Data Validation (DV) Report
for TESS ID 36352297
Sectors 6 - 6

This Data Validation Report was produced in the
TESS Science Processing Operations Center (SPOC) Pipeline
at NASA Ames Research Center

17-Feb-2019 00:20:05 Z

Contents

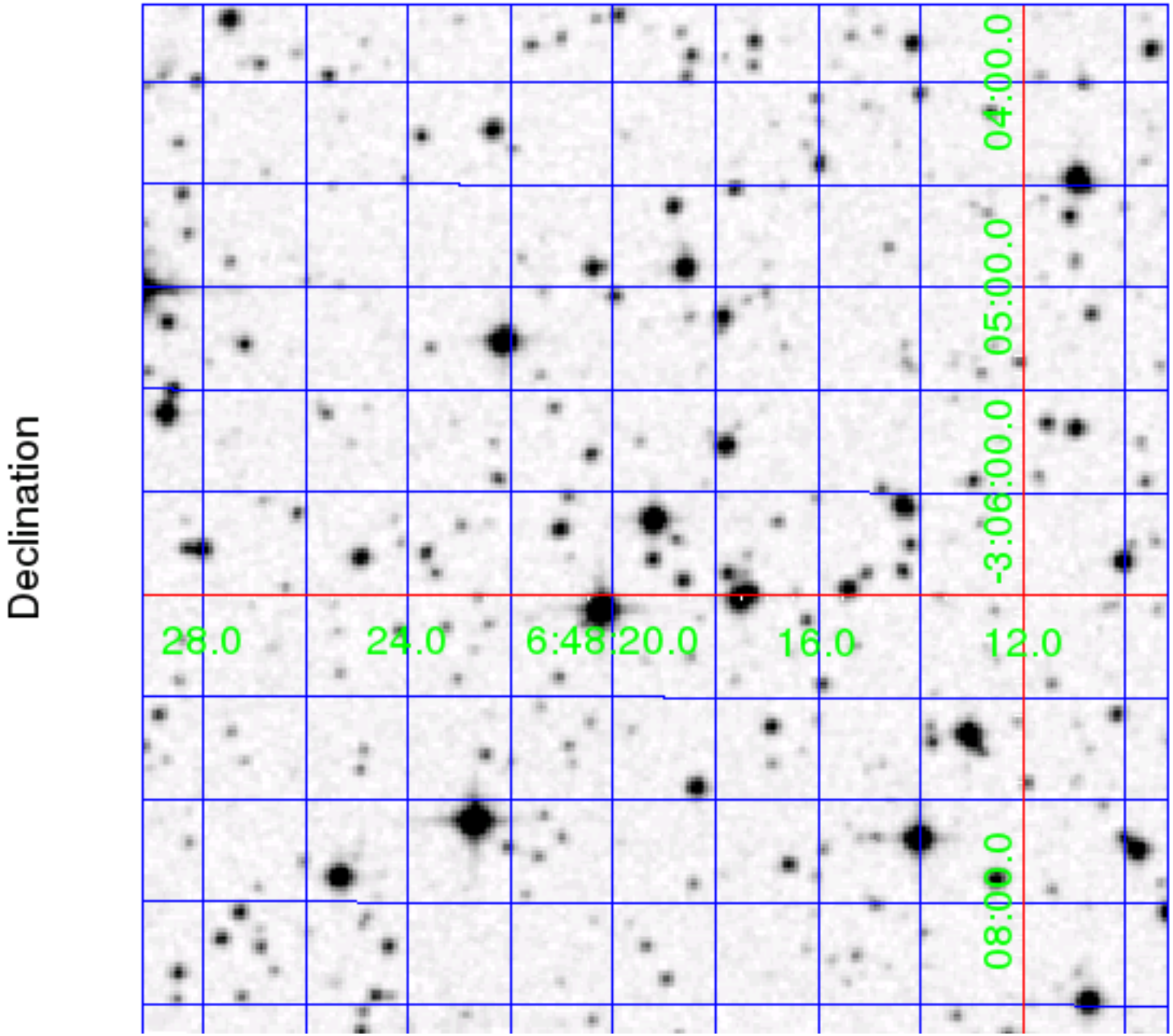
1 Summary

Target Properties	Value	Uncertainty	Units	Provenance
Catalog ID	36352297			
TOI ID	-			
TESS Name	-			
RA	102.07988400	0	degrees	TIC7
Dec	-3.10214600	0	degrees	TIC7
Magnitude	12.989	0.02		TIC7
Radius	1.110	0.000	Solar radii	TIC7
Effective Temperature	5950	0	Kelvin	TIC7
log(g)	4.326	0	cm/sec^2	TIC7
[M/H]	0.066	0.030058	Solar metallicity	TIC7
Stellar Density	0.695	0.000	Solar density	TIC7-Derived
Limb Darkening Coefficient 1	0.54471			
Limb Darkening Coefficient 2	0.053323			
Limb Darkening Coefficient 3	0.20685			
Limb Darkening Coefficient 4	-0.15007			
Number of Planet Candidates	1			
TOI Model	-			
TESS Names Model	-			
External TCE Model	-			
Software Revision	spoc-3.3.57-20190215			
Date Report Generated	17-Feb-2019 00:20:05 Z			

Sector	Target Table	Camera/ CCD	Crowding Metric	Flux Fraction
6	141	1:2	0.4005	0.7538

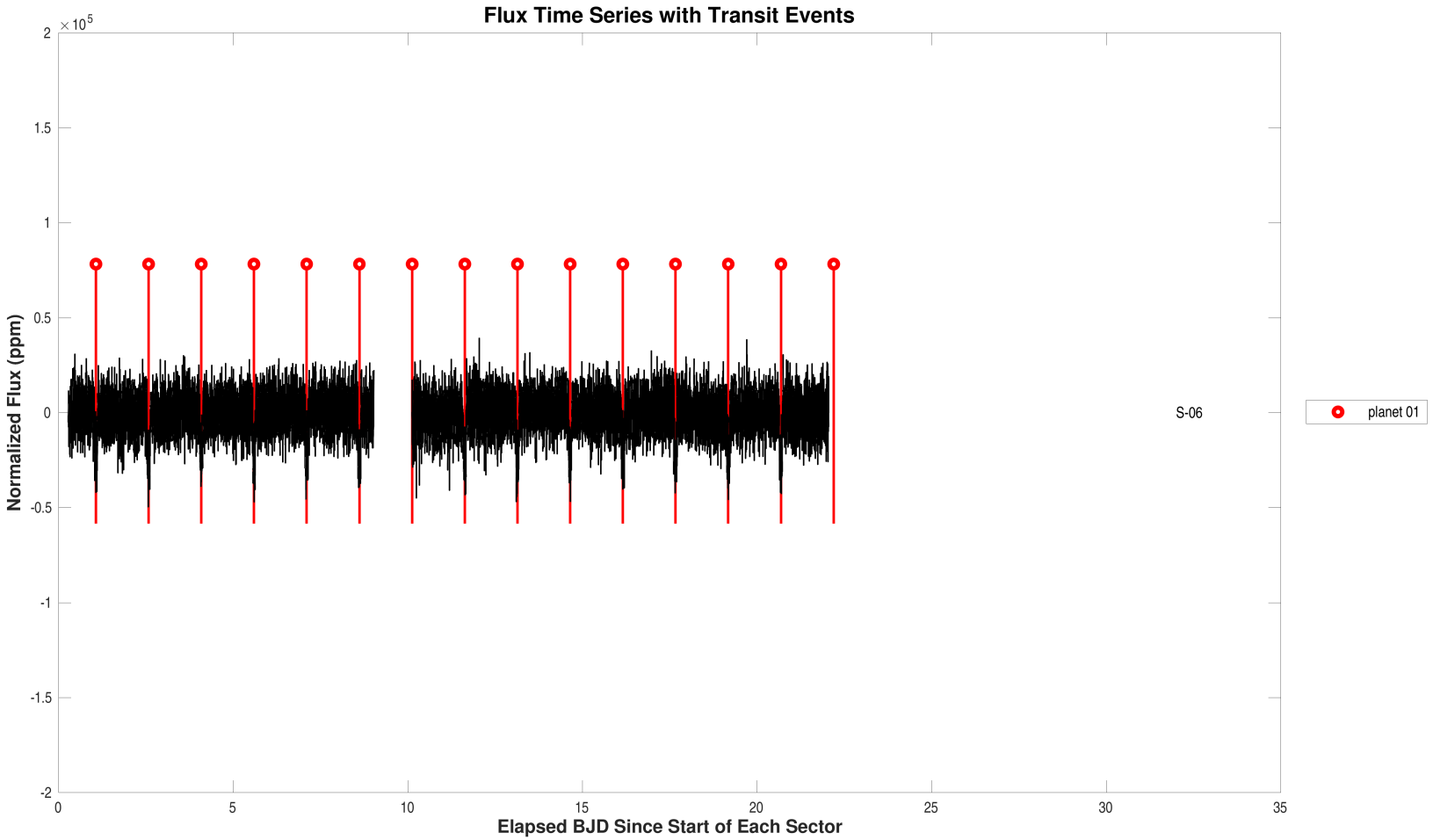
Planet Candidate	TOI ID	TESS Name	TOI Correlation	Period (days)	Period Ratio	Epoch (BTJD)	Semi-major Axis (AU)	Radius (Re)	Seff	Teq (K)	False Alarm	Suspected EB
1	-	-	-	1.509	1.00	1469.068	0.03	17.6	2156.1	1738	9.66e-199	false

2 Survey Image

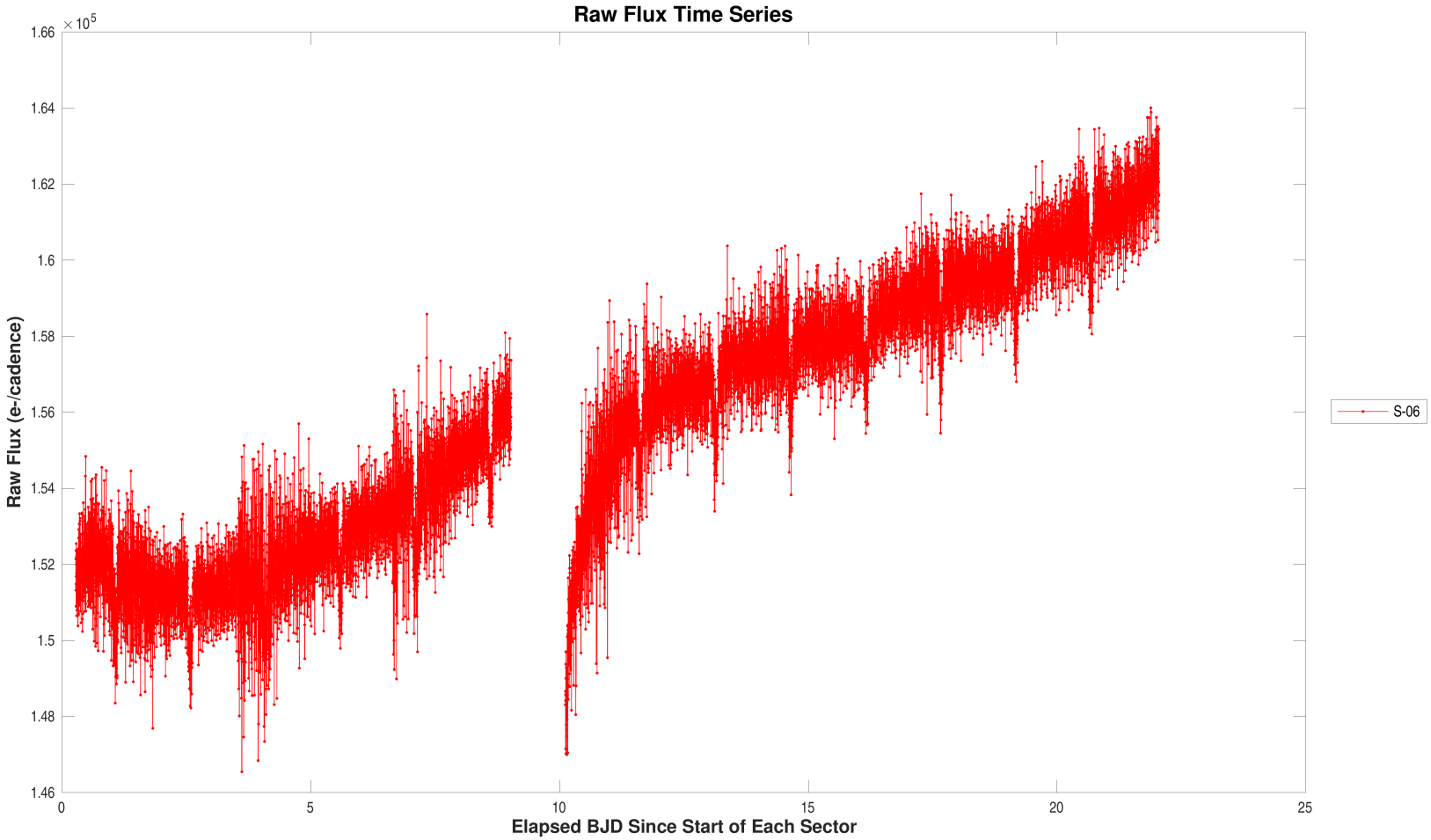


Digitized Sky Survey (DSS) red image. The 5' x 5' image is centered on the J2000 coordinates of target (36352297).

