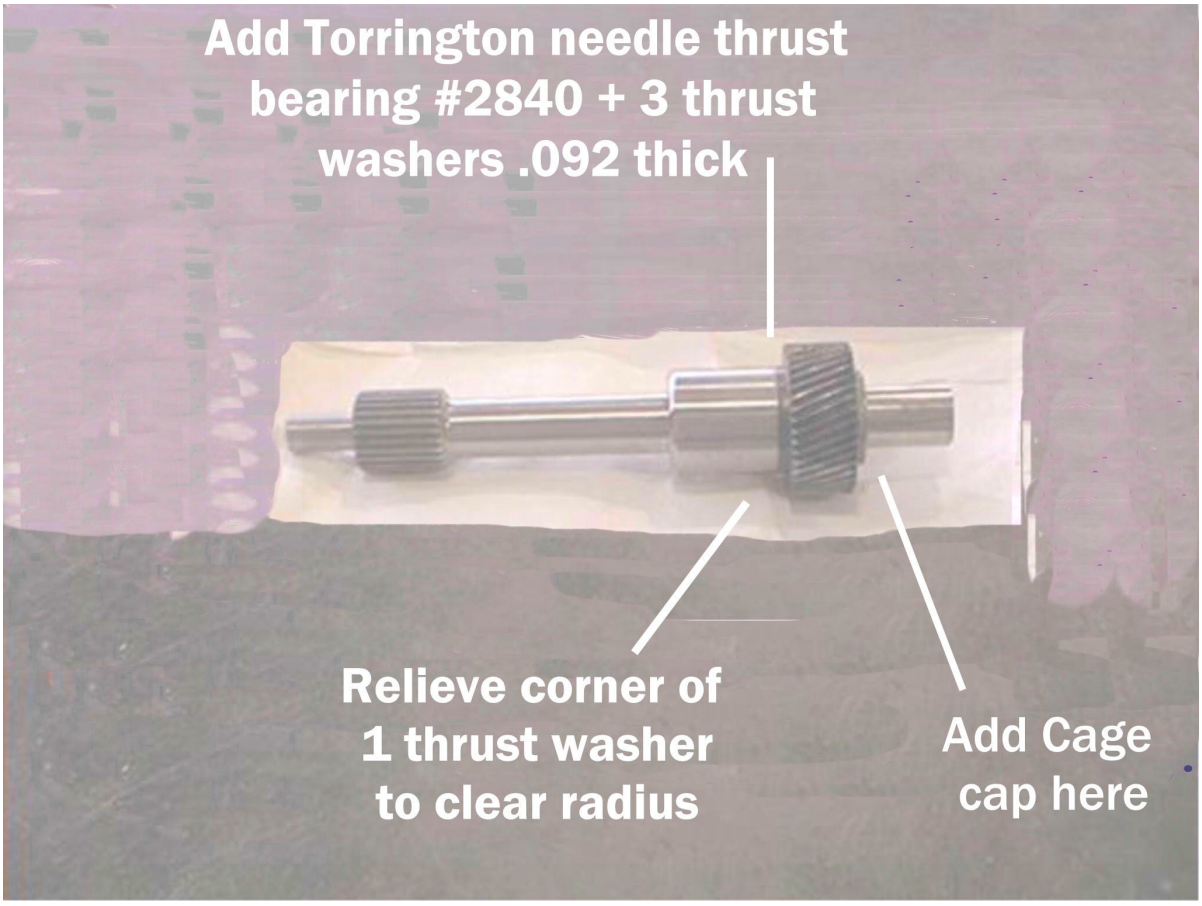
Al Wick’s mods to Ross PSRU that was used on a Subaru engine:

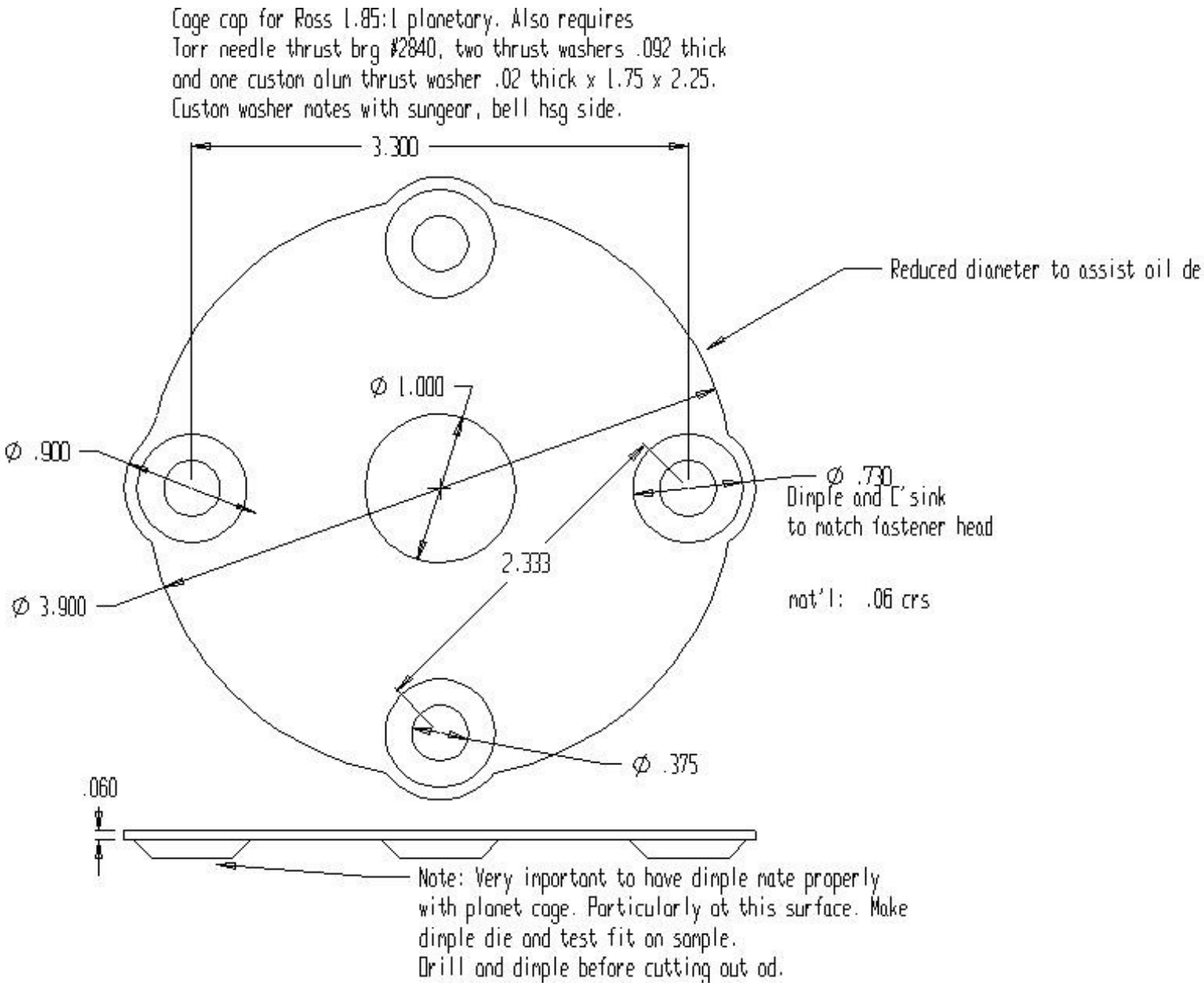
Psru modifications:

I'm using a Ross planetary gear reduction unit having a 1.85:1 ratio. This allows the prop to spin relatively slow at high engine rpm. There were a few reports of psru failures. All of the failures were related to the input shaft moving fore and aft. This causes a noticeable rattle at idle rpm. The movement can fatigue the clutch plate sheet material. It also causes the flywheel pilot bearing to degrade after only 40 hours of operation.

I never had any failures, but I did observe pilot bearing wear and loss of bearing lubrication. While investigating input shaft end clearances, I realized that differential heat expansion of the steel and aluminum components could allow the clearances to change substantially during normal operation. I changed the design to eliminate this variation and to reduce the input shaft end clearance. The input shaft can no longer impact the face of the pilot bearing.



Note that the thrust bearing does not see prop thrust loads, only input shaft thrust loads. Thickness I describe were ideal for my unit, your unit may be different. I used 2 thrust washers .092" thick, and one custom alum washer .02" thick. The aluminum one mates with the face of the sun gear. Sorry, none of these are shown in the picture.



The cage cap assembly effectively serves as a spring. It allows the input shaft to have zero end clearance, yet not bind. On occasions when the input shaft pushes against the cage cap, the cap can flex approximately .005", whereupon it touches the output shaft. This is pretty difficult to explain. It works, but it's possible that a simple thrust washer could accomplish the same.

The thrust bearing gets plenty of lubrication. I have over 150 hours on this unit since design change.