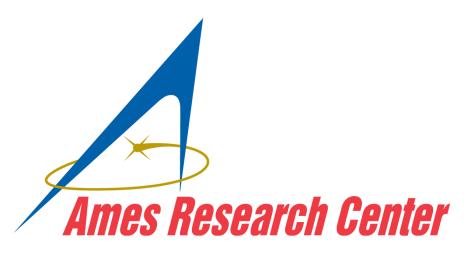
Team TARDIGRADES

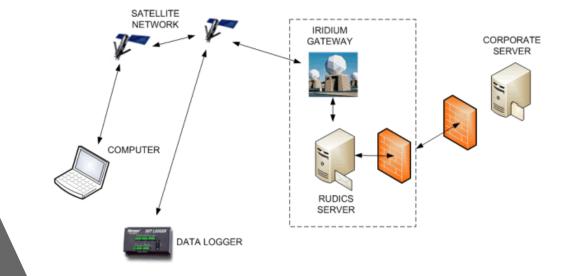
- Finan Bryan (ME)
- Joe Dennison (CompE)
- Robert Goes (Math & CS)
- Cosette King (CS)
- Lily Mortensen (MSE)
- Drew Pilchard (EE)
- Grace Rosenvall (ME)
- Harrison Thomsen (EE)
- Taegan Williams (CS)





9523 - Problem Description

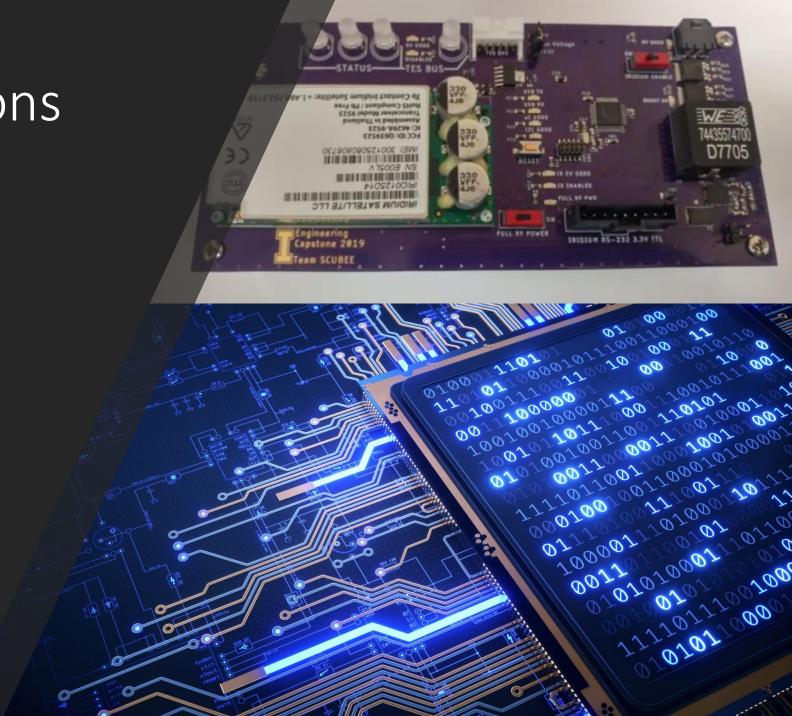
- Primary goal will be to complete the software and hardware development of a carrier module for the Iridium 9523 Satellite Modem.
- Iridium 9523 is a commercial satellite communications modem capable of operating in both Short Burst Data (SBD ('texting')) and streaming network (RUDICS (data)) modes.





9523 Specifications

- PCB Design for Space
 - Microcontroller, 30W GaN power converter, Iridium support circuitry
 - Professional class-3 manufacture after successful prototype
- Software Development
 - Real-time data handling and parsing
 - Onboard encryption/decryption
 - Update encryptions standards from AES 128 to AES 256
 - Development of device software and ground-based server asset