3 Flux Time Series



Summary plot of sector-stitched flux time series and transits for target 36352297, marked with DV fitted epoch/period (or TPS epoch/period if fit was not successful). Transits of identified planets are labeled with epoch BTJD and orbital period. For the data of sector 6, target table 141, start BJD is 2458468.
Open `./summary-plots/0000000036352297-00-flux-dv-fit-06-141.fig`



Summary plot of raw flux time series. For the data of sector 6, target table 141, start BJD is 2458468.
Open `./summary-plots/0000000036352297-00-raw-flux-06-141.fig`

4 Dashboards

Planet Candidate 1

<table>
<tr><td rowspan="2">Model Fitter</td><td colspan="2">Stellar Radius
1.1 ± 0.0 Solar units</td><td rowspan="2">Core Aperture Correlation Statistic
Value = 33.79
Significance = 100.00%
Halo Aperture Correlation Statistic
Value = 3.44
Significance = 99.97%
Core/Halo Ratio
Ratio = 9.83</td><td rowspan="2">Ghost Diagnostic Test</td></tr>
<tr><td colspan="2">Period = 1.5 ± 0.0 days
Depth = 24016 ± 480 ppm
Planet Radius = 17.6 ± 0.3 Earth radii
Semi-major Axis = 0.0 ± 0.0 AU
Effective Stellar Flux = 2156.1 ± 0.2
Equilibrium Temperature = 1738 ± 0 Kelvin
Chi-squared/DoF = 0.9
SNR = 52.8</td></tr>
<tr><td rowspan="2">Eclipsing Binary Discrimination Test</td><td colspan="2">Odd-Even Depth Comparison Statistic
Value = 5.63e+00
Significance = 1.76%</td><td>Offsets Relative to Out of Transit Centroid
Source RA Offset = -8.88e+00 ± 2.53e+00 arcsec (-3.50 σ)
Source Dec Offset = 2.10e+01 ± 2.53e+00 arcsec (8.31 σ)
Source Offset Distance = 2.28e+01 ± 2.53e+00 arcsec (9.02 σ)
Offsets Relative to TIC Position
Source RA Offset = -1.32e-01 ± 2.53e+00 arcsec (-0.05 σ)
Source Dec Offset = -8.75e-02 ± 2.53e+00 arcsec (-0.03 σ)
Source Offset Distance = 1.59e-01 ± 2.53e+00 arcsec (0.06 σ)</td><td>Difference Image Centroid Offsets</td></tr>
<tr><td>Shorter Period Comparison Statistic
Value = N/A
Significance = N/A</td><td>Longer Period Comparison Statistic
Value = N/A
Significance = N/A</td><td>False Alarm = 9.66e-199
Transit Count = 14
Max Multiple Event Statistic = 28.4</td><td>Bootstrap Test</td></tr>
</table>

Summary of model fitter results and validation test results for target 36352297, planet candidate 1. In general, green denotes that the candidate is likely a planet, while red denotes that the candidate is unlikely to be a planet. Cyan denotes that no data is available. The color of the Model Fitter block is: green, when the SNR of the fit is greater than or equal to 10; yellow, if the SNR is greater than or equal to 7.1 but less than 10; red, if the SNR is less than 7.1 or if the fitter failed. The color of the Ghost Diagnostic Test and Eclipsing Binary Discrimination Test blocks are: green, when the significance is within 2-sigma; yellow, when the significance is between 2- and 3-sigma; red when the significance is greater than 3-sigma. The color of the Difference Image Centroid Offsets block is: green, when the max offset distance sigma is less than or equal to 2; yellow, when the max sigma is between 2 and 3; red when the max sigma is greater than 3. The color of the Bootstrap Test block is green whenever the false alarm probability is less than 10^{-12}, low enough to limit the total number of false alarms from a four year mission to less than one. If the false alarm probability is greater than 10^{-12}, the color of the Bootstrap Test block is: green, when the false alarm probability is less than or equal to the CCDF of a Gaussian distribution at the observed maximum multiple event statistic; yellow when the false alarm probability is between 1 and 2 times that of a Gaussian distribution at the max multiple event statistic; and red when the false alarm probability is more than 2 times that of a Gaussian distribution at the max multiple event statistic.

5 Pixel Level Diagnostics

To reduce clutter, the catalog IDs in the difference images have been replaced by indices representing distance from the target star. The mapping between the indices and the catalog IDs is found in a table at the end of this section.

5.1 Planet Candidate 1

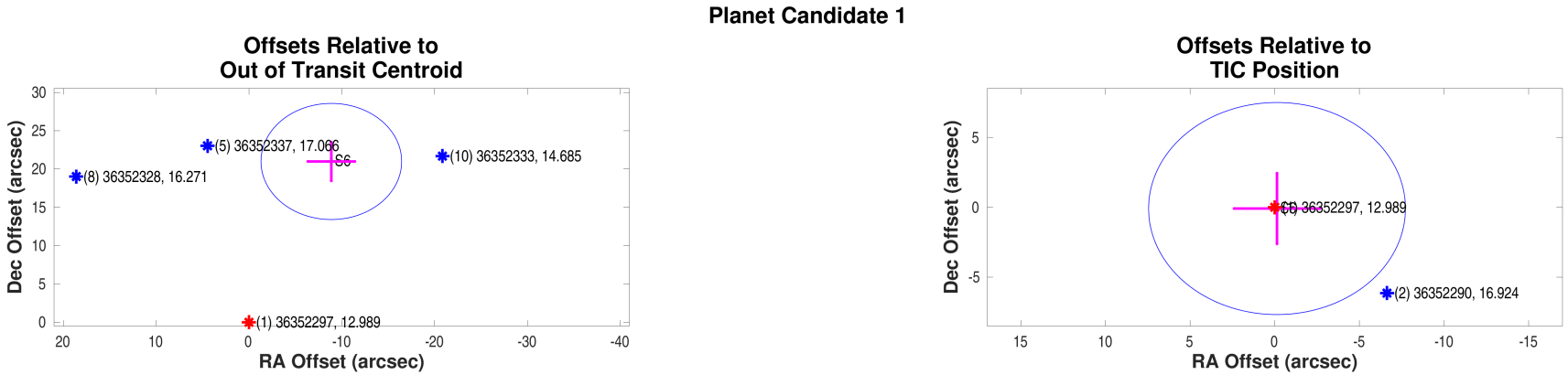
Multi-Sector Average PRF Fit of the Difference Images

Mean offset from the PRF fit to the out of transit image

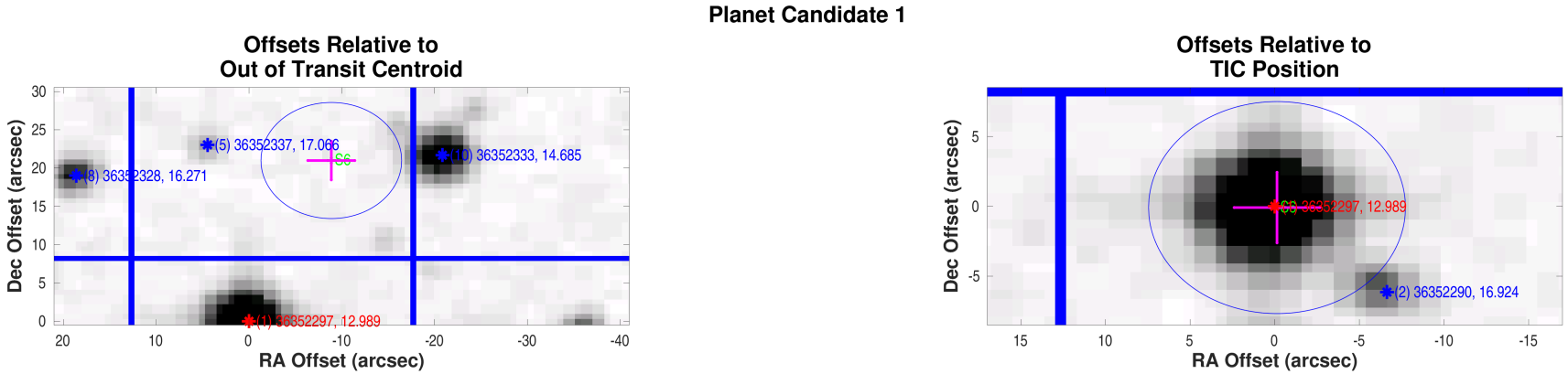
	RA	Dec	Units
Offset	$-8.8758 \pm 2.53e+00$	$20.9837 \pm 2.53e+00$	arcseconds
Offset/σ	-3.50	8.31	
Offset Distance	$22.7837 \pm 2.53e+00$		arcseconds
Offset Distance/σ	9.02		
3σ Radius	7.5794		arcseconds

Mean offset from the TIC RA and Dec

	RA	Dec	Units
Offset	$-0.1322 \pm 2.53e+00$	$-0.0875 \pm 2.53e+00$	arcseconds
Offset/σ	-0.05	-0.03	
Offset Distance	$0.1585 \pm 2.53e+00$		arcseconds
Offset Distance/σ	0.06		
3σ Radius	7.5911		arcseconds



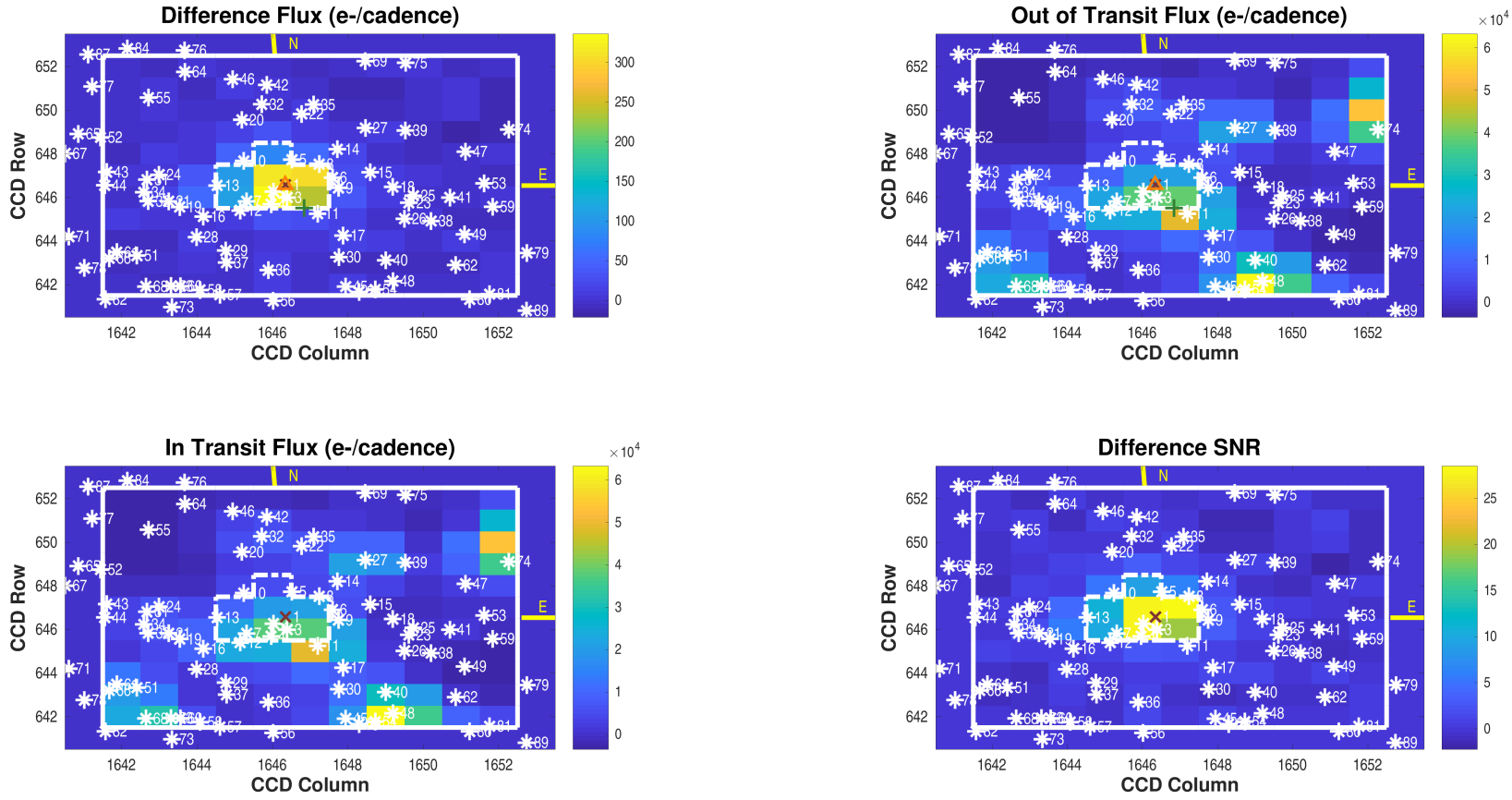
Difference image centroid offsets for target 36352297, planet candidate 1. Left: difference image PRF centroid offsets in RA and Dec with respect to the per sector out-of-transit centroids for the given target. Right: difference image PRF centroid offsets in RA and Dec with respect to the TC coordinates of the given target. Symbol key: green cross: per sector centroid offsets with 1-sigma error bars in RA and Dec; magenta cross: robust weighted mean offset over all sectors with 1-sigma error bars in RA and Dec; blue circle: 3-sigma radius of confusion for weighted mean offset; red asterisk: location of target star; blue asterisk: location of other TIC objects in the neighborhood. TIC ID and magnitude are noted in the text associated with each marked object. A constant error term of 2.5000 arcseconds has been added in quadrature to the computed uncertainty in the RA and Dec components of the robust mean offset.
Open `./planet-01/difference-image/0000000036352297-01-difference-image-centroid-offsets.fig`



Difference image centroid offsets for target 36352297, planet candidate 1, diplayed on survey image for given target. Left: difference image PRF centroid offsets in RA and Dec with respect to the per sector out-of-transit centroids for the given target. Right: difference image PRF centroid offsets in RA and Dec with respect to the TIC coordinates of the given target. Symbol key: green cross: per sector centroid offsets with 1-sigma error bars in RA and Dec; magenta cross: robust weighted mean offset over all sectors with 1-sigma error bars in RA and Dec; blue circle: 3-sigma radius of confusion for weighted mean offset; red asterisk: location of target star; blue asterisk: location of other TIC objects in the neighborhood. TIC ID and magnitude are noted in the text associated with each marked object. A constant error term of 2.5000 arcseconds has been added in quadrature to the computed uncertainty in the RA and Dec components of the robust mean offset.
Open `./planet-01/difference-image/0000000036352297-01-difference-image-centroid-offsets-survey.fig`

Difference Image Summary Metrics

Number of Difference Images	Number of Metrics	Number of Good Metrics	Fraction of Good Metrics	Quality Threshold
1	1	1	1.0000	0.70



Difference image for target 36352297, planet candidate 1, sector 6, target pixel table 141. Upper left: difference between mean flux out-of-transit and in-transit; upper right: mean out-of-transit flux; lower left: mean in-transit flux; lower right: difference between mean flux out-of-transit and in-transit after normalizing by the uncertainty in the difference for each pixel. The optimal aperture is outlined with a white dash-dotted line in each panel and the target mask is outlined with a solid white line. Symbol key: x: target position from TIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby TIC objects converted to CCD coordinates via motion polynomials; +: PRF-fit location of target from out-of-transit image; triangle: PRF-fit location of transit source from the difference image. Number of transits = 13; number of valid in-transit cadences = 707; number of in-transit cadence gaps = 1; number of valid out-of-transit cadences = 2027; number of out-of-transit cadence gaps = 9. Difference image quality metric = 0.99 (good).
Open `./planet-01/difference-image/0000000036352297-01-difference-image-06-141.fig`

PRF Fit of the Difference Image

Offset from the PRF fit to the out of transit image

	Row	Column	Units	RA	Dec	Units
Out of Transit Image Centroid	$645.52 \pm 6.76e-05$	$1646.84 \pm 7.19e-05$	pixels	$102.08230084 \pm 7.49e-07$	$-3.10798349 \pm 7.27e-07$	degrees
Difference Image Centroid	$646.57 \pm 1.74e-02$	$1646.34 \pm 1.97e-02$	pixels	$102.07983170 \pm 1.13e-04$	$-3.10215468 \pm 9.92e-05$	degrees
Offset	$1.0546 \pm 1.74e-02$	$-0.4982 \pm 1.97e-02$	pixels	$-8.8758 \pm 4.05e-01$	$20.9837 \pm 3.57e-01$	arcseconds
Offset/σ	60.65	−25.30		−21.94	58.74	
Offset Distance	$1.1663 \pm 1.77e-02$		pixels	$22.7837 \pm 3.59e-01$		arcseconds
Offset Distance/σ	66.07			63.53		

