

SSG Darren Conrad, Team (NCOIC) Noncommissioned Officer in Charge, supervises SGT Anuj Manandhar and SPC Michael Bombard as they process a request for satellite imagery during Operation Terminal Fury 10.



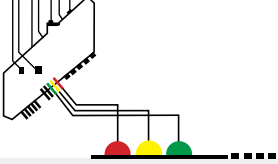
SPACE OPERATIONS IN THE ARMY NATIONAL GUARD

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Photos and images courtesy of MAJ Joe Paladino



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“The space age began as a race for security and prestige between two superpowers. The opportunities were boundless, and the decades that followed have seen a radical transformation in the way we live our daily lives, in large part due to our use of space ... The utilization of space has created new markets; helped save lives by warning us of natural disasters, expediting search and rescue operations, and making recovery efforts faster and more effective; made agriculture and natural resource management more efficient and sustainable; expanded our frontiers; and provided global access to advanced medicine, weather forecasting, geospatial information, financial operations, broadband and other communications, and scores of other activities worldwide. Space systems allow people and governments around the world to see with clarity, communicate with certainty, navigate with accuracy, and operate with assurance.”

– National Space Policy 2010

The U.S. military has embraced the increased utilization of space that is reflected in the 2010 National Space Policy in order to more efficiently engage in decisive operations while minimizing collateral damage. “Virtually every Army operation relies on space capabilities to some degree to enhance the effectiveness of our combat forces. Space capabilities enable the Army to communicate, navigate, target the enemy, and protect forces.”¹ The Army responded to this increased reliance on space by creating a career field of space operations officers – functional area 40 – in 1997. Army space operations officers provide incident commanders with staff expertise necessary to fully exploit the space component of communications, precision engagement, geospatial intelligence, environmental effects on satellite communications, and overhead persistent infrared imaging capabilities.²

The National Guard has benefitted from the addition of space operations officers to our force. Today there are approximately 135 space operations officers and enlisted space enablers in 25 states integrated throughout the Army National Guard. Several of these officers are incorporated into staffs of fires brigades and divisions, however roughly 85 percent of these space professionals are located in the 117th Space Battalion, Colorado Army National Guard.

The 117th Space Battalion is the only space battalion in the Army National Guard and only one of two space battalions in the Army. The battalion deploys Army Space Support Teams globally to plan, coordinate, integrate, synchronize and execute space-based capabilities in support of full-spectrum operations. These are teams of individual specialties that deploy as “a tailorable, six-Soldier team

comprising of two officers and four enlisted Soldiers, each having unique space-related skills, knowledge and abilities.”³ The team leader is a FA40 space operations officer who provides commanders with the staff expertise necessary to fully exploit space capabilities and enhance a command’s ability to task, collect, process and act on space-based products, information, and warnings. “Space-based capabilities enable full-spectrum dominance, particularly with respect to achieving information superiority, creating situational awareness, and operating within high-tempo, noncontiguous, simultaneous framework of distributed operations.”⁴ Army Space Support Teams have been integrating space-based capabilities into all domains of full-spectrum operations throughout Iraq since 2003 and are currently synchronizing and executing these capabilities in support of ground forces in Afghanistan. In addition to utilizing space capabilities to more efficiently engage in decisive operations overseas, National Guard Army Space Support Teams also possess a great capability to provide support to domestic disaster responses and national special security events such as the presidential inauguration or major sporting events such as the Super Bowl or Olympics.

