

SCOAR Brief

29 June 2016



WP-3.

Presenter:
Jim McFadden
Chief, Programs AOC



Office of Marine and Aviation Operations

AGENDA

- **Light Aircraft and UAS Activities - LTJG Doremus**
- **2016 Heavy Aircraft (P-3 and G-IV) Progress**
- **2016 Approved Aircraft Plan (AAP)**
- **P-3 Service Life Extension Program Update**
 - 1. Engine Refurbishment and Upgrade**
 - 2. Re-winging**
 - 3. Avionics Upgrades**
- **The New Look**



- (4) DHC-6-300 Twin Otters
- (1) AC-695A Turbo Commander
- (1) BE-350CER King Air

Light Aircraft Fleet



FY16-To-Date Light Aircraft Flight Hours

DHC-6 Twin Otters (N46RF N48RF N56RF N57RF)

NE and SE AMAPPS	East Coast, US	TBD
NERW	Northeast US and Canada	242.4 (in progress)
SERW	Southeast US	277
Florida Keys NMS	Key West, FL	64.7 (in progress)
Snow Survey/Soil Moisture	All US and Canada	545.5 (in progress)
Coastal Mapping	Coastal US/Islands	366.2 (in progress)
Arctic Stratification	Northern AK	20.1 (in progress)
Leatherback Sea Turtles	Gulf of Mexico/CA Coast	TBD
Steller Sea Lions	Alaska	TBD
Harbor Seals	Alaska	TBD
Loggerhead Sea Turtles	West Coast	33.5 (in progress)
Davidson Seamount	Monterey CA	27.1

AC695A Turbo Commander (N45RF)

Snow Survey	All US and Canada	320.9 (in progress)
Emergency Response	All US Property	27.4 (in progress)
GRAV-D	Central US	TBD

BE-350CER King Air (N68RF)

Coastal Mapping	Coastal US/Islands	400 (in progress)
Emergency Response	All US Property	56.5 (in progress)

Total 2,381.3



Recent Light Aircraft Upgrades

- Research-quality winds/ temp/pressure on Twin Otter N56RF
- Dropsonde/AXBT Launcher on Twin Otter
- 3 of 4 Otter's completed Garmin G600/Flight Stream 210 glass cockpit upgrade



NOAA AOC Unmanned Aircraft Systems



LT Matthew Nardi

Chief of AOC's UAS Office, Programs Sub-section



U.S. Department of Commerce
National Oceanic and Atmospheric Administration

FY16 Unmanned Aircraft Systems Projects

APH-22 Hexacopter

Project	Locations	Operational Days
Alaska Steller Sea Lions	Yakutat, AK	2
Northeast Grey Seals	Muskeget, MA	3
Descanso Ranch Training	Descanso Ranch, CA	10
Antarctica Gentoo / Chinstrap Penguins	Antarctica	17
Cape Cod Humpback Whale	Cape Cod, MA	5
Cape Cod Right Whales	Cape Cod, MA	2
Piedras Blancas Gray Whales	San Simeon, CA	15
Washington Orca Whales (Ongoing)	Friday Harbor, WA	5
Bahamas Beaked Whales	Sandy Point, Bahamas	Planned: 10
Aleutian Steller Sea Lions	Aleutian Islands, AK	Planned: 30
Atlantic Bluefin Tuna	Northeast Coast, USA	Planned: 15
Hawaiian Cetaceans	Oahu, HI	Planned: 15
Pribilof Islands Fur Seals	Pribilof Islands, AK	Planned: 30
Vancouver Orca Whales	North Vancouver Island, Canada	Planned: 30
Atlantic Menhaden	NE Cape Cod, MA	Planned: 15
Northwest Hawaiian Islands Monk Seals	Northwest, HI	Planned: 30
Hawaiian Surface Slicks	West Big Island, HI	Planned: 15
Olympic Coast	Quillayute, WA	Planned: 10

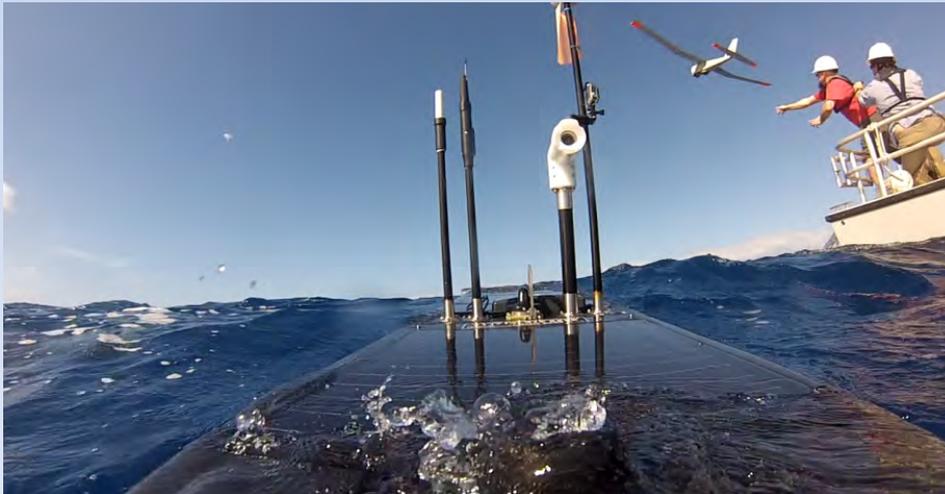
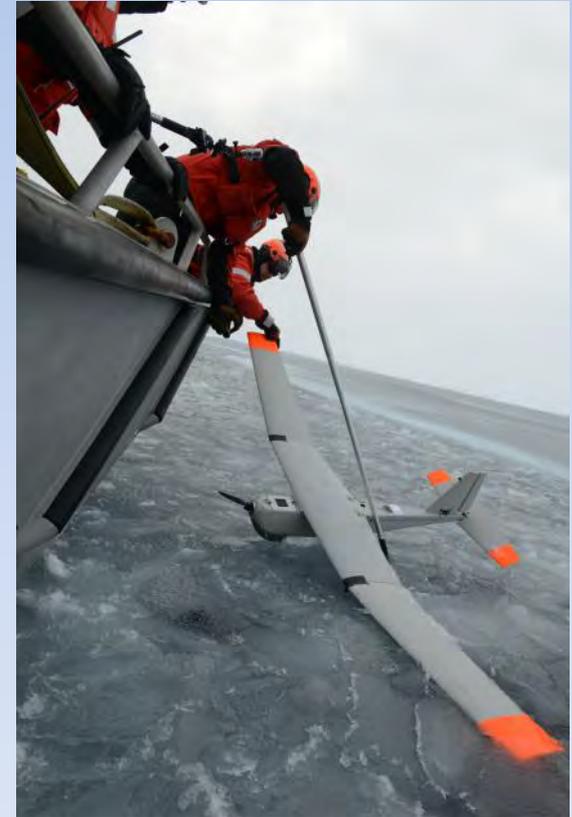


U.S. Department of Commerce
National Oceanic and Atmospheric Administration

FY16 Unmanned Aircraft Systems Projects

RQ-20 Puma - Fixed Wing

Project	Locations	Operational Days
Channel Islands National Marine Sanctuary	Channel Islands, CA	22
Shearwater Net Capture Testing	Channel Islands, CA	1
USCGS Polar Star	Antarctica	25
Oil Spill Response	Avon Park, FL / Richmond, CA	Planned: 10

