



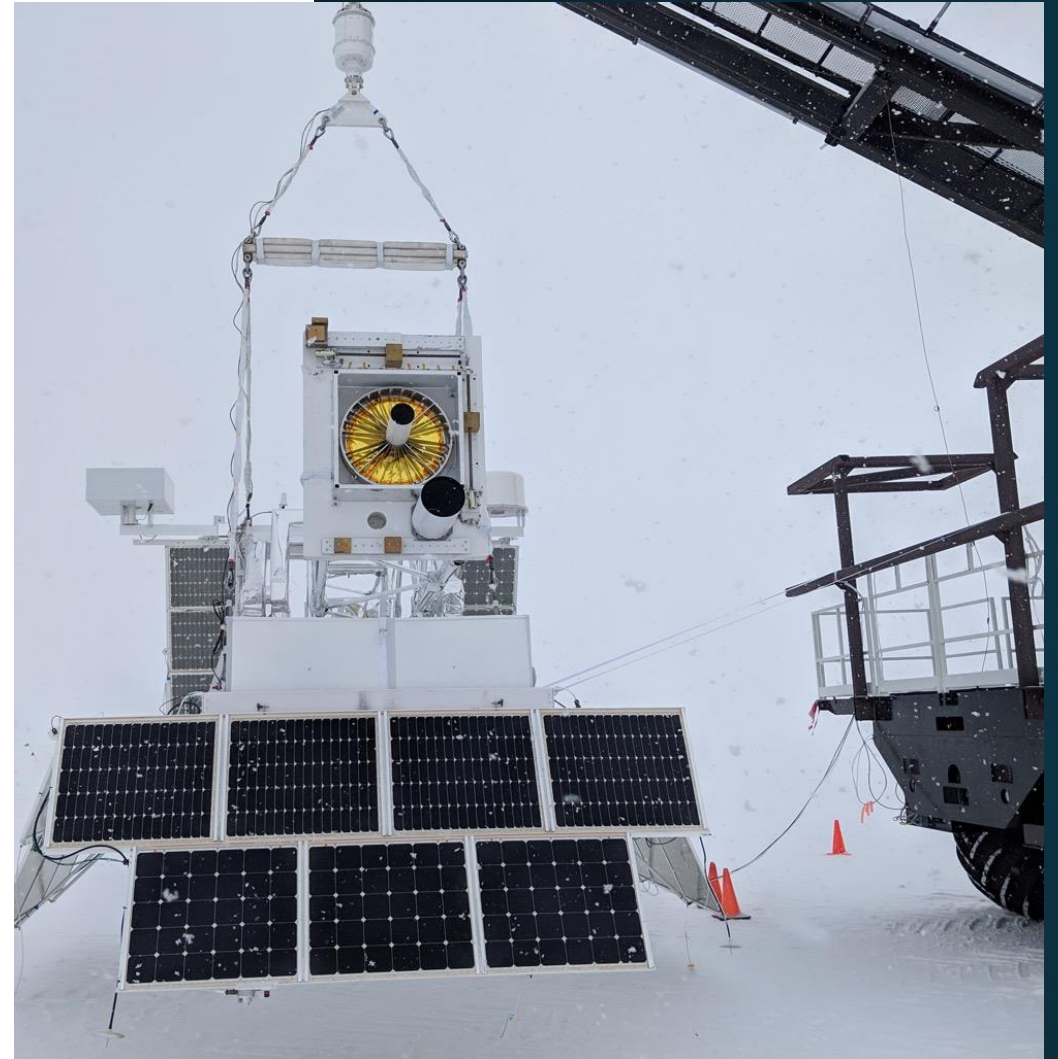
Wallops Arc-Second Pointing (WASP) System

Scott Heatwole

NASA Balloon Program Office

Suborbital and Special Orbital Projects Directorate

Goddard Space Flight Facility's Wallops Flight Facility



X-Calibur 2018, McMurdo (snowing)



