

53rd Weather Reconnaissance Squadron

2026 AR Recon Workshop

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Every trip has its stories



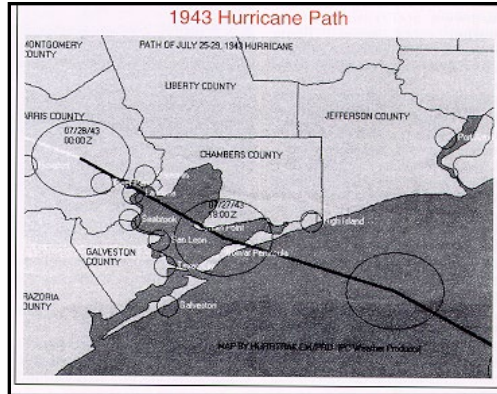


Every trip has its stories





Weather Reconnaissance (WR)



On a Wing and a "Dare"

Bryan, TX
July 1943



"The only embarrassing episode would have been engine failure, which, with the strong ground winds, would probably have prevented a landing, and certainly would have made descent via parachute highly inconvenient."



Pilot
Joe Duckworth



Navigator
Ralph O'Hair



WX Officer
William Jones-Burdick



Weather Reconnaissance Missions



Defense Support to Civil Authorities (DSCA)

Includes:

- National Hurricane Operations Plan (NHOP)
- National Winter Season Operations Plan (NWSOP)



Department of War Support

Includes:

- U.S. Navy buoy support
- Other operational requirements as needed

High Elevation Radiation Array (HERA) Detectors for Airborne Thunderstorm Investigations

Abstract

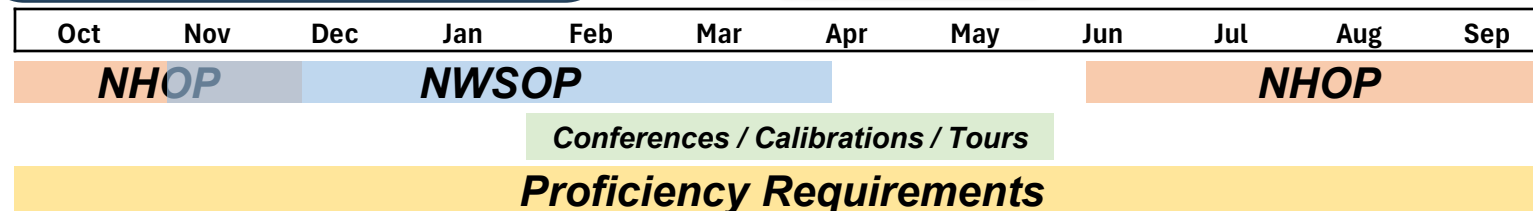
The Air Force Institute of Technology (AFIT) and the United States Air Force School of Aerospace Medicine (USAFSAM) are conducting an aircrew ionization study in collaboration with the 53rd Weather Reconnaissance Squadron. To investigate the high energy atmospheric physics phenomenon known as a terrestrial gamma-ray flash (TGF), a suite of gamma-ray instruments will be installed and flown on ten USAF WC-130J 'Hurricane Hunter' aircraft. The



Other Agency Support

Includes:

- Collaborative efforts with academia and research labs (i.e., AFRL, NRL, ONR, etc.)





DSCA Mission

NWSOP Operation Locations:

Keesler AFB, MS
Mather Airfield, CA
Reno, NV
Elmendorf AFB, AK
Barbers Point, HI
Anderson AB, Guam

National Winter Season Operations Plan (NWSOP)

24-hour operations
4 flights/day from 3 locations
24-hour response time

National Hurricane Operations Plan (NHOP)

24-hour operations
3 Storms from 3 locations
16-hour response time

NHOP Operation Locations:

Keesler AFB, MS
Kelly Field, TX
Savannah, GA
Homestead ARB, FL
St Croix, USVI
US FOL, Curacao
Barbers Point, HI

Guiding Documents:

- [H.R. 2427 \(1989\)](#) - Est. DoD support to DoC
- [CJCS DSCA EXORD](#) - Directs unit to support
- [AFI 10-801](#) - Identifies AFRC as WR force provider
- [AFMAN11-2WC-130J Volume 3](#) - Sets operational procedures
- [NHOP/NWSOP](#) - Coordinates interagency requirements

