Limited Distribution

IOC/IODE-XXIV/3.3.1c
Oostende, 24 February 2017
Original: English

IOC

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

Twenty-fourth Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE-XXIV)

Kuala Lumpur, Malaysia, 28-31 March 2017

Report on the Memorandum of Understanding between the Flanders Marine Institute (VLIZ) and the IOC regarding the IOC Project Office for IODE

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1. Historical Background

The first MoU between UNESCO/IOC and the Flanders Marine Institute regarding the UNESCO/IOC Project Office was signed on 19 December 2005. The establishment of the Office was formally approved by the Twenty-second Session of the IOC Assembly through Resolution XXII-7.

The Terms of Reference (Article I) of the Office were defined as follows:

(i) To establish a creative environment facilitating the further development and maintenance of IODE projects, services and products with emphasis on improving the efficiency and effectiveness of the data and product/service stream between the stage of sampling and the user;
(ii) to assist in strengthening the capacity of Member States to manage oceanographic data and information (by organizing relevant training and the capacity building related activities) and to provide ocean data and information products and services required by users;
(iii) to liaise and maintain links with relevant UNESCO/IOC programmes and other projects as relevant to the projects implemented by the UNESCO/IOC Project Office for IODE;
(iv) to establish and maintain links with other relevant organizations, institutions and programmes in order to promote cooperation with the UNESCO/IOC Project Office for IODE.

Under the agreement (Article III) VLIZ would contribute the cost of establishment of the Office: costs of renovation of an office block adjacent to VLIZ with an approximate floor space of 1100m^2 as well as the equivalent of not less than one support staff. UNESCO would contribute the cost of transfer of facilities to the Office as well as the transfer of staff to the Office.

In terms of operating the office VLIZ would contribute the cost of renting the office block adjacent to VLIZ including office partitioning and training rooms, basic infrastructure (painting of walls, floor covering, light fixtures, electrical outlets, communication service wiring, security installation, plumbing, heating installation), cost of utilities, use of permanent high bandwidth internet connection, cost of taxes, cost of maintenance and insurance of the building, and the equivalent of one support staff (administrative assistance). UNESCO would contribute the cost of at least one professional staff based at the Office (Office manager). The office manager was recruited by UNESCO/IOC (Dr Vladymyr Vladymyrov) at P-3 level.

The initial agreement had a duration of four years (1 January 2006 – 31 December 2009) but this term was in fact extended up to 30 April 2012. However, as a result of the December 2004 tsunami, the support provided by the Flanders Government was further increased to include 2 additional full-time equivalents (1 scientific, 1 technical) the cost of which would be included in an annual recurrent financial contribution of €500,000.

The scientific staff, recruited by VLIZ in close consultation with UNESCO/IOC was charged with the coordination of IODE training activities at the Office. The technical staff, also recruited by VLIZ in close consultation with UNESCO/IOC was charged with the management of the computer servers and training and office computers.

While the Project Office was initially a “satellite” office of IOC Headquarters, Paris, under the supervision of the Head of the Ocean Services Section (responsible for IODE, Tsunami and

Bathymetry), this changed in August 2007, when a new tsunami section was established at IOC Headquarters and the management of the IODE programme was fully transferred to the Project Office in Oostende.

On 1 August 2007, Dr Vladymyrov left the Project Office and was replaced by Mr Peter Pissierssens (P-5 level: Senior Programme Specialist, IODE programme coordinator). This upgraded the status of the Office to a full programme office (while it was decided, for purely administrative reasons, not to change the name of the Office from Project Office to Programme Office).

The professional staff was expanded on 21/10/2009 with an IT software developer (P-1 level) as well as a project manager (P-3 level in August 2009 for the ODINAFRICA project (see below). He was transferred to Nairobi in February 2012 as head the IOC-Africa office (P-4 level).

Accordingly staff of the Office increased from one in May 2005 to five by the end of the first agreement in April 2012.

2. Agreement 1 May 2012 – 31 December 2016

The Terms of Reference (Article I) of the second agreement were identical to those of the first agreement (2006-2012).

Contributions (Article III) of both parties were modified as follows:

VLIZ shall contribute:

(i) offices, meeting and conference rooms with an approximate floor space of not less than 1100 m^2;
(ii) the cost of utilities (water, power, heating, cooling);
(iii) use of a permanent internet connection (broadband, >100 Mb/s upload and download);
(iv) the cost of taxes levied on the physical facilities;
(v) the cost of maintenance and fire insurance of the building/offices and their content;
(vi) an annual financial contribution of not less than €250,000 to be used as a contribution towards the operational expenses and programme activities of the Project Office. The actual annual financial contribution will depend upon the approval of the budget of the Government of Flanders and budget of VLIZ;
(vii) not less than three staff FTE who will be made available to the project office through a non-reimbursable loan agreement or equivalent arrangement;
(viii) in-kind technical assistance for the management of the main internet connection (see iii), firewall and servers.

UNESCO/IOC shall contribute:

(i) the cost of remuneration of at least one Professional staff (The Head of the UNESCO/IOC Project Office for IODE);
(ii) the cost of cleaning of the office space used by IOC;
(iii) the cost of telephone and fax.

During the period 2012 to mid-2016 staffing of the Office increased from 5 to 10:

- recruitment of the OBIS project manager (UNESCO regular position, P-3 level)
- recruitment of OBIS data manager (project appointment, P-1 level)
- recruitment of IT software developer (project appointment, P-1 level)

- recruitment of Ocean Literacy project manager (project appointment, P-3 level: note: was transferred to UNESCO Venice Office in May 2016)
- recruitment of IODE OceanTeacher content editor (consultant)

These new positions complemented the 5 existing positions:

- Head, IOC Project Office for IODE (UNESCO regular position, P-5 level)
- IODE training coordinator (VLIZ position, scientific)
- IT system manager (VLIZ position, technical)
- Administrative assistant (VLIZ position, administrative)
- IT software developer (project appointment, P-1/P-2)

During this period China provided also 2 interns. We also received one Erasmus Mundus student for a short-term assignment and an MSc student from the University of Ghent (MSc thesis on OBIS).

3. Project Office Milestones

3.1 Development of data and information products

The first objective mentioned in the Terms of Reference of the Project Office is "*To establish a creative environment facilitating the further development and maintenance of IODE projects, services and products with emphasis on improving the efficiency and effectiveness of the data and product/service stream between the stage of sampling and the user*".

The first way this has been achieved is as a meeting place for IODE experts. Figure 1 shows the number of meetings and other events while Figure 2 shows the number of experts who attended the meetings and events (events at the project as well as others). These meetings have in many cases resulted in new projects of which many of the products (online services) are hosted by the Office. Examples are OceanDocs, OceanExpert, OceanDataPractices, OceanDataStandards, African Coastal and Marine Atlas, etc. To this we also need to add the OBIS database.

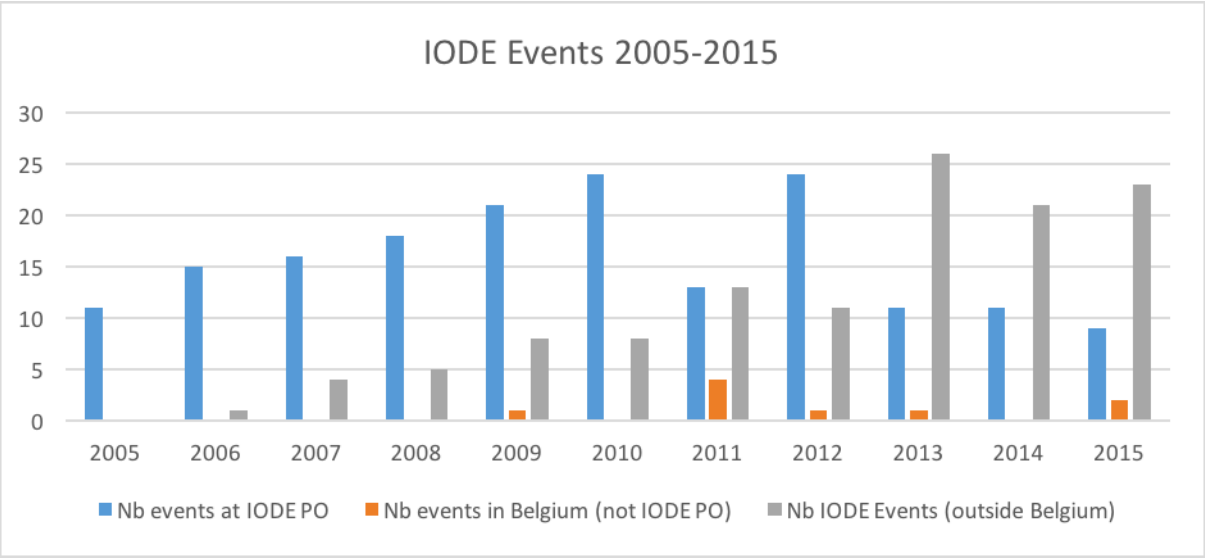


Figure 1: IODE events evolution 2005-2015

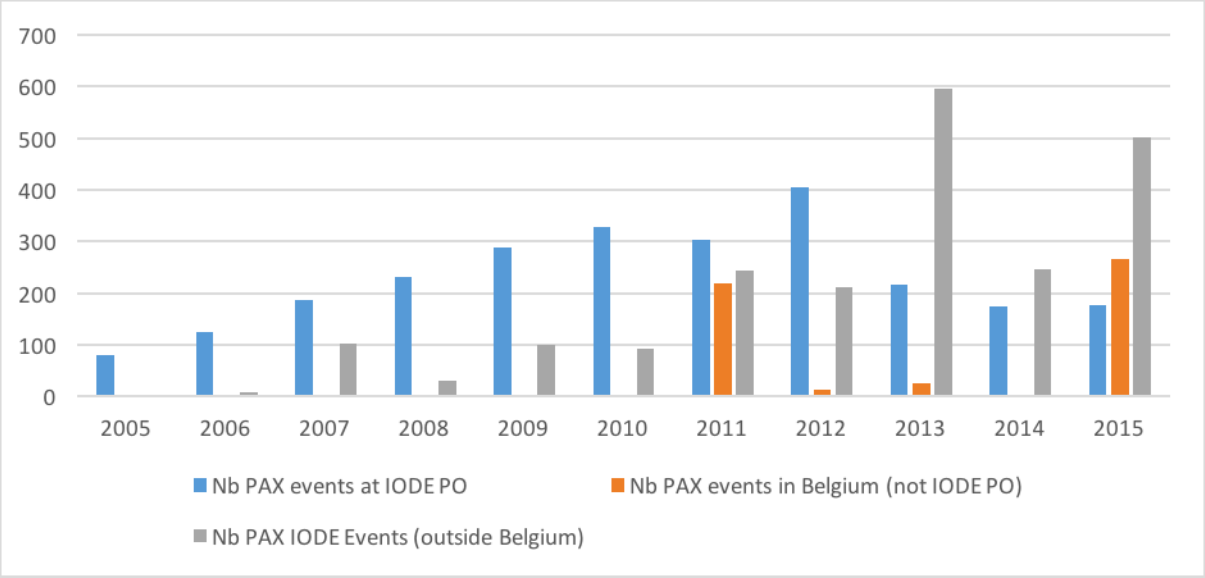


Figure 2: Number of participants in IODE events 2005-2015

Due to the limitations of the Project Office facilities (1 large conference hall for up to 120 participants and one small meeting room for up to 12 participants (which is also used for courses of up to 20 participants) the number of events that can be organized during the year (12 months of which 9 can be used for events: no events are held in July and August as hotel accommodation is then difficult to obtain + this is a holiday period), and during the first half of January and the second half of December. Therefore in practical terms the maximum number of events is approx. 24/year.

