Annual Business Plan
Period 1 July 2016 to 30 June 2017

Integrated Marine Observing System (IMOS)

National Collaborative Research Infrastructure Strategy (NCRIS 2016, NCRIS Programme Guidelines March 2016)

IMOS is a national collaborative research infrastructure, supported by Australian Government. It is led by University of Tasmania in partnership with the Australian marine & climate science community.
1 Executive Summary

IMOS is led by the University of Tasmania in partnership with the Australian marine and climate science community. IMOS commenced under National Collaborative Research Infrastructure Strategy (NCRIS) 2006, was extended and enhanced under the Education Investment Fund in 2009, and extended under the Collaborative Research Infrastructure Scheme, NCRIS 2013 and NCRIS 2015 schemes.

In April 2016 the Federal Education and Training Minister Simon Birmingham announced a $14,243,000 allocation to IMOS for 2016-17. On 2 May 2016 IMOS submitted an application for $1.5M under the Agility funds (decision pending). This IMOS Business Plan encompasses both those funding schemes, and represents the 11th year of operation of IMOS.

**NOTE:** The activities in this plan reflect those achievable with core NCRIS 2016 funds, plus Agility funds. If IMOS is unsuccessful in securing Agility funds, then a revised Business Plan will need to be submitted and agreed to by the Department of Education and Training.

In December 2015, the Australian Government released its National Innovation and Science Agenda. The Innovation Agenda includes an ongoing commitment to NCRIS, backed by $1.5BN of investment over the next ten years. During 2016, Australia's Chief Scientist will chair an expert group to undertake a road-mapping process to identify specific future research infrastructure capability requirements. The new, ongoing commitment to NCRIS will commence from 2017-18 at the level of $150M per annum plus indexation i.e. $153.9M in 2017-18.

Alongside regular IMOS activities throughout 2016-17, the IMOS community will prepare to engage with future NCRIS. Development of a credible, scalable, multi-year plan is an essential step. IMOS will do this for a five-year timeframe (2017-22) as the ten year NCRIS funding commitment is likely to have a mid-term review point. To view the milestones and steps to achieve this see [http://imos.org.au/5yearplan17-22.html](http://imos.org.au/5yearplan17-22.html).

2 Outline of governance and management arrangements

The strong governance and management processes adopted have ensured IMOS is recognised nationally and internationally as having well developed systems of planning, management, reporting and review. The key components of this are:

- IMOS leadership by the University of Tasmania, in partnership with University of Western Australia, Sydney Institute of Marine Science\(^1\), Curtin University, CSIRO, Australian Institute of Marine Science, Bureau of Meteorology, and South Australian Research and Development Institute (collectively termed Operators).
- Engagement with many other collaborating partners (Australian and international), State Government co-investors and key research users.
- An Advisory Board headed by an independent chair, and membership encompassing skills in corporate governance, financial and business management, research and development

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\(^1\) Whose core partners are University of New South Wales, University of Sydney, Macquarie University and University of Technology Sydney
activities, international and national activities to develop ocean observing systems and
ocean and data management.
• An IMOS Office dedicated to driving implementation of the national strategy and ensuring
the national activities outlined in this Plan are achieved.
• Scientific Nodes (regional and open ocean) providing a mechanism by which the Australian
marine and climate science community organises itself to guide the design and
implementation of IMOS and drive the uptake and use. All of the Node Science Plans have
been internationally peer reviewed, and undergo periodic revision and updating.
• A portfolio of IMOS Facilities which has been constructed to provide the observations and
data required to address Node Science Plans in the most effective and efficient manner
possible. Facilities are funded to deploy equipment and ensure data collected is made
available via the Australian Ocean Data Network (https://portal.aodn.org.au/) in a timely
manner (more detail in part 3 below).

