DEPLOYABLE COMMUNICATIONS SYSTEM
For Disaster Communications Applications
The Harris integrated system solution re-establishes public safety communications in the wake of natural or man-made disasters.
When disasters occur, the existing public safety communications infrastructure can be quickly overloaded, damaged, or completely destroyed. The Harris Disaster Communications System (DCS) enables critical public safety communications to be rapidly augmented or re-established, to facilitate law enforcement and infrastructure restoration. DCS supports the provision of a customer’s resilient public safety network.

Procuring a complex public safety communications system is usually no easy matter. Customers can spend substantial time and resources, only to find themselves behind schedule and over budget, with a system that does not meet their requirements. Harris Corporation’s new, simplified approach to systems procurement uses pre-engineered system configurations that provide fast, cost-effective solutions to today’s most critical operational needs, such as emergency public safety communications.

Instead of designing a unique system for every customer, Harris has developed a comprehensive family of preconfigured systems. Each system is fully integrated and includes all equipment, cables, software, and manuals, with training and installation available. Every system has undergone extensive testing and can be relied upon to meet its objectives.

This executive summary describes the Harris Disaster Communications System and outlines the advantages of our packaged system solutions:

- **Low Risk** — Field proven and comprehensively tested systems
- **Fast Delivery** — Complete systems can be delivered in a matter of months to meet urgent operational needs by eliminating long system definition and development phases
- **Cost-Effectiveness** — Customers’ development costs are minimized
- **Simplified Procurement** — Systems can be purchased as off-the-shelf items
- **Phased Implementation** — Packaged systems form building blocks that enable the acquisition of capability in a spiral fashion, protecting current investment and supporting future goals
- **Flexibility** — Packaged systems are readily customized and integrated with in-country partners

All this from Harris, a company with over 50 years of large-scale international communications systems experience, the most comprehensive range of tactical communications products, and world-class systems engineering and integration capabilities.

Contact Harris now to discuss your systems needs: [www.harris.com/systems](http://www.harris.com/systems)
Natural disasters can happen anytime and anywhere, at short notice. Earthquakes, volcanoes and tsunamis are unpredictable. Human tragedies from hurricanes and floods may be minimized due to advanced warning, but the community infrastructure is defenseless. Today governments must also be concerned about man-made disasters such as terrorist attacks. When these disasters occur, the public safety communications infrastructure can become overloaded, damaged or destroyed. It needs to be quickly restored or augmented so that people can be rescued and the process of rebuilding can begin.

When disaster strikes, people may panic and make unnecessary calls, and the sick and injured may be in need of emergency services. Local police and first responders require reliable and secure communications in order to carry out their assigned tasks. Restoration of communications capabilities must be the first order of business.

To support rapid recovery of essential public safety communications after a disaster, equipment must be brought into the affected area. This can be accomplished by installation of the equipment in a rugged trailer which can be towed by a High Mobility Multipurpose Wheeled Vehicle (HMMWV) or other tactical vehicle to negotiate difficult terrain to reach the affected area. Such a trailer should contain a communications system which will permit:

- Rapid establishment of a Project 25 (P25) Land Mobile Radio (LMR) public safety network to allow first responders to communicate and coordinate disaster recovery activities within the affected area
- Backhaul connection to a surviving network infrastructure to allow for coordination with government agencies, utility companies, and other relief agencies outside the disaster area
- Establishment of a professional communications network among public utility companies working to restore telephony, power, etc.
- Interoperability with local military or paramilitary forces who have been assigned to support disaster relief efforts

Internationally deployed Project 25-compliant systems support secure voice communications for public safety users like the police, firefighters, ambulances, and emergency medical teams. It is critical for these first responders to be able to coordinate their responses to minimize loss of life and property damage. In major disaster areas, utilities can be severely interrupted. Repairs to gas mains and the electricity supply must occur before rebuilding can commence. Utility companies need radio communications to coordinate their activities, and typically use private networks for this. These networks may be compromised in a disaster scenario.

