



# Euro-Argo Status

P.Y. Le Traon, S. Pouliquen, E. Mamaca  
and Euro-Argo partners

AST-13, Paris, March 2012



Euro-Argo: A new European Research Infrastructure

Coordinator:  **Ifremer**

Institut Français de Recherche pour l'Exploitation de la Mer - France



# Outline

- The long-term organisation of Euro-Argo
- New projects and EU funding
- Euro-Argo float deployment plans (2012 and +)
- Euro-Argo views on the long-term evolution of Argo



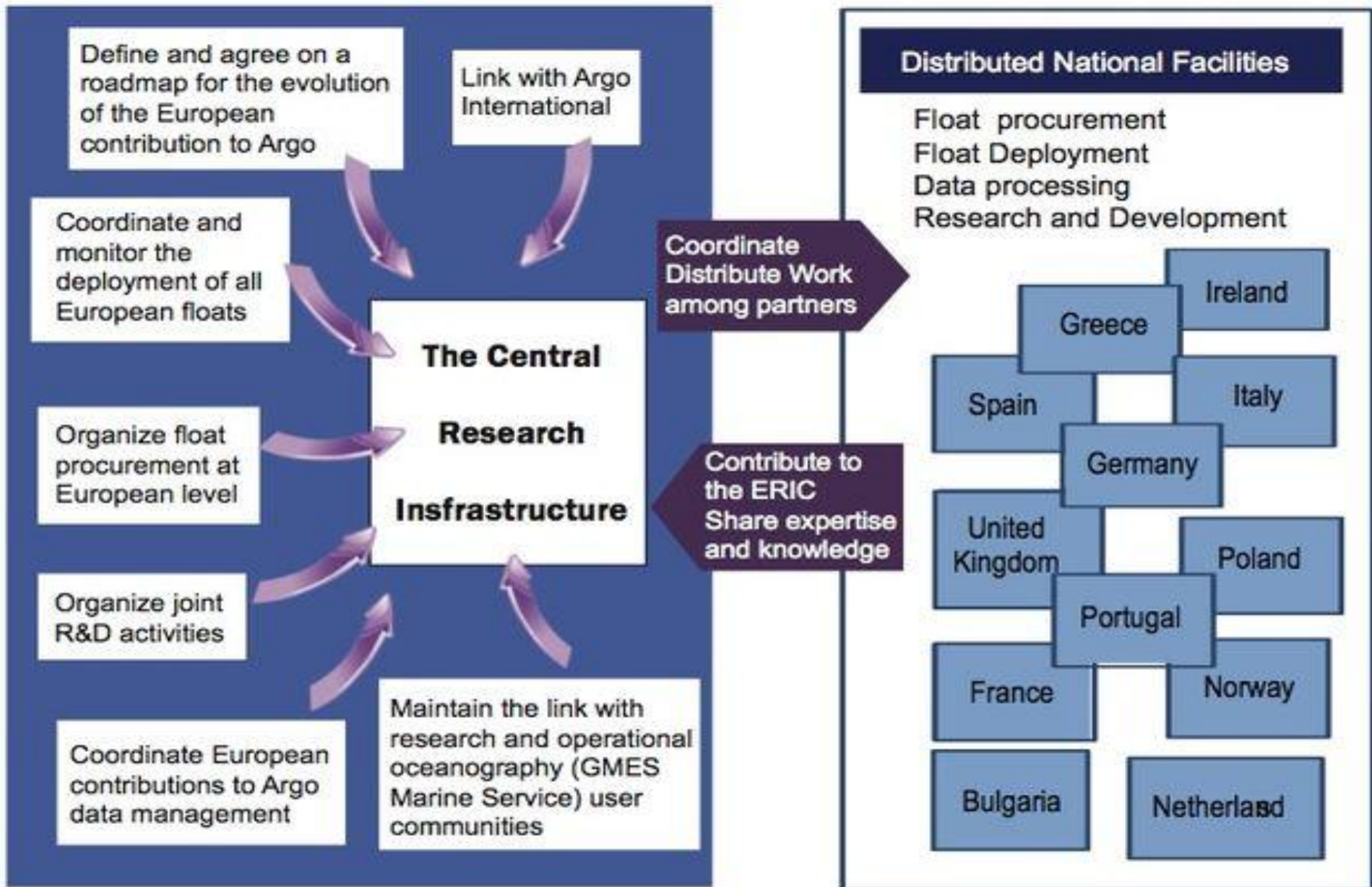
# Euro-Argo : A new European Research Infrastructure

- Objective: ensure a long term European contribution to Argo.
- Proposal : Europe establishes an infrastructure for  $\frac{1}{4}$  of the global array
  - Requirement : 250 floats per year including regional enhancements (Nordic seas, Mediterranean&Black seas) (about 50 floats per year for regional enhancements)
  - Dual use : research/climate and operational oceanography (GMES)
- Set up a new European legal structure (Euro-Argo ERIC) that will allow European countries to consolidate and improve their contribution to Argo international. Agreements are at ministerial level and this will help to ensure long term sustainability.



