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Department of Climate Change, Energy,
the Environment and Water
Australian Antarctic Division



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RSV Nuyina Update – 2024

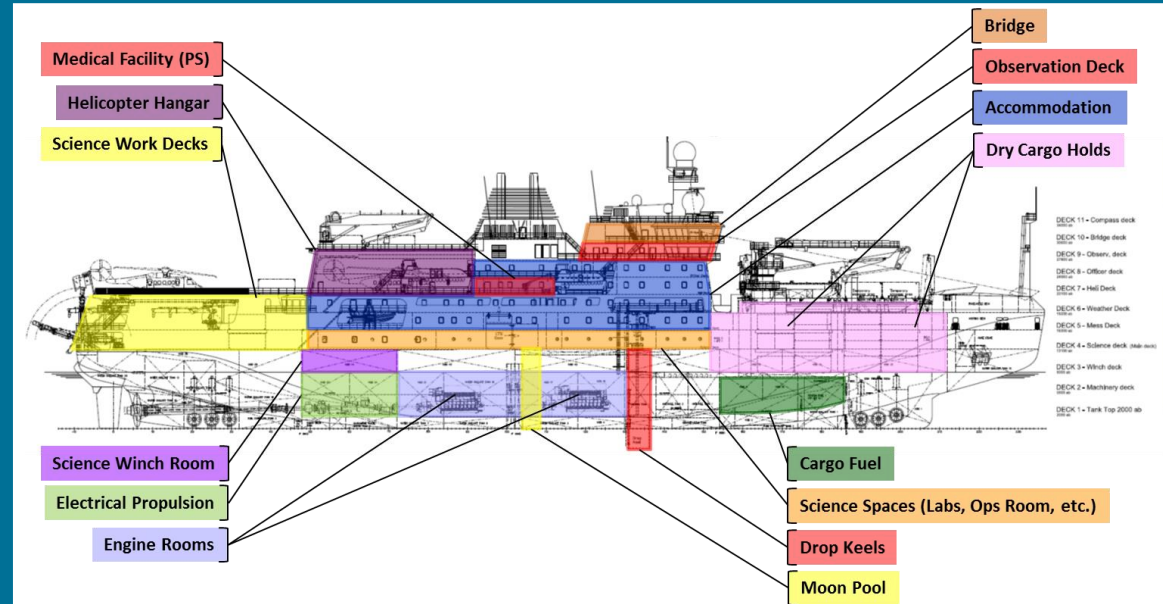
Dr Imojen Pearce
Marine Science Delivery
Australian Antarctic Division



