Air Intelligence Finland Oy
UAV ARCTIC 2016

Kuopio 2.11.2016

Yrjö Halttunen, Toni Rosendahl, Matti Lappalainen – AIF Oy
Lauri Valdman - Threod

Yhtiö

Air Intelligence Finland (AIF)

- UAV/RPAS services for the critical services of the society
- AIF Ltd will begin during 2017 a service network starting from Finland and Estonia providing 24/7 –services. Company wil expand to other Baltic Sea countries.
- Threod is a shareholder and Equipment is provided by them. The Autopilot-Simulation-Training system is operational system of the whole company
  - Electric and gasoline powered engines, fixed wing and multirotor equipment
- In the future also leasing and insurance

www.airint.fi

AIF - services

- Flying services for authirities and other demanding customers
  - Continuous surveillance
  - On-call servises
  - Pre-scheduled
- Own cameras and sensors
- Sales and maintenance of Threod systems
- Joint services with eg. Environics or Aeromon

Today using 1. **Airborne KX-8**

- Robust detachable arms, Top/Bottom camera mounting, Battery Quick Change connector, Dual stage vibration mounting, Rain Dome/Weather Proofing, Redundant Propeller Flight Capability, Onsite maintenance feasibility, KIT & RTF options
- Helicopter weight 5.7kg
- Lift capacity max 7kg
- Setup time 5min
- Flight time 10-15min (max kuorma) – 75 min
- Frame footprint (prop to prop spacing) 81cm
- Cost ca 50.000 (Components configurable)

Today showing 2.
KX-4 MULTIROTOR

- KX-4 is a highly configurable and easy to assemble multirotor platform for survaillance, military and law enforcement missions.
  - - Lightweight, modular design
  - - Backpack-transportable
  - - Rapid deployment
  - - Fully autonomous or fly-by-camera flight modes
  - - Powerful and fully stabilized dual EO/IR gimbal
  - - HD video feed and on-board recording
  - - AES-256 encrypted telemetry, imagery and voice
  - - Handheld or Mobile Ground Control Station
  - - Remote Video Terminal
  - - STANAG 4609 compliant KLV metadata

Tänään esillä, EOS mini-UAS

EOS mini-UAS

Mini-UAV that brings tactical UAV capabilities down to mini UAV level.

EOS is a hand-launched and parachute-recovered electric mini UAV designed to deliver stable and clear imagery. EOS brings tactical UAV capabilities down to mini UAV level. Proudly tested and used in NATO ISAF and KFOR operations.

Purpose: Platoon Area of Operations, Force Protection, Point Security, First Responder Support, Border Security and National Border Management

Threod Systems Autopilot TSAP600

Automatic takeoff and landing

Automatic navigation between user-defined waypoints

Real-time modification of waypoints

Loiter modes

Scan patterns

Emergency contingency routes and landing areas

Warning displays

GPS, INS, GLONASS navigation

Ground Control Station

Remote Video Terminal

Handheld GCS for UAV control

Touch screen and joystick controls

Live picture stream

Remote Video Terminal

Real time video and telemetry streaming

Used in field, vehicle, command post

Standalone unit with router or with a computer

Today showing, EOS mini-UAS

Single RPAS or an entire system

- Need today and in the future
  - Considerations for the single acquisition
- RPAS is almost always designed to be a part of a sysytem
  - System(s) of all participants
  - Map/location Sysytems
  - Auto-Pilot
  - Training

