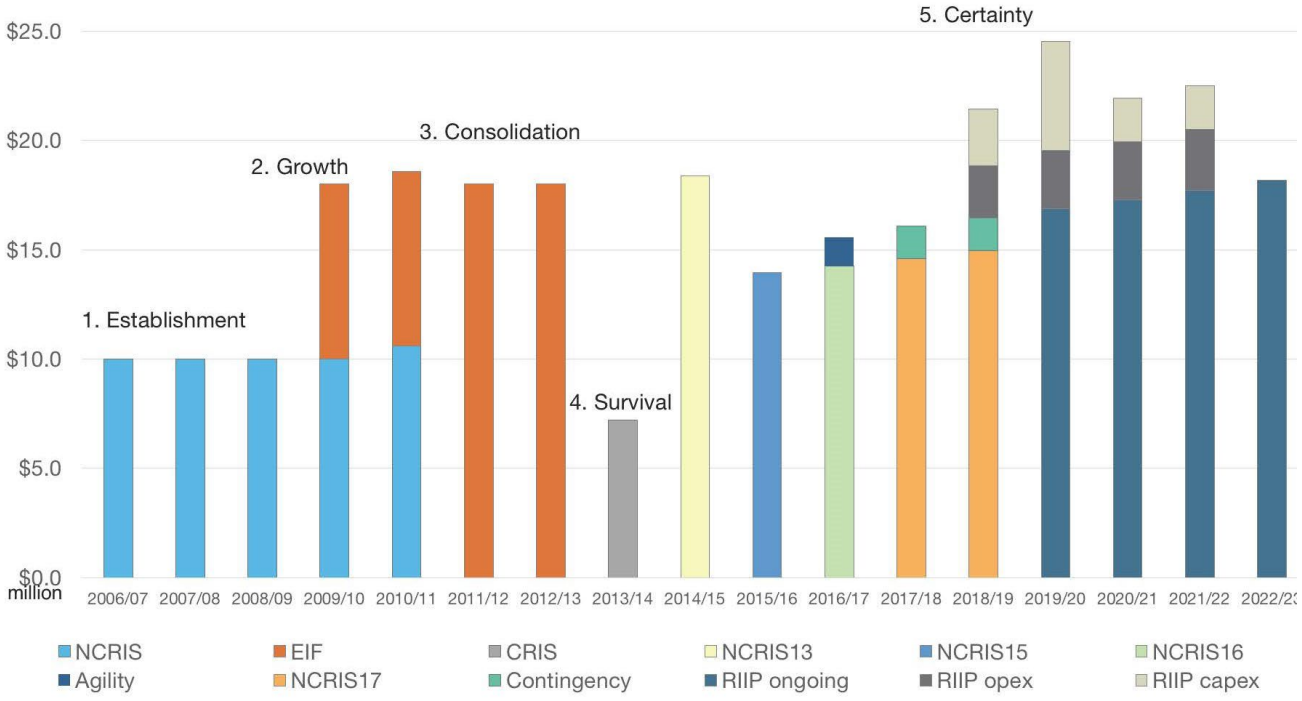
IMOS reflections

Adj. Prof. Tim Moltmann (UTAS/IMAS)

- CSIRO Marine & Atmospheric Research 1998-2009
- **IMOS Director 2009-19**
- Independent Consultant 2019+ (NESP, COTS, NHRA)

