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)

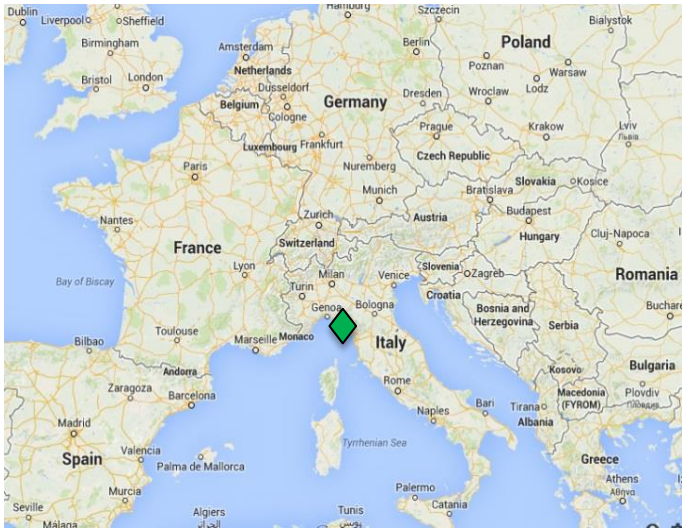
NATO Science and Technology Organization

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

*Formerly the NATO Undersea Research Centre (NURC).

Mission

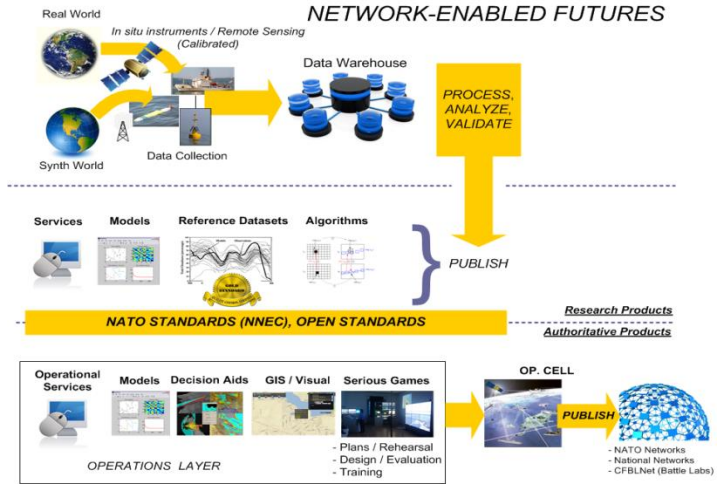
CMRE organises and conducts scientific research and technology development, and delivers innovative and field-tested S&T solutions to address the defence and security needs of the Alliance in the maritime domain.



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.

- Highly-skilled, international, interdisciplinary professionals
- Visiting Scientists
- Collaborative Research Program
- Over 50 years preparing instrumentation and performing controlled measurements at sea



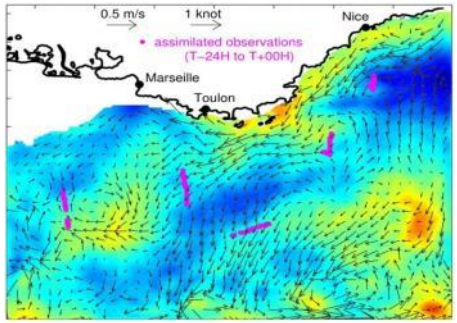
What is CMRE?