The decline in events held at the Project Office as from 2013 is due to training courses held in candidate OceanTeacher Global Academy Regional Training Centres (RTCs) . As will be explained later in this document this is a temporary effect as new types of courses will be

organized in Oostende once the RTCs are fully operational. In terms of the number of participants we can see a linear increase between 2005 (80 participants) and 2012 (406 participants). As mentioned above there is a decline as from 2013 but the organization of courses at the RTCs represents an overall increase in the total number of participants of approx. 900 (2013-2015).

3.2 ODINAFRICA

The development of the Office during the first MoU went hand in hand with the implementation of two large scale projects funded under the FLANDERS-UNESCO TRUST FUND FOR SCIENCE. These were the "Ocean Data and Information Network for Africa (ODINAFRICA)" project and the "OceanTeacher" project.

The **Ocean Data and Information Network for Africa** has been one of the most successful projects of the International Oceanographic Data and Information Exchange programme (IODE) of the Intergovernmental Oceanographic Commission of UNESCO (IOC). The Ocean Data and Information Network for Africa (ODINAFRICA) brings together more than 40 marine related institutions from twenty-five countries in Africa (below) to address the challenges faced in accessing data and information for coastal management. With the support of the Intergovernmental Oceanographic Commission of UNESCO and the Government of Flanders(Kingdom of Belgium) the network strives to address the challenges faced in ensuring that ocean and coastal data and information generated in national, regional and global programmes are readily available to a wide range of users in an easily understandable format. The cooperation between the Government of Flanders and UNESCO/IOC in the ODINAFRICA project goes back to 1997 when Flanders provided support for a small scale project that focused on information exchange in Africa. This led, in 2000, to ODINAFRICA-II, in 2004 to ODINAFRICA-III and in 2009 to ODINAFRICA-IV. Thanks to the establishment of the IOC project office for IODE in 2005 several training activities, as well as project coordination meetings of ODINAFRICA III and IV were held in Oostende. (ODINAFRICA web site: http://www.odinafrica.org). As a result of the ODINAFRICA project, more than 20 African Member States have established National Oceanographic Data Centres (NODCs), marine libraries, created their own web sites, and serve data and information. This process of twenty years was assisted by the comprehensive training provided by the IOC Project Office for IODE in Oostende.

The ODINAFRICA project also spawned an offshoot: the African Coastal and Marine Atlas (web site: http://www.africanmarineatlas.net). This product is not just a data product but it serves coastal management in Africa. While the atlas data layers are produced by the collaborating African countries, the Atlas technology is hosted by the IOC Project Office for IODE in Oostende. The success of this activity later led to a similar initiative in Latin America (Caribbean Marine Atlas: web site: http://www.caribbeanmarineatlas.net).

3.3 Technical Training: OceanTeacher

Responding to the Project Office's objective (ii) (assist in strengthening the capacity of Member States to manage oceanographic data and information (by organizing relevant training and the capacity building related activities)) one of the core activities of the Project Office since its opening has been the organization of training courses. While IODE had a long and rich history in technical training that started in the 1980s (see Figure 3), the rapid increase in technical requirements (personal computers, internet connectivity) made that organizing courses in various Member States became increasingly difficult and expensive. Very few hosts could provide the technical configuration that was required for our courses.

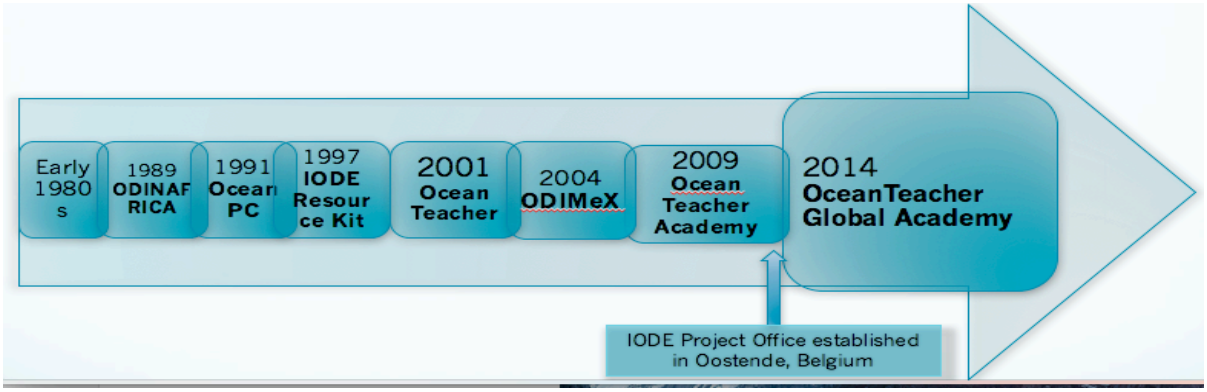


Figure 3: History of IODE training programme

The establishment of the IOC Project Office for IODE in Oostende in 2005 solved these problems completely.

The equipment (30 training PCs, video projectors) and other technical facilities (high speed internet, video conferencing) available in Oostende made it possible to develop a streamlined facility specialized in technical training.

In addition the Oostende office developed and hosted the **OceanTeacher** training platform, an advanced e-learning platform used to manage all training content, hereby positioning itself ahead of many other e-learning systems that were based on lecturer "content folders". This was done within the framework of the ODIMeX (*An Integrated Expert and Training System for Oceanographic Data and Information Management)* project (2004-2009) and OceanTeacher Academy project (2009-2013), funded through the Flanders-UNESCO Trust Fund for Science. The combination of the funds provided through VLIZ to the Project Office, the training coordinator provided through VLIZ and the funds provided through FUST to ODIMeX enabled the rapid development of a comprehensive training programme as from 2005. The FUST funded project in addition allowed the recruitment of a software developer (P-1).

Figures 1 and 2 (above) clearly show the increase in trainees. Overall, during the past 10 years the IOC Project Office for IODE provided training to over 2000 students from more than 100 countries.

While the numbers clearly show the considerable training effort implemented during the past ten years we also identified a few shortcomings in our approach:

(i) language: our courses use only English as training language;
(ii) number of students: due to facility limitations we can train only 20 students/course and we cannot organize more than 6-8 courses/year
(iii) as the courses are global in student coverage it is not easy to take into account specific local needs and priorities;
(iv) travel time can be extreme for some students (>24 hours) and this, combined with a time difference of up to 12 hours makes that some students cannot be fully fit for the courses.

3.4 OceanTeacher Global Academy

In 2014 it was therefore decided to decentralize OceanTeacher into a global network of regional training centres (RTCs). A new project was successfully submitted to FUST for the OceanTeacher Global Academy. The new OceanTeacher Global Academy will build upon and expand the existing OceanTeacher Academy based at the IOC Project Office for IODE in Oostende, Belgium, to a truly **worldwide training facility**. It will provide a **programme of training courses related to IOC programmes**, contributing to the **sustainable management of oceans and coastal areas worldwide**, and **relevant to Member States in the regions**.

Figure 4 shows the distribution of the RTCs (both candidate RTCs and confirmed/designated RTCs). The latter have successfully organized at least one course in 2014/2015 and passed all tests).

Figure 4: global network of regional training centres

- OTGA RTCs:
  - Belgium: UNESCO/IOC Project Office for IODE
  - Colombia: INVEMAR
  - India: INCOIS
  - Kenya: KMFRI
  - Malaysia: INOS-UMT
- OTGA Candidate RTCs:
  - China: NCOSM/NMDIS
  - Mozambique: ESCMC-EMU
  - Senegal: ISRA-CRODT
  - South Africa: AfriCOG/NMMU
  - USA: NSU

The innovative nature of the OceanTeacher Global Academy is based on:

(i) A network of training centres hosted by national academic institutions or research centres who have in-house experts able to provide training in languages that are used within their region;
(ii) An e-learning platform that is used by all training centres for the creation and management of their courses and enabling the sharing (and translation) of content;
(iii) The possibility to use video conferencing technology to invite experts in nearby time zones for "visiting lectures".

The IOC Project Office for IODE plays a key role in the OceanTeacher Global Academy as it (i) coordinates the project; (ii) provides assistance with the creation and management of courses; (iii) provides assistance in the organization of courses; (iv) hosts, develops and technically manages the e-learning platform.

The success of the OceanTeacher Academy and the IOC Project Office for IODE has not remained unnoticed within the United Nations: the World Meteorological Organization has had a comprehensive training programme for decades. While they have used similar e-learning technology they have expressed strong interest in collaborating with IOC/IODE in this field, especially in the area of the WMO Global Campus programme.