# Organisation of the Euro-Argo RI

*A central facility and distributed national facilities*





# The Governance of the Euro-Argo ERIC

## Local Host for Euro-Argo ERIC

France (Ifremer, Brest)

### Members:

Bulgaria, France, Germany, Greece, Italy, Netherlands, Norway (TBC), Spain, United Kingdom (TBC)

### Observers:

Ireland, Poland, Portugal (TBC)

+ Finland ?  
Turkey ?

Argo International

The Scientific and Technical Advisory Group  
(Advises on any scientific and technical matters)

Euro-Argo User Group

## Euro-Argo ERIC

### The Council

Defines the broad strategic direction of the ERIC and its evolution. It is composed of one delegate per member.

### The Management Board

Supervises the operation of the Euro-Argo ERIC and ensures that it operates and evolves in accordance with the strategic direction set by the Council.

### The Central Research Infrastructure

Responsible for the implementation of the decisions and programmes adopted by the Management Board.

Includes a Programme Manager and a Project Officer. May hire additional personnel to support the Euro-Argo activities.



# Two phases for the Euro-Argo ERIC

- **2011-2013**
  - Light structure: 1 programme assistant (100%) (E. Mamaca), 1 programme manager (20%) (S. Pouliquen). Ifremer personnel seconded to the ERIC.
  - Budget for missions (incl. ERIC members), workshops, WWW
  - Funding by members and observers
- **2014+**
  - Structure : 1 programme assistant (E. Mamaca), 1 programme manager (50%) (S. Pouliquen), 1 technician, 1 engineer/scientist (ERIC employees or seconded by members to the ERIC).
  - Budget for missions (incl. ERIC members), workshops, WWW
  - Funding by members and observers and the European Commission
  - 50 to 100 floats/year procured by the ERIC (EC funding). EC co-funding for the data system.
  - Consolidated European contribution to the Argo Information Centre.





# Status of the Euro-Argo ERIC application

- **Statutes, technical & scientific description have been validated:**

- Members: Germany, UK (TBC), France, Italy, Netherlands, Greece, Spain, Bulgaria, Norway (TBC)
- Observers: Ireland, Poland, Portugal (TBC)
- Contributions of different countries have been defined
  - Float procurement, contribution to the data system
- Hosting institution for the ERIC : France (Ifremer)



- **We have defined and agreed on our internal working procedures. Ifremer has sent a proposal to host the ERIC (agreed by partners).**

- **French ministry of research has completed the validation of the Euro-Argo ERIC application (recognition as an international body, VAT exemption) and has sent the official application to the EC. Validation by the EC almost done.**

- **Next step: signature by different countries. Setting up of the ERIC mid 2012**


*Note : an interim structure (project office) was set up to continue the coordination from July 2011 (end of the PP) to July 2012 (start of the ERIC).*




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# Euro-Argo RI

European contribution to Argo program



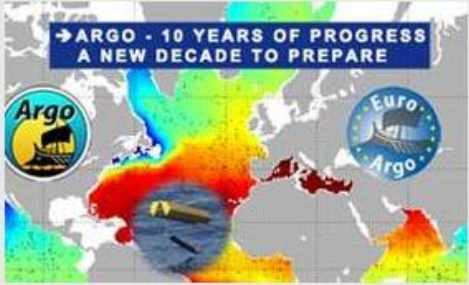
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**→ ARGO - 10 YEARS OF PROGRESS  
A NEW DECADE TO PREPARE**



Published on the 30/01/2012  
**4th Argo Science Workshop - Sept. 2012**  
Sept. 26-28, 2012, in Venice-Lido, Italy. It will be part of the symposium on "20 Years of Progress in Radar Altimetry".