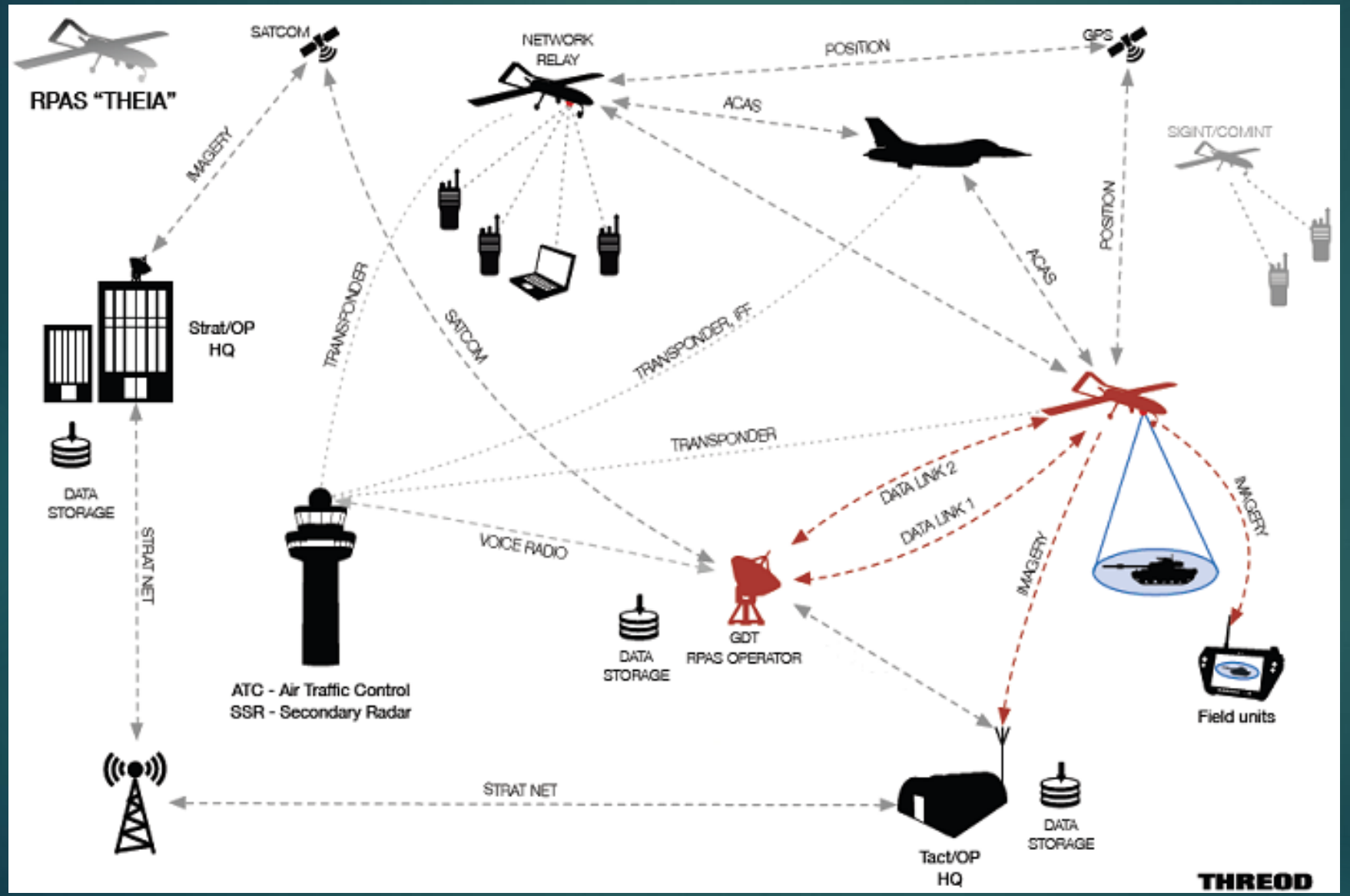
Choosing a single drone

- 1. What environment are you planning to fly in?
  - Temperature range
  - Humidity, winds, etc.
  - Obstacles (Forests, mountains, buildings, etc.)
  - Disturbances (Radio towers, GSM antennas, WiFis, etc.)
  - Access before Take-Off
- 2. What specific requirements do you have concerning the drone?
  - Operating Altitude
  - Range from pilot
  - Flight time
  - Automatic flight mode features
  - Number of axles for gimbal
  - Single or dual operator
- 3. What payload are you planning to lift?
  - Weigh and Dimensions
  - Power supply of payload
  - Data links needed with the drone

