

NCRIS CAPABILITY 5.12
INTEGRATED MARINE OBSERVING SYSTEM
ANNUAL BUSINESS PLAN 2007/08

Contents	Page
1. Status of the Project—progress since January 2007	2
2. Activities to advance the Project—July 2007 to June 2008	17
3. Governance and management arrangements	24
4. Promotion of the Project	25
5. Access and pricing	26
6. Staffing and financial projections	28
7. Co-investments	39
8. Milestones	41
List of Acronyms	44

Introduction

The establishment of an Integrated Marine Observing System (IMOS) as a part of the National Collaborative Research Infrastructure Strategy (NCRIS) was announced on 27 November 2006 by the Minister for Education, Science and Training, the Hon Julie Bishop MP.

IMOS is a distributed set of instruments deployed in the coastal and blue-water oceans around Australia, together with data management infrastructure that serves primary data and value-added data-products. The instruments are operated by Facilities, each of which maintains an array of a particular type of instrument (or set of similar instruments) in regions around the country. There are 11 Facilities: three operate in blue-water regions outside Australia's coastal zone, where ocean-atmosphere interaction preconditions the terrestrial climate of Australia; six operate in the coastal marine environment where major boundary currents interact with marine ecosystems on the shelf; and two are primarily concerned with the management of satellite and in situ data. The Facilities were selected for development after extensive consultation with the Australian marine research community through informal groupings of marine researchers called Nodes. The Nodes identified the scientific rationale for investment in infrastructure. Four of the Nodes are regional in character—representing Queensland, New South Wales, South Australia and Western Australia—and one Node headquartered in Tasmania represents the open ocean, blue water domain.

The structure of this plan is based on the eight headings in the table of contents. A general overview is presented under each heading, followed if appropriate by more detailed discussion relevant to each Facility.

1. Status of the Project—progress since January 2007

1.0 IMOS Office and general overview

The University of Tasmania (UTAS) through the IMOS Office will have overall responsibility for the management and implementation of the Project in accordance with the reporting and accountability requirements outlined in the Funding Agreement with the Department of Education, Science and Training (DEST). The Office will manage the Project and will sub-contact with organisations to establish, operate and/or provide access to the 11 Facilities.

UTAS established a Project Steering Committee chaired by Prof Richard Coleman in January 2007 to address the legal, financial and administrative issues of the start up phase. The Committee appointed Prof Gary Meyers as Director of the IMOS Office, Mrs Jo Neilson as Executive Officer and Ms Jeanette Harris as Executive Assistant. The Committee also commissioned CSIRO Marine and Atmospheric Research to provide technical advice to the office, on an annually renewable basis, coordinated by Mr Simon Allen. The Committee acquired temporary space at UTAS to quickly set up the IMOS Office, and has acquired a permanent space, which will be occupied after appropriate renovations.

The IMOS Office drew up the Terms of Reference (TOR) for the IMOS Advisory Board. On advice from the IMOS Office, and after consultation with the marine research community through the IMOS Nodes, the Acting Pro-Vice Chancellor (Research), Prof

Allan Canty, appointed the independent Chair of the Advisory Board and Board members. Dr Trevor Powell will serve as the first Chair. The selection criteria for Board Members are given in the TOR. Importantly, Board Members were nominated as individuals for their outstanding abilities to guide the project. They do not represent organisations or regions. The Board Members are Dr Neville Smith, Dr John Parslow, Dr Ian Poiner, Prof Jason Middleton, Prof Chris Marlin, Prof John Gould (international member), Dr Chris Simpson, Dr Rob Lewis. The first meeting of the Board was held 3 May 2007 at the University of Tasmania.

The IMOS Office has taken carriage, on behalf of the University of Tasmania, of liaison with DEST in agreeing on details of the Funding Agreement. The Agreement was executed by UTAS and DEST on 22 May 2007.

The IMOS Office convened the first annual general meeting of IMOS Node and Facility Leaders (IMOS-1) in Hobart on 31 January-2 February 2007. The purpose of the meeting was to re-ignite contacts and enthusiasm of the project leaders, to build links between Facilities and to outline this first Annual Business Plan.

The Nodes in IMOS are at the present time loosely formed groups of researchers who came together to propose observations. The Nodes now need to be given a more formal structure to play their role as defined in the Project Plan (paragraph 4.3.8). The process to achieve a formal structure will be initiated with a meeting of each Node in its home territory with the Director and Executive Officer present. These meetings are also meant to promote IMOS and inform the marine research community about the infrastructure that is being developed. Initial Node-meetings with GBROOS (11 May) and WAIMOS (23 February and 18 May) and Bluewater on 30 May have been held. Meetings with the other Nodes are scheduled as follows: NSWIMOS on 4 June and SAIMOS on 12 June 2007.

Progress in IMOS Facilities

1.1 Argo Australia

Objective:

Argo Australia aims to undertake real time monitoring of the broad ocean state around Australia by maintaining an array of profiling (Argo) floats that measure temperature and salinity down to 2000m every 10 days in real time. This provides the essential and dominant in situ data stream for ocean and climate research and climate prediction and characterisation of the state of the ocean.

The minimum design coverage is 1 Argo float every 3x3 degrees of latitude/longitude. To ensure 50% of coverage in the Australian region (i.e. between 90°E to 180°E, equator to Antarctic) requires deployment of 60 floats per year with the balance derived from international partners. The NCRIS investment along with currently identified Australian partners will provide for ~ 50 % of this requirement with further opportunities for co-investment and/or contributions from international partners.

Highlights:

- Global Argo coverage reached 93% of planned coverage in January 2007, and has increased since then

- Data processing software developed at CSIRO has been implemented at Bureau of Meteorology to support the near real time use of Argo data in research and products such as seasonal climate prediction

Difficulties:

Effort is ongoing to remove small biases in the data set due to deviations from pre-deployment and idealised sensor calibrations including, drifts in pressure and salinity sensors, biases in salinity due to a CTD thermal-lag error, and global assessments of drift data files. Argo Australia collaborates with the International Argo Steering Team and the Argo Data Management Team on bias removal.

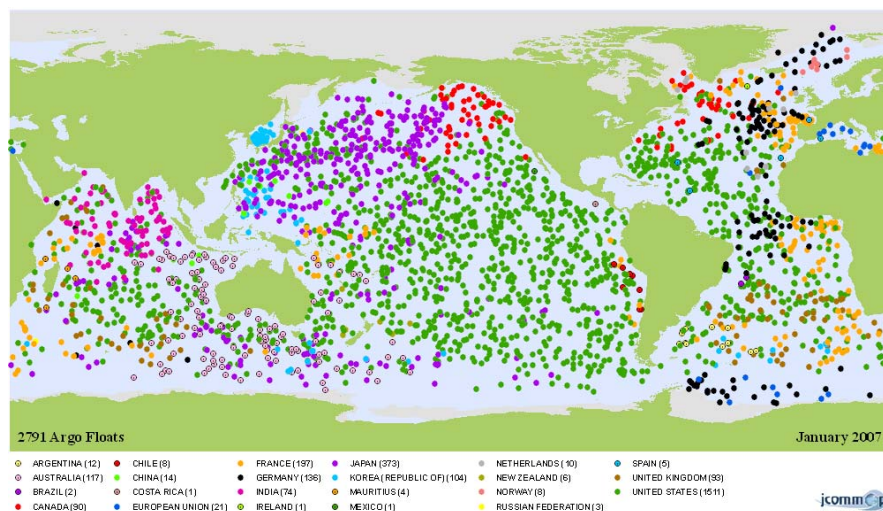
Progress:

Argo Australia, through past support by AGO, CSIRO, BoM and RAN, has an array of 122 operating floats (Fig. 1) which are largely located to the west and south of Australia. CSIRO operates the network. Due to limited resources, almost no Australian floats have been deployed in the Tasman and Coral Seas (although floats from international partners are located there). The array density there remains less than required; hence, these regions will be targeted during 2007/08.

A major step in dissemination of data over the last year was installation of real-time data-processing at the Bureau of Meteorology, with new software authored by Jeff Dunn of CSIRO. This makes Argo data immediately available to support research and products (such as seasonal climate predictions). The highest level of data quality control continues at CSIRO, but this needs to be speeded up to meet the standard required by the international program.

Collecting Argo data in the Indonesian Exclusive Economic Zone is a sensitive issue. Ann Thresher, CSIRO Scientist in Charge of Operations, negotiated a Memorandum of Understanding with our partner agency in the Ministry of Marine Affairs and Fisheries, Indonesia, to ensure joint Indonesian/Australian Argo deployments can continue.

Figure 1: Global Argo coverage was at 93% of the target global coverage in January 2007. Most of the floats in the Coral and Tasman Seas have been deployed by international partners.



1.2. Enhanced Measurements from Ships of Opportunity (SOOP)

Objective:

This facility will implement a set of integrated, multidisciplinary observing instruments on volunteer ships as they cross Australian regional seas. The instruments will support research on physical, chemical and biological oceanography with a view toward understanding the complex linkages in the oceanic environment and ecosystems. As such it builds upon existing 'underway' observing programs. The target regions are the boundary current systems off Eastern and Western Australia, the Southern Ocean, the shelf seas across northern Australia, and the Great Barrier Reef. The observations will span spatial scales from eddies to basin-width, and time scales from seasonal to decadal. The Australian SOOP measurements are a contribution of major significance to the international SOOP Program. SOOP Programs are a very cost effective way of obtaining oceanographic data.

Highlights:

- The best location of pCO₂ measuring equipment on research vessel Southern Surveyor was determined and installation planned

Difficulties:

A difficulty is that ships sometimes irregularly shift on and off the routes that are to be monitored. Recently the planned vessel (Pacific Waikato) for Tasman Sea CO₂ sampling moved to a new route, requiring a search for a new vessel, and delaying the implementation.

Progress:

The transoceanic, expendable bathy-thermograph (XBT) lines using merchant ships were established by CSIRO as early as 1983. They have been updated to high density or frequently repeated sampling as recommended by the international JCOMM SOOP Panel.

Enhancement of IMOS SOOP measurements to provide data for multidisciplinary research including biogeochemistry, physical- and biological-oceanography and climate research has been planned. There are four components: (1) Multidisciplinary oceanography using merchant ships (2) Sensors on tropical research vessels (3) Hull mounted sea surface temperature (SST) sensors on merchant ships (4) Research vessel real-time air-sea fluxes. Agreement in principle was reached with the ship-operators on overall design and associated plans for installations. This allowed preliminary work on ORV Southern Surveyor (during port period) to prepare installation of pCO₂ measuring equipment. Ships were inspected to identify the best location for SST sensors.

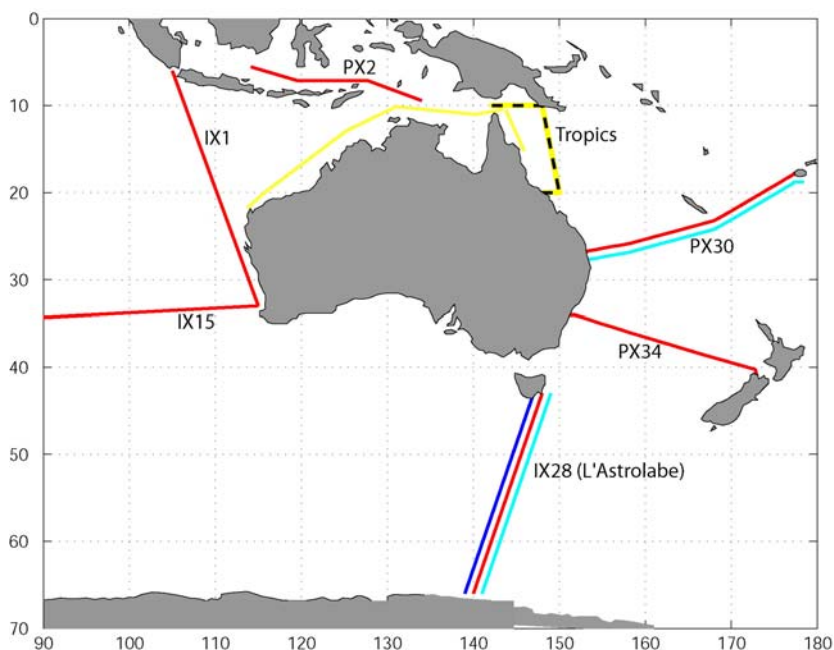


Figure 2: The main shipping routes included in the proposal. The red lines are temperature transects, the dark blue are biogeochemical transects, cyan are plankton transects and the yellow line is indicative of the tropical research vessel routes. Additional monitoring (not shown) is provided by the research/supply vessels Southern Surveyor and Aurora Australis. The routes covered by merchant ships with SST sensors are not shown but include the Southern Ocean, coastal Australia (Queensland to South Australia), Bass Strait, and the Tasman Sea.

