Sky Spotter™ System Architecture

Sensors
(Input)

- WFOV Staring Detector
- NFOV Investigator
- Radar Systems Legacy & New

Central Controller Unit

Operator's UI

AI Identification — F-16

Processing unit

Target Discrimination

Target Association

Image Processing

Trajectory Construction

Customers & Services
(Output)

- Real Time Assets Display
- Ground Base Air Defense
- Early Warning
- Aerial Situational Picture
- Air-space Control Intelligence

Sky Spotter™ Main Sensors:

WFOV

The optical parameters of the Sky Spotter™ WFOV are:

- FOV = 48º × 45º or 18º × 90º
- Detector Format = 1280 × 1024 pixels
- Spectral Transmission Band = MWIR 3-5 µ

NFOV

- Tracking accuracy: absolute 1 mRad
- Spectral Band: MWIR, SWIR
- Detector Format: both sensors 640 × 480 pixles
- NFOV: MWIR10º-0.4º, SWIR: 1.1º-0.2º
- Focal length: MWIR 1400 mm, SWIR 2500 mm

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SMART AND TO THE POINT

Sky Spotter ™
Passive Early Warning Electro Optical (EO) System
Airspace brought to its (EO) Senses
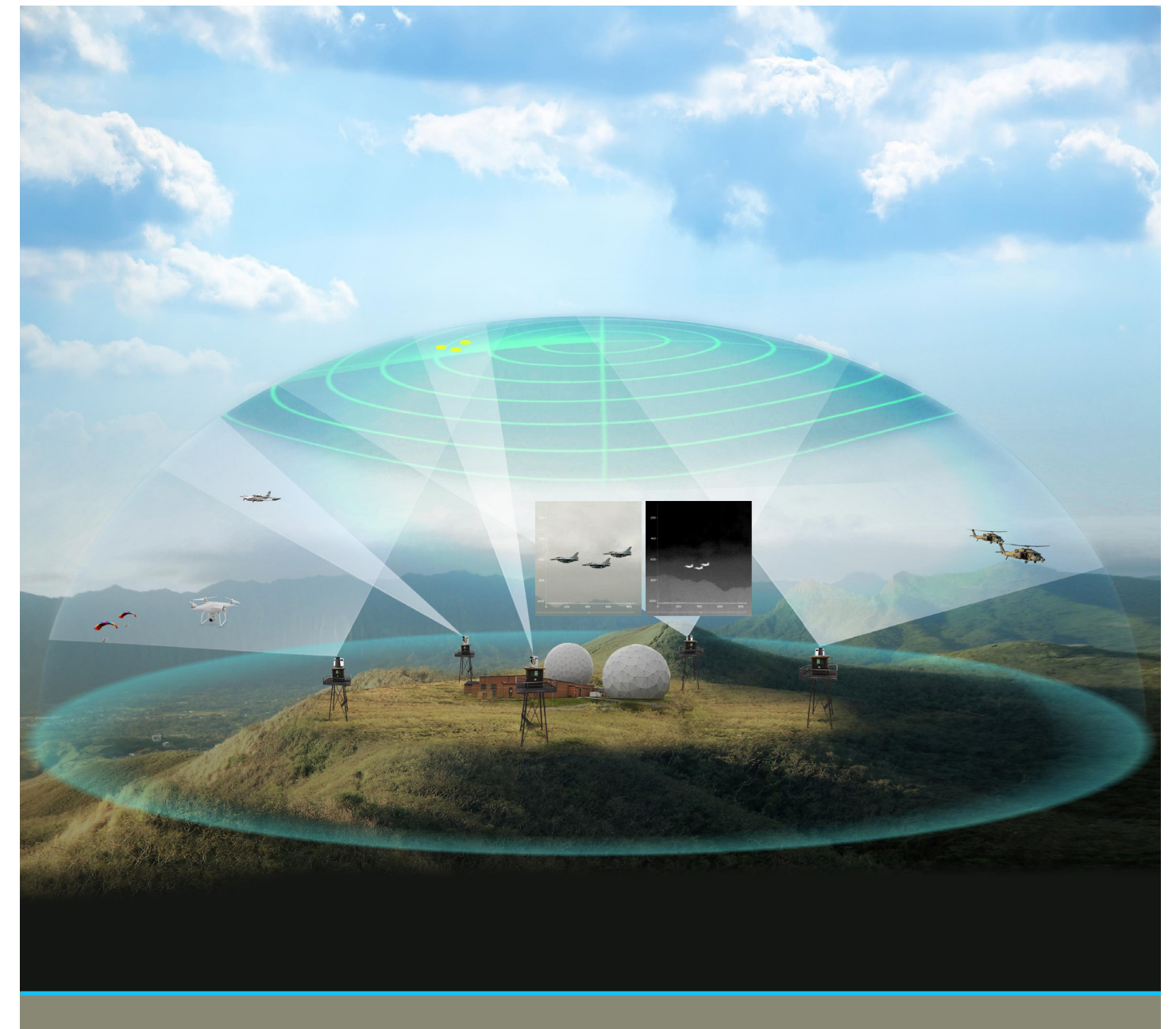
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Sky Spotter™ - Operational Background

The modern airspace is becoming increasingly challenged as aerial threats are manifested with growing capabilities, in quantity, lethality and sophistication. Legacy radars' inherent shortcomings are now used by new types of foes that endanger both the integrity of aerial sovereignty and ground-based critical assets.

Low RCS threats sneaking simultaneously "below the radar" will pose a new level of difficulty for any air defence system, while Suppression of Enemy Air Defence (SEAD) and EW techniques will cripple emitting radars which are both conspicuous and vulnerable to Anti-Radiation weapons.

