



International Association of Fire Chiefs
Technology Council

in Cooperation with



A SMART™ Model for
Interoperable Communications

Satellite Mutual Aid Radio Talkgroup Program

INFORMATION PAPER

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Foreword by Jim Corry, VP-Government Solutions, SkyTerra LP

February 2009

A SMART™ Model for Interoperable Communications

This information paper, "A SMART Model for Interoperable Communications," has been produced by the Technology Council of the International Association of Fire Chiefs to explain the network technology and administration behind the SMART program as well as operational applications.

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About the Technology Council

The IAFC's Technology Council serves as a knowledge center for technological developments that affect the fire service. The council provides a forum for information and knowledge exchange among different stakeholders, including fire chiefs, public safety organizations and vendors.

Vision

To advance the fire/rescue/EMS services and allied agencies to be on the leading edge of technological adaptation.

Mission

To promote an environment that encourages and supports innovation to drive the adoption, adaptation and/or acceptance of technological solutions within a standards-based, interoperable framework.

Disclaimer: This paper is not an endorsement of SkyTerra or its products but is an opportunity for the fire service to learn about an emerging and valuable technology available to them.

Foreword:

A SMART™ Model for Interoperable Communications

Jim Corry, VP-Government Solutions, SkyTerra LP



For more than 32 years I've been a user of public safety communications and, throughout this period, have seen first hand the need for improved communications interoperability for federal, state, local, and tribal jurisdictions. For more than two decades, as a federal law enforcement officer, I voiced my concern for improved communications interoperability. For the past 10 years, I've tried to solve this challenge as a private sector communications executive. **The biggest barriers to communications interoperability for this nation's public safety community always seem to be governance and budget issues.** That changed in August 2007, when Adam Siegel of the FBI and Robert Zanger of the Department of Justice's Wireless Management Office proposed a public-private partnership with SkyTerra to establish a nationwide, interoperable Satellite Mutual Aid Radio Talkgroup (SMART™). SMART would be for the exclusive use of public safety officials on SkyTerra's unique satellite two-way radio network; but they insisted that there not be any incremental cost to SkyTerra's government and public safety customers. To take advantage of the free SMART program, an agency must subscribe to SkyTerra's basic push-to-talk (PTT) service.

SkyTerra's executive leadership team agreed with their request and not only created the first nationwide SMART talkgroup managed by the Department of Justice but also authorized the creation of an entire program of public-private partnerships across the nation with federal, state, local, and tribal agencies. Shortly after the creation of the DOJ nationwide SMART talkgroup, David Stone and Jay Lockwood of the Louisiana Governor's Office of Homeland Security and Emergency Preparedness created the first regional SMART talkgroup providing interoperability throughout the Gulf States. The result is a full suite of SMART talkgroups for nationwide and regional communications interoperability. **SkyTerra's fully operational SMART program provides federal, state, local, and tribal interoperability via SkyTerra's nationwide network. The program is nationally and regionally focused and completely administered, managed, and monitored by public safety officials from all levels of government across the nation.**

Each national SMART talkgroup serves a different public safety community such as law enforcement, fire service, Emergency Medical Services (EMS), public health, and National Security/Emergency Preparedness. J-SMART, the initial Department of Justice talkgroup, serves as the common denominator for all government and public safety agencies nationwide. Regional SMART talkgroups managed by state and local agencies, as well as one by the Central U.S. Earthquake Consortium, supply geographical interoperability on a multi-state, regional basis. Soon to be released are international SMART talkgroups serving public safety needs on both sides of the Canadian/U.S. and Mexican/U.S. borders. Every talkgroup operates under guidelines outlined in official Standard Operating Procedures.

Chief Charles Werner has done an excellent job of distilling some very technical issues into a very clear and straightforward report. **I have learned from Adam Siegel, Robert Zanger, David Stone, Jay Lockwood and all the other SMART talkgroup managers, that interoperability can be achieved when creative, cooperative people from both the public and private sectors solve a problem by overcoming governance and money issues.** I'm very honored to be associated with everyone who has proven that national public safety interoperability can truly be realized. **The personnel involved in creating and deploying the SMART program are managing a program that is very clearly a SMART model for all interoperable, public safety communications technologies.**

SMART is a registered trademark of SkyTerra LP

Introduction: SMART™



SMART™ – Satellite Mutual Aid Radio Talkgroup is SkyTerra’s nationwide and regional program of public safety talkgroups that operates on the SkyTerra satellite network. These talkgroups enable critical and interoperable communications among homeland security officials, law enforcement, emergency responders, and public safety officials from various departments and agencies across the United States.

By using SkyTerra’s unique push-to-talk satellite technology, each member of a SMART talkgroup can participate in the talkgroup conversation. SkyTerra is making these talkgroups available without additional cost to SkyTerra public safety customers.

SMART™:

- Was pioneered by the Department of Justice (DOJ) and the Federal Bureau of Investigation (FBI) in 2007;
- Operates on SkyTerra’s satellite communications network;
- Is virtually immune to terrestrial network congestion and destruction;
- Is able to establish communications in the most rural and mountainous regions;
- Offers one-to-many, push-to-talk, dispatch style communications;
- Is able to handle up to 9,999 users per talkgroup;
- Connects government and public safety agencies nationwide;
- Public safety personnel enrolled in one region are able to quickly join regions outside their regular jurisdiction should the need arise.
- All 50 states, the District of Columbia, the U.S. Virgin Islands and Puerto Rico have access to at least one of the nationwide and regional SMART talkgroups.
- The SMART program is available at no additional cost to SkyTerra Push-to-Talk (PTT) customers.
- The SMART program is providing federal, state, local and tribal interoperability on a nationwide communications network. This family of interoperable talkgroups operates at national and regional levels; and is managed entirely by federal, state and local agencies.
- International interoperability via cross-border SMART programs with Mexico and Canada is under development.