12th March 2026

Context – IMOS funding 2006-23



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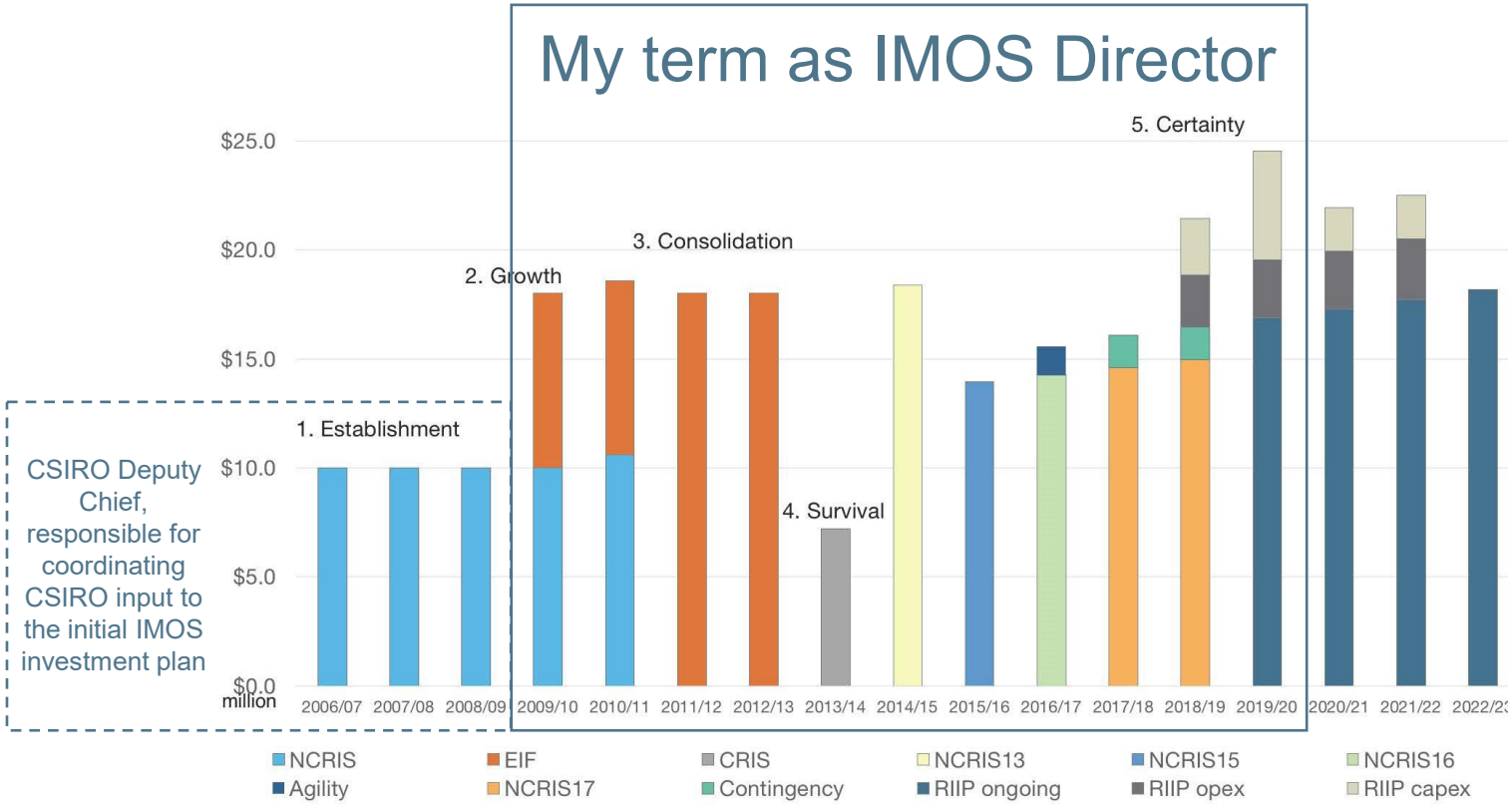
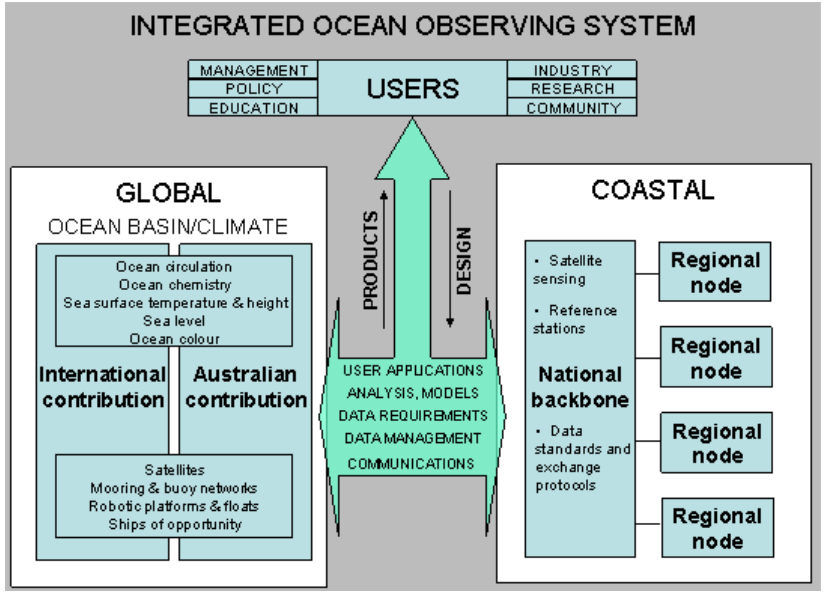