3 Descriptions of each of the project’s major components

There are 12 IMOS Facilities (http://imos.org.au/facilities.html). Ten of these are technology
platforms used to undertake the observations and deliver the data streams. Each of the Facilities has
one or more Operating Institutions that are contracted and funded to deliver various components of
the system. These Facilities are not standalone entities. They represent a carefully selected portfolio
designed to deliver a nationally integrated set of marine observations and data streams. This
portfolio approach has been adopted for two reasons. It enables the marine and climate science
community to access the multi-platform observations required to address really big science
questions, such as ocean warming from the surface to the deep. And it provides operational
efficiencies through Facilities that have broad utility across multiple research themes. The following
components will be maintained in 2016-17:

• **Argo floats** – ongoing near real time data stream from the global Argo array in the
Australian region, including reduced level of IMOS floats plus co-invested floats. IMOS
funding for maintenance of the array reduced to 12 floats in 2016-17, plus co-investment.
Ongoing investment in communications and data management to exploit the remaining
‘live’ floats that will continue to stream data.
• **Ships of opportunity** – mostly fixed equipment on multiple vessel platforms. The work will
be continued via the following Sub-facilities:
  o **Expendable bathythermograph** – ongoing measurements from high-density lines
  o **Biogeochemical** – ongoing CO₂ measurements via ship-board instruments
  o **Continuous plankton recorders** – ongoing collection of phytoplankton and zooplankton
    species data along the East Australia Current, along the south coast of Australia, and in
    the Southern Ocean (in collaboration with the AAD) during the summer
  o **Tropical research vessels** – ongoing shipboard measurements in northern Australia
  o **Sea surface temperature sensors** – ongoing measurements from ship-board instruments
  o **Real time air-sea fluxes** – ongoing measurements from ship-board instruments
  o **Bio-acoustic** – ongoing measurements from fishing vessels in the Tasman/Coral Sea,
    Indian Ocean and Southern Ocean
• **Deep water moorings** – the work will be continued via the following Sub-facilities:
  o **Southern Ocean time series observatory** – the reconfigured observatory will be
    maintained, with the turnaround voyage scheduled on the RV Investigator in March
    2017.
  o **Deep arrays** – the East Australian Current moorings will be maintained. The Indonesian
    Throughflow mooring array has paused due to lack of certainty as to whether
permissions from Timor-Leste would be granted to redeploy these moorings in their waters in 2017

- **Ocean gliders** – continuation of regional and open ocean glider missions, albeit with fewer deployments in light of reduced funding (*circa* 14 slocum and 4 seaglider missions).

- **Autonomous underwater vehicle** – continuation of campaigns to revisit survey sites (tropical, temperate, east and west coasts) delivering high resolution optical and acoustic sea floor imagery.

- **National mooring network** – continuation of regular mooring turnarounds and biogeochemical sampling at seven national reference stations (NRS), plus regional shelf moorings turnarounds via the following Sub-Facilities:
  - Queensland and Northern Australia – continuation of Yongala NRS, Darwin NRS, and Stradbroke Island NRS, plus shelf moorings in the Great Barrier Reef, Darwin Harbour and North-West Western Australia
  - New South Wales – continuation of Port Hacking NRS, plus shelf moorings near Sydney, Batemans Bay, ORS065 and Coffs Harbour, and biogeochemical transect at Port Hacking
  - South Australia – continuation of Kangaroo Island NRS, plus shelf moorings off Spencer Gulf and Coffin Bay (including BGC sampling at the former two sites)
  - Western Australia – continuation of Rottnest NRS, plus shelf moorings off Two Rocks and Perth Canyon
  - Southeast Australia - continuation of Maria Island NRS
  - NRS coordination – national coordination of biogeochemical sampling. Ecotriplet sampling will be discontinued at the NRS.
  - Passive acoustics – continuation of NSW, SA and WA sites, with increased focus on increasing the broader utility of the data streams
  - Acidification moorings – maintenance of deployments and data streams from CO2/acidification moorings at the Maria Island, Kangaroo Island and Heron Island sites

- **Ocean radar** – continuation of the six radar sites at the current locations, plus installation and operation of a new SeaSonde radar system in NSW enabled through co-investment by the University of New South Wales

- **Animal tracking and monitoring** – the work will be continued via the following Sub-Facilities:
  - Acoustic Tracking – continuation of a reduced number of receiver array locations, while continuing to focus on data quality and availability of species level data
  - Satellite tagging – continuation of Southern Ocean and Great Australian Bight deployments

- **Wireless sensor networks** – during 2016-17 this Facility will be downsizing as it transitions to a new operating model. As the installed infrastructure is in a Marine Park there needs to be a complete removal of any non-essential equipment as part of the transition. The plan for the year is to start this process with a focus on One Tree Island and some reductions at Heron Island and Davies Reef.

