

Sharing Oceanographic Data

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GeoSolutions



- **Founded in Italy in late 2006**
- **Expertise**
 - Image Processing, GeoSpatial Data Fusion
 - Java, Java Enterprise, C++, Python
 - JPEG2000, JPIP, Advanced 2D visualization
- **Supporting/Developing FOSS4G projects**
 - MapStore, GeoServer, GeoNetwork
 - CKAN, GeoTools , GeoBatch
- **Clients**
 - FAO (CIOK, FIGIS, NRL, FORESTRY, ESTG), DLR, EUMETSAT, JRC, ARPAT, NATO CMRE
 - ITT-VIS, E-GEOS, GEOSMART, OpenGeo, BOAB, SINERGIS, City of Prato, City of Florence, County of Florence, CSI-Piemonte, NWGEO, IGEA, AMBRERO, LIBEROLOGICO, DigitalGlobe, Astrium UK, NefTex, etc...
- **<http://www.geo-solutions.it>**



Centre for Maritime Research and Experimentation (CMRE)

NATO Science and Technology Organization

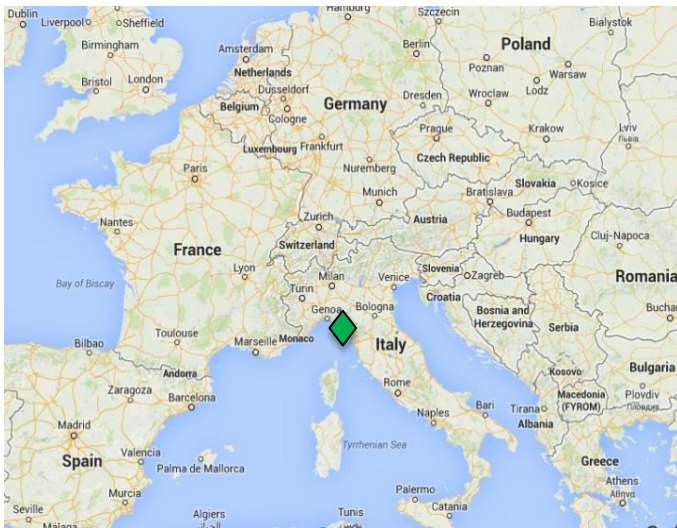
- CMRE* is an established, world-class NATO scientific research and experimentation facility located in La Spezia.



*Formerly the NATO Undersea Research Centre (NURC).

Mission

CMRE organises and conducts scientific research and technology development, and delivers innovative and field-tested S&T solutions to address the defence and security needs of the Alliance in the maritime domain.



CMRE operates two ships, NRV *Alliance*, a 93-meter 3,180 ton open-ocean research vessel, and CRV *Leonardo*, a smaller ship designed for coastal operations.



In addition to its laboratories the Centre is equipped with a fleet of autonomous underwater and surface vehicles and a world-class inventory of seagoing sensors.



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- The diagram illustrates the NATO Standards (NNEC) and Open Standards framework for network-enabled futures, organized into three main layers: Real World, Synth World, and Operations Layer.
- Real World / Synth World:** This layer shows the flow of data from real-world and synthetic environments. *In situ instruments / Remote Sensing (Calibrated)* and *Data Collection* feed into a *Data Warehouse*. The *Synth World* also feeds into the *Data Warehouse*. The *Data Warehouse* then feeds into a *PROCESS, ANALYZE, VALIDATE* block.
- Operations Layer:** This layer is divided into *Operational Services*, *Models*, *Decision Aids*, *GIS / Visual*, and *Serious Games*. These components feed into a *PUBLISH* block, which then feeds into a *OP. CELL* (Operational Cell). The *OP. CELL* feeds into a *PUBLISH* block, which then feeds into a *Research Products* block.
- Research Products:** This block is divided into *Research Products* and *Authoritative Products*. It includes a list of products: *NATO Networks*, *National Networks*, and *CFBNet (Battle Labs)*.
- Standards and Open Standards:** A yellow bar at the bottom indicates *NATO STANDARDS (NNEC), OPEN STANDARDS*.

What is CMRE?

- Research and experimentation in support of maritime operational requirements of NATO & Nations
- Basic scientific research and the technological application of acquired knowledge to military problems
- Sea trials to discover and test hypotheses & technologies in difficult environments
- Unbiased applied scientific research in the maritime domain:
 - The development of capabilities for NATO maritime forces
 - Assistance to NATO member state S&T and R&D programmes
- Advice and support to NATO Forces
 - Technologies for autonomous ISR and associated concepts of operations (LF, active, and synthetic aperture sonar; risk mitigation)
 - Knowledge of ocean processes for military application (acoustic propagation models, tactical prediction and decision making)
 - Experimentation at sea, tests & trials (autonomous vehicles)
 - Networking (academia, research institutes, defence labs and naval forces)

