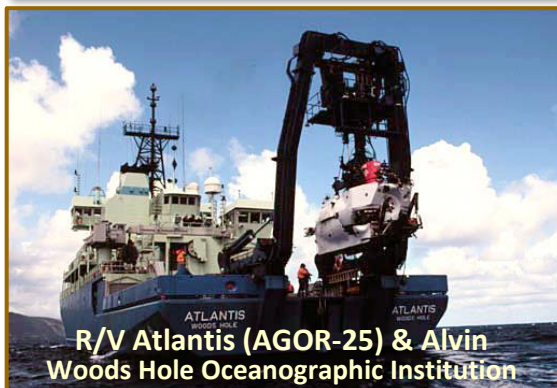




ONR Research Vessels

40-50 at-sea field experiments and demonstrations each year



- Navy research ships have global reach - regular two year expeditions
- Science teams rotate to ship for 18-25 day projects
- Navy owned ships have been scheduled via UNOLS since 1972
- Navy ships in UNOLS average 280 days/yr operations
- Daily operations costs are recovered via a "day rate" charged to agency research
- NSF is the major user, then Navy, NOAA, USGS, DOE
- Crews are university employees and professional mariners





AGOR 23 Class Mid-Life Refit and Service Life Extension

R-1 Line Item 10, PE 0602435N, Project 0000

- **Completed major overhauls on ONR’s AGOR 23 Class of research vessels *Thompson, Revelle* and *Atlantis***
 - AGOR 23 *Thompson* completed its refit December 2017, now with a projected end-of-service life of 2036
 - AGOR 24 *Revelle* completed its refit July 2020, now with a projected end-of-service life of 2041
 - AGOR 25 *Atlantis* completed its 17-month refit July 2021: with a projected end-of-service life 2043
 - NOAAS Ronald Brown – conducting Midlife based on these plans

- **Extended the service life of Navy’s largest oceanographic research vessels from 30 to 45 years, avoiding the cost of replacement estimated at \$200M per ship**
 - Upgrades the ship’s systems environmental compliance to conform to the latest international standards.
 - Overcomes component and system obsolescence.
 - Renews and upgrades oceanographic research mission capabilities.
 - Enduring partnership with National Science Foundation and other federal agencies to continue the success of these national assets.



**Ocean-going Research Enables Science for
Decisive Advantage in the Great Power Competition**



AGOR 26 Class Mid-Life Refit and Service Life Extension

- **Starting plans for major overhaul on ONR's AGOR 26 *Kilo Moana*: \$60-70M investment?**
 - Funded a 2020 ABS Study: Hull structure is expected to achieve an expected service life of 39 years based on fatigue assessment (Year 2041)
 - Glosten Naval Architects Study – Summer 2023 to provide cost, scope and schedule estimate.
 - Target 2025 Shipyard. Potential for Congressional Plus up – perhaps over phased of 3 years
 - Concerns with Power Supply reliability could be addressed with a repower.

- **Extended the service life from 30 to 45 years, avoiding the cost of replacement estimated at \$100-119 Plus outfitting**
 - A high level, uncertified estimate for an AGOR replacement based on NOAA AGOR variant (NAV2) is \$119M in FY25 dollars - using in a cost benefit analysis.
Accommodations 20 crew + 28 science berths
Length 244'-6" Beam 51'-3" Draft (light ship) 14.24' Displacement 2,861 LT (Full Load)
 - Enduring partnership with National Science Foundation and other federal agencies to continue the success of these national assets.

- **No replacement option:**
 - Current "official" End of Life is 2033, as reported in Navy annual shipbuilding plan to Congress
 - Could replace with new build "around" End of Life. **Current requirement is six - AGORs**
 - Deactivation prior to end of life may require Congressional Approval.

Is the Navy and or the Nation committed to replacing or extending the service life of RV Kilo Moana?