1.3 Southern Ocean Automated Time Series Observations (SOTS)

Objective:

High temporal resolution observations of the ocean surface mixed layer are rare for any property, and almost non-existent for many biogeochemical and ecosystem properties. This limits our ability to understand the coupling of physical, chemical, and biological processes, which are important to carbon transports, phytoplankton community structure and primary production, as well as the transfer of nutrition to higher trophic levels and the transport of pollutants. In particular with regard to the Southern Ocean, the international research community has identified the following high priorities for research:

1. the assessment of current and future ocean uptake of carbon and its impact on atmospheric composition,
2. impacts of climate change on the marine biosphere
3. the role of marine biota in mediating climate change
4. the fluxes of heat, freshwater and momentum at the air-sea interface.

This facility will acquire and deploy moored instruments for time-series observations of physical, biological, and chemical properties, in the Sub-Antarctic Zone southwest of Tasmania, with twice-yearly servicing. It will be one of only 29 high temporal resolution sites identified globally by the Global Ocean Observing System Time Series Working Group and 1 of 3 proposed for the Southern Ocean. Platform 1 focuses on marine

meteorology and delivers measurements which are necessary for computing air-sea fluxes of heat, momentum and mass. Platform 2 is the so called ACE/CMAR PULSE mooring previously deployed to observe the ocean carbon cycle and phytoplankton productivity. Its capability will be enhanced to enable collection of a wider range of parameters to assess biogeochemical and carbon cycling. Platform 3 is a Tethered Profiler based on the APEX float that measures high resolution vertical profiles of ocean temperature, salinity, fluorescence, turbidity, and oxygen.

Highlights:

- Woods Hole Oceanographic Institute (WHOI) agreed to design and build platform 1
- WHOI performed basic design analysis for platform 1

Difficulties

- Increase in platform 1 construction quote made reconsideration of the budget necessary. There will not be sufficient funding for a replacement if the first deployment is lost due to the harsh environment. Insurance will be arranged.
- Platform 2 is being re-designed after a partial loss of gear in last year's (pre-IMOS) deployment

Progress

- Developed requirements for platform 1, including a base set of weather observations and potential enhancements if resources permit
- Agreed with WHOI on a general design for platform 1

1.4 Australian National Facility for Ocean Gliders (ANFOG)

Objective:

Gliders are a new technology capable of operating over extended regions and time frames including transects of up to a 1000km and vertical profiling to 2000 m. It is proposed to invest in 10 gliders collectively capable of operating in both shelf/slope waters and in the open ocean. The objective of this facility is firstly to build the capability (capacity and skills) in Australia to use this new technology. In the context of IMOS the scientific objective is to contribute to studies of the interaction between major boundary currents (e.g. Leeuwin Current, East Australia Current) and biophysical structure over the continental slopes and shelves.

Highlights:

- A glider purchased by UWA for its own (non-IMOS) activity was tested and successfully operated off Perth and Dampier.
- Software for tracking glider operation and data at the ANFOG headquarters was developed.

Difficulties:

- The use of ocean gliders is rapidly expanding all over the world. One of the difficulties is that both manufacturers have a large backlog of orders and there is uncertainty as to how quickly our orders will be filled.
- Recruitment of a technician to run the program needs to be initiated as soon as

possible to get a person with the necessary high level of marine technical skills.

Progress:

- The ANFOG Facility has been established at the University of Western Australia.
- Orders have been placed for three Webb Research Slocum gliders (max depth 200m) and six University of Washington Seagliders (max depth 1000m).
- A program for training the new technician and building capability to use this new technology has been outlined.

1.5 Autonomous Underwater Vehicle Facility (AUV)

Objective:

The ability to conduct geo-referenced, high resolution, repeatable surveys of marine habitats – particularly those beyond diver depths – is a potentially key contribution to studies of the marine environment and ecosystems. The objective of this facility is to provide operational support for an AUV owned by Australian Centre for Field Robotics (part of the ARC Centre of Excellence for Autonomous Systems, University of Sydney). The AUV is equipped with a high resolution stereo camera with synchronized strobes, a mechanically scanned, low frequency terrain-aiding sonar, Doppler Velocity Log (DVL) including a compass with integrated roll and pitch sensors, Ultra Short Baseline Acoustic Positioning System (USBL), CTD and a forward looking obstacle avoidance sonar. IMOS funds will be used to offset the costs of vehicle operations, maintenance and transport costs together with the integration of additional sensor payloads. These sensors will include a multibeam sonar, inertial navigation unit, fluorometers (chlorophyll-a, CDOM, etc.), backscatter sensors for turbidity (470, 530 and 660nm wavelengths), dissolved oxygen, methane and other sensors to support the requirements of the proposed vehicle deployments. This relatively small investment marks the aspiration to have a national AUV facility in a future round of NCRIS.

Highlights:

- Securing of a Sesqui Major Equipment Grant for the purchase of a swath mapping system to be fitted to the AUV *Sirius*
- Commissioning of multi-beam sonar on DSTO vessel M/V Kimbla, which will support future applications of the AUV.

Difficulties:

- Lead times for sensor purchases may delay integration of the new capability into the upcoming applications of the AUV.

Progress:

- The AUV Facility has been established at the University of Sydney's Australian Centre for Field Robotics, part of the ARC Centre of Excellence for Autonomous Systems.
- Ship time and funding for AUV deployments was committed for a total of approximately three weeks of AUV time in the water including:
 - AIMS WA funding secured for 2 week cruise at Ningaloo WA, May 2007
 - JCU James Kirby funding for 4 day cruise on GBR
 - Southern Surveyor cruise confirmed for 3 week cruise between Cairns

and McKay, Sept 2007

1.6 Australian National Mooring Network

Objective:

The Australian National Ocean Mooring Network will comprise a series of national long term reference stations and a series of regional moorings designed to monitor particular oceanographic phenomena in coastal ocean waters and their long term variability. The Facility comprises a number of Sub-facilities coordinated at a national scale with ownership and operation being distributed.

For the Reference Stations the investment will extend the number of long term time series observations in Australian coastal waters in terms of variables recorded both in their temporal distribution and geographical extent. It will also provide for biological, physical and chemical sampling and for 'ground truth' of remotely sensed observations. Currently there are only 3 long term reference stations and these would be extended to 9 distributed around the continent. The reference stations will provide a baseline for monitoring the marine environment and ecosystems, understanding climate impacts and documenting long term change.

The regional moorings will monitor the interaction between boundary currents and water masses on the shelf and their consequent impact upon ocean productivity (e.g. Perth Canyon Upwelling; Kangaroo Island Upwelling) and ecosystem distribution and resilience (e.g. Coral Sea interaction with the Great Barrier Reef, impact of the East Australia Current on the shelf environment).

Highlights:

- Sub-facility Annual Business Plans were developed and incorporated within the general plan for the national network. Governance within each regional sub-facility was addressed.

Difficulties:

- Long lead times on the supply of oceanographic equipment (90 days or more) will be a constant difficulty during all procurement phases of this project.
- Some sub-facilities are starting from a low base of technical skill. It will take time to build capacity through recruitment and training.
- Some personnel may need to be attracted from overseas, which could increase the delay to start up. This low base in some regions concerns the full range of mooring activity—personnel, experience at sea, IT and data management.

Progress:

The Facility Leader has engaged the sub-facilities in numerous discussions by email and in one-on-one meetings. A telephone hook-up bringing together all the main players in the National Network took place on 16 May. The main outcome agreed at this meeting was to decide on an appropriate level of national homogeneity in the moorings. A higher level of homogeneity is required for the National Reference stations as opposed to the regional moorings for specific applications (e.g. impact of a particular current on the regional ecosystem.) Goals for 2007/08 agreed at the meeting are given below.

Activity in the regional sub-facilities:

New South Wales—SIMS has appointed an IMOS administrative assistant as a co-investment supported by SIMS to support the moorings and acoustic tracking components of IMOS. The regional community has experienced difficulty in determining the optimum mooring deployment array in the face of many interested parties and scientific interests.

Queensland: AIMS has placed a purchase order for a significant portion of the slope moorings equipment prior to receiving IMOS funding.

South Australia: SARDI vessel Ngerin identified as capable of supporting South Australia moorings.

Western Australia: WAMSI adopted WAIMOS as an element of its structure. The CSIRO Coastal research vessel has been modified to service coastal moorings. Western Australia Fisheries have provided additional support for deployment of moorings further afield along the WA coastline. After considerable discussion the community agreed on a new mooring plan that extends spatial coverage by using a number of thermistor chains (which cost less than current meters) and not attempting to measure currents at every site.

Goals for 2007/08 agreed at the 16 May hook-up:

The primary goal this year is to carry out the first steps in a staged implementation of an array of in-situ measurements of key physical and biogeochemical parameters around Australia as an Australian National Moorings Network, centrally coordinated, but operated as a series of regional sub-facilities making use of localised infrastructure for deployment and support. Each sub-facility will deploy a fraction of their planned moorings during 2007/08. Capacity building is essential in some sub-facilities.

Developing the capability for data management and transfer of data to eMII has a high priority in this first stage. The adoption of common standards for calibration, quality control and data delivery across the sub-facilities also has a high priority.

Steps need to be taken to raise the profile of the regional moorings in the IMOS nodes to engage users. We have to promote the mooring array as a tool to address problems that are national in scope.

1.7 Australian Coastal Ocean Radar Network (ACORN)

Objective:

HF radar provides unprecedented time-resolved surface current maps over the monitoring sites for physical and biological ocean research.

Highlights:

- The first HF radar station at Tannum Sands was installed in late March.
- The twin for the Tannum Sands station is the one at Lady Elliot Island and the supply-barge delivered the gear on 15 May. Landing the heavy gear on the beach in significant surf was eventful.
- SARDI confirmed a co-investment of \$500,000 from the South Australia Government to partially support an installation in that State.

Difficulties:

A potential difficulty is delay in ACMA radio licence approval for the installations in Western Australia and South Australia. The time from the first application to the ultimate granting of the licence has been as long as 18 months in the past. This is not satisfactory and the ACORN Leader is negotiating with ACMA for a more expedient process. Start-up delays in the project may impact on this Business Plan to 30 June 2008. The Plan assumes start-up at 1 Feb 2007.

The recent fire and damage to the University of Queensland's marine facility is not likely to cause substantial delays.

Progress:

The ACORN Facility has been established at James Cook University. Getting licenses for installation of radar is often a long process. Activity to achieve this has started. Approvals were obtained for radar installation on the Great Barrier Reef, including approval from Calliope Shire Council to site one radar at Tannum Sands; permit from Great Barrier Reef Marine Park Authority to carry out research in the Marine Park, and to operate one radar station on Lady Elliot Island; and for a radio licence from Australian Communications and Media Authority (ACMA) to operate the radio transmitters.

The first HF radar station at Tannum Sands was installed in late March. It is working but broadband phones to send real-time data downloads are not yet installed. We are now starting to address the issues of real-time data flow from a data management perspective. The station was installed on time to observe the Solomon Islands tsunami on April 2nd. Coincidentally, the Facility Leader recently submitted a paper to the International Journal of Remote Sensing, which addresses the merits of HF radar for tsunami detection at the edge of the Continental Shelf.

1.8 Australian Acoustic Tagging and Monitoring System (AATAMS)**Objective:**

Acoustic monitoring is a powerful tool for observing animals in coastal and continental shelf ecosystems with networks or cross shelf arrays (curtains) of receivers, allowing animals to be monitored over scales of 100s of metres to 100s of kilometres. An array or network consists of a series of Acoustic Receivers (Vemco VR3m) that can be left on the sea floor for up to 7 years with the ability to upload data as often as needed.