Scientific Programme

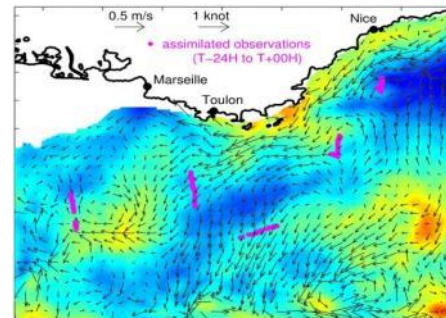
- **Maritime Information, Surveillance, Recon. (MISR)**

- Autonomous Naval Mine Countermeasures
- Cooperative Anti-Submarine Warfare



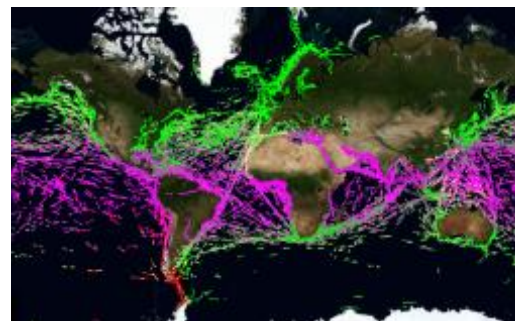
- **Environmental Knowledge and Op Effectiveness**

- Robotic Characterisation
- Tactical Prediction
- Decision Making

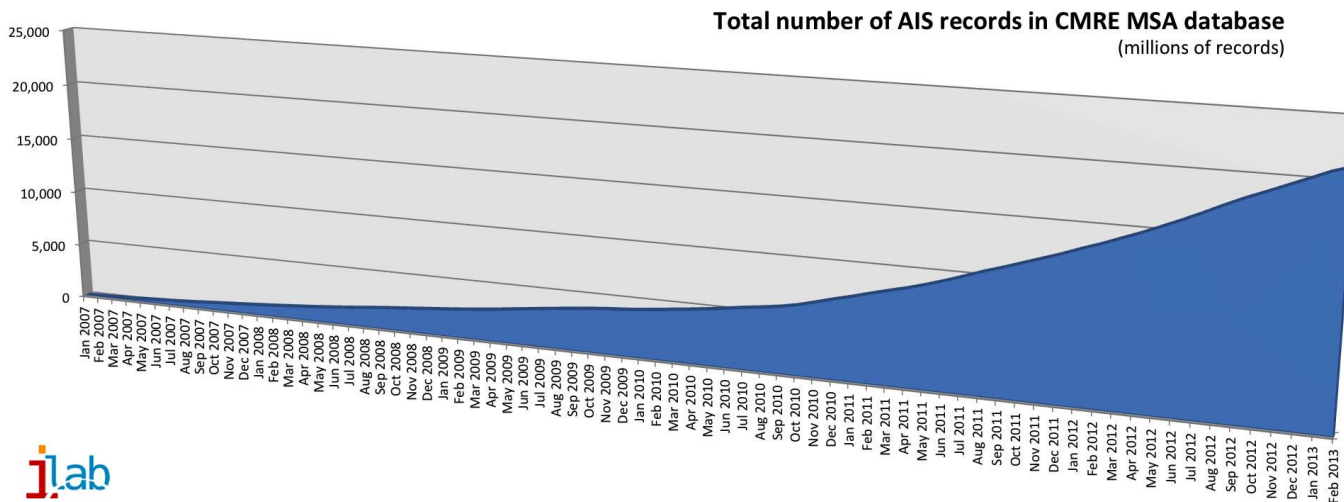
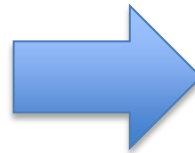


