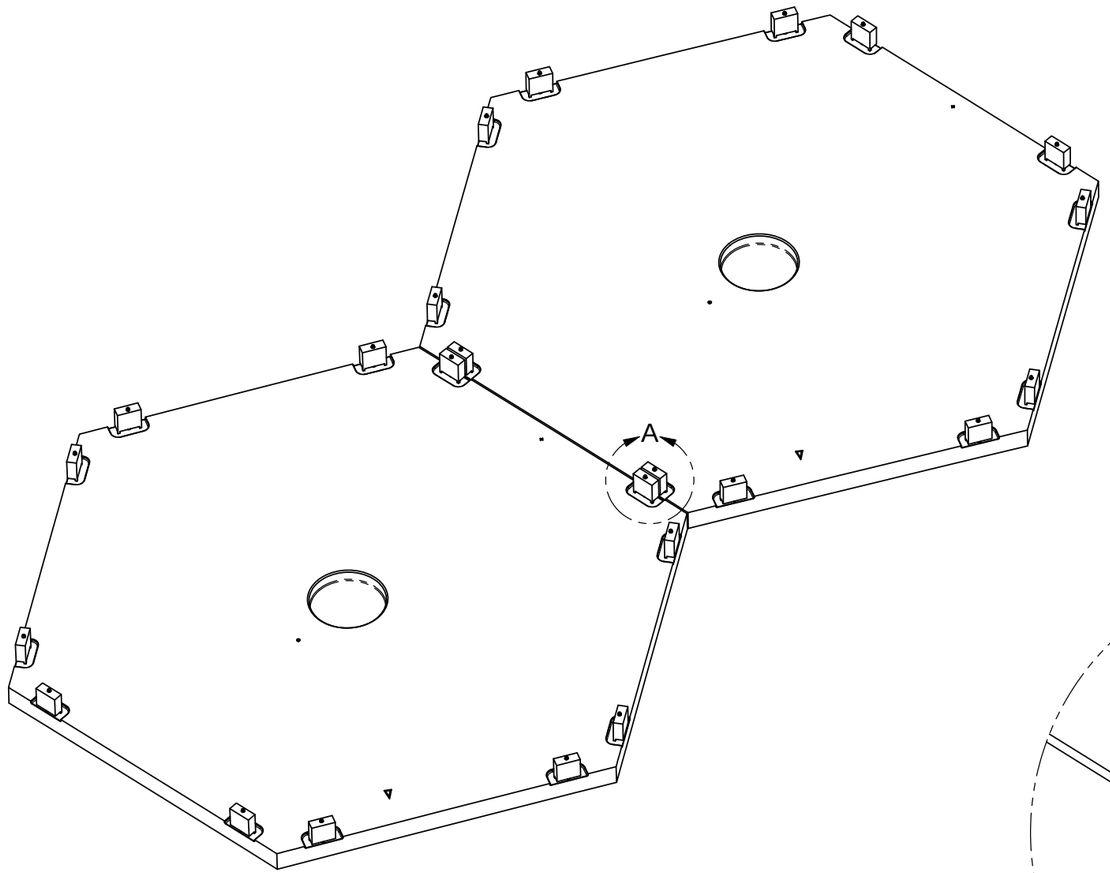
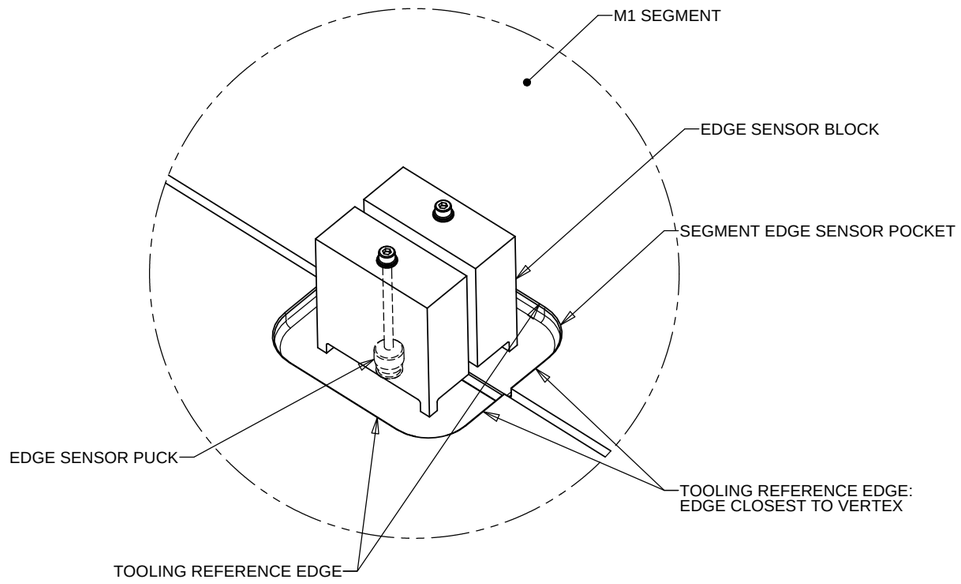
REVISIONS				
REV	SHEET/ZONE	DESCRIPTION	DATE	APPROVED

Proposed for DCC Release
12-18-09



ISOMETRIC VIEW



DETAIL A
NOT SHOWN: DUST BOOT

SEE SHEET 7 FOR NOTES.

