Service contract B4-3301/2001/329175/MAR/B3
"Coastal erosion – Evaluation of the need for action"
Directorate General Environment
European Commission

Living with coastal erosion in Europe: Sediment and Space for Sustainability

Guidelines for implementing local information systems dedicated to coastal erosion management

Information system functionalities

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1. Introduction

The information reported in this document has been gathered in the framework of the EUROSION project (service contract B4-3301/2001/329175/MAR/B3: "Coastal erosion – Evaluation of the need for action"). EUROSION is a two-year study undertaken commissioned by the Directorate General Environment of European Commission upon the request of the European Parliament.

The implementation of a local information system supporting sustainable coastal erosion management consists of a wide range of activities. This document contributes to the EUROSION guidelines local information systems dedicated to coastal erosion management. These guidelines are intended to help regional authorities willing to make a major contribution to coastal erosion management and coastal information sharing.

The objectives assigned to local information systems may vary considerably from one site to another. In the fields of coastline management however, experience gained from EUROSION pilot sites makes it possible to define these objectives as answers to frequently asked management questions. To a large extent, these management questions are linked to investment decisions, which can be summarized as follows :

- Will my investment be exposed to coastal erosion hazard during its lifetime ?
- Will my investment impact coastal erosion processes ?
- Do the benefits generated by my investment (including the environmental benefits) exceed its costs (including environmental costs) ?

The answers to these questions are far from obvious and generally require a considerable amount of data from different nature and different sources. In line with these three questions, EUROSION proposes the development of local information systems dedicated to three main functionalities.

Within EUROSION a generic prototype of a Local Information System has been developed, based upon existing technologies and freeware. This generic prototype has been developed in line with the pilot sites subject to information management study. Within this document the main functionalities are described and visualised.
This document aims at describing the steps and guidelines in the determination of system functionalities in order to be optimal developed for the targeted end-user community. The system functionalities address the human machine interface design in general. Main functionalities are facilitating the search to information, the visualisation, access and the needs for processing.

The information system functionalities are part of the ***Functional specifications***. Functional specifications aim at clarifying the objectives of the information system. They describe which coastline management decisions are to be supported by the system, as well as their data requirements. To some extent, the functional specifications are the *raison d'être* of the information system.

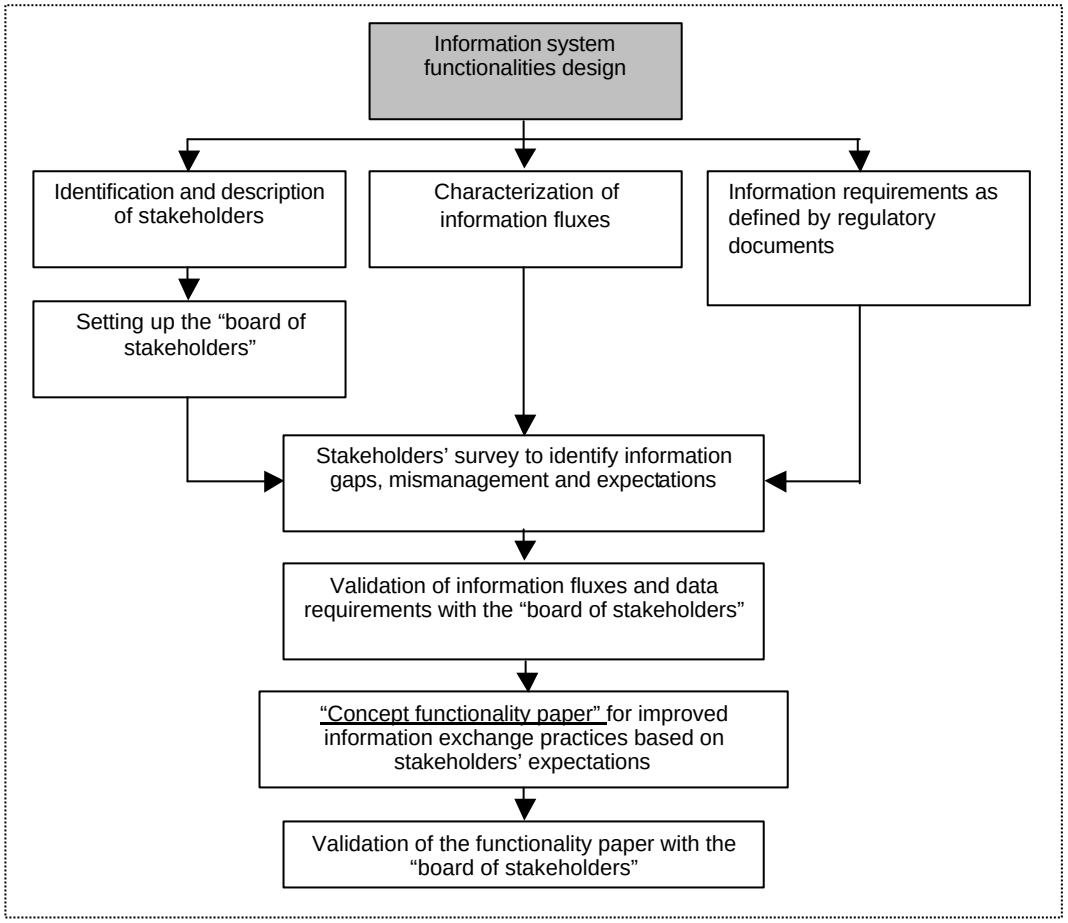
This document will briefly describe the functionalities in 3 function groups of the EUROSION LIS:

Function group No.1 : Searching and accessing information
Function group No.2 : Uploading and editing information
Function group No.3 : Managing the system

2. Methodology

Within the development process in determining the required and feasible system functionality a methodology needs to be agreed upon. Central component in this process is the interaction between all the stakeholders. The weighting and selection process of functionalities is varying and to be determined and endorsed by the board of stakeholders. The steps and activities to be followed for the design of the information system functionalities have been thoroughly described in the document "Manual of procedures for setting up Local Information Systems". An example is included in the task diagram below.

Task diagram



3. Function groups

New technologies, such as high-speed networks and inexpensive massive storage along with the Internet expansion have led to a considerable increase of the amount and availability of on-line text. However, information is only valuable to the extent that it is accessible, easily retrieved and structured. The growing volume of data, the lack of structured information, and the information diversity has made its retrieval and management even more difficult. Thus, there is a strong need for improved means of controlling the information explosion. To this end, remarkable effort has been made towards the development of advanced techniques for organizing and accessing information.

When the required contents and work processes supported are clearly described the next steps consist in the assessment of the functional specifications. The user interface (look and feel when connecting to the LIS), and detailed functionalities (e.g. searching, displaying, editing manipulating of data or information) are decided upon.
Accessibility, possible limitations (user ID, password) specific profiles (depending on the type of user) and technical specifications (usage of buttons, scroll lists, thesauri, geographical maps etc.) are determined through consultation, analysis and decision making.

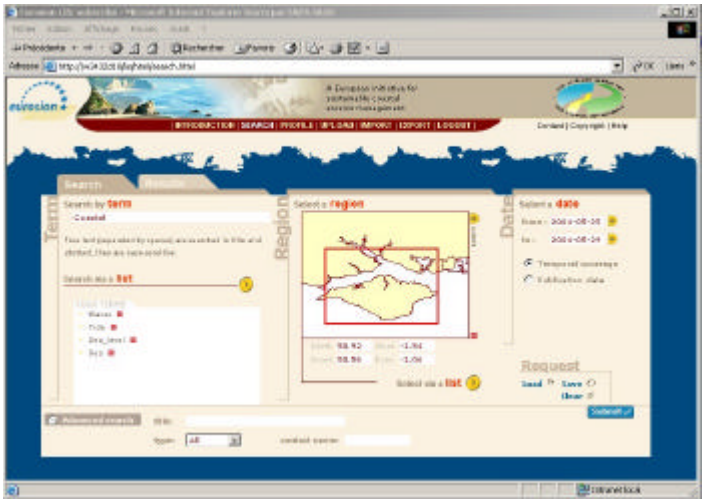
The list below provides a list of main functionalities expected from the LIS prototype. This list has been based on experiences through EUROSION contacts established with representatives of local pilot areas. It intends to highlight the basic functionalities, which fit the best to everybody's expectations.
For each of the functionalities listed below, the guidelines clarify which formats and standards shall be used, and provide tentative screenshots to give a visual impression of the Internet-based application and provide guidance to the IT developer. If needed, the guidelines will re-adjust that list by introducing new functions or removing old ones.