Also at the level of the United Nations General Assembly OceanTeacher has not remained unnoticed:

> *UNGA A/RES/70/235 (December 2015)*
>
> *http://daccess-ods.un.org/access.nsf/Get?Open&DS=A/RES/70/235&Lang=E*
>
> *34. Expresses its appreciation for the contribution of the Intergovernmental Oceanographic Commission to capacity-building through its Ocean Teacher Academy training system, which has provided training in ocean data and information management, and notes the setting up of the Ocean Teacher Global Academy, operating through a network of regional training centres, which builds capacity and promotes expertise available in developing countries;*
>
> *UNGA A/RES/69/245 (December 2014)*
>
> *http://daccess-ods.un.org/access.nsf/Get?Open&DS=A/RES/69/245&Lang=E*
>
> *29. Expresses its appreciation for the contribution of the Intergovernmental Oceanographic Commission to capacity-building through its Ocean Teacher Academy training system, which has provided training in ocean data and information management to more than 1,300 students and professionals from more than 120 countries, and takes note of the setting up of the Ocean Teacher Global Academy, operating through a network of regional training centres, which builds capacity and promotes expertise available in developing countries;*

It is worth mentioning that it is highly unusual for a specific project to be mentioned in UNGA resolutions. This further demonstrates the global impact of the activities carried out by the IOC Project Office for IODE.

3.5 Ocean Biogeographic Information System (OBIS)

Another major milestone in the history of the IODE Project Office is the establishment of the Project Secretariat of the Ocean Biogeographic Information System (OBIS).

OBIS was established by the Census of Marine Life program (www.coml.org). Between 2000 and 2010 it developed as an evolving strategic alliance of people and organizations sharing a vision **to make marine biogeographic data, from all over the world, freely available over the World Wide Web**. Any organization, consortium, project or individual may contribute to OBIS. OBIS provides, on an 'open access' basis through the World Wide Web:

- taxonomically and geographically resolved data on marine life and the ocean environment;
- interoperability with similar databases;
- software tools for data exploration and analysis.

OBIS was one of the earliest Associate Members of the Global Biodiversity Information Facility (www.gbif.org) which publishes data on all species. In 2014, IOC and GBIF signed a letter of agreement, with the view to enhance the quality and scope of marine biodiversity data available through both networks for research and decision making, while recognizing the special role of OBIS in meeting its requirements for marine biodiversity.

During the first 10 years of its existence OBIS was supported financially mainly by the Alfred P. Sloan Foundation. The Secretariat was hosted by Rutgers University, New Brunswick, NJ, United States, more particularly at the Institute of Marine and Coastal Science.

Taking into consideration that the funding by the Sloan Foundation would end in December 2010, the OBIS Governing Board considered options to safeguard the future of this important initiative that by 2010 had accumulated over 22 million records in its database. The IOC Executive Secretary, member of the former OBIS Governing Board, offered to investigate the "adoption" of OBIS by the Intergovernmental Oceanographic Commission of UNESCO. After some meetings and many discussions the 25th Session of the IOC Assembly decided through Resolution XXV-4, in June 2009, to accept OBIS within the IODE Programme "and start its integration on a schedule that will ensure a smooth transition of OBIS into IOC as its responsibilities and funding under the CoML are completed".

In December 2011 it was decided to postpone the establishment of the IOC Project Office for IODE/OBIS in 2012 at Rutgers University due to the financial crisis at UNESCO (which would reduce the operational budget for 2012-2013 by 80%) but, to minimize cost, to post the OBIS project manager at the IOC project Office for IODE in Oostende, Belgium.

The OBIS steering group, composed of 46 experts from 22 countries meet annually in Oostende and in 2013 assessed the importance of the OBIS secretariat. They concluded that the secretariat is crucial in providing training and technical assistance to its data providers, guiding new data standards and technical developments, and encouraging international cooperation to foster the group benefits of the network. Without the OBIS secretariat the global cooperative network will fall apart (see annex 5 of the 3rd OBIS Steering Group meeting report).

The OBIS secretariat builds and maintains a central, collective, global database, integrating 47 million records of marine species occurrences across the globe. Not less than 597 institutes from 56 countries have been providing data to OBIS. The database grows with an average of 3 million records per year and is used extensively by the scientific community. Already over 1000 scientific papers have cited OBIS, of which several very high impact papers (e.g. SCIENCE, NATURE) and about 100 are added to that list every year. The contribution of OBIS to marine scientific research was recently recognized by the United Nations General Assembly (A/RES/70/235 paragraph 254).

OBIS contributes to several international processes. In 2010, the 193 Parties to the Convention on Biological Diversity (Decision COP10/29, 10 & 35 & 39) called upon OBIS to provide marine biodiversity data to support the identification of Ecologically or Biologically Significant marine Areas. The IOC Assembly (IOC-XXVIII/Dec.6.1, June 2015) encouraged increased participation of IOC in the work of the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES) through OBIS and other relevant IOC programmes. The IPBES task force on data and knowledge mentioned OBIS in Annex I of their data management plan, as one of the key strategic partners of IPBES in the data and knowledge area. OBIS receives funding through FUST for the development of information products and services based on OBIS to support IPBES and the UN World Ocean Assessment (WOA). OBIS data was used in 3 chapters of the first WOA.

It is important to mention that, despite the extreme financially difficult situation of UNESCO since the decision of the United States to leave UNESCO, the organization created a professional position (P-3 level) for the OBIS project manager and this position was created in Oostende. The project manager started his duties on 1 May 2012 in Oostende.

We further mention that the professional recruited was of Belgian nationality and at the time of his recruitment, working at VLIZ. This demonstrates the international recognition of the quality of Flemish expertise (the recruitment procedure was international and fully open).

To this we can add that also the internationally recruited data manager is Belgian, demonstrating the excellence of Flemish expertise in IT. We note that the two additional internationally recruited IT staff of the Project Office are of Indian nationality.

3.6 International Coastal Atlas Network (ICAN)

ICAN is a community of practice of about 70 organizations who have been meeting since 2006 to scope and implement data interoperability approaches to coastal web atlases (CWAs). In 2012 the ICAN community, realizing that it needed a more stable “home” approached IODE. IODE, recognizing that geospatial products such as coastal atlas were an important data and information product and highly relevant to the mandate of IODE agreed to welcome ICAN as an IODE project.

In 2013, during IODE-XXII, ICAN became an IODE project. The mission/strategic aim of the IODE ICAN project is to share experiences and to find common solutions to CWA development (e.g., user and developer guides, handbooks and articles on best practices, information on standards and web services, expertise and technical support directories, education, outreach, and funding opportunities, etc.), while ensuring maximum relevance and added value for the end users. The long-term view is for global-level operational interoperability which will evolve as the ICAN project members strive to increase awareness of the opportunities that exist for increased coastal and marine data sharing among policy makers and resource managers as strategic users of a CWA. ICAN members seek to play a leadership role in forging international collaborations of value to the participating nations, thereby optimizing regional governance in coastal zone management. A major goal is to help build a functioning digital atlas of the worldwide coast based on the principle of shared

distributed information. We will go about this by organizing a cooperative interoperability network for the integration of locally-maintained CWAs as the premier source of spatial information about coastal zones throughout the world. We will do this by developing community-held constraints on mapping and data distribution conventions to maximize the comparability and reliability of information about our coasts. This is done to provide a basis for rationally-informed discussion, debate and negotiation of sustainable management policies for our societies, nations and people throughout the world. This has tremendous potential to be relevant for global spatial data infrastructures, marine spatial planning and related projects around the world.

3.7 IOC's web presence and the Project Office

Web sites are one of the key communication tools for any organization. IOC started its web presence in 1995, soon after UNESCO's first web site. While the IOC has web content within the UNESCO web site (see http://ioc.unesco.org or http://www.unesco.org/new/en/natural-sciences/ioc-oceans/ and under "themes" http://en.unesco.org/themes/one-planet-one-ocean) the status of IOC as an organization with functional autonomy within UNESCO has made that IOC has, since 1995, developed a wide variety of web sites in addition to the content under UNESCO.

Each IOC programme has its own website and most projects developed by the programmes also have their web sites. A special application (developed by the Project Office) enables the sharing of news, documents, people information and events across the different web sites.

Most IOC web sites (and JCOMM site) are hosted and technically maintained by the IOC Project Office for IODE in Oostende. Figure 5 shows a diagram of the sites hosted.

In 2016 the IOC senior management decided to re-develop the IOC web presence and to use the PaperClip software platform developed by IODE (providing tools for the management or "people" information, events and documents) across all IOC programme websites and the main IOC public web site. Financial resources provided from extra budgetary sources were made available for the development at the Project Office in 2017. In addition the Project Office was also requested to develop an "IOC country profile" module. Further work is expected to contribute, on an ongoing basis, to the Global Ocean Science Report (GOSR).

In 2017 the Project Office was also contracted to develop software and web presence for the LME:Learn project database.

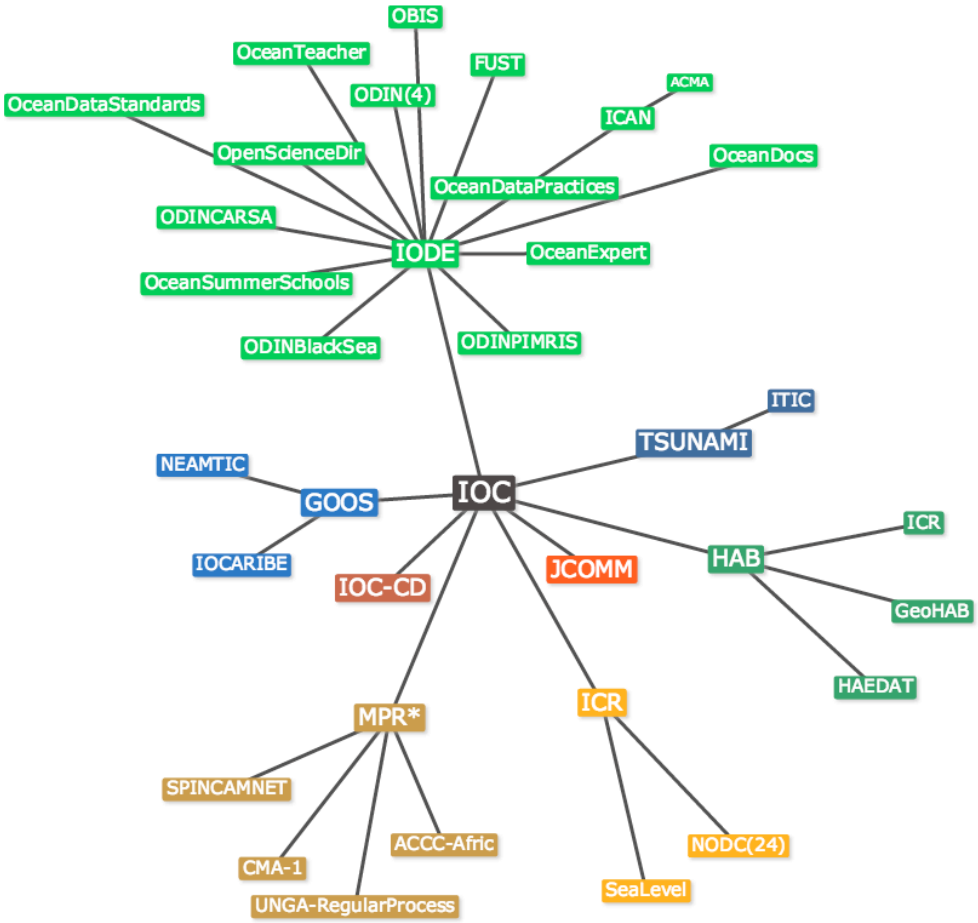


Figure 5: web sites hosted by the IODE project office (May 2016)

3.8 The IOC Project Office for IODE and GOOS-Bio

The professional position created for OBIS is actually shared with the Global Ocean Observing System (GOOS) programme based at IOC Headquarters, Paris. This sharing is strategic: as GOOS is venturing into biological data a linkage between IODE/OBIS and GOOS is important.