Offset from the TIC RA and Dec converted to pixels via motion polynomials

	Row	Column	Units	RA	Dec	Units
TIC Reference Centroid	$646.58 \pm 1.08e-04$	$1646.35 \pm 1.10e-04$	pixels	$102.07986847 \pm 0.00e+00$	$-3.10213037 \pm 0.00e+00$	degrees
Difference Image Centroid	$646.57 \pm 1.74e-02$	$1646.34 \pm 1.97e-02$	pixels	$102.07983170 \pm 1.13e-04$	$-3.10215468 \pm 9.92e-05$	degrees
Offset	$-0.0044 \pm 1.74e-02$	$-0.0065 \pm 1.97e-02$	pixels	$-0.1322 \pm 4.05e-01$	$-0.0875 \pm 3.57e-01$	arcseconds
Offset/σ	−0.25	−0.33		−0.33	−0.25	
Offset Distance	$0.0078 \pm 1.92e-02$		pixels	$0.1585 \pm 3.98e-01$		arcseconds
Offset Distance/σ	0.41			0.40		

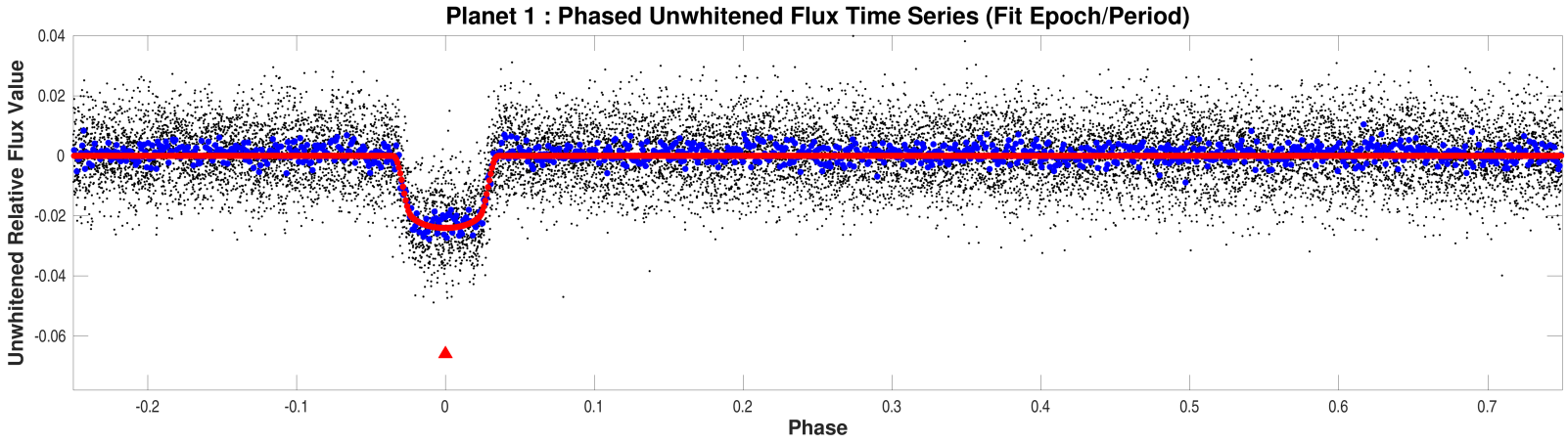
5.2 Difference Image TIC Key

Index	Catalog ID	Mag	RA (degrees)	Dec (degrees)	Distance (arcsec)
1	36352297	12.989	102.07986847	-3.10213037	0.00
2	36352290	16.924	102.07802300	-3.10383600	9.04
3	36352272	16.123	102.07995625	-3.10536081	11.63
4	36352256	15.723	102.07754024	-3.10704614	19.58
5	36352337	17.066	102.08111200	-3.09573400	23.46
6	36352305	17.371	102.08682733	-3.10025131	25.91
7	36352260	16.028	102.07398795	-3.10635055	26.03
8	36352328	16.271	102.08504910	-3.09685011	26.61
9	36352292	14.841	102.08758840	-3.10288058	27.88
10	36352333	14.685	102.07406434	-3.09610579	30.09
11	36352242	12.111	102.08421148	-3.10944877	30.62
12	36289604	13.217	102.07292360	-3.10867761	34.33
13	36289587	17.330	102.06986207	-3.10233228	35.98
14	36352354	17.411	102.08788265	-3.09305529	43.56
15	36352316	17.212	102.09243068	-3.09890373	46.63
16	36289609	17.125	102.06745459	-3.11026023	53.37
17	36352208	17.324	102.08767663	-3.11498036	54.11
18	36352294	17.953	102.09553947	-3.10260214	56.36
19	36289598	14.916	102.06412000	-3.10783076	60.22
20	36352407	15.292	102.07427647	-3.08565090	62.64
21	36289595	17.002	102.06256671	-3.10638954	64.06
22	36352409	16.497	102.08310158	-3.08411025	65.91
23	36352258	17.458	102.09769188	-3.10661423	66.07
24	36289578	17.121	102.06149382	-3.09963257	66.66
25	36352279	16.896	102.09843600	-3.10481200	67.44
26	36352233	17.570	102.09686674	-3.11066007	68.39
27	36352396	13.060	102.09225443	-3.08761443	68.65
28	36289622	16.163	102.06621600	-3.11546700	68.66
29	36289631	15.930	102.07032917	-3.11888637	69.39
30	36352180	17.772	102.08681334	-3.12045598	70.54
31	36289585	14.179	102.05965473	-3.10090929	72.80
32	36352429	13.996	102.07737313	-3.08167970	74.17
33	36289594	16.691	102.05957998	-3.10637803	74.52
34	36289589	15.961	102.05904506	-3.10411483	75.19
35	36352427	15.211	102.08494593	-3.08171804	75.72
36	36352157	14.692	102.07630915	-3.12382642	79.15
37	36289641	18.004	102.07029966	-3.12193621	79.16
38	36352231	17.342	102.10071977	-3.11122665	81.80

Index	Catalog ID	Mag	RA (degrees)	Dec (degrees)	Distance (arcsec)
39	36352384	17.892	102.09805631	-3.08820942	82.38
40	36352168	17.440	102.09362006	-3.12120209	84.60
41	36352277	15.022	102.10376243	-3.10523739	86.62
42	36352455	15.520	102.07832943	-3.07675926	91.50
43	36289576	16.590	102.05386000	-3.09900626	94.17
44	36289588	18.124	102.05341102	-3.10240487	95.11
45	36352142	17.571	102.08742930	-3.12793232	96.78
46	36289527	15.670	102.07342200	-3.07532900	99.23
47	36352350	17.477	102.10659100	-3.09356100	100.89
48	36352149	11.815	102.09441203	-3.12651578	102.18
49	36352213	18.169	102.10546569	-3.11460623	102.39
50	36352134	17.422	102.08932835	-3.12928439	103.50
51	36289636	16.610	102.05726862	-3.12022373	104.13
52	36289555	17.914	102.05336781	-3.09020970	104.48
53	36352299	16.625	102.10894009	-3.10159433	104.52
54	36352138	17.079	102.09171127	-3.12865506	104.55
55	36289540	18.024	102.06088280	-3.08007076	104.71
56	36352124	17.672	102.07665743	-3.13163114	106.83
57	36289668	16.069	102.06894181	-3.13012377	108.16
58	36289664	17.554	102.06609376	-3.12890236	108.35
59	36352253	18.173	102.10990579	-3.10754314	109.72
60	36289657	18.373	102.06326000	-3.12796900	110.53
61	36289632	13.313	102.05436546	-3.11936401	110.70
62	36352160	17.261	102.10378500	-3.12241300	112.80
63	36289656	17.929	102.06190717	-3.12792862	113.11
64	36289519	16.482	102.06650231	-3.07347228	113.81
65	36289553	17.202	102.05016772	-3.08933288	116.28
66	36289638	16.607	102.05317900	-3.12095100	117.45
67	36289562	16.293	102.04800109	-3.09431249	117.96
68	36289659	12.455	102.05820509	-3.12804976	121.54
69	36352488	14.896	102.09303365	-3.07060069	122.98
70	36352101	17.782	102.08045267	-3.13665883	124.32
71	36289621	17.762	102.04754744	-3.11544356	125.68
72	36289563	15.196	102.04559406	-3.09468392	126.09
73	36289676	17.504	102.06178567	-3.13329042	129.65
74	36352389	16.283	102.11321283	-3.08793117	130.31
75	36352485	16.533	102.09891059	-3.07103386	131.22
76	36289508	17.536	102.06674385	-3.06799185	131.64

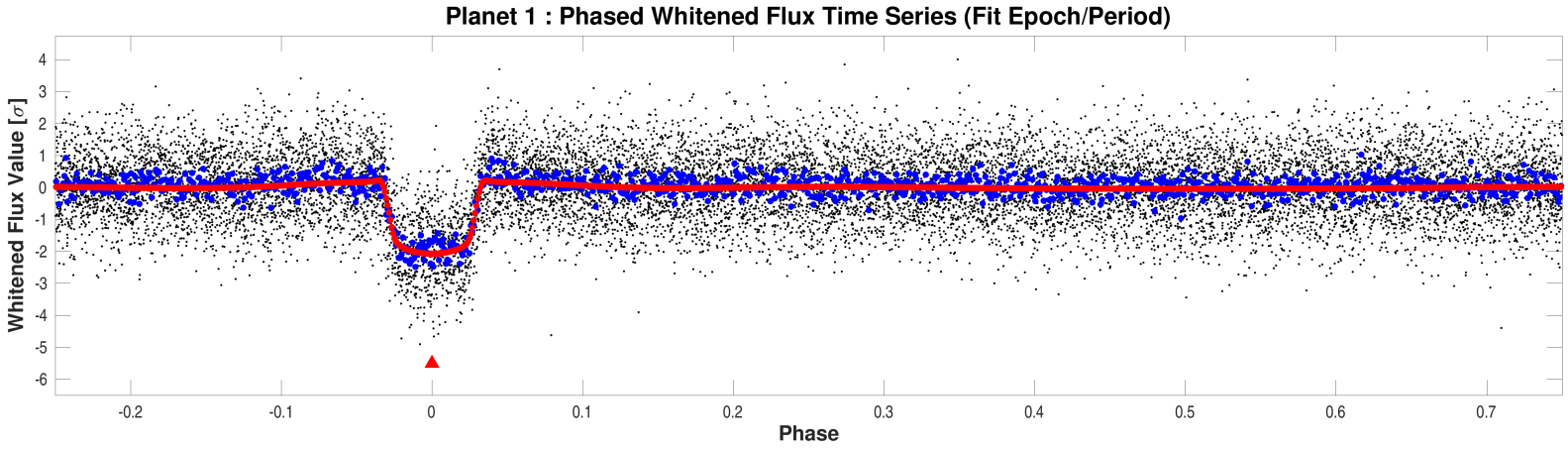
RA, Dec and Distances are corrected for proper motion. This table may not contain all of the objects shown.

6 Phased Light Curves

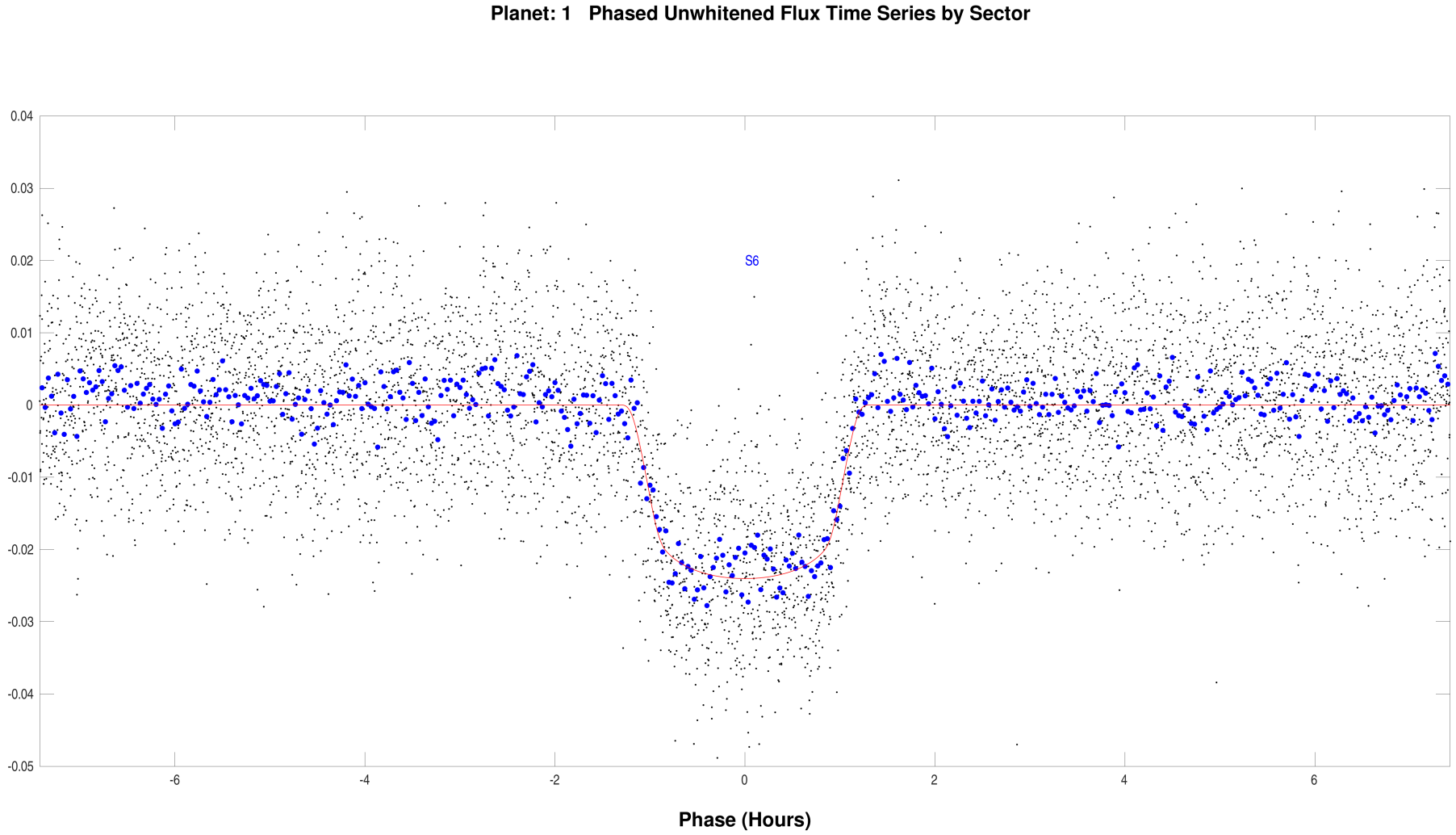


Phased unwhitened flux time series is plotted in black dots. When all transits fit completed with full or secondary convergence, the phase is determined with the fitted epoch and period; otherwise, the phase is determined with the TPS epoch and period. The values of the phased unwhitened flux time series averaged in one cadence wide bins are plotted in bigger blue dots. When all transits fit completes with full or secondary convergence, the averaged values of the phased unwhitened fitted model light curve are plotted in red dots. Transit event markers in different colors indicate the locations of the transits of all planet candidates. The transits of the same planet candidate are labeled with the markers of the same color, for example, blue markers for transits of plane candidate #1, red markers for transits of planet candidate #2, etc.