East Coast Australia: The east coast of Australia encompasses a wide range of habitats and the biota is under the major influence of the East Australia current. The facility will provide complete coverage for animals with large scale North-South migration along the East Coast.

Northwest Western Australia: AATAMS will establish an acoustic array on Ningaloo Reef within the Ningaloo Marine Park in Western Australia. It abuts the narrowest part of Australia's continental shelf. In this relatively small area there are a variety of habitats with high biodiversity, and the reef experiences seasonal pulses of productivity.

South Australia: In SA, acoustic receivers will be used to provide data that will be used to determine the nature and dynamics of two key and unique ecosystems (Kangaroo Island –Eyre Peninsula and the Bonney Coast) in relation to higher marine species foraging.

Highlights:

- A large grant \$35mCAN to support the Canadian Ocean Tracking Network was announced in February 2007. OTN will provide some of the co-investment in AATAMS.

Difficulties:

- Finding the right balance between logistic /operational needs with scientific issues has made site selection for the East Coast curtain problematic and difficult to find a consensus in the research community. A vigorous discussion continues within NSW IMOS and the AATAMS Scientific Committee.

Progress:

The AATAMS Facility has been established at SIMS and the Scientific Committee was appointed and held its first meeting in January 2007. The Facility issued a media-release in January 2007 announcing its goals and relevance to Australia. A mailing list for a potential user group has been developed.

AATAMS has developed strong international links with Ocean Tracking Network (OTN), a large-scale global initiative that comprehensively monitors ocean conditions and marine life responses in five oceans and across all seven continents. A large grant to support OTN activity was announced in February 2007. OTN will provide some of the co-investment in AATAMS.

1.9 Facility for Automated Intelligent Monitoring of Marine Systems (FAIMMS)**Objective:**

FAIMMS will deploy sensor networks to collect real-time data at the spatial and temporal scales required to understand complex marine processes, particularly those involving the interface between pelagic and benthic environments. The term 'sensor network' refers to an array of small, wirelessly interconnected sensors that collectively stream data to a central data aggregation point. Data from the sensor network will be aggregated and streamed in real-time back to a staging data centre onshore where they will be quality assured and processed for submission as conformal data to the eMII.

The key applications of the sensor network will be to:

- observe variations in heat and light around coral reefs; allowing researchers to understand the physical basis of coral bleaching,
- observe the up-welling of cold water from the Coral Sea onto the continental shelf; allowing researchers to understand the impact of up-welled nutrients on the productivity of GBR ecosystems, and
- to relate both phenomena to variability in the Coral Sea, through linked observations with other elements of GBROOS (e.g. moored arrays to monitor the dynamics of ocean currents).

Observing these processes is required to understand and model climate impacts on the GBR.

Highlights:

- Evidence that the dynamics of the Coral Sea at basin scale may set up the conditions for coral bleaching (as opposed to mechanisms involving coastal meteorology) and offers the prospect of early warning based on ocean observing (see details below).

Difficulties:

Planning to date has assumed that the first sensor network would be created at Heron Island because of its central role in several international experiments on the physical controls of coral bleaching and ocean acidification. Tragically the Heron Island Research Station was severely damaged by fire on 29 March 2007 and may be inoperable for some time. The impact of this upon the roll out of FAIMMS is unknown at this stage but does not seem critical given that the first rollout of equipment is planned for March 2008.

The deployment of equipment within the Great Barrier Reef Marine Park requires permits and approvals from GBRMPA and QPWS. This process includes engineering certification for all structures placed within the Park as well as full Environmental Management Plans for each site. A dialogue has been started with GBRMPA to ensure that any issues are identified early and that lack of permits does not delay the planned roll out in 2008.

Progress:

A series of meetings have been held with the Facility partners to look at the design of the network, the choice of sensors, and the capture of data. The outcome of this is an implementation plan that specifies equipment designs, deployment schedules and resource requirements. A workshop was held in Townsville on 11 May 2007 to fine-tune the implementation plan with the Facility partners and the IMOS Director.

Discussions have been held also with the owner operators of the four island research stations in the GBR (Heron, Lizard, One Tree, and Orpheus) about their needs and support for local sensor networks.

A design study has been started by the AIMS Engineering Facility to consider matters of performance, maintenance, and future upgrades of the main sensor platforms. A communications expert has been identified to work on data transmission with a focus on getting a service level of reliability. This includes testing the capabilities of the new Telstra NextG communications network.

AIMS Data Centre is working on a framework for QA/QC of the data that will be able to scale to the anticipated load once the system is operational. Data Gateways that provide the two way communication with the sensors have been prototyped and will be ruggedised for field deployment. Data hosting arrangements are being negotiated and tested with data being staged at JCU and QCIF before being forwarded to the eMII portal.

A microwave link between AIMS and Davies reef is operational and is being load tested to determine performance metrics. This technology may be extended to other sites in the Network (as appropriate) allowing data to be transmitted from more demanding sensors.

In the last five years, AIMS has deployed a growing array of small cheap temperature loggers at locations across and along the continental shelf in order to map geographical variations in the thermal environment and develop risk maps for future bleaching episodes. These delayed mode loggers have captured evidence of episodic cold-water intrusions that have extended across much of the continental shelf. The greatest number of such strong intrusions occurred in the winters preceding the last two mass bleaching episodes, which occur in summer when both heat and light is high. Although not conclusive yet, this suggests that the dynamics of the Coral Sea at basin scale may set up the conditions for coral bleaching (as opposed to mechanisms involving coastal meteorology) and offers the prospect of early warning based on ocean observing. This would be highly beneficial in terms of being able to optimise research investment.

In 2006/07, Far North Queensland experienced a strong wet season with large volumes of freshwater run-off discharging from rivers throughout the central GBR. The type of sensor networks being designed and installed under FAIMMS will be able to monitor such events in real-time and allow researchers to better estimate mixing rates and nutrient budgets at continental shelf scale.

1.10 eMarine Information Infrastructure (eMII)

Objective:

This activity provides the fundamental linking component to all other investments in IMOS since it is the means by which IMOS data will be accessed and distributed. It builds upon the work by the Australian Ocean Data Centre Joint Facility (AODCJF) and the BlueNet Project. AODCJF is a joint venture between six Australian Government marine data agencies – Australian Institute of Marine Science, Australian Government Antarctic Division, Bureau of Meteorology, CSIRO Marine and Atmospheric Research, Geoscience Australia and the RAN Directorate of Oceanography and Meteorology. The BlueNet project extends the AODCJF initiative by linking universities to the AODCJF virtual data facility to establish a national distributed marine science data network supporting the long term data curation requirements and data access needs of Australia's marine science researchers.

eMII will make open, free and timely IMOS data and enhanced data products available to users through the facilities of AODCJF and BlueNet.

Highlights:

- Identification of parallel software development activities with other parties has provided important opportunities for sharing of expertise.

Difficulties:

- The Oceans Portal (being developed for that National Oceans Office) requires further development if it is to meet the baseline level of functionality. It is uncertain when the Portal will be made available to the hosting-community, and for public release. Alternative arrangements have been made to upload data if the necessary functionality of the Oceans Portal is not realised in time to handle IMOS data streams.

Progress:

The first eMII planning meeting was convened in November 2006, with representation of the host-nodes, the AODCJF, other technical experts, and the eMII Chief Investigator. This meeting identified a broad-brush strategy, timelines for delivery of software infrastructure, eMII dependencies, and a plan to address delays resulting from staff changes, contractual shortfalls, and communication difficulties.

The first stage of a needs analysis has been completed. This has included circulation to node leaders of a questionnaire to ascertain datastream characteristics, processing, details of existing standards and quality control procedures, and perceived data management needs. The development of “first-cut” models of end-to-end data-flows for each IMOS data-stream is complete. Survey results will be used to revise these models, and to inform eMII future planning in relation to support, standards and guidelines development; software development and enhancement; and negotiation with stakeholders about best practice, subsequent training and support. Outcomes of this and follow-up work with each node will form the basis of the guidelines which will underpin conformance, as set out in the IMOS contract with each facility.

The AODCJF Data Standards Working Group has been established, and will determine standards for the AODN. This group has met twice, and there is regular communication and feedback between meetings.

A first stage metadata entry and search tool (MEST) specifically designed for use in the marine community has been completed, and development of the Oceans Portal continues. Listservers have been set up for eMII, and a secure website area has been established for document-sharing.

The legal office at the University of Tasmania has been consulted for advice in obtaining commitments from hosts to uphold their responsibilities as part of AODN.

Platforms for Collaboration (PfC): AODCJF / eMII have made several overtures to Rhys Francis, and several of us had a half-day meeting with Rhys in Hobart just before Christmas (19 Dec). We had a useful conversation that included ideas about generic activities that would be well within the scope for PfC but also germane to eMII / AODCJF. On behalf of eMII the Facility Leader will be presenting at the e-Research Australasia conference in Brisbane on 26 June (abstract has been accepted). This is a key meeting for development of Platforms for Collaboration.

The vision and status of eMII will also be presented at the Australian Marine Sciences Association national conference in Melbourne in July.

1.11 Satellite Remote Sensing**Objective:**

Currently there are seven L band reception stations acquiring NOAA AVHRR satellite data and four X band reception stations acquiring MODIS satellite data in Australia. The purpose of this proposal is to strengthen the existing infrastructure, improve coordination and integration of data from these stations and most importantly, to make the ocean products readily available to government agencies, researchers and the

academic community via an Australian Ocean Remote Sensing Distributed Archive and Access Centre.

Highlights:

- A meeting was held in Melbourne at the Bureau of Meteorology on the 6th of February to outline the annual business plans for the first 18 months of IMOS. After an overview by Gary Meyers, there were presentations from each sub-facility team. A CD with all the PowerPoint presentations was produced and distributed to participants and other interested people.

Difficulties:

- This will be the largest and probably most widely used IMOS data stream.

Progress:

Software development has been initiated at the Bureau of Meteorology and CSIRO for obtaining and assembling high resolution SST data and combining various sources for the production of regional maps for the High Resolution SST project.

Plans to purchase a new X-band antenna to be located at AIMS in Queensland are well underway. The Bureau of Meteorology has worked with AIMS to place a tender for a number of units and a successful tenderer (local manufacturer) has been chosen. The TERSS antenna has suffered a major failure and Geoscience Australia are purchasing new replacement motor control electronics which were budgeted for in the TERSS upgrade.

The Australia Oceans Data Archive and Access Centre (AO-DAAC) is raising considerable interest and a variety of discussions have been held with interested groups particularly in Western Australia. The technical group for the AO-DAAC has arranged to travel to WA in July/August to discuss coordination with researchers in Western Australia.

A methodology to assemble the data has been proposed for review by key players in the Facility.

Collaboration with University of Tasmania School of Computing is being developed. An undergraduate project to provide an improved user interface to satellite data served through OPeNDAP has started and looks like delivering a useful result. An Honours project will be offered to the next mid year intake of students. These projects do not use IMOS resources except in the minimal supervisory role of the students.

2. Activities to advance the Project—July 2007 to June 2008

2.0 IMOS Office and general overview

An essential activity early in the year is to finish negotiations for subcontracts with operators of the facilities and sub-facilities, if this is not completed before June 2007.

The second major activity will be collecting data and information for the Annual report, due in September 2007. This will require designing templates so that submissions from the facilities will have a uniform format that provides the information required by the IMOS Office to meet the DEST requirements. A template for quarterly financial reports on the expenditure of NCRIS funding and the realisation of co-investments will be designed. Aspects of the Governance Structure—the Implementation Panel and the Steering Committee—will be initiated to assist the IMOS Office to assemble and to assess the Annual Report. Finally, the second meeting of the IMOS Advisory Board will be convened in mid-September before the Annual Report is submitted to DEST.

A substantial effort will be devoted to promotional activities throughout the year, as discussed in section 4.

Further effort is required to develop and enhance the IMOS nodes so that they become effective channels of communication with the marine research community. Following the NCRIS vision, we also aim to change the research culture related to infrastructure development, and this will require nurturing the Nodes in the early phase of IMOS. The IMOS Director and/or the Executive Officer will attend the annual general meeting of each node. Activity of the IMOS Steering Committee will be initiated to provide the Office with assessments of the Annual Business Plans, Reports and proposals for access to moveable IMOS infrastructure.

