Rigel Robotic Telescope Base Adapter Progress

Dr. Scott Bounds designed a base adapter assembly to position the Rigel Telescope on the pedestal in the 12 foot dome.  The University of Iowa Physics Department Machine Shop donated the material and cut the pieces to the required shape.  They attempted the welding several times, but their TIG welder was not intended to weld such thick pieces of aluminum.  The bottom plate of this adapter is 1.75 inches thick.  That much mass is able to sink more heat than some welding machines can supply.  Welding with helium gas was considered to improve results, but it was decided the work would be moved to a shop that had a more robust welder.

CAA member, Jim Hannon, volunteered to have his son Paul do the welding.  Paul works for Timpte Trailer in Urbana and does a lot of aluminum welding repairing trailers.

The alloy of the material was not known.  A 4043 alloy of aluminum filler wire was used at first.  It has 5% silicon added.  A high power setting on the welder was used.  The welds looked good at first, but had linear cracks after cooling.

Jim spent several hours with an angle grinder removing the welds that had fractured.

A lower power welder setting and a 5356 aluminum alloy filler wire which has 5% magnesium was used with good results.  It has a higher longitudinal shear strength than 4043.

Insert picture 1 here.  It shows the assembly half done.  The 1.75 inch base is on the bottom in this photograph.

Insert photograph 2 here.  It is Paul Hannon standing.  The caption is,

“Paul Hannon with theRigel Telescope base adapter.  Note the thickness of the material.”

Insert photograph 3 here.  The caption reads, “Sixteen gussets were added to the structure.  Paul is shown welding one of the gussets.”

Insert photograph 4 here.  The caption reads, “Jim Hannon (left) and Paul Hannon (right) at the completion of welding.”

Insert photograph 5 here.  The caption reads, “This is the base adapter assembly with all of the welding completed.  It shown upside down and before sandblasting.  The design employed channels in the base to align the cross braces.”

The assembly was sandblasted.  Jim is in the process of painting it.  Then the assembly will be returned to the University of Iowa Physics Machine Shop for final machining.  Two additional plates must be made for use in mounting the telescope.