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March 27, 2006

Reference Number: 075G-001

Office of Standards, Regulations and MSHA
1100 Wilson Blvd, Room 2350
Arlington, VA. 22209-3939
Attn: Mr. Robert Stone

Subject: Comments from Harris Corporation

Reference: RIN 1219-AB44

Gentlemen,

Harris Corporation, Government Communications Systems Division, is a long time provider of communication systems, information handling systems and robotic systems to the Federal Government. Historically, our business has been concentrated with DOD, but we also have considerable business with other Federal Agencies such as the FAA, NASA and the FBI. Our products and services range from tactical quality hardware (radios) to satellite communications systems to finger-print analysis/storage/retrieval systems. We develop new technologies at the laboratory level, integrate large engineering content programs, and we excel at custom, large scale system installation around the world. Harris GCSD is a versatile supplier with a very broad experience in communication equipment and systems. Please refer to the attached Harris Corporation Brochure for an overview of our capabilities.

Should you have any questions, please feel free to contact myself at (321) 727-5647.

Sincerely,

P J Redding Jr.

P J Redding, Jr.
Lead Contract Administrator

AB44-COMM-81

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Department of Labor, Mine Safety and Health Administration

Solicitation MSHA-RIN 1219-AB44

Information Response from Harris Corporation

Government Communications Systems Division

27 March 2006

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Underground Mine Rescue Equipment and Technology

Harris Government Systems Communications Division is a long time provider of communication systems, information handling systems and robotic systems to the Federal Government. Historically, our business has been concentrated with the DOD, but we also have considerable business with other Federal Agencies such as the FAA, NASA and the FBI. Our products and services range from tactical quality hardware (radios) to satellite communications systems to finger-print analysis/storage/retrieval systems. We develop new technologies at the laboratory level, integrate large engineering content programs, and we excel at custom, large scale system installations around the world. Harris GCSD is a versatile supplier with a very broad experience in communication equipment and systems. Refer to the attached Harris Corporation Brochure for an overview of our capabilities.

In the past, Harris has not pursued mining communication techniques, products or installations. However as a critical national objective, we have some concepts to offer you regarding mine safety. Our perspective is providing an infrastructure that embeds fault-tolerant network communication systems in the mine levels itself; specifically a self-healing, functional network. The same infrastructure applies to embedding search and rescue robotic equipment into mines before disasters happened. Such automated equipment can be in place as part of normal mining operations to assist miners. Embedded functional agents (robotic equipment) convert to emergency rescue agents with preplanned functions and responsibilities when disaster strikes.

These are evolutionary recommendations in that they involve constructing embedded communication networks and robotic rescue equipment within a mine as the mine itself evolves in length and depth. This approach represents both economic and mine cultural shifts that may be difficult to over come. We argue that a proactive systems approach outweighs an individual point product solution because the components are tightly coupled; point solution examples are: radios, remote deployed robotics, and or emergency-only equipment additions. As with any embedded system covering a large physical expanse, to be effective the beneficiaries must maintain the equipment thereby becoming its most proficient operators. As a result, those that need the rescue features are confident to use the embedded services and trust its affectivity.

We will use your information request document to structure our thoughts. Our comments are inserted with highlighted, italic text. Should any of the concepts interest you, please contact our designated representative.

A. Rapid Deploy Systems

Rapid Deploy Systems are systems which are easily transportable for use in mine emergencies and which can be quickly set up to provide emergency service. An example would be a seismic sensing system for detecting movement underground, or an electromagnetic sensing system to detect signals transmitted by trapped miners. These systems may employ advanced technology and may be under development.

1. What kinds of rapidly deployable systems could be used to locate miners who are trapped by a mine emergency?

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Mine emergency rescue equipment should be embedded within the mine infrastructure and be connected at all times with a survivable, mine communication network that applies overlapping communication technologies to deal with a broad range of mine disasters.

2. How would such a system work?

   For the embedded rescue systems, deployment is a matter of recognizing the existence and nature of the localized disaster in the immediate vicinity of each rescue asset. Pre-planned rescue functions are built into each embedded asset. These assets are under direct local control of a surviving miner (or) under remote control by way of the enduring communication network.

3. Is the system currently available?

   Such systems are not currently available although several demonstrations of self-healing systems foreshadow its implementation.

   - If not, what obstacles are there to the development and implementation of this type of system?

     There will be economic and social objections to such systems because they incur costs not normally budgeted for mine operations. Expenses might not scale when systems are customized and installed for each mine facility. An approach to minimize cost is to establish a process built around modular building blocks. The architecture and building blocks should be open-ended to accommodate both technology growth and unlimited mine configurations.

   - How long would it take to develop the system?

     Notionally, it will take 18 months to design the system and organize an initial set of building blocks amenable to mine environments. It will require nominally 6 months to apply the architecting process to a specific nominal mine configuration and 6 additional months to select the appropriate building block ensemble for the facility. It would take another 6 to 9 months for a mining-technology partner to engineer the physical installation design. Finally, another 6 to 9 months would be required for the physical installation and non-interference operational check out. In summary, after the initial 18 month investment, it could take as long as from 24 to 30 months to do an initial mine installation depending on the mine's complexity.

B. Breathing Apparatus

A mine rescue breathing apparatus is a device which provides oxygen for a mine rescue team member to use in contaminated mine atmospheres.

Harris has no direct comment on breathing apparatus technology or products. We do however consider such apparatus an integral part of the over mine safety system. Our integrated system solution would address the maintenance and accessibility, and current state of breathing apparatus.

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1. U.S. mine rescue teams use devices by Draeger and Biomarine. What other types of breathing apparatuses are currently in use by foreign mine rescue teams?
2. Are these other types of breathing apparatuses the best available for quick response in mine emergencies?
3. Do these apparatuses incorporate the best available technology? Can they be readily obtained? Do they meet U.S. approval and certification standards?
4. How can they be improved? How long would it take and at what cost?

C. Self-Contained Self-Rescuers (SCSR)

SCSRs are devices that provide miners with an MSHA required one hour of useable oxygen to be used for a mine emergency escape. Currently, SCSRs rely on two different technologies. One type uses a chemical reaction to generate oxygen. The other type uses compressed oxygen.

Harris has no direct comment on SCSR technology or products. We do how ever consider such apparatus an integral part of the over mine safety system. Our integrated system solution would address the maintenance and accessibility of breathing apparatus in our over disaster survival system architecture.

1. Is there more effective technology to protect miners than the SCSRs currently available? If so, please describe.
2. Should an SCSR be developed that provides more than one hour duration of oxygen? What duration is feasible considering that miners must carry the SCSR? Would it be desirable to require smaller and lighter SCSRs with less oxygen capacity to be worn on miner's belts while at the same time requiring longer duration SCSRs to be stored in caches?
3. MSHA standards require each mine operator to make available an approved SCSR device or devices to each miner. Should mines be required to maintain underground caches of SCSRs for miners to use during an emergency, or should each miner have access to more than one SCSR?
4. SCSRs are currently required to be inspected at designated intervals pursuant to 30 CFR 75.1714-3. Should SCSRs be inspected more frequently than the current requirements?
5. SCSR service life is determined by MSHA, NIOSH and the device's manufacturer. The service life can range from ten to fifteen years depending on the type of SCSR. Should the service life of SCSRs be reduced to five years or a different time limit?

D. Rescue Chambers

A rescue chamber is an emergency shelter to which persons may go in case of a mine emergency for protection against hazards. A rescue chamber could provide, among other things, an adequate supply of air, first aid, and an independent communication system.

1. Should rescue chambers be required for coal mines?

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Harris GCSD suggests that rescue chamber should be part of the rescue solution for coal mines as part of the total rescue system solution.

2. What characteristics should they have? Should they be mobile? Should the rescue chamber be semi-permanent, or built into the mine?