The IMOS Implementation Panel will be established to provide the Office with periodic, technical information on the progress of IMOS field work and to prepare the Annual Business Plan for 2008/09 in the second half of the fiscal year. The process will begin with convening the second annual meeting of node and facility leaders (IMOS-2). The goal of this meeting is to review and assess the accomplishments of year 1 and outline the business plan for year 2. Again, a template needs to be designed to collect the data and information required by the IMOS Office. This process will conclude with approval of the plan at the third meeting of the IMOS Advisory Board and submission to DEST.

The IMOS Office will develop links to cross-fertilize with leading, overseas programs similar to IMOS, in particular Ocean.US (http://ocean.us/what_is_ioos) and EuroGOOS (<http://www.eurogoos.org/>). These programs were established a few years ago and will have experience that will be useful for IMOS. They now focus on operational oceanography. On the other hand IMOS has some features that may prove useful to them—namely the integrated approach combining capacity building within universities with the aim of systematic, sustained observations to support research.

In collaboration with the IMOS Office, each Facility will write a procedure for access to its infrastructure at sea following the principles in Paragraph 3.1 of the Project Plan. Access is discussed further in section 5.

Risks and risk-management will be revisited this year for some facilities.

A general overview of activity to implement observations is presented in Figures 3 a, b & c. The tentative deployments to be achieved by June 2008 or early the following fiscal year as outlined at the first IMOS meeting of Node and Facility Leaders (IMOS-1) are presented in the following maps. The bluewater network is shown in Fig. 3a. The priority for Argo deployments is in the Coral and Tasman Seas where the present-day array is weak. Ship of opportunity instruments will be installed on several merchant shipping lines and on three research vessels. Activity in the coastal mooring facility (facility 6) is shown in Figure 3b. The mooring locations are only indicative of the general region. The exact locations of moorings will be decided after a careful site selection analysis. Activity in the other coastal Facilities 4, 5, 7, 8, 9, 10, and 11 is represented in Figure 3c. These maps give a visual image of the likely status of IMOS in the second half of 2008.

Figure 3a

Tentative IMOS Bluewater Deployment/Observation plan out to June 2008.

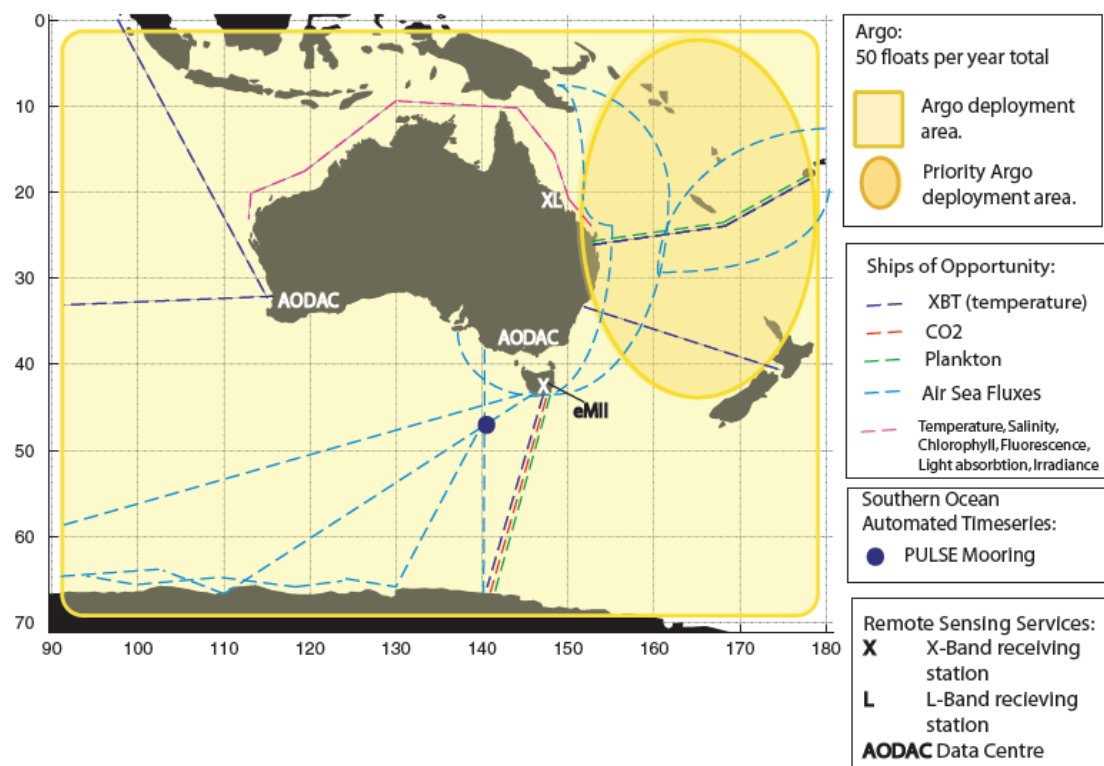


Figure 3b

Tentative IMOS Moorings Deployment Plan - out to June 2008

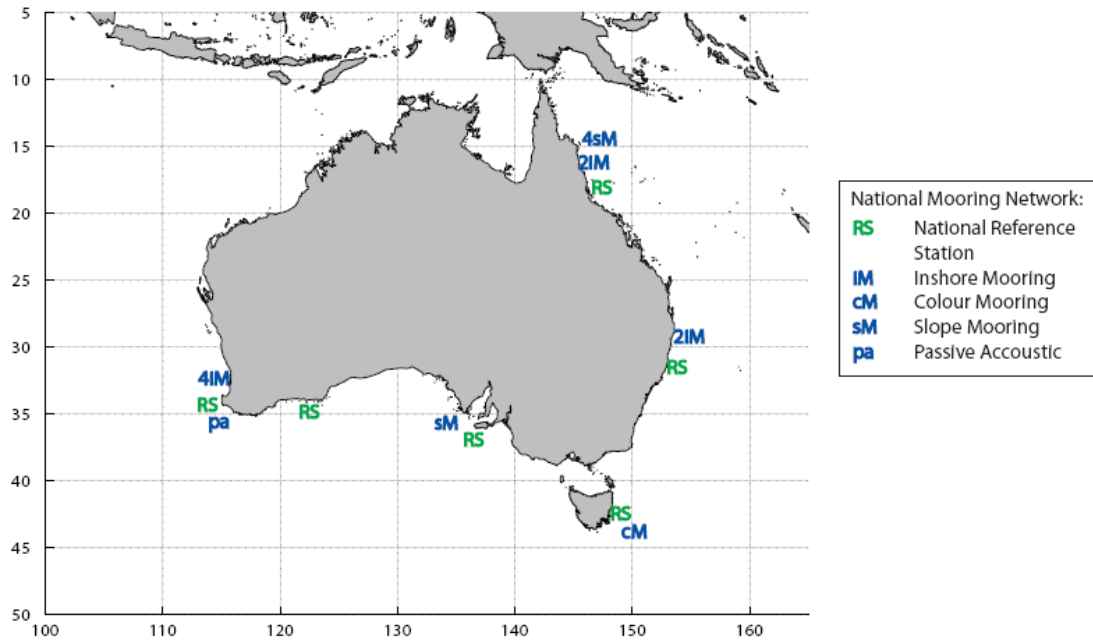
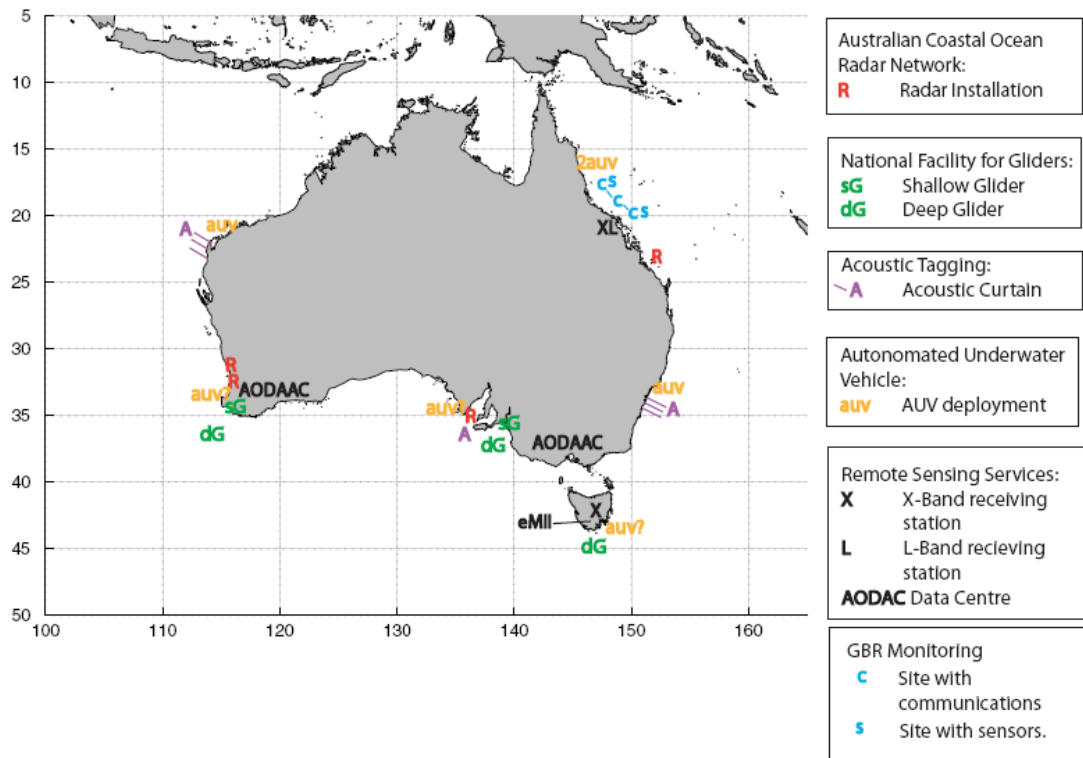


Figure 3c

Tentative IMOS Coastal Deployment Plan - out to June 2008



Details of the activities in each Facility are given in the following paragraphs.

2.1 Argo Australia

- with partners, purchase 50 Argo floats, perform laboratory checks on floats, re-battery and prepare for deployment
- by liaising with the shipping industry, navy and overseas research agencies, organise float deployments in oceans around Australia, targeting current and future gaps (where floats are aging)
- publish all Argo data in real time on the internet at the Argo Global Data Assembly Centers, on the WMO's Global Telecommunication System and when it is enabled, the ocean data portal provided by eMII.
- continue to increase the portion of Australian Argo data that has undergone delayed-mode data processing and deliver these profiles to international data centres and eMII.
- Host the International Argo Data Management Team meeting in Hobart

2.2. Enhanced Measurements from Ships of Opportunity

Multidisciplinary Underway Network

- Purchase and testing of XBT recorder, data telecommunication units, 2 pCO₂ systems with biogeochemistry sensors, 2 continuous plankton recorders (CPR), supporting hardware for all installations, custom microscope for CPR analysis
- Develop new software for real-time telecommunication of XBT data via Iridium
- Train 2 technicians for work at sea
- Plan data processing and submission to eMII

Sensors on Tropical Research Vessels

- Design, purchase and test underway data logging systems
- Plan data processing and submission to eMII

Sea Surface Temperature Sensors

- Design, purchase, test and calibrate hull-mounted sensor packages and a thermosalinograph
- Construct calibration tank
- Develop software for real-time data transmission via the existing Bureau Automatic Weather Station system on vessels in the Australian Volunteer Observing Fleet
- Negotiate agreements with shipping company for installations
- Install and test the system on one vessel
- Test thermosalinograph on Heron Island Ferry and new telecommunication system on Rottneest Island Ferry
- Plan data processing and submission to eMII

Research Vessel Real-Time Air-Sea Fluxes

- Purchase, install, and test meteorological instruments on Research Vessels Southern Surveyor and Aurora Australis
- Plan telecommunication system for sending data from ships to the Bureau of Meteorology
- Employ data management - product development staff at BMRC
- Plan data processing and submission to eMII
- Coordinate IMOS activity with the international Shipboard Automated Meteorological and Oceanographic System (SAMOS) to conform with international standards of data standards and formats.

