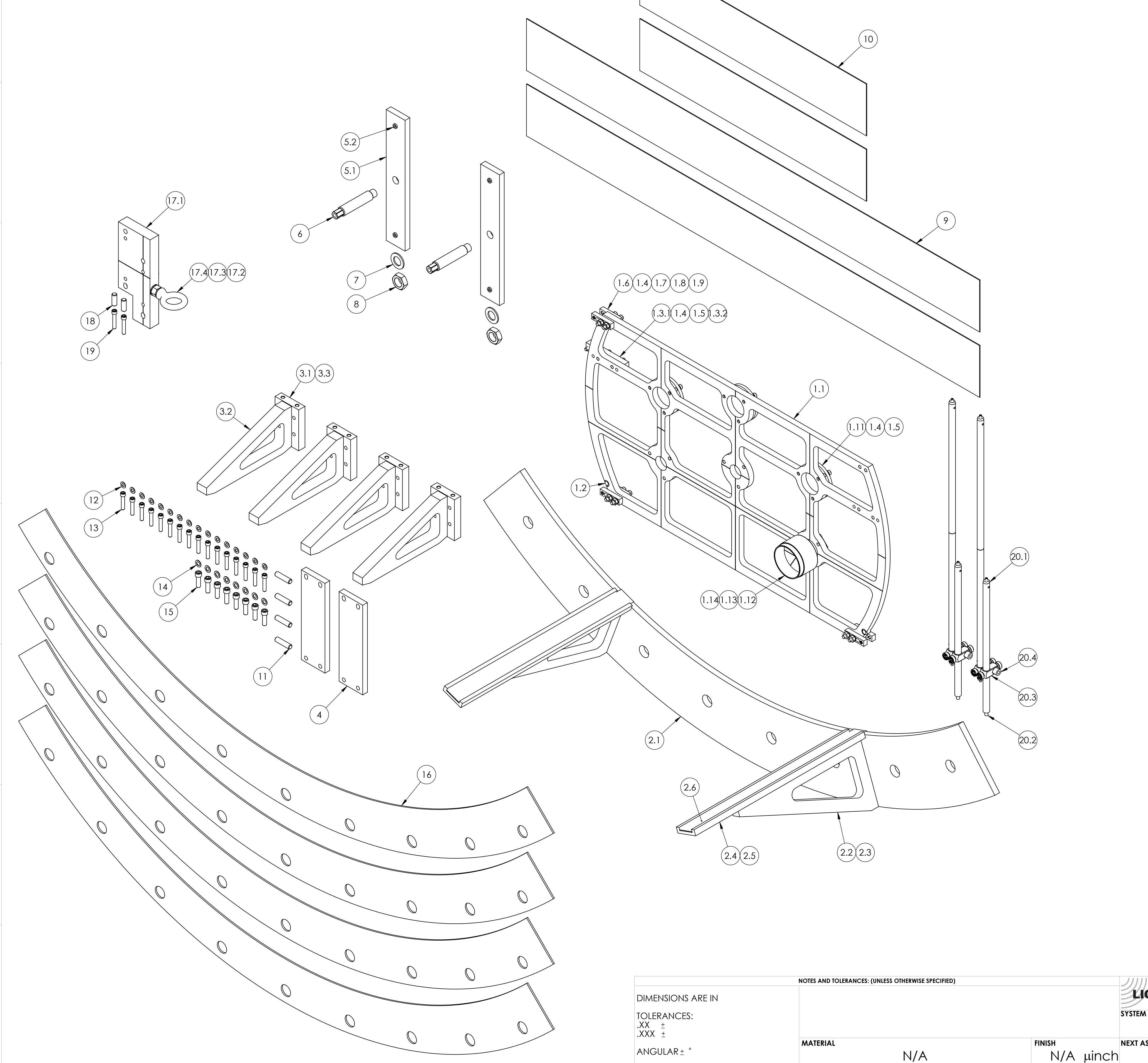


NOTES:
 1. ADDITIONAL TOOLING USED:
 7/8-9 UNC X 4L HEX HEAD BOLT, QUANTITY- 8, (AVAILABLE FROM DE-INSTALL OF A1 ADAPTER)
 FLAT WASHER FOR 7/8 BOLT, QUANTITY- 16, (AVAILABLE FROM DE-INSTALL OF A1 ADAPTER)
 7/8-9 UNC NUT, QUANTITY- 8, (AVAILABLE FROM DE-INSTALL OF A1 ADAPTER)