Cyberinfrastructure and Bandwidth

Scripps-led advocacy in Congress has focused on cyberinfrastructure and bandwidth needs that are common throughout the Academic Research Fleet

- Many research vessels are currently at risk due to inadequate, aging or outdated infrastructure that cannot support modern cybersecurity compliance
- Major investment is needed in hardware, software, support, monitoring, surveillance methods and secure broadband communications capable of mitigating cyber-risk aboard research vessels
- A broad constituency requires access to new data and observations requiring remote access to shipboard data streams, on-shore monitoring, quality control, and remote management of shipboard instruments and telemetered data streams
- Research vessel operations have modern workplace needs that require access to off-ship resources. Examples include digital charts, up-to-date weather, HR, wellness, timekeeping, requisitions, regulatory reporting, maintenance record keeping and remote support from equipment manufacturers and vendors
- Supporting academic institutions require always-on Internet connectivity, in terms of supporting their employees, including mariners and scientists

Increase in the utility and impact of oceanographic vessels on research and education, with appropriate cybersecurity



Cyberinfrastructure and Bandwidth

Scripps-led advocacy in Congress has yielded funding for Navy-owned ARF vessels:

- FY 22: \$4M in DoD funds for a pilot program for bandwidth boosts to Navy-owned ARF vessels during CY 22-23
- FY 23; \$8M in DoD funds to provide Navy-owned ships (and maybe Navy-supporting ships) with "broadband bandwidth" during CY 23-24
- FY 23: \$8M in DoD funds to provide Navy-owned ships (and maybe Navy-supporting ships) with "cyberinfrastructure improvements" during CY 23 (and perhaps into out-years through 2028)

Ongoing advocacy in Congress by Scripps:

- FY 24: Scripps is advocating in Congress for future cyberinfrastructure support, notably ongoing bandwidth which is anticipated to cost ~\$1.3M / ship / year

Increase in the utility and impact of oceanographic vessels on research and education, with appropriate cybersecurity

Oceanographic Research Vessel Act 1965 and other unresolved legal issues



- **I personally am a proponent for update to ORVA 1965**
 - Vessels for “public purpose” are exempt? – but Public purpose is not defined
 - USCG says it will create a policy – 835 cards have been withdrawn
 - Needs to codify both MARAD Training ships and ARF – Vessels in federal-state partnerships.
 - Ambiguity on Pilotage Requirements

- **Interagency Policy Conflicts and Lack of Navy guidance.**
 - Build America, Buy America – US ARF is outlier for gov’t owned vessels – (is a vessel infrastructure: NSF - yes, DoD - no) . Impacts ability to use foreign shipyards
 - Sovereign Immunity (UNCLOS) – no formal policy that properly address this topic
 - Safer Seas Act: Sexual Assault Reporting – when to report international and who is responsible domestically. – no clear USCG guidance (commercial vs non-commercial)
 - Vessel Liability (personal, environmental, international) – lawsuits against owner or operator
 - Is the operator an agent of the government? *In rem (vessel) vs in persona (operator)*
 - Riding Gang Member – DFARS clause – but no guidance on how to implement
 - Liabilities relate to international observers
 - Accident Investigation – no guidance on agency authority – ex: RV Petrel in Scotland. Possible that University or funding agency would be responsible and not USCG or NSTB.

- **Caution for other UNOLS operators**
 - These legal issue impact University owned vessels when the University is Public State Institution

Lack of Codified Rules and Policies makes these vessel subject to unknown legal issues.



DSV ALVIN HISTORY AND 6500M OVERHAUL

- **Extended service life of Navy's only remaining DSV**
- Jun 1964 – ALVIN Commissioned (TD 6000 ft)
- Jan 1966 – Recovery of dropped Hydrogen Bomb in the Med
- 1986 – Explored Titanic Wreck
- 1994 – Mods Completed to Increase TD to 4500m
- 2010 – Responded to Deepwater Horizon Crisis
- 2010-13 – Vehicle Overhaul Stage I Upgrade
- 2020-22 – Vehicle Overhaul Stage II Upgrade

