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AM Payload: NASA Sounding Rocket

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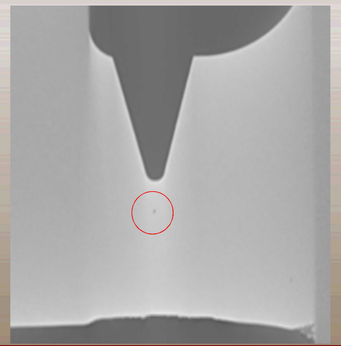
Experiment Overview

- Deliver AM experiments onto a NASA sounding rocket for experimental evaluation
- Payload limited in power, but recovered
- Opportunity to expose AM parts to combined mechanical environments
- Sounding rocket flew on March 22nd from NASA Wallops

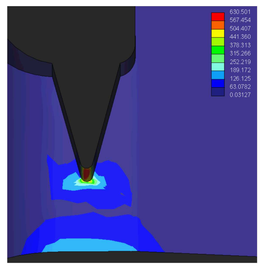
Experiment Details

- Two sets of four cantilever beams designed to fail at specific accelerations
- Cantilevers fabricated via LENS process with final machining to get tolerances in critical regions
- Beams CT scanned prior to integration to look at shape and pores in critical region

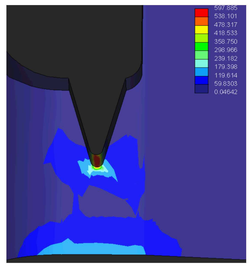


Modeling Efforts

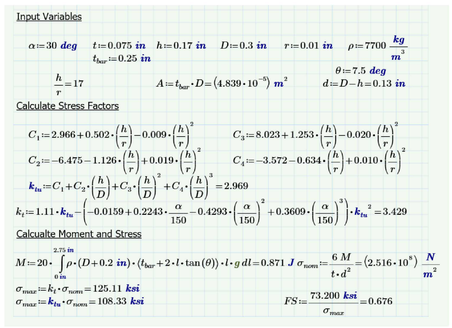
- Notch geometry designed such that launch stresses are greater than ultimate tensile strength
- Hand calculations used to optimize notch geometry
- FEA conducted to validate hand calculations



20g

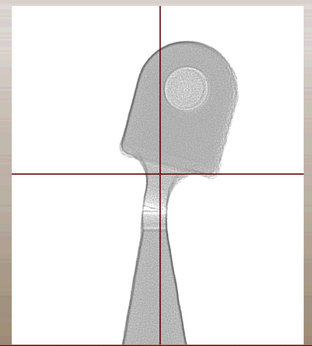


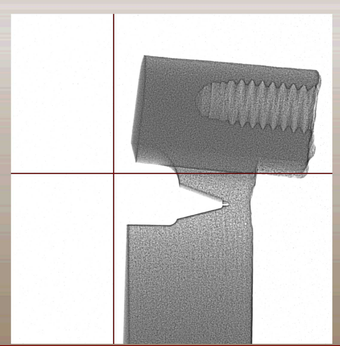
30g

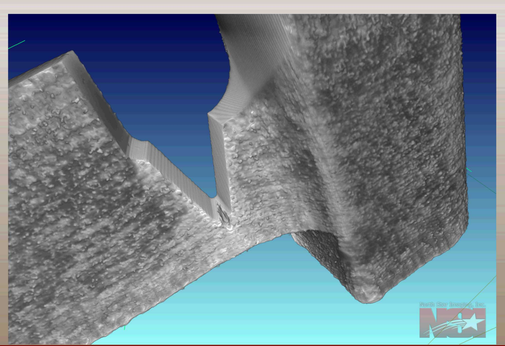


After Recovery Results

- Beams CT scanned to check pore distribution and crack length in neck region
- 20g beams saw more deformation than 30g set but not total failure as expected
- Next Steps: Integrate strain gauges and qualify material







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