- **Maritime Security**

- Maritime Situational Awareness
- Infrastructure Protection



Big data infrastructure

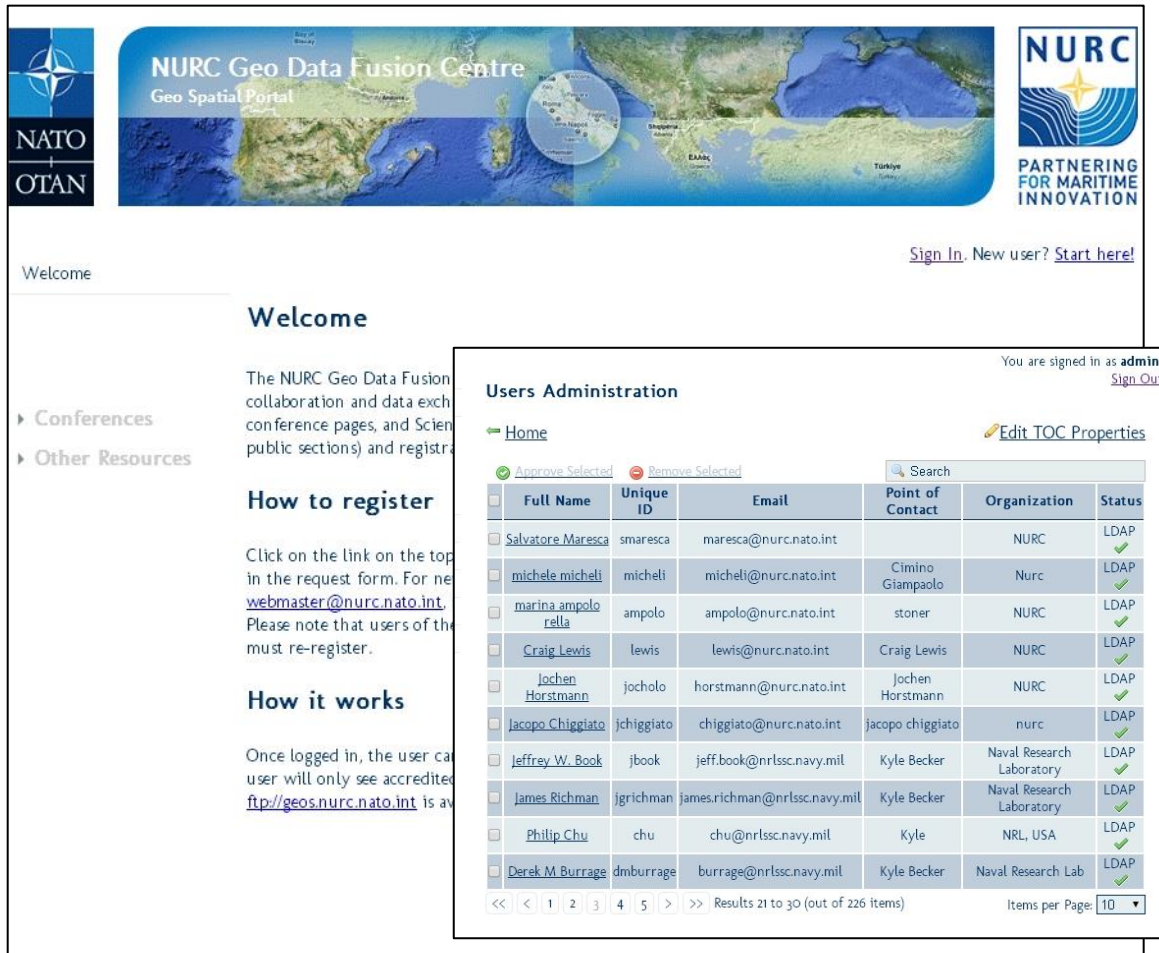


- 20 TB of at-sea data collected every year, user community based in 28+ Nations
- 300 AIS messages ingested every second
 - 2010: 250M new AIS entries per month
 - 2013: 1 billion new AIS entries per month
- **Database with over 30 Billion entries as of 1st January 2014**

Summary

- STO-CMRE's Programme of Work is centred on data (as 'producer' and as 'consumer')
 - Ongoing efforts in data curation, interoperability, international collaboration
- Proven capability to coordinate (within the maritime domain):
 - Joint Research Projects
 - Multinational Projects
 - Innovation and collaboration between nations
- Invites
 - Visiting Researchers
 - Specialist meetings, workshops, conferences

STEP 1: GEOS3 Portal



Welcome

[Sign In](#). New user? [Start here!](#)

Welcome

The NURC Geo Data Fusion Centre provides a platform for collaboration and data exchange (including conference pages, and Science public sections) and registration.

- Conferences
- Other Resources

How to register

Click on the link on the top in the request form. For new users, please contact webmaster@nurc.nato.int. Please note that users of the system must re-register.

How it works

Once logged in, the user can access the system. The user will only see accredited data. The system is available at <http://geos3.nurc.nato.int>.

Users Administration

You are signed in as **admin**. [Sign Out](#)

[Home](#) [Edit TOC Properties](#)

[Approve Selected](#) [Remove Selected](#)

