

EXO-EARTH DISCOVERY & EXPLORATION NETWORK

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Earths in Other Solar Systems Team / NASA NExSS



Search for Habitable Worlds

~3,700 known exoplanets

~60 habitable zone earth-sized planets known

1 kpc typical distance

**1,000: estimated number of exo-earth candidates
within 15pc (close enough for detailed follow-up)**

Currently known: 4

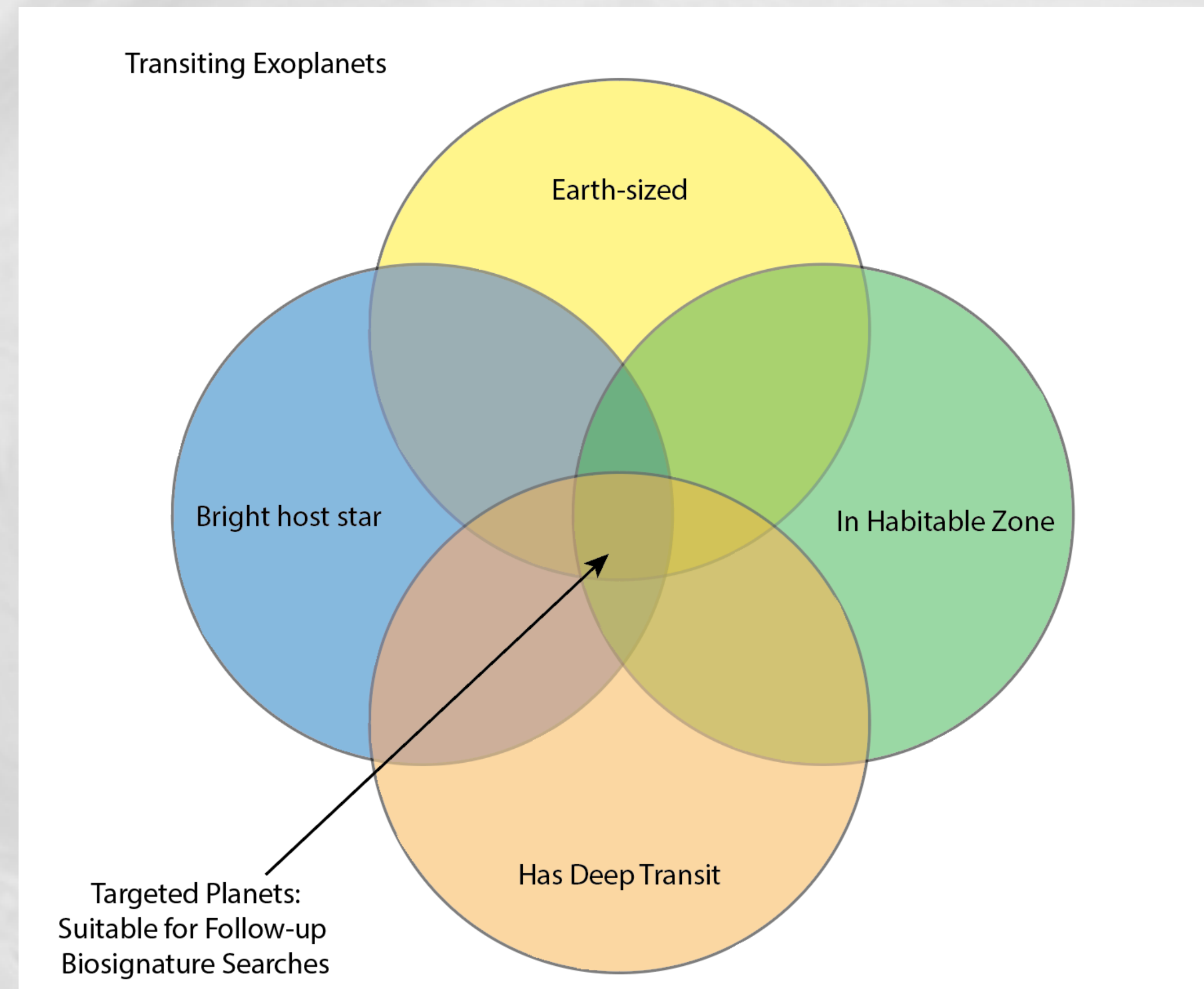
Spectroscopy possible in next 10 years: 1 system



Project EDEN's goal is to discover and characterize habitable planets within 15 pc.

