## WWW.MARSO.AERO

MANNED AIRBORNE AIRBORNE BEAL-TIME SURVEILLANCE & OBSERVATION SYSTEM

## THE MARSO SYSTEM

is a versatile surveillance system for a large class of missions ranging from large area ship detection via side-looking radar to vehicle tracking via optical and infrared video stream. Operating up to 200 km away from ground station, data can be downlinked in real-time. The system is operated efficiently from a relocatable/mobile base with minimum infrastructure requirements. Integration in existing surveillance system is supported by modular, standardized architecture.

### THE PLATFORM

**TRIXYEYE** platform is a certified two-seat very light gyrocopter developed by **TRIXY AVIATION** for professional use. Trixy Aviation is a certified aviation company based on EASA guide rules. Fields of application for TrixyEye are:

- Aerial photography
- Traffic observation
  Police air support

Border control

Coast guarding

- Search & rescue
- Media broadcasting
- Pipe line surveillance
- Power Line surveillance
- Wide area fire observation
- Avalanche blasting

Trixy Aviation

- Animal protection
- Relay station
- Drug war

## **TRIXYEYE** is a very economical and yet very capable aircraft designed to carry equipment and master various missions:

- Flying capabilities in stormy winds of 55 knots (100 km/h)
- Operation temperature range from  $-20^{\circ}$  to  $+50^{\circ}$  C
- Night flying capability with modern instruments and IR screen
- Take-off roll less than 75 meters (250 ft) unpaved
- Landing roll less than 30 meters (100 ft) unpaved
- Endurance of up to 6 hours with anti-explosion auxiliary fuel tank
- Slow flying capability for observation at 22 knots (40 km/h)
- Maximum altitude of 15,000 ft (4,500 m)
- Payload of 280 kg (620 lb)
- Optional skids, floats and bosh wheels available

## THE GIMBAL

MARSO is equipped with a 4-axis Gyro-stabilized SkyEye 2X-3 gimbal successfully developed for standard integration by Peiport. Peiport Industries Limited is a leading developer of observation and surveillance equipment based in Hong Kong with large manufacturing facilities in China.

#### SkyEye 2X-3 key features are:



#### HD Daylight Camera – SONY, Japan

Image sensor:1 / 2.8" CMOSResolution:1920 x 1080Effective pixels:3.27 MegapixeSensitivity:0.5 Lux (Color)Optical zoom:30x continuouWide FoV (H):40.6°Narrow FoV (H):1.4°Focal length – zoom:129 - 4.3 mm

#### 1 / 2.8" CMOS HD 1920 x 1080 3.27 Megapixels 0.5 Lux (Color), 0.095 Lux (B&W) 30x continuous 40.6° 1.4° 129 - 4.3 mm





#### Uncooled Thermal Camera – FLIR, USA

System Type Resolution: Zoom: FOV: LWIR Thermal Imager 640x512 3x (Opt) 2/4/8x (Dig) 18° X 14° ~ 6° X 4.5° Laser Range Finder Detection range: 4.5 km



The **RST WSMS-S** is a Side-looking Imaging Radar designed for fast coverage of huge areas - up to 4000 sq. km/hour. It allows operation in Day/Night- and All-Weather/Fog-conditions. RST is highly specialised German/Swiss enterprise in the field of Spaceborne, Airborne and Ground Based Radars.

#### Key features of the WSMS-S Radar are:

- On-board real-time SAR Processing
- Swath width up to 40 km (depending on resolution)
- Single Side looking SAR imaging selectable left or right side
- Oil detection mode (detecting oil on water surface)
- Ship detection mode (high resolution)
- Provision of real time SAR online images for down-link operation
- Real-time SAR image Display in aircraft and on ground
- Data recording for high-end post-Processing
- Fast coverage of large areas (up to 5000 sq. km/hour)
- small antenna and low output power

## The RST WSMS-S Radar supports maritime missions:

- Traffic control
- Oil spill detection
- Illegal immigration
- Illegal fishing
- Smuggle
- Debris detection
- Maritime search and rescue

#### As well as land missions:

- Border surveillance
- Disaster management
- Illegal mining
- Illegal deforestation
- Environment monitoring
- Area evaluation



### THE DRONE

The very slow flying capability of the gyrocopter and the fact that its rotor does not create "down-wash" make it possible to carry and deploy drones during a mission flight far away from the operation base or the ground station. MARSO is able to carry up to four Satellite Drones. They are mounted underneath the gyrocopter and can be deployed one at a time in special missions to obtain close-up images.

#### **Operation:**

- Operated by drone-pilot from rear seat
- Gyrocopter circles in save distance
- Visual contact (up to 2 km) allows legal operation in most civil air space
- Drone image recording and transmission to ground station
- Drones are not recovered in flight but can be landed safely





### THE UP- AND DOWNLINK

The **M4Com COFDM** Datalink provides a configurable transceiver solution for airborne and ground operations. M4Com is a German company involved in the development of challenging solutions for geo-data visualisation, distribution and processing in dispersed environments. The intended use is the provision of a configurable broadband down- and uplink, to send and receive video, IP streams and control data. It provides the capabilities to control EO/IR sensor gimbals, radar or other data acquisition sensors with ultra-low latency. It is also capable of encoding and transmission of multiple full-HD video streams in parallel to other sensor data sources with a data rate up to 31 Mbps.