- 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)

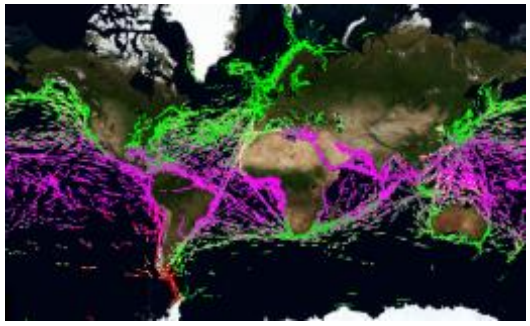
Scientific Programme

- **Maritime Information, Surveillance, Recon. (MISR)**
  - Autonomous Naval Mine Countermeasures
  - Cooperative Anti-Submarine Warfare

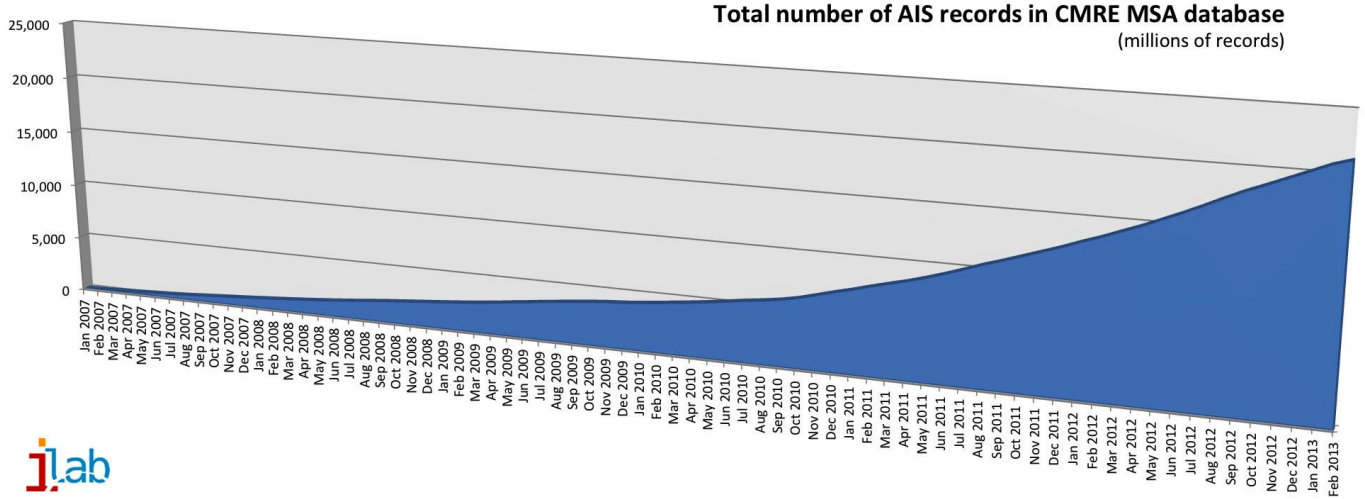
- **Environmental Knowledge and Op Effectiveness**
  - Robotic Characterisation
  - Tactical Prediction
  - Decision Making



- **Maritime Security**
  - Maritime Situational Awareness
  - Infrastructure Protection