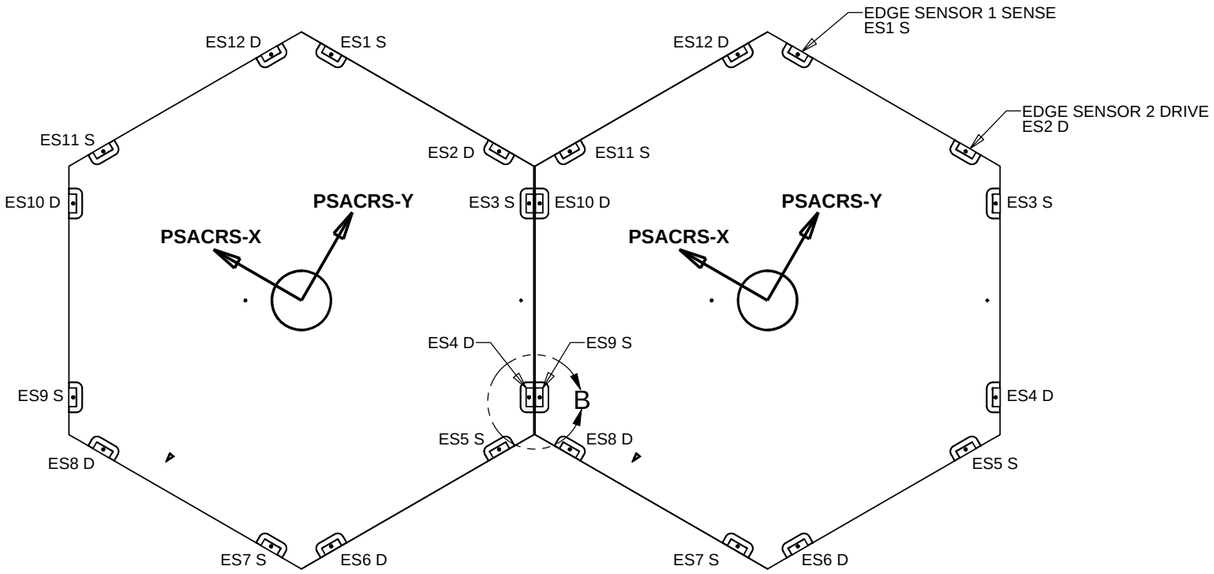
METRIC	UNLESS OTHERWISE SPECIFIED:		NAME	DATE
THIRD ANGLE PROJECTION	DIMENSIONS ARE IN MILLIMETERS TOLERANCES: ANGULAR: MACH ±0.5 ° TWO PLACE DECIMAL ±0.8 THREE PLACE DECIMAL ±0.3 INTERPRET GEOMETRIC TOLERANCING PER: ASME Y14.5M-1994	DRAWN	C. TURB	12/08/09
		CHECKED		
		ENG APPR.	C. EARLES	
		I/F APPR.	C. LINDENSMITH	
		Q.A.		
	MATERIAL			
NEXT ASSY / USED ON	FINISH			
APPLICATION	DO NOT SCALE DRAWING			

TMT Observatory Corporation
www.tmt.org

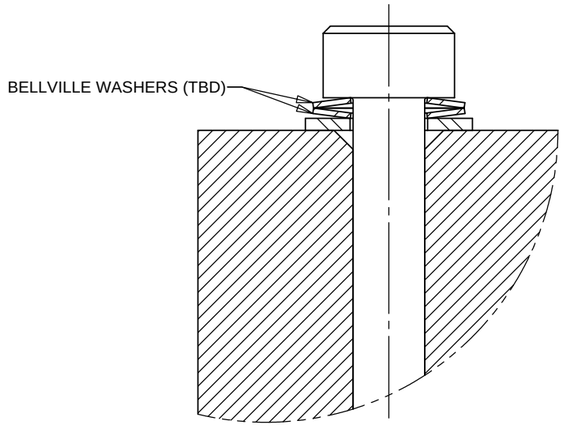
TITLE: MIS SEGMENT - MICS EDGE SENSOR INTERFACE CONTROL DRAWING

SIZE	DWG. NO.	REV.
D	TMT.M1.MICS-INT-001	A

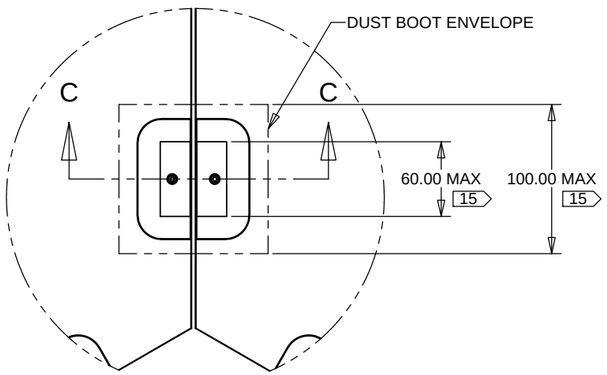
SCALE: NONE | WEIGHT: | SHEET 1 OF 7



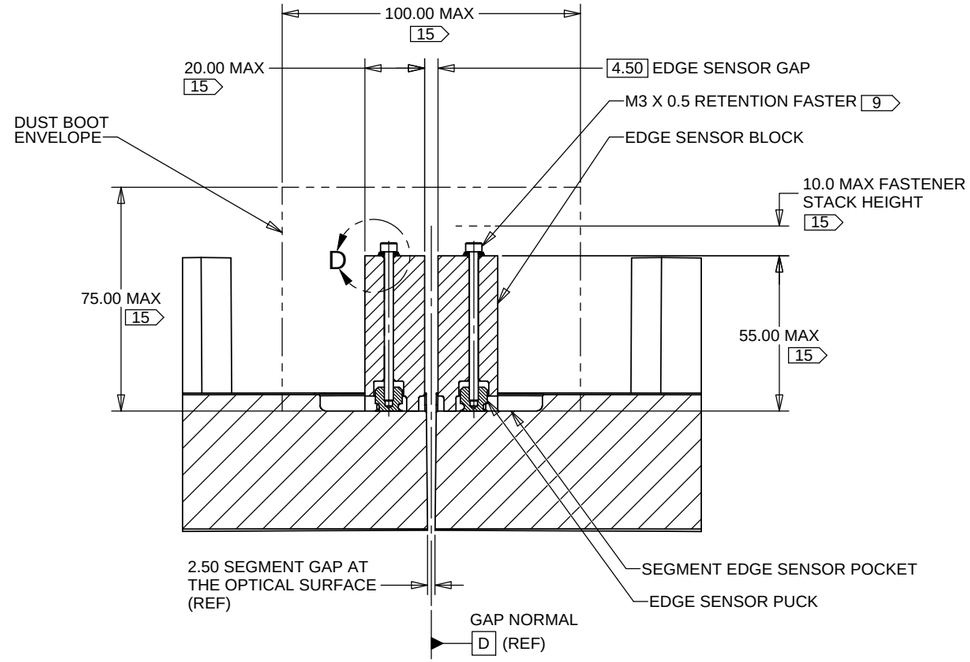
EDGE SENSOR NUMBERING AND SENSE-DRIVE ARRANGEMENT
ADJACENT SEGMENTS VIEWED FROM THE BACK