[Read the news](#) +

Image gallery

Site WWW updated: <http://www.euro-argo.eu>





# Direct European Union (EU) Funding for Euro-Argo

Euro-Argo Preparatory Phase (January 2008- June 2011): 3 Meuros

**SIDERI: Strengthening International Dimension of Euro-Argo Research Infrastructure (1 Meuros) December 2011 - December 2013**

- International integration
- Integrating and extending Euro-Argo activities in the European Neighbourhood
- Float deployment coordination
- Legal and policy issues
- Conferences, workshops and outreach

**E-AIMS: Euro-Argo Improvements for the GMES Marine Service September 2012- September 2015 (2 Meuros) (accepted)**

R&D call (GMES) : evolution of Argo technology for GMES

**2014 – 2020** : still aiming at a long term funding EU funding through GMES, DG Research or DG Mare (50 to 100 floats/year, bio, co-funding for the data system)





# SIDERI - Main objectives

- Strengthening International dimension of Euro-Argo
  - Link with Argo International
  - Work on the evolution of the Argo core mission
  - Work on the evolution of the Argo data centers and role of the European components,
  - Work on the link with WMO Information System
- Integrate and extend Euro-Argo activities to European neighborhood: Mediterranean&Black Seas, North-East Atlantic
- Refine the float deployment strategy in Europe at global and regional scales
- Review legal and policy issues (law of the sea),
- Organize scientific and thematic (regional) workshops open to international partners



## SIDERI 2012 - Work Plan

- Coordinate European deployment plans to Argo
- Study how to enhance at sea monitoring of the European fleet
- Facilitate access to research vessel cruise plans
- Foster ARC activities in North Atlantic, Mediterranean and Black Seas and southern Atlantic Ocean
- Organize workshops to entrain new European nations into Argo data use and float deployment (Mediterranean and Black seas, Nordic seas) (Venice ASW-4)

# E-AIMS

## Context

### COLLABORATIVE PROJECT

*Small or medium-scale focused research project*

FP7-SPACE-2012

### Euro-Argo Improvements for the GMES Marine Service

### E-AIMS

Date of preparation: 23/11/2011

Version number: 1

Participant no.	Participant organisation name	Country
01	IFREMER / Institut Français de Recherche pour l'Exploitation de la Mer	France
02	UKMO / Met Office	United Kingdom
03	OGS / Istituto Nazionale di Oceanografia e di Geofisica Sperimentale	Italy
04	NERC / Natural Environment Research Council	United Kingdom
05	KNMI / Royal Netherlands Meteorological Institute	Netherlands
06	IEO / Instituto Español de Oceanografía	Spain
07	IMR / Institute of Marine Research	Norway
08	USOF / University of Sofia	Bulgaria
09	IOPAS / Institute of Oceanology Polish Academy of Sciences	Poland
10	IFM-GEOMAR / Leibniz-Institut für Meereswissenschaften	Germany
11	Mercator Ocean	France
12	INGV / Istituto Nazionale di Geofisica e Vulcanologia	Italy
13	CLS / Collecte Localisation Satellites	France
14	ACRI-ST / GIS COOC	France
15	CSIC / Consejo Superior de Investigaciones Científicas	Spain
16	IOBAS / Institute of Oceanology Bulgarian Academy of Sciences	Bulgaria

#### Work programme topics addressed

FP7-SPACE-2012

Area 9.1.3 Support to the coordinated provision of observation data

SPA.2012.1.3-01 Research and development for *in-situ* component

Name of the coordinating person: Pierre Yves Le Traon (Ifremer)

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fax: +33 2 98 22 45 33

GMES in-situ

Euro-Argo proposal

Role of Euro-Argo ERIC

16 partners

Budget 2 Meuros

Design and test of new floats and impact for operational oceanography and climate centers

16 new floats (our first EU floats) : 6 Bio, 2 Deep, 4 O2, 4 Iridium/Argos-3

Related objectives : long term EU funding for Euro-Argo

# E-AIMS project

**WP1**  
Management/  
Coordination  
(Ifremer)

**WP1.1**  
Project management (Ifremer)

**WP1.2**  
Financial and administrative  
Management (Ifremer)

**WP1.3** Communication (Ifremer)

**WP2**  
R&D on float  
technology  
(Ifremer)

**WP3**  
Impact and design  
studies from GMES Marine Service  
and Seasonal/ decadal  
Modelling/forecasting centers  
(Mercator Ocean)

