



Background

- Manufacturing satellites in space would revolutionize the ability to learn and adapt to space exploration and sustainability.
- An essential part of this project would be to develop a system to monitor this production.
- Research explores the feasibility of a payload designed to implement both thermography and ultrasound for in-space Nondestructive Evaluation (NDE) of bonded joints.

Research Results and Products

- The payload prototype is made of aluminum and includes a thermography setup with an IR camera mounted on the frame.
- Aluminum sheets (50mm x 50mm x 0.5mm) act as placeholders for solar cells, allowing for testing of both ideal and defective adhesion samples.
- The IR camera (SEEK Thermal S304SP) captures the entire base of the prototype from a vertical angle.
- Ultrasound testing uses two bonded transducers to excite and analyze wave propagation in the sample to detect defects.

Research Objective

- Develop a fully functional payload prototype to perform NDE of bonded joints in-space for quality inspection (look for defects).
- Developed payload will be hosted outside the ISS (International Space Station) to perform the NDE testing.
- NDE methods include ultrasound testing and infrared thermography.

Commercialization and/or Societal Impact Opportunities

- **Application:** In-Space Manufacturing of Satellites
- **Key Values:** Nondestructive Evaluation system that can monitor the quality of bonded joints
- **Potential Customers:** Space technology manufacturers, specifically interested in in-space manufacturing

Team Names & Collaborators

ARCS Students:

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Collaborators:

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Citations

Gaddy, E., Douglas, M., Sharps, P., & Kerestes, C. (n.d.). *Transformational solar array option I final report - PDF free download*. DocPlayer. <https://docplayer.net/198365106-Transformational-solar-array-option-i-final-report.html>

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