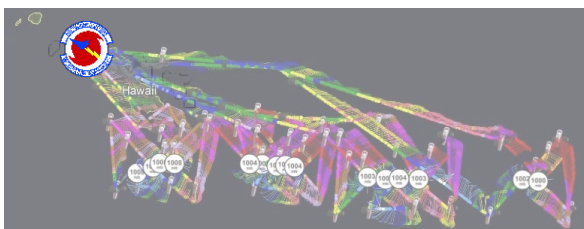


NHOP Operations

Missions Support the National Hurricane Center and Central Pacific Hurricane Center (NOAA)

Mission Objectives

- Provide real-time situational awareness to forecasters (storm movement & intensity)
- Reduce forecast model errors
- Support civil authorities and DoW decision makers
- Mitigate disruptions to supply chains, travel and commerce



Calvin – Continued HI support

Hilary – First NHOP operations off West Coast

Lee – Impact to New England & Nova Scotia

Philippe – Crossed fiscal years

Data collected increases forecast accuracy and intensity

UNCLASSIFIED

Melissa



UNCLASSIFIED



NWSOP Operations

Missions Support the National Center for Environmental Prediction (NOAA)

Mission Objectives

- Reduce large forecast errors
- Support water management decisions and flood forecasting
- Mitigate disruptions to supply chains, travel and commerce
- Improve forecasts of significant weather events (such as ARs) for civil authorities and DoW decision makers

Pacific Operations (Atmospheric Rivers):

- Customized tracks flown when ARs threaten West Coast
- Significant value due to tailoring to meet weather scenario

West Coast customized tracks improve forecast model accuracy



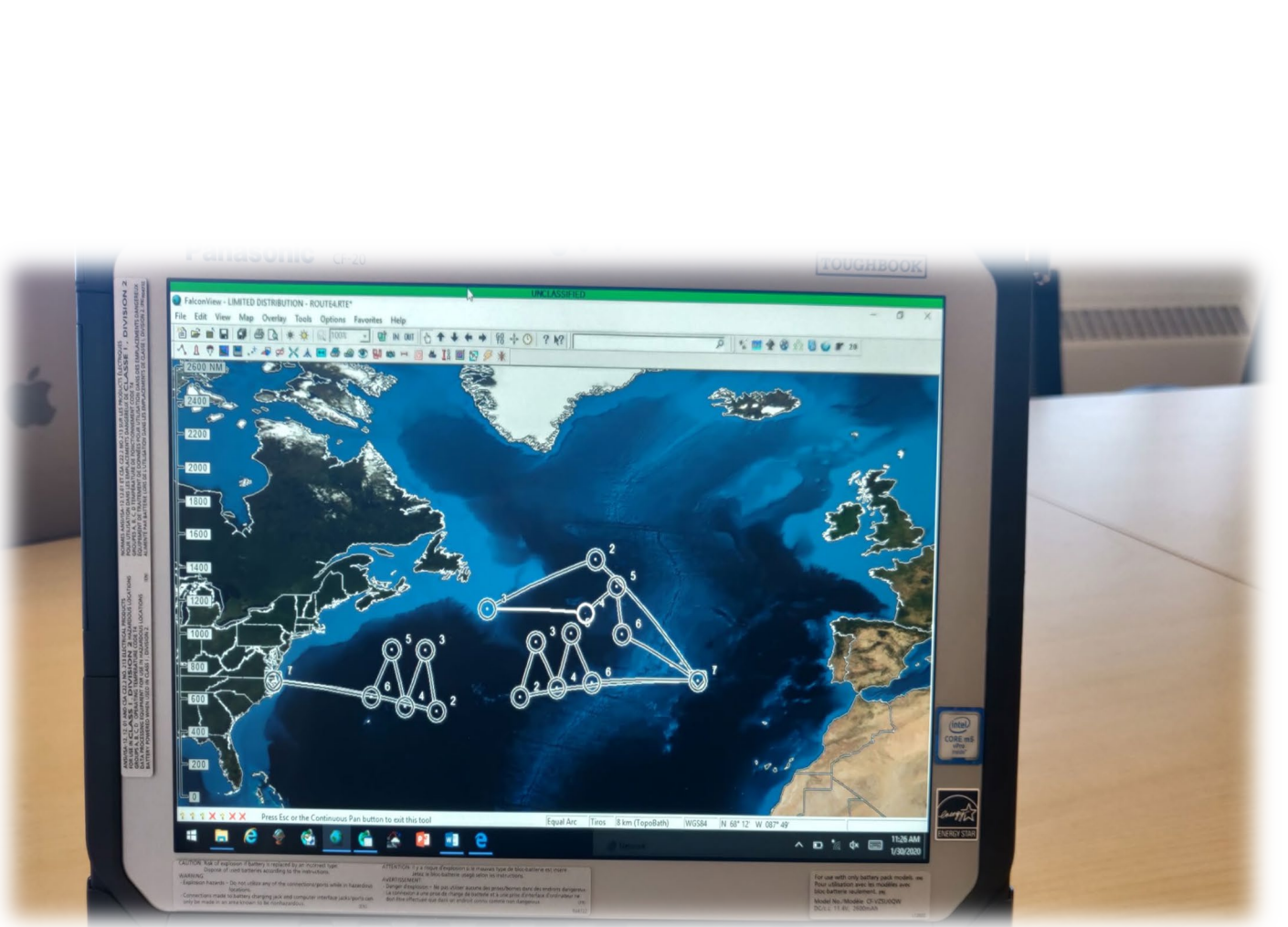
Atlantic Operations:

- Fixed Tracks flown when weather threatens East Coast



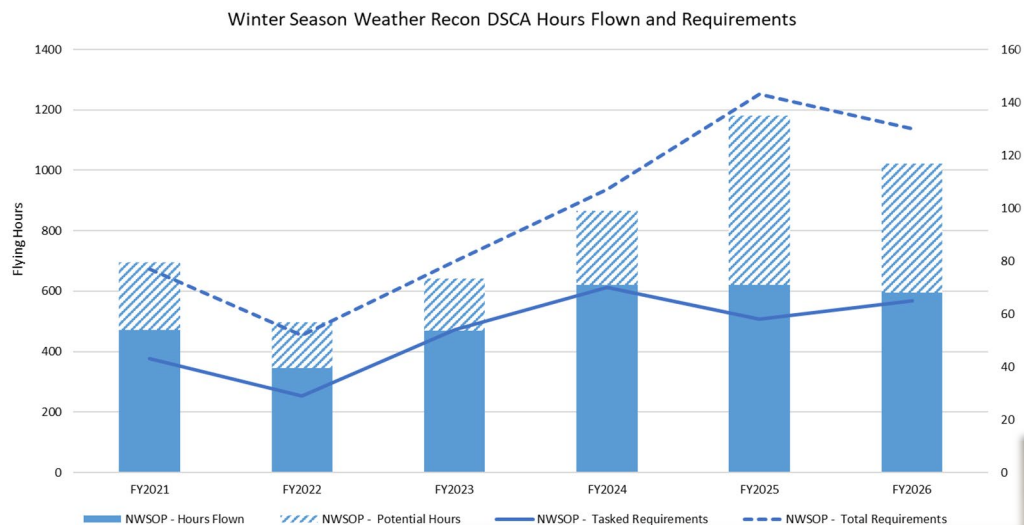


Future predicted (Jan '20)