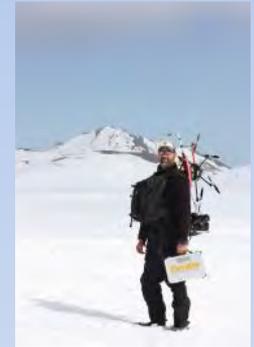


U.S. Department of Commerce
National Oceanic and Atmospheric Administration

FY16 Unmanned Aerial Systems Projects

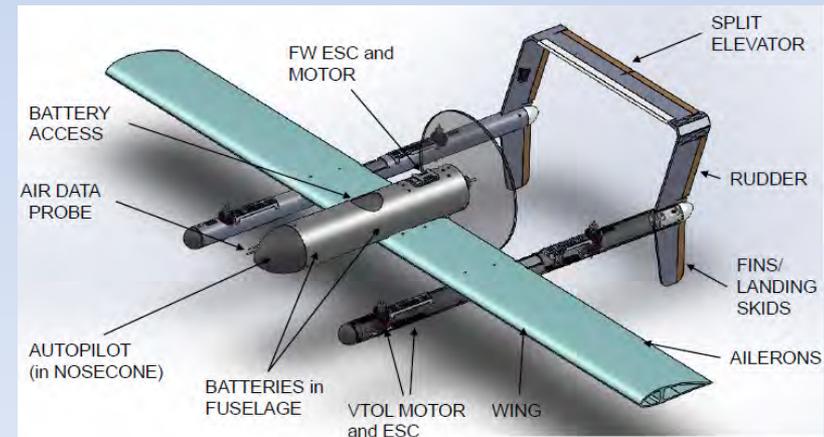
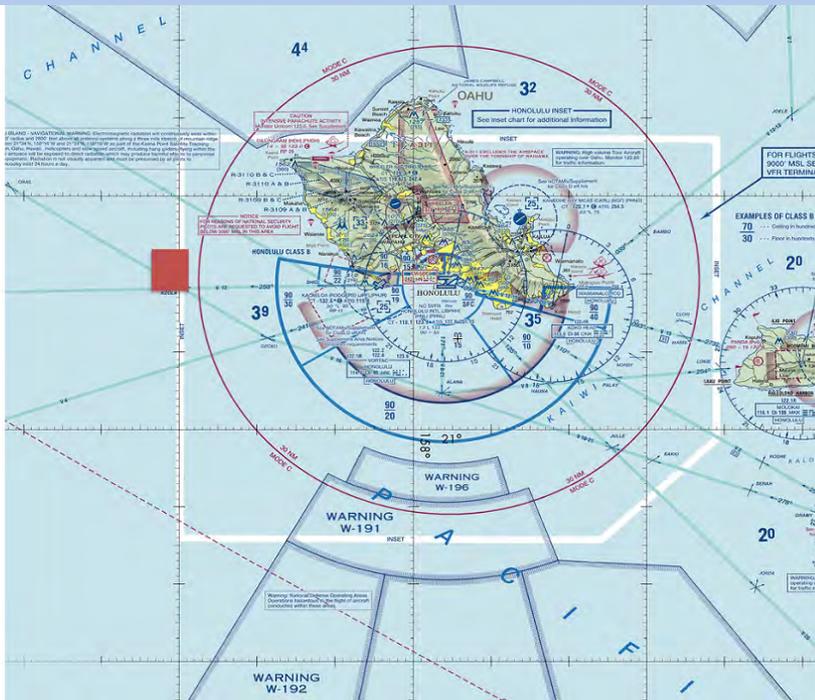
Miscellaneous Platforms

Project	Locations	Operational Days
DJI S-1000 Convective Initiation Operational Research (Ongoing)	Belle Mina, AL	Planned: 90
Latitude Testing Onboard R/V Sette	Oahu, HI	Planned: 10
Coyote Storm Flights	Atlantic Ocean	Planned: up to 7
Global Hawk Storm Flights	Atlantic Ocean	Planned: 60



