

Ashley Peterson

WFIRST Facility Cryo Radiator Support

Background

- From Blaine, Minnesota
- Started attending school at NDSU in fall of 2015
- Junior studying mechanical engineering
- Anticipated graduation in spring of 2019

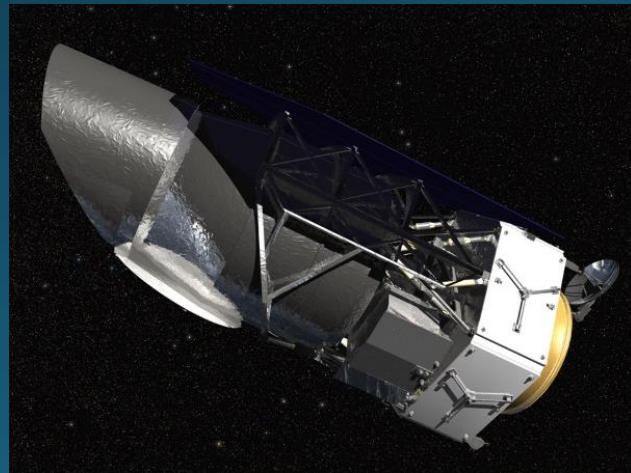


Goddard Space Flight Center



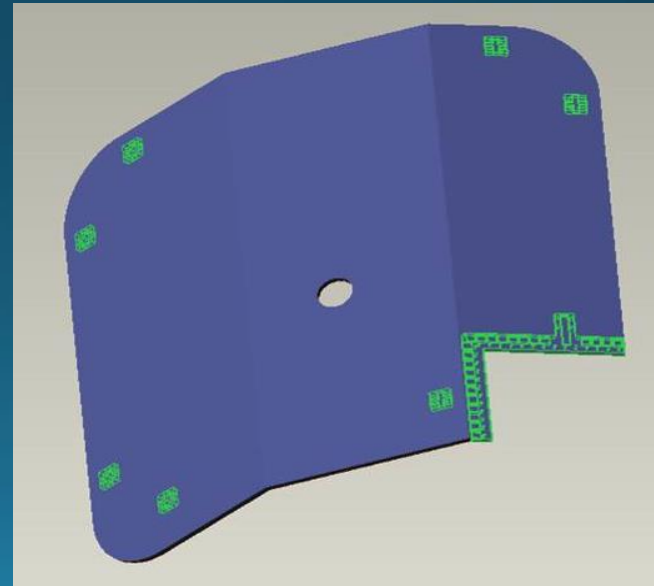
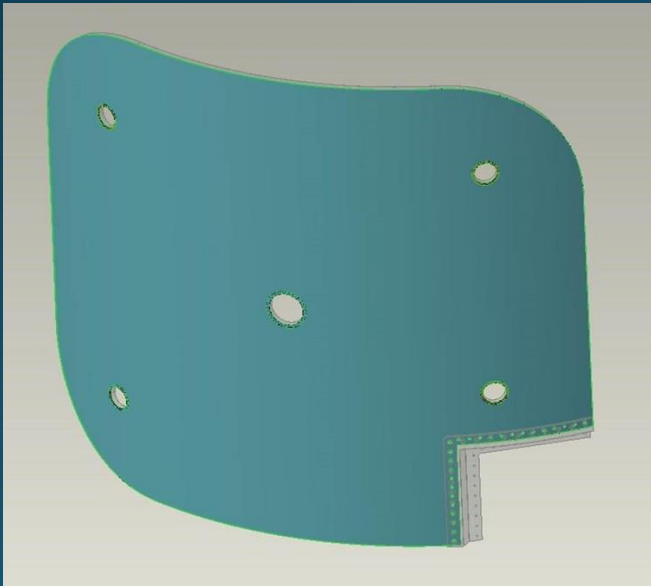
WFIRST

The Wide Field Infrared Survey Telescope is a NASA observatory designed to explore questions in the areas of dark energy, exoplanets, and infrared astrophysics. The mirror is 2.4 meters in diameter, the same size of the Hubble Space Telescope, yet the field of view is 100 times greater than that of Hubble's infrared instrument. The telescope will be going to L2 and is estimated to launch in the mid 2020's



Facility Cryogenic Radiator

- For WFIRST to be able to detect faint heat signals from distant objects, the detector in the WFI needs to remain very cold (100 K)
- There were two major designs, curved and faceted
- Same front face sheet surface area of 7 m²