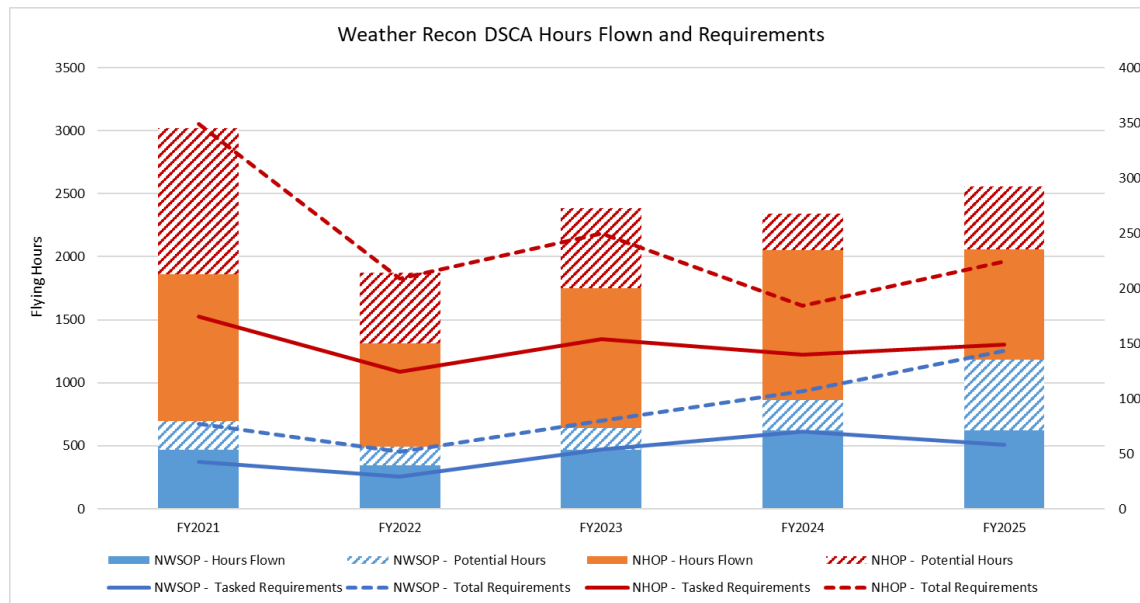
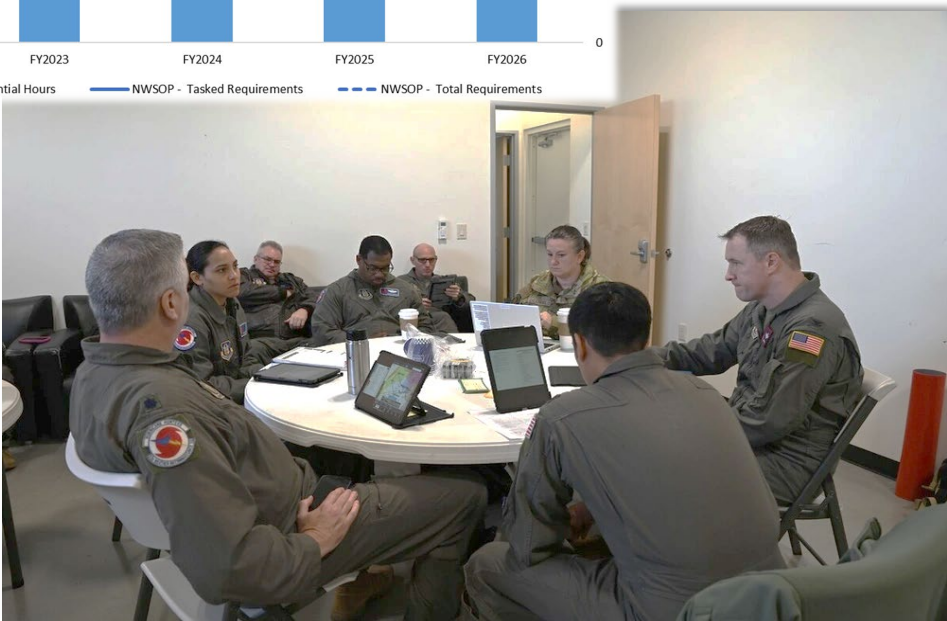




Demand Increasing



- Winter season requests have been historically increasing
- Additional requests for expansion into the western Pacific by NOAA and DoW





