

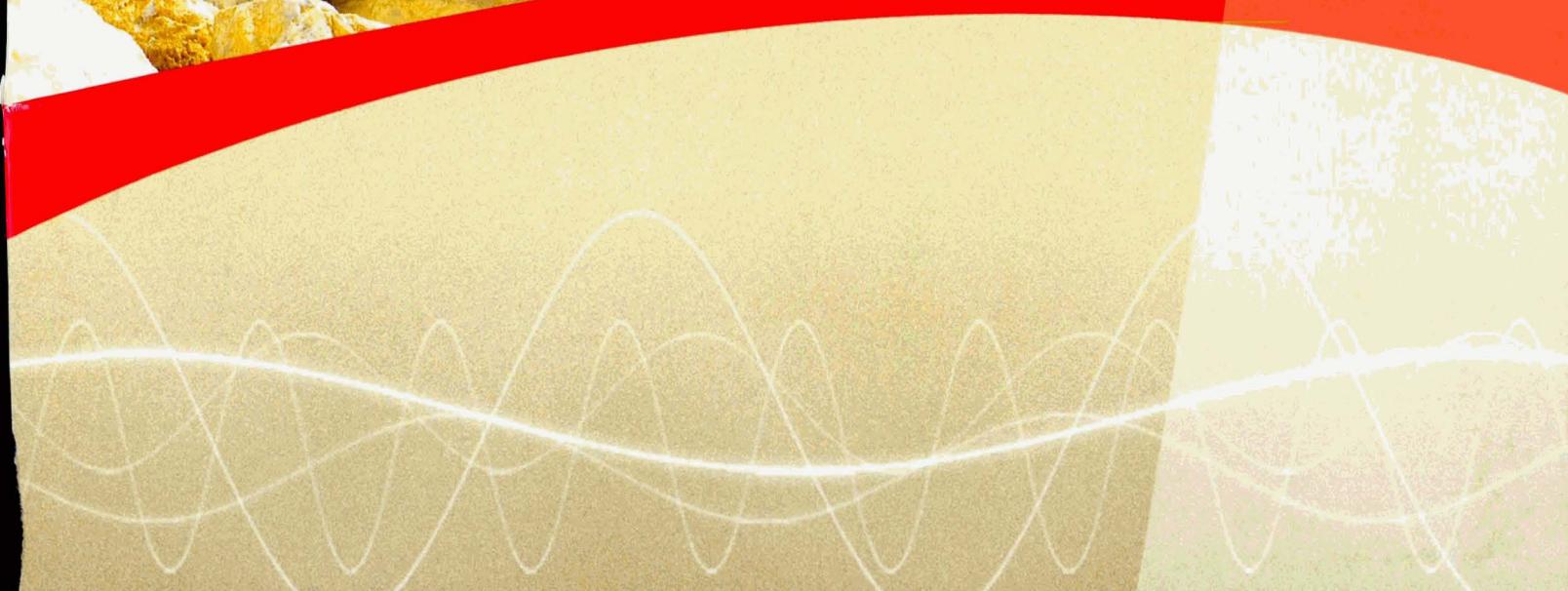


UNMANNED SURVEILLANCE SYSTEM

For Force Protection and Border Security Applications



A vertical, semi-transparent white text overlay on the right side of the image. The text reads "SURVEILLANCE SYSTEM" in a large, bold, sans-serif font. The letters are partially cut off at the top and bottom edges of the frame.





The Security and Surveillance System is a pre-engineered capability supporting force protection and border security applications

PACKAGED SYSTEMS

Harris Corporation provides a simpler approach to C4ISR systems procurement

In this world full of asymmetric threats, maintaining the security of your forces and borders is becoming increasingly important, difficult, and complex. A flexible toolbox of unmanned surveillance capabilities based on a common architecture would allow commanders to cost-effectively address a wide range of missions and threats.

Procuring a complex C4ISR* system is usually no easy matter. Too often customers 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 C4ISR systems procurement uses pre-engineered system configurations that provide fast, cost-effective solutions to today's most critical operational needs, such as security and surveillance.

