Origins – An Overview

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HST Has Been Carrying Us on Its Back for the Last Decade, & It Will Have to Do So Again Well Into This Decade...

…But, the Time Has Come to Prepare for Passing the Torch.

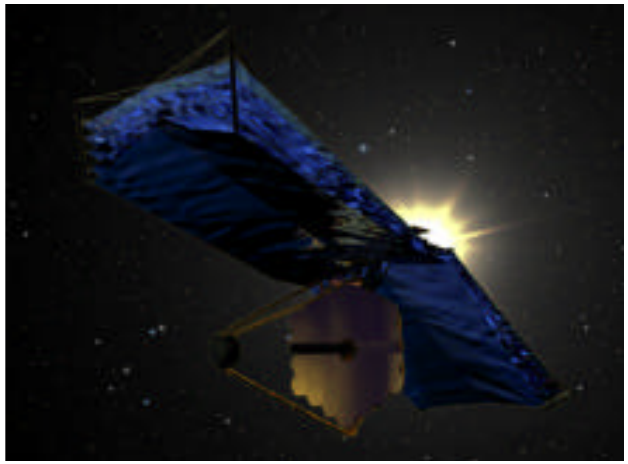
Origins' Three ***Landmark*** Observatories

(in the Making Over the Next Dozen Years)

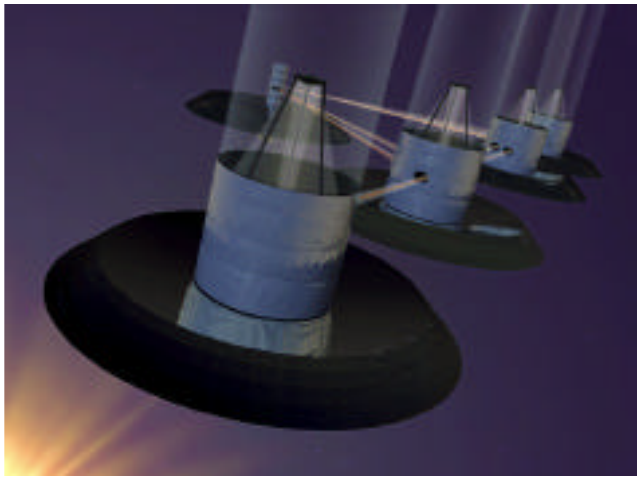
Interferometry, Large Apertures, Constellations of Large Apertures Interferometrically Connected