U.S. Department of Commerce
National Oceanic and Atmospheric Administration

UAS Project Request – NOAA Sette Missions



Latitude Flights off NOAA Ship Sette
Policy Challenge: Risk-based Airworthiness



U.S. Department of Commerce
National Oceanic and Atmospheric Administration

AOC

Heavy Aircraft





UNITED STATES DEPT OF COMMERCE

N429F

UNITED STATES DEPT OF COMMERCE

N439F



N49RF



AFRC
65302

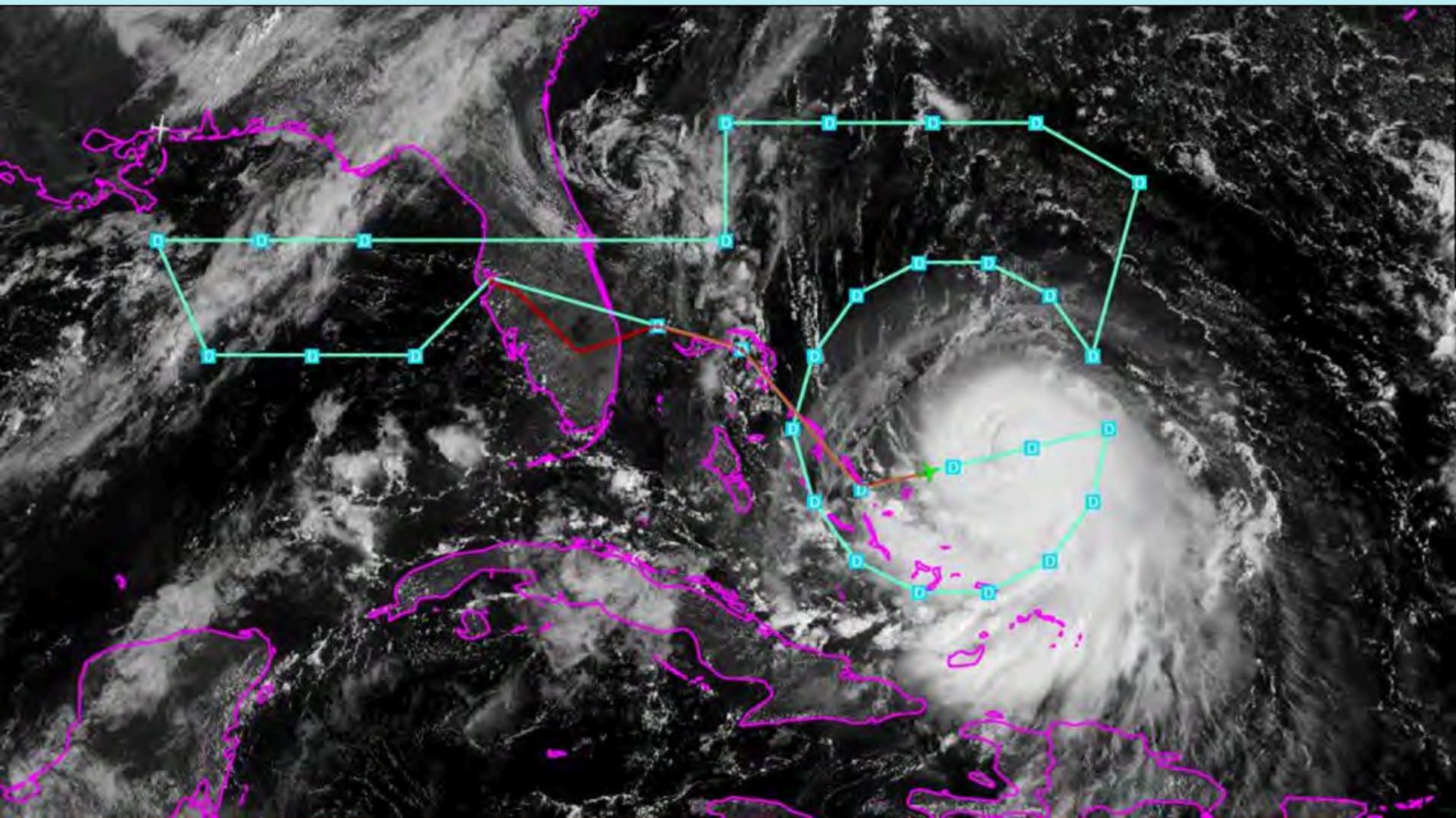
FY21016 Heavy Aircraft Plan

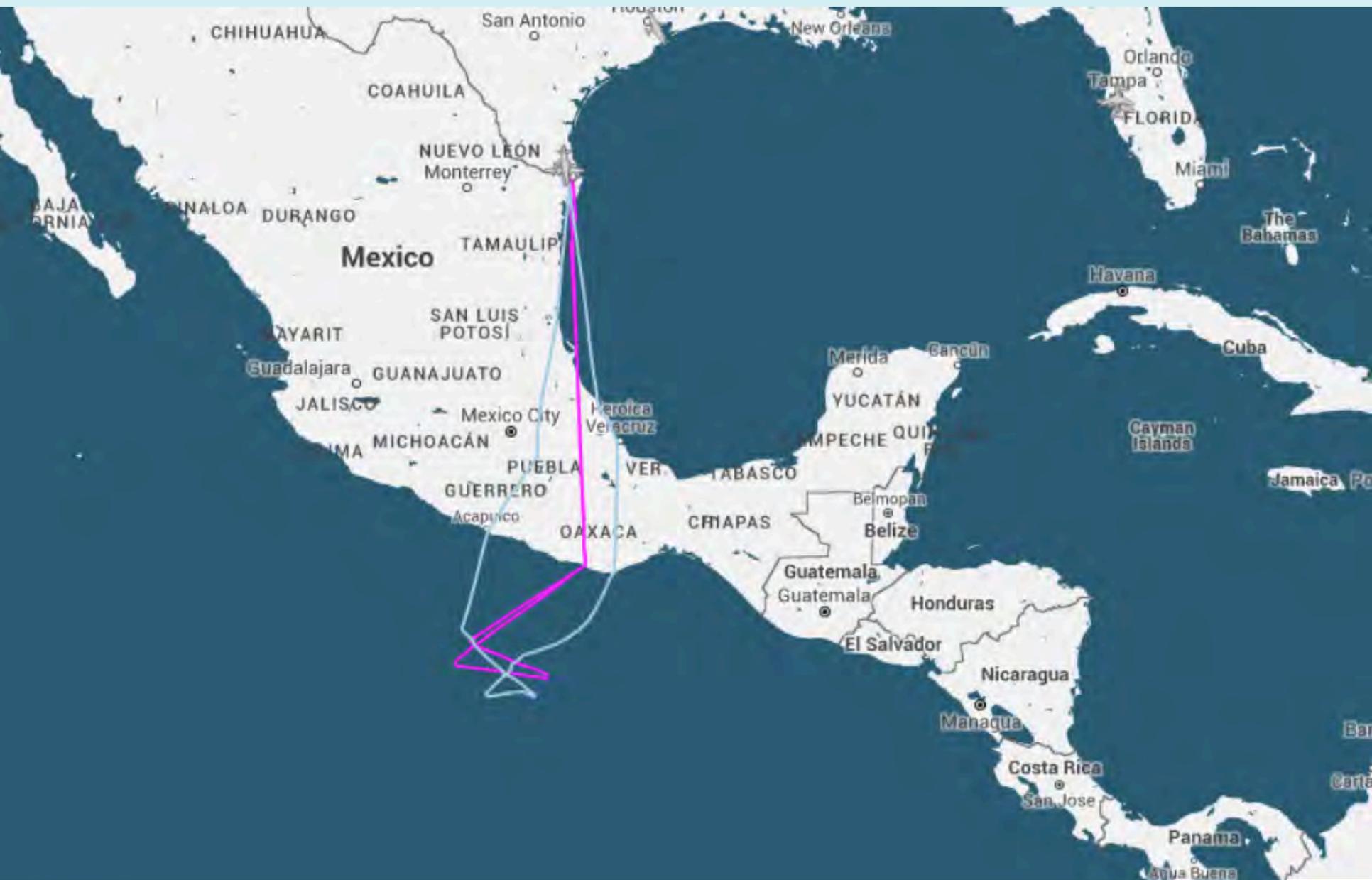
Heavy Aircraft Plan FY 2016

Aircraft	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
N42RF	Re-Winging											
N43RF	Hurricane Ops.			Ocean Winds	Phase/Other MtL	NASA OIB Int.	NASA Op. Ice Bridge		Phase MtL		Hurricane Operations	
											Hurricane Research	Ocean Winds
N49RF	Hurricane Surv.										Hurricane Surv.	
	Hurricane Research			El Nino Rapid Response			Annual Maint. Cycle	[A]			Hurricane Research	



G-IV Surveillance Track around Hurricane Joaquin





Office of Marine and Aviation Operations

Average Flight Level Wind Over 30 Seconds (knots)

