



SPI

ADVANCED MILITARY LONG RANGE EO/IR IMAGING SYSTEMS

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SPI Advanced Long Range thermal IR imaging flir camera systems



COMPANY OVERVIEW

- ▶ IN OPERATION SINCE 1974
- ▶ STARTED WITH COMMERCIAL VIDEO PRODUCTS
- ▶ FOCUSED ON MILITARY AND HOMELAND SECURITY APPLICATIONS
- ▶ 27,000 SQUARE FOOT FACILITY
- ▶ EXTENSIVE CNC MACHINE SHOP AND AUTOMATED INSPECTION
- ▶ ISO 9001 AND AS9100 REGISTRATION (PERFECT SCORES)
- ▶ FACTORY CAPACITY CAN SUPPORT >30 INTEGRATED SURVEILLANCE OR CAMERA SYSTEMS PER MONTH
- ▶ KEY MARKETS ARE MILITARY, ISR, AIRBORNE SYSTEMS, SHIPBOARD SYSTEMS, ULTRA LONG RANGE SURVEILLANCE SYSTEMS, ARMORED VEHICLE SIGHTS

KEY PRODUCTS AND TECHNOLOGIES

- ▶ ARMORED VEHICLE SYSTEMS
 - ▶ COMMANDERS PAN VIEWER FOR THE STRYKER MOBILE GUN SYSTEM, LRSS (**CANADIAN LAV**: GIMBAL, LASER POD, VISIBLE POD AND SWIR POD)
 - ▶ PRECISION MULTI AXIS GIMBALS
 - ▶ MULTIPLE SHORT, MEDIUM AND LONG RANGE IMAGING SYSTEMS, LRSS (**CANADIAN LAV**)
 - ▶ INDUSTRY LEADING RUGGED, RELIABLE SENSOR SYSTEMS
 - ▶ ULTRA LONG RANGE IR AND VISIBLE/LOW LIGHT CAMERA SYSTEMS
 - ▶ ULTRA LONG RANGE, EYE SAFE **AT THE APERTURE** LASER POINTER
 - ▶ ULTRA LONG RANGE EYE SAFE LASER ILLUMINATORS
 - ▶ INTEGRATED LASER RANGE FINDERS
 - ▶ INTEGRATED, NETWORK ENABLED SURVEILLANCE SYSTEMS BASED ON OPTIMIZED SELECTION AND INTEGRATION OF GIMBAL AND SENSOR CONFIGURATIONS
 - ▶ SHIPBOARD SYSTEMS – GIMBAL SYSTEM FOR USN AIRCRAFT CARRIERS, ZUMWALT CLASS SURVEILLANCE SYSTEMS
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KEY PRODUCTS AND TECHNOLOGIES

- ▶ AIRBORNE SENSOR SYSTEMS
 - ▶ **KC-767 TANKER VISION SYSTEMS**, C-17 LOAD MASTER VISION SYSTEM, ADVANCED FLIGHT RESEARCH SENSOR SYSTEMS FOR NASA F/18, F/15, 747, AND HIGH ALTITUDE RESEARCH AIRCRAFT
- ▶ ENVIRONMENTAL ENCLOSURES FOR DEMANDING APPLICATIONS FROM OIL PRODUCTION TO SPACE BASED IMAGING
- ▶ FIRMWARE, SOFTWARE AND USER INTERFACES BASED ON EXTENSIVE FIELD TESTING AND DEPLOYMENT
- ▶ COMPLETE SYSTEMS ENGINEERING SERVICES FROM REQUIREMENTS DEVELOPMENT TO OPTIMIZED ESS AND ACCEPTANCE TESTING



US NORTHERN BORDER IMAGING SYSTEMS



US SOUTHERN BORDER LONG RANGE IMAGING SYSTEMS



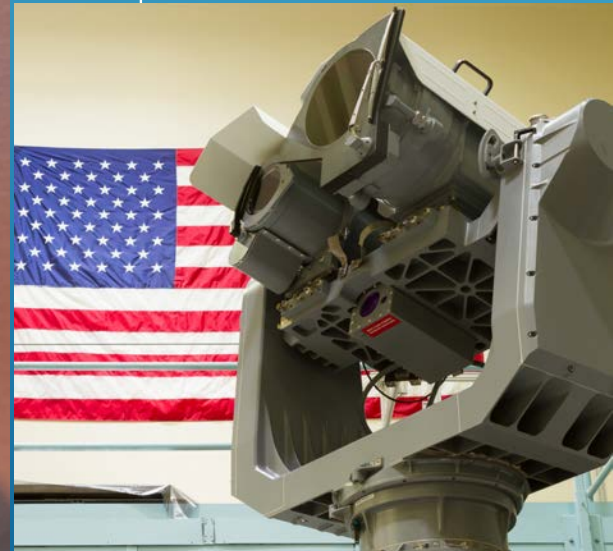
MULTIPLE CONTRACT FOR US GOVERNMENT MOBILE BORDER PATROL SECURITY/SURVEILLANCE APPLICATIONS



