

HALO: High Autonomous Low-SWaP Operations

Team Members:

- Sloan Hatter shatter2022@my.fit.edu
- Blake Gisclair bgisclair2022@my.fit.edu

Faculty Advisor: Dr. Ryan T White rwhite@fit.edu

Client: Dr. Ryan T White rwhite@fit.edu

Progress Matrix of Milestone 6

Task	Completion %	Sloan	To Do
Finalize Showcase Poster	100%	100%	None
Demo Video	80%	100%	Splice together imagery data.
User/Developer Manual	100%	100%	None
Finalize performance metrics and results for all CNN and ViT models	100%	100%	None
Record metrics for quantized 8-bit ViT for CNN comparison if feasible	100%	100%	None

Discussion of Accomplished Tasks for Milestone 6:

- **Showcase Poster Draft**
 - The poster for the Senior Design Showcase was completed and submitted on April 17th, 2026. The poster outlines the motivation behind the project, the goals of the project, and the methods and resources that were used to complete the project, along with images of model detection, the Vision Transformer framework, a table of model comparisons, a future works section, and references and acknowledgments.
- **Demo Video**
 - There is a demo video of the 16-bit Vision Transformer model performing inference on a video of satellite images to showcase its functionality and performance. This video will be on display at the Senior Design Showcase on Friday, April 24th, 2026. For right now, the demo consists of satellite image stills showing model detections.
- **User/Developer Manual**

- The Developer Manual for HALO has been completed. The document outlines the architecture of the system, the architecture of the models, the methodology used, and all of the necessary source files.
- **Finalize Performance Metrics**
 - Mean Average Precision (mAP) scores were calculated for each of the five models for comparison with each other, and notably between the CNN models and the Vision Transformer models.
- **Record Metrics for Quantized 8-bit ViT model**
 - I was able to quantize a Vision Transformer down to 8-bit; however, the mAP score evaluation showed that the 8-bit model was performing incredibly poorly, so it was not added to the poster. The 8-bit model was performing well under the 16- and 32-bit models, as well as the CNN models, to the point where it was not justifiable to add it in the final product.

Discussion of Contribution to Milestone 6:

- **Sloan Hatter:** I completed the showcase poster in totality with help from my teammate on satellite image selection and feedback from my advisor, Dr. White. A demo video is currently in the works by splicing together imagery data to create a video; for now, the demo consists of satellite imagery stills showcasing model detections. Performance metrics for each of the five neural network models were computed through the utilization of mAP scores and added to a table that is displayed on the showcase poster for ease of viewing. I was able to obtain an 8-bit quantized Vision Transformer model; however, when the mAP scores were evaluated for it, it showed that the model was performing very poorly to the point where it was not viable to add to the showcase poster.

Lessons Learned:

- **Effective Presentations:** Communicating a project to others who don't know the background is very important, and doing it effectively is even more important. Outlining good presentations that contain relevant information, but not too much information to the point where it bogs down the explanations and gets wrapped up in technical jargon, is very important. Clear, concise information is the best policy and the best way to get your point across when presenting on technical projects.
- **Demonstration Importance:** I've learned that it is vital to have good demonstrations of your work for project milestones so that the work that has been completed thus far can be showcased properly, not only for your stakeholders but for yourself as well. It helps keep good documentation of progress and good checkpoints/baselines to work off of.
- **Time Management:** I feel as though I could have managed my time better. It was a little difficult balancing my internship, classes, and extracurriculars alongside Senior Design; looking ahead more and planning out specific task completions would have benefited the end goal of this project to a much higher degree.
- **Project Scope:** Coupled with Time Management, I could have consolidated the project scope further by better assessing the project timeline and identifying setbacks earlier rather than later.
- **Team Communication:** Communicating with your teammate, updating them, and, in turn, having them update you is vital to the success of a project. Communication could have been stronger between my teammate and me about where we were both at in the project

timeline and any setbacks that were encountered. If communication had been stronger in those respects, then this project could have gone further than where it ended.

Date of Meetings:

- 04/03/26
- 04/09/26
- 04/16/26

Client Feedback on Milestone 5:

See Faculty Advisor Feedback below.

Faculty Advisor Feedback on Milestone 5:

Faculty Advisor Signature: _____ Date: 20 April 2026