   Harris suggests that rescue chambers be mobile structures designed to survive cave-ins and gas-fueled fires. Rescue chambers should house other rescue equipment and be networked into the mine communication network at all time.

3. How long should they support a breathable environment?
4. How many people should they support?
5. How many rescue chambers should be required--how far apart should they be located?

   Harris suggests there is not a point answer to issues 3, 4 and 5. There should be modular flexibility in rescue chamber design such that their locations and size can be easily customized for each unique mine environment.

E. Communications

1. What types of communication systems can be utilized in an emergency to enhance mine rescue?

   Harris suggests that a fault-tolerate, communication network is the only enduring solution for mine safety and rescue. Furthermore, the network must be embedded into the mine infrastructure and used as the backbone mine communication system for daily operations. Our experience and knowledge with communication systems of all types, frequencies and propagation environments indicate that any single, point radio solution is doomed to failure in the underground mine environment. Probable mine disaster scenarios applied to any one particular radio technology or products quickly invalidate such solutions. Today there is a mixture of independent radio or telephony products applied in the mining industry. You address them below. The hope is that even though all of them have known failure modes, one or more might survive in a disaster. Such has not been the case, particularly in the Sago Mine Disaster on January 2, 2006. The core issue with this communication approach is that the individual technologies/products are not interoperable.

2. Current systems include permissible hand-held radios, hand-held radios using small diameter wires, pager systems, sound powered telephones, leaky feeder systems that ``leak" radio signals out of and into special cables, and inductive coupled radios that use existing mine wires as a carrier for radio signals. Are there other systems?
3. Should a particular system be required over another? If so, which system and why?
4. What new communication devices or technology may be well suited for day-to-day operations and also assist miners in the event of an emergency?

   The solution for mine communication deficiencies is a networked communication system that provides connectivity during normal operations as well as disasters. As a

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collection of communication access nodes, the networked communication system establishes an infrastructure that ties together existing mine communication technologies and products, while paving the way for the proliferation of low cost, wireless radio communication within local line-of-sight mine volumes. By being a self-organizing mesh network, the system guarantees communication connectivity to all nodes still connected to the network. Redundant network paths provide a high degree of confidence for node-to-network connectivity.

The network infrastructure backbone is an array of access nodes connected by fiber optic cables. Physical node redundancy ensures each node has high reliability, while spatial node dispersion provides disaster diversity. Figure 1 illustrates the spatial diversity approach. Access nodes are spaced nominally in a grid structure with nodes physically located in human habitat areas. In-situ rescue chambers are by necessity, access node locations. Access nodes are connected to adjacent (next-to, above and below) nodes by fiber optic transmission lines. With a self organizing mesh network connectivity manager, connection paths are maintained across the entire network. Any single access node connects to another access node when at least one mesh survives.

Access node themselves can vary in nature across the network. Access nodes are essentially portals to the network that interface with the physical communication device. These devices (radio's or telephone sets) could connect to access nodes with permanent, hardwired connections, temporary plug-in connections or they could be wireless. In the short term, existing mine communication equipment can be adapted into access nodes. In the long run, local communications in the vicinity of the access nodes would probably migrate to 802.xx wireless radios developed specifically for or adapted to the mine environments.

We should note that the proposed communication network can be a broadband communication network supporting Ethernet bandwidths for voice, data and digital video communications.

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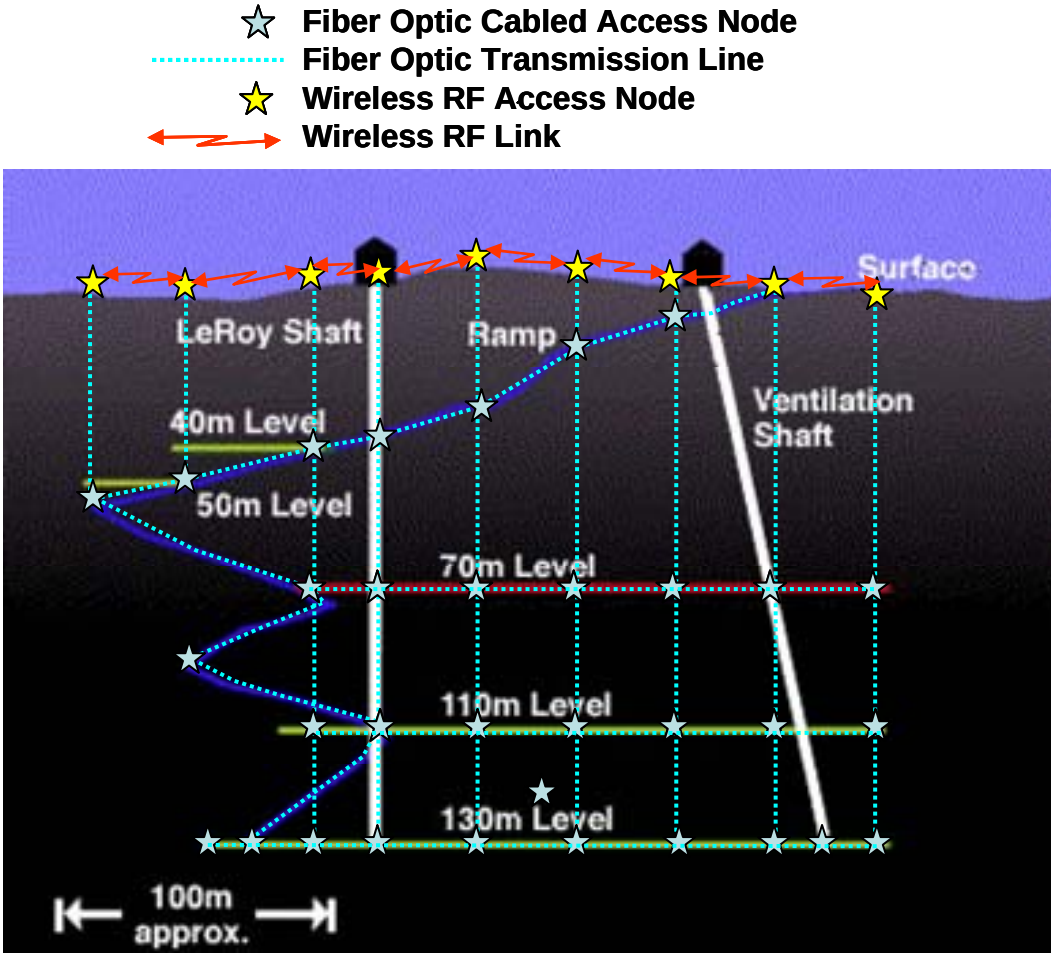

Figure 1 Self-Organizing Mine Infrastructure Mesh Network Example

Vertical node connections in Figure 1 could be made by way of existing pathways or by creating new pathways using directional drilling technology. Technology exists for inserting fiber optic cables into existing conduits where space is available. Directional drilling technology and commercial equipment is applied to drill long distance small tunnels (inches in diameter) under roads to install new utility services, including fiber optic telephone cables. At the surface, vertical access nodes are shown connected with wireless links, but they could also be fiber or hard wire connections depending on the specific mine installation.

Figure 2 illustrates how the mesh network autonomously reacts to destruction of nodal paths. In general, the self-organizing feature finds the best path between nodes based upon signal strength and/or message communication quality. Normally, the best path is the shortest path. In Figure 2 the shorts paths around the collapsed area are the

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adjacent existing access nodes. There are many other access nodes paths that could also maintain communication connectivity with the physically block mine shaft area.