Function group No. 1 : Searching and accessing information
Define geographic criteria of search by typing a geographical location
Define geographic criteria of search by selecting a location in a geographical thesaurus
Define geographic criteria of search either by delimiting an area on an interactive map
Define thematic criteria of search by typing free keywords
Define thematic criteria of search by selecting keywords in a thematic thesaurus
Consult the definition of a specific term via an interactive glossary
Find out the LIS data repository which data sources are matching the selected criteria
Select a data source in a list of items matching the selected criteria and view its related metadata
If available, download the data
f available, view the data itself with an appropriate viewer (Word, Excel, etc.)
Function group No. 2 : Uploading and editing information
Edit and save new metadata records
Attach to the record a set of keywords from a thesaurus
Attach to the record a data file (optional)
Define the access rights to download or view such a data file (optional)
Function group No. 3 : Managing the system
Select the language for the criteria of search, the interface, and the glossary
Modify or delete existing metadata records
Create or delete a new forum
Create, modify, delete user profiles with specific access rights (rights to search for data, to view or download data themselves, to upload new information, to participate a forum)
Create, modify, delete new users within each user profile
Regular transfer of metadata, and if available data themselves, towards EUROSION server.

Function group No.1 : Searching and accessing information

Geographical boundary search

The function allowing the user to determine and specify the spatial coverage of the required information can be done through different functionalities, described and visualised.

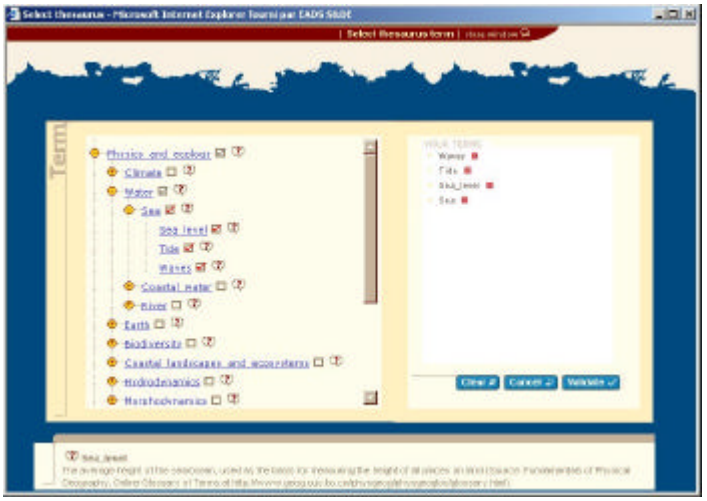


Three identified and developed geographical search functionalities:

- Define geographic criteria of search by typing a geographical location
- Define geographic criteria of search by selecting a location in a geographical thesaurus
- Define geographic criteria of search either by delimiting an area on an interactive map

Thematic search

Beside research by geographic location, search may also be performed on the basis of free text or a thesaurus. A thesaurus facilitates storage and retrieval of datasets by describing the datasets with a standardized set of keywords.