- **Satellite remote sensing** – the work will be continued via the following Sub-Facilities:
  - Sea surface temperature products – continued provision of satellite SST products, including the addition of data from at least one new sensor (either VIIRS on Suomi-NPP or AVHRR on METOP-B) to the IMOS-GHRSST product suite over the coming 2016-17 period
  - Data collections – continued maintenance of remote sensing data archive infrastructure and content to support a) AODN delivery of national data sets in ocean colour and SST and b) IMOS OceanCurrent. The Sub-Facility will also be taking on a major new activity this year, which is detailed in Section 4.
- **Townsville ground-station** – maintain routine reception and delivery of satellite imagery from Townsville receiving station.

- **Ocean colour** – focus will be on the continued production and validation of ocean colour, specifically the production of delayed mode standard ocean colour products and their integration into the OceanCurrent website. An annual accuracy assessment of key ocean colour products will be provided through match-up analysis using ground observations collated by the Bio-Optical Data Base. Additionally, the continuous above water radiometric data will continue to be collected at the Lucinda Jetty Coastal Observatory (LJCO), which is integrated into the global NASA Aeronet-OC network.

- **Satellite altimetry** – focus will be on a number of altimeter “comparison points” (CP) in Bass Strait, with the Storm Bay mooring being discontinued. The regular 6-monthly servicing/redeployment of moorings at “historical” CP that supports the NASA/CNES Jason-2 and Jason-3 missions will continue. The Sub-Facility will do likewise for the simple mooring presently deployed at the “S3A” CP that supports the ESA Sentinel-3A mission, noting that they will likely have sufficient data from this location (given its close proximity to the “Historical” CP) in Feb 2017, hence the scheduled removal of the mooring at this site at that time. Finally, in Feb 2017 a new mooring will be deployed at the “S3B” site in support of the Sentinel-3B mission.

There is also a Marine Information Infrastructure Facility making all of the data discoverable, accessible, usable and reusable, and an IMOS Office (Management and Governance Facility). The following components will be maintained in 2016-17:

- **Marine information** – the new-look Australian Ocean Data Network (AODN) Portal was launched in June 2016. This signified the official merger of the IMOS eMarine Information Infrastructure (eMII) Facility and the Australian Ocean Data Network (AODN) into a single entity. The marine information Facility of IMOS is now the AODN. This Facility will continue to maintain the AODN during the period.

- **IMOS Office** – continued co-investment from the University of Tasmania and Tasmanian Government means most activities will continue. A major activity during the 2016-17 year for the office is planning for the next five years (2017-2022), see http://imos.org.au/5yearplan17-22.html.

4 **Linkages to other NCRIS projects**

IMOS has linkages to the following NCRIS projects through 2016-17:

- **Bioplatforms Australia (BPA)** - The marine microbes project supported by BPA is using IMOS marine observing infrastructure and applying its genomics network to perform DNA sequencing to generate the large-scale datasets scientists require to understand fundamental marine processes. IMOS is supporting the pelagic component, and the project also has a benthic/coastal component. We will explore whether the benthic/coastal component provides a potential pathway for IMOS to grow in this region.

- **Research Data Services (RDS)** - IMOS will continue to support the use of NCRIS-funded e-Research infrastructure by keeping an ‘archive’ copy of IMOS data (synchronised with Amazon Web Services) as part of the Tasmanian Partnership for Advanced Computing (TPAC) ‘Marine and Climate’ data collections supported through the RDS.
National eResearch Collaboration Tools and Resources project (NeCTAR) - IMOS continues to participate in the NeCTAR-funded Virtual Laboratory program MARVL (Marine Virtual Laboratory). In this year (to October 2016) the project looks to engage with international community groups and industry, by bringing new MARVL testers on board and getting them to consider how MARVL might be modified to suit their particular requirements. Part of the work includes improving look and functionality of the interface, bringing data collections up to date and adding more collections. One of the community models in MARVL is ROMS (Regional Ocean Modelling System) and some of these improvements are intended for showcasing at the 2016 ROMS Asia-Pacific Workshop, taking place in Hobart, 17-21 October. (http://www.myroms.org/Workshops/ROMS2016/flier.pdf).

Australian National Data Service (ANDS) – IMOS continues to work with ANDS on management and publication of AODN controlled vocabularies through Research Vocabularies Australia (RVA) and on developing new vocabularies as a contribution to the ANDS High Value Collections Program support for the National Environmental Science Programme (NESP).

