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 systems:

- **Low Risk** – Field proven and comprehensively tested systems provide existing, cost-effective solutions
- **Fast Delivery** – Complete systems can be delivered in a matter of months to meet urgent operational needs
- **Simplified Procurement** – Systems can be purchased as off-the-shelf items, eliminating long system definition and development phases
- **Phased Implementation** – Packaged systems form building blocks that enable the incremental acquisition of capability
- **Flexibility** – Systems are readily customized and can be integrated by 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 system needs: 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 trailer which can be towed by a High Mobility Multipurpose Wheeled Vehicle (HMMWV) or other tactical vehicle 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
- Interoperability with local military or paramilitary forces who have been assigned to support disaster relief efforts using either a analog or digital radio technology
- Establishment of a professional communications network among public utility companies working to restore telephony, power, etc.

Internationally deployed P25-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.

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 and the supporting military units assigned to assist in disaster recovery.

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, and the optional Harris BeOn Professional Communications system restores this capability.

*Alternate packaging of the System is available upon request.
The Harris Disaster Communications System (DCS) provides:

- **Rapid Deployment** — The system is housed in a trailer, permitting rapid deployment into affected areas
- **Public Safety Communications Restoration** — Our P25-compliant system permits rapid restoration of inter-agency communications
- **Backhaul Connection** — The system can be connected to the remaining operational network infrastructure via SATCOM backhaul or optional HCLOS technology, depending on the range to the operational network
- **Legacy P25 Support** — The system’s conventional P25 gateway supports the use of analog radios already in service
- **Inter-Agency Coordination** — Dispatch management capability provides for efficient utilization of resources
- **Emergency Operations Center** — DCS can operate as a self-contained operations management capability
- **Military Interoperability** — The system can interoperate with local military users of Harris Falcon II® and III® analog and digital radio technology
- **Professional Communications (Optional)** — The system can support professional communications using the Harris BeOn® technology that runs across commercial GSM and LTE networks.
- **OpenSky Integration (Optional)** — The system can interoperate with legacy OpenSky systems.
The Disaster Communications System is a versatile and expandable public safety solution

The Disaster Communications System (DCS) utilizes the strength of our P25 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 military 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. Once in place, the system serves as a P25 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 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.

During such a disaster, hospitals and emergency medical teams may lose their ability to exchange time-critical and life-saving information. With a portable generator to provide system power, DCS can supplement these communications in very quick order. The system also can provide a backhaul connection to the Internet so that hospital staff can access medical records and other required data.

Military forces equipped with Harris Falcon II® and III® tactical radios will often 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 teams. Optionally, communications with professional users such as utilities also can be provided.

Key Features:

- **A Versatile Public Safety Platform** — The system is designed as a standalone P25 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** — Advanced tactical gateways support interoperability with Harris Falcon II® and III® analog and digital radios.
- **Professional User Interoperability (Optional)** — A tactical LTE base station and BeOn® server enable professional users of the BeOn system, such as utilities, to interoperate with DCS. Commercial GSM can also be used.
Disaster Communications System Concept of Operations

- Network Switching
- Dispatch Management
- Tactical Radio Interop
- SATCOM Backhaul
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
- Tactical Radio Interoperability Gateway for Harris Falcon II® and legacy analog tactical radio support
- V® Console for Dispatch Management
- Two Unity® radios and six P5400 radios
- Generator to power equipment
- RF-7800N-CP Mobile Computing Platform with VIDA proxy application software supporting interoperability with digital Falcon III® radios
- RF-7800V VHF Vehicular Radio

Optional capabilities include:
- Professional communications server and tactical 4G cellular base station
- Secure Personal Radio (SPR)
- Multiband Networking Radio (MBNR)
- Terrestrial backhaul via High Capacity Line-of-Sight (HCLOS) radios
- OpenSky interoperability

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, additional time will be required for delivery.