Open `./summary-plots/0000000036352297-01-phased-unwhitened-flux-time-series.fig`



Phased whitened flux time series is plotted in black dots. When all transits fit completed with full or secondary convergence, the phase is determined with the fitted epoch and period; otherwise, the phase is determined with the TPS epoch and period. The values of the phased whitened flux time series averaged in one cadence wide bins are plotted in bigger blue dots. When all transits fit completes with full or secondary convergence, the averaged values of the phased whitened fitted model light curve are plotted in red dots. Transit event markers in different colors indicate the locations of the transits of all planet candidates. The transits of the same planet candidate are labeled with the markers of the same color, for example, blue markers for transits of plane candidate #1, red markers for transits of planet candidate #2, etc.
Open `./summary-plots/000000036352297-01-phased-whitened-flux-time-series.fig`



Phased unwhitened flux time series by sector for target 36352297, planet candidate 1. Period = 1.509 days; transit epoch = 1469.0676 BTJD.
Open `./summary-plots/0000000036352297-01-phased-unwhitened-flux-time-series-by-sector.fig`

7 Planet Candidate 1

7.1 Model Fitter: All Transits

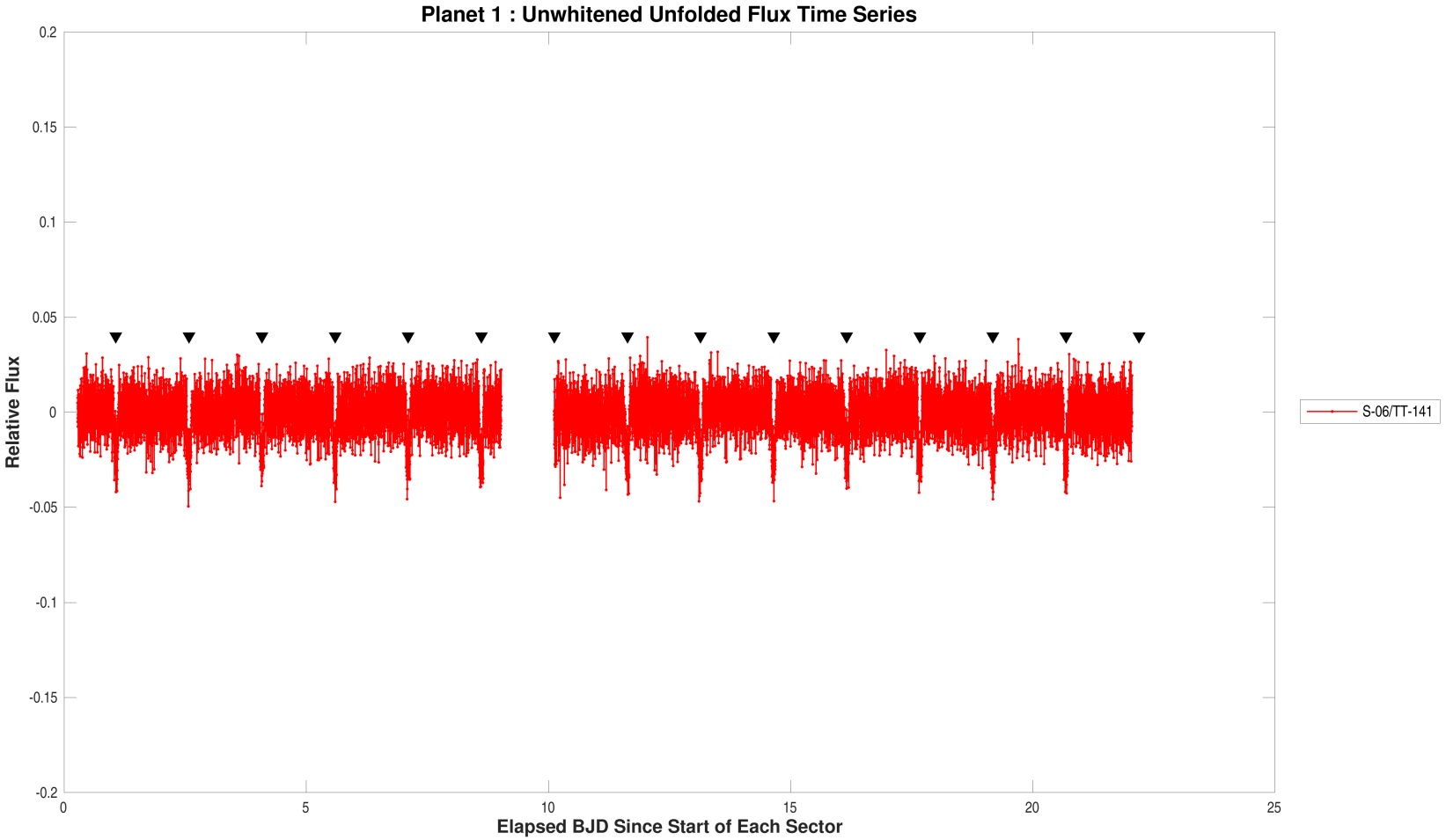
Model Characteristic	Name
Transit Model	mandel-agol_geometric_transit_model
Limb Darkening Model	claret_tess_nonlinear_limb_darkening_model

TCE Parameter	Value	Units
Trial Transit Pulse Duration	2.0	hours
Transit Epoch	1469.0616722	TJD
Orbital Period	1.5091876	days
Maximum SES	9.5	
Maximum MES	28.4	
Robust Statistic	50.9	
Chi Square Goodness of Fit Statistic (DoF)	854.2 (812)	
Chi Square2 Statistic (DoF)	127.6 (233.7)	
Threshold for Desired PFA		

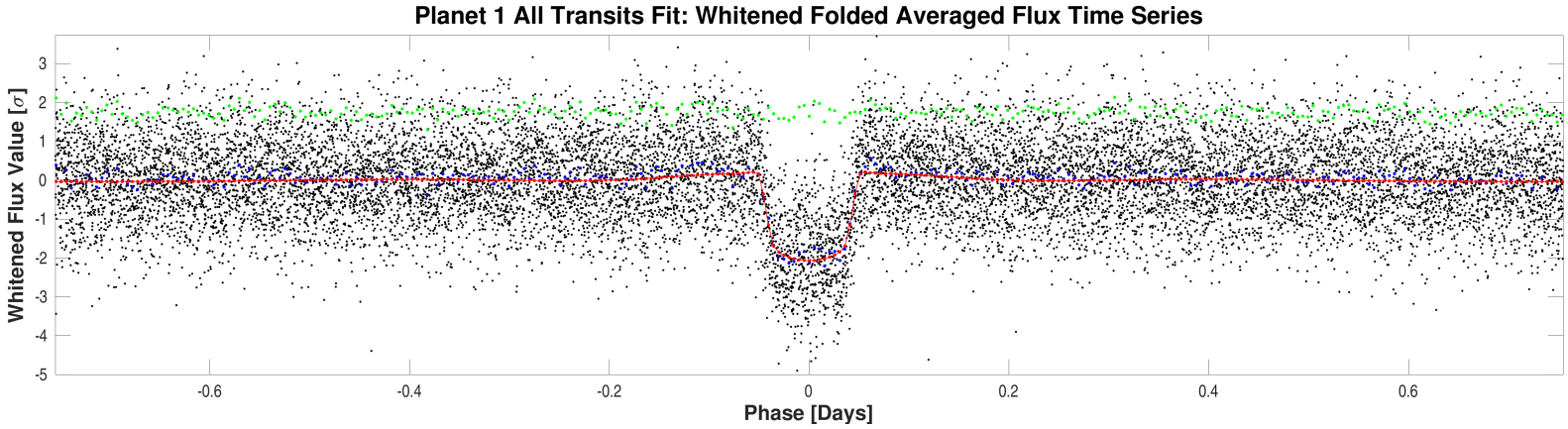
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	52.8		
Orbital Period	1.5090171	1.0891e-04	days
Transit Epoch	1469.0675932	8.5617e-04	BTJD
Impact Parameter	0.3113	2.4725e-01	
Planet Radius to Star Radius Ratio	0.1450996	2.8005e-03	
Semi-major Axis to Star Radius Ratio	5.1826	4.2419e-01	
Planet Radius	17.5830	3.3937e-01	Earth radii
Semi-major Axis	0.0253	1.2189e-06	AU
Effective Stellar Flux	2156.0679	2.0749e-01	Goldilocks
Equilibrium Temperature	1738	4.1812e-02	Kelvin
Stellar Density	0.8213	2.0165e-01	Solar density
Transit Depth	24016	4.7961e+02	ppm
Transit Duration	2.4746	6.4258e-02	hours
Transit Ingress Duration	0.3466	6.5533e-02	hours
Eccentricity	0.0000	0.0000e+00	
Peri Longitude	0.0000	0.0000e+00	degrees
Model Chi Square Statistic (DoF)	4403.2 (5100.4)		
Model Chi Square Goodness of Fit Statistic (DoF)	651.3 (1085)		
Model Chi Square2 Statistic (DoF)	25.9 (13)		

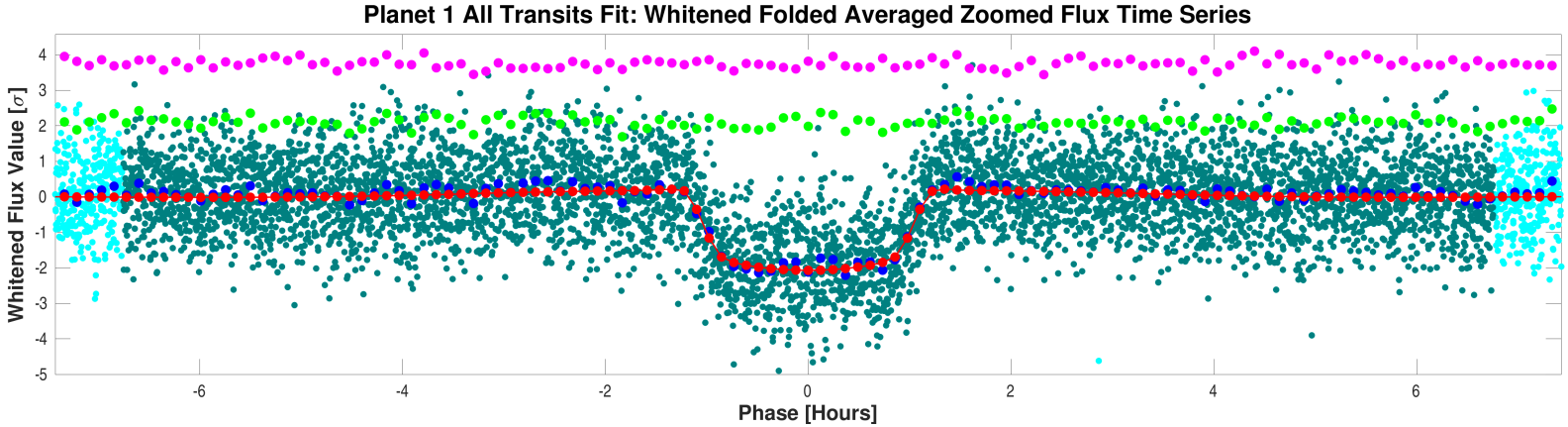
DoF: Degrees of Freedom



Flux time series for CatId 36352297, Planet candidate 1 in the unwhitened domain. For the data of Sector-06/TargetTableId-141, start BJD is 2458468. Transit event markers indicate the location of transits of the given planet candidate. All transits fit completed with full convergence.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000036352297-01-all-unwhitened-06-141.fig`



Folded flux time series for CatId 36352297, Planet candidate 1 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light curve of the all transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. All transits fit completed with full convergence.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000036352297-01-all-whitened.fig`

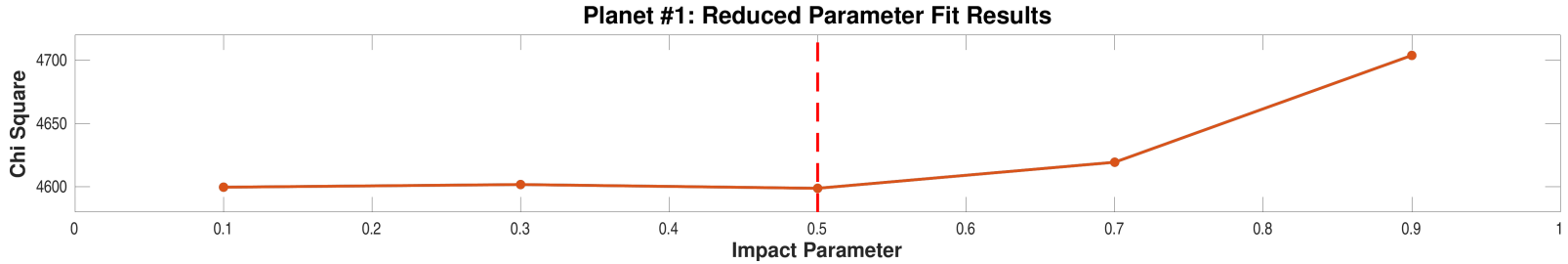


Folded flux time series for CatId 36352297, Planet candidate 1 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the fitted model light curve of the all transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Magenta dots are the averaged values of the folded flux time series, with a phase shift of 0.5 relative to the blue dots, vertically offset for clarity. All transits fit completed with full convergence.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000036352297-01-all-whitened-zoomed.fig`

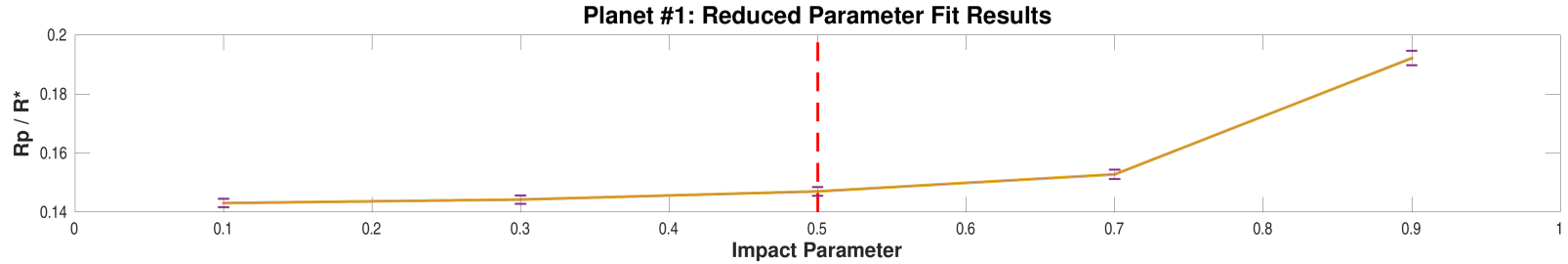
7.2 Model Fitter: Reduced Parameter Fit Results