Reflections (on why I think IMOS has succeeded over 20 years)

1. Thinking big
2. Walking the talk
3. It’s all about the data…
4. Moving up the value chain
5. Planning for impact

Reflection #1 - Thinking big

- IMOS exists today because in 2004 the ~National Marine Science Committee set up a working group to scope an Australian Integrated Ocean Observing System (Aus-IOOS)
- There was no funding opportunity on the horizon at that time – it was about a vision
- When the NCRIS opportunity arose in 2006, the marine science community was ready to respond - $50M/ 5 yrs
- The Aus-IOOS vision wasn't for research infrastructure, but that's what we got
- IMOS has been very creative in leveraging this research infrastructure investment for greater good, with the AusIOOS vision in mind

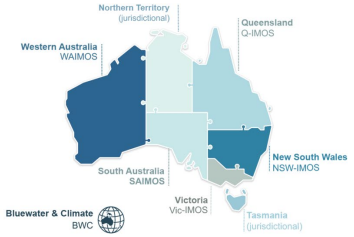


[1] Membership: Simon Allen (CSIRO), Crispian Ashby (FRDC), Rick Bailey (BoM), Doug Cato (DSTO), Peter Doherty (AIMS), Trevor Gilbert (AMSA), John Middleton (UNSW), Phil O'Brien (Geosciences Australia), John Parslow (CSIRO), Chari Pattiaratchi (UWA), Martin Rutherford (RAN), Neville Smith (BoM), Sally Troy (DEH).

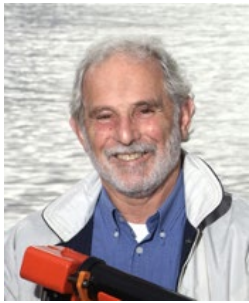
Reflection #1 - Thinking big

- The initial thinking was that IMOS would be funded through Nodes, but it quickly became obvious that this would fuel regional competition, not national collaboration
- The decision was therefore made to fund national Facilities, which Nodes could access based on requirements set out in community-driven science and implementation plans
- These plans were put out to international peer review in 2009-10 which
  a. encouraged our community take the science planning seriously, and
  b. put IMOS on the map internationally