RSV NUYINA PERFORMANCE & LOGISTICS

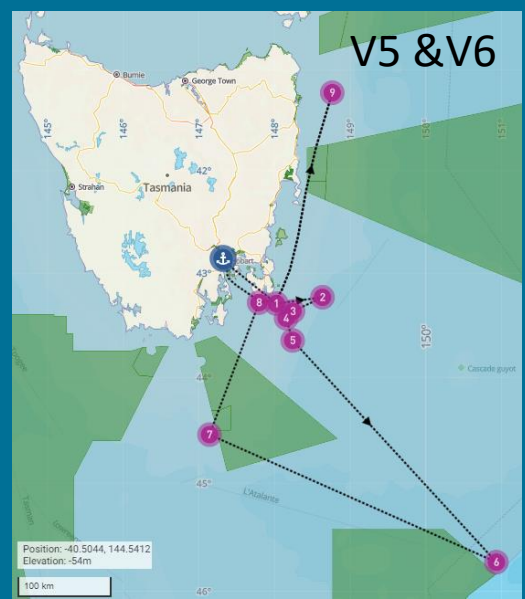
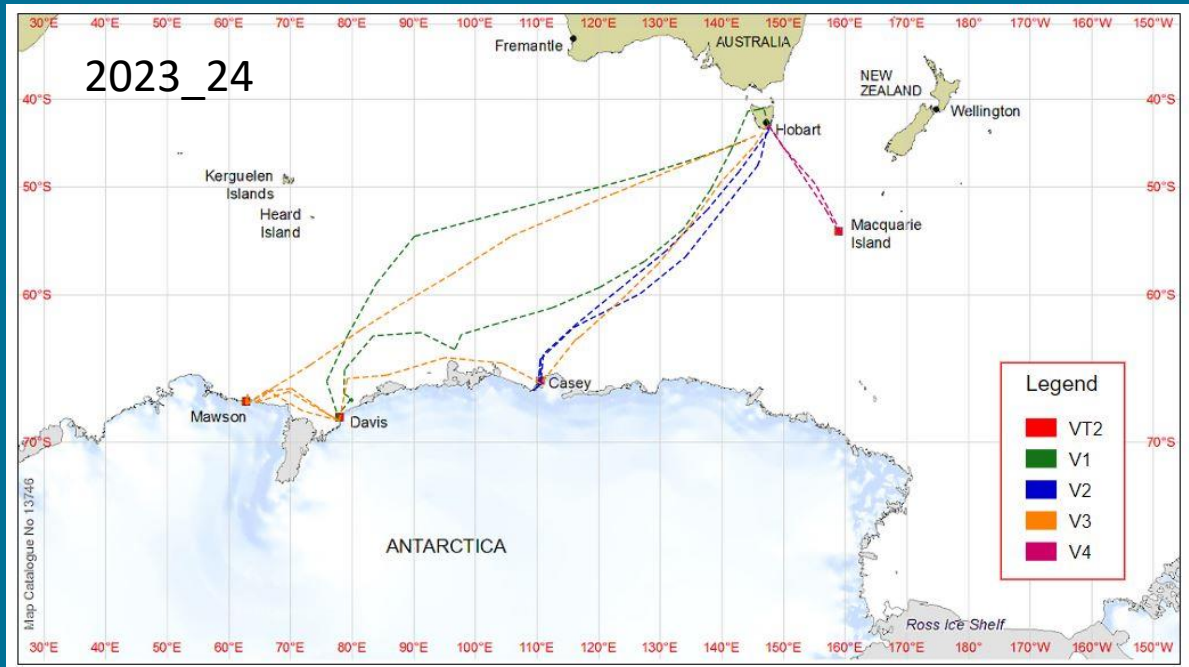
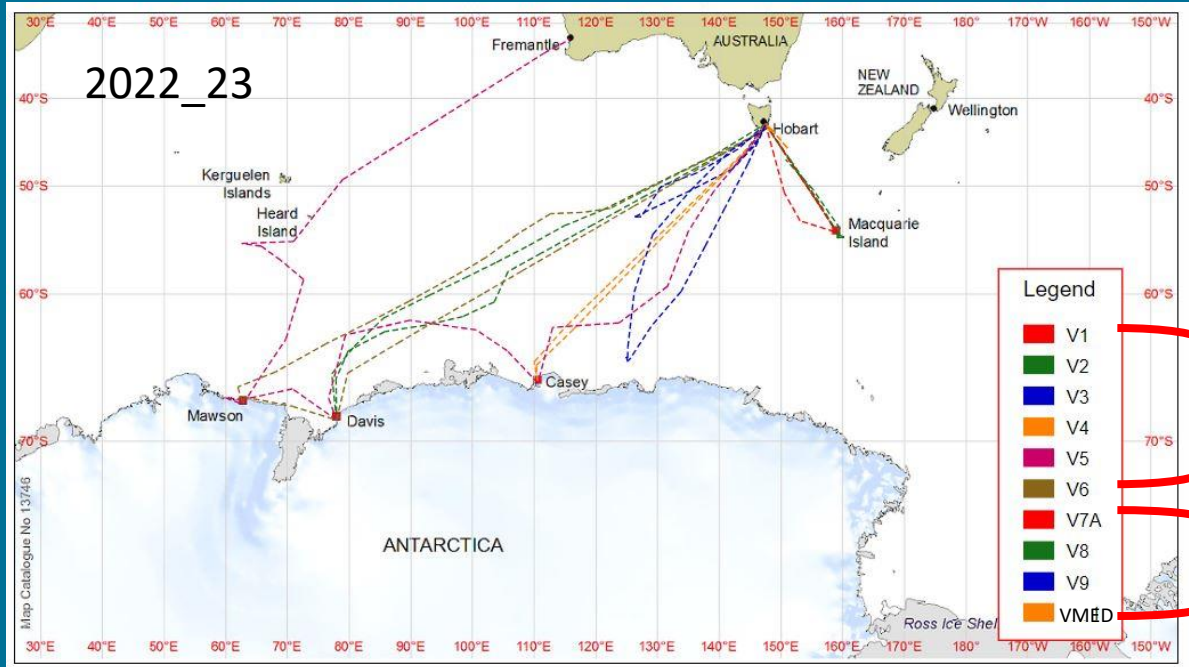


