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Abstract: Military radio, EW and RF sensor systems operate in a congested and contested electromagnetic environment. The NATO Science and Technology Organization established the Research Task Group 069 in order to take charge of the IST-146 project on Electromagnetic Environment Situational Awareness. The project was aimed at evaluating the operational benefits for NATO in line with the Electromagnetic Spectrum Strategy and at evaluating the Radio Environmental Map (REM) technology. The paper describes the military scenario considered for the study. Its operational analysis establishes the importance of Electromagnetic Spectrum Command and Control integrated with other C2 processes. The description of the data sources, models, and representation is done. Key user benefits are highlighted.

Then proposals for possible evolution of electromagnetic operations and spectrum management within NATO are made. The paper further describes the proposed reference architecture based on the Internet of Things (IoT). It establishes how the relationships between the REM elements have been validated through the project scenario. Tests and simulations, carried out for the construction of measurement-based REMs and transmitter localization, are presented. The paper finally describes the proposed demonstration, which enables understanding through visualization of an interference situation and de-confliction by dynamically re-assigning frequencies.

Keywords: Electromagnetic Environment, Situational Awareness, Radio Environment Map, Spectrum Management

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