

- At NASA's request, ST ScI is conducting a community-based study to develop a strategic plan for the second decade of HST
- The "HST Second Decade Study" will
  - provide a *vision* for HST following the final servicing mission, including the early years of NGST
  - provide forethought about *opportunities*, *constraints*, and *issues* important for HST's future
  - provide *guidance* on allocating HST observing resources

- HST Second Decade Study committee

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- Key features

- first meeting at ST ScI, July 7-8, 1998
- final meeting at ST ScI and study completion in early 1999
- community-based approach (WWW storefront @ [http://sso.stsci.edu/second\\_decade/](http://sso.stsci.edu/second_decade/))
- final report distributed in booklet and electronic forms

*We welcome all comments and suggestions on this study! Send them to [rbrown@stsci.edu](mailto:rbrown@stsci.edu)*

- **Conceptualize the *opportunities***
  - what developments will set the scientific agenda?
    - what questions will be most important for HST to address?
  - what synergy could and should develop between HST and NGST or with other space–or ground-based observatories?
    - precursor and/or coordinated observing programs with NGST or other observatories.
  - relative emphasis on archival program
- **Understand the *constraints***
  - instrument capabilities as a function of time (WFPC2, WFC3, COS, STIS, ACS, NICMOS)
    - undefined aspects of WFC3, NICMOS, and COS
  - spacecraft capabilities as a function of time
  - low-cost operations (at fraction of current cost)
- **Develop the *issues***
  - HST uniqueness space in uv-optical-infrared as a function of time
  - optimal mix of large and small observing programs
    - possible surveys
  - implications for guest-observer support
  - options with respect to proprietary data rights
- **Formulate *recommendations***
- **Prepare and distribute *report***

The HST Project is requesting that the ST ScI conduct a community-based study to develop a strategic plan for the second decade of HST that is consistent with the following boundary conditions and objectives, taking account of existing developments and studies. The Project solicits the particular advice of this study group on:

1. observing strategies for the HST that would extract maximum scientific value from the observatory while it is still in operation
2. other relevant topics that merit investigation.

The HST Project has been authorized by the Office of Space Science to plan for an extension of the HST mission beyond the previous 2005 end-of-mission date. The boundary conditions for the extended mission are as follows:

1. final solicitation for new instruments in 1997
2. final in-orbit servicing and reboost of HST in 2002
3. major reductions in HST budget to create development wedge for NGST
4. low-cost operations to end of mission
5. de-orbit in 2010

This extension is consistent with the recommendations of the "HST and Beyond" (Dressler Committee) study, and will allow synergy between the HST and NGST missions. In its second decade, HST will be the premier UV-Optical space observatory, complementing and supporting NGST's extraordinary capabilities in the near-IR.

The HST Second Decade Study will create a strategic plan for the second decade of HST science addressing the following desired outcomes:

1. continuation of healthy observatory operations (spacecraft and ground system), with graceful degradation, at least to 2010
2. continuation of HST's capabilities at the forefront of world-class scientific research at least to 2010, with emphasis on those areas where HST is likely to remain unique
3. optimization of HST for UV-optical imaging and spectroscopy, assuring both primary and adequate backup instrumentation sufficient to assure its performance to 2010 or beyond
4. achievement of objectives 1-3 within a highly constrained budget, taking maximum advantage of resources that already exist within the HST Project.

Several key elements which would form a basis for the extended mission are already in place, under development or under study, and are consistent with this approach. These are:

1. The Space Telescope Imaging Spectrograph (STIS) - the primary tool for UV-optical spectroscopy; development complete and paid for; 13 years old by 2010
2. Advanced Camera for Surveys (ACS) - the primary tool for UV-optical imaging; under development for SM3/1999; developed at about half the cost of comparable earlier instruments by use of spare hardware, design drawings, and other heritage from STIS

3. Wide Field and Planetary Camera 2 (WFPC2) - currently primary imager on HST; after SM3/1999 serves as primary backup to ACS and provides continued unique science because of its filter set; would be 17+ years old by 2010

4. NICMOS Cooling System (NCS) - under study and development for potential flight in SM3/1999; very low cost approach (\$6-10M) to extend HST near-IR capability essentially indefinitely

5. Cosmic Origins Spectrograph (COS) - extends HST faint-source UV spectroscopy beyond any prior capability; selected via AO process for flight in SM4/2002; limited backup to STIS UV MAMA channels; low cost instrument, utilizing returned GHRS flight hardware and design heritage plus detector design and grating technology previously developed for FUSE

6. Wide Field Camera 3 (WFC3) utilizes returned WFPC1 flight hardware, spare CCD detectors from the ACS program and NICMOS mechanism design heritage; will be developed as a facility instrument to fly in SM4/2002; serves as a newer, more reliable backup to ACS and will continue to provide unique imaging science complementary to ACS.

7. Low-Cost Operations - new HST ground system (Vision 2000) currently under development, with some elements already being phased into operation; exploits process improvements and efficiencies plus capabilities of new spacecraft 486 computer (flying on SM3/1999), to dramatically reduce costs of HST operations; no further on-orbit servicing