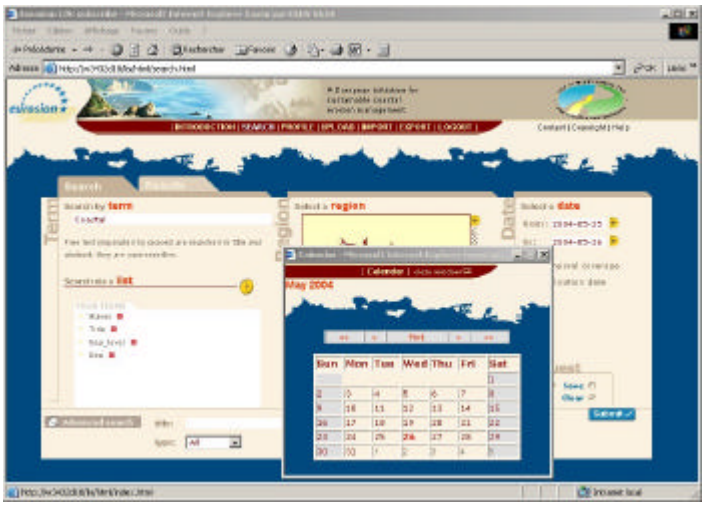


Identified and developed thematic search functionalities:

- Define thematic criteria of search by typing free keywords
- Define thematic criteria of search by selecting keywords in a thematic thesaurus

The thesaurus function can be expanded to an interactive glossary, in order to provide definition of a specific term. Multi lingual functions can be added.

Time search

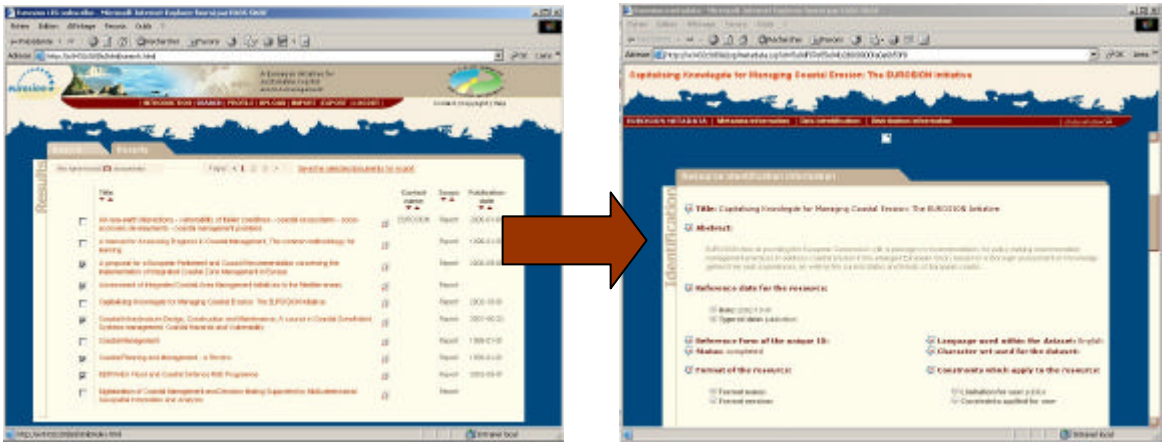


Time search

Especially for the accessing of information stored in huge relational databases the time frame can be an important element to delineate the information query. For example the measurements (parameters) needed to calculate, process predict currents, tides etc. These data are mainly stored in huge relational database management systems, which require proper querying.

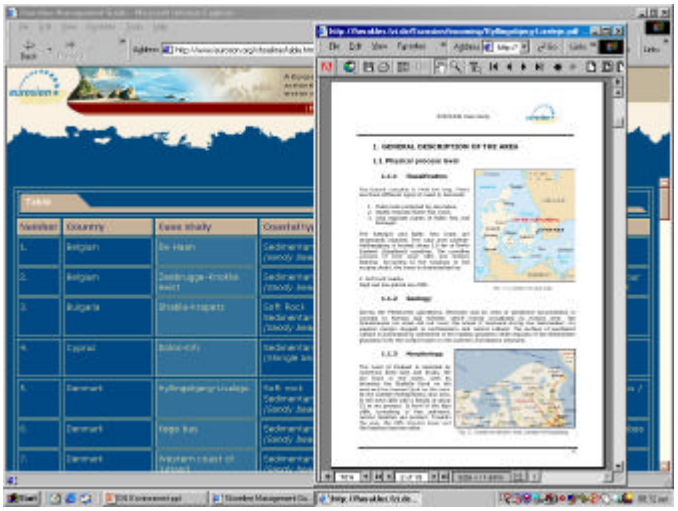
Result query

The results of the search query are displayed through a listing of these. The end user can select a data source in a list of items matching the selected criteria and view its related descriptions (through so- called metadata). This is a two-step approach, first the titles of matching items are listed, after which the titles of interest are activated to study the abstract, date of production etc.



