

SAG17 Final: Community Resources Needed For K2 And TESS Planetary Candidate Confirmation

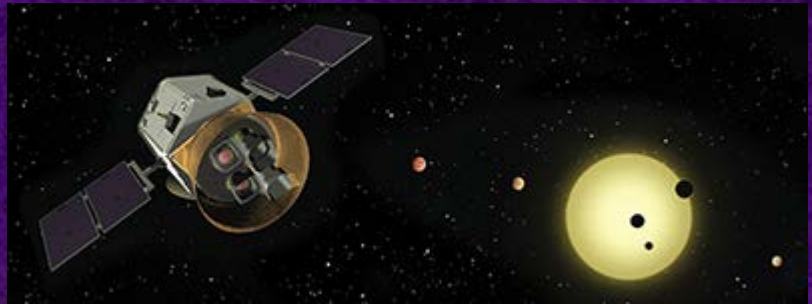
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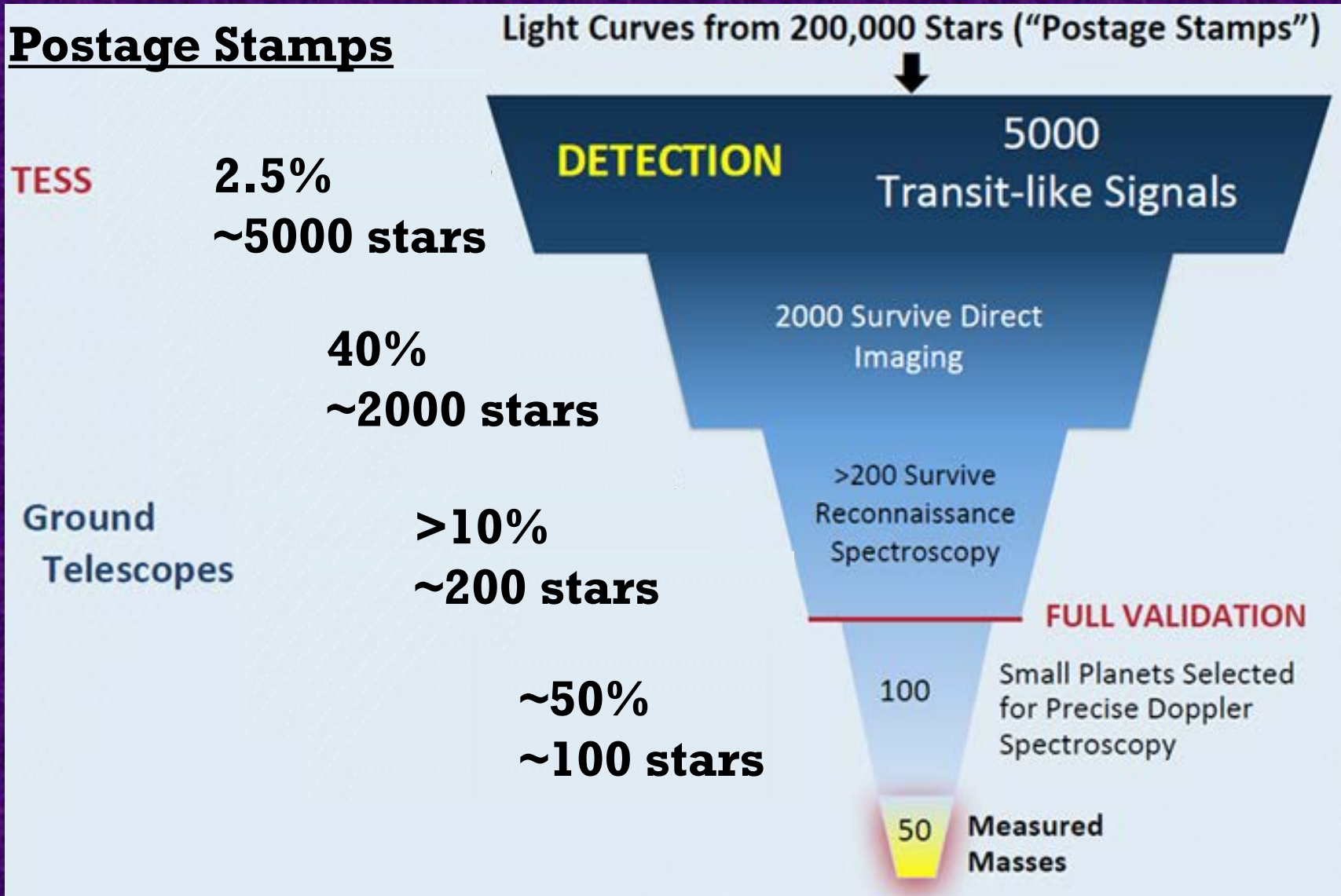
2018 July 29



