- Launch readiness – 2012
- Proposed payload for the GOES-R series:
  - Advanced Baseline Imager (ABI)
  - Hyperspectral Environmental Suite (HES)
  - Solar Instrument Suite (SIS)
  - Space Environment In Situ Suite (SEISS)
  - GOES Lightning Mapper (GLM)

GOES-R/HES – Coastal Waters

- Hyperspectral Environmental Suite (HES) to have a capability to observe coastal waters (CW)
- Vis-NIR (412 - 900 nm) imager, either
  - Multispectral (14 bands minimum), or
  - Hyperspectral
- This offers significant potential to collect high temporal and spatial resolution observations – on a continuing basis – to meet *both operational and research applications*

GOES-R/HES/CW – Applications

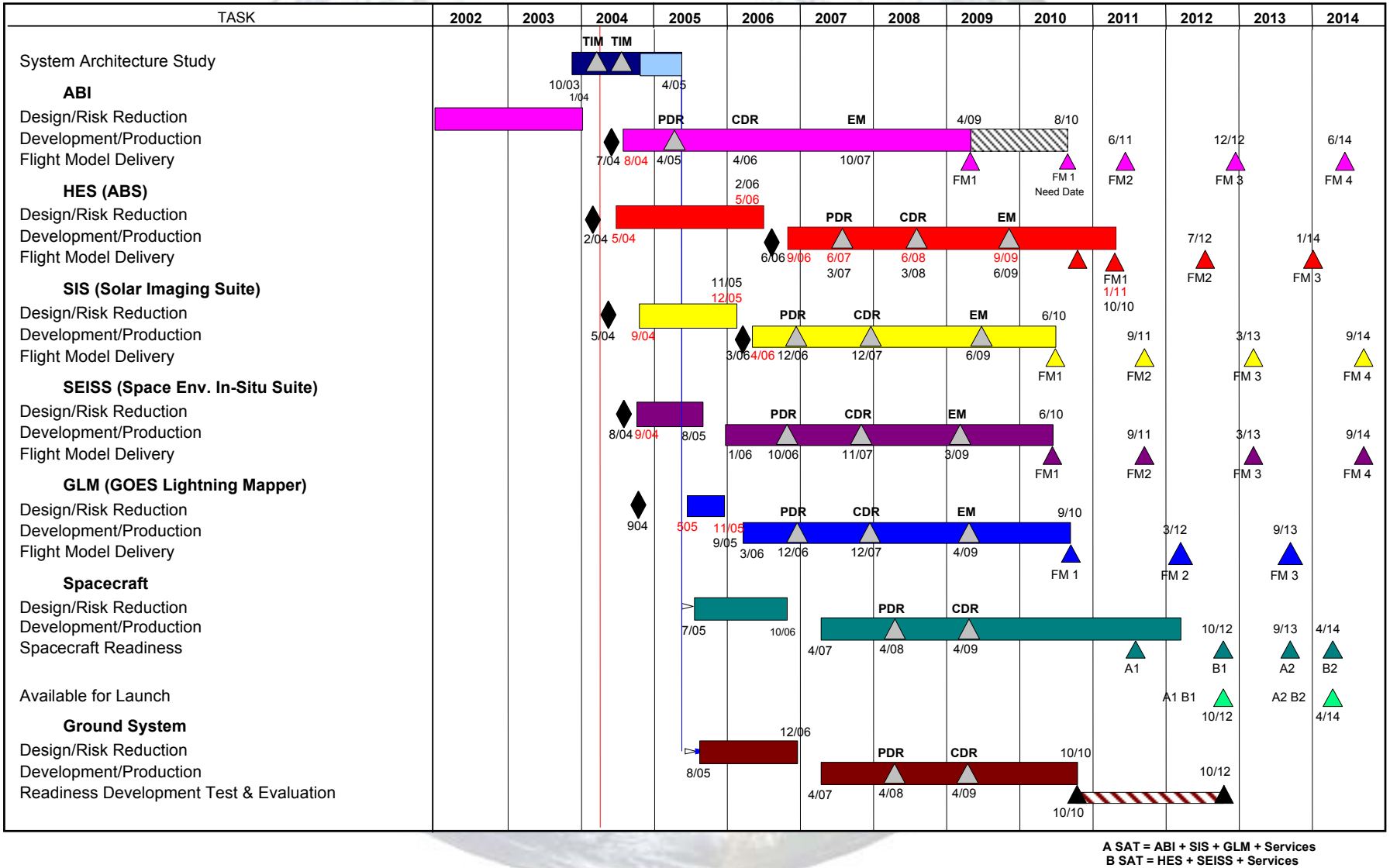
- Monitor and assess
  - Harmful algae blooms
  - Coral reefs
  - Coastal wetlands
  - Submerged aquatic vegetation
  - Water quality
  - Coastal erosion & bathymetry
- Support response to hazardous spills
- Contribute to carbon cycle program
- Understand influence of tides and run-off on coastal circulation
- Investigate response of marine ecosystems to environmental change

