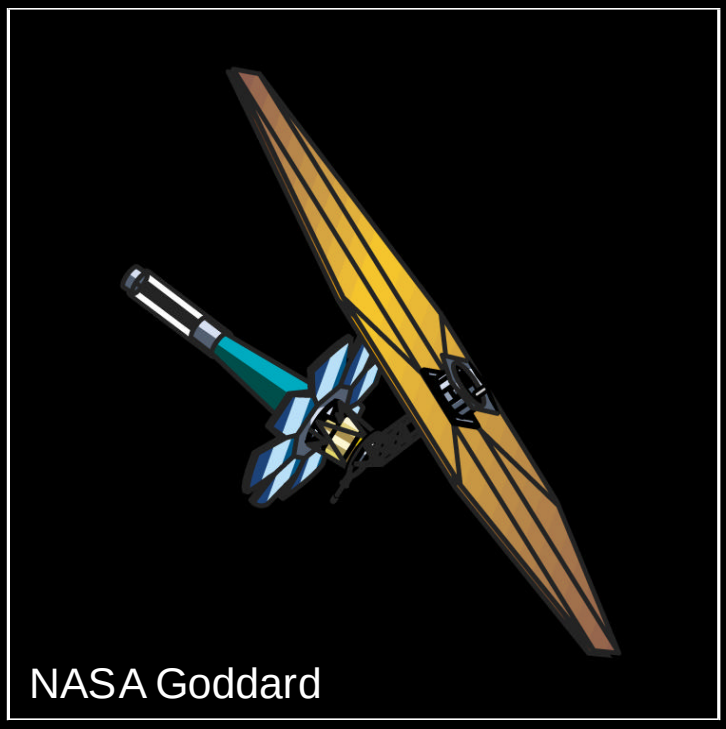
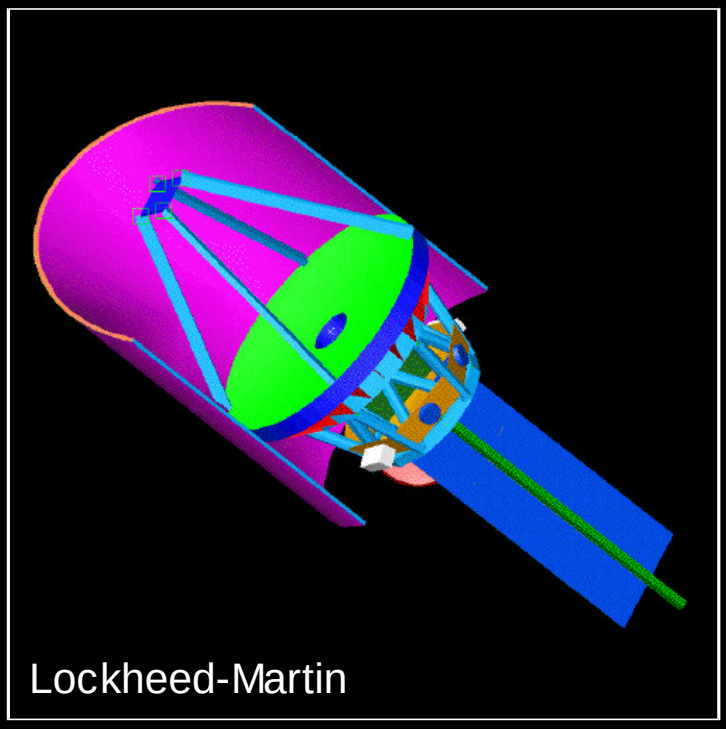
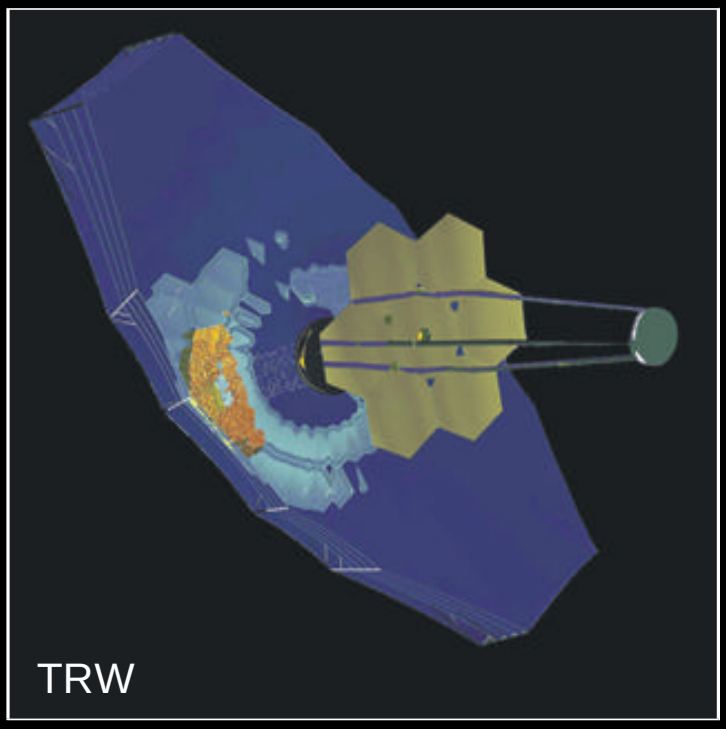