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 Security and Surveillance System and outlines the advantages of our packaged C4ISR system solutions:

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

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

*C4ISR = Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance

Contact Harris now to discuss your C4ISR systems needs:
www.harris.com/systems

THE OPERATIONAL CHALLENGE

Protecting personnel, bases, and borders has always required separate, isolated solutions

Unattended ground sensors have been used for years as force protection assets and for monitoring remote borders. Typical applications included:

- » Hasty perimeter defense for a unit that has temporarily halted (e.g., platoon early warning)
- » Semi-permanent emplacement around a forward operating base
- » Monitoring trails for infiltration of enemy troops or illegal immigrants

Unattended ground sensors were originally designed for deployment in areas where any activity was unexpected and required a response. Even these simple missions required sensor systems with different attributes. For some applications, lifetimes from seven to 30 days were sufficient, while monitoring remote, illegal border crossings required systems that could last six months or more. Transmission range requirements were also application-specific. Force protection systems typically required ranges of less than one kilometer, while most border applications required transmission distances of tens of kilometers.

With new threats came new requirements for unmanned surveillance systems. The proliferation of terrorists, asymmetric warfare, and drug smuggling has complicated surveillance needs. Unlike a standing military force, these unconventional threats rarely wear uniforms or travel in marked vehicles. Insurgents

can quickly blend into the general population, with only their actions to provide a clue to their intent. Wars and dire economic conditions also have increased the number of refugees and illegal immigrants crossing borders.

Always manpower-constrained, militaries and federal agencies now must prioritize responses to these increasing non-traditional threats. To aid in this effort, surveillance systems should provide pictures of the targets. For example, a border guard may decide that two people illegally crossing the border is a low-priority event when he is also expecting a major drug shipment to occur soon. A picture from a remote sensor can provide the information required to differentiate one activity from another.

Federal agencies or security forces also may need to obtain evidence to combat illegal activities, and typically a picture is not sufficient. For example, they may want to:

- » Monitor a drug crop-growing area to determine who owns and harvests the plants, and to collect video that can be used to convict a suspect
- » Monitor a drop area for illegal immigrants or drugs to obtain vehicle information such as make, model, and license plate numbers
- » Monitor a suspected safe house to document activities and identify people who use it

Illegal immigration and drug smuggling are problems worldwide



In response to these new requirements and increased threats, a number of different single-use or dedicated systems have been developed. This approach to addressing force protection and law enforcement missions has a number of drawbacks:

- ❖ More time and resources are spent training on a variety of equipment
- ❖ Equipment may be purchased from different vendors, making data integration difficult
- ❖ The logistics package to support multiple systems with different equipment can become large and expensive
- ❖ The use of multiple, incompatible systems may make it difficult for the field commander to determine which system is best suited for a given mission

What is needed is a toolbox of capabilities based on a common system architecture. This will allow a commander or field agent to quickly select the mission-specific components required for the needed functionality.

Harris offers a packaged, integrated system solution—a toolbox—that can provide real-time warning of relevant activity in support of force protection, counter-terrorism, counter-drug, and police missions. Data from the system will allow operators to quickly and accurately determine whether there is an actual threat, and how best to respond to it.

The Harris Security and Surveillance System provides commanders:

- ❖ **Real-Time Intelligence** — Real-time picture of front-line situation allows commanders to determine the exact nature and intent of the threat at standoff ranges
- ❖ **A Plug-and-Play Toolbox** — Elements of the system build upon each other to span the range of force protection and law enforcement requirements
- ❖ **Force Multiplier** — Remote areas are easily monitored without the need to commit human resources
- ❖ **Video Management and Storage** — Video of the operation can be used to provide evidence to prosecute criminals, review the operation, and train future forces in dealing with threat situations
- ❖ **Existing Capability** — The system is available now, to help commanders deal with difficult and varied force protection and law enforcement scenarios

SOLUTION OVERVIEW

The integrated Security and Surveillance System eliminates “stovepiped” solutions

The Harris Security and Surveillance System is a toolbox of integrated capabilities derived from our MicroTerrain Observation System and ground sensor products. It allows security forces and agents to implement diverse solutions based on a common architecture and command and control platform.

