


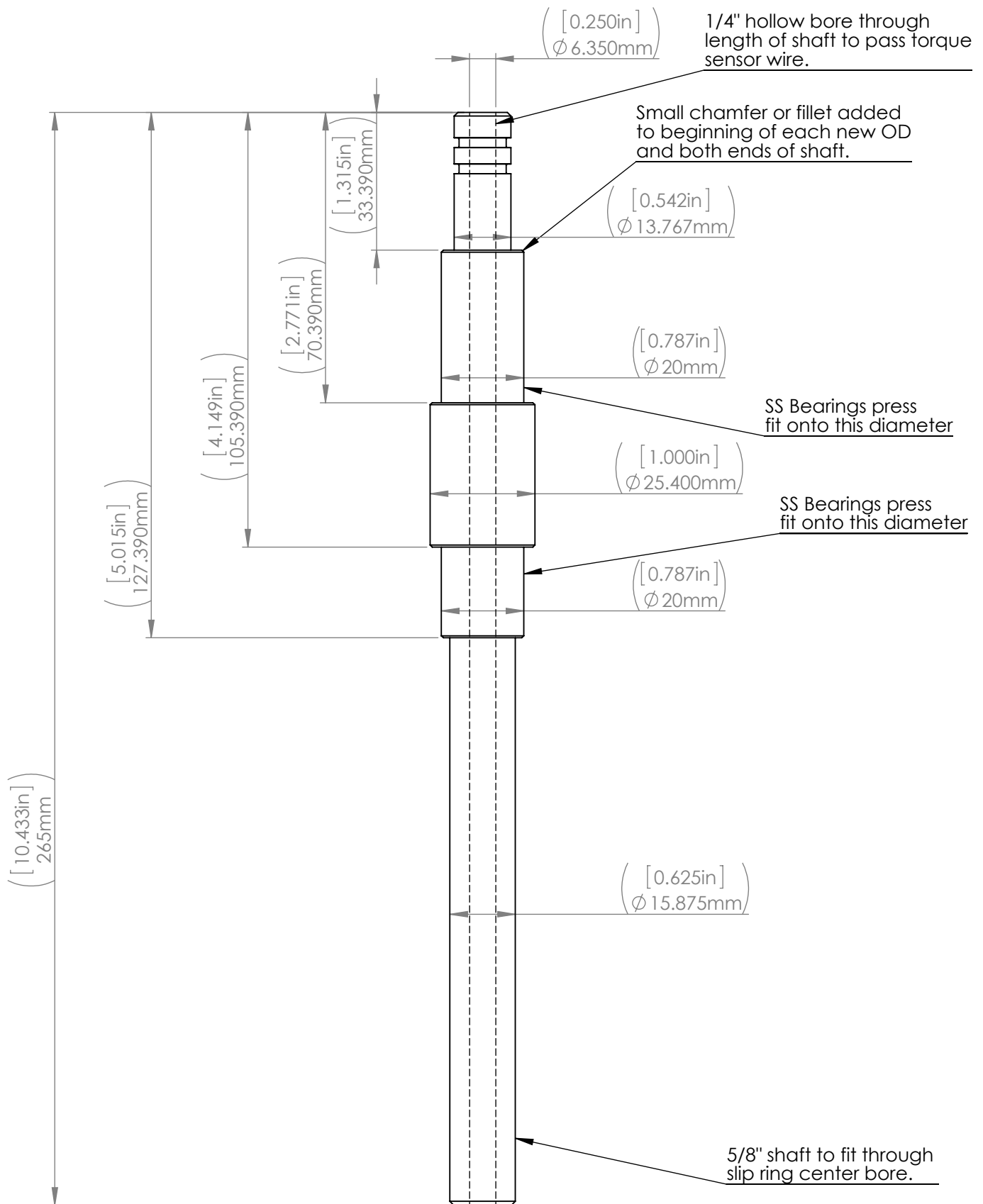



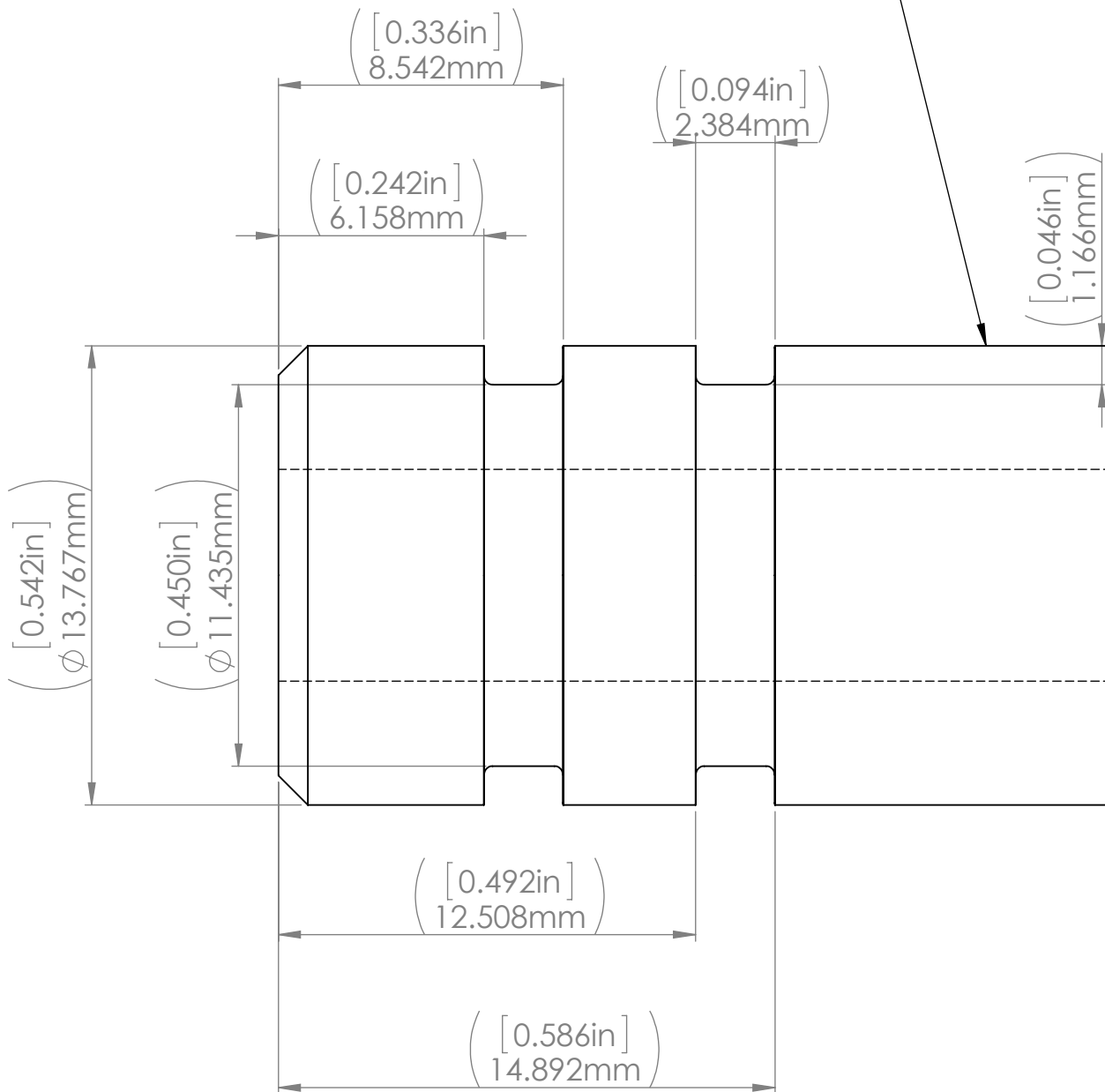


VIEW: Transparent			NOTES: The nacelle is a combination of many parts, houses the slip ring, and sprocket. The middle shell and side arm are made of aluminum and welded together to provide a water-tight seal.
	NAME	DATE	
DRAWN BY	SolidWorks Student Edition.		
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MATERIAL: Various			PART: Tidal Turbine Nacelle
UNIVERSITY OF MINNESOTA (UMN) - ST. ANTHONY FALLS LABORATORY (SAFL)			U.S. DEPARTMENT OF ENERGY REFERENCE HYDROKINETIC TURBINES