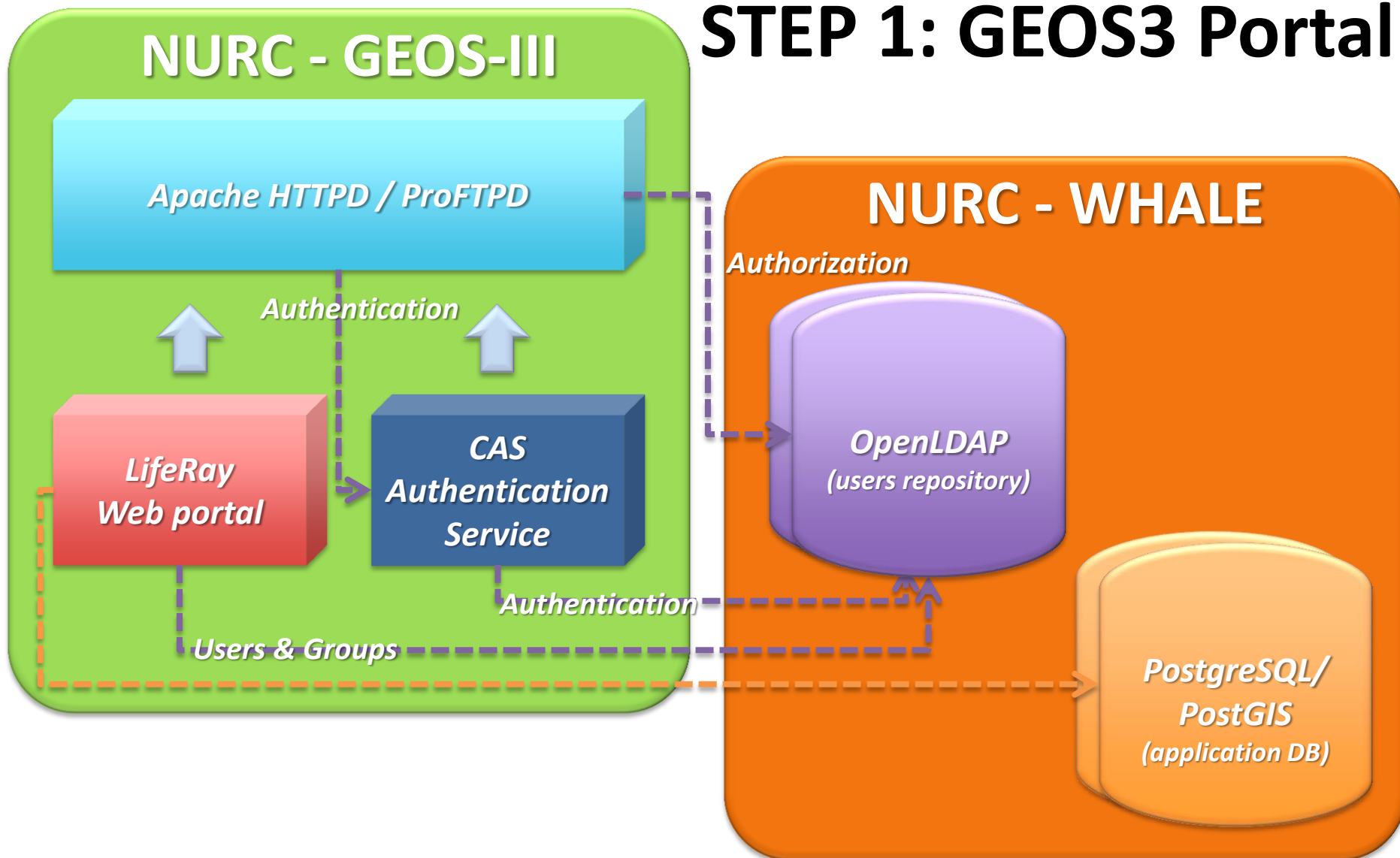
	Full Name	Unique ID	Email	Point of Contact	Organization	Status
<input type="checkbox"/>	Salvatore Maresca	smaresca	maresca@nurc.nato.int		NURC	LDAP ✓
<input type="checkbox"/>	michele micheli	micheli	micheli@nurc.nato.int	Cimino Giampaolo	Nurc	LDAP ✓
<input type="checkbox"/>	marina ampola rella	ampola	ampola@nurc.nato.int	stoner	NURC	LDAP ✓
<input type="checkbox"/>	Craig Lewis	lewis	lewis@nurc.nato.int	Craig Lewis	NURC	LDAP ✓
<input type="checkbox"/>	Jochen Horstmann	jocholo	horstmann@nurc.nato.int	Jochen Horstmann	NURC	LDAP ✓
<input type="checkbox"/>	Jacopo Chiggiano	jchiggiano	chiggiano@nurc.nato.int	Jacopo Chiggiano	nurc	LDAP ✓
<input type="checkbox"/>	Jeffrey W. Book	jbook	jeff.book@nrlssc.navy.mil	Kyle Becker	Naval Research Laboratory	LDAP ✓
<input type="checkbox"/>	James Richman	jgrichman	james.richman@nrlssc.navy.mil	Kyle Becker	Naval Research Laboratory	LDAP ✓
<input type="checkbox"/>	Philip Chu	chu	chu@nrlssc.navy.mil	Kyle	NRL, USA	LDAP ✓
<input type="checkbox"/>	Derek M. Burrage	dburrage	burrage@nrlssc.navy.mil	Kyle Becker	Naval Research Lab	LDAP ✓

<< < 1 2 3 4 5 > >> Results 21 to 30 (out of 226 items) Items per Page: 10

- Unique Access Point
- Centralized A&A (RBAC) + SSO
- Automated Workflow for Management
- GUI For managing Users, Groups and Roles
- Integrated HTTP and FTP access
- *One portal to rule them all!*

<http://geos3.cmre.nato.int/>

STEP 1: GEOS3 Portal



STEP 1: GEOS3 Portal

- This is all nice, but how can I find the netCDF file for the glider acquisition of the NOMR12 cruise on the XX/XX/2012???*