DETAIL D



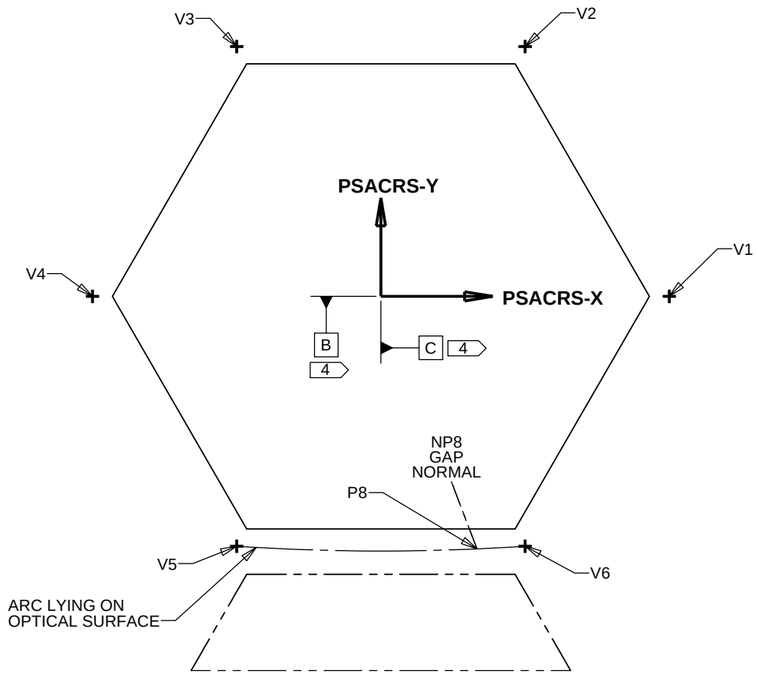
DETAIL B

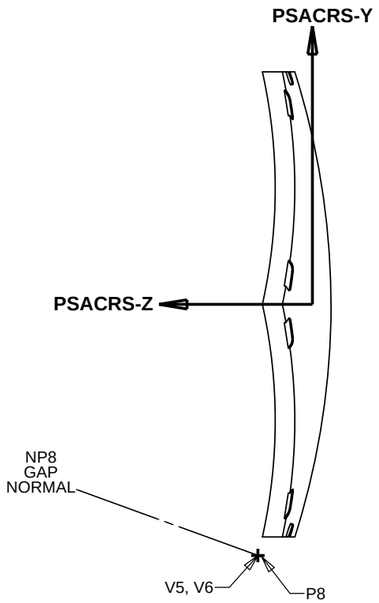


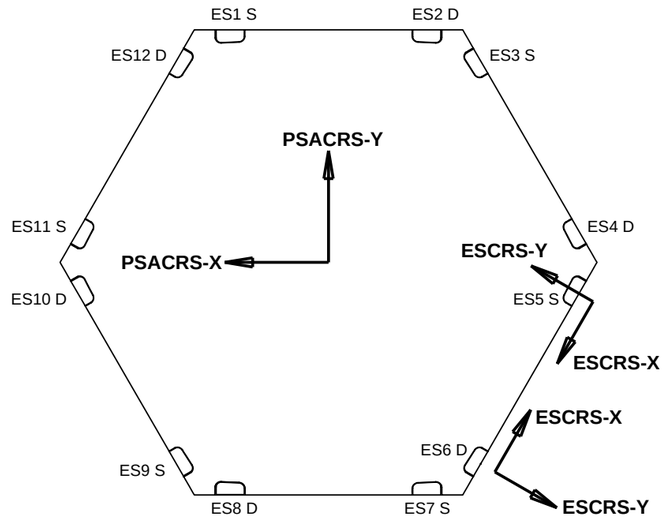
SECTION C-C

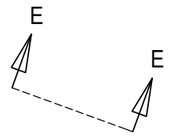
ENVELOPE DIMENSIONS AND ASSEMBLY FEATURES

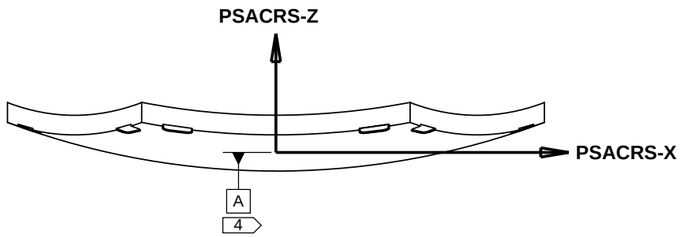
SIZE	DWG. NO.	REV
D	TMT.M1.MICS-INT-001	A
SCALE: NONE	WEIGHT:	SHEET 2 OF 7

