winds from very massive stars displace dust clouds

newest generations of stars Forming in dust lanes

Super-starclusters, dissipated dust

winds from very massive
ACS 144 orbits
WFC3 / IR 10 orbits
Within ~ 4 weeks of taking the first WFC-3 "Treasury Program" data, the GO community had 10 papers on Astro-ph:
- \( z \sim 8 \) galaxies
- Galaxies in the reionization epoch
- Galaxy formation

after only 60 of 192 orbits
courtesy of the HUDF09 Team
PI: Garth Illingworth
Outreach impact

number of stories
Outreach impact

number of readers reached

SM4 and ERO

reached over

1 billion readers

among

newspapers and

internet articles
HST budget projection in FY 2008 for "cheap ops." - already significantly below post SM3B levels

STScI budget evolution

- STScI budget evolution

- ACS
- NICMOS
- STIS
- WFPC-2
- FGS

27% (39% inflation)

- WFC-3
- COS
- NICMOS
- STIS
- ACS
- FGS

POST SM4
efficiency improvements
Science metrics:

Refereed publications
efficiency & improvements

spacecraft on target efficiency

median retrieval times (hours)
Phase I Proposal Preparation and submission:
- improved user tools
- improved documentation
- no budget for observing proposal until accepted

Phase II Processing:
- improved user tools (fewer problem submissions)
- streamlined processing & automation
- simplified conflict/duplication rules & tools
- simplified change request processing

Planning & Scheduling:
- improved operational tools & automation
- added onboard data capacity

Data Management:
- improved pipeline (maturity)
- streamlined processing & automation
- data distribution via internet
James Webb Space Telescope

IIM Structure at GSFC
Both HST’s and JWST’s expectations are probably unrealistic.
### President’s FY 2010 Budget Request Detail

#### Budget Authority, $ in million

**By Appropriation Account**

<table>
<thead>
<tr>
<th>By Theme</th>
<th>FY 2008 Actuals</th>
<th>FY 2009** Enacted</th>
<th>FY 2010</th>
<th>FY 2011</th>
<th>FY 2012</th>
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<td>207.7</td>
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<td>James Webb Space Telescope (JWST)</td>
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<td>Stratospheric Observatory for Infrared Astronomy (SOFIA)</td>
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<td>72.8</td>
<td>74.0</td>
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</table>
8-m Monolithic Primary
(shown with on-axis SM configuration)

9.2-m Segmented Telescope
36 1.3-m hexagonal mirror segments

16.8-m Segmented Telescope
36 2.4-m hexagonal mirror segments
Diffraction limited @ 500 nm

Designed for SE-L2 environment

Non-cryogenic OTA at ~280° K

Thermal control system stabilizes PM temperature to ± 0.1° K

OTA provides two simultaneously available foci - narrow FOV Cassegrain (2 bounce) for Exoplanet UV instruments and wide FOV TMA channel for Vis/NIR Gigapixel imager and MOS

Designed to permit (but not require) on-orbit instrument replacement and propellant replenishment (enables a 20+ year mission lifetime)
Are We Alone?

The number of star systems where one can search for potentially habitable worlds increases approximately as the cube of the telescope diameter.

An Earth-twin at a distance of 20 parsecs is 8x fainter than the faintest galaxy in Hubble’s Ultra Deep Field Survey. A large space telescope is required to detect life on exoplanets.

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The signature of life is encoded in the spectrum of the Earth.
Star formation & evolution; resolved stellar populations

Galaxy formation & evolution; supermassive black hole evolution

Formation of structure in the universe; dark matter kinematics

Origin and nature of objects in the outer solar system

A “life finder” telescope will clearly be a multi-billion dollar facility. Support by a broad community will be needed if it is to be built.

ATLAST can characterize a large sample of potentially habitable worlds AND do a wide range of pioneering astrophysics.