Setting requirements – science and implementation plans



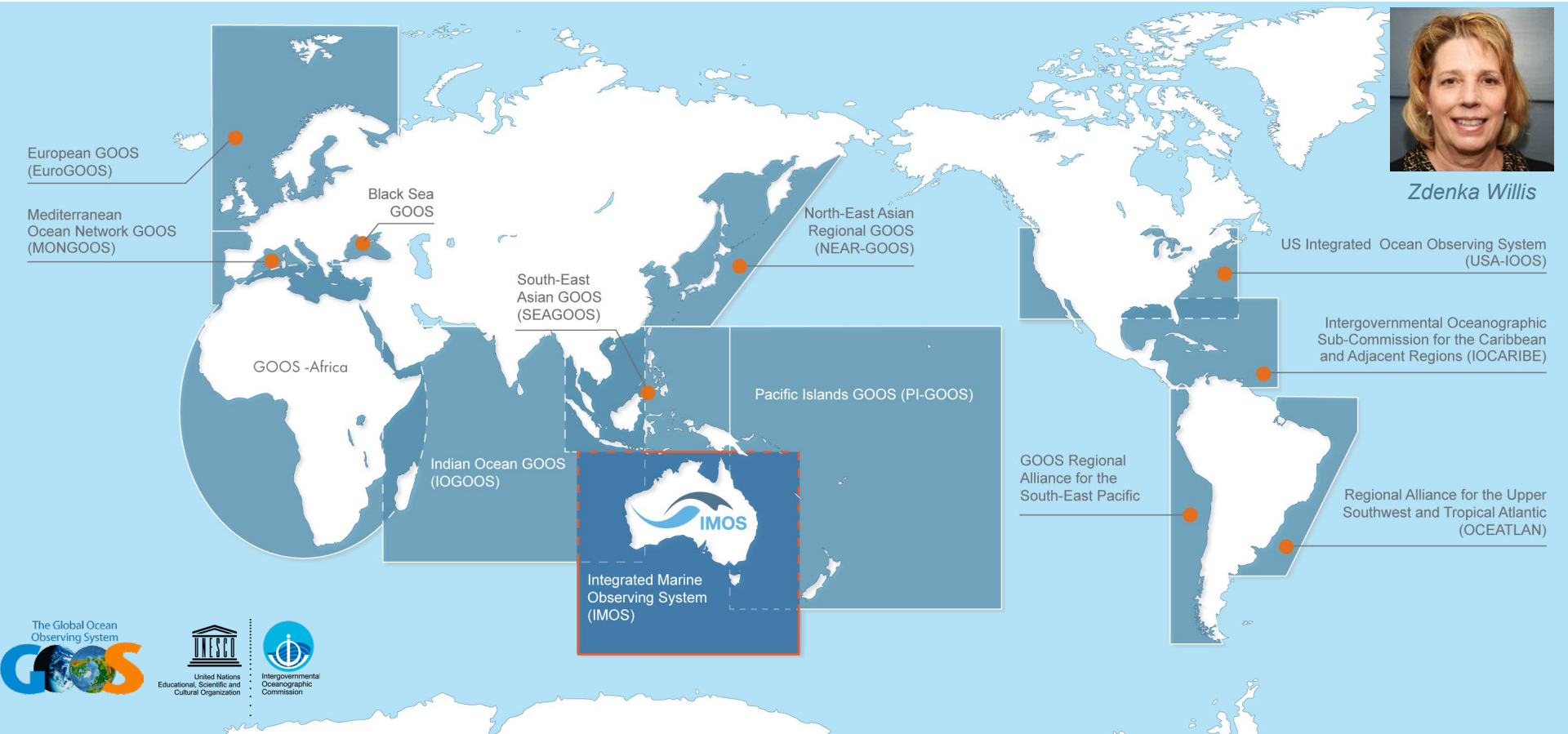
Trevor Powell



Gary Meyers

Katy Hill

IMOS – part of the Global Ocean Observing System

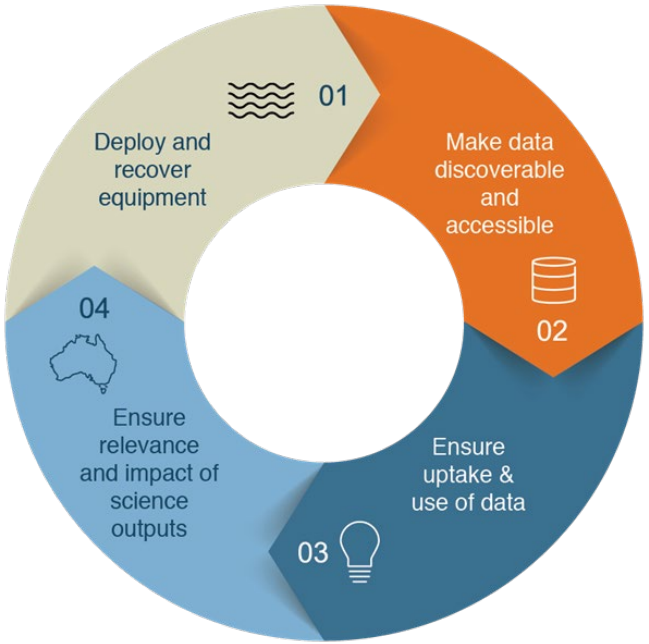


Reflections (on why I think IMOS has succeeded over 20 years)

1. Thinking big
   - bold vision, strong scientific underpinning
2. Walking the talk
3. It's all about the data…
4. Moving up the value chain
5. Planning for impact

