

NATO SCIENCE FOR PEACE AND SECURITY (SPS) PROGRAMME:

“G5014 - Holographic and Impulse Subsurface Radar for Landmine and IED Detection”



Brief report on the August 2016 field research expedition in the Kharkiv and Donbass regions by the Franklin & Marshall College team and Usikov Institute team

The Franklin & Marshall College team had a successful kick-off of the August field research expedition. They spent some time interacting with the local government defense and security personnel, as well as the experimental farm in Donbass, to thoroughly understand local safety conditions. Director Baliuk of the Soils Institute also kindly took some time off his just-begun holiday to meet with the team and pledge his continued collaboration.

The Ukrainian staff carefully laid-out several kilometers of transects covering the dominant soil types of Donbass, as well as other terrain. They also expertly prepared a GIS map with highly-detailed soil delineation, the transect traces, and the best-available digital elevation model. Preliminary field tests have been carried out near Kharkiv to check-out the equipment and develop a measurement protocol for the work in Donbass. The time spent in the Kharkiv fields, while providing some interesting data, was critically important in order to develop and practice an efficient experimental procedure so that the Donbass field crew may collect as much electromagnetic soil data as possible in the limited time available. Thanks to clever thinking by all colleagues, they developed a procedure that allowed to collect about 75 stations per hour. At each station they recorded dielectric constant, electrical resistivity, magnetic susceptibility, and surface reflection coefficient. Given this data acquisition rate, we were able to collect up to perhaps two kilometers of transect at two-meter stationing, sampling all those four parameters at each station. In addition, along a number of transect segments that cross locally extreme topographic reliefs, staff of the experimental farm recorded very high resolution (10 cm lateral, 5 mm vertical) topographic profiles that will aid us in modelling the robotic platform performance and radar image correction/compensation for relief effects.

Also a new poster now appears in all of the train cars from Kiev to Kharkiv (and maybe other UA rail lines?) emphasizing the importance of this work.