The Biology and Ecosystems Panel of GOOS (GOOS Bio-Eco) was established with the goal of developing and coordinating efforts in the implementation of a global ocean observation system to include essential biological and ecosystem variables. This panel will work cooperatively and across disciplines with the physics and climate panel, a successful model set in place more than two decades ago, and the recently established biogeochemistry panel. Together, they will contribute to enhance global ocean observations and achieve critical policy development and management decisions on ocean and coastal resource sustainability and health.

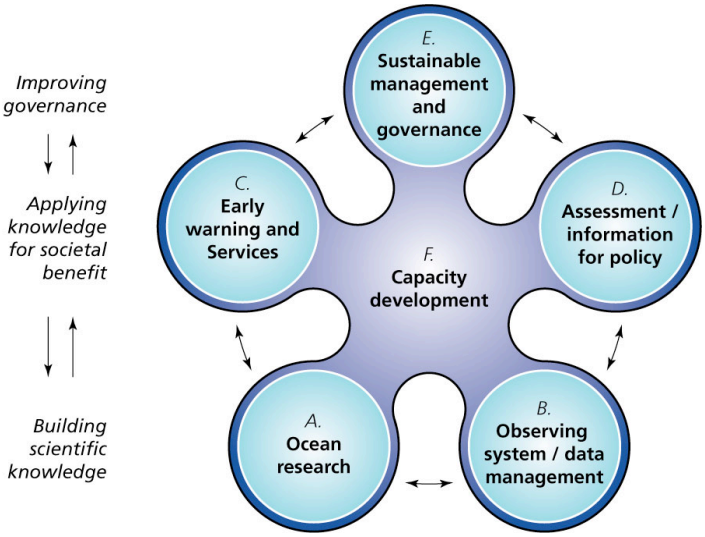
3.9 Collaboration between IOC/IODE and other IOC programmes

The IOC's vision of the 2014-2021 Medium-Term Strategy (MTS) is "Strong **scientific understanding** and **systematic observation** of the changing world climate and ocean ecosystems shall underpin **global governance for a healthy ocean**, and global, regional and national **management of risks and opportunities** from the ocean".

This translates into 4 high-level objectives:

- Healthy ocean ecosystems
- Early warning for ocean hazards
- Resiliency to climate change and variability
- Enhanced knowledge of emerging issues

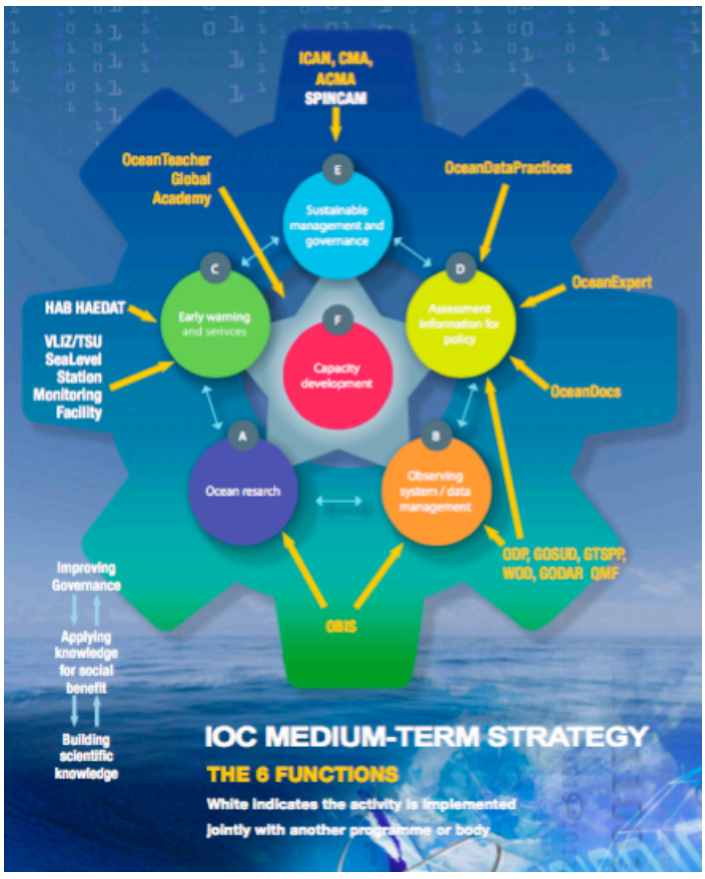
What is new in the 2014-2021 MTS is the definition of "functions" of which there are 6 as shown in Figure 6.



The "functions" have now finally enabled IODE to demonstrate its cross-cutting nature: many IODE projects, products or services contribute to one or more of the six functions.

This has greatly facilitated collaboration of IODE with other IOC programmes and this both at the global as well as regional level.

left: Figure 6: IOC 6 functions



Examples are the joint IODE-HAB development of the Harmful Algae Information System (HAIS) and database (HAEDAT), cooperation with the coastal management, marine spatial planning and large marine ecosystems projects through the International Coastal Atlas Network (ICAN), the Caribbean Marine Atlas (CMA), the African Coastal and Marine Atlas (ACMA) and at the regional level the SPINCAM (Southeast Pacific data and information network in support to integrated coastal area management) project. In addition many IODE data or information products contribute directly or indirectly to other IOC activities as shown in Figure 7. Centrally, under Capacity Development, the OceanTeacher Global Academy is playing an increasingly important role: IOC programmes like HAB, ICAM/MSP are using the

Figure 7: IODE contributions to the IOC functions

OceanTeacher methodology and e-learning platform to deliver courses to their target audiences and it is expected that all IOC programmes will follow the example.

As mentioned above the Project Office is increasingly requested or contracted to develop web-based database and infobase products for extra-budgetary projects as well as for IOC.

4. Rationale for the continuation of the agreement

4.1 Benefits to IOC/UNESCO

During the 1980s and early 1990s the IODE programme, based at IOC Headquarters Paris, had a staffing of 3 professionals and 2 general support staff. During the late 1990s and early 2000s this was reduced to 1 professional (in fact 0.5 as the position was shared with the Pacific tsunami warning system programme) and 1 general support staff. While during this period the ODINAFRICA project (and the OceanTeacher concept was conceived) was developed and implementation started, this was also a period of low activity in other IODE subject areas.

The establishment of the IOC Project Office for IODE in 2005 was the start of a new IODE. The resources made available by the Government of Flanders, either directly through VLIZ or indirectly through the Flanders-UNESCO Trust Fund for Science, established a “creative environment” that spawned a wide variety of new services and products that are of direct benefit to the oceanographic data and information management community.

In the previous chapters we have clearly demonstrated the high level of activity at the Office. The Flanders investment in the Office was also a catalyst for additional investments by IOC/UNESCO as well as by other partners:

- European Commission: IOC/IODE is a partner or sub-contractor in projects such as ECOPOTENTIAL, SeaChange and ODIP-2
    - ECOPOTENTIAL is a large European-funded H2020 project that focuses its activities on a targeted set of internationally recognised Protected Areas, blending Earth Observations from remote sensing and field measurements, data analysis and modelling of current and future ecosystem conditions and services. ECOPOTENTIAL considers cross-scale geosphere-biosphere interactions at regional to continental scales, addressing long-term and large-scale environmental and ecological challenges. (see http://www.ecopotential-project.eu)
    - Sea Change is an EU H2020 funded project that aims to establish a fundamental “Sea Change” in the way European citizens view their relationship with the sea, by empowering them, as Ocean Literate citizens, to take direct and sustainable action towards a healthy ocean and seas, healthy communities and ultimately a healthy planet. (see http://www.seachangeproject.eu)
    - The Ocean Data Interoperability Platform (ODIP) contributes to the removal of barriers hindering the effective sharing of data across scientific domains and international boundaries. ODIP includes all the major organisations engaged in ocean data management in EU, US, and Australia. ODIP is also supported by the IOC/IODE who participates in its implementation and operation, closely linking this activity with its ODSBP project. (see http://www.odip.org)

- Russian Federation to establish (2013) the Partnership Centre for the IODE Ocean Data Portal in Obninsk, Russia where 3 full time staff developed and maintain the IODE OceanDataPortal (http://www.oceandataportal.org).

- Staff secondments/internships by IOC Member States: China has provided 2 interns to the Project Office (1 year each). Japan has committed 2 internships (3-6 months each) to start in 2016.

- In-kind contribution by host institutions of the OceanTeacher Regional Training Centres: while funds are provided by the OceanTeacher Global Academy for the organization of 1-2 courses/year in each RTC, the majority of resources for the Regional Training Centres (facilities, staff, infrastructure) are provided by the host institutions of the RTCs.

