

SIXTH FRAMEWORK PROGRAMME

PRIORITY 1.1.6.3

Global Change and Ecosystems



Contract for:

SPECIFIC SUPPORT ACTION

Annex I - "Description of Work"



Project acronym: GRAND

Project full title: GOOS Regional Alliances Network Development

Proposal/Contract no.: 505360

Related to other Contract no.: *(to be completed by Commission)*

Date of preparation of Annex I: July-December 2003

Dates of the contract: 1st February 2004 to 31st January 2006.

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1. Project summary

Large-scale operational ocean monitoring and forecasting networks, defined in the international programme Global Ocean Observing System (GOOS), are needed to implement global conventions and agreements signed by the EU and its member states, including the United Nations Convention on the Law of the Sea, International Convention for the Safety of Life at Sea, Convention on Biodiversity, Framework Convention on Climate Change, Programme of Action for Sustainable Development.

GOOS Regional Alliances co-ordinate the efforts of states around the world to implement GOOS. They have different capacities, resources and level of activity, but all seek to establish a global sustained system of observations to predict the state of the marine environment, to fulfil their duties in international agreements and to gain practical benefits for a variety of end-users and for public good.

Europe (EuroGOOS, MedGOOS) has world leadership. EC RTD projects such as MAMA, PAPA and ARENA support international co-operation for GOOS. MFSTEP develops the modelling effort for the environmental prediction. MAMA, as well as MERSEA, participate in the initial phase of the Global Monitoring of Environment and Security, the European contribution to global monitoring systems.

GRAND brings together all the GOOS Regional Alliances (GRAs) and is supported by the major international organisations related to GOOS (IOC, JCOMM, IGOOS). The partnership covers all the oceans on Earth to provide a forum, led by Europe, to harmonise the diverse regional systems within GOOS, while advancing the European contribution to the global system.

GRAND will facilitate the dissemination of best practice, technology transfer, development of international co-operation, establishment of observing systems in developing countries, application of results of EU projects to the broader international community active in the GRAs. This will help to strengthen the role of the EU on the international stage while contributing to the integration and strengthening of the European Research Area.

2. Objective(s) of the project and state of the art

Strategic objectives

- Disseminate European expertise and technology on ocean monitoring and forecasting.
- Support the participation of developing countries in the global ocean observing system (GOOS).
- Establish an effective dialogue among all the GOOS Regional Alliances and international programmes, for a coherent implementation of the global system.
- Promote the European contribution to the ocean and climate observing systems, as planned in the Global Monitoring for Environment and Security (GMES).
- Prepare a regional strategy for advancing the implementation of the regional monitoring and forecasting systems coherent with the global planning.
- Optimise the use of the best human resources in Europe, encouraging greater participation by women scientists.
- Encourage the young scientists and technologists to master innovative thinking and emerging technologies for sustained cost-effective ocean monitoring and forecasting.
- Contribute to the integration, strengthening and internationalisation of the European Research Area, fostering a pan-European approach.
- Uphold European competitiveness in ocean monitoring.

Global conventions and agreements, such as the UN Convention on the Law of the Sea, the International Convention for the Safety of Life at Sea, the Convention on Biodiversity, the UN Framework Convention on Climate Change and the Programme of Action for Sustainable Development require large scale operational monitoring and forecasting networks.

The European Union and the Member States signatories of the Conventions are expected to contribute to the system through firm commitment, and the goal is to build a sustained global infrastructure. The IOC-WMO-UNEP-ICSU programme for the Global Ocean Observing System, GOOS, has through the work of panels and committees produced design criteria and requirements for the establishment of a global system.

The main resources for GOOS today exist in national and regional systems that are justified by local or regional requirements. GOOS Regional Alliances (GRA) associated coastal states all over the world to implement the Global Ocean Observing System (GOOS) by co-ordinated contributions.

Europe (EuroGOOS, MedGOOS), has world leadership in the field. This leadership has been supported by the investment in marine research and technology of EC Framework Programmes 3, 4, 5, and is continuing in FP6. A strong European marine community has been created, and is now ready to contribute to the dissemination outside Europe.

EC RTD projects, such as MAMA, PAPA and ARENA are showing the way ahead for international co-operation. The *Operational Ocean Forecasting Cluster*, organised by the DG Research, has been adding value to leading edge scientific projects developing the scientific and technological knowledge base for ocean forecasting.

These projects, MERSEA, MFSP, MFSTEP, EUROROSE, EDIOS, ODON, DIADEM, TOPAZ, MEDAR/MEDATLAS, just to mention some, are addressing a variety of scientific and technological issues identified by the EC Framework Programmes as strategic for the sustainable development. As a whole Europe is producing a major contribution to the world science underpinning ocean monitoring and forecasting.

The GMES Global Monitoring for the Environment and Security (GMES), is providing the strategic framework to develop a European autonomous operational capability for environmental monitoring, and the European contribution to the global system. MAMA and MERSEA are pilot projects of the initial phase of GMES.

The European leadership has been particularly manifest at the 3rd International EuroGOOS Conference and held in Athens in December 2002. Scientists and managers from all the GOOS Regional Alliances attended the conference, exchanging views and experiences.

The concept of GRAND has been developed at the 1st GOOS Regional Forum during the Athens Conference, on the initiative of the I-GOOS Chair, in a brainstorming meeting participated by representatives of all GOOS Regional Alliances. The success of MAMA in the Mediterranean proves that international co-operation for a global ocean observing system is possible, even in very complicated geo-political areas. GRAND extends the MAMA concept to all the world.

GRAND aims to take the lead by bringing together all the GOOS Regional Alliances to disseminate best practice, share knowledge, transfer technology, build capacity, learning from each other to implement effective and efficient observing and forecasting systems for public good and for a variety of end-users, capitalising on the European scientific, technological and organisational capability.

GRAND is planning to establish the greatly needed dialogue between the operational initiatives at regional level, organised into GOOS Regional Alliances and the international organisations, committees, panels, planning the for a global system to ensure a coherent development of a long-term sustained Global Ocean Observing System (GOOS), including its contribution to the Global Climate Observing System (GCOS).

Specific objectives of GRAND are to:

- Build consensus, trust and co-operation between partners to ensure a well co-ordinated effort and harmonisation toward the implementation of GOOS.
- Take stock of ongoing EC initiatives such as the:
 - MAMA GMES Pilot Project, networking marine institutions from all Mediterranean countries to assist the establishment of a basin wide ocean observing system;
 - EDIOS project and its initial meta-database on European sustained marine observations;
 - GMES assessments of a) institutional scientific and technological requirements, b) data exchange and constraints to the use of data, and c) socio-economic issues.
- Survey and evaluate the present capabilities and activities, for systematic observations of the marine environment and ecosystem in all GOOS Regional Alliances and participating countries.
- Establish a profitable dialogue with the major international organisations related to GOOS to assess what is available and what is needed at global level for the implementation of the global observing system.
- Work towards an effective two-way interface between regional/national scale efforts, GMES and the global activity of GOOS, by using the GRAND-Network of GOOS Regional Alliances and bodies responsible for the global planning of GOOS.
- Match the inventories of the regional capacities, assets and needs compiled within the GRAND WP-INFORMATION with the requirements from global system, and deliver to GRAND WP-STRATEGY.
- Evaluate the European capacity to fulfil regional GOOS requirements and identify gaps in the present monitoring systems and in the capability to measure, model and forecast the ecosystem.
- Plan the European contribution to the global ocean observing system and to the ocean component of the global climate observing system.
- Disseminate good practice, transfer of know-how and technology from European GOOS Regional Alliances, and between GOOS Regional Alliances through advanced training workshops
- Transfer technology, know-how and operational experience through the advanced training workshops at the major institutions implementing GOOS or developing science and technology for GOOS.
- Support developing countries to participate in the implementation of and get benefits from the global ocean observing system.
- Provide, at the end of the project, a strategic forward look for advancing implementation of the regional monitoring and forecasting network.

General objectives of GRAND addressed by the Advisory Board in WP-Strategy are to:

- Ensure that the effort of GRAND keeps focused on the priorities set out in this proposal.
- Provide guidance, inputs and feedback in the preparation of the GOOS Regional Strategy.

3. Participants list

List of Participants

Partic. Role*	Partic. No.	Participant name	Participant short name	Country	Date enter project**	Date exit project**
CO	1	IOI - Malta Operational Centre, University of Malta (MedGOOS)	IOI-MOC	Malta	Month 1 (start of project)	Month 24 (end of project)
CR	2	Consiglio Nazionale delle Ricerche (MedGOOS)	CNR-IAMC	Italy	Month 1 (start of project)	Month 24 (end of project)
CR	3	Swedish Meteorological and Hydrological Institute (EuroGOOS)	SMHI	Sweden	Month 1 (start of project)	Month 24 (end of project)
CR	4	Institute of Marine Sciences, Middle East Technical University (Black Sea GOOS)	IMS-METU	Turkey	Month 1 (start of project)	Month 24 (end of project)
CR	5	Marine Fisheries Research Division (GOOS Africa)	MFRD	Ghana	Month 1 (start of project)	Month 24 (end of project)
CR	6	Indian National Centre for Ocean Information Services (Indian Ocean GOOS)	INCOIS	India	Month 1 (start of project)	Month 24 (end of project)
CR	7	IOC GOOS Rio Regional Programme Office, Directorate of Hydrography and Navigation (Tropical and South Atlantic GOOS)	Rio GOOS Office	Brazil	Month 1 (start of project)	Month 24 (end of project)
CR	8	IOC Sub-commission for the Caribbean and Adjacent Regions of UNESCO Secretariat	IOCARIBE-UNESCO	Colombia	Month 1 (start of project)	Month 24 (end of project)
CR	9	Pacific Oceanological Institute (NEAR-GOOS)	POI	Russian Federation	Month 1 (start of project)	Month 24 (end of project)
CR	10	South Pacific Applied Geoscience Commission (Pacific Islands GOOS)	SOPAC	Fiji Islands	Month 1 (start of project)	Month 24 (end of project)
CR	11	Southeastern Asian START Regional Centre (Southeast Asia GOOS)	SEA START RC	Thailand	Month 1 (start of project)	Month 24 (end of project)
CR	12	GRASP / Servicio Hidrografico y Oceanografico de la Armada	GRASP / SHOA	Chile	Month 1 (start of project)	Month 24 (end of project)

CR	13	Imperial College of Science, Technology and Medicine	ICL	United Kingdom	Month 1 (start of project)	Month 24 (end of project)
CR	14	Across Limits Ltd.	ACL	Malta	Month 1 (start of project)	Month 24 (end of project)
CR	15	Intergovernmental Oceanographic Commission / Perth Regional Programme Office	IOC PERTH OFFICE	Australia	Month 1 (start of project)	Month 24 (end of project)
CR	16	IOC WMO UNEP Intergovernmental Committee of GOOS	IOC / IOGOOS	France	Month 1 (start of project)	Month 24 (end of project)
CR	17	Centre of Excellence for Shelf Seas Science CeSSS at the Institute of Oceanology of the Polish Academy of Sciences	CeSSS / IOPAS	Poland	Month 1 (start of project)	Month 24 (end of project)
CR	18	International Ocean Institute – Operational Centre of the Caspian Sea	IOI-Caspian Sea	Russia	Month 1 (start of project)	Month 24 (end of project)

*CO = Coordinator
CR = Contractor

** Normally insert “month 1 (start of project)” and “month n (end of project)”

These columns are needed for possible later contract revisions caused by joining/leaving participants

4. Relevance to the objectives of the specific programme and/or thematic priority

GRAND addresses **Sub-Priority VI Operational forecasting and modelling including global climatic change observation systems**", specifically area **VI.I Development of observing and forecasting systems**.

The objective of the sub-priority is (i) to make systematic observations of oceanic parameters, including those of climate, so as to improve forecasting of the marine.....environment, (ii) consolidate long-term observations for modelling and in particular prediction, (iii) contribute to international programmes, (iv)...focus on the development of observing and forecasting systems such as ..GOOS (Global Ocean Observing System).

(i) Systematic observations of oceanic parameters

Systematic observations of oceanic variables are performed by large scale operational ocean monitoring and forecasting networks, defined in GOOS, to comply with international conventions and agreements, signed by EU and member states. They are in turn expected to contribute to the system through firm commitments to build a sustained global infrastructure.

The Intergovernmental Committee for GOOS (I-GOOS) at UNESCO, chaired by Silvana Vallerga, Advisor to the Co-ordinator of GRAND, has the role of defining the specifications and the resources for the commitments of Member States for systematic oceanic observations. I-GOOS in its VIIth session on March 10-14, 2003 has endorsed the GRAND proposal as a tool to contribute to the implementation of the global ocean observing system.

GRAND brings together 9 GOOS Regional Alliances They associate over 80 coastal states collaborating to implement GOOS.

The concerted effort envisaged in the project will improve systematic observations in terms of geographical coverage, effectiveness and range of measured variables.

Europe (EuroGOOS, MedGOOS) has world leadership. It is thus taking the responsibility of launching this project to support other regions of the world.

The most relevant GRAND activities are to:

- Survey the present regional capacities, assets, for systematic observations of the marine ecosystem in the participating GOOS Regional Alliances.
- Assess the key regional marine environmental problems and specific regional needs.
- Disseminate 21st century technology, for the monitoring and prediction of the marine ecosystem through advanced training workshops.
- Transfer good practice, know-how, cost-effective technologies from Europe and between GOOS Regional Alliances through joint meetings and the advanced training workshops.
- Design jointly a regional strategy to support the implementation of GOOS contributing also to the global component of GMES.
- Launch the GRAND Publication Series to support the GOOS Regional Alliances, inform GOOS stakeholder and support a permanent training scheme for the regions.
- Empower the regions to achieve the goals of I-GOOS: (i) Transfer of prototypes from the research into the operational mode, (ii) Learn from the regions, (iii) upgrade capacities, (iv) address the legal framework of GOOS related observation in the EEZ.

(ii) Consolidate long-terms observations

The consolidation process requires national and international commitments. GRAND is supporting the dialogue between the regional initiatives - GOOS Regional Alliances - and the IOC related bodies planning the global system, I-GOOS, GSC, JCOMM. The aim is to ensure a coherent development of a long-term sustained GOOS, including its contribution to the Global Climate Observing System (GCOS).

The relevant GRAND actions are to:

- Establish a profitable dialogue with the major international organisations related to GOOS (I-GOOS, GSC, JCOMM) to assess what is available and what is needed at global level for the implementation of the global observing system.
- Work towards an effective two-way interface between regional/global scale efforts, GMES and the global activity of GOOS, by using the GRAND-Network of GOOS Regional Alliances and bodies responsible for the global planning of GOOS.
- Prepare a regional strategy to support the implementation of GOOS and long-term monitoring systems needed also to contribute to the global component of GMES.

(iii) Contribute to international programmes

A number of international programmes are related to the implementation of GOOS, such as IMBER, supported by SCOR, IOC-IODE. GOOS is itself an international programme.