REV.	DATE	DCN #	DRAWING TREE #
v1	09 JUL 2013	-	
v2	10 JUL 2013	-	



20.4	TR2 (Thorlabs)	1	OPTICAL POST, 1/2" DIA., 2"L, 8-32 STUD, 1/4-20 HOLE	300 SSSL	
20.3	RA90 (Thorlabs)	2	RIGHT ANGLE POST CLAMP	6061-T6 Al	
20.2	92311A541 (McM-Carr) or equiv	2	SCREW, SOCKET SET, 0.25-20 UNC-2A X 0.875 LONG	300 SSSL	
20.1	TR12 (Thorlabs)	3	OPTICAL POST, 1/2" DIA., 12"L, 8-32 STUD, 1/4-20 HOLE	300 SSSL	
20	D1300618	2	aLIGO PCAL TOOLING, ROTATION STABILIZING BAR ASSEMBLY	N/A	
19	92196A545 (McM-Carr) or equiv	2	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 1.375 LONG	300 SSSL	
18	98381A624 (McM-Carr) or equiv	2	DOWEL PIN, 3/8 X 1 L	Alloy Steel	
17.4	8891179 (McM-Carr) or equivalent	1	EYEBOLT, SHOULDER, 1/2-13 X 1-1/2L THREAD	316 SSSL	
17.3	91845A310 (McM-Carr) or equiv	1	HEX NUT, 1/2-13	300 SSSL	
17.2	98017A655 (McM-Carr) or equiv PER NAS 1149-C0863R	1	WASHER, FLAT, 1/2	300 SSSL	
17.1	D1201577-02	1	aLIGO PCAL TOOLING, PERISCOPE PRE-ALIGNMENT TIP AXIS BASE, LIFTING	6061-T6 Al	
17	D1300621	1	aLIGO PCAL TOOLING, PERISCOPE LIFT BLOCK ASSEMBLY	N/A	
16	D1300496	4	aLIGO FMP TOOLING, FLANGE PROTECTOR, 72-1/4" I.D.	6061-T6 Al	
15	92196A583 (McM-Carr) or equiv	8	SCREW, SOCKET HEAD CAP, 5/16-18 UNC-2A X 1 LONG	300 SSSL	
14	98017A220 (McM-Carr) or equiv PER NAS 1149-C0532R	8	WASHER, FLAT, 5/16	300 SSSL	
13	92196A714 (McM-Carr) or equiv	16	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 1.25 LONG	300 SSSL	
12	98017A655 (McM-Carr) or equiv PER NAS 1149-C0432R	16	WASHER, FLAT, 1/4	300 SSSL	
11	98381A628 (McM-Carr) or equiv	4	DOWEL PIN, 3/8 X 1-1/2 L	Alloy Steel	
10	D1300493-02	2	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION HIGHWAY STRIP, 24"	PTFE	
9	D1300493-01	2	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION HIGHWAY STRIP, 48"	PTFE	
8	91847A550 (McM-Carr) or equiv	2	JAM NUT, 3/4-10	300 SSSL	
7	98017A220 (McM-Carr) or equiv PER NAS 1149-C1290R	2	WASHER, FLAT, 3/4	300 SSSL	
6	D1300228	2	aLIGO PCAL TOOLING, PERISCOPE JACK SCREW	NITRONIC 60	
5.2	92778A135 (McM-Carr) or equiv	2	SCREW, SOCKET SET, OVAL POINT, 3/8-16 UNC X 0.625 LONG	300 SSSL	
5.1	D1300229	1	aLIGO PCAL TOOLING, PERISCOPE SUPPORT FOOT	6061-T6 Al	
5	D1300620	2	aLIGO PCAL TOOLING, PERISCOPE SUPPORT FOOT ASSEMBLY	N/A	
4	D1300237	2	aLIGO PCAL TOOLING, PERISCOPE STABILIZING BAR	6061-T6 Al	
3.3	92196A582 (McM-Carr) or equiv	3	SCREW, SOCKET HEAD CAP, 5/16-18 UNC-2A X 0.875 LONG	300 SSSL	
3.2	D1300236	1	aLIGO PCAL TOOLING, PERISCOPE SLIDE	6061-T6 Al	
3.1	D1300235	1	aLIGO PCAL TOOLING, PERISCOPE STABILIZING MOUNT	6061-T6 Al	
20.2	D1300245	4	aLIGO PCAL TOOLING, PERISCOPE STABILIZING SLIDE	N/A	
2.6	D1300383	2	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION ENTRY PAD SKID	PTFE	