25 30 35 40 45 50 55 60+

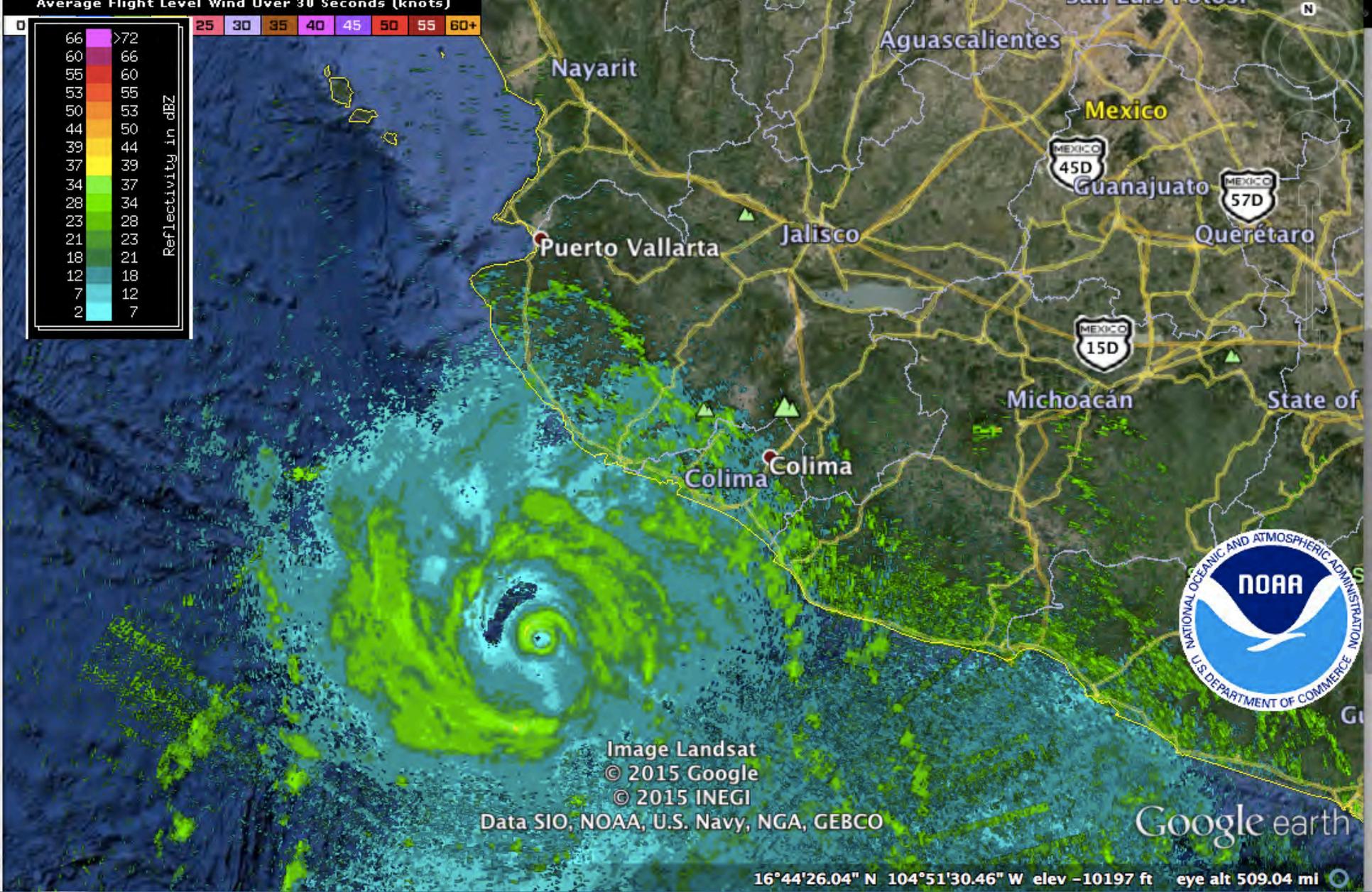
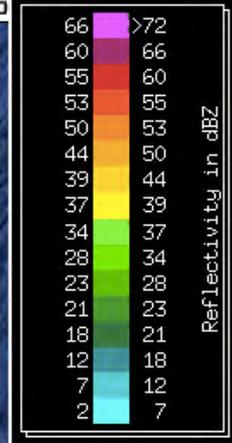


Image Landsat
 © 2015 Google
 © 2015 INEGI
 Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Google earth

16°44'26.04" N 104°51'30.46" W elev -10197 ft eye alt 509.04 mi



Office of Marine and Aviation Operations



Hurricane Patricia October 23, 2015



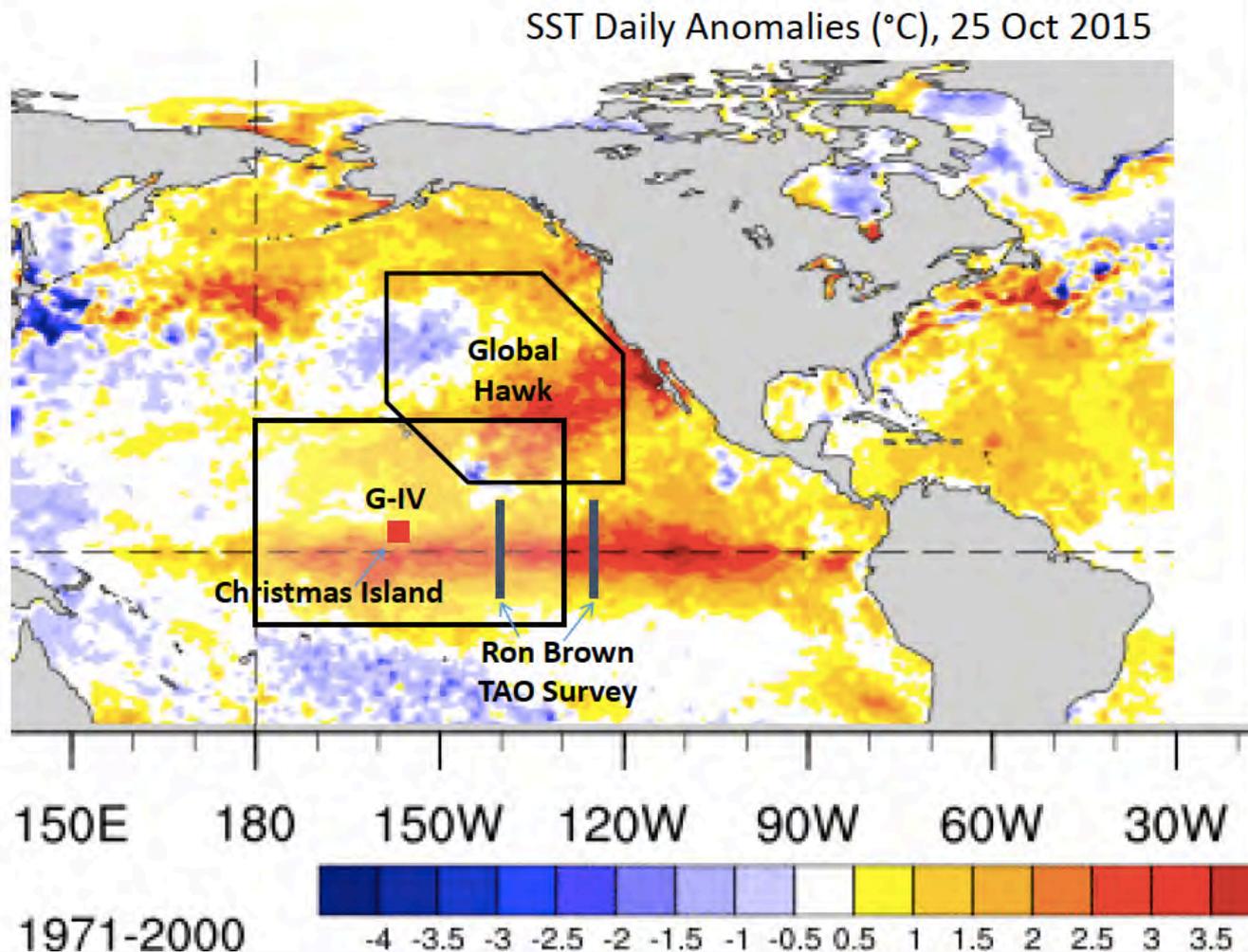


Hurricane Patricia October 23, 2015



Planned Implementation Strategy

- G-IV: Divergent outflow and jet extension processes in central and eastern tropical Pacific
- Global Hawk: Coupling to midlatitude weather with surveys in eastern Pacific midlatitudes to evaluate impacts on U.S. West Coast
- Ron Brown: Survey of atmosphere and ocean conditions in eastern tropical Pacific