In order to establish a profitable dialogue with international bodies, advantage is taken of the participation in GRAND of high ranking scientists with responsibilities in international bodies.

The relevant GRAND activities are:

- Work towards an effective two-way interface between regional/national scale efforts and the bodies responsible for the global planning of GOOS.
- Contribute to link GMES and the global activity of GOOS, by using the GRAND-Network of GOOS Regional Alliances.

(iv) Focus on the development of GOOS

The I-GOOS (Intergovernmental Committee for GOOS auxiliary body of IOC-UNESCO) is the official body, participated by almost all coastal states of the world, in charge of the development of GOOS.

I-GOOS at the VII session, March 10-14 2003, has endorsed the GRAND proposal as a tool to contribute to the implementation of the global ocean observing system.

(v) Societal and policy objectives

GRAND will address societal and policy issues related to ocean monitoring and forecasting using the results of the cross cutting studies of the initial phase of GMES, which include socio-economic studies, to be presented at the end of 2003.

The strategic objective of GRAND addresses a number of societal and policy issues.

The gender issue

- GRAND will optimise the use of the best human resources in Europe, encouraging greater participation by women scientists.

The participation of women scientists is at the highest level in GRAND. Silvana Vallerga is Advisor to the Co-ordinator, and leader of WP-Strategy; Shubha Sathyendranath is a member on the Advisory Board. Two other partners responsible are female.

GRAND will support the mainstreaming of the gender issue in GOOS, taking into account the recommendations of the Group of Helsinki established by the European Commission, coherently with the activities of the EC Programme on Science and Society.

Promote the international role of Europe

Europe is leading in GRAND the initiative of networking the GOOS Regional Alliances. The participants to the endeavour are from 16 countries all around the world. GOOS Regional Alliances represent over 80 countries.

Furthermore the project is placing particular evidence in supporting the development of capabilities in developing countries to participate into the GOOS.

Specific GRAND objectives are:

- Support the participation of developing countries in the global ocean observing system
- Promote the European contribution to the global ocean and climate observing systems, as planned in the Global Monitoring for Environment and Security (GMES)
- Uphold European competitiveness in ocean monitoring.

Capacity building

A specific workpackage – WP2 Empowerment is devoted to capacitate scientists, technologists, and managers to improve the expertise of human resources underpinning the necessary research and technological development, managing of infrastructures and maintenance of observing platforms.

The specific related GRAND objectives are to:

- Capacitate on 21st century technologies for ocean monitoring and forecasting the GOOS Regional Alliances with the advanced training workshops and the GRAND publication series.
- Disseminate good practice, transfer of know-how and technology from European GOOS Regional Alliances, and between GOOS Regional Alliances through the advanced training workshops
- Transfer technology, know-how and operational experience through the advanced training workshops at the major institutions implementing GOOS or developing science and technology for GOOS.
- Encourage the young scientists and technologists to master innovative thinking and emerging technologies for sustained cost-effective ocean monitoring and forecasting

Contribution to ERA

As a whole the proposal enables a joint effort between a large number of European institutions and third countries. EuroGOOS represents 30 institutions in Europe; MedGOOS represents 20 institutions, all working together, thus providing a building block for ERA.

GRAND contributes to the integration, strengthening and internationalisation of the European Research Area, fostering a pan-European approach with the broad international cooperation covering over 90 countries.

5. Potential Impact

Current situation and state-of-the-art of the research

There is substantial European activity in monitoring the ocean globally and in European Seas. These are well documented in the EuroGOOS publication series, and in the IOC publications.

In situ monitoring - Monitoring of coastal seas depends mainly on in situ observations. These include periodic surveys by ships, such as the long-standing work of ICES in support of fisheries, and mapping of chemical concentrations. These have the advantage of high quality measurements, but tend to suffer from poor space-time sampling. Increased sampling is being introduced by the EuroGOOS Ferry-box programme. Some national Environment Agencies undertake routine surveys of their waters using a combination of ships and aircraft (including lidar altimeter mapping). A permanent ring of unmanned tide gauges and moored observation stations provide sea level, meteorological and wave data, the last of these being critical for monitoring swell.

In situ monitoring of the global ocean is needed for climate prediction. Europe's climate fluctuates in response to the North Atlantic Oscillation, and is vulnerable to changes in the thermohaline circulation. Predicting these variations requires observations both from space and in situ. Europe is participating in the international ARGO programme of drifting profilers, and in the GODAE programme designed to assess its impact on modelling changes in ocean circulation.

Modelling Meteorological experience has shown that the best way to extract useful information from observations is to assimilate them into prognostic models which realistically simulate the system being observed. That is the basis for weather forecasting. The sophisticated methods of data assimilation are being taken up in operational ocean forecasting (FOAM, MERCATOR, POLCOM), and in research models. Transient eddies which contain most of the kinetic energy in the global ocean circulation, and the fronts, jets and large internal waves which are important in coastal seas can now be resolved. Effective specialist models exist for coastal engineering and storm surge prediction for coastal flood protection and port operations (negative storm surges). Progress has been slower in developing models for water quality (pollution) and fisheries, both of which are held back by inadequate scientific knowledge of the ecosystem, and modelling techniques.

Data communication Effective ocean forecasting, and especially nowcasting depends on rapid transmission of data to modelling centres and service providers. And it is important that products from service providers reach their customers fast. This is obvious, but many of the deficiencies of existing marine environmental services are attributable to failures of timely data and product communication. In part this arises from the need to gather data from a number of countries operating different systems. The International Ocean Data Exchange (IODE) committee is dealing with the issue.

Duplication of effort Operational oceanography started at local level under national control (port management and offshore oil and gas, coastguard). This has led to duplication and incompatibility in monitoring, modelling and analysis systems in regions where a single coherent system would offer logistic and economic advantages. EuroGOOS notes that there are 23 systems in the southern North Sea. There are socio-economic and legal (UNCLOS) difficulties to overcome before an efficient ocean observing system can be established. Pre-operational trials are the first step towards collaborative operational systems.

New technology Monitoring systems are based on observing tools and models first used in oceanographic research. Substantial effort is needed to engineer research tools for operational use; the investment is justified by cost saving, improved quality, and new operational products. Robotic observing systems (notably unmanned autonomous vehicles) are revolutionizing ocean monitoring by replacing costly ships and working in hazardous locations (under ice, in stormy weather). New biochemical sensors and remote sensing by HF radar (EC project EuroROSE), optics (lidar, holography) and acoustics (tomography, thermometry) also hold potential for operational monitoring. There are furthermore several promising new tools; The problem is that there is no

mechanism to provide the sustained funding to engineer them for operational use; development often depends on diverting research funding, with no guarantee of the sustained support needed over ten or more years.

Space The global aspect is dominated by satellite observations (ESA, Eumetsat), with well established ground stations and advanced procedures for calibration by in situ measurements. Scatterometer data are assimilated into operational weather forecasting at the ECMWF and national weather agencies. Altimeter data are assimilated into operational global ocean models (FOAM and MERCATOR, and a number of commercial, regional and pre-operational models, (EC projects DIADEM, MFS). SAR data are used operationally for shiprouting in ice-covered seas. Research is under way to exploit satellite SAR and altimeter data for wave prediction. The best temperature measurements come from ATSR, but the coverage is patchy because of clouds, and operational temperature maps remain disappointing. Satellite ocean colour images remain promising but as yet under exploited, largely because of inadequacies in the state of knowledge about the marine ecosystem, and ecosystem modelling techniques.

Impact on the implementation of activities of the work programme

GRAND covers the majority of the objectives of sub priority 6. It is expected to have a large impact on the activities of the work programme, comparable with the scale of ambition of the proposal.

The SSA GRAND will add value to the results of the over 10 large EC funded RTD projects developed within the EuroGOOS and MedGOOS framework providing a world wide forum for the application of results (MAMA, PAPA, ARENA, MFSP, MFSTEP, EuroROSE, MEDAR/MEDATLAS, DIADEM, TOPAZ, EDIOS, MERSEA).

The proposal will further increase the impact of the Cluster for Operational Ocean Forecasting bringing a full international dimension, additional expertise and end-users.

GRAND will assist MAMA to contribute, and will contribute itself, to the establishment of GMES by 2008, evaluating the European capacity to fulfil GOOS requirements and identify gaps in the present monitoring systems and in the capability to measure, model and forecast the ecosystem.

The global network for ocean monitoring and forecasting resulting from GRAND will be a contribution to the global component of GMES.

The strategic forward look for advancing implementation of the regional monitoring and forecasting systems coherent with the global planning and the end of the project will prepare future community RTD activities.

Value added to the impact by the European dimension

GRAND has a pan-European dimension. Over 40 European institutions participate in the project through EuroGOOS (30 members in 17 countries), MedGOOS (20 members in 16 countries), Black Sea GOOS (10 members in 6 countries).

The large European dimension is mirrored by the large international partnership. The 9 GOOS Regional Alliances, 2 IOC GOOS Regional Offices represent institutions in over 70 countries. GRAND is supported by the results of the activities of six major international bodies: IOC, I-GOOS, COOP and OOPC, JCOMM, POGO. These will provide the global framework for the European partnership.

The value added to the proposal by the pan-European dimension of the project can be identified into the following major impacts:

- Europe is leading the diverse GOOS Regional Alliances to establish a co-operative network embodying over 70 countries
- GRAND will establish the dialogue regions/GOOS bodies to harmonise the regional data and product, and the global requirements will be established.

5.1 Contributions to standards:

GRAND will build upon “best practice” established in the most advanced GOOS regions, such as EuroGOOS and its sub-regional implementations in the Baltic and in the Mediterranean. In particular the question of monitoring standards, quality control and data exchange policy will be addressed.

All the participants will discuss the issues, and best practice of interest transferred, to the managers of the GRAs during the GRAND training workshops. The GRAND publication series will help toward the broad dissemination, and will contribute to set sound basis for standards.

Monitoring standard and quality control

The reports for the first phase of the GMES will be taken into full account. The compliance with the first phase of GMES, and specifically with the finding of the GMES cross-cutting assessment BICEPS (Building an Information Capacity for Environmental Protection and Security) will be supported by the participation to the Advisory Board of Peter Ryder, Chairman of EuroGOOS and a consultant to the BICEPS study.

The quality control will address: calibration of instruments, optimisation of sampling strategies, verification of products against independent data collected for that purpose, and detailed diagnosis of forecasts. The quality control system will also focus on improving products to end-users.

The experience on the monitoring standards, and the necessary quality control for operational oceanography will be forwarded by operational agencies participating in GRAND members, such as SMHI. Furthermore the work done within MAMA and related S&T projects on data quality control will be taken into account.

Data policy The XXII Assembly of the IOC in June 2003 has approved the IOC policy on data exchange. The data policy has been developed with a large contribution of EuroGOOS and now it will be implemented in the regions. Hans Dahlin, EuroGOOS Director has been instrumental in developing the data policy. His participation in GRAND will help with the implementation. The strategy for the establishment of a marine XML for data gathering and exchange, developed within IOC programmes and EuroGOOS will be also be part of the endeavour. The GRAND co-ordinator, Aldo Drago, is participating to the International Ocean Data Exchange (IODE) committee, thus ensuring the coordination between the work of GRAND and of IODE.

5.2 Contribution to policy developments:

GRAND is contributing to the regional operation of GOOS. It is thus part of the global effort for the implementation of sustainable development strategies and related policies, as defined at the UNCED (Rio De Janeiro, 1992), WSSD (Johannesburg, 2002) and the Gotheborg conference.

GRAND will contribute to the development of the environmental policy of the Union. The Commission has recognised the need for an overall European Union approach to monitoring to support the Sustainable Development Strategy of the Community "Sustainable development has been a paramount objective of the European Union since the Amsterdam Treaty of 1997... the Commission calls for “establishing by 2008 a European capacity for global monitoring of environment and security (GMES)”. [COM (2001) 609 final]. National programmes alone cannot address problems that are trans-boundary in nature, such as the transport and re-suspension of pollutants, impact of storms, coastal erosion, shift in fish stock migration, and toxic algal blooms.

The project will contribute to the Environment policy addressing the 6th Environmental Action Plan 5(3)- Climate Change Convention, 6(b) Floods, Community Action Plan, 6.1,6.2(g)-Marine Thematic Strategy & Coastal Erosion 7.1,7.2(e) Water Framework Directive and the Information Management Tools-ESDI (DG ENV.B.3/HDG D (2001). The collaboration with national Environment Agencies will assure adherence to the EC Environmental policy. Mike Depledge, UK Environment Agency will participate in the GRAND kick-off meeting to establish a co-operation with the GRAs.

Scientific, technical, organisational/institutional, legislative problems have to be solved at European, and global, level to produce and distribute useful information from observations collected on a long-term basis and assimilated into dynamical models. The resulting information, whether this relates to short-period crises or to long-term environmental change, is likely to have a profound effect on European policies and the mobilisation and commitment of substantial resources. GRAND will contribute to develop a global ownership of the underpinning monitoring and the data processing.

Equal opportunity: the proposal will take into full account the gender policy of the EU promoting the role of women in science. The gender issues are addressed in the part 9.

5.3 Risk assessment and related communication strategy:

Risks are not associated with the execution of GRAND. The risk for the ecosystem of new monitoring technologies will be addressed at the GRAND training workshop.

6. Project management and exploitation/dissemination plans

6.1 Project management:

The GRAND project management will be carried out in a dedicated WorkPackage (WP0 GRAND Co-Ordination) and is devised to address the trans-continental partnership and the multifaceted activities of the project. More specifically the project management targets are to:

- build consensus, trust and co-operation among partners;
- monitor the project for timely delivery of results according to the declared milestones;
- optimise the benefits of community funding;
- harmonise the project activities into the GMES plan;
- bring together EU funded, national and regional initiatives to contribute to the integration and strengthening of the European Research Area;
- mainstream the gender issue.

The project responsibility will be shared by the Project Co-ordinator, Aldo Drago (MedGOOS Secretariat, IOH-MOC, Malta) and the Advisor to the Co-ordinator, Silvana Vallergera (I-GOOS and MedGOOS Chair, CNR, Italy). They have a long experience of sharing work together within the MedGOOS Association, in the implementation of the MAMA project and other trans-national projects.

The Project Co-ordinator will ensure the communication flow in the network of GOOS Regional Alliances, organise the general GRAND meetings and the related management meetings. The Co-ordinator will communicate with the EC. The Advisor to the Co-ordinator will establish links with international organisations and organise the specialised training workshop workshops, taking care of experts needed for the training workshops and the GRAND Regional Strategy, and addressing the gender issue.

The management structure is organised into: (i) the Management Committee (for decision making), (ii) the Advisory Board (for external advice), and (iii) the GRAND Alliance (for planning and endorsing).

The project management is furthermore facilitated by the fact that the Project Coordinator, the Advisor to the Co-ordinator and the Advisory Board Chair will be also leading the three GRAND WPs respectively.

