GROOM

Gliders for Research, Ocean Observation and Management

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2nd Report on the Stakeholders Open Forum activities

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I. INTRODUCTION

This 2nd report (D1.9) concerns the Stakeholders Open Forum (SOF) activities during the 2nd reporting period. It recalls the general strategy that has been established considering the resources allocated to these activities, and presents the major event organized by GROOM during Oceanology International'14 in London, lists the activities conducted by GROOM partners as part as the SOF, and presents an assessment of the results of the SOF during the project.

II. STAKEHOLDER CATEGORIES

As presented in the first report (D1.8), stakeholders have been classified in four main categories:

- Non European partners (and 'non GROOM' European glider groups that will emerge during GROOM) with similar scientific and technical profiles as the partners, including major Observing Systems (OSs) such as US/IOOS,
- Other European projects for Marine Research Infrastructures (MRIs), such as I3, ESFRI projects in preparatory phase, etc., at all relevant levels, including the Copernicus Marine Environment Monitoring Service,
- Policy makers in the fields of MRIs and OSs such as national and European official bodies, international bodies like IOC/UNESCO, and other public stakeholders like marine/maritime clusters, etc.,
- SMEs active in the field of expertise covered by the proposal.

The following table lists these groups and the way to approach them.

Stakeholders categories	**Main representatives in each category**	**Strategy to approach the category with the maximum effectiveness and efficiency**
I - Non European glider operators stakeholders	- USA: IOOS/NOOA, OOI, WHOI, UW, SIO, Rutgers Univ., Oregon State Univ.., - Australia : IMOS/ANFOG - Canada: CCOG - Peru: IMARPE - Chile: Univ. of Conception - South Africa: Univ. of Cape Town	Direct contacts at the partner level. The EGO annual meetings; Other similar international or national scientific workshops are the usual way to approach these groups for communication, collaboration and/or advice

	- Cape Verde: INDP - New glider operators emerging during GROOM	
II - Similar platform oriented and MRI projects	- FP7 I3 projects: JERICO, FIXO3, etc. - Euro-Argo, EMSO, EMBRC - Mercator, MyOCEAN, EMODNet, etc.	These projects have similar mechanisms such as the SOF to interact with their stakeholders and GROOM will use them as well.
III - Policy makers and public regional stakeholders	- EC - Ministries for research - EuroGOOS, Marine Board, ESFRI - International organizations, like IOC/UNESCO - Conference of Peripheral Maritime Regions - Marine/maritime clusters - Any relevant regional organizations (marine protected areas, water agencies) - Others	A comprehensive list has already been established based on EC and GISC reports. By nature, most of these entities have an established methodology to gather expertise from the scientific community and GROOM will make use of them.
IV - European SMEs and other non European glider/sensor manufacturers	- gliders: ACSA, Teledyne, I-Robot; Kongsberg; Bluefin Robotics - sensors: AANDERAA, CONTROS, Seabird, - services: CLS, ACRI, KUM, RS Aqua Limited, Actimar	Several technological exhibitions and forums already exist for that, at the national and international levels. Some of the SMEs are also active partners in the marine/maritime clusters and contact with them will be easy.

