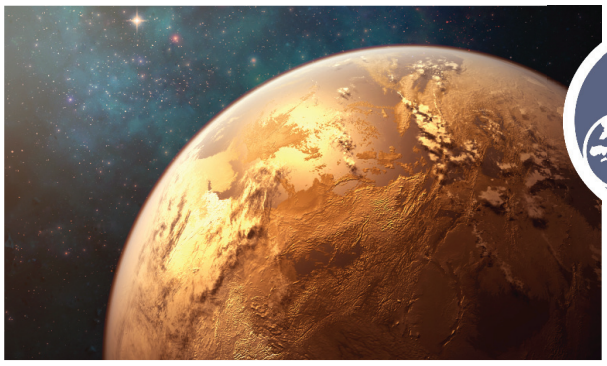
HabEx

HABITABLE EXOPLANET OBSERVATORY

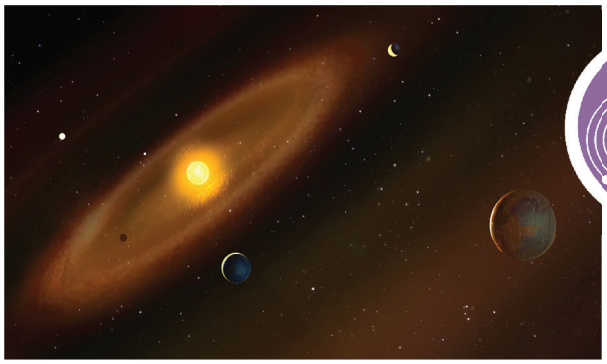
EXPLORING PLANETARY SYSTEMS *AROUND NEARBY SUNLIKE STARS AND ENABLING OBSERVATORY SCIENCE FROM THE UV THROUGH* ***NEAR-IR***

www.jpl.nasa.gov/habex/



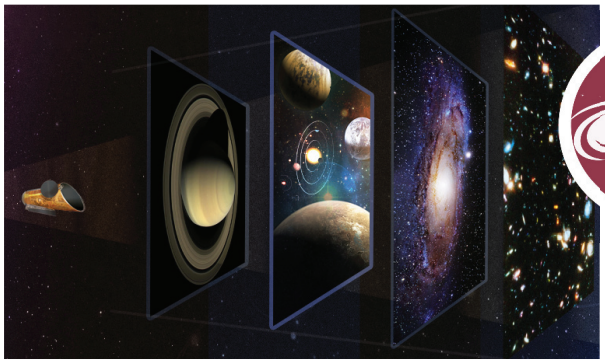
GOAL 1

To seek out nearby worlds and explore their habitability, *HabEx* would search for habitable zone Earth-like planets around sunlike stars using direct imaging and spectrally characterize promising candidates for signs of habitability and life.



GOAL 2

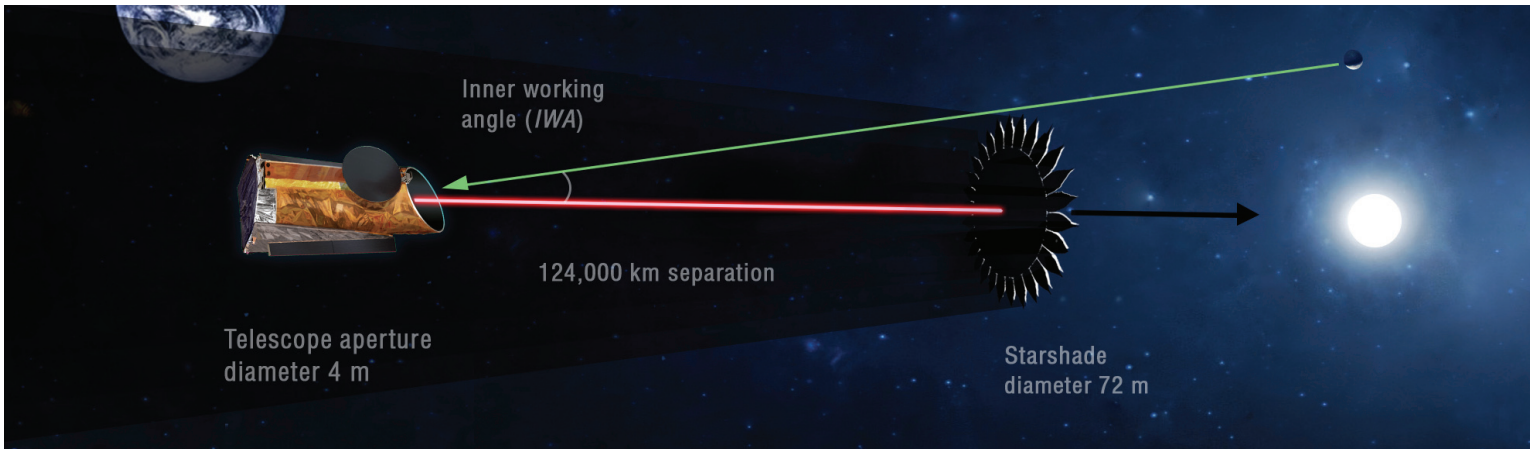
To map out nearby planetary systems and understand the diversity of the worlds they contain, *HabEx* would take the first "family portraits" of nearby planetary systems, detecting and characterizing both inner and outer planets, as well as searching for dust and debris disks.