Reflection #2 - Walking the talk

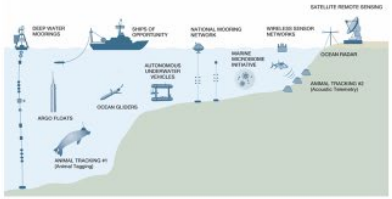
- We’re here today, 20 years on, because IMOS works
- As a research infrastructure, it needs to reliably deliver observations and data for science, research, teaching and other purposes
- Early on, we set four KPIs
  - Get the kit in and out of the water
  - Make the data available
  - Ensure the data is used
  - Ensure the data is used to do something that someone cares about
- Rinse and repeat…

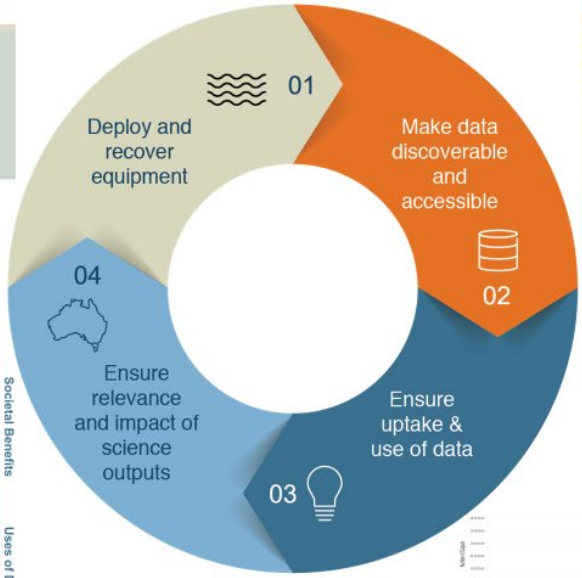


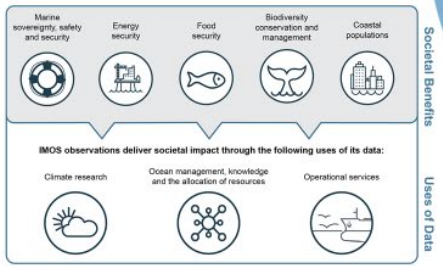
Reflection #2 - Walking the talk

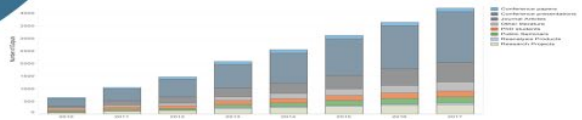
We built systems to monitor performance against all KPIs, and inform remedial action when required

IMOS 4 Key Performance Indicators (KPIs)









Reflection #2 - Walking the talk

- All of you make IMOS work
  - Facility and Sub-Facility leaders, project scientists, technicians, engineers, vessel operators, Node leadership teams, Task Teams, IMOS Office staff, Advisory Board members, Operator Reps, legal and finance professionals, program managers in the Department of Education…

MTS marine technology society

Opportunity runs deep™

Compass International Award: Presented to an individual, company, or organization (outside the United States) for outstanding contributions to the advancement of marine science and technology.

Recipient – Integrated Marine Observing System Australia **2021**

- Since 2006, the Integrated Marine Observing System (IMOS) has successfully operated a wide range of marine technology throughout Australia's coastal and open oceans, turning observations into open data for the marine and climate science community, decision makers and international collaborators. IMOS has provided Australia with a step-change in marine observing and data management capability over the last fifteen years. Specifically it has advanced sustained ocean observing through operating ~10% of the global Argo; maintaining a wide range of sensors on ships of opportunity (both research and commercial); maintaining deep water mooring sites including in the Southern Ocean; developing and operating a national glider fleet, a national high frequency radar network, a national autonomous underwater vehicle facility, a national network of long-term reference sites and coastal moorings; a nationally coordinated animal tagging and monitoring network; and a sensor network on the Great Barrier Reef.