Impact Parameter	SNR	Model Chi Square	Planet Radius to Star Radius	Uncert	Semi-major Axis to Star Radius	Uncert	Transit Depth (ppm)	Uncert	Transit Duration (hours)	Uncert
0.10	54.3	4599.7	0.1430512	1.3940e-03	5.4067	5.6922e-02	23718	4.5912e+02	2.4465	2.5672e-02
0.30	54.2	4601.7	0.1442306	1.4130e-03	5.1956	5.6564e-02	23762	4.6223e+02	2.4730	2.6886e-02
0.50	54.3	4598.8	0.1470103	1.4520e-03	4.7413	5.5757e-02	23863	4.6748e+02	2.5446	3.0030e-02
0.70	53.8	4619.4	0.1527560	1.5751e-03	3.9554	5.5630e-02	24031	4.8940e+02	2.7378	3.9123e-02
0.90	52.8	4703.8	0.1921245	2.4368e-03	3.1117	6.1368e-02	26236	5.5799e+02	3.0613	6.0976e-02

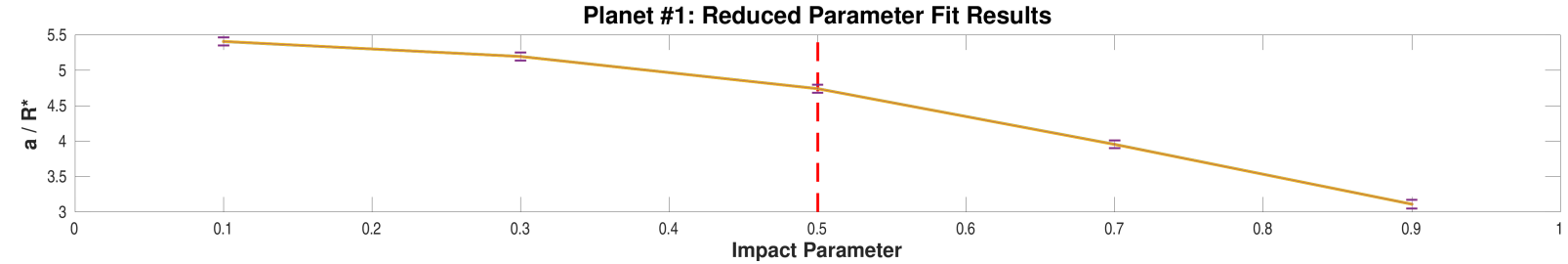
Highlighted row is the best reduced-parameter model fit.



Model chi squares of reduced parameter fits vs. impact parameter for CatId 36352297, Planet candidate 1. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-01/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000036352297-01-reduced-fits-chi-square.fig`



Ratios of planet radius to star radius of reduced parameter fits vs. impact parameter for CatId 36352297, Planet candidate 1. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-01/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000036352297-01-reduced-fits-rp-over-rstar.fig`



Ratios of semimajor axis to star radius of reduced parameter fits vs. impact parameter for CatId 36352297, Planet candidate 1. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-01/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000036352297-01-reduced-fits-a-over-rstar.fig`

7.3 Model Fitter: Trapezoidal Fit Results

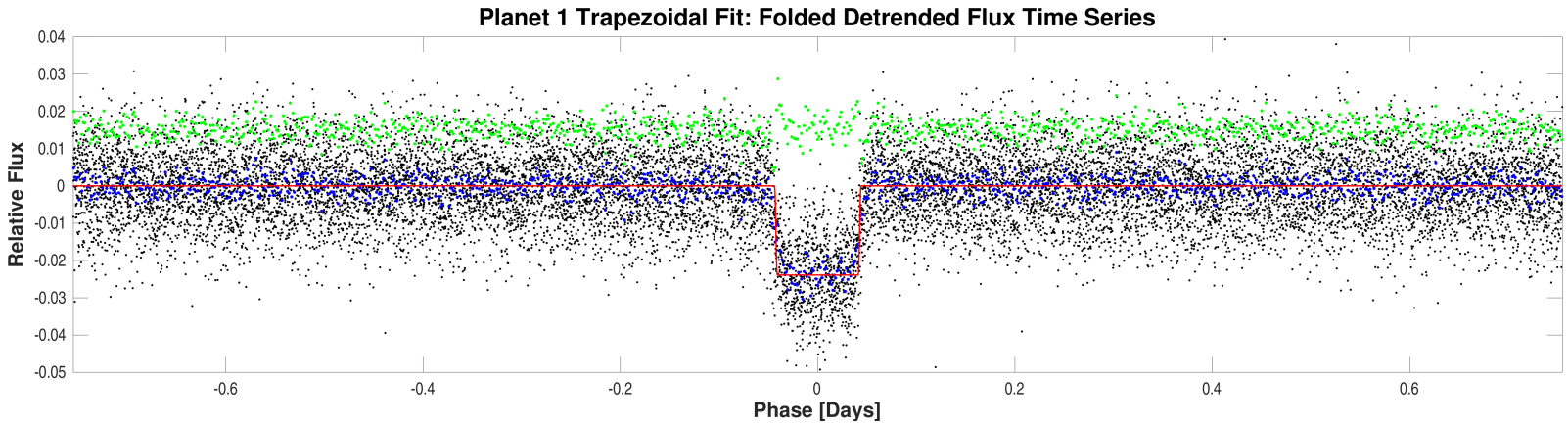
Model Characteristic	Name
Transit Model	trapezoidal_model
Limb Darkening Model	

TCE Parameter	Value	Units
Trial Transit Pulse Duration	2.0	hours
Transit Epoch	1469.0616722	TJD
Orbital Period	1.5091876	days
Maximum SES	9.5	
Maximum MES	28.4	
Robust Statistic	50.9	
Chi Square Goodness of Fit Statistic (DoF)	854.2 (812)	
Chi Square2 Statistic (DoF)	127.6 (233.7)	
Threshold for Desired PFA		

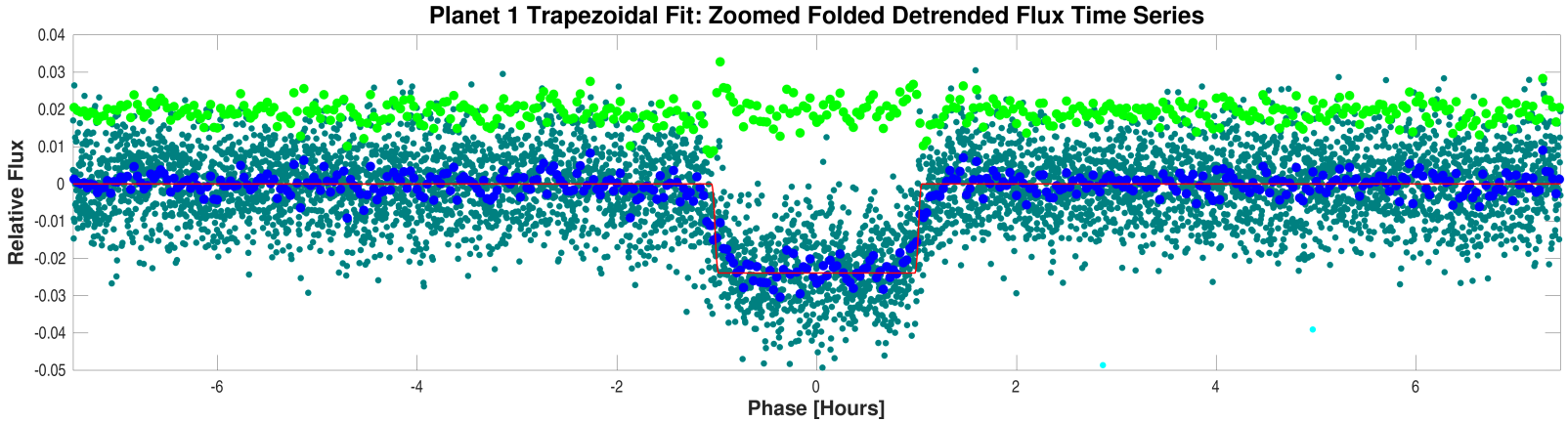
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	65.5		
Orbital Period	1.5091876		days
Transit Epoch	1469.0665655		BTJD
Transit Depth	23924		ppm
Transit Duration	2.4809		hours
Transit Ingress Duration	0.4449		hours
Model Chi Square Statistic (DoF)	14473.8 (6593)		

DoF: Degrees of Freedom



Folded detrended flux time series for CatId 36352297, Planet candidate 1 and folded trapezoidal model light curve.
Open `./planet-01/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000036352297-01-all-trapezoidal.fig`



Zoomed folded detrended flux time series for CatId 36352297, Planet candidate 1 and folded trapezoidal model light curve.
Open `./planet-01/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000036352297-01-all-trapezoidal-zoomed.fig`

7.4 Validation Tests

The Centroid Test and Eclipsing Binary Discrimination Test are chi-squared hypothesis tests. For these tests, a significance of 100% favors a planet, while 0% indicates an unlikely planet.

7.4.1 Weak Secondary Test

Result	Value	Uncertainty	Units	Statistic in Sigmas	Significance (%)
Orbital Period	1.5092		days		
Transit Duration	2		hours		
Maximum MES	28.4				
Secondary Phase	0.64028		days		
Secondary MES	2.5				
Minimum Phase	0.96335		days		
Minimum MES	-2.7				
Median MES	-0.4				
MAD MES	0.6963				
Robust Statistic	1.9				
Secondary Depth	880.2	4.2778e+02	ppm		
Geometric Albedo	1.0	4.9003e-01		0.0105	49.58
Planet Effective Temperature	2690	3.2792e+02	Kelvin	2.9048	0.18

7.4.2 Eclipsing Binary Discrimination Test

Result	Value	Value in Sigmas	Significance (%)
Odd Even Transit Depth Comparison Statistic	5.6343e+00	2.3737	1.76

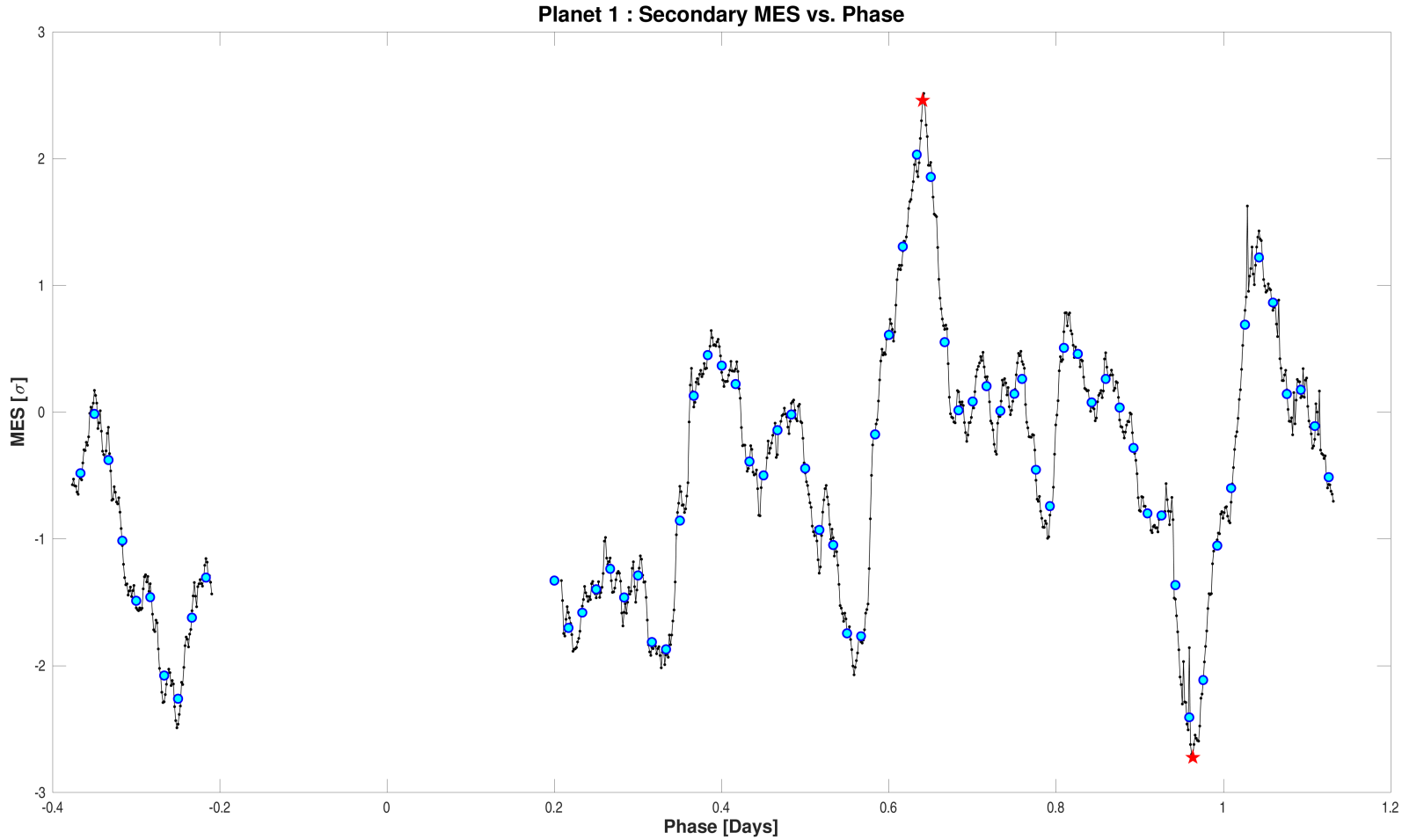
7.4.3 Bootstrap Test

Result	Value
False Alarm Probability	9.6631e-199
Bootstrap Threshold for Desired PFA	6.9
MES Mean	0.19
MES Standard Deviation	0.94
Transit Count	14