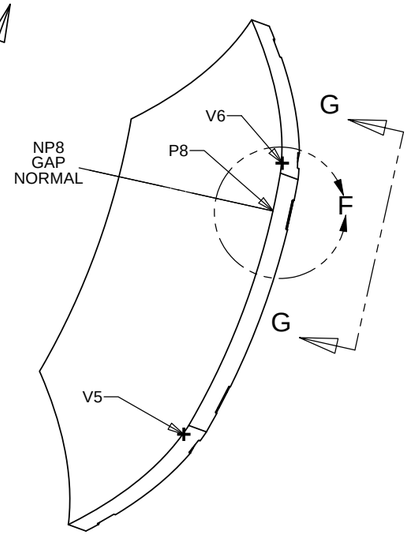




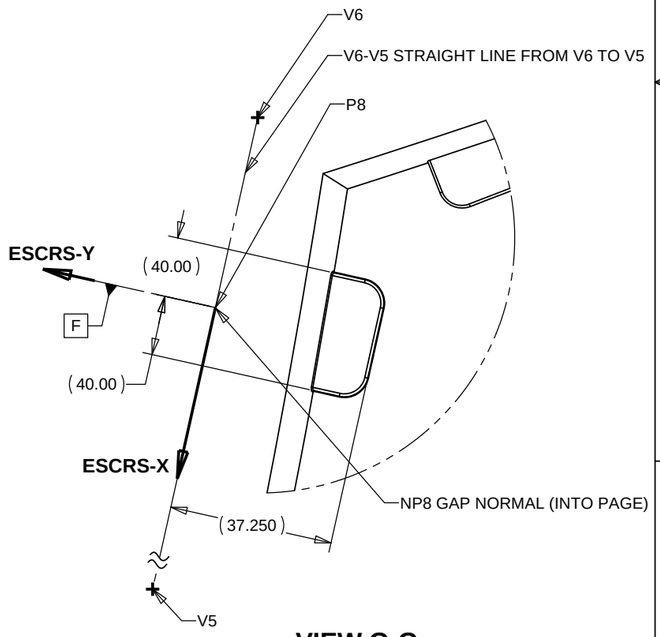




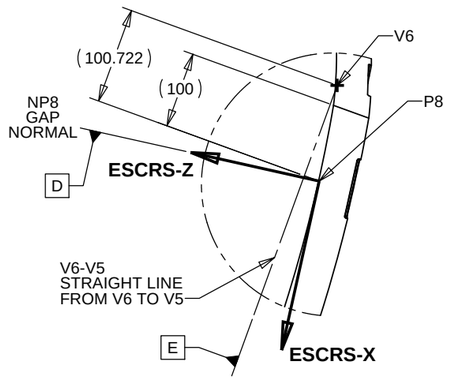




VIEW E-E
PARALLEL TO GAP NORMAL



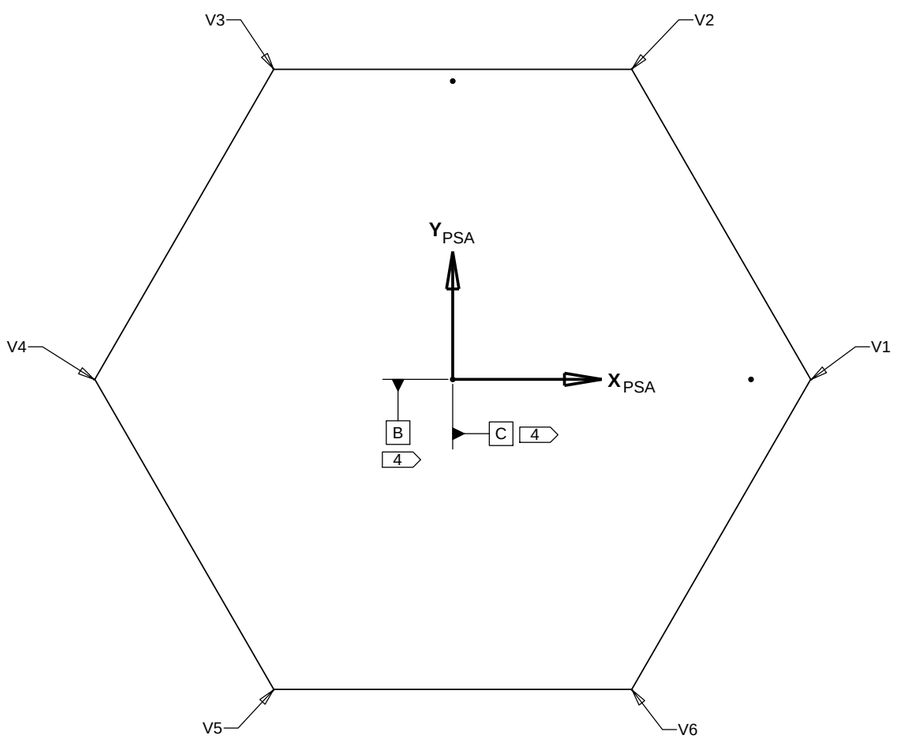
VIEW G-G

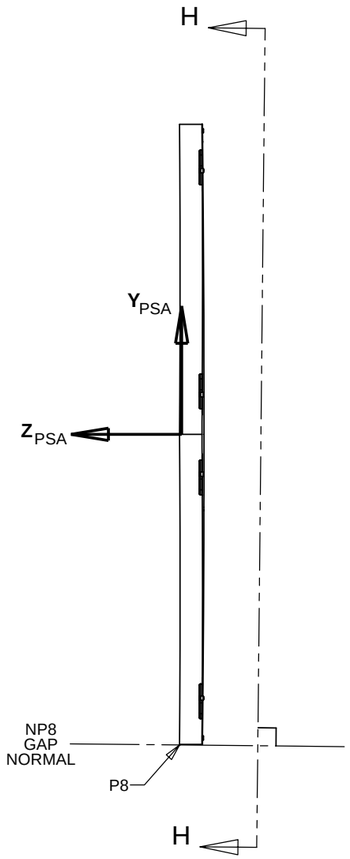


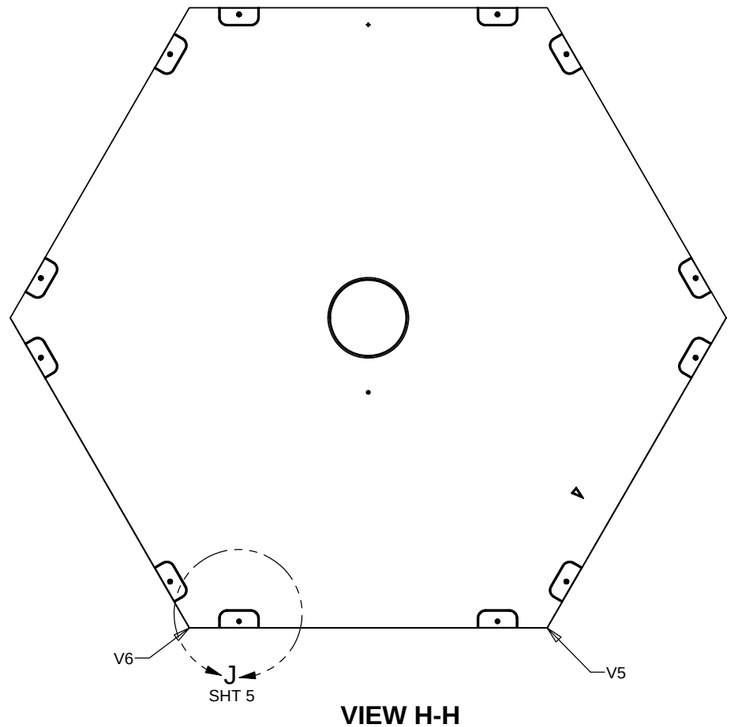
DETAIL F

**INTERFACE THEORETICAL GEOMETRY:
EXAGGERATED SEGMENT GEOMETRY,
GAPS AND CURVATURE GREATLY INCREASED
TO CLARIFY GEOMETRIC CONSTRUCTION
TECHNIQUES. PUCKS NOT SHOWN.**

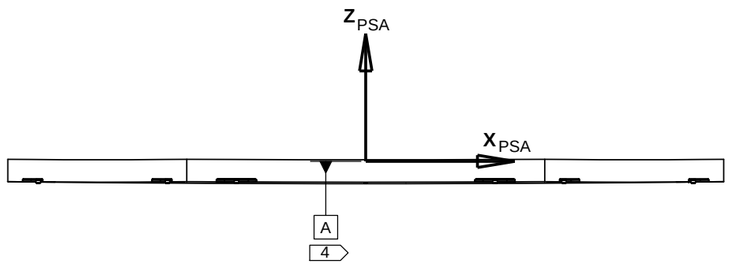
SIZE	DWG. NO.	REV
D	TMT.M1.MICS-INT-001	A
SCALE: NONE	WEIGHT:	SHEET 3 OF 7