Scientific Balloons Background



- NASA's Balloon Program
 - Two types of balloons
 - Zero pressure and Super pressure
 - Payloads up to 2948 kg (6500 lbm)
 - Altitudes from 29.2 to 38.7 (km)
 - up to 34km (110kft) for super pressure
 - Balloons 11 to 39 million cubic feet (~31.1 – 110 thousand cubic meters)
 - Typical WASP payload is 1800 kg (~4000lbm)
 - WASP provides the gondola and pointing system for a science telescope



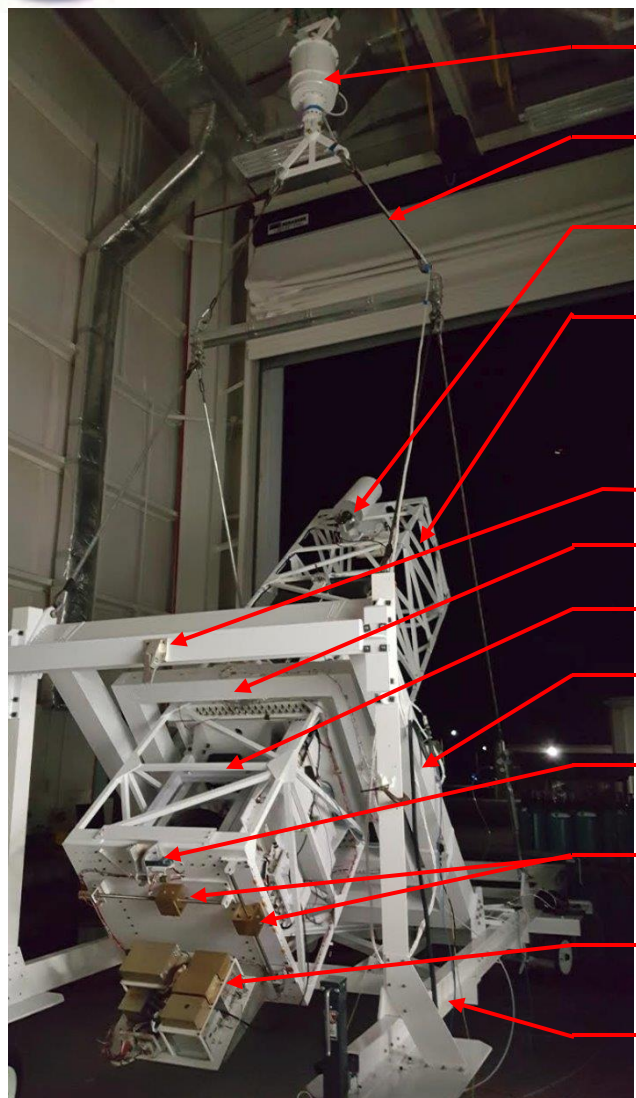