Reflections (on why I think IMOS has succeeded over 20 years)

1. Thinking big
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3. It's all about the data…

4. Moving up the value chain

5. Planning for impact

Reflection #3 - It's all about the data…

- Around the time that AusIOOS was being conceived, the RAN reviewed its National Ocean Data Centre and moved to multi-Commonwealth-agency joint facility with a vison to create Australia's 'digital ocean commons'
- With no new resources AODC-JF could do little more than influence, before the IMOS opportunity arrived
- The AODC-JF leadership proposed an eMarine Information Infrastructure Facility in IMOS, at ~10% of total investment
- This Facility eventually became the Australian Ocean Data Network (AODN), in line with the original vision

AODC
Australian Ocean Data Centre
JOINT FACILITY

eMarine Information Infrastructure (eMII) Facility

AODN
Australian Ocean Data Network

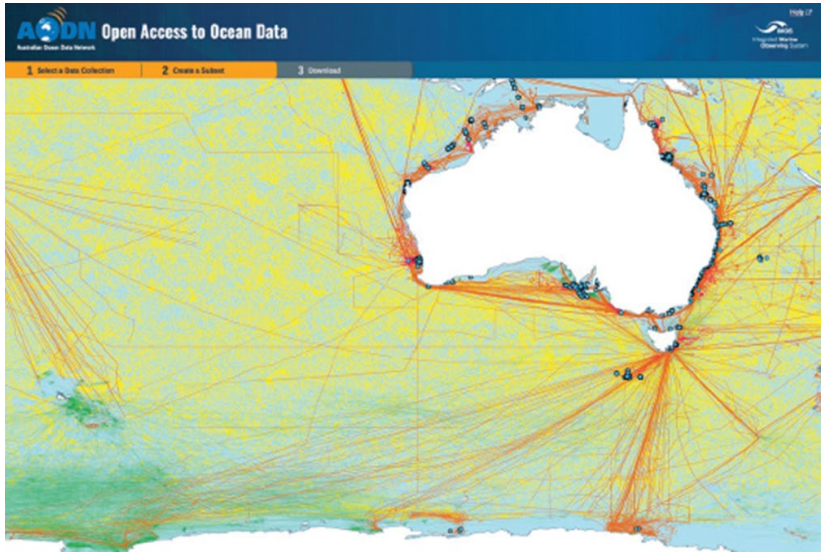

Kim Finney


Craig Johnson


Roger Proctor

Reflection #3 - It's all about the data…

- IMOS has set and achieved a very high standard by ensuring that every observation is turned into data that is findable, accessible, interoperable, and reusable (FAIR) via the AODN
- It's proven very effective to view the datasets and timeseries as the infrastructure we are creating
- And to leverage this information infrastructure for national benefit beyond IMOS



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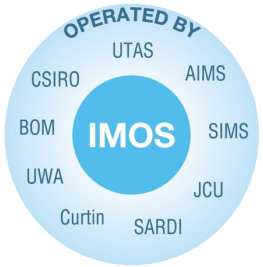
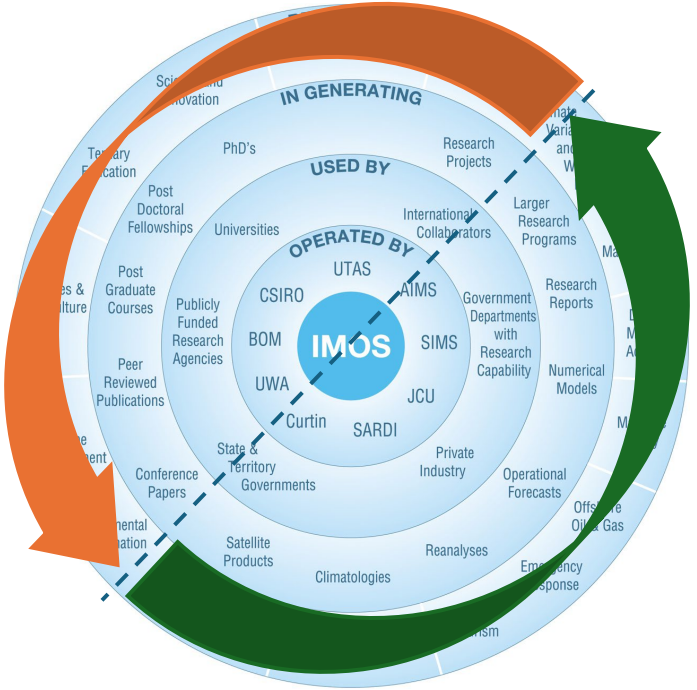
Reflection #4 - Moving up the value chain

