

Contributions of the AAVSO to Year 1 of TESS

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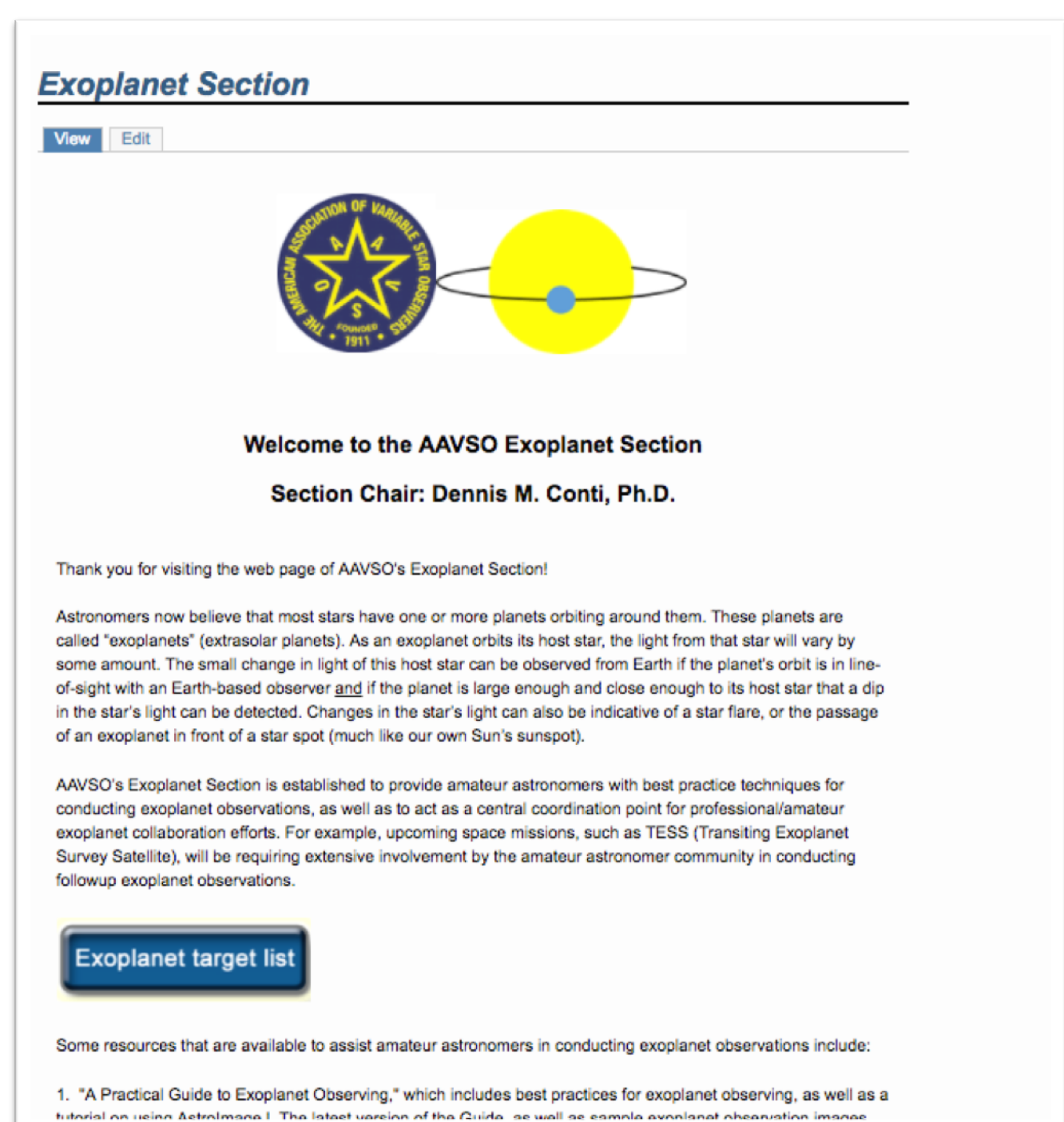
Just as the AAVSO has been the *de facto* home for variable star observers, it now has established itself as the primary organization for promoting, training, and qualifying amateur astronomer participation in exoplanet missions such as TESS. Its members have already contributed to the confirmation of TESS planets and have provided software utilities that are now integral to the TESS confirmation process. This poster discusses these and other contributions that the AAVSO has made to TESS during its first year of operation.

