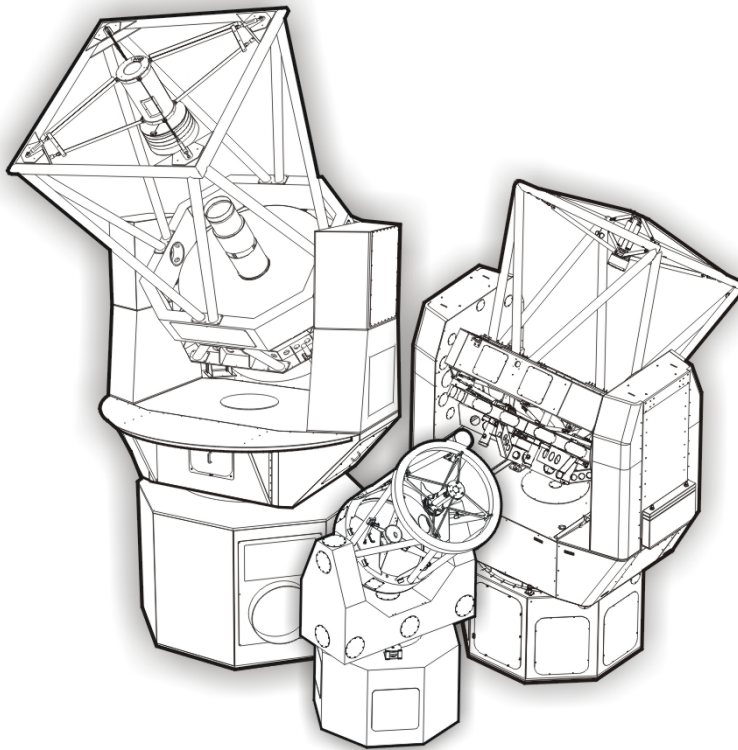




EOS Technologies, Inc.

AUTOMATED PLANET FINDER TELESCOPE OPTICAL PRESCRIPTION

OPT-5020-2



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DOCUMENT CONTROL**Issue: 1**

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Issue	Date	Description	Prep	Chk	Appr
1	10/22/2003	Initial release	RLM	CS	RLM
2	1/13/2010	Updated prescription	AL	DSS	DSS

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AUTOMATED PLANET FINDER TELESCOPE OPTICAL PRESCRIPTION

1. INTRODUCTION

1.1 SCOPE

This document describes the optical prescription of the Automated Planet Finder Telescope, both the initial prescription and the final prescription (telescope only).

1.2 CONFIGURATION STATUS

This document has been configured as OPT-5020 and is a designated controlled document under the EOST Quality System.

2. INITIAL OPTICAL PRESCRIPTION

2.1 SUMMARY

A complete system optical design was prepared by UC and the parameters related to the telescope have been accepted by EOST. These are shown on the following pages.

Surf	Type	Comment	Radius	Thickness	Glass	Diameter	Conic
OBJ	STANDARD		Infinity	Infinity		0	0
1	STANDARD	BAFFLE DIAM. TBD!	Infinity	3077.831		350	0
STO	STANDARD	EOS 2.4M F/1.5	-7200	-3077.831	MIRROR	2350	-1
3	STANDARD	F/15 SECONDARY	-1163.126	2500	MIRROR	341.8975	-1.506732
4	COORDBRK		-	0		-	-
5	STANDARD	TERTIARY	Infinity	0	MIRROR	254.9154	0
6	COORDBRK	A GUESS...	-	-2000		-	-
7	STANDARD	ALT BEARING FACE	Infinity	-30		200	0
8	STANDARD	LICK I2 CELL	Infinity	-6	BK7	70	0
9	STANDARD	3" I2 PATHLENGTH	Infinity	-75	VACUUM	70	0
10	STANDARD	"	Infinity	-6	BK7	70	0
11	STANDARD	BFD UPPED TO 500	Infinity	-500		70	0
12	STANDARD	SLIT PLANE	Infinity	-134.7804		100	0
13	COORDBRK		-	0		-	-
14	STANDARD	25MM DIAM FLAT	Infinity	0	MIRROR	25	0
15	COORDBRK		-	0		-	-
16	COORDBRK		-	25		-	-
17	STANDARD	FRD: LENS J	25.7359	7	CAF2EPPS	16	0
18	STANDARD		-19.12746	0.08	Q2-3067	16	0
19	STANDARD	FRD: LENS H	-19.12746	3	S-LAL7	16	0
20	STANDARD		-56.46842	48.95852		16	0
21	STANDARD	FRD: LENS G	10.20903	7	CAF2EPPS	12	0
22	STANDARD		-53.14231	9		12	0
23	STANDARD	INTERNAL FOCAL PL	Infinity	9		9	0