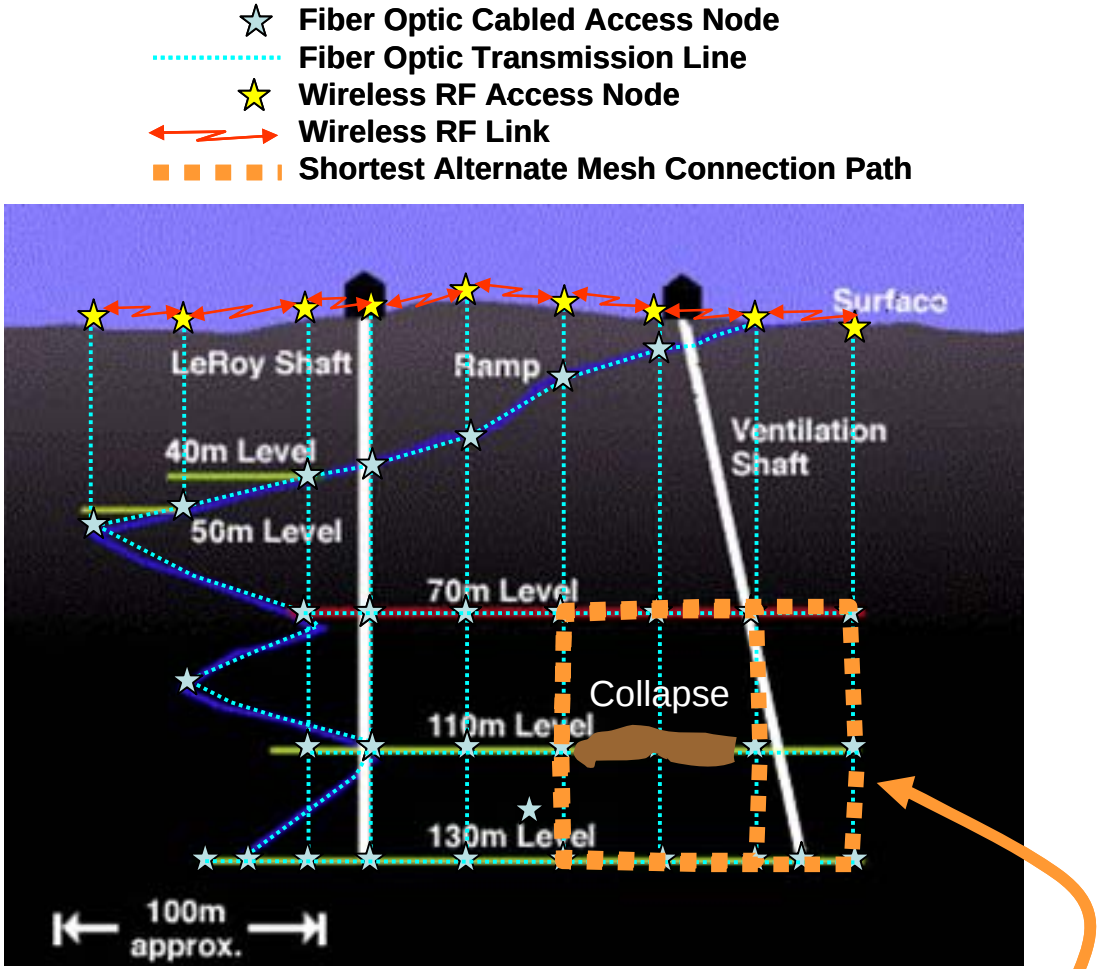

Figure 2 Self Organization Network Automatically Establishes Connection Paths Around Broken Mesh Node Paths

5. How should information be securely, reliably, and quickly transmitted during emergencies from remote locations to the mine rescue Command Center, or from MSHA headquarters to District offices? What technology should be used to quickly and securely transmit information from the mine site to or from MSHA headquarters, to District offices, mining companies, and the media?

   The communication network would extend to above ground facilities. From those nodes either by telephony landlines or a dedicated SATCOM terminal, the mining operations center, or rescue Command Center could be linked to MSHA headquarters to District offices.

6. How can the number of relay points be minimized in a rescue situation so that communications do not get garbled or misunderstood?

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7. How can communications be improved when a rescuer is wearing a breathing apparatus and talking through a speaking diaphragm in the mask?
8. PEDs are one-way communication devices that transmit text messages through the earth to receivers which are carried by miners. PEDs are currently being used in nineteen mines throughout the U.S. Should PEDs be used even though they can only transmit signals to miners and are not bi-directional?
9. Can PEDs be developed into 2-way systems? If so, how long would it take and at what cost?

All of these existing communication devices can be interfaced into the proposed self-organizing mesh communication network.

F. Robotics

A robot is a remote controlled device that can obtain and transmit information relative to the underground environment during mine emergencies. MSHA has pioneered the use of robots in mine emergency operations.

1. Besides providing video, gas readings and temperature readings, what other uses can be made of robotics in mine emergencies?
2. What could be the role of a robot in mine rescue operations?
3. What information could the robot supply to the Command Center?
4. What tasks could robots be built and programmed to perform?
5. Should individual mines use robots for emergency situations?

In our related applications of mobile and fixed robotics with the Federal Government, Harris GCSD considers robotic equipment to provide many functions normally done by humans. We specifically categorize functional agents as human agents or robotic agents. Even simple robots can perform some subset of functions done by humans. Roboticists often say that robots are good for the doing the 3D's: jobs that too dirty, dull, or dangerous for humans to do. Certainly, this applies in the mining environment.

In general this particular robotic application states that robots consists of the following elements: sensors, some controllable mechanisms, some level of self-intelligence, probably a communication channel to humans and a self-contained energy source sized to support to specific operational periods. Note that primary sensors from mobile robots are forward and rear looking video cameras. The nature of these robotic elements determines what functions the robot might perform. Robotic elements and their integrated functions are determined in their design phase. Actual operational functions are determined by what the robot senses and/or what humans direct the robot to do. In either case, the robot's sensor assists the robot or its operator in deciding what to do. This relationship results in a robot having managed behavior.

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A well designed robot has well established behaviors. A poorly designed robot has unexpected, usually unappreciated behaviors.

In the context of robotics in mine rescues, two different robot types are of great value: fixed robotics and mobile robotics. Fixed robotics operate in a fixed location in a remotely control, perhaps in a teleoperated mode (remote driving by viewing the robot's video camera sensors) or are pre-programmed to implement simple functions once a specific disaster event type is detected. Fixed robotics can monitor sensors (environmental, equipment infrastructure, etc) and take appropriate action with its mechanisms. For example if the fixed robot has control over a valve or electrical power switch, the robot can change the state of those items.

Mobile robots provide a multitude of disaster/emergency functions including, but not limited to:

- ***Moving sensors to dangers locations unfit for humans***
- ***Searching for trapped or lost miners and reporting***
- ***Conducting triage on found miners***
- ***Fire fighting***
- ***Restricting/Sealing off areas with fire or deadly gasses***
- ***Transporting survival supplies to trapped miners***
- ***Digging access paths to trapped miners***
- ***Evaluating damaged access paths***
- ***Collecting environmental information and forwarding to rescuers***

The same mobile robotics used in emergencies should perform normal functions to leverage their acquisition and maintenance costs:

- ***Transport personnel and equipment***
- ***Map mine paths/environments***
- ***Assess mine structural integrity***
- ***Monitor personnel movements/ security monitoring***
- ***Perimeter security monitoring and defense reaction***
- ***Track equipment & assets locations***
- ***Inspect for regulation compliance; Remote operated or semi-automatic deployed.***

A typical question is, 'how big are mobile rescue robots'? The answer is 'as large or as small as they need to be for specific rescue functions. Small mobile robots can pass through otherwise impassable access paths to search for survivors, move food and supplies and provide a communication channel back to rescue workers. A large robot can carry larger supplies and cover miles of mine pathways searching for survivors and/or dangerous areas. Small to large mobile robot are available in many different sizes for above ground use. Daily use and survival modes in underground mining

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environments are challenging conditions; especially on the robotic equipment such as the robot's traction mechanisms (wheels, tracks, legs etc). Dust, debris, temperatures, gasses and moisture impose stringent survival requirements to robotics, but not insurmountable requirements. As a result, robots tailored to mining environments should cost more than an equivalent above ground robot.