NASA Goddard

Ball Aerospace



Lockheed-Martin



TRW

Proposed Designs for
Next Generation Space Telescope

PRC98-20• ST ScI OPO• June8,1998• NASA

Hubble Space Telescope
NEWS

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PROPOSED DESIGNS FOR NEXT GENERATION SPACE TELESCOPE

Here are brief descriptions of the four designs NASA is considering for the Next Generation Space Telescope (NGST).

Upper left: The Goddard Space Flight Center-led team developed this lightweight design for NGST. It incorporates many of the features found in the other designs: a deployable, 26-foot-wide (nearly 8 meters) primary mirror, a large deployable sunshade to shield the optics, and an orbit 930,000 miles (1.5 million kilometers) from Earth at the L2 Lagrangian point, a balancing point between the gravitational tug of the Earth and the Sun. The spacecraft has a deployable sunshade, an umbrella that will keep the telescope chilled -370 degrees Fahrenheit to -298 degrees Fahrenheit, which allows it to see the faint infrared glow of distant objects. With this design, the telescope can view about 40 percent of the sky at any time.

Upper right: This design by Ball Aerospace features four widely separated sunshields that are effective in reducing the temperature of the telescope optics and the science instrument compartment. The deployable primary mirror is mounted on three hinged slices of a 26-foot (8 meters) circular structure. By rolling the spacecraft so that the sunshade is always perpendicular to the Sun, the telescope can view half of the sky. The Ball model is designed for launch to L2 or similar orbits.

Lower left: This Lockheed-Martin design emphasizes simplicity and features a monolithic, 20-foot-wide (6 meters) primary mirror and rings of metal shields. The telescope would be launched into a highly elliptical orbit around the Sun. The elliptical orbit would take the telescope beyond Mars and almost to the inner portions of the asteroid belt. At this distance from the Sun, scattered sunlight and infrared light from dust in our solar system is 10 to 30 times dimmer than what is seen by orbiting spacecraft near Earth. The large deployable solar array is required to provide sufficient power for the spacecraft and communications when it is far from the Sun.

Lower right: Based on a proven technology for deploying large microwave antennae, the TRW design uses six hexagonal mirrors (10 feet or 3 meters between edges), which are stacked above a seventh central hexagonal mirror and are deployed and locked once the spacecraft reaches the L2 orbit. Like the Ball design, the TRW telescope can point to any target over more than half of the sky. The TRW sunshade design features many shields that are deployed with masts and wires.

Credit: NASA

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