

M9

MARINE SYSTEMS CLASS EXTREME LONG RANGE MULTI SENSOR

COASTAL SURVEILLANCE

NAVAL VESSEL

USV / ASV

HARBOR PATROL

SEARCH / RESCUE

MARINE GRADE

RELIABLE OPERATION IN ALL ENVIRONMENTS

**IP-68
SUBMERSIBLE**



The M-CLASS MARINE Long Range STABILIZED Multi Sensor platform is a robust Marine Grade imaging system designed to withstand the rigors of oceangoing vessels in all weather conditions. The M-CLASS can be used as a stand alone system or can be easily integrated into existing marine electronics including radar and navigation systems. The highly configurable M-CLASS can be controlled by a variety of bridge mounted controllers or tied into common protocol systems you already have. The long range stable M-CLASS is ideal for coastal surveillance from land or from vessels underway. The M9 is the only IP68 completely sealed nitrogen purged system on the market that can withstand 100% humidity and operate while completely submerged. The M-CLASS is the preferred platform for integration into the latest USV/ASV programs. The clear choice for coastal asset protection.

THE HIGHLY CONFIGURABLE M-CLASS EO/IR SYSTEMS ARE THE SINGLE SOLUTION FOR ALL YOUR COASTAL SECURITY IMAGING APPLICATIONS

Sierra Pacific Innovations Corp - Las Vegas, NV, USA - 702-369-3966 - sales@x20.org - www.x20.org

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BORN TO SERVE YOUR NEEDS

The Ultra Long Range M9 CLASS COOLED MWIR M9 is a highly sensitive mid-wave IR camera designed for long-range surveillance and security applications. Manufactured to exacting standards and customer centric design philosophies.



MODULAR OPEN DESIGN ARCHITECTURE

- A true integrated approach to surveillance systems where all the system elements and their interactions are considered on a continuous basis
- 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
- Internal system controller design supports rapid integration of new sensor packages
- User interface is common regardless of sensor selection
- FPGA artwork, firmware and operational software can be updated over the network to support new capabilities and changing requirements
- Expanded pelco d interface to support direct integration into existing c2 systems
- Modular system design - the system can be rapidly installed and reconfigured in the field. Maintenance is simplified with symmetrical external covers and hinged service panels to expose all the internal sub-systems

SYSTEM ARCHITECTURE FEATURES

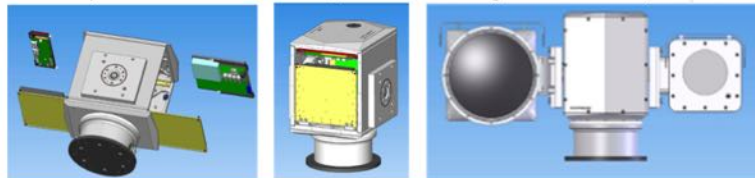
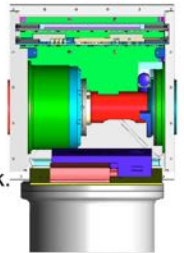
- Key components from the stryker commanders pan viewer were utilized for the system
- Edge cooled cards and system components validated iaw mil-std-810f operation between -40c and +85c
- Blind-mating, hot swappable sensor packages eliminate external cabling and support rapid system integration with excellent bore-sight.
- Light weight modular configuration to support rapid deployment
- Single screen gui with a familiar game controller interface
- ETASS compliant
- Expanded pelco-d interface for integration into existing command and control systems

EXCLUSIVE MOTOR DRIVE DESIGN

- Direct drive servo motors and encoders directly connected to the azimuth and elevation drive shafts support the full resolution of the 19 bit absolute encoders with no hysteresis.
- Brushless motors and oversize bearings provide high reliability, excellent alignment retention and significant structural margin
- There are no wear or limited life components in the system that require service or maintenance. No gears, chains or belts to break.

INDUSTRY LEADING RELIABILITY

- Direct drive servo design eliminates any wear issues associated with competing systems that use chains, belts and gears.
- Large diameter high strength bearings and shafts provide significant structural margin and precise motion.
- Edge cooled circuit cards, qualified to an edge temperature of 85°C, provide reliable operation in extreme environments.
- Sensor suite is fully sealed and submersible.
- Encoders are designed and tested for extreme temperature and high vibration environments.
- Major components have been field proven as part of the us military pan viewer system (HUNDREDS of units fielded).
- The M9 system, which is comprised of the M9 pan/tilt and sensor suite, has an MTBF greater than 40,000 hours.