The core architecture allows mission-specific equipment configuration sets based on:

- » The type of target to be detected
- » The standoff range required between the monitoring station and the target area
- » Target characteristics to be detected and reported
- » Imaging requirements
- » Video requirements

The Security and Surveillance System equipment supports a variety of missions ranging from simple squad force protection to complex surveillance requiring video of illegal activities:

- » A sniper can protect his flank and rear access with a few strategically placed Mini-Sensors; audible alerts received via headset will warn of any approaching threats.
- » Special forces personnel can emplace Mini-Sensors on entrance and exit points, so they will receive an audio warning if someone is following them. Similarly, a platoon can guard its perimeter when halting for the night.

- » Borders and avenues of approach can be monitored with the same Mini-Sensors, with relay units available for range extension or to overcome obstacles.
- » Counter-drug agents may need evidence about who is maintaining a drug “grow” so that in addition to destroying the crop, they can arrest the criminals. The system can cue the camera to capture video only when people have been detected in the area of interest.

Key Benefits of the Harris Solution:

- » **Persistent Surveillance** — Minimizes logistics and manpower requirements and increases personnel safety
- » **Legacy Interoperability** — Sensors can transmit in multiple formats, allowing interoperability with other systems currently in use
- » **Low False Alarm Rates** — Embedded algorithms have been independently proven to reduce false alarms and thereby increase productivity of agents
- » **Customized Off-the-Shelf Availability** — The Security and Surveillance System is a Harris packaged system based on ruggedized military equipment, and can be readily customized as required



Harris equipment provides persistent surveillance in the harshest environments, conserving manpower in force protection, border security, tactical surveillance, and counter-drug missions

LOW-RISK SOLUTION

The Security and Surveillance System equipment is ready for delivery

Delivery of the Harris Security and Surveillance capability is a low-risk proposition. The equipment is in use worldwide by special operations forces, border security agents, counter-drug agencies, federal police, and military units.

The toolbox is delivered with:

- » Three Sniper Protection Kits
- » Three Platoon Defense Kits
- » Two MicroTerrain Observation Kits
- » Three Programming and Control Kits
- » One Border Monitoring Kit

The contents of the kits can be combined to meet a variety of mission needs. For example, the Mini-Sensors in the Platoon Defense Kit(s) can be combined with the MicroTerrain Observation Kit and a Programming and Control Kit to provide or augment perimeter security at a forward operating base.

Likewise, the equipment in the Platoon Defense Kit can be distributed as required to provide a security capability to each squad in the platoon, and relays from the Border Monitoring Kit can be utilized to extend the range from the sensors to the monitoring point.

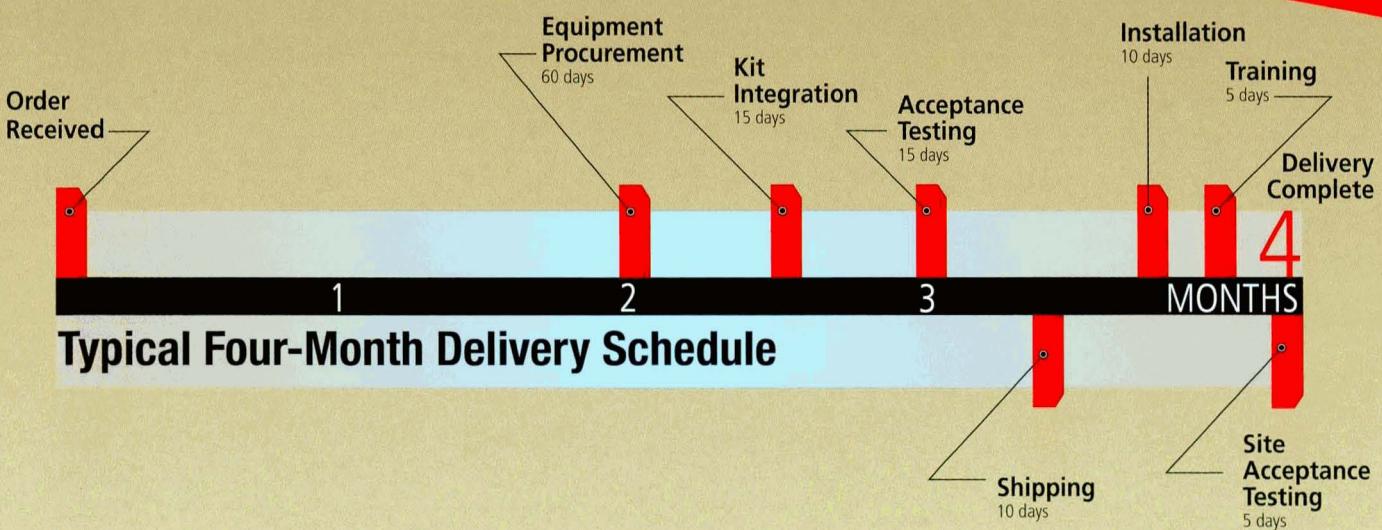
This equipment set is very flexible, and additional functionality and equipment sets are easily incorporated. Due to the modular design of the system, most of these additional features and equipment sets can be added either at initial purchase or as a subsequent system upgrade.