Big data infrastructure

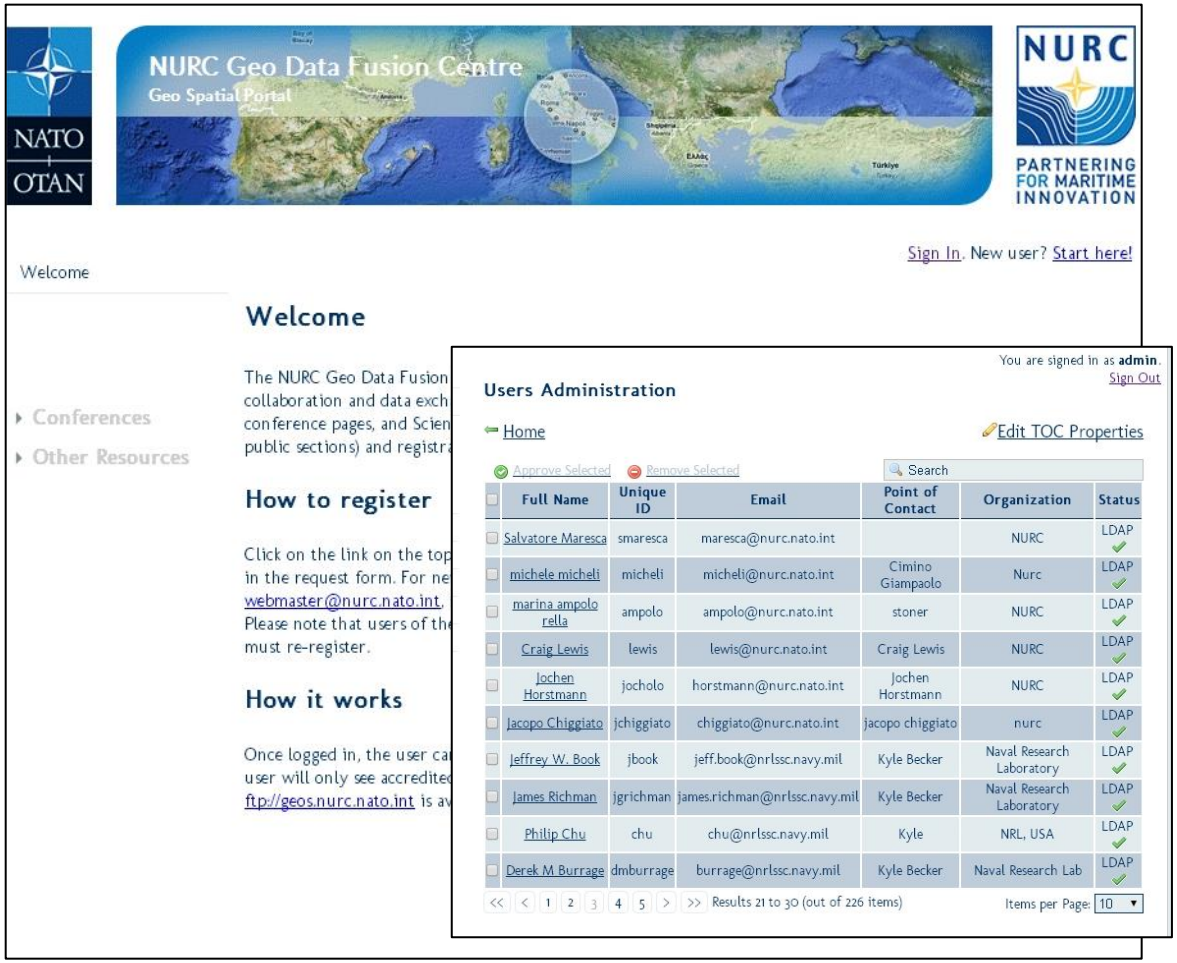


- 20 TB of at-sea data collected every year, user community based in 28+ Nations
- 300 AIS messages ingested every second
  - 2010: 250M new AIs entries per month
  - 2013: 1 billion new AIS entries per month
- **Database with over 30 Billion entries as of 1st January 2014**