Launch Video



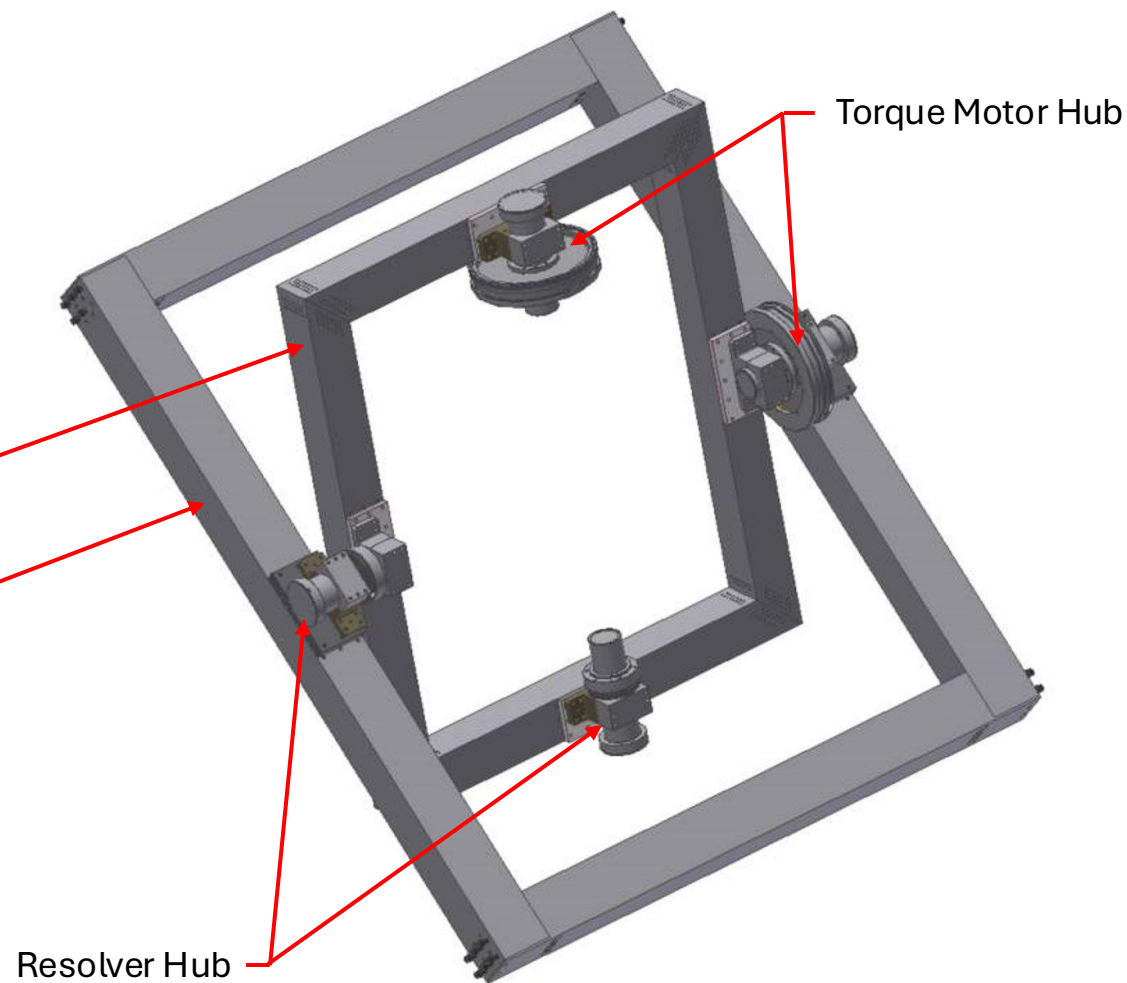
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WASP Mechanical Components



- Rotator
- Suspension Bridle
- Star Tracker
- Instrument Support Structure
- Caging Mechanism (passive half)
- Inner Gimbal Frame
- Inertial Measurement Unit
- Outer Gimbal Frame
- Caging Mechanism (active half)
- Flight Adjustable Trim Weights
- WASP Flight Electronics
- Main Gondola Structure





