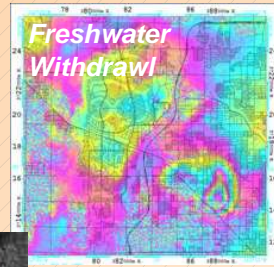
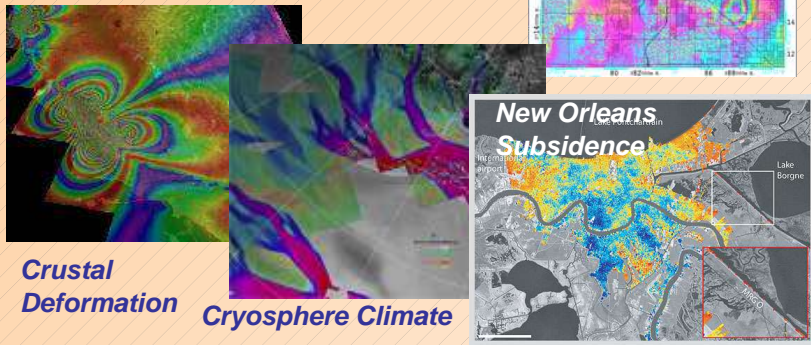
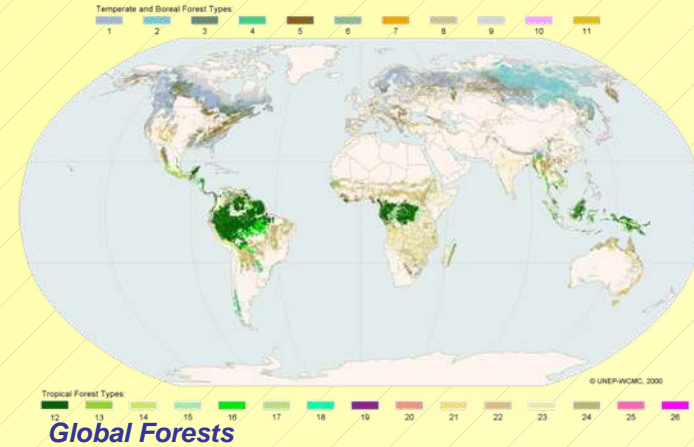


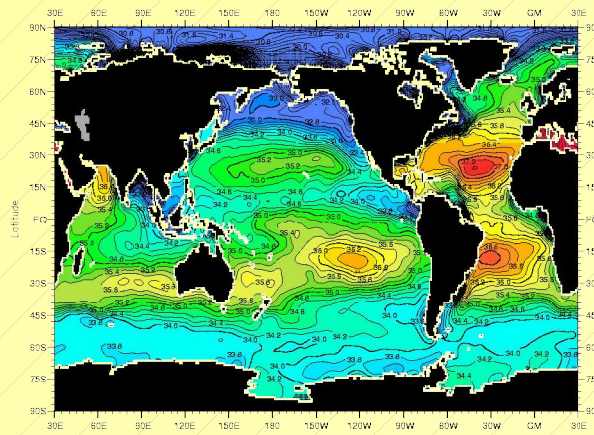
At L-band, measure 3D surface deformation in global deforming regions with an intrinsic frequency of 8 days



Measure the biomass extent, variability, and structure from L-/P-Band Quad-Pol measurements

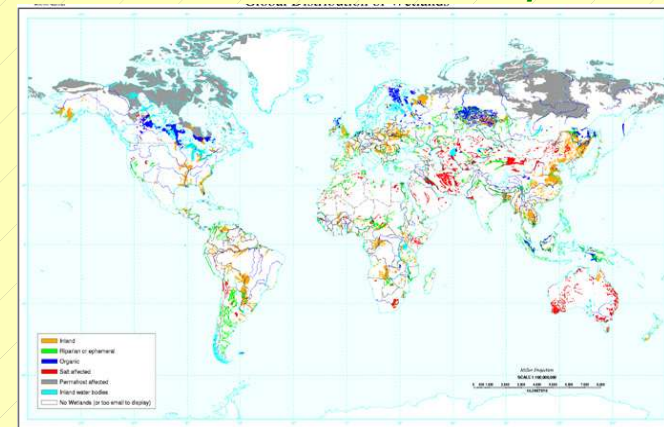


Measure sea surface salinity with passive radiometry, with L-Band scatterometer surface roughness correction



