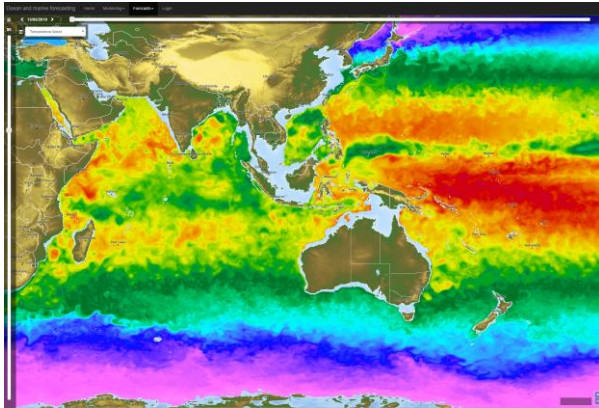




# Operational Oceanography: a Navy Perspective



**Forum for Operational Oceanography**

**16 October 2019**

***CMDR Jo Haynes, RAN  
SO1 METOC Under Sea Warfare***





## Scope

- **Navy Oceanography Community**
- **Strategic Context**
- **Data Sources and the METOC System**
- **Example Support Products**
- **Challenges and Future Focus**
- **Opportunities for Collaboration**

# Navy Oceanography Community

- ~30 personnel (LEUT to CAPT)
- Maritime Geospatial Officer – Meteorology and Oceanography (MGO-M) specialists
- Part of Navy's warfare community
- Minimum BoM GradDip(Met) up to PhD level qualifications

## Roles:

- Forecasting support to ADF operations
  - (Headquarters Joint Operations Command, Bungendore)
- Aviation forecasting
  - (Naval Air Station Weather and Oceanography Centre, Nowra & LHDs)
- Deployable Mobile METOC Teams
  - (Maritime Geospatial Warfare Unit, Sydney)
- METOC Under Sea Warfare Cell
  - (Australian Geospatial-Intelligence Organisation, Canberra)
- METOC Reserves



# Strategic Context

- Dynamic strategic environment
- 2016 *Defence White Paper*
- AGO Strategy
- Protect Australia's national interests by understanding and exploiting the environment
- Growing demand for accurate and reliable METOC products to support growing maritime capability

Australia's Strategic Defence Framework

Strategic Defence Interests		
A secure, resilient Australia, with secure northern approaches and proximate sea lines of communication.	A secure nearer region, encompassing maritime South East Asia and the South Pacific.	A stable Indo-Pacific region and a rules-based global order.
Strategic Defence Objectives		
Deter, deny and defeat attacks on or threats to Australia and its national interests, and northern approaches.	Make effective military contributions to support the security of maritime South East Asia and support the governments of Papua New Guinea, Timor-Leste and of Pacific Island Countries to build and strengthen their security.	Contribute military capabilities to coalition operations that support Australia's interests in a rules-based global order.



# Data Sources and the METOC System

- Data types:
  - Climatology and reanalysis data
  - METOC forecasting data
  - Observations
  - Weapon and sensor
  - Intelligence data
- Multiple sources
- Cross-domain/  
system/classification
- Limited storage options

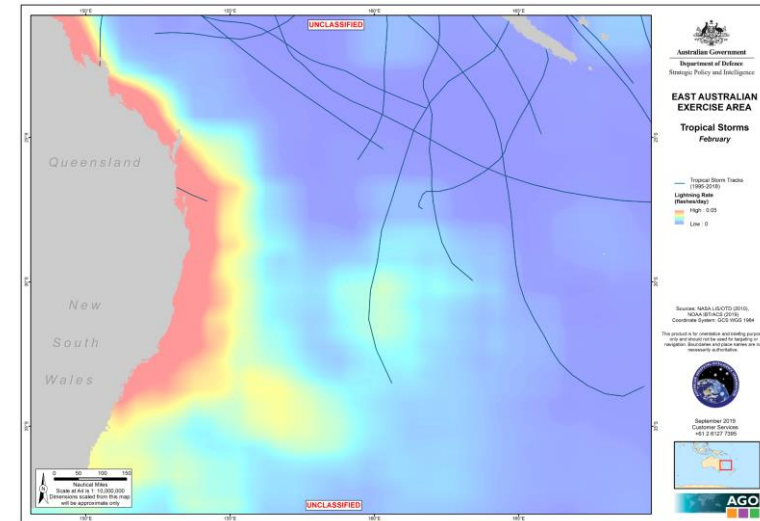
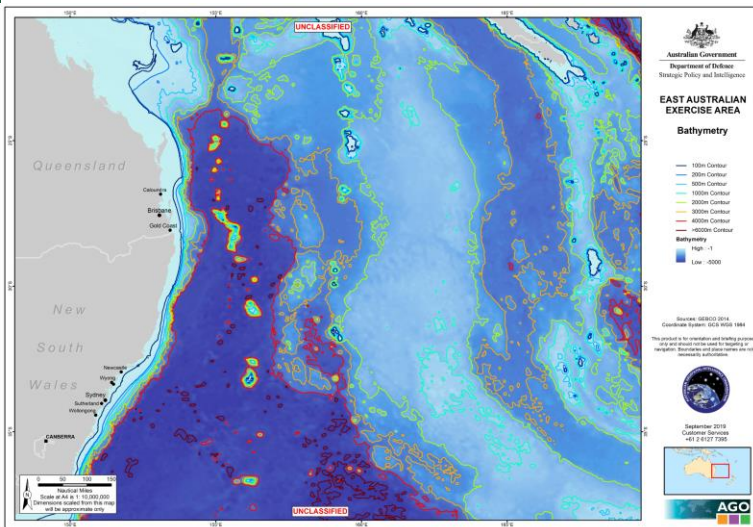
	Observe	Analyse	Forecast	Downscale	Apply
Atmosphere	World Weather Watch HMAS Observations	ACCESS BARRA	ACCESS	ROAM ADEPT	Graphical products Visual Weather Data AREPS SME
Ocean	IOC GOOS IMOS HMAS Observations Argo program Ocean gliders	OceanMAPS BRAN	OceanMAPS	ROAM ADEPT	Graphical products DIVE Data SAGE SME



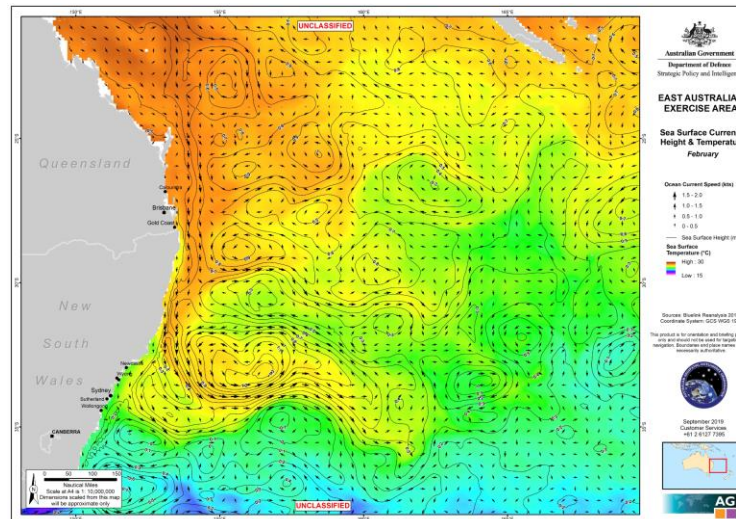
## Example Support Products: Pre-Mission Planning – ‘Safety’

## ***Bathymetry***

## Severe Weather



## Currents



1. WARNINGS:
2. METEOROLOGY:
  - A. SYNOPTIC SITUATION AT 040001Z:
  - B. WINDS:
  - C. SEA STATE:
  - D. COMBINED SEA (M):
  - E. SWELL:
  - F. WEATHER:
  - G. AIR TEMPERATURE (C): MIN: MAX:
  - H. RELATIVE HUMIDITY (PC):
  - I. EVAPORATION DUCT:
  - J. VISIBILITY (NM):
  - K. OUTLOOK:
  - L. EXTENDED OUTLOOK:
3. OCEANOGRAPHY:
  - A. OCEANOGRAPHIC SITUATION:
  - B. SEA SURFACE TEMPERATURE (C):
  - C. CURRENT:
  - D. SLD (M):
  - E. BOTTOM LOSS:
  - F. BELOW LAYER GRADIENT (BLG) (DEG/M):
  - G. SHALLOW SOUND CHANNEL (SSC) AXIS (M):
  - H. DEEP SOUND CHANNEL (DSC) AXIS (M):
  - I. DEPTH EXCESS (M):
  - J. DENSITY (KG/M3):
  - K. OUTLOOK:
  - L. EXTENDED OUTLOOK:
4. TACTICAL ASSESSMENT/FORECAST:
5. EPHEMERALS (TIMES G):
6. ISSUED BY LEUT WEATHERHEAD POC: HQJOC JOR METOPS WATCHKEEPER

# Example Support Products: In-Mission Forecasting

## OCEAN FORECASTING

ROAM  
(CSIRO)

Observations

OceanMAPS  
ADEPT  
(BoM)

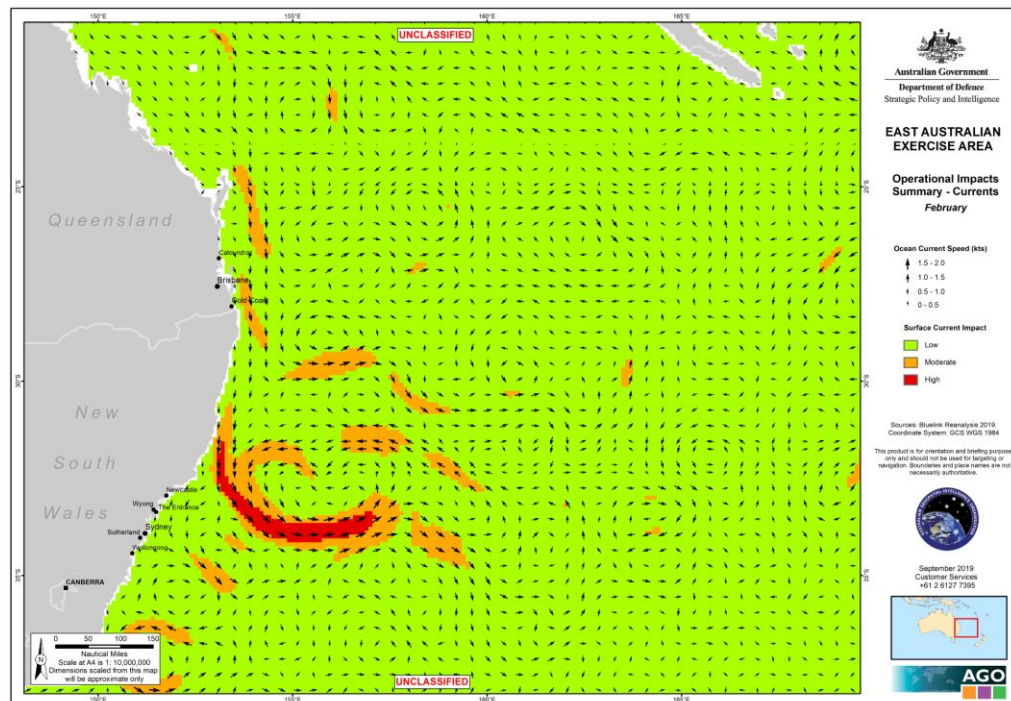
Products  
(signals, briefs)

### Grid Definition

Origin is  rotate using large white circle, **resize** using small white circles. Longitude and Latitude are WGS84



ROAM



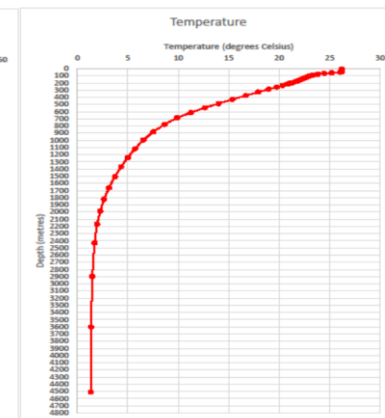
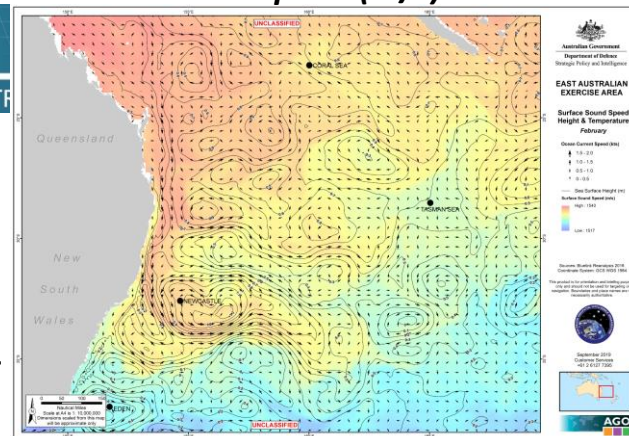
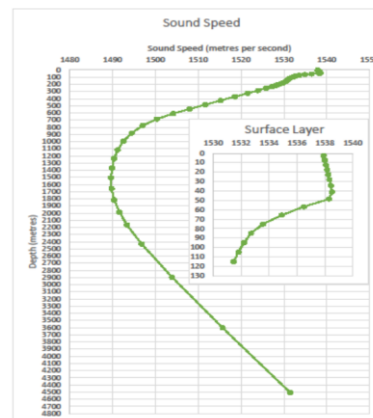
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METOC Impacts 'Traffic Light' Summary

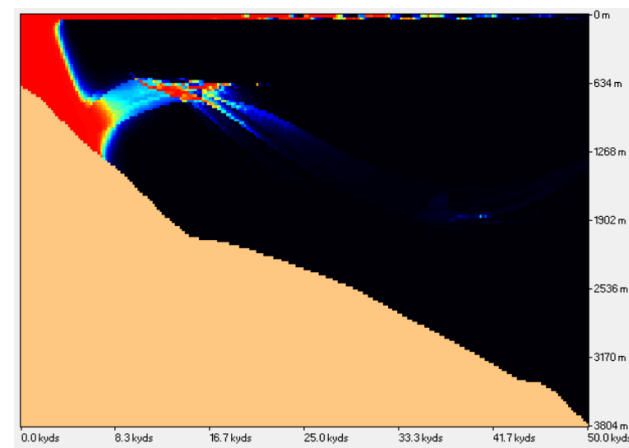


# The 'So What'

- Not just an ocean forecast, but a tactical analysis
- Understanding environmental impacts on own and adversary capability
- Assist the war-fighter in understanding and using the environment to gain tactical and operational advantage



*Vertical Profiles*







# Challenges and Future Focus

- Data availability and management
- ICT systems and software
- Operational security
- Growing demand for services and prioritisation of support

- Continue and grow stakeholder engagement and collaboration
- Turn 'lessons identified' into 'lessons learned'
- Keep pace with developments in science and technology
- Grow oceanography and acoustics knowledge within Navy



# Opportunities for Collaboration

- Identification and sharing of ocean model and observational data
- Product development and data visualisation
- Knowledge sharing (oceanography and acoustics)
- Increased liaison and short-term placements



Australian Government

Department of Defence  
Intelligence and Security

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AGO

AUSTRALIAN GEOSPATIAL-INTELLIGENCE ORGANISATION

# questions ?



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