Research Flight 4

Mesoscale Convective Circuit Module

FRI/29 Jan 2016
Take Off 1100 HT
Duration 7.6 h

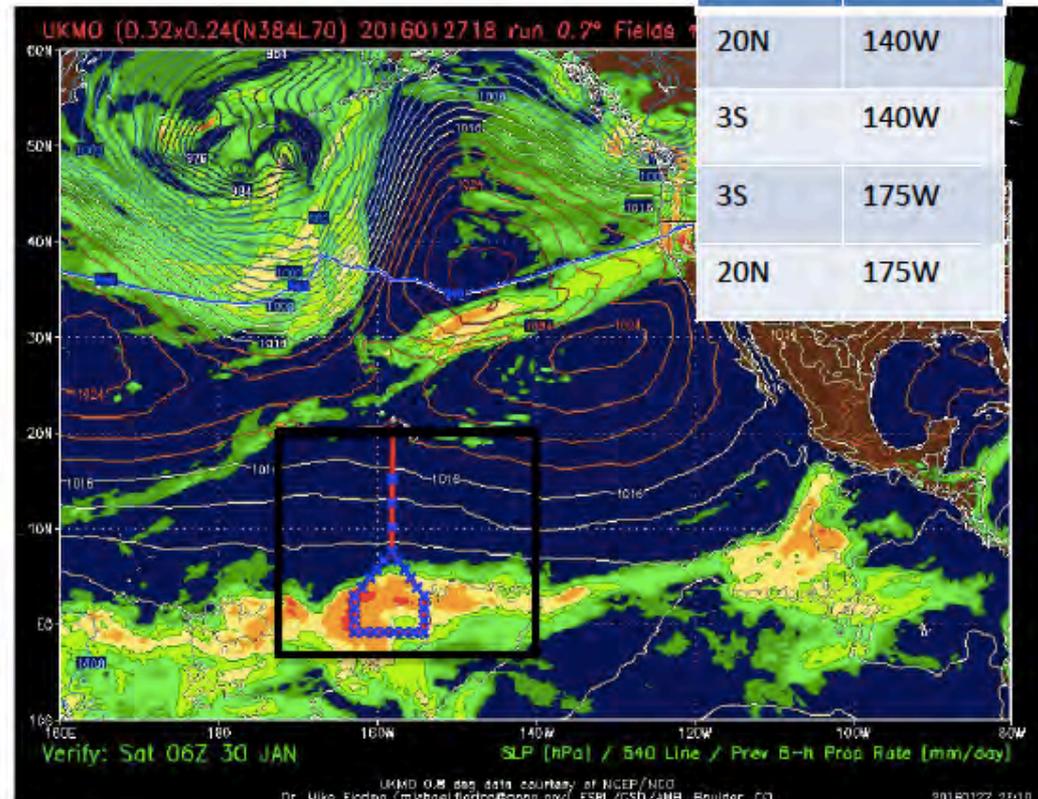
Flight Details

- Sample thermodynamics and region of poleward divergent outflow and subsidence north of mesoscale convective complex/line along ITCZ
- G-IV flies “house” module clockwise at cruise altitude (41-45 kft)

Platform Scientist: Janet Intrieri/Matt Newman
Onboard Scientist: Ryan Spackman
Onboard Press: Henry Fountain
Dropsondes: 27 dropsondes (75 nmi spacing except 150 nmi spacing out of HNL)
Kiritimati radiosonde launch operations daily at 0200 and 1400 LT

NOTAM Box

Lat	Lon
20N	140W
3S	140W
3S	175W
20N	175W



Research Flight 22

California Dreamin' Science-in-Transit

NOAA49 Thurs/10 Mar 2016

Take Off 10/2200Z

Land 11/0600Z FL 410-450

Flight Details

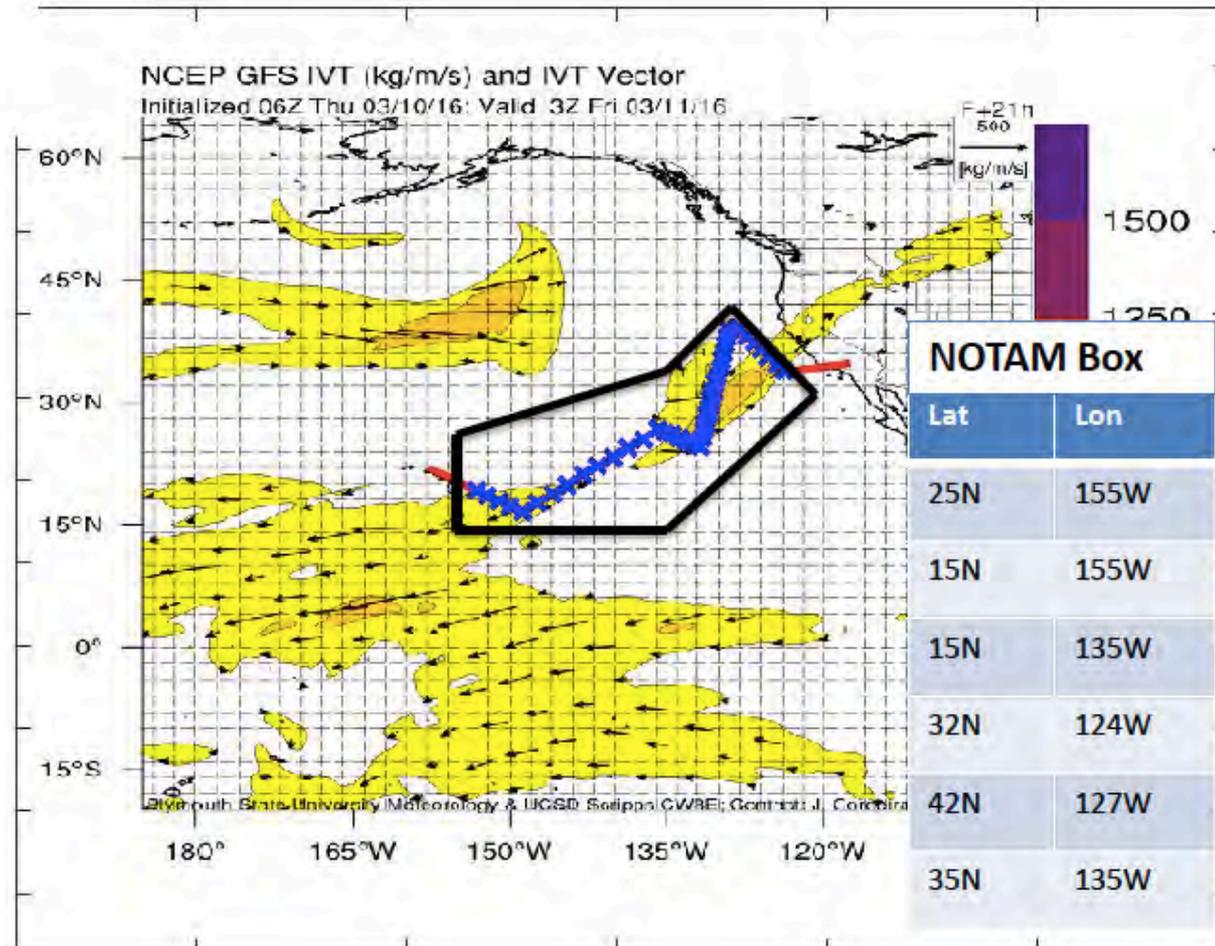
- Fly multiple transects at cruise altitude (41-45 kft) across the moisture flux associated with the mature AR northeast of Hawaii that is forecasted to make landfall along the northern and central CA coast
- Alpha Jet (based at Moffett Field) will conduct a 2 hour mission along the central CA coast between 3/10 2230Z and 3/11 0030Z

Platform Scientist: Ryan Spackman monitoring from ground (HNL)