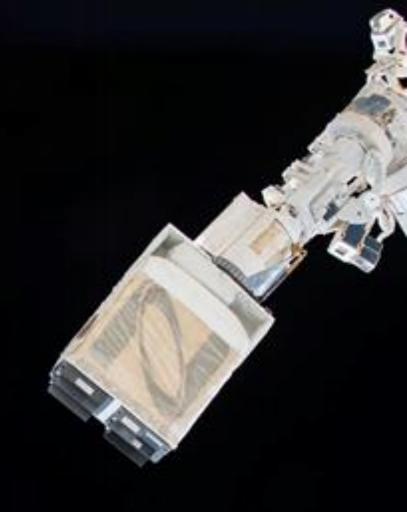


Schedule-9523

		Project:	TARD	IGRA	DES											
		Last Updated:	10/6	5/20												
		Year					2020									
		Month		Se	pt				Oct				Nov			
Task Description	Duration	Assigned	9/7	9/14	9/21	9/28	10/5	10/12	10/19	10/26	11/2	11/9	11/10	6 11/23	3 11/3	
<u>ECE</u>																
Look over Dev board and SAMD51 manual	3 weeks	Joe														
Porting from the Pi to the SAMD51	2 weeks	Joe														
Wire Devboard to SAMD51 via RS-232 header	1 week	Joe														
Split firmware between dev board and SAMD51	2 weeks	Joe														
Design and sim RF power converter first iteration	2 weeks	Drew + Harrison														
Physical testing RF power converter/second iteration d	2 weeks	Drew + Harrison														
Schematic with upgaded boost convertor/SAMD51	2 weeks	Drew + Harrison + Joe														
Test final satellite board	Next Sem	Joe														
<u>CS</u>																
ook over past code repositories/9523 manual	4 weeks	Robert + Cosette + Taegan														
Determine SAMD51 encryption library	2 weeks	Robert + Cosette + Taegan														
Resolve Decryption issue/rewrite code (blocked by san	3 weeks	Robert + Cosette + Taegan														
mprove Encryption standards	2 weeks	Robert + Cosette + Taegan														
Feature complete (blocked row 30)		Robert + Cosette + Taegan														
Bug Tested	1 week	Robert + Cosette + Taegan														
Determine new Rudics Needs	1 week															
Determine ground server requirements	4 weeks	Robert + Cosette + Taegan														
acryption and Decryption Implementation	2 weeks	Robert + Cosette + Taegan														
acryption and Decryption Implementation	2 weeks	Robert + Cosette + Taegan														
Determine ground server requirements	4 weeks	Robert + Cosette + Taegan														
Determine new Rudics Needs	1 week															
		Robert + Cosette + Taegan														

ADCS Problem Definition

To evaluate and combine COTS components to create a more cost effective ADCS unit prototype



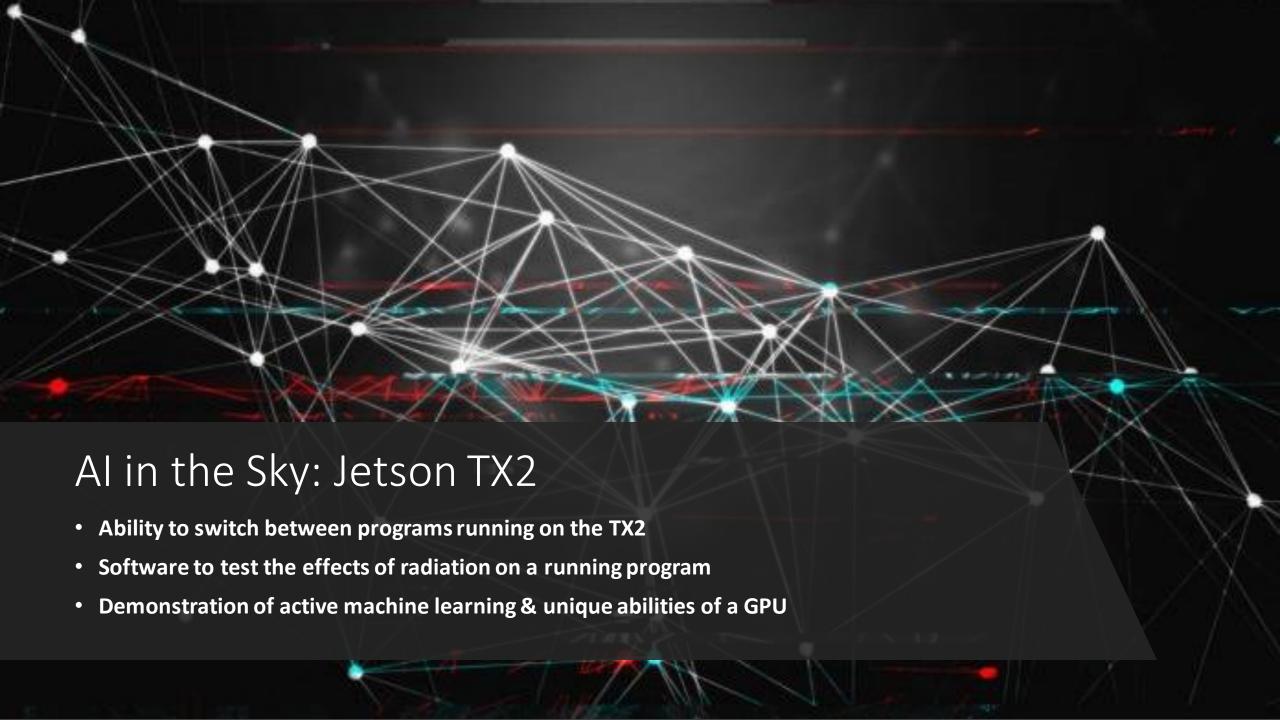
Component Research

- Reaction Wheels
- Sun Sensors
- Magnetorquers/Torque Rods
- IMU
- Magnetometers



Schedule-ADCS/AI

ADCS subgroup Tasks		Į.						
Research ADCS components	2 weeks	Finan + Grace + Lily						
Preliminary Force Calculations	1 week	Finan + Grace + Lily						
Generate Component shortlist with design matrix	4 weeks	Finan + Grace + Lily						
Prototype layout/design Round 1	2 weeks	Finan + Grace + Lily						
Refine Force Calculations to match shortlist	2 weeks	Finan + Grace + Lily						
Final component selection	4 weeks	Finan + Grace + Lily						
Calculations complete for control of final components	2 weeks	Finan + Grace + Lily						
Prototype design Round 2 with final components	2+ weeks	Finan + Grace + Lily						
AI in the Sky subgroup Tasks								
earn how to interface with TX2		Robert						
mplement task switching		Robert						
Determine proof of concept		Robert						
Determine proof of concept		Robert						
mplement task switching		Robert						



Budget

- Submitted purchase request, awaiting delivery of microcontrollers
- \$3000 available,\$100 so far spent on microcontrollers
- Budget requirements for ADCS/Al in Sky are unknown until further research is completed.