The real issue regarding robotics for mine disaster rescue is not if they should be applied, but that of why they shouldn't they embedded in the mine's infrastructure. Our national concept of bringing a mine rescue team to a mine disaster from distant locations involving air travel and/or hours of land travel is counterproductive. The first few hours of a mining disaster offer the best chance to find and rescue trapped and possibly injured miners. Rescue teams should be resident at the mine and their core rescue tools should be embedded in the mine's infrastructure ready for switchover at a moments notice. An analogy to current mine response practices might be like a building manager responding to a fire in a high rise building; this manager would not call specialists from another state when he needed a response in minutes.

As a system integrator, we would survey existing mobile robots applicable to the mining environment and select candidate vehicles. We would then outfit those platforms with the appropriate sensor, customized for specific mine environments and infrastructures. There are several tactical and commercial robotic platforms potentially suitable for this application, including platforms from the Remotec Corporation and iRobot. Carnegie Mellon University and the affiliated company 'RedZone' are also starting points for fundamental mobile robotic platform capabilities.

G. Thermal Imagers and Infra-Red Imagers

Thermal imagers are devices which provide video pictures of the heat emitted by objects underground. Infra-red imagers provide similar information through the use of the infra-red light spectrum.

1. What ``thermal imagers" and ``infra-red imagers" outside of those currently available in the U.S. are in use in other countries, and how can these be deployed in a mine rescue?
2. Permissible equipment is equipment which is approved by MSHA to be safely used in gassy atmospheres. Should thermal and infra-red imagers be permissible equipment?
3. What are the costs associated with these devices?
4. Should all underground mining operations be required to have one of these devices available on-site?

Harris GCSD suggests that thermal and infrared imagers should be an integral part of mine disaster detection and survivor rescue. We further suggest that these imagers be contained within the sensor suite of mobile robotic search and rescue platforms discussed within Section F. above.

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H. Developing New Mine Rescue Equipment

1. What are the technological or economic problems in developing new equipment such as mine communications equipment or other mine rescue technology?
2. Do manufacturers of such equipment have problems with making the equipment permissible for use?
3. What are the specific problems?
4. Should the approval process for such equipment be streamlined or otherwise changed? Do current approval standards allow the flexibility for developing new technology?
5. How can equipment manufacturers be encouraged to invest in new technologies for mine rescue equipment?

I. Mine Rescue Teams

Mine rescue teams are specially equipped and trained miners who enter mines during mine emergencies to rescue trapped miners and help recover mines. Teams are equipped with self-contained breathing apparatuses, gas detectors, mine rescue communication systems, and other specialized equipment.

1. What equipment should an effective team have?
2. Should the number of required breathing apparatuses per station be changed? How and why?
3. Each mine rescue station is required to have twelve permissible cap lamps and a charging rack. Each station is also required to have two gas detectors. Should the number of cap lamps and detectors per station be changed? How and why?
4. Where and how should that equipment be maintained?
5. MSHA requirements for mine rescue teams are found in 30 CFR part 49. These requirements cover such topics as type of equipment, equipment maintenance, team membership and training. What other equipment, technology, membership requirements and training would facilitate or would better facilitate team preparedness?
6. Should each team be familiar with the operation of the transportation equipment maintained at all the mines the team covers?
7. Some mine rescue teams are using breathing apparatus which, according to the equipment manufacturer, will soon become obsolete. How can existing mine rescue teams be encouraged to update the equipment and technology they use?
8. Should any new technology be used to assist mine rescue teams at mine emergencies?

J. Government Role

1. What equipment and technology should be promoted to improve mine rescue?
2. How should a mine's status (small, remote or operating under special circumstances) be taken into account in developing new or different equipment requirements?

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3. How could our standards and implementation regarding mine equipment and technology be improved?
4. What training, instruction and procedures should be provided to miners to better enable them to survive an underground emergency?
5. What types of emergency supplies (timbering materials, ventilation materials, sealing materials, etc.) should be maintained at each mine site?
6. What non-regulatory initiatives should we explore?
7. What further steps should we take to improve the capability, availability and effective use of mine rescue equipment and technology?

Integrated H, I & J Comments

Sections H, I, and J requires familiarity with developing specialized mining equipment and conformance to approval regulations. Harris GCSD has not provided a communication system for underground mines and therefore we can not at this time offer authoritative comments on current mine rescue techniques and associated Federal Government regulations. However, Harris has extensive experience providing ground, air, space, and sea systems that meet Federal and International regulations. We know how to interpret, design to and comply with government requirements and regulations. For multi-technology systems we typically partner with selected technology and industry associate contractors. We strive for 'best-in-class' partners to provide the best value solutions for our customers. We have a long history of success using this approach with our DOD and FAA customers. By partnering with mine technology experts to address the issues of sections H, I and J, Harris would be well suited to follow through with our proposed approach outlined in section A.3 for developing system architectures and products for "Rapid Deploy Systems".

In summary, Harris GCSD offers our expertise as system architects and integrators for large scale systems involving advanced communication technologies. We can develop system level solutions applying the appropriate technologies to provide an enduring mine communication infrastructure. We also offer that such an infrastructure could and should rely on embedded mobile robotic agents for use in daily mining operations and as instant response assets in the case of mining disasters.

Carlos Rodriguez
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Harris GCSD

Attachment: PDF CIT

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Communications and Information Technology

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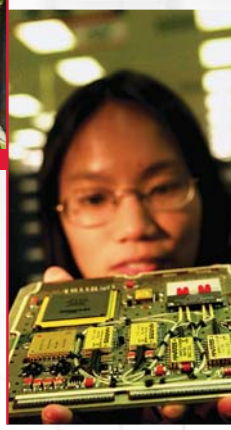


Harris is, at its core, a company built on world-class technology, delivering world-class products and services through a world-class group of people. By leveraging our deep and unique technical base through increased internal collaboration and new acquisitions, we are accelerating our ability to provide innovative solutions to existing and new customers around the globe.

Harris Corporation serves government and commercial markets in more than 150 countries. For more information about our international technology applications, please see page 12.

Table of Contents

Company Overview 1
Government Communications Systems Division 2
RF Communications Division 4
Broadcast Communications Division 6
Microwave Communications Division 8
Corporate and Social Responsibility 10
International Initiatives 12
Headquarters and Division Locations 13

CEO Howard Lance with team members of the FAA Primary Network ▶
Operations and Control Center (PNOCC) in Melbourne, Florida. The PNOCC is the main operations center from which Harris and FAA personnel monitor and manage the FAA's nationwide telecommunications network.

Company Overview

Harris Corporation (NYSE: HRS) is an international communications and information technology company focused on providing assured communications products, systems, and services for government and commercial customers in more than 150 countries. Today, Harris Corporation consists of four divisions that serve markets for government communications, RF communications, microwave communications, and broadcast communications. Headquartered in Melbourne, Florida, Harris has annual sales of $3 billion and employs more than 13,400 worldwide, including 5,500 engineers and scientists.

Harris has a singular focus: To provide assured communications and information technology to government and commercial customers, wherever and whenever they need it, with the highest levels of performance and reliability. Our ability to innovate, integrate, and manage advanced technology for our customers is the competitive advantage we bring to the market every day.

Harris serves government customers through its Government Communications Systems Division and its RF Communications Division. Harris provides communications and information processing technology and systems for the U.S. Department of Defense, federal government agencies, and the national intelligence community. Harris RF Communications Division provides secure tactical radios and systems to U.S. and international defense and peacekeeping forces.

