

**INFORMATION ABOUT THE START OF PROJECT TESTING  
PROBA-V AND VEGETATION DATA FOR AGRICULTURAL  
APPLICATIONS IN BULGARIA AND ROMANIA –  
PROAGROBURO**

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The current VEGETATION 1 & 2 instruments onboard the French SPOT 4 and SPOT 5 satellites will only be available until 2012. For more than 10 years now, these instruments have monitored and mapped the worldwide vegetation every 10 days, thus providing essential information on crop yields, droughts, desertification, changes in the type of vegetation, deforestation, etc. to an ever extending user community. ESA is currently building the Sentinel 3 satellites in view of the European GMES programme. These satellites will contribute to the continuation of the availability of Vegetation type data but will not be operational in due time, thus creating a major time gap in the data continuity. Therefore, Belgium has decided to build a small satellite mission called PROBA-V ("V" standing for Vegetation). In that way, it will be a complement to the Sentinel 3 satellites to be launched after PROBA-V. While being designed as a continuity mission to the SPOT VEGETATION series, PROBA-V will provide some different characteristics, either through the technology used to collect data or through the enhancements in spatial resolution. The Preparatory Programme (<http://eo.belspo.be>) started in 2010 have two basic objectives:

- to get future users acquainted with these new data sets and their full characteristics and quality,
- to prepare the full exploitation of PROBA-V data sets with respect to the technical enhancements which are planned (spatial resolution in particular).

Spanning a 1-year period, the "PROBA-V Preparatory Programme" is funded by the Belgian federal government and managed by the Belgian Federal Science Policy Office (BELSPO) and the Proba V International Users Committee. In 2010, a call was announced for research proposals in the context of the PROBA-V Preparatory Programme. A number of 12 projects were selected (<http://probav-iuc.org>), which started their work in 2010. One

of these projects is *Testing PROBA-V and VEGETATION data for agricultural applications in Bulgaria and Romania – PROAGROBURO* with implementation period between 02/12/2010 to 31/12/2011. (<http://proagroburo.meteoromania.ro>).

**The main objective** of the project is to assess the quality of the PROBA-V mission as a continuity mission to VEGETATION 1 & 2 by comparison and validation of SPOT-VEGETATION and PROBA-V simulated data for assessing crop condition on chosen test areas for the territory of Bulgaria and Romania. This objective will be achieved by an interdisciplinary team of researchers from the two countries. The team comprises experts in remote sensing of the Earth and GIS technologies, as well as in agrometeorology and agro-forecasts. This team will be supported by the VITO SPS (System Performance Simulator) team which will provide a simulated PROBA-V dataset (<http://www.vito.be>) prepared based on hyperspectral EO-1/Hyperion data and multispectral SPOT 5 data.

Partners on (of) the *PROAGROBURO* Project are:

The Space and Solar-Terrestrial Research Institute – Bulgarian Academy of Sciences (SSTRI–BAS) is responsible for the overall implementation of the Project. The Principal Investigator of the Project is Assoc. Prof. Dr. Eugenia Roumenina with Promoter from the Romanian National Meteorological Administration (RNMA) – Dr. Gheorghe Stancalie, and Promoter from the National Institute of Meteorology and Hydrology – Bulgarian Academy of Sciences (NIMH–BAS) – Assoc. Prof. Dr. Valentin Kazandjiev.

**The test areas** in Bulgaria and Romania are chosen in the agricultural environments of Zhiten (Bulgaria), and Fundulea (Romania). Within each of them, a set of 4 test fields for field sampling will be chosen to perform the analysis and comparison of both spectroradiometers: SPOT VEGETATION and PROBA-V. The test area of Zhiten proposed for Bulgarian territory pertains to the Bulgarian Aero-Space Test Sites (BASTS). It is located in Dobrich Region, North-East Bulgaria, The test area on Romanian territory is located in Bargan Plain, South-East Romania.

**A methodology** to validate simulated PROBA-V and SPOT-VEGETATION data for agricultural applications will be developed. It will encompass three work tasks: building geodatabase; conducting sub-satellite experiments; and combined analysis of satellite and ground-based data. Three sub-satellite experiments for collecting meteorological data for each of the two test areas will evaluate and measure winter crop status during the

growing season. Common methodology will be applied on the two test areas to measure Fraction of Intercepted Photosynthetic Active Radiation (FIPAR), Leaf Area Index (LAI), soil moisture, canopy cover. Field data will be used to assess winter crop status by crop growth models (WOFOST and DSSAT). All field data and PROBA-V simulation images along with SPOT VEGETATION images for the growing season (2010–2011) will be organized in a geodatabase.

**As a result of the analysis**, the relation between satellite data from the two sensors and the ground-assessed crop status and LAI will be determined and statistically explained. Achieving useful results is based on validation of both sensors with referent ground-based data under the same conditions. The applied methodology has the following expected deliverables: methodological requirements, designing a geodatabase with integrated satellite and in situ biophysical data, establishing correlations between ground-based observations and satellite spectral indices, validating PROBA-V data, spatial statistics and pattern analysis of the simulated PROBA-V and SPOT VEGETATION derived indices and crop growth simulation and yield prediction. The project will also show the potentials of using VEGETATION type satellite data in addition to ground-based measurements and crop growth simulation models. The results are expected to aid the objective comparison of the two sensors, their performance and potential for combined usage in this application field.

**The implementation** of the project will contribute to the PROBA-V Preparatory Programme by acquiring independent and objective ground-based data that can be used to assess the quality of PROBA-V mission as a continuity mission to VEGETATION 1 & 2. The PROAGROBURO Project is dealing with one of the basic applications of the Vegetation instrument – agriculture, through which the VEGETATION 1 & 2 has gained respect among the user's community. Thus, it is essential to make sure that the PROBA-V mission is challenging the issue with even better quality. The combined use of PROBA-V with SPOT VEGETATION data will help improve agricultural services and products for Romania and Bulgaria. The regular monitoring will also help cope with emergency situations in the field of food production. The project will benefit the PROBA-V mission by providing validating tools and algorithms suitable for PROBA-V data. After the Project's implementation, on the selected test areas, ground-based and satellite data will continue to be collected on a regular basis, which might be included in the *in situ* component of the GMES and GEOSS Programmes.