

Phoenix System Maintenance & Development

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NIROPS Closeout, NIFC, Boise



Season & Mission Goals

- Running NIROPS Missions
- Minimize Phoenix Scanner downtime
- Phoenix NexGen System ready for new airplanes

Phoenix NexGen

- New Motor and Controller
- Ekinox INS/GNSS
- Single Board Computer
- Cryocoolers
- New ADC/DSP
- 64-bit Operating system
- New Pre-Amp and Signal conditioning
- New Mirrors

Major Accomplishments

Motor Controller

- 19 lbs. reduction in weight.
- Stable scanline width.
- 28 V DC controlled

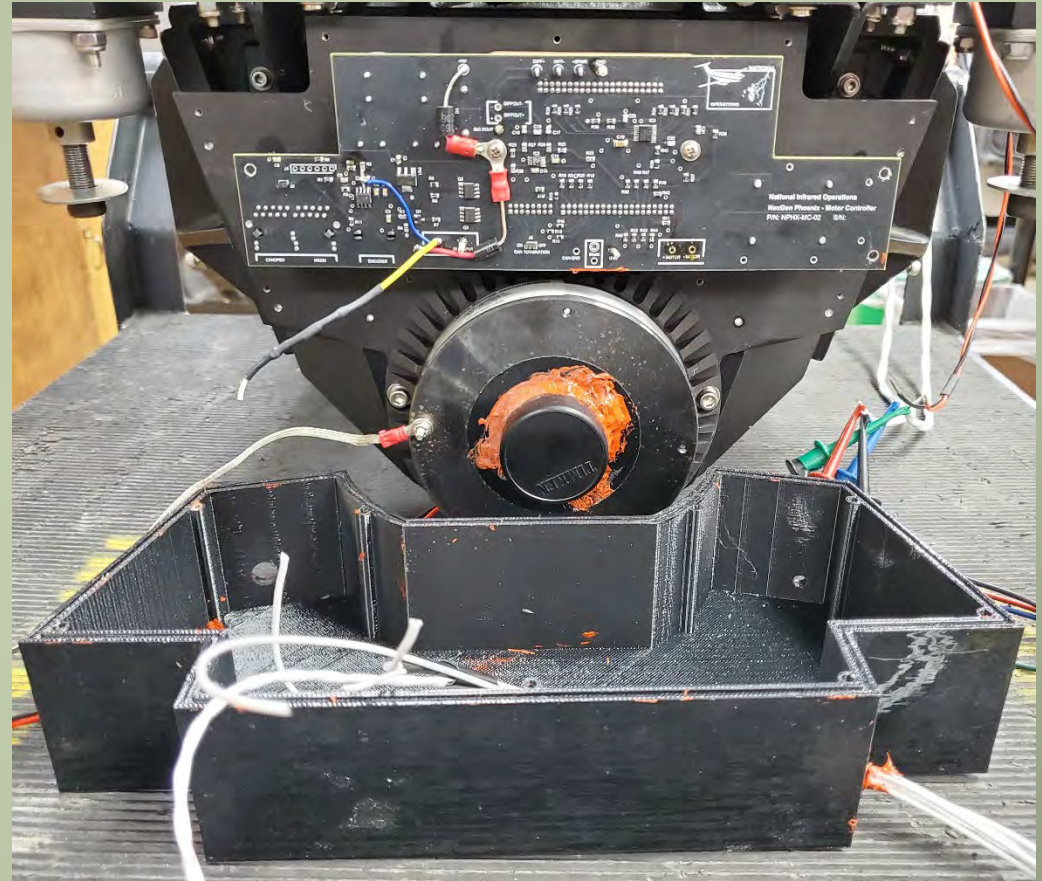


Figure 1: Motor controller circuit (top), Motor and encoder (middle) and motor cover (bottom)

Major Accomplishments

Cryocooler

- Replace liquid LN2 cooling system.
- Reduce height of scanner
- Reduced RFI/EMI by 75%
- Integrated Cold Shield