The **Management Committee** is composed of:

The Project Coordinator and WP1 INFORMATION leader; the Advisor to the Co-ordinator and WP2 EMPOWERMENT leader; and the WP3 STRATEGY leader and Chairman of the Advisory Board.

The Management Committee will be chaired, by the Project Coordinator, further participated by an EC Officer as an observer, and supported by the Project Assistant and Project Secretarial Office within the MedGOOS Secretariat at the IOH-Malta Operational Centre. It will meet approximately every 6 months.

The specific tasks of the Management Committee are to:

- carry the technical and scientific responsibility for the project execution;
- co-ordinate the activities and integrate the results of the different GRAs;
- prepare yearly reports;
- catalyse inter-regional and intra-regional synergies and exchanges between GOOS Alliances, with GMES and with global programmes.

GRAND - GOOS Regional Alliances Networking Development



FIG. 1 SCHEMATIC DIAGRAM OF THE GRAND MANAGEMENT STRUCTURE

The **Advisory Board** – composed of distinguished senior scientists with a high profile and international reputation in operational oceanography:

- John Woods, past Chair of J-GOOS and EuroGOOS, Imperial College of Science, Technology and Medicine, London, UK
- Jim Baker, Academy of National Sciences, Philadelphia, USA
- Harlyn Halvorson, Head Department of Marine Policy, University of Massachusetts, Boston, USA
- Tony Knap, Co-chair of the Coastal Observing Ocean Panel (COOP) for GOOS, Director Bermuda Biological Marine, Bermuda
- Peter Ryder, EuroGOOS Chair, GMES Assessor
- Shubha Sathyendranath, Executive Director of the Partnership for Observation of the Global Oceans society (POGO), Bedford Institute of Oceanography, Canada.

The Advisory Board will be chaired by the GRAND WP3 leader. It will meet twice formally during the project lifetime, with room for ad hoc meetings called by the Chairman when deemed necessary. The Advisory Board will:

- advise on the scientific and technical quality of the work carried out,
- assist the Management Committee in the biannual progress evaluation of the project,

- ensure links and benefits from related global and regional activities in operational oceanography,
- contribute to the preparation of the GRAND Strategy (WP3)

The **GRAND Alliance** – participated by all members of the GOOS Regional Forum (GOOS Regional Alliances), the Advisory Board, the international organisations and international programmes participating in GRAND. The GRAND Alliance meetings will be chaired by the Advisor to the Co-ordinator and Chair of the GOOS Intergovernmental Committee.

The GRAND Alliance will meet twice, taking advantage of the conjoint meetings of the GOOS Regional Forum and I-GOOS meeting. It will be supported by the MedGOOS Secretariat.

It will:

- overview the project implementation
- bring all the regional groups together to benefit from each other's achievements and diffuse “best practice”,
- exchange ideas and experiences for future activities,
- monitor and assess the progress on planned activities within the project.
- build synergies and joint initiatives between the GRAs, in line with the harmonious development of GOOS.

The GRAND Alliance extends the concept of the GOOS Regional Forum, established by the Intergovernmental Committee for GOOS (I-GOOS) to provide a tool for the harmonisation of the work among the GOOS Regional Alliances and to serve Member States of IOC in the implementation of GOOS. The GOOS Regional Forum is chaired by the I-GOOS Chair and GRAND Advisor to the Co-ordinator.

The project will furthermore avail of a full-time Project Assistant, based at a Secretarial Office at IOI-MOC, University of Malta that will be responsible for the administrative issues and the routine project management. The Secretariat will:

- assist the Coordinator and Advisor to the Coordinator, the Steering Committee and the Advisory Board
- maintain and strengthen contacts between partners
- organise meetings
- disseminate updates on the project activities
- set up and maintain the project website

Reporting to the Commission

Reports to the Commission will be submitted in accordance with Articles 6 and 7 of the GRAND contract, the further details described in Article 7 of the General Conditions at Annex II to the GRAND contract and any other instructions that may be issued by the Commission.

All these reports will be prepared by the GRAND partners and approved by the Management Committee, which has the technical and scientific responsibility for the execution of the project.

Organisation of meetings

The partners will meet regularly to establish the interacting network needed for the accomplishment of the GRAND objectives. In order to make scale economy and to get higher visibility, the meetings will be held back to back with large international meetings related to GOOS.

The kick-off meeting will be held during II GOOS Regional Forum, organised by I-GOOS to support the Pacific Islands GOOS. The second general meeting will be organised back to back to the VIIth meeting of I-GOOS, in Paris, possibly in conjunction with the IVth EuroGOOS International

Conference. There will be thus a total of two general meetings, with two specialised training workshops and additional interim management meetings furnishing enough interaction between partners.

The Grand general meetings will be organised by the project Secretariat Office. The two management meetings organised back to back with the specialised training workshops, and the meetings of the Advisory Board will be under the responsibility of the Advisor to the Co-ordinator.

(Schedule of meetings in Section 7.2)

Assurance of quality and performance

The participants are used to work in international programmes and together, either at regional or global level within the GOOS bodies (I-GOOS, GSC and GOOS Regional Forum). All the partners come from high ranking institutions and have responsibilities in international bodies.

The project is supported by a sound decision making structure and an experienced Secretariat that has already performed successfully similar functions in the EC funded project MAMA.

The interaction among participants will be facilitated by the project Secretariat Office, the GRAND website, and through the project meetings.

The control of the scientific and technological performance of GRAND will be done by the Advisory Board composed of world-leading scientific experts with a sound experience in the management of large international programmes.

The coherence with the global strategy is ensured through the Intergovernmental Committee for GOOS (I-GOOS) of UNESCO that has endorsed GRAND at its VI session in Paris (March 10-14 2003) and by the endorsement provided by the IOC General Assembly at its XXII meeting (Paris 25 June – 3 July, 2003).

6.2 Plan for using and disseminating knowledge

By its very nature GRAND has to primarily promote the networking of GRAs, consolidate a common approach and synergise activities to continue the network after the project termination and support follow-up actions. GRAND moreover targets to establish and nourish dialogue between the regional and the global scale initiatives relevant to operational oceanography.

The plan for using information generated by the project and disseminating results is thus a key element of GRAND and must cater for this multi-dimensional aspect of the project. The preliminary plan expounded in this section is only a starting point and will be refined in a first instance during the project kick-off meeting, and updated subsequently during the project lifetime under the responsibility of the Management Committee. The Final Plan for dissemination will be part of the GRAND final report.

Initial plan and policy for information dissemination

The need for the efficient flow of information is necessary at several levels:

- (i) inherently at the project implementation level between partners
- (ii) as a two-way flow with key interested parties (such as with the global scale programmes initiatives, and relevant bodies, as well as the members of GRAs) to enable pertinent access and exchange of information as well as feedbacks on project developments and results.
- (iii) as a mechanism to provide a service to others, especially at the regional level, by disseminating good practice, know-how, expertise, through the sharing of project results and activities, as well as provision of support in the regional development and planning of GOOS.

The dissemination of knowledge is done by different tools (listed below) with a different level of involvement, from the representatives of the GRAs, to all project participants and to a broader audience. Vertically this will be achieved mainly through the function of I-GOOS and the GOOS Regional Forum, and horizontally by direct interactions at regional level with key players in the associated countries, by means of the project website and associated electronic activities (such as fora and news updates), as well as by other dedicated project activities.

The GRAND Publication Series is a project deliverable that directly targets the dissemination outside the consortium. These publications will have a broad dissemination at the level of knowledge providers, service providers and policy-makers. The GRAND Publication Series will be initiated within GRAND, but will continue after the project through the activities of the GRAs and of the GOOS related activities.

Key tools for dissemination

- GRAND training workshops will disseminate innovative European know-how for the benefit of the GOOS regions. The perspective is to establish a sustained GOOS Advanced School. The training workshops will provide an avenue for the diffusion of information to improve the performance of the GRAs through the high level lectures on advanced technologies and management tools. The training workshops will be also an important tool of networking between regions and high scientific level institutions. They will provide the basis for a sustained system of continuous training.
- GRAND Publication Series to serve as a reference on GOOS dealing with key issues relevant to operational oceanography and providing the basis for a common approach. The GRAND publications will be a benefit to managers, scientists, policy makers and public at large. The dedicated publications will support the continuous upgrading of awareness and expertise in the regions.

- GRAND meetings back to back with other meetings such as the South Pacific Forum, IGOOS VII, EuroGOOS 4th conference, thus informing a broad community on GRAND activities.
- GRAND website which will be used both for internal dissemination of information, reports and relevant material, as well as a showcase and a source for general open consultation from outside the partnership. The Grand WWW will have parts targeted to a general public and links with the GRA websites and other sites relevant to GOOS .

6.3 Raising public participation and awareness

The realisation and relevance of GOOS will indeed be measured against its relevance to the user community, its scope to sustainable development, to the general improvement of life and the welfare of the public at large that it will manage to trigger.

The dissemination of information will be unrestricted among partners. The dissemination of the GRAND publications and of the reports, described as a public deliverable, will be strongly promoted. The Project Co-ordinator, in consultation with the Advisor to the Coordinator and the Management Committee, will be responsible to issue authorisations for the dissemination of other material.

- Mass media, newspaper and television channels will be addressed to inform on the benefits of, and raise consensus on the long term ocean observing system; and on the international cooperation, supported by Europe.
- Meetings, promoted at regional and national level. Media coverage will be ensured.

GRAND is addressing a broad community of stakeholders with the first two publications, the GRAND Regional Strategy, and the VEW Handbook of the GRAND Publication Series.

Imperial College of Science, Technology and Medicine has an outstanding tradition in high level education and in overseas training. It will manage the preparation and diffusion of the GRAND Publication Series toward a broad audience.

The activities of GRAND and its achievements will be promoted through the organisation of the GRAND meetings back to back with other meetings. This regional strategy has proven very successful with MAMA, and it will be replicated with GRAND. The meetings envisaged are the GMES project leaders meetings, the GMES forum, the IGOOS and IOC meetings. GRAND activities will be presented at all the GOOS regional meetings in all the GOOS Regions.

Furthermore the Coordinator and the Advisor to the Coordinator will be promoting GRAND at the meetings, conferences and other fora of the major international organisations, committees and panels where they are expected to participate in their capacity of representative of international and national organisations.

The media will be informed of the activities of the regions in GRAND, on the achievements of pilot projects. The experience of MAMA will greatly help in promoting the necessary awareness to optimize the public participation.

7. Workplan – for the full duration of the project

7.1 Introduction - general description and milestones

Large-scale operational ocean monitoring and forecasting networks, defined in the international programme Global Ocean Observing System (GOOS), are needed to implement many global conventions and agreements signed by the EU and member states, including Convention on the Law of the Sea, International Convention for the Safety of Life at Sea, Convention on Biodiversity, Framework Convention on Climate Change, Programme of Action for Sustainable Development.

GOOS Regional Alliances co-ordinate the efforts of states all round the world to implement GOOS. They have different capacities, resources and level of activity, but all seek to establish a global sustained system of observation to predict the state of the marine environment, to fulfil their duties in international agreements and to gain practical benefits for a variety of end-users and for the public good in general.

The European component of GOOS, EuroGOOS is presently leading the implementation phase of GOOS. Operational activities are already in place and several of European RTD initiatives to develop ocean forecasting have received support from the European Commission. Consequently, Europe is taking the responsibility to initiate a networking dialogue with other GOOS partners, in order to promote European know-how, to share expertise in joint activities, assist in identifying gaps in the present capability of other regions, support capacity building and enhance advocacy and awareness of GOOS.

GRAND brings together all GOOS Regional Alliances (GRAs), with the support of the major international organisations related to GOOS. The partnership covers all the oceans on Earth to provide a forum, led by Europe, to harmonise the diverse regional systems within GOOS, while advancing the European contribution to the global system. GRAND will help towards the FP6 goals in sustainable development and the global component of GMES and will moreover catalyse the propagation of European methods, equipment, industry applications, etc. to the rest of the world.

The concept underlying the work has already been successfully experienced by the Project Co-ordinator and Advisor to the Co-ordinator in the EU project MAMA, linking all Mediterranean countries.

All the partners will work together in the different tasks. The exchange of experience, assets and problems, and the collaboration in the work will furnish the synergies and joint efforts for a major approach to the implementation of GOOS at regional level. The capacity building elements in the project will involve all the GRA managers. The whole organisation of GRAND is such as to build trust and a strong institutional and networked infrastructure set to meet the future activities and next steps.

The legacy of GRAND for the EU, and the global GOOS is the goal of the final document. The regional strategy for GOOS is meant to serve the EU, contributing to the implementation of GMES and to serve the Intergovernmental committee for GOOS (I-GOOS) for the regional implementation of GOOS.

The activities are organised into four workpackages that are linked to each other at several stages. Workpackage 0 concerns the project coordination and is described in detail in Section 6. The rest of the workpackages are briefly described below:

WP1 GRAND – Information

Within this workpackage a survey will be conducted amongst the existing and potential GRAs to obtain information on, and evaluate on a regional basis: (i) the nature and extent of key marine environmental issues in the various GOOS regions, and (ii) the capabilities currently deployed in terms of ongoing initiatives, methodologies and practices, technological infrastructures and equipment, resources and funding to address these issues.

The scope of the survey is to:

- (i) Assess the status of GOOS implementation in the regions and furnish important indicators to the regional strategy for GOOS, and to the points of coherence needed between global planning and regional activities.
- (ii) Obtain an inventory on local assets and needs grouped by regions
- (iii) Propose awareness for cross-regional synergies between GRAs, and
- (iv) Work towards overcoming the disparate missions of different national ocean agencies.