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

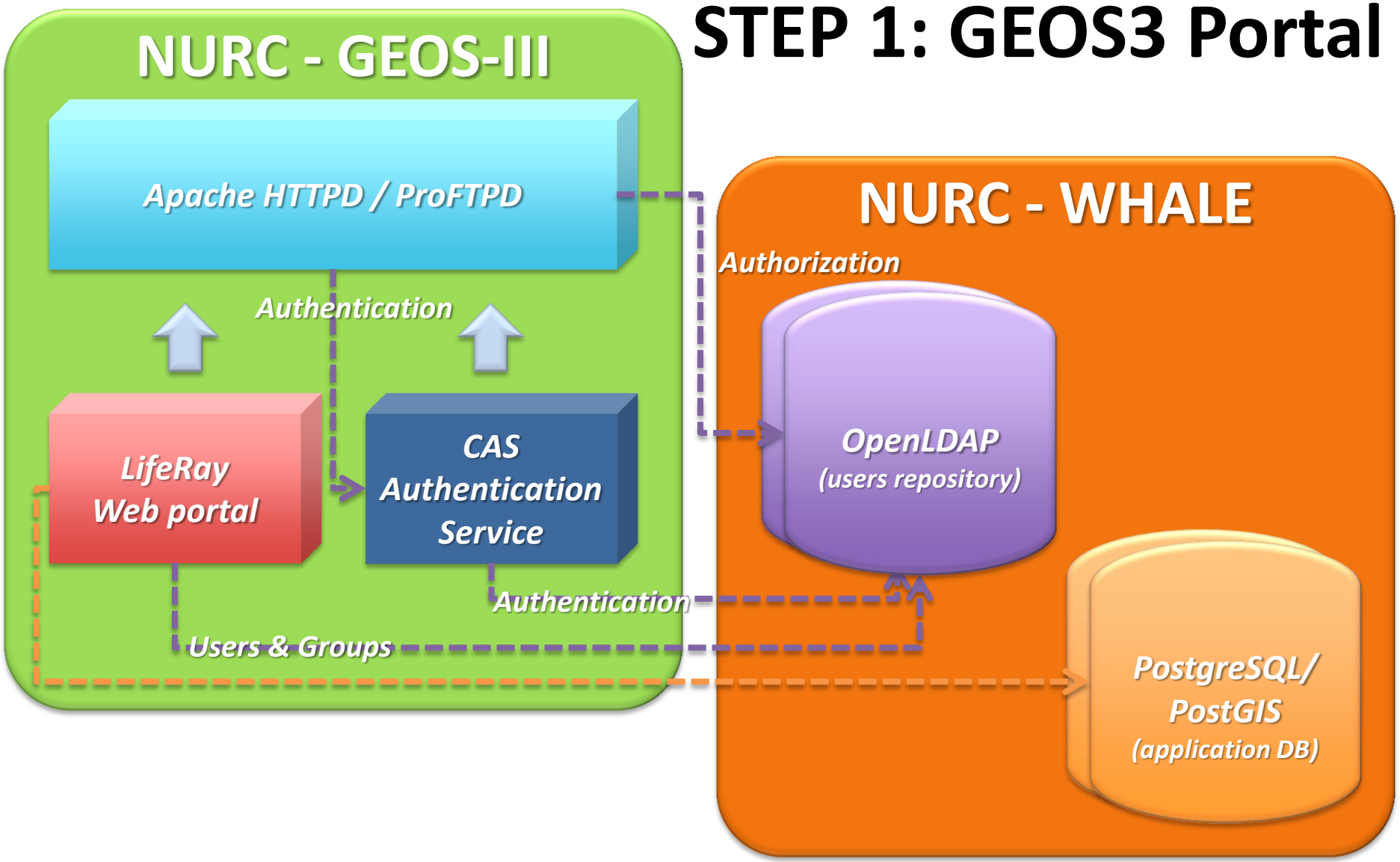
STEP 1: GEOS3 Portal



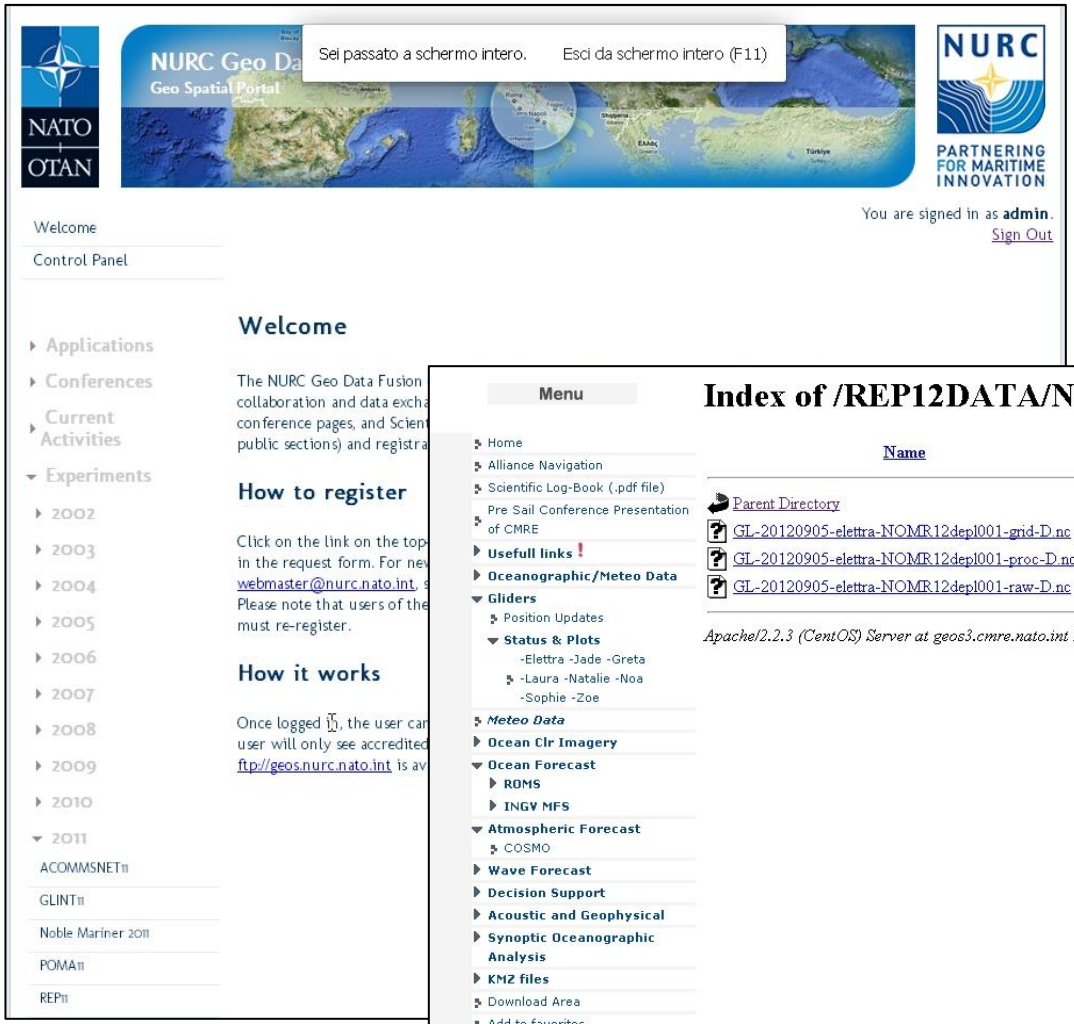
- **Unique Access Point**
- **Centralized A&A (RBAC) + SSO**
- **Automated Workflow for Management**
- **GUI For managing Users, Groups and Roles**
- **Integrated HTTP and FTP access**
- ***One portal to rule them all!***