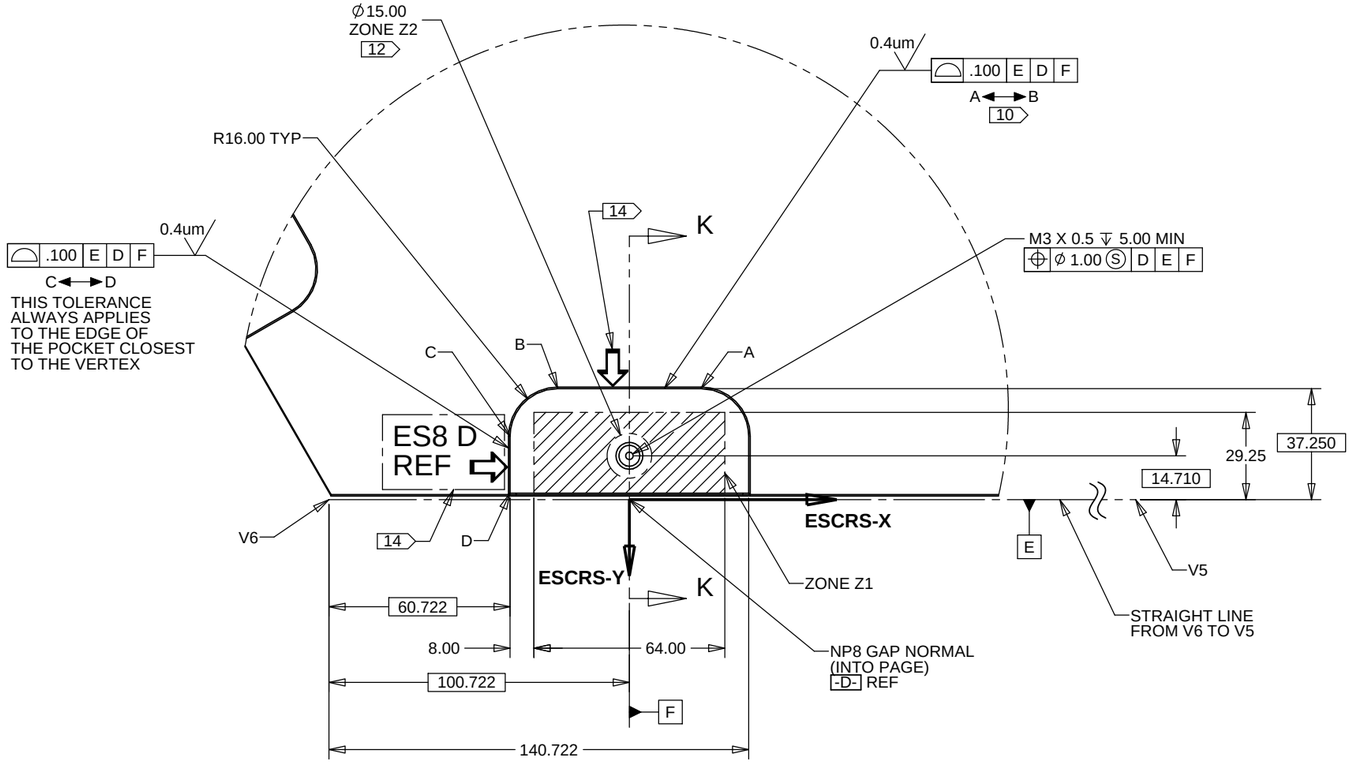


VIEW H-H

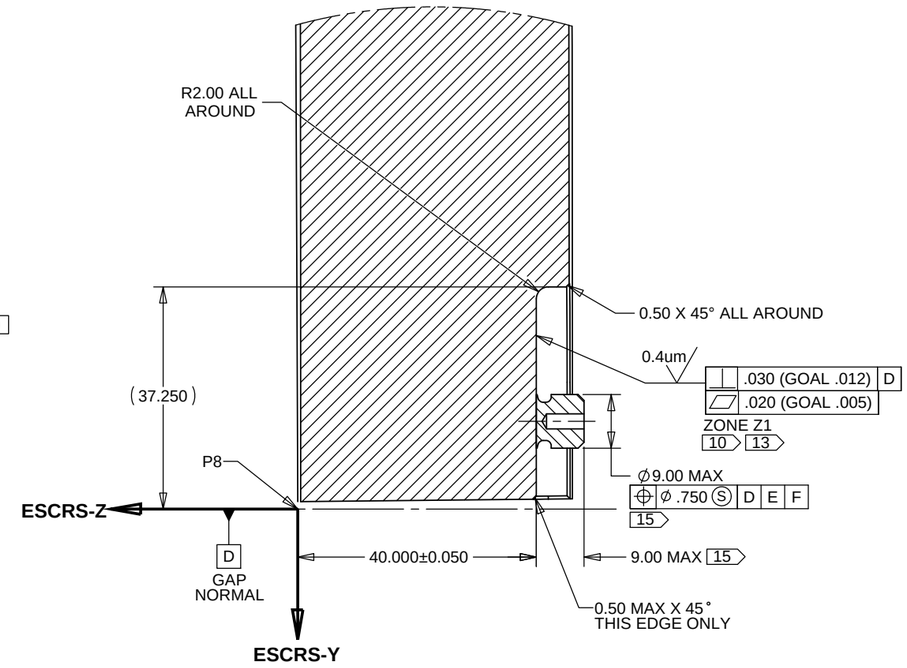


SEGMENT INTERFACE REQUIREMENTS:
NOMINAL SEGMENT GEOMETRY,
ALL FEATURES SHOWN TO SCALE.

SIZE	DWG. NO.	REV
D	TMT.M1.MICS-INT-001	A
SCALE: NONE	WEIGHT:	SHEET 4 OF 7