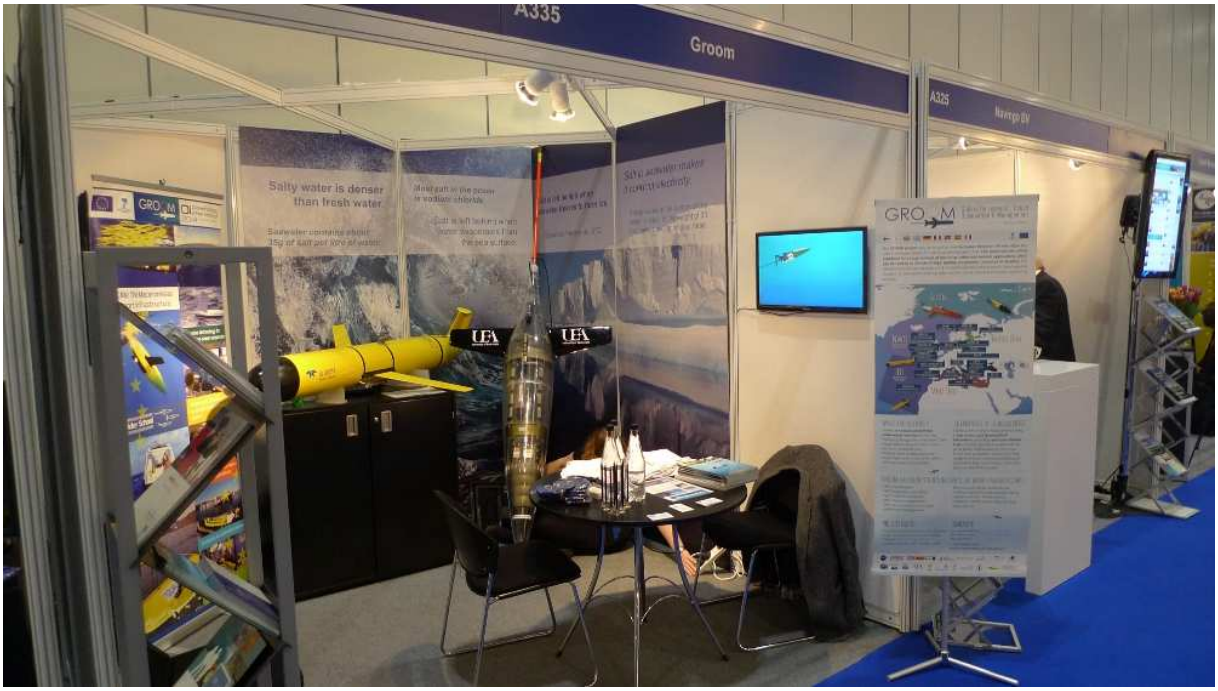
In the early stage of the project, the possibility for GROOM to organize itself a major SOF event during each reporting period was evaluated as unfeasible considering the context and the available resources. A participation to one of the major international events or exhibitions was selected to be relevant for our purposes. During OI'14 (March 2014), GROOM was presented to many stakeholders. This participation allowed GROOM to make the project much more visible and to shape a lot of contacts. These were initiated thanks to the above listed way to approach the stakeholders. As a result, in March 2014, the communication skills of the GROOM project were much higher with an extensive address book

III. GROOM PARTICIPATION AT OI'14 IN LONDON

Oceanology International is the leading conference and exhibition for ocean science and marine technology, gathering several hundreds of international exhibitors renowned for networking with suppliers and end-users in marine sciences and in the offshore and sub-sea industries. It is one of the global forums where industry, academia and government agencies share knowledge and connect with the marine technology and ocean science , to improve their strategies for measuring, exploiting, protecting and operating in the world's oceans. The last Oceanology International (OI) 2014 in London has been the largest event of the OI series with approximately 8,400 attendees and 528 exhibiting companies from 35 countries.

For GROOM it was a unique opportunity during the duration of the project to meet the largest marine science and ocean technology communities, all in one place. Our objective was to showcase the project to companies and key decision makers and also to contact new companies and stakeholders relevant to our activities. For example, an in-depth contact was established with the Brazilian PROOCEANO company, one of the first private companies being able to operate gliders to service the Oil and Gas industry.

A 9m2 booth was rented for GROOM. The organization and set up of the booth were ensured by UPMC with the help of UEA. In addition to the printed matters available for the project (GROOM flyer, copies of articles published in the journal International Innovation, institutional brochures .) two exhibition gliders were exposed and in particular the "transparent" Seaglider from UEA, useful to explain the functioning of a glider. Two looping projected videos have been specifically designed for OI and presented during the whole conference. During the three days of the exhibitions, the booth was stood by UPMC and colleagues from UEA and SAMS.



Groom booth at Oceanology International 14

More than 150 visitors to the booth, giving rise to at least a short interview, were registered during the exhibition. In addition, the animators of the booth have been visiting the exhibitions, in particular the companies involved in the O&G sector, both O&G majors such as Total S.A., in particular its TEC/GEO (Geotechnics / Geophysics / Metocean / Geomatics / Ice Engineering) division, or companies servicing this sector such as Prooceano and CLS.

In addition, GROOM participated to four side conferences and workshops during OI'14:

- Conference 'Ocean Observing systems' which included a panel discussion on *Why is the Marine Space so Important to Operate in and How Can Each of the Sectors Participate and Make Advances in Ocean Observing?*. This discussion clearly showed that the O&G sector is currently not contributing to the OSs in the context of e.g. GOOS, despite the fact that their observational activity for key oceanographic parameters is extremely important in some areas relevant for the global and regional observing systems managed by public authorities and academia,
- Conference 'Unmanned underwater vehicles showcase',
- Workshop organized by the EU project NEXOS (www.nexosproject.eu) on current challenges and requirements for sensors development,
- Workshop organized by the EU project JERICO (www.jerico-fp7.eu) aiming at identifying the best practices about dissolved oxygen calibration procedure.