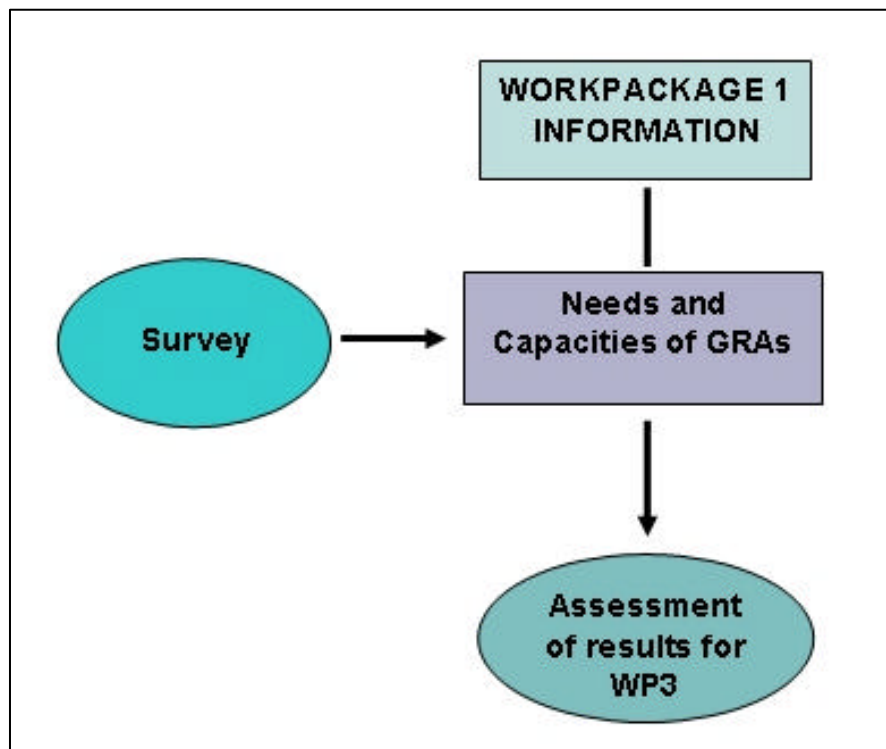


Fig. 2 Flow diagram and main elements of WP1

WP2 GRAND - Empowerment

It will contribute to empowering GRAs to participate with local expertise, and benefit, in GOOS and GMES sustainability. The performance of the GRAs will be improved through a specialised training scheme for the GRA managers providing them with guidance on GOOS and GMES, and on 21st century technology in ocean observations and modelling. A demonstrator will be developed for training on the Virtual Ecology Workbench (VEW). The medium term objective of this WP is to provide a scheme for the permanent training for the GRAs.

Two specialised training and strategy workshops will be organised in 2004 and 2005 on the following topics:

- Advanced and cost-effective methods for ocean observation and forecasting.
- GOOS possible training schemes (short course, distance learning, on-the-job training)
- Pilot initiative for the application of new technologies to GOOS regions (*MAMA-What if? Prediction*) to be participated by the regions
- Virtual Ecology Workbench (VEW), software tool as a demonstrator for What if? prediction
- Series of GRAND publications
- Regional strategy

Each specialised training and strategy will provide an insight on the 21st century technologies for GOOS and GMES in transition from the research to the operational mode and the possible funding scheme for underpinning research and pilot initiatives.

A specific tool for the What-if? Prediction, the Virtual Ecology Workbench, will be developed by the COSMIC group at Imperial College London. The VEW will be prepared and analysed in the first year of the project. Then the β test will be done for 3 months by selected users. The VEW and its draft handbook will be presented at the 2nd GRAND training workshop.

The demonstration of the Virtual Ecology Workbench (VEW) will show how it can be used for What-if? Prediction. It will cover the following points:

1. The VEW handbook.
2. Basic concept and structure.
3. Analysing an ecological problem for What-if? Prediction on the VEW.
4. Creating a new virtual ecosystem to assess proposals for remedial action
 - a. Designing the model.
 - b. Designing the scenario.
 - c. Specifying the ecosystem problem.
 - d. Specifying proposed remedial action.
 - e. Specifying the output data set.
 - f. Running the job.
5. The properties of the virtual ecosystem data set.
6. Using the Workbench to analyse the data set.
7. Sensitivity studies and quality control.

The practical class will provide an opportunity for workshop participants to operate the VEW themselves, with support from an experienced tutor.

The GRAND regional strategy will be presented at the 2nd workshop and the continuous training plan will be agreed with the GRA representatives, and presented to the intergovernmental Committee for GOOS (I-GOOS) at its 7th meeting.

It is expected that each GRA sends its own manager/s to get maximum benefit of the training and to contribute to the planning of the future training.

This WP contributes to the empowerment of the GRAs, maximising the benefits of a concerted approach, providing opportunities for the sharing, exchange and acquisition of technical, scientific and managerial expertise required by GRAs to address regional and national needs and to fully contribute to the implementation of GOOS.

In the longer term perspective the activity in this WP is intended to build up a team of experts working on a regional and intra-regional basis, to disseminate knowledge, methodologies and practice for the implementation of GOOS.

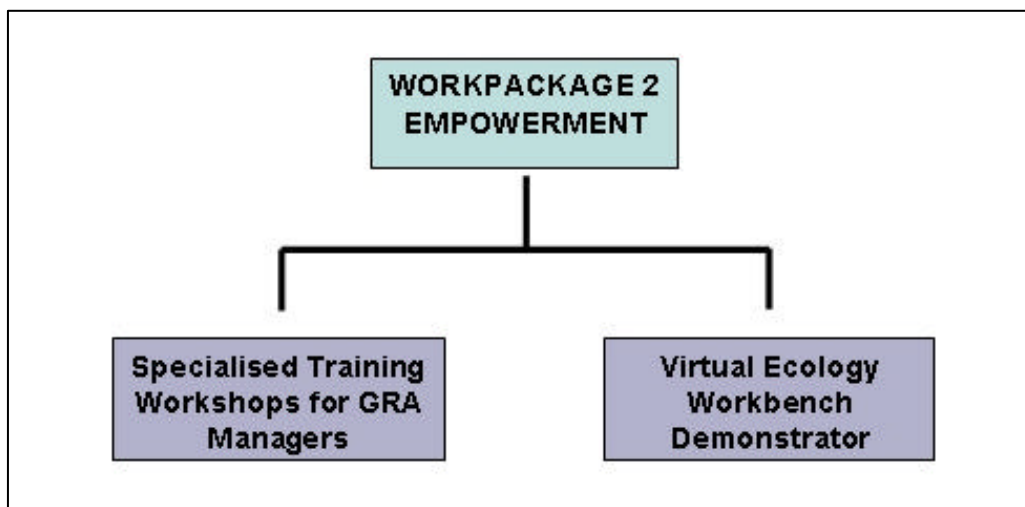


Fig. 3 Flow diagram and main elements of WP2

WP3 GRAND – Strategy

This workpackage will contribute a regional strategy for GOOS and initiate a series of GRAND publications to serve as a common reference for the GOOS regions.

The GRAND Regional Strategy will introduce into GOOS and GMES planning a structure for integrating the global and regional dimensions, taking account of the need for capacity building and the application of science and technology derived from the research community.

The Strategy will be constructed from four main inputs:

- (i) Existing plan and documents for GMES and GOOS, including ABELOS (for the UN Law of the Sea), and other international bodies such as GESAMP;
- (ii) Information collected in WP1 from the GOOS Regions, including their marine environmental problems as well as their assets and capacities to address them;
- (iii) Scientific and Technical advice from the GOOS Scientific Committee and the GRAND Advisory Board;
- (iv) Feedback from members of the GRAND Alliance on drafts of the Strategy report.

The drafting team will include the members of the GRAND Advisory Board, assisted by an external expert.

This WP will take advantage of the cross-cutting studies of the EC/ESA initiatives for Global Monitoring of the Environment and Security on: (i) scientific issues linked to gaps in knowledge, models and technology; (ii) technical issues concerning the adequacy of monitoring networks and the quality of resulting data; (iii) issues of data policy, including ownership, confidentiality, accessibility, security and cost; (iv) organisational, institutional, funding and socio-economic issues.

The requirements of GMES, the GOOS principles and the indications of the Coastal and Climate Panels of GOOS (COOP and OOPC) will be taken into account.

The GRAND GRAs have already contributed to the background document mentioned as an input to the Regional strategy. Furthermore their input will be forwarded in the brainstorming discussion planned during the training and strategy workshop, and in the GRAND meetings.

An outline of the document will be completed by the end of month 10, in time for discussion during the GMES Forum in November 2004, within the presentation of the MAMA achievements for GMES.

The draft of the regional strategy will be presented at the 2nd GRAND training workshop and submitted to the GOOS Member States at the 7th meeting of I-GOOS in March 2005.

The regional strategy will include a scheme for continuous upgrading of the capabilities of the regions to support a permanent sustainable empowerment.

A plan will be devised to initiate a GRAND publication series for the benefit of the users, thus addressing the users' perspectives. Each publication will deal with issues of particular relevance for GOOS such as: Coastal radars; Environmental monitoring with aircrafts; Satellites for ocean observations; AUVs, GIS; Rapid Assessment of Environmental Pollution; Adaptive grid modelling.

The final regional Strategy document will be completed by the end of the project and it will be the first publication of the GRAND series.

A second publication will be the VEW Handbook. This publication will deal with methodologies for the prediction of the marine ecosystem. This publication will be presented and discussed at the second Training and Strategy workshop organised by WP 2.

The GRAND Publication Series (GPS) will serve also as a reference for the GOOS regional managers as well as a support for the training schemes.

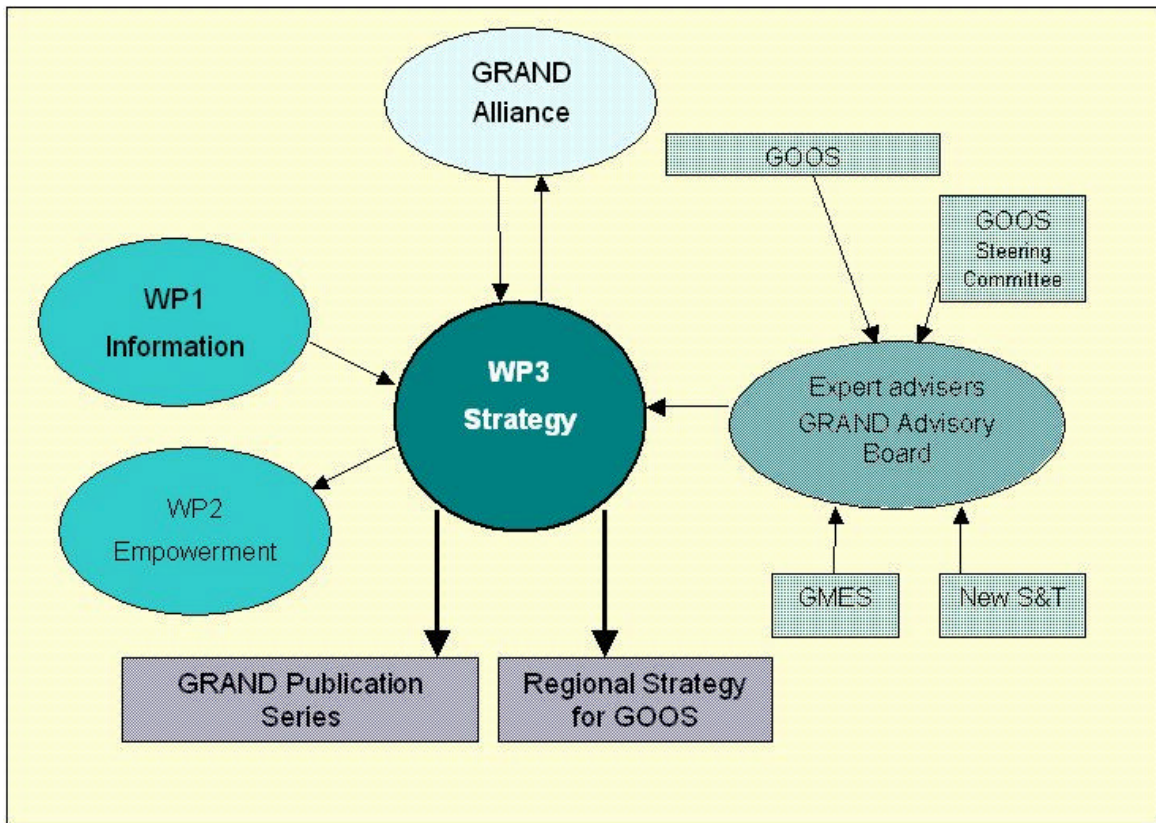


Fig. 4 Flow diagram and main elements of WP3

Table 2 - Main project milestones and delivery time

MILESTONES	Workpackage	Delivery Month
Establishment of the GRAND Secretariat	0	1
Kick-Off meeting	0	2
Launching of the GRAND website	0	4
Launching of the survey on need and capabilities of GRAs	1	5
1st training workshop	2	10
Full development of the GRAND website	0	12
Collation of survey results in an information pack	1	12
2 nd GRAND general meeting	0	15
VEW Demonstrator – preliminary version	2	15
2nd training workshop	2	15
Launching of the GRAND Publication Series (GPS)	3	15
Draft of the regional strategy	3	15
VEW Demonstrator - final version	2	23
GPS1 - Regional Strategy for GOOS	3	23
GPS2 - VEW Handbook	3	23

7.2 Planning and timetable

The GRAND Secretariat will inform the partners of the details on the work schedule and project activities for the first six months in time for the kick off meeting. The Secretariat at IO-MOC will continue to support the networking of partners and facilitate implementation throughout the full duration of the project. The GRAND WWW will be established at an early stage of the project, with a first functional version by month 4, and gradual development thereafter.

The main activities will start with the identification in WP1 of the key problems and needs of GRAs in relation to the sustainable use and management of marine resources, and on their assets and capacities to address such issues through applications of ocean observations and forecasts. The survey entry forms and guidelines will be prepared by month 5; the collection of information will deploy the participation of all GRAs and completed by month 12 in time to feed the drafting phase of the GOOS Regional Strategy.

The two training workshops in WP2 will be held in months 10 and 15 respectively. Both will be carefully planned in terms of identification of content, lecturers, arrangement with educational organisations for the logistics. The dissemination of workshop activities and results will be done through the GRAND WWW and meetings.

The training workshop will also serve for exchange among the GRAs and to feed WP3 with valuable direct feedbacks from the GRAs.

The workshop results will be analysed to build sustained empowerment activities. The idea is to establish a long-term team with corpus of complementary expertise to assist the regions.

The Regional Strategy for GOOS will build on inputs from the experts on the Advisory Board, and the GOOS Scientific Committee, from the other WP activities (especially WP1), from existing studies, assessments and plans such as from GOOS and GMES and by other key related international bodies such as ABE-LOS/IOC and GESAMP, and make use of an appointed external expert.

The outline of the document will be introduced at the 6th GMES Forum in November 2004, if planned. The first draft will be prepared by month 15 and submitted to the 7th I-GOOS meeting in March 2005. The regional strategy will continue to be developed to reach final form by month 23.

Two publications of the GRAND Publication Series will be prepared within the life-time of the project, the VEW Handbook and the Regional Strategy for GOOS.