2.3 Southern Ocean Automated Time Series

- The University of Tasmania and Bureau of Meteorology will be co-Principal Operators of this Facility and CSIRO will be an Associate Operator; mechanisms to ensure seamless coordination will be established.
- Complete design of meteorological mooring
- WHOI to commence building meteorological mooring
- Purchase instruments for enhancement of biogeochemical PULSE mooring
- Deploy the enhanced biogeochemical PULSE mooring
- Deploy tethered profiler depending on test results
- Liaise with the international mooring program OceanSITES to coordinate international standards of data formats
- Employ fractional time staff
 - Facility manager/support at CMAR
 - Mooring design engineer at CMAR
 - Mooring construction technician at CMAR
 - Mooring deployment technician at UTAS
- Develop real-time data management, QA and flux product systems

2.4 Australian National Facility for Ocean Gliders

- Order 12 ocean gliders to include a mix of shallow (to 200m) and deep (to 1000m) capability.
- Set-up a laboratory for glider calibration and preparation for deployment
- Establish a telecommunication system to bring glider data to the facility at UWA through satellite communications and telephone lines
- Establish access to glider-data through a web portal at UWA for real time display of data
- Build capability (skills, capacity, management-structure) with trial deployments of a Slocum (inshore)/Seaglider (offshore) pair in Western Australia off Perth, a pair in South Australia (off Adelaide) and a Seaglider in Tasmania (off Hobart)
- Establish protocols for quality control and assurance of glider-data and the provision of calibrated data to eMII.

2.5 Autonomous Underwater Vehicle Facility

- Design and purchase of the sensors for enhancement of AUV capability, in consultation with the marine research community
- Integration of new sensors into the AUV data systems and trials at sea
- Establish protocols for quality control and assurance of AUV-data and the provision of research-quality data to eMII.

2.6 Australian National Mooring Network

- Completion of contract between CSIRO and the University of Tasmania for the establishment and coordination of the Australian National Moorings Network.
- Completion of contracts between the sub-facility host organisations [operators] and the University of Tasmania for the establishment of the Australian National Moorings Network regional elements.
- Advertise and appoint a National Moorings Coordinator at CMAR and staff in the sub facility host organisations around Australia.

- Establish common practices across sub-facilities.
- Establish analysis methods and outputs for physical samples.
- Establish logistics of physical sample transport for national reference stations
- Where moorings are likely to be deployed near popular fishing areas community liaison will be engaged upon, once personnel are employed.
- Establish data portal linked to eMII for data managed at a national level and determine commonality of formats for data managed by the sub-facilities.
- Design and build initial National Reference Station for deployment at Maria Island.
- Procure and deploy Temperate Coastal Ocean Colour Reference Instruments.
- Deploy moorings in the regions as detailed in section 8 (Milestones).

2.7 Australian Coastal Ocean Radar Network

- Install GBR radar system:
The first HF radar in the ACORN Network was installed at Tannum Sands in March 2007 and Lady Elliot Island is scheduled to be installed in June 2007 to cover the GBROOS area. Agreement for costs and logistics at Lady Elliot Island is yet to be finalised.
- Install radar system in South Australia:
Site selection has commenced in South Australia for a 2-station system to be installed in February 2008 in the SAIMOS Node area off Kangaroo Island and the Eyre Peninsula.
- Install radar systems in WA
One 3-station system will be installed by June 2008 between Perth and Jurien Bay, and a 2-station system near Rottnest Island in the WAIMOS Node area
- Plan data processing and submission to eMII.

The Roll-out Plan to 30 June 2008 is summarised in the following table, with items beyond that date under discussion and subject to proposal and review.

Item	July06-June07	July07-June08	July08-June09	July09-June10	July10-June11
WERA LR GBR(LIEF)	GBR Heron150km				
WERA LR		SA 200km Kangaroo			
WERA MR		WA Rotto100km		NSW Coffs	
CODAR LR (3)		WA Perth Jurien150km		SA Bonney	
CODAR MR			NSW 100km Sydney		
WERA LR			TAS East 150km		GBR Lizard

2.8 Australian Acoustic Tagging and Monitoring System

- Continue to build and formalise links with OTN, including site selection and availability of non-IMOS data
- Establishment of AATAMS Scientific Committee and subcommittees

- Recruitment and training of the AATAMS Technical Officer
- Site selection and approvals from State Agencies
- Plan data processing and submission to eMII

2.9 Facility for Automated Intelligent Monitoring of Marine Systems

- On-going meetings with the science and technology partners to fine tune the technology packages, deployment details and the deployment schedule;
- Use of a communications consultant to verify and fine-tune some of the inter-reef communications systems;
- Field trials of base equipment at AIMS including data gateways, instrument packages and sensors;
- Development of position descriptions for personnel to be employed - people will be appointed as per the project plan once a contract is in place;
- Site surveys to determine the location of the major components such as communication links and spar-buoys;
- Discussions with GBRMPA to progress the development of documentation to support the permit applications required to deploy the equipment;
- Development of draft work plans for the next financial year including detailed internal budgets and resource allocations;
- Development and testing of data processing infrastructure and link to eMII.

2.10 eMarine Information Infrastructure

- eMII project staff will liaise directly with IMOS Nodes and Facilities as well as with the IMOS Office to ensure arrangements are in place to deliver facility data streams consistent with the IMOS aims and eMII plans, approach, timelines, standards, services, and the AODN vision.
- Continued meetings of the eMII planning group (which will morph into a more formal eMII Implementation Group), Data Standards Working Group, and expert sub-groups. Establishment of the eMII Coordination Committee, and a Technical Infrastructure Working Group to further define, document and communicate data standards and flows for particular IMOS nodes, oversee technical developments, and guide the planning and delivery of eMII.
- Finalise first-pass baseline data management guidelines for inclusion in IMOS contracts;
- Continue to review and finetune data management guidelines.
- Develop communications strategy, and commence more in-depth outreach to Nodes and Facilities.
- Further development of the MEST, and metadata guidelines, to facilitate ease of use and re-use, for specific data streams.
- Further involvement of the development of the Oceans Portal through consultation with the software developers, the National Oceans Office, and in-house developers.
- Development of agreements, between the members of the AODCJF and TPAC as AODN host-nodes for best practice curation and web-services delivery for IMOS data.
- Development of agreements between eMII and other IMOS nodes detailing the data quality, metadata, storage and recovery requirements.
- Appointment of eMII project office staff, and support staff for the development and management of data integration, framework and schemas. Other staff

members will be appointed as required.

2.11 Satellite Remote Sensing

Australian Satellite SST L2P products

- Recruit staff at Bureau of Meteorology for product development, quality control, data processing and management.
- Purchase computing equipment
- Modify the present low resolution SST processing systems at Bureau of Meteorology and CSIRO to be compatible and to produce high resolution SST fields around Australia from the ground stations at 7 locations: Darwin, Perth, Casey Station, Alice Springs, Townsville, Melbourne and Hobart.
- Develop software for transmission of SST products to eMII

Australian Ocean Remote Sensing Data Distributed Archive and Access Centre

- Review the utility of technologies available at CSIRO and University of Tasmania (e.g. data base search tools, metadata tools, file format tools)
- Document to specify the requirements for access to satellite data and the services that will be provided
- Document on standards for data and metadata
- Develop a data base schema
- Test the system in the operational environment at the Bureau of Meteorology
- Coordinate access to data with eMII

Upgrade of Hobart and Townsville Ground Stations

- Purchase and test the operation of new X-band antenna system for installation at AIMS
- Purchase parts and upgrade TERSS (Geoscience Australia)—refurbish gear box, replace interface cards and install new demodulator

3. Governance and management arrangements

The Governance Framework for IMOS is essentially a partnership between particular institutions for the delivery of marine observing infrastructure on behalf of the marine community with each institution agreeing to a particular role.

Nationally the program is managed and coordinated by the IMOS Office established and operated by the University of Tasmania which contracts with the Department of Education, Science and Technology (DEST) for the implementation of IMOS. In turn, the University of Tasmania through the IMOS Office is entering into IMOS sub-contracts with particular institutions (termed Operators) for the ownership and operation of the infrastructure (termed Facilities and Sub Facilities) under the terms and conditions of this header Funding Agreement with DEST. The IMOS Office operates with the advice and agreement of an Advisory Board which has an Independent Chair appointed by the University of Tasmania in consultation with the Operators. The Board Members are appointed in consultation with the marine community through the Nodes as individuals for their outstanding abilities to guide the project. The Board must approve the Annual Business Plan and the Annual Report each year.

Each Facility will submit an Annual Business Plan and an Annual Report each year, under direction of the Facility Leader with assistance from sub-facilities. The IMOS

Office will assemble the Annual Business Plan for submission to DEST, with assistance from the IMOS Implementation Panel, made up of three Facility Leaders (representing blue water, coastal physical and coastal biological activities).

The marine community has formed Nodes representing blue water activity, Queensland, New South Wales, South Australia and Western Australia. The Nodes will have a formal structure as defined in a paper entitled: IMOS Regional Nodes—Terms of Reference. The Nodes provide the scientific rationale and research goals for ocean observing. The Node Leaders, the Leader of eMII and the Director form the IMOS Steering Committee. The Steering Committee assists the IMOS Office in assessments of Annual Business Plans, Annual Reports, proposals for access to IMOS Infrastructure and the scientific merit of research and publications based on IMOS data, before these matters are taken to the Advisory Board for approval.

4. Promotion of the Project

Promotion within IMOS and to the larger marine community will be in part through Newsletters, approximately bi-monthly, and upgrading the IMOS website. Each Facility will establish a website, linked to the IMOS website, showing the existing deployments, planned deployments and overview of the available data-streams. In due course the websites may include lists of research projects using the data and, in the case of new or unfamiliar technology, a tutorial on how to use data from the facility.

An annual IMOS Symposium will be held in alternate years at the annual meetings of the Australian Marine Science Association (AMSA) and the Australian Meteorology and Oceanography Society (AMOS). Since this is the first full year of IMOS, symposia will be held at both AMSA2007 in July 2007 and at the 15th AMOS Conference in February 2008. Presentations on IMOS will be given at various other national and international conferences including the International Union of Geodesy and Geophysics (which will have special sessions on earth-observation on this occasion).

One or more IMOS leaders will also give presentations at:

- Australian Meteorology and Oceanographic Society
- Australian Marine Science Association
- Coasts and Ports Conference
- CLIVAR/GOOS Indian Ocean Panel
- International Union of Geodesy and Geophysics
- International Radio Oceanography Workshop,

and other opportunities as they arise

A critical activity this year is to revise and enhance the Communication Strategy and Plan. In addition to communication with the marine research community described above, it is essential to develop the pathway to high level promotions that will be required for sustaining IMOS into the long term. A document entitled IMOS Communication Strategy and Plan will be prepared in consultation with the communication departments at the University of Tasmania, CSIRO Marine and Atmospheric Research, Australian Institute of Marine Science and other contributors to IMOS.

5. Access and pricing

It is the intent of IMOS that all data and data-products produced under auspices of IMOS will be provided to the marine community, and that the eMarine Information Infrastructure (eMII) will provide free and timely access to the data and data products. (Note that fast tracked access to data in the early stages of IMOS may incur a processing fee.) Some IMOS data such as Argo will be widely available through other data portals.

Access to IMOS infrastructure deployed at sea may be an opportunity for both merit-based and other projects. For example, an ARC project may find it advantageous to put special sensors on one of the IMOS coastal moorings or on a ship of opportunity. Some of the moveable infrastructure (ocean gliders and the AUV for example) is not committed for the duration of IMOS. Access to the moveable infrastructure may also be an opportunity to support research. The sensor network on the Great Barrier Reef is an opportunity for regional researchers.

Access to IMOS infrastructure is by proposal, following the principles and procedures in article 3.1 of the IMOS Project Plan. The IMOS Office will prepare a document giving the procedure for making a proposal and the criteria for assessment. Proposals should be submitted through the appropriate IMOS Node. Proposals will be assessed by the IMOS Steering Committee and a decision made by the IMOS Office. Proposals from merit-based projects and non-merit-based projects will be treated in the same way, although the level of peer-review will be one of the assessment criteria. Other potential criteria for evaluation are: (1) availability of co-investment to support the enhancement of IMOS infrastructure (2) sustainability of the sampling program in the long term (3) consistency with IMOS objectives and principles (4) scientific merit of the proposed applications of data (5) attractiveness to the research community (e.g. the likely number of data-users).