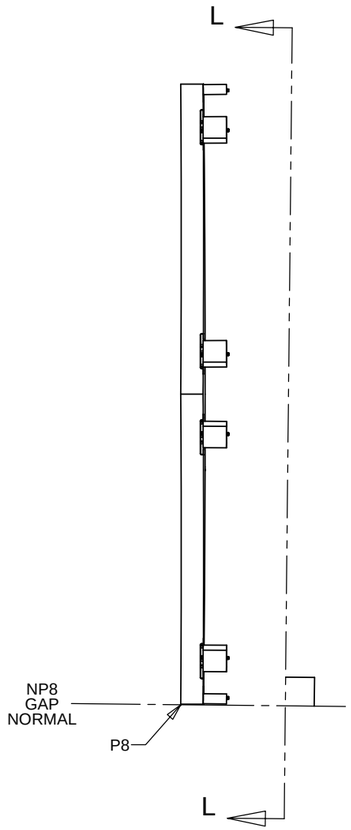
DETAIL J
SHEET 4, ZONE B3

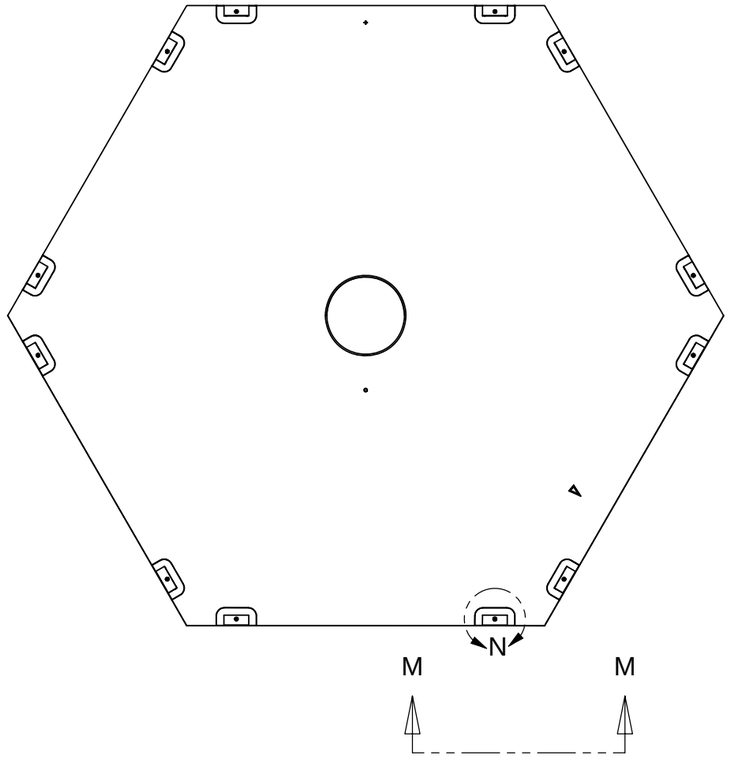


SECTION K-K

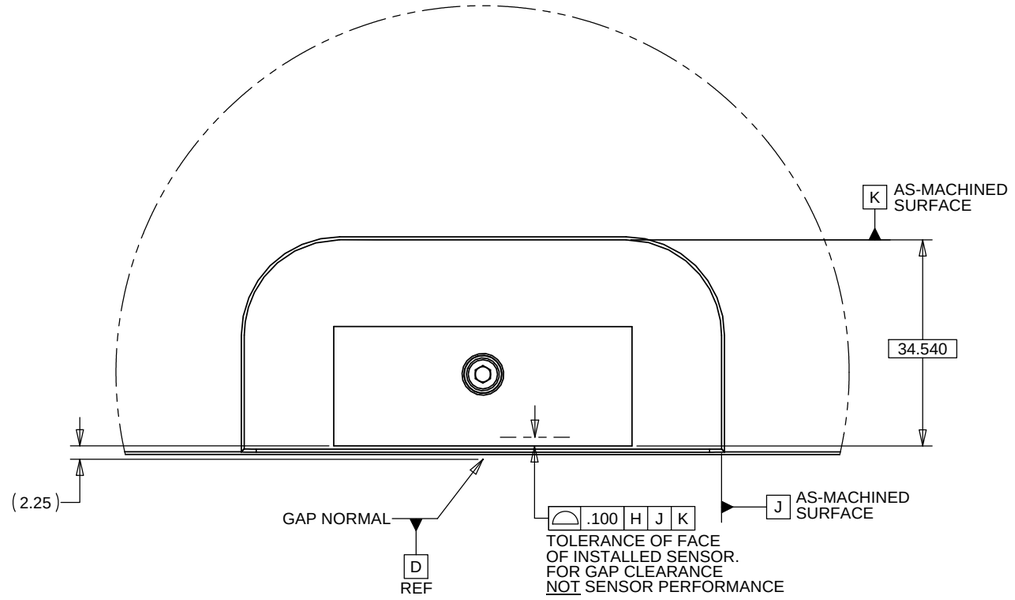
SEGMENT INTERFACE REQUIREMENTS:
NOMINAL SEGMENT GEOMETRY,
ALL FEATURES SHOWN TO SCALE.

