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## **Information Resources: A Holistic Approach Dr Saviour Formosa**

Joint Research Center – Ispra  
Seminar: EU Member States on the Implementation of the Aarhus Convention

Twinning Project MT/06/IB/EN/01  
Further Institution Building in the Environment Sector

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# Information Resources: A Holistic Approach

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## Objectives:

- Structure of spatial data
- Data cycle process employed for environmental and land use data
- Prediction modelling using spatial data
- Dissemination processing such as web portals and on-line analytical/querying systems
- SEIS implementation at JRC and Vienna Prototypes
- Dynamics between environmental, social and land-use spatial data

## Main Themes Reviewed:

SEIS – Harmon  
Remote sensing  
Risk mapping  
Infrastructure and networks  
Geoportals  
Metadata technologies  
INSPIRE and IRs  
Cognition



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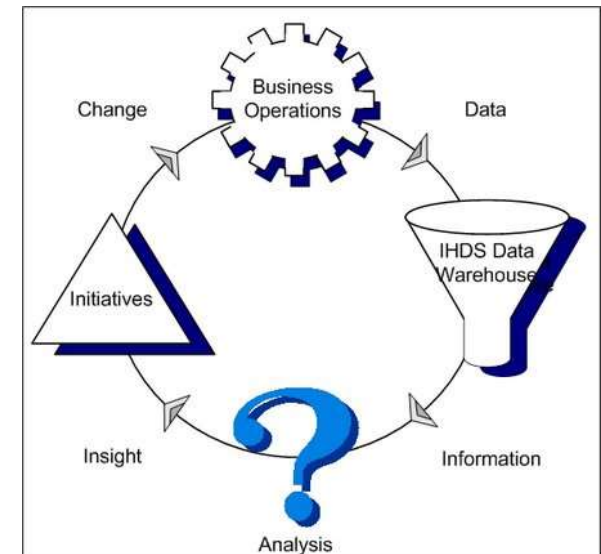
## Data cycle process employed for environmental and land use data:

### Differentiation between environmental (thematic) and landuse-data

- Who gathers what?
- Data transfer and ownership
- Inter-departmental exchange system (costings and buying of material/services) between units
- Models that exist which can help process data across the disciplines:
  - lineage
  - iso procedures

### MoUs

- Intra and inter-organisational MoUs
- Inter-regional
- Inter-national
- GEO-level

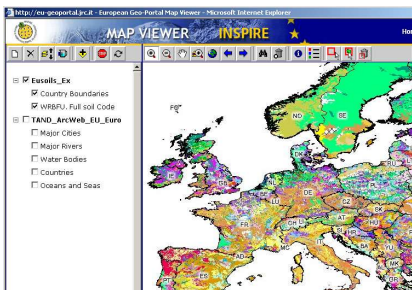




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## Geoportal technologies and the Processes behind the Metadata Editor:

- Discussed the issue of a **prototype of a discovery view** client for metadata both in JRC and in Malta
- One option would be to use Mapinfo or Arcinfo to export the metadata and then make it INSPIRE compliant
- There is potential to have **one metadata client across for all Europe**, in addition creating a 2-way system, where the national clients feed the European client
- Two options also exist in transmission where the **metadata xml is uploaded to one repository (url) or else to create a csw system**
- **MT can take the option to upload all its metadata to the JRC folder as in the case of the EEA CDR function**
- We can put in an **iframe** of the JRC client in the MEPA website
- Regarding the Metadata Editor (MEditor) review the MEditor website and review the catalogue
  - Can also search by map area in the geoportal
  - Created a geochannel that allows a query tool – georss field and then use tools such as Outlook or Mozilla to view the georss



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## Overview of SEIS and HARMON as well as to discuss the new metadata outputs:

- discussed the issues of socio-economic impacts and planning
- discussed the SEIS implementation and overview through the new JRC project HARMON that is being initiated at the present time
- SEIS and INSPIRE metadata converter for the xls version
  - Discussed the possibility of existence of tools that would QA/QC the xls input to verify the content: the metadata editor is INSPIRE-compliant but there is no way to verify INSPIRE-compliance in the xls version. JRC stated that this has not been done yet. Harmon: an overview of the new project funded by DG Env with JRC as the managing agency
- Project is monitoring SEIS and other projects such as NESIS for harmonisation of works and is reviewing and running:
  - Baseline assessment procedures
  - Comparative analysis
  - Propose alternative policy options (inclusive of cost-benefits)
  - It looks solely at monitoring strategy and infrastructure





## To review the Annex I Data Specifications testing Phase:

- The outputs of the data specifications should be presented in Brussels in June as based on Annex I data specifications
  - They are based on OO
  - Based on 9 themes covering both the reference and thematic aspects, thus it has been difficult to draft such specifications
  - The current process aims to build up a conceptual framework for a common framework that brings in all the 9 themes together
  - The process is based on 8 steps and JRC is currently at the 7th step: the testing phase
- Members states do not need to change the data they hold to OO but need to ensure that transfer mechanisms are in place
  - As an example an MS may have a cadastre or base map
  - The EU will ask for the first reporting in 2 years
  - The MS, in its report needs to state that the data is available to the EU in the shape specified in the data specifications
  - MS has to ensure that tools exist to transform the object into the specifications required
- the Metadata outcome)
- it is still not clear who will 'own' the GML files, whether JRC or Eurostat





## Review the e-cognition technologies available for use:

- Methodologies
  - Current and future tools
- The debate centred on the need for new technologies that automate the image interpretation process, through space-time
- The main issue centres on the fact that all algorithms require ground-truthing
- The system requirements for a system to be operations should be based on the following:
  - Ease of use
  - Efficiency
  - Effectiveness
  - Scalability and robustness
- Imagery is no longer a real-problem as availability for all is increasing rapidly through free satimages
  - Seabers – available since 2007 (low quality)
  - Landsat – available since October 2008 (high quality)
  - Sentinel – planned for 2012 (GMES – GEO)
- The method developed at JRC is based on a heuristic approach that is dependent on segmentation iterations
  - A tool will be available in July called Envi 4.3

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## Nanotechnology Monitors:

- JRC-Ferrara Air monitoring sensors
  - Reviewed the main data emanating from the sensors
  - Analysed the latest data gathering processes
  - Reviewd the issue of installation of second monitor since the first one was corroded
  - Data is ssen as reliable but needs to be cross analysed with the current station output



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### Infrastructure and data structures employed at JRC:

- Note was made that ArcGIS server is OGC compliant and not INSPIRE compliant
- Services available are wms and wcs - Wms as based on WGS84
- Caching should only be carried out for stable datasets such as aerial imagery
- ArcGIS server will create the schemas whilst ArcGIS desktop creates the tiles
- Creates images 512x512
- Png24 is the best for topographic maps (256 col)
- Jpg for orthos as it has more colour
- Then use WMS client such as GAIA 3,2 (opensource) – supports only 111, whilst OpenLayers supports 130
- Use the new ArcExplorer since it gives the same outputs as Google
- One can combine ArcGIS layers with Google Maps or MS Virtual Earth: to download the link code from Google for the former where one can also add geoprocessing tools such as print, etc as well as geostatistical tools



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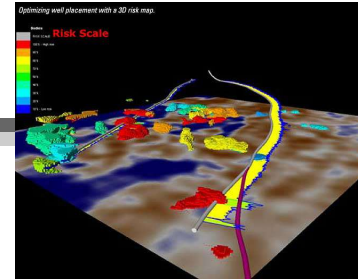
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Knowledge of distributed geoprocessing and how it can be employed in the new datasets that will be acquired by Malta from the SF\_Monitoring project:

- Prediction modelling using spatial data and how they bring it together for dissemination purposes such as web portals and on-line analytical/querying systems
  - Reviewed WSDL – webservice description language
  - Reviewed SOAP - Use WPS – Webprocessing service for transformation processes
  - Reviewed ORCHESTRA which is a service oriented architecture (FP6) for risk management – more of a method than a structure
  - Each data provider sends the data in WFS format – adds local schemas into a common schema
  - Handles both raster and vector transformations
  - MapAlgebra was used for NUTS3 and NUTS5 simulations
- Distributed geoprocessing
  - Data intensive - Data light
- Service composition
  - Engine controlled services (BPEL engine – business process executive language)
  - Uses OASIS standard
  - Active BPEL software is available through opensource – engine is ORACLE



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## Knowledge on risk-mapping outputs:

- An overview was given of the **EFFIS** (European Forest Fire Information System) through the use of the EFFIS geoportal which output is based on the FWI (Fire Water Index) methodology and has data of the last ten years. The outputs are resultant from MODIS with daily updates in summer (fire season)
  - The system has both archival data and predictive outputs
- Issues highlighted:
  - The resolution for this product ranges on a **30-50Km pixel size** which in effect makes it difficult at local (Maltese level) to analyse since it produces a cell for Gozo instant and two for Malta (one North and one South)
  - The system results in polygons of burn areas that are larger than 40Ha
- Operationally two meetings are held every year: one before and one after the fire season
- In the case of **water and flood risk analysis**, this is handled by a specific unit, and the issue revolves around a restricted system for flood alerts. Draughts are also monitored.

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Review cross-discipline issues such as environment and health and the use of modelling:

- Dynamics between environmental, social and land-use spatial data
  - Models that analyse across the disciplines
    - » Economic - physical
    - » Socio-economic – landuse
    - » Risk-based modelling
    - » Single-variable vs multi-variable analysis



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## General Recommendations/Conclusions:

- This training was instrumental in reviewing and learning about new hi-tech tools and methodologies used for spatial, metadata and the whole datacycle focusing on the spatial infrastructure integration.
- The main outputs from this training will be implemented within the Structural Funds project and technologies will be employed by the Information Resources Unit in its services to the Environment and Planning Directorates within MEPA as well as the core services provided by the Corporate Services for MEPA and other MT organizations



## Main Item 1 JRC:

- The variety and complexity of GI-related tools employed by JRC indicate the linkages that are required between the different phases of the datacycle employed for environmental and land use data.
- The **tools' progression** show that JRC is committed to the dissemination of data through web-portals using **hi-end and preferably opensource software**.
- ***It is imperative that the GI specialists in MEPA become consonant with the tools identified in this document.***



## Main Item 2 JRC:

- This training was of a **highly technical nature** and the issues covered included an analysis of the **spatial data employed for INSPIRE implementation** particularly the dissemination processing such as web portals and on-line analytical/querying systems
- The system also looked at **prediction modelling tools and ecognition tools** using spatial data structures and methodologies which will enhance MEPA's analytical construct for both planning and environment.
- The training however reviewed the **linkages between the social-physical and environmental constructs.**

## Main Item 3 JRC:

- SEIS implementation at JRC is highly advanced and this training served as a basis for carrying out a hi-level input for **HARMON** project for JRC consumption. This project output will ***enable the harmonisation of data structures, metadata and dissemination as well as technical, operational and informational constructs.***

## Main Item 1 Vienna:

- The systems employed by the Austrian Environment Agency in terms of **SEIS legacy and plans could be emulated locally**, though the ***German PortalU can actually serve as the precursor for MEPA's SEIS structure.***
- To review SEIS implementation within the SF\_Monitoring Project.



## Main Item 2 Vienna:

- **INSPIRE in Austria is being handled by an external agency** though the interactions bring up similar issues to the ones experienced by MEPA in its dealings with external agencies.
- The issue of ***SENSORWEB is crucial for Malta since it may help integrate and streamline all ongoing dataflows.***



### Main Item 3 Vienna:

- **New e-Reporting tools are being envisaged which should integrate the current reporting structures** and particularly automate them easing the current multi-faceted system of uploads, reporting to multiple agencies and usage of unlinked tools.





Thank You

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