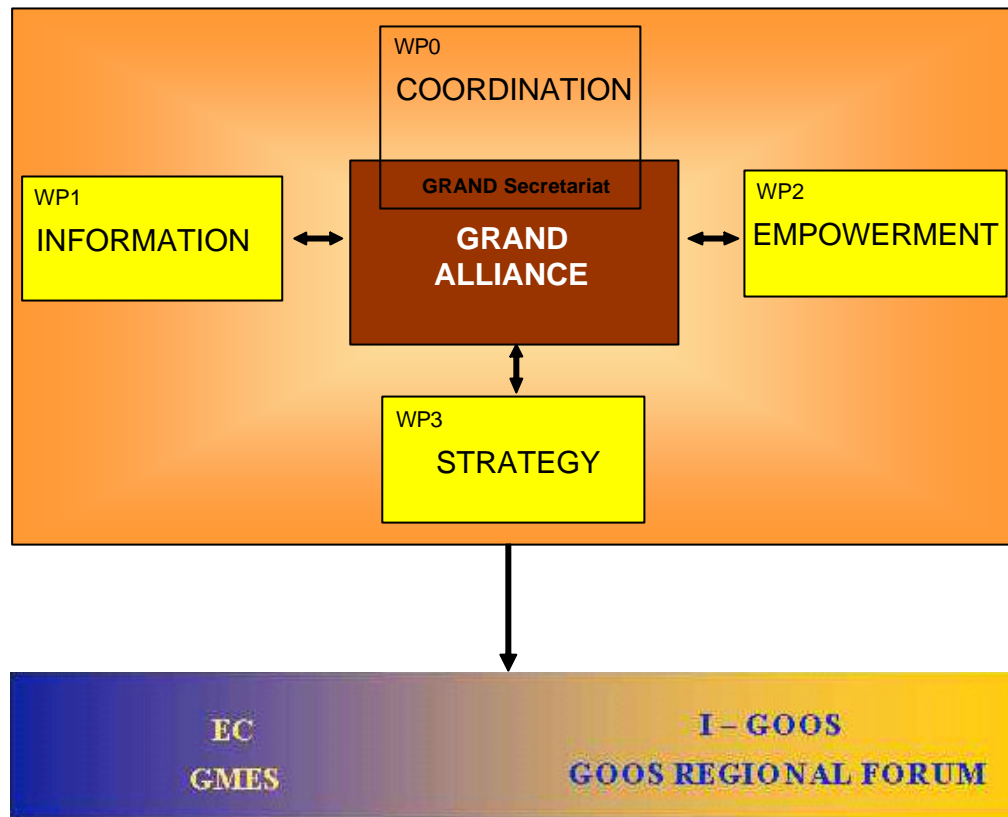
Work Packages (WP)	Partners: Person/months														1st Year												2nd Year							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24										
WP 0: GRAND Co-ordination	20	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-									
- Project Management - Grand General meetings - Management committees - GRAND WWW															<p>Development and launching (R) Further development and links Maintenance and updates (R)</p> <p>* Meeting</p>																			
WP1 - GRAND Information	8	1	2	2	2	2	2	2	2	2	1	1																						
- Survey on GRAs															<p>Preparation Collection Compilation (R) Additional information</p>																			
WP2 - GRAND Empowerment	1	10	1	1	1	1	1	1	1	1	1	1	1	6	-																			
- Technical demonstrator VEW - Training Workshops															<p>VIEW DEMO Preparation and Analysis Launching (R) Dissemination</p> <p>Preparation of the workshops.. Planning the future empowerment</p> <p>Organisation and execution of WS1 * Analysis & dissemination of WS1</p> <p>Organisation and execution of WS2 * Analysis & dissemination of WS2</p>																			
WP3 - GRAND Strategy	1	6	1	1	1	1	1	1	1	1	1	1	8	-																				
- Advisory board - GOOS Regional Strategy - GRAND Publication Series															<p>Advisory board: ad hoc meeting * meeting at WS * meeting at WS * ad hoc meeting *</p> <p>Gathering input to GPS drafting (R) analysis synthesis (R)</p> <p>Preparation ... Launching (R) Planning the future publications Diffusion</p>																			
Total Person Months	30	21	4	4	4	4	4	4	4	4	4	16	2	109																				

Legend :
R Report; * Meeting; * possible ad hoc meeting

Table 3: Main Scheduled project meetings

MONTH	MEETINGS + EXCHANGE	REMARKS	Venue
2	GRAND Kick-off meeting GRAND Alliance Management Committee WP preliminary meetings	<i>In conjunction with the 2nd GOOS Regional Forum and the South Pacific Forum meeting</i> All partners	Fiji Islands
10	Training Workshop I Management Committee Advisory Board meeting	Participation by at least one representative from each GRA	Southampton or London
15	GRAND Alliance Management Committee WP meetings GRAND Advisory Board	<i>In conjunction with I-GOOS-VII and possibly with the IVth EuroGOOS conference</i> All partners	Paris
15	Training Workshop II Launching VEW Demonstrator (preliminary version)	Participation by at least one candidate from each GRA	Genoa (Italy)
20	Management Committee	Committee Members	London

7.3 Graphical presentation of the work packages



7.4 Work package list

Work package list (full duration of project)

Work package No	Work package title	Lead contractor No	Person-months	Start month	End month	Deliverable No
WP0	GRAND Co-Ordination	1,2	26	1	24	D1, D2, D3, D4, D11, D15
WP1	GRAND Information	1	31	1	24	D5, D7
WP2	GRAND Empowerment	2	27	1	24	D6, D8, D10, D12
WP3	GRAND Strategy	13	25	1	24	D9, D13, D14
	TOTAL		109			

7.5 Deliverables list

Deliverables list (full duration of SSA)

Del. no.	Deliverable name	WP no.	Lead participant	Estimated person-months	Nature ¹	Dissemination level ²	Delivery date (project month)
D1	Updates of Plan for using and disseminating knowledge	0	1	3	R	PU	2,8,13,20
D2	Kick-off meeting & report	0	1	2	R	RE	2
D3	Meetings and reports for Management Committee, GRAND Alliance, Advisory Board	0	1,2,13	4	R	RE	2,8,13,20
D4	Development of GRAND WWW with links to GRA homepages and related global programmes	0	1	5	O	PU	4, 12
D5	Questionnaire, guidelines for survey on GRA needs and capabilities	1	1	5	R	PP	5
D6	1 st Training Workshop	2	2	10	O	RE	10
D7	Collection and compilation of GRA survey results	1	1	20	R	PP	12
D8	First draft of VEW Demo	2	2	4	D	PP	15
D9	First draft of the Regional Strategy for GOOS	3	13	13	R	PP	15
D10	2 nd Training Workshop	2	2	10	O	RE	15
D11	2 nd GRAND general meeting & report	0	1	2	R	RE	15
D12	VEW Demo	2	2	3	D	PP	23
D13	Regional Strategy for GOOS GRAND Publication 1	3	13	10	R	PU	23
D14	VEW Handbook GRAND Publication 2	3	13	2	R	PU	23
D15	Final report and final plan for using and disseminating knowledge	0	1,2	2	R	RE	24
TOTAL				95	(excluding effort for project management)		

¹ Please indicate the nature of the deliverable using one of the following codes:

R = Report

P = Prototype

D = Demonstrator

O = Other

² Please indicate the dissemination level using one of the following codes:

PU = Public

PP = Restricted to other programme participants (including the Commission Services).

RE = Restricted to a group specified by the consortium (including the Commission Services).

CO = Confidential, only for members of the consortium (including the Commission Services).

7.6 Work package descriptions

WP0 – GRAND Co-Ordination

Work package number	0		Start date or starting event:							Month 1				
Activity Type	Consortium management activities													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Person-months per participant:	20	4	-	-	-	-	-	-	-	-	-	-	1	1

Objectives

Ensure the communication flow in the network of GOOS Regional Alliances and with GOOS related international organisations; organise the meetings, harmonise the project activities, achieve the project goals and optimise the benefits of community funding, address the gender issue.

Description of work

The project co-ordinator Aldo Drago (MedGOOS Secretariat, IOI-MOC, Malta) will ensure the communication flow in the network of GOOS Regional Alliances, organise the general GRAND meetings and the management meetings, and communicate with the EC

The Advisor to the Co-ordinator Silvana Vallerga (CNR, Italy) will establish links with international organisations, and organise the specialised training and strategy workshops. She will take care of the relations with the experts needed for the training and strategy workshops, make sure that all GRAs participate in process to define the regional strategy and address the gender issue.

The WP3 leader and chairman of the advisory board John Woods (ICL, UK) will correspond with the advisory board members and call their meetings.

Management Committee – Composed by the Project Coordinator and Advisor to the Co-ordinator (in charge of WP1 and WP2, respectively), the chairman of the advisory board, also in charge of WP3, will be participated by the EC project officer and chaired by the project co-ordinator.

The management committee will provide guidance for the project implementation and will meet four times during the project lifetime, back to back with the two meetings of the GRAND Alliance and the two training workshop workshops.

GRAND Alliance – participated by all members of the GOOS Regional Forum (GOOS Regional Alliances), the Advisory Board, the international organisations and international programmes participating in GRAND. The GRAND Alliance meetings will be chaired by the Advisor to the Co-ordinator and Chair of the GOOS Intergovernmental Committee.

The GRAND Alliance will meet twice, taking advantage of the conjoint meetings of the GOOS Regional Forum and I-GOOS meeting. It will be supported by the MedGOOS Secretariat.

Task 0.1 Project Management

The project co-ordinator will communicate with the partners and facilitate the linkages among them. The project website will be established at the MedGOOS secretariat.

The Advisor to the Co-ordinator will ensure the synergy and co-ordination with international organizations and other projects. ,

The Coordinator and Advisor to the Co-ordinator will have regular exchange via e-mail, telephone and meetings whenever necessary.

The Management Committee will: (i) carry the technical and scientific responsibility for the execution of the project; (ii) prepare the periodic scientific and financial reports.

Task 0.2 Organisation of meetings

Two meetings of the GRAND Alliance are scheduled during the project lifetime, including a kick-off

meeting in Fiji, in conjunction with the 2nd GOOS Regional Forum and the Pacific Island Oceanography meeting. The second GRAND meeting will be organised in Paris back to back with the 7th I-GOOS and 4th EuroGOOS meetings. The organisation of these meetings will be dealt with by the Project Co-ordinator office.

The Management Committee will meet on the occasion of these two GRAND Alliance meetings. Two further Management Committee meetings will be organised, one back to back to the specialised training and strategy workshop to be held in UK (Southampton or London, month 10) and another one in month 20. These Management Committee Meetings will be organised by the Advisor to the Co-ordinator office.

Two meetings of the Advisory Board will be organised, back-to-back with the GRAND Management Committee meetings, by the Advisor to the Co-ordinator.

In order to improve the performance of the project the project co-ordinator and advisor will meet, and visit partners, when needed and within the limits of the budget.

Task 0.3 Dissemination and Awareness

The preliminary plan expounded in section 6.2 constitutes a starting point for the plan on the use and dissemination of knowledge. This plan will be refined in a first instance during the project kick-off meeting, and subsequently updated during the project lifetime under the responsibility of the Management Committee and the supervision of the Advisory Board and with due interim assessments of achievements, leading to the full Final Plan at the end of the project.

The GRAND web page will be designed as a means of visibility and communication among partners. Links will be established with relevant regional/national web sites and global/regional programmes.

The goals and achievements of GRAND will be widely disseminated in each GOOS region focussing on the need for a coherent global observing and forecasting system with compatible regional components and on the European role in the designing and implementation of GOOS.

The Grand Publication Series in WP3 as well will contribute to dissemination of results and awareness.

Deliverables

Short periodic reports; Project progress and financial reports; **D1** Plan for using and disseminating knowledge; **D2** Kick-Off and general meetings reports; **D3** reports of the meetings of the Management Committee and Advisory Board; **D4** the GRAND website with links to partners and related international programmes; **D11** 2nd GRAND general meeting; **D15** Final report and final plan for using and disseminating knowledge.

Milestones and expected result

Establishment of the GRAND Secretariat; Kick-Off Meeting; Launching of the GRAND website; Full development of the GRAND website; 2nd GRAND general meeting

WP1 – GRAND Information

Workpackage number	1	Start date or starting event:										Month 1		
Activity Type	Activities specific for the support action													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Person-months per participant:	8	1	2	2	2	2	2	2	2	2	2	2	1	1

Objectives

Survey on the present capabilities of the GOOS regions for ocean observations, the methodology used to address the major marine environmental issues in the regions, the state of implementation for ocean observations and prediction of the state of the marine environment.

Description of work

The MedGOOS Secretariat (IOH-MOC) will collect from each GRA information on the magnitude of marine environmental issues in the region, the capacities available to address those issues, and the methods and systems already in place.

The key information collected will be in the form of:

- Categories of marine environmental issues and their magnitude in the different GOOS regions
- Regional capacities to meet the needs (agencies/organisations dealing with the ocean monitoring and forecasting, human resources, funding, infrastructure, etc)
- Methods currently in use
- National spending and global interventions (such as GEF and others)

This exercise will be conducted by means of a survey with compilation by each GRA of information on a dedicated entry form.

The GRAs will be provided with the templates and guidelines to be prepared by IOH-MOC in consultation with the Advisor to the Co-ordinator and the Advisory Board.

The national and regional data collected for the Mediterranean within the EU projects, MAMA and EDIOS, will be available as well as the material collected by the regional surveys for the Indian Ocean and the South East Asia region, and the national contributions to ocean observations gathered by IOC through GOSIC (Global Observing System Information Centre).

The countries involved in GRAs are presently (2003) 93. IOC member states are 129. The countries not belonging to GRAs will be welcome to join the effort, possibly with the support of IOC.

The survey will be assessed by the GRAND Advisory board and the data collected will be used in the planning of the regional strategy for GOOS.

Deliverables

D5 Questionnaire and guidelines for survey on GRA needs and capabilities; **D7** Compilation of GRA survey results

Milestones and expected result

Launching of the survey on need and capabilities of GRAs; Collation of survey results in an information pack.

WP2 – GRAND Empowerment

Work package number	2	Start date or starting event:	Month 1											
Activity Type	Activities specific for the support action													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Person-months per participant:	1	10	1	1	1	1	1	1	1	1	1	1	6	-

Objectives

Empower GRAs to participate in with local expertise, and benefit from GOOS and GMES, build a strong interregional network of local experts, set the basis for a long-term training scheme: “GOOS *Advanced Schools*”. Organise high level training workshops for GRAs managers to address issues of common interest and to help with specific needs. Develop a demonstrator for training on the Virtual Ecology Workbench (VEW) and application in the context of *What-if? Prediction*.

Description of work

Two specialised training and strategy workshops will be organised. The topics will include:

- Modern technologies for GOOS and GMES
- Cost-effective methods for ocean observation and forecasting, such as RAMP
- GOOS possible training schemes (short course, distance learning, on-the-job training)
- Pilot application of new technologies to GOOS regions (*MAMA-What if? Prediction*)
- Possible funding scheme for pilot initiatives
- Virtual Ecology Workbench (VEW), software tool as a demonstrator for *What if? Prediction*
- Other issues that will emerge in the discussion with GRAs and the Advisory Board.

Each workshop will last for five working days. The first will be held in UK (Imperial College of Science, Technology and Medicine, London, or Southampton Oceanographic Centre), the second in Italy (CNR, Genoa).

A specific tool for the *What-if? Prediction*, the Virtual Ecology Workbench, will be developed by the COSMIC group at Imperial College of Science, Technology and Medicine. The VEW will be prepared and analysed in the first year of the project. Then the β test will be done for 3 months by selected users. The VEW and its draft handbook will be presented at the 2nd GRAND training workshop. A draft of the GRAND regional strategy will be presented at the 2nd workshop.