Dropsonde Counts



2023	
Tropical	841
AR / Winter Storm	568
Total	1409
Fail Rate	10.00%

2024	
Tropical	1410
AR / Winter Storm	802
Total	2212
Fail Rate	8.27%

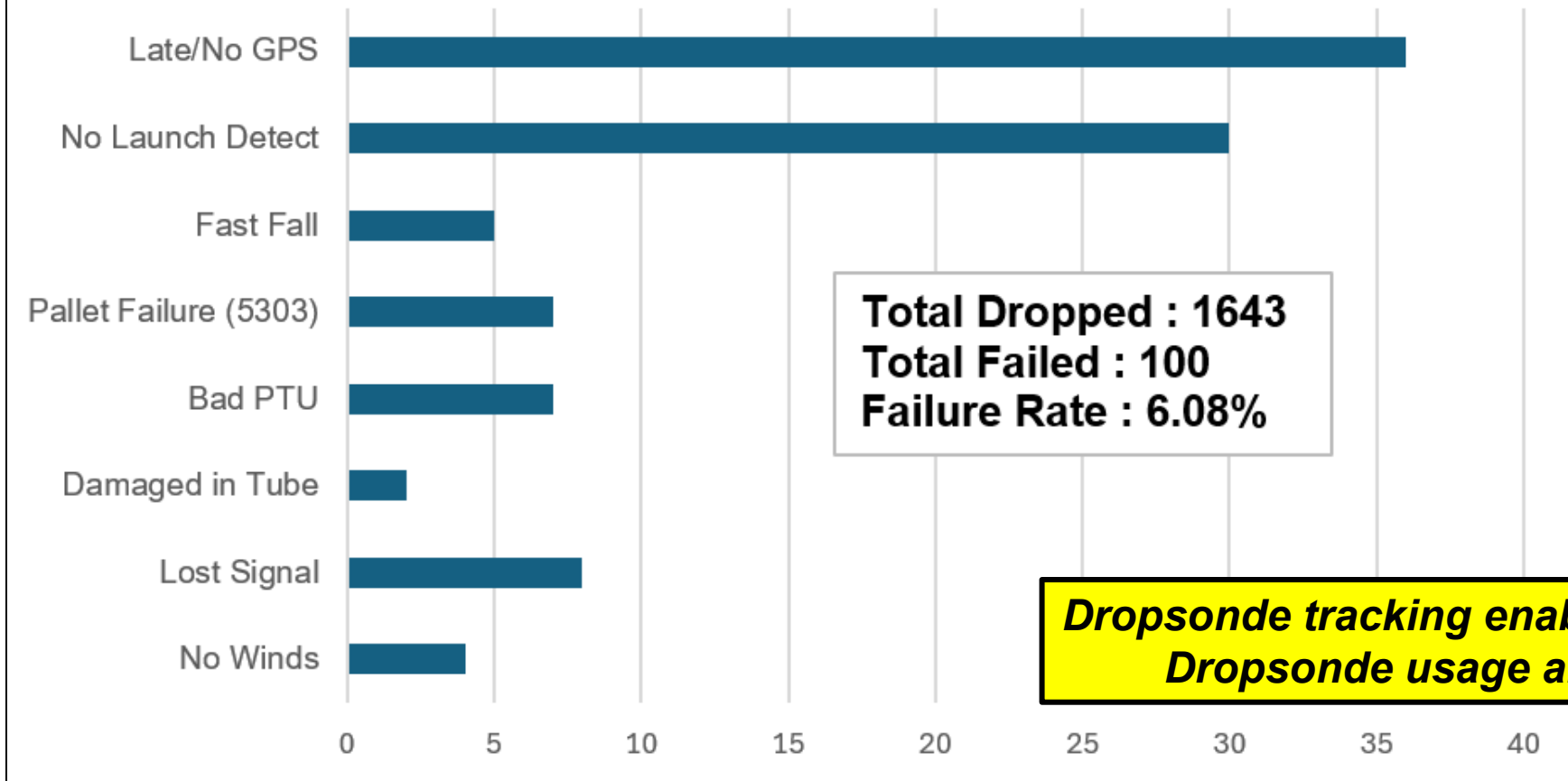
2025	
Tropical	1007
AR / Winter Storm	636
Total	1643
Fail Rate	6.08%

2026	
Tropical	
AR / Winter Storm	842
Total	842
Fail Rate	5.22%



2025 Failures

2025 NHOP/NWSOP Season Dropsonde Failures



Dropsonde tracking enables us to troubleshoot issues
Dropsonde usage also helps predict funding



Challenges

Operations:

- The government shutdown during the busiest month generated unique challenges
- Generally had funds to execute missions but maintenance support was minimal outside of storm flights and deployments
- Increasing demand with limited personnel and aircraft, executing high operations tempo for ten months out of the year, from multiple locations exacerbates aircraft maintenance issues

Manning:

- Crews
- Mx personnel must share resources across both squadrons at Keesler

Equipment:

- Testing and installation delayed due to aircraft availability, personnel shortages, and funding
- Lack of dedicated program office personnel to work modifications (Proposal submitted to correct)
- Supply chain for parts for aircraft (HDD6 & Windshields)
- Software upgrades slow and create issues when not operating on the same as NOAA



Successes



Instruments and Data Standardization/Improvement:

- Deployed a new real-time data upload capability enables rapid instrument review and early detection of faulty equipment.
- Dropsonde Total: 5734 (24' 1200, '25 3626, '26 908)
- 4 Starshield Minis enroute (funded 1 year): ARO, BUFR, Chat (NOAA, CARCH, 53rd)

Developing Capabilities:

- Terrestrial Gamma Flash Detector is operational, had data collection from multiple storms
- Pressurized buoy launchers should arrive shortly 3 and then to 5.
- Wideband SATCOM system assessing capabilities in operational environment, we're targeting to have this capability
- SABIR Pod system feasibility study complete
- Gulf/Atlantic customized tracks – North of 33, direction, increased dropsondes