- Fuel tanker, cargo ship, aviation platform, passenger vessel, ice breaker, science research
- Max speed: 16+ knots, cruising speed: 12 knots
- Helicopter & Boat operations
- Accommodation: 149 berths
- Endurance: 90 days
- Solid Cargo: 96 x 20' container positions
- Liquid cargo: ~2M l cargo fuel, 300,000 l water
- Ice breaking: 1.6m ice @ 3 knots



2022-2024 RSV NUYINA VOYAGES

| 2023 | | 2024 | |
|-------|-----------------------|-------|------------------|
| April | Return from Singapore | Jan | Maintenance |
| May | MQ Is. Resupply | Feb | V3 Resupply |
| June | Ice Stress Test | Mar | V3 Resupply |
| July | Maintenance | April | Maintenance |
| Aug | Science Commissioning | May | V4 Resupply |
| Sep | Casey Medevac | June | V5 Commissioning |
| Oct | V1 Ice Trials | July | V6 Commissioning |
| Nov | V1 Resupply | Aug | Maintenance |
| Dec | V2 Resupply | Sep | VTrials |
| | | Oct | V1 Resupply |
| | | Nov | V1 + Maintenance |
| | | Dec | V2 Resupply |



V9 2023 – ICE STRESS TEST ~64 °S

Aims: to test the performance and capabilities of RSV Nuyina in the cold (-20 °C)

- Deluge testing of fire suppression systems
- The HVAC system maintained $> +4^{\circ}\text{C}$ temperatures in working holds/CTD hanger
- The UCSW intake and system, including ice blockage clearing – still issues
- Moonpool freezing over – still issues
- External safety showers fine but eyewash froze
- Most issues rectified but some to be addressed next dry dock



AUG-SEP 2023 CASEY MEDEVAC



Nuyina breaking heavy ice during medivac

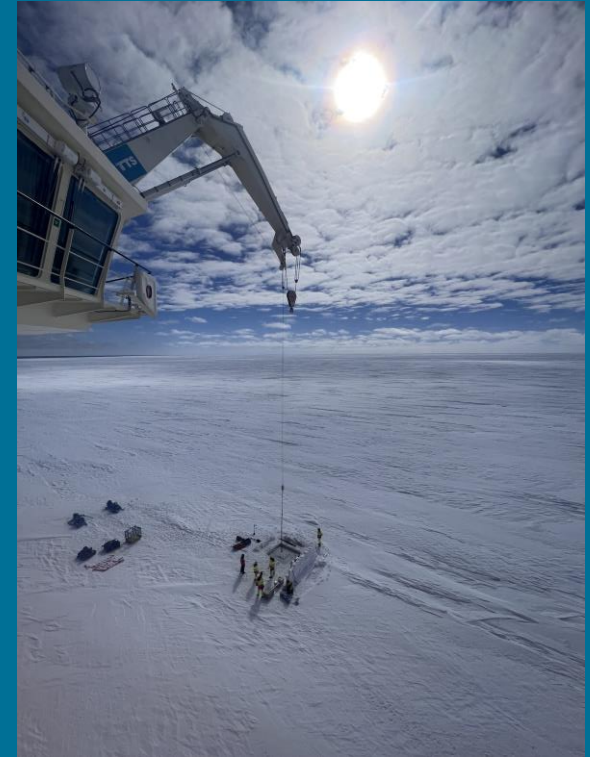


BK117 Helicopter at Casey facilitating medevac

V1 2023 ICE BREAKING TRIALS

Aims, to formally test Nuyina's:

- Ability to break ice at 3kt in 1.65m of level ice with 30cm of snow cover;
- Ability to perform 180 degrees turn in 1.65m of level ice with 30cm of snow cover;
- The ability to moor at an ice floe;
- The operational performance over 24hr in heavy ice conditions;



Results:

Nuyina performed all tasks and the trials showed that the vessel is much more capable and can break through ice greater than 2m thick at a constant speed





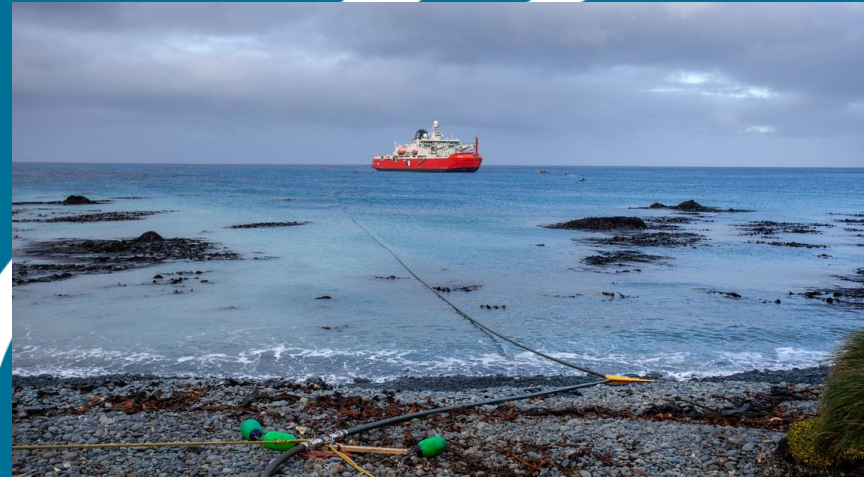
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2022-2024 STATION RESUPPLY





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2024 SCIENCE SYSTEMS COMMISSIONING

- Approach was to ensure the majority of the 150 science systems were covered off in 28 operations
- Limitations, all commissioning had to be conducted in local waters – sub zero temperatures were not experienced.

2024 COMMISSIONING AIMS:

- To train AAD technical personnel and Serco crew in the correct operation of the science systems to support future marine science
- To develop and refine AAD & Serco operating procedures;
- Very process driven: Documentation, Safety Brief, Go/No/Go, After Activity Reviews