4.2 Benefit/impact to Flanders: VLIZ impact analysis study

The following paragraphs focus on the added value of the cooperation between VLIZ and the UNESCO/IOC Project Office for IODE in terms of scientific and economic impact. (obtained from VLIZ)

4.2.1 VLIZ' impact on scientific knowledge creation

4.2.1.1 R&D expenditure

For the support of marine research and scientific education, VLIZ received a grant of 1.6 million euro in 2013 and an additional grant of 1.1 million euro for the international tasks of the Flemish government in the field of marine research and data management (IODE Project Office of IOC-UNESCO, secretariats of EMODNet, JPI-Oceans, and the European Marine Board). The Province of West-Flanders provides a grant of 152 thousand euros.

VLIZ manages to multiply this investment by the Flemish government by attracting another 3.3 million euro of external financing through research projects.

4.2.1.2 Infrastructure – Data Centre

It is considered one of VLIZ' main tasks, one of exceptional added value for different target groups and in particular scientists, to develop its datacentre and promote data flows both within Flanders and internationally. The VLIZ datacentre is responsible for the maintenance and development of 10 important datasystems. One task is to manage individual datasets for researchers. Also, by setting up monitoring and observatories, and by integrating existing datasets into datasystems and data products, the VLIZ datacentre contributes to the creation of accessible, high-quality, interdisciplinary data and time series, thus creating direct added value both in terms of knowledge creation and transformation.

Next to the datasystems under own management, VLIZ also developed a strong supporting role and network for international external datasystems, e.g. with IODE and for the GLOSS datasystem of UNESCO/IODE. IODE is the "International Oceanographic Data and Information Exchange", a world-wide programme that aims to facilitate the exchange of oceanographic data and information between participating Member States, and to meet the needs of users for data and information products. Since 2005, the principal training centre of this programme, the UNESCO/IOC Project Office for IODE is accommodated and supported by VLIZ in Ostend. GLOSS is the Global Sea Level Observation System, an international programme conducted under the auspices of the Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) of the World Meteorological Organisation

(WMO) and the Intergovernmental Oceanographic Commission (IOC). Its objectives are to establish high quality global and regional sea level networks for application to climate, oceanographic and coastal sea level research. It thus provides information about the operational status of global and regional networks of real time sea level stations and a display service for quick inspection of the raw data stream from individual stations. The data website is developed and managed by VLIZ for UNESCO/IOC.

4.2.2 VLIZ' impact on knowledge transformation and exploitation

4.2.2.1 Knowledge transfer through human capacity building

VLIZ is involved in training activities in several ways. It provides support for teachers and guides (cf. section **Error! Reference source not found.** in the part on societal impact) and it organises all kinds of information events for teachers, guides, policy and the public at large to inform and create awareness. At the scientific level, human capital is developed through the involvement in doctoral theses, internships and teaching activities at universities on different topics. But next to all these activities, VLIZ also organises direct training on data management. This training takes an international scope with the involvement in the IODE Ocean Teacher programme[1]. This activity underlines the excellent position of the datacentre and monitoring/sampling infrastructure of VLIZ and train people to collect, store and manage their data in a more effective and efficient manner – thereby contributing to the quality of scientific data management overall. Also, the director of VLIZ holds a dual position and combines his position at VLIZ with a professorship at the Marine Biology Research group of Ghent University. This allows for mutual knowledge transfer between VLIZ and work at the university.

4.2.2.2 Impact on policy level

VLIZ also participates actively in national and international networks and advisory committees. Examples of national networks are the Science Information Network (WIN) of the Flemish government, Flanders' Maritime Cluster, Marine Biotechnology Platform Flanders, etc. International networks are for example the IODE and POGO networks and related committees, and several European initiatives. These network effects at policy level are discussed in more detail in the catalytic impact section.

4.2.3 Framework for economic impact analysis

Apart from the own day-to-day operations VLIZ also (financially and operationally) supports a number of international marine organisations: the UNESCO/IOC Project Office for IODE, the European Marine Board Secretariat, the JPI Oceans secretariat and the EMODnet secretariat. Apart from JPI Oceans secretariat which is located in Brussels, these organisations are all located on the same InnovOcean site as VLIZ. Also the Province of West Flanders has located its Regional Office Coast at the InnovOcean site close to VLIZ. These **partner organisations make expenditure** in the local/Belgian economy as well, also resulting in additional employment and additional demand in the rest of the economy

In the impact analysis the consultant focussed for the economic impact analysis on the following sources of economic impact creation:

[1] www.oceanteacher.org: OceanTeacher has been developed as a training system for ocean data managers (working in ocean data centres), marine information managers (marine librarians) as well as for marine researchers who wish to acquire knowledge on data and/or information management. It is a comprehensive web-based training system that supports Classroom training (face-to-face), Blended training (combining classroom and distance learning), online tutoring and online self-learning.

- VLIZ' expenditure related to its core activities and expenditure related to specific investment projects in the Belgian economy;
- expenditure of VLIZ' partner organisations at the InnovOcean site (and Brussels for JPI Oceans Secretariat) in the Belgian economy;
- expenditure of visitors to VLIZ and the InnovOcean partners.

4.2.3.1 Impact of the activities of VLIZ' partner organisations (at the InnovOcean site)

To estimate the economic impact of the partner organisations of VLIZ at the InnovOcean site (i.e. UNESCO/IOC Project Office for IODE, EMB Secretariat, EMODnet Secretariat, Province of West Flanders – Regional Office Coast) and in Brussels (JPI Oceans), we will apply a 'light version' of the methodology. Instead of analysing the individual supplier invoices from each of the partner organisations, we collect only information on the total amount of invoices that have been paid by these organisations annually in the period 2009-2013. Subsequently, we hypothesize that the spending behaviour of these organisations is similar to VLIZ' spending behaviour in terms of sector distribution and thus has a similar multiplier effect. This hypothesis allows us to estimate the indirect and induced economic effects with minimal data requirements for the partner organisations. Only for the UNESCO/IOC Project Office for IODE we use an organisation specific estimate of the sector distribution of expenditure.

Based on the results from the direct, indirect and induced impact analysis, the fiscal and parafiscal return to the government is estimated according to the methodology discussed above. We refer to Chapter 0 for the results of the analysis.

4.2.3.2 Impact of the visitors to VLIZ and the InnovOcean partners

VLIZ and its partners annually welcome numerous visitors that come to consult data, use specific infrastructure, attend workshops or conferences,… These visitors make use of taxi's, restaurants, hotels (when they stay overnight), etc. and thus spend money in the local economy that is not paid by VLIZ nor one of its partners[2].

To estimate the economic impact that these visitors have generated in the period 2009-2013, ideally we have detailed information about their spending. However, this information is not on hand. Alternatively, a large survey could be set up to question all visitors in a specific period about their spending pattern. But, time and budget constraints make this option unfeasible as well. We therefore estimate visitors' impact, by combining limited information on visitors (number, profile) from VLIZ and its partners with information from relevant studies that have conducted detailed surveys on the spending behaviour of visitors to specific events. We distinguish between local visitors and foreign visitors (that stay overnight), as we assume that their pattern of spending is rather different.

Based on this information, we make an estimate of the first order effects i.e. the amount of additional spending in the economy by the visitors. Economic impact of VLIZ' partner organisations.(information available from VLIZ).

Over the years, VLIZ has not only grown as a marine institute itself. It has also been able to develop a cluster of (inter)national institutions active in marine and maritime research and research support. Most of these partner organisations are located at the InnovOcean site in

[2] Except for the IODE Project Office, which pays fixed allowances to its visitors. The economic impact of their visitors' spending is included in the impact analysis of the IODE Project Office itself.

Ostend (UNESCO/IOC Project Office for IODE, EMB Secretariat, EMODnet Secretariat and Province of West Flanders – Regional Office Coast); one international partner organisation (JPI Oceans Secretariat) is located in Brussels. VLIZ provides administrative and logistical support to all the international partner organisations. This task is in line with the management agreement with the Flemish government. VLIZ receives an annual grant from the Flemish government (EWI) to execute this task.

It is clear that in addition to the economic impact that VLIZ creates with its activities, these partner organisations create an economic impact as well by employing staff and by spending in the economy.

Summarising the results from the economic impact analysis, VLIZ' and its partners' activities generate an economic impact at different levels. A more detailed analysis is consultable in the impact analysis report (available from VLIZ).

4.2.3.3 VLIZ' core activities and investments

VLIZ itself increased direct employment (central staff + job students + RV staff at DAB Vloot) from 45 to 62 FTE employees (+38%). By purchasing goods and services for its core activities and investments, VLIZ generated an additional 34 FTE jobs (indirect + induced) in the economy in 2013. This is an increase of + 49% in indirect and induced employment generation compared to 2009.

The activities of VLIZ generated on average a total amount (direct + indirect + induced) of 6,3 million euro in output annually and 1.8 million added value.

The creation of employment, output and value added resulted in an average fiscal return to public authorities of 2.4 million euro annually, for the years 2009-2013. In 2013 this amount equalled 3.2 million euro, an increase of +58% compared to 2009.

4.2.3.4 Activities of VLIZ' partner organisations

Over the years VLIZ managed to broaden its (inter)national network of marine research institutes and to attract a number of partners to Ostend (and Brussels), with whom VLIZ closely collaborates and that VLIZ (financially and administratively) supports.

In 2013, the partner organisations jointly employed 27 FTEs. Compared to 2009 (when only three partner organisations were already established at the InnovOcean site), this is an increase in employment of +93%. The expenditure of the partner organisations in the economy generated another 23 FTE jobs in different sectors (indirect + induced) in 2013. In the period 2009-2013, thanks to the partner organisations on average 33.5 FTE jobs have been created annually (direct + indirect + induced effect).

The activities of the partner organisations generated on average a total amount (direct + indirect + induced) of 4.2 million euro in output annually and 1.2 million added value.

The activities of VLIZ' partner organisations resulted in an average fiscal return to public authorities of 1 million euro annually, for the years 2009-2013. In 2013 this amount equalled 1.68 million euro, an increase of +98% compared to 2009. Taking into account that the annual grant of EWI to VLIZ for supporting the partner organisations only rose with +52% in the same period, there was a significant increase in return on investment for public authorities (from 1.17 euro return per 1 euro grant in 2009 to 1.53 euro return per 1 euro grant in 2013).

