

eSAS

NIGHT VISION SITUATIONAL AWARENESS FOR SOLDIERS

More than 35 embedded sensors for cutting-edge situational awareness system and soldier's health

A concentration of technologies !

- HMSD (Helmet Mounted Sight & Display)
- OST (Optical See Through)
- Dark night vision (NATO level 5)
- Wide (80°) & unobstructed field of view (minimum blind spot)
- Thermal/visible fusion
- Threat detection at 360°
- Lightweight and better balanced than NVGs
- 10 hours mission



EXAMPLES OF MISSIONS

URBAN COMBAT IN A
HOSTILE ENVIRONMENT

PROGRESSION IN ISOLATED
MOUNTAIN TERRAIN

CLANDESTINE RECONNAISSANCE
IN DEEP NIGHT

INFILTRATION AND SABOTAGE
OF ENEMY POSITIONS

COORDINATED NIGHT ASSAULT

EVACUATING A WOUNDED SOL-
DIER UNDER FIRE

CROWD CONTROL IN
ZONES OF INSTABILITY



DEFENCE OF A FIXED
STRATEGIC POINT

OPERATION IN CBRNe
ENVIRONMENT

SETTING UP A TEMPORARY
BASE

INTERCEPTION OF A TARGET
CONVOY OR PERSON

DETECTION AND NEUTRALIZATION OF
BOOBY TRAPS, IMPROVISED EXPLO-
SIVE DEVICES (IEDS) AND ANTI-PER-
SONNEL MINES

RESCUE OR RECOVERY OF CRITICAL
INFORMATION

EXAMPLES OF MISSIONS

1. URBAN COMBAT IN A HOSTILE ENVIRONMENT

- Neutralize enemy forces in dense architectural environments (buildings, basements, floors).
- Protection of teammates and civilians.
- Efficient coordination in a confined environment.

2. PROGRESSION IN ISOLATED MOUNTAIN TERRAIN

- Move discreetly and efficiently over steep, unstable or dangerous terrain.
- Maintain group cohesion despite dispersion.
- Anticipate and react to extreme environmental conditions.

3. CLANDESTINE RECONNAISSANCE IN DEEP NIGHT

- Observe and identify enemy targets without being detected.
- Collect visual, environmental and tactical information.
- Transmit or store intelligence data in real time.

4. INFILTRATION AND SABOTAGE OF ENEMY POSITIONS

- Discreetly infiltrate a defended enemy perimeter.
- Place or trigger a destructive device (explosive, electronic neutralization).
- Exit undetected or unengaged..

5. COORDINATED NIGHT ASSAULT

- Attack several points simultaneously in the dark.
- Maintain coordination and identification of allies.
- Remove enemy defenses in the first shock.

6. EVACUATING A WOUNDED SOLDIER UNDER FIRE

- Locate, stabilize and extract a wounded combatant in a hostile zone.
- Maintain vital functions during evacuation.
- Coordinate with an extraction vector (drone, vehicle, chopper).

7. CROWD CONTROL IN ZONES OF INSTABILITY

- Maintain order and protect the population.
- Identify troublemakers in dense crowds.
- Remain non-lethal and non-intrusive.

8. DEFENCE OF A FIXED STRATEGIC POINT

- Prevent access to or takeover of a sensitive point (forward HQ, ammunition depot, communications relay).
- Continuously monitor approaches to the perimeter.

9. OPERATION IN CBRNe ENVIRONMENT

- Carry out an operation or reconnaissance in a contaminated environment.
- Survive and detect CBRN threats.

10. SETTING UP A TEMPORARY BASE

- Create a secure base in a potentially hostile environment.
- Install communication and surveillance systems quickly.

11. INTERCEPTION OF A TARGET CONVOY OR PERSON

- Intercept a fast-moving target.
- Reduce collateral damage.

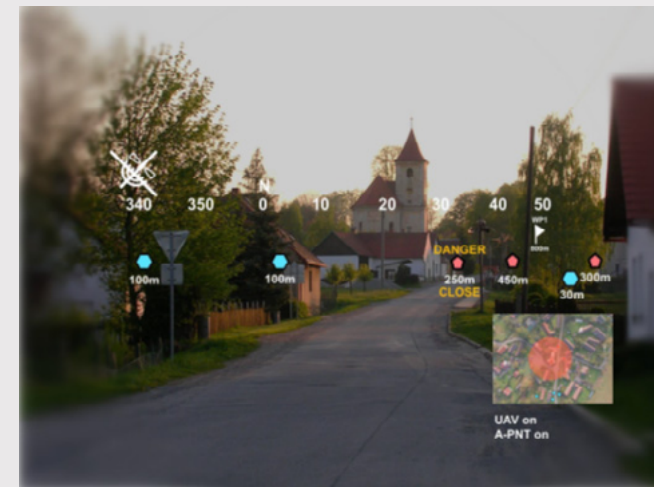