Focused on safe operations – crawl / walk / run approach

SCIENCE SYSTEM COMMISSIONING: RMT & CTD

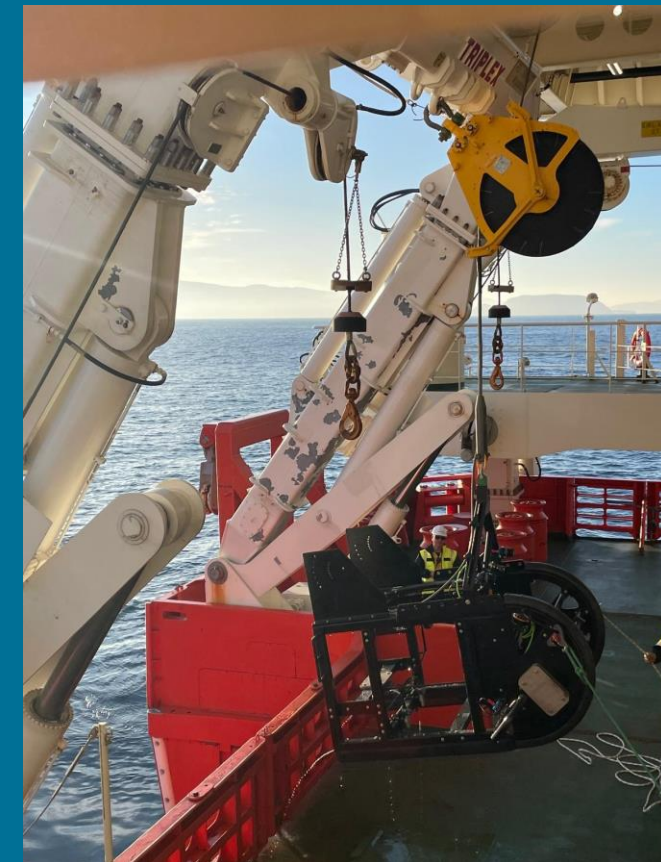
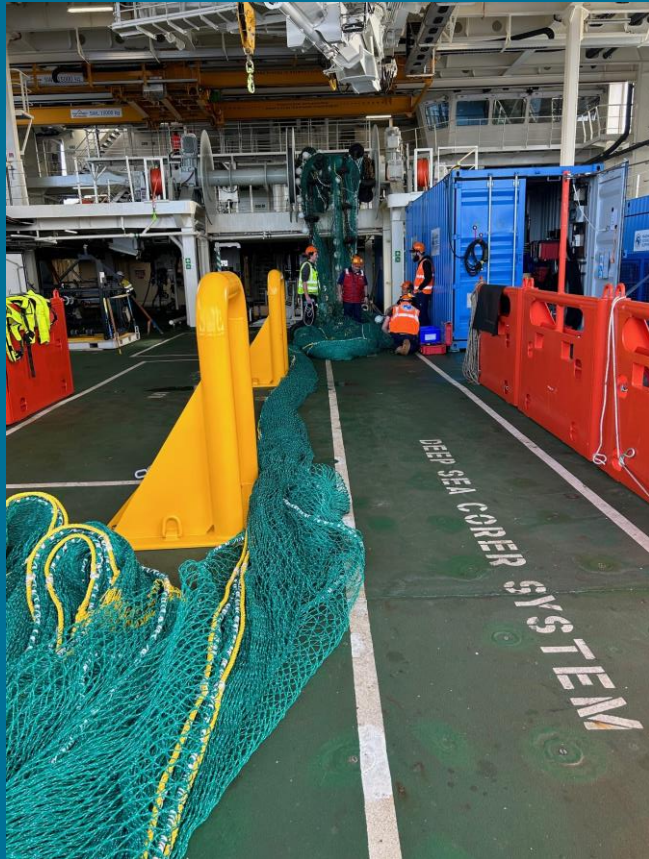
- Target trawling –very precise control over the ship to target krill swarms
- Side outboard & moon pool CTD deployments successful, some issues with EOM cable



SCIENCE SYSTEM COMMISSIONING: TOWED CAMERA FRAME & DEMERSAL TRAWL



- Towed Camera successful for capturing footage of the sea floor
- Demersal trawl successful