Dropsondes: 42 dropsondes at 75/100/40/60/60 nmi spacing

Kiritimati balloon launch ops daily at 0200 and 1400 LT

RHB balloon launch ops 8 times daily 16 Feb – 18 Mar



Thule Air Base, Greenland

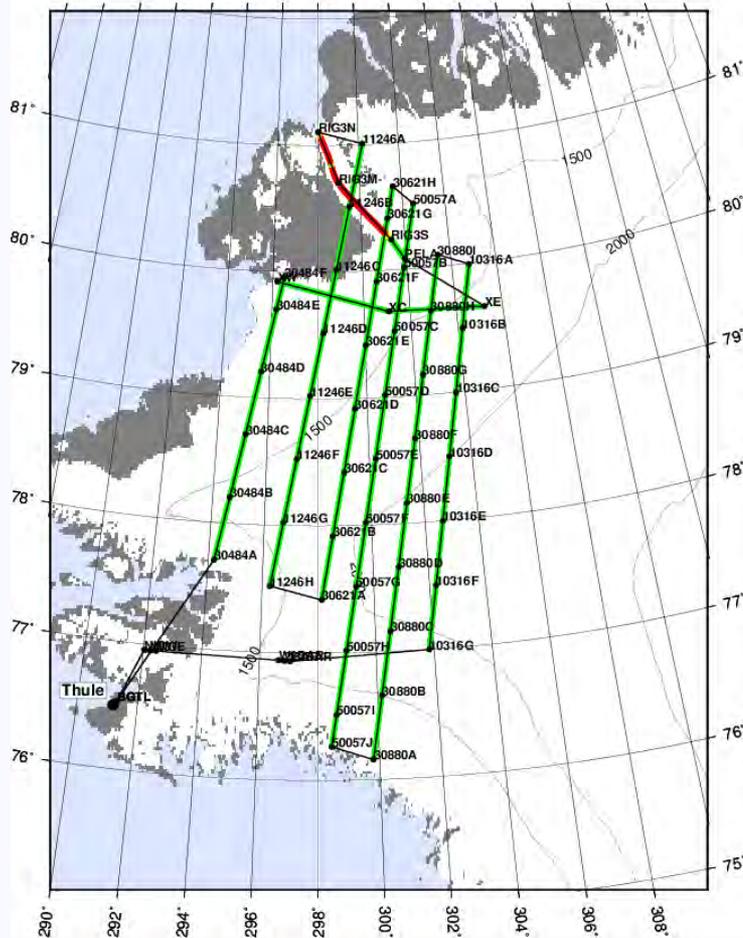




Office of Marine and Aviation Operations

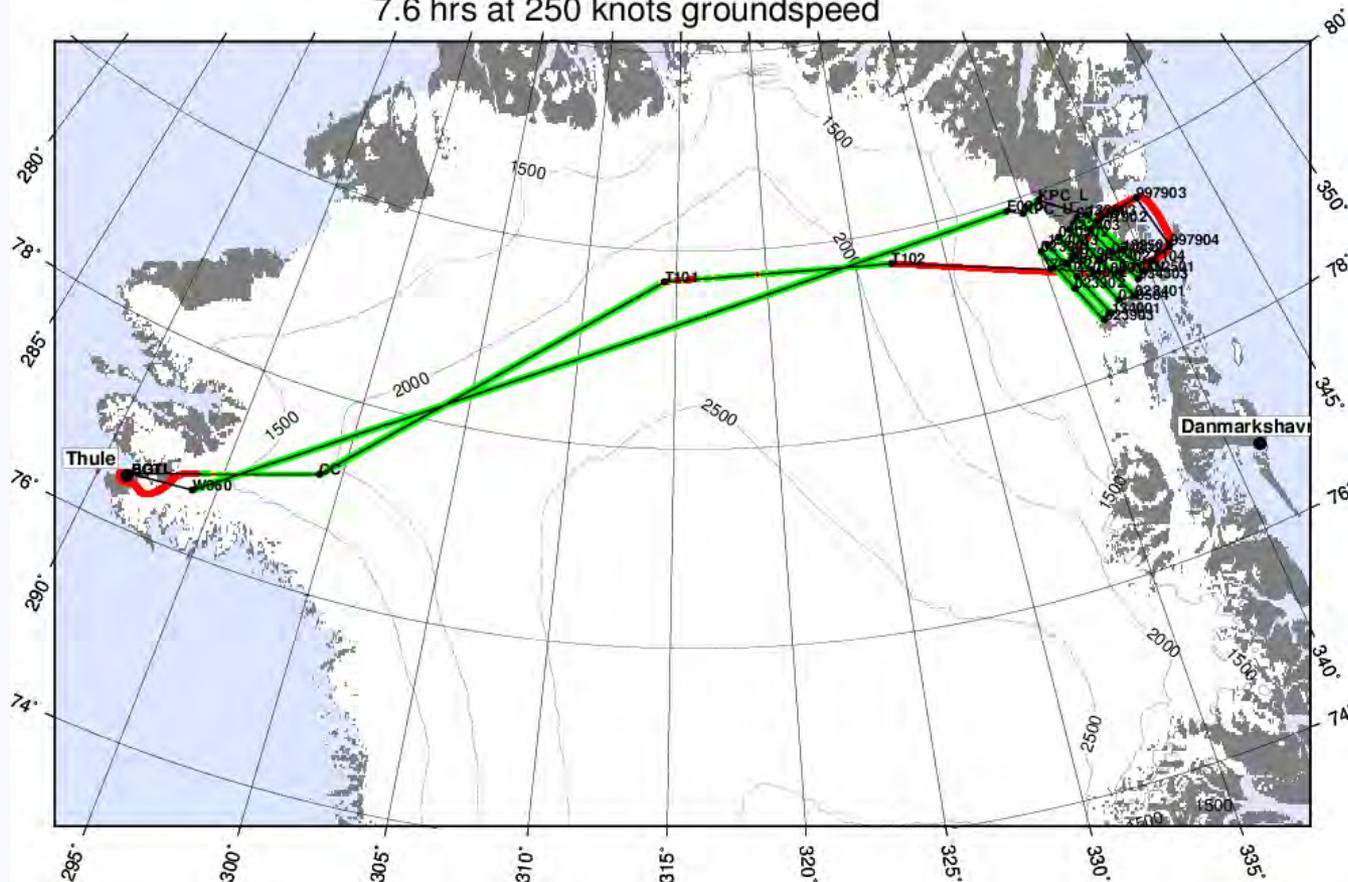
IceSat-2 North / CryoSat-2 SARIn

7.9 hrs at 250 knots groundspeed



Zachariae-79N

7.6 hrs at 250 knots groundspeed

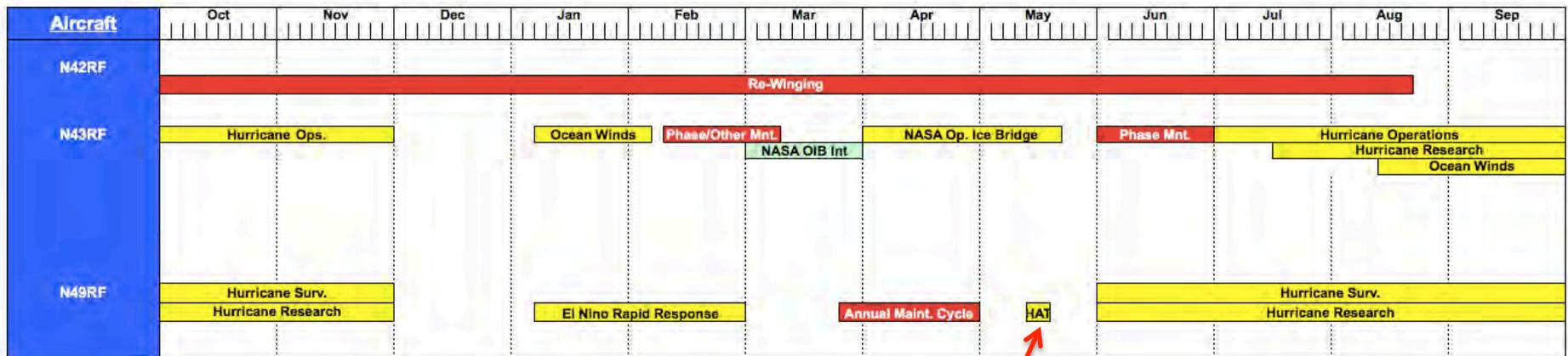




Office of Marine and Aviation Operations

FY21016 Heavy Aircraft Plan

Heavy Aircraft Plan FY 2016



HAT



2016 Hurricane Awareness Tour





CATASTROPHE
RESPONSE TEAM
800 531 8777

NOAA HURRICANE HUNTERS

Airborne Radar Capabilities



Track our Hurricane Flights **LIVE**
in Our New Website!