IV. LIST OF OTHER ACTIVITIES

Meetings, exhibitions, etc. where GROOM partners participated and started an activity with the Stakeholders met during events are listed below.

	Name of the Event	Date	Location
1	Baltic Sea Science Congress	26/08/2013	Klaipeda University, Lithuania
	I – Scientist from the Baltic countries and Russia II - None III – Local Authorities IV – Local companies The objective of the BSSC series of congress is to bring together marine scientists and experts as well as young researchers of Baltic Sea region in order to exchange information and strengthen interdisciplinary approaches to solve the problems facing the Baltic Sea today. The GROOM project was presented during the congress by GEOMAR.		
2	Fifth session of the WMO-IOC JCOMM-OCG	05/09/2013	Silver Spring, Maryland, USA
	I – None II – None III – Most of the JCOMM management committee and JCOMM-OCG members IV – None Besides the standard agenda of the JCOMM Observations Coordination Group (OCG), this meeting included a session dedicated to common issues between JCOMM-OCG and other observing networks such as GROOM. The project was presented by Pierre Testor who attended the meeting. The meeting was the first concrete opportunity for GROOM to assess the requirements for the glider community to be recognized as a GOOS component.		

	The 31 participants to the 5th JCOMM-OCG session meeting		
3	Workshop on Arctic and Marine Research Infrastructures	17/09/2013	Rome, Italy
	I – None II – EuroFleet and EMSO chairmen's III – ENV SWG ESFRI members and EC officials IV – None The objective of this workshop were to discuss European research infrastructures (RIs) strategies, in particular in the context of ESFRI, as well as synergies between key European initiatives and infrastructures projects, and to identify areas and ways of cooperation with third countries, in particular USA and Canada.		
4	EurOCEANS Conference	07/11/2013	Telde, Gran Canaria, Spain
	I – None II – Several MRI and sensors related projects III – None IV – None This conference aimed at showing progress achieved over the past 5 years by the EUR-OCEANS Consortium and at analyzing perspectives on selected 'hot topics' in Marine Science. It also intended to pave the way for the integration of the EUR-OCEANS community in the future EuroMarine+ Consortium. Two presentations on PLOCAN glider activities. This meeting was important regarding the networking of OS activities in the Macaronesian region.		
5	EuroGOOS AISBL annual General Meeting	20/11/2013	Brussels, Belgium
	I – None II – EMODNet, EuroArgo, MyOcean III – EuroGOOS members IV – None This EuroGOOS meeting was the first occasion for a formal presentation of the GROOM project to the EuroGOOS AISBL.		
6	2nd Iinternational Cconference on Research Infrastructure ICRI 2014	02/04/2014	Athens, Greece
	I – GeoSciences Directorate NSF USA; IOLR, Israel, Australian Institute of Marine Science II – EuroArgo, EMSI, EMBRC, and other related MRI projects III – EC, ESFRI, RIs national representatives IV – None The objectives of ICRI 2014 was to highlight how global research infrastructures can respond to the grand challenges that the world is facing today, what lessons have been learned from the past, and what the priorities and directions are for the future. Although not specifically devoted to MRIs, a full day parallel session was devoted to Marine and Arctic Research Infrastructures.		
7	Workshop "Landscape of the European Research Infrastructures for Environmental Sciences"	22/05/2014	Paris, France
	I – None II – All ESFRI ENV infrastructure		

	III – ENV SWG ESFRI chair and France RIs representatives of the Min. of Research IV – None EuroArgo chair presented the landscape of European Marine Research Infrastructures and highlighted one possible integrative scheme through the EOOS. The workshop was an essential opportunity for GROOM to meet the ENVRI consortium, which resulted in GROOM coordinator's participation to the ENVRI+ proposal to the H2020 INFRA-DEV2014 call.		
8	7th EuroGOOS Conference	28-30 /10/2014	Lisbon, Portugal
	I – IOOS II – Most MRIs III – Official of most concerned European countries IV – Some This conference was matching with the 20th anniversary of the EuroGOOS establishment as organization. GROOM partners participated with several oral presentations and posters.		

V. CONCLUSION

V.1 Non European glider operators stakeholders

These stakeholders included

- the two major non European glider operators, which are already structured with their own national Ocean Observing System (IOOS for the USA, IMOS for Australia),
- several other existing glider operators all around the world (Canada, Chile, Mexico, South Africa),
- and emerging ones (Algeria, Brazil, Cabo Verde, Estonia, Iceland, Ireland, Israel, Tunisia), where GROOM directly contributed to help developing the glider activity by visiting or hosting the interested institutions.

