Autonomous Optical Technology and Physical-Capture Systems for C-UAS

OpenWorks Engineering provides innovative products for use in counter-drone and air defense systems.

Deployed around the world as part of integrated systems, protecting high-profile assets during counter-UAS missions.

SKYWALL
NET CAPTURE

VISION
AUTONOMOUS OPTICS

CONTENTS

Classification: 78% quadcopter

SKYWALL
NET CAPTURE

VISION
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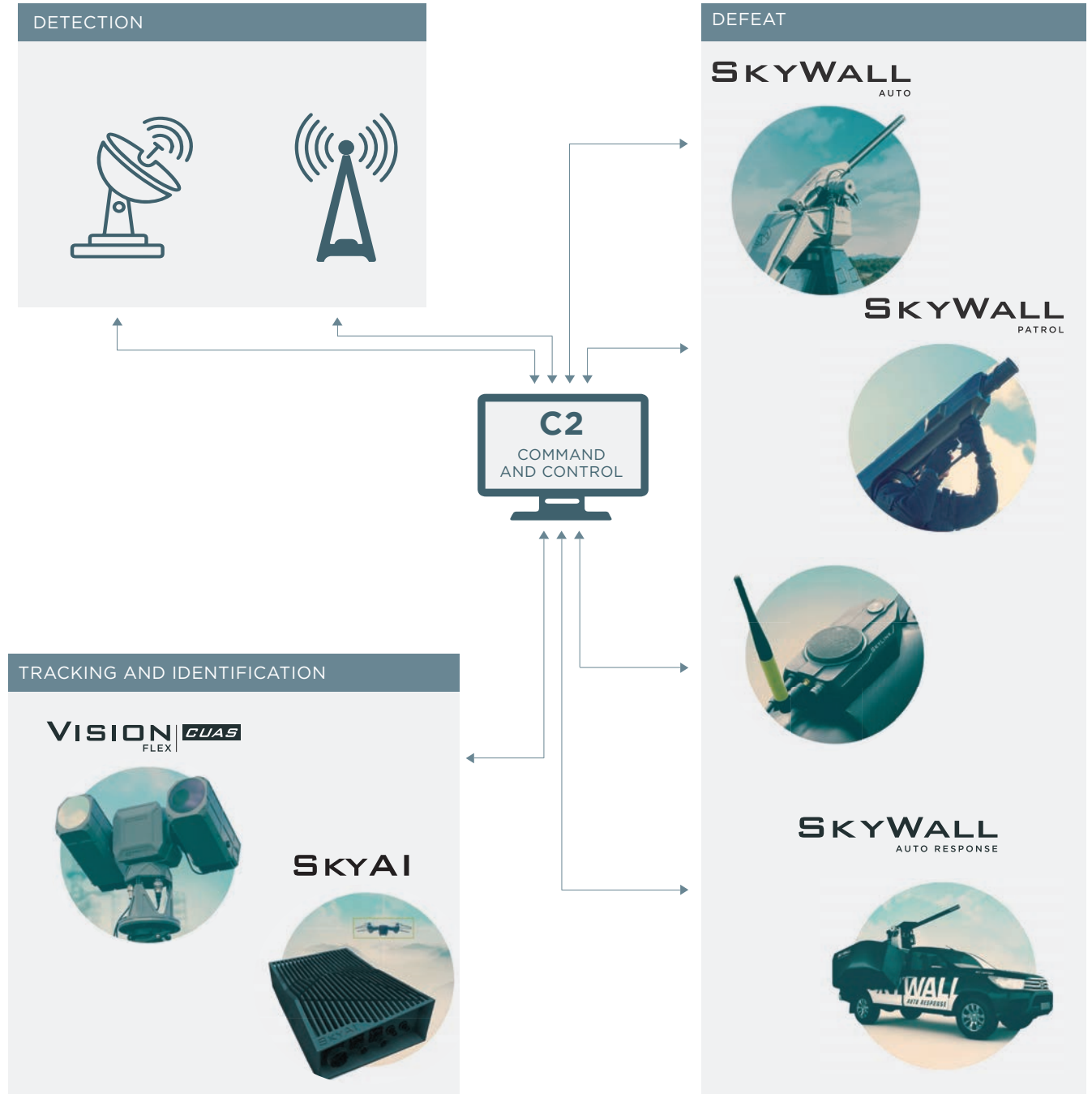
Section 1.

INTEGRATED SOLUTIONS

All SkyWall products are designed to be integrated with a simple to use software development kit. Many C-UAS systems already have the SkyWall interface implemented.

DETECTION

DEFEAT

SKYWALL AUTO

SKYWALL PATROL

SKYWALL AUTO RESPONSE

C2
COMMAND AND CONTROL

TRACKING AND IDENTIFICATION

VISION FLEX | CUAS

SKYAI

SKYWALL NET CAPTURE   **VISION** AUTONOMOUS OPTICS

Section 2.

HANDHELD AND AUTONOMOUS NET CAPTURE SYSTEMS

SkyWall Net Capture systems are operationally-deployed and provide the ability to physically capture a drone in a specifically designed 'drone entangling' net. They are often used in conjunction with electronic countermeasures for a layered defence, or in environments where electronic attack cannot be deployed.