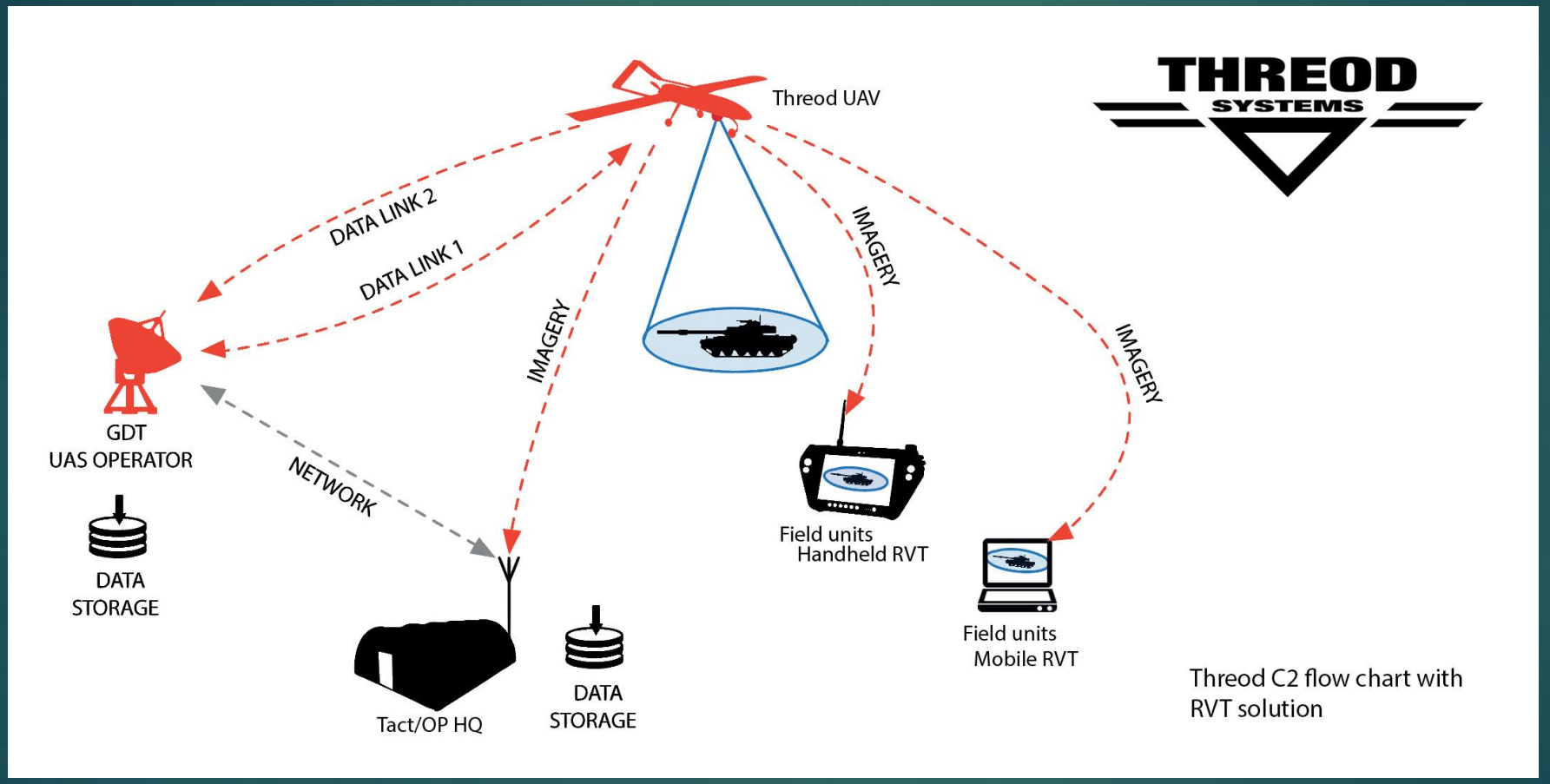
Design your fleet - Fixed wing or multirotor RPAS

- Airborn time, range
  - Fixed wing: several hrs. tens or hundreds of kilometers
- Payload
  - Comparable in both
- Autopilot
  - Threod has the same for all; Training, map and simulation systems, communication components, power components etc
- Actions at the target
  - Noice
  - Camera targeting
  - Speed/sample taking

