TREATY MONITORING FROM SPACE - SATELLITE IMAGERY ANALYSIS WITHIN COMPLIANCE VERIFICATION REGIMES

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ABSTRACT

In the last decades, the international community has signed several international treaties and conventions, such as Multilateral Environmental Agreements (MEA). These agreements oblige parties, directly or indirectly and at different extent, to implement procedures for monitoring and assessing the environment on a regular basis and report about their effort to combat environmental degradation. Some authors [1,2,3] provide overviews on using Earth Observation (EO) data for MEA monitoring.

Moreover, a number of international agreements and export control regimes have been concluded in order to reduce the risk and proliferation of arms, particularly weapons of mass destruction. The objectives of these agreements is to reduce or eliminate certain weapons or weapon systems, to curb the proliferation of weapons and of sensitive, dual-use technologies, or to increase security and build confidence in other ways [4].

Different conventions imply different obligations and implementation practices for the parties. However, EO generally represents a key source of information for the different national and international bodies involved in the implementation of international agreements. If the area of interest is not accessible, remote sensing sensors represent one of the few opportunities to gather almost real-time data over the area.

EO technology may provide a significant contribution to achieving the objectives of MEA by increasing scientific and technical knowledge about the environment, supporting the efficient management of environmental problems and contributing to improve the performance of the agreement [1].

For arms control and non-proliferation Treaties, such as Nuclear Non-Proliferation Treaty (NPT), the main applications of satellite imagery are to verify the correctness and completeness of the member states' declarations, and to provide preparatory information for on-site inspections and other technical visits.

Taking into consideration recent developments in satellite sensor technologies and software solutions, the given paper discusses some challenges with regard to both technical and political issues. The following issues will be discussed:

- State-of-the-art and future developments of civil and commercial satellite sensor technologies relevant for treaty verification;
- earth observation policies ("is space an open space?") and data availability from space;
- parameters identifiable and measurable from space for various verification purposes;
- digital image processing vs. visual interpretation;
- confidence building, improvement of openness and transparency;

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