US GOVERNMENT SLEW TO CUE RADAR MOBILE PTZ BASED LONG RANGE THERMAL/VISIBLE IMAGING SYSTEMS W/CO-ALIGNED LASERS



US NAVY AIRCRAFT CARRIER LONG RANGE GIMBAL SYSTEM CONTRACT



US NAVY ZUMWALT CLASS DESTROYER IMAGING SYSTEMS CONTRACT



ARMOR

CPV FOR THE STRYKER MGS CONTRACT

- ▶ The CPV design uses the same absolute encoders and direct drive servo motors as our Long range M9 products providing extremely high pointing accuracy and repeatability.
- ▶ Over 250 systems produced and fielded since 2000
- ▶ Exceedingly high reliability after over 1 million vehicle miles combined with thousands of 105mm rounds fired.
- ▶ <100 micro radian RMS per axis stabilization over a bump course with the main gun un-stabilized.
- ▶ The CPV deployment validates the high reliability of the key design elements of all our gimbal products in an extreme environment





EXCEPTIONAL EO/IR IMAGE QUALITY UTILIZING THE BEST SENSORS AND OPTICS



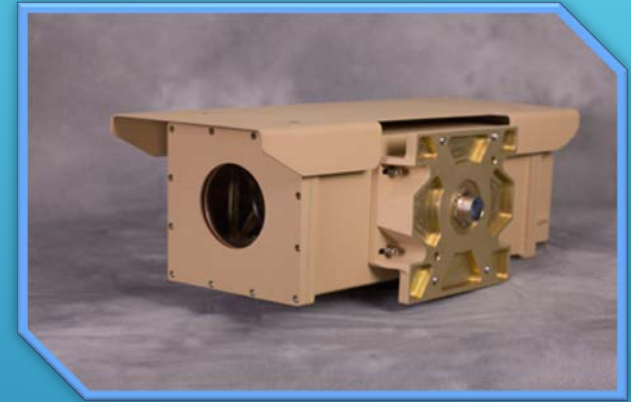
SENSOR SYSTEMS ZOOM LASER ILLUMINATOR

- ▶ The Long Range Zoom Laser Imaging Illuminator system provides variable field of view and uniform illumination out to ranges in excess of 3,000 meters to point out and illuminate targets, with sufficient coverage area for use with visible EM-CCD cameras and Night Vision Goggles (NVGs) in darkness. The laser illuminator is packaged in our fourth generation sensor enclosure that combines over 20 years of field proven performance with incremental improvements to enhance performance, stability, durability and ease of deployment. Designed to withstand the harshest conditions and environments, this configuration has been successfully deployed in both mobile and fixed homeland security roles throughout the United States, as well as in force protection roles in both Afghanistan and Iraq. Most recently, it was provided for industrial security roles in the Middle East.



SENSOR SYSTEMS EYE SAFE LASER POINTER

- ▶ The Long Range Laser Pointer/Designator is an eye-safe *at the aperture* laser spot pointing system that provides a 1½-meter diameter laser spot to ranges in excess of 10,000 meters to point out targets and illuminate areas of interest. The laser system has been successfully deployed in both mobile and fixed homeland security roles throughout the United States, as well as in force protection roles in both Afghanistan and Iraq. Typical use is in spotting applications in tandem with Night Vision Goggles (NVGs) or EM-CCD visible cameras.