VIEW: SIDE			NOTES: Custom stainless steel shaft. See details of O-ring groove dimensions on next sheet. Bearings need to be press fit onto OD of shaft.	
DRAWN BY	NAME	DATE		
  			PART: Hollow Shaft	
UNIVERSITY OF MINNESOTA (UMN) - ST. ANTHONY FALLS LABORATORY (SAFL)			U.S. DEPARTMENT OF ENERGY REFERENCE HYDROKINETIC TURBINES	

Dimple shaft after initial installation where set screws contact the shaft.



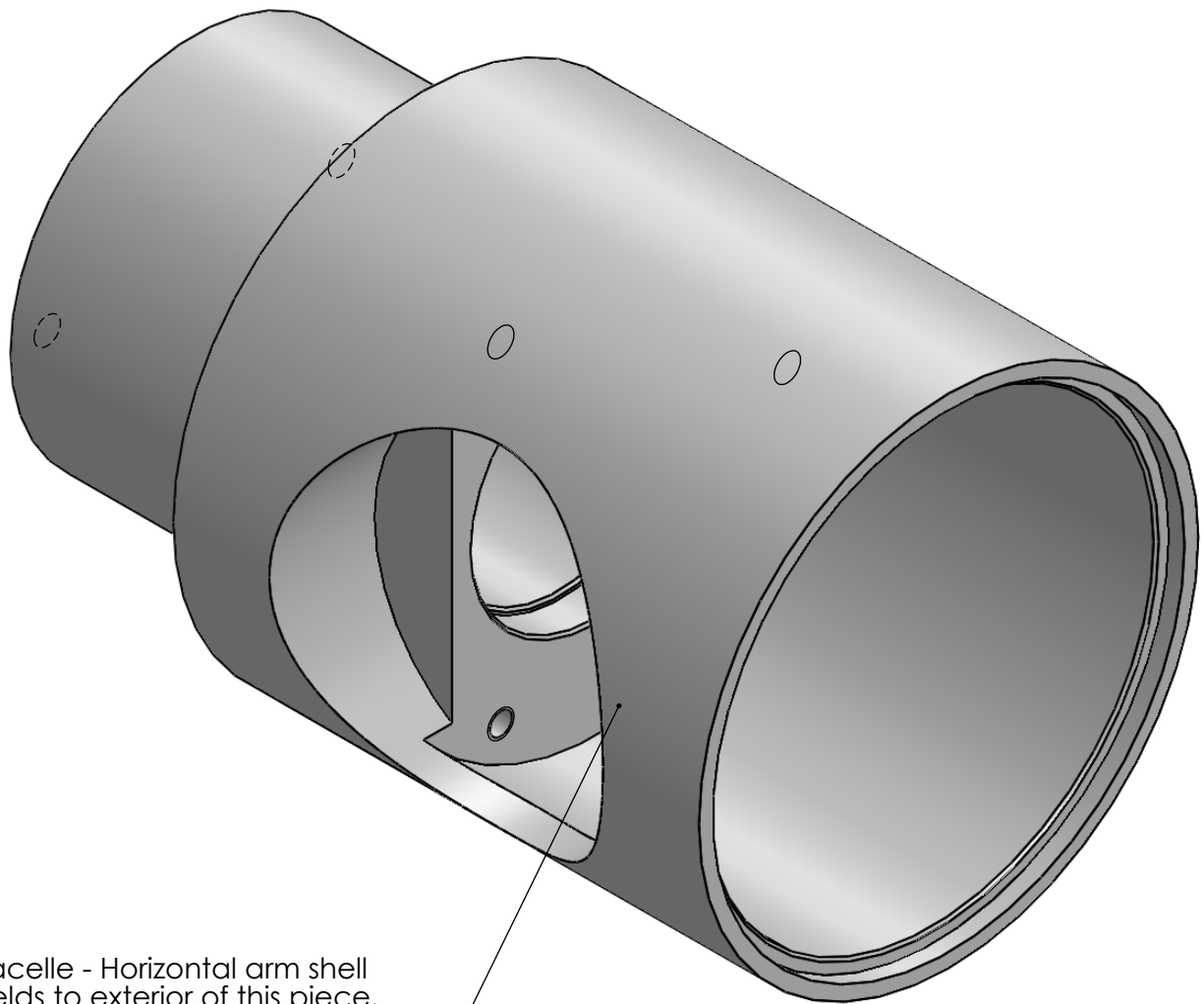
VIEW: O-Ring Groove

NOTES:




NAME	DATE
DRAWN BY	DATE
  	
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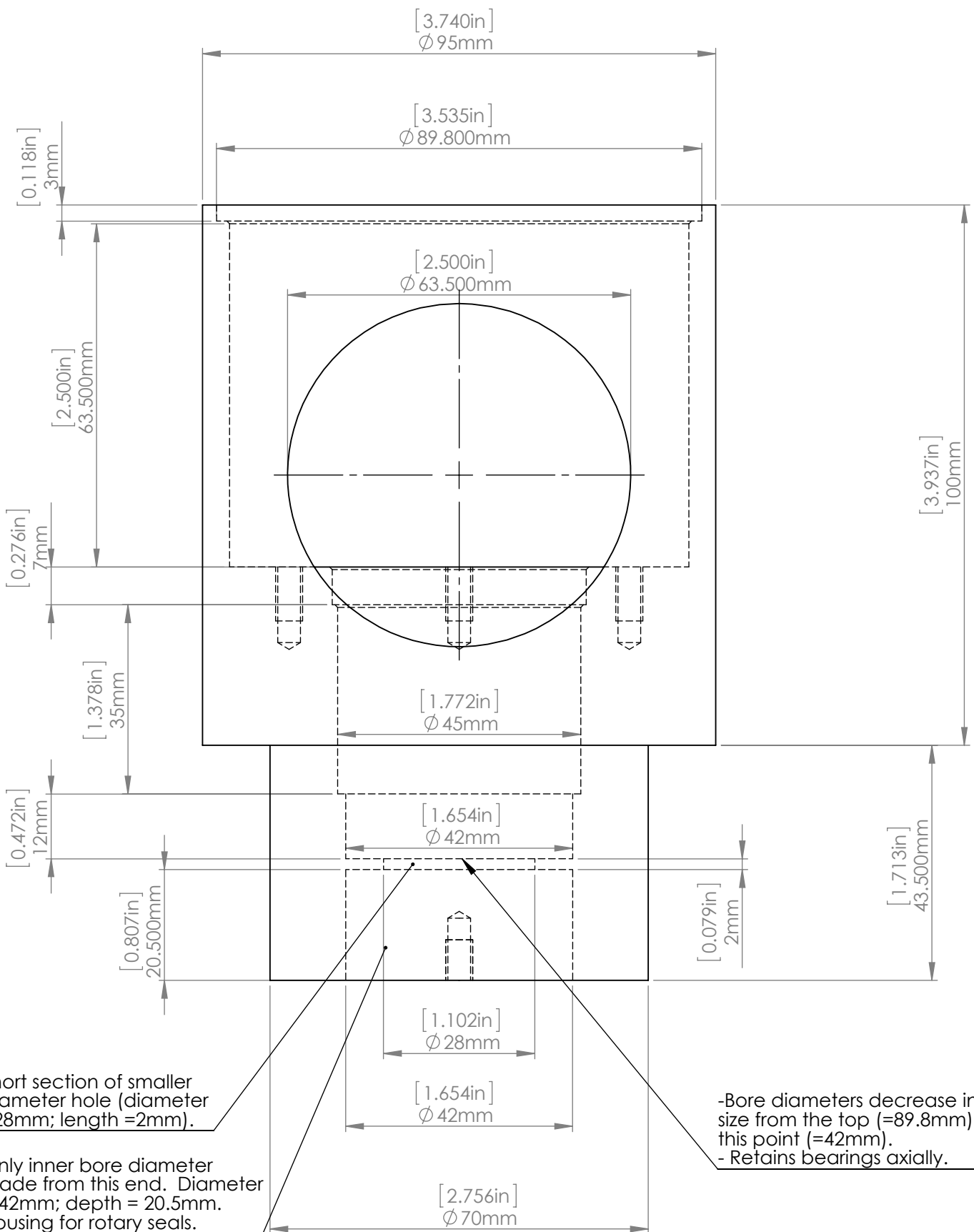
PART:

Hollow Shaft

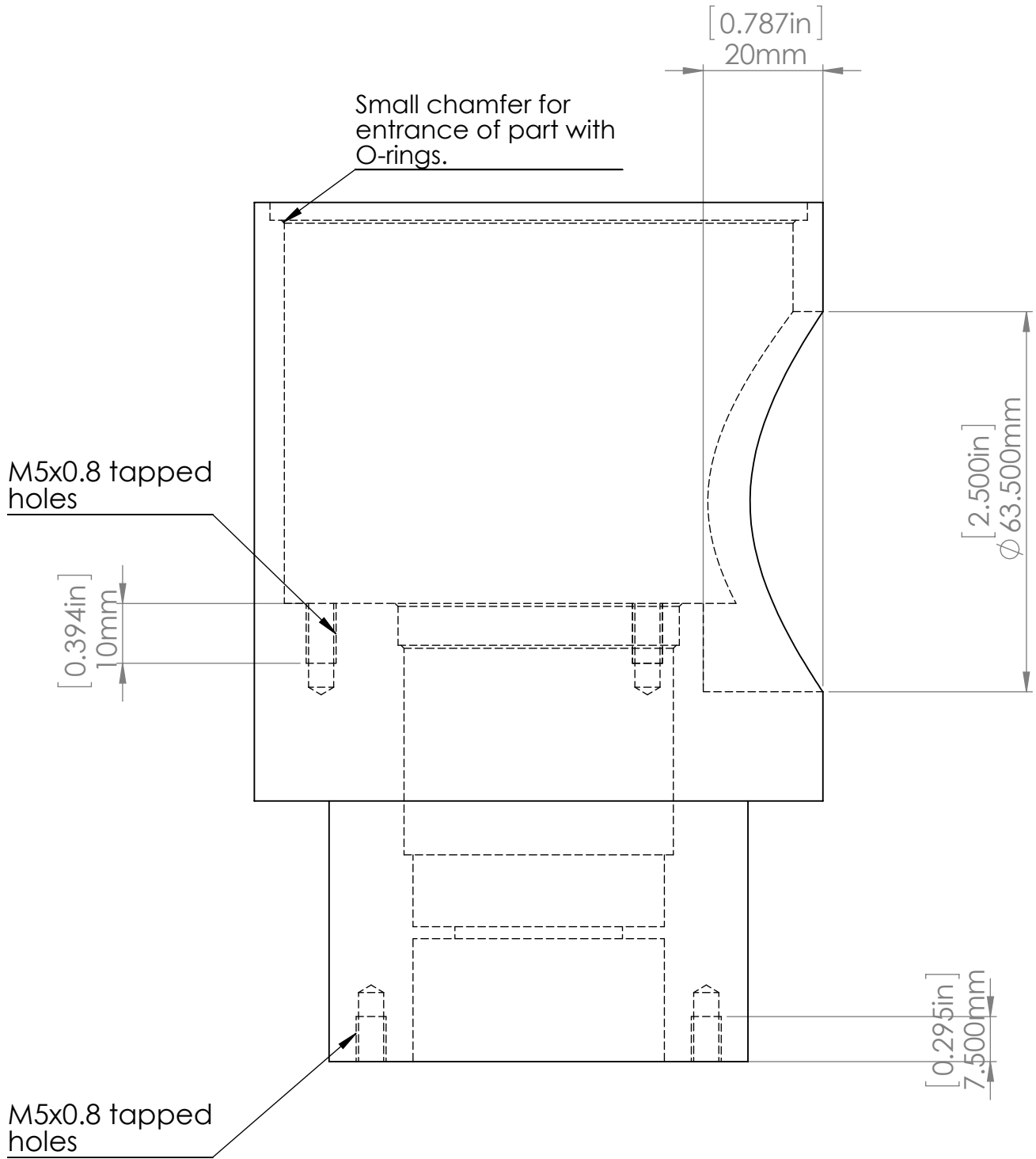





Nacelle - Horizontal arm shell
welds to exterior of this piece,
creating a water-tight connection.