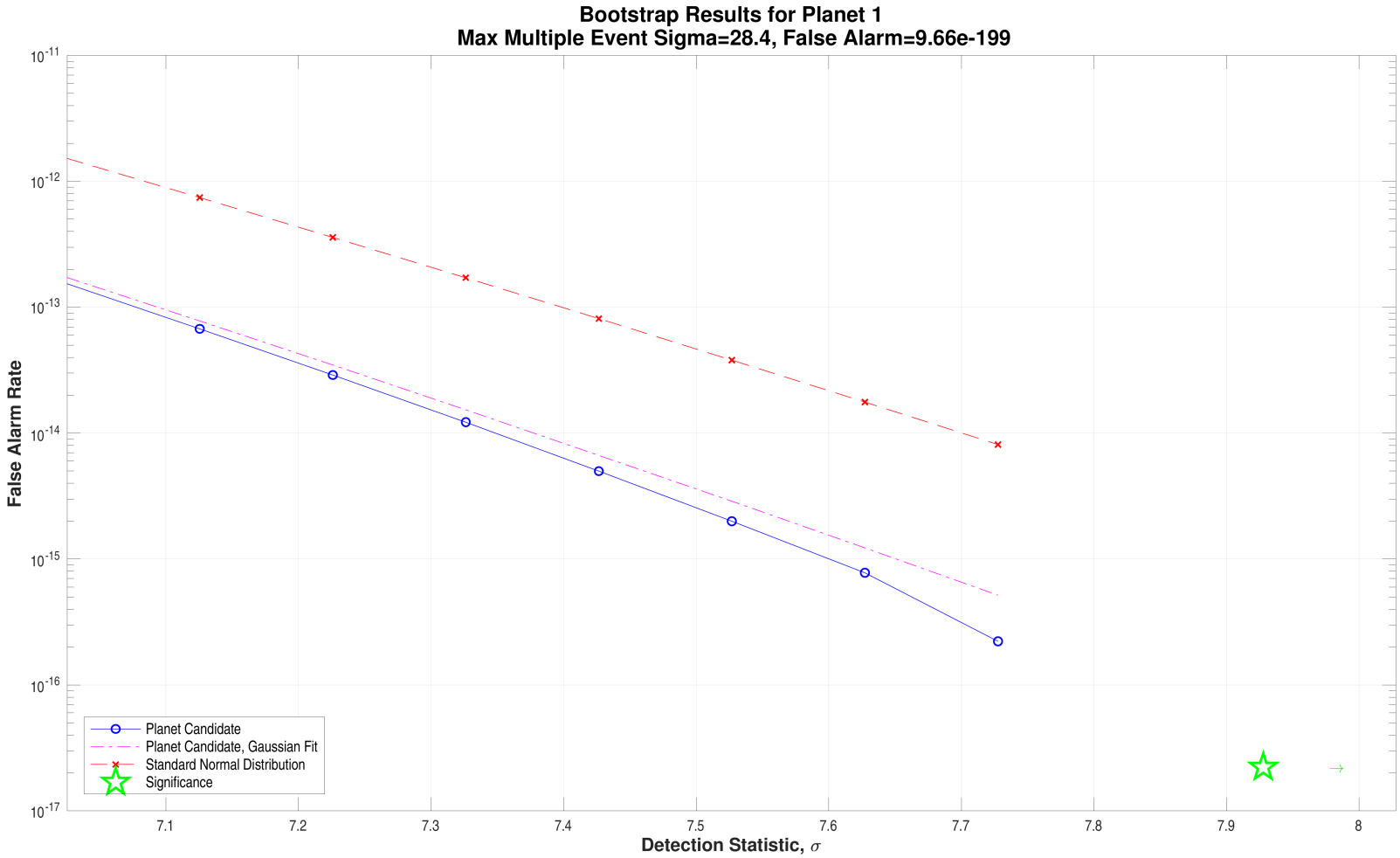
7.4.4 Ghost Diagnostic Test

Result	Value	Significance (%)
Maximum MES	28.4	
SNR	52.8	
Core Aperture Statistic	3.3792e+01	100.00
Halo Aperture Statistic	3.4375e+00	99.97
Ratio of Core/Halo Aperture Statistics	9.8305e+00	

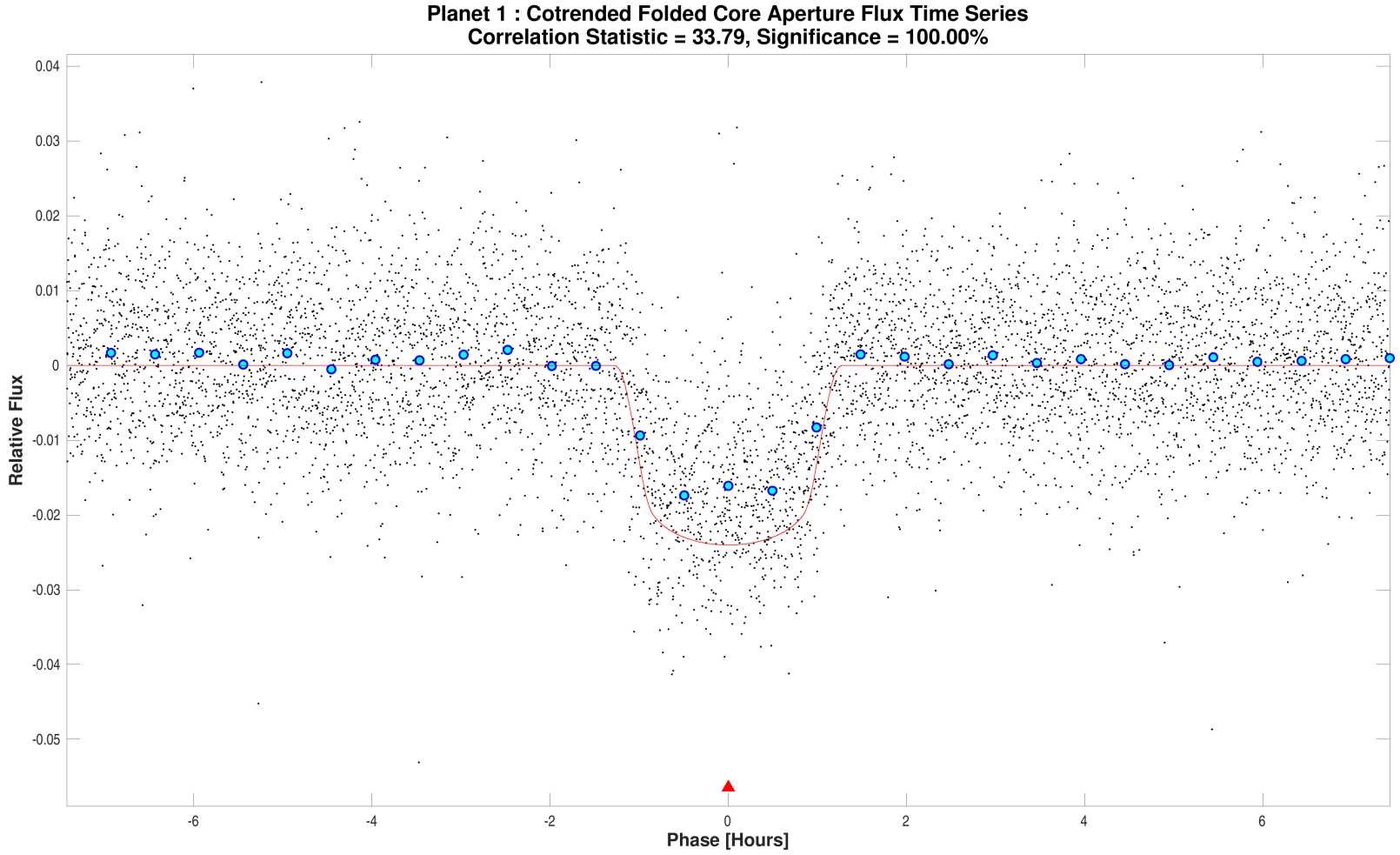
7.4.5 Validation Test Figures



The primary event has been set to zero and both the max and min of the resulting MES vs. Phase are marked with a red star. The best matched pulse duration in hours is 2. The maximum secondary MES and corresponding phase are 2.4615 and 0.64028 days respectively. The minimum secondary MES and corresponding phase are -2.7236 and 0.96335 days respectively.
Open `./planet-01/report-summary/0000000036352297-01-weak-secondary-diagnostic.fig`

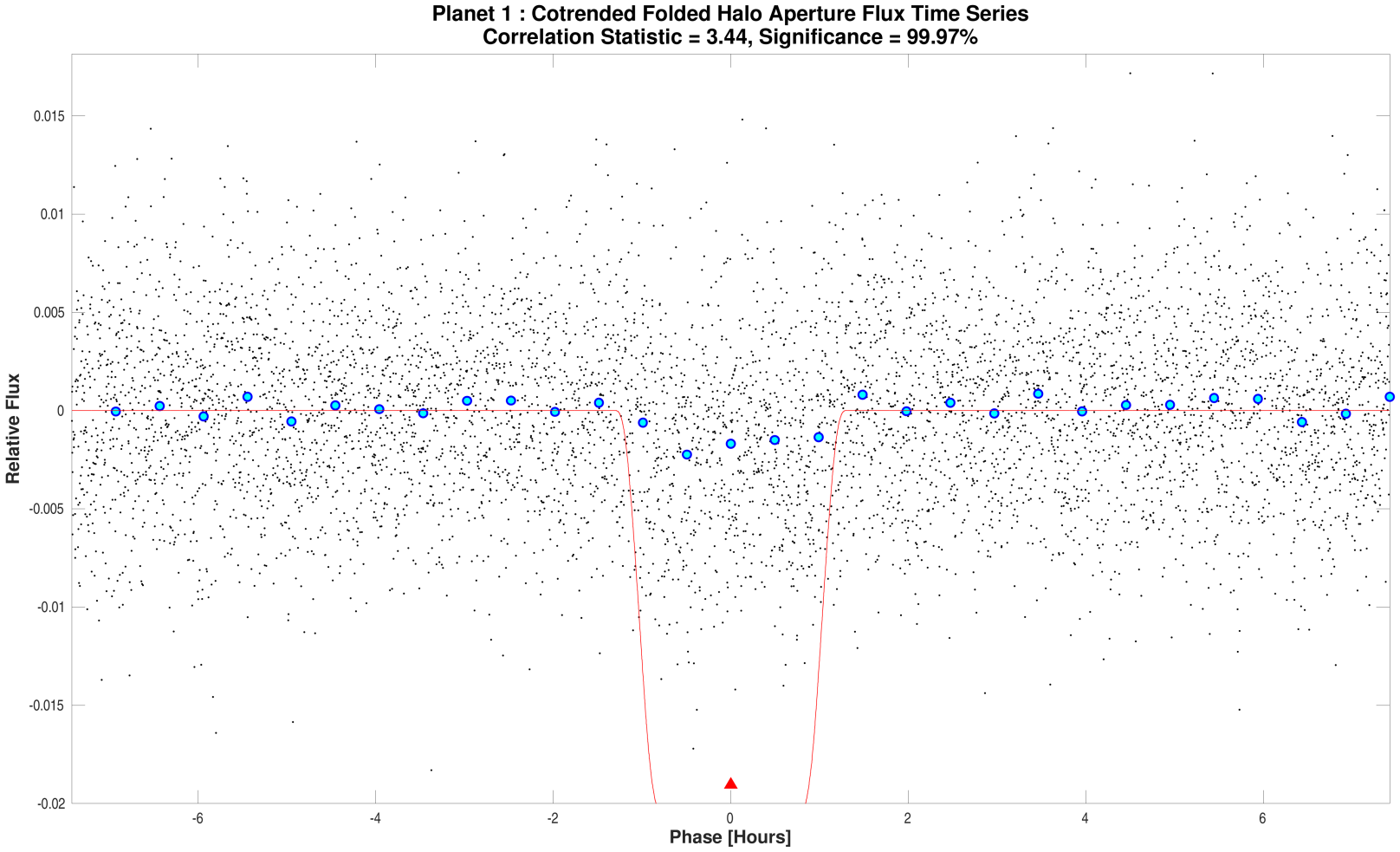


Bootstrap results for target 36352297, planet 1. Cumulative sum of the probabilities (derived from the histogram of counts) from upper tail to the search transit threshold; false alarm probability is indicated by the star. The Gaussian equivalent threshold for this false alarm probability is 30.0541. The threshold on this distribution that achieves the same false alarm rate as a 7.1 sigma threshold on a Gaussian distribution is 6.8594.
Open `./planet-01/bootstrap-results/0000000036352297-01-bootstrap-false-alarm.fig`



Optical ghost diagnostic core aperture flux time series for target 36352297, planet candidate 1. The unwhitened time series is phase folded at the orbital period associated with the planet candidate and centered on the epoch of the first transit. The time series was first cotrended against spacecraft engineering data, motion proxies, and/or cotrending basis vectors (CBVs) to remove systematic effects. Flux time series data represent the mean per pixel flux in the core or haloaperture; phase folded data points are shown in the figure with black dots. Binned and averaged phase folded flux values are marked with filled blue circles. The unwhitened transit model light curve is displayed in the figure with a red line. The value and significance of the core aperture correlation statistic are displayed in the figure title if the statistic was successfully computed.

Open `./planet-01/ghost-diagnostic-results/0000000036352297-01-core-unwhitened-cotrended-zoomed-model.fig`

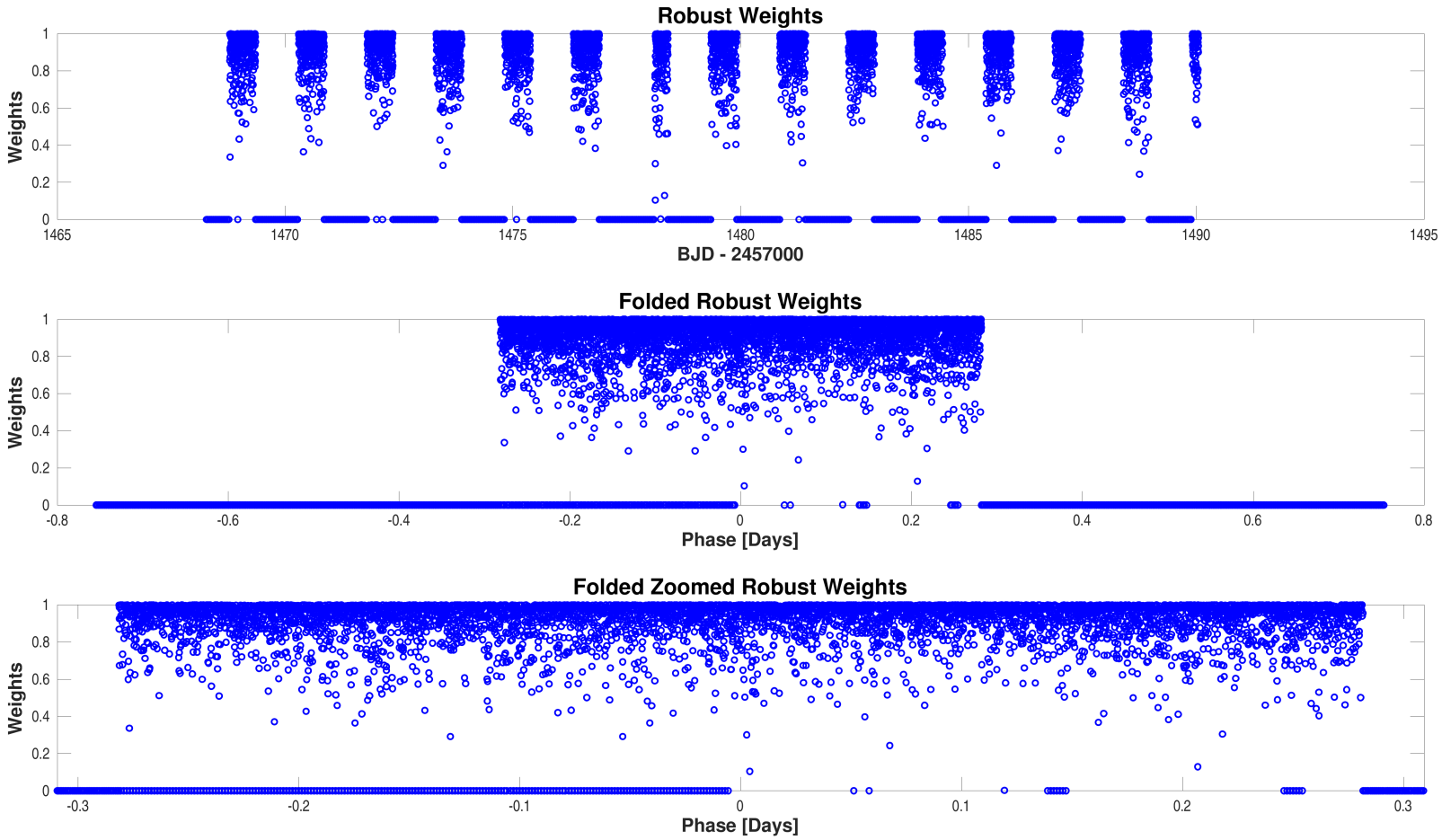


Optical ghost diagnostic halo aperture flux time series for target 36352297, planet candidate 1. The unwhitened time series is phase folded at the orbital period associated with the planet candidate and centered on the epoch of the first transit. The time series was first cotrended against spacecraft engineering data, motion proxies, and/or cotrending basis vectors (CBVs) to remove systematic effects. Flux time series data represent the mean per pixel flux in the core or haloaperture; phase folded data points are shown in the figure with black dots. Binned and averaged phase folded flux values are marked with filled blue circles. The unwhitened transit model light curve is displayed in the figure with a red line. The value and significance of the halo aperture correlation statistic are displayed in the figure title if the statistic was successfully computed.