Compatibility

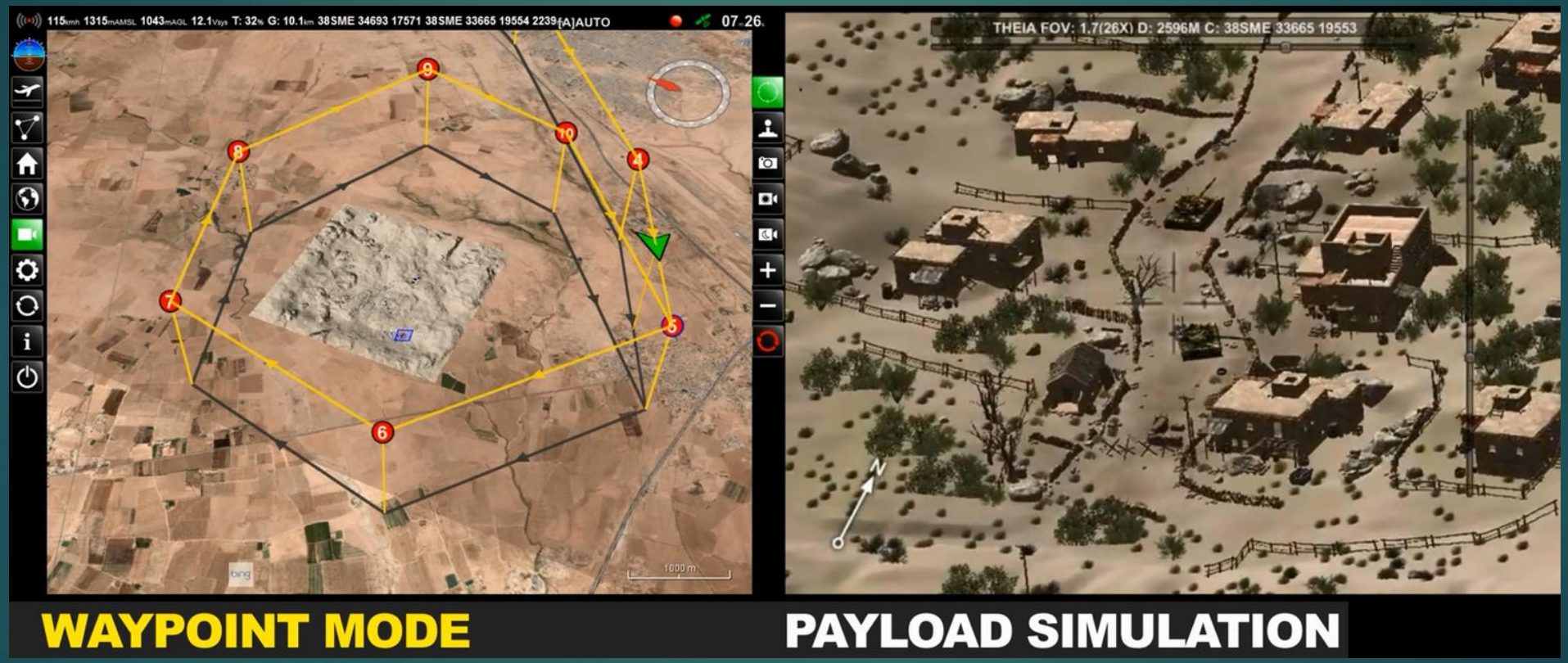


Compatibility



Threod C2 flow chart with RVT solution

Map system, map simulation



Auto-Pilot

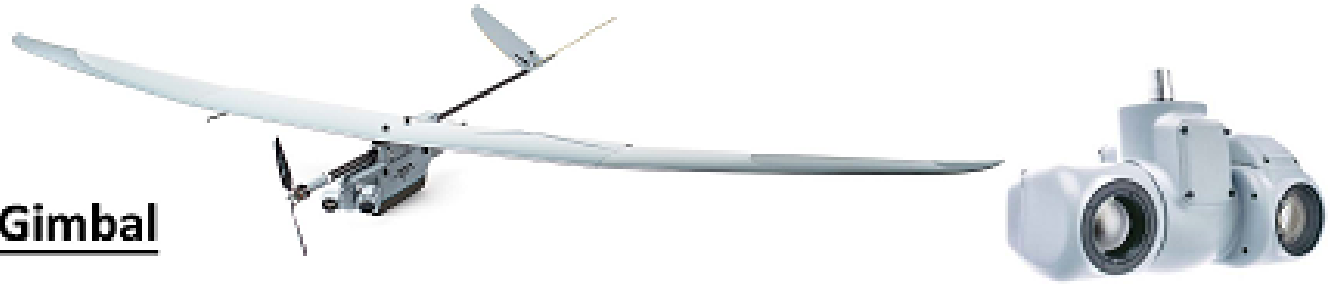
Manual vs Autopilot - VLOS /BVLOS

- Manual
  - Exception
  - Ad-hoc, when no maps
  - Usually visual connection
  - Loittering-mode