The standard system can be delivered within four months, as shown on the opposite page. Integration of different or additional cameras may add about one month to the delivery schedule, due to the lead time on the optical components.

The operation of the equipment is easy to learn, with users typically requiring less than five days of training.

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

- » **Systems Expertise** — Harris has extensive experience developing custom system solutions that utilize "best in class" products
- » **Open Architecture** — The data is converted to IP packets as soon as possible, so it can be forwarded seamlessly over a variety of Harris and commercial systems, eliminating "stovepipes"
- » **Use of Standard Interfaces** — Standard interfaces are used to support the widest variety of products and to ensure that upgrades and product improvements can be readily inserted



Low-Risk System Characteristics:

- » Pre-engineered system implementation
- » Integration risks are eliminated
- » Surveillance data is easily exported to other systems due to the use of standard protocols
- » Expandable by including additional kits
- » 4 to 6 months delivery, depending on modifications

SYSTEM DESCRIPTION

Providing a common set of tools for security and surveillance missions

The Security and Surveillance System is divided into five different pre-configured kits for ease of deployment. The equipment in these kits can be readily combined to provide extended capabilities. Key elements of each kit are listed in the table below, and some of the individual components are also illustrated at right.

Sniper Protection Kit (Qty 3)

This module allows the sniper to focus on his mission while providing warning of threats that may be approaching from his blind side. The headset earpiece delivers voice alerts from the sensors, and a stock-mounted push-to-talk switch enables the user to receive alarms and talk with support personnel over the RF-7800M-HH radio without taking his eyes off the area of regard.

Platoon Defense Kit (Qty 3)

This kit augments a unit's defenses when it is temporarily at the halt; it also can provide protection for more permanent encampments such as forward operating bases. An individual kit contains sufficient sensors and detectors to completely cover a typical platoon front of 450 meters, as well as sensor report monitoring capability.

MicroTerrain Observation Kit (Qty 2)

In each kit, one RF-7400E-VG Tactical Video Gateway is provided along with medium-range day and IR imagers and a 12085-1125-01 Access Point. A unit can deploy two sensor-cued video or imaging systems by incorporating Mini-Sensors from a Platoon Defense Kit.

Programming and Control Kits (Qty 3)