The company serves commercial customers through its Broadcast Communications Division and its Microwave Communications Division. Harris Broadcast provides TV and radio transmission equipment, enterprise software solutions, and networking solutions for existing and emerging broadcast markets and creators of rich media content worldwide. Harris Microwave provides microwave radio transmission solutions and network management systems for global cellular telecom service providers and private networks..

Acquisitions

Harris strengthened its position in government technical services and information technology markets through its acquisition of The Orkand Corporation in 2004, adding key customers within the U.S. Department of State and the U.S. Postal Service. Harris also acquired Encoda Systems in 2004, adding automation, media asset management, and traffic and billing software to its Broadcast Communications portfolio. To further expand its broadcast business and digital broadcast offering, in 2005 Harris acquired Leitch Technology Corporation, a provider of high-performance video systems for the television broadcast industry.

Research and Development

Harris devotes significant resources to the continued development of leading communications technologies. During fiscal year 2005, research, development, and engineering expenditures for the corporation totaled $870 million, fueling new product development and strengthening Harris' technical capabilities. This investment includes significant funding from the U.S. government as well as company-sponsored R&D. Harris also has a rich portfolio of intellectual property that includes more than 900 U.S. and foreign patents.

Corporate and Social Responsibility

Beyond providing world-class communications products and services, Harris Corporation continuously strives to be a responsible corporate citizen. This includes support of appropriate civic, educational, and business activities; respect for the environment; and the encouragement of Harris employees to practice good citizenship and support community programs.

◀ The FAA Telecommunications Infrastructure (FTI) Program is just one example of Harris' ability to provide large-scale systems integration to a geographically dispersed customer.

▼ Advanced avionics from Harris are used onboard military aircraft such as the F/A-22 Raptor.

Government Communications Systems Division

Overview

Harris has served agencies and departments of the U.S. government for more than 50 years. As one of the top 25 federal prime contractors, Harris designs, develops, and supports state-of-the-art communications networks and information systems for a variety of federal agencies, the U.S. Department of Defense (DoD), and the intelligence community. Harris Government Communications Systems Division is the largest of the corporation's four divisions, and is the company's hub for research and development.

Harris provides its broad U.S. government customer base with advanced architectures, equipment and systems, systems integration, engineering services, and operations and maintenance expertise in the areas of satellite communications (SATCOM); command, control, communications, and computing (C^4); intelligence, surveillance, and reconnaissance (ISR); communications services; and image and data collection, processing, interpretation, storage, and retrieval. Harris GCSD serves four strategic program areas: Civil, DoD, National Intelligence, and Technical Services.

Civil

One of the division's largest programs is a prime example of Harris' ability to provide mission-critical, assured communications solutions. Through its work as the prime contractor and communications systems integrator on the $2.2 billion FAA Telecommunications Infrastructure (FTI) program, Harris is helping to modernize the telecommunications system that connects more than 5,000 FAA facilities nationwide. Through FTI, Harris is providing network engineering and equipment, and securing network access from service providers while monitoring and maintaining the FAA's nationwide network through its operations control center. The result is a unified infrastructure for the FAA's voice, data, and video communications that provides enhanced security, improves service, and leverages new and emerging technologies while reducing operational costs. FTI is just one example of Harris' ability to provide large-scale systems integration to a geographically dispersed customer.

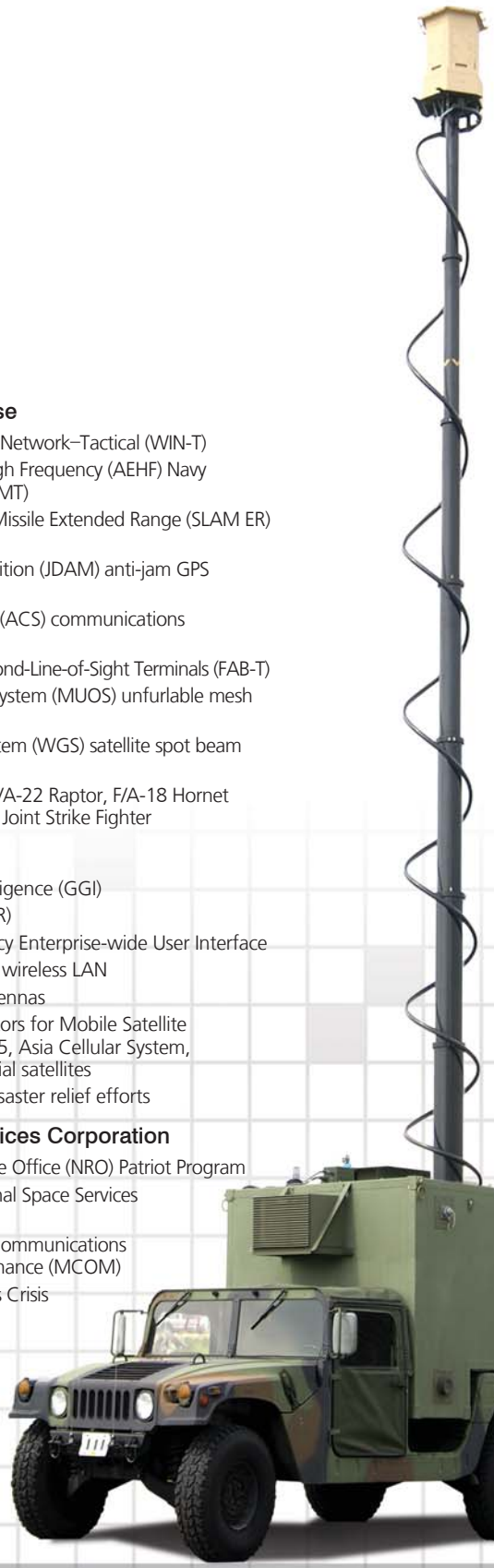
Department of Defense

Harris is providing high-speed networking and satellite communications expertise to help the DoD transform the future of military communications. The DoD's Global Information Grid, or GIG, will give defense forces access to information when and where they need it via secure, interoperable communications networks. A key element of the GIG is the U.S. Army's Warfighter Information Network-Tactical, or WIN-T, which is a high-speed communications network that supports more mobile, agile, and rapidly deployable fighting units. The division's DoD Programs business unit is providing secure, high-speed wireless local area networking and phased array capabilities for WIN-T's wireless transmission system. Harris is also applying its leadership in multiband satellite communications terminal technology to the U.S. Navy's Advanced Extremely High Frequency (AEHF) satellite program, which is a follow-on to the DoD's highly secure MILSTAR communications satellite system. Harris is providing four Navy Multiband Terminal (NMT) prototypes to support the AEHF program. The NMTs being developed by Harris will allow units at sea and on shore to communicate from anywhere in the world via military and commercial satellites, simultaneously.

National Intelligence

Harris is considered a "national asset" by members of the intelligence community who know the company through its National Programs business unit. Harris technology addresses each of the six steps of the intelligence cycle: tasking, collection, processing, exploitation, dissemination, and analysis. The division provides the communications equipment, advanced imagery products, and information processing systems and expertise that are essential to the collection, processing, and dissemination of intelligence information. One example in which the division is putting its intelligence systems experience to work is with the National Security Agency (NSA), where it is developing and deploying software that seamlessly integrates multiple applications, providing security analysts with a single user interface that accelerates and simplifies the process of analyzing intelligence data.

◀ Maritime Communications Services (MCS): Satellite terminals from Harris MCS provided critical broadband communications capabilities to a ravaged Gulf Coast in the wake of Hurricane Katrina. The earth station shown here was installed at the Kiln Public Library in Hancock County, Mississippi, where it provided local residents a crucial link to families and insurance companies. Multiple Harris divisions supported disaster relief efforts.