4.2.3.5 Visitors to VLIZ' and its partners' activities[3]

The visitors of VLIZ or one of the partner organisations spend money[4] in the economy to be able to attend meetings or conferences, or to make use of specific infrastructure. We estimate that on average 125 thousand euro (minimum) was spent by visitors in the years 2009 to 2013 in the (local) economy annually. In 2013 more than half of the amount was spent locally. 38% of total expenditure was spent to hotels (almost exclusively in Ostend), by visitors that stayed overnight. 7% was spent to local transport and 10% was spent in restaurants and cafés. As visitors to VLIZ and the partners come to Ostend mostly off season, this segment of visitors directly contributes to reducing overcapacity in the lower seasons for the local horeca (hotels, restaurants, cafés).

4.2.3.6 Economic impact beyond the analysis

The above mentioned calculations of VLIZ' economic impact should be considered as a lower bound. In addition to the economic impact that has been calculated in the previous chapters, VLIZ also generated additional economic impact in the period 2009-2013 through

its data management activities at national, European (EMODnet) and global (WoRMS, GLOSS, MarineRegions) level and its efforts to **contribute to an integrated international data network**;

the **research infrastructure that VLIZ manages** to the benefit of the whole Flemish marine and maritime research community;

the **renewal of its research vessel infrastructure**, replacing the old RV Zeeleeuw with the new RV Simon Stevin. A total amount of 11 million euro was spent (largely in the Netherlands) to build the new research vessel. The old research vessel RV Zeeleeuw was donated to the Kenyan government. The refurbishment and transportation of the RV Zeeleeuw involved additional spending in the local economy (see box below).

4.2.4 The catalytic impact of VLIZ

During the workshop on the discussion of the VLIZ ecosystem and its importance, there was clear support for the proposition that over time VLIZ has evolved into a key player and a facilitator in marine and maritime sciences and the associated national and international community, within the context of the mandate given to VLIZ by the Flemish government. VLIZ has managed to clearly leverage the 'value' of its ecosystem towards the Flemish but also the international stakeholders. VLIZ has become a 'hub' for the Flemish research community, and has the potential to strengthen its position towards the government (as a policy preparatory actor), society and industry. For the latter, this will require for the Flemish government to give VLIZ an explicit mandate to do so and to put the parameters in place to guarantee VLIZ' independency. Internationally, VLIZ is well-known, in particular within the circle of institutions and actors active in marine and maritime data collection, treatment and analysis.

The national and international ecosystem that VLIZ has developed, and which it is part of today, has had a clear impact on the visibility, recognition and even excellence of the

[3] We remark that the numbers of visitors exclude those visitors to the IODE Project Office that receive a fixed allowance. The economic impact of those visitors has already been calculated in the economic impact of the partner organisation itself.

[4] For the visitors to the IODE Project Office we can make use of estimates from IODE on the total spending annually (i.e. on average 56 thousand euro annually). As there is no information on the sector distribution of their spending, we assume a similar sector distribution as for the other visitors

Flemish research community. This is also evident from the answers given by more than 100 VLIZ stakeholders from Flanders and abroad (see below) on these aspects.

4.2.5 Recommendations to further strengthen VLIZ' impact

In the next paragraphs we focus on key recommendations for VLIZ to specifically strengthen its scientific and catalytic impact based on the cooperation with IODE.

4.2.5.1 Scientific

VLIZ provides an elaborate portfolio of services and products to the marine research community in Belgium and internationally to support (academic) research. The quality assurance of many of VLIZ' services is derived from accreditation by international networks (IODE, ICSU,…) and – much like university research teams – scientific output (A1 publications, citations, citable databases and websites, participation in projects with competitive funding,…). For a number of services provided to the research community however (such as e.g. the sampling activities on board of the RV), applying **internationally accredited quality standards** would strengthen the credibility of VLIZ' and researchers' contribution in scientific knowledge creation. This recommendation relates to the already strong position of VLIZ in data collection and management, and aims to further consolidate this position in the future. An official quality certificate underlines the already present quality of VLIZ' services but can increase its scientific impact by opening new doors where VLIZ is not yet as well known.

4.2.5.2 Catalytic

Recommendation to further enlarge/strengthen the network in a strategic manner (rather than ad hoc), bearing in mind the ultimate goals of VLIZ. This might also require stepping out of the 'comfort zone' of the current circle of contacts and reach out to new actors. The current relationship of VLIZ with IOC and IODE can be deepened in this respect. Through the involvement of VLIZ in the Intergovernmental Oceanographic Commission (IOC) of UNESCO, VLIZ (and thus the Flanders marine research community) has access to many specialized ocean research and observation peer communities. This also applies for ICSU, EMB and other networks. There is clear potential to further develop and valorize these relationships;

4.2.6 Self-evaluation EX-POST as relevant to the Project Office

In the following paragraphs the 2012-2016 policy plan of VLIZ – as presented to and approved by the Minister and the Department in accordance with article 13 §2 of the covenant – is commented related to the cooperation with IODE.

4.2.6.1 Tasks of the Coordination Division of VLIZ

Support the IOC Project Office for IODE in Ostend

This activity has been performed properly. A cooperation agreement has been concluded for the 2012-2016 period.

The Flemish government approved the continuation of the Flanders UNESCO Trust Fund (FUST) for the 2014-2018 period in May 2014. The funds are furthermore used in the same thematic areas where Flanders has provided support since 1999.

The support of the IOC Project Office for IODE was clarified in a brief by EWI of 21 May 2015, which was approved by the VLIZ Board of Directors on 17 June 2015. This brief specifies the expectations regarding VLIZ in the performance of international activities within the scope of the covenant with the Flemish government.

4.2.6.2 Services by the VLIZ' Marine Data Centre

VMDC provides internal IT support to VLIZ, IODE, province, European Marine Board-ESF (hardware, network, software) – facilitating access to HPC for Flemish marine scientists – providing expertise both inside and outside VLIZ – hosting websites and databases – looking up or composing specific data sets on request – carrying out or supervising data analyses together with experts.

The VLIZ data centre has set up data flows that make it possible to redistribute data efficiently to international systems such as the IODE Ocean Data Portal (IOC-UNESCO), the global Ocean Biogeographic Information System (OBIS) and its European pillar EurOBIS, the European Marine Observation and Data Network (EMODnet) and SeaDataNet. VLIZ redistributes data from the Flemish Banks Monitoring Network upon request provided they are used for scientific purposes.

4.2.6.3 Cooperation agreements

International embedding

UNESCO/IOC/IODE: *The VMDC is the National Oceanographic Data Centre (NODC) of Flanders, and as such actively involved in different initiatives of the IODE network. The VMDC participates in the training courses and workshops organised in the Ostend Project Office, and attends meetings of IODE expert groups (Ge-BICH, Data Publishing, Harmful Algae etc.). Numerous websites and databases have been developed and several training courses have been (co)organised (ODINAFRICA, ODINCARSA, tsunami projects) on a project basis.*

UNESCO/IODE/GLOSS: *The VMDC was asked by GLOSS to develop a real-time monitoring system for more than 300 tide gauges used globally to study rising sea levels and to monitor tsunamis.*

VLIZ formulated a formal commitment in August 2012 to continue to perform these activities.

OBIS/EurOBIS/GBIF: *the OBIS network collects marine biogeographical data. The VMDC accommodates the European node EurOBIS. The OBIS network and the GBIF*

network are given online access to the biogeographical data collected within the scope of MarBEF, supplemented with numerous other data sets.

The VLIZ Library is a member of international networks such as the International Association of Aquatic Sciences Libraries and Information Centres (IAMSLIC) and Joint IODE/IAMSLIC Group of Experts on Marine Information Management.

4.2.7 Self-evaluation EX-ANTE as relevant to the Project Office

VLIZ worked out a draft strategic plan for the 2017-2021 period on the basis of the ex-post part of the self-evaluation, taking into account the current policy context on the one hand and the expected developments on the other. This plan was finalised before the end of February 2016 to use as input for the evaluation of VLIZ and the drafting of a new five-year covenant between the Flemish Government and VLIZ.

4.2.7.1 Mission and objectives

New mission

VLIZ promotes accumulation of marine knowledge and excellence in marine research in Flanders.

- The marine research areas are the ocean and seas, the coast and the tidal systems.
- The target groups for knowledge accumulation are the marine research community as well as educational institutions, the general public, policymakers and the industry (within the scope of the blue economy).

New strategic objectives

- Initiate, support, promote and implement innovative and multidisciplinary marine research for the benefit of, in collaboration with and/or supplementary to Flemish and international marine research groups.
- Promote the national and international image of Flemish marine research.
- Serve as a national and international point of contact in the field of marine research.
- Promote ocean literacy in Flanders and marine research visibility among the general public.
- Provide tailored scientific data, information, knowledge and insights to the Flemish marine research community, the blue economy and policymakers with regard to marine matters.

4.2.7.2 Proposed operational objectives

VLIZ proposed in its self-evaluation 9 strategic objectives to be included in the new convenant. One of these reflects its international tasks, i.e.:

- **VLIZ** supports international organisations on behalf of the Flemish government. These include **(1) the IOC Project Office for IODE in Ostend,** (2) the European Marine Board secretariat in Ostend, (3) the European Marine Observation and Data Network (EMODnet) secretariat in Ostend and (4) the Joint Programming Initiative on Healthy and Productive Seas and Oceans (JPI Oceans) secretariat in Brussels. In addition, VLIZ represents the Flemish government in the Belgian delegation at the Executive Council and the General Assembly of the Intergovernmental Oceanographic Commission (IOC), serves as the National Oceanographic Data Centre (NODC) within IOC's IODE, participates in the steering committee of the UNESCO/Flanders Fund-in-Trust for the support of the scientific activities of the UNESCO Science Programme (FUST), represents the Research Foundation – Flanders in the European Marine Board, and ensures the development and operational maintenance of the central portal of EMODNet. VLIZ prospects for the further development and reinforcement of the InnovOcean site in Ostend.

4.2.7.3 Core activities

Amongst its core activities VLIZ identified the following tasks (not limited):

Actively support international organisations and develop the InnovOcean site

- **Support the IOC Project Office for IODE in Ostend** and represent the Flemish government in the Belgian delegation at the Executive Council and the General Assembly of IOC.
- Participate in the steering committee of the UNESCO/Flanders Fund-in-Trust for the support of the scientific activities of the UNESCO Science Programme (FUST).
- Etc.

Promote the national and international image of Flemish marine research

- Capture the results of Flemish marine research, data and metadata, and increase their visibility by means of the Data Centre division's data systems (IMIS, IMERS) and international data networks (IODE, SDN, OBIS, ICES, WOD).
- Steer and pioneer data processing, analysis and mining as well as developments within international organisations and infrastructures (EMODnet, EMBRC, LifeWatch, OBIS, GBIF, IODE, GLOSS, OTN, Jerico-Next, AtlantOS & SeaDataNet).
- Etc.

