



Master in Homeland Security – 4th edition

Università Campus Bio-Medico Roma

Project Work:

SPARC – Space Awareness for Critical Infrastructures

THE TELECOMMUNICATION TERRESTRIAL NETWORKS ROLE AND ITS
DEPENDENCIES WITH REGARD TO SATELLITE ASSETS

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Abstract

In the modern society, many of the critical sectors strongly depend on telecommunications to continue with their functionalities and maintain business. Some of the terrestrial telecommunications infrastructures depend on satellite systems and the satellite technology itself is one of the available telecommunication solutions. The satellite technology can have a strategic importance with regard to some critical infrastructures and terrestrial telecommunication services, and the disruption of its services could affect the correct function of the whole telecommunication environment.

In recent decades, our lives have become increasingly dependent on a number of infrastructures, ranging from physical assets – such as roads or the electricity grid – to the networked environment – such as financial services, or the internet. We perform many activities and satisfy many of our primary needs thanks to these types of infrastructure: relying on these infrastructures allows us to act more economically and efficiently. This also means, however, that the disruption of infrastructure may damage our economies substantially and lead to natural disasters and loss of human life.

Analysis of the vulnerabilities and threats of the satellite and space systems become important in order to be able to classify the risks associated to the satellite technology and to prepare the right countermeasures required to prevent the disruption of other related services. In this work it is presented an overview of terrestrial Telecommunication infrastructures, how they can be classified, and to which extent they can be considered Critical Infrastructures. Then it is analysed how Telecommunication infrastructures may make use of space technologies, specifically focusing on some real-life cases including satellite based positioning, commercial communication and Earth observation satellites. Then, assuming that some event is impairing the Satellite systems, it will be addressed the consequences on other telecommunications networks. In order to do so, a representative list of inter-dependencies among satellite systems and telecommunication systems will be introduced.

This work represents a first iteration of activities performed for the SPARC project, specifically aimed at addressing risk analysis and mitigation approaches for Telecommunication Infrastructures which make use of Space Systems. This work will be extended and further detailed during the following milestones of the project. Other partners of the team will address other Infrastructures, such as transportation, finance, etc. supported by a domino effect and inter-dependency analysis of all of them together.

After an analysis of possible threats to Space assets, followed by some guidelines on risk mitigation, a preliminary recommendation on how to reduce the risk and continue the activity of Telecommunication infrastructure when they depend on Satellite systems is presented.