A draft for continuous training will be agreed with the GRA representatives, and presented to the intergovernmental Committee for GOOS (I-GOOS) at its 7th meeting in Paris in March 2005.

It is expected that each GRA sends its own manager/s to get maximum benefit of the training and to contribute to the planning of the future training.

The workshops will be planned jointly between WP2 and WP3. The organisation will be dealt with by the Advisor to the Co-ordinator's office. Half a day of each workshop will be devoted to the preparation and discussion of the GOOS regional strategy to be developed in WP3. All the GRAs have been already involved in the preparation phase developed within the I-GOOS activities.

This WP contributes to the empowerment of the GRAs, providing GRAs' managers with information on a portfolio of 21st century technologies, European know-how and best practices to address regional and national needs and to fully contribute to the implementation of GOOS.

In the longer term perspective the activity in this WP is intended to build up an integrated team of experts working together at regional and global level to the implementation of GOOS.

Deliverables

D6/D10 two specialised workshops participated by at least one representative for each GRA;

D8/D12 VEW Demonstrator

Milestones and expected results

1st Training workshop; Draft of the VEW Demonstrator; 2nd Training workshop; VEW Demonstrator

WP3 – GRAND Strategy

Work package number	3	Start date or starting event:	Month 1											
Activity Type	Activities specific for the support action													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Person-months per participant:	1	6	1	1	1	1	1	1	1	1	1	1	8	-

Objectives

To prepare a regional strategy for GOOS and to initiate a series of GRAND publications to serve as a common reference for the GOOS regions.

Description of work

The Strategy will be constructed from four main inputs:

1. Link regional activities in operational oceanography to GMES and GOOS
2. Introduce modern technologies to achieve the regional goals of
3. Identify the needs for capacity building at a regional level
4. Review how to achieve these goals in the context of UNCLOS

It will take into account the:

- special needs of each GOOS region as identified by WP1,
- existing capabilities in each region,
- requirements of GMES,
- goals of I-GOOS ,
- plans the GOOS Scientific Committee and its panels (COOP and OOPC),
- findings of the ABE-LOS/IOC WG on legal aspects of GOOS observations, and
- advice of the GRAND Advisory Board.

Advisory Board – Senior scientists of world reputation in different branches of GOOS and GMES. Chair: J.Woods (Imperial College for Science, Technology and Medicine London, UK and WP2 leader). Members: J.Baker (GSC, Chair, USA); H.Halvorson (UMass, USA); Tony Knap (Co-chair of COOP, Bermuda); P.Ryder (EuroGOOS Chair, UK), S.Sathyendranath (POGO, Canada). It will meet twice. If needed hoc meetings will organised. The members of the GRAND Advisory Board, assisted by an external expert, will be the drafting team for the regional strategy.

An outline of the regional strategy will be presented, within the MAMA presentation, at the VI GMES Forum (November 2004). The draft will be presented at the 2nd workshop and submitted to the 7th meeting of I-GOOS in March 2005.

A GRAND publication series will be designed. Each publication will deal with issues of particular relevance for GOOS. For technologies field: coastal radars; monitoring with aircrafts; satellites for ocean observations; AUVs, GIS; Rapid Assessment of Marine Pollution; Adaptive grid modelling.

The first publication will be the regional strategy. The second publication will be the VEW Handbook. The GRAND Publication Series (GPS) will serve also as a reference for the GOOS regional managers as well as a support for the training schemes.

Deliverables

D9/ D13 GRAND regional strategy for the GOOS regions; **D14** Handbook for the VEW

Milestones and expected results

GOOS Publication Series; Draft of the regional strategy; Regional Strategy Demonstrator GRAND Publication Series – GPS 1; VEW Demonstrator GRAND Publication Series – GPS2

8. Efforts for the full duration of the project:

Specific Support Action Effort Form - Full duration of project

Project number (acronym): GRAND

	Participant 1 IOI-MOC	Participant 2 CNR	Participant 3 SMHI	Participant 4 IMS-METU	Participant 5 MFRD	Participant 6 INCOIS	TOTAL ACTIVITIES
Activities specific for the Support Action							
WP0: GRAND Co-Ordination	10	-	-	-	-	-	10
WP1: GRAND information	8	1	2	2	2	2	17
WP2: GRAND Empowerment	1	10	1	1	1	1	15
WP3: GRAND Strategy	1	6	1	1	1	1	11
Total 'specific activities'	20	17	4	4	4	4	53
Consortium management							
WP0: GRAND Co-Ordination	10	4	-	-	-	-	14
WP1: GRAND information	-	-	-	-	-	-	0
WP2: GRAND Empowerment	-	-	-	-	-	-	0
WP3: GRAND Strategy	-	-	-	-	-	-	0
Total 'management'	10	4	-	-	-	-	14
TOTAL per PARTICIPANT	30	21	4	4	4	4	67
Overall TOTAL EFFORTS							

Specific Support Action Effort Form - Full duration of project

Project number (acronym): GRAND

	Participant 7 Rio GOOS Office	Participant 8 IOCARIBE- UNESCO	Participant 9 POI	Participant 10 SOPAC	Participant 11 SEA-START RC	Participant 12 SHOA	TOTAL ACTIVITIES
Activities specific for the Support Action							
WP0: GRAND Co-Ordination	-	-	-	-	-	-	-
WP1: GRAND information	2	2	2	2	2	2	12
WP2: GRAND Empowerment	1	1	1	1	1	1	6
WP3: GRAND Strategy	1	1	1	1	1	1	6
Total 'specific activities'	4	4	4	4	4	4	24
Consortium management							
WP0: GRAND Co-Ordination	-	-	-	-	-	-	0
WP1: GRAND information	-	-	-	-	-	-	0
WP2: GRAND Empowerment	-	-	-	-	-	-	0
WP3: GRAND Strategy	-	-	-	-	-	-	0
Total 'management'	-	-	-	-	-	-	0
TOTAL per PARTICIPANT	4	4	4	4	4	4	24
Overall TOTAL EFFORTS							

Specific Support Action Effort Form - Full duration of project

Project number (acronym): GRAND

	Participant 13 ICL	Participant 14 ACL	Participant 15 IOC / Perth Office	Participant 16 IOC / I-GOOS	Participant 17 CeSSS/IOPAS	Participant 18 IOI Caspian Sea	TOTAL ACTIVITIES
Activities specific for the Support Action							
WP0: GRAND Co-Ordination	1	2	-	-	-	-	3
WP1: GRAND information	1	-	-	-	-	-	1
WP2: GRAND Empowerment	6	-	-	-	-	-	6
WP3: GRAND Strategy	8	-	-	-	-	-	8
Total 'specific activities'	16	2	-	-	-	0	18
Consortium management							
WP0: GRAND Co-Ordination	-	-	-	-	-	-	0
WP1: GRAND information	-	-	-	-	-	-	0
WP2: GRAND Empowerment	-	-	-	-	-	-	0
WP3: GRAND Strategy	-	-	-	-	-	-	0
Total 'management'	-	-	-	-	-	0	0
TOTAL per PARTICIPANT	16	2	0	0	0	0	18
Overall TOTAL EFFORTS							109

9. Gender issues

GRAND will contribute to optimise the use of the best human resources in the field available Europe, and in other regions of the world, encouraging greater participation by women scientists.

The participation of women scientists is at the highest level in GRAND. Silvana Vallerga is Advisor to the Co-ordinator, and leader of WP-Strategy; Shubha Sathyendranath is a member on the Advisory Board, Janice Trotte is in charge of the RIO GOOS Office, and Christelle Pratt of PI GOOS.

GRAND will support the mainstreaming of the gender issue in GOOS, taking into account the recommendations of the Group of Helsinki established by the European Commission, on a decision of the European Parliament to promote the role of women in science.

Appendix A

A1. Participants and Consortium

The consortium is primarily made up of institutions leading or representing all the GOOS Regional Alliances (GRAs) and consists of 18 partners from 16 countries: from EU member states, associated candidate countries, associated states, third countries and international and intergovernmental organisations. The GRAs represent the much larger number of member coastal states in the respective regions. The Co-ordinator of this project is the MedGOOS Secretariat, within the IO-Malta Operational Centre at the University of Malta.

The advisor to the Co-ordinator is the current President of I-GOOS and has worked with all the organisations present in the consortium in the past (especially the GRAs) and all the partners involved are used to work together (especially the GRAs within the GOOS Regional Forum), thus providing assurance for an efficient co-ordination of the activities within such a large network of institutions.

One partner is an SME and will contribute by covering technical activities required by the project, mainly in connection with the project website.

The interaction of the European partners with other members of the consortium will be a precursor for worldwide leadership of Europe in operational oceanography.

GRAND has a pan-European dimension. Over 40 European institutions participate in the project through EuroGOOS (30 members in 17 countries), MedGOOS (20 members in 16 countries), Black Sea GOOS (10 members in 6 countries).

The participants are leading research organisations, academies, agencies in various regions that are in charge of, or are doing environmental management. All the GRAs partners have major roles in co-ordinating regional initiatives in the field of ocean monitoring and forecasting. In this sense the consortium has ramifications in the various regions and provides the necessary critical mass to support such a global scale programme of activities. Most of the partners being intergovernmental organisations. A wide research spectrum of stakeholders is represented in the consortium.

Each member of the consortium has a specific role related to his/her scientific/technical expertise, regional location, facilities provided for the project, linkage with related regional/international RTD initiatives and stakeholders.

Thus, the network has the proper critical mass, scientific and technical expertise, together with the worldwide geographical coverage needed to attain project objectives.

The project Co-ordinator and advisor to the Co-ordinator are respectively the Executive Secretary and Chair of the MedGOOS, and already have experience in conducting projects with large consortia such as the ongoing FP5 MAMA project.

The high quality of the work is assured by the expertise of participants and will be assessed by the Grand Advisory Board. The Board will be chaired by the project Co-ordinator, from IOI-MOC and composed of the advisor to the Co-ordinator and five external experts:

- **John Woods**, Department of Earth Science and Engineering, Imperial College of Science, Technology and Medicine, London, UK, Chairman – Honorary president of EuroGOOS, former member of I-GOOS, the International scientific committee of GOOS;
- **Jim Baker**, Academy of Natural Sciences, Philadelphia, USA, President of the Academy of Natural Sciences and also the GSC Chair;
- **Peter Ryder**, EuroGOOS Chair, GMES Assessor;
- **Harlyn Halvorson**, Head Department of Marine Policy, Umass, USA;
- **Tony Knap**, COOP Panel of GOOS, Bermuda Biological Station for Research, Bermuda;
- **Shubha Sathyendranath**, Executive Director of the Partnership for Observation of the Global Oceans (POGO).

Partner Institutions and Expertise												
General Info			Legal Status				Activity Type				Responsibility	
Partner No.	Partner short Name	Country Code	Governmental National Organisation	Governmental International Organisation	Private Organisation	Private Organisation Public Body	Higher Education	Research	Industry	Other	WORKPACKAGES Legend: 0. Co-ordination 1. Information 2. Empowerment 3. Strategy WP leader	
1	IOI-MOC (MedGOOS)	MT									0,1,2,3	
2	CNR (MedGOOS)	I									0,1,2,3	
3	SMHI (EuroGOOS)	S									1,2,3	
4	IMS-METU (Black Sea GOOS)	TR									1,2	
5	MFRD (GOOS Africa)	GH									1,2	
6	INCOIS (IOGOOS)	IN									1,2	
7	Rio GOOS Office	BR									1,2	
8	IOCARIBE-UNESCO	CO									1,2	
9	POI (NEAR GOOS)	RU									1,2	
10	SOPAC (PI-GOOS)	FJ									1,2	
11	SEA START RC (SEA GOOS)	TH									1,2	
12	SHOA (GRASP)	CL									1,2	
13	ICL	UK									1,2,3	
14	ACL	MT									0,1	
15	IOC Perth Office	AU										
16	IOC / I-GOOS	F										
17	CeSSS/IOPAS	PL										
18	IOI-Caspian Sea	RU										

Section A – Funded Partners

MedGOOS

Partner No. 1 Project Coordinator (Malta): MedGOOS Secretariat, International Ocean Institute – Malta Operational Centre (MedGOOS Sec./IOI-MOC)

Partner No. 2 Advisor to the Coordinator (Italy): MedGOOS, Consiglio Nazionale delle Ricerche (MedGOOS/CNR-IAMC)

The Mediterranean Global Ocean Observing System (MedGOOS) is an informal association founded under the auspices of UNESCO/IOC in November 1997 in Malta. It aims to facilitate the development of an operational forecasting system at a regional and coastal scale to the benefit of a wide group of users in the region. The key priorities targeted by the MedGOOS include the identification of the regional priorities for operational ocean forecasting and marine meteorology, an assessment of the related economic and social implications, and the guidance and assistance to the riparian states towards the harmonious implementation of the Mediterranean ocean observing and forecasting system built on existing elements and based on principles of co-development, co-ownership and sharing of benefits. Furthermore it aims to build a system to the benefit of a vast spectrum of customers and marine industries, addressing the requirements of governments to enable sustainable development and lead to socio-economic goals. The MedGOOS ensures the upgrading of national systems to the same level of expertise and infrastructure and stimulates the necessary pre-operational R&D to ensure that GOOS is fully effective when it is eventually established, hopefully in ten to twenty years time.

The MedGOOS Secretariat was set up following a decision of the MedGOOS Executive Board at the meeting in Genova in September 1998. Together with the Chairperson, the MedGOOS Secretariat establishes and consolidates links with international organisations, and identifies projects to be developed by the MedGOOS members. Moreover it supports the networking of the leading marine institutions in the Mediterranean committed to reach the scope of MedGOOS and the implementation of projects. It monitors the development of the projects and make sure that the work proceeds according to schedule. The MedGOOS Secretariat provides administrative support and assists in the co-ordination of MedGOOS activities. It secures the continuous flow of information related to MedGOOS and its project activities, among the members. Important developments, training opportunities, conferences, seminars, etc. related to ocean monitoring and forecasting in the region are circulated to the members by the MedGOOS Secretariat.

IOI-Malta Operational Centre (IOI-MOC), within the University of Malta, hosts the MedGOOS Secretariat. The research activities of IOI-MOC are done under the Physical Oceanography Unit constitutes the research arm of IOI-MOC. It undertakes fundamental research in coastal meteorology, hydrography and physical oceanography with a main emphasis on the experimental study of the hydrodynamics of the sea in the vicinity of the Maltese Islands.