SCIENCE SYSTEM COMMISSIONING: KASTEN & MULTICORE & ROCK DREDGE

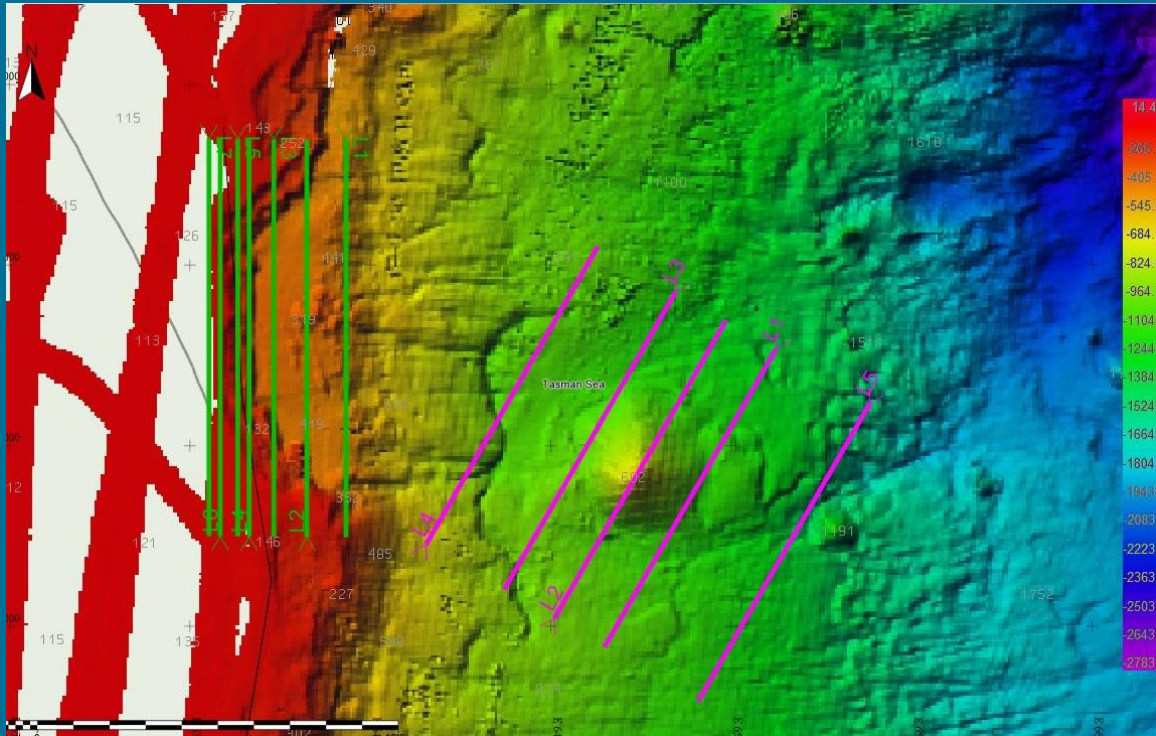
- Kasten & multicore deployments
- Rock Dredging
- Core transport to Lab from back deck