**WP4**  
Impact for the  
validation of satellite  
observations  
and for joint  
in-situ/satellite  
analyses (CSIC)

**WP5**  
R&D on Euro-Argo  
data system  
and interfaces with GMES  
Marine Service  
(Ifremer)

**WP6**  
Real time  
processing,  
impact and final  
assessment  
(OGS)

**WP2.1**  
Test of new  
Oxygen sensors  
(IFM-GEOMAR)

**WP2.2**  
Test of new  
deep floats  
(IEO)

**WP2.3**  
Test of new  
biological floats  
(IMR)

**WP2.4**  
Test of floats with  
Iridium/Argos3  
transmission  
capability  
(OGS)

**WP2.5**  
Test of Arctic  
floats  
(IO-PAN)

**WP2.6**  
Synthesis  
(Ifremer)

**WP3.1**  
Global ocean  
analysis and  
forecasting  
(Mercator-Ocean)

**WP3.2**  
Weather, seasonal  
and decadal  
forecasting  
(UKMO)

**WP3.3**  
Mediterranean  
& Black Seas  
(INGV)

**WP3.4**  
Synthesis  
(Mercator-Ocean)

**WP4.1**  
Altimetry  
(CLS)

**WP4.2**  
Ocean Colour  
(ACRI-ST)

**WP4.3**  
SST  
(UKMO)

**WP4.4**  
Sea Surface Salinity  
(CSIC)

**WP4.5**  
Synthesis  
(CSIC)

**WP5.1**  
Define, prototype  
and test real time  
and delayed mode  
data processing  
techniques for  
oxygen variable  
(Ifremer)

**WP5.2**  
Define and test  
real time and  
delayed mode data  
processing  
techniques for  
other biogeochemical  
Variables  
(ACRI-ST)

**WP5.3**  
Develop the  
Euro-Argo  
DACs for the new  
Argo floats  
(Ifremer)

**WP6.1**  
Real time data  
processing of new  
floats and interfaces  
with MyOcean  
(Ifremer)

**WP6.2**  
Impact of use for  
GMES  
Marine Service  
(Mercator-Ocean)

**WP6.3**  
Impact and use  
for satellite Cal/Val  
(CLS)

**WP6.4**  
Final assessment  
(OGS)



# Euro-Argo float deployment plans



## Euro-Argo – deployed floats (from AIC) and plans for 2012 and 2013

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 estimated	2013 estimated*	Average
UNITED KINGDOM	38	38	47	28	26	33	29	20	25	43	40	40	34
FRANCE	8	34	85	89	51	36	90	35	57	53	65	80	57
GERMANY	14	27	44	55	36	35	71	33	61	48	66	50	45
ITALY	0	0	0	0	0	0	0	0	1	4	16	22	4
NETHERLANDS	0	0	3	4	4	4	13	4	9	7	7	7	5
NORWAY	3	6	0	0	2	0	0	0	4	0	0	3	2
SPAIN	0	7	2	1	1	0	0	0	12	17	13	5	5
IRELAND	0	2	0	0	0	0	4	4	3	3	3	3	2
POLAND	0	0	0	0	0	0	0	2	2	0	1	2	1
GREECE	0	0	0	0	0	0	0	0	1	0	4	3	1
BULGARIA	0	0	0	0	0	0	0	0		3	1	3	1
FINLAND	0	0	0	0	0	0	0	0	2	2			0
TURKEY													2
EUROPE (EC)	70	4	19	26	20	9	0	0	0			16	16
<b>TOTAL</b>	<b>133</b>	<b>118</b>	<b>200</b>	<b>203</b>	<b>140</b>	<b>117</b>	<b>207</b>	<b>98</b>	<b>177</b>	<b>180</b>	<b>216</b>	<b>236</b>	<b>163</b>

\*Germany - 2013 (35 BSH confirmed, 15 KDM assumed), France (includes NAOS floats)