AIRBORNE SYSTEMS KC-767



KC-767 Situational
Awareness Camera
System Contract



AIRBORNE SYSTEMS FOR KC-767



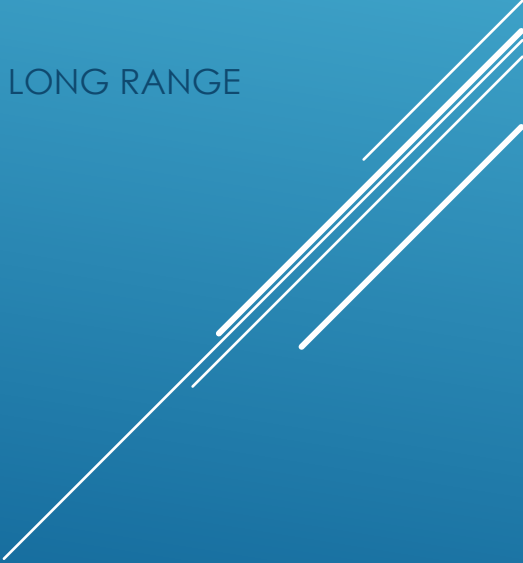
KC-767 (Boom Airborne
Refueling Camera System)

FACILITY OVERVIEW

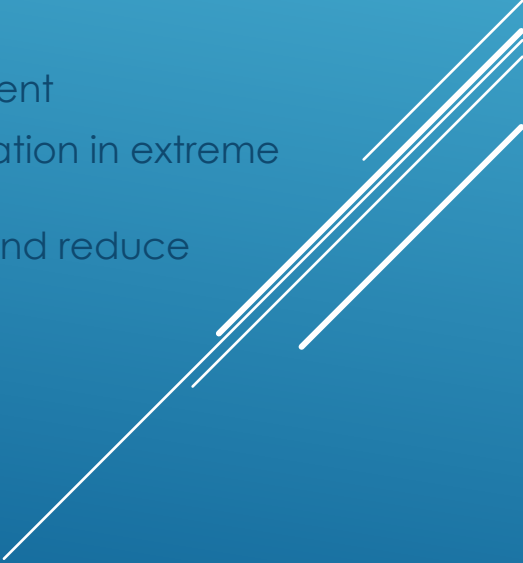
- ▶ 27,000 SQUARE FOOT FACILITY WITH INTEGRATED DESIGN, FABRICATION, ASSEMBLY INTEGRATION AND TEST CAPABILITIES
- ▶ EXTENSIVE CNC MACHINE SHOP RUNNING TWO FULLY STAFFED SHIFTS AND ONE AUTONOMOUS OPERATION SHIFT
- ▶ CLASS 10,000 CLEAN ROOM WITH LAMINAR FLOW BENCH
- ▶ OPTICAL INTEGRATION LAB
- ▶ LASER INTEGRATION AND TEST LAB
- ▶ INTEGRATED ENVIRONMENTAL TEST CENTER



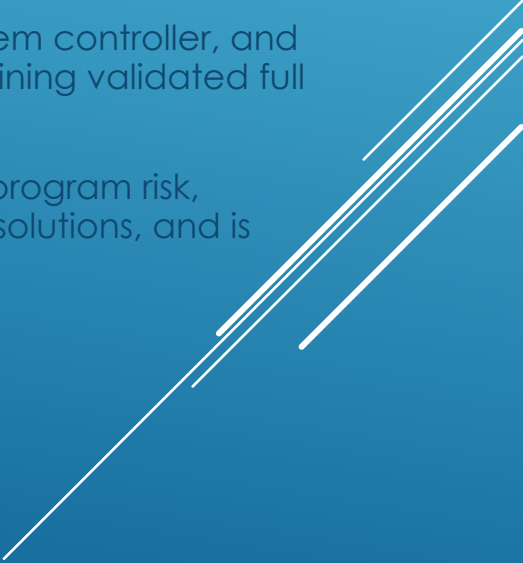
AFFORDABLE EXCELLENCE FROM PROTOTYPE TO PRODUCTION