SkyWall Net Capture systems are already deployed at major sites across Europe, North America and Asia. They provide protection at international airports, nuclear power stations and critical national infrastructure sites, such as the Pentagon.

SKYWALL
NET CAPTURE

SKYWALL
PATROL

HANDHELD DRONE CAPTURE

SKYWALL
AUTO

AUTONOMOUS DRONE CAPTURE

SKYWALL
AUTO RESPONSE

AUTONOMOUS DRONE
CAPTURE VEHICLE

Projectile based net capture provides a multi-shot capability that is easy to deploy quickly.

KEY FEATURES:

- Physical Drone Capture - No Electronic Countermeasure, Predictable Outcome
- Proportionate Response
- Fast Multiple Target Engagement
- Very Low Collateral Damage Risk
- Target Captured for Forensic Investigation

SKYWALL
PATROL

HANDHELD NET CAPTURE

SkyWall Patrol is a handheld system that gives a mobile operator the ability to physically capture a drone in a specifically designed 'drone entangling' net. It uses compressed air to launch a projectile up to the drone after the operator has targeted it using the onboard SmartScope.

SkyWall Patrol can be used as a standalone drone defence system but can also be integrated with a wider security system, using the SkyLink module, to offer a highly capable counter drone package.

A single SkyWall Patrol system can protect an area or multiple systems can be deployed from mobile units to protect a large site.

The SkyWall Patrol system has a number of built in safety features that ensure it can only be operated when all safety critical elements are functioning correctly. The launcher has a continuous monitoring system to give further protection.

The onboard SmartScope helps capture moving targets by locking on to the drone and adjusting the operators aim before programming the projectile prior to launch.

KEY FEATURES:

- Physical Drone Capture - No Electronic Countermeasure, Predictable Outcome
- Proportionate Response
- Handheld – Highly Portable
- Very Low Collateral Damage Risk

SkyWall physical capture is deployed in conjunction with electronic counter-measures for a layered defence, or in environments where electronic attack cannot be deployed.

TR40

TRAINING

SP10/15

NET ONLY

SP40/45

NET AND
PARACHUTE

The SkyWall launchers can be used with a range of SkyWall projectiles. There is a parachute projectile to control the descent of the captured drone, minimising collateral damage risk. If the parachute is not required, the net-only projectiles can offer an increase in range and capture rate.

SKYWALL PROJECTILES CAN BE RESET AND USED MULTIPLE TIMES.

https://youtu.be/eOpZDv3BztE

SKYWALL
NET CAPTURE

SKYWALL
AUTO

AUTONOMOUS NET CAPTURE

SkyWall Auto is a remotely operated system that can physically capture a drone in a specifically designed 'drone entangling' net. It uses compressed air to launch a projectile up to the target drone after classifying and tracking it autonomously.

SkyWall Auto can be used as a standalone drone capture system but can be integrated with a drone detection and security system to offer a highly capable and easy to operate counter drone solution.

A single SkyWall Auto system can protect a high-value asset and multiple systems can be networked and deployed to protect a large site.

The SkyWall Auto launcher can be used with a range of SkyWall projectiles. The onboard targeting enables the system to have a high capture rate by adjusting the launcher aim based on the movement of the target and programming the projectile prior to launch.

A computer vision tracking module called SkyAI allows the system to autonomously follow targets, minimising the operator skill level required.

KEY FEATURES:

- Physical Drone Capture - No Electronic Countermeasure, Predictable Outcome
- Proportionate Response
- Long Range Net Capture
- Can be Integrated for Full Autonomy
- Very Low Collateral Damage Risk

COMPATIBLE PROJECTILES:

SP15
NET ONLY

SP45
NET AND PARACHUTE

SkyWall Auto can deploy quickly from undercover to provide physical capture to large areas.

SKYWALL
AUTO RESPONSE

AUTONOMOUS DRONE
CAPTURE VEHICLE

Section 3.

AUTONOMOUS OPTICAL DETECTION AND TRACKING TECHNOLOGY

Vision Flex Autonomous Optics products make use of the latest developments in deep-learning neural network classification to quickly and reliably detect and classify a target. They achieve industry leading tracking performance by controlling the camera motion using AI, whilst providing the highest performance EO/IR systems available.

VISION FLEX | CUAS

CONFIGURABLE AIR
DEFENCE CAMERAS

SKYAI

AI DETECT/CLASSIFY/TRACK
MOTION CONTROL

False alarms from primary sensors are rejected, reducing operator distraction. Targets can be tracked against complex backgrounds without disruption and SkyAI motion control ensures targets are not lost even if they momentarily disappear behind trees or buildings.

SkyAI software allows for easy integration to achieve an autonomous handover from detection sensors, making use of the proven SkyWall interface and well supported SDK.

Reduce false alarms with fast acting optical detection and tracking technology powered by AI.

