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CURRENT AND NEAR-FUTURE STATE OF SPACE TECHNOLOGY FOR DISASTER SITUATIONS

Abstract

In the current era of changing climates and rapid demographic growth, the intensity and frequency of natural hazards are increasing rapidly across the globe, often interacting in a given spatial region and/or temporal period. As a result, natural disasters - when the occurrence of a natural hazard has a significant impact on a community - are on the rise. This is most prominent in disaster-prone, economically vulnerable regions, for example in the Asia Pacific, where a combination of several technological and policy-oriented bottlenecks hinder efficient disaster preparedness. There also exists the lack of capacity building for understanding accessible remote sensing satellite data, which leads to failure of local governments in making critical decisions such as evacuating affected areas on-time, often leading to the loss of hundreds, if not thousands, of innocent lives. Thus, Disaster Risk Reduction (DRR) and relief utilizing space assets has become critically important. The Space Technology for Disaster Management project group (STDM) of the Space Generation Advisory Council (SGAC) proposes the increased use of satellite remote sensing data in disaster management, especially during the preparedness-warning and monitoring-response stages, due to its cost-effectiveness, short temporal resolution, and large coverage area. This paper

provides an overview of current and near-future space technology which can be leveraged to assist in such situations, and describes how this related data can be accessed and used with relative ease. Specifically, we discuss the application of space technology to the following hazards, which may lead to disaster situations: floods, earthquakes, landslides, wildfires, heat waves, debris flow, tsunamis, snowmelt, and storms. Technology discussed includes remote sensing techniques such as Optical and Synthetic Aperture Radar (SAR) sensors. Particular attention is drawn to the use of freely accessible data and disaster management systems, such as the European Space Agency (ESA) Copernicus Emergency Management Services, National Aeronautics and Space Administration (NASA) Disasters Program, and a growing number of commercial systems which provide limited imagery free of charge to emergency management and humanitarian organizations. Case studies are drawn from across the vastly different Australia, Japan, and Bangladesh. Space technology for DRR and relief schemes similar to those employed across these case study regions can be expanded and adapted to other regions around the world to cope with increasing occurrences of natural disasters.