

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Future Earth Observation Systems (2)

Author: Dr. Gregoriy Kaplan
Terra Space Lab., Israel, grigorii@terraspacelab.com

Mr. Meir Chen
Terra Space Lab., Israel, meir@terraspacelab.com

Mr. Adi Ezaguy
Terra Space Lab., Israel, adi@terraspacelab.com

Dr. Alex Silberklang
Terra Space Lab., Israel, alex@terraspacelab.com

Prof. Nir Shaviv
Terra Space Lab., Israel, nir@terraspacelab.com

TERRA SPACE LAB SATELLITES TO IMPROVE THE TEMPORAL AND SPATIAL RESOLUTION
OF EARTH OBSERVATION IN SWIR AND MWIR DIAPASON

Abstract

Currently, optical remote sensing is mostly being conducted by the satellites operating in visual-NIR parts of the electromagnetic spectrum. While several orbital constellations operate also in the SWIR and MWIR parts of the spectrum, they either have a low temporal resolution (8 days for Landsat-8 and -9 SWIR, 5 days for Sentinel-2 SWIR), or spatial resolution (1 km for MODIS SWIR and MWIR). Earth observation in SWIR and MWIR diapasons is important because it is optimal for employing in various crucial remote sensing tasks such as fire monitoring, oil spill detection, soil moisture estimation. Moreover, reflectance in SWIR bands might be a proxy of vegetation development as estimation of such important field variables as leaf area index and biomass were previously accomplished via satellites operating with SWIR bands. Therefore supplementing the currently existing constellations of EO satellites with a new system, which would provide additional capabilities is necessary. Such a system is currently being developed by Terra Space Lab Company (TSL). The new system will be operating with satellites equipped with an optical multi-spectral instrument that will operate in the bandwidth of 1500-4200 nm (SWIR and MWIR), with a spatial resolution of approximately 80 m, swath width up to 1000 km, and a very high temporal resolution of 30 min (after the constellation of all 30 satellites is deployed). The new system will be capable of detecting a weak fire. Such characteristics are especially important for near-real-time fire detection and oil polluting vessel tracking. The working bands of new satellites will be carefully chosen in order to be compatible with working bands of Sentinel-2, Landsat and MODIS that would permit the development of cross-calibration functions between imagery obtained by these satellites. As a result, the application of various image processing algorithms and applications developed for these systems will be possible also to a new system. This possibility will dramatically improve the applicability of the Terra Space Lab satellites for Earth monitoring and provide insights on various phenomena.