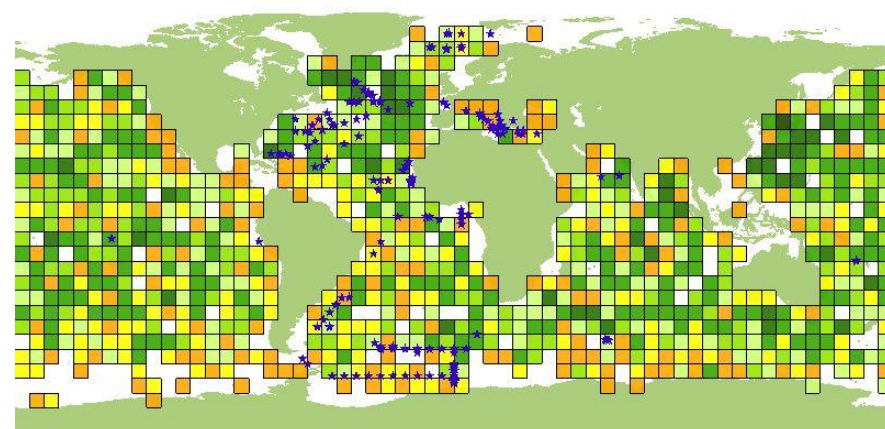
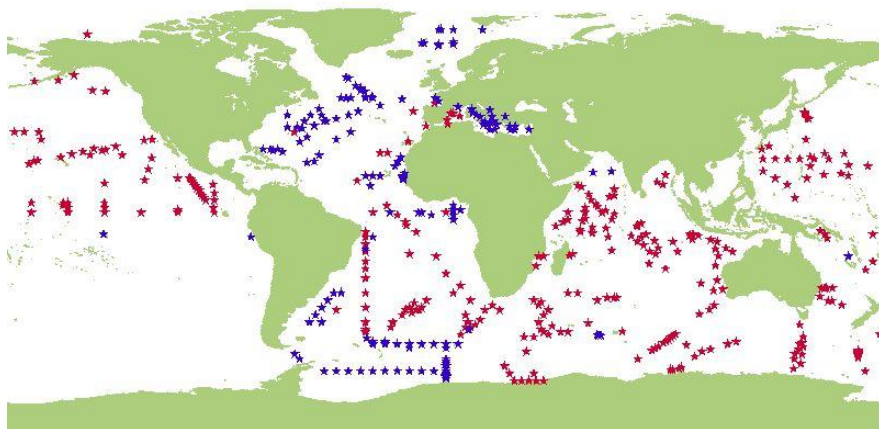
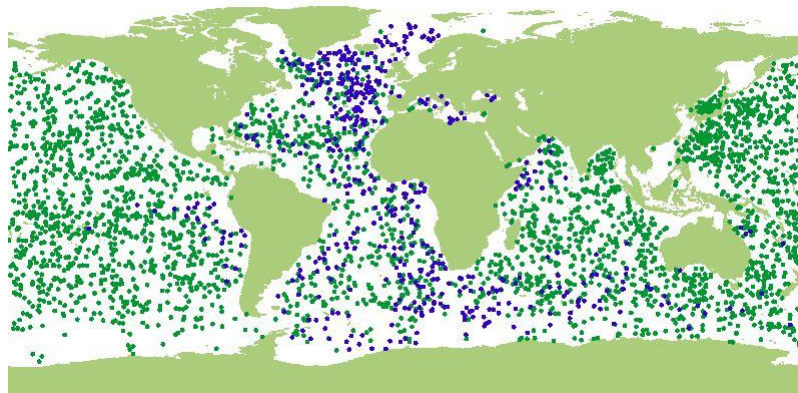
**Part of the Euro-Argo floats are in regional or marginal seas (> 50 floats/year). More effort for the global component is needed. A fraction of Euro-Argo floats includes oxygen and biogeochemical sensors (pilot experiments). This proportion will increase in coming years.**