25 July 2022 – 6500m Certification



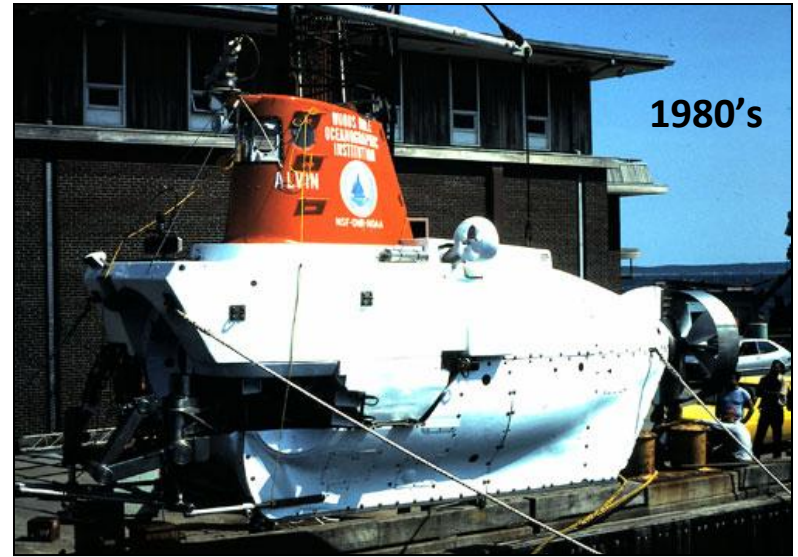
Deep Sea Ocean-going Research Enables Science for Decisive Advantage in the Great Power Competition

DSV ALVIN History

1960's



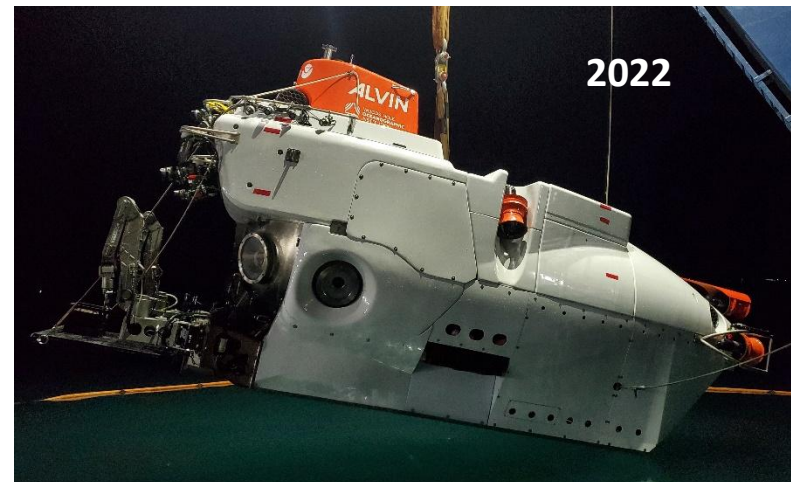
1980's



2000's



2022



Naval Priorities



- **Seabed Warfare**
 - Acquisition of RV Petrel by Navy Expeditionary Warfare Command
 - Installation of SBP-29 and multi-beam upgrades
 - Support to interagency mapping
- **Regional Partnership**
 - Use of foreign RV: Korea, Norway, NATO, French**
 - Areas of Research in support of key Allies**
- **Task Force Ocean, Acoustics**
- **Arctic Domain Awareness and Access**
- **Cyber and Information Warfare**



CNR #27 Rear Adm. Kurt Rothenhaus is a native of New York City. Commission in 1992 BS University of South Carolina: MS, Computer Science and Ph.D. in Software Engineering from the Naval Postgraduate School. Combat Systems Officer on Aircraft Carrier USS Harry S. Truman and chief engineer on Destroyer USS O'Brien. Individual Augmentee tour in Baghdad, Iraq.