eman
CANOPY 10x10

FY16 AAP

	BH	PH	RH	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP			
AC 695A TURBO COMMANDER - N45RF	934	0	0	SNOW WATER EQUIVALENT AND SOIL MOISTURE SURVEYS 754BH										GRAY-D 180BH	SNOW			
DHC-6 TWIN OTTER - N46RF	740	0	0	SNOW WATER EQUIVALENT AND SOIL MOISTURE SURVEYS 500BH										CORROSION 110BH	SE AMAPPS 110BH	NE AMAPPS 110BH		
DHC-6 TWIN OTTER - N48RF	0	0	0	CORROSION/UPGRADES						NORTHEAST RIGHT WHALE		NERW			SNOW SURVEY	SNOW SURVEY		
DHC-6 TWIN OTTER - N56RF	365	214	0	LOGGERHEAD 110PH	NERW 3	SOUTHEAST RIGHT WHALE 113RH 114RH			NERW	FL 140B	FLIR INSTALL		ARCTIC 40PH	STELLER 80BH	ARC 40P		ARCT 100BH	PL
DHC-6 TWIN OTTER - N57RF	958	25	0	COASTAL MAPPING/EMRG. RESP 145BH		NORTHEAST RIGHT WHALE 350RH 25PH		FL	COASTAL MAPPING/LIDAR 255BH		COASTAL MAPPING/LID		BIOLIDAR 100BH	GREENHOUSE 110BH			WEST COAST TURTLE 90BH	
GULFSTREAM G-IV-SP - N49RF	419	0	0	HURRICANE FLIGHTS 244BH		ANNUAL MAINT		EL NIÑO RR 175BH	OPS MAINTENANCE				HURRICANE FLIGHTS					
KING AIR 350ER - N68RF	580	0	0	COASTAL MAPPING/EMERGENCY RESPONSE 580BH														
WP-3D ORION - N42RF	0	0	0	REWING / PMI												CONFIGURATION/INST		
WP-3D ORION - N43RF	214	0	200	HURRICANE FLIGHTS 112BH				OCEAN WINDS 90BH	PHASE MAINT		ICE BRIDGE 200BH		HAT 12B	HURRICANE FLIGHTS				
Fleet Totals	4210	339	200															

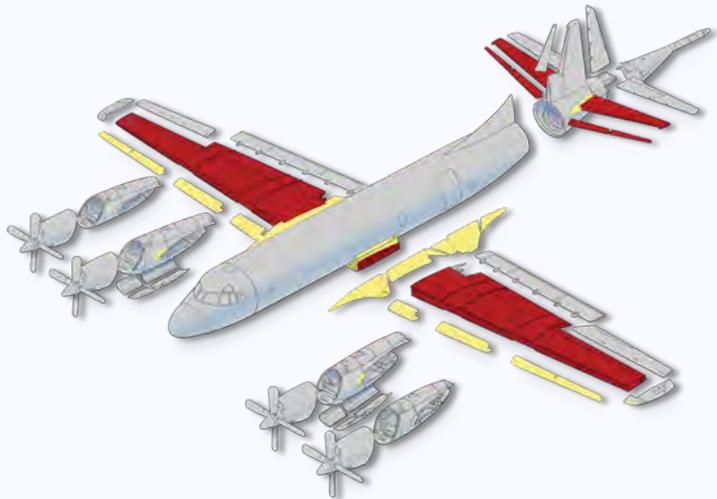


WP-3D Service Life Extension – Executive Summary

- \$326M to NOAA to Address Sandy Mitigation Efforts (\$42.3M to OMAO after sequestration to be used in three (3) project areas).
- Project Areas:
 - **T56-A-14 Engine Refresh**
 - Overhaul to Zero Time
 - Series III Reliability Enhancements
 - Series 3.5 Engine Enhancement Package
 - **WP-3D Re-Winging**
 - Outer Wing
 - Horizontal Stabilizer
 - **Avionics Upgrades**



Re-wing Kit Installation





Office of Marine and Aviation Operations

WP-3D Avionics Upgrades

- Communications**
- Infrastructure**
- Flight Instruments**
- Scientific Radar**



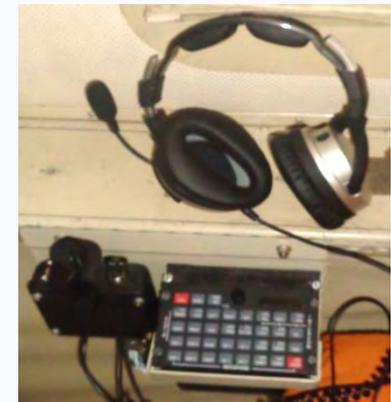
WP-3D Avionics Upgrades - Communications

Digital HF and Vertical Stab. Antenna
- Maintainability, no more 'long wire' antennas



2nd High Speed Inmarsat System
- Redundancy, extra bandwidth

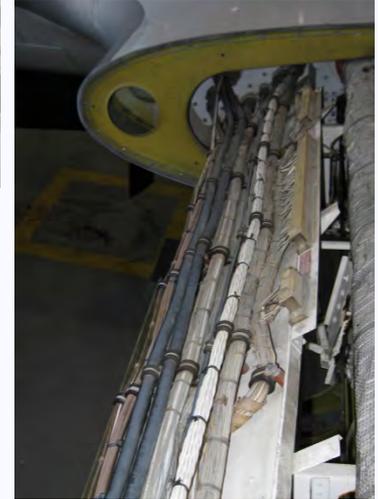
Replace AIC-22 ICS System
- Zonal communications, cockpit hot mic



WP-3D Avionics Upgrades - Infrastructure

Power and Signal Wiring Renewal

- Replacement Wing and Tail Harnesses (Ship's & science)
- New 60 Hz freq. converters



Cloud Physics Pylons

- Production version of prototype

Design new racks and floor load enhancements

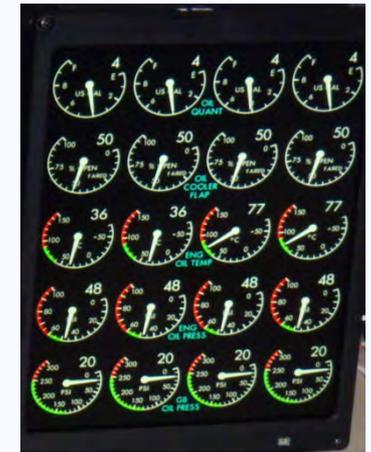
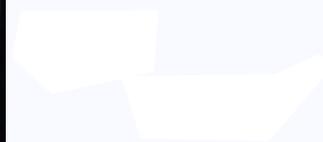
- Existing racks are from 1975, built by U.S. NBS
- Selective floor reinforcement, similar to TAP-3