Harris offers a trailer-based Disaster Communications System which can be deployed to the affected area to restore the essential communications vital to successful recovery. The system provides the capabilities necessary to re-establish communications and provide interoperability among first responders, utility companies, and supporting military units assigned to assist in disaster recovery.
The Harris Disaster Communications System (DCS) provides commanders:

- **Rapid Deployment** — The system is housed in a rugged trailer, permitting rapid deployment into affected areas.

- **Public Safety Communications Restoration** — Our Project 25 compliant system design permits rapid restoration of inter-agency communications.

- **Backhaul Connection** — The Harris Disaster Communications System can be connected to the remaining operational network infrastructure via SATCOM backhaul or optional WiMAX or LTE technology, depending on the range to the operational network.

- **Legacy Support** — The system’s conventional P25 gateway supports the use of legacy analog radios.

- **Inter-Agency Coordination** — Dispatch management capability provides for efficient utilization of resources.

- **Emergency Operations Center** — DCS will operate as a self-contained operations management capability.

- **Professional Communications** — The system can support professional communications using the Harris BeOn® technology that runs across commercial GSM networks.

- **Military Interoperability** — The system can interoperate with local military users of Falcon III® radio technology.
The Disaster Communications System (DCS) utilizes the strength of our Project 25 and Falcon III® communications products integrated with leading-edge partner technology. It provides new capabilities that allow more effective and efficient restoration of public safety and professional communications following a disaster.

The system is designed to be deployed into a disaster area as quickly as possible. This typically can occur as soon as the event has subsided and it is safe to enter the affected area. With the ability to be towed over rough, unpaved surfaces, the trailer is designed for transport through damaged areas. Once in place, the system serves as a Project 25 base station to re-establish emergency and public safety communications capabilities.

Consider a hurricane scenario. Once the wind subsides, there will likely be downed power lines and trees, flooding, and extensive property damage. The Disaster Communications System can be deployed into the affected area as quickly as safety concerns permit. Upon arrival, the system can be powered up so that local public safety, professional and military users can immediately collaborate on the restoration of public safety. This is an essential step before the public can return to their homes and places of work.

A hospital may be in need of critical communications. Once power is available, the system can provide the hospital staff with the information exchange capabilities they need in very quick order. In addition, the system can provide a backhaul connection to the Internet so that hospital staff can access medical records and other required data.

Quite often, military forces equipped with Harris Falcon III® military radios will be dispatched into the affected area to assist with the recovery. The Disaster Communications System can provide interoperability capabilities so that these military users can communicate with the public safety and professional teams.

Key Benefits of the Harris Solution:

- **A Versatile Public Safety Platform** — The system is designed as a standalone Project 25 public safety system, but can be easily expanded to permit additional capabilities.
- **Use of Open Standards and Interfaces** — Standard interfaces allow the plug-and-play addition of optional features. Technology advances are also easily incorporated as they become available. A range of mission-specific capabilities can be easily and cost-effectively deployed.
- **IP-Based Communications** — Allows networked distribution of critical public safety data across existing communications infrastructure via Harris tactical and public safety radios and SATCOM links.
- **Customized Off-the-Shelf Availability** — The Disaster Communications System is available for delivery now, and can be readily customized as required.
- **Military Interoperability** — DCS utilizes Harris’s advanced gateway to support interoperability with Falcon III® radios.
- **Professional User Interoperability** — A tactical 2G and 3G compatible GSM base station and BeOn® server enable professional users of the BeOn system, such as utilities, to interoperate with DCS.
TACTICAL TRAILER
MASTR®

Smart Phone Running BeOn®

Ku/C-Band Satellite

Optional Backhaul (WiMAX or LTE)

Standard Backhaul (VSAT SATCOM)

Dismounted Military User with RF-7800S SPR

Disaster Communications System Concept of Operations (CONOPS)
Delivery of the Harris Disaster Communications System is a low-risk proposition. The system is based on our well-established Public Safety products, which have been shipped to many customers and are currently in extensive use. This means that all of the system interfaces have been proven on previous equipment deliveries.