Technical Services

One of the division's fastest-growing business units is its technical and professional services subsidiary, Harris Technical Services Corporation. Harris provides operations support for customers requiring enterprise management, information technology outsourcing, engineering services, and system design. Exemplifying this expertise is the $1 billion Patriot program for the National Reconnaissance Office (NRO), where Harris is providing operations, maintenance, and support services for the agency's global communications and information systems, resulting in more cost-effective IT service management for the agency. Harris' acquisition of The Orkand Corporation offers expanded opportunities with important new customers, including the Department of State, Department of Labor, Department of Health and Human Services, and the U.S. Postal Service.

Key Technologies

- Avionics
- High-speed data links and data networks
- Antennas
- Ground and space satellite communications
- Communications networks and network distribution
- Intelligence, surveillance and reconnaissance
- Geospatial processing and imaging
- Information processing and management

Key Programs

Civil

- FAA Telecommunications Infrastructure (FTI)
- FAA Weather and Radar Processor (WARP)
- FAA Voice Switching and Control System (VSCS)
- U.S. Census Bureau Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER®) Accuracy Improvement Project

Department of Defense

- Warfighter Information Network–Tactical (WIN-T)
- Advanced Extremely High Frequency (AEHF) Navy Multiband Terminals (NMT)
- Stand-off Land Attack Missile Extended Range (SLAM ER) Weapon Data Links
- Joint Direct Attack Munition (JDAM) anti-jam GPS electronics
- Aerial Common Sensor (ACS) communications subsystem integration
- Family of Advanced Beyond-Line-of-Sight Terminals (FAB-T)
- Mobile User Objective System (MUOS) unfurlable mesh reflectors
- Wideband Gapfiller System (WGS) satellite spot beam antennas
- Advanced avionics for F/A-22 Raptor, F/A-18 Hornet and Super Hornet, F-35 Joint Strike Fighter

National Security

- Global Geospatial Intelligence (GGI)
- Space-Based Radar (SBR)
- National Security Agency Enterprise-wide User Interface
- SecNet 11® Plus secure wireless LAN
- DirecTV spot beam antennas
- Unfurlable mesh reflectors for Mobile Satellite System, TerreStar, XM-5, Asia Cellular System, and NSTAR-c commercial satellites
- Communications for disaster relief efforts

Harris Technical Services Corporation

- National Reconnaissance Office (NRO) Patriot Program
- U.S. Air Force Operational Space Services and Support (OSSS)
- U.S. Air Force Mission Communications Operations and Maintenance (MCOM)
- U.S. State Department's Crisis Management System

Harris Corporation is designing and testing ▶ the wireless transmission system architecture for the U.S. Army's Warfighter Information Network–Tactical (WIN-T) program. The company is applying its proven enabling technologies for wireless, on-the-move communications including phased arrays and SecNet 11® Plus, a revolutionary, Type 1 Secure Wireless Local Area Network (SWLAN) solution.

◀ The advanced Harris Sierra™ II encryption module addresses all of the requirements of the Joint Tactical Radio System (JTRS) and the National Security Agency's Crypto Modernization Program, including the requirement for programmability.

▼ Soldiers on the battlefield entrust their lives to assured radio communications, and Harris radios have become the standard to which they turn.

RF Communications Division

Overview

Harris Corporation is a leading supplier of secure voice and data communications products, systems, and networks. The company's RF Communications Division provides secure radio products and systems for manpack, vehicular, strategic fixed-site, and shipboard applications.

These products are used by the U.S. Department of Defense, other federal agencies, and international defense agencies worldwide. In fact, peacekeeping forces around the globe are increasingly standardizing on Harris tactical and strategic radio systems. These lightweight, software-defined radios are used in some of the harshest environments and can be linked with computers to provide networking capabilities on the battlefield.

The demand for Harris radios continues to accelerate as defense forces worldwide pursue modernization and standardization initiatives that require common-platform, software-based systems that can integrate HF, VHF, and UHF communications systems and provide interconnectivity among land-based and wireless communications media. Harris has been highly successful in the commercial entry of its tactical radios, such as the AN/PRC-117F(C), AN/PRC-150(C) and AN/PRC-152, while simultaneously providing innovative solutions that address large modernization programs such as the U.S. Joint Tactical Radio System (JTRS) and the Bowman Tactical Radio Programme in the UK.

Falcon® II and Falcon® III Multiband Tactical Radios

The Harris Falcon family of tactical radios has been "soldier tested and combat proven" by U.S. and allied military forces in Iraq, Afghanistan, and other theaters of operation around the globe. Harris Falcon II radios are in use by every branch of the U.S. military – including the Reserves and National Guard – as well as for Homeland Security operations and by first-responder agencies.

During 2005, Harris introduced the Falcon® III multiband handheld radio, which is the first radio on the market that is certified by the National Security Agency to implement the Software Communications Architecture (SCA) developed for the Joint Tactical Radio System (JTRS) program. Falcon® III will provide interoperability with key legacy waveforms, including SINCGARS, and can be configured to accommodate vehicle-mounted functionality while providing handheld portability for quick-dismount scenarios. The radio provides the high-speed data and networking capabilities required by U.S. and international forces.

Embeddable Encryption

Harris is a leader in embedded encryption solutions that meet or exceed the highest standards established by the U.S. government for security modules. The Harris Sierra™ II programmable, multimode voice and data encryption module is ideally suited for JTRS and other military radios, wireless LANs, remote sensors, guided munitions, and unmanned aerial vehicles. Its small size, low power requirements, and high data rates make it the solution of choice for battery-powered applications. Harris also offers the Citadel® cryptographic engine, which provides military-grade encryption for non-Type 1 applications.

Harris has delivered tactical communications systems to defense and peacekeeping forces in more than 65 countries.

Wireless Email

The Harris Wireless Gateway and Wireless Message Terminal transparently transfer electronic mail and files in a secure environment over HF, VHF, UHF and multiband radios, landline, fax, or satellite. Reliable and flexible, these applications complement the existing communications infrastructure and are the first of their kind to adhere to federal and military standard HF protocols.

Shipboard Communications

Harris RF Communications is the leading supplier of complete ship and shore communications systems to the U.S. Navy. The company's sophisticated HF and HF/Strategic radio systems meet the complex and demanding needs of the shipboard environment.

Key Products and Services

- Comprehensive, interoperable Falcon® II and Falcon® III family of secure radio communications products
- HF, VHF, UHF and multiband tactical radios
- Encryption products and systems
- Tactical networking systems
- High-frequency modems
- Digital video imaging products and systems
- Wireless email and messaging systems
- Radio products for use in sensors

The next-generation Falcon® III ► handheld radio offers multimission capabilities, high-speed data transmission, and networking.

◄ SHIPBOARD RADIOS
Harris High Frequency radios were designed to meet the exacting reliability, environmental, and performance specifications of the U.S. Navy. This system offers unmatched reliability, survivability, and collocation performance.

◀ HARRIS HARDWARE AND SOFTWARE SYSTEMS ensure that broadcasters everywhere are always "on air."

▼ CROWN MEDIA uses a Harris automation system to manage and control digital media assets.

Broadcast Communications Division

Overview

Harris is regarded as one of the world's foremost developers and manufacturers of radio and television transmission systems, and has introduced well over 70 major technological breakthroughs – including many world standards that have literally changed the way our world sees and hears itself. Since Harris Broadcast Communications was founded in 1922, the company has become a leader in the global broadcast markets it serves, providing products, systems, and services to customers in more than 150 countries.

Today, Harris Broadcast Communications also has become a global leader in total content delivery, with flexible software solutions that can benefit virtually any organization with the need to create, manage, and deliver content efficiently and cost-effectively. The Harris H-Class™ Content Delivery Platform provides a framework for the development of the first content-aware application suite that makes it possible to deliver the right content to the right subscriber on the right device at the right time.