Overview:

A SMART™ Model for Interoperable Communications

Public safety professionals and emergency responders are trained for the all-important job of protecting the public – on a day-to-day basis and when faced with a natural disaster or other emergency situation. Much of this training and preparation assumes that they will be able to communicate with each other when an emergency occurs.

For years, land mobile radio (LMR) networks have been the staple of public safety communications. Cell phones have increasingly been adopted as a communications tool by many first responders. **However, neither option ensures reliable, interoperable and sustainable communications – the ability for multiple federal, state, local and tribal public safety teams to talk efficiently to each other – during an emergency or for daily operational communications.**

Emergency situations can leave cellular networks congested or disabled, and land mobile radios typically only allow communications among officials within one unit or agency. Because of the radios' limited geographic reach and restricted number of licensed frequencies, the equipment may not allow multi-agency interoperable communications between a police officer, a firefighter, a local EMS crew, a hospital in a neighboring state, or a representative from the Federal Emergency Management Agency (FEMA). Hurricane Katrina illustrated the need for reliable, interoperable communications. However, the Gulf Region and other areas prone to hurricanes are not the only places in need of this type of technology. Wildfires, earthquakes, tornados, severe snow storms and other natural and man-made disasters such as 9/11, the Oklahoma City bombing, and hostage situations, all require reliable, inter-agency communications to ensure the safety and security of the public.

Achieving interoperable communications nationwide is an increasingly high priority for policymakers and the public safety and emergency response communities. It is this growing concern that led an electronics technician with the FBI and an attorney with the DOJ to approach SkyTerra Communications¹ with an idea that would initiate the Satellite Mutual Aid Radio Talkgroup (SMART™) program.

SMART is a satellite-based service that connects federal, state, local and tribal public safety professionals via numerous overlapping national and regional talkgroups. The SMART program is designed to tackle the financial and governance challenges that have often impeded the development of interoperable public safety communications.

SkyTerra's satellite network delivers reliability and interoperability. Satellite service is available even when cell towers and landlines are congested or damaged and is accessible from remote areas not served by terrestrial communications networks. The mobility of SkyTerra's satellite terminals ensures that public safety officials can communicate, even if emergency operations centers need to be evacuated, which was the case during Hurricane Katrina. In addition, SkyTerra's dispatch-style, push-to-talk technology is familiar to first responders and ideal for command and control. A SMART talkgroup provides significant interoperability in addition to other talkgroups a SkyTerra customer may already be using locally.



¹The operating entity of SkyTerra Communications, Inc. was formerly Mobile Satellite Ventures.

To reduce financial barriers, SkyTerra offers the SMART talkgroups free of charge to anyone who already has Push-to-Talk (PTT) service with SkyTerra. Many government and public safety organizations across the country currently are SkyTerra subscribers.

The management of SMART rests not with SkyTerra but is entirely in the hands of the people who know public safety best. **Each SMART talkgroup is managed and monitored 24x7 by a different federal, state, or local public safety entity, ensuring design, control, and management by public safety officials through multiple public-private partnerships with SkyTerra.**

This information paper is organized into three sections and presents SMART as a nationwide, reliable and interoperable communications solution. The first section provides technical information about SkyTerra's current generation technology that supports the SMART program. The second section expands on the benefits and capabilities of SMART. The third section discusses SkyTerra's next-generation network currently under development, its potential benefit to the public safety community, and what policymakers can do to drive the adoption of communications technologies to help ensure the nation's safety and security.

I. SkyTerra's Current Generation Network

Reliability Via Satellite

Reliability is imperative for successful interoperable communications. Without reliability, the efficient and timely movement of critical services and resources can be severely compromised, potentially costing unnecessary loss of life and personal distress. The SMART program ensures reliability by using SkyTerra's satellite network. A satellite network is more dependable and available than landline or wireless service during an emergency or disaster, because **satellites are generally more immune to the congestion and damage typically suffered by terrestrial networks, especially those touching the Public Switched Telephone Network (PSTN). Satellite networks also provide coverage in sparsely populated areas far from cellular and LMR towers.** SkyTerra's satellite network, in particular, is also capable of handling many simultaneous voice calls, PTT talkgroups, and low speed data transmissions. This capability ensures that public safety officials will be able to communicate, even when call traffic significantly increases during an emergency, because SkyTerra's communications don't depend upon the PSTN.



SkyTerra’s two geostationary satellites, MSAT1 and MSAT2, currently operate at 106.5° W and 101.3° W, respectively. They have six regional spot beams and a service link bandwidth of 29 MHz that provides satellite communications for all of North America and its coastal waters. (See Figure 1.) The extreme polar regions are not covered by SkyTerra’s service.

In 2010, the SMART program is expected to transition to SkyTerra’s two new satellites, which will be two of the most powerful satellites ever launched by a commercial satellite operator. These satellites and the additional benefits of SkyTerra’s next-generation network will be discussed in section three of this paper.