National Computational Infrastructure (NCI) - The Satellite Remote Sensing Data Collections Sub-Facility is undertaking a new activity in 2016-17 to provide initial support for the Copernicus Regional Data Hub (CRDH) at the NCI to facilitate exploitation by marine users, particularly IMOS Sub-Facilities in SST, Ocean Colour, and OceanCurrent. The CRDH delivers data from the European Sentinel missions to the NCI, but provides no additional value add—consequently the potential for the emergence of a range of different and incompatible approaches is a significant risk. This Sub-Facility will take the lead for IMOS, in concert with other Sub-Facilities, to ensure that initial organisation and cataloguing of the Sentinel-3a ocean colour, SST and altimetry data streams (and potentially also Sentinel 2 - in the coastal zone) meets the needs of marine researchers. This activity will lay the foundation for maximising the uptake of these data by IMOS users in subsequent years.

5 Stakeholder Engagement

Stakeholder engagement is core business for IMOS, and will continue into 2016-17 and beyond. A specific Industry Engagement Plan was submitted to the Department in July 2015 as part of NCRIS 2015 reporting requirements, and an update against the Plan was included in the NCRIS 2015 Project Report 2 (accepted April 2016). The majority of the engagement activities outlined in the Industry Engagement Plan are ongoing into the 2016-17 year.

In addition, during this period the IMOS Office and community will continue working on the IMOS 2017-22 Plan http://imos.org.au/5yearplan17-22.html. The key drivers for IMOS derive from the fact that it is a national research infrastructure; used by academics, researchers, and other users to deliver impact; funded by Australian Government; reliant on co-investment by partners; operating in a globally connected system; and making extensive use of technology (platforms, sensors, data and compute). Specific international, national, and regional initiatives involving industry and other end users, which IMOS will consider in the forward planning include the following:

- **International:**
  - Global Ocean Observing System (GOOS) Framework for Ocean Observing. **Note** - IMOS is one of thirteen Regional Alliances of the Global Ocean Observing System (GOOS), and the IMOS Director has recently taken up the chair of the GOOS Regional Alliance Council for two years.
- GEO Blue Planet
- Open data access (ODIP, RDA etc.)
- Southern Ocean Observing System (SOOS)
- Indian Ocean Observing System (IIOE-2)
- Tropical Pacific Observing System (TPOS 2020)

**National:**
- National Innovation and Science Agenda
- Industry Growth Centres
- National Science and Research Priorities
- National Marine Science Plan [http://www.marinescience.net.au/](http://www.marinescience.net.au/). **Note** - The IMOS Director has now taken up the role of Chair of the National Marine Science Committee.
- Marine National Facility (RV Investigator)
- Forum for Operational Oceanography (FOO) [http://www.foo.org.au/](http://www.foo.org.au/). **Note** - The IMOS Director has been co-chairing the FOO Steering Committee with Jan Flynn (Shell Australia) since early 2014. FOO has progressed very well over this period, to the point where it has clear potential to be a significant component of the marine science community’s response to the National Innovation and Science Agenda.
- Bureau of Meteorology (BOM) Marine Strategy
- Australian Antarctic Science Strategic Plan
- Antarctic Climate & Ecosystems (ACE) CRC
- Antarctic Gateway Partnership
- National Environment Science Program (NESP)
  - Marine Biodiversity Hub. **Note** - IMOS is officially recognised as a partner in the NESP Marine Biodiversity Hub and is a member of the Research Partners Committee
  - Earth Systems & Climate Change Hub
  - Tropical Water Quality Hub
- Defence White Paper
- BlueLink
- Australian Research Council (ARC)
- Cooperative Research Centre (CRC) Program
- Fisheries Research & Development Corp. (FRDC)

**Regional:**
- Reef 2050 Long Term Sustainability Plan, and Reef Integrated Monitoring and Reporting Program (RIMREP). **Note** - The IMOS Director is a member of the RIMREP Steering Committee, and co-chair of the RIMREP Data Management and Systems Working Group.
- eReefs. **Note** - The IMOS Director is a member of the eReefs Operations Committee.
- Advance Queensland
- White Paper on Developing Northern Australia
- WA Marine Science Blueprint
- WA Marine Science Institution (WAMSI). **Note** - IMOS is an associate member of WAMSI.
- Marine Innovation South Australia (MISA)
- Great Australian Bight Research Program
- NSW Research Attraction & Acceleration Program
- Marine Estate Management Authority (MEMA)
- Victorian Marine Science Consortium
6 Target performance measures and associated achievement level for each project component

IMOS has key performance measures across the dimensions of:

(i) equipment deployment and recovery – by meeting the milestones agreed for each Facility / Sub-Facility
(iii) uptake and use of data – by continued assessment of uptake of IMOS data across a number of metrics – see http://imos.org.au/imospublications.html
(iv) relevance and impact of scientific outputs – by ensuring IMOS continues to be engaged with relevant national and international programs in the marine and climate domain.