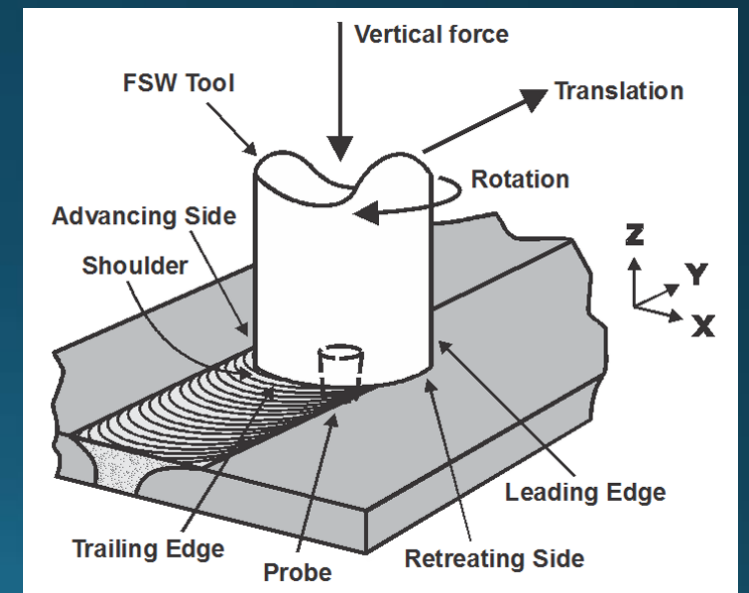


Challenges

- Which option is best?
- Front surface area for both options is bigger than what can be ordered off the shelf.
- How can we make a radiator that large without losing the thermal conductivity?
- Where can we find a machine large enough to shape it?

Friction Stir Welding

- Chosen material: AL 1100
- Pure aluminum alloy
- Thermal conductivity through the welded area will remain very similar to a regular sheet
- Improvement of friction stir welding
- Experiment



- <https://www.youtube.com/watch?v=VFBAAJRhO4>

Forming

Curved

- Roll forming machine
- Mandrel to hold in place



Tri-fold

- Press brake machine
- Easier to find a big machine



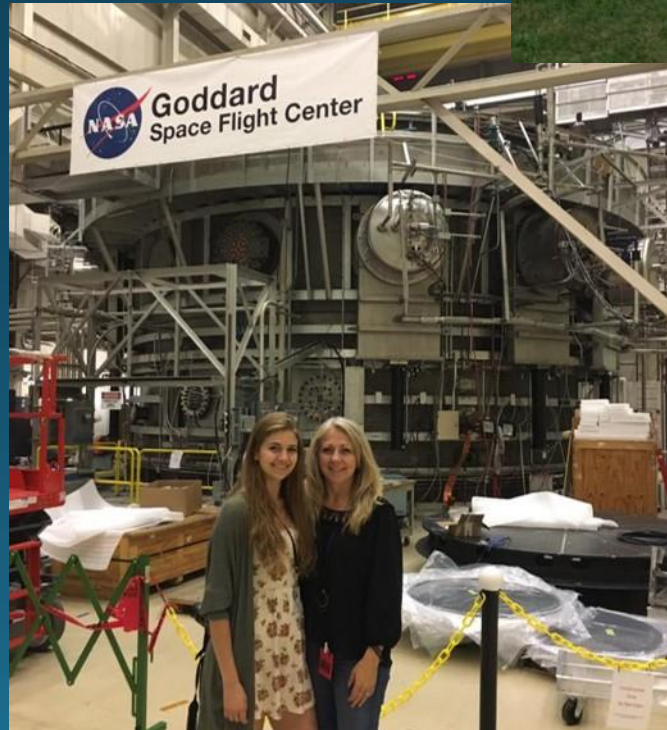
Challenges and Surprises

- Vacations!
- Constant changes to design

- Acronyms everywhere!
- WABBA, FABBA, OBA

Activities

- NASA picnic
- Poster presentations
- Astronaut John Grunsfeld



Activities cont.

- Weekend trips to DC
- Hiking
- Meeting lifelong friends



Impact of the Future

- Being in Maryland showed me how much I love to travel!
- Great people make for a great work environment
- And of course all things airborne!
- Future plans for an internship with Rockwell Collins – airborne hardware