Chapter III

Using Space Technology for Disaster Monitoring, Mitigation, and Damage Assessment

Pasquale Pace
University of Calabria, Italy

Gianluca Aloi
University of Calabria, Italy

Luigi Boccia
University of Calabria, Italy

ABSTRACT

The theme of this chapter is how space technologies and satellite applications can mitigate the impact of natural and man-made disasters. The objective is to provide the reader with an overview of the most important space technologies for both monitoring and telecommunications and to show the main issues in managing a disaster response. The chapter is divided into three parts. Firstly, the potential of remote sensing satellites related to natural disasters is described. Secondly, the strength and the weakness of space-based telecommunication architectures for the emergency and recovery phase are outlined. Finally, international policies currently applied for emergency management and disaster recovery will be described, while trying to individuate the needs for an optimal provision of information and accessibility of space-related services and coordination of existing in-orbit assets in case of disaster.
INTRODUCTION

In the last few years, natural and man-made disasters have been affecting an increasing number of people (Figure 1), causing significant social and economic damages (Figures 2-3) (EM-DAT, 2006). This rising trend is mainly due to the augmented vulnerability of the world’s population, which can be attributed to several factors, including population pressure, declining resource base, and degradation of the environment. In general, the effects of catastrophic events can be limited, reducing the various elements of vulnerability. However, an effective strategy aiming at a reduction of the disasters’ impact cannot be developed without considering a pervasive application of modern technologies. In particular, space-based applications play a fundamental role in all the stages of a catastrophe. Earth observation and meteorological satellites are in fact an essential tool for collecting the information needed to mitigate the human and economic losses due to a disaster. Besides, most of the communications and data exchange occurring during the emergency response and recovery make use of satellite communication systems even as a complement of that available from other ground-based sources. Furthermore, a disaster remains one of the most critical and severe challenges to public emergency services and to the national governments. Disaster management, in fact, requires not only an efficient coordination at several hierarchical levels of all the national and international organizations involved in the recovery phase, but also the adoption of a correct policy for an optimal provision of the information concerning the situation. This results in the need of an international policy for disaster management, but it requires also well-based communication and data exchange procedures aiming at the creation of a global disaster monitoring and information network.

Figure 1. Total number of people affected by natural or man made disasters in the world (1900-2004)
Related Content

Mobile-Commerce Intention to Use via SMS: The Case of Kuwait
www.igi-global.com/chapter/mobile-commerce-intention-use-via/10116?camid=4v1a

A Contingency Theory for Online Customer Retention: The Role of Online Shopping Habit
www.igi-global.com/chapter/contingency-theory-online-customer-retention/9590?camid=4v1a

Internet Prices and Price Dispersion
Jihui Chen (2016). Encyclopedia of E-Commerce Development, Implementation, and Management (pp. 2288-2299).
www.igi-global.com/chapter/internet-prices-and-price-dispersion/149119?camid=4v1a

A Pattern-Oriented Methodology for Engineering High-Quality E-Commerce Applications
www.igi-global.com/article/pattern-oriented-methodology-engineering-high/3528?camid=4v1a