In light of such situations, Early Warning requirements have accordingly become very stringent: alert time is measured in seconds, while False Alarms are considered intolerable, mostly when civilian population is involved. Therefore, even during the daily routine, many cases of unverified aerial objects which appear on the screen just as "blips" compel frequent, yet unnecessary scrambling of fighter jets, solely for the purpose of providing paramount visual ID.

Sky Spotter™ is a passive Early Warning System with a high probability of detection and a very low false alarm rate.

Sky Spotter™ is used in a variety of implementations, either as a vital component in the fixed national network of the air situational picture, or by deployments of standalone Automatic Sense and Warn (AS&W) application for Force Protection and support to C-UAS / GBAD systems.

Sky Spotter™ uses highly sensitive MWIR, SWIR and Day sensors, establishing a passive aerial defence sphere, ranging from a 1 km radius up to tens of kilometers and more. Advanced algorithms of automation, image processing and Artificial Intelligence (AI), enable multiple targets to be engaged, tracked and managed simultaneously. Proprietary algorithms for coupling EO and radar readings into a unified picture, maximize the synergy of both 'physics', and provide an all-weather solution with proven robustness against particularly tough scenarios.

Innocent: Flock of migrating birds

Hostile: Armed UAV, by terrorist organization

Sky Spotter™ WFOV Staring FLIR Sensor

Any object in the FOV that disrupts the constant scenery is detected by the sensor which then applies a set of Image Processing (IP) algorithms that determine the nature and behaviour of the object. If the object meets a given set of criteria, it will be defined by the sensors IP algorithms as a "suspect", prompting a dedicated message which will be sent from the sensor to the central controller.

Sky Spotter™ EO WFOV FLIR Staring Sensor

Example of the WFOV operator's HMI

Target Detection

Target Detection

Sky Spotter™ EO Automatic Detection of Two Threats

Sky Spotter™ NFOV Investigating FLIR/SWIR/Day Sensors

Sky Spotter™ WFOV detection sensors have been reinforced with NFOV Multispectral investigation sensors, acting as powerful telescopes and allowing zooming-in on selected targets for the purpose of verification and tracking. Several investigating sensors are used for this purpose. The NFOV is pointed at the target by either early detection of the WFOV/radar or by a slaving request given by the human operator. An operator can manage up to 4 separate sensors simultaneously, each with two channels. For that purpose, a dedicated set of algorithms optimally controls the mission and effectively manages the sensor observation resources.
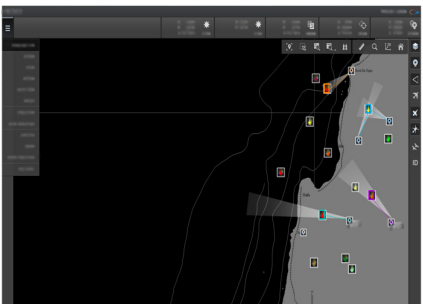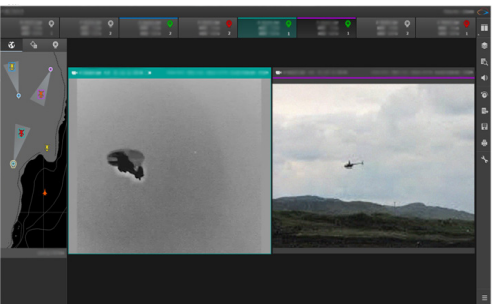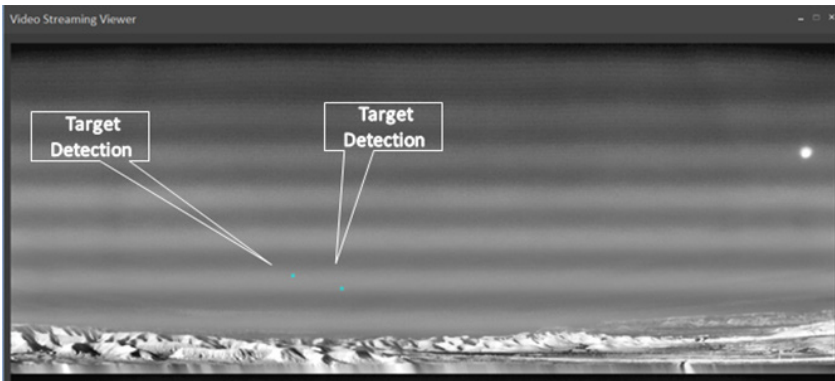
SWIR NFOV SENSOR

FLIR NFOV SENSOR

Sky Spotter™ EO NFOV Investigating Sensor
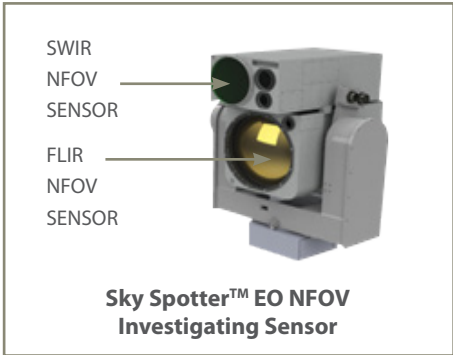
Drone

Fast Jet

Mini UAV

Targets on Sky Spotter™ NFOV Sensor

NFOV LOS Management Screen

NFOV EO Video Management Screen

Benefits

- Passive sensing, survivable and covert detection, tracking, classification and identification of aerial targets
- Unaffected by radar "classic" challenges: Multipath, Clutter, Background, EW & CM, Low RCS-stealthy targets or their evasive manoeuvre
- Multiple targets simultaneous tracking
- 24/7 persistent capability
- Highly accurate : Azimuth and Elevation (for single sensor) and Range by corroboration of multiple sensors
- Significantly Low Life Cycle Cost

Sky Spotter™ Control Center