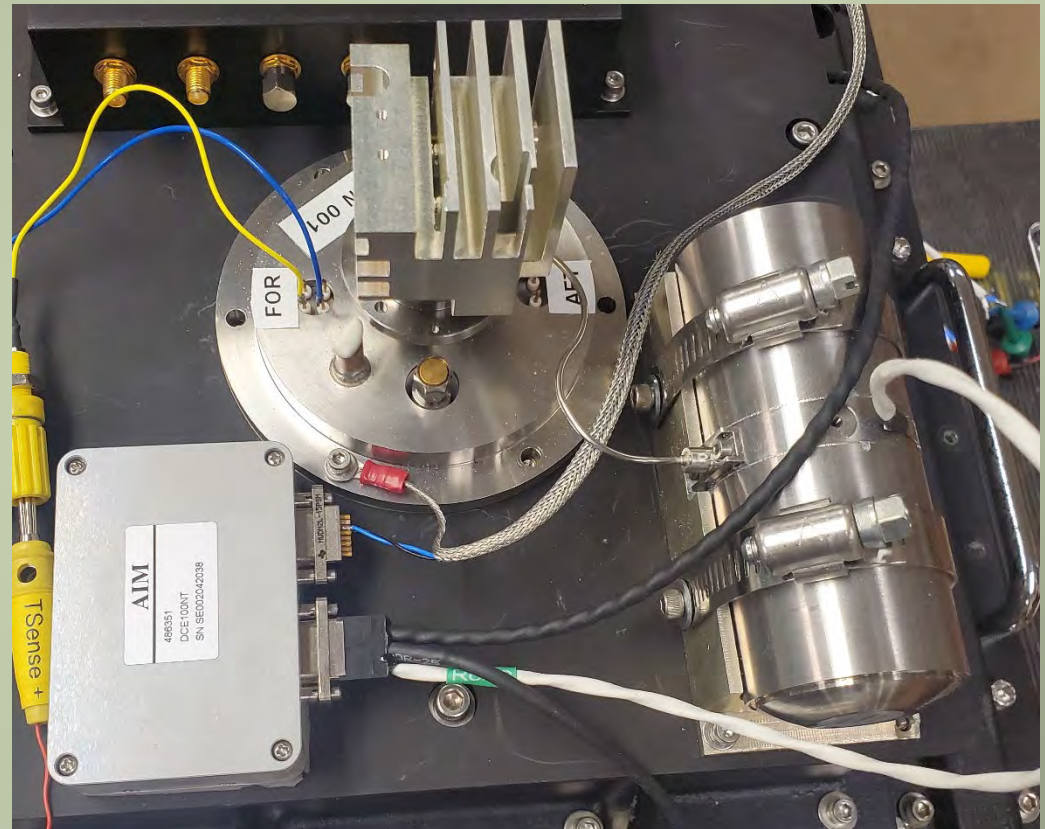
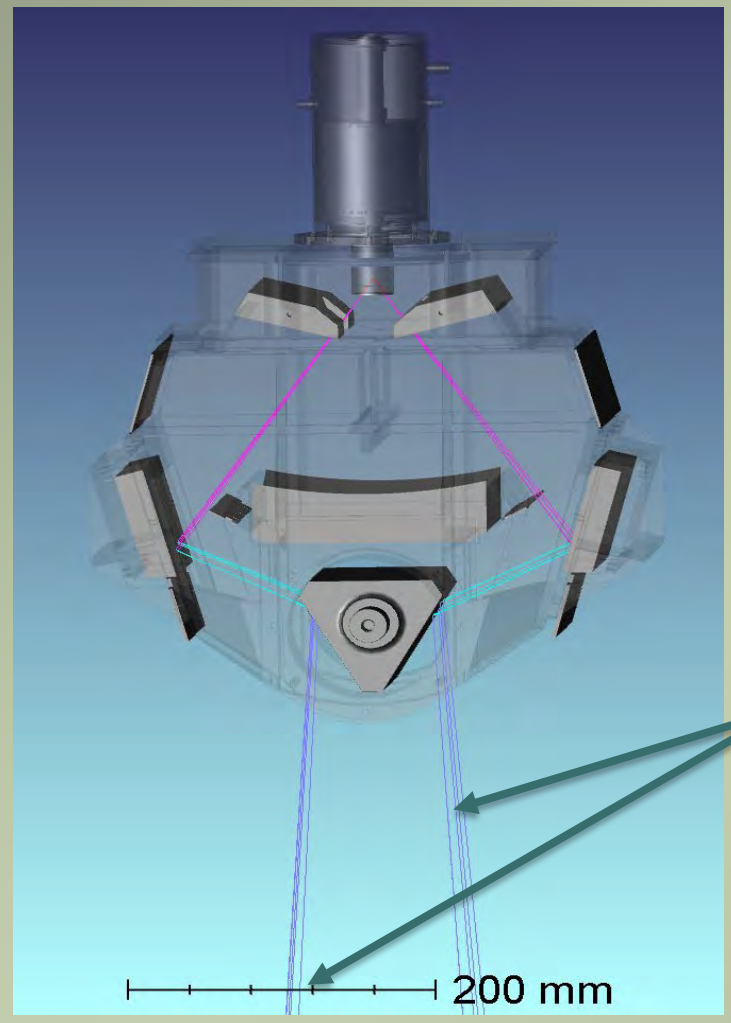