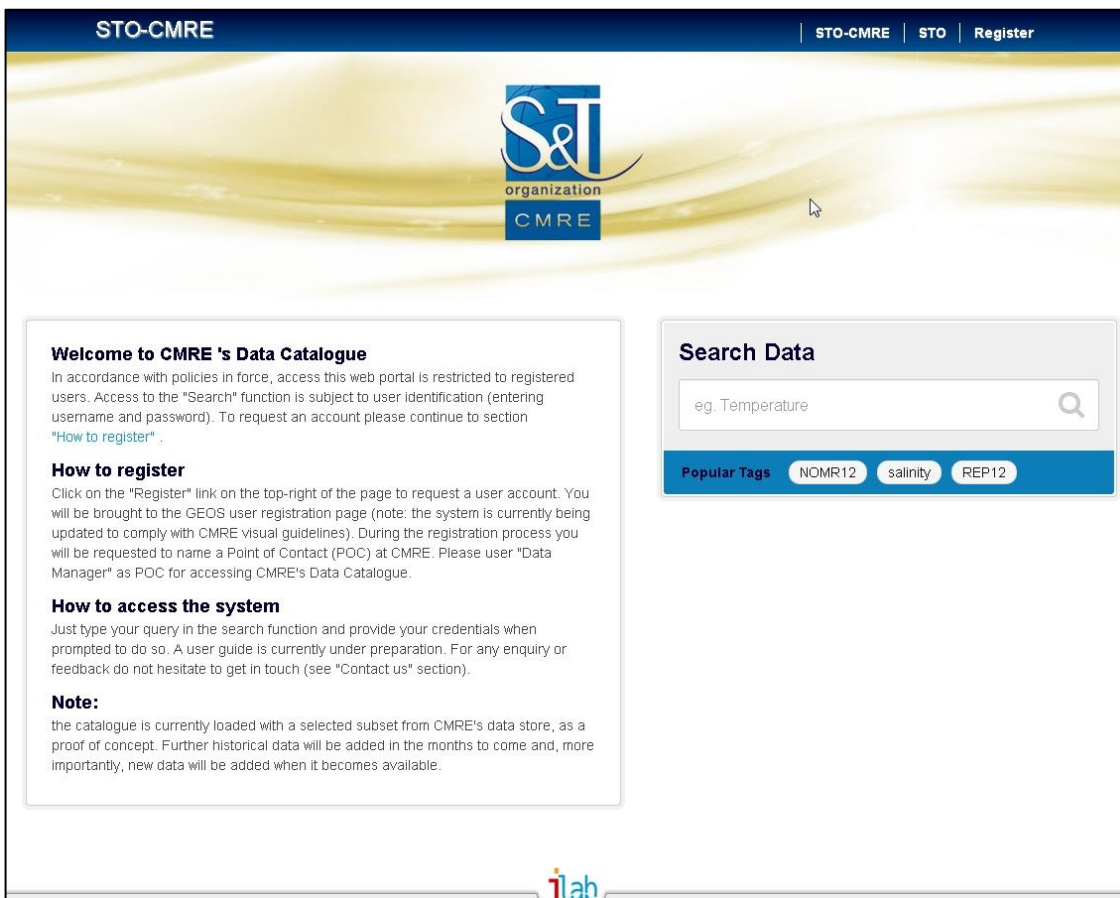



Name	Last modified	Size	Description
Parent Directory	-	-	-
GL-20120905-elettra-NOMR12depl001-grid-D.nc	18-Nov-2013 15:20	5.2M	
GL-20120905-elettra-NOMR12depl001-proc-D.nc	18-Nov-2013 15:20	58M	
GL-20120905-elettra-NOMR12depl001-raw-D.nc	18-Nov-2013 15:20	69M	

