

EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Sensors and Technology (3)

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STATUS ON ADVANCED PASSIVE AND ACTIVE OPTICAL EO SENSORS IN THE GERMAN
SPACE PROGRAMME- THE HYPER SPECTRAL INSTRUMENT ON ENMAP AND THE MERLIN
LASER RADAR**Abstract**

Future satellite based Earth remote sensing instruments for atmospheric and surface monitoring applications strongly depend on innovative instrument concepts and new technological developments. The paper refers to the future optical missions in the German space program relying on new instrument concepts. The focus of these missions is on surface characterization with an imaging spectrometer, a so called hyperspectral sensor (EnMAP), and on active sensing of the methane concentrations in the atmosphere (MERLIN). Both instruments rely on cutting edge technologies and are in different development phases. EnMAP has successfully passed the Critical Design Review by the end of 2012 and started the Phase D in the beginning of 2013. The MERLIN mission Phase B started in the beginning of 2013. The hyperspectral Instrument on EnMAP monitors the Earth's surface within about 250 continuous spectral bands in the wavelength range between 430 - 2450 nm. The ground resolution is 30 x 30 m in good correlation with the Landsat data guaranteeing in combination with the application of the latest detector technology sufficient Signal to Noise Ratio (SNR). The sensor works in a push broom configuration in a sun synchronous orbit at a height of about 640 km. The system offers the broad science and application community a new, extensive and highly resolved set of data supporting and optimizing the development of future models and processors to describe and predict different effects in our environment. Kayser-Threde is the prime contractor for the EnMAP mission and is responsible for the hyperspectral instrument. MERLIN is a path integrating active remote sensing system (Lidar) for column density monitoring of CH₄. This project is a French-German collaboration, where France is supplying the satellite platform (Myriade) and Germany is contributing with the Lidar instrument. Kayser-Threde is part of the core team in the phase B study started in early 2013. Once in operation, the Lidar instrument onboard the Myriade satellite will perform its measurements from an orbit height of about 500 km (sun synchronous). The laser operates at a wavelength of 1.6 μm applying a so called "Integrated Path Differential Absorption" (IPDA) method. MERLIN is finally creating and maintaining a global grid of data points of CH₄ column density with significant weight of the low troposphere close to the sources on ground. The paper will give an overview of the advanced instruments on both satellites highlighting the specific developments in different subsystems.