Army Space Support to Civil Support Operations

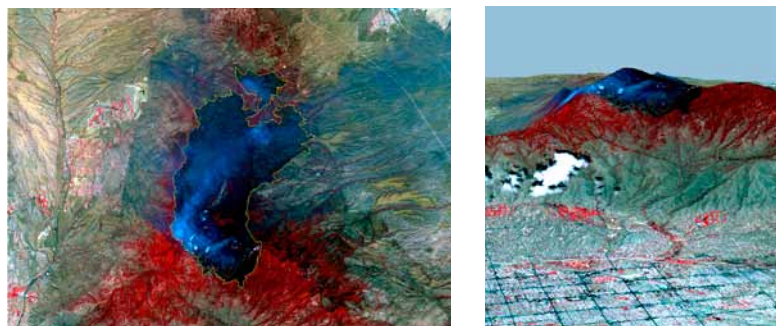
During a domestic emergency response or national special security event, space professionals from different governmental and non-governmental agencies all contribute to saving lives and minimizing damage of local infrastructure by their innovative use of available space assets and capabilities. Army space personnel use their unique experiences to bridge technical gaps,

ensuring the space effects operational value is understood and used at all command levels. The Army Space Support Team integrates closely with these governmental and non-governmental agencies to bring current capabilities and initiatives to the response and recovery effort. This working relationship becomes synergistic and provides more rapid and precise space effects.

The Army Space Support Team maintains a standalone satellite communications (SATCOM) terminal that offers global broadband communications capabilities, providing the capability to produce space-related products. Examples of these products include Global Positioning System (GPS) navigation accuracy predictions, satellite location predictions, and space-related geospatial imagery products. During an emergency response, there is a high probability that the commercial communications infrastructure will be highly saturated due to higher than normal use or the communications infrastructure can experience severe degradation or destruction depending on the incident.⁵ An Army Space Support Team provides non-secure internet protocol router network, secure internet protocol router network and voice over internet protocol capability to augment the supported agencies until local communications equipment and networks are restored. Teams also monitor the status of all SATCOM and satellite communications systems and help mitigate signal degradation or outages due to electromagnetic interference.

Space derived imagery enable civil authorities to conduct Incident Awareness and Assessment. The topographic specialist of an Army Space Support Teams uses unclassified, commercial satellite imagery to provide situational assessments and terrain analysis. These releasable products help emergency responders and national special security event planners prepare evacuation routes, map critical infrastructure, assess damage, establish distribution networks and displaced civilian

centers, and predict flooding areas for personnel evacuations, helicopter landing zones, logistics centers, and command and control activities. These products allow incident commanders and first responders to visualize what occurred, where it happened and what the impacts are in the affected areas. During the 2002 Hayman Wildfire in Colorado, satellite imagery was not only used by emergency responders to assess the extent of burned areas across the rocky mountain front range, but also utilized by multiple government agencies in their post-fire mitigation programs. In 2005, satellite imagery was used to monitor the status of Hurricane Katrina as it made its way toward the gulf coast. During the days following landfall, an Army Space Support Team from the Colorado Army National Guard deployed to New Orleans and utilized satellite imagery to provide incident awareness and assessment to task force commanders and map infrastructure to enable local law enforcement to conduct site and area security operations.



Wildfire Damage Assessment, 2D and 3D perspective.
Approved for public release by the Advanced Geospatial-
Intelligence (AGI) Division on 24 FEB 2010

The Navstar GPS allows users with proper receivers to calculate position, velocity, navigation information, and time. GPS devices can aide in emergency responses by recording precise locations of damaged property, casualties, critical infrastructure and emergency services. Army Space Support Teams produce reports that predict the accuracy of systems that rely on GPS based upon a given location, the geometry of the constellation, and information concerning the health and status of individual satellites within the constellation. These navigational accuracy reports ensure first responders know the accuracy of their positional fixes, providing them with confidence in their GPS system to rescue disaster victims in a timely manner.