WASP Pointing



Science Instrument

Star Tracker/
Sun Sensor



CARDS Processor



Yaw Axis Hub

Inner Gimbal Frame

Pitch Axis Hub

CARDS Sun Sensor Head

Instrument Support
Structure

Outer Gimbal Frame

Main Gondola Structure

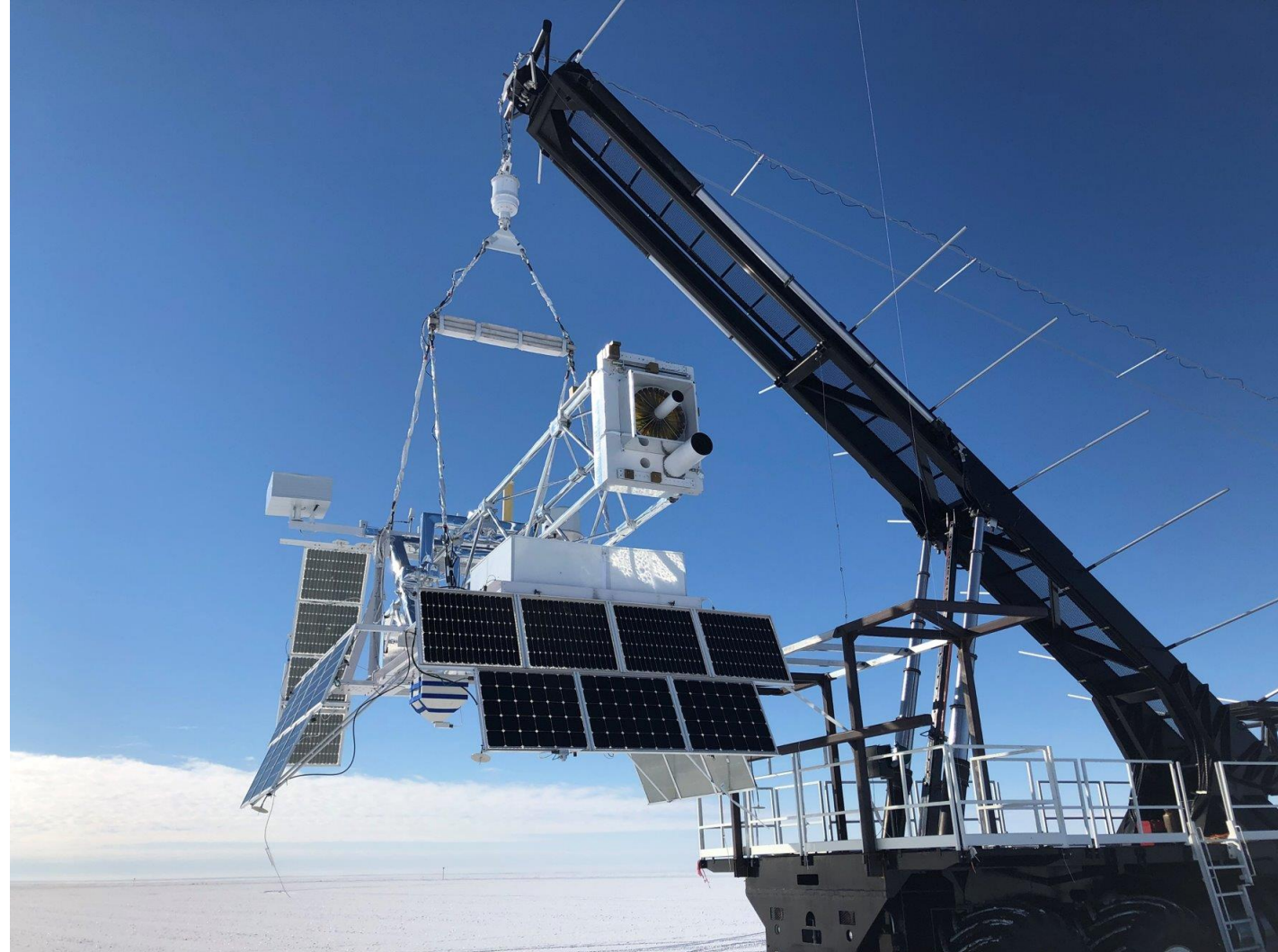


WASP Flights

X-Calibur
Balloon Borne
8m X-Ray Polarimetry Telescope

Washington University
University of Hiroshima
NASA's Goddard Space Flight
Facility

FT Sumner 2016
McMurdo 2018-2019





BITSE

Balloon-borne
Investigation of
Temperature and
Speed of
Electrons in the
corona (BITSE)

NASA's Goddard
Space Flight Center
(GSFC)
and
Korea Astronomy
and Space Science
Institute
(KASI)

FT. Sumner 2019

19 Nov 2024





Picture-C

Planetary Imaging
Concept Testbed Using
a Recoverable
Experiment-
Coronagraph
(PICTURE-C)

University of Massachusetts,
Lowell

FT Sumner 2019, 2022

19 Nov 2024





XL-Calibur

Balloon Borne

12m X-Ray Polarimetry Telescope

Washington University in St. Louis

University of New Hampshire

Osaka University

Nagoya University

Hiroshima University

KTH Royal Institute of Technology
(Sweden)