AAVSO Path to TESS Participation:

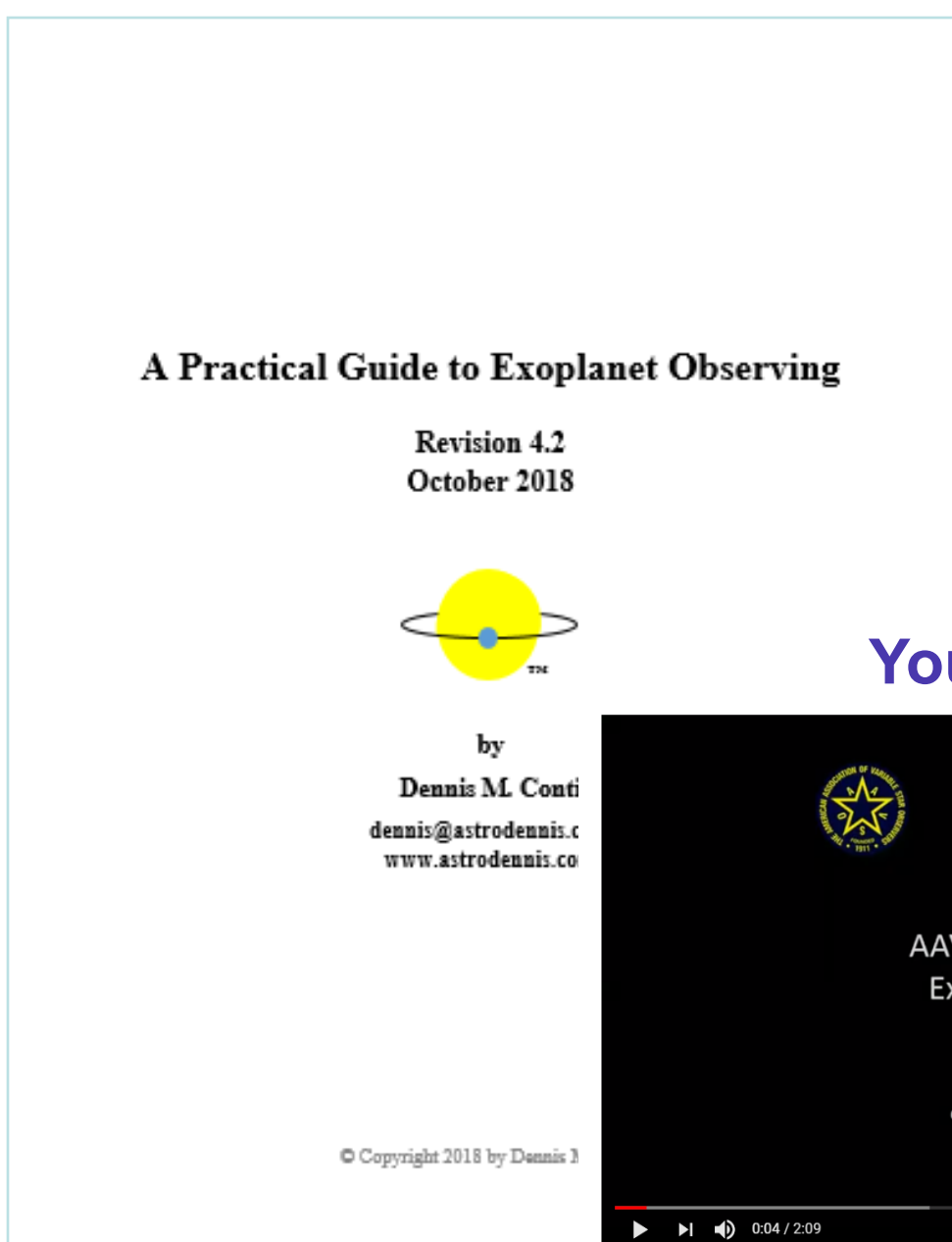
Promotion

Training via Online Courses

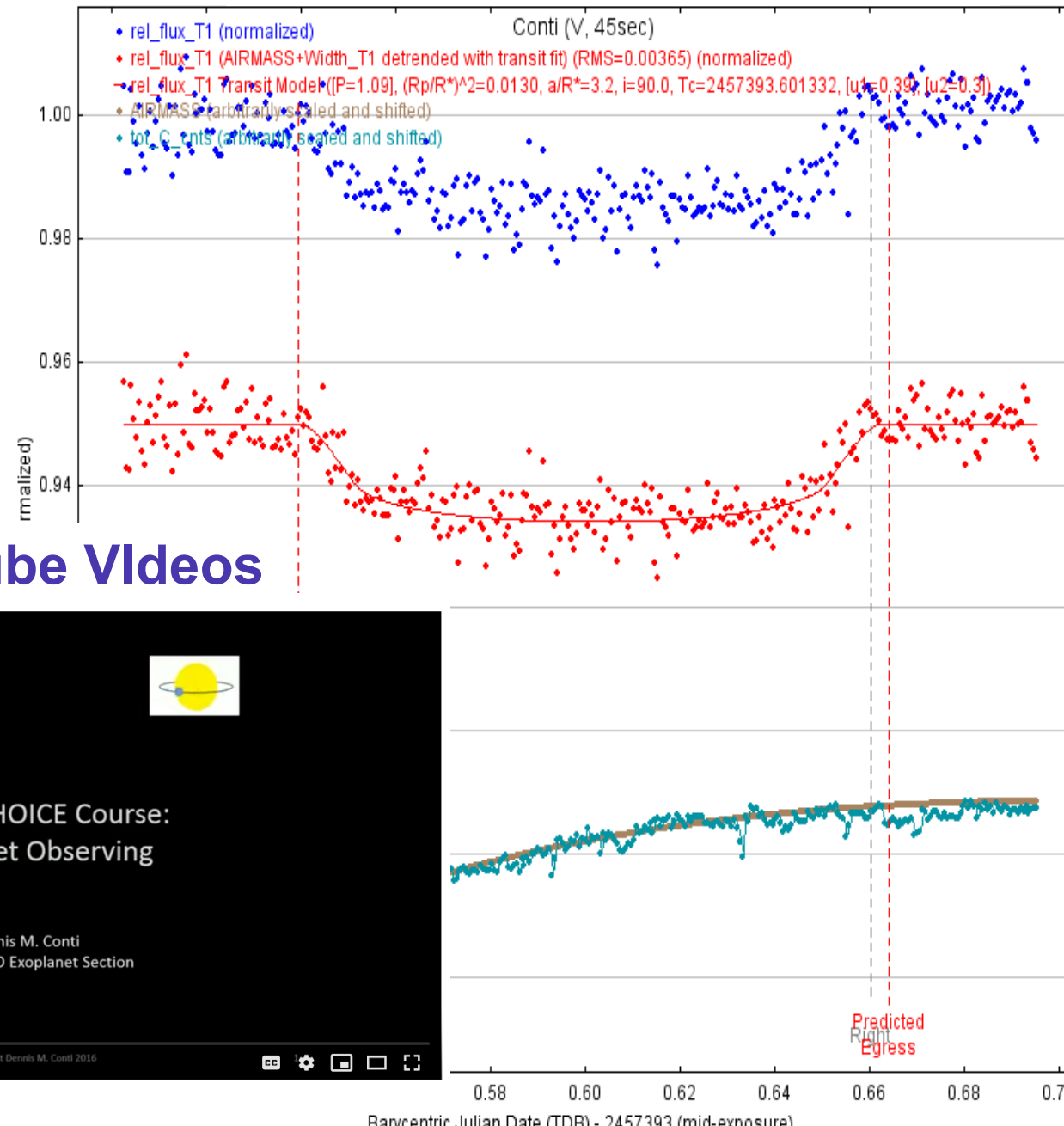
AAVSO TESS Qualification Process



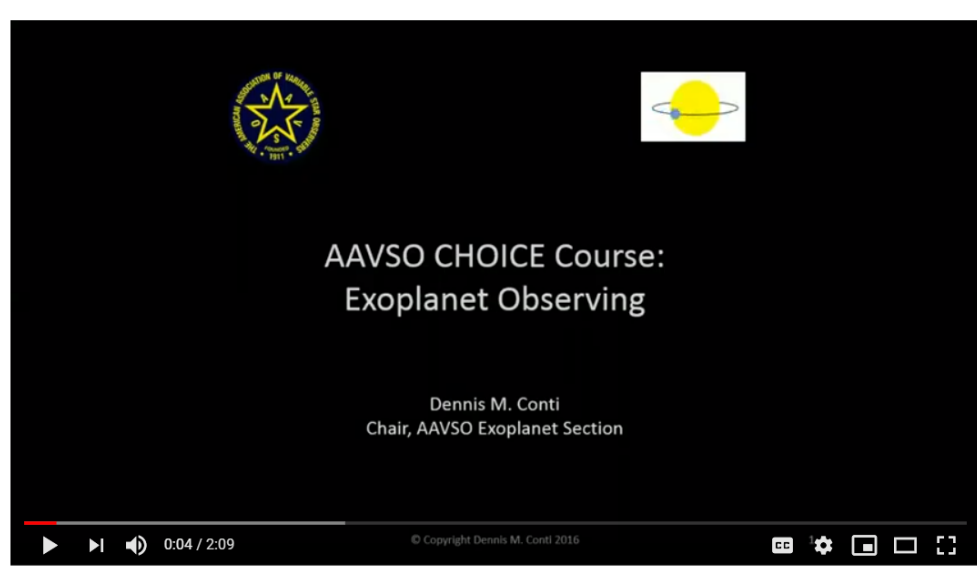