7 Summary of expected expenses for each major component

On 21 April 2016 the University of Tasmania signed a contract to secure $14.243M NCRIS funds for the 2016-17 year. On 2 May 2016 the University submitted as application for $1.511M Agility Funds (application pending). Thus the total we have included in this 2016-17 Business Plan is $15.754M. The IMOS Office, informed by recommendations from the IMOS Advisory Board has undergone an extensive process to seek detailed budgets and plans for utilizing the funds to the maximum advantage of the Australian marine and climate science community in the 2016-17 year.

A high level summary of expected expenses against NCRIS and Agility funds in 2016-17 for each IMOS Facility (major component) in line with the Guidelines is as follows:

<table>
<thead>
<tr>
<th>Facility</th>
<th>Governance</th>
<th>Technical staff</th>
<th>Infrastructure maintenance</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Argo floats</td>
<td>0</td>
<td>538,856</td>
<td>858,143</td>
<td>1,396,999</td>
</tr>
<tr>
<td>02 Ships of opportunity</td>
<td>0</td>
<td>983,357</td>
<td>44,948</td>
<td>1,028,305</td>
</tr>
<tr>
<td>03 Deepwater moorings</td>
<td>0</td>
<td>782,709</td>
<td>548,741</td>
<td>1,331,450</td>
</tr>
<tr>
<td>04 Ocean gliders</td>
<td>0</td>
<td>608,630</td>
<td>333,812</td>
<td>942,442</td>
</tr>
<tr>
<td>05 Autonomous underwater vehicle</td>
<td>0</td>
<td>250,000</td>
<td>179,000</td>
<td>429,000</td>
</tr>
<tr>
<td>06 National mooring network</td>
<td>0</td>
<td>2,433,866</td>
<td>2,246,307</td>
<td>4,680,173</td>
</tr>
<tr>
<td>07 Ocean radar</td>
<td>0</td>
<td>495,971</td>
<td>264,656</td>
<td>760,627</td>
</tr>
<tr>
<td>08 Animal tracking and monitoring</td>
<td>0</td>
<td>386,699</td>
<td>397,417</td>
<td>784,116</td>
</tr>
<tr>
<td>09 Wireless sensor networks</td>
<td>0</td>
<td>122,478</td>
<td>114,202</td>
<td>236,680</td>
</tr>
<tr>
<td>10 Marine information</td>
<td>0</td>
<td>2,262,709</td>
<td>249,954</td>
<td>2,512,663</td>
</tr>
<tr>
<td>11 Satellite remote sensing</td>
<td>0</td>
<td>761,918</td>
<td>51,028</td>
<td>812,946</td>
</tr>
<tr>
<td>12 IMOS Office</td>
<td>838,296</td>
<td>0</td>
<td>0</td>
<td>838,296</td>
</tr>
<tr>
<td><strong>2016-17 Totals</strong></td>
<td><strong>838,296</strong></td>
<td><strong>9,627,193</strong></td>
<td><strong>5,288,208</strong></td>
<td><strong>15,753,697</strong></td>
</tr>
</tbody>
</table>

Funded by:

- NCRIS contract signed 21 April 2016 $14,243,000
- Agility application submitted 2 May 2016 $1,510,697
- Estimated 2016-17 funding $15,753,697
This table details budgets from each of the eight IMOS Operating Institutions, for each of the 40 Sub-Facilities which make up the major Facilities outlined above. We are able to provide any more detailed information which the Department may require in assessing this Business Plan.