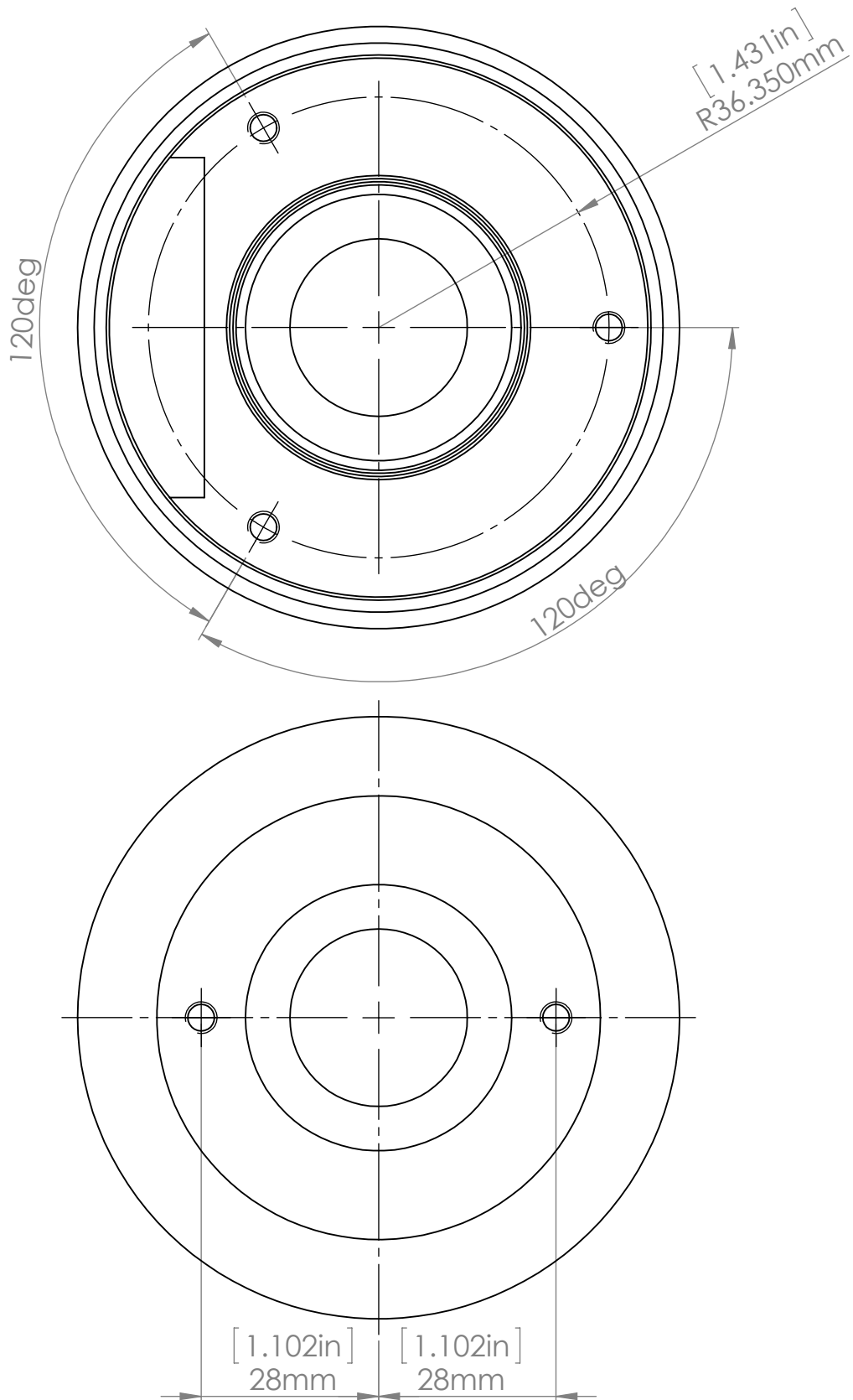
VIEW: 3D OVERVIEW			NOTES: Middle nacelle shell section. Start with solid aluminum bar. Multiple inner bore diameters accomodate various sized bearings, sprockets, seals, etc. Horizontal nacelle arm shell section welds perpendicular to this section.	
DRAWN BY	NAME	DATE		
  			PART: Nacelle - Middle Shell	
UNIVERSITY OF MINNESOTA (UMN) - ST. ANTHONY FALLS LABORATORY (SAFL)			Aluminum	
			U.S. DEPARTMENT OF ENERGY REFERENCE HYDROKINETIC TURBINES	



VIEW: SIDE			NOTES: Middle nacelle shell section. Start with solid aluminum bar. Multiple inner bore diameters accommodate various sized bearings, sprockets, seals, etc. Horizontal nacelle arm shell section welds perpendicular to this section.		
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Aluminum			PART: Nacelle - Middle Shell		
UNIVERSITY OF MINNESOTA (UMN) - ST. ANTHONY FALLS LABORATORY (SAFL)			U.S. DEPARTMENT OF ENERGY REFERENCE HYDROKINETIC TURBINES		