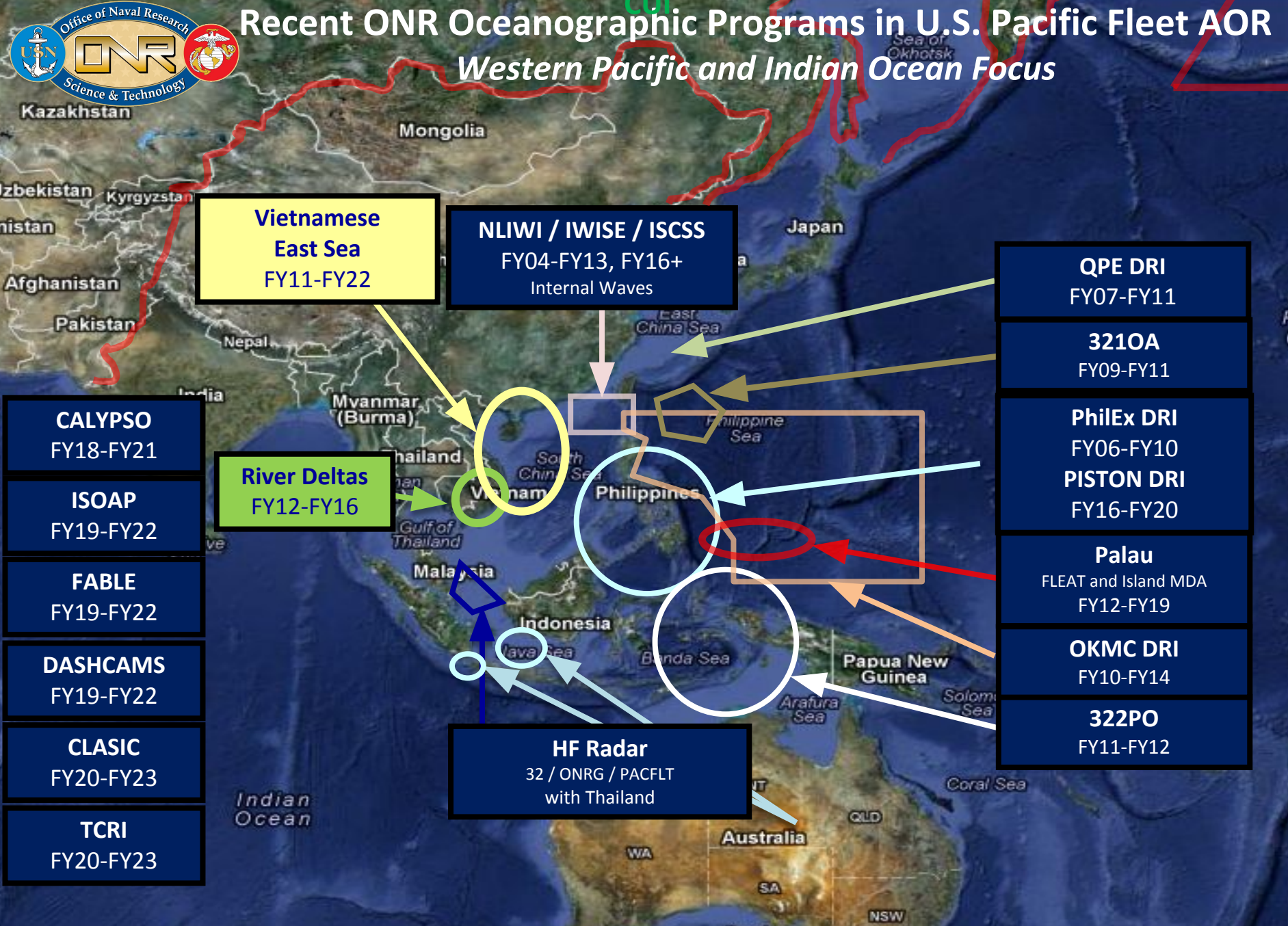
Shore tours: Program Manager (PM) for the Navy's Tactical Networks Program Office, Commanding Officer of Space and Naval Warfare Systems Center Pacific. He also served as the deputy PM for the Navy Communications and GPS Program Office (PMW/A 170), the assistant PM for the Consolidated Afloat Network Enterprise Services (CANES) in PMW 160, and the Maritime Tactical Command and Control (MTC2) assistant PM in the Navy Command and Control Program Office (PMW 150).