WP-3D Avionics Upgrades – Flight Instruments

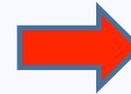
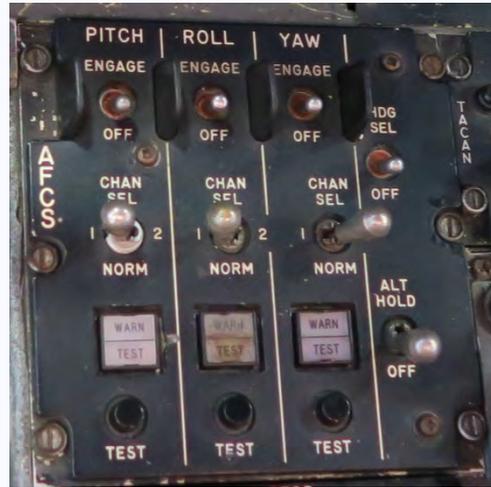


Flat-Panel Engine and Oil Status Displays, LED Annunciators



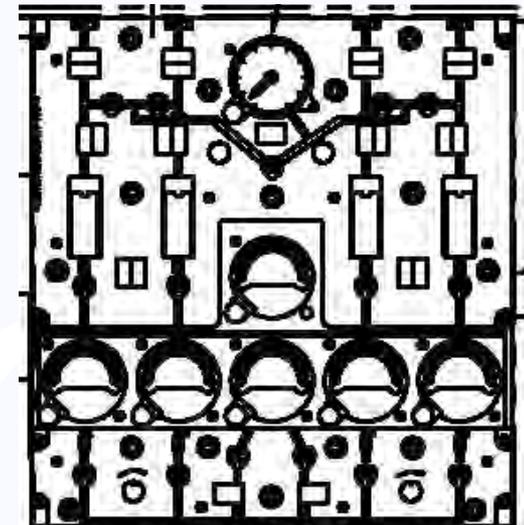
WP-3D Avionics Upgrades – Flight Instruments

Replace ASW-31 with ASW-60 Autopilot

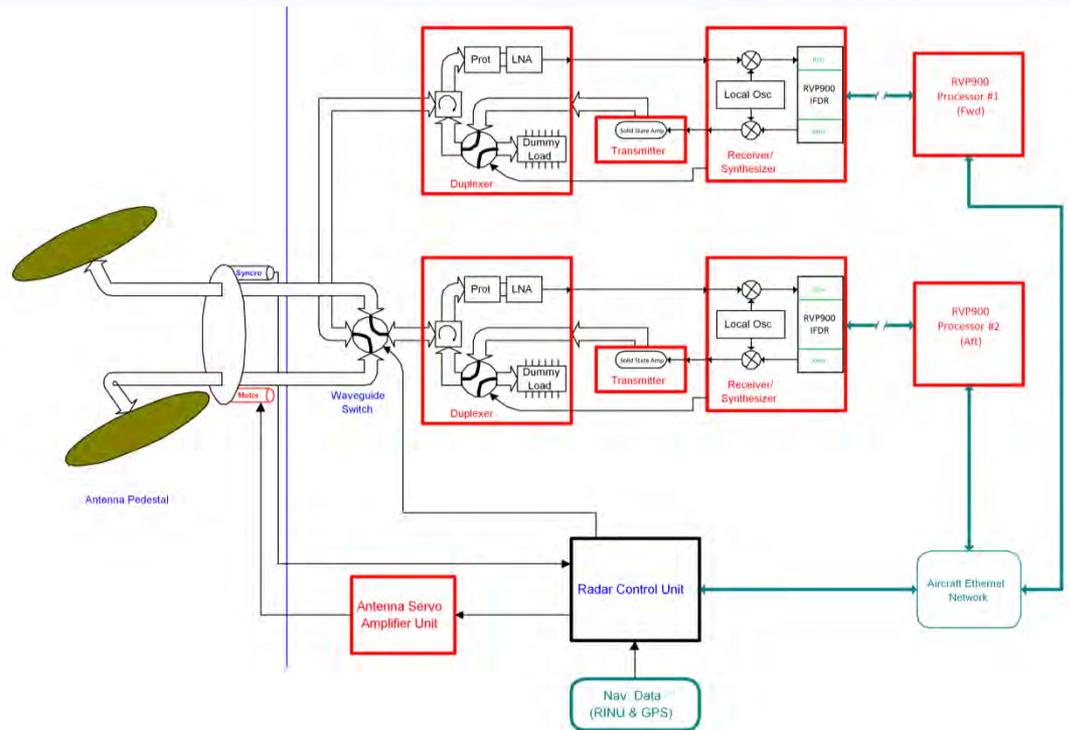


Add Cockpit Voice Recorder, Flight Data Recorder and Wing Life Monitoring System

Install Digital Fuel Quantity System

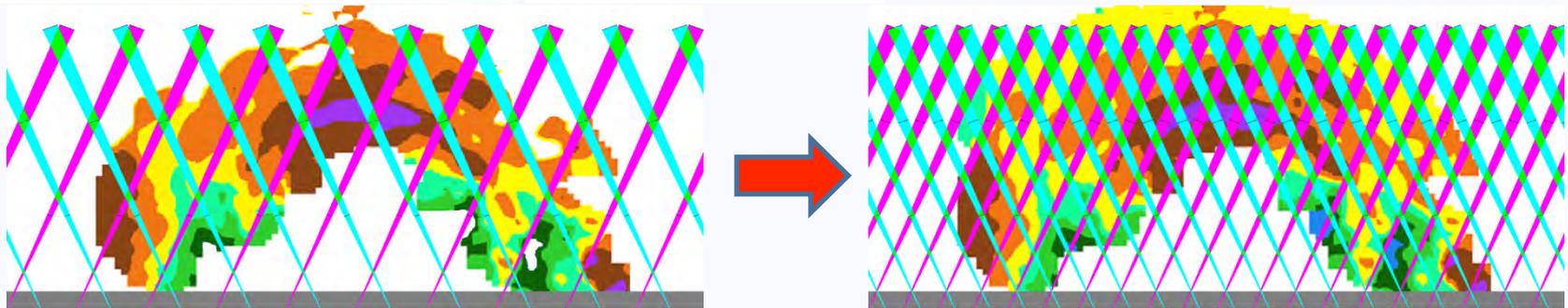


WP-3D Avionics Upgrades – Scientific Radar



Upgrade Tail Doppler Radar

- Completely dual system (Xmtrs, Rcvrs, Processors) for higher along-track resolution and redundancy
- 8 KW Solid State Power Amplifiers for improved sensitivity (5 dBZ -> -9 dBZ)
- Upgraded processors are the same as used in NOAA's NEXRAD WSR-88D ground radar
- Replacement antenna motors to double rotation speed and along-track resolution



WP-3D Avionics Upgrades – Scientific Radar

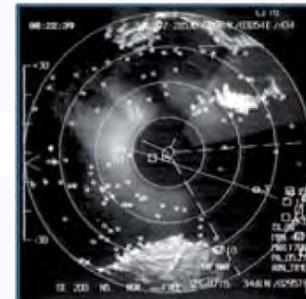


Replace Lower Fuselage Weather Radar with AN/APY-11 Multimode Radar System



Inverse Synthetic Aperture (ISAR)

Weather, AIS, Air-to-Air



Synthetic Aperture (SAR)



The New Look