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SPECIFICATIONS

Optical Assembly

Image Sensor	: Full Frame 100% pixel depth CMOS 1/1.9" 1920X1080 SENSOR multi-mode high sensitivity CMOS HD 1920x1080 BSI FPA 1920x1080 through entire system
Camera Hardening	: Hardened wiring harness and staked connectors to military standards boresight retention over range
Sensor Stabilization	: 4 Layer 4 Axis Electronically and Mechanically Stabilized Optical Platform
Output Resolution	: 1080P HD 60 FULL 1920x1080 output through system
Lens	: 2000mm UFA™ (UltraFast Autofocus) 12bit registered with bore sight stability to better than 2% over the entire zoom range
Optical Zoom	: Fast Continuous zoom visual
Minimum Illumination	: 0.0003 lx full color (f/1.2) .00002 LX BW (f/1.2) STD.
Fog/Haze Filter	: Atmospheric penetrating Bi Linear Fog/Haze mitigation routine for Long Range Disturbance Attenuation (LRDA)
Backlight Compensation	: BLC/HLC/DWDR (Digital WDR)
Optical Enclosure	: Hardened 99% transmissible. CLEAN ROOM assembly. Rated IP68 100% humidity submersible

Thermal Imager

Image Sensor	: HD InSb Lattice Mesh FPA High Sensitivity Cooled MWIR
Sensor Stabilization	: Mechanical and Electronic Layer 4 Axis Centerline Stabilization
Lens Focal Length	: 1200mm Extended range continuous zoom
Array Format	: 640x512
DRI Detection Range	: 51+KM
Digital Detail Enhancement	: Digital Detail Enhancement (DDE) Low/Medium/High
Image Processing	: LAP Local Area Processing Gain for Wide Dynamic range imaging and target discrimination in challenging environments.
Cooler Lifetime	: 40,000 hours (rated), nitrogen purged
Window	: Hardened DLC 99% transmission CLEAN ROOM assembly. Rated IP68 100% humidity submersible

Pan/Tilt Mechanical

Drive Unit	: Direct Drive Zero Hysteresis
Pan Angle	: 360° Continuous Pan Rotation
Tilt Angle	: 180° + -90° Full Tilt Angle
Positioner Speed	: + .0001° /sec to 180° /sec in Pan and Tilt axis
Positioner Accel.	: 200° /sec² in Pan and Tilt axis
Encoder	: 19bit absolute encoder
Resolution	: +0.0006
Electro Assist Stab.	: <80 Å/rad
Backlash	: None
Gyro Stabilisation	: Up to 4 Axis Layered Composite Gyro Mechanical Payload and Positioner stabilization
Absolute positioning	: Yes
Payload Mount	: Quick disconnect zero downtime blind mate gold plated connectors TASS connection

Environmental

Operational Temperature	: -40°C to +70°C Standard
Humidity	: 100% Validated with total submersion testing on every unit waterproof IP68
Environmental Certifications	: MIL-STD-810, IP68 will function while moving up to 130 MPH Humidity, Salt Fog, Immersion, Blowing Sand.
NBC/CHEM/BIO	: Operational with Nuclear/Chemical/Biological protective gear MOPP IV protective suit.

Sensors

Laser Range Finder	: 22km Extreme Long Range Laser Range Finder. Boresighted. Eye protection device.
GPS/Compass	: Geo Location sensors and DMC with real time on screen symbology
Radar Integration	: Radar Ready for Slew To Cue Integration
Processor	: Integrated TASS image processor to provide enhanced imaging capability in hot Tropical conditions.

Manufacturing

Country Of Origin	: MADE IN THE USA
Certificate	: ISO 9001 AS9100B
Fabrication	: Complete in house machining and fabrication for quality control
Optical Assembly	: CLASS 10,000 clean room facility for all optical package assembly

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COMPANY OVERVIEW

- Focused on military and homeland security applications
- Team of talented engineers, technicians and sales support staff
- 27,000 square foot manufacturing facility and 3,000 square foot support center
- Extensive CNC machine shop and automated inspection
- ISO 9001 and AS9100 registration (perfect scores)
- Factory capacity can support >40 integrated surveillance or camera systems per month
- Key markets are airborne systems, ultra long range surveillance systems, armored vehicle sights, border protection and coastal security



PRODUCT AREAS

- Precision 2, 3 and 4 axis gimbals
- Industry leading rugged, reliable sensor systems
 - o Ultra long range IR and visible/low light camera systems
 - o Ultra long range, eye safe at the aperture laser pointer
 - o Ultra long range eye safe laser illuminators
 - o Integrated laser range finders
 - o Color night vision
- Integrated, network enabled surveillance systems based on optimized selection and integration of gimbal and sensor configurations
- Airborne sensor systems
 - o Hunter uav take off/landing camera, 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

MANUFACTURING CAPABILITIES

- 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
- 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
- Two shift machine shop and one assembly and test shift delivering >40 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
- Flexible lean operations

TESTING/VALIDATION

- Thermal stress test of camera and lens to identify components requiring replacement, active cooling/heating, modification or hardening
- Incorporate changes and perform validation thermal stress test
- Integrate modified components on baseline optical bench
- Perform vibration stress test to identify components requiring reinforcement or isolation
- Incorporate changes and perform validation vibration stress test
- Repeat thermal validation tests
- Perform ESS testing on all units to storage temperature and maximum operation vibration levels

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