

Radio Astronomy Feed Positioner – Dominion Astrophysical Observatory, National Research Council of Canada

Status: Filled

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Sponsor(s): National Research Council of Canada

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Gary Hovey P.Eng, Electrical Engineer, Radio Frequency (RF) Systems (to 2.6 GHz) for frequencies of up to 50 GHz. One of the challenges at higher frequencies is thermal deformation of the telescope as it sweeps across its field of view. The positioner will compensate for this by adjusting the feed position on all three axes as required, with an accuracy of 0.1 mm. It will also provide 150 mm travel in the z-direction (along the axis of the telescope) to compensate for the out-of-focus holography of the feeds. Finally the positioner will allow multiple feeds to be mounted at once and rotated into position as required, though the rotation is not part of the first stage of its construction.

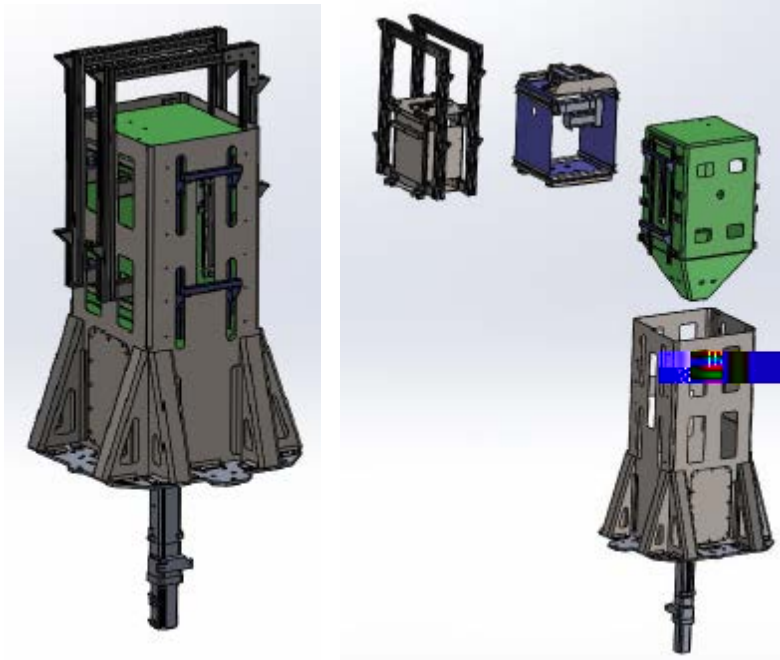
The motors, sensors, and drives used will produce radio frequency interference (RFI) that will affect telescope readings. Research and development on how to quantify and mitigate this RFI is required.

The mechanical design is complete and due for review. The first phase of the project is the manufacturing of the designed parts, and procuring the motors and sensors. The second phase will be the assembly and testing of the positioner. The third phase will be the integration and commissioning the positioner on the telescope.

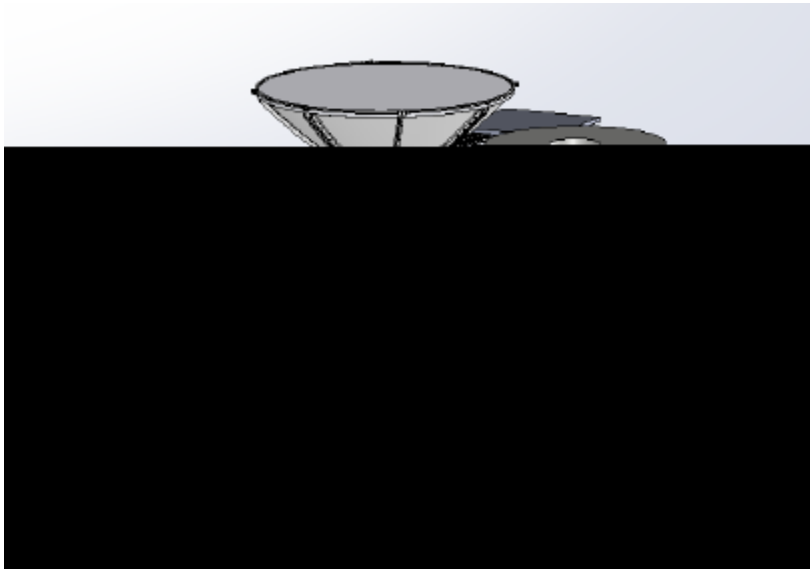
Deliverables:

Parts manufacturing –

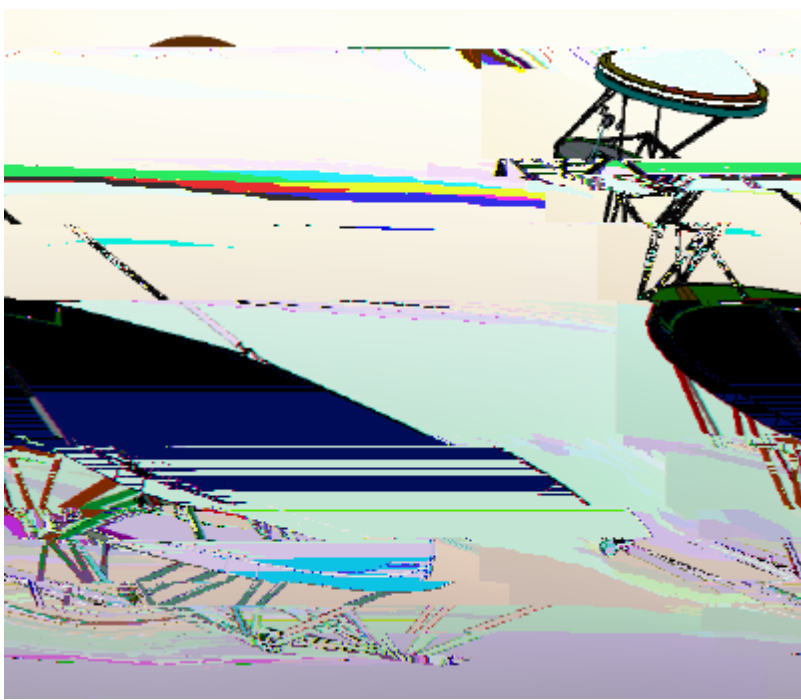
Construction of the indexer (fabricated parts, rails, mounting motors and encoders) – April - May
Final control system design integrated with indexer – June – July
Final integration and testing with the DVA2 control system on site – August 15
Research on radio frequency interference measurement and mitigation– Ongoing



Indexer – assembled (left), exploded to illustrate the 3-axis motion (right)



Indexer on the deck with feeds mounted



DVA2 (minus the main tower and the indexer)