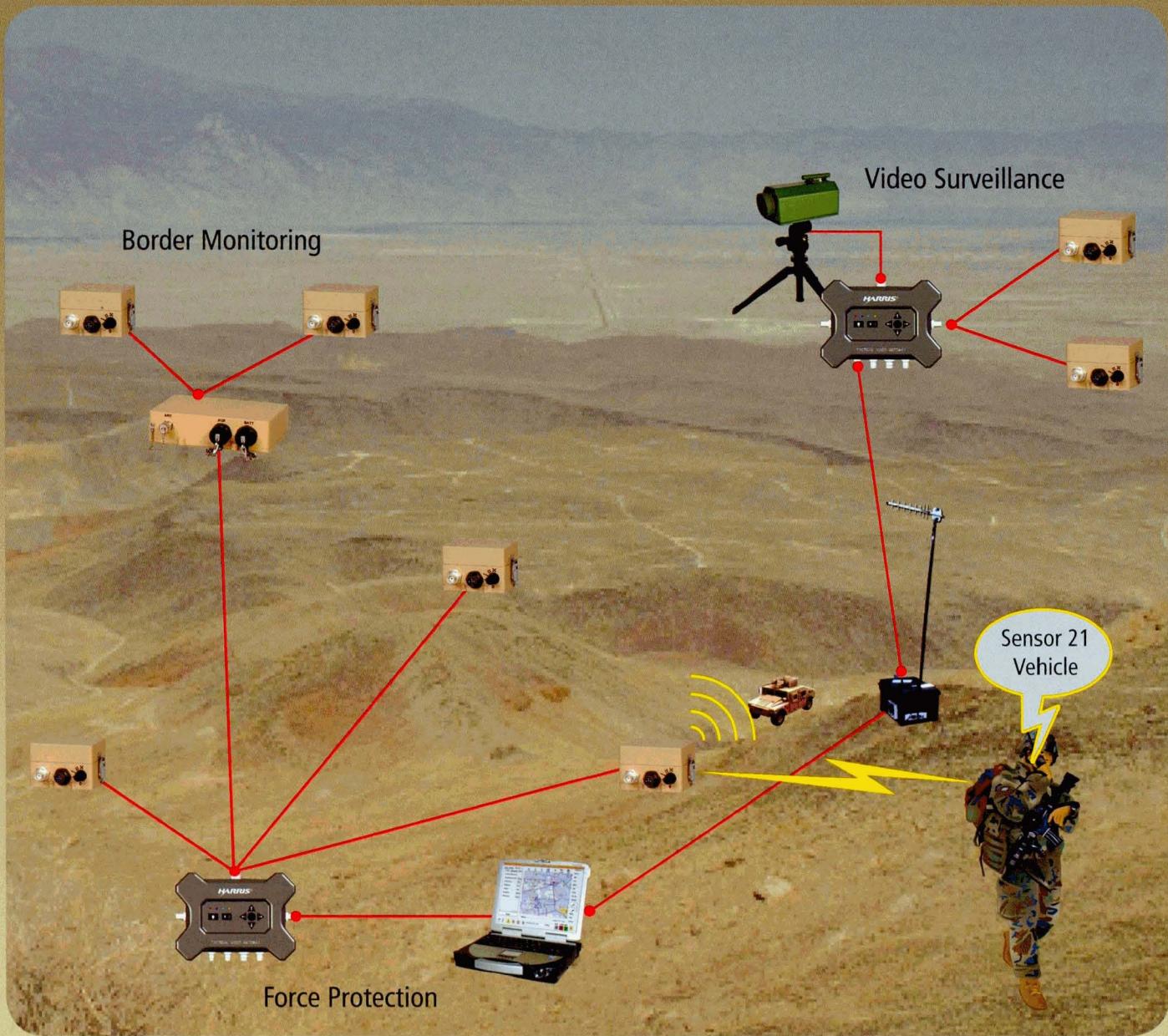
Each kit comprises a laptop computer, cables and the software necessary to program the security and surveillance equipment as well as to display the sensor, imaging and video reports. The RF-7800M handheld radio is included for receiving voice alarms from the sensors when portability is a requirement.

Border Monitoring Kit (Qty 1)

This kit provides the additional capabilities needed to deliver the standoff range and lifetime required for typical border monitoring missions. The RF-5400VH-RU Relay Unit provides a minimum range extension of five kilometers and will operate for approximately 10 months.