H-Class™ is an integrated approach to managing the delivery of rich media across multiple networks, channels, formats, and devices to either one or many consumers. For the first time, broadcasters and content delivery service providers have the means to integrate the many disparate media workflow and business processes into an integrated system of application modules that handle content from creation to consumption across the enterprise. Harris led the digital transmission transition to high-definition television and radio, and now it is leading that transition throughout the entire digital content delivery chain.

Broadcast Business Areas

Harris Broadcast Communications consists of four business areas: Television Broadcast Systems, Radio Broadcast Systems, Software Systems, and Networking Solutions.

Television

Television Broadcast Systems is a leading developer and manufacturer of analog and digital television transmission systems for global broadcast and mobile applications. Harris offers proprietary technologies that increase operating efficiencies and facilitate remote operation. Harris also offers a wide range of digital television products, and can support requirements for large international systems.

Radio

Radio Broadcast Systems offers the most complete range of radio products and integrated systems, including Harris' industry-leading analog and digital transmitters, audio and networking consoles, and many technologies that reduce the cost of conversion to digital transmission and enable such new services as surround sound and multichannel operation. This business can provide single products or end-to-end systems including nationwide networks with hundreds of transmitters.

◀ INTERNATIONAL BROADCASTING: HARRIS HAS PROVIDED total broadcasting solutions to Radiocomunicatii in Romania (left) and to the Iraqi Media Network in Iraq, and is supporting the transition from analog to digital technology around the world.

◀ Mobile TV
Harris broadcast products and delivery platforms are being used in trials of video to hand-held devices around the world.

Two strategic acquisitions, Encoda Systems and Leitch Technology, have significantly broadened our traditional base to now include enterprise software solutions and high-performance professional video systems.

Software

Software Systems is a leading provider of software systems for broadcasters, cable and satellite companies, and advertising agencies. The portfolio includes software for media program scheduling, traffic and billing, digital asset management, playout automation, and other creative and business processes. Harris offers modular, standards-based solutions with open APIs for maximum ease of integration and future scalability.

Networking

Networking Solutions provides highly differentiated network access and multiplex platforms, as well as the intelligent transport application that is part of the H-Class content delivery platform. The application combines networking equipment with H-Class™ and third-party software to provide innovative solutions for broadcast, public safety, and federal government applications.

Key Products and Services for Total Content Delivery

- Digital and analog television transmission systems
- Digital and analog radio transmission systems
- Transmission remote control and monitoring
- Digital encoding platforms
- Radio studio systems, consoles and furniture
- Facility and network management
- Network access and content distribution
- Enterprise-class content delivery platform
- Program scheduling software
- Traffic and billing software
- Play-out automation systems
- Digital asset management systems
- Advertising agency software
- Technical services and training

Harris continues to be the leader ▶ in digital television transmission systems. The company also is leading the way in the radio market's transition to digital.

◀ **Global Leadership:** Harris microwave networks are being used in 150 nations on six continents, providing capacity upgrades, network expansion, and new telecom networks for both access and transport applications.

◀ Foundation for Growth: Microwave technology is a critical infrastructure element in developing nations and rural communities, where digital radio installations provide 21st-Century networking technology rapidly and economically.

Microwave Communications Division

Overview

Harris has been setting the standard in microwave technology for half a century. The company is the largest supplier of microwave systems in North America and a leader worldwide, addressing markets with complete solutions for mobile network operators, government agencies, transportation and utility companies, public safety operators, and broadcasters. Today, Harris is leading the wireless segment in network flexibility and reach and the global transformation to Internet Protocol (IP).

Harris offers the industry's broadest product portfolio of point-to-point digital radio systems from 2 to 38 GHz that are used for new network deployments, network expansions, and capacity upgrades. Capacities range from single T1/E1 to multiple OC-3/-STM-1, enabling cost-efficient, reliable transport of voice, data, and video. Harris point-to-point radios are field-proven in SONET, SDH, PDH, ATM, and IP applications and meet industry standards around the world.

TRuepoint™– Breakthrough Microwave Radio Technology

Designed to address global market opportunities, TRuepoint™ offers the industry's most comprehensive platform for point-to-point wireless communications, covering the broad range of frequencies and capacities required by network operators around the world. Its software-based architecture enables seamless transition between traditional access applications and higher-capacity transport interconnections.

The TRuepoint™ product family delivers service from 4 to 180 Megabits-per-second capacity at frequencies ranging from 6 to 38 GHz. It offers significant strategic benefits to telecom service providers, including enhanced revenue, dramatically reduced deployment and operating costs, rapid market entry, faster time to revenue, and easy transition to Internet protocol and future applications.

Constellation® and MegaStar® 155PX

The Harris microwave portfolio also includes the trusted, industry-standard Constellation radio, an ideal solution for wireless mobile carriers and private operators, including critical public safety networks. Designed for high-performance and low-cost networking applications, the point-to-point digital radio's scalable low-, medium-, and high-capacity settings provide reliable transport from 8xDS1 to OC3 and 4xDS3. Additionally, the Constellation's backward-compatible 4xDS3 interface offers operators increased flexibility in network planning and facilitates field upgrades.

MegaStar® is designed for high-capacity, multichannel applications when synchronous digital radio is required at OC-3 and STM-1 rates. MegaStar® provides an exceptionally low cost of ownership for a high-capacity platform.

▲ Increasing demand
Harris designs, manufactures and sells a broad range of digital microwave radios for use in worldwide wireless communications networks.

Harris was tapped by MTN Nigeria to design and implement a high-capacity GSM backbone cellular system, which spans more than 4,500 kilometers and traverses more than 120 towns and villages.

Versatile Network Management

Harris microwave radios are optimized to work seamlessly with Harris' NetBoss® network management platform. For carriers, enterprises, and public safety operators, NetBoss® provides a single point of control to effectively manage and maintain a broad array of legacy and next-generation microwave, networking, and broadcast products.

Unmatched Support

Harris offers solutions that cover the complete cycle of network implementation – from planning, design, and systems integration to site surveys, deployment, management, training, and customer service. A vast network of local, regional, and centralized sales and support teams is ready to assist customers worldwide.

Key Products and Services

- State-of-the-art modular, programmable microwave digital radios
- A full line of radios, in frequencies from 2 GHz to 38 GHz
- High-capacity radios compatible with SONET/SDH standards
- Low- and medium-capacity PDH radios meeting ANSI and CEPT standards
- Spread spectrum radios (license-exempt frequency bands)
- Cost-effective network and element management systems for global applications
- A comprehensive suite of professional services and turnkey solutions

TRUEPOINT™ IS ALTERING the landscape of the point-to-point wireless market by enabling telecom carriers to focus more resources on developing their service portfolios. ▶

◀ BANDWIDTH: DEMAND FOR GREATER BANDWIDTH is creating growing opportunities for wireless infrastructure providers.

Corporate and Social Responsibility

Harris has a strong commitment to corporate and social responsibility programs. Our efforts in this area are focused on Corporate Governance; Environmental, Health, and Safety; and Community Involvement. These programs are an integral part of our company's mission and strategy for growth, and are backed by standards of accountability at all levels of the corporation.

Corporate Governance

The business culture of Harris is rooted in a common set of values–integrity, honesty, and responsibility–that govern our relationships with customers, employees, shareholders, suppliers, and the communities in which we operate. The Harris Board of Directors first adopted governance principles more than 40 years ago, and they continue to be refined to assist the Board in carrying out its responsibilities.

Harris also has a strong Business Conduct program that helps us to operate in many countries with differing laws, cultures, and practices. Our Business Conduct program has been developed around a core group of policies and guidelines that form the basis for our "Standards of Business Conduct" and support the values we share as a company.

