A LOW COST SENSOR SETUP FACILITATING REAL TIME DELIVERY OF ENVIRONMENTAL INFORMATION

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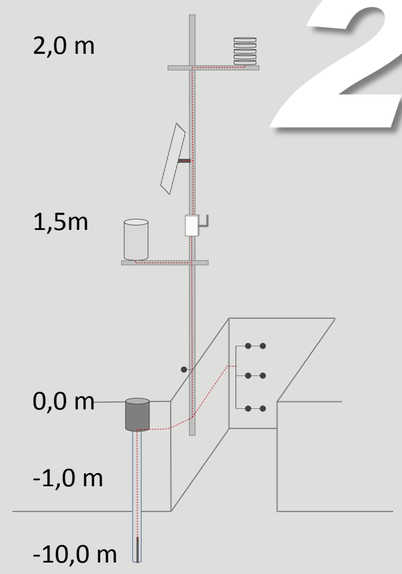
1 Background

In recent years the Mondsee catchment close to the city Salzburg in Austria was affected by severe heavy rainfall events causing flooding. These extreme events appear 'out of the sudden' and without any notification or warning to those who need the information for preparedness and adaptation strategies.

In addition to the high water loads emitting to the surface water bodies, nutrients and especially phosphorus loads increased during these events. Since phosphorus is the limiting element in the Mondsee catchment, eutrophication happened and algae production increased with an affect on the lake Mondsee ecosystem.

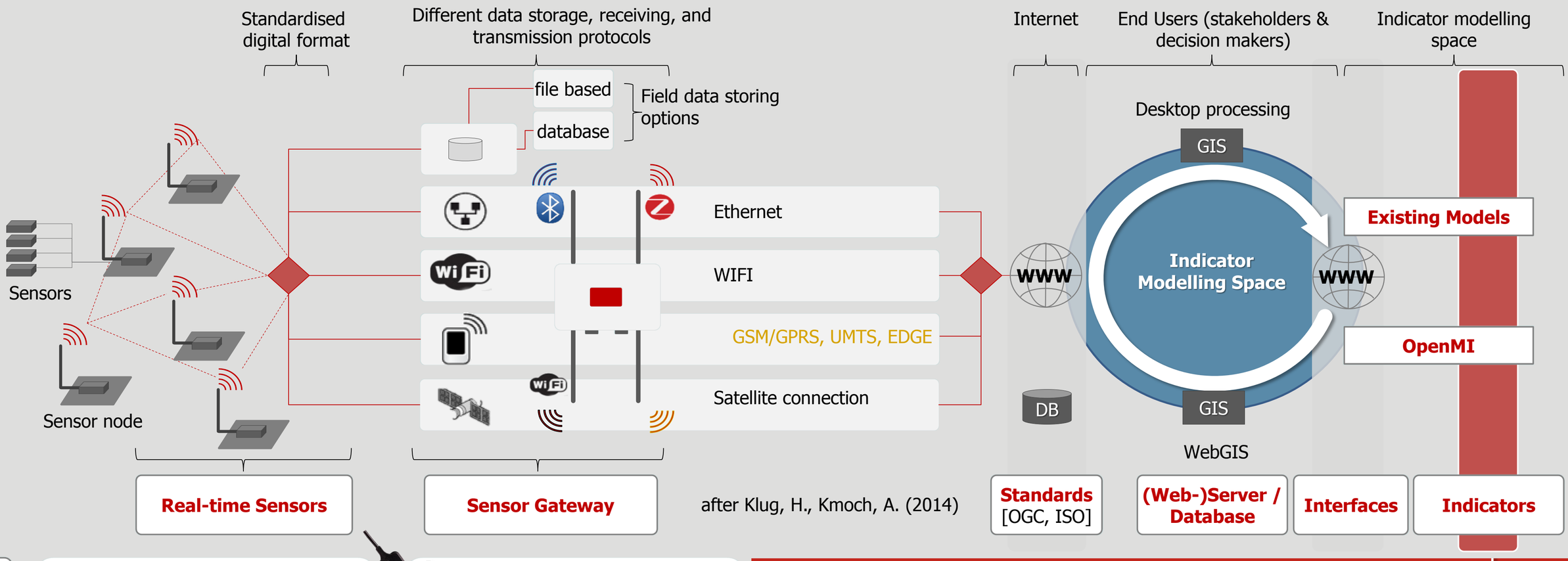
2 Challenges and Objectives

As the technical and methodological challenge in this poster we highlight the development of a specific sensor setup of environmental parameters (meteorological, hydrological, and pedological) to be measured during extreme weather conditions. We provide a platform independent and open source based framework to drive a low cost and energy autarchic Wireless Sensor Network (WSN). Additionally we provide standardised data transmission according to OGC/ISO (SOS, O&M, WaterML) feeding real-time measurements into web enabled geospatial analysis.

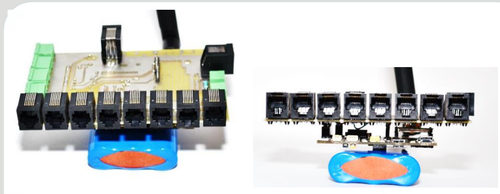


3 Methodology

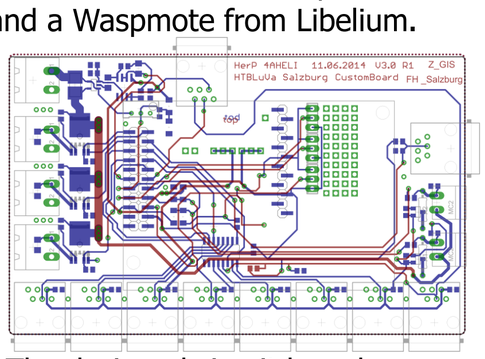
The combination of environmental sensors should be tailored to the observation needs. This requires a newly designed circuit board connecting the required sensors to a transmission entity, the Waspmote building up the sensor node. Transmitted to the sensor gateway the measurements enter the internet in a standardised format and are integrated in web processing services to provide spatial-temporal end user demanded indicators in real time.



New Developments



The custom board on top of a battery and a Waspmote from Libelium.



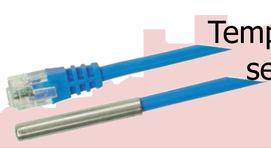
The designed circuit board.

Decagon 10HS soil moisture probe

Davis wind direction and wind speed

Davis rain gauge

Quantum bivalent water level sensor



Temperature sensor

4 Discussion and Outlook

With an investment of approximately 100 EUR we were able to design a custom board able to take up the required sensors for describing the spatial temporal movement of water in space and time (temperature, wind direction, wind speed, precipitation, soil moisture, water level). With the real time measurements we expect a better understanding of the hydrological processes at plot and landscape scale and thus the movement of nutrients transported with the water through the environment into the water bodies.

Literature

Klug, H., Kmoch, A. (2014): Operationalizing environmental indicators for real time multi-purpose decision making and action support. In: Journal Ecological Modelling, Vol. xx, p. xx-xx, DOI 10.1016/j.ecolmodel.2014.04.009