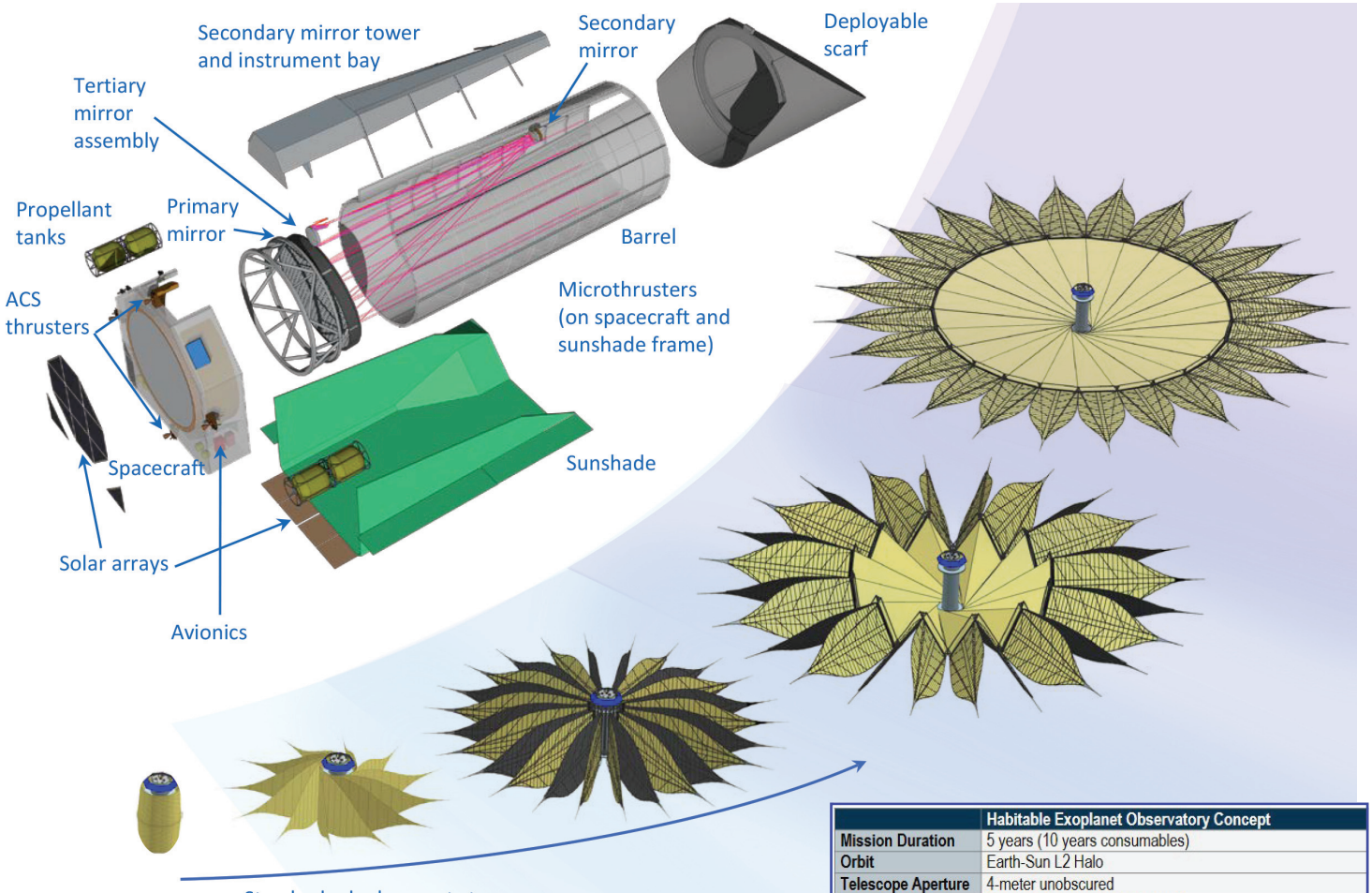


GOAL 3

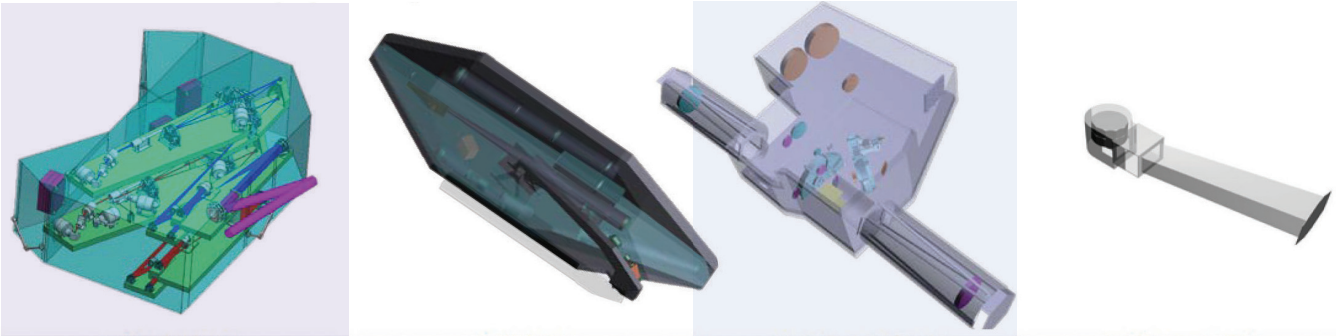
To enable new explorations of astrophysical systems from our solar system to galaxies and the universe by extending our reach in the UV through near-IR, *HabEx* would have a community-driven, competed Guest Observer program to undertake revolutionary science with a large-aperture, ultra-stable UV through near-IR space telescope.

The HabEx concept design relies on demonstrated, yet cutting edge, technologies wherever possible, which enables world-leading science in the 2030s while limiting risk and cost.





	Habitable Exoplanet Observatory Concept
Mission Duration	5 years (10 years consumables)
Orbit	Earth-Sun L2 Halo
Telescope Aperture	4-meter unobscured
Telescope Type	Off-axis three-mirror anastigmat
Primary Mirror	4-meter monolith; glass-ceramic substrate; Al+MgF2 coating
Instruments (4)	Exoplanet science: Coronagraph, Starshade Observatory science: UV Spectrograph, Workhorse Camera
Attitude Control	Slewing: hydrazine thrusters; Pointing: microthrusters



	Coronagraph	Starshade	Workhorse Camera	UV Spectrograph
Purpose	Exoplanet imaging and characterization	Exoplanet imaging and characterization	Multipurpose, wide-field imaging camera and spectrograph for general astrophysics	High-resolution, UV spectroscopy for general astrophysics