A standard Disaster Communications System is delivered with:

- One 4-channel 380-403 MHz MASTR® V Base Station (other frequency band splits available)
- VIDA® Select Network Switching Center (NSC)
- One VSAT SATCOM system for Beyond Line-Of-Sight (BLOS) backhaul
- Trailer including internal LAN
- Interoperability Gateway for Harris Falcon III® tactical radio support
- BeOn® Professional Communications Server
- KnightHawk™ Tactical 3G Cellular Communications Base Station
- Secure Personal Radio (SPR)
- Vº Console for Dispatch Management
- Two Unity® radios and six P5400 radios

This configuration is very flexible, and additional functionality and alternate equipment sets are easily incorporated. Due to the modular system design, many additional features and equipment can be integrated either at initial purchase or as a subsequent system upgrade.

The standard system can be delivered within approximately four months, assuming trailer integration at Harris. A delivery schedule is shown on the opposite page.

Optionally, the system can be integrated into customer-supplied trailers by in-country Harris partners. If the equipment configuration must be customized, there will be additional time required for delivery.

Our ability to readily customize the packaged system is due to three factors:

- **Systems Expertise:** Harris has extensive experience developing custom system solutions that utilize “best in class” products.
- **Open Architecture:** The data is converted to IP packets as soon as possible for seamless delivery over a variety of Harris and commercial systems, eliminating “stovepipes.”
- **Use of Standard Interfaces:** Standard interfaces are used to support the widest variety of products and to ensure that upgrades and product improvements can be readily inserted.
Low-Risk System Characteristics:
- Pre-engineered system implementation
- Integration risks are eliminated
- Standard interfaces and protocols ease incorporation of future enhancements
- Leverages Harris Public Safety radio technology
- Expandable, with ability to add features and equipment
- 4 to 6 months delivery, depending on modifications
**SYSTEM DESCRIPTION**

**DCS is a public safety capability that quickly restores essential communications**

The Disaster Communications System provides the capabilities of a Project 25 base station. It quickly establishes the communications infrastructure that is essential for coordination among agencies striving to deal with the aftermath of a natural or man-made disaster.

At the heart of the system is a Harris MASTR® V Base Station which provides the core Project 25 communications capabilities. The MASTR V supports four channels of operation—one for trunking control and the other three for traffic, providing adequate capacity for large teams dispatched to facilitate disaster recovery. The base station and related equipment are deployed in a tactical trailer that can easily reach areas with a compromised transportation infrastructure. The base system includes a MASTR V at 380-403 MHz frequency. The MASTR V is also available in other frequencies including VHF, UHF, and 700 or 800 MHz. This ensures interoperability with all public safety users.

A long-range backhaul connection to the remaining operational network is provided by the VSAT capability of Harris CapRock, the largest supplier of managed satellite services in the world. Optionally, a broadband backhaul capability is available through either a 4.9 GHz WiMAX or a 700 MHz LTE radio.

A dedicated Harris VIDA® Select Network Switching Center provides network management and control, enabling multiple agencies, radio vendors, frequencies, and protocols to be linked through a common IP network. Dispatch functions are managed via IP technology, as well, through the Harris V® Console, which provides for secure end-to-end communications. Also included in the equipment set are a router, switch, and firewall.

To support interoperability with dismounted soldiers using Harris Falcon III® radios, the trailer is outfitted with a tactical radio interoperability gateway, as well as an RF-7800S Secure Personal Radio. The Harris BeOn® Server enables communications with professional users such as utility companies, with the Harris KnightHawk™ Tactical 3G GSM Base Station providing cellular capabilities to support BeOn operations. A number of public safety radios are also included with the base system for the benefit of users on the scene who do not have them.

The equipment configuration for the Disaster Communications System is shown at right.

