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SPACE SAFETY FOR DISASTER MANAGEMENT ON THE GROUND

Abstract

International space traffic management does not meet the current needs of space traffic operators as accessibility to resources is not widely available. In 2021, countries around the globe realised the impact of weak international cooperation when dealing with hard-to-track space debris. Specifically, in June 2021, China's dead rocket re-entered the Earth's atmosphere around the Maldives, and uncertainties prevented the world's top experts from accurately predicting possible impact sites. This event shows that current measures in space traffic management do not enable multilateral coordination in possible emergency scenarios. Also, an international consensus does not exist regarding specific safety aspects related to space traffic, making it nearly impossible to predict possible consequences. Safety seems fragmented when dealing with threats crossing the atmosphere. Little awareness is in updating disaster management procedures to guarantee the safety of people on the ground when hard-to-track space threats cannot stop. China's dead rocket flew over several populated countries, and there were no known evacuation procedures to protect the local population beyond warnings (e.g., "Stay home far away from windows"). Space traffic coordination shall strengthen the link with space activities and closely related Earth-based mechanisms established to protect the people and our planet. Such coordination might be the starting point for having a multilateral space traffic management system. The slowness of the regulation-making processes, the foundation of space traffic management, can be overcome by developing an information-sharing system built on leading-edge technologies such as artificial intelligence (AI) techniques. To date, nations have started investing in data repositories; yet, data are not often entirely disclosed to the public. AI techniques shall enhance existing resources for connecting information (not necessarily raw data) across the international community, including civil activities. This paper is a feasibility study to raise awareness of existing ground and space safety gaps. The goal is to explore the practical use of AI to bridge space traffic coordination and disaster management systems on Earth. The objective is to identify opportunities in international cooperation and capabilities to be used or produced for enabling such a link. Investments in the space sector shall be in advancing aspects of space safety for preventing and addressing possible circumstances thar could interest the increasing number of space assets and space debris.