Key personnel (MedGOOS Sec./IOI-MOC)

Aldo F. Drago mans the Research Division and the Physical Oceanography Unit at the IOI-Malta Operational Centre, University of Malta. He is also the Maltese delegate to the Intergovernmental Oceanographic Commission (IOC/UNESCO) and to the International Commission for the Scientific Exploration of the Mediterranean (ICSEM) and the National Representative for the Committee on the International Oceanographic Data and Information Exchange (IODE/IOC). He obtained his Ph.D. in physical oceanography from the University of Southampton, SOC in 1999. Since his engagement in 1991 he conducted a number of programmes and initiatives both at local and international scales. The most important are the scientific co-ordination of an AVICENNE research programme in Data Management for Real-

Time Monitoring of the Mediterranean (MEDNET) with participants from France and Cyprus and a UNESCO-funded multidisciplinary oceanographic survey in the NW coastal area of Malta. He is currently co-ordinating work in relation to two EU-MAST III projects the MFSP and the MEDAR/MEDATLAS. Since 1998, he is serving as the Secretary of MedGOOS with Office in Malta.

Key personnel (MedGOOS/CNR-IAMC)

Silvana Vallerga holds a Laurea degree in Physics. Scientific Director of the IMC and Head of the CNR Section of Sistemi Sensoriali e Ambiente Marino (S²AM) at Oristano, Senior researcher at CNR. Chairperson of the MedGOOS - Mediterranean Global Ocean Observing System, Officer, Treasurer and Trustee of EuroGOOS, Vice Chairperson of the Marine Board of the European Science Foundation, national delegate to EC MAST II and III, national delegate to EUROMAR, national delegate in the Helsinki Group (Women and Science in EC). Member of National Oceanographic Commission, of the National Polar Commission, of the Ministerial Committee for Co-operation with Mediterranean Partner Countries. Visiting Associate at NIH, Bethesda, Md, USA. Main research interests: adaptation of marine organisms to their environment, genetics and physiology of adaptation, visual ecology. Author of over 100 scientific publications.

EuroGOOS

Partner No. 3 (Sweden): EuroGOOS Office, Swedish Meteorological and Hydrological Institute (EuroGOOS Office/SMHI)

EuroGOOS is an Association of Agencies, founded in 1994, to further the goals of GOOS, and in particular the development of Operational Oceanography in the European Sea areas and adjacent oceans. EuroGOOS brings together agencies from different countries, combining resources and expertise. This co-operation between members enables EuroGOOS to establish a concerted European approach to identifying European priorities for operational oceanography, promoting the development of the scientific, technology and computer systems for operational oceanography, and assessing the economic and social benefits from operational oceanography.

EuroGOOS is involved in many projects of varying scales, to provide guidance and expertise, and in 2002 launched its own EDIOS project, (European Directory of the Initial Ocean-observing System) designed by EuroGOOS to build up searchable marine directory of the ocean observing, measuring, and monitoring systems operating in Europe.

An important objective for EuroGOOS is to promote the development of European regional and local operational oceanography. Regional task teams have been formed for the different European sea areas - the Baltic, the North West shelf, the Arctic, the Atlantic and the Mediterranean - and it is within these regions that EuroGOOS members coordinate and implement operational systems. As these regions have become stronger they are encouraged to form their own support organisations and activities, resulting in BOOS around the Baltic and NOOS for the North West Shelf area.

Key personnel

Hans Dahlin has been the director of the EuroGOOS Secretariat Office since January 2002. Form 1994 to 1999 he was a EuroGOOS and the initiator and first chairman of Baltic Operational Oceanographic System, BOOS. From 1992 till 2001 he was a senior adviser and co-ordinator of oceanography at SMHI. From 1982 to 1992, Hans Dahlin was Director of the Oceanographic Section of SMHI with a staff of 50 people working on marine observations, marine data management, marine operational forecasting, marine environment quality assessment, and applied oceanographic research. He is also the. Head of Swedish delegation in IOC/ Assembly Executive Council; delegate in I-GOOS, JCOMM; past vice chairman of

IGOSS; chairman of advisory board of EDIOS; member of advisory board of MAMA, PAPA; delegate in the Committee for Monitoring and Assessment of the Helsinki Commission; delegate in the Oceanography Committee of the International Council for the Exploration of the Sea.

Black Sea GOOS

Partner No. 4 (Turkey): Black Sea GOOS Secretariat, Institute of Marine Sciences, Middle East Technical University (Black Sea GOOS Sec./IMS-METU)

Co-ordination of Black Sea GOOS is mainly via Internet correspondence. Chairman, Valery Eremeev from The Oceanography Centre of UNAS, Ukraine and the Executive Secretary, Ilkay Salihoglu from Middle East Technical University, Institute of Marine Sciences, Turkey utilize the Internet too, but whenever possible the opportunity to meet on other occasions, i.e. IOC-General assembly meetings, NATO SfP Project meetings, regional international organizations such as Black Sea Environmental Programme and IOC Black Sea Regional Committee, etc., are used to meet and discuss relevant issues. The "Annual Steering Committee" meeting forms the core of coordination and evaluation of the Black Sea GOOS. Dissemination and co-ordination through the web is regularly used. The web address of the Black Sea GOOS is: http://www.ims.metu.edu.tr/black_sea_goos/.

Black Sea GOOS participates in the MedGOOS, EuroGOOS and IGOOS activities. The co-ordination is via several means, such as correspondence via Internet, direct contact by participation to the meetings, having access to these organizations Web, collaborating through EU funded and other projects such as MAMA, SeaSearch and ARENA.

In the original GRAND proposal, Black Sea GOOS was represented by two partners: UNAS and IMS-METU. Following the decision to reduce to one representative partner from each GRA in the final GRAND partnership due to the drastic cut in funding, IMS-METU has been chosen to be the representative partner for Black Sea GOOS.

Key personnel

Sukru Besiktepe, is an Associate Professor of Physical Oceanography in the Institute of Marine Sciences of the Middle East Technical University where he serves as the Assistant Director of the Institute. He holds a B.S. in physics from Ankara University, M.S., and Ph.D., both in physical oceanography from the Institute of Marine Sciences of METU. Dr. Besiktepe's research interests includes the combining observations and dynamical models to attain, dynamical processes in semi-enclosed seas with special emphasis given to the Black Sea and Marmara Sea, dynamics of marine ecosystem, effects of physical processes in ocean ecosystems. He actively involves in Institute's projects and organises sea-going activities. He participated in oceanographic data base development studies within the NATO TU-Black Sea project. Dr. Besiktepe is the member of the International Scientific Group of the GEF/UNEP Black Sea Environmental Programme.

GOOS Africa

Partner No. 5 (Ghana): GOOS Africa, Marine Fisheries Research Division (GOOS Africa/MFRD)

The GOOS-Africa Co-ordinating Committee is a Pan-African organizational structure decided by the participating countries to take forward the development of the GOOS in Africa. The membership is based on scientific capacity of the members taking into consideration the geographical balance within Africa. The Committee has a rotation system for its members. The GOOS-Africa chair is currently being held by the Marine Fisheries Research Division, Ghana

with support from the GOOS-Africa Technical Secretary at the Intergovernmental Oceanographic Commission (IOC) of UNESCO, which is based in France. The Co-ordinating Committee, in collaboration with the GOOS Project Office (GPO) is encouraging establishment of National GOOS-AFRICA Committees and will provide Member States with advice to this end.

Key personnel

Dr. Kwame A. Koranteng is the director of Research, Fisheries Department of Ghana; an expert in biological oceanography, fish stock assessment and statistics. A PhD in Biological Sciences (ecosystems analysis governance) he has achieved diverse academic achievements in fisheries oceanography, fishery science and biometry; member of the New York Academy of Sciences; 22 years working experience in marine and brackish water fisheries assessment and management extending scientific advice to government and non-governmental organisations; consultant to FAO and other international bodies on various aspects of fisheries and the marine environment; managed research grants from the European Union (Science & Technology for Development) and ORSTOM for multi-national and multi-institutional collaborative research in fisheries and the environment; Ghana national coordinator of the ODINAFRICA project; chairman of GOOS-Africa Coordinating Committee; member of FAO Advisory Committee on Fishery Research

IOGOOS

Partner No.6 (India): IO GOOS, Indian National Centre for Ocean Information Services (IOGOOS/INCOIS)

Nineteen organisations of 10 Indian Ocean countries signed a Memorandum of Understanding to create and actively participate in a Regional Alliance for IOGOOS, signed on 5 November 2002. This Memorandum of Understanding is one of the strongest instruments of cooperation and collaboration in the context of the oceanographic development of the region. IOGOOS is intended to elevate the Indian Ocean from one of the least studied to one of the most studied of the world's major oceans, with a real emphasis on the link between societal and scientific issues.

IOGOOS is made up of several member organisations throughout the Indian Ocean region. A few more Organisations (from Bangladesh, India and Seychelles) as well as SACEP are expected to become Members shortly. Active Interactions are underway with Organisations from Comoros Malaysia, Indonesia, Pakistan, Tanzania, Thailand, Myanmar, Maldives, Qatar, Oman and Yemen.

Key personnel

Dr. K. Radhakrishnan, an Electrical Engineer, is the founder Director of Indian National Centre for Ocean Information Services (INCOIS), an autonomous body under the Department of Ocean Development at Hyderabad. He is a Vice Chairman of the Intergovernmental Oceanographic Commission (IOC), Chairman of Indian Ocean GOOS, Member of the International Argo Science Team and Regional Coordinator Argo Project for Indian Ocean. He has been a Member of the four-member review group set up by IOC in 2002 for a comprehensive review of the Global Ocean Observing System (GOOS).

Tropical and South Atlantic GOOS

Partner No. 7 (Brazil): IOC GOOS Rio Regional Programme Office, Directorate of Hydrography and Navigation (Rio GOOS Office)

The Rio GOOS office was created by a Memorandum of Understanding signed between UNESCO and the Government of Brazil, on 08 October 2002, and after a long period of Governmental negotiations. The Office is located at the Directorate of Hydrography and Navigation (DHN) of the Brazilian Navy, in Rio de Janeiro, Brazil.

The motivation for the setting up of the Rio GOOS Office comes from the pressing need to implement sustained ocean observations in the South and Tropical Atlantic, through the establishment of links among relevant regional programmes and agencies, as appropriate.

Key personnel

Janice Romaguera Trotte is the officer in charge at the Rio GOOS office. She holds a B.Sc. in Marine Biology from the Universidade Santa Ursula in Rio de Janeiro and a M.Sc. in Biological Oceanography from Dalhousie University, Canada. From 1985 till 1991 she occupied the post of head of the Division of Scientific Projects and International Cooperation for the Brazilian Antarctic Programme (PROANTAR) Interministerial Commission for Sea Resources (CIRM). After 3 years as head of the Department for the National Oceanographic Data Centre, Directorate of Hydrography and Navigation (DHN) of the Brazilian Navy, she spent another 2 years as the head of the Brazilian Executive Committee for the Global Ocean Observing System. Before taking the current position, Ms. Trotte was a Programme Specialist at the P-5 level GOOS Project Office, IOC Secretariat, Paris.

IOCARIBE

Partner No. 8 (Colombia): IOCARIBE-UNESCO Sec., IOC Acting Secretary for IOCARIBE (IOCARIBE Sec.)

IOCARIBE is a regional subsidiary body of the Intergovernmental Oceanographic Commission (IOC) of UNESCO, created in November 1982 as a specialized mechanism of the UN system to co-ordinated ocean scientific research and ocean services in the Caribbean and Adjacent Regions. It is the IOC Sub-Commission for the Caribbean and Adjacent Regions and is responsible for the promotion, development and co-ordination of IOC marine scientific research programmes, the ocean services, and related activities, including Training, Education and Mutual Assistance (TEMA) in the Wider Caribbean.

The Regional Secretariat is a field office of UNESCO/IOC Office in charge of executing and following up activities of the Sub-Commission, fulfilling the IOC functions in the region and undertaking as appropriate, any other duties assigned by the IOC Secretariat and UNESCO. It is the physical presence of IOC and the representation of the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the Caribbean and Adjacent Regions.

In the original GRAND proposal, IOCARIBE was represented by two partners: the IOC Acting Secretary for IOCARIBE and the Acuاريو Nacional de Cuba (ANC). Following the decision to reduce to one representative partner from each GRA in the final GRAND partnership due to the drastic cut in funding, the IOC Acting Secretary for IOCARIBE has been chosen to be the representative partner for IOCARIBE.

Key personnel

Cesar Toro is presently the Head of the IOC Sub-commission for the Caribbean and Adjacent Regions IOCARIBE-UNESCO. Former Sales Manager and Senior Project Engineer at OCEANOR - Oceanographic Company of Norway. Expert in numerical modelling of oceanic processes and in Design of Monitoring and Surveillance Environmental Systems. Dr. Toro has a sound experience in managing international projects in the maritime sector, including project negotiations, contractual matters, project elaboration and execution. Also, he has been the leader and manager of projects that include marine environmental impact assessment studies, training and education, oceanographic cruises planning and field work.

NEAR-GOOS

Partner No. 9 (Russian Federation): NEAR-GOOS, Pacific Oceanological Institute (NEAR-GOOS/POI)

The coordinating mechanism for NEAR-GOOS consists of a Coordinating Committee that meets annually. Each member country is represented by two representatives on the committee, invariably from different agencies/institutions in the country. Observers are welcome to participate in the meetings of the Committee. Each country has its own mechanism for the coordination of activities at the national level operating with different degrees of autonomy either through the respective National Oceanographic Committees or their equivalent, or through some ad hoc coordination among interested institutions and agencies.

NEAR-GOOS essentially operates as a virtual platform of interlinked national data servers (near-real time and delayed mode database) established in each of the countries, whereby the Japanese databases carry out the aggregation at the regional level. Main concept of NEAR-GOOS is free of charge data exchange. Each data server has its own website set up, mostly in the national language.

In the original GRAND proposal, NEAR-GOOS was represented by five partners: China-Korea Joint Ocean Research Centre (CKJORC); V.I.Ilichey Pacific Oceanological Institute (POI); Far Eastern Regional Hydrometeorological Research Institute (FERHRI); Japan Meteorological Agency (JMA); and Korea Oceanographic Data Centre, National Fisheries Research and Development Institute (NFRDI). Following the decision to reduce to one representative partner from each GRA in the final GRAND partnership due to the drastic cut in funding, POI has been chosen to be the representative partner for NEAR-GOOS.

Key personnel

Vyacheslav B.Lobanov is the deputy director of the Pacific Oceanological Institute. In 1993 he obtained his PhD from the Far Eastern Branch of Russian Academy of Sciences, Vladivostok. His scientific interests include: physical oceanography, mesoscale dynamics and the application of satellite data. He occupied the position of Chair in the Physical Oceanography and Climate Committee, PICES from 1998 to 2001, and currently he is the Acting chairman of the NEAR-GOOS Coordinating Committee.

PI-GOOS

Partner No. 10 (Fiji Islands): Pacific Islands GOOS, South Pacific Applied Geoscience Commission (PI-GOOS/SOPAC)

Pacific Islands GOOS was established in 1998 to enable the potential twenty-three member countries to review their ongoing ocean research and monitoring activities, as well as to assess their priority demands and needs of GOOS through the utilization of regional capacity.

