Air Quality Monitoring in Smart City Using Intelligent Sensors

Mykola Lavreniuk (1,2,3), Andrii Shelestov (1,2,3), Andrii Kolotii (1,2,3), Vladimir Vasiliev (3), Tatyana Bulanaya (4,5), Igor Gomilko (4,5)

(1) Space Research Institute NASU-SSAU, Kyiv, Ukraine (nick_93@ukr.net), (2) National Technical University of Ukraine "Igor Sikorsky Kiev Polytechnic Institute", Kyiv, Ukraine , (3) EOSDA, Kyiv, Ukraine , (4) Noosphere Engineering School, Dnipro, Ukraine, (5) Oles Honchar Dnipro National University, Dnipro, Ukraine

The problem of air quality is important and vital for habitants of large mega policies and cities. Nowadays, high resolution satellite data and products are widely used for crop state assessment and crop area estimation [1], [2]. In the same time, there are satellites that measure air quality, in particular products for nitrogen dioxide (NO_2), sulfur dioxide SO_2), ammonia (NH3), carbon monoxide (CO) and particulate matter (PM). But, sparse resolution of such products is very low and it is impossible to discriminate different zones within one city, for example we have one or a few pixels for Kyiv city (capital of Ukraine). Thus, we propose to develop information technology for fusion data from satellite and in-situ data from ground stations with intelligent sensors for air quality monitoring. We are going to establish intelligent sensors in the most crucial locations in Kyiv city within Smart City SMURBS ERA-PLANET project. Sensors will be calibrated with the data from existing official CGO stations. As a result, we obtained new ecological map for monitoring air situation in Kyiv city and further we would like to expanded this new experience to other cities in Europe. Detailed results and products will be presented within conference.

[1] N. Kussul et al., "Parcel-Based Crop Classification in Ukraine Using Landsat-8 Data and Sentinel-1A Data," IEEE J. of Select. Topics in Appl. Earth Observ. and Rem. Sens., vol. 9, no. 6, pp. 2500–2508, 2016.
[2] S. Skakun, N. Kussul, A. Y. Shelestov, M. Lavreniuk, and O. Kussul, "Efficiency Assessment of Multitemporal C-Band Radarsat-2 Intensity and Landsat-8 Surface Reflectance Satellite Imagery for Crop Classification in Ukraine," IEEE J. of Select. Topics in Applied Earth Obser. and Rem. Sens., vol. 9, no. 8, pp. 3712-3719, 2016.