Army Space Support Teams also monitor terrestrial and space environmental factors that may negatively impact systems that commanders and emergency responders rely upon during domestic operations. Terrestrial weather can impact space-based commercial imagery collections; clouds, heavy rain, light conditions, and sand storms can all have adverse affects on obtaining new imagery to support Incident Awareness and Assessment. Additionally, severe weather around mission ground stations can impact data reception. Just the same, space weather, such as solar flares, cause bursts of electromagnetic radiation



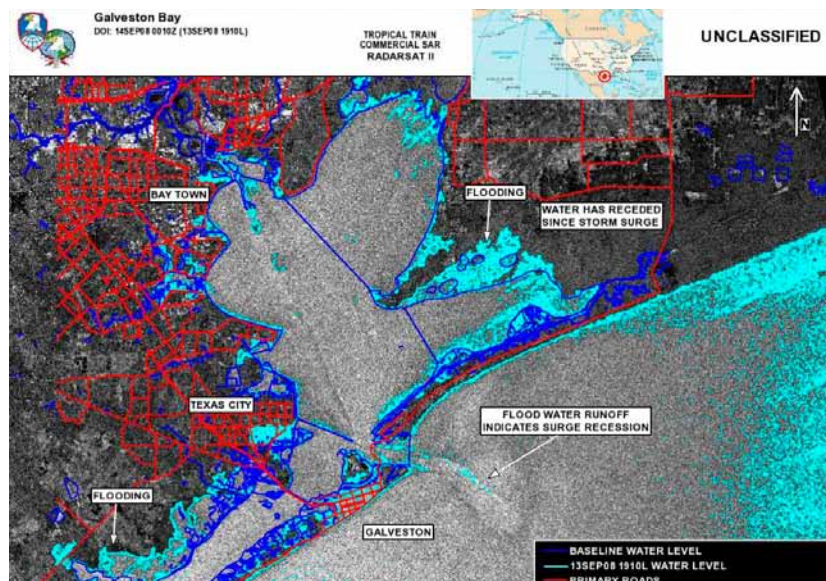
Members of an Army Space Support Team (Colorado Army National Guard) deploy their Satellite Communications Suite in support of Joint Task Force-Homeland Defense during Operation Terminal Fury 10 at Fort Shafter, Hawaii.

resulting in reduced SATCOM and GPS reliability due to scintillation and orbital decay. Teams monitor these space and terrestrial environmental factors and make recommendations to mitigate these impacts and their effects on operations.

As the Army National Guard continues to evolve throughout the 21st Century, Soldiers must be trained to understand the benefits derived from space assets and how to use them effectively. "The medium of space and space products are increasingly a critical consideration for leaders and planners at all levels."⁶ Whether delivering decisive combat power on the battlefield or mapping critical infrastructure in support of a domestic emergency response, Army National Guard space forces bring to bear existing and emerging space capabilities to bridge technical gaps and further improve the effectiveness of Army operations. 

"The U.S. Army is one of the largest users of space-based capabilities in DoD. As the Army transforms, its operational characteristics will, in large part, be achieved through the use and exploitation of transformational space systems. This dependency requires the Army to actively participate in defining space related capability needs that ensure necessary force structure and systems are developed and acquired to enable the land force to conduct the full range of military operations now and in the future."

- Army Space Policy, 2009



Synthetic-Aperture Radar (SAR) product from RADARSAT-II used to determine extent of flooding during Hurricane Ike, September 2008. Approved for public release by the Advanced Geospatial-Intelligence (AGI) Division on 24 FEB 2010

For more information about Army National Guard space forces and capabilities, please contact MAJ Joe Paladino: joseph.paladino@us.army.mil.

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BIO

MAJ JOE PALADINO

currently serves as the commander of the 217th Space Company, 117th Space Battalion, Colorado Army National Guard. Prior to this assignment Major Paladino served as Team Leader for Army Space Support Team 27 and successfully led his team to Al Asad, Iraq in support of the 2d Marine Expeditionary Force (Forward) command element and combat operations throughout Multi-National Forces-West, Iraq. Major Paladino also works for the Colorado National Guard as the full time Executive Officer for Brigadier General Robert W. Enzenauer, the Assistant Adjutant General for Space and Missile Defense.