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VALUE OF SPACE FOR EMERGENCY RESPONSE & DISASTER MANAGEMENT

Abstract

Based on a 2020 publication titled *The Value of Space* and subsequent work, this paper discusses the use of U.S. satellite systems for emergency response and disaster management and examines how developments in space-based services could affect emergency response and disaster management in the future. As outlined in the paper, from predicting the disaster, warning the population, assessing the damage, and directing search and rescue, satellite services can contribute to every step in the process.

Weather Alerts

The best way to mitigate a disaster is to avoid it, and weather alerts allow people to do just that. Because of weather satellites, warning for tornadoes, flash flooding, and other extreme events are now issued earlier. Satellite observations even make it possible to predict the track of a hurricane five days out, which has produced a big drop in the loss of life from hurricanes.

Communications

Once the data is obtained and analyzed, it needs to be disseminated so that people receive timely warnings. The U.S. government issues weather alerts and warnings via television and radio, employing satellite signals and direct-broadcast satellite systems. These warnings, including alerts for tornados, hurricanes, floods, thunderstorms, and drought, give citizens time to protect their property and evacuate.

Damage Assessment

Remote sensing satellite provide detailed information on the condition of infrastructure such as roads, bridges, ports, utilities, and buildings within hours or minutes of an event. If ground-based communications are down, rescue and recovery personnel use remote sensing imagery to direct rescuers and emergency resources to the areas that need help the most.

Location and Navigation

PNT services help emergency responders determine the precise location of a person in distress and route personnel as quickly as possible. Distress beacons from vehicles and ships may connect to different types of satellites—from dedicated search-and-rescue satellites and communications satellites to navigation satellites and even weather satellites. Space-based search-and-rescue services are credited with facilitating more than 41,000 rescues worldwide since 1982.

Looking Ahead

From 2015-2020, the number of communications and remote sensing satellites has more than doubled and is set to continue to rise dramatically, placing more dependency on space-based communications services, particularly in rural areas, and space-based monitoring and assessment. While the number of PNT and weather satellites have been increasing less precipitously, commercial alternatives are arising for navigation and weather, creating additional opportunities for emergency response and disaster management in the coming years.