Global Sea Surface Salinity

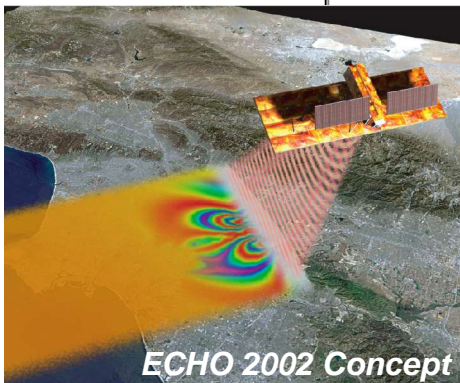
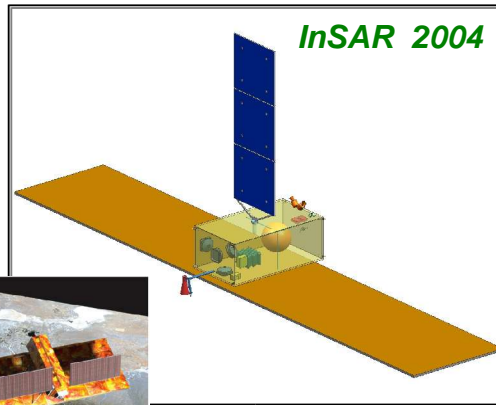
Measure polarimetric signature of wetlands to characterize their extent and temporal variability



Global Wetlands



# Previously Proposed InSAR Concepts



## Phased Array Advantages

- Straightforward radar beam-forming and control
- High thermal dissipation balanced by large radiating area
- Graceful degradation

## Phased Array Disadvantages

- Current technology and materials drive a high mass density on a large array
- Large number of elements drive to higher integration costs
- Accommodation of multiple frequencies drives design to larger and/or more complex aperture

Meeting additional science requirements drove the decision to consider a different radar implementation in subsequent trades