Japanese Institute of Space and
Astronautical Science

RIKEN (Japan)

US Naval Research Laboratory

NASA's Goddard Space Flight Center
and Wallops Flight Facility

Esrange 2022 and 2024

19 Nov 2024





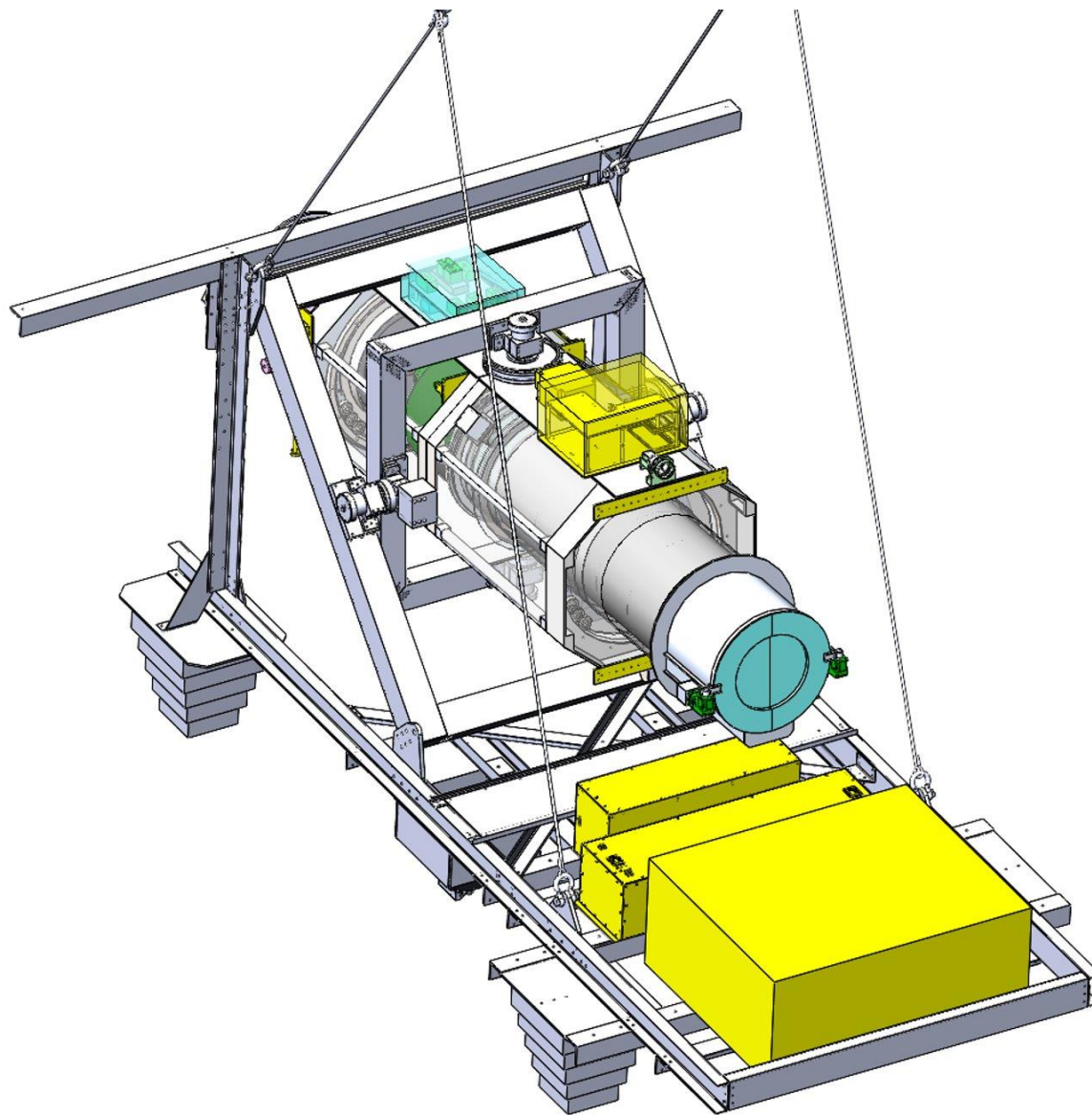
CORSAIR

Coronal Spectrometer for
Airborne Infrared Research
(CORSAIR)