Here, the synergies between national initiatives from GROOM partners, the EGO COST action and the FP7 JERICO and GROOM projects allowed initiating concrete collaborations with these stakeholders, also by providing the adequate funding schemes. For example, the collaboration with ENSSMAL in Algeria started with French support from the Ministry of Foreign Affairs only for meetings and capacity building, while actual glider field operations were supported by the TNA funding scheme from JERICO.

To better assess the potential of glider to support marine activities in developing countries, GROOM included a specific action with the Cape Verdean Institute for Fisheries Development (INDP), sited on the Cape Verde Island Sao Vicente. The INDP is in fact an important stakeholder to further unlock the potential of West African countries to contribute to, and to make use of, ocean observing in general, and glider observations in particular. Thank to the collaboration with GROOM over the last three years, the INDP has evolved into one of the few, but a so far opportunistic, 'African glider port'.

The INDP provided logistic support for several glider missions during GROOM. In July 2012 a first Macaronesian crossing, as part of the international Siblo glider expedition (lead by Rutgers University, USA) took place. A joint French (UPMC)/Germany (GEOMAR) multiglider mission in 2014 started at two locations in parallel from the Cape Verdes and from Senegal. These missions did survey along a transect through the eastern boundary upwelling region, one of the most important world regions for fisheries.

Generally speaking, the INDP has a great potential and interest as a stakeholder for ocean observation in general - for the local marine monitoring as well as for international

collaboration. They attended the international summer school on underwater glider technology at PLOCAN as well as participated to the activities of the TENATSO observatory aiming at establishing Long-term Ocean-atmospheric Observations on Cape Verde.

Currently the construction of the 'Ocean Science Centre Mindelo' (OSCM) is taking place. OSCM will serve as a platform for marine and atmospheric research in the Northeast tropical Atlantic. The centre shall be available to the international atmospheric and oceanographic community and also offer teaching and training possibilities for West Africa. Within this future OSCM, the INDP glider activities could serve the Macaronesian archipelagos (Azores, Madeira, Cape Verde, Canary Islands) in conjunction with the glider port on the Canary Island (PLOCAN), but also link to the African Mainland, in particular the eastern boundary upwelling of Mauritania and Senegal.

V.2 Similar platform oriented and MRI projects

During the GROOM period, all the FP7 MRI projects have been active or were finishing (EuroArgo PP, SIDERI and AIMS two EuroArgo 'side projects', EMSO PP, EMBRC PP, BlackSeaScene I3, Mesoaqua I3, Eurofleets I3, Assemble I3, Marinet I3, Aquaexcel I3, SeaDataNet II I3 and JERICO I3, FIXO3 I3), the last one being FIXO3 which started only in late 2013. The ESFRI projects (EuroArgo, EMBO and EMBRC) were actively conducting their Preparatory Phase toward an ERIC status, and EuroArgo first reached this status in July 2014. During the same period, the EMODnet long term initiative of DGMARE, was consolidating, offering day after day more concrete elements on which to rely. Among all these projects, the JERICO project (still running) which resulted from a top-down request of the EC, started to build a joint European research infrastructure network of coastal observatories focused of physical observations. JERICO included thus an important glider workpackage in which all participants are also GROOM partners. In Addition, the FP7 PERSEUS project in the Mediterranean included a large workpackage for observations where the design of the glider component in the observing systems active in Mediterranean have been defined, implemented and assessed.

As the matter of fact, GROOM succeeded to establish the right contacts with most of these projects in order to promote the work and results being produced by GROOM, as well as to exploit new synergies. This was made easier because in most cases, GROOM partners were also partners of these projects.

Today, the European context of the Operational Oceanography, both for OSs themselves and for information systems like the Copernicus Marine Environment Monitoring Service, has

become sufficiently mature to clearly identify where the glider can best contribute. Several GROOM deliverables describe into details how gliders can 'fill the gaps' left by others OSs and how its contribution – concretely the glider data flow – can be used by others. As being the last platform oriented project running now, FIXO3 will certainly capitalize a lot of the contribution of these projects, in particular within its workpackage on 'Virtual Observing Networks'.

V.3 Policy makers and public regional stakeholders

At the same time, a lot of fore-sighting works were initiated and conducted at the European (DGRI MRI group, Eranet SeasEra, Marine Board, etc.) and National levels both for the structuring of the MRIs initiatives or for OSs in Europeans seas. EuroGOOS and its ROOSes also became more active, and EuroGOOS is certainly now the main stakeholder for structuring Operational Oceanography at the European level in link with the global one. This is not the place to review all these works, but these, including the above FP7 projects, resulted for GROOM in a quite complex landscape of initiatives and projects, several of them being already mature ones when GROOM started.