- Autopilot
  - Adaptive
    - easy to operate
    - Safe(triple redundancy)
    - Compatible with simulation systems
    - Yhdenmukainen simulaatioympäristön kanssa with multiple sensors and datalinks

THREOD SYSTEMS

Gyro Stabilized Dual EO/IR Camera Gimbal



Dual EO/IR Camera Gimbal	Basic PAL / HSG2	Basic HD / HSG2	Shark 1 / HSG2	Shark 2 / HSG2	Shark 3 / HSG4
EO sensor	10x	30x	30x	30x	30x
EO resolution	PAL	720p HD	720p HD	720p HD	720p HD
IR sensor (35 mm lens)	FLIR TAU2 640	FLIR TAU2 640	FLIR TAU2 640	FLIR TAU2 640	FLIR TAU2 640
IR resolution	640x512	640x512	640x512	640x512	640x512
IR sensor DRI human	1280/320/160m	1280/320/160m	1280/320/160m	1280/320/160m	1280/320/160m
IR sensor DRI vehicle	3850/950/295m	3850/950/295m	3850/950/295m	3850/950/295m	3850/950/295m
IR zoom	Y	Y	Y	Y	Y
Laser Range Finder	-	-	-	-	Laser class 1
IR illumination	-	-	-	-	Class IIIB, 1-4W
Video output (PAL)	Y	-	-	-	-
Video output (HD)	-	Y	Y	Y	Y
Image stabilization	Y	Y	Y	Y	Y
Onboard recording and snapshot	Y	Y	Y	Y	Y
Moving Target Identification – basic	Y	Y	Y	Y	Y
Moving Target Identification – wide	-	-	O	Y	Y
Video tracking and scene steering	-	-	O	Y	Y
Geo-tracking, target positioning	-	-	O	Y	Y
Gimbal Video Display SW and Report Creation Feature	Y	Y	Y	Y	Y

THREOD SYSTEMS

Gyro Stabilized Triple EO/IR/IR Camera Gimbal

Triple EO/IR/IR Camera Gimbal	Basic HD / DG3	Dome 1 / DG3	Dome 2 / DG3	Dome 3 / DG5
EO sensor	30x	30x	30x	30x
EO resolution	720p HD	720p HD	720p HD	720p HD
IR sensors	FLIR TAU2 640	FLIR TAU2 640	FLIR TAU2 640	FLIR TAU2 640
IR resolution	640x512	640x512	640x512	640x512
IR sensor 1 (25 mm lens) DRI human	820/210/104m	820/210/104m	820/210/104m	820/210/104m
IR sensor 1 (25 mm lens) DRI vehicle	2200/580/290m	2200/580/290m	2200/580/290m	2200/580/290m
IR sensor 2 (60 mm lens) DRI human	1750/450/225m	1750/450/225m	1750/450/225m	1750/450/225m
IR sensor 2 (60 mm lens) DRI vehicle	4500/1240/640m	4500/1240/640m	4500/1240/640m	4500/1240/640m
Laser Range Finder	-	-	-	Laser class 1
IR illumination	-	-	-	Class IIIB, 1-4W
Video output (HD)	Y	Y	Y	Y
Image stabilization	Y	Y	Y	Y
Onboard recording and snapshot	Y	Y	Y	Y
Moving Target Identification – basic	Y	Y	Y	Y
Moving Target Identification – wide	-	O	Y	Y
Video tracking and Scene Steering	-	O	Y	Y
Geo-tracking, target positioning	-	O	Y	Y
Gimbal Video Display SW and Report Creation Feature	Y	Y	Y	Y

Further contact informationAir

Air Intelligence Finland Oy
Upseerinkatu 1, torni 2
02600 Espoo Finland

www.airint.fi