High Level engagement:

- As an effort to increase communication at the senior leader level, which was highlighted in the GAO audit, NDAA, multiple congressional inquiries: the NWSOP and NHOP now include 22 AF/CC signature

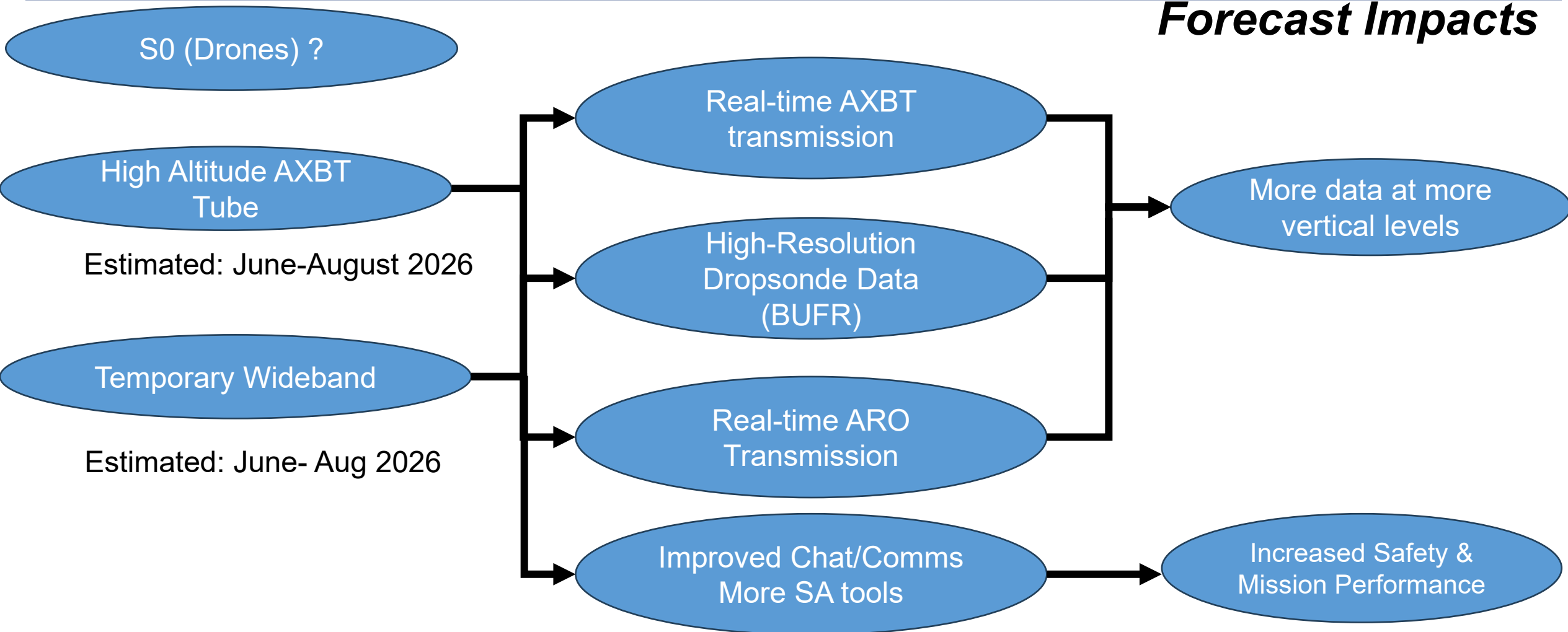


Hatch-mount Ku Antenna



Changes for FY26-27

Forecast Impacts





Trivia

- 1. Who was the pilot that won the bet by flying a T-6 Texan into the eye of a hurricane for the first time?**
- 2. What was the call sign of the last WC-130 aircraft lost in a tropical mission?**
- 3. What is the current call sign used by the 53 WRS?**



Trivia

1. Who was the pilot that won the bet by flying a T-6 Texan into the eye of a hurricane for the first time? **Major Joe Duckworth**
2. What was the call sign of the last WC-130 aircraft lost in a tropical mission? **Swan 38**
3. What is the current call sign used by the 53 WRS? **Teal**

Tie Breaker: What is the airspeed that WC-130s have to fly at in order to have rough air penetration speed (in knots)?

Questions?