RF-7600P-UI401 Security and Surveillance System Equipment

SNIPER PROTECTION X 3	PLATOON DEFENSE X 3	MICROTERRAIN OBSERVATION X 2
<ul style="list-style-type: none">» RF-5400VH Mini-Sensors with 12047-3712-A1 Seismic Detectors (QTY: 4)» RF-3162DB-AT001 Dismount Antenna» RF-7800M-HH Handheld Radio» RF-5961-HS003 Security Forces Communications Set» 12041-1595-001 Accessory Bag	<ul style="list-style-type: none">» RF-5400VH Mini-Sensors with 12047-3712-A1 Seismic Detectors (QTY: 15)» RF-7800M-HH Handheld Radio» 12047-3733-01 Passive Infrared Detectors (QTY: 7)» RF-7400E-VG Tactical Video Gateway	<ul style="list-style-type: none">» 12085-1125-01 Access Point» RF-7400E-VG Tactical Video Gateway» RF-7400E-IK002 Medium-Range, Low-Light Camera» RF-7400E-IK004 Medium-Range Infrared Camera



PROGRAMMING AND CONTROL X 3	BORDER MONITORING	OPTIONS
<ul style="list-style-type: none"> » RF-3577-73EN Rugged Laptop Computer » 12047-4120-01 Mission Programming Application » RF-7800M-HH Handheld Radio » RF-5410FC-EN001 FalconCommand Application » RF-7400E-CV001 Falcon C2View Application 	<ul style="list-style-type: none"> » 12047-2437-01 Battery Bag (QTY: 5) » BB-2590/U Rechargeable Batteries (QTY: 30) » RF-5400VH-RU Relay Units (QTY: 5) » RF-5902-CH008 Eight-Bay Battery Charger 	<ul style="list-style-type: none"> » Additional Surveillance Cameras » Additional Kits » MicroTerrain Relays

ENABLING TECHNOLOGIES

Our strengths in sensing, video processing, and low-power communications enable the system's functionality

Several key technologies and capabilities are incorporated into the Harris Security and Surveillance System which allow it to facilitate a broad range of security and surveillance missions:

- » Advanced algorithms which significantly reduce false and nuisance alarms, allowing operators to focus on the mission
- » Video processing that enables transmission over long distances and narrow channels
- » Designs that minimize power consumption
- » Operational design flexibility, allowing the same equipment to perform in multiple mission scenarios
- » Intuitive video management software

False and nuisance alarm performance makes the difference between a security and surveillance system that is a force multiplier and one that is a manpower-consuming distraction. Constant investigation of nuisance alarms will drain resources from the unit's primary mission and may eventually lead the security team to retire the system altogether. Harris has included various algorithms that minimize reports from a variety of typical nuisance sources such as animals, high winds, low flying aircraft and helicopters, artillery fire, etc. The U.S. Army Capabilities Manager for Unattended Ground Sensors office praised our sensors, noting that our false and nuisance alarm performance should be the goal of every sensor vendor.

Today the commander often needs to be able to view a video of detected targets to determine whether they are indeed threats. The Security and Surveillance System toolbox provides a remote video capability that can meet this requirement. Since video

data requires large amounts of transmission bandwidth, it can be difficult to transmit the data over long distances without the use of masts and highly directional antennas. Harris solved this problem by developing the RF-7400E-VP low-power Tactical Video Processor, which performs video input digitization, frame rate selection, and variable data compression. This capability allows the operator to trade off range, frame rate, and picture quality depending on mission requirements, consistent with low-power communications operations. The Tactical Video Processor functionality is embedded in the RF-7400E-VG Tactical Video Gateway.

Depending on the size of the area being protected and the needs of the unit employing the system, detection reports can be received as voice reports over Harris radios, displayed in a tabular format on the RF-7400E-CV001 Falcon C2View application, or displayed with geo-referencing on a laptop through FalconCommand™ battle management software.

Falcon C2View is used to display, store, and manage video transmitted by the MicroTerrain Observation function. This software also allows the operator to remotely modify the surveillance node configuration parameters and camera presets. The emplacing team can concentrate on positioning and camouflaging the surveillance node, which is typically done at night; no time is wasted adjusting settings and presets in the target area.

