SELEX GALILEO
A Finmeccanica Company

EPTAVIEW: SEVEN-FLYING-EYES SYSTEM 360° AIRBORNE SURVEILLANCE SYSTEM

EPTAVIEW presents a new concept of airborne surveillance for manned/unmanned and conventional/unconventional aerial vehicles. It provides the user with a full 360° Field-of-View (FOV), automatic target tracking with pan/tilt stabilised Pod, digital recording, bi-directional remote communication, GPS/INS navigation with maps, and smart Human Machine Interface (HMI) presentation.

GENERAL DESCRIPTION AND KEY FEATURES

The EPTAVIEW system comprises:

- Sensors Unit installed outside the vehicle
- Display Unit
- Processing Unit
- Ground Station.

EPTAVIEW components are classified as per "No Hazard" applications fulfilling applicable DO and MIL standards for HW and SW parts.
The sensor unit is a group of seven camera sensors.
One of the cameras is installed in a pan/tilt stabilised Pod and can be manoeuvred by the crew. The other six are fixed and placed at regular angles on a circular base so that a full 360° FOV in azimuth is achieved. All cameras are based on digital colour CMOS sensor, Automotive/Industrial grade (compatible with infrared uncooled cameras) characterised by an optical and digital zoom, digital auto-focus and real-time automatic Electronic Image Stabilisation (EIS).
A full Gyro-Mechanical Stabilisation system inside the EPTAVIEW moving Pod reduces vehicle vibration and allows precise and automatic target tracking execution.
The Display Unit is an avionics grade 8.4" high-res colour ATFT-LCD DUMB display with embedded resistive touch-screen, installable in the cockpit or for use as a removable unit.
The Processing Unit performs the simultaneous presentation of real video from the seven cameras on the display unit and the HMI management.
It includes several low cost functional modules:

- GPS/ INS navigation module: based on Micro-Electro Mechanical Systems (MEMS) technology with full provision for interfacing magnetometer and air data systems
- Interface to bidirectional datalink module: for wide-band P2P or broadband SAT links data transmission
- Digital recorder module; solid state disk or rugged hard-disk for real-time recording of all the seven views
- Real-time encryption/ decryption module.

The Ground Station allows playback of the recorded images and includes a Remote Control System for the connection to several remote EVs, tracking over a map and the remote control of the on-board system.

TECHNICAL CHARACTERISTICS

Image Sensors	
Type	• Low-cost lightweight CMOS colour digital automotive/ industrial derived
	• Near-IR built-in capabilities
Specifications	• Up to XGA res 1024x768px at 30fps
	• Built-in gain control, auto-balancing, de-noising, auto-focus, panning, zooming

Optics	
Type	Low-cost lightweight fixed focal automotive/ industrial derived
Specifications	• Mounting selection of horizontal FOV from 90° down to 3° (max 100mm length) achieving 2X to 12X optical zoom • 4:3 image aspect ratio • Fixed camera optics mounted at 60° each in azimuth, typically -25° in elevation but can be modified according to customer requirements

Pod	
Stabilisation	Autonomous pan/tilt Gyro-mechanical
Gyros Type	MEMS. Automotive/Industrial derived
Performances	• Positioning ± 360 pan, ±90° tilt • Speed: max 120°/sec both • Resolution: 0.005°/step both • Gyros angular rate range: ±300°/sec

Target Tracking	Via Pod stabilisation and Gyro-imaging for Moving Target Tracking (MMT)

Main Features	
Processing Platform	Multi-core multi-DSP low-cost, low-power, high-performance Automotive/industrial derived
Functions	• Electronic Image Stabilisation (EIS) • Real-time image & data CODEC • 3-step optical zoom, HW/SW digital zoom • Real-time parallel video streaming with dynamic balancing of throughput, resolution, frame-rate, scaling and panning. • Defrost/ heating and dust removing system for cover glasses
HMI & Presentation	• Airborne HMI through a minimum 8.4" Display Unit • Portrait orientation, resolution 768x1024px with simultaneous presentation of the fixed cameras and, centrally, of Pod moving camera as high-res video. • Presentation of auxiliary data such as tracking area/ status, recording status, position, navigation, attitude, system/ status data. • Map module alternatively presented over high-res video area, with multiple selectable overlaying layers. • Bezel with resistive touch-screen and nine bottom buttons assigned to system functions • Touch-screen actions for moving camera alignment to touched fixed thumb and re-tracking to touched interest area.
Interfaces	
	• Gbit Ethernet or dual-redundant 100MbitEth (AFDX ready) • 100Mbit ethernet to external communication module • GPS antenna • Optional VGA/DVI, PAL, STANAG 3350 video standard • RS422, discretes, CANbus, generic synch serial
GPS/INS Navigation Unit	
GPS Module	WAAS & DGPS enabled
INS Module	6DOF MEMS technology
Modes	GPS+INS, GPS only, INS only, full sensor set (optional)
Performances	INS only accuracy: <3 nmls/hrs
Additional Optional Sensors	Air data, magnetometer, air temperature, others through serial itfs

Digital Recording Unit	
Technology	Solid State Disk (SSD)
Capacity	64G up to 500G user-defined
Performances	Real-time recording with time/ position tagging, built-in high efficiency CODEC achieving up to 6 hours of continuous recording at best quality level at original input resolution

System Characteristics	
Input Power/ Power Consumption	+28VDC/<10A
Dimension	EV-U: 420x480x190 EV-FPU: 380x380x155
Weight	EV-U: <7.0Kg EV-FPU: <7.0Kg
System Classification	"No Hazard"
Environmental Compliancy	DO160E
Hardware Compliancy	DO254 ready
Software Compliancy	DO178B Level D (level C/B ready)

SYSTEM LEVEL OPTIONS

Uncooled near camera and IR optics, Optical Image Stabilisation (OIS) for moving camera module.
Laser Range Finder (LRF) carried on moving camera module for direct distance measurements.
Passive Measuring Systems performed by moving camera module for remote target measurement and sizing.
Target geo-referentiation by GPS and LRF.
Open interface and modularity to existing EO systems/ pods, also in PAL/ NTSC formats, removing EV-UNIT's pod.

EPTAVIEW is developed in partnership by SELEX Galileo and Pariani S.r.l.

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