- ▶ INTEGRATED IN HOUSE DESIGN, FABRICATION ASSEMBLY, TESTING, AND SUPPORT
 - ▶ ALL PROCESSES AND PROCEDURES ARE DOCUMENTED AND CERTIFIED TO AS9100B CERTIFIED AND ISO 9001
 - ▶ INTEGRATED PRODUCT DEVELOPMENT INCLUDING REQUIREMENTS DEFINITION AND ANALYSIS, MECHANICAL DESIGN ENGINEERING , ELECTRICAL DESIGN, SOFTWARE DEVELOPMENT AND SUPPORT, PRECISION ASSEMBLY, INSPECTION AND TEST
 - ▶ PRECISION MACHINE SHOP WITH A RANGE OF HIGH SPEED CNC MILLS AND LATHES
 - ▶ TWO SHIFT MACHINE SHOP AND ONE ASSEMBLY AND TEST SHIFT DELIVERING >30 MULTI-SENSOR SUITES PER MONTH
 - ▶ EVERY SENSOR AND LASER PRODUCT IS SUBJECTED TO FULL ESS, IMMERSION, TEST, AND FUNCTIONAL TESTING
 - ▶ EXTENSIVE FIELD TESTING AND VALIDATION
 - ▶ CLOSE, LONG TERM SUPPLIER AND CUSTOMER RELATIONSHIPS (MILITARY LONG RANGE IMAGER SUPPLIER TEAM UNCHANGED SINCE INCEPTION IN 2001)
 - ▶ FLEXIBLE LEAN OPERATIONS
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MODULAR OPEN ARCHITECTURE

- ▶ Support both new and legacy platforms and applications
 - ▶ Provide a seamless upgrade path as requirements and technologies change
 - ▶ Our goal is zero obsolescence, at a system level, and the lowest cost over the life of the program or platform
 - ▶ We aim to achieve this goal while providing users with the capability to deploy the latest and best sensor technology available.
 - ▶ Design system modules as true line replaceable units to simplify maintenance and support capability upgrades in the field.
 - ▶ Eliminate the need for any special tools or equipment
 - ▶ Eliminate or reduce the need for sensor alignment after replacement
 - ▶ Maximize the use of captive fasteners for all LRUs to support installation in extreme and challenging environments
 - ▶ Minimize the use of external cables to simplify system integration and reduce potential failure points
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MODULAR OPEN ARCHITECTURE SYSTEM CONFIGURATION

- ▶ Direct Drive Servos motors for Az and El, sized to meet payload and system requirements
 - ▶ 19 or 21 bit direct mount encoders
 - ▶ Electronic and Mechanical Gyro-scope available for Multi axis stabilization and third axis via electronic de-rotation
 - ▶ Same C2, Software ICD and mechanical mounting interface for all gimbal designs.
 - ▶ Standard mounting interface may be readily adapted to meet legacy and platform specific interface requirements
 - ▶ Hot Swappable sensors for maintenance and easy rotation of sensors and spares
 - ▶ Front and Rear Covers removable for component, video encoder, system controller, and gimbal servo controller troubleshooting and replacement while maintaining validated full immersion capability to IP68 standards
 - ▶ This Modular Integrated System, Sensor, and Gimbal Approach lowers program risk, decreases integration costs, reduces time for integration and platform solutions, and is easily configurable for unique platform and payload requirements.
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LOWEST COST OVER THE LIFE OF THE PROGRAM

- ▶ Zero system level obsolescence moving forward based on the ability to integrate new sensor technology as it is released
- ▶ Allows engagement of Legacy and New Sensors: Reverse Compatible to legacy sensors, or a combination of new sensors and legacy sensors as spares
- ▶ Forward compatible from SD to full HD, as new sensors are introduced
- ▶ No wear components
- ▶ Sensors and Gimbals sealed within Aluminum Weldments or Carbon Fiber sealed IP 68 plus enclosures which are full immersion tested
- ▶ Very High industry leading MTBF
- ▶ Uses standard Ethernet or Serial C2 connections
- ▶ Code for new sensors upload-able remotely into the on-board FPGA from system Ethernet connection
- ▶ Rapid upgrades saves time and material costs
- ▶ Rapid Sensor changes reduce labor and down time
- ▶ Streamlined integration effort minimizes schedule and technical risk
- ▶ This approach drives the cost down for each platform over the life of the Program while at the same time still remaining competitive at initial purchase cost for each system.

LOWEST SCHEDULE AND TECHNICAL RISK

- ▶ Our system solution utilizes current long range ptz imaging system products deployed for US border security applications with multiple successful programs awarded
 - ▶ Systems have been fully qualified based on third party laboratory tests
 - ▶ All long lead items are in inventory or have been secured for immediate delivery
 - ▶ Full control over our manufacturing schedule utilizing in house NC machining resources
 - ▶ 100% immersion testing and Environmental Stress Screening for each system delivered
 - ▶ ISR integration has been completed and validated in the field
 - ▶ Militart radio has been fully integrated with the gimbal and can be offered as part of the integrated system
 - ▶ We can support the required delivery schedule with no risk
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