Serve as a national and international point of contact in the field of marine research

- The Data Centre and Library divisions are developing the Flanders Marine Data and Information Centre (VMDC). The VMDC is an official National Oceanographic Data Centre (NODC) within the IODE network of UNESCO and the WDS network of ICSU, and serves as the (inter)national point of contact and hub for all activities relating to data and information exchange between different parties: researchers, policymakers, industry and public.
- Play a leading role in the development, elaboration, implementation and compliance with standards for (marine) data. The division does this by hosting and further elaborating global databases such as (1) the World Register of Marine Species (WoRMS), the internationally accepted standard for marine taxonomy, (2) Marine Regions, a standard for geographic information on marine place names, and (3) EurOBIS & OBIS, standards for marine biogeographic data.
- Etc.

4.2.7.4 Cooperation agreements (non-limited lists)

The following lists summarize the activities in which VLIZ wants to cooperate with IOC/IODE for the future.

4.2.7.5 National

Belgian Marine Data Centre (Directorate Natural Environment)

VLIZ provides data for integration into the IDOD database within the scope of various federal science policy projects. Cooperation with the BMDC also takes shape within the IODE network and the SeaDataNet project.

4.2.7.6 International

UNESCO/IOC/IODE

The Data Centre division is the National Oceanographic Data Centre (NODC) for Flanders; as such, it is actively involved in different initiatives of the IODE network. It participates in IODE projects (GOSUD, WOD, etc.), contributes to the training courses and workshops organised in the Ostend Project Office, and attends meetings of IODE expert groups (Ge-BICH, Data Publishing, Harmful Algae, etc.).

UNESCO/IODE/GLOSS

VLIZ formulated a formal commitment in August 2012 to continue to manage the real-time monitoring system of over 300 tide gauges worldwide.

OBIS/EurOBIS/GBIF

The VLIZ data centre accommodates the European node EurOBIS of the OBIS network concerning marine biogeographic data. In this context, it ensures the dataflow to EMODnet, the OBIS network and the GBIF network. In addition, it hosts the OBIS database and provides support for quality control.

IAMSLIC

The VLIZ library is a member of international networks such as the International Association of Aquatic Sciences Libraries and Information Centres (IAMSLIC) and Joint IODE/IAMSLIC Group of Experts on Marine Information Management. At the national level, the VLIZ library is a member of the Flemish Association for Libraries, Archives and Documentation Centres (VVBAD).

4.2.8 Evaluation

The evaluation of VLIZ reflected on its current activities and gave recommendations for the future. In these recommendations no specific topics were raised related to the international tasks of VLIZ. However, an Expert Panel visited VLIZ on 14-15 April 2016, to advise on its activities. One of their 11 observations/recommendations stated:

> [6] VLIZ plays a critical role in hosting and/or supporting a range of European and international bodies at the InnovOcean site in Ostend, namely the European Marine Board Secretariat, the IODE project office of IOC-UNESCO, the EMODnet Secretariat and also the contribution of three full-time staff to the JPI Oceans secretariat in Brussels. The support (offices, staff, benefit in kind) that VLIZ provides to those international organisations is fundamental to their success. In return, the presence of these international organizations and the close link between VLIZ and these offices, has opened the international arena for Flemish researchers and serves as a channel that works in two directions. With this role, VLIZ goes beyond the objective of 'increasing the visibility' of Flemish research, transforming it into a bridging role that facilitates participation in international programmes by the Flemish community. Participation in key ESFRI infrastructure ERICs and projects (Lifewatch, ICOS, EMBRC) is another key achievement that illustrates this role in the international arena.

4.2.9 New Convenant between the Flemish Government and VLIZ for the period 2017-2021

The Flemish Government, represented by the Minister of Economy, Science and Innovation Philippe Muyters, concluded a five-year covenant (Dutch only) with VLIZ on 1 January 2017, by which the objectives of VLIZ are confirmed and updated by assigning new mandates related to research and policy information. The full text is available at: http://www.vliz.be/en/administrative-documents

In short, the new convenant endorses its engagement towards IODE, i.e.

Operational objective 10:

VLIZ supports and houses international organisations on behalf of the Flemish government. These include (1) the IOC Project Office for IODE in Ostend, (2) the European Marine Board secretariat in Ostend, (3) the European Marine Observation and Data Network (EMODnet) secretariat in Ostend and (4) the Joint Programming Initiative on Healthy and Productive Seas and Oceans (JPI Oceans) secretariat in Brussels.

The following conditions will be taken into account:

- at the time of drafting the VLIZ budget sheets for the following year, VLIZ produces concise workplans for the institutions for which it is providing personnel (IODE Project Office, European Marine Board, EMODnet, JPI Oceans) and submits them to the Department. These concise workplans also indicate whether changes are expected in the cooperation and fundamental tasks of the staff seconded by VLIZ as a basis for assessing any changes in the operational budgets;
- Specifically for the IODE Project Office, an annual meeting will be organised in October-November between VLIZ and the Project Office to discuss the collaboration related to IOC trainings and workshops that will be supported in the coming working year. On that occasion VLIZ examines the opportunities of these IOC activities for the Flemish marine research community.

Extra assignments:

In addition to its core activities, VLIZ represents the Flemish government in the Belgian delegation at the Executive Council and the General Assembly of the Intergovernmental Oceanographic Commission (IOC), serves as the National Oceanographic Data Centre (NODC) within IOC's IODE, participates in the steering committee of the UNESCO/Flanders Fund-in-Trust for the support of the scientific activities of the UNESCO Science Programme (FUST), represents the Research Foundation – Flanders in the European Marine Board, and ensures the development and operational maintenance of the central portal of EMODNet.

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4.3 What if there was no Project Office

As mentioned before the staffing of the IODE programme at IOC Headquarters had reduced to 0.5 around the year 2000. While the December 2004 Indian Ocean Tsunami prompted the establishment of a separate tsunami section at IOC headquarters, staffing for IODE increased only marginally to professional staff.

Without any doubt we can state that none of the milestones described above would have seen the light of day if IODE had remained at IOC Headquarters with just one professional staff.

4.4 Past reviews and statement made by IOC Assemblies related to the Project Office and its activities

While no specific review of the Project Office has been made, its effectiveness has been highlighted in the External Evaluation Report of the Flanders-UNESCO Science Trust Fund – Phase III, published in July 2013 by Savithri (Savi) Narayanan and Wouter Buytaert. For IOC the review focused mainly on the SPINCAM project but it also reviewed the OceanTeacher Academy project implemented at the IOC Project Office for IODE, Oostende. The reviewer made an extensive visit of the Office.

The following observations are included in the report (available through http://fust.iode.org/project-reviews):

> *"The FUST funded IOC project portfolio has been effective and successful in leveraging additional resources and generating relevant and high-quality outcomes. The OceanTeacher Academy has been especially highlighted during the site visits as an extremely valuable resource as it not only provides courses in its Oostende office but also remotely through modern technologies as well as training materials. " (page 17)*

> *"All evidence indicates that the FUST project portfolio provides good value for money by enabling the participants to obtain significant co-funding and establish strong scientific and technical collaborations. The IODE Project Office, OceanTeacher Academy and SPINCAM, as well as other projects have been able to use the funding received from FUST to build synergies with programmes of other national and international organizations. For example, the IODE Project Office and the OceanTeacher Academy have been able to benefit from the capacity building activities of organizations such as World Meteorological Organization, Partnership for Observation of the Global Oceans, and others. " (page 18)*

> *"Key observations (on how its capacity building initiative supported by the OceanTeacher Academy contributes to the success of FUST and to the needs of not only IOC but also many other global and national initiatives) were:*

> - *The OceanTeacher Academy plays a very important function to support training and capacity building, serves many users through multiple venues, and is well recognized for its contribution.*
> - *The Academy maintains its high standards of training, though not yet accredited, through the time and effort, commitment and dedication of many experts around the world with the outcome that very good training materials and excellent instructors are available for the courses, delivered on-site, on-line and through video technology.*

- *With respect to SPINCAM, the Academy plays a key role to develop the expertise in Latin America; this was confirmed during the site visit to Ecuador and Colombia. " (page 28)*

"…there is not doubt that the Project Office is a corner stone of the marine science programme of IOC and of the Capacity Building for IOC, UNESCO and Flanders, and is also an essential element for the success of SPINCAM" (page 29)

Reviewers identified the following challenges:

- Selecting students for training from many individual applicants, those nominated by non-governmental organizations and governmental institutions to ensure maximum benefit for the member states within the limited capacity of the Academy.
- Ensuring that the students have the necessary background to benefit from the course and the opportunity to make use the lessons learned in their normal work.
- Identifying the training needs and developing an annual training plan with trainers and funding within the confines of the international process.
- Meeting the emerging requirements while maintaining the programme as technology evolves.

These challenges have been taken into account when drafting the proposal for the OceanTeacher Global Academy.

The IOC Assembly has regularly commented on the Project Office and expressed appreciation for the support provided by the Government of Flanders:

IOC-XXVIII (2015): *126 The Assembly recognized the 10th anniversary of the IOC Project Office for IODE as an important milestone for the IOC and noted the continuous support of several Member States: the Government of Flanders (Belgium) for supporting the office, Russian Federation for its support through the Partnership Centre for the IODE Ocean Portal and Canada for providing staff support for the Portal*.

Decision IOC-XXVIII/7.2.1 : "…*Expresses its deep appreciation to the Government of Flanders (Belgium) for hosting and supporting the IOC Project Office for IODE and for its continuing and increasing financial support to IODE, the Russian Federation for its support through the hosting of the Partnership Centre for the IODE Ocean Data Portal in Obninsk, as well as to other donors and Member States who are providing financial and in-kind support for IODE; "*

IOC-XXVII (2013): Decision IOC-XXVII/Dec.5.3.4 : *"Expresses its deep appreciation to the Government of Flanders (Belgium) for hosting and supporting the IOC Project Office for IODE and for its continuing and increasing financial support to IODE, the Russian Federation for its support through the hosting of the Partnership Centre for the IODE Ocean Data Portal in Obninsk, as well as to other donors and Member States who are providing financial and in-kind support for IODE;"*

IOC-XXVI (2011): *194 The Assembly noted with appreciation the success of the IOC Project Office for IODE in Ostend, Belgium, which since its establishment in 2005, has developed into an excellent centre for training, meetings and conferences.* ***The Assembly further welcomed*** *the success of the OceanTeacher Academy project, managed at the Project Office, and called on Member States to actively make use of this training facility.*

195 The Assembly expressed its gratitude to the Government of Flanders (Belgium) for the considerable support provided to IODE through the IOC Project Office for IODE in Ostend,

Belgium (and the Flanders Marine Institute), as well as through the Flanders–UNESCO Trust Fund for Science, which supports ODINAFRICA and OceanTeacher."