Mobile Satellite Communications

Mobility is an important cornerstone of interoperable communications for public safety – allowing emergency responders to stay in touch from the field and ensuring that those staffing emergency operations centers can take their SkyTerra satellite phones/two-way radios with them if a disaster forces them to evacuate.

To communicate with the satellites, SkyTerra users employ the MSAT-G2. The MSAT-G2 is lightweight and can be installed in a building, in a vehicle, or packaged as a “Go-Kit” for portable satellite communications. A Go-Kit is an MSAT-G2 packaged in a durable, water-resistant container with a battery to supply power for remote and “on-the-go” operations.

The MSAT-G2 contains three pieces of equipment: a handset, a transceiver, and an L-Band antenna. The L-Band antenna is auto-acquiring/auto-tracking and a 16 channel GPS receiver. The antenna is available in a land-mobile model or a maritime model that ensures consistent tracking of the satellite, even in choppy waters. The transceiver sends and receives signals to and from the satellites on SkyTerra’s L-Band spectrum (1500/1600 MHz), and the handset operates as either a telephone or a two-way radio. Figures 2 and 3 show the MSAT-G2 and the Go-Kit.

The MSAT-G2 operates in the lowest frequencies of the L-Band range (for commercial satellite communications). The longer wavelengths in the L-Band provide better penetration than higher frequency bands. Signal degradation due to weather is not an issue.

In addition, the MSAT-G2 can be integrated with a two-wire interface shown in Figure 4. The interface connects the satellite terminal to a standard desk phone, providing a more traditional telephone experience, including a dial tone (which a satellite phone typically doesn’t produce). If the desk phone is cordless, the satellite coverage extends throughout a building with the same reach as the cordless phone.

Covering North America	
No. of Satellites	2
Coverage Area	North & Cenral America, Caribbean
Orbital Position	101.3° W, 106.5° W
Service Link Bandwidth	28 MHz
Spot Beams	6 Regional
Power (AEIRP)	57 dBW
G/T (dB/K)	2.5
L-Band Reflector Diameter	Two 5 x 6 m
First Launch	1995
Design Life (Inclined)	10 (12) Years
EOL Power (W)	3,000
Manufacturer	Hughes
Launch Mass (Kg)	2,900
Launch Vehicle	Atlas II AS, Ariane IV

Figure 1



Figure 2 - MSAT-G2



Figure 3 - Go-Kit



Figure 4 - Two-Wire Interface

The MSAT-G2 is also compatible with a number of off-the-shelf interoperability modules and vehicular repeaters. (See Figure 5.) The interoperability modules allow different brands and models of radios and wireless phones with PTT capability to interoperate with each other and the MSAT-G2 satellite telephone/two-way radio. The vehicular repeaters extend the range of an MSAT-G2 that has been installed in a car or truck. This set-up allows a public safety official to maintain connectivity when he exits his vehicle with an LMR portable radio. He continues to communicate on his portable back through the vehicle which is operating as a satellite repeater.

Satellite Telephony

SkyTerra’s satellite network provides two services: telephony and push-to-talk radio service. The telephony service is full duplex so callers can talk at the same time, similar to a landline or wireless phone call. Directory assistance and GPS tracking are available. Other call management features such as voicemail, call waiting, call forwarding, call blocking, and conference calling are also available.

The telephony service is compatible with the Government Emergency Telecommunications Service (GETS). This is important during situations when an emergency responder needs to make an urgent call to someone on a landline phone. In this case, once the call travels from the MSAT-G2 to the satellite and back to Earth, it still must travel through the Public Switched Telephone Network (PSTN) to reach the individual on the landline (See Figure 6.) Call blocking often occurs on the PSTN when network controls are enabled during an emergency to protect this critical, terrestrial infrastructure. If the PSTN is congested with calls because of the emergency, GETS ensures that urgent calls from public officials get past those network controls and are successfully completed.

Push-to-Talk: The Key to Interoperability

SkyTerra is currently the only commercial satellite operator in North America offering push-to-talk service. SkyTerra’s two way, PTT radio service over satellite is a popular option for communications in remote areas or during emergency situations. The dispatch or two-way radio style is familiar to the public safety community and ideal for command and control. Individuals can efficiently broadcast messages to an entire talkgroup or talk one-to-one via a “private mode” talkgroup (See Figure 7.) The “trunking” concept inherent in SkyTerra’s push-to-talk service allows a large number of users to share a group of channels by simply pressing the PTT button. The network has been designed to provide the most effective possible use of limited satellite power and bandwidth. In addition to using demand-assigned communication channels, the network also employs the concept of “call types” to assign different satellite power and call-handling resources to each call, depending on its type. In an incident where PSTN and cellular network congestion is an issue, SkyTerra’s group oriented communication is spectrally efficient as it allows communication within a large group of users with a single set of frequencies without touching the PSTN. Frequencies are released following a pre-defined period of inactivity (hang-time).