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**RF-7600P-DC201 Disaster Communications System Equipment**

<table>
<thead>
<tr>
<th>STANDARD CONFIGURATION</th>
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<tbody>
<tr>
<td>◇ MASTR® V Project 25 Base Station</td>
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<tr>
<td>◇ VIDA® Select Network Switching Center</td>
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<tr>
<td>◇ Router, Switch and Firewall</td>
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<tr>
<td>◇ Interoperability Gateway</td>
</tr>
<tr>
<td>◇ BeOn® Professional Communications Server</td>
</tr>
<tr>
<td>◇ KnightHawk™ Tactical 3G Cellular Communications Base Station for access to BeOn</td>
</tr>
<tr>
<td>◇ V® Console for Dispatch Management</td>
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<tr>
<td>◇ VSAT SATCOM</td>
</tr>
<tr>
<td>◇ RF-7800S-V001 Vehicular Radio</td>
</tr>
<tr>
<td>◇ QTY: 2 Unity® multi-frequency multi-mode public safety radios</td>
</tr>
<tr>
<td>◇ QTY: 6 PS4000 single-frequency single-mode radios</td>
</tr>
<tr>
<td>◇ Trailer with Internal LAN</td>
</tr>
</tbody>
</table>

**OPTIONAL CAPABILITIES**

| ◇ VIDA® Broadband and/or VIDA® LTE backhaul |
| ◇ Tent |
| ◇ End-to-End Encryption |
Disaster Communications System Configuration

- **3GPP** – Third Generation Partnership Project
- **BeOn** – Harris proprietary professional communications cellular network
- **BSC** – Base Station Controller
- **BTS** – Base Transceiver System
- **GSM** – Global System for Mobile (Communications)
- **LTE** – Long Term Evolution (4G cellular protocol)
- **SATCOM** – Satellite Communications
- **VSAT** – Very Small Aperture Terminal
- **UMTS** – Universal Mobile Telecommunications System
- **WiMAX** – Worldwide Interoperability for Microwave Access
The system solution capitalizes on our extensive portfolio of communications equipment

MASTR V Base Station
The flexible Harris MASTR® V base station will meet critical communication needs today and into the future. The MASTR V:
- Provides secure, digital, trunked communications
- Supports the P25 Common Air Interface
- Operates on a secure, scalable Internet Protocol (IP) network

The MASTR V Base Station provides an access point to the Harris P25-IP network. Any P25-compliant mobile or portable radio equipment, irrespective of manufacturer, will be able to communicate with the MASTR V Base Station. The MASTR V Base Station supports digital voice communications for improved voice quality and secure, digital, trunked communications for the provision of reliable, mission-critical applications.

As network needs expand, the MASTR V station can grow to meet the communication requirements of the 21st century. The MASTR V enables IP voice and data packets to be sent over a Harris P25-IP network and received at the base station. This setup enables all of the advantages of IP:
- Seamless integration of off-the-shelf IP data applications such as voice consoles and web browsers
- Easy interconnection of peripherals and ancillary equipment such as mobile data terminals, printers, scanners, and video devices
- Economical routing and backhaul of network data
- Redundancy benefit of distributed IP architecture, one of the key requirements for most public safety users

Harris CapRock VSAT Terminal
SATCOM capability at Ku/C Band utilizing a Very Small Aperture Terminal (VSAT) is provided for backhaul. This enables reachback into the surviving network infrastructure. The VSAT terminal will be housed in an easily deployable, hardened transit case, and should take no longer than 30 minutes to set up. Depending upon the satellite to be used, antenna aiming may be manual or automatic. In some circumstances, it may take a day or two to obtain “on demand” satellite bandwidth.

KnightHawk Tactical 3G Base Station
The Harris KnightHawk™ Tactical 3G Base Station is a ruggedized, highly mobile, and customizable IP-based cellular network, providing public safety officials at the disaster relief site with unsurpassed connectivity in harsh operating environments.

The KnightHawk system is built upon 3G (third generation cellular) UMTS (Universal Mobile Telecommunications System) technology, which is the fastest 3G cellular technology available today. In addition to voice, high-speed data, video, and SMS messaging, the KnightHawk system supports High-Speed Packet Access (HSPA) which allows for dynamic allocation of data resources to 3G mobile devices, enabling more devices to access the network simultaneously. KnightHawk is a complete, self-contained WCDMA cellular network that operates in the 2100 MHz band. This single-carrier, high-capacity wireless base station provides 10 watts of power output and features a capacity of up to 60 simultaneous voice calls and 14 HSPA data connections. At 20 kilograms, it is easily deployed by a single technician.
### VHF/UHF Features

