The Computerworld Honors Program

Honoring those who use Information Technology to benefit society

Final Copy of Case Study

YEAR:
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STATUS:
Laureate

Organization:
DigitalGlobe

Organization URL:
www.digitalglobe.com

Project Name:
DigitalGlobe's response to the Japanese tsunami using FirstLook and FirstWatch

What social/humanitarian issue was the project designed to address? What specific metrics did you use to measure the project's success?

When the earthquake and resulting tsunami struck Japan on March 11, 2011, it was a crisis of epic proportions. Together, the killer quake and tsunami took the lives of more than 15,000 people, left nearly 8,000 missing, displaced 450,000 more and damaged in excess of $300 billion worth of property. Adding to the unprecedented scope of these natural disasters was the compromise of the multi-reactor Fukushima nuclear plant complex, which released radiation necessitating evacuation of the surrounding area. DigitalGlobe immediately tasked the power of our industry-leading satellites, which are called into action whenever a global change event occurs, such as the Japanese crisis, the earthquake in Haiti or the Arab Spring. Monitoring in this kind of situation takes on a new dimension. When numerous hazards, from road wreckage to nuclear explosion, make it impossible to conduct on-the-ground assessments, only the eyes in the sky can safely see what is going on. Passing over the impact zone for ten straight days, DigitalGlobe satellites revealed widespread destruction, including evidence of collapsed structures, extensive debris, massive flooding and damage to key infrastructure. They witnessed the explosions and failures at nuclear facilities (including images taken less than one minute before and three minutes after the explosion at the Fukushima Dai-ichi Nuclear Facility, Unit #3), documented the state of the country's highways, and assessed damage at the main ports and refineries. DigitalGlobe's online and analytic services, FirstLook and FirstWatch, enabled users to see damage on a street-by-street basis, enabling in-country organizations to deliver aid and medical care and attempt to rescue those trapped in collapsed buildings. Using our ImageLibrary,

our team was able to match fresh images with historical archives to rapidly confirm the degree of damage to the area.

Please describe the technologies used and how those technologies were deployed in an innovative way. Also, please include any technical or other challenges that were overcome for the successful implementation of the project.

Our technology starts with our satellites. DigitalGlobe has a world-class constellation of earth imaging satellites, capable of 8-band multispectral imagery and stereo imagery with very tight precision, as small as 50 cm. We then transform that raw imagery into daily shipments of upwards of 20 terabytes of imagery daily. A global tragedy like the Japanese tsunami creates two distinct challenges. The first and most important is timeliness. In the last year, we've invested and implemented in an industry-leading ground station network as well as a proprietary high-performance computing cluster (HPC), both of which were specifically architected to not only handle these extremely large volumes of image data files, but to do so in a parallel computing paradigm where we can create images minutes after downlinking the imagery. The second challenge is distribution. With multiple petabytes of imagery and single image files stretching over 50 gigabytes in size, getting that much imagery data into the hands of first responders when hours are important, drove us to build a geospatial cloud distribution system capable of immediately making our imagery available globally via open standards and accessible on common tools like Google Earth. Our products FirstLook, which is imagery only, and FirstWatch, which adds a layer of analysis, take those technology challenges and ensure that images with answers are in the hands of those who need it most, and quickly. Imagery is a starting point, but what our customers really needed were the answers, which FirstWatch helped provide. During this crisis, DigitalGlobe satellites constantly monitored the area for ten consecutive days, allowing DigitalGlobe's FirstWatch report to show users the destruction on a street-by-street basis and enact targeted response plans for rescue and humanitarian aid.

Please list the specific humanitarian benefits the project has yielded so far.

DigitalGlobe's high-resolution imagery and analysis have supported efforts in evacuation planning, monitoring, disaster response, recovery and rebuilding in many regions, from Iraq to Indonesia to New Orleans, where immediate response and on-the-ground assessments were difficult, at best. Our near real-time monitoring capabilities have helped governments, rescue workers and the international community to understand and manage grave political situations and natural disasters. Other recent projects include partnering with the Enough Project, UNOSAT and George Clooney to detect and hopefully deter war crimes and genocide in Sudan with the Satellite Sentinel Project and shedding light on Middle East protests by revealing the scale and magnitude of expanding protest movements in Libya, Bahrain, Yemen, and Egypt. DigitalGlobe's analytic services, FirstLook and FirstWatch, enabled browsers of the Japan disaster to see damage on a street-by-street basis, enabling in-country organizations to deliver aid and medical care and attempt to rescue those trapped in collapsed buildings. The whole idea of revisit and refresh takes on new importance in this situation. Using our ImageLibrary, the largest in the world, our team was able to match fresh images with historical archives to confirm rapidly the degree of damage to the area. DigitalGlobe's imagery and analysis helped the Japanese and U.S. governments, FEMA, the United Nations, Open Street Maps and concerned groups and citizens around the world to understand the scope of the disaster, manage the ever-changing situation on the ground and set the path for recovery. Though this disaster was oceans away from many of us, it will have major political and economic repercussions across the globe for years to come. We hope that with our efforts and technology, we'll continue to bring insights into this situation a little closer to home.

Please provide the best example of how the project has benefited a specific individual, enterprise or organization. Feel free to include personal quotes from individuals who have directly benefited from the work.

"Because the Great East Japan earthquake so radically altered and submerged the coastline, geospatially referenced maps and imagery were the obvious choice by which to visualize and exchange information. In addition, because no one could enter or fly over the evacuation zone near the Fukushima nuclear plant due to radiation exposure issues, satellite imagery was the only way to safely assess damage." - Hitachi. "Even now, after we've imaged the entire earth's surface many times over, I continue to be amazed at the unique, critical perspective satellite imagery offers to the pressing events of our time. In the last decade, we've been involved in responding to many disasters. There has been nothing like the disaster in Japan, a terrible and devastating combination of a massive earthquake, a tsunami, and a nuclear disaster. Thankfully, our constellation has been able to cover all of this." - Stephen Wood, Vice President, DigitalGlobe's Analysis Center.