# PRESENTATION OF THE PROJECT SODA

Contract number: IST-1999-12245
Project acronym: SoDa
Title : Integration and exploitation of networked Solar radiation Databases for environment monitoring
Key Action: KA I
Action line: 1.1.2.-1.5.1


ABSTRACT: The project SoDa answers the needs of industry and research for information on solar radiation parameters with a satisfactory quality. The methodology is user-driven with a large involvement of users in the project. A prototype service will be developed that will integrate and efficiently exploit diverse networked information sources to supply value-added information in a selected number of environmental applications. A multi-disciplinary consortium has been assembled, which gathers companies and researchers with the necessary expertise in solar radiation and information and communications technologies. Customers and potential users are also represented as partners in the consortium via the involvement of commercial private vendors of solar radiation databases and of representatives of large international or local environmental research and development programmes.

| | Participant Name | Short Name | Country |
|---|---|---|---|
| PARTNERS | Association pour la recherche et le développement des méthodes et processus industriels | ARMINES | France |
| | Ecole Nationale Supérieure des Mines de Paris / Groupe Télédétection & Modélisation | ENSMP/T&M | France |
| | Joint Research Center – ISIS/Reliable Information Technologies Unit | JRC | Italy |
| | Hungarian Meteorological Service | HuMet | Hungary |
| | MeteoTest | Meteotest | Switzerland |
| | University of Manchester – Institute of Science and Technology | UMIST | UK |
| | University of Genoa – Department of Physics | DIFI | Italy |
| | University of Oldenburg | EHF | Germany |
| | Ecole Nationale des Travaux Publics de l'Etat / CNRS | ENTPE | France |
| | iCONS | iCONS | Italy |
| | Fraunhofer Institute for Solar Energy Systems | FhG-ISE | Germany |

TOTAL COST: *2,114,484 Euro*
EC CONTRIBUTION: *1,194,154 Euro*
STARTING DATE: *1st January 2000*
DURATION: *36 months*

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# PROJECT DESCRIPTION

***The Sun is the source of life***

The Sun is the primary source of energy for the Earth. Beyond its direct impact on human being and human health, solar radiation concerns many domains: environment, air quality in cities, photo-chemical conversion, primary production and photo-biological processes, weather forecasting, prediction of meteorological extreme events, agro-meteorology, agriculture, oceanography, climate, global change, water supplies (evaporation in reservoirs, primary production, water quality), land drainage use of renewable energies (solar energy, energy from biomass, energy-conscious building design …), solar chemistry, durability of materials (polymers, coatings), cosmetics etc. Tourism is also under concern: the number of sunny days is one of the main arguments of several skiing and summer resorts to attract customers. Solar radiation has even been central in legal actions.

***We need information***

There is a **strong need for information on solar radiation** for environmental and industrial applications. Solar radiation is measured by ground networks of measuring stations. The types of measured data are diverse: sunshine duration, cloudiness, global irradiation, its diffuse and direct components, spectral distribution, etc. Investment and maintenance costs for each site are large. Consequently, national networks often comprise only a few stations, even in Western Europe and Northern America. In other parts of the world, information is scarce and non-existent for the oceans. The result is that there is a **large discrepancy between user request and available information**.

## *KEY ISSUES*

***Three major problems to solve***

Three major problems should be tackled to **supply** the customers with **information relevant to** their **requests**:

**Access**

**Improving access**. The access to the relevant information is poor for many reasons. Access is complicated by the various types of data, various storage standards, various units, various ways of expressing time, diversity in information properties stored in databases: sampling support, observational period, frequency of individual observations and averaging time intervals, etc.

**Knowledge**

**Improving space and time knowledge**. Space and time characteristics of presently available data are unsatisfactory. Interpolation / extrapolation techniques can be employed to gain knowledge at any geographical location and any time, but the present techniques lead to poor quality estimates. Consequently more R&D effort is mandatory.

**Matching needs**

**Improving matching to actual customer needs**. Present databases contain raw measurements, which are not what are really needed by the customer. More advanced information should be supplied to the customer, such as the fraction of radiation available for photosynthesis processes or for driving photochemical transformations causing problems of air quality in cities.

## *TECHNICAL APPROACH*

### *Answering needs*

The project SoDa is based on considerable previous experience, and intends to use this as a springboard to answer customer needs by an efficient use of advanced ICT. More precisely, an integration of information sources of different natures within a smart network will be realised. These sources include databases containing solar radiation parameters and other relevant information (meteorology, geography, terrain elevation, satellite-borne sensor parameters). Several of these databases originate from an advanced processing of remote sensing images. These databases are presently available separately. The information sources will also include application-specific user-oriented numerical models and advanced algorithms.

Algorithms based on innovative techniques in data fusion, data mining, data processing, and data assimilation in numerical models will be developed and tested to **supply value-added information on solar radiation**. The system will be validated through users trials, and its benefits will be assessed.

### *User-driven*

The methodology is **user-driven**. The user needs will be taken into account to design the intelligent system, which, in turn, will be tested by selected users. The connection between design and development and the potential users will be effective; rapid prototyping combined with several improvements and tests cycles will improve the dialogue and lead to better products and services.

The project SoDa is receiving strong support from the customers and the market. Several companies, international environmental research programmes, research institutes, authorities, agencies etc. are paying attention to its outcomes and are ready to collaborate actively. Their involvement will especially focus on the use of the service and on the expression of benefits of this service with respect to their best practices.

### *Applications*

Applications of the project SoDa are very numerous. Seminars will be held to create awareness of the services and ensure a better dialogue with users. Several applications have been targeted:

- vegetation (assessment of the available photosynthetically active radiation - APAR)
- marine biology (assessment of the APAR)
- air quality in cities and dispersion models
- weather forecasting in limited area
- engineering of solar systems
- buildings and daylighting

## *OBJECTIVES*

To answer the needs for high quality customer-tailored information on solar radiation

To integrate diverse sources of information presently available separately within a smart integrating network

To develop and operate a prototype service, which efficiently exploits this smart network, and which will be used and gauged by selected users

To increase the quality of the delivered information through improved modelling of time and space structures of the solar radiation, and improved matching to actual customer needs

To disseminate the achievements of the project, and assess the sustainability of a permanent commercial service