Smithsonian Astrophysical
Observatory

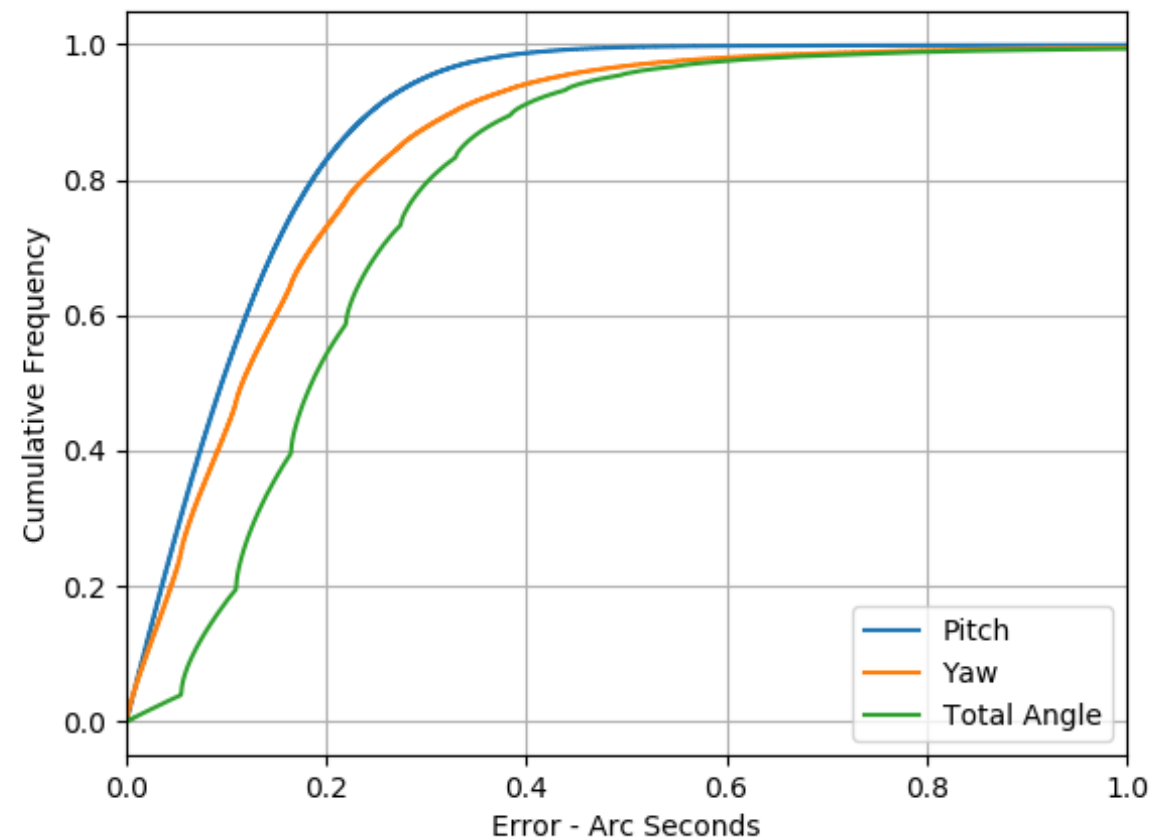