At the European level, here again, GROOM succeeded to be identified by most stakeholders, and despite the complex landscape, the bases for an implementation of a Glider European Research Infrastructure (GERI) have been established. EuroGOOS will certainly help in a short period of time, to progress toward an actual implementation plan (see D1.10).

The regional level is different. It is recognized that the Mediterranean is perfectly suited for an implementation of a sustained glider observing component that must rely on a transnational organization to share the lines to be sustained. Some Mediterranean regions and marine clusters are also convinced that the glider technology and a distributed glider infrastructure can bring benefit to the region. Concerning the Baltic Sea, GROOM partners have now a good potential to address the same issue thanks to the work carried by FMI and GEOMAR during GROOM and the growing interest of Estonia and Poland for the glider technology. For the North Atlantic, the H2020 AtlantOS project which is starting, include a substantial coordination activity for glider observations, and this will provide the opportunity to assess the interest of regional stakeholders in this region. However, as a general statement, it is not yet clear how GROOM can progress toward an implementation strategy with the support of the regions concerned by these ocean observatories and related MRIs. A recent meeting with the Conference of Peripheral Maritime Regions of Europe (CPMR) has allowed addressing this issue. This is a medium term action that will be conducted, and a

network of interested regions for each European sea must first be created. At the Mediterranean level, it seems clear that Pole Mer Méditerranée, the French Marine Mediterranean cluster, is willing to help GROOM for that.

At the national level, the question is also complex. Except in the UK where a voluntary national policy for an infrastructure for AUVs gave birth to the Marine Autonomous Robotic Systems (MARS) facility (30 gliders) in 2012, and Spain, in particular with the creation of the multiplatform SOCIB infrastructure, most countries (France, Norway, Italy) are still building their MRIs roadmap where a glider component is discussed. More details are provided in D2.5 and D1.10.

V.4 European SMEs and other non European glider/sensor manufacturers

The SME landscape is quite diverse.

Besides the historic US glider manufacturers, only one has reached a commercial stage in Europe (ALSEAMAR). The collaboration with GROOM partners was really efficient here, giving rise to the successful H2020 project 'Bringing together Research and Industry for the Development of Glider Environmental Services' (BRIDGES) project. BRIDGES aims at producing two deep gliders with *service*-oriented capabilities, in particular for the O&G and sea mining industries. In the context of marine technology districts (Italy and Spain), other SMEs have started glider platform projects which maturity has still to be investigated to assess their relevance for GROOM.

SMEs active for sensors development constitute an important and active sector in Europe. GROOM and other European and national projects have paved the way toward this successful sector in Europe, where SMEs and research institutes develop together sensors for a wide range of marine applications. In particular, the recently established FP7 NEXOS project, aiming at developing the next generation of marine sensors, incorporate a 'glider' component and several GROOM partners participate to this project.

Concerning marine services, it is still difficult to ascertain how European SMEs are addressing this sector or will be able to it. The Prooceano Brazilian company is still to our knowledge the unique example of successful service to the O&G industry, and here the Brazilian context certainly matters. It seems that SMEs are more attracted by the wave glider, an Autonomous Surface Vehicle (ASV), for which applications related to what could be measured at surface to service industrial and environmental needs are more

straightforward. BRIDGES will certainly help making progress to better understand what are the market needs for gliders, and what are exactly the required products.

Here, a key element for innovation by SMEs is the context in which SMEs can develop their initiative. It is well accepted that marine technological districts or clusters, where Universities, research centers and industry are closely networked, is key for success. Two prominent examples are certainly the Southampton region with the recently established 'Southampton Marine and Maritime Institute' in the context of the University of Southampton Science Park and the Technopole de la Mer near Toulon.

The near future will certainly give us some more concrete answer about the potential of the glider sector for SMEs, and here again BRIDGES will have a main role.

V.5 Conclusion

During the course of the project, GROOM partners have established contacts with stakeholders at all relevant levels for the GROOM objectives, both the research and the ocean monitoring ones. Not all contacts are equally mature. It is clear that the EC/DGRI and EuroGOOS context still offers the main possibilities for progressing toward the establishment of a Glider European RI. The role of stakeholders at regional and national level has still to be better understood and exploited, while it is clear that an active European industrial sector for glider is about to emerge for research, ocean observations and also marine management and industrial applications.