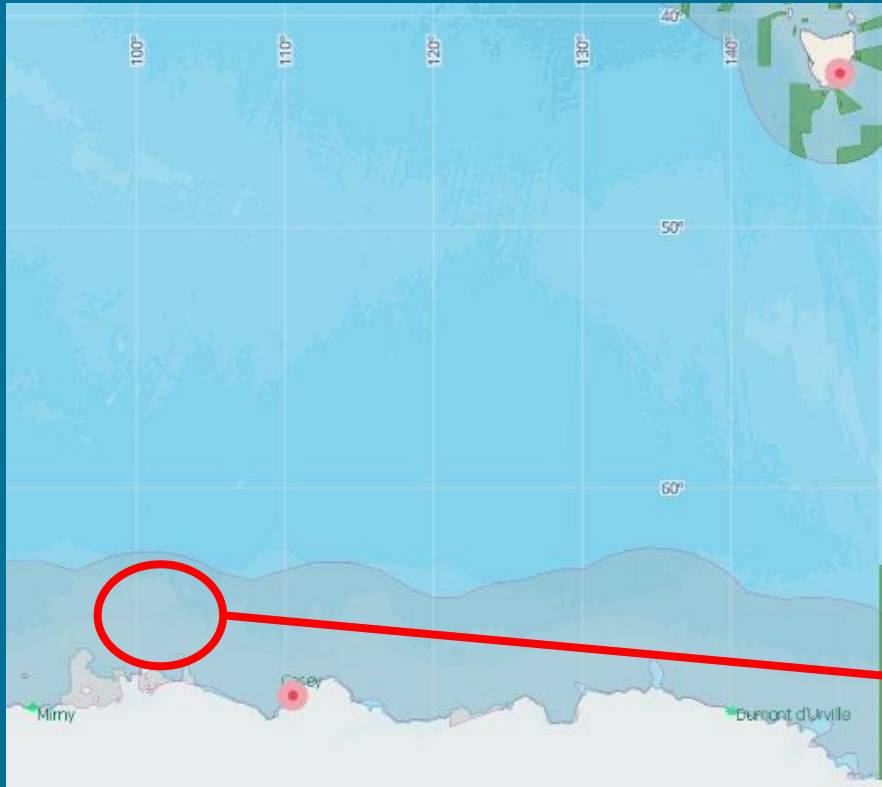
SCIENCE SYSTEM COMMISSIONING: ACOUSTICS



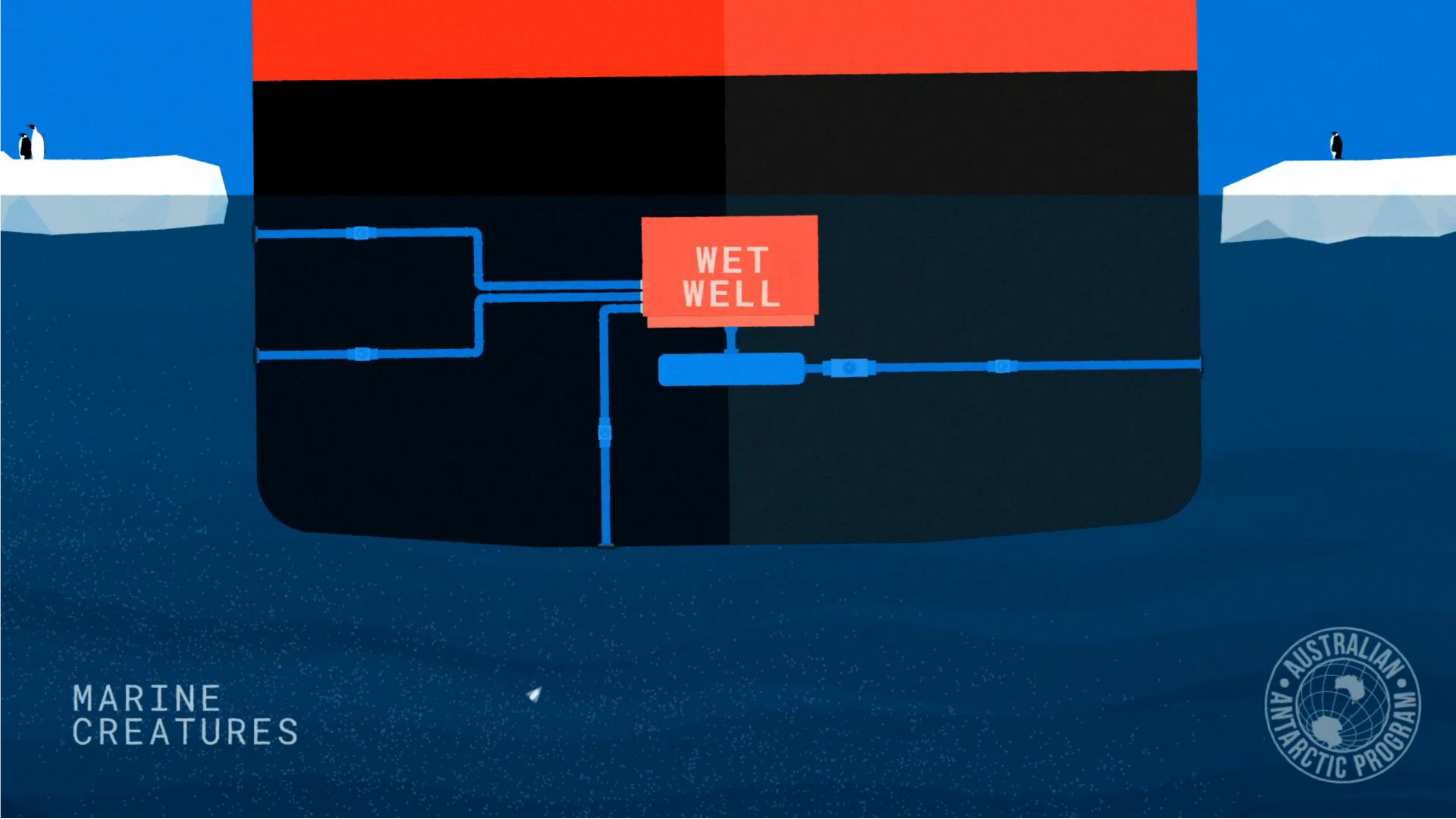
- Use of multibeam a real game changer for our AAD operations
- EK80 biological echosounder calibration
- Hull & drop keel multibeam & Sub-bottom profiling
- ADCP (hull & drop keel)