Instrument Type	Vortex charge 6 coronagraph with: - Raw contrast: 1×10^{-10} at IWA - Δmag limit = 26.0 - 20% instantaneous bandwidth Imager and spectrograph	72 m dia starshade occulter with: - 124,000 km separation - Raw contrast: 1×10^{-10} at IWA - Δmag limit = 26.0 - 107% instantaneous bandwidth Imager and spectrograph	Imager and spectrograph	High-resolution spectrograph
Channels	Vis, Blue: 0.45–0.67 µm Imager + IFS with R = 140 Vis, Red: 0.67–1.0 µm Imager + IFS with R = 140 NIR: 0.95–1.8 µm, Imager + slit spectrograph with R = 40	UV: 0.2–0.45 µm Imager + grism with R = 7 Vis: 0.45–1.0 µm Imager + IFS with R = 140 NIR: 0.975–1.8 µm Imager + IFS with R = 40	UV/Vis: 0.15–0.95 µm Imager + grism with R = 2,000 NIR: 0.95–1.8 µm Imager + grism with R = 2,000	UV: 0.115–0.3 µm (20 bands), R = 60,000; 25,000; 12,000; 6,000; 3,000; 1,000; 500
Field of View	FOV: 1.5×1.5 arcsec^2 @ 0.5 µm IWA: 2.4 λ/D = 62 mas @ 0.5 µm OWA: 0.74 arcsec @ 0.5 µm	FOV: 11.9×11.9 arcsec^2 (Vis) IWA: 60 mas (0.3–1.0 µm) OWA: 6 arcsec (Vis)	3×3 arcmin^2	3×3 arcmin^2
Features	64×64 deformable mirrors (2) Low-order wavefront sensing & control	Formation flying sensing & control	Microshutter array for multi-object spectroscopy 2×2 array, 171×365 apertures	Microshutter array for multi-object spectroscopy 2×2 array, 171×365 apertures