SIZE	DWG. NO.	REV
D	TMT.M1.MICS-INT-001	A
SCALE: NONE	WEIGHT:	SHEET 5 OF 7

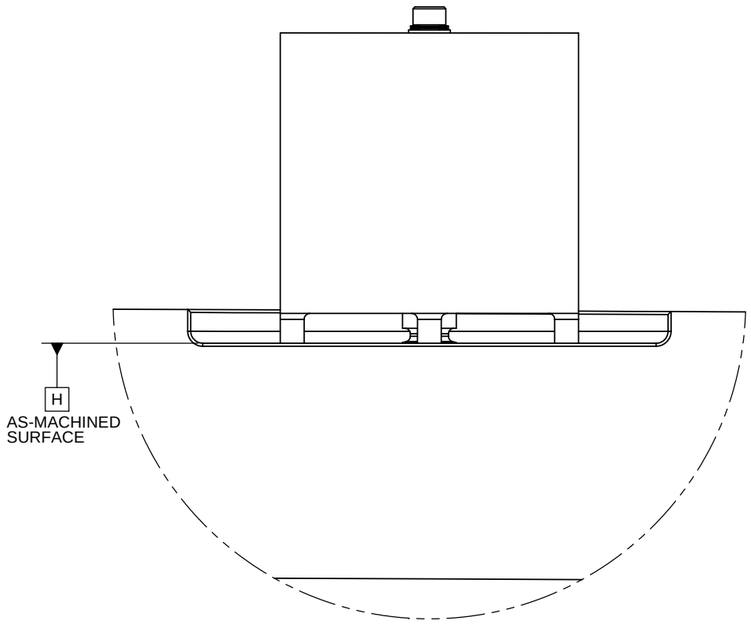




VIEW L-L



DETAIL N



VIEW M-M

EDGE SENSOR BLOCK:
INTERFACE REQUIREMENTS
ON PLACEMENT OF BLOCK

SIZE	DWG. NO.	REV
D	TMT.M1.MICS-INT-001	A
SCALE: NONE	WEIGHT:	SHEET 6 OF 7

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS.

2. DIMENSIONS AND TOLERANCING PER ANSI Y14.5M-1994.

3. THIS DRAWING SHALL BE INTERPRETED IN CONJUNCTION WITH THE EDGE SENSOR – TO- SEGMENT INTERFACE CONTROL DOCUMENT (TMT.CTR.ICD.08.001) AND THE TMT M1 SEGMENTATION DATABASE (TMT.OPT.TEC.07.044).

4. DATUMS A, B AND C DEFINE THE THEORETICAL REFERENCE SYSTEM FOR THE POLISHED SEGMENT. THESE DATUMS ARE IDENTICAL TO THOSE DEFINED IN THE POLISHED SEGMENT DRAWING, 280-TMT-01-0100, AND ARE BASED ON THE PRIMARY SEGMENT ASSEMBLY (PSA) COORDINATE SYSTEM. THE PLANES OF THE PSA COORDINATE SYSTEM ARE SPECIFIED AS DATUMS A, B AND C AS FOLLOWS:
   DATUM A SHALL BE THE PSACRS-X - PSACRS-Y PLANE
   DATUM B SHALL BE THE PSACRS-X - PSACRS-Z PLANE
   DATUM C SHALL BE THE PSACRS-Y - PSACRS-Z PLANE

5. VIEWS SHOWN ON SHEET 3 DETAIL THE GEOMETRIC CONSTRUCTION REQUIRED TO DEFINE THE ORIENTATION FOR 1 OF THE 12 EDGE SENSORS INTERFACES. THE ORIENTATION OF EACH OF THE 12 INTERFACES IS UNIQUE.

6. PROCEDURE FOR DEFINING EDGE SENSOR GEOMETRY SHALL BE AS FOLLOWS:
   a. FOR THE SEGMENT OF INTEREST, DEFINE V1 THROUGH V6, THE LOCATION OF THE UNGAPPED SEGMENT VERTICES.
   b. DEFINE THE EDGE SENSOR OF INTEREST. EDGE SENSORS SHALL BE IDENTIFIED BY NUMBER, AS SHOWN ON SHEET 2. ALL SUBSEQUENT STEPS AND EXAMPLES WILL CONSIDER EDGE SENSOR ES8. THIS IS THE EDGE SENSOR BETWEEN SEGMENT VERTICES 5 AND 6, BUT NEARER TO 6.
   c. DEFINE DATUM E: CONSTRUCT LINE V6-V5, A STRAIGHT LINE FROM THE NEAR VERTEX (V6) TO THE FAR VERTEX (V5).
   d. CONSTRUCT LINE NV6, THE NORMAL TO THE OPTICAL SURFACE AT THE NEAR VERTEX (V6).
   e. CONSTRUCT PLANE NV6-V5, DEFINED BY THE FAR VERTEX (V5) AND THE NORMAL TO THE OPTICAL SURFACE AT THE NEAR VERTEX (NV6). NOTE THAT, BY DEFINITION, THIS PLANE CONTAINS LINE V6-V5.
   f. WORKING IN PLANE NV6-V5, CONSTRUCT A POINT ON LINE V6-V5 THAT IS 100.722MM AWAY FROM THE NEAR VERTEX (V6). FROM THAT POINT, CONSTRUCT A LINE THAT LIES IN PLANE NV6-V5 AND THAT IS PERPENDICULAR TO LINE V6-V5. THE INTERSECTION OF THIS LINE WITH THE OPTICAL SURFACE IS DEFINED AS POINT P8. P8 IS THE ANCHOR POINT FOR THE EDGE SENSOR ES8, AND THE ORIGIN OF THE EDGE SENSOR LOCAL COORDINATE SYSTEM.
   g. DEFINE DATUM D: CONSTRUCT LINE NP8, THE NORMAL TO THE OPTICAL SURFACE AT POINT P8. THIS IS THE GAP NORMAL, AND DATUM D
   h. DEFINE DATUM F: CONSTRUCT A LINE COINCIDENT WITH P8, PERPENDICULAR TO THE GAP NORMAL NP8, AND PERPENDICULAR LINE V6-V5. THIS LINE BISECTS THE EDGE SENSOR, AND IS DEFINED AS DATUM F.