A Theme for Astrophysics in This Century

SIM



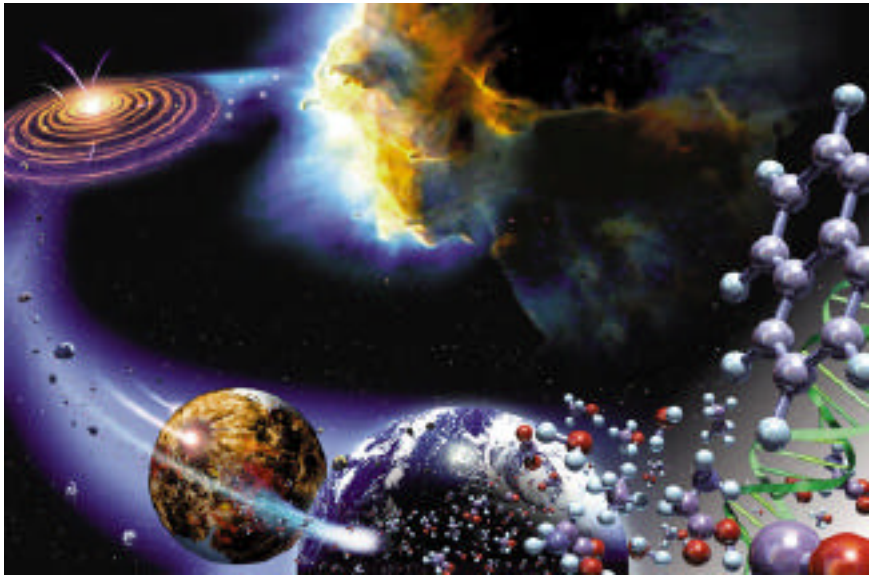
NGST



TPF

Origins Theme's Two Defining Questions

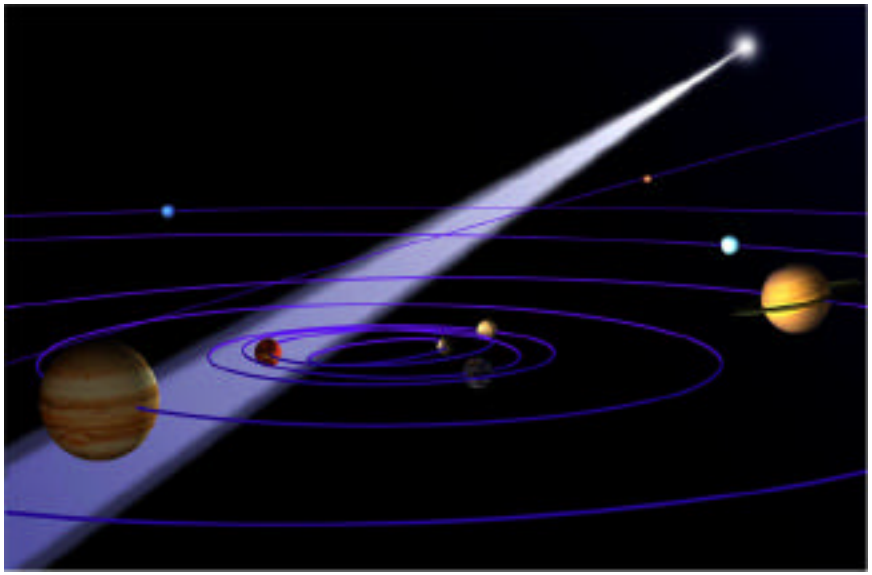
Where Did We Come From?



Tracing Our Cosmic Roots

- Formation of galaxies, stars, heavy elements, planetary systems and ... life on the early Earth

Are We Alone?



Search for Life Outside the Solar system

- Remote detection of the "smoking guns" indicating biological activities on extra-solar planets

Interferometry Roadmap

Current State of Interferometry in the World

- Ground research/testbed facilities
- Built for a few $Ms ($5M?) with schedule as a flexible variable
- Limited science
- When something goes wrong, experts with “screwdrivers” show up
- Example? PTI

Next Up on the Ground

- A routinely operational facility (similar to major ground telescopes)
- Built at a cost of several $10s M
- Breakthrough science — not achievable with current telescopes
- You can count on it to be there and working
- Example? Keck Interferometer (US), VLTI (ESO)

Interferometry Roadmap (cont.)

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What Is Up in Space?

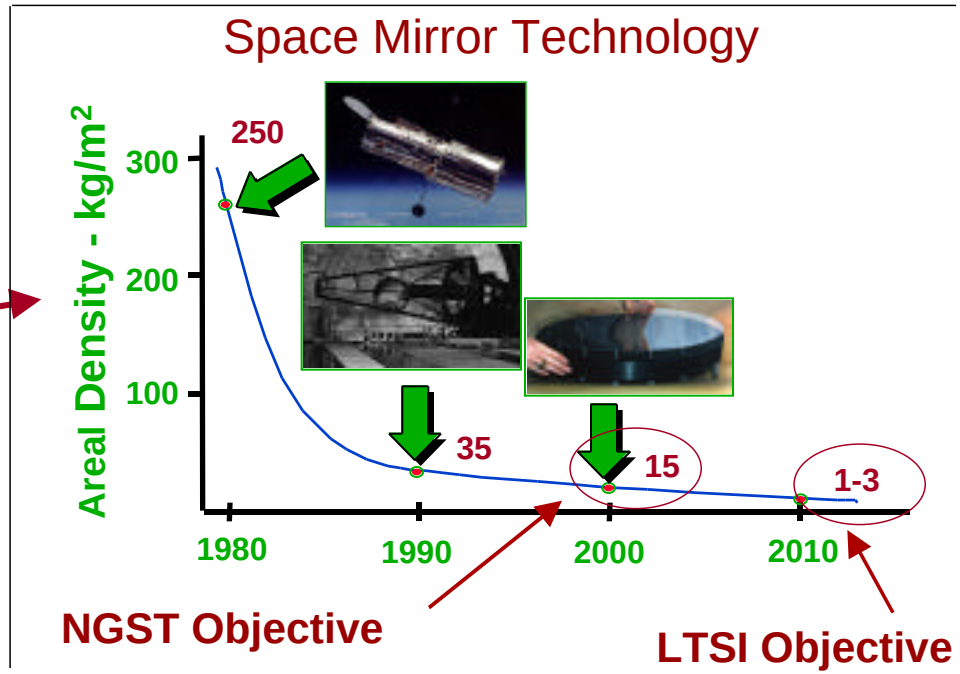
- Interferometers are complex instruments
- Need to create the confidence they can work in space without the need for experts with "screwdrivers" when things go wrong
- A trailblazer/demonstrator space interferometer (not for science) is the right first step
- Useful to have its schedule offset by 2-3 years relative to the first major science space interferometer
  - 2-3 years lead in manufacturing, I&T, launch and ops — provides learning experience & "sweeps the mine field"
- ST-3 fulfills this purpose

