

International Space Station Data Collection for Disaster Response

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Remotely sensed data acquired by orbital sensor systems has emerged as a vital tool to identify the extent of damage resulting from a natural disaster, as well as providing near-real time mapping support to response efforts on the ground and humanitarian aid efforts. The International Space Station (ISS) is a unique terrestrial remote sensing platform for acquiring disaster response imagery. Unlike automated remote-sensing platforms it has a human crew; is equipped with both internal and externally-mounted remote sensing instruments; and has an inclined, low-Earth orbit that provides variable views and lighting (day and night) over 95 percent of the inhabited surface of the Earth. As such, it provides a useful complement to autonomous sensor systems in higher altitude polar orbits.

NASA remote sensing assets on the station began collecting International Disaster Charter (IDC) response data in May 2012. The initial NASA ISS sensor systems responding to IDC activations included the ISS Agricultural Camera (ISSAC), mounted in the Window Observational Research Facility (WORF); the Crew Earth Observations (CEO) Facility, where the crew collects imagery using off-the-shelf handheld digital cameras; and the Hyperspectral Imager for the Coastal Ocean (HICO), a visible to near-infrared system mounted externally on the Japan Experiment Module Exposed Facility. The ISSAC completed its primary mission in January 2013. It was replaced by the very high resolution ISS SERVIR Environmental Research and Visualization System (ISERV) Pathfinder, a visible-wavelength digital camera, telescope, and pointing system.

Since the start of IDC response in 2012 there have been 108 IDC activations; NASA sensor systems have collected data for thirty-two of these events. Of the successful data collections, eight involved two or more ISS sensor systems responding to the same event. Data has also been collected by International Partners in response to natural disasters, most notably JAXA and Roscosmos/Energia through the Urugan program.