Transit Survey, Radial Velocity, Direct Imaging

EDEN-TS



Citizen science and crowd funding component: <http://project-eden.space>

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The use of existing telescopes with large (1m-2.5m) apertures places us in a very competitive position both for searches for new planets and, from 2020, for confirming/characterizing TESS candidates

EDEN Science Team:

Daniel Apai (PI, Steward/LPL)

Paul Gabor (Vatican Observatory)

Andres Jordan (PU Chile)

David Osip (Carnegie Observatories)

Alex Bixel (Steward Observatory)

Benjamin Rackham (Steward Observatory)

Telescopes tested / being evaluated:

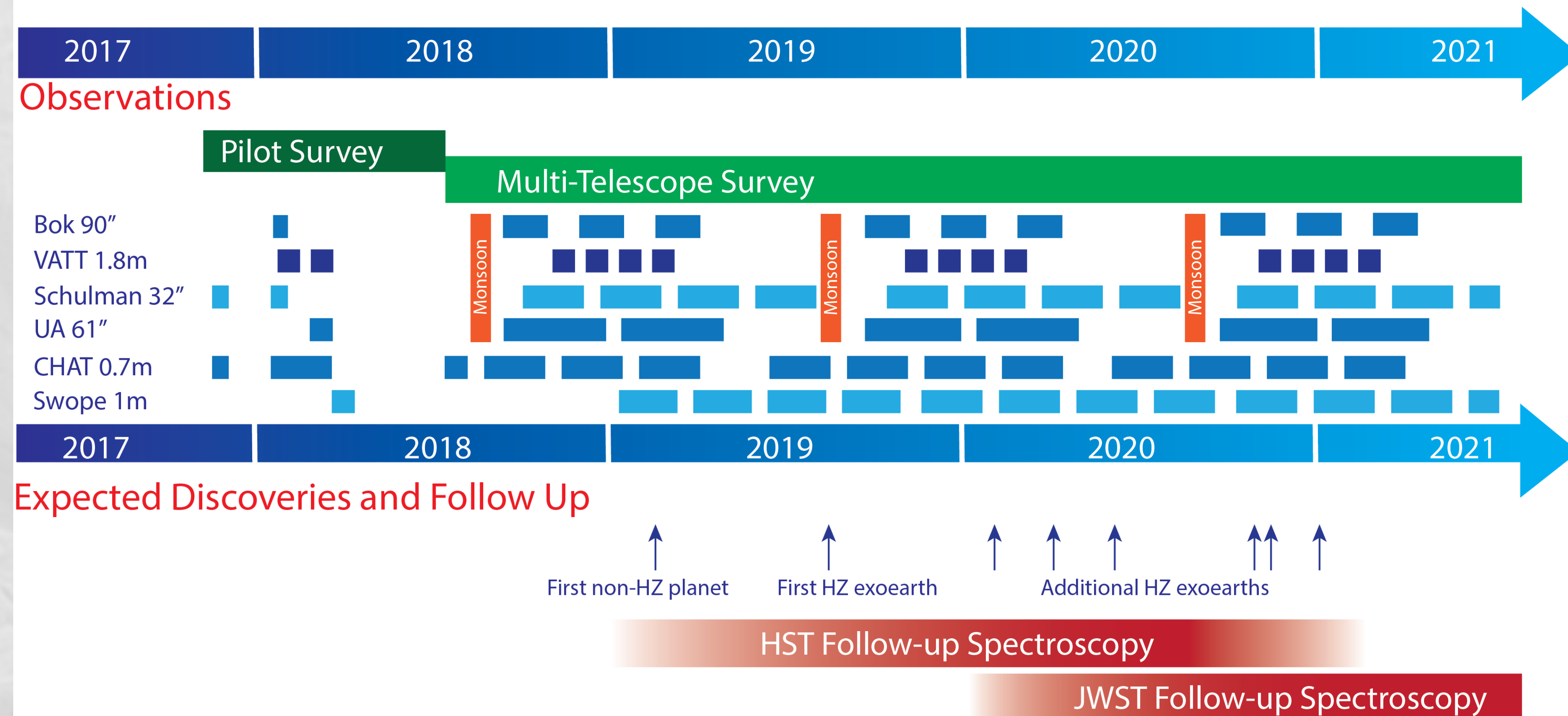
UA 61", Schulman 32", VATT1.8m, CHAT0.7m, Swope 1m, Bok 90", CAHA2.2m