SkyTerra’s MSAT G2 Third Party Interface Compatibility	
Telephone Interface	Link Communications MSAT-PSTN Interface
Vehicular Repeaters	CPI Communications SV3SV Product
	Pyramid Communications SVR200/MSTA200 Product
Interoperability Modules	Raytheon JPS Communications ACU Products
	Communications Applied Technologies ICRI Product
	Link Communications Tactical Communications Bridge Products

Figure 5

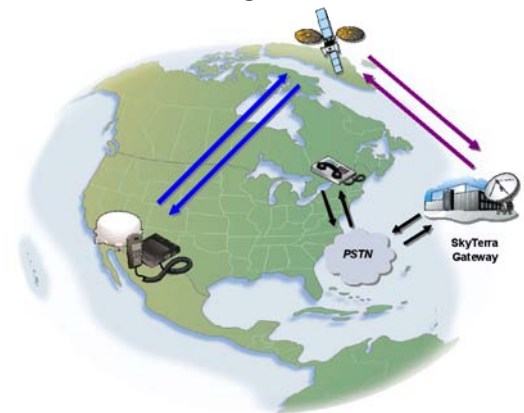


Figure 6 - Telephony Pathway

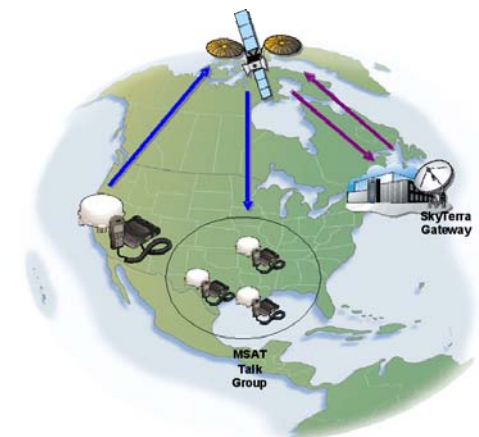


Figure 7 - Push-to-Talk Pathway

Each talkgroup can support up to 9,999 users, and each user can belong to as many as 16 talkgroups; 15 talkgroups provide one-to-many PTT, and the 16th talkgroup is a private mode talkgroup providing one-to-one PTT. All of this allows a department or agency to connect the entire department or subsets of a department who frequently work together. For example, a police department might set up a talkgroup for the entire force, another talkgroup just for senior management, and an additional talkgroup for the SWAT team. The SWAT commander could have all three programmed into his or her satellite phone for convenient access, as well as interdepartmental talkgroups.

Talkgroup managers can easily add any user – from any department or agency – provided the user has SkyTerra equipment.

Other features of the push-to-talk service include over the air programming, Web-based GPS tracking, and priority interrupt, which allows a user a 20-30 second, hands-free interruption if another user is accidentally “keying” the microphone. The push-to-talk service also has dial-in and dial-out options. These options allow access to a talkgroup from anywhere in the world over any landline, cellular or satellite telephone (MSAT or other) with the use of a PIN; or access from the talkgroup to a preset phone number can also be accommodated. For example, if an emergency occurred while a supervisor was traveling in Europe, he or she could call in to the talkgroup within the United States to efficiently provide direction to the entire on-scene team.

To take advantage of the SMART program, a user department must:

- Have a SkyTerra satellite radio kit.
- Subscribe to SkyTerra service
- Apply to the specific SMART talkgroup manager(s) for the talkgroup(s) requested.

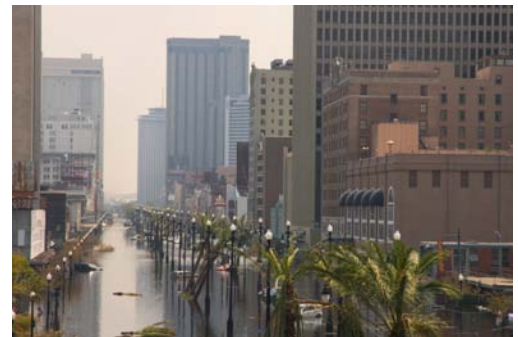
SkyTerra’s service will not:

- Provide high-speed data service for media such as live camera feeds.
- Provide handheld portable device communications similar to LMR portables.

Case History: Mississippi Department of Wildlife, Fisheries and Parks

In 2003, the Mississippi Department of Wildlife, Fisheries and Parks purchased numerous SkyTerra units. The department had them installed in the vehicles of the officers who patrol the state’s extensive waters and forests to ensure that fishing and hunting enthusiasts abide by state regulations. Mobile satellite communications are ideal for this unit, because the officers on patrol cover very large, remote areas that generally are out of LMR and cell phone range. SkyTerra’s satellite network allows the department to stay connected and coordinate efforts, even when miles from home base and each other.

In 2005, Hurricane Katrina hit the Gulf Region damaging landlines, cellular networks, and LMR communication systems. Communications among the many federal, state and local entities involved in the rescue effort were extremely difficult throughout the region. SkyTerra’s satellite network, however, never failed – before, during or after the storm. As a result, the State of Mississippi was able to call on the Department of Wildlife, Fisheries and Parks for help. By parking the satellite-equipped patrol vehicles at critical government offices and emergency facilities, Mississippi was able to immediately restore statewide communications, helping the disaster relief teams coordinate and prioritize efforts to best serve the public in the wake of the disaster.



II. Satellite Mutual Aid Radio Talkgroups (SMART) The Development of SMART

In July of 2007, Robert Zanger with the DOJ-Wireless Management Office and Adam Siegel from the FBI approached SkyTerra about the idea of a nationwide, public safety talkgroup to facilitate interoperable communications during a crisis among federal, state, local and tribal authorities. SkyTerra's push-to-talk service was ideal. However, in order to recruit users to the talkgroup – especially those in smaller, less-funded communities – the service could not be a financial burden.