Visualisation and downloading

The selected information can be downloaded or visualised with an appropriate viewer



Visualisation and downloading

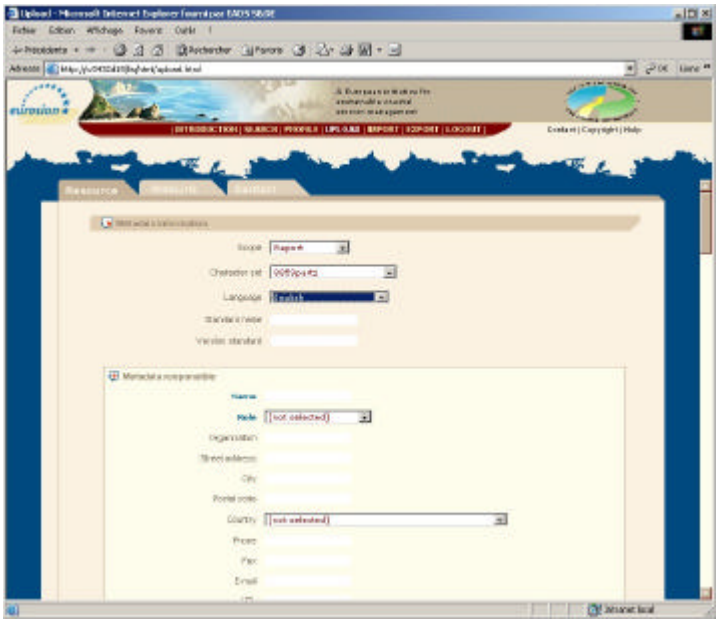
The visualisation function allows the user to view the corresponding data file with an appropriate viewer, both on-line or after downloading it. The viewer is developed to be present in the operating system and associated with the right content type of current information types (Acrobat Reader, MS Word, MS Excel, JPG Format, etc.)

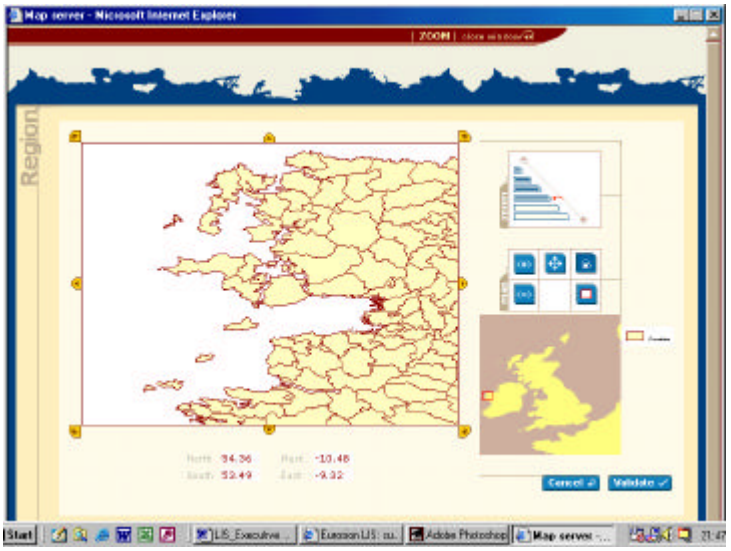
Downloading function gives the user direct access to the required data record (on LIS server or by remote linkage).