The coordination mechanism for PI-GOOS is mainly via Internet/Email correspondence and through GOOS related meetings such as IOC General Assembly Meetings, WESTPAC meetings/workshops, Marine Sector Working Group Meetings and PI-GOOS workshops and meetings. Each member country is represented by at least two representatives to the various PI-GOOS related meetings, invariably from different agencies/institutions in the country. The Annual PI-GOOS Steering Committee Meeting forms the core of coordination and evaluation of relevant issues of the PI-GOOS.

The SOPAC Technical Secretariat is recognized as the interim PI-GOOS Secretariat. The PI-GOOS Chair coordinates PI-GOOS activities with other GOOS bodies together with respective PI-GOOS members from the various member countries. Collaboration is carried out via the Internet/Email or direct participation to various GOOS meetings and workshops.

Key personnel

Cristelle Pratt has tertiary qualifications in marine geoscience and, marine law and policy. Professional experience includes marine geoscience in the Department of Mineral Development, Fiji Government, marine management with the SOPAC Secretariat, and risk management within the private sector in New Zealand. Cristelle currently manages the Ocean and Islands Programme, one of three key programme areas of the SOPAC Work Programme. As Programme Manager her responsibilities include, amongst others, managing the secretariat activities for the Pacific Islands GOOS Regional Alliance. As a fledgling GOOS-GRA, activities have focused on developing a strategic plan for PI-GOOS and convening two regional capacity building, advocacy and awareness workshops, for which there have been joint publications relating to these GOOS activities, between SOPAC and the GOOS Secretariat.

SEA GOOS

Partner No. 11 (Thailand): SEA GOOS, Southeast Asia START Regional Centre (SEA GOOS/SEA START RC)

Recently SEA START RC has been invited to take leading roles in several GOOS related activities including: WMO Initiative on GCOS for East and Southeast Asia where SEA-GOOS is well integrated as an official action in such plan; JCOMM/TCP Ocean Forecasting Capacity Building for Southeast Asia, where numerical forecasting systems for wave and storm surge develop by SEA START RC for Southeast Asia region are used as the key system for training and log-term operation; Initiative of IOC GOOS Supporting Unit to gain commitment from relevant countries in the region to establish SEA-GOOS

Southeast Asia START Regional Centre is the regional centre for the region responsible for Global Change System for Analysis, Research and Training (START). START was established as a joint effort among the International Geosphere Biosphere Programme (IGBP) of ICSU, Global Change International Human Dimension Programme of ICSU (IHDP), and World Climate Research Programme of WMO-IOC.

Key personnel

Dr. Anond Snidvongs is a lecturer within the Department of Marine Science, Chulalongkorn University, Bangkok, Thailand. He is also: the director of Southeast Asia START Global Change Regional Centre, the project leader for the IOC-UNESCO/WESTPAC International Cooperative Study on the Gulf of Thailand, a member of the International START Scientific Steering Committee, a member of the Southeast Asia START Regional Scientific and Technical Committee, a member of the Regional Scientific and Technical Committee, UNEP/GEF Project on Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand and forms part of the liaison officer for Southeast Asia, Asia Pacific Network for Global Change Research (APN).

GRASP

Partner No. 12: Servicio Hidrografico y Oceanografico de la Armada (SHOA)

The Hydrographic and Oceanographic Service of the Chilean Navy (SHOA) is a governmental agency whose main objective is to provide safe navigation in Chile. To accomplish this, it produces the official nautical charts of the country, generates complementary publications and provides technical and scientific information to the users. As a national official Service in the field of oceanography, SHOA is mostly involved in the acquisition and dissemination in quasi-real time of oceanographic and meteorological data (sea level, sea surface temperature, air pressures and others) collected in coastal platforms located along the coast and in oceanic islands. These data is mainly used by SHOA to support studies in the field of “El Niño, Southern Oscillation” (ENSO) phenomenon monitoring, to provide Tsunami warning, to make the official Tide Tables, and to support other studies of time series analysis. SHOA is an active member of the GOOS Regional Alliance for the Southeast Pacific (GRASP).

GRASP was created on May, 31, 2003 by a Consortium of Research Institutions of Colombia, Ecuador, Peru, Chile and USA to promote, implement, and manage relevant aspects of GOOS in the Southeast Pacific Region. These Institutions are dedicated to develop and improve regional capabilities to do Operational Oceanography.

Key personnel

Commander Rodrigo H. Nuñez is currently Head of the Department of Oceanography within the Chilean Navy Hydrographic and Oceanographic Service. In 1998 he obtained his Ph.D in Physical Oceanography at the Florida State University. Commander Nuñez has participated actively in several international activities: Chilean National delegate for the Scientific Committee on Oceanic Research (SCOR); Chilean National delegate for IOC; Associate Director of the International Tsunami Information Center (ITIC – ITSU/IOC), Honolulu, Hawaii, USA; member of the Steering Group of CLIVAR/VAMOS (Variability of the American Monsoon) of the World Climate Research Programme (WCRP); vice-Chairman of IGOOS; member of the Service Experts Group of JCOMM; member of the Chilean Delegation to IOC/ABE-LOS (designated by the Chilean Government as one of the two experts requested by IOC); member of the Ad Hoc Expert Group on the Evaluation of Hydroacoustic Data Processing at the International Data Centre of the Provisional Technical Secretariat (PTS) of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), UN Offices, Vienna, Austria; and Acting Chairman of the GOOS Regional Alliance for the South East Pacific (GRASP) recently formed in Cartagena, Colombia (May).

Imperial College of Science, Technology and Medicine

Partner No. 13 (England): Imperial College of Science, Technology and Medicine (ICL)

Imperial College of Science, Technology and Medicine is a university that is world-renowned for its teaching and research in science, technology and medicine. The graduate school of the environment (created by John Woods in the mid 1990s) gathers together the university's outstanding strengths in both the natural and the engineered environment. The research cluster COSMIC (Complex System Modelling at Imperial College) brings together skills in computation, software engineering, modelling of complex systems and optimization theory, with applications in the atmosphere, ocean and solid earth. Staff at Imperial College have made major contributions to strategic planning of operational oceanography. The Department of Earth Science and Engineering has the unique distinction of repeatedly gaining top grades in the national assessments of university research and teaching. It specializes in adopting an engineering approach to the geosciences, ranging from planetary dynamics to oil exploration, and from sedimentary geology to marine ecology. The department runs a pioneering undergraduate course in Computational Geophysics, which trains students in key skills needed for operational oceanography. The Imperial College Ocean Model applies advanced methods derived from nuclear engineering (such as adaptive meshes) to operational oceanography.

Key Personnel

Professor John D. Woods is professor of oceanography at Imperial College of Science, Technology and Medicine, and head of COSMIC (Complex System Modelling at Imperial College). He was the founding Dean of the Graduate School of the Environment and head of the Department of Earth Resource Engineering. His personal research is split three ways. He models the marine ecosystem using individual-based modelling techniques. He models interaction between businesses competing to transport goods in sea containers. And he does strategic planning in operational oceanography. Professor Woods was co-chairman of WOCE (the world ocean circulation experiment). He is one of the pioneers of GOOS and personally initiated EuroGOOS, which he chaired in its formative years. He is a founding member of the Academia Europaea, and has served on a number of European committees, including ECOPS which helped set the agenda from collaborative research in ocean and polar sciences. His awards include an honorary doctorate of science from the university of Liège. Before moving to Imperial College of Science, Technology and Medicine in 1994, John Woods was director of marine and atmospheric sciences at the UK Natural Environment Research Council, where he founded the Southampton Oceanography Centre. He had previously worked at the UK Meteorological Office and held chairs in the universities of Southampton and Kiel. Recent work on operational oceanography has included co-editing "Ocean Forecasting" (Springer 2002). Among his over 100 scientific papers are 20 on a subject that he has invented, virtual ecology; most recently "Predicting Fisheries in the context of the environment" (Philosophical Transactions of the Royal Society of London, in press).

Across Limits

Partner No. 14: (Malta): Across Limits Ltd (ACL)

AcrossLimits is a dynamic SME and creative E-Business, Internet and Knowledge Management solutions provider based in Malta. AcrossLimits provides various services relating to Information Technology focusing mostly on creating e-commerce and e-business solutions.

Key Personnel

Angèle Giuliano has specialised in Internet marketing techniques and innovative business management methodologies. Heading major projects such as the creation of Smart Online Shopping, she has developed a strong background in high-traffic websites. She also led a 15-strong team to win the coveted Euro-Med Multimedia Award in 1998.

Section B – Non-funded Partners

Perth Office

Partner No. 15 (Australia): IOC GOOS Perth Regional Programme Office (IOC/PERTH OFFICE)

The IOC Perth Regional Programme Office is located in Western Australia and it is funded by IOC, the Western Australia government and the Commonwealth Government of Australia (Bureau Of Meteorology). Its function is to develop GOOS in the Indian Ocean, South Pacific and Australia. It is temporarily assisting Southeast Asia GOOS as well. The Office is engaged in capacity building, awareness building, organizational development, and implementation of GOOS and related pilot projects. It plans and conducts these activities in cooperation with the regional GOOS alliances mentioned. It has planned and implemented several major GOOS conferences in the region in the past few years. It also undertakes extensive planning with organisations in the region to further GOOS.

Key personnel

William Erb has served as an oceanographer with the US Navy, 1965-1975, various positions in US State Department concluding with Director, Office of Marine Science and Technology Affairs-19775-2000, Senior Advisor to Secretary of the IOC 1996-1999 and NASA External Affairs-1999-2000. I have been Head of the Perth Office since 2000.

I-GOOS

Partner No. 16 (France): Intergovernmental Oceanographic Commission - International Committee for GOOS (IOC / I GOOS)

The Intergovernmental IOC-WMO-UNEP Committee for the Global Ocean Observing System (I-GOOS) was initially established by the IOC Executive Council at its twenty-fifth Session (Paris, March 1992) as the IOC Committee for GOOS (resolution EC-XXV.3), to, *inter alia*, replace the Committee on Ocean Processes and Climate. WMO and UNEP agreed to co-sponsor the Committee in 1993. The main responsibilities of IOC Committee for GOOS are: (i) promotion, co-ordination, implementation and management of the Global Ocean Observing System

(GOOS); (ii) identification of the resources needed for GOOS and the means for obtaining them; (iii) develop and update plans for, initiate implementation stages and monitor the progress of GOOS; (iv) develop such plans on the advice of the GOOS Technical and Scientific Advisory Panel and other scientific and technical groups as appropriate; (v) maintain liaison with related research projects as input to the design of GOOS and to help GOOS respond to research needs; and (vi) representation of GOOS at meetings of other bodies.

Key personnel

Silvana Vallerga holds a Laurea degree in Physics. Scientific Director of the IMC and Head of the CNR Section of Sistemi Sensoriali e Ambiente Marino (S²AM) at Oristano, Senior researcher at CNR. Chairperson of the MedGOOS - Mediterranean Global Ocean Observing System, Officer, Treasurer and Trustee of EuroGOOS, Vice Chairperson of the Marine Board of the European Science Foundation, national delegate to EC MAST II and III, national delegate to EUROMAR, national delegate in the Helsinki Group (Women and Science in EC). Member of National Oceanographic Commission, of the National Polar Commission, of the Ministerial Committee for Co-operation with Mediterranean Partner Countries. Visiting Associate at NIH, Bethesda, Md, USA. Main research interests: adaptation of marine organisms to their environment, genetics and physiology of adaptation, visual ecology. Author of over 100 scientific publications.

CeSSS/IOPAS

Partner No. 17: (Poland): Centre of Excellence for Shelf Seas Science at IOPAS (CeSSS)

The Centre of Excellence for Shelf Seas Science (CeSSS) is one of the projects under the 5th Framework Programme. The Centre is designed to strengthen co-operation between leading centres and bridging the Western and Eastern European shelf seas experts. The specific objectives of the CeSSS, contributing to the integration with the European Research Area, are: to direct the CeSSS/IOPAS potential towards advanced fields of physical and chemical oceanography, the ecology and operational oceanography of shelf sea systems through the organisation of conferences, workshops and exchange visits, to improve links with outstanding marine centres in the EU (especially in the countries around the Baltic Sea and European Arctic Seas), to re-establish links with leading marine universities and institutes in the Newly Associated States and Russia, to organise international co-operative research cruises on board of the CeSSS/IOPAS research vessel *Oceania*, to extend existing PhD studies focused on oceanology and fishery to postgraduates from abroad, and to disseminate the results of the Centre's activities to the scientist communities and people living along sea coasts, it means to contribute to the capacity building and awareness of in the field of operational oceanography.

Key Personnel

Dr. Jan Piechura has a PhD in natural sciences (1965) and has held the title of Professor since 1990. He has past experience in directing the Marine Physics and the Sea Fisheries institutes in Poland, besides having worked as an expert in physical oceanography for the UNESCO field project in Aden (Yemen). Since 1990 he has headed the Marine Dynamics Department at the Institute of Oceanology, Polish Academy of Sciences, Sopot, Poland. His main scientific interest are mesoscale dynamics and mixing of the deep (inflowing) waters in the Baltic Sea, exchanges through the Danish Straits, thermohaline circulation and climate, frontal zones and transfrontal exchange and salt water formation on the Svalbard shelf.

IOI-CASPIAN Sea

Partner No. 18 (Russian Federation): International Ocean Institute-Caspian Sea (IOI-CASPIAN Sea)

The International Ocean Institute Operational Centre of the Caspian Sea (IOI Caspian Sea) is a network of 3 Affiliates in the Caspian Basin. The Astrakhan State Technical University (ASTU) hosts the IOI Caspian Sea. Research conducted by ASTU contributes to fundamental studies in several sectors including economics, management, natural and social sciences, technology and law. The ASTU provides education to ecologists and biologists taking into consideration new global changes affecting the Caspian Basin environment such as climate changes, potential threats caused by pollution with view to the future oil exploitation in the basin. Activities of the IOI Caspian Sea are focused on: Coastal zone sustainable development; Research (monitoring, observing and modelling of coastal ecosystems); Education and training based on the principles of the IOI Virtual University and training trough research; Ocean governance; Increase of public awareness of the Caspian Sea and its condition. The IOI Caspian Sea pays a special attention to all problems concerning global changes and sustainable management of marine ecosystems.

Key Personnel

André-Serge Mikouiza is the Deputy Director of IOI Caspian Sea/ Program Coordinator and Senior Research Scientific Officer at The Caspian Research Institute of Fisheries, expert on marine environmental and bio-resources issues, Scientific Coordinator of the Caspian Sea Ecological Monitoring Network of NGO in Northern Caspian, Corresponding Member of International Academy of Ecology and Life Protection Sciences. During an eight year period working on the problems related to assessment and management of biological productivity of small lakes in the Delta of River Volga, a thesis of doctorate was written on the results obtained by the researches working on the project: Biological Productivity of Small Lakes in the Volga Delta, Management and Rational use.

A5 partners list and contacts

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		Name	Position				
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