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

STEP 1: GEOS3 Portal

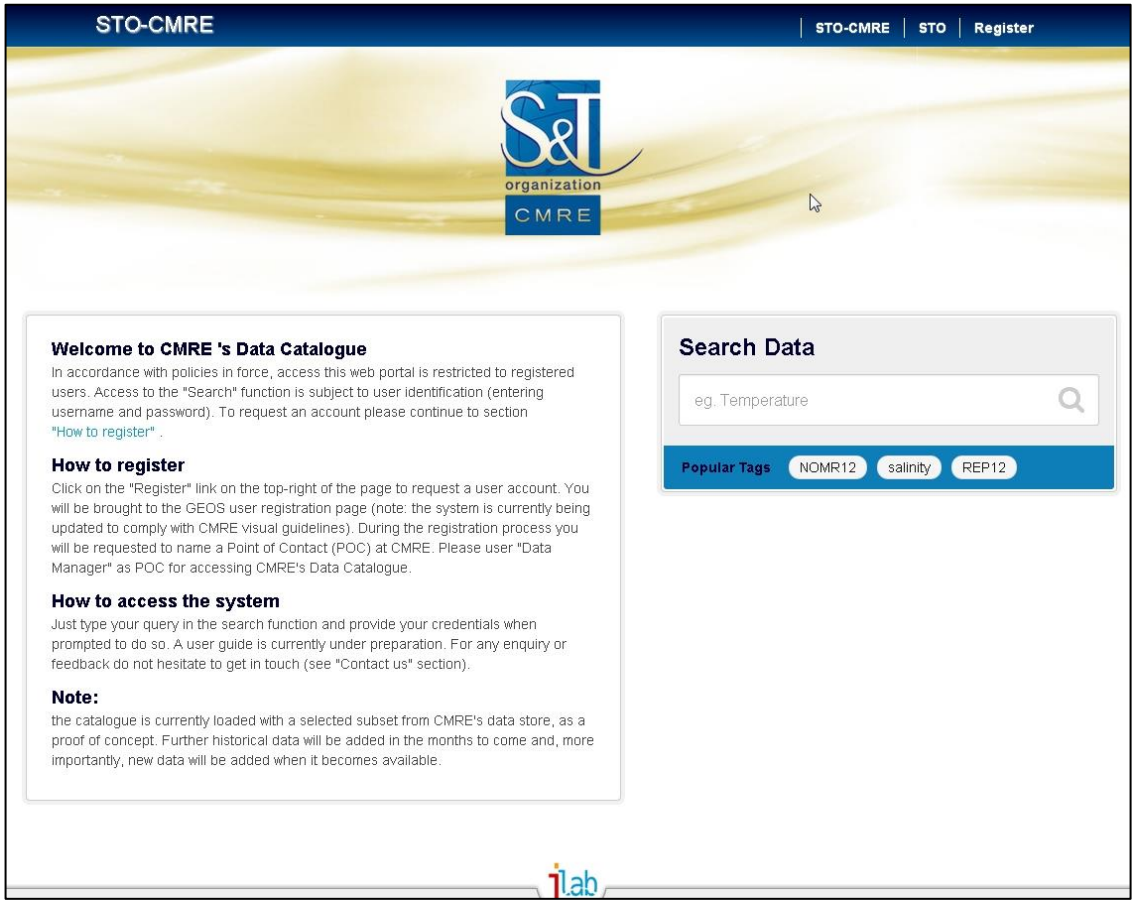


STEP 1: GEOS3 Portal



- ***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???***

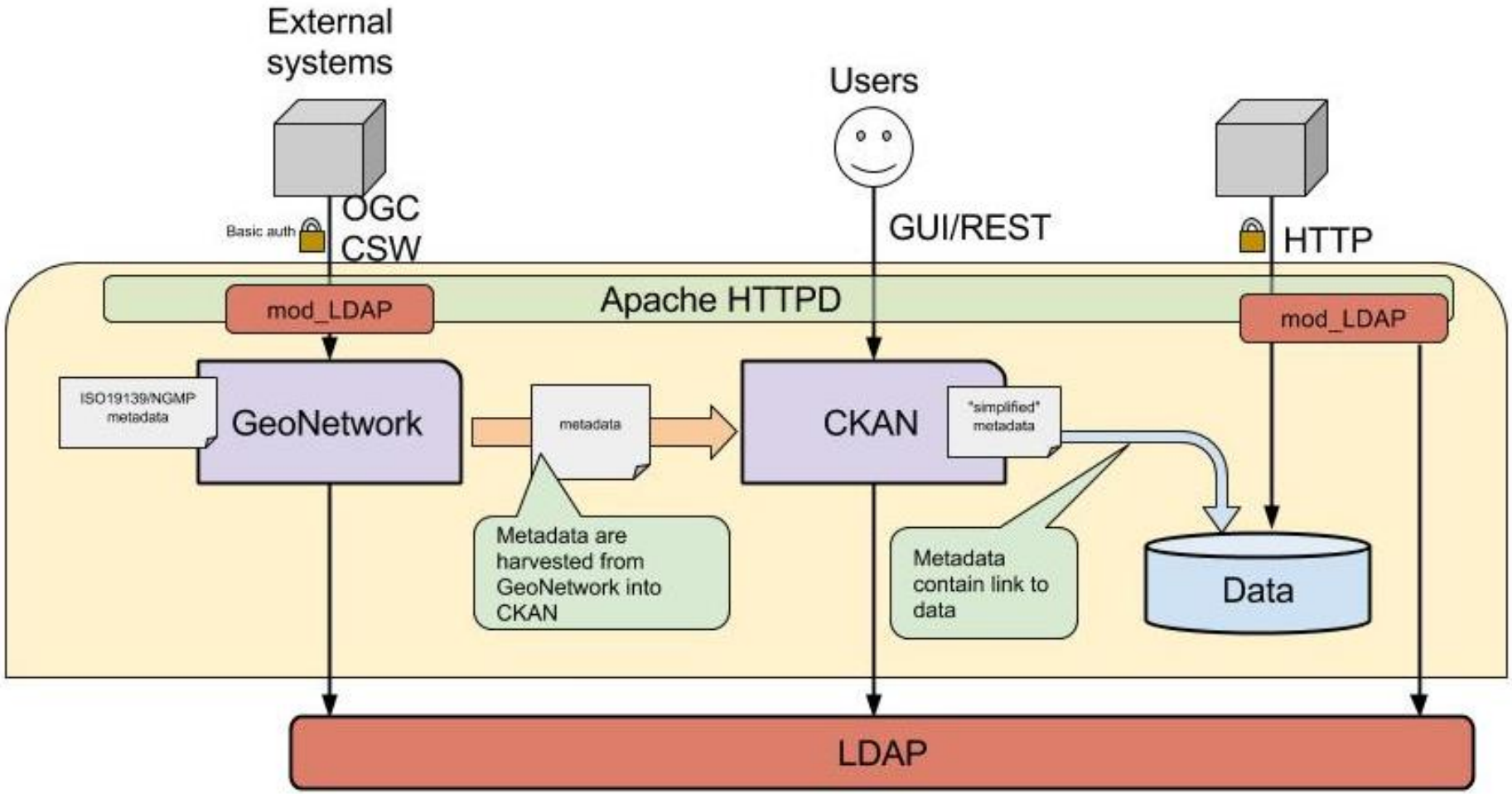
STEP 2: DataCatalog



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

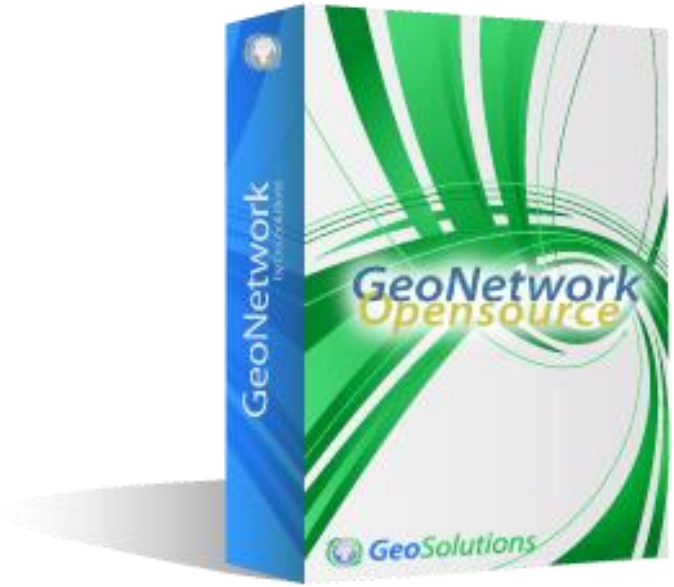
- **Objective: Allow Data Discovery**
  - ***Programmatic***
  - ***Interactive***
- **<u>Idea: Make Metadata Mandatory for data publishing</u>**
- **Usage of NGMP ISO 19115 Profile via pre-filled templates**
- **Per experiment Python scripts that:**
  - **Parse data as it is acquired/created**
  - **Complete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