Figure 2: Cryocooler assembly. Compressor (right), Dewar and detectors (middle) and controller (left).

Cold Shield

- Eliminate “ghosting” artifacts in images



Stray light paths out of the scanner leave the scanner at an angle to the direction that the scanner is pointing towards on the ground.

Figure 3: Xiomas optical study showing stray light paths exiting from the scanner.

Detectors see light from areas at an angle to the ground target, which causes apparent flaring of the bright images.

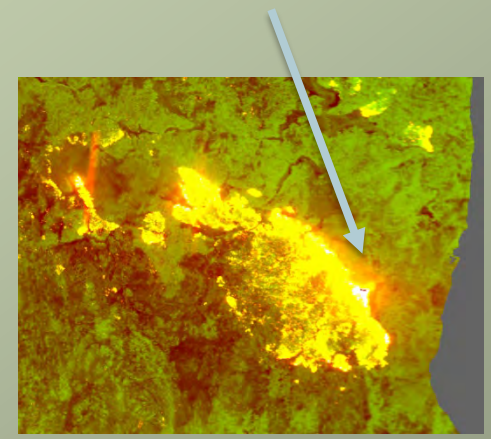
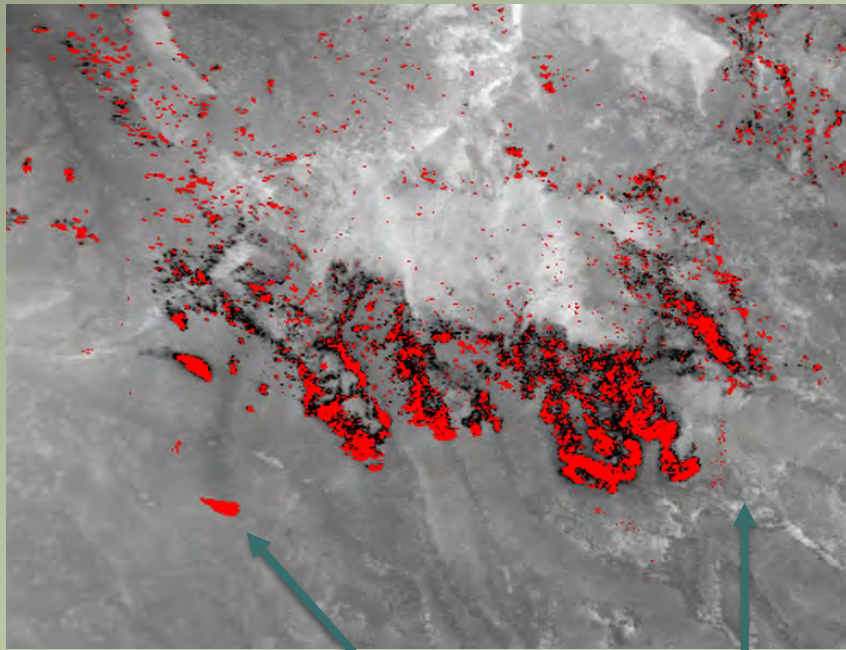
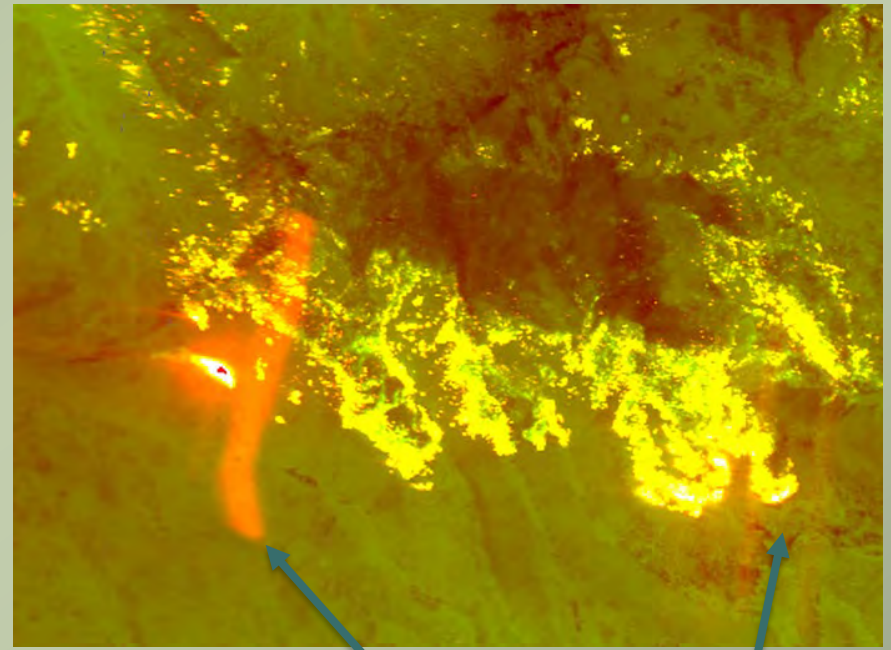