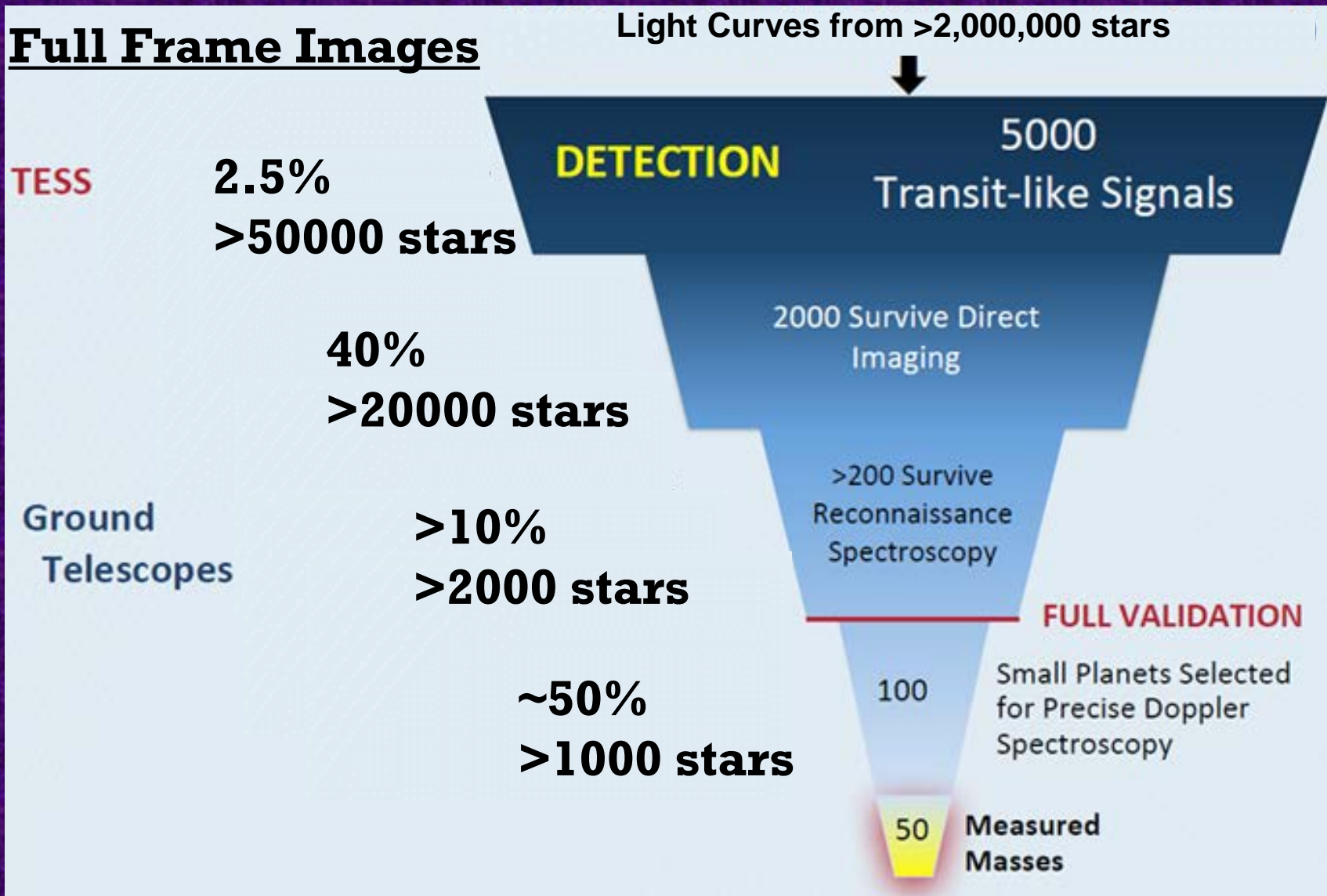
SAG17 Charter

- Identify needed follow-up observations for K2 and TESS
 - Imaging: Seeing-limited and High Spatial resolution
 - Spectroscopy: Stellar parameters and radial velocity
 - Photometric Time – series
- Identify resources available to the US community
 - Telescopes and Instruments (space and ground)
 - Estimate available time
 - Financial
- Identify how archival resources can be utilized
- Identify how the community and resources can be organized
 - TESS FFIs analyzed, candidates identified, and candidates prioritized
 - Community communication – lessons learned from Kepler and K2

Expected Number Requiring Follow-Up



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Minimum Number of Telescope-Hours

Observing Technique	Typical Telescope Size	Number of Postage Stamp Candidates	Hours Needed for Postage Stamp Candidates	Number of Full Frame Image Candidates	Hours Needed for Full Frame Image Candidates
Seeing-Limited Time Series Photometry	< 1.0 m	~5000	~5000 – 10,000	>50,000	>50,000 – 100,000
Stellar Spectroscopy	1 – 4 m	~2000	~1000	>20,000	>10,000
High Resolution Imaging	1 – 10 m	~2000	~1000	>20,000	>10,000
Precision Radial Velocity	1 – 10 m	~200	~2000	~2,000	>10,000

What US Public Resources are available?

- Most resources are private with limited or no access to the community
- Seeing-Limited Imaging Observation: 0.5 - 1.0 m telescopes
 - NOAO/LCO: North: 1m telescope network
 - NOAO/LCO: South: 1m telescope network
 - NOAO/WIYN: 0.9m Half-degree imager
 - NOAO/SMARTS: CTIO 1.3m and 0.9m
- Reconnaissance Spectroscopy: 1 - 4m telescopes
 - NOAO: CTIO Blanco 4m - COSMOS (Opt: R~2200), ARCoIRIS (IR: R~3000)