24	COORDBRK	AXIS SHIFT	-	0		-	-
25	STANDARD	FF: LENS F	Infinity	10	I-BAL15Y	66	0
26	STANDARD	SET @ 55.0MM	129.198	55		66	0
27	STANDARD	FOLDFLAT PLANE	Infinity	63.13345		0	0
28	STANDARD	LENS E	676.756	40	I-FPL51Y	200	0
29	STANDARD	R HELD FOR GHOSTS	-205.2464	362.8223		200	0
30	STANDARD	LENS D	-1089.185	11.25	I-BSM51Y	300	0
31	STANDARD	OIL GAP	339.0112	0.342	_LL-4750	270	0
32	STANDARD	LENS C	339.0112	100	CAF2EPPS	270	0
33	STANDARD	OIL GAP	-176.688	0.342	_LL-4750	270	0
34	STANDARD	LENS B	-176.688	10	I-BSM51Y	270	0
35	STANDARD		-463.3058	1.8		300	0
36	STANDARD	LENS A	2478.977	50	I-FPL51Y	300	0
37	STANDARD		-339.1263	99		300	0
38	COORDBRK	PRISM ATTACK ANGL	-	0		-	-
39	STANDARD	105MM THICK PRISM	Infinity	105	BSL7Y	300.7035	0
40	COORDBRK	45 DEGREE APEX	-	0		-	-
41	STANDARD	2ND PRISM FACE	Infinity	0		284.4532	0
42	COORDBRK	500MM TO ECHELLE	-	500		-	-
43	COORDBRK	GAM=0; ALPHA=76.3	-	0		-	-
44	DGRATING	ECHELLE	Infinity	0	MIRROR	679.9543	0
45	COORDBRK	DETILT	-	0		-	-
46	COORDBRK	DETILT	-	0		-	-
47	COORDBRK	DETILT	-	-500		-	-
48	COORDBRK	INTO PRISM AGAIN	-	0		-	-

49	STANDARD	3RD PRISM FACE	Infinity	-104.3579	BSL7Y	292.8966	0
50	COORDBRK		-	0		-	-
51	STANDARD	4TH PRISM FACE	Infinity	0		298.0202	0
52	COORDBRK		-	-99		-	-
53	STANDARD	LENS A AGAIN	-339.1263	-50	I-FPL51Y	300	0
54	STANDARD		2478.977	-1.8		300	0
55	STANDARD	LENS B AGAIN	-463.3058	-10	I-BSM51Y	300	0
56	STANDARD		-176.688	-0.342	_LL-4750	270	0
57	STANDARD	LENS C AGAIN	-176.688	-100	CAF2EPPS	270	0
58	STANDARD		339.0112	-0.342	_LL-4750	270	0
59	STANDARD	LENS D AGAIN	339.0112	-11.25	I-BSM51Y	270	0
60	STANDARD		-1089.185	-362.8223		300	0
61	STANDARD	LENS E AGAIN	-205.2464	-40	I-FPL51Y	200	0
62	STANDARD		676.756	-63.13345		200	0
63	COORDBRK		-	0		-	-
64	STANDARD	FOLD FLAT	Infinity	0	MIRROR	112.9157	0
65	COORDBRK		-	55		-	-
66	STANDARD	PLANO-CNCV F-F	-129.3096	10	I-BAL15Y	84	0
67	STANDARD	BFD SET AT 9.0MM	Infinity	9	VACUUM	84	0
IMA	STANDARD	E2V CCD42-90 CCD	Infinity			70.28251	

3. UPDATED OPTICAL PRESCRIPTION

3.1 SUMMARY

The prescription was updated using ‘as-built’ parameters for radius of curvature and conic constant on the primary and secondary mirrors. The secondary mirror parameters were confirmed via measurement at Lick. The primary mirror parameters were measured by the vendor, Rayleigh.

At the predicted best focus position, initial sky testing with a Shack-Hartmann showed significant spherical aberration. Based on measurements, revised values for the primary curvature and conic were estimated. To get acceptable performance at the required instrument location, Lick fabricated a new secondary mirror. Sky testing with the new mirror showed small (acceptable) spherical aberration at the instrument location, confirming the estimate of the primary mirror and measurement of the new secondary parameters.

An updated ZEMAX prescription for the telescope optics only, including the baffle locations, is shown on the following page. This does not include the atmospheric dispersion compensators (ADCs) or any instrument-related optics.

Surf	Type	Radius	Thickness	Glass	Diameter	Conic	Comment
OBJ	STANDARD	Infinity	Infinity		0	0	
1	COORDBRK	-	0		-	-	
2	STANDARD	Infinity	0		2351.942	0	Spider
3	COORDBRK	-	420		-	-	
4	STANDARD	Infinity	2910.64		414	0	M2 Baffle OD
STO	STANDARD	Infinity	95.8		2350	0	M1 Edge
6	STANDARD	-7213.8	-1216.4	MIRROR	2400	-0.9982	M1 Estimate
7	STANDARD	Infinity	-1790.04		260	0	M1 Baffle OD
8	STANDARD	Infinity	-62		410	0	M2 Baffle ID
9	STANDARD	-1198.82	1852.04	MIRROR	370	-1.4893	As-Built M2
10	STANDARD	Infinity	623		244	0	M1 Baffle ID
11	COORDBRK	-	0		-	-	
12	STANDARD	Infinity	0	MIRROR	288.3875	0	M3
13	COORDBRK	-	-163.5		-	-	
14	STANDARD	Infinity	-2025.5		197	0	M1 Baffle Hole
15	STANDARD	Infinity	-631		60.23846	0	Tine Interface
IMA	STANDARD	Infinity			20.73804	0	