**Perspectives for 2014-2020 (Euro-Argo ERIC agreements):**

**200-220 floats/year. With EU funding: > 250 floats/year (+Argo extension)**



## EU Floats and deployment plans for 2012 (from AIC)

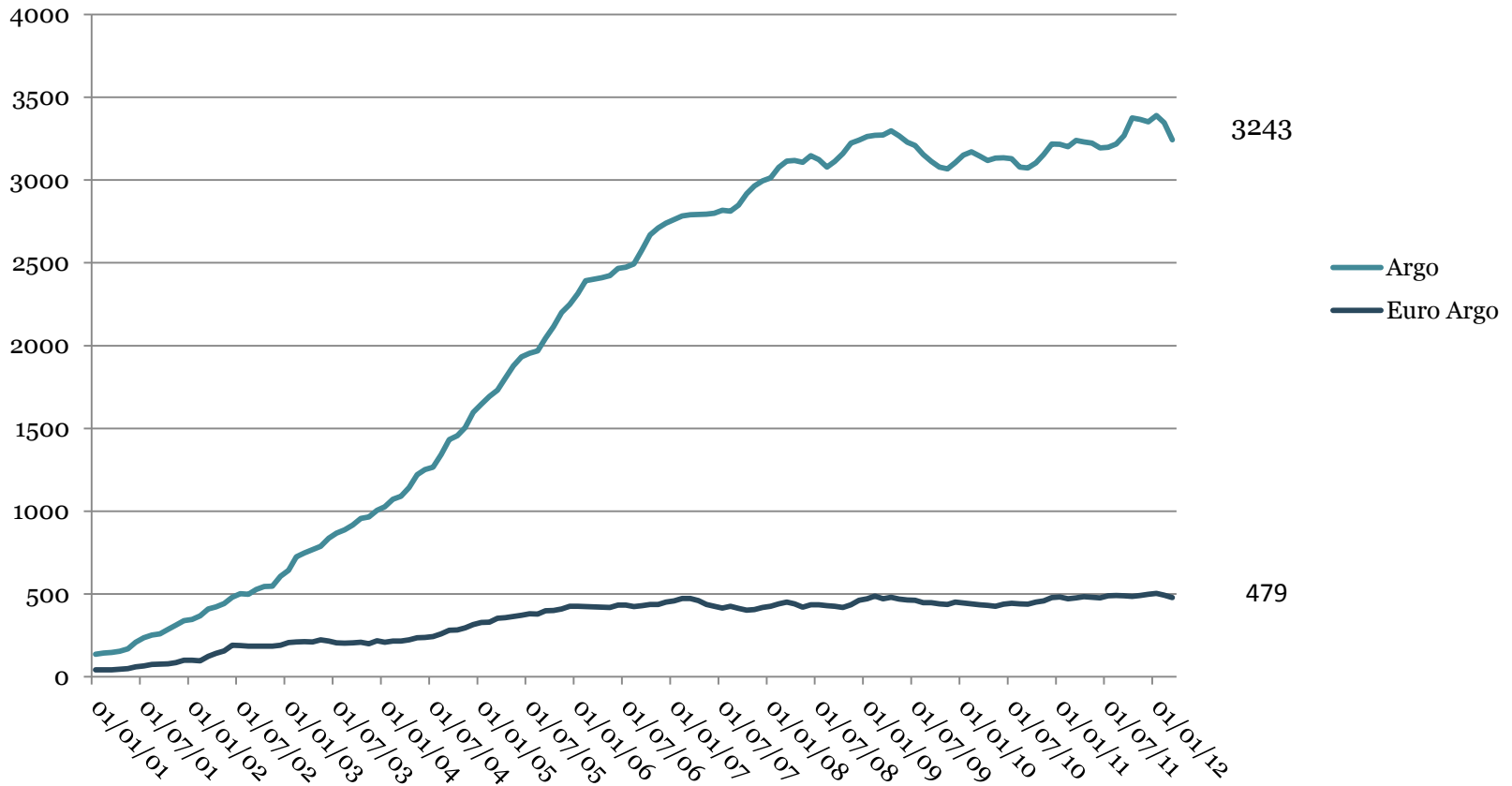






# Euro-Argo active floats (GDAC) versus total Argo floats (from AIC)

GDAC OBSERVATIONS  
DISTINCT WMO



**Euro-Argo target is 800 active floats (about 500 floats today)**



# Euro-Argo views on the long term evolution of Argo



## Euro-Argo and the evolution of the Argo programme

***Euro-Argo needs to meet requirements from the research and operational (GMES) oceanography community in Europe.***

Strong European requirement for marginal seas: Mediterranean and Black Seas. Euro-Argo requirements have been defined. Implementation is ongoing.

Important European research activities in high latitudes: Nordic Seas, Arctic

Strong interest (and good maturity) of the European research community and GMES (operational oceanography) for extension to biogeochemical variables : Oxygen, Chl-a. Several pilot experiments ongoing or planned (Nordic seas, Atlantic, Med Sea, Eastern Pacific). France has two major research projects (Remocean – 60 floats, NAOS – 40 floats from 2012 to 2016) (incl. an Arctic component in collaboration with Canada).

Improved resolution at the surface (SST, SSS) needed (on going)

Deeper measurements needed - a longer term issue. France will start a pilot project (NAOS) in the North Atlantic (24 floats-3500 dbar) in 2014-2016.

Tests of Argo extension at European level with E-AIMS project



# Euro-Argo and the evolution of the Core Argo program

**There is a need to redefine the Argo international mission  
so that it better matches activities**

## Proposal :

1. Keep the Argo « Core mission » as the global +/-60° array (T&S)
2. Define and agree on an Argo « extended mission » for marginal seas (T&S)
3. Define and agree on an Argo « extended mission » for high latitudes (T&S)
4. Define and agree on a strategy for O2 and Bio Argo « extended mission » implementation
  - Common sensor package
  - Pilot experiments from now to 2014 or +
  - Sharing of best practices, develop/improve the data system, technology
  - Part of the global and regional arrays from 2014 or + ? (what is the target for the global array – 1/4 ? - and for marginal seas ?)
5. Deep floats : start with pilot experiments. Design studies needed.
6. Need to monitor the different components (through the AIC)



