

## **Satellite based services for the wind industry**

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The life cycle of a wind farm can be parted into seven phases: 1) Site selection, 2) feasibility study, 3) permit stage, 4) design and engineering, 5) construction, 6) operation, maintenance, monitoring and 7) decommissioning. For each of the phases there is a need for geophysical, environmental or physical data. Earth Observation (EO) – based information service for wind farm management (EO-WINDFARM) is a market development project that aims at providing EO data to fill the need for data in offshore and remote areas. The overall objective is to design and integrate an EO (Earth Observation i.e. satellite data)-based mapping service based on end-user demands for geo-information when planning, constructing and operating wind farms. The focus of the project is on providing an EO-based information service, aiding potential customers with the first six phases of the wind farm development. The service provides different products for different regions. Through an interaction between service providers, market players and users, five products have been selected. Over the sea the products are spatial wind measurements and wind climate, spatial wave climate and spatial tidal currents and heights. Onshore the products are terrain roughness and orography. The main difference between satellite data and in situ observations are that the satellite data are spatial observations, while using in situ measurements requires a model to calculate the distribution over the area of interest. The type of instrument used for all the products is an active satellite borne radar that measures the backscatter of microwaves from the Earth surface. Combination of different radars is used to provide the best products, such as combining high spatial resolution data with coarse resolution data that has a high repeat frequency in order to obtain high resolution both in space and time of for instance wind measurements. Each of the products will be thoroughly tested and validated at designated test sites in Norway, Ireland, Denmark, France and Italy. The service will be web based with some of the products available off-the-shelf while others that require manual analysis will be on request. A demonstration site is set up at <http://www.eo-windfarm.org> where example products from our test sites are available for downloading. The paper will give details on each of the products and present the validation results.