Environmental, Health, and Safety (EHS)

Harris' ongoing EHS programs have resulted in reductions in the rates of work-related injuries and illnesses, substantial reductions in the use and disposal of certain chemicals, and significant energy and water use savings across the company. Standards and procedures have been deployed across the company to protect the health and safety of workers, and the environment.

Community Involvement

The people of Harris are fully engaged in their communities and genuinely care about being trusted neighbors. This commitment to social responsibility reflects our understanding that Harris and its employees will best prosper in communities that are vibrant and growing. During the past year, Harris and its employees actively responded to needs in many parts of the world, ranging from the worst natural disasters to local children who were without school supplies.

Disaster Relief

Harris and its employees responded quickly to the natural disasters that headlined much of 2005, beginning with a $100,000 commitment to organizations assisting victims of the Indian Ocean tsunami disaster.

When Hurricane Katrina struck the Gulf Coast in August 2005, Harris committed $150,000 to disaster relief, including a corporate gift of $100,000 and a dollar-for-dollar matching employee gift up to $50,000. In addition, employees across the company immediately went to work assembling, delivering, and installing critical equipment that helped to restore the communications infrastructure of the stricken region. These products included:

- Harris satellite communications terminals that were deployed in the six most devastated counties in Mississippi to provide voice, data, Internet, and fax capabilities.
- An IT portal that provided large commercial satellite images of the hurricane-damaged area to first responders for damage and recovery assessment.
- Multiband radios that provided first responders with an extended 200- to 300-mile range communications network for telephone and IP.
- Broadcast transmission equipment that helped to establish temporary transmission sites for television and radio stations knocked off the air by the hurricane.
- Microwave radios that were used to help support public safety and other communications networks.

Community Outreach

The United Way

Harris supports a number of community organizations that provide a broad range of services. The company's formal fundraising campaign during each year is the United Way Campaign. In 2004, Harris had the largest campaign in Brevard County, Florida, raising almost $795,000. The United Way has been very successful in meeting the pressing needs of thousands of individuals and families in our community. Many of our employees across the country volunteer their time at United Way agencies.

"Harris always has been a very active participant in the communities where we have facilities, not just as a major employer, but also as a leader in local charities, education, and cultural activities. It is a role that Harris employees have embraced."

Howard L. Lance, Harris Chairman, President and CEO

The Harris Foundation

The Harris Foundation assists Harris in its commitment to being a responsible corporate citizen. Support is provided either through employee gift matching or direct contributions. The Foundation supports educational, health and welfare, and civic and cultural initiatives, primarily in communities where Harris has significant employee populations. In addition, the Foundation matches contributions made by regular, full-time employees to qualified secondary schools, colleges, and universities up to a maximum of $10,000 per fiscal year, and to 501(c)3 community organizations that have been approved by the Board of the Foundation up to $1,000 per organization per fiscal year.

Just a few of the organizations supported by the Harris Foundation in 2005 include the United Negro College Fund; the Rochester Institute of Technology; the University of Florida Foundation; Save the Children (tsunami relief fund); the Sojourner House in Rochester, New York; the United Way organizations of Brevard County, Florida, as well as those in Rochester, Raleigh-Durham, Montreal, and San Antonio; the George Eastman House in Rochester, the King Center for the Performing Arts in Melbourne, and the Space Coast Ballet.

In 2005 the Harris Foundation also completed a successful $150,000 challenge grant in support of the Brevard County Neighborhood Development Coalition. The challenge grant was designed to jump-start the capital campaign for the construction of a 3,300 square-foot Outreach Center for Children and Youth in an area that has Melbourne, Florida's, highest density of poverty and juvenile crime. The Center will offer a safe haven for children in the neighborhood and provide a place where they can receive warm meals, tutoring, learn to use computers, and participate in recreational activities and enrichment classes that expose them to the arts and help to build character. The Harris challenge grant matched contributions dollar for dollar up to $150,000.

Other programs include the Teach the Teacher program, in which Harris each year brings in nationally recognized leaders in specific areas for five one-day seminars designed for middle and high school teachers; the FIRST Competition, for which Harris provides financial and mentoring support for students who are teamed with professionals to solve a robotics engineering design problem in an intense and competitive way; and the Aerospace Industry Association's (AIA) Team America Rocketry Challenge, for which Harris is a corporate sponsor and where student teams from junior and senior high schools and non-profit educational groups design, build, and fly model rockets. In addition to providing corporate sponsorship, Harris also has sponsored individual high school teams competing in both the FIRST and Rocketry Challenge events.

Harris divisions also support local school systems with donations of surplus furniture and supplies, and with donations that support the Newspapers in Education program.

International Initiatives

Global Reach with Innovation

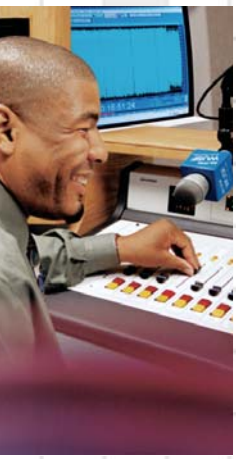
With the combined world-class engineering resources of its four divisions, Harris can provide tailored communications solutions to meet the needs of government and commercial customers anywhere across the globe. Harris, or its authorized local distributors, provides sales and service in more than 150 countries. Our customers span all types of public and private agencies and businesses.

Recent International Initiatives

- Completion of a countrywide digital radio system for Romania in only 20 months that ensures 100 percent nationwide coverage for two national networks over urban and vast rural communities, often divided by mountains. The project included multiple division technologies, engineering, installation, training, and commissioning services.
- Supplying HF radios to the Norwegian Armed Forces for secure voice and data communications with seamless IP interface to support NATO and Partnership for Peace missions. Harris radios are used by defense forces in more than 65 countries. During the past year, Harris provided its Falcon radios to Pakistan, the United Kingdom, Denmark, Sweden, the Netherlands, Malawi, Romania, Latvia, the Republic of Georgia, the Philippines, Uganda, and Ethiopia
- Creation of an entire public television and radio network for Iraq, with operating locations centralized in Baghdad and linked to 30 regional sites throughout the country.
- Providing an end-to-end digital studio to transmitter link to Universidade Luterana do Brasil, enabling a bi-directional audio, data and video network between its studios and transmitter site via IP.
- Implementing a complete network management platform for Jordan Telecom, providing centralized support, and automating supervision of core network switches, transmission and data networks.
- Completing the design and implementation of a high-capacity backhaul GSM network for MTN Nigeria, one of the largest cellular networks in Africa, to increase network capacity and provide a lower-cost alternative to existing satellite links.
- Deploying a backbone system to Lannet Communications to provide voice and data services to residences and businesses throughout Greece, enabling telephone services, VPNs, high-speed Internet access and leased lines.
- Completion of an unmanned oceanographic data collection and telemetry system in the Eastern Mediterranean Sea to provide seismic information for scientists around the world for use in ocean monitoring and forecasting activities of earthquakes, tidal waves, and other events.

Global Harris Contacts

Contact our webmaster at **webmaster@harris.com** and we will provide you with information on the Harris office nearest your location. A Harris representative will get in touch with you to provide any support or services you need, and to discuss how Harris can help you reduce costs and increase revenue. Please visit our Worldwide Operations website at **http://www.harris.com/harris/contact/worldwide-operations.html** for additional contact information, including locations and the names of Harris representatives in your region and specific contact information related to product lines, training needs and technical service.



Harris, or its authorized local distributors, provides sales and service in more than 150 countries. Our customers span all types of public and private agencies and businesses.

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Or visit Harris on the Internet at www.harris.com.

For information about careers at Harris, visit www.careers.harris.com.

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