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User Requirements and User Strategy in the AWARE Project

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Abstract

AWARE (A tool for monitoring and forecasting Available WAter REsource in mountain environment) is a Project in the VI Framework Programme of European Community. It started in July 2005 and aims at offering methods and

within AWARE and illustrates some results of the user requirements analysis.

1. Introduction: the AWARE Project rationale

Water from Alpine snowmelt reaches an extremely wide and populated region, and it is a main resource in many activities, such as agriculture, hydropower production, freshwater and risk management. Stakeholders involved in these fields are interested in a deeper knowledge and monitoring of snowmelt runoff, figuring out its values and its trends through time.

This is the framework of the AWARE Project (A tool for monitoring and forecasting Available WAter REsource in mountain environment)[2], which aims at offering methods and tools to monitor and forecast the water resource derived from Alpine snowmelt by models which will make use of data collected from both *in situ* measurements and Earth Observations (EO). The Project products will be: on one side, information regarding hydrological state variables (maps of snow cover/water equivalent, land surface temperature, land use, etc.), and fluxes (such as snowmelt runoff); on the other one, prototypes of software tools to access hydrological models and to obtain data and results.

AWARE originated from ideas capitalising on previous projects regarding snow, glaciers and water monitoring on Alps[3]. They taught that local end-users[4] of runoff forecast models are at the same time, in many cases, owners and providers of local data necessary to feed the models themselves. There is often a gap between end-users, owning local experience and data, and experts in modelling, whose practice is generally based on wide-spectrum considerations. These two actors speak sometimes different languages and look at themselves like counterparts, thus exposing to risk the results of their collaboration. AWARE proposes therefore to make end-users (and local data providers) the chief characters of the runoff simulation process. The Project aims at developing a geo-service: prototypes of user friendly software environments, available on the Internet and compliant with the European INSPIRE Initiative (CEC 2004), which can be accessed directly at end-users desks.

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[2] AWARE (Contract no. SST4-2004-012257) is co-funded by EC as a Strep Project in the VI FP, GMES initiative. Its duration is three years and it started last July, 2005. More information on the Project can be found at http://www.aware-eu.info.

[3] See by example ESA DUP Project GLASNOWMAP (GLAcier and SNOW MAPping information service) (2001-2003).

[4] In this paper the term *user* identifies a member of the AWARE users group which is composed by end-users, who will act at the same time as supervisors of the results themselves and/or as receivers of the outputs (Maguire/Bevan 2002).

As in many other projects dealing with information system design (Maguire/Bevan 2002), strength collaboration with end-users is vital in order to reach such ambitious objective. The Project plan contains three main activities in which the users are involved, i.e.:

4. Elicitation of user requirements and analysis, to be performed at the beginning of the Project.
5. Dissemination of Project activities and exploitation of results, during all the Project life.
6. Test and demonstration activities, when the AWARE products are ready.

Section 2 describes what has been developed to collect user requirements with respect to AWARE. Section 3 regards user requirements analysis. The paper further outlines the activities conceived in the dissemination plan for the next future.

2. AWARE strategy in the collection of user requirements

The importance of end-users within AWARE is testified by their involvement from the very beginning of the project, i.e. from its proposal. In fact, a group of four end-users offered their collaboration in sharing their experience; in making available their data; and in assessing quality and reliability of AWARE products and geo-service.

Among all available models used to study the best strategy to involve users into a research project, a qualitative approach was chosen for AWARE, due to a number of factors. The geo-service, which will be the final product of the project, is addressed to a restricted panel of users, with different interests and missions, who have been identified in the following categories: political (water policy makers); economical (hydropower companies, municipal water suppliers, etc.); social (regional, basin and municipal authorities, citizens); educational (students, trainers, researchers). Even if heterogeneous, a certain degree of expertise is expected by such users in the use of new Information Technologies, and, some reliance on remote sensing observations. In fact the survey of user habits and expectations is of basic importance in order to design:

- the organisation of AWARE products (types, formats, temporal and spatial resolutions, etc.);
- the overall online system prototype to access and run AWARE models (the user interfaces, as well as its components, architecture and connection capabilities);
- the procedures to tailor models to local basins.

As a tool for disseminating and involving users into the project we chose a hybrid approach: distributing a questionnaire and filling it during interviews, when necessary.

This approach was suggested by the wish to avoid misunderstanding in answers, to clarify users' doubts, to satisfy their curiosities and to break ice in researcher/user relation.

The drawing up of the guided questionnaire has taken into account the above cited typologies of users. The questionnaire is structured in three main chapters regarding:

1. information on the organisation of the user, its expertise in the hydrologic field and the area of interest;
2. user's present practices with respect to data collection/management, software/hardware availability;
3. user's expectations and needs with respect to AWARE products.

Expectations on the resolution (both temporal and spatial) as well as on the coverage of the required data receive a particular care: this aspect could in fact represent a qualifying factor in order to raise user interest in the Project products.