IOC-XXV (2009): Resolution XXV-3: "*Expresses its appreciation to the Government of Flanders (Belgium), the Flanders Marine Institute and the city of Ostend for their continuing support of the IOC Project Office for IODE, to the Government of China for its hosting and support of the 20th Session of the IODE Committee, to the United States of America and to the Republic of Korea for their financial support to the IODE programme in 2008–2009; "*

IOC-XXIV (2007): "246 *The Assembly noted with appreciation the success of the IOC Project Office for IODE as a global oceanographic data and information management training facility involving not only IOC but also such IOC partners as WMO (through JCOMM) and IOI."*

IOC-XXIII (2005): "*129: The Assembly warmly welcomed the opening of the IOC Project Office for IODE, noting that this facility will be a meeting venue, training centre and a communications hub, and will serve as a forum and creative environment for developing IODE and partnership projects, programmes and organizations. The Assembly invited other organizations and programmes to make use of this new facility and to establish joint activities with IOC and its IODE.*
130: The Assembly thanked the Government of Flanders for its generous and continuing support to IODE through its hosting of the IOC Project Office for IODE, and its continuing and expanding financial support of IODE's capacity-building activities."

4.5 The Project Office and the IOC Capacity Development Strategy

The IOC Capacity Development Strategy was adopted by the 28th Session of the IOC Assembly (2015) through Resolution XXVIII-2.

Capacity building is an essential tenet of IOC's mission: It enables all Member States to participate in and benefit from ocean research and services that are vital to sustainable development and human welfare on the planet. This Strategy's vision identifies capacity development as the primary catalyst through which IOC will achieve its four high level objectives in the current 2014–2021 IOC Medium-Term Strategy.

The **vision statement** of IOC's Capacity Development Strategy:

Through international cooperation, IOC assists its Member States to collectively achieve the IOC'S high-level objectives (HLOs), with particular attention to ensuring that all Member States have the capacity to meet them.

The Mission Statement of IOC's Capacity Development Strategy:

The IOC will undertake relevant actions to assist Member States with developing and sustaining the necessary capacity to undertake activities necessary to achieve the IOC vision at the national level as well as at the international cooperation level.

This strategic framework provides six outputs and numerous activities that are elaborated in detail below. These outputs call for investing in people and the institutions of which they are a part, enhancing access to scientific tools and methodologies, reinforcing IOC's capabilities to provide services to Member States, enhancing the communication between scientific and policy makers communities, expanding ocean literacy in civil society and mobilising resources to accomplish these goals.

Output	Activity
1. Human resources developed	1.1 Academic (higher) education
	1.2 Continuous professional development
	1.3 Sharing of knowledge and expertise/ community building
	1.4 Gender balance
2. Access to physical infrastructure established or improved	2.1 Facilitating access to infrastructure (facilities, instruments, vessels)
3. Global, regional and sub-regional mechanisms strengthened	3.1 Further strengthening and supporting secretariats of regional commissions
	3.2 Enhance effective communication between regional sub-commission secretariats and global programmes as well as other communities of practice (incl. other organisations)
4. Development of ocean research policies in support of sustainable development objectives promoted	4.1 Sharing of information on ocean research priorities
	4.2 Developing national marine science management procedures and national policies
5. Visibility and awareness increased	5.1 Public Information
	5.2 Ocean Literacy
6. Sustained (long-term) resource mobilization reinforced	6.1 In-kind opportunities
	6.2 Financial support by Member States to IOC activities

The IOC will contribute to some of the outputs and activities, possibly assisted by other countries and organizations will develop others.

Looking at outputs 1, 2 and 3 it is clear to see that the activities supported under the Flanders-UNESCO Trust Fund for Science as well as those of the IOC Project Office for IODE have been implementing activities that contribute directly to these 3 outputs:

- OceanTeacher (IOC Project Office for IODE) has been providing continuous professional development and promoting the sharing of knowledge and expertise. It has also actively promoted community building (former students) [activity 1.2, 1.3]
- OceanTeacher (IOC Project Office for IODE) has an active gender balance policy aiming at 50/50 gender distribution in its courses; [activity 1.4]
- The ODIN projects supported by FUST always included 3 components: training, provision of equipment and operational support. [activity 2.1]
- The African Coastal and Marine Atlas project (part of ODINAFRICA) and the Caribbean Marine Atlas (CMA2) are actively collaboration and sharing expertise as well as technology. This is an example of activity 3.2.

This demonstrates that the capacity development model developed through the IOC Project Office for IODE and the FUST projects have in fact been trailblazers towards the IOC Capacity Development strategy.

4.6 Future challenges, opportunities and growth path

4.6.1 Impact of establishment IOC CD coordination in Oostende on activities in Oostende

The transfer of responsibility for IOC CD coordination from IOC HQ to Oostende is a clear acknowledgement of the overall importance and relevance of the IODE training programme to all of the IOC. The first task of the new IOC CD coordinator (also Head of the IOC Project Office for IODE) was the development of the IOC CD Strategy (see also under 3.5). Subsequently a new web site (http://www.ioc-cd.org) was developed by Project Office staff and hosted by the Project Office. The updating of the site will also be continued by the Project Office.

The development of the network of regional training centres will not have a negative impact on the level of training activity of the Oostende training facility. While the RTCs will focus on courses that are of local (regional) relevance there will always be a need for courses that have a global focus. In fact one of the major indirect objectives of the classroom model is the interaction between students (this is one of the major differences with pure e-learning) which often leads to informal networking and community building: after studying together for a week students continue to communicate with each other later which contributes to the community building which is so important for IODE. We therefore need to be careful that we do not loose the global community building and replace it “only” by regional community building. As such it is essential to continue hosting courses in Oostende as well. The role of the Oostende Training Centre should therefore focus on identifying upocoming training needs and developing the corresponding training resources, which can afterwards be transferred and adapted to/by the other OTGA RTCs. To this we should add that Oostende will also be the regional training centre for Europe (including Eastern Europe).

In the coming years the role of the Oostende training facility will increasingly focus on the development of reference courses for use by the network of RTCs with special emphasis on emerging topics related to not only oceanographic data and information management but also other topics within the mandate of IOC, specifically the implementation of SDG-14.

A challenge that has developed and increased since 2005 is the lack of indexation of the funding allocation to the Project Office under the MoU. While the staff cost increases annually due to indexation the total amount provided remains the same, resulting in an annual decrease of funding available for operations equal to index (approx.. 1.5-2%/year). This does not take into account increases of other operational costs (cost of tickets, cost of student accommodation,…).

4.6.2 Oostende’s role as meeting venue

The role of Oostende as IODE’s main meeting venue has grown and remained important during the past ten years. The central location of Brussels in Europe and affordable travel from any part of the world to Brussels, relatively good connections between the airport and Oostende (although this could be further improved), combined with the low cost of hotel accommodation in Oostende, make Oostende an excellent location for meetings.

4.6.3 Challenges

While staff at the Project Office has grown considerably it must be noted that most of the growth has been through recruitment of project appointment positions. By their very nature these positions are unstable as they depend on the projects they serve. Currently the majority of projects implemented at the Project Office are funded through the Flanders-UNESCO Trust Fund for Science (FUST). This funding source is shared between IOC, UNESCO/MAB and UNESCO/ECO. As such there is no certainty of funding. A second source of funding is the European Commission. Funding through tis channel is equally unpredictable and in many cases IOC cannot be a partner but only a sub-contractor. In terms of UNESCO Regular Positions and taking into account UNESCO's financial situation it is highly unlikely that additional regular positions can be secured for the Office in the foreseeable future. Staffing stability is currently provided by the two UNESCO regular positions (Head of Office, P-5 and OBIS project manager P-3 (the latter is actually shared at 50% with GOOS)) and the 3.5 FTE local staff positions (training coordinator, administrative coordinator, IT manager, administrative assistant). Staffing instability currently affects mostly ICT staff (software developer P-2, software developer P-1, database manager P-1). Taking into account the ICT work load of the Office this raises some concern.

5. CONCLUSION

Without any doubt the support provided by the Government of Flanders has been a key element in the establishment of the IOC Project Office for IODE as an internationally recognized training facility as well as emerging global data and information centre for oceanographic data and information.

Since its establishment in 2005 the Centre has gained global recognition and appreciation and with this, the Government of Flanders (Kingdom of Belgium), as one of the largest and most sustained financial contributors of the IOC of UNESCO. The combination of the direct support provided to the IOC Project Office for IODE, Oostende and the support provided through the Flanders-UNESCO Trust Fund for Science provide funding mechanisms that have proved to be highly efficient and effective (as compared to *ad hoc* donations) and are a model within UNESCO and its IOC: a recurrent annual contribution of staff and funding, combined with a competitive project-based funding scheme funding large scale as well as small scale activities has enabled the successful development and implementation of global and regional capacity development initiatives.

During the past 12 years the UNESCO/IOC Project Office has evolved from a small-scale satellite office dealing with training activities one of IOC's programmes (IODE) into the largest field office of the IOC with 10 staff members (two UNESCO regular positions, 4 project appointments and 4 seconded staff) managing the IODE programme activities (including OBIS), serving data and information management requirements of other IOC programmes as well as as the global hub of the OceanTeacher Global Academy which provides training facilities as well as e-learning platform for IODE as well as other IOC programmes and projects.

Taking into account the achievements of the IOC Project Office for IODE covering the two past terms of the MoU (2005-2012 and 2012-2016) it is recommended to renew the Memorandum of Understanding between UNESCO/IOC and the Flanders Marine Institute (1 January 2017 – 31 December 2020) with the same or similar conditions.

[DRAFT RECOMMENDATION]