Security and Surveillance System cameras can observe "blind spots" because they are strategically deployed in the field



FEATURES	BENEFITS
Excellent False Alarm Performance	Harris's animal cadence, footstep count, qualification, and filtered mode algorithms can virtually eliminate false and nuisance alarms. U.S. Government testing for three full days on an active test range resulted in no false or nuisance alarms.
Advanced Video Processing	Using advanced compression algorithms, the Tactical Video Gateway (TVG) provides multiple video frame rate and compression ratios for optimizing the video quality over the radio channel. The TVG generates pan/tilt/zoom commands for any PTZ camera attached to it, either in response to remote operator commands or due to sensor cues received over the wireless link. Advanced video compression standard (H.264) provides enhanced image quality with up to 50 percent less bandwidth than previous standards.
Low-Power Electronics	Allows systems to be emplaced in remote areas for extended periods, minimizing force exposure, logistics, and possible equipment compromise during resupply missions. Increases equipment reliability since components are not stressed and generate less heat; reduces need for spares and reduces system life-cycle costs.
Modular Architecture and Standardized Interfaces	Modularity ensures that the system can be scaled to adapt to a wide range of mission needs and deployments by simply adding more components such as sensors, surveillance nodes, and monitoring stations. Converting video into IP data packets allows it to be easily transmitted across networks of Harris Falcon III® and other IP-based radios. Modularity also allows for technology refresh/upgrade of system capabilities (e.g., camera, radio, displays) at low cost and low risk.

SERVICE OFFERING

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. The Security and Surveillance System leverages the program management principles and practices used in our custom development programs. Our responsive program management team and customer service organization will deliver and support a highly capable force and border protection system.

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

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

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

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

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

Additional capabilities include:

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

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

Harris trains approximately 5,000 students per year on the installation, operation, and maintenance of our equipment and systems. This training occurs in formal classrooms at Harris facilities, at customer locations, and in the field. Our students (our customers) routinely rate the training they receive as "meeting or exceeding expectations."



The Harris Security and Surveillance System provides economic benefits over its entire life cycle:

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

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

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

Life-cycle costs are reduced by:

- » Use of common equipment and software applications
- » 24/7 support capabilities
- » Available in-country training and training material
- » Common equipment interfaces and programming
- » Availability of installation and maintenance by in-country partners
- » Availability of extended warranties beyond the standard 12 months
- » Low-cost upgrade paths



PROVEN PERFORMANCE

Harris supplies and services products in over 150 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 modern communications media, including voice, data, video, and imaging. We use this

unique capability to provide systems and networks for customers in defense, intelligence, government, public safety, healthcare, broadcast, and energy markets.

Harris RF Communications Division (RFCD) is the leading supplier of tactical, secure voice and data communications products, systems, and networks to military, government, and commercial organizations worldwide. Over 50 years of international experience is leveraged into the design and deployment of Harris RFCD's packaged C4ISR system solutions.

The Security and Surveillance System is one more example of Harris responding to the needs of its customers.



Harris has internationally acclaimed products which have left everyone else in the dust. ➤ *International Customer*

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*



Always connected. Never alone.



Our proven solutions provide:

- » Voice, data, and video where it's needed, when it's needed
- » Cost effectiveness over the life cycle of the system
 - No long, costly development cycle
 - Unsurpassed in-country support during and after delivery
- » Scalability and growth options
- » Configurable solution sets
- » On-time delivery of quality systems

 RFCD Headquarters and Manufacturing
 Regional Hubs
 Harris Offices
 Harris Partners
 Harris Falcon® Customers

THE HARRIS DIFFERENCE

As your partner, Harris is committed to your success

Harris Corporation welcomes the opportunity to discuss the Security and Surveillance 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.
- » Pre-engineered system designs emphasize commonality of equipment and resources to reduce life-cycle sustainment costs such as training, sparing, and maintenance.
- » Harris systems engineers and in-country partners can readily customize the solution, as required.
- » The systems are supported by our world-class customer service organization that operates in every part of the world and is second to none.

Harris Corporation is a \$5 billion (USD) international communications systems company serving government and commercial markets in more than 150 countries. We are confident that our packaged C4ISR system solutions represent the best value with the lowest schedule, cost, and technical risks for meeting your complex operational challenges.

Our solutions leverage:

- » Harris video processing and management technology
- » Unattended ground sensor expertise
- » Open standards and interfaces
- » Focused program teams
- » Over 50 years experience providing state-of-the-art military systems
- » Product service teams that deploy to our customer
- » Over 7,000 engineers and scientists throughout the corporation



**Protecting units, bases, and borders
with target-cued surveillance**



HARRIS
assuredcommunications®

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