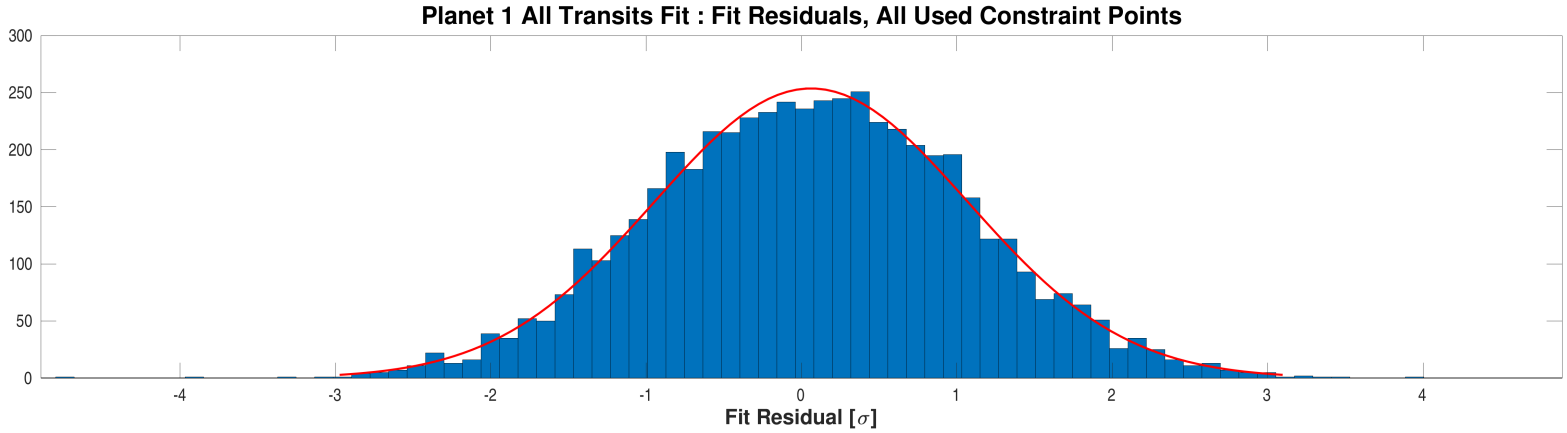
Open `./planet-01/ghost-diagnostic-results/0000000036352297-01-halo-unwhitened-cotrended-zoomed-model.fig`

Appendix A Planet Candidate 1

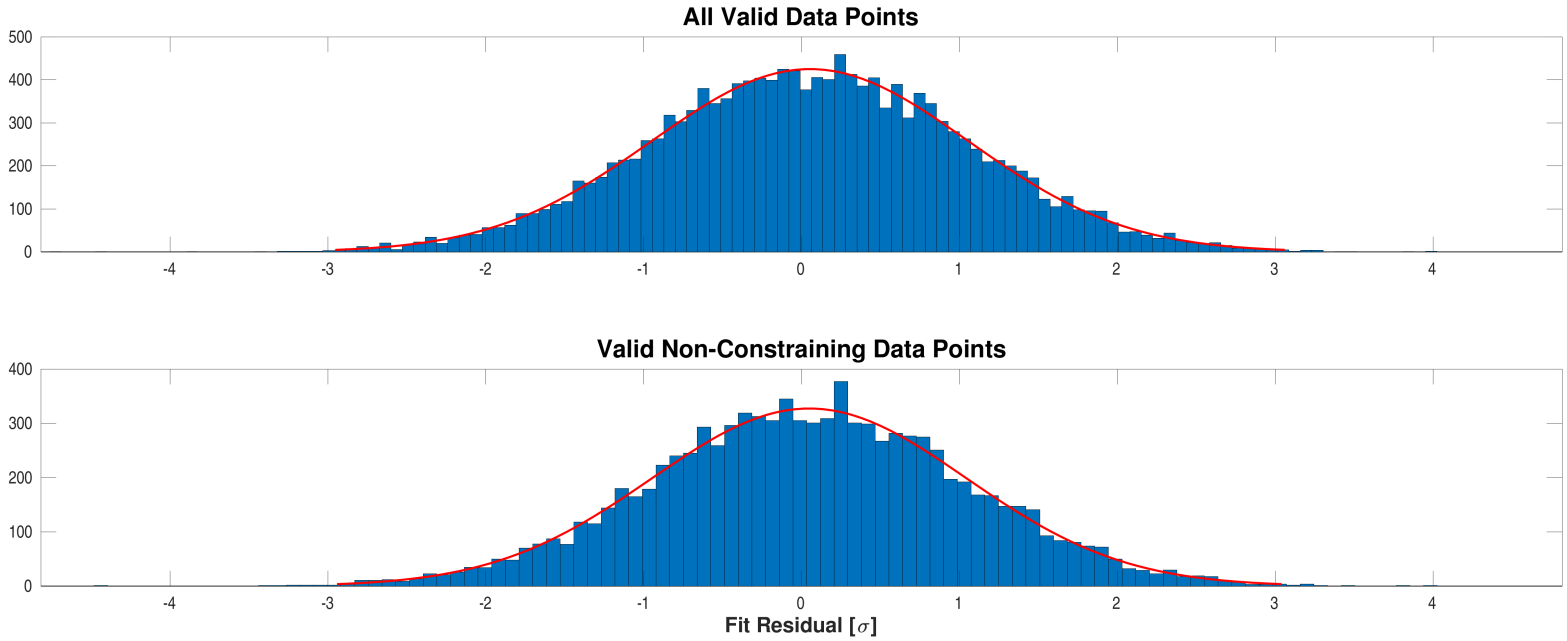
A.1 Model Fitter: All Transits



Robust weights distribution for CatId 36352297, Planet candidate 1. Top plot: all data points. Middle plot: all data points, folded per the fitted period and epoch. Bottom plot: all data points, folded and zoomed.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000036352297-01-all-robust-weights.fig`



Fit residuals distribution for CatId 36352297, Planet candidate 1. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000036352297-01-all-histo-used.fig`

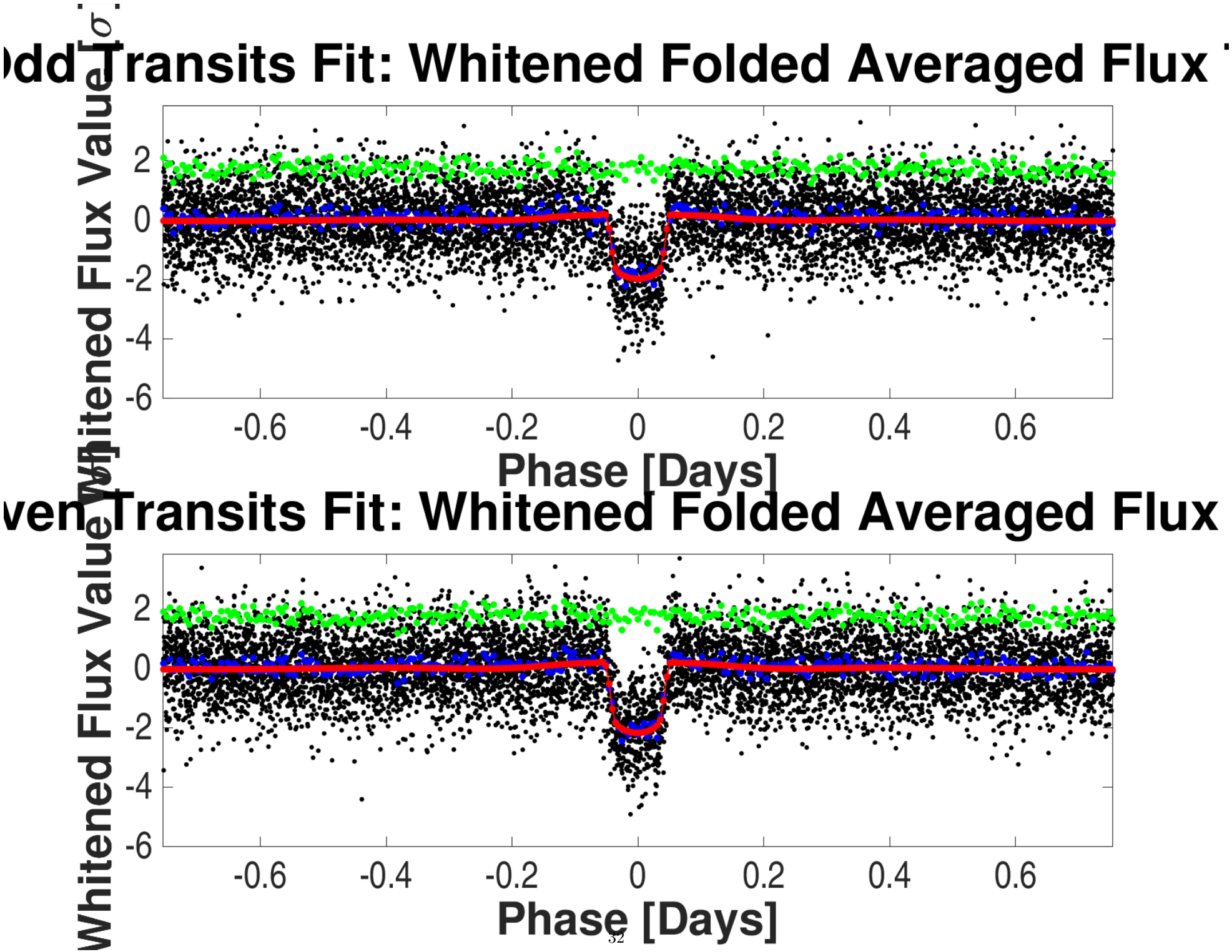


Fit residuals distribution for CatId 36352297, Planet candidate 1. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000036352297-01-all-histo-all-and-unused.fig`