To address this issue, SkyTerra revised its billing software and formed a new talkgroup category called SMART. SkyTerra offered unlimited access to SMART talkgroups at no additional cost to government public safety users with SkyTerra service. For security purposes, it was also important that the public safety community had control over who could join SMART. For DOJ's J-SMART, the first talkgroup in the program, the Department of Justice agreed to manage the group. In addition, the joint FBI/DOJ communications center in Seattle monitors J-SMART 24 hours a day, seven days a week to mediate talkgroup operations and provide assistance in an emergency.

Since a specific SMART talkgroup occupies just one of the 16 talkgroup slots available to each SkyTerra user, public safety professionals are able to keep nationwide and regional interoperable communications of SMART separate from local talkgroups managed by individual agencies.

Public safety officials from departments and agencies across all levels of government soon joined J-SMART. By connecting these users, J-SMART created – for the first time – federal, state, local and tribal interoperability on a nationwide network across the United States.

Nationwide SMARTs

In addition to J-SMART managed by DOJ, the National Security and Emergency Preparedness Talkgroups (NS/EP) were created to ensure reliable communication among critical COOP/COG sites across the country as well as the Network Operations Centers of critical telecommunications companies. The Department of Homeland Security's National Communications System (NCS) manages and monitors these three NS/EP SMART talkgroups. SkyTerra and NCS also worked together to custom design a box for the MSAT-G2 to be installed in every site. In addition to the transceiver unit, these boxes are equipped with diagnostic lights, surge protection, voltage regulation, and battery backup to ensure that these units are always powered and available if an emergency should occur.

The Kentucky Department for Public Health (KDPH) manages two National Public Health Satellite Talkgroups – NPHST-1 and NPHST-2. NPHST-1 connects the health departments of all 50 states and the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. NPHST-2 connects a larger group of state and county health departments, hospitals and other medical facilities, ensuring reliable communications among the nation's health community. KDPH manages these two SMART talkgroups, and 24x7 monitoring is provided by the Director's Emergency Operations Center at the Centers for Disease Control and Prevention (CDC) in Atlanta.



"It is critical for us to be able to quickly move rescue workers, medical support, repair teams and essential supplies in order to save lives and quickly begin recovery and rebuilding. And we can't do that when our communication systems are down."

Randy J. Johnson, assistant manager of communications for Plaquemines Parish, Louisiana



Regional SMARTs

Regional SMARTs enable public safety interoperability within smaller areas of the country. The first regional group addressed the need for interoperable communications across the Gulf Region, which continues to be plagued by hurricanes and tropical storms. SkyTerra established G-SMART, for public safety officials across Texas, Louisiana, Mississippi, Alabama, Florida, Puerto Rico and the U.S. Virgin Islands. G-SMART is managed by the Louisiana Governor's Office of Homeland Security and Emergency Preparedness and monitored by the Louisiana State Emergency Operations Center. The Governor's Office has the ability to quickly add and remove individuals to and from this talkgroup. This capability is important, as it allows federal organizations like FEMA and the Red Cross and public safety teams from across the country to be included in the conversation when they arrive to help.

Since the development of J-SMART and G-SMART, SkyTerra has worked with local, regional and national entities to create eight more regional talkgroups. Annex B depicts how national and regional SMART groups overlap, detailing each group and providing contact information for each SMART manager.

Case History: Hurricane Gustav Preparations

Throughout the 2008 Labor Day Weekend, SkyTerra offices in the United States and Canada stayed in constant touch with federal, state, and local agencies equipped with SkyTerra technology operating in the Gulf States in support of Hurricane Gustav emergency response and relief efforts. In addition to G-SMART, the public safety personnel in the Gulf States were also able to conduct interoperable communications with the nationwide J-SMART talkgroup managed by the Department of Justice, as well as the neighboring 12-state Southeast SMART talkgroup – a regional group that encompasses various federal, state local, and tribal public safety organizations throughout the southeast U.S. The SkyTerra emergency communications team worked throughout the weekend activating new equipment, moving critical talkgroups to first responder's SkyTerra devices, and conducting long-distance refresher training in satellite communications. SkyTerra also provided loaner devices to several critical agencies that activated emergency response plans and deployed to the region.

“SMART talkgroups are being set up to allow more effective communications among officials from multiple federal, state, local and relief organizations during emergency situations.”

David Stone, Louisiana Governor's Office of Homeland Security and Emergency Preparedness



“Our southwest regional talkgroup enables critical and interoperable communications at all levels of public safety agencies and facilities in an eight-state region.”

Kody Kerwin, telecommunications specialist for the Contra Costa County (CA) Fire Protection District

Talkgroups for Specific Purposes

While all of these SMARTs are used for command and control, SkyTerra's push-to-talk service also can be used for interoperable tactical operations. In addition to J-SMART, DOJ also operates SMART-T. This SMART would be used, for example, in a hostage situation or standoff where DOJ, state and local law enforcement are all working together to manage a situation. Most likely, these groups would all have different types of day-to-day communication equipment. However, with SMART-T, DOJ could quickly add everyone involved in the situation to the talkgroup. The team could communicate seamlessly, helping to resolve the incident as quickly and safely as possible. Once the situation is over, DOJ can remove users just as easily.

