National Aeronautics and Space Administration

ORIGINS Space Telescope

Seeing Beyond the Light

Following the rise of dust and metals in galaxies and the path of water across cosmic time to Earth and other habitable planets

Tracing the Signatures of Life and the Ingredients of Habitable Worlds

The Origins Space Telescope will map the trail of water through all stages of star and planet formation and characterize the atmospheres of potentially habitable worlds.

Unveiling the Growth of Black Holes and Galaxies over Cosmic Time

The Origins Space Telescope will reveal powerful starbursts and buried black holes, energetic feedback, and the dynamic interstellar medium from which stars are born.

The Origins Space Telescope will trace the rise of metals in thousands of galaxies to z~10, probe the first sources of cosmic dust and signatures of the earliest stars, and the birth of galaxies.

Charting the Rise of Metals, Dust, and the First Galaxies

The Origins Space Telescope will chart the role of comets in delivering water to the early Earth, and survey thousands of ancient Trans-Neptunian Objects at distances greater than 100 AU and down to sizes of less than 10 km.

Characterizing Small Bodies in the Solar System

The **Origins Space Telescope** is the mission concept for the **Far Infrared Surveyor** developed through a community-led study sponsored by NASA in preparation for the *2020 Astronomy and Astrophysics Decadal Survey*.

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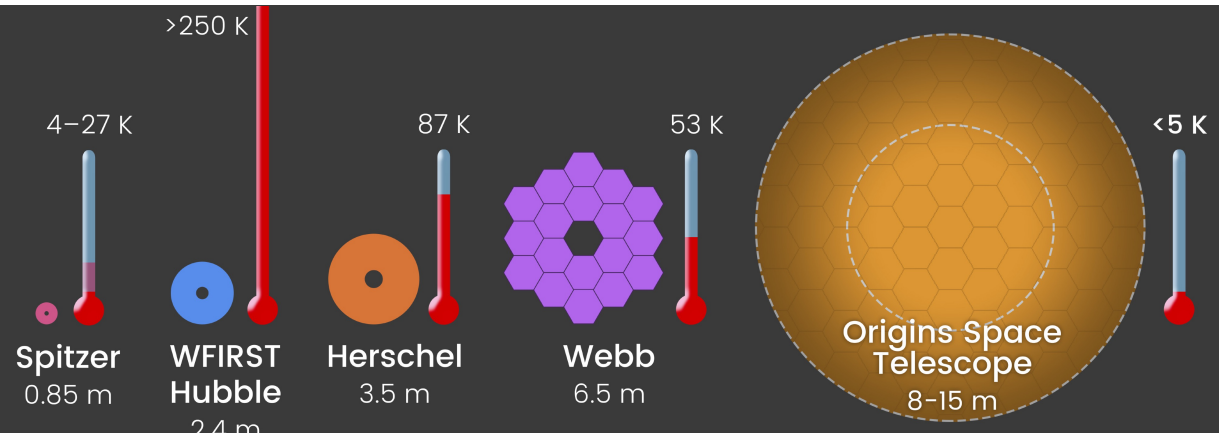
Capabilities & Characteristics

Origins will be an actively cooled telescope covering the infrared spectrum. Spectrographs and imagers will enable 3D surveys and discover and characterize distant galaxies, exoplanets, and the outer reaches of the Solar System. We would like to hear from you. Contact us at:

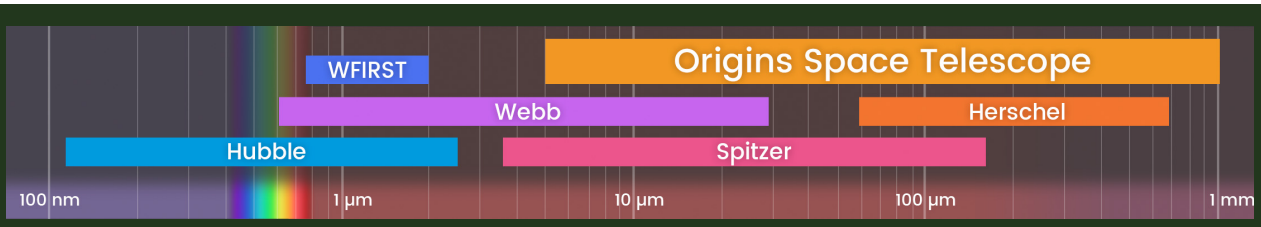
email: **OST_info@lists.ipac.caltech.edu** *twitter:* **@NASAOriginsTele**
web: **origins.ipac.caltech.edu** • *asd.gsfc.nasa.gov/firs*



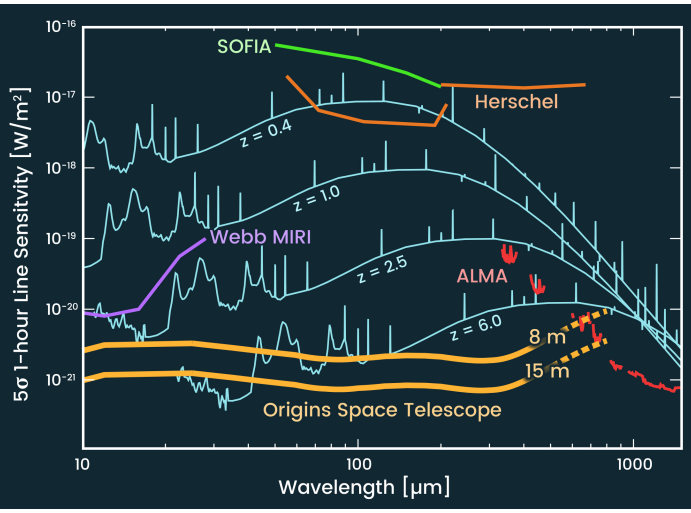
Actively-Cooled Large Aperture

Will attain sensitivities 100–1000x greater than any previous far-infrared telescope

Potential Wavelength Coverage from 5 μm–1 mm

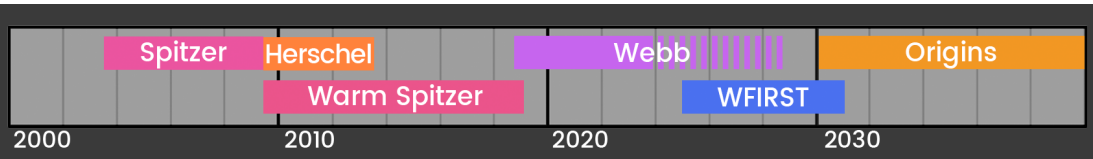


Enables observations of biosignatures in the atmospheres of transiting Earth-like planets, mid- and far-infrared diagnostic lines in galaxies out to redshifts of 10, and characterization of water from the Solar System to the ISM.



Unprecedented Sensitivity

Fast mapping speed with hundreds or thousands of independent beams will enable 3D surveys of large areas of sky, pushing to unprecedented depths to discover and characterize the most distant galaxies to the outer reaches of our Solar System.



Timeline of IR Space Telescopes

FS-2016-10-503-GSFC