Figure 4: Ghosting example



False trips off ghosting
stray light path

Figure 5: Decker Fire 2019 Ortho image



Ghosting artifacts shown in
raw color image

Figure 6: Decker Fire 2019 color image

Phoenix NexGen

Single Board Computer

- Sheldon Instruments
- 64-Bit & portable across multiple operating systems
- Extremely small and lightweight



Figure 7: Single board computer with stacked ADC and DSP

Phoenix NexGen

- Extended operational life
- Improved system versatility and usage
 - Miniaturized and modern digital electronics
 - Repeatable/streamlined calibration
- Improved System Performance
 - Enhanced orthorectification
 - Improved image collection/resolution
- Expected fire season 2022

NATIONAL INFRARED OPERATIONS

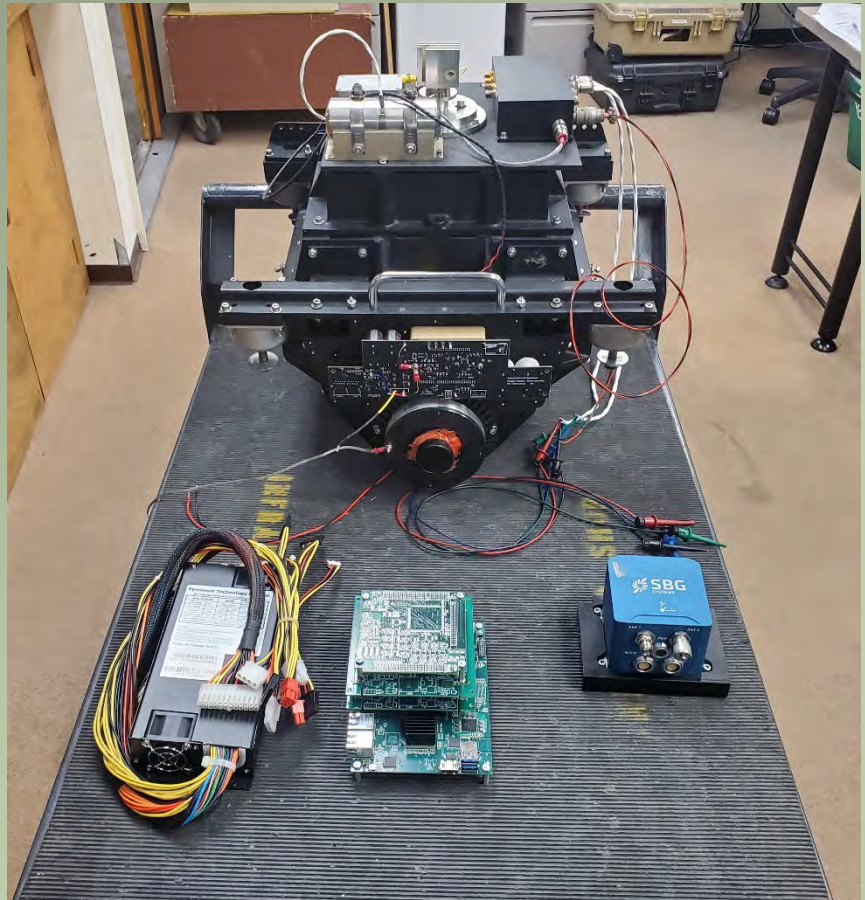


Figure 8: Complete Phoenix NexGen

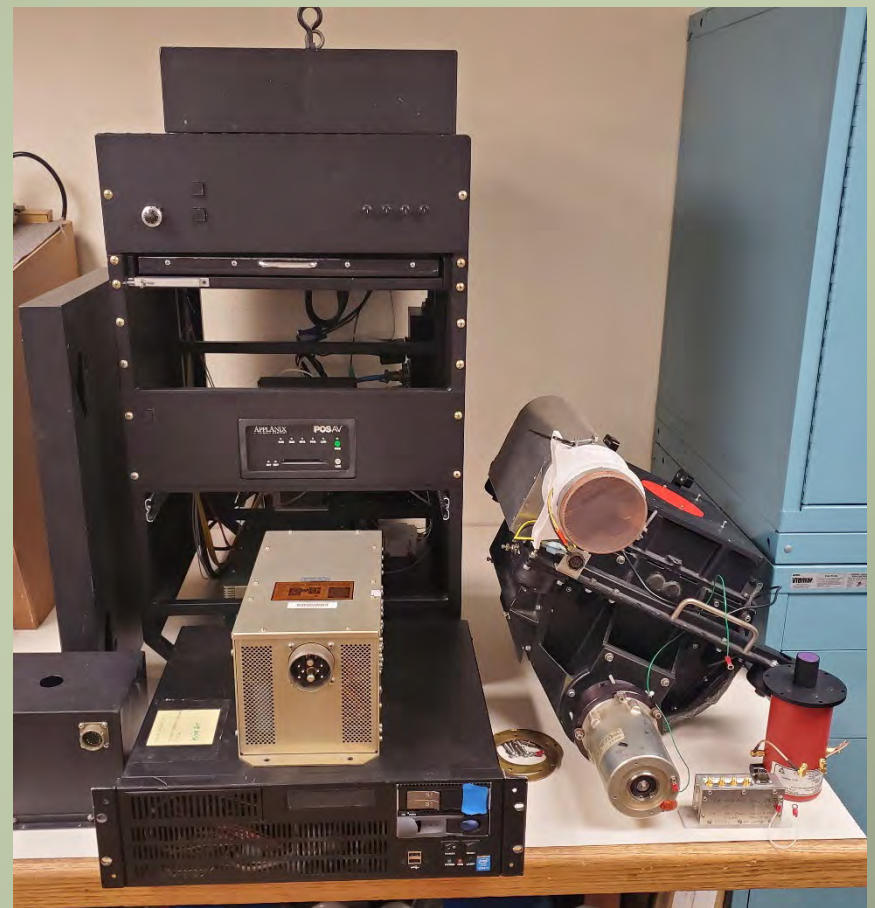


Figure 9: Complete Previous version Phoenix

Satellite Communications

- Inmarsat's SwiftBroadband network
- Improve connectivity more bandwidth
 - Speeds of up to 1,728 Kbps
 - (Previous Aircell speeds were 30 Kbps)
- Necessary for remote operation and automation.

Autonomous Modular Sensor (AMS)

- Viable AMS Platform with new aircrafts
- Complete Spectral, Radiometric & Blackbody calibration at
NASA AMES
- AMS is operational and ready



Thank You