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
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</thead>
<tbody>
<tr>
<td>Small Aperture Antenna</td>
<td>Easy to transport and deploy</td>
</tr>
<tr>
<td>Ku/C Band Connectivity</td>
<td>Supports data rates in the 128 kbps to 2 Mbps range, depending upon service plan chosen by customer</td>
</tr>
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### MASTR® V Base Station

<table>
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<tr>
<th>Features</th>
<th>Benefits</th>
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</thead>
<tbody>
<tr>
<td>Regulatory Compliance</td>
<td>Complies with worldwide regulations including FCC, ETSI and Industry Canada</td>
</tr>
</tbody>
</table>
| Standards Compliance | Complies with TIA Project 25 Standard  
Meets or exceeds all mandatory requirements of the Common Air Interface |
| Upgradable        | Software upgradable to TIA Project 25 Phase 2 (TDMA), for improved spectral efficiency |
| Compact Design    | 4 channels per 5-rack unit shelf, portable                                |

### VSAT Terminal from Harris CapRock

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>19-inch Form Factor</td>
<td>Permits easy installation in a 19-inch rack or optionally stackable packaging</td>
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### KnightHawk™ Tactical 3G Base Station

<table>
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<tr>
<th>Features</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>UMTS 3G Technology</td>
<td>Provides up to 14.4 Mbps data rate in normal operations, supporting a wide range of applications</td>
</tr>
<tr>
<td>UMTS 3G Standards Compliance</td>
<td>Enables the use of commercial 3G handsets, minimizing cost to the customer</td>
</tr>
</tbody>
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The KnightHawk™ Tactical 3G Base Station is designed for tactical environments, offering high-bandwidth connectivity in challenging conditions. Its compact design allows for easy installation in limited space, while its rugged construction ensures durability in harsh environments. The UMTS 3G technology supports data rates up to 14.4 Mbps, making it suitable for a wide range of applications, from real-time video transmission to high-speed data transfer for critical operations. The KnightHawk™ also meets all mandatory requirements of the Common Air Interface, ensuring compatibility and reliability across various networks. Its software upgradability to TIA Project 25 Phase 2 (TDMA) enables improved spectral efficiency, further enhancing its operational capabilities.
Harris has earned a worldwide reputation as the low-risk vendor of choice for tactical radios and systems. The Disaster Communications System leverages the same program management principles and practices used in our custom development programs. Our responsive program management team and customer service organization will deliver and support a highly capable public safety communications system.

An agile manufacturing process allows Harris to modify the build schedule and adapt our factory’s output to meet customer demands, providing accelerated delivery when required. The Harris factory is one of the highest-volume defense communications manufacturing facilities in the world. Harris has the commitment and capability to deliver, with 99 percent of our international programs rated by our customers as either meeting or exceeding expectations.

Unlike many other companies, Harris has “boots on the ground” experience, supporting our products from initial fielding to obsolescence. Harris still provides support to our customers for systems which have been deployed for over 20 years. The company is absolutely committed to customer satisfaction—and that is why our customers rate Harris an average of two times higher than our nearest competitor in our annual customer satisfaction survey.

Harris has extensive experience in providing logistics and sustainment support throughout the world and is a proven provider of advanced radio, sensor, and integrated systems to customers in over 150 countries. We have developed highly successful processes for fielding, maintaining, supporting, repairing, and upgrading equipment, no matter where it is deployed in the world.

Many employees in our product and technical service departments have prior military experience, and establish a close, personal bond with our customers. In addition to this personal level of support, we have two highly successful formal channels which include classic telephone and email support as well as web-based services. Our Premier website (https://premier.harris.com/rfcmm/) offers customized access to:

- Computer-based training courses
- Manuals
- Frequently asked questions
- Department contact information
- Application notes
- Purchase of accessories and ancillaries

Additional capabilities include:

- Downloading and tracking software upgrades
- Warranty and maintenance support, including receiving RMA numbers and tracking status of returned goods

System training is another important consideration. If the user cannot adequately deploy and operate the system, it will likely sit on a shelf or in a warehouse, unused.