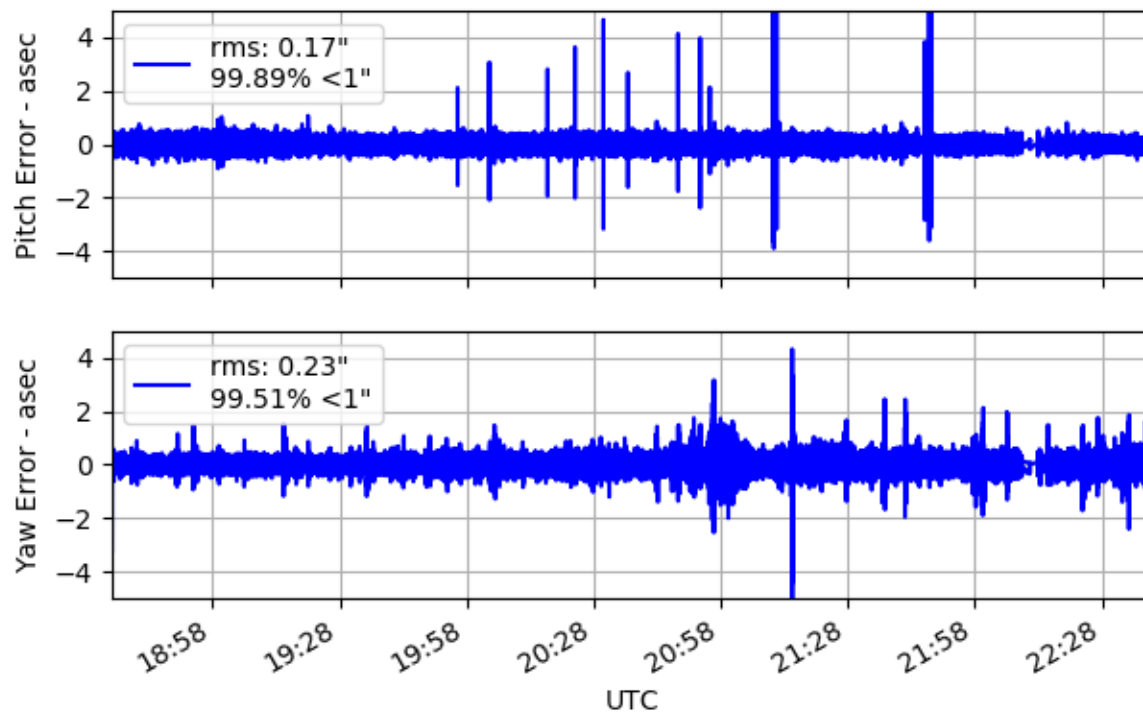
FT Sumner 2025

