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**HARD & SOFT**  
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Hard& Soft 2010

## SoNDa: Sensor Network for *Data*: Explore!

Your task is to demonstrate the capabilities of modern wireless mobile devices to act as sensors or sensor controllers as part of a system for data gathering, analysis, interpretation and delivery via internet or web based services. The keywords are: wireless, sensors, communication. The choice of application(s), sensors, their interfacing, web services, internet based processing, and user interface is entirely up to you. There are no restrictions on the mobile platform, programming languages or operating system you adopt. However, the Jury will be looking for novel ideas that you have developed into working systems, and remember you should make your work accessible and interesting (spectacular?) to the audience of the public exhibition on Friday.

The outline requirements are:

**Sensors:** The mobile device must be able to discover and associate its sensors, with no, or minimal, user GUI interaction. The sensors may include any of the mobile devices own components.

You should assume that other sensors and mobile devices are in the same area.

Smart strategies for how to ensure that the mobile device and its sensors are correctly associated will add to the usability.

Additional sensors can be connected either wirelessly or wired to the mobile device as appropriate.

**Power Consumption:** Particular consideration must be given to the power consumption of the mobile part of your system (processors, sensors, wireless technologies and usage modes).

A Power Meter indicating battery levels and instantaneous power should be considered to show the impact of any low power strategies adopted.

**Minimum User Intervention:** Alternative strategies to manage the data collection from the sensors should be considered and their tradeoffs understood before implementation. A key design aim should be to minimise user intervention and to automatically connect and reconnect without undue wastage of resources. The application should gracefully degrade and recover when sensors are moved in and out of range.

Careful consideration should be given to simplifying the installation of the application on the mobile device.

**Wireless Security:** Data integrity and security should be considered.

**Robustness:** The application(s) you choose to run on your system should illustrate the power and robustness of the communication architecture adopted.

Issues such as scalability and co-existence should be considered.

### Additional Information

Note that additional sensors may be hard wired through serial, or usb, interfaces to enhance the capability of a low functionality mobile device linked wirelessly to applications hosted elsewhere.

It is probable that you will consider a Bluetooth based solution given its near ubiquitous deployment in mobile phones and portable devices, and the use of standardised APIs such as Java JSR-82. However, Wifi alternatives or proprietary communication technologies are allowed. The use of web services is optional but if adopted code generators for developing the service and the client may be used.

The focus of your design should be to identify the necessary classes and APIs to be developed and implemented. The Jury will expect to see: interaction diagrams, to document the major interactions among the objects or classes: state diagrams, to denote the states of the connection and the application life cycle e.g. if Java is adopted, the MIDlet states should be handled.

There are no restriction on the application area(s) you choose other than those imposed by the nature of the contest and the contest rules, some potential areas are: environment, health/fitness, navigation and positioning, movement and activity detection, logistics, games, social monitoring, multiple user interaction, audience participation, music and entertainment.....

**Judging** will be based on two Jury visits (Wednesday and Friday morning), your public exhibition and submitted documents (exact details will be e-mailed to teams on Wednesday by lunchtime).

Finally, an illustrative example drawn from an EU Framework 6 project:

### EU FP6 Project CAALYX: System Overview

The project measured and monitored specific vital signs of the older person, detected falls *and* identified which vital signs and patterns are relevant. Many wireless communication technologies and sensors were adopted.