Best Practices



Introduction to AstrolmageJ



YouTube Videos

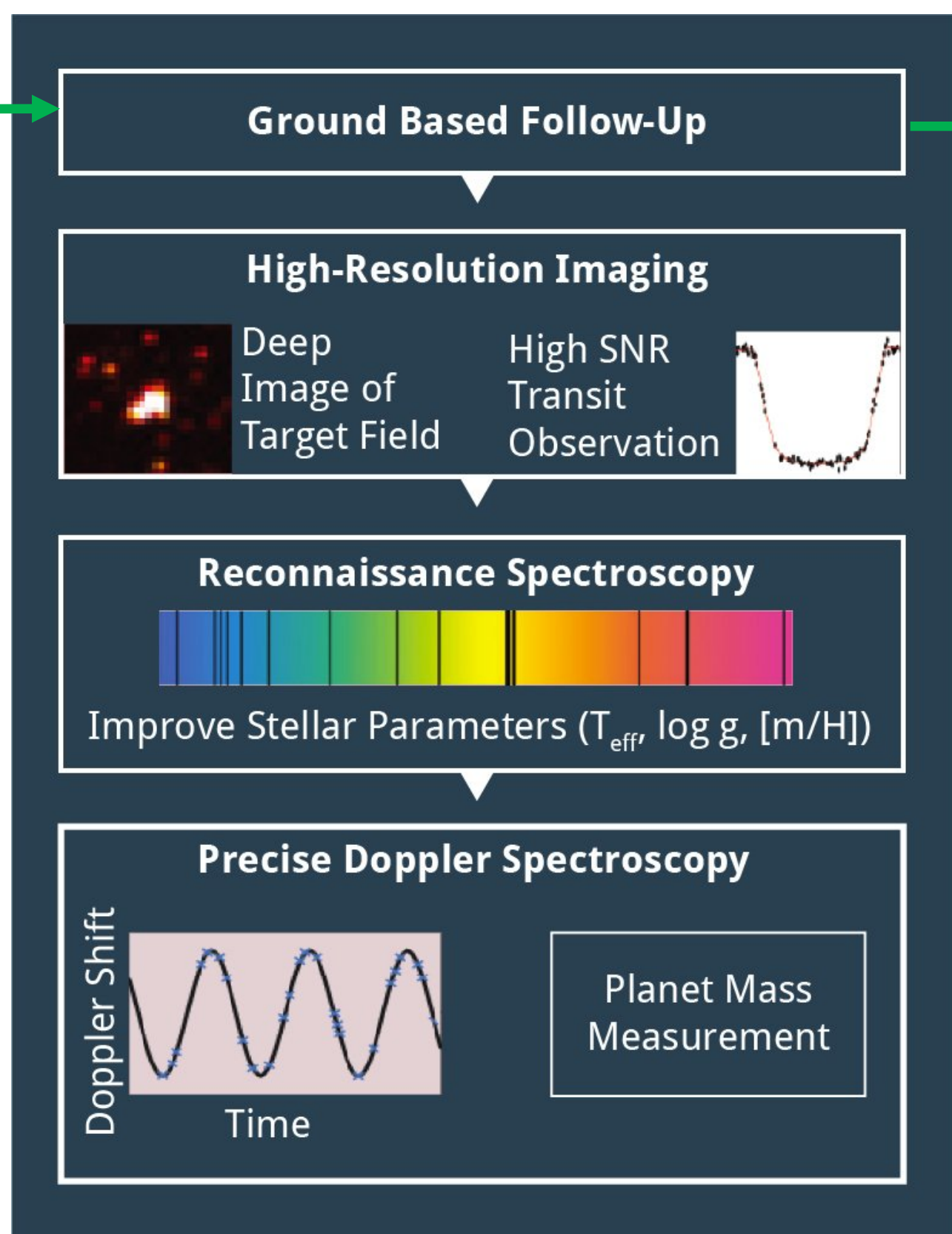


1. Review pertinent documents (false positive detection methods, etc.).
2. Submit sample exoplanet observation.
3. Successfully analyze a simulated TESS observation.
4. Certify compliance with TFOP charter and publication policy.
5. Admission to TFOP SG1 (TESS Follow-up Program, Sub-group 1): Ground Based Follow-Up.