Some Facilities may establish a user group this year. User groups can make recommendations to the IMOS Steering Committee concerning access.

ACORN has nominated the following members:

- Mal Heron mal.heron@jcu.edu.au
- John Middleton middleton.john@saugov.sa.gov.au
- Chari Pattiaratchi chari.pattiaratchi@uwa.edu.au
- Moninya Roughan mroughan@unsw.edu.au
- Stuart Anderson Stuart.Anderson@dsto.defence.gov.au
- Richard Coleman Richard.coleman@utas.edu.au
- Simon Allen simon.allen@csiro.au
- Gary Meyers gary.meyers@imos.org.au

AATAMS has nominated:

- SIMS (Rob Harcourt, Iain Suthers, Vic Peddemors, David Booth),
- DPI NSW (Steve Kennelly and Nick Otway),
- DPI Victoria (Jeremy Hindell),
- University of Tasmania (George Jackson and Jayson Semmens),
- CSIRO (Barry Bruce),
- SARDI (Simon Goldsworthy) and AIMS (Mark Meekan)

- Ron O'Dor (Census of Marine Life and OTN)

The Australian National Mooring Network and FAIMMS have also nominated user groups (names not available at the time of writing).

The AUV is a special case in IMOS because it is largely supported by other sources of funding. In this case the IMOS Office will make a recommendation on any proposal for access to the AUV to the AUV scientific committee.

6. Staffing and Financial Projections

6.0 IMOS Office and general overview

Table 1 summarises the allocation of NCRIS funds for the IMOS Office and each Facility and Operator the period of this Annual Business Plan.

Table 1 – Allocation of NCRIS resources for the 2007/2008 financial year (\$million)

Facility	Operator	Capital	Operating	Personnel	Total
01 Argo Australia	CSIRO	0.420	0.376	0.068	0.864
01 Total		0.420	0.376	0.068	0.864
02 Enhanced Measurements from Ships of Opportunity	AIMS		0.024		0.024
	BoM	0.096	0.076		0.172
	CSIRO	0.096	0.620		0.716
02 Total		0.192	0.720		0.912
03 Southern Ocean Automated Time Series Observations	BoM	0.545	0.002		0.547
	CSIRO		0.041	0.205	0.246
	UTAS	0.412	0.025	0.085	0.522
03 Total		0.957	0.068	0.290	1.315
04 Australian National Facility for Ocean Gliders	UWA	0.750	0.220	0.305	1.275
04 Total		0.750	0.220	0.305	1.275
05 Autonomous Underwater Vehicle Facility	SIMS	0.075	0.095	0.075	0.245
05 Total		0.075	0.095	0.075	0.245
06 Australian National Mooring Network	AIMS	0.416	0.195	0.052	0.663
	CSIRO	0.920	0.494	0.210	1.624
	Curtin	0.175	0.020		0.195
	SARDI	1.140	0.081	0.136	1.357
	SIMS	0.480	0.096	0.150	0.726
06 Total		3.131	0.886	0.548	4.565
07 Australian Coastal Ocean Radar Network	JCU	2.147	0.093	0.357	2.597
07 Total		2.147	0.093	0.357	2.597
08 Australian Acoustic Tagging and Monitoring System	SIMS	0.025	0.200		0.225
08 Total		0.025	0.200		0.225
09 Facility for Automated Intelligent Monitoring of Marine Systems	AIMS	0.287	0.126		0.413
09 Total		0.287	0.126		0.413
10 eMarine Information Infrastructure	UTAS		1.375		1.375
10 Total			1.375		1.375
11 Satellite Remote Sensing	AIMS	0.190	0.047		0.237
	BoM	0.026	0.020	0.170	0.216
	CSIRO	0.123	0.015	0.165	0.303
	GA	0.150			0.150
11 Total		0.489	0.082	0.335	0.906
12 IMOS Office	UTAS			0.241	0.241
12 Total				0.241	0.241
Grand Total		8.473	4.241	2.219	14.933

PLEASE NOTE: In relation to the above NCRIS budget, and also the more detailed budgets provided for the IMOS Office and each Facility below, that at the time of preparing this Annual Business Plan, the overriding contract between DEST and the University of Tasmania was being finalised. During this period many of the Operators and Organisations involved with IMOS have been underwriting expenses in the expectation that these will be funded when NCRIS funding is received. The delay in completing the contractual side of establishing IMOS is likely to lead to a large unspent balance in the 2006/2007 funding, which will carry forward into the 2007/2008 financial year. The quantum of this carry forward will not be known until the 2006/2007 Annual Report is prepared, at which time approval will be sought from DEST to carry forward 2006/2007 unspent funding into the 2007/2008 financial year.

The table below shows a more detailed breakdown of resources for the IMOS Office (similar detailed budgets are shown for each facility below).

Budget Summary for the IMOS Office for 2007/2008 (\$million):

Operator	Type	Organisation	Nature	Total
UTAS	Cash	NCRIS	Personnel	0.241
	Cash Total			0.241
	Coinvest	DED	Operating	0.138
		UTAS	Operating	0.005
			Personnel	0.120
	Coinvest Total			0.263
	Inkind	UTAS	Oper/Cap/Pers	0.139
	Inkind Total			0.139
			TOTAL	0.643

Staffing for the IMOS Office in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
Director	Gary Meyers	0.5 FTE	UTAS
Executive Officer	Jo Neilson	1.0 FTE	UTAS
Executive Assistant	Jeanette Harris	1.0 FTE	UTAS
Technical Director	Simon Allen	0.2 FTE	CSIRO
Technicians	Various (CSIRO)	0.5 – 0.75 FTE	CSIRO
	TOTAL	3.2 – 3.45 FTE	

6.1 Argo Australia

Budget summary for Argo Australia for 2007/2008 (\$million):

Operator	Type	Organisation	Nature	Total
CMAR	Cash	NCRIS	Capital	0.420
			Operating	0.376
			Personnel	0.068
	Cash Total			0.864
	Coinvest	ACECRC	Capital	0.310
			BoM	0.100
			CSIRO	0.220
	Coinvest Total			0.630
	Inkind	ACCSP	Personnel	0.300
			ACECRC	0.150
			BoM	0.050

Operator	Type	Organisation	Nature	Total
		RAN	Capital	0.010
Inkind Total			0.510	
TOTAL			2.004	

Staffing for Argo Australia in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
Scientist in Charge of Operations	Ann Thresher	0.5 FTE	CSIRO
Float Engineer	Vito Dirita	1.0 FTE	CSIRO
Float Technician	Bob Weldon	0.75 FTE	CSIRO
Delayed-mode data QC	Tseviet Tchen	0.5 FTE	CSIRO
Delayed-mode data QC	Esmee Van Wijk	1.0 FTE	ACECRC
TOTAL		3.75 FTE	

6.2 Enhanced Measurements from Ships of Opportunity

Budget summary (by sub-facility) for Enhanced Measurements from Ships of Opportunity for 2007/2008 (\$million):

Sub-Facility	Operator	Type	Organisation	Nature	Total		
2a Multidisciplinary Underway Network	CMAR	Cash	NCRIS	Capital	0.096		
				Operating	0.620		
		Cash Total					0.716
		Coinvest	ACECRC			Oper/Cap/Pers	0.154
						Operating	0.038
						Capital	0.530
						Operating	0.250
		Coinvest Total					0.972
		Inkind	ACCSP			Operating	0.680
						AGAD	Oper/Cap/Pers
Inkind Total					0.785		
2a Multidisciplinary Underway Network Total					2.473		
2b Sensors on Tropical Research Vessels	AIMS	Cash	NCRIS	Operating	0.024		
				Cash Total			
		Inkind	AIMS			Oper/Cap/Pers	0.070
						Inkind Total	
2b Sensors on Tropical Research Vessels Total					0.094		
2c Sea Surface Temperature Sensors	BoM	Cash	NCRIS	Capital	0.086		
				Operating	0.039		
		Cash Total					0.125
		Inkind	AIMS			Oper/Cap/Pers	0.005
						BoM	Oper/Cap/Pers
Inkind Total					0.052		
2c Sea Surface Temperature Sensors Total					0.177		

Sub-Facility	Operator	Type	Organisation	Nature	Total	
2d Research Vessel Real Time Air-Sea Flux	BoM	Cash	NCRIS	Capital Operating	0.010 0.037	
		Cash Total				0.047
		Coinvest	AGAD	Operating	0.001	
		Coinvest Total				0.001
		Inkind	BoM	Personnel	0.028	
			MNF	Personnel	0.004	
		Inkind Total				0.032
2d Research Vessel Real Time Air-Sea Flux Total					0.080	
TOTAL					2.824	

Staffing for Enhanced Measurements from Ships of Opportunity in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
<i>2a Multidisciplinary Underway Network</i>			
Reading CPR silk rolls	CSOF2	2.0 FTE	CSIRO
XBT	CSOF4	0.5 FTE	CSIRO
BGC	CSOF4	0.5 FTE	CSIRO
<i>2a sub-total</i>		<i>3.0 FTE</i>	
<i>2c Sea Surface Temperature Sensors Total</i>			
Hardware/software design and construction	APS6	0.25 FTE	BoM
Real-time data management and quality assurance	APS 6	0.1 FTE	BoM
Assessment of data quality	AOF 4	0.15 FTE	AIMS
Resources for equipment maintenance on two vessels		As needed	AIMS
Resources for assessment of data quality		As needed	CMAR
Resources for maintenance of equipment on one vessel		As needed	CMAR
<i>2b sub-total</i>		<i>1.4 FTE</i>	<i>Plus additional resources as detailed above</i>
<i>2d Research Vessel Real Time Air-Sea Flux</i>			
Real-time data management and product development staff	APS 6	0.25 FTE	BoM
<i>2d sub-total</i>		<i>0.25 FTE</i>	
		TOTAL	4.65 FTE

6.3 Southern Ocean Time Series

Budget summary for Southern Ocean Automated Time Series Observations for 2007/2008 (\$million):

Operator	Type	Organisation	Nature	Total	
BoM	Cash	NCRIS	Capital	0.545	
			Operating	0.002	
	Cash Total			0.547	
	Inkind	BoM	Personnel	0.030	
Inkind Total			0.030		
CMAR	Cash	NCRIS	Operating	0.041	
			Personnel	0.205	
Cash Total			0.246		
UTAS	Cash	NCRIS	Capital	0.412	
			Operating	0.025	
			Personnel	0.085	
	Cash Total			0.522	
	Coinvest	ACECRC	Operating	0.108	
	Coinvest Total			0.108	
	Inkind	ACECRC/AGAD	Operating	0.170	
			CSIRO	Personnel	0.070
			MNF	Operating	0.495
UTAS			Personnel	0.032	
Inkind Total			0.767		
TOTAL			2.220		

Staffing for Southern Ocean Automated Time Series Observations in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
Facility Manager and support role	CSOF6	0.25 FTE	CSIRO
Mooring Design Engineer	CSOF6	1.0 FTE	CSIRO
Mooring Construction Technician	CSOF4	0.25 FTE	CSIRO
Mooring Deployment Technician	HEO7	0.25 FTE	UTAS
	TOTAL	1.75 FTE	

6.4 Australian National Facility for Ocean Gliders

Budget summary for Australian National Facility for Ocean Gliders for 2007/2008 (\$million):

Operator	Type	Organisation	Nature	Total
UWA	Cash	NCRIS	Capital	0.750
			Operating	0.220
			Personnel	0.305
	Cash Total			1.275
Inkind	UWA	Oper/Cap/Pers	0.138	
Inkind Total			0.138	
TOTAL			1.413	

Staffing for Australian National Facility for Ocean Gliders in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
Glider field deployment and service technician		1.0 FTE	UWA
Glider mission control and communications technician		1.0 FTE	UWA
Glider data QA/QC, calibration technician		1.0 FTE	UWA
	TOTAL	3.0 FTE	

6.5 Autonomous Underwater Vehicle Facility

Budget summary for Autonomous Underwater Vehicle Facility for 2007/2008 (\$million):