# Supplements



# Funding issues

## Euro-Argo estimation of costs/year

Category	Unit cost (k€)	Number	Cost (k€)
<b>Float procurement</b>			
Global (assumes standard Argo float)	14	200	2800
Regional (assumes enhanced floats)	17	50	850
<b>Operations</b>			
Telecommunications	0.4	800	320
Personnel for management/coordination	100	5	500
Personnel for technical/logistic support	100	6	600
Misc (e.g. freighting)	0.2	250	50
Equipment and consumables			50
Dedicated ship time			300
<b>Data management</b>			
Personnel	100	19	1900
Equipment, other			100
<b>Euro-Argo central infrastructure (CI)</b>			
Personnel for management/coordination	100	2	200
Personnel for technical/logistic support	100	3	300
Missions (users workshops, board, council), equipment, etc.			100
<b>International infrastructure support</b>			
Support to Argo Information Centre			40
Support for Argo Project Office/Director			30
<b>Total</b>			<b>8140</b>

**250 floats + 35 FTE**

**Includes extra staff  
for processing,  
operation and  
coordination  
(14 FTE)**



Euro Argo cost is about 8.2 Meuros/year (250 floats+ 35 FTE/y). Based on planned Member States contributions (4-5 Meuros/year), a direct EU funding (through GMES) of about **3.3 Meuros/year** focused on activities of European relevance is needed.

Category	Member States	EC	TOTAL
<b>Float procurement</b>			
Global	1400	1400	2800
Regional	850		850
<b>Operations</b>			
Telecommunications	160	160	320
Personnel for management/coordination	500		500
Personnel for technical/logistic support	600		600
Misc (e.g. freighting)	50		50
Equipment and consumables	50		50
Dedicated ship time		300	300
<b>Data management (part of GMES Marine Core Service)</b>			
Personnel	950	950	1900
Equipment, other	50	50	100
<b>Euro-Argo central infrastructure (CI)</b>			
Personnel for management/coordination	200		200
Personnel for technical/logistic support		300	300
Missions (users workshops, board, council), equipment, etc	50	50	100
<b>International infrastructure support</b>			
Support to Argo Information Centre		40	40
Support for Argo Project Office/Director		30	30
<b>Total without MCS</b>	<b>3850</b>	<b>2280</b>	<b>6140</b>
<b>Total with MCS</b>	<b>4860</b>	<b>3280</b>	<b>8140</b>



# Euro-Argo and the evolution of Argo

- This has been discussed at international and European levels over the past two years.
- One of the focus of the new FP7 SIDERI and E-AIMS projects.
- Extension towards biogeochemistry (O<sub>2</sub>, Chl-a, Nitrate, Carbon) (Bio-Argo). This is already on going with pilot experiments. Both Europe and USA are converging for an objective of  $\frac{1}{4}$  of the array with bio sensors. Extra cost for European effort is estimated to 1.5 to 2 Meuros/year (Claustre et al, 2011) (incl. extra staff for processing).
- Extension towards deeper measurements (climate) is not yet at the level of pilot experiments. A rough estimation of additional costs for Europe is 0.5 to 1 Meuros/year.





# Purpose of Euro-Argo long-term infrastructure

- Manage and supervise operation of the Research Infrastructure (RI),
- Organize float procurement,
- Coordinate float deployments in the world's oceans,
- Monitor array performance and operations,
- Decide on evolutions (array design, technology, data systems),
- Facilitate data access to users, develop new data sets and products
- Conduct R&D activities at European level
- Interfaces with users and user requirements (research, GMES)
- Link with, and integrate into, international structure.







# ASW-4 - Venice, September 26-28

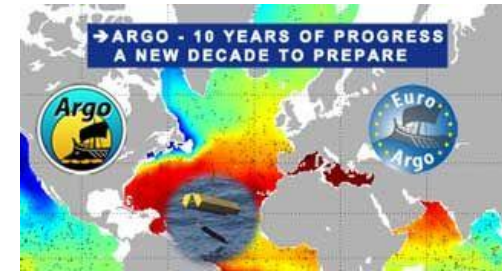
## Argo - 10 Years of Progress: A new decade to prepare

Part of the symposium on "[20 Years of Progress in Radar Altimetry](#)" organized by ESA & CNES (more than 400 abstracts received).

**Altimetry symposium\***: Monday to Thursday (September 24–26)

**Argo Science WorkShop** :Thursday to Saturday (September 27–29) (2.5 days)

**OSTST**: Thursday to Saturday (September 27 – 29)



The workshop include a review of Argo achievements in ocean and climate research (e.g. heat and salt budget, large scale seasonal and interannual variability and ocean circulation, mesoscale variability, marginal seas, ocean analysis and forecasting) and float technology and science discussions on the development on the new phase of Argo for the next decade (sustaining Argo and developing extension towards biogeochemistry, deep ocean and polar regions).