7. PROCEDURE FOR DEFINING EDGE SENSOR LOCAL COORDINATE SYSTEMS (ESCRS) SHALL BE AS FOLLOWS:
   a. FOR THE EDGE SENSOR OF INTEREST, THE ORIGIN OF THE ESCRS IS POINT Pn, WHERE n IS THE NUMBER OF THE EDGE SENSOR. THE DEFINITION OF POINT Pn IS GIVEN IN NOTE 6 ABOVE
   b. THE Z AXIS OF THE ESCRS IS THE GAP NORMAL NPn, AS DEFINED ABOVE. THIS IS EQUIVALENT TO DATUM D.
   c. THE Y AXIS OF THE ESCRS IS DEFINED AS THE CROSS PRODUCT OF [(ESCRS-Z) X (VECTOR Vnear - TO - Vfar)].
   d. THE X AXIS OF THE ESCRS IS DEFINED SUCH THAT X-Y-Z IS AN ORTHOGONAL RIGHT HANDED COORDINATE SYSTEM, WITH ECRS-X POINTING FROM THE NEAR VERTEX TOWARDS THE FAR VERTEX.

8. THE ORIENTATIONS OF THE EDGE SENSOR INTERFACE FEATURES ARE GIVEN IN THE SEGMENTATION DATABASE (TMT.OPT.TEC.07.044). (NOTE THAT AS OF REL05, THIS INFORMATION HAS NOT YET BEEN INCORPORATED). INFORMATION PROVIDED IS AS FOLLOWS:
   a. LOCATION OF THE UNGAPPED SEGMENT VERTICES IN THE PSACRS: V1 THROUGH V6.
   b. EDGE SENSOR ANCHOR POINT IN THE PSACRS: E.G. P8.
   c. UNIT VECTOR OF DATUMS D,E AND F, IN THE PSACRS, FOR EACH EDGE SENSOR.
   d. UNIT VECTORS OF THE EDGE SENSOR COORDINATE SYSTEMS, IN THE MICRS.

9. FASTENER PRELOAD SHALL BE 22N +/- 2N (TBR). FASTENER TORQUE SHALL BE TBD.

10. THE INDICATED GEOMETRIC TOLERANCES ARE INTENDED TO CONTROL THE CONTRIBUTION OF THE SEGMENT POCKET TO THE ANGULAR ORIENTATION OF THE MOUNTED EDGE SENSOR BLOCKS. THE CORRELATION BETWEEN GEOMETRIC AND ANGULAR TOLERANCES IS GIVEN IN THE TABLE BELOW.

DOF EDGE SENSOR LOCAL COORDINATE SYSTEM	GEOMETRIC TOLERANCE (REF)	CORRESPONDING ANGULAR TOLERANCE (REF)
R_x	⊥ .030 (GOAL .012) | D	1.0 mRAD (GOAL 0.4 mRAD)
R_y	ZONE 1 SH5/C1	0.5 mRAD (GOAL 0.2 mRAD)
R_z	⌓ .100 | E | D | F A ◄—► B SH5/D5	2.0 mRAD

11. ALL SURFACES OF THE POCKETS SHALL BE FINELY GROUND TO MINIMIZE SUBSURFACE DAMAGE. GRINDING SHALL BE DONE IN STEPS USING PROGRESSIVELY SMALLER ABRASIVE GRAINS. EACH GRINDING STEP SHALL REMOVE MATERIAL TO A DEPTH OF AT LEAST 1.5X THE MAXIMUM GRAIN SIZE OF THE PREVIOUS GRINDING STEP. THE FINAL GRINDING STEP SHALL UTILIZE AN ABRASIVE GRAIN SIZE OF 15 MICRONS MAX.

12. ZONE Z2 TO BE ETCHED PRIOR TO BONDING OF EDGE SENSOR PUCK PER PROCEDURE TBD.

13. ZONE Z1 TO BE FINISHED BY (PROCESS TBD). THIS PROCESS IS TO SMOOTH PEAKS LEFT BY GRINDING AND ASSURE THAT FACE-TO-FACE CONTACT WITH EDGE SENSOR IS STABLE. CANDIDATE PROCESSES INCLUDE ETCHING, POLISHING, AND CONFORMAL BUFFING. ALL DIMENSIONS AND TOLERANCES APPLY AFTER INDICATED PROCESS.

14. MARK SEGMENT IN AREA INDICATED WITH EDGE SENSOR IDENTIFIER. IDENTIFIER SHALL BE OF THE FORM “ESn D” or “ESn S” WHERE n IS THE NUMBER OF THE EDGE SENSOR, “D” REPRESENTS A DRIVE HALF, AND “S” REPRESENTS A SENSE HALF. CHARACTER HEIGHT SHALL BE 8+/-3MM. ARROWS SHALL INDICATE THE TWO PRECISE REFERENCE EDGES OF THE EDGE SENSOR POCKET. MARKING METHOD SHALL BE (TBD).

15. NOT-TO-EXCEED ENVELOPE DIMENSION.

16. OPTICS GROUP HARDWARE RESPONSIBILITY: SEGMENT, EDGE SENSOR PUCK, BONDING OF EDGE SENSOR PUCK TO SEGMENT.

17. CONTROLS GROUP HARDWARE RESPONSIBILITY: EDGE SENSOR BLOCKS, DUST BOOT, FASTENERS.

SIZE	DWG. NO.	REV
D	TMT.M1.MICS-INT-001	A
SCALE: NONE	WEIGHT:	SHEET 7 OF 7