Customization of a packaged system is inherently low risk:
- Harris has more than 50 years of experience developing custom solutions
- Data is converted to IP packets for seamless delivery over a variety of Harris and commercial networks, when applicable
- Standard external interfaces are used to support the widest variety of products and to facilitate upgrades and product improvements
Typical Four-Month Delivery Schedule

Order Received

Equipment Procurement
60 days

Kit Integration
15 days

Acceptance Testing
15 days

Installation
5 days

Training
5 days

Delivery Complete

Shipping
10 days

Site Acceptance Testing
10 days

MONTHS
1 2 3 4

Low-Risk System Characteristics:

- Pre-engineered system implementation
- Integration risks are eliminated
- Standard interfaces and protocols ease incorporation of future enhancements
- Leverages our advanced Public Safety radio technology
- Expandable, with ability to add features and equipment
SYSTEM DESCRIPTION

DCS is a public safety capability that quickly restores essential communications

The Disaster Communications System provides the capabilities of a Project 25 (P25) 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 P25 communications capabilities. The MASTR V supports four channels of operation—one for trunking control and the other three for traffic, providing ample 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, ensuring 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 a 4.9-5.8 GHz RF-7800W HCLOS 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.

The DCS supports communications with soldiers using Falcon II® and III® radios, the trailer is outfitted with a Tactical Radio Interoperability Gateway, as well as an RF-7800S Secure Personal Radio. 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 RF-7800N-CP Mobile Computing platform supports a ViDA Proxy application for digital tactical radio interoperability support.

Optionally, the Harris BeOn® Server enables communications with professional users such as utility companies, with the Harris Fusion Tactical LTE Base Station providing cellular capabilities to support BeOn operations.

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>V® Console for Dispatch Management</td>
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<tr>
<td>VSAT SATCOM</td>
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<tr>
<td>Tactical Radio Interoperability Gateway</td>
</tr>
<tr>
<td>QTY 2: Unity® multi-frequency, multi-mode public safety radios</td>
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<tr>
<td>QTY 6: PS400 single-frequency, single-mode radios</td>
</tr>
<tr>
<td>Trailer with Internal LAN</td>
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<tr>
<td>Generator to power equipment</td>
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<tr>
<td>RF-7800N-CP Mobile Computing Platform with ViDA Proxy application software</td>
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<tr>
<td>RF-7800V VHF Vehicular Radio</td>
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<tr>
<th>OPTIONAL CAPABILITIES</th>
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<tbody>
<tr>
<td>RF-7800W HCLOS backhaul</td>
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<tr>
<td>BeOn® Professional Communications Server</td>
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<tr>
<td>Fusion Tactical 4G LTE Cellular Communication Base Station for access to BeOn</td>
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<tr>
<td>RF-7800M Multiband Networking Radio (MBNR)</td>
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<tr>
<td>Tent</td>
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<tr>
<td>End-to-End Encryption</td>
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<tr>
<td>RF-7800S-V001 Vehicular Radio</td>
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</table>
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)
HCLOS – High Capacity Line-of-Sight
LTE – Long Term Evolution (4G cellular protocol)
SATCOM – Satellite Communications
VSAT – Very Small Aperture Terminal
UMTS – Universal Mobile Telecommunications System
ENABLING TECHNOLOGIES

The system solution capitalizes on our portfolio of advanced 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 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.

Fusion Tactical Cellular (Optional)
Harris delivers the ultimate tactical cellular network in any military or public safety application. The Fusion™ system brings the advantages of intuitive edge devices with broadband speed and LTE standards to the soldier. A rugged 4G LTE eNodeB, with efficient spectrum and bandwidth management, provides this advanced technology to the mobile environment. The rugged Harris server (RF-7800M-CP Mobile Computing Platform (MCP)) hosts cellular services providing voice, data, video, and network management for compatible edge devices. The Harris Fusion Tactical Cellular solution integrates a full solution down to the edge user devices, including rugged Android platforms, like the Harris RF-3590 tablet or any suitably configured customer supplied smartphone.
### Features and Benefits