 - NOAO/SMARTS: CTIO 1.5m - CHIRON (Opt: R~80,000)
 - NOAO: SOAR 4m - Goodman (Opt: R~ 2000 - 14,000), OSIRIS (IR: R~3000)
 - NASA: IRTF 3m - SpeX (IR: R~2000), iShell (IR: R~75000)

What US Public Resources are available?

- Most resources are private with limited or no access to the community
- High Resolution Imaging Observation: 4 – 10m telescopes
 - NOAO: Gemini-N 8m – NIRI (NIR AO), 'Alopeke (Opt Speckle)
 - NOAO: Gemini-S 8m – GSAOI (NIR AO), DSSI/Zorro (Opt Speckle), GPI (NIR)
 - NOAO: SOAR 4m – SAM (AO system in front of optical and NIR camera)
 - NOAO: WIYN 3.5m – NESSI (Opt Speckle)
 - NASA: Keck 10m – NIRC2 (NIR AO)
- Precision Radial Velocity: 1 – 10 m telescopes
 - NASA: Keck 10m – HiRES (Opt)
 - NOAO: CTIO 1.5m – SMARTS/CHIRON
 - [NASA: IRTF 3m – *iShell* (NIR)]
 - [NASA/NOAO: WIYN 3.5m – *NEID* (opt)]
 - [NOAO: AAT 4m – *veloce* (opt)]

Report Submitted to ExEP

- Ground-based observations are a critical component to success of the transit missions. Without the ground-based observations, the scientific goals of the missions can not be met. As such, the ground-programs are as significant to the missions as the spacecraft themselves.
- Ground-based telescope resources are necessary to validate, confirm, and characterize exoplanets. Resources include a suite of telescopes spanning 1-m class through the 10-m class and capabilities must include a suite of instruments that enable wide-field imaging, high angular resolution imaging, spectrographs with resolutions of a few thousand or greater, and precision radial velocity spectrographs.
- Financial resources to the community to support the necessary ground-based follow-up work of students, postdoctoral scholars, and early-career scientists are needed.