Apache/2.2.3 (CentOS) Server at geos3.cmre.nato.int Port 80

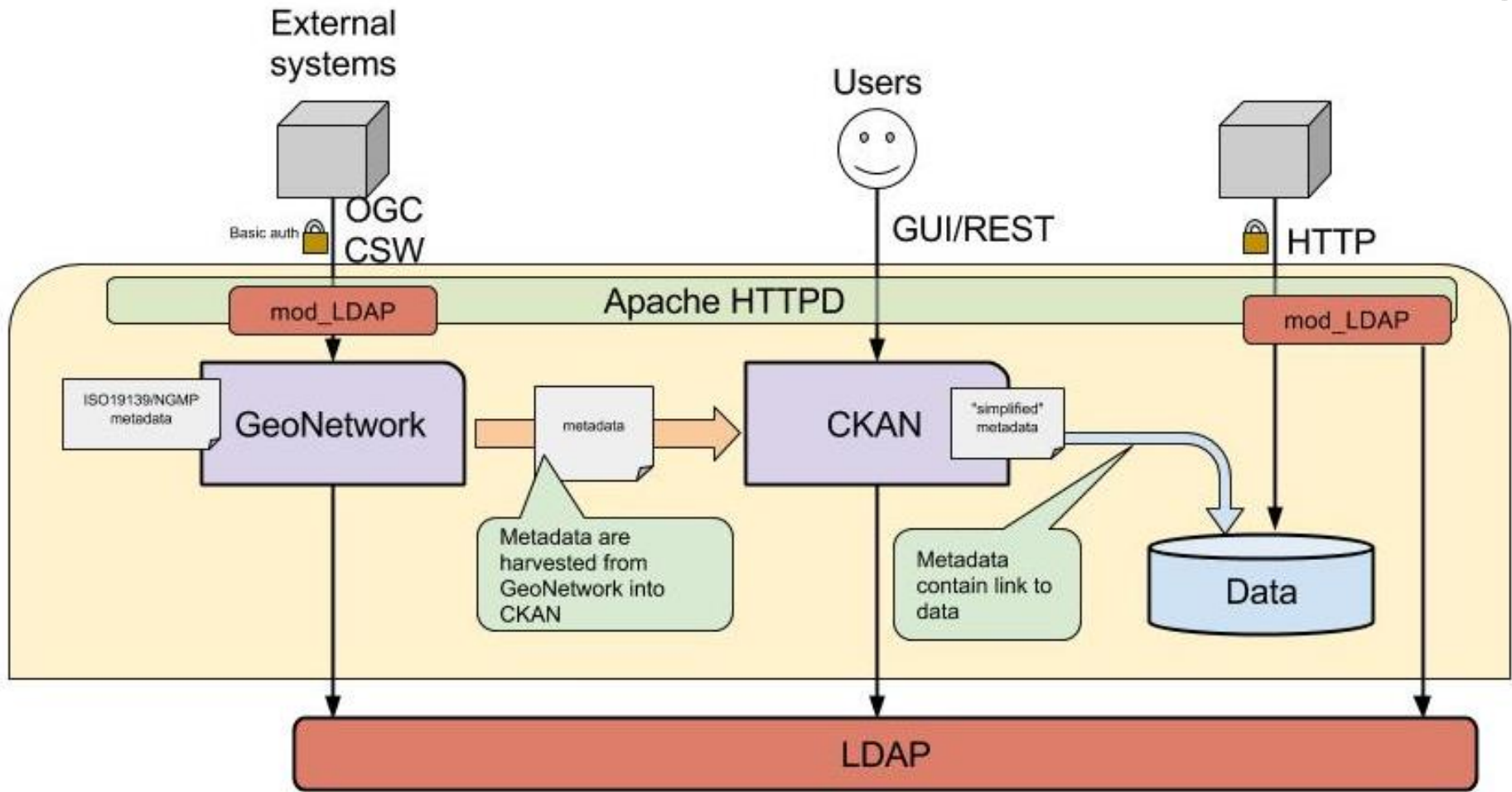
STEP 2: DataCatalog

- **Objective: Allow Data Discovery**
 - *Programmatic*
 - *Interactive*
- **Idea: Make Metadata Mandatory for data publishing**
- **Usage of NGMP ISO 19115 Profile via pre-filled templates**
- **Per experiment Python scripts that:**
 - **Parse data as it is acquired/created**
 - **Complete the metadata**
 - **Push in GeoNetwork**
- **Harvesting CKAN – GeoNetwork for discovery**



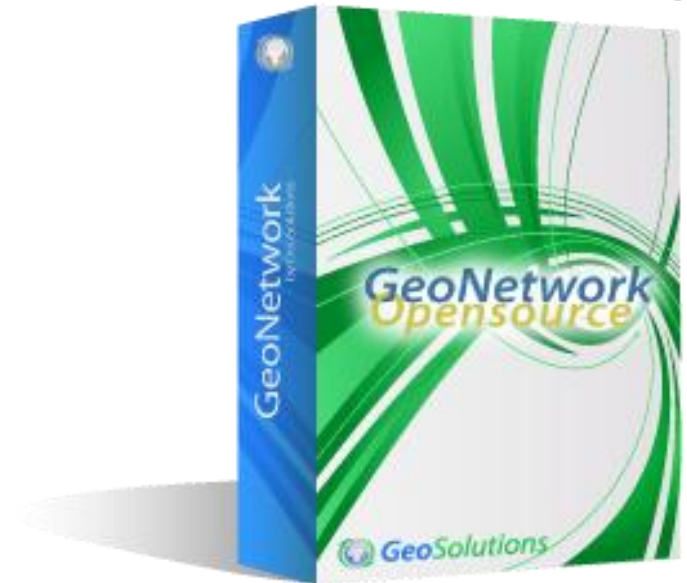
<http://datacatalog.cmre.nato.int/>

STEP 2: DataCatalog



STEP 2: DataCatalog

- CKAN
 - You know what I am talking about
- GeoNetwork
 - (GeoSpatial) Catalog
 - Registry of Metadata
 - Repository
 - Enterprise Search Appliance
 - GeoPortal
 - SDI entry point
 - Information Broker