2025 DENMAN GLACIER MARINE SCIENCE



- Kasten, multicoring & Rock dredge
- CTD, TMF CTD & in situ pumps
- Beam Trawl & Towed Camera
- Mooring & float deployments
- Seal Tagging
- Atmospheric measurements
- Glider, ADCP & bathymetry



WET
WELL

MARINE
CREATURES



RSV NUYINA WET WELL

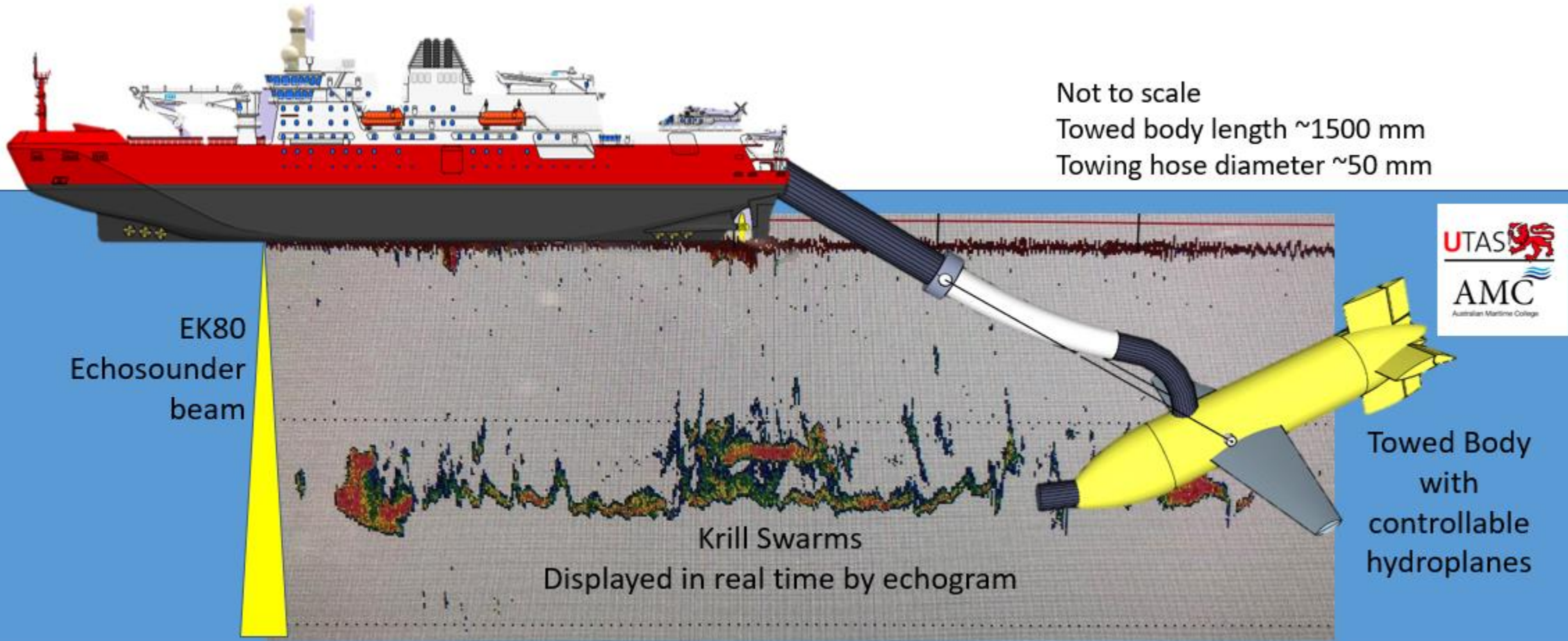
High Quality Live Specimens

- Collected without using any ship time
- Krill in excellent condition, even at 14 knots
- Survival rate 95% versus 10% with trawl nets
- Ctenophores and pteropods caught intact
- Ice algae community samples



FUTURE PLANNING – ACOUSTICALLY TARGETED TOWED BODY

- Creation of an acoustically targeted towed body operating in conjunction with the Wet Well



THANK YOU! –QUESTIONS?





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