8 Overall accounting for the total funding provided under NCRIS showing amounts to be used for major components and the amounts allocated to smaller projects

Overall 2016-17 resources allocated to IMOS Facilities – categorised by NCRIS/Agility funds, co-investment and staffing (FTE) are as follows:

<table>
<thead>
<tr>
<th>NCRIS funding</th>
<th>NCRIS / Agility funding</th>
<th>Co-investments (cash and in-kind)</th>
<th>2016-17 NCRIS plus co-investment</th>
<th>NCRIS/Agility FTE staff</th>
<th>Co-invest FTE Staff</th>
<th>Total staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Argo floats</td>
<td>1,396,999</td>
<td>1,108,613</td>
<td>2,505,612</td>
<td>4.35</td>
<td>0.35</td>
<td>4.70</td>
</tr>
<tr>
<td>02 Ships of opportunity</td>
<td>1,028,305</td>
<td>1,642,756</td>
<td>2,671,061</td>
<td>8.61</td>
<td>0.47</td>
<td>9.08</td>
</tr>
<tr>
<td>03 Deepwater moorings</td>
<td>1,331,450</td>
<td>3,840,534</td>
<td>5,171,984</td>
<td>5.66</td>
<td>1.71</td>
<td>7.37</td>
</tr>
<tr>
<td>04 Ocean gliders</td>
<td>942,442</td>
<td>974,798</td>
<td>1,917,240</td>
<td>5.10</td>
<td>0.20</td>
<td>5.30</td>
</tr>
<tr>
<td>05 Autonomous underwater vehicle</td>
<td>429,000</td>
<td>1,123,500</td>
<td>1,552,500</td>
<td>2.50</td>
<td>2.00</td>
<td>4.50</td>
</tr>
<tr>
<td>06 National mooring network</td>
<td>4,680,173</td>
<td>4,861,191</td>
<td>9,541,364</td>
<td>18.89</td>
<td>1.21</td>
<td>20.10</td>
</tr>
<tr>
<td>07 Ocean radar</td>
<td>760,627</td>
<td>1,137,801</td>
<td>1,898,428</td>
<td>4.00</td>
<td>0.22</td>
<td>4.22</td>
</tr>
<tr>
<td>08 Animal tracking and monitoring</td>
<td>784,116</td>
<td>4,896,719</td>
<td>5,680,835</td>
<td>4.00</td>
<td>7.80</td>
<td>11.80</td>
</tr>
<tr>
<td>09 Wireless sensor networks</td>
<td>236,680</td>
<td>228,089</td>
<td>464,769</td>
<td>1.00</td>
<td>0.20</td>
<td>1.20</td>
</tr>
<tr>
<td>10 Marine information</td>
<td>2,512,663</td>
<td>2,058,504</td>
<td>4,571,167</td>
<td>18.15</td>
<td>0.00</td>
<td>18.15</td>
</tr>
<tr>
<td>11 Satellite remote sensing</td>
<td>812,946</td>
<td>868,232</td>
<td>1,681,178</td>
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<td>0.46</td>
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<tr>
<td>12 IMOS Office</td>
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<td>978,686</td>
<td>1,816,982</td>
<td>5.80</td>
<td>0.00</td>
<td>5.80</td>
</tr>
<tr>
<td>Totals</td>
<td>15,753,697</td>
<td>23,719,423</td>
<td>39,473,120</td>
<td>83.33</td>
<td>14.62</td>
<td>97.95</td>
</tr>
</tbody>
</table>

The IMOS Office has received very detailed budgets for each of these, and also for the sub-facilities which comprise parts of the larger Facilities outlined in this table. Additional information can be provided as needed.

9 Five-year (2017-22) capital upgrade path

A summary of the capital upgrade/renewal requirements, their timing by financial year and estimated total quantum of funding required is provided in the table below:

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Argo floats</td>
<td>377,143</td>
<td>386,571</td>
<td>396,236</td>
<td>404,160</td>
<td>412,244</td>
<td>1,976,354</td>
</tr>
<tr>
<td>02 Ships of opportunity</td>
<td>201,200</td>
<td>71,400</td>
<td>201,350</td>
<td>51,560</td>
<td>74,200</td>
<td>599,710</td>
</tr>
</tbody>
</table>
In seeking advice from IMOS Operating Institutions for this summary, we requested they reflect major equipment procurements by year for 2017-22 and base it on continuation of the suite of deployments in place at December 2015. Much more detailed information can be provided if the Department requires any further information.

10 Other information and confidentiality

None of the material in this report is confidential.

11 Declaration

I confirm that the information in this report is true and correct to the best of my knowledge following due investigation.

[Signature] 24th June 2016

Tim Moltmann
IMOS Director, University of Tasmania