Current Status

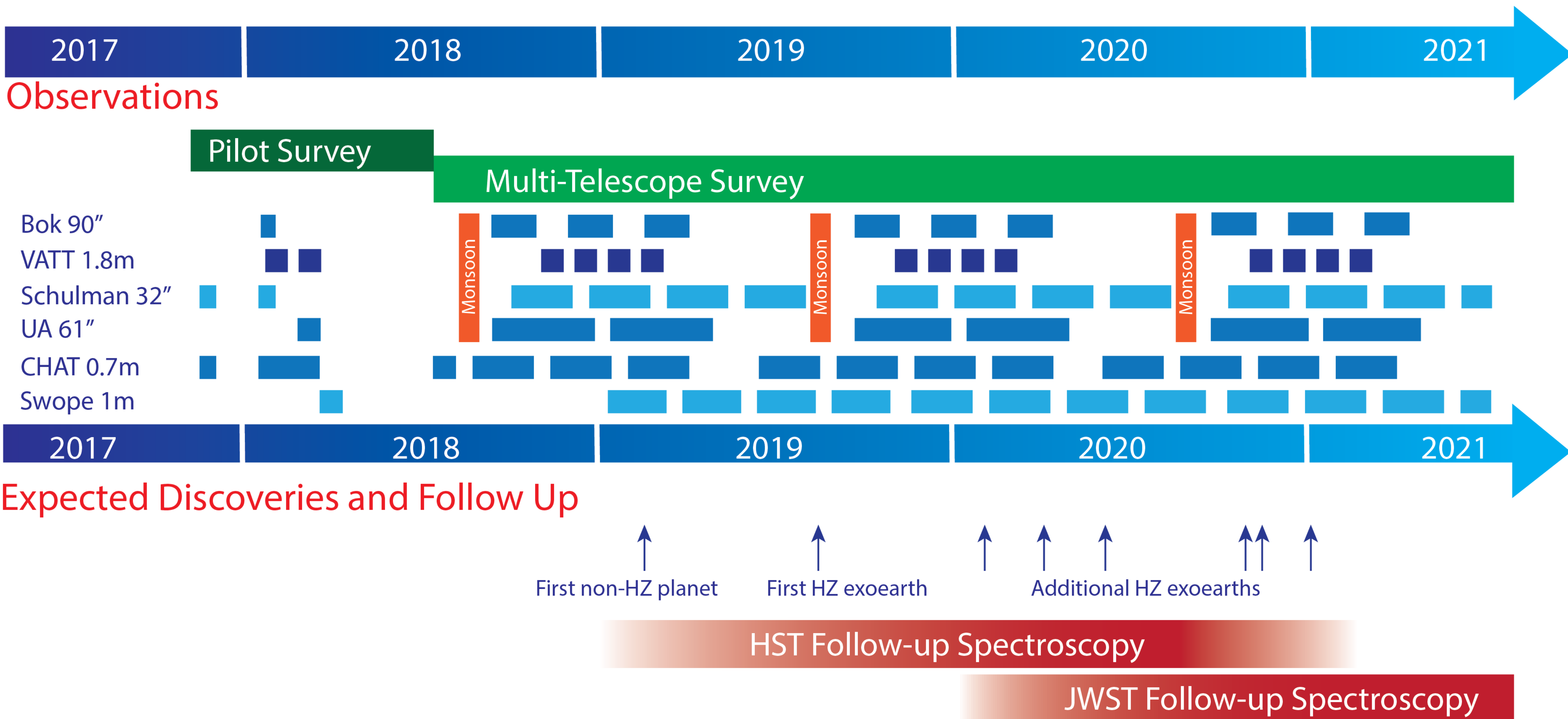
Project and collaboration definition (ongoing)
Automatic pipeline exists
Initial set of telescopes/instruments identified
Pilot study ongoing
Undergraduate student team

Funding being sought from foundations, NASA/NSF
Crowdfunding component being developed

Tentative EDEN Transit Survey Timeline



Tentative EDEN Transit Survey Timeline



Requirements (preliminary)

Telescope apertures between 0.4 and 2m (target stars $I=10-18$ mag)

Precise guiding/tracking (keeping targets on the same pixel)

Num. Nights: $\sim 1,000$ (for three years operation)

95% of time flexible scheduling (transit search);

5% of time: time-critical observations (transit verification, follow-up)

Typical obs. block length: 3 hours (minimum useful: 2h)

Red-sensitive CCD or NIR camera

Photometry only - single filter sufficient (R, I, z', or custom I+z')

Preferred:

Autonomous operation (smart scheduler) / robotic operation (scripted) / remote operations