2.5	90585A540 (McM-Carr) or equiv	10	FLAT HEAD SOCKET SCREW, 1/4-20 X 3/4	18-8 SSSL	
2.4	D1300382	2	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION ENTRY PAD CHANNEL	6061-T6 Al	
2.3	92196A540 (McM-Carr) or equiv	8	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 0.75 LONG	300 SSSL	
2.2	D1300381	2	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION ENTRY PAD GUSSET	6061-T6 Al	
2.1	D1300380	1	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION ENTRY PAD MOUNT	6061-T6 Al	
2	D1300379	1	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION ENTRY PAD ASSEMBLY	N/A	
1.14	D1300497	1	aLIGO PCAL TOOLING, CORNER QUBE ATTACHMENT NUT	6061-T6 Al	
1.13	98079A519 (McM-Carr) or equiv PER MS 15795-822	1	WASHER, FLAT, 0.81 I.D.	300 SSSL	
1.12	D1300125	1	SOKKIA 30MM OFFSET CORNER CUBE	N/A	
1.11	D1300482	3	aLIGO PCAL TOOLING, 2" MIRROR CLAMP	6061-T6 Al	
1.10	M12045-1047 (PRECISION PHOTONICS)	3	MIRROR, 2" DIAMETER, 1047NM HR, 45 DEGREE INCIDENCE	GLASS	
1.9	92778A127 (McM-Carr) or equiv	3	SCREW, SOCKET SET, OVAL POINT, 1/4-20 UNC X 0.5 LONG	300 SSSL	
1.8	91845A029 (McM-Carr) or equiv	6	HEX NUT, 1/4-20	300 SSSL	
1.7	92196A548 (McM-Carr) or equiv	6	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 1.75 LONG	300 SSSL	
1.6	CL3 (ThorLabs)	6	TABLE CLAMP, ANODIZED	6061-T6 Al	
1.5	92196A541 (McM-Carr) or equiv	11	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 0.875 LONG	300 SSSL	
1.4	98017A655 (McM-Carr) or equiv PER NAS 1149-C0432R	23	WASHER, FLAT, 1/4	300 SSSL	
1.3.2	MS16555-641	3	DOWEL PIN, 1/4D, 3/4L	416 SSSL	
1.3.1	D1300454	1	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION CENTER TARGET CLOCKPIECE	6061-T6 Al	
1.3	D1300483	1	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION CENTER TARGET CLOCKPIECE	N/A	
1.2	98380A692 (McM-Carr) or equiv	2	DOWEL PIN, 1/2D, 1/2L	416 SSSL	
1.1	D1300384	1	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION CENTER TARGET PLATE	6061-T6 Al	
1	D1300437-01	1	aLIGO PCAL TOOLING, PERISCOPE INSTALLATION CENTER TARGET ASSEMBLY, X-ARM	N/A	
ITEM NO.	NUMBER	QTY.	SPARE	DESCRIPTION	MATERIAL

NOTES AND TOLERANCES: (UNLESS OTHERWISE SPECIFIED)

DIMENSIONS ARE IN
 TOLERANCES:
 .XX ±
 .XXX ±
 ANGULAR ± °

MATERIAL	FINISH	NEXT ASSY
N/A	N/A μinch	N/A

LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SYSTEM: **ADVANCED LIGO** SUB-SYSTEM: **AOS**

Part Name: aLIGO PCAL TOOLING LAYOUT, PERISCOPE INSTALLATION

DESIGNER: R. SAVAGE 09 JUL 2013 SIZE DWG. NO. **D1300564** REV. **v2**
 DRAFTER: C. CONLEY 09 JUL 2013
 CHECKER: **D**
 APPROVAL: **D**

SCALE: NONE PROJECTION: SHEET 1 OF 1

D1300564 aLIGO PCAL Tooling Layout, Periscope Installation, PART PDM REV: X012, DRAWING PDM REV: X013