VIEW: TOP			NOTES: Middle nacelle shell section. Start with solid aluminum bar. Multiple inner bore diameters accomodate various sized bearings, sprockets, seals, etc. Horizontal nacelle arm shell section welds perpendicular to this section.
DRAWN BY	NAME	DATE	
  			PART: Nacelle - Middle Shell
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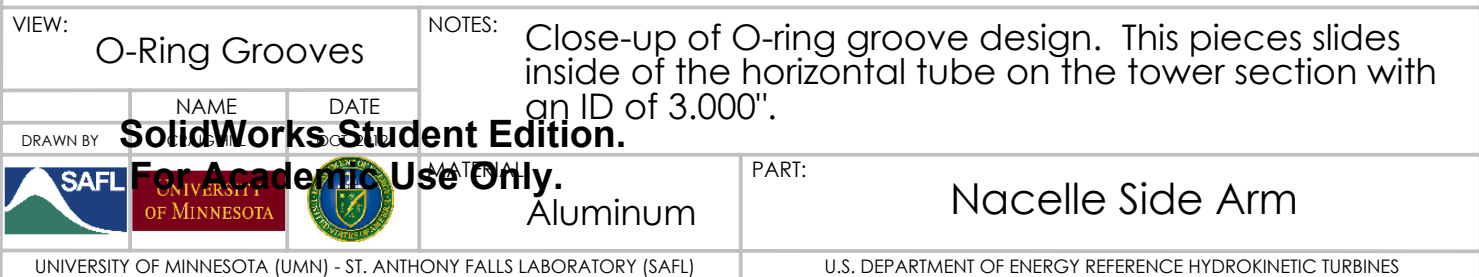
VIEW: RIGHT, LEFT			NOTES: Middle nacelle shell section. Start with solid aluminum bar. Multiple inner bore diameters accomodate various sized bearings, sprockets, seals, etc. Horizontal nacelle arm shell section welds perpendicular to this section.
DRAWN BY	NAME	DATE	
SolidWorks Student Edition. For Academic Use Only.			PART: Nacelle - Middle Shell
SAFL	UNIVERSITY OF MINNESOTA	UNIVERSITY OF MINNESOTA	
UNIVERSITY OF MINNESOTA (UMN) - ST. ANTHONY FALLS LABORATORY (SAFL)			U.S. DEPARTMENT OF ENERGY REFERENCE HYDROKINETIC TURBINES

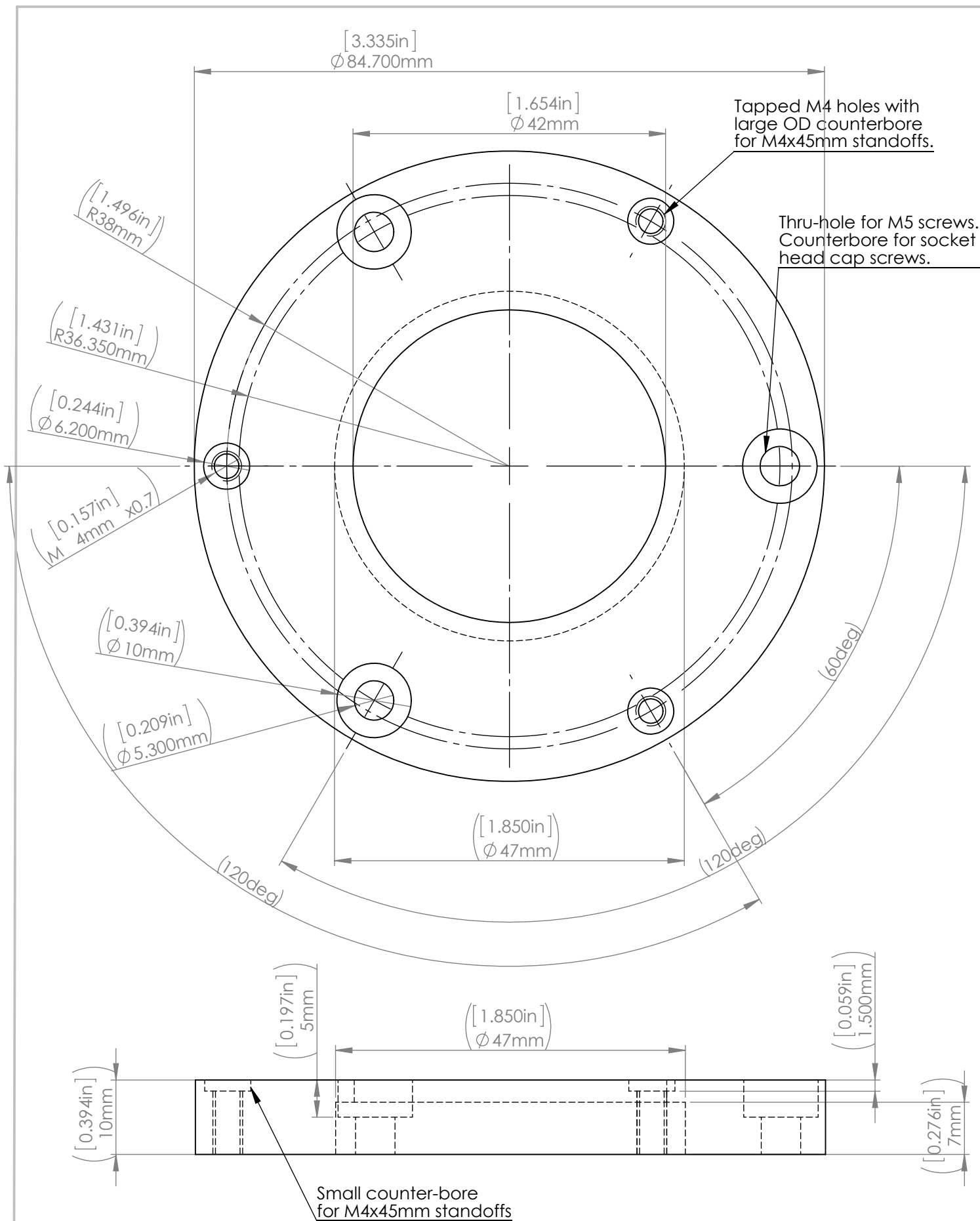
NOTE: The OD of this pipe is slightly smaller for 3.949" to accommodate O-ring design and inner-bore of the tower section that it inserts into.

Radius matches exterior of Nacelle Middle shell.