As a result of the first six months of activity, the group of users has grown up to twelve elements; in the meanwhile a database was created to store questionnaire content, to let its flexible management, and to structure and summarise the survey results.

2.1 Database structure

The AWARE User Database (AUDB) has a relational structure and contains nine tables and different types of relations. Each table regards a particular topic. For example, the records stored in the table Organisation contain the main data of the organisation that filled the questionnaire. The storing of contact details allows a possible further follow-up of the user. The records of the table Expertise store information about the type of user organisation, its main activity in the hydrological field, the boundaries of the competence area, the available budget for different purposes and the training methods of the organisation.To know the present sources, types of data and information used by the organization, four tables have been designed: Existing_Data, Existing_Data_Resolution, Existing_sw/hw and Evaluation_of_existing,. The first table also contains the transmission methods used, the processing level and the data formats and reference systems of the data received by the organisation. For each existing data source, the second table specifies: the spatial resolution, the update frequency and the accuracy. The third table organises data regarding methods for storing data, for the exchange and interchange of information and some software packages and models used (if they exist). The last table of this group collects the advantages and drawbacks of data/information/management methods used in the organisation at present.

To manage the requirements of AWARE products, they were assembled into two tables: Products_Required and Products_Resolution. The first table stores: data about usefulness of the AWARE information products; reference systems needed; user interest in the AWARE services; purpose of the use of AWARE products/services. The resolution of the AWARE products required regards many characteristics: frequency, spatial resolution, scale, minimum and maximum extent, minimum and maximum accuracy. User suggestions are stored in the Comment table.

3. Analysis of collected information

Data and results analysis is mandatory to obtain input for the design of prototype Project result.

To manage and better visualise collected data some utilities, such as forms, queries and reports, have been developed. In particular, forms have been designed to allow the faster consultation of questionnaires stored and the data entry activities.

An objective of the questionnaire was to test the use of Internet as source of data and as method of data transmission, asking also the type of used support (modem or dedicated line). All users interviewed access to Internet as source of data and a considerable percentage of them (80%) uses Internet as method of transmission of data and information. Figure 1 (left side) regards user interest in different AWARE products: it is quite high: in particular users are interested in runoff values, snow water equivalent (SWE) and snow cover maps. A further investigation is made with respect to some important parameters such as update frequency, spatial resolution, scale, extent, precision and reference systems of the AWARE products. For example, Figure 1 (right side) represents the update frequency and the spatial resolution required for SWE.

This trend is confirmed by the analysis of the interest in AWARE possible services. In particular, the users already interviewed consider a SWE service the most interesting final product. It is important to remember, however, that the dissemination of AWARE activities started not so long ago, and, new users are going to send applications in this period, and new questionnaires that will be filled in the next months would improve the definition of user requirements.

The first fallouts of the analysis regard an important contribution to the design of the AWARE geo-service, supporting two key choices: (1) which satellite sensors are useful to provide input data in the project framework - particularly in terms of spatial and temporal resolution -; (2) the geographic reference system common to the geo-service users - harmonising between INSPIRE recommendations and user's practices.

4. Conclusions and forthcoming activities

AWARE Project considers user involvement as an extremely important activity and devotes strong efforts in contacting users, collecting their requirements and disseminating future Project achievements. The first two above tasks are not confined in the first Project period but will last until the first demonstrations.

Besides the above analysed activities, other initiatives will follow. The Project has now activated the design phase. When prototypes will be ready, the demonstration WP will organise meetings, transfer end-users feed backs to developers, and assess users' satisfaction degree. Furthermore, the Project Dissemination WP planned for the future one (or more) Open Day(s) in which the key topics of AWARE will be illustrated and users invited to a face-to-face interaction with partners (AWARE D260.1 2006). The Open Day(s) will host not only to the users who already joined the Project, but also local and national stakeholders involved in the environment protection and water policy.

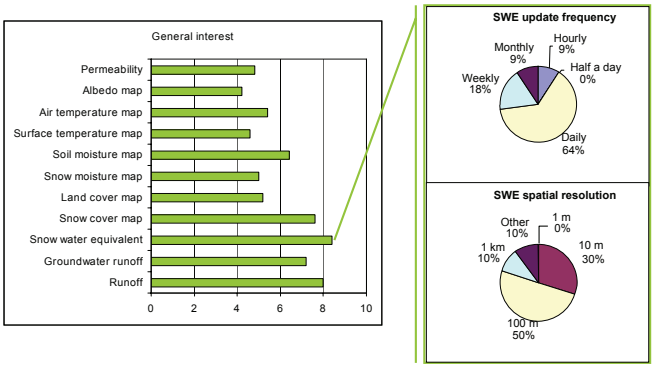

Fig. 1:
On the left the Users' interest in products: *0* corresponds to "*Not useful*"; *10* corresponds to "*Most useful*".
On the right: Update frequency and spatial resolution required for Snow Water Equivalent (SWE)

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