

G7 Future Oceans Initiative

Recommendation subgroup reporting template (2 page max)

Recommendation	1
Topic (e.g. ARGO, gliders)	Gliders
Consulted experts	<p>UK: National Oceanography Centre, Scottish Association for Marine Science</p> <p>France: LOCEAN</p> <p>Germany: GEOMAR</p> <p>USA: Rutgers University, Scripps Institution of Oceanography, University of Washington</p> <p>Italy: Istituto Nazionale di Oceanografia e Geofisica Sperimentale</p> <p>Japan: Meteorological Research Institute, National Research Institute of Fisheries Science</p> <p>Canada: Memorial University of Newfoundland</p>
<ul style="list-style-type: none"> Identify key policy, research, and global issues that need to be addressed 	<p>There are important gaps in ocean <i>in situ</i> monitoring capacity between the open ocean Argo array, the global research vessel fleet, and fixed-point stations. They concern key regions in the ocean. This is particularly evident in the transition region between the open-ocean and coastal area above the continental slopes and over the shelf seas. In particular three crucial systems fall in these gaps</p> <ol style="list-style-type: none"> 1. Ecosystems in upwelling systems and shelf seas support a significant proportion of global fisheries. These regions are especially susceptible to anthropogenic pressure. 2. Boundary currents play a key role in climatically important meridional transports of heat and fresh water as well as biogeochemical properties 3. Strong and localized air-sea interactions (hurricanes, deep convection) require specific sampling that can be solely addressed by gliders.
<ul style="list-style-type: none"> Proposed actions (keep brief and high level): 	<ol style="list-style-type: none"> 1. Support an office for the coordination of the global glider observation effort in the framework of the GOOS (Global Ocean Observing System). 2. Develop globally the infrastructure required for operating gliders on a sustained basis according to common standards and best practises. 3. Establish and maintain sustained glider (physical and biological) observation programs in key locations.
<ul style="list-style-type: none"> Objectives (what measurable implementation steps will be completed) 	<p>Short term:</p> <ol style="list-style-type: none"> 1. Establishment of universal global community of glider users that adopt common protocols for sampling, calibration, quality control and data dissemination of EOVs (Essential Ocean

<ul style="list-style-type: none"> o Short term 1-3 years o Long term 5-10 years 	<p>Variables).</p> <ol style="list-style-type: none"> 2. Develop an internationally recognised framework for sharing glider data in real time and in delayed mode. 3. Establish an education and outreach program to facilitate wider use of glider technology meeting necessary standards for data particularly among developing nations and a wider contribution of quality-controlled glider data to the global program 4. Prioritise biogeochemical and biological sensor development for sustained glider programs. <p>Long term:</p> <ol style="list-style-type: none"> 1. Expand the number of regional sustained glider observation networks so that the global ocean boundaries are all observed with pre-defined sampling requirements 2. Increase the number of EOVs reliably delivered by gliders from the present figure.
<ul style="list-style-type: none"> • Target outcomes (ie impacts on issues outlines above) 	<ol style="list-style-type: none"> 1. Establishing the global community of people and organizations will facilitate the increased use of glider technology and the amount of data available to the global observing system. 2. Educating marine sector stakeholders around the world will have a large, positive impact on the future development of the infrastructure both in geographical spread and its ability to capture a wide range of socially relevant phenomena.
<ul style="list-style-type: none"> • Anticipated challenges 	<ol style="list-style-type: none"> 1. Continental slopes mostly fall within EEZs. Establishing a complete network will be dependent upon participation of coastal states. 1. Wider adoption of gliders to include assessment of ecosystem health requires significant and diverse biogeochemical sensor development.
<ul style="list-style-type: none"> • Potential partner organisations and countries to be engaged for delivering the action plan including approach and scope of engagement, e.g. through a existing GOOS, IOC, or other group/committee 	<ol style="list-style-type: none"> 1. "OceanGLIDERS." Steering team. Recently established under the auspices of WMO/IOC JCOMM Observation Coordination Group (OCG). 2. The international EGO network of glider users. 3. Groups currently deploying gliders as part of regional observing systems, including Australian IMOS. 4. Coastal states.
<ul style="list-style-type: none"> • Costs/Budget/Resourcing (per year, and total over initial 5 years and 	<ol style="list-style-type: none"> 1. Support 2 FTE for coordination activities, and provide support for meeting and travel of steering team. Total \$300k per year. 2. An education program including 1 FTE to organise and conduct and scholarships for 15-

<p>10 years beginning in 2017)</p>	<p>day training schools for c. 20 persons per year. \$200k per year.</p> <p>3. Support 10 flagship sustained glider observation lines at \$200k per year each. Total \$2M per year</p>
<ul style="list-style-type: none"> • Links to other recommendations 	<ol style="list-style-type: none"> 1. Objectives of this recommendation include the establishment of universally accepted protocols for data management and quality control. This will aid the promotion of data sharing (recommendation 3). 2. An education program that increases the capacity to use autonomous vehicles in developing countries would contribute to recommendation 4.