- Operated by a small number of institutions
- Used by all (science plans, open access)
- To generate a wide range of outputs
- Relevant across government, industry, society



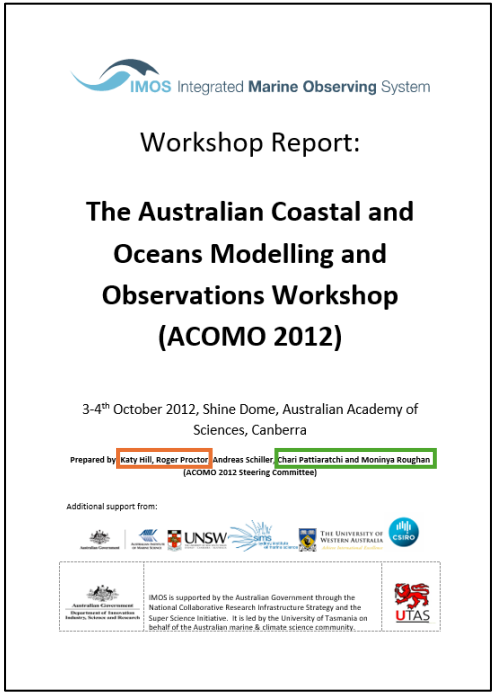
Reflection #4 - Moving up the value chain

- By thinking broadly about potential users, products, and beneficiaries, IMOS opened up additional pathways for delivering value to Australians
  - perhaps more so than some other NCRIS capabilities
- In some cases, however, we did not have mechanisms in place to capture that potential value e.g.
  - coastal and ocean modelling
  - marine industries and services



Reflection #4 - Moving up the value chain

- A clear message from the 2009-10 international peer review process was the need for better integration between observations and modelling
- At the time, however, there was no national coordination mechanism to facilitate this engagement
- With support from the ~NMSC, IMOS established the Australian Coastal Ocean Modelling and Observations (ACOMO) biennial workshop series in 2012



IMOS Integrated Marine Observing System

Workshop Report:

The Australian Coastal and Oceans Modelling and Observations Workshop (ACOMO 2012)

3-4th October 2012, Shine Dome, Australian Academy of Sciences, Canberra

Prepared by Katy Hill, Roger Proctor, Andreas Schiller, Chari Pattiaratchi and Moninya Roughan (ACOMO 2012 Steering Committee)

Additional support from:

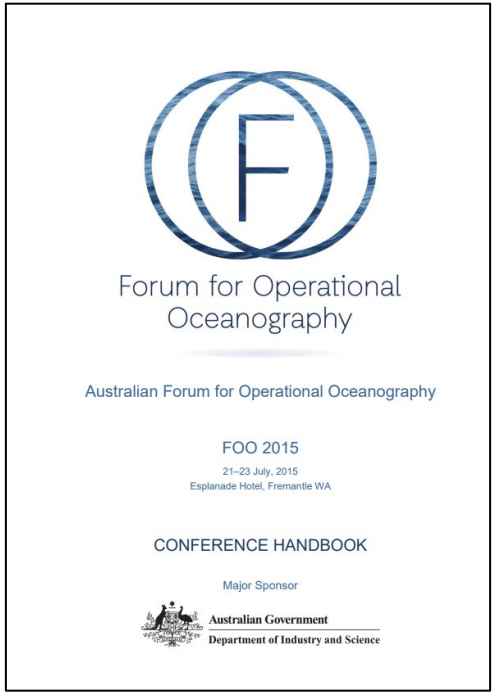
IMOS is supported by the Australian Government through the National Collaborative Research Infrastructure Strategy and the Super Science Initiative. It is led by the University of Tasmania on behalf of the Australian marine & climate science community.