DETECT ▶ CLASSIFY ▶ IDENTIFY

The next generation of ultra high performance target tracking, available with built-in Twin-AI control.
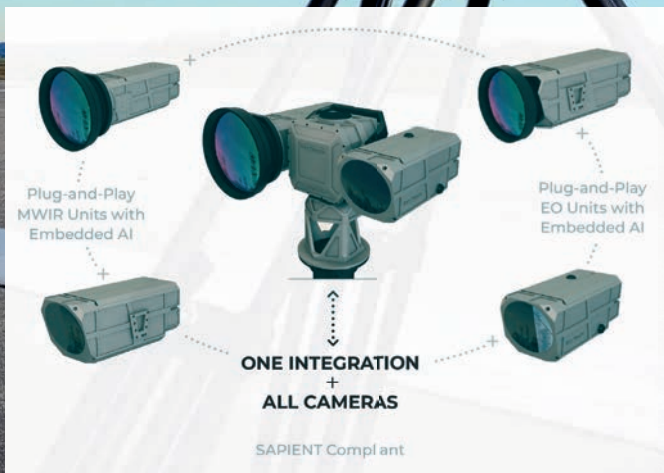
VISION | CUAS
FLEX

CONFIGURABLE AIR DEFENCE CAMERAS

Vision Flex provides the highest performance tracking and classification capability available, specifically designed for dynamic air targets. Vision Flex optical systems are highly configurable and can be used with built-in twin-AI modules or 3rd Party classifiers and trackers.

The system is easy to integrate and has a range of plug-and-play optical modules and upgrades to allow it to be configured easily to suit each mission or site.

HD daylight EO and cooled thermal MWIR sensors are available, from 275mm to 900mm focal length, allowing the ideal sensor to be selected and cost minimised.
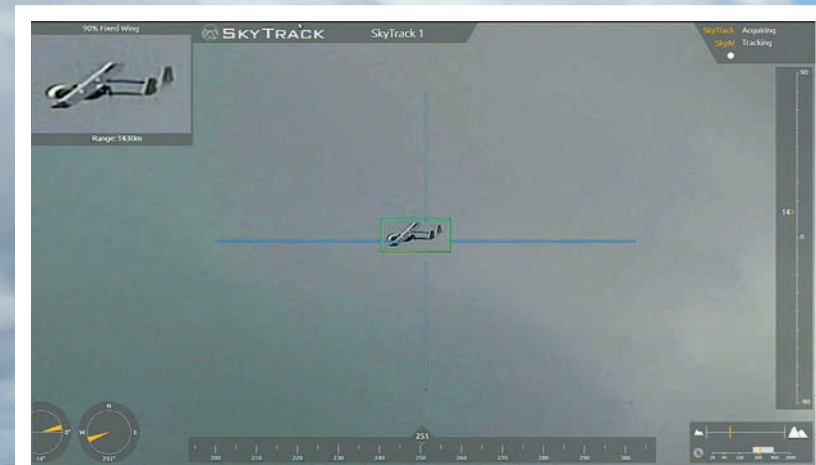
Autonomous operation is made possible with SkyAI modules embedded inside the optical units, offering fast AI target classification, tracking and false alarm rejection. AI built into both EO and IR units allows simultaneous Edge-AI processing.

KEY FEATURES:

- 1 Easy Integration = ALL Cameras
- Plug and Play Optical Modules For Easy Install, Upgrade and Testing
- Cost Effective and Exportable (non-ITAR and Dual-Use)
- MWIR Sensors with Large-FOV when Zoomed for Fast Searching
- Up to 8km+ AI Tracking of Fast Moving Agile Air Targets
- Fast and Automated Classification and slew-to-cue
- AI Classification and False Alarm Rejection (with SkyAI)
- Sensor and Effector Payload Mounting and Fire Control Output

Vision Flex advances tracking beyond vision.

https://youtu.be/5f_T9HzY-2g

VISION
AUTONOMOUS OPTICS

SKYAI

EXTERNAL CONTROLLER

AI DETECT-CLASSIFY-TRACK MOTION CONTROL

SkyAI turns any camera system into an autonomous sensing module. Available in a range of software and hardware configurations. SkyAI uses the latest developments in deep-learning neural network classification.

False alarms from primary sensors are rejected, reducing operator distraction. Targets can be tracked against complex backgrounds without disruption and SkyAI motion control ensures targets are not lost even if they momentarily disappear behind trees or buildings.

SkyAI software allows for easy integration to achieve an autonomous handover from detection sensors, making use of the proven SkyWall interface and well supported SDK.

SkyAI can be integrated with most PTZ camera systems. Cost effective solutions using widely available Bosch, 360V and Axis cameras have

been proven alongside high-performance military optical systems.

A range of communication protocols can be provided. Computing hardware configurations are available to suit military and security missions.

Non-UAS targets can be trained into the system to provide a multi-role capability, for conventional land, sea or air threats.

KEY FEATURES:

- Reduces Operator Cognitive Load
- Uses Advanced Artificial Intelligence to Detect, Classify and Track the Target Type of Your Choice
- Simple Integration with Existing Camera Systems
- Intuitively Connects to the C2 Software of Your Choice
- Multiple Camera Inputs Possible

Before SkyAI, C-UAS systems gave a high false alarm rate and required persistent monitoring by human operators.

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