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



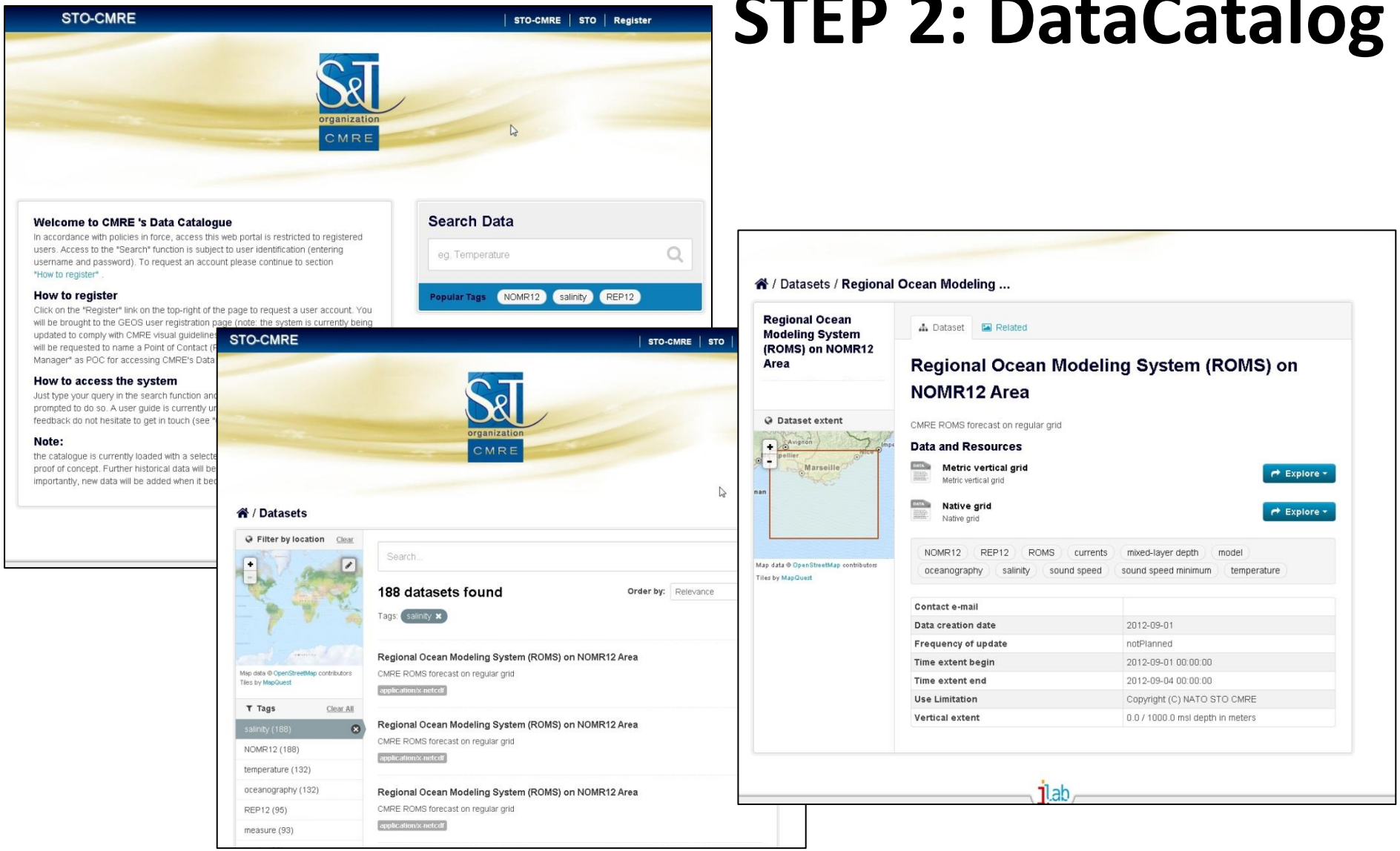
http://geonetwork-opensource.org/

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



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