For the most flexible adaptation to customer requirements, there are different stackable options like ultra-low delay video-view to sensor-control ("glass-to-glass") or high efficient encoding through low bandwidth.

The internal datalink management provides configurable and automatic settings like "on the fly range versus bandwidth adaption". The RF frontends contain a Software Defined Radio (SDR) for a frequency change within a defined range by software configuration. The spectral bandwidth occupied is 5 to 8 MHz.

The Transmission range under optimal conditions and dependent on data rate is more than 200 km (108 NM).

#### Applications:

- Bi-directional full-duplex broadband multi-channel link
- Bi-directional IP Bridge
- Parallel live streaming of data from multiple sensors or other data sources (e.g. video, radar, raw data, voice, imagery)
- Simultaneous control of sensors via uplink
- Uni-directional data link

Software Defined Radio for fine-tuning of bandwidth and adjustable center frequency in 1 kHz steps.

### THE GROUND STATION

The **M4Com Ground Station** provides modular multi-sensor and multi-INT surveillance and exploitation with next generation data storage and retrieval capabilities.

#### Additional features include:

- Multi-user capability with access to a centraland external databases
- Scalable from a portable single-user system up to a multi-user capable exploitation center
- Connectable to geospatial agencies using international standards
- Open Architecture extendable using a plugin concept



#### Annotation and Situational Awareness Management

- Create, overlay and manage annotation layers
- Various flexible and standard annotations and symbols
- Create, edit and manage situation and task information

#### Video Exploitation

- Seamless transition between live and historic video data
- Frame accurate positioning in all video streams of any size
- High-precision geospatial reference for slanted imagery

- Synchronous video- and image/map display with automated scroll and orientation
- Lossless and highly efficient video clipping functions
- Generation of geo-referenced still images using drag-and-drop



#### Task Management and Data Administration

- Support for institutional and national tasking procedures
- Support for various data sources (VIDIS, Data bases)
- Geospatial and time based query capabilities in all sources including the visualization of the results on a map
- Consistent support of geodetic standards

#### Collaboration & Reporting

- Chat and group chat
- Exchange various geographical information ob jects using point-and-click / drag-and-drop
- Dynamic reporting
- Various report formats
- Export video clips and markers
- Export of images and still video frames

## Manned Airborne Real-time Surveillance & Observation System

SIDE-LOOKING RADAR

SATELITE DRONE

4-AXIS-STABILIZED GIMBAL

D-MBTN

TP



TrixyEye

## FOUR BEST-IN-CLASS-COMPANIES

# have joined their knowledge and experience to create an efficient and affordable manned, airborne observation and surveillance system

#### THE SYSTEM

- Mission adaptable = Comprehensive equipment
- Economic = Low initial, operations and maintenance cost, Minimum staff
- Mobile/Relocatable = Compact, via trailer/container, on land or water
- All-weather = Temperature and wind resistant, day and night observation
- Minimum infrastructure requirements = No fixed base, Minimum ground staff, Single pilot

#### THE PLATFORM

- Airborne = Bird view over wide area
- Manned = Legal and safe to fly in any airspace
- Gyrocopter = Most suitable aircraft characteristics for observation and surveillance missions
- Safe = No stall, Reliable systems, Anti-explosion tanks, Single pilot operation, armoured version available
- Glass cockpit = Full instrumentation including warning systems and black box

#### THE RADAR

- Wide-swath = Large areal coverage (40 km swath-width)
- Image quality = Constant over swath, Large dynamic range
- Detecting the invisible = Day, night, behind clouds and through fog detection
- Modes = Ship and oil spill detection

#### THE GIMBAL

- Four-axis-gyro-stabilized = Excellent, vibration free images
- Full motion = 360° continuous horizontal rotation and 120° vertical tilt
- Fully equipped = HD video 30 x zoom, IR sensor, Laser range finder, Object tracking
- Multi-control input = Remote operation via link, back seat operator or pilot controls

#### THE SATELLITE DRONE

- The low speed flying capability and the "NO-Downwash" of the Gyrocopter allow
- Carrying and deploying small drones in flight
- · Legal in-sight operation by a drone pilot in the rear seat of the gyrocopter
- · Close-up images saved in the gyrocopter
- Images may be transmitted to ground station

#### THE UP/DOWN-LINK

- Long range = 200 km line of sight communication for radar, gimbal, drone and voice
- Remote control = Operating the airborne gimbal and the radar from the ground station over 200 km

#### THE GROUND STATION

- Ground station = Featuring real-time monitors, recorders and remote controls
- Exploitation = Live video exploitation and off-line high quality radar processing
- Annotation and Situation awareness management
- Flexible = Fixed base or mobile/relocatable ground station in truck/container

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