SG1 Ground Based Follow-Up:

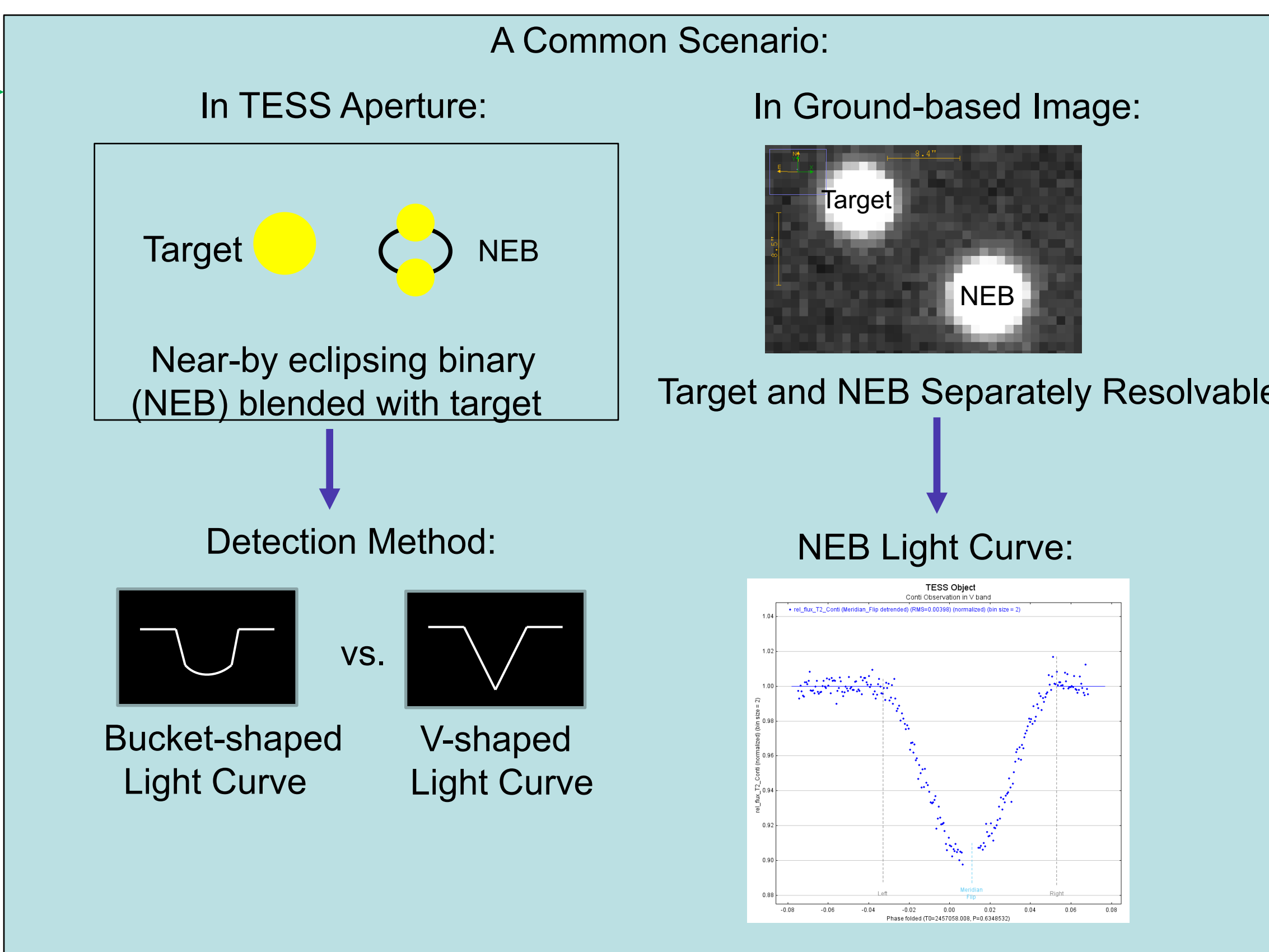
TESS Pipeline

TFOP
SG1



Courtesy: Karen Collins (CfA)

Example: Detection of False Positives (e.g., NEBs)