Operator	Type	Organisation	Nature	Total	
SIMS	Cash	NCRIS	Capital	0.075	
			Operating	0.095	
			Personnel	0.075	
	Cash Total				0.245
	Inkind		AIMS	Operating	
			CSIRO	Operating	0.068
			DSTO	Operating	0.050
			SIMS	Personnel	0.081
	Inkind Total				0.199
	TOTAL				0.444

Staffing for Australian Underwater Vehicle Facility in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
Operations and data management Technician		1.0 FTE	SIMS
		1.0 FTE	SIMS (inkind)
	TOTAL	2.0 FTE	

6.6 Australian National Mooring Network

Budget summary (by sub-facility) for Australian National Mooring Network for 2007/2008 (\$million):

Sub-Facility	Operator	Type	Organisation	Nature	Total	
6a Queensland and Northern Australia	AIMS	Cash	NCRIS	Capital	0.416	
				Operating	0.195	
				Personnel	0.052	
		Cash Total				0.663
		Coinvest	SDTI		Capital	0.866
					Operating	0.389
		Personnel	0.103			
Coinvest Total				1.358		
Inkind	AIMS		Operating	0.496		
			Personnel	0.066		
Inkind Total				0.562		
6a Queensland and Northern Australia Total					2.583	
6b NSW	SIMS	Cash	NCRIS	Capital	0.480	
				Operating	0.096	

Sub-Facility	Operator	Type	Organisation	Nature	Total
				Personnel	0.150
		Cash Total			0.726
		Inkind	MHL / DEC	Operating	0.022
			SW / MHL	Capital	0.020
				Operating	0.300
			DEC	Operating	0.020
			SIMS	Personnel	0.110
		Inkind Total			0.472
6b NSW Total					1.198
6c Southern Australia	SARDI	Cash	NCRIS	Capital	1.140
				Operating	0.081
				Personnel	0.136
		Cash Total			1.357
		Inkind	Flinders Uni	Capital	0.010
				Operating	0.012
				Personnel	0.040
	SARDI	Capital	0.082		
		Operating	0.035		
		Personnel	0.032		
		Inkind Total			0.211
6c Southern Australia Total					1.568
6d Western Australia	CMAR	Cash	NCRIS	Capital	0.520
				Operating	0.122
				Personnel	0.050
		Cash Total			0.692
		Inkind	CSIRO	Operating	0.026
		Inkind Total			0.026
6d Western Australia Total					0.718
6e Acoustic Observatories	Curtin	Cash	NCRIS	Capital	0.175
				Operating	0.020
		Cash Total			0.195
		Coinvest	DSTO	Operating	0.070
		Coinvest Total			0.070
		Inkind	CUT	Operating	0.050
		Inkind Total			0.050
6e Acoustic Observatories Total					0.315
6f National Reference Stations Analysis & Coordination	CMAR	Cash	NCRIS	Capital	0.150
				Operating	0.362
				Personnel	0.160
		Cash Total			0.672
		Inkind	CSIRO	Operating	0.016
		Inkind Total			0.016
6f National Reference Stations Analysis & Coordination Total					0.688
6g Satellite Ocean Colour Calibration/Validation	CMAR	Cash	NCRIS	Capital	0.250
				Operating	0.010
		Cash Total			0.260
6g Satellite Ocean Colour Calibration/Validation Total					0.260
				TOTAL	7.330

Staffing for Australian National Mooring Network in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
<i>6a Queensland and Northern Australia</i>			
Mooring Technician		1.0 FTE	AIMS
<i>6a sub-total</i>		<i>1.0 FTE</i>	
<i>6b NSW</i>			
Mooring Technical Manager		1.0 FTE	SIMS
Administrator		1.0 FTE	SIMS (coinvest)
Data Archivist		1.0 FTE	SW / MHL (inkind)
<i>6b sub-total</i>		<i>3.0 FTE</i>	
<i>6c Southern Australia</i>			
Seagoing Technician		1.0 FTE	SARDI
Technical Assistant		0.5 FTE	SARDI
Research Assistant		0.2 FTE	SARDI (inkind)
<i>6c sub-total</i>		<i>1.7 FTE</i>	
<i>6d Western Australia</i>			
Moorings Technician		0.5 FTE	CSIRO
<i>6d sub-total</i>		<i>0.5 FTE</i>	
<i>6e Reference Stations Analysis & Coordination</i>			
National Moorings Coordinator		1.0 FTE	CSIRO
<i>6e sub-total</i>		<i>1.0 FTE</i>	
		TOTAL	7.2 FTE

6.7 Australian Coastal Ocean Radar Network

Budget summary for Australian Coastal Ocean Radar Network for 2007/2008 (\$million):

Operator	Type	Organisation	Nature	Total	
JCU	Cash	NCRIS	Capital	2.147	
			Operating	0.093	
			Personnel	0.357	
	Cash Total				2.597
	Coinvest	Flinders Uni	SA Govt	Operating	0.005
				Capital	0.516
				Operating	0.005
	Coinvest Total				0.526
	Inkind	Flinders Uni	JCU	Oper/Cap/Pers	0.012
				Operating	0.206
				Oper/Cap/Pers	0.028
	Inkind Total				0.246
	TOTAL				3.369

Staffing for Australian Coastal Ocean Radar Network in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
ACORN Scientific Leader		1.0 FTE	JCU
Two Technicians		2.0 FTE	JCU
Personnel		0.1 FTE	SARDI (inkind)
Personnel		0.1 FTE	Flinders (inkind)
		TOTAL	3.2 FTE

6.8 Australian Acoustic Tagging and Monitoring System

Budget summary for Australian Acoustic Tagging and Monitoring System for 2007/2008 (\$million):

Operator	Type	Organisation	Nature	Total
SIMS	Cash	NCRIS	Capital	0.025
			Operating	0.200
	Cash Total			0.225
	Coinvest	OTN	Capital	1.250
	Coinvest Total			1.250
	Inkind	AIMS	Operating	0.056
			DPI	0.069
	Inkind Total			0.125
			TOTAL	1.600

Staffing for Australian Acoustic Tagging and Monitoring System in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
One position		1.0 FTE	SIMS
	TOTAL	1.0 FTE	

6.9 Facility for Automated Intelligent Monitoring of Marine Systems

Budget summary for Facility for Automated Intelligent Monitoring of Marine Systems for 2007/2008 (\$million):

Operator	Type	Organisation	Nature	Total
AIMS	Cash	NCRIS	Capital	0.287
			Operating	0.126
	Cash Total			0.413
	Coinvest	SDTI	Capital	0.287
			Operating	0.126
	Coinvest Total			0.413
	Inkind	AIMS	Operating	0.096
			ISSNIP	0.050
			QCIF	0.135
			TMN	0.306
Inkind Total			0.587	
			TOTAL	1.413

Staffing for Facility for Automated Intelligent Monitoring of Marine Systems in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
Hardware development & deployment		1.0 FTE	AIMS
Communications		0.5 FTE	AIMS
Data including data transfer standards		0.5 FTE	AIMS
GBROOS Manager		0.5 FTE	AIMS (inkind)
	TOTAL	2.5 FTE	

6.10 eMarine Information Infrastructure

Budget summary for eMarine Information Infrastructure for 2007/2008 (\$million):

Operator	Type	Organisation	Nature	Total
UTAS	Cash	NCRIS	Operating	1.375
	Cash Total			1.375
	Inkind	AODCJF	Personnel	0.025
		TPAC	Operating	0.050
		UTAS	Oper/Cap/Pers	0.304
Inkind Total			0.379	
			TOTAL	1.754

Staffing for eMarine Information Infrastructure in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
eMII Director		1.0 FTE	UTAS
eMII Executive Officer		1.0 FTE	UTAS
eMII Administrative Officer		1.0 FTE	UTAS
Support for development of data integration, frameworks and schema		4.8 FTE	UTAS
Support for Argo		1.0 FTE	UTAS
Support for SOTS		0.5 FTE	UTAS
Support for ANFOG		0.25 FTE	UTAS
Support for Moorings		0.5 FTE	UTAS
Support for ACORN		1.0 FTE	UTAS
Support for AATAMS		0.5 FTE	UTAS
Support for FAIMMS		1.0 FTE	UTAS
Support for Remote Sensing		1.0 FTE	UTAS
	TOTAL	13.55 FTE	

6.11 Enhancing Access to Australian Ocean Remote Sensing Data

Budget summary (by sub-facility) for Enhancing Access to Australian Ocean Remote Sensing Data for 2007/2008 (\$million):

Sub-Facility	Operator	Type	Organisation	Nature	Total	
11a Australian Satellite SST L2P Products	BoM	Cash	NCRIS	Capital	0.026	
				Operating	0.020	
				Personnel	0.170	
		Cash Total				0.216
		Inkind	BoM	Oper/Cap/Pers	0.107	
Inkind Total				0.107		
11a Australian Satellite SST L2P Products Total					0.323	
11b Australian Ocean Remote Sensing Data Distributed Archive & Access Centre	CMAR	Cash	NCRIS	Capital	0.123	
				Operating	0.015	
				Personnel	0.165	
				Cash Total		
		Inkind	AIMS	Oper/Cap/Pers	0.024	
BoM	Oper/Cap/Pers		0.118			
CSIRO	Oper/Cap/Pers		0.100			

Sub-Facility	Operator	Type	Organisation	Nature	Total	
			CUT	Oper/Cap/Pers	0.024	
			GA	Oper/Cap/Pers	0.025	
Inkind Total					0.291	
11b Australian Ocean Remote Sensing Data Distributed Archive & Access Centre Total					0.594	
11c Upgrade Hobart and Townsville Ground Stations	AIMS	Cash	NCRIS	Capital	0.190	
				Operating	0.047	
		Cash Total				0.237
		Inkind	AIMS	Oper/Cap/Pers	0.195	
	Inkind Total				0.195	
	GA	Cash	NCRIS	Capital	0.150	
				Cash Total		
		Inkind	CSIRO	Personnel	0.008	
			GA	Personnel	0.035	
		Inkind Total				0.043
11c Upgrade Hobart and Townsville Ground Stations Total					0.625	
TOTAL					1.542	

Staffing for Enhancing Access to Australian Ocean Remote Sensing Data in 2007/2008 will be as follows:

Position	Person	Total FTE	Employer
<i>11a Australian Satellite SST L2P Products</i>			
Development		.25 FTE	CSIRO
Development		1.3 FTE	BoM
<i>11a sub-total</i>		<i>1.55 FTE</i>	
<i>11b Australian Ocean Remote Sensing Data Distributed Archive & Access Centre</i>			
Development & web serving ops		0.5 FTE	CSIRO
Development & web serving ops		0.1 FTE	GA
Development & web serving ops		0.5 FTE	BoM
Development & web serving ops		0.1 FTE	AIMS
Development & web serving ops		0.1 FTE	CUT
<i>11b sub-total</i>		<i>1.3 FTE</i>	
<i>11c Upgrade Hobart and Townsville Ground Stations</i>			
Support for TERSS upgrade		0.1 FTE	CSIRO
Support for TERSS upgrade		0.5 FTE	GA
Support for Townsville upgrade		0.05 FTE	AIMS
Operation/maintenance support		0.25 FTE	AIMS
<i>11c sub-total</i>		<i>0.9 FTE</i>	
TOTAL		3.75 FTE	

7. Co-investments

7.0 IMOS Office and general overview

The following table records the cash and in-kind co-investments from each participating Organisation for the 2007/2008 financial year. Details of co-investments for each facility are shown in the tables in part 6 above.