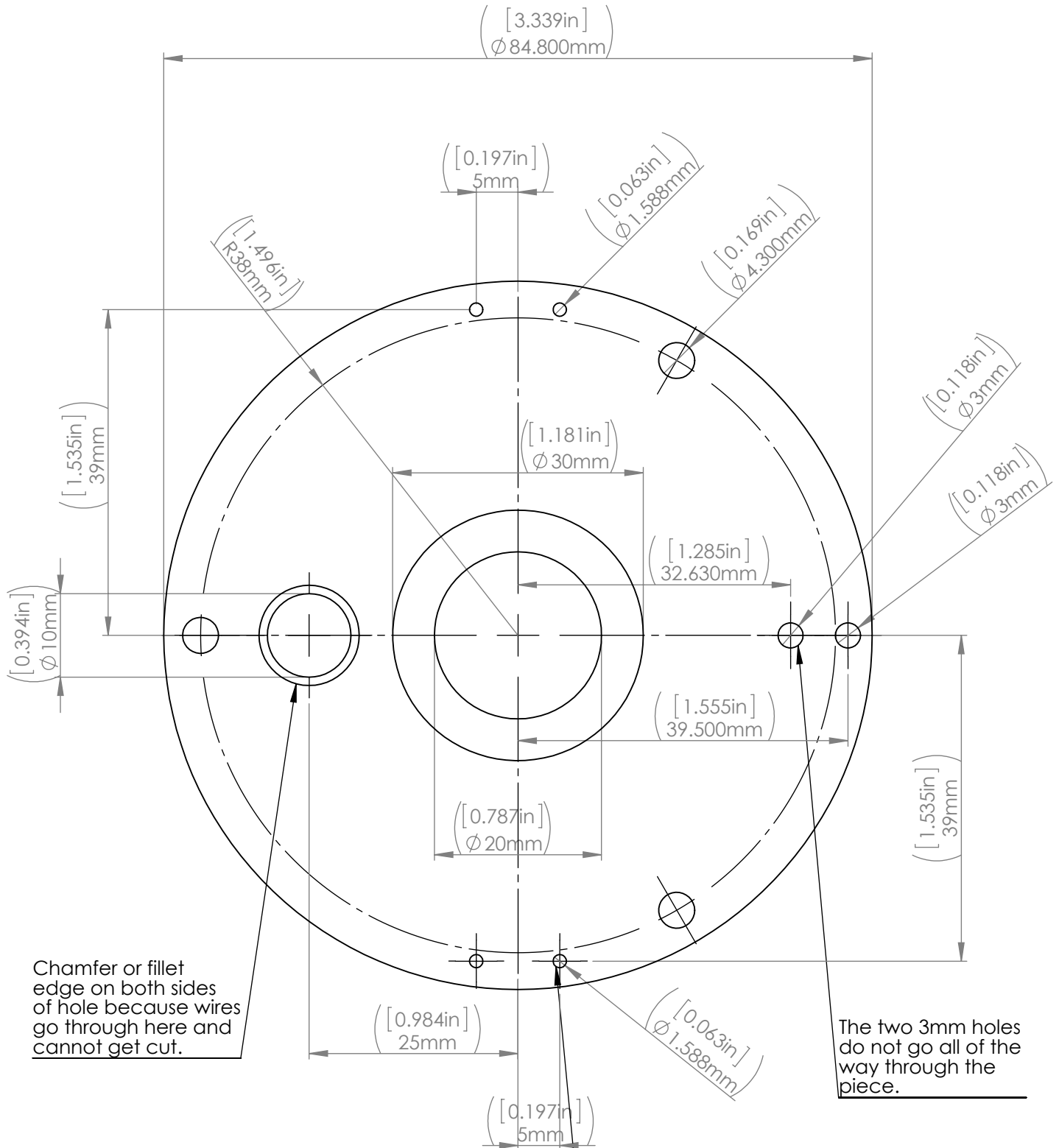
VIEW:	TOP	NOTES:	Horizontal Side arm section with 2 O-rings. This piece gets welded to the exterior of the nacelle middle shell.
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PART: Nacelle Side Arm





VIEW: TOP, SIDE		NOTES: Three counter-bored holes for M5 socket head cap screws attach this piece to the inside of the Nacelle Middle Shell. Another 3 small M4 threaded holes have a shallow counter-bore to nest the M4x45mm standoffs and are used for attached the downstream Nacelle insert piece.	
DRAWN BY	NAME		
DATE	DATE	PART: Nacelle Inside Bearing Clamp	
SolidWorks Student Edition. For Academic Use Only.		Aluminum	
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VIEW:

TOP

NOTES:

Inserts into Nacell Middle Shell part way. 2 O-rings seal against Middle Shell and the Downstream Shell. Long hex cap screws thread through M4x45mm standoffs into the Bearing Clamp insert piece.

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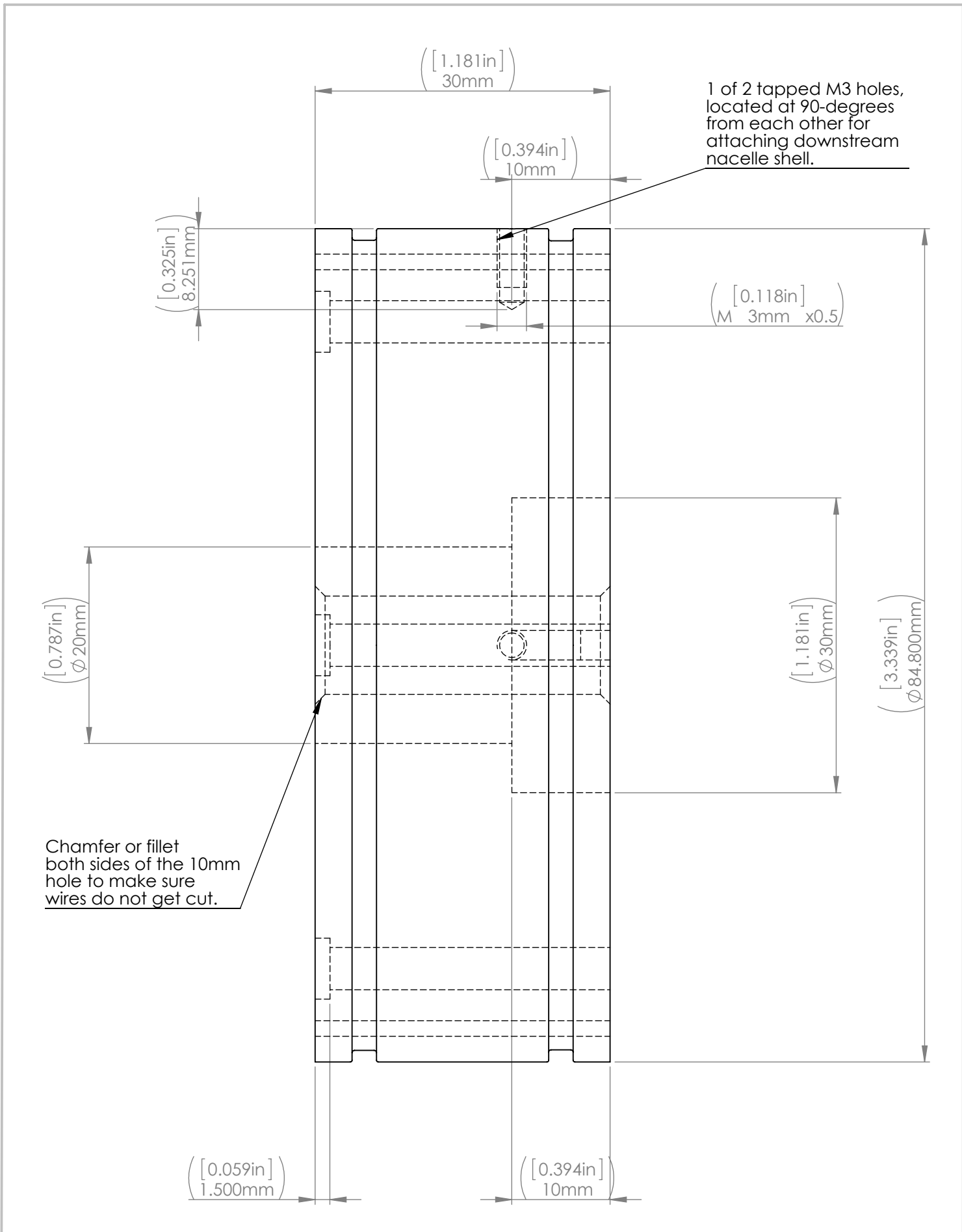
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Aluminum