Next Up in Space

- The first major science interferometer in space
- A landmark astrophysics mission — SIM

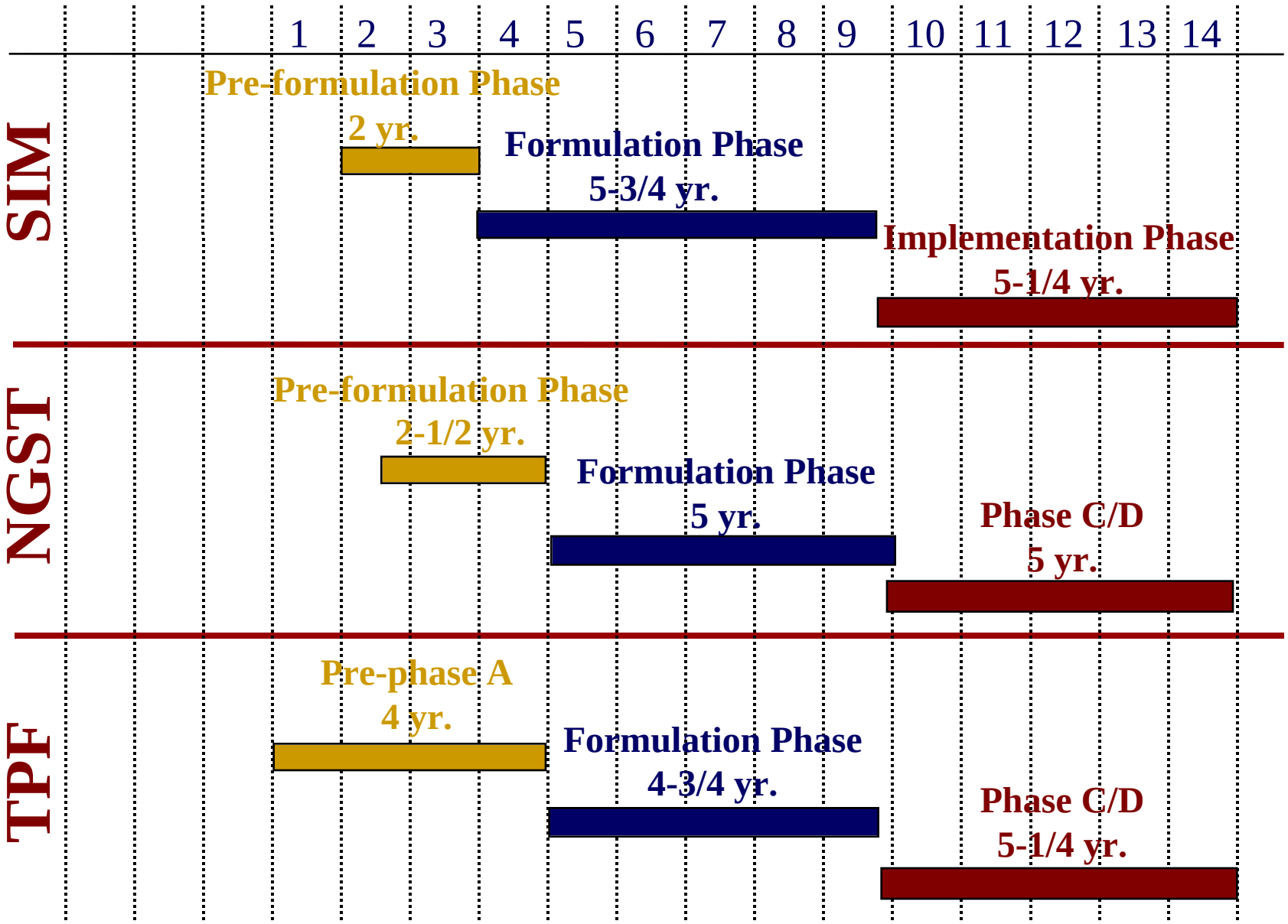
Large Space Telescope System Technology Initiative (LTSI)
Our Seed Corn

- While SIM/NGST/TPF will consume most of our attention and resources, we should not neglect our further out future
- We propose LTSI to provide the technology infrastructure needed for future telescopes with 20m - 40m aperture diameters
- Critical elements of a telescope **system** are included
  - Lightweight apertures
  - Wave front sensing and control
  - Thermal management
  - Detectors



Development Schedule for Origins Large Observatories

Concept to Launch ~ 14 years



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For more information, visit our website:

http://origins.jpl.nasa.gov