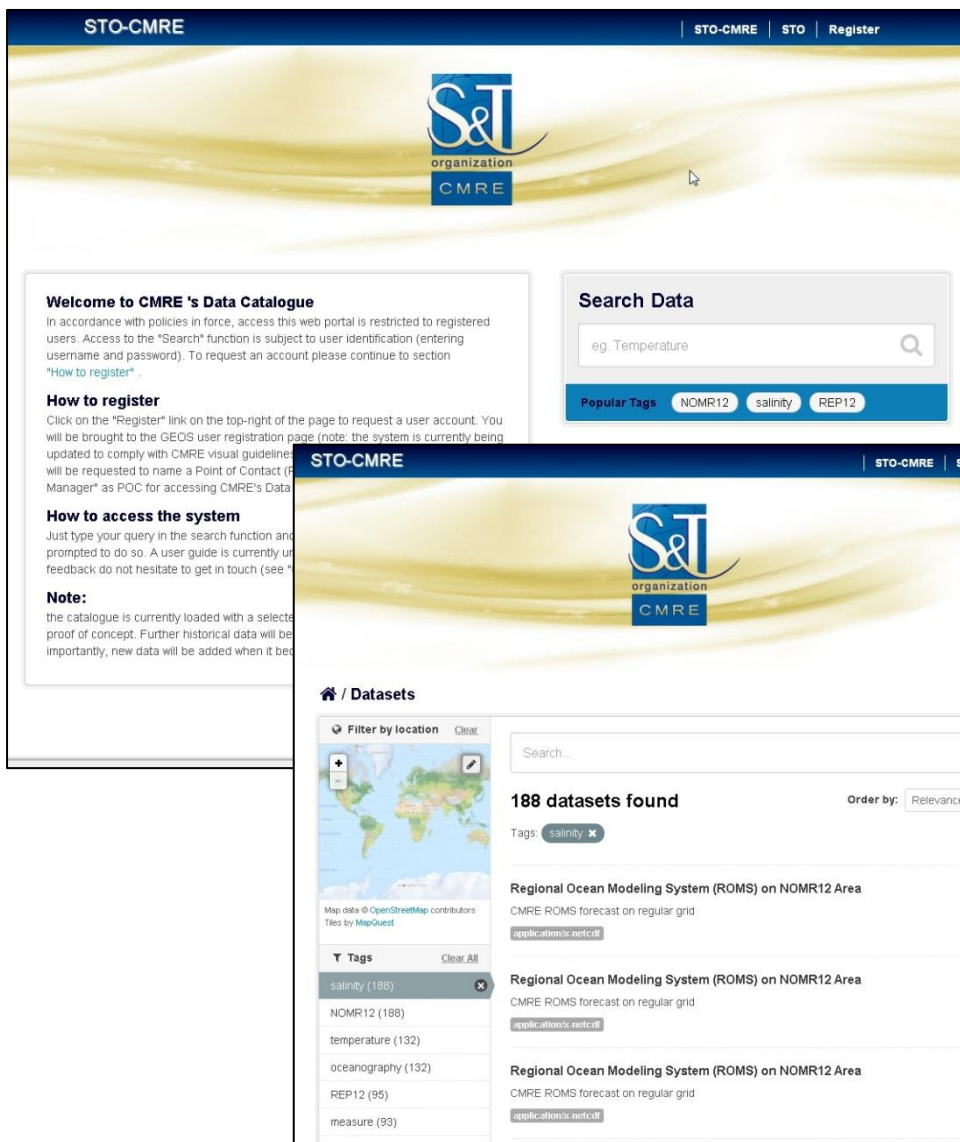


<http://geonetwork-opensource.org/>

STEP 2: DataCatalog

- GeoNetwork (continued...)
 - Metadata Editor
- Standards Based
- ISO TC 211
 - 19110:2005
 - **19115:2003**
 - **19115:2005**
 - **19119:2005**
 - **19139:2007**
 - 23950/Z39.50
- **OGC CSW 2.0.2 (ISO Profile)**
- **INSPIRE Discovery Service**
- FGDC
- OpenSearch Geo
- RSS/GeoRSS
- WebDAV
- **OAI-PMH**
- **Dublin Core**

STEP 2: DataCatalog



STO-CMRE | STO-CMRE | STO | Register

Welcome to CMRE's Data Catalogue
In accordance with policies in force, access to this web portal is restricted to registered users. Access to the "Search" function is subject to user identification (entering username and password). To request an account please continue to section "How to register".

Search Data
eg. Temperature

Popular Tags | NOMR12 | salinity | REP12

How to register
Click on the "Register" link on the top-right of the page to request a user account. You will be brought to the GEOS user registration page (note: the system is currently being updated to comply with CMRE visual guidelines). You will be requested to name a Point of Contact (POC) as POC for accessing CMRE's Data Catalogue.