Following the successful rollout of the Regional SMART Network, SkyTerra cooperated with the Charlottesville VA Fire Department, the Kentucky Department for Public Health, and the United States Marshals Service to establish three nationwide public safety talkgroups focused to serve fire service, emergency medical services and law enforcement respectively. Fire Service (F-SMART), Emergency Medical Services (E-SMART) and Law Enforcement (L-SMART) provide an important supplement to existing interoperable communications among agencies with specific public safety missions.

SkyTerra is currently working to develop SMART talkgroups for cross-border interoperability. SkyTerra envisions three SMARTs on the U.S./Mexican border and another three on the U.S./Canadian border. Discussions regarding governance of these SMART talkgroups will soon be undertaken with appropriate officials from Canada, Mexico and the U.S. (See Figure 8.)

Border SMART™ Talkgroups

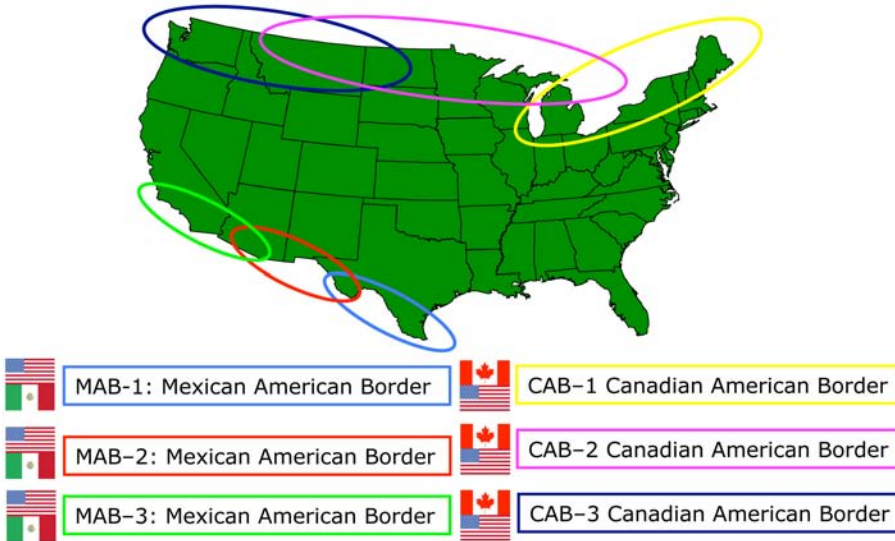
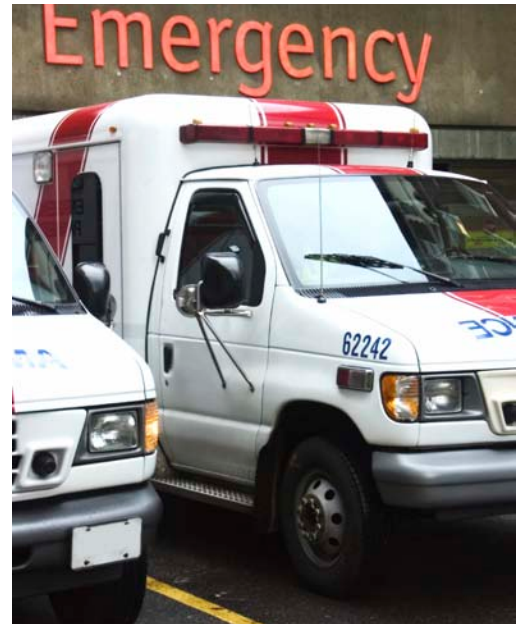


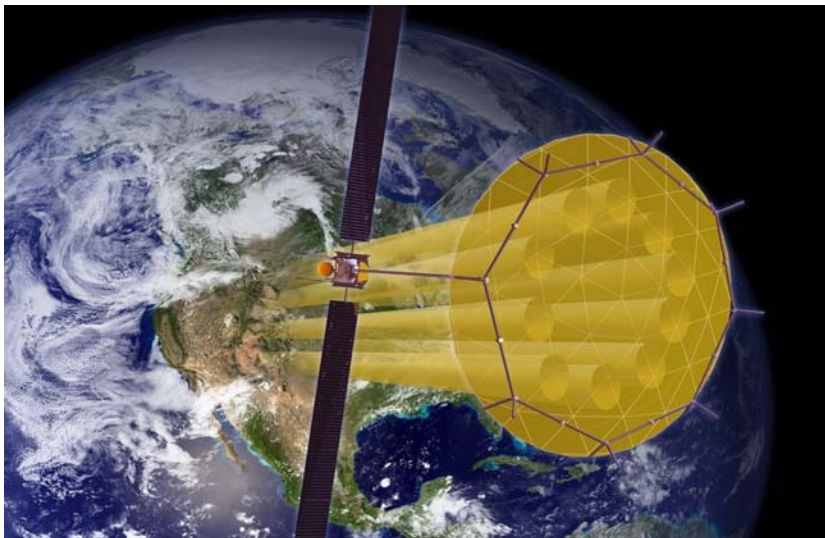
Figure 8

For emergency response, law enforcement, or public health, SMART meets the need for nationwide interoperability among multiple federal, state, local and tribal public safety teams, providing these professionals with the communications tools they need to ensure the safety and security of the American public. **SMART has established federal, state, local, and tribal interoperability on a nationwide network at the national and regional level and all managed by federal, state, local agencies and one not-for-profit, the U.S. Earthquake Consortium.**



III. Powerful New Satellites – SkyTerra’s Next-Generation

SkyTerra is currently building its next-generation, integrated satellite-terrestrial network. In order to support the dramatic increase in users as well as the growing number of broadband applications, SkyTerra is constructing two new satellites, SkyTerra 1 and SkyTerra 2, which will be two of the most powerful commercial satellites ever built. These two new geostationary satellites, which will replace MSAT1 and MSAT2, will operate at 101.3° W and 107.3° W, will have 500 spot beams, an antenna diameter of 22 meters (75 feet), and will have 10 times the power of current generation satellites. These new satellites will support the bandwidth and applications that current and future generations of wireless communication users demand. The satellites are expected to begin operations in 2010.



Conclusion

In recent years, the United States has faced a variety of costly natural and man-made disasters. From hurricanes and tornadoes, wildfires, flooding and earthquakes to high profile standoffs and the 9-11 terrorist attacks, events have taught us that many emergencies today affect significant numbers of the population. This has amplified the need for dependable communications that enable organizations to communicate with each other. **These situations have also demonstrated time and time again that mobile satellite communications is quite often the only means available to the public safety/emergency responder community.**

To address these needs, **federal, state and local agencies have voluntarily banded together with SkyTerra in a public-private partnership to create the SMART program – enabling nationwide and regional interoperability at no additional cost to SkyTerra users.**

Since SMART is a feature provided at no cost to SkyTerra’s public safety users, it is a cost-efficient program that delivers measurable return on investment – swift and reliable communications interoperability for emergency response and contingency operations. With the rapid growth of SMART, public safety and emergency responders have a resource that enables communications interoperability that is immediate, reliable and always available.

Next-Generation Satellites Covering North America	
No. of Satellites	2
Coverage Area	North & Cenral America, Caribbean
Orbital Position	101.3° W, 107.3° W
Service Link Bandwidth	33 MHz
Spot Beams	500
Power (AEIRP)	79 dBW*
G/T (dB/K)	21*
L-Band Reflector Diameter	22 m
First Launch	2010
Design Life (Inclined)	15 Years
EOL Power	12 Kwatts
Manufacturer	Boeing
Launch Mass (Kg)	5400 (fueled)
Launch Vehicle	Proton/Breeze M, Zenit-3SL

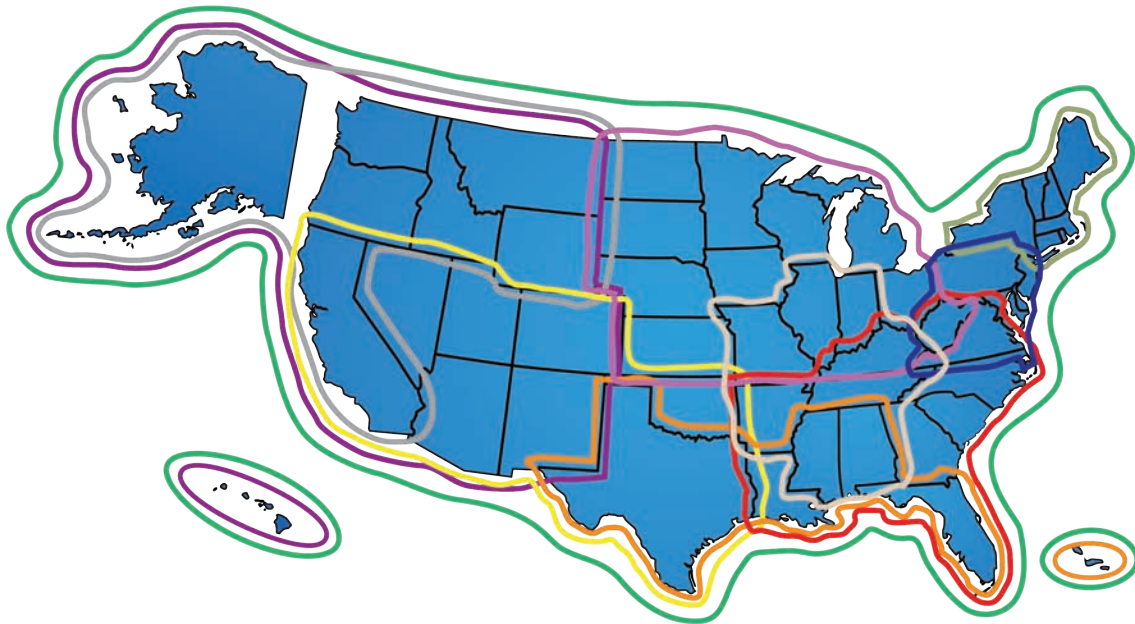
* Over primary service area

Figure 9

Annex A: Regional, National & International SMART™ Talkgroups

Regional SMART talkgroups				
Name	Purpose	Eligibility	Manager	Monitor
NESMART	Northeastern Public Safety	CT, DE, ME, MA, NH, NY, NJ, PA, RI, VT	CT State Police	CT State Police HQ
M-SMART	Mid-Atlantic Public Safety	DE, MD, PA, VA, WV, DC	Allegany County (MD) Dept. of Public Safety & Homeland Security	Allegany County 911
SES-SMART	Southeastern Public Safety	DC, AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV	Fairfax County (VA) Office of Emergency Management and Department of Public Safety Communications	Fairfax County (VA) EOC
G-SMART	Gulf States Public Safety	AL, FL, LA, MS, TX, PR, USVI	LA Governor's Office of Homeland Security & Emergency Preparedness	LA State EOC
MWSMART	Midwestern Public Safety	IL, IN, IA, KS, KY, MI, MN, MO, OH, NE, ND, SD, WV, WI	IN Dept. of Homeland Security	IN State EOC
SWSMART	Southwestern Public Safety	AZ, CA, CO, NM, NV, OK, TX, and UT.	Contra Costa County (CA) Fire Protection District	Contra Costa County (CA) 911
W-SMART	Western Public Safety	AK, AZ, CA, CO, HI, ID, NV, NM, OR, UT, WA, WY	CA Office of Emergency Services	CA State EOC
NWSMART	Northwestern Public Safety	AK, CA, ID, MT, OR, WA, WY	WA State Emergency Management Division	WA State EOC
CUSEC-1	Central U. S. Public Safety	AL, AR, IL, IN, KY, MS, MO, TN	Central U.S. Earthquake Consortium	IN State EOC
Nationwide SMART talkgroups				
Name	Purpose	Eligibility	Manager	Monitor
E-SMART	EMS	All EMS	Kentucky Dept. for Public Health	Medical Center EMS, Bowling Green, KY
F-SMART	Fire Service	All fire service	Charlottesville (VA) Fire Department	Charlottesville-UVA-Albemarle County Emergency Communications Center
J-SMART	Public Safety	All government and public safety	DOJ-Wireless Management Office	DOJ/FBI Comms Center-Seattle
L-SMART	Law Enforcement	All law enforcement	U. S. Marshals Service	USMS Comms Center-HQ
NPHST-1	Public Health	Two (2) devices only from state health departments, including DC, PR, USVI	Kentucky Dept. for Public Health	CDC-DEOC
NPHST-2	Public Health	All health departments/medical facilities	Kentucky Dept. for Public Health	CDC-DEOC
NS/EP-G	National Security/Emergency Preparedness	Federal/state critical COOP/COG sites	DHS-National Communications System	TBD
NS/EP-I	National Security/Emergency Preparedness	NOCs of critical telecom companies	DHS-National Communications System	TBD
NS/EP-E	National Security/Emergency Preparedness	All NS/EP-G & I members	DHS-National Communications System	TBD
SMART-T	DOJ Tactical Operations	DOJ law enforcement agencies + others on an ad hoc basis	DOJ-Wireless Management Office	TBD: Event basis
International SMART talkgroups				
Name	Purpose	Eligibility	Manager	Monitor
CAB-1	Eastern Can/Am Cross Border Interoperability	under development	TBD	TBD
CAB-2	Central Can/Am Cross Border Interoperability	under development	TBD	TBD
CAB-3	Western Can/Am Cross Border Interoperability	under development	TBD	TBD
MAB-1	Eastern Mex/Am Cross Border Interoperability	under development	TBD	TBD
MAB-2	Central Mex/Am Cross Border Interoperability	under development	TBD	TBD
MAB-3	Western Mex/Am Cross Border Interoperability	under development	TBD	TBD

Annex B: Satellite Mutual Aid Radio Talkgroups



Nationwide SMART Information



J-SMART: National Talkgroup for Public Safety Agencies

Manager: Department of Justice and FBI
Email: SMART@usdoj.gov



E-SMART: Emergency Medical Services

Manager: Kentucky Department for Public Health
Email: ESMART@ky.gov



NPHST-1 & 2: National Public Health Talkgroups

Manager: Kentucky Department for Public Health
Email: NPHST@ky.gov



F-SMART: National Fire Service Talkgroups

Manager: Charlottesville, VA. Fire Department
Email: FSMART@charlottesville.org



NS/EP - G,I, & E - National Security and Emergency Preparedness

Manager: National Communications System
Email: csrhelp@skyterra.com



L-SMART: National Law Enforcement Talkgroups

Manager: US Marshals Service
Email: LSMART@usdoj.gov

Regional SMART Information



NE-SMART: CT, DE, MA, ME, NH, NY, NJ, PA, RI & VT

Manager: Connecticut State Police
Email: NESMART@po.state.ct.us



SW-SMART: AZ, CA, CO, NV, NM, OK, TX & UT

Manager: Contra Costa County Fire Protection District
Email: SWSMART@cccfd.org



M-SMART: DC, DE, MD, PA, VA & WV

Manager: Allegany County (MD) Dept. of Public Safety & Homeland Security
Email: MSMART@allconet.org



W-SMART: AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA & WY

Manager: CA State Office of Emergency Services
Email: WSMART@oes.ca.gov



SE-SMART: AR, AL, FL, GA, KY, LA, MS, NC, SC, TN, VA & WV

Manager: Fairfax County (VA) OEM/Public Safety Comm.
Email: SESMART@fairfaxcounty.gov



NW-SMART: AK, CA, ID, MT, OR, WA & WY

Manager: WA State Emergency Management Division
Email: NWSMART@emd.wa.gov



G-SMART: AL, FL, LA, MS, TX, PR & USVI

Manager: LA Governor's Office of Homeland Security & Emergency Preparedness
Email: GSMART@OHSEP.Louisiana.gov



CUSEC-1: AL, AR, IL, IN, KY, MS, MO & TN

Manager: Central United States Earthquake Consortium
Email: CUSEC-1@cusec.org



MW-SMART: IA, IL, IN, KS, KY, MI, MN, MO, OH, ND, NE, SD, WI & WV

Manager: IN Department of Homeland Security
Email: MWSMART@dhs.IN.gov

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