UNOLS community: Focus on Alliance, Autonomy, Acoustic superiority



Recent ONR Oceanographic Programs in U.S. Pacific Fleet AOR

Western Pacific and Indian Ocean Focus



Vietnamese East Sea
FY11-FY22

NLIWI / IWISE / ISCSS
FY04-FY13, FY16+
Internal Waves

QPE DRI
FY07-FY11

3210A
FY09-FY11

PhilEx DRI
FY06-FY10
PISTON DRI
FY16-FY20

Palau
FLEAT and Island MDA
FY12-FY19

OKMC DRI
FY10-FY14

322PO
FY11-FY12

CALYPSO
FY18-FY21

ISOAP
FY19-FY22

FABLE
FY19-FY22

DASHCAMS
FY19-FY22

CLASIC
FY20-FY23

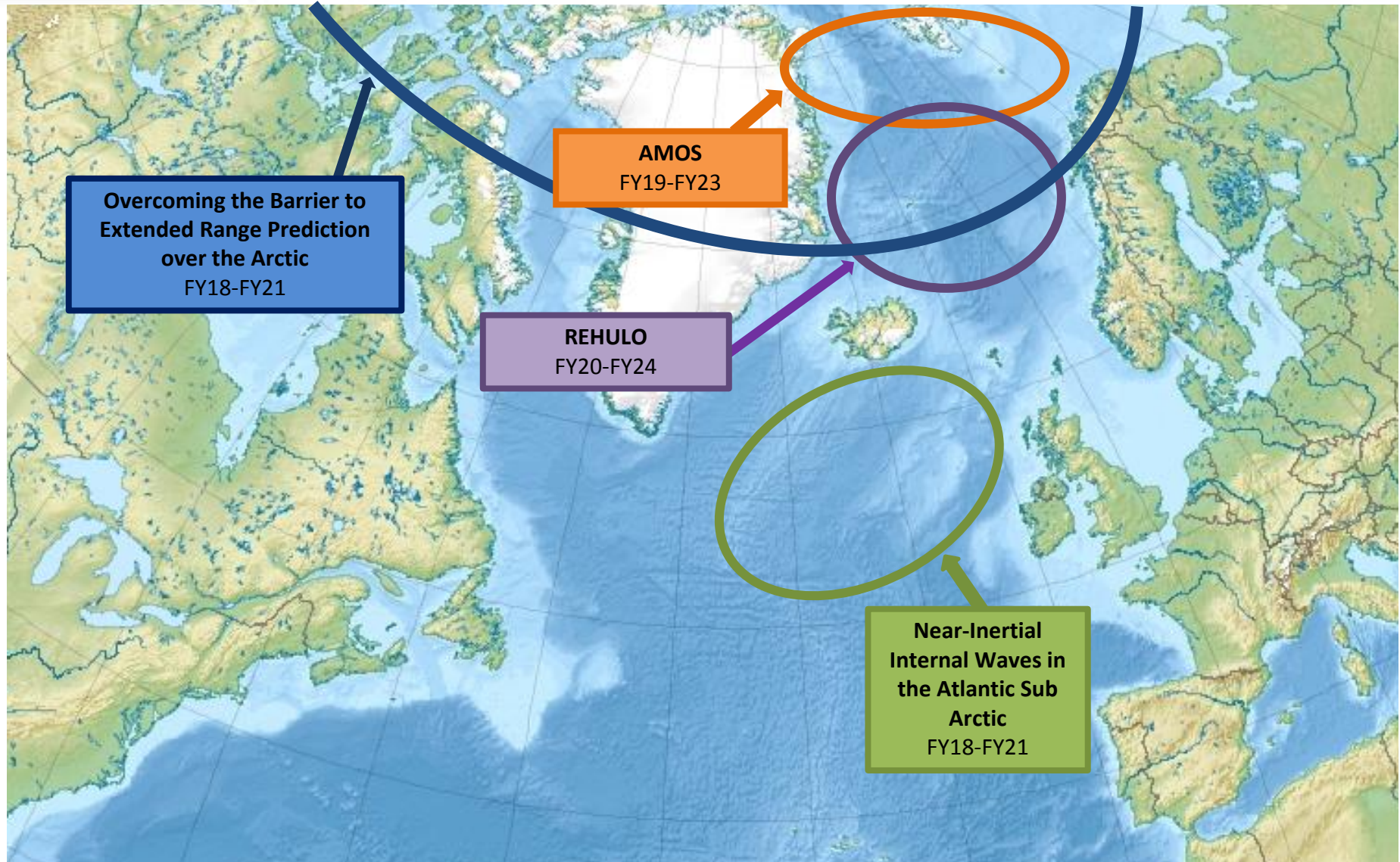
TCRI
FY20-FY23

River Deltas
FY12-FY16

HF Radar
32 / ONRG / PACFLT
with Thailand