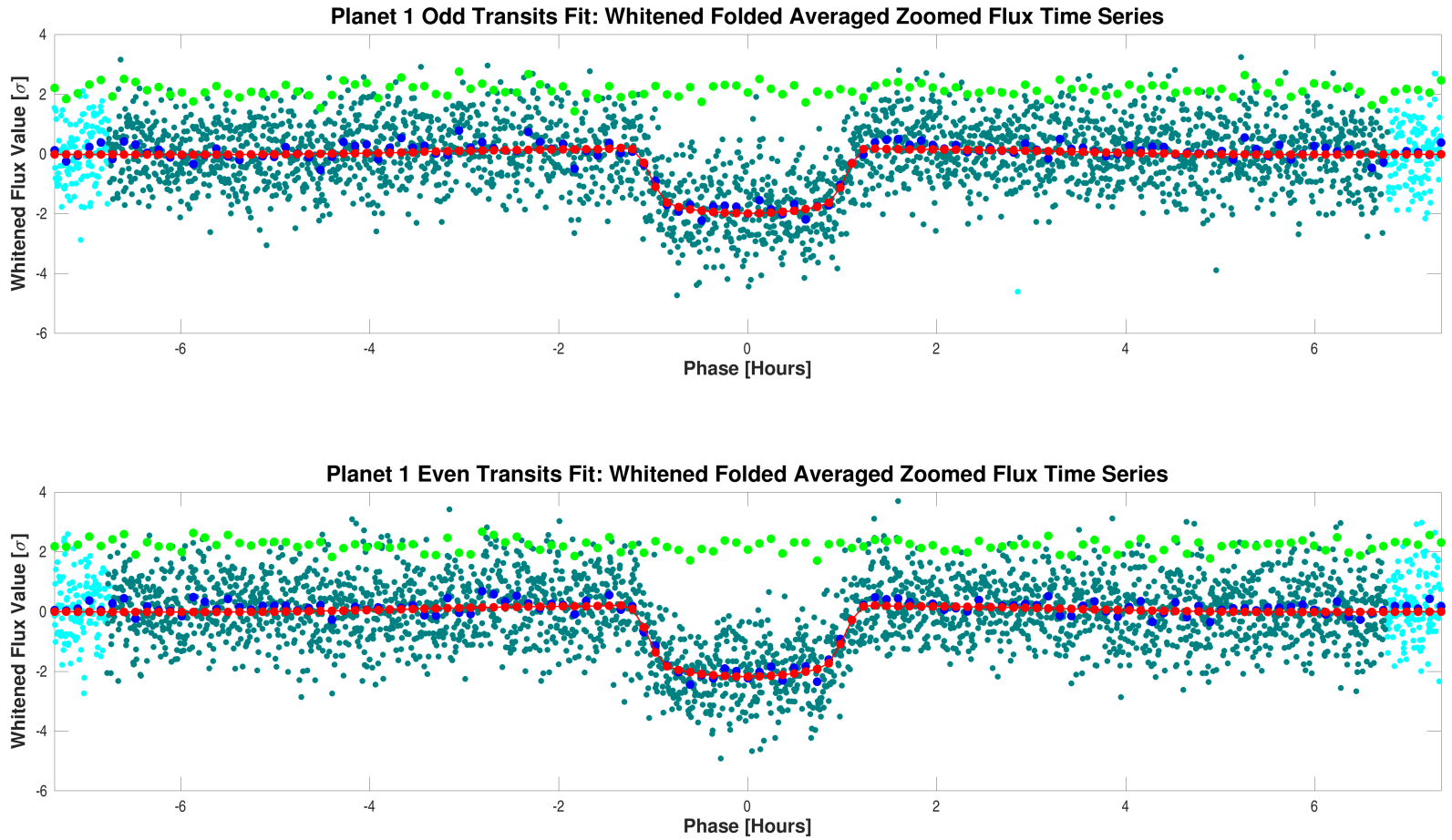
A.2 Model Fitter: Odd & Even Transits

Parameter	Odd Transits Value	Odd Transits Uncertainty	Even Transits Value	Even Transits Uncertainty	Units	Difference / ‖Uncertainty‖
SNR	35.0		40.1			
Orbital Period	1.5091300	1.5906e-04	1.5089326	1.4836e-04	days	9.0767e-01
Transit Epoch	1469.0673285	1.1898e-03	1470.5768212	1.0925e-03	BTJD	2.9446e-01
Impact Parameter	0.2612	4.8926e-01	0.2426	4.4971e-01		2.8016e-02
Planet Radius to Star Radius Ratio	0.1409020	4.2731e-03	0.1476631	3.8419e-03		1.1766e+00
Semi-major Axis to Star Radius Ratio	5.2832	6.9690e-01	5.2701	5.8771e-01		1.4397e-02
Planet Radius	17.0743	5.1781e-01	17.8936	4.6556e-01	Earth radii	1.1766e+00
Semi-major Axis	0.0253	1.7800e-06	0.0253	1.6603e-06	AU	9.0767e-01
Effective Stellar Flux	2155.8528	3.0296e-01	2156.2288	2.8266e-01	Goldilocks	9.0768e-01
Equilibrium Temperature	1738	6.1057e-02	1738	5.6958e-02	Kelvin	9.0767e-01
Stellar Density	0.8699	3.4424e-01	0.8637	2.8894e-01	Solar density	1.3887e-02
Transit Depth	22773	6.8859e+02	25049	6.6758e+02	ppm	2.3737e+00
Transit Duration	2.4448	9.7081e-02	2.4752	8.6027e-02	hours	2.3435e-01
Transit Ingress Duration	0.3247	9.8519e-02	0.3394	8.7145e-02	hours	1.1174e-01
Eccentricity	0.0000	0.0000e+00	0.0000	0.0000e+00		
Peri Longitude	0.0000	0.0000e+00	0.0000	0.0000e+00	degrees	
Model Chi Square Statistic (DoF)	4413.3 (5100.0)		4413.3 (5100.0)			

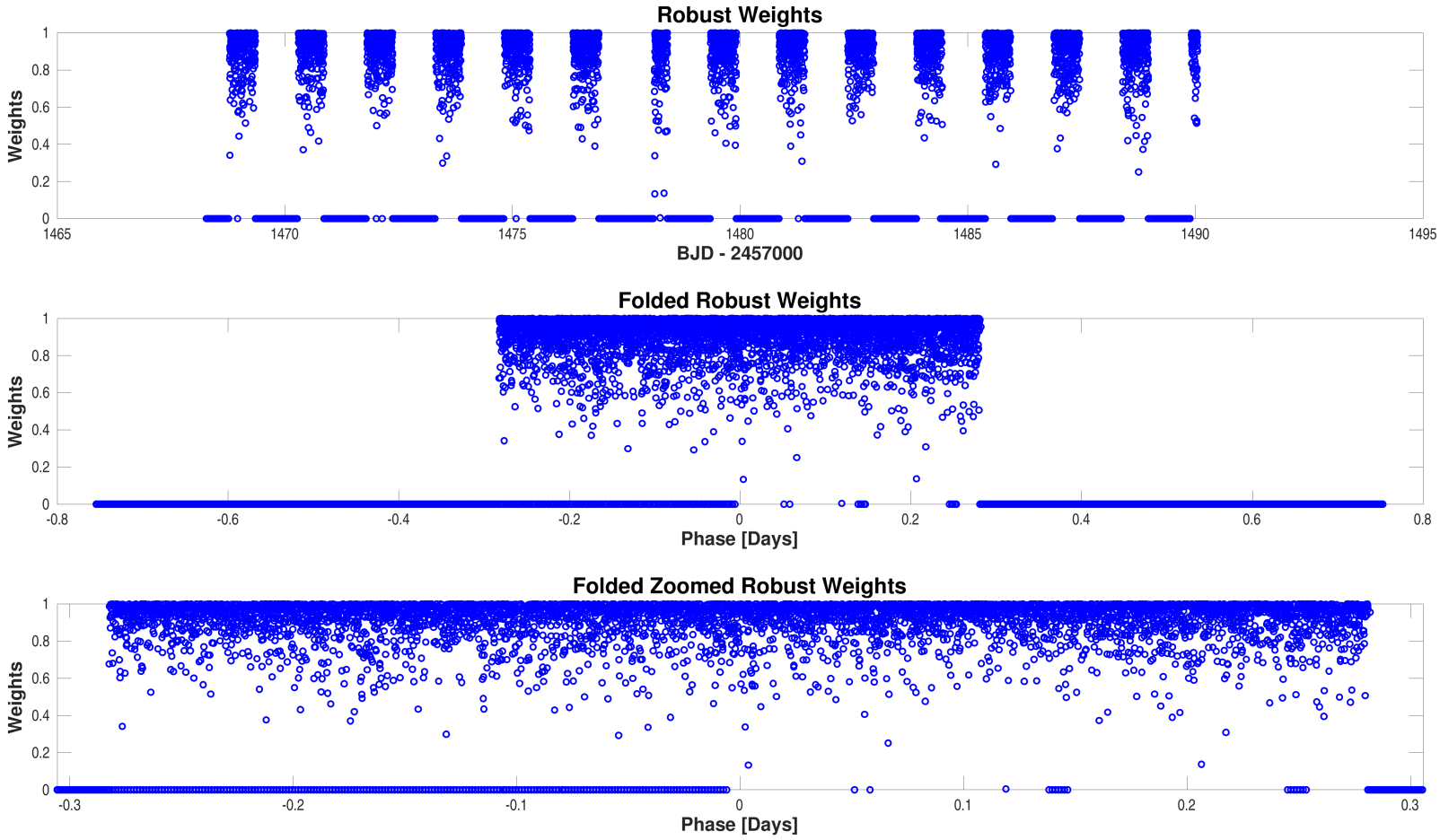
DoF: Degrees of Freedom


dd Transits Fit: Whitened Folded Averaged Flux
Whitened Flux Value [σ]
2
0
-2
-4
-6
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
Phase [Days]
ven Transits Fit: Whitened Folded Averaged Flux
Whitened Flux Value [σ]
2
0
-2
-4
-6
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
Phase [Days]

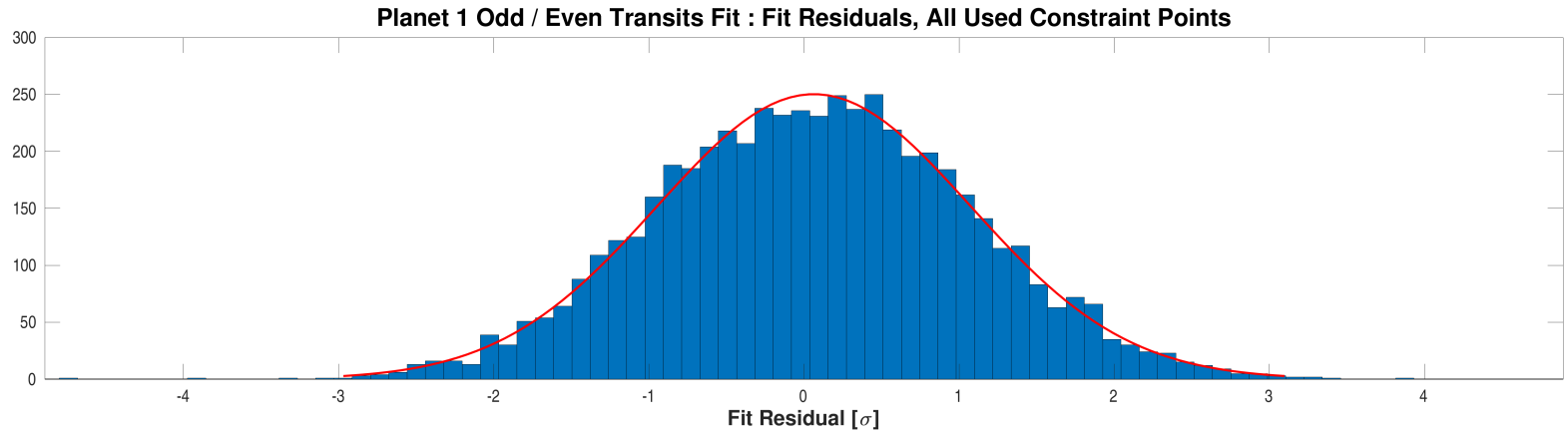
Folded flux time series for CatId 36352297, Planet candidate 1 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light curve of the odd/even transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Odd-even transits fit completed with full convergence.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000036352297-01-odd-even-whitened.fig`



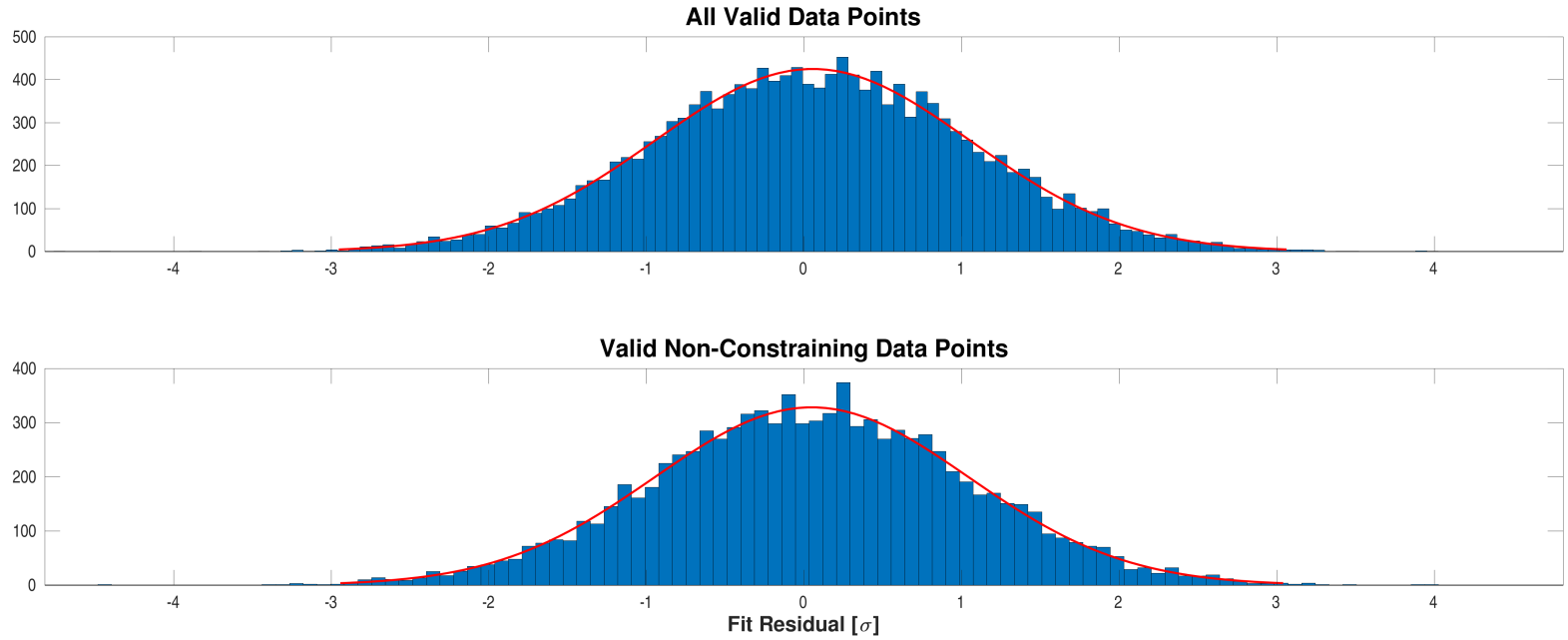
Folded flux time series for CatId 36352297, Planet candidate 1 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the fitted model light curve of the odd/even transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Magenta dots are the averaged values of the folded flux time series, with a phase shift of 0.5 relative to the blue dots, vertically offset for clarity. Odd-even transits fit completed with full convergence.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000036352297-01-odd-even-whitened-zoomed.fig`



Robust weights distribution for CatId 36352297, Planet candidate 1. Top plot: all data points. Middle plot: all data points, folded per the fitted period and epoch. Bottom plot: all data points, folded and zoomed.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000036352297-01-odd-even-robust-weights.fig`

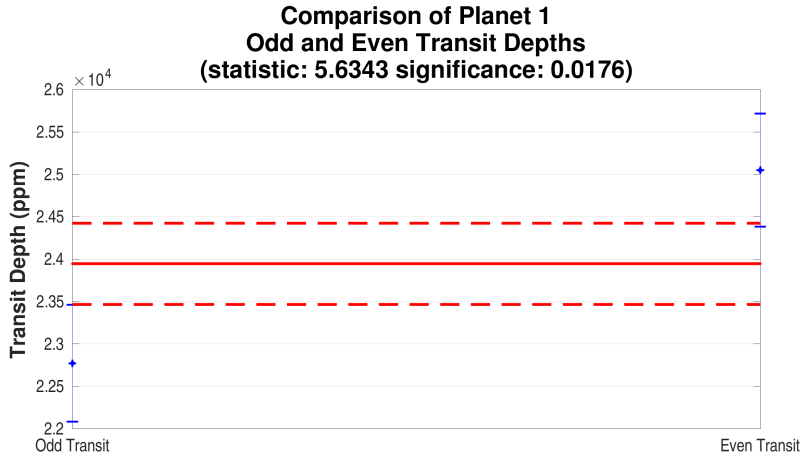


Fit residuals distribution for CatId 36352297, Planet candidate 1. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000036352297-01-odd-even-histo-used.fig`



Fit residuals distribution for CatId 36352297, Planet candidate 1. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000036352297-01-odd-even-histo-all-and-unused.fig`

A.3 Eclipsing Binary Discrimination Test



Top-left: Diagnostic plot of Odd/Even Transit Depth Test for catId 36352297, planet 1. A significance level close to 1/0 favors a transiting planet/an eclipsing binary. Open `./planet-01/binary-discrimination-test-results/000000036352297-01-eclipsing-binary-discrimination-tests.fig`

Appendix B Alerts

Time	Severity	Message
1531.5139	warning	TOI matching is disabled (target=1, catId=36352297, component=performDvToiMatching)