

FOREWORD

Dear readers,

Vehicle operations on unpaved surfaces are an area of interest for the fields of military, agriculture, construction, exploration, and recreation. Some of the frequent problems that arise as a result of off road vehicle operations include the destruction of soil and plant cover, the creation of deep ruts, and overall damage to the local environment. However, it is not just the environment that suffers when vehicles perform poorly off road. If a vehicle becomes stuck it can prevent a group from performing necessary tasks. These problems can be minimized with a better understanding of the dynamics between vehicles and their operating environment. The interaction between tires and the soil determines the mobility of a vehicle and characterizes its dynamics. This interaction is also dependant upon a number of factors such as the vehicle type, the properties, the performance parameters (speed, turning needs, etc.) of the vehicle, and the soil properties, the relief, the land use and the climatic conditions of the terrain. Dry or frozen soil can support vehicle operations just as well as roads. However, circumstances can change drastically during wet conditions, as well as during periods of rain and snow. Although there have been numerous studies worldwide regarding soils and vehicles and their interactions, there are still as of yet many unknowns that remain, especially in regard to changing conditions.

Therefore, the Estonian Ministry of Defence, the Estonian University of Life Sciences, the Estonian National Defence College, and the Estonian Defence Forces came together to organize the international seminar titled “Soil trafficability – challenges for soils and vehicles” on March 26–27, 2015 in Tartu, Estonia. The seminar was organized under the auspices of the project “An Assessment of the trafficability of soils for combat armour vehicles in Estonia”, and was focused on the investigation and modelling of two critical aspects of vehicle-soil interaction: 1) vehicle developments for better soil–tire interactions, and 2) changes in soil properties over time.

The 36 registered participants from nine different countries, included researchers and representatives of the defence forces and the military vehicle industry attended the event. Over a two-day period, nine oral and six poster presentations were made. In the current special issue, you will find five papers focusing on the mapping of soil trafficability, performance of vehicles on snow and ice, ways of predicting soil freezing, and a study of ways to improve tracks for wheeled vehicles.

On behalf of the organizers,

Endla Reintam