Organizing committee: P.Y. Le Traon, P.M. Poulain, S. Pouliquen, E. Mamaca, F. Loubrieu.

Scientific committee: AST co-chairs, other AST members (3 ?), P.Y. Le Traon, P.M. Poulain, S. Pouliquen (role: review the abstracts, organize the workshop programme and its sessions, final round table)

Funding : Europe (20 Keuros) (SIDERI), USA (10 keuros), Australia (10 kUS\$).

**Meeting registration will be via the altimetry symposium WWW site** (<http://www.altimetry2012.org>).

**Argo Venice Workshop Secretariat.** Email: [argovenice@ifremer.fr](mailto:argovenice@ifremer.fr)

**Abstract submission open.** Deadline **April 30, 2012.** (<http://www.altimetry2012.org>)

Abstracts will be reviewed by the scientific committee. Notification for acceptance will be given by end of May. Workshop programme finalized by mid June.



**Note : Argo will also be represented in the altimetry symposium session the integrated approach (Tuesday afternoon , Wednesday morning) + opening and final sessions**



THURSDAY 27 SEPTEMBER 2012					FRIDAY 28 SEPTEMBER 2012								
9.30-11.30	OSTST Meeting, Plenary Session <b>LA PERLA</b>			ARGO Workshop, Plenary Session <b>SALA FESTA</b> (coffee break 11h00 -11h30)	9.00-10.20	Instrument processing (Part 1) <b>SALA FESTA</b>	Precision orbit determination <b>MOSAICO 1</b>	Tides, internal tides and high-frequency processes <b>MOSAICO 2</b>	ARGO Workshop Plenary Session <b>LA PERLA</b>				
11.30-12.30	OSTST POSTER SESSION - Coffee Break- <b>SALA ADRIATICO</b>				10.20-10.50	Coffee Break							
12.30-14.00	LUNCH - <b>SALA LAGUNA</b>				10.50-12.30	Instrument processing (Part 2) <b>SALA FESTA</b>	Precision orbit determination <b>MOSAICO 1</b>	Tides, internal tides and high-frequency processes <b>MOSAICO 2</b>	ARGO Workshop Plenary Session <b>LA PERLA</b>				
14.00-14.20	Regional and Global CAL/VAL for Assembling a Climate Data Record (Part 1) <b>SALA FESTA</b>	Quantifying Errors and Uncertainties in Altimetry Data <b>MOSAICO 1</b>	Outreach, Education & Altimetric data services <b>MOSAICO 2</b>	ARGO Workshop, Plenary Session <b>LA PERLA</b>	12.30-14.00	LUNCH - <b>SALA LAGUNA</b>							
14.20-14.40					Round tables for each splinter (and OSTST Poster Session for other participants) <b>use of "FESTA", "MOSAICO1", "MOSAICO2" + 5 small rooms</b>	ARGO Workshop Plenary Session <b>LA PERLA</b>							
14.40-15.00						Coffee Break							
15.00-15.20						Coffee Break							
15.20-15.40						Coffee Break							
15.40-16.10	Coffee Break			ARGO Workshop Plenary Session <b>LA PERLA</b>	16.00-18.30	OSTST PLENARY CLOSING <b>LA PERLA</b>		ARGO Workshop, Splinter meeting TBC <b>SALA FESTA</b>	ARGO Poster Session <b>SALA ADRIATICO</b>				
16.10-16.30	Regional and Global CAL/VAL for Assembling a Climate Data Record (Part 2) <b>SALA FESTA</b>	Near Real Time Products and Applications <b>MOSAICO 1</b>	The Geoid, Mean Sea Surfaces and Mean Dynamic Topography <b>MOSAICO 2</b>		16.10-16.30	SATURDAY 29 SEPTEMBER 2012							
16.30-16.50					OSTST POSTER SESSION - COCKTAIL <b>SALA ADRIATICO</b>					ARGO Workshop, Plenary Session <b>LA PERLA</b>			
16.50-17.10										ARGO Workshop, Plenary Session <b>LA PERLA</b>			
17.10-17.30										ARGO Workshop, Plenary Session <b>LA PERLA</b>			
17.30-17.50										ARGO Workshop, Plenary Session <b>LA PERLA</b>			
17.50-18.10										ARGO Workshop, Plenary Session <b>LA PERLA</b>			
18.10-18.30				ARGO Workshop, Plenary Session <b>LA PERLA</b>									
18.00-19.30	WORKING DINNER (no host)			8.20-12.30	ARGO Workshop, Plenary Session <b>LA PERLA</b>								

**ASW-4 – Rooms and schedule (La Perla = 600 seats, SalaFesta = 200 seats)**