Table 2 – Cash and in-kind co-investment by Organisation for the 2007/2008 year (\$million)

Organisation	Type	Capital	Oper/Cap /Pers	Operating	Personnel	Grand Total
ACCSP	Inkind			0.680	0.300	0.980
ACCSP Total				0.680	0.300	0.980
ACECRC	Cash	0.310	0.154	0.108		0.572
	Inkind				0.150	0.150
ACECRC Total		0.310	0.154	0.108	0.150	0.722
ACECRC/AGAD	Inkind			0.170		0.170
ACECRC/AGAD Total				0.170		0.170
AGAD	Cash			0.001		0.001
	Inkind		0.105			0.105
AGAD Total			0.105	0.001		0.106
AIMS	Inkind		0.294	0.648	0.066	1.008
AIMS Total			0.294	0.648	0.066	1.008
AODCJF	Inkind				0.025	0.025
AODCJF Total					0.025	0.025
BoM	Cash	0.100		0.038		0.138
	Inkind		0.272		0.108	0.380
BoM Total		0.100	0.272	0.038	0.108	0.518
CSIRO	Cash	0.220				0.220
	Inkind		0.100	0.110	0.078	0.288
CSIRO Total		0.220	0.100	0.110	0.078	0.508
CUT	Inkind		0.024	0.050		0.074
CUT Total			0.024	0.050		0.074
DEC	Inkind			0.020		0.020
DEC Total				0.020		0.020
DED	Cash			0.138		0.138
DED Total				0.138		0.138
DPI	Inkind			0.069		0.069
DPI Total				0.069		0.069
DSTO	Cash			0.070		0.070
	Inkind			0.050		0.050
DSTO Total				0.120		0.120
Flinders Uni	Cash			0.005		0.005
	Inkind	0.010	0.012	0.012	0.040	0.074
Flinders Uni Total		0.010	0.012	0.017	0.040	0.079
GA	Inkind		0.025		0.035	0.060
GA Total			0.025		0.035	0.060
ISSNIP	Inkind			0.050		0.050
ISSNIP Total				0.050		0.050
JCU	Inkind			0.206		0.206
JCU Total				0.206		0.206

Organisation	Type	Capital	Oper/Cap /Pers	Operating	Personnel	Grand Total
MHL / DEC	Inkind			0.022		0.022
MHL / DEC Total				0.022		0.022
MNF	Inkind			0.495	0.004	0.499
MNF Total				0.495	0.004	0.499
OTN	Cash	1.250				1.250
OTN Total		1.250				1.250
QCIF	Inkind			0.135		0.135
QCIF Total				0.135		0.135
RAN	Cash	0.530				0.530
	Inkind	0.010				0.010
RAN Total		0.540				0.540
SA Govt	Cash	0.516				0.516
SA Govt Total		0.516				0.516
SARDI	Cash			0.005		0.005
	Inkind	0.082	0.028	0.035	0.032	0.177
SARDI Total		0.082	0.028	0.040	0.032	0.182
SDTI	Cash	1.153		0.515	0.103	1.771
SDTI Total		1.153		0.515	0.103	1.771
SIMS	Inkind				0.191	0.191
SIMS Total					0.191	0.191
SIO	Cash			0.250		0.250
SIO Total				0.250		0.250
SW / MHL	Inkind	0.020		0.300		0.320
SW / MHL Total		0.020		0.300		0.320
TMN	Inkind			0.306		0.306
TMN Total				0.306		0.306
TPAC	Inkind			0.050		0.050
TPAC Total				0.050		0.050
UTas	Cash			0.005	0.120	0.125
	Inkind		0.443		0.032	0.475
UTas Total			0.443	0.005	0.152	0.600
UWA	Inkind		0.138			0.138
UWA Total			0.138			0.138
Grand Total		4.201	1.595	4.543	1.284	11.623

8. Milestones

8.0 IMOS Office

- Submit Annual Report for January-June 2007 to DEST (30 September 2007)
- Submit Annual business Plan to DEST (31 March 2008)

8.1 Argo Australia

- achieve an array of >150 operating Argo Australia floats with real time data available by electronic transfer (June 2008)

8.2 Enhanced Measurements from Ships of Opportunity

- Recruitment and completed training of four staff for biogeochemical sampling (1), CPR sampling (2) and air/sea flux data management (1); recruit PhD student for CPR analysis and interpretation (December 2007)
- Software for transmission of data to eMII developed for all new installations (April 2008)
- Completed on-board, at sea testing of all newly purchased equipment (see 2.2), and final design of all installations (June 2008)

8.3 Southern Ocean Time Series

- Employ Staff (January 2008)
- Complete design and commence building of meteorological mooring at WHOI (January 2008)
- Deploy tethered profiler after testing (June 2008)
- Test real-time data system and transmission of data to eMII (June 2008)

8.4 Australian National Facility for Ocean Gliders

- Recruitment and training of three (3) technicians for calibration and preparation of gliders for field deployment, mission control and communications, data quality control and assurance (December 2007)
- Availability of real-time data for the three initial deployments in Western Australia, South Australia and Tasmania (June 2008)
- Accepted proposals for additional deployments (December 2007)
- Assessment of national capability to use gliders (June 2008)

8.5 Autonomous Underwater Vehicle Facility (AUV)

- Recruitment of one technician (July 2007)
- Selection and ordering of new sensors (July 2007)
- Completion of initial trials and cruises (Capricorn Bunker Reef Group Cruise and Great Barrier Reef Cruise) (September 2007)
- Completed cruise plans for the period to June 2008 (December 2007)
- Delivery, integration and testing of new sensors in the AUV system (March 2008)
- Software for transmission of data to eMII developed for all data streams (June 2008)

8.6 Australian National Mooring Network

- Slope moorings installed in GBROOS (November 2007).
- Recruitment of staff within the regions to be completed (December 2007).
- Perth Canyon moorings installed in WAIMOS (January 2008).
- Slope Moorings installed in SAIMOS (February 2008).

- 5 out of 8 National Reference moorings installed (June 2008).
- Colour Reference Station installed at Maria Island (June 2008).

8.7 Australian Coastal Ocean Radar Network

- Three installations operating (June 2008)
- Appointment/recruitment of staff (Facility Leader and technician) (August 2007)
- Freely available streams of ACORN Data (GBR by 31 Dec 2007; SA by 30 June 2008)

8.8 Australian Acoustic Tagging and Monitoring System

- Recruit and train a technical office for the role of national coordinator (July 2007)
- Order and take delivery of instruments (February 2008)
- Establish the three IMOS Curtains at Ningaloo (April 2008), East Coast (April 2008) and South Australia (June 2008)
- One to two users of the IMOS curtains supported by ARC or other funding bodies (June 2008)

8.9 Facility for Automated Intelligent Monitoring of Marine Systems

- Employ the key staff detailed in this Business Plan (July 2007)
- Obtain necessary permits from GBRMPA (December 2007)
- Specify and document technical packages (August 2007)
- Design, build and test (local sea-trials) key equipment (March 2008)
- Survey all field sites to finalise deployment designs (November 2007)
- Install communications links at 2-3 sites depending on timing (October 2007 for the first site)
- Deploy sensors at 1-2 sites depending on timing (Heron Island and One-tree Island by May 2008; Rib Reef by October 2007)
- Establish standards for data exchange and integration with the eMII project (September 2007)
- Make data systems operational (March 2008)
- Deposit data from at least one site with eMII by July 08 (June 2008)
- Develop website for FAIMMS and settle hosting arrangements (October 2008)
- Advertise FAIMMS to the Australian marine scientific community (May 2008)
- Gain recognition of FAIMMS from CREON and ILTER (December 2007)

8.10 eMarine Information Infrastructure

- Establishment of eMII Office and employment of office staff (31 July 2007)
- Employment of other eMII staff members associated with particular data streams (30 October 2007)
- Identification, documentation and communication of Data Management guidelines (31 December 2007)
- Refinement of the MEST (metadata entry and search tool) designed and streamlined for each IMOS node, as well as well-defined data flows and work practices (31 December 2007)
- Basic level deployment and integration of the IMOS data outputs into the Marine Catalogue and the Oceans Portal (31 July 2007)
- Development of agreements underpinning the management of the archiving of

data by members of the Australian Ocean Data Centre Joint Facility (30 August 2007)

- Successful archiving and recovery of initial data from Investment Areas 1, 3, 4, 6, 7, 8, and 11 (31 December 2007)

8.11 Enhancing Access to Australian Ocean Remote Sensing

Data

- Technical officer appointed at Bureau of Meteorology (July 2007)
- Analysis software tested and able to run operationally at Bureau of Meteorology (September 2007)
- Production of real-time, high resolution maps of SST from seven ground stations (February 2008)
- Report on operational test of the distributed archive and access system at Bureau of Meteorology (June 2008)
- Report on the impact of ground-station upgrades at the AIMS and TERSS antennae (June 2008)

List of Acronyms

Acronym	Full Title
AATAMS	Australian Acoustic Tagging and Monitoring System (Facility 8)
ABP	Annual Business Plan
ACCSP	Australian Climate Change Science Programme
ACECRC	Antarctic Climate and Ecosystems Collaborative Research Centre
ACMA	Australian Communications and Media Authority
ACORN	Australian Coastal Ocean Radar Network (Facility 7)
AGAD	Australian Government Antarctic Division
AGO	Australian Greenhouse Office
AIMS	Australian Institute of Marine Science
ANFOG	Australian National Facility for Ocean Gliders (Facility 4)
AODCJF	Australian Ocean Data Centre Joint Facility
AODN	Australian Ocean Data Network
AO-DAAC	Australian Ocean [Remote Sensing Data] Distributed Archive and Access Centre
ARC	Australian Research Council
Argo	Argo Australia (Facility 1)
AUV	Autonomous Underwater Vehicle Facility (Facility 5)
BGC	biogeochemical
Bluewater	Bluewater and Climate Node
BMRC	Bureau of Meteorology Research Centre
BoM	Bureau of Meteorology
CMAR	CSIRO Marine and Atmospheric Research
CODAR	Brand name for equipment
CPR	Continuous Plankton Recorder
CREON	Coral Reef Environmental Observatory Network
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTD	Conductivity Temperature Depth
CUT	Curtin University of Technology
DAAC	Distributed Archive and Access Centre
DEC	Department of Environment and Conservation (NSW)
DED	Department of Economic Development (Tas)
DEST	Department of Education, Science & Training
DPI	Department of Primary Industries (NSW)
DSTO	Department of Defence (Defence Science and Technology Organisation)
eMII	electronic Marine Information Infrastructure (Facility 10)
FAIMMS	Facility for Automated Intelligent Monitoring of Marine Systems (Facility 9)
GA	Geoscience Australia
GBR	Great Barrier Reef
GBRMPA	Great Barrier Reef Marine Park Authority
GBROOS	Great Barrier Reef Ocean Observing System (Node)
GOOS	Global Ocean Observing System
ILTER	International Long-Term Ecological Research
IMOS	Integrated Marine Observing System

Acronym	Full Title
ISSNIP	Intelligent Sensors, Sensor Networks and Information Processing Network
JCOMM	Joint WHO-IOC Technical Commission for Oceanography and Marine Meteorology
JCU	James Cook University
MEST	Metadata entry and search tool
MHL	Manly Hydraulics Laboratory
MNF	Marine National Facility
Moorings	Australian National Mooring Network (Facility 6)
NCRIS	National Collaborative Research Infrastructure Strategy
NSWIMOS	New South Wales Integrated Marine Observing System (Node)
OPeNDAP	Open-source Project for a Network Data Access Protocol
OTN	Ocean Tracking Network
PULSE	Brand name for equipment
QCIF	Queensland Cyber-Infrastructure Foundation
QPWS	Queensland Parks and Wildlife Service
RAN	Royal Australian Navy (Directorate of Oceanography and Meteorology)
SAIMOS	South Australian Integrated Marine Observing System (Node)
SARDI	South Australian Research and Development Institute
SDTI	Department of State Development, Trade and Innovation (Qld)
SIMS	Sydney Institute of Marine Science (was SHIMS)
SIO	Scripps Institute of Oceanography (USA)
SOOP	Enhanced Measurements from Ships of Opportunity (Facility 2)
SOTS	Southern Ocean Automated Time Series Observations (Facility 3)
SRS	Satellite Remote Sensing (Facility 11)
SSTs	Sea Surface Temperature sensors
SW	Sydney Water
TERSS	Tasmanian Earth Resources Satellite Station
TMN	Tropical Marine Network
TOR	Terms of Reference
TPAC	Tasmanian Partnership for Advanced Computing
UTAS	University of Tasmania
UWA	University of Western Australia
WAIMOS	Western Australia Integrated Marine Observing System (Node)
WAMSI	Western Australia Marine Science Institute
WERA	Brand name for equipment
WHOI	Woods Hole Oceanographic Institute
XBT	Expendable bathy-thermograph