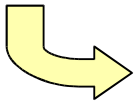


# InSAR Solution for Additional Science

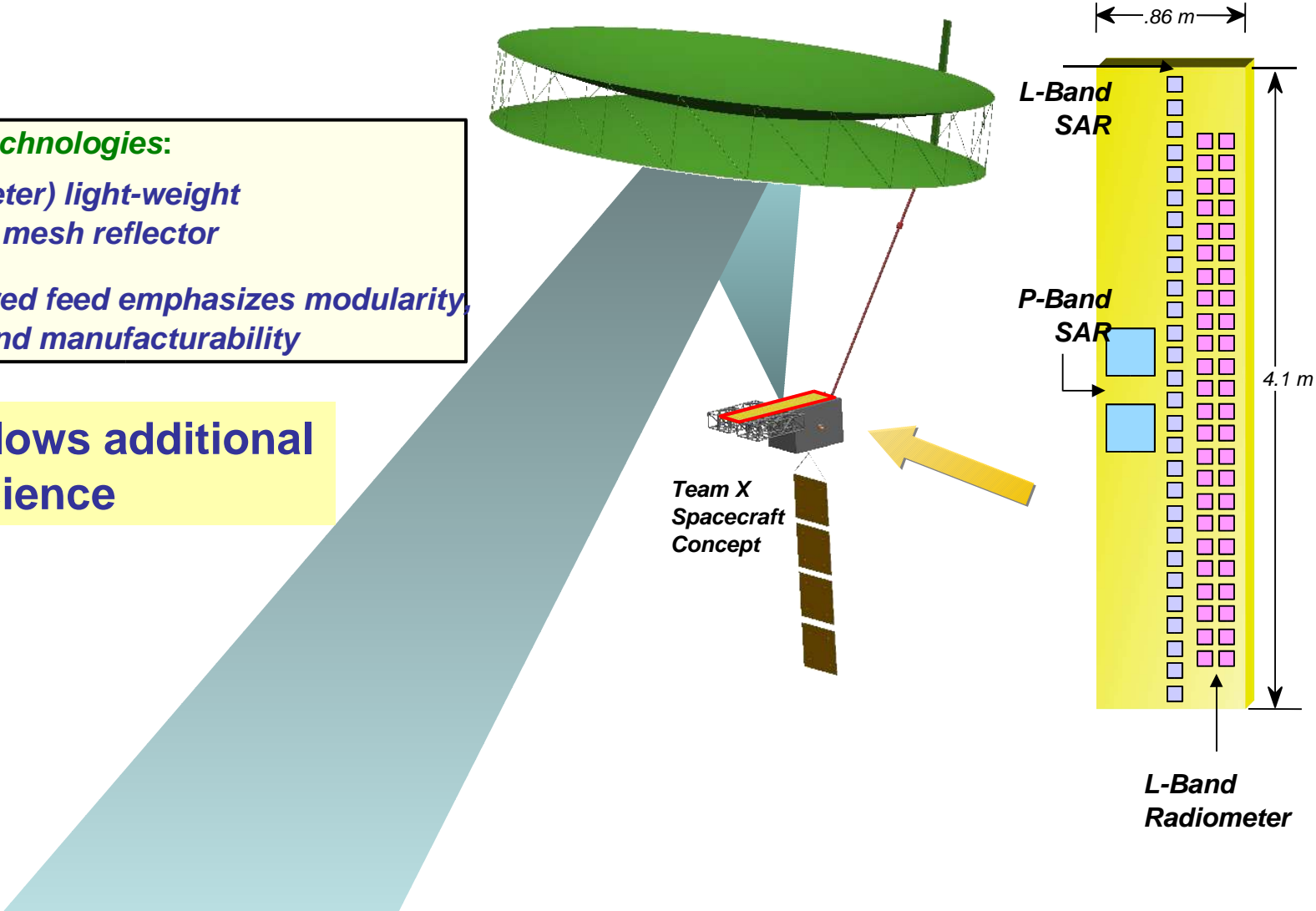


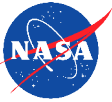
**Enabling Technologies:**

- 15m (diameter) light-weight deployable mesh reflector
- Small, shared feed emphasizes modularity, efficiency and manufacturability



**Allows additional Science**





# InSAR Trades for Additional Science



## Principal InSAR Mission Trade space

Mission Options	Science Capability				Description
	Crust Climate	Terr Carbon	Hydro. Science	Ocean Science	
<b>Reference Mission:</b> L-Band Quad-Pol	■	■		■	Phased Array option, elevation steering Core InSAR + moderate vegetation, and ocean waves
<b>Option 1:</b> L-Band Single-Pol	■			■	Reflector option, elevation beams Core InSAR
<b>Option 2:</b> L-Band Quad-Pol	■	■		■	Reflector option, elevation beams Core InSAR + moderate vegetation, and ocean waves
<b>Option 3:</b> L-/P-Band Quad-pol	■	■	■	■	Reflector option, elevation beams Core InSAR + heavy vegetation, + regional soil moisture
<b>Option 4:</b> L-/P-Band Quad-pol + L-Band Rad/Scatt.	■	■	■	■	Reflector option, elevation beams Core InSAR + heavy vegetation, + regional soil moisture + Aquarius follow -on salinity
<b>Option 1a - 4a:</b>	Add water vapor instrument to enhance sensitivity of crustal deformation / climate measurements (see full package for details)				

Reflector Options

- Designed to Address Science Objective
- Contributes to Science Objective



# Study Summary



- InSAR mission at L-band can be implemented with either phased array or feed-reflector technology
  - Both technologies are mature and feasible
- Additional science can be accommodated in feed-reflector implementation with straightforward instrument augmentations
  - Additional feeds are relatively small, mounted on the spacecraft
  - Electronics components are modular and mature
- Important factors in optimizing total science mission are
  - Orbit reconfiguration (e.g. 8-day repeat vs. 30-day repeat)
  - Baseline (e.g. zero for deformation vs. multiple for vegetation)
  - Mode contention (e.g. ScanSAR vs. Quad-pol)
  - Data rate and volume for multiple simultaneous modes