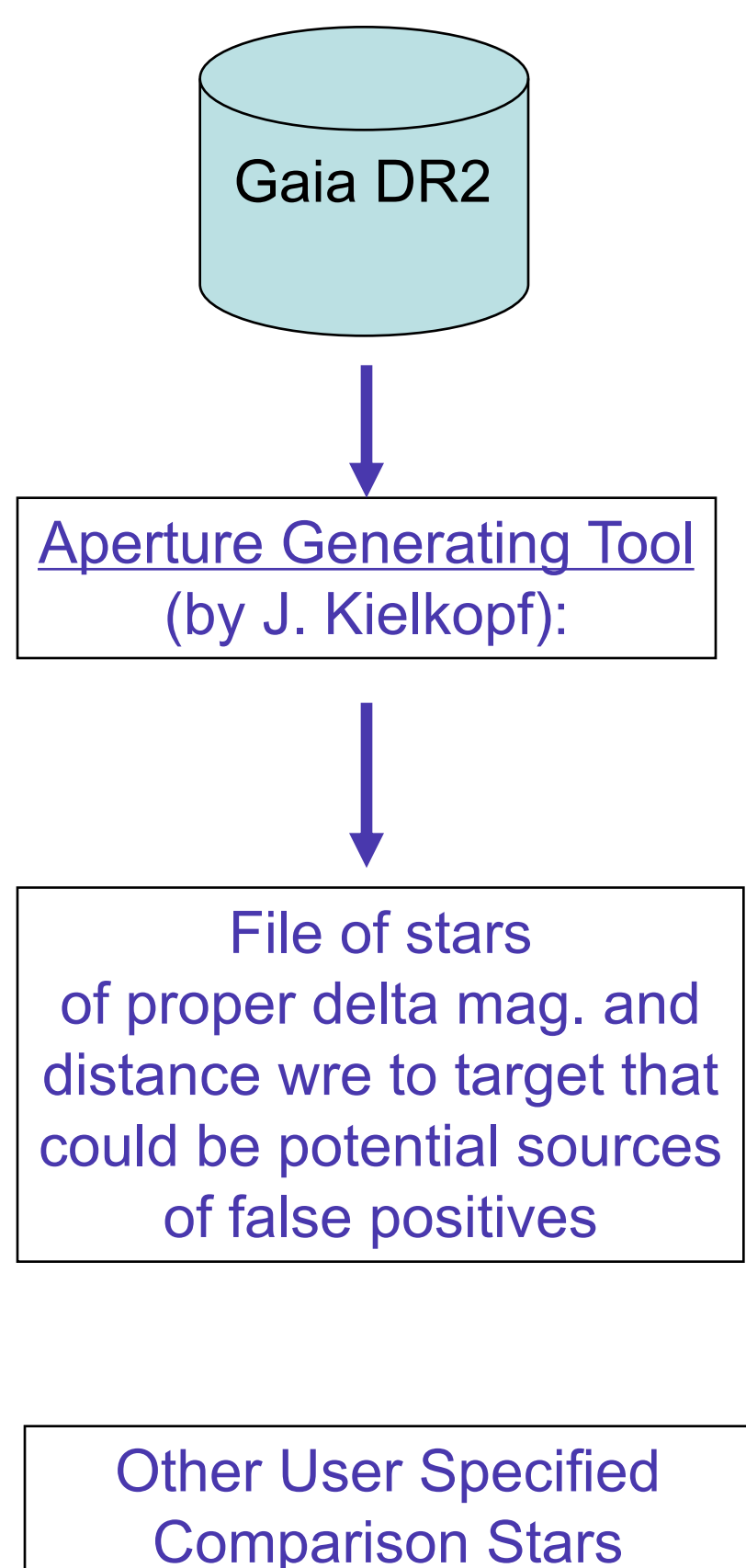


AAVSO Member Contributions To-date

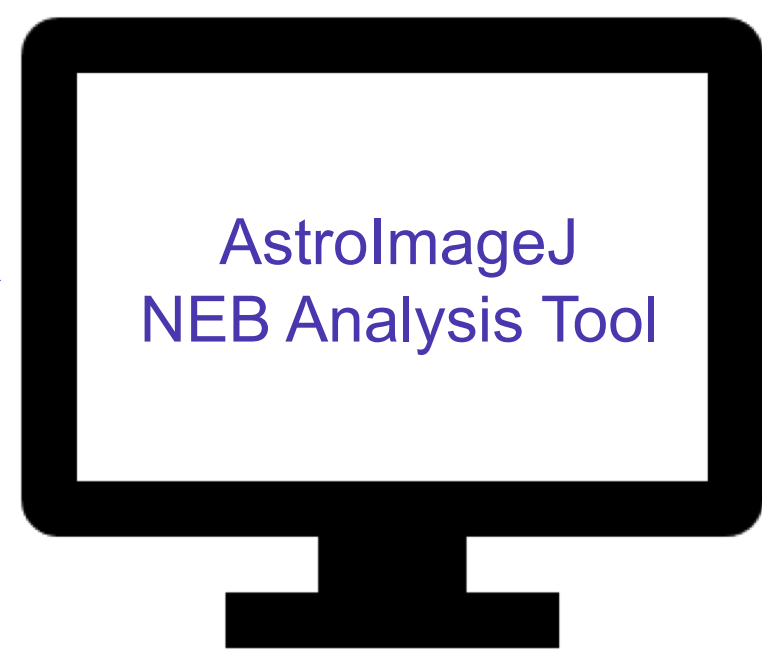
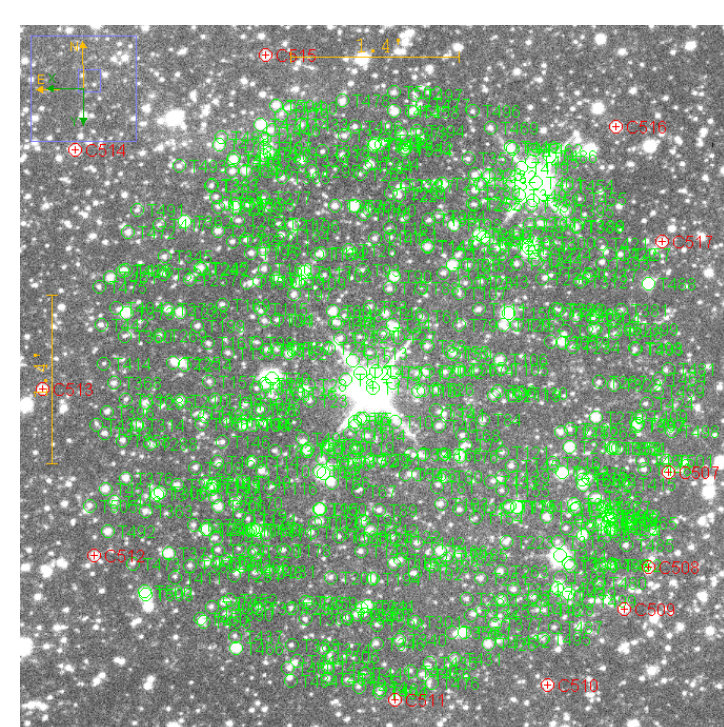
1. During Year 1 of TESS, AAVSO members have participated in numerous detections of false positives, as well as planet confirmations.
2. AAVSO member observations have been included in several TESS planet discovery papers.
3. Important contributions to overall SG1 team by AAVSO Section Chair:
 - a) developed TFOP SG1 Observation Guidelines - includes observation best practices and requirements for data submission to ExoFOP-TESS
 - b) developed an NEB Analysis Tool (see below) being used by SGI lead (Karen Collins) and team members to detect or clear potential sources of false positives.

NEB Analysis Tool:

NEB Analysis Tool Products:



Potential NEBs within 2.5' of target and user-specified comp stars:



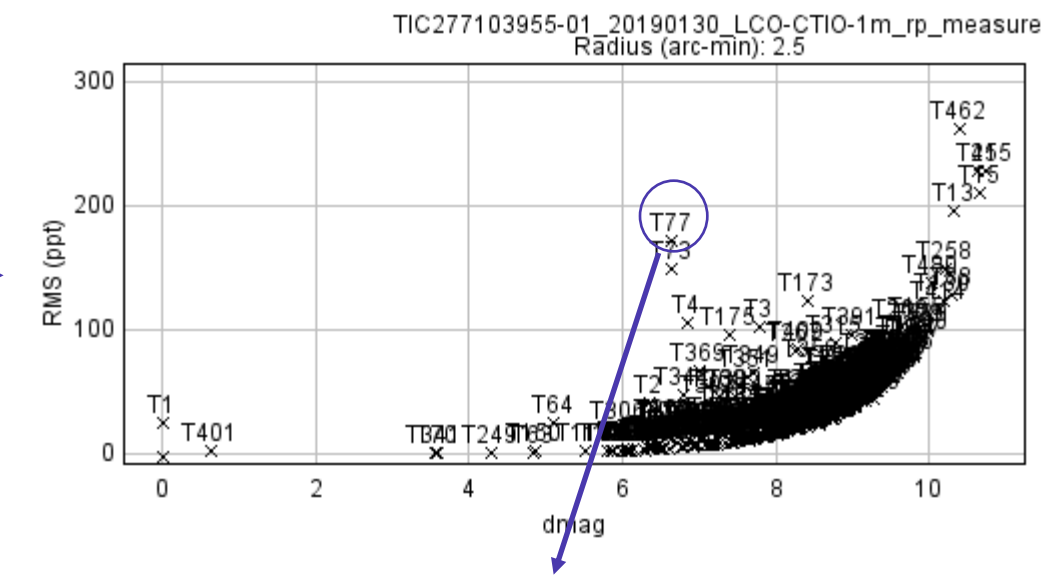
File: SGI_TESS_Vis_Help

Pixel Scale (arc-seconds/pixel): 0.30
Predicted apert. time: 451
Predicted apert. time: 234
Target predicted depth: 180
Target Star: T1
Aperture Radius: 2.5
Number of Observations (obs.): 275.2
Number of Images: 104
Average Exposure Delay Time (sec.): 100.7
Cadence Requested when Calculating RMS (sec.): 100.0
Strong Used when Calculating RMS: 1
Average Aperture Radius: 0.0 (pixels): 1.1 (arc-seconds)
Depth correction factor to account for difference with TESS band: 0.5

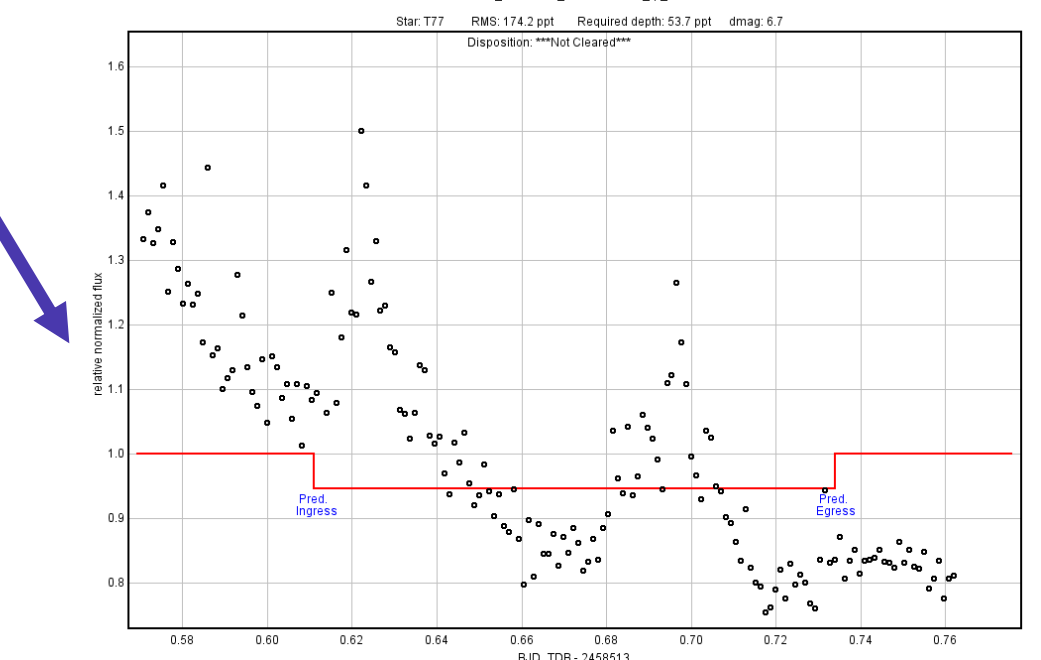
Separation

Star	True Target	RA (deg)	Dec (deg)	Separation (arcsec)	Uncorr. mag (mag)	NEBDepth (mag)	NEBDepth (mag)	Disposition
12	0.18	NA	6.355	41.89	46.0	0.0	***not cleared***	
13	0.18	NA	7.885	384.43	54.0	1.5	***not cleared***	
14	0.18	NA	6.842	387.72	54.0	0.0	***not cleared***	
15	0.18	NA	8.238	25.89	120.0	0.7	Cleared	
16	0.18	NA	7.985	22.88	104.0	0.6	Cleared	
17	0.18	NA	7.393	26.34	100.4	0.6	likely cleared	
18	0.18	NA	8.475	26.52	104.0	0.6	Cleared	
19	0.18	NA	7.848	24.27	101.1	0.7	Cleared	
110	0.18	NA	8.173	41.82	114.4	2.1	Cleared	
111	0.18	NA	8.375	25.88	200.7	0.1	Cleared	
112	0.17	NA	7.064	24.77	70.0	3.4	likely cleared	
113	0.18	NA	10.109	100.78	1100.1	2.8	Cleared-Too Faint	

NEB Table:
Displays disposition of each star: Cleared, Not Cleared, etc.



Plot of RMS vs. Delta Mag.:
Shows outliers that might be potential false positive sources



Individual Star Plots:
Shows light curve of each star relative to depth needed to produce a false positive