19 Nov 2024





BITSE Pointing Performance



total error: 99.4% < 1"



Questions?



- Contact Info
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 - <https://sites.wff.nasa.gov/code820/>

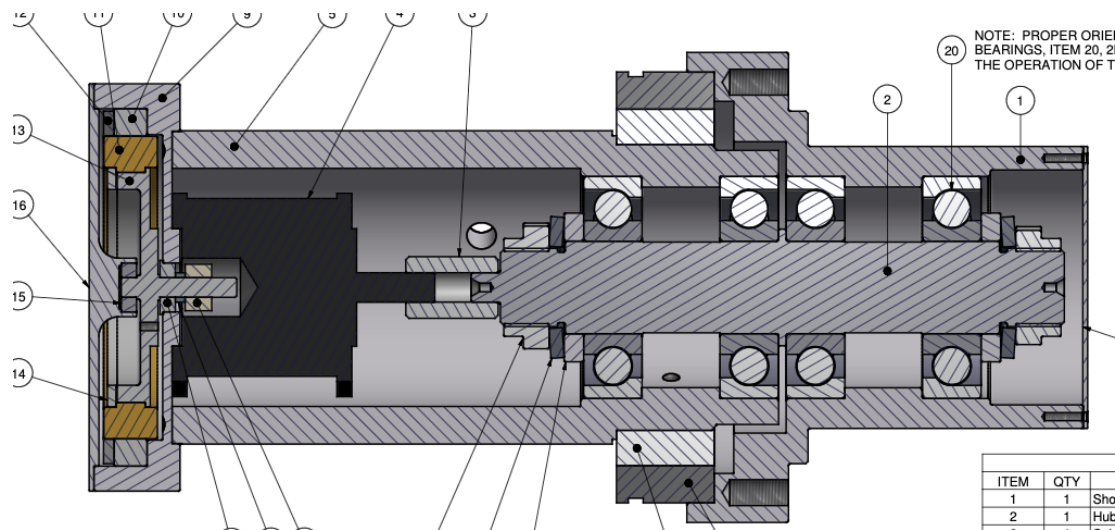


Backup



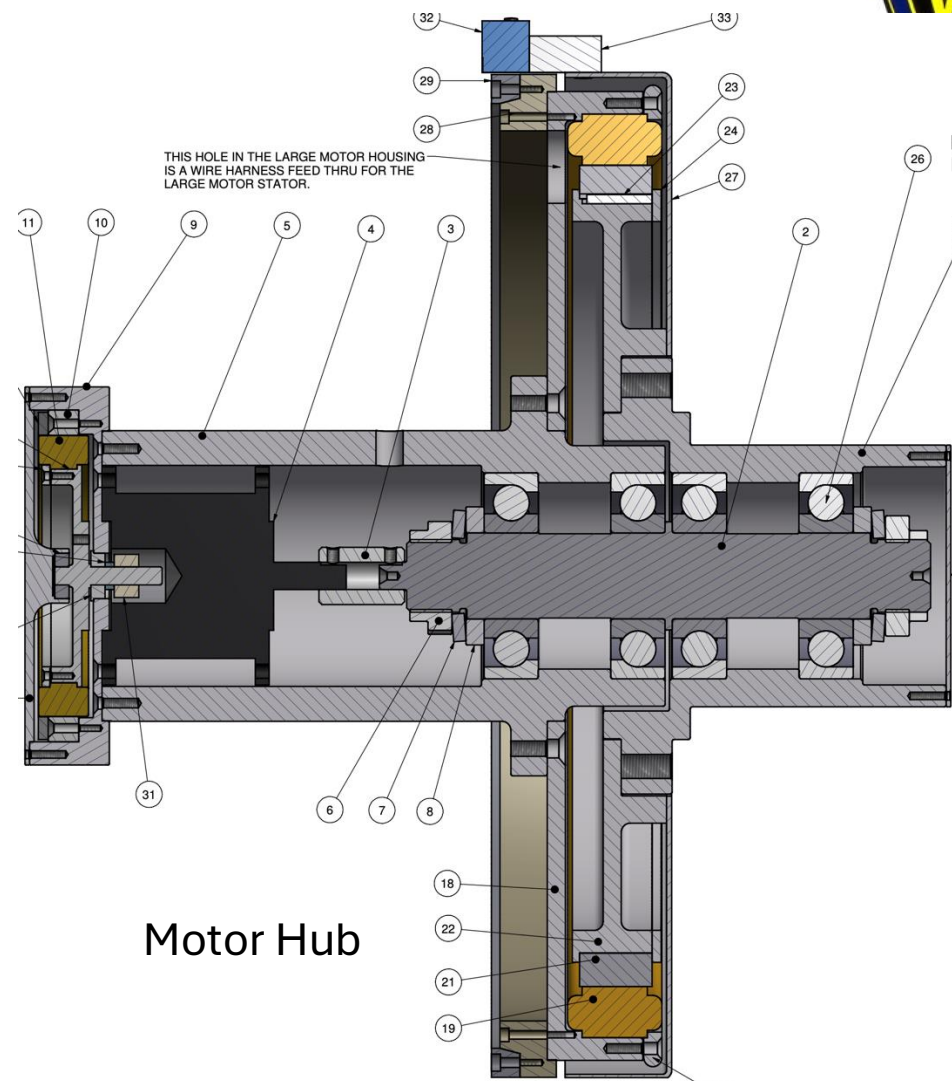


WASP Hubs



ITEM	QTY	SHA
1	1	Sha
2	1	Hut

Resolver Hub



Motor Hub