

Perspective

Steven Beckwith

~~The loss of the space shuttle Columbia reminded us just how perilous human spaceflight still is.~~ We had almost come to take for granted the precision with which NASA launches astronauts into orbit and brings them safely back home. The fiery breakup of Columbia over Texas showed us how daring each mission really is.

On April 24, 1990, STS-31 carried the Hubble Space Telescope aloft to begin its mission of astronomical discovery. The flawed mirror, discovered only after it was in orbit, would have doomed any telescope that could not be serviced. Yet in December 1993, astronauts aboard STS-61 went back to fix the observatory and make it the superlative instrument that it is today.

~~Hubble has N~~not only has Hubble delivered images of the universe that captivate the entire world; it has kept getting better as NASA has installed new instruments in subsequent servicing missions. In February 1997, STS-82 brought up the infrared camera, NICMOS, and the advanced spectrograph, STIS. In December 1999, STS-103 refurbished Hubble's guidance system and computers. They In March 2002, STS-109 installed the Advanced Camera for Surveys (ACS) ~~last March after STS 109~~ and revived NICMOS, ~~thanks to the installation of with~~ a novel cooling system. This feat recalled memories of the historic mission in 1993 to fix the telescope itself.

Hubble has become an icon of scientific progress and technical innovation, and its's scientific impact continues to grow, at an even faster pace than in the past.

~~W~~Our telescope has become a world icon for scientific progress.

~~Where~~ would astronomy be ~~today~~ without a shuttle program ~~or astronauts and astronauts to repair and upgrade Hubble?~~ We would not have the Hubble Deep Field. ~~N~~or the ~~precise measurements of distances to~~ high-redshift supernovae ~~to make~~making a ~~compelling~~the case for dark energy. ~~Nor,~~ the images of circumstellar disks ~~that make~~making planet formation credible. ~~Nor,~~nor the first detection of ~~sodium in~~ the atmosphere of an extrasolar planet. ~~The~~We could not visualize the awesome images of Eagle Nebula, the auroras on Jupiter and Saturn, nor the rings around SN1987a, ~~and~~and ~~we would not know~~ the measurement value of the Hubble constant with from Cepheids in Virgo galaxies ~~would not be part of our consciousness.~~ ~~Indeed, w~~Without the shuttle astronauts, we would not have had the ten years of compelling images this window on the universe at all.

~~But—~~thanks to STS-31, STS-61, STS-82, STS-103, and STS-109—Hubble exists, and all it has accomplished is real. Today, Hubble is the world's most recognized and admired scientific instrument. It has helped And astronomy is become the foremost science in the public interest ~~that have made astronomy a dominant science in public interest—a~~

~~curiosity-driven science, with a gift for educating and inspiring. yet offering no material improvement to people's lives.~~

~~The astronauts restored and improved Hubble to create one of the world's most recognized and admired scientific instruments, exciting people worldwide are excited to be learning about~~ where the universe came from and what it is all about.

~~We have~~Hubble has accomplished ~~these great things~~so much—and will accomplish so much more—because astronauts are willing to risk their lives for science, for a telescope. We are grateful that they go into space to improve our lives—and civilization and our culture—~~throughby enabling the~~ discovery and of new knowledge. We are both proud of and humbled by their courage ~~to journey to space on and purpose~~our behalf, and we, and we ~~shall~~will always remember their sacrifices they make when we think of Columbia's last crew. ~~We shall never forget the images of Columbia as it broke up on a clear winter day trying to get back home.~~