How to access the system
Just type your query in the search function and you will be prompted to do so. A user guide is currently under development. Feedback do not hesitate to get in touch (see "Contact" link).

Note:
the catalogue is currently loaded with a selection of data. Further historical data will be added when it becomes available. Importantly, new data will be added when it becomes available.

STO-CMRE | STO-CMRE | STO

/ Datasets

Filter by location | Search...

188 datasets found | Order by: Relevance

Tags: salinity ✕

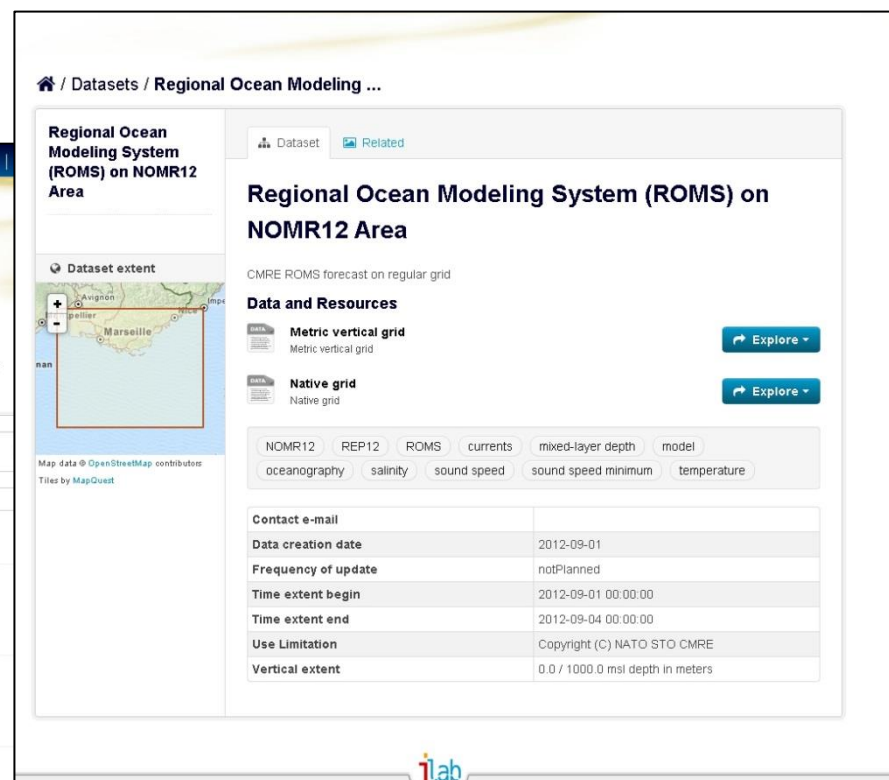
Regional Ocean Modeling System (ROMS) on NOMR12 Area
CMRE ROMS forecast on regular grid
application: netcdf

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Tags | Clear All

- salinity (188)
- NOMR12 (188)
- temperature (132)
- oceanography (132)
- REP12 (95)
- measure (93)



/ Datasets / Regional Ocean Modeling ...

Regional Ocean Modeling System (ROMS) on NOMR12 Area

Dataset | Related

Dataset extent

Map data © OpenStreetMap contributors
Tiles by MapQuest

Data and Resources

Metric vertical grid
Metric vertical grid | Explore

Native grid
Native grid | Explore

NOMR12 | REP12 | ROMS | currents | mixed-layer depth | model | oceanography | salinity | sound speed | sound speed minimum | temperature

Contact e-mail	
Data creation date	2012-09-01
Frequency of update	notPlanned
Time extent begin	2012-09-01 00:00:00
Time extent end	2012-09-04 00:00:00
Use Limitation	Copyright (C) NATO STO CMRE
Vertical extent	0.0 / 1000.0 msl depth in meters

ilab

CMRE-EUDAT Collaboration

- CMRE Short Term Interests
 - **B2Find** for making CMRE Datasets discoverable for EUDAT users
 - **B2Share** for making selected CMRE Datasets directly accessible from EUDAT infrastructure
- Different Interoperability Options
 - OGC CSW ISO AP, INSPIRE, NGMP
 - OAI-PMH
 - Dublin Core
 - CKAN REST API

} GeoNetwork

CMRE-EUDAT Collaboration

- Issues to address
 - B2Find or B2Share ?
 - Programmatic Access to B2Share
 - CMRE produces a large amount of scientific data
 - Manual Upload is not manageable
 - Programmatic Upload integrating with existing workflow
 - Access Policy Enforcement
 - Not everybody can access all NATO CMRE Data
 - Not everybody can discover all NATO CMRE DATA
 - Which Interoperability path we choose?
 - OAI-PMH vs CKAN Harvesting vs B2Share Upload vs ??

For more information about the CMRE

- **Website**

www.cmre.nato.int

- **E-mail**

alessandro.berni@cmre.nato.int