#### MASTR® V Base Station

<table>
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<tr>
<th>Feature</th>
<th>Benefit</th>
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<tbody>
<tr>
<td>Software-Defined System</td>
<td>Easily upgradable to P25 Phase 2 (TDMA) with no hardware costs involved</td>
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<tr>
<td>Linear Simulcast</td>
<td>Provides superior coverage</td>
</tr>
<tr>
<td>Compact and Integrated Hardware</td>
<td>Maximizes portability while allowing up to eight channels per cabinet</td>
</tr>
<tr>
<td>Secure, Scalable Internet Protocol Network</td>
<td>Seamlessly integrates into existing and future IP applications without additional hardware</td>
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#### VSAT Terminal from Harris CapRock

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
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<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>
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#### Fusion Tactical Cellular (Optional)

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<th>Feature</th>
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<tbody>
<tr>
<td>4G LTE Technology</td>
<td>Provides high bandwidth connectivity to support video and other applications such as Situational Awareness, text/chat and data</td>
</tr>
<tr>
<td>Integrated core</td>
<td>A complete eNodeB is provided as part of the system allowing it to be deployed stand alone if necessary</td>
</tr>
<tr>
<td>Commercial compatibility</td>
<td>Allows commercial smart phones and tablets to be used if desired</td>
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After-sales service supports mission-critical systems worldwide

Harris has earned a worldwide reputation as the low-risk vendor of choice for tactical radios and systems, with 99 percent of our international program customers reporting that Harris meets or exceeds their expectations. Our responsive program management team and customer service organization will deliver and support a highly capable public safety communications system.

An agile manufacturing process enables Harris to modify production to meet customer demands. With one of the highest-volume defense communications manufacturing facilities in the world, we have the commitment and capability to deliver on our promises.

Harris delivers powerful radios and powerful networks, with customer support a top priority. We are currently servicing systems that have been deployed for more than 20 years, underscoring our absolute commitment to customer satisfaction. Our customers rate Harris an average of two times higher than our nearest competitor.

As a proven provider of advanced radio, sensor, and integrated systems to customers in over 120 countries, Harris has extensive experience in providing logistics and sustainment support throughout the world. We have developed highly successful processes for fielding, maintaining, supporting, repairing, and upgrading our equipment, no matter where it is deployed.

Our comprehensive service offering includes classic telephone and email support as well as web-based services. The Harris Premier website (https://premier.harris.com/) provides customized access to:

- Computer-based training courses and manuals
- Frequently asked questions
- Application notes
- Purchase of accessories and ancillaries

Customers also can use the website to:

- Download and track software upgrades
- Receive warranty and maintenance support, including RMA numbers and returned goods status

System training is another important consideration. Harris trains approximately 5,000 students per year on the installation, operation, and maintenance of its equipment and systems. This process occurs in our company classrooms, at customer locations, and in the field. Our students (our customers) consistently rate the training they receive as meeting or exceeding their expectations.
The Harris Disaster Communications System provides economic benefits throughout its entire life cycle:

**Partnership** – Harris stands beside you with decades of communications experience, program management efficiencies, technical expertise, and world-class customer support.

**High Performance** – The open architecture design capitalizes on technology refresh of components, maximizing the value of customers’ investments over an extended time period.

**System Sustainment and Supportability** – Sustainment issues are reduced by the use of rugged 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
Harris RFCD supplies tactical and public safety radio products in over 120 countries worldwide

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 wireless communications 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, 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. More than 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
Always connected. Never alone.

Our proven solutions provide:

- Voice, data, and video where it’s needed, when it’s needed
- Cost effectiveness throughout 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 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.
- Our 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.

With approximately $5.5 billion (USD) in annual revenue, Harris is an international communications and information technology company serving government and commercial markets worldwide. 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:

- Advanced P25 Public Safety radio technology
- VSAT SATCOM technology from Harris CapRock
- 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
- Nearly 6,000 engineers and scientists throughout the corporation
Restoring public safety communications so the relief effort can begin