Recent ONR Oceanographic Programs

North Atlantic Focus



Overcoming the Barrier to Extended Range Prediction over the Arctic
FY18-FY21

AMOS
FY19-FY23

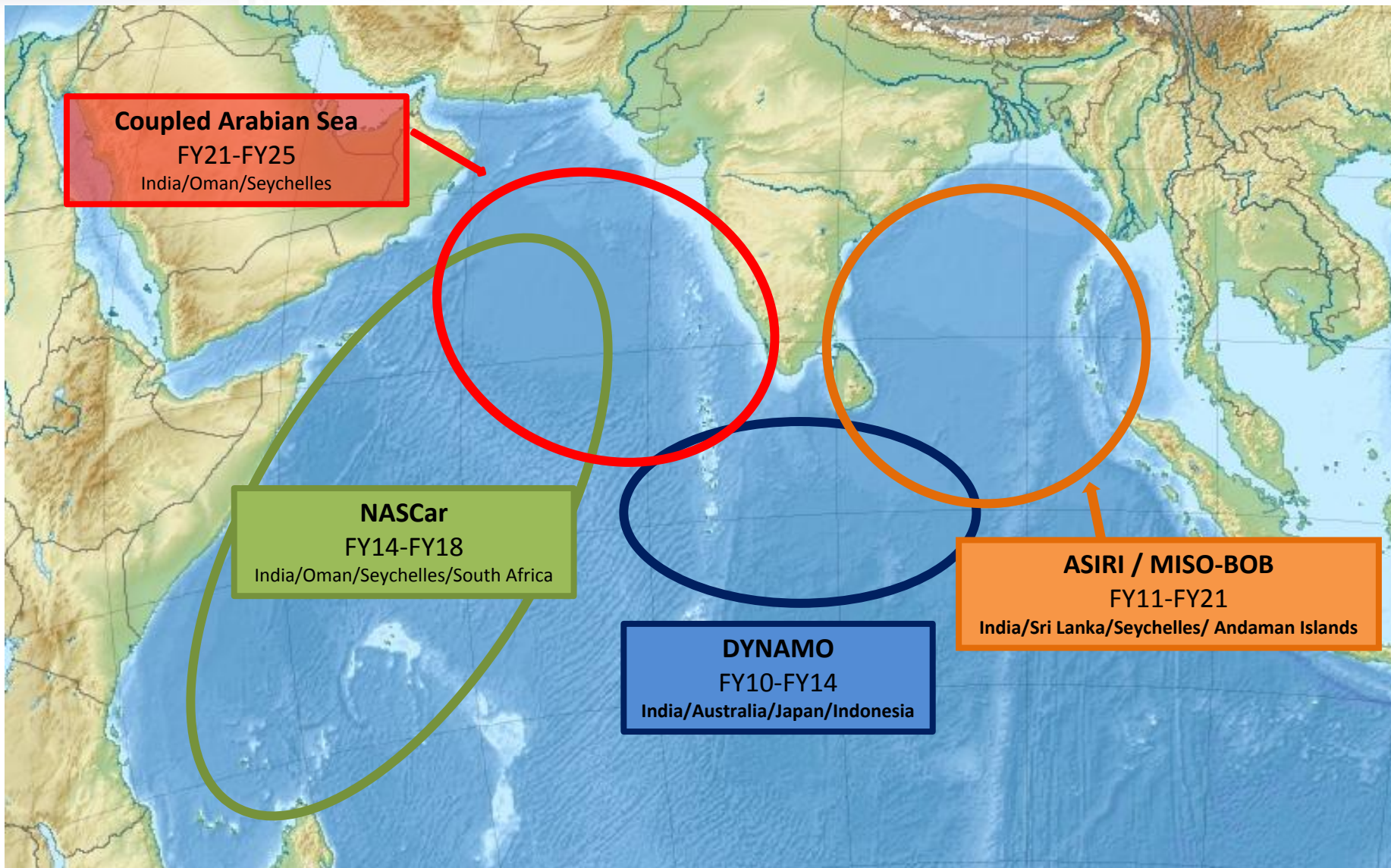
REHULO
FY20-FY24

Near-Inertial Internal Waves in the Atlantic Sub Arctic
FY18-FY21



Recent ONR Oceanographic Programs in Pacific Fleet AOR

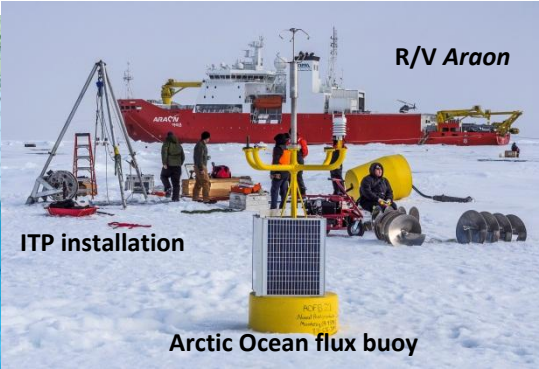
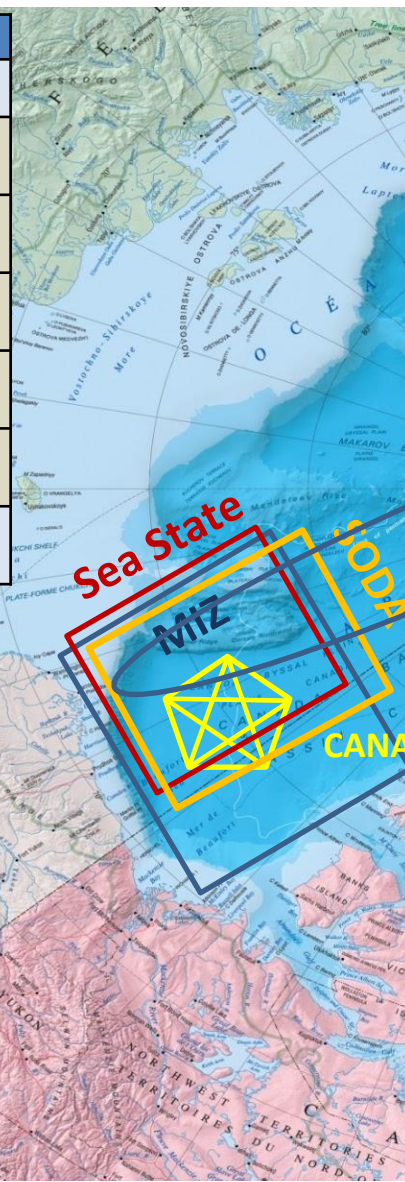
Western Indian Ocean Focus



Recent ONR Oceanographic and Acoustic Programs Western Arctic



2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
ONR 'Core' Program, <i>Arctic and Global Prediction</i>											
Marginal Ice Zone DRI											
Waves and Sea State DRI											
CANAPE (acoustics)											
Stratified Ocean Dynamics DRI											
CAATEX (acoustics)											
Arctic Mobile Observing System											



- **Marginal Ice Zone (MIZ) Initiative**
 - 2014 Field Program
- **Waves and Sea State Initiative**
 - 2015 Field Program
- **Canada Basin Acoustic Propagation Experiment**
2015, 2016-2017 Field Programs
- **Stratified Ocean Dynamics in the Arctic (SODA)**
 - 2017-2019 Field Programs
- **Canadian Arctic Acoustic Thermometry Experiment (CAATEX)** 2018-2020 Field Programs
- **Arctic Mobile Observing System (AMOS)**
 - 2020-2023 Field demonstrations