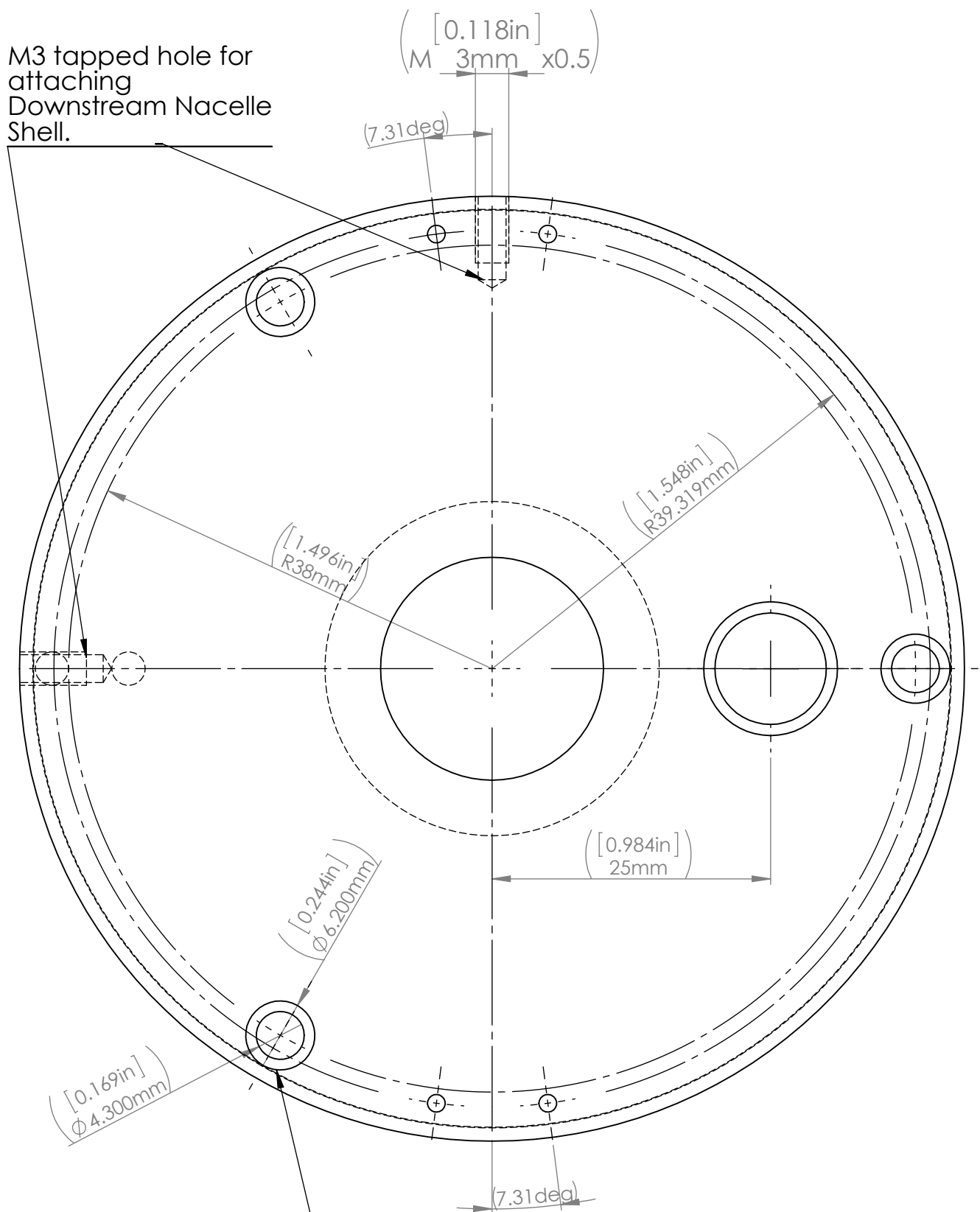
PART:

Nacelle Downstream Insert



VIEW: SIDE		NOTES:	
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  		PART: Nacelle Downstream Insert Aluminum	
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M3 tapped hole for
attaching
Downstream Nacelle
Shell.



These 3 holes are thru-holes for long M4 socket head cap screws. On this side of the piece, there is a shallow counter-bore with OD 6.2mm for fitting the M4x45mm standoffs.

VIEW: BOTTOM

NOTES:

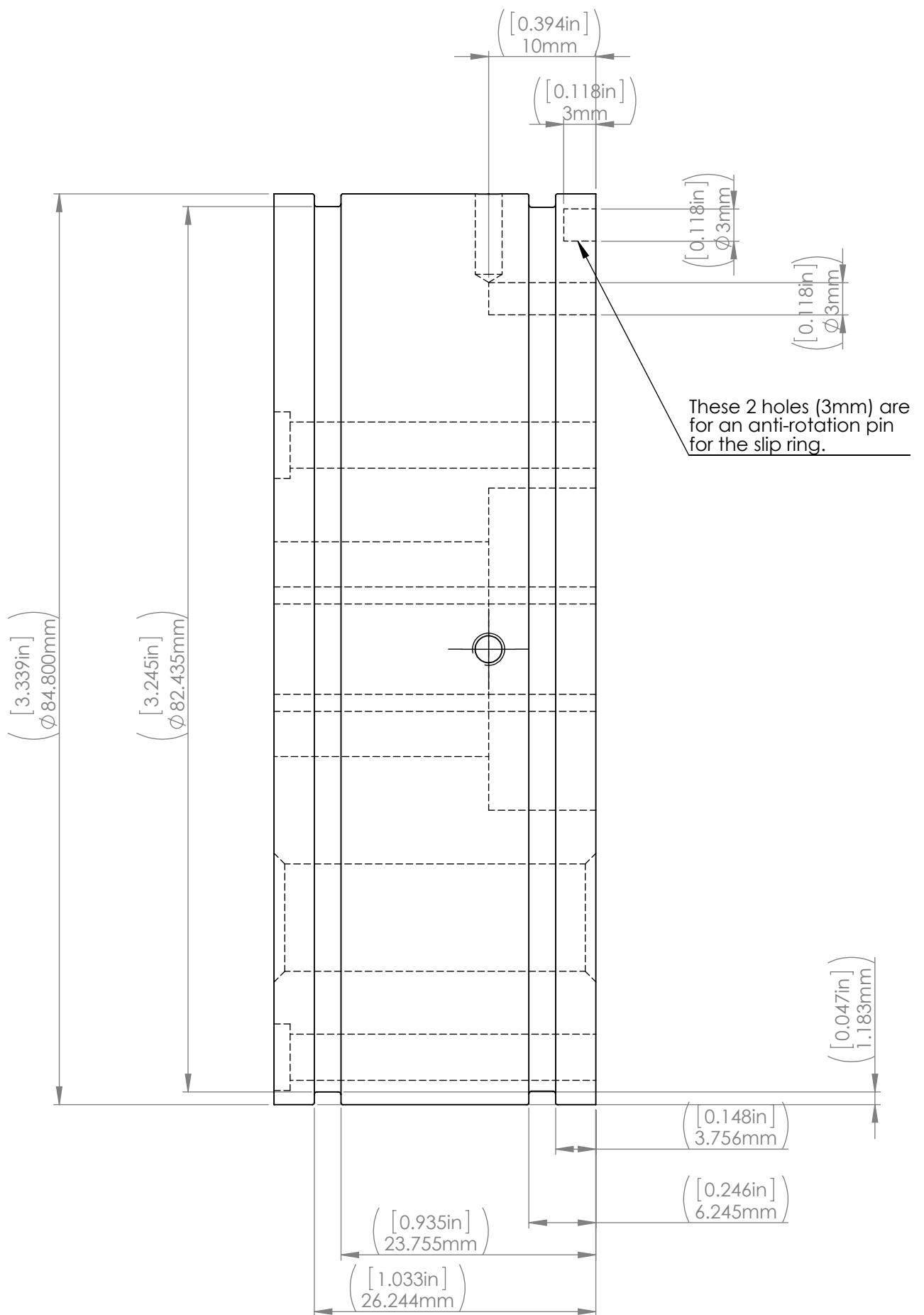
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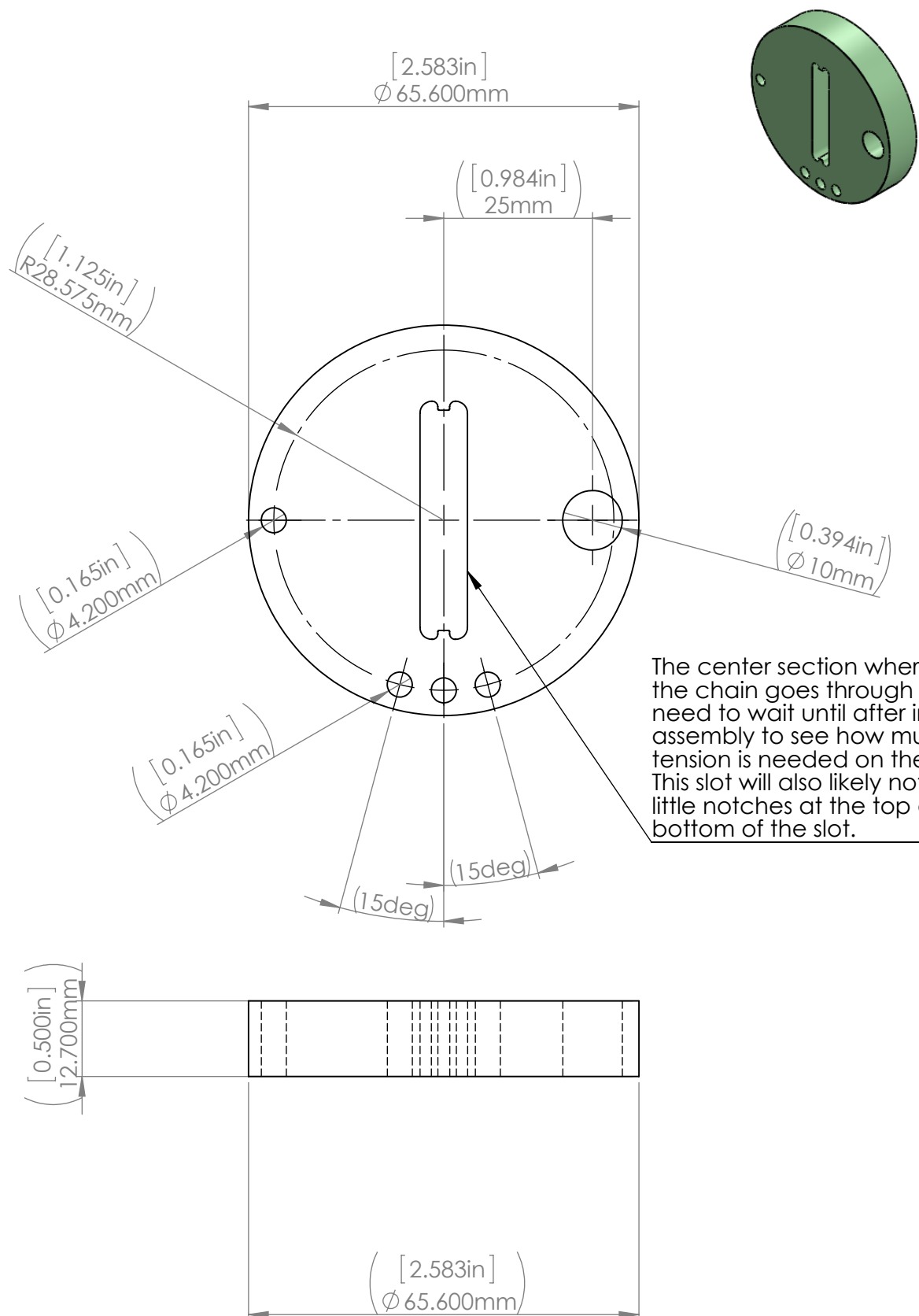
Aluminum

PART:

Nacelle Downstream Insert



VIEW: SIDE 2		NOTES:	
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PART: Aluminum		Nacelle Downstream Insert	
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VIEW:

TOP, SIDE

NOTES:

Custom made plastic chain guides that fit inside of the Nacelle side arm. Held together by #10-24 threadrod that tensions them together. Made from oil-impregnated plastic from McMaster.

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DATE

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Plastic

PART:

Chain guides - Nacelle