GOES-R/HES – Studies

- With launch readiness in 2012, GOES-R Project plans to issue three substantial contracts for two-year design and risk-reduction studies on the HES
- A set of *threshold* (must have) and *goals* (nice to have) requirements will be used as a target for these studies
- Following these studies, it is anticipated that the Project will select one contractor to develop, produce, and deliver flight models of the HES

GOES-R Project Schedule

(Feb 5, 2004)



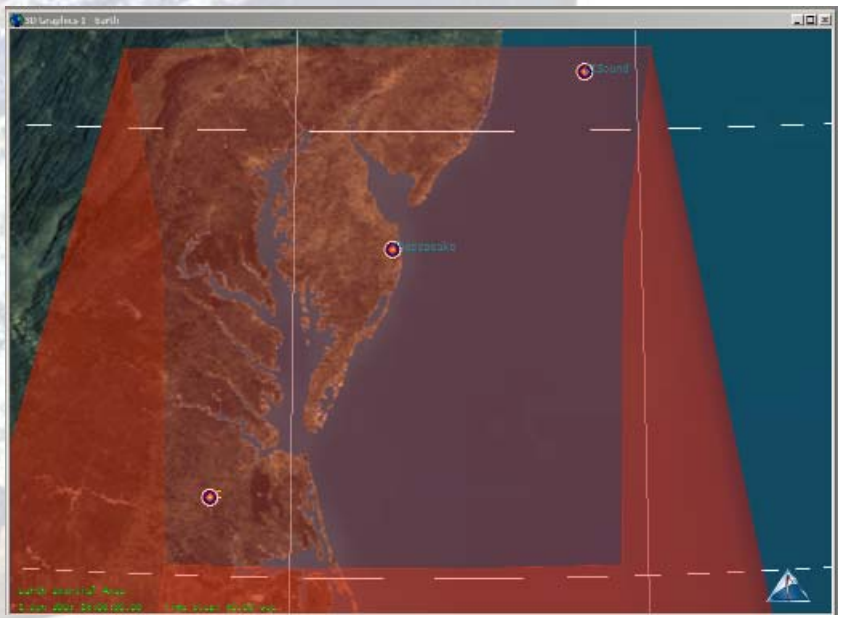
Nominal HES-CW Channel Specifications

Thresholds			Goals		
Wavelength (um)	Resolution (um)	Signal to Noise	Wavelength (um)	Resolution (um)	Signal to Noise
0.412	0.02	300 to 1 all channels	0.407 through 0.987	0.01	900 to 1 all channels
0.443	0.02		0.57	0.01	
0.477	0.02		1.38	0.03	
0.49	0.02		1.61	0.06	
0.51	0.02		2.26	0.05	
0.53	0.02		11.2	0.8	
0.55	0.02	Horizontal Resolution	12.3	1	Horizontal Resolution
0.645	0.02				
0.667	0.01	300 meters (at Equator)			150 meters (at Equator)
0.678	0.01				
0.75	0.02				
0.763	0.02				
0.865	0.02				
0.905	0.035				

HES-CW Modes

400 km x 400 km viewing geometry with two modes:

- Survey – cover East /Gulf Coast EEZ within 1 to 3 hours & 300-m spatial resolution (at the Equator)
- Local – stare at a region of interest with 150- to 300-m spatial resolution (at Eq.)



GOES-R/HES – Science Working Group

- NOAA proposes to establish a broadly based science working group (SWG) to address oceanic applications of the HES, focused on those related to the collection of images of coastal waters
- Experts would be invited to participate from NOAA, NASA, Navy, the academic community, and other organizations, as appropriate
- The SWG would run at least for the duration of the two-year design and risk-reduction studies

Tasks for SWG

- Review the nominal threshold and goal requirements used as the basis for the HES studies
- Articulate oceanic applications - both operational and research - for which the HES could have a significant impact, with a focus on coastal waters
- Establish linkages between the applications and the associated requirements
- Contribute to understanding the relationships between requirements, performance, and cost

Importance of SWG

- Input from the SWG would be critical to good decision-making for trade-offs
- HES/CW is different from *traditional* capabilities flown on NOAA operational satellites
- Implementation will require a *broad consensus* and *genuine sense of ownership* among the greater user community regarding the specifics proposed for coastal waters
- But if implemented, this will represent a *continuing* capability

What Next?

- Build on lessons learned from the Special Events Imager (SEI)
- Harmonize planning among the agencies
- Identify prospective members and candidate leaders for such an SWG
- NOAA, in concert with NASA and Navy, would establish the group and proceed
- If we could all agree on what needs to be done, we could develop a single, clear message to maximize our prospects for success