Function group No.2 : Uploading and editing information

Before an (online) information system can profit from a critical mass of data or information, information and data have to be added to the system. Since data can have different providers (just like information has different users) it is useful to have an option to upload different data onto an online web-based system. That is why it is convenient that the person uploading information also supplies the metadata of his record. Metadata, of course, should be subject to standards (otherwise interoperability of systems is impossible). However, for a user and supplier of information it is an annoying task to fill in all the metadata fields that may be available when uploading a certain information record. That is why there should be a clear distinction between mandatory and optional fields when confronting system users with metadata fields. More metadata is not always necessary or better, but this depends on the aims of your information system.
If an information system has a more technical user group, where the detailed documentation is an absolute prerequisite, then an extensive metadata catalogue might be a necessity. If the system should be a support to policy and decision makers, than metadata might be experienced as an obstacle towards getting the 'real' information (especially if dealing with documents), and should be limited to a minimum set of fields (e.g. only name, type and summary)

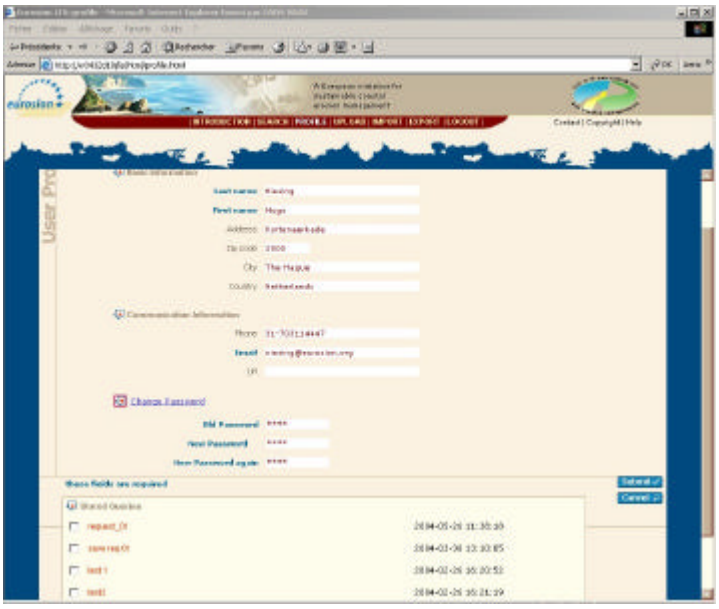
It is essential that metadata and data/information, once uploaded, can be edited or altered by users and suppliers in any way. Especially metadata fields such as keywords should be assigned to the uploaded information (see below), to keep search capabilities, one could click a keyword from a list of keywords.





Both geo-coding (metadata regarding the geographical location of the data) of uploaded datasets and research of information is performed using a map server. This tool makes it possible to navigate on a map (with the possibility to zoom in and zoom out) and to capture the rectangular coordinates (latitude, longitude) of the dataset bounding box. A bounding box defines the geographical extent of a particular dataset (above an example of the map server nearby the county of Mayo in the UK).

Finally, there is the option of attaching the actual data itself to the record (see image below). Please note that the actual data is sometimes copyrighted and therefore some use is restricted (e.g. only view). Sometimes there is a limited upload capacity (for large GIS files, just metadata and contact information might be sufficient, especially when copyrighted). However, for policy documents or images, the option of uploading the actual data is highly recommended because users have then direct access to the information.



Function group No.3 : Managing the system

Additional functionalities include the glossary and the forum. Here, For the system manager some extra tasks are available. Firstly, only the administrator can delete existing metadata records, create of delete new for a and add or delete users and their profiles. Secondly, managing the system will also mean frequently making transfers of metadata (or, if available: data) towards EUROSION server.
After login, users may add (meta)data to the LIS, edit or delete their own (meta)data and view (meta)data of others. System administrators can create, modify, delete new users within each user profile

Corporate design

To facilitate communication within EUROSION towards the public, it is important that the LIS prototype respect the same graphical features as EUROSION Web site. The guidelines are therefore expected to provide the IT developer with graphical requirements. Such requirements include

- Number and size of frames
- Colours, including background colours, text colours, etc.
- font and size of text
- logos
- counter of visitors
- etc.

It is reminded that the LIS prototype is meant to be adapted to each specific pilot site. As a consequence, the prototype design should make it possible afterwards to add new logo, change colours, etc., as a result of the feasibility and pre-design conclusions (see volume II of the implementation manual: the technical specifications) .