Harris trains approximately 5,000 students per year on the installation, operation, and maintenance of our equipment and systems. This training occurs in formal classrooms at Harris facilities, at customer locations, and in the field. Our students (our customers) routinely rate the training they receive as “meeting or exceeding expectations.”
The Harris Disaster Communications System provides economic benefits over its entire life cycle:

**Low Risk** – Our customer knowledge, program management, technical expertise, and world-class customer support serve to reduce fielding risk.

**High Performance** – The open architecture design allows the Harris Disaster Communications System solution to capitalize on technology refresh of components, enabling customers to maximize the value of their investment over an extended time period.

**System Sustainment and Supportability** – Sustainment issues are reduced by the use of rugged military equipment (with existing training and ILS packages) and the availability of Harris field service representatives.

**Life-cycle costs are reduced by:**

- Use of common equipment and software applications
- 24/7 support capabilities
- Available in-country training and training material
- Common equipment interfaces and programming
- Availability of installation and maintenance by in-country partners
- Availability of extended warranties beyond the standard 12 months
- Low-cost upgrade paths
Millions of people and hundreds of government agencies throughout the world rely on assured communications® solutions from Harris to deliver critical information to the right place at the right time. They know there is too much riding on the outcome to risk anything less. What sets Harris apart is our depth of expertise, breadth of experience, and focus on providing the most advanced products, systems, and services that meet or exceed the requirements of our customers.

Harris is one of the only companies in the world specializing in advanced technology for capturing, aggregating, distributing, and analyzing the full breadth of modern communications media, including voice, data, video, and imaging. We use this unique capability to provide systems and networks for customers in defense, intelligence, government, public safety, healthcare, broadcast, and energy markets.

Harris RF Communications Division (RFCD) is the leading supplier of tactical, secure voice and data communications products, systems, and networks to military, government, and commercial organizations worldwide. Over 50 years of international experience is leveraged into the design and deployment of Harris RFCD’s packaged system solutions.

The Disaster Communications System is one more example of Harris responding to the needs of its customers.

I firmly believe that Harris RF Communications really listens to their customer base and lives by the creed: the customer is king. I truly feel that sense of partnership with Harris, and I’ve been dealing with Harris for years now. ▶ NATO Staff Member

Harris has internationally acclaimed products which have left everyone else in the dust. ▶ International Customer
Our proven solutions provide:

- Voice, data, and video where it’s needed, when it’s needed
- Cost effectiveness over the life cycle of the system
  - No long, costly development cycle
  - Unsurpassed in-country support during and after delivery
- Scalability and growth options
- Configurable solution sets
- On-time delivery of quality systems
As your partner, Harris is committed to your success

Harris Corporation welcomes the opportunity to discuss the Disaster Communications System in more detail, and how it can be applied to your missions and applications.

We believe that our packaged systems provide a significant value to you, our customer, in the following ways:

- The systems are available now, eliminating long and expensive development and procurement cycles.
- The use of the latest wideband P25 and CapRock VSAT SATCOM technology supports new operational capabilities, such as group calls and live video transport, that have not previously been possible.
- Software-defined radio technology which uses open architectures and standard interfaces, allowing the system to incorporate new capabilities and stave off obsolescence.
- Pre-engineered system designs emphasize commonality of equipment and resources to reduce life-cycle sustainment costs such as training, sparing, and maintenance.
- Harris systems engineers and in-country partners can readily customize the solution, as required.
- The systems are supported by our world-class customer service organization that operates in every part of the world and is second to none.

Harris Corporation is a $5 billion (USD) international communications systems company serving government and commercial markets in more than 150 countries. We are confident that our packaged system solutions represent the best value with the lowest schedule, cost, and technical risks for meeting your complex operational challenges.

Our solutions leverage:

- Harris P25 Public Safety radio technology
- Harris WiMAX and LTE Broadband radio technology
- Harris CapRock VSAT SATCOM technology
- Open standards and interfaces
- Focused program teams
- Over 50 years experience providing state-of-the-art military, public safety, and professional communications systems
- Product service teams that deploy to our customer
- Over 7,000 engineers and scientists throughout the corporation
Restoring public safety communications so the relief effort can begin