Neville Smith

Andreas Schiller

Reflection #4 - Moving up the value chain

- Another key gap was in understanding marine industry needs
  - there was no national forum for IMOS to engage with
- Based on emergence of a forum for operational oceanography in the UK, the concept of an Australian FOO was developed around ‘four pillars’
  - R&D Providers, Government Agencies, Marine Industries, Service Providers
- IMOS secured additional seed funding to establish FOO, in 2015
  - IMOS hosts the FOO and co-chairs with industry



Jan Flynn

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   - thinking broadly about value, creating pathways where they didn't exist
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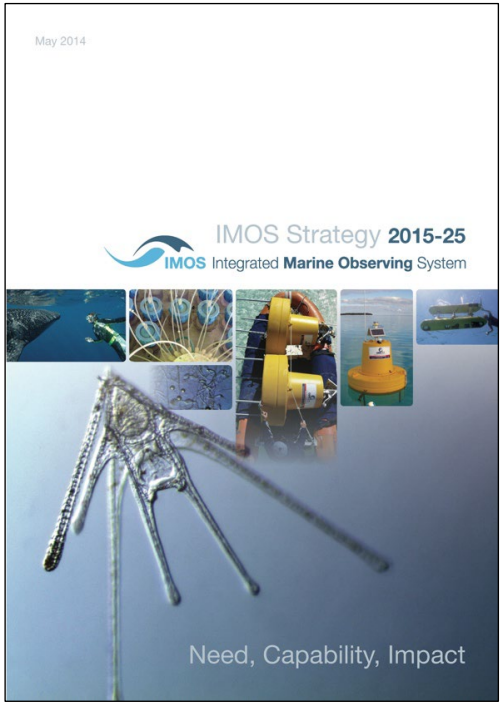
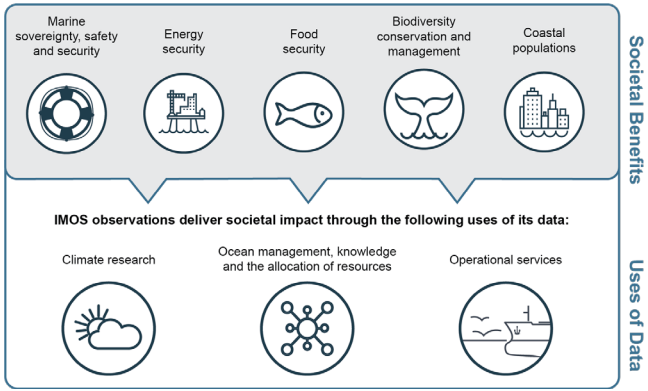
Reflection #5 – Planning for impact

- In the first ~five years of IMOS, a huge amount of effort was required to implement the observing program and get the data flowing and available
- In response to increasing government focus on the value of publicly funded research, attention then turned to impact



Reflection #5 – Planning for impact

- The emphasis shifted from impact being
  - something that emerged from what IMOS did and how we did it,
  - to something that IMOS planned for and measured itself against
- This required
  - development of a theoretical framework for how a research infrastructure should think about impact,
  - and much more sophisticated tools for tracking impact over time



Pathways: Tools to Track to Impact

- There are lots of pathways to impact
- Use strategic goals to define and categorise what these will be ("we'll measure that, but not this")
- Knowing that the core baseline information exists for other investigations if needed.
- The outcomes/impact should be linked to individual outputs and thematically organised (e.g. societal benefit areas)

Data
- Website tracking
- User registration information on download
- User surveys
- Publish or Perish (full text search of publications for data information)
- Team reporting
- User engagement

Publications
- Uptake into policy and policy-related documents – which in turn influence decision-making, strategies
  - Overton*; Altmetric*
- Contribution to SDGs
  - Dimensions
- Scientific excellence
  - Scopus*, WOS*

Reports
- Uptake into policy-related documents – which in turn influence decision-making, strategies
  - Custom databases containing documents relevant to organisation (nb big time cost)
  - Overton*
- Stakeholder interviews/communication

People
- Exit interviews
- Emails (with appropriate permissions)
- Maintaining networks

*Subscription-based, but universities often have access

Indi Hodgson-Johnston

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5. Planning for impact
   - Theoretical framework, sophisticated tools

Thanks for the opportunity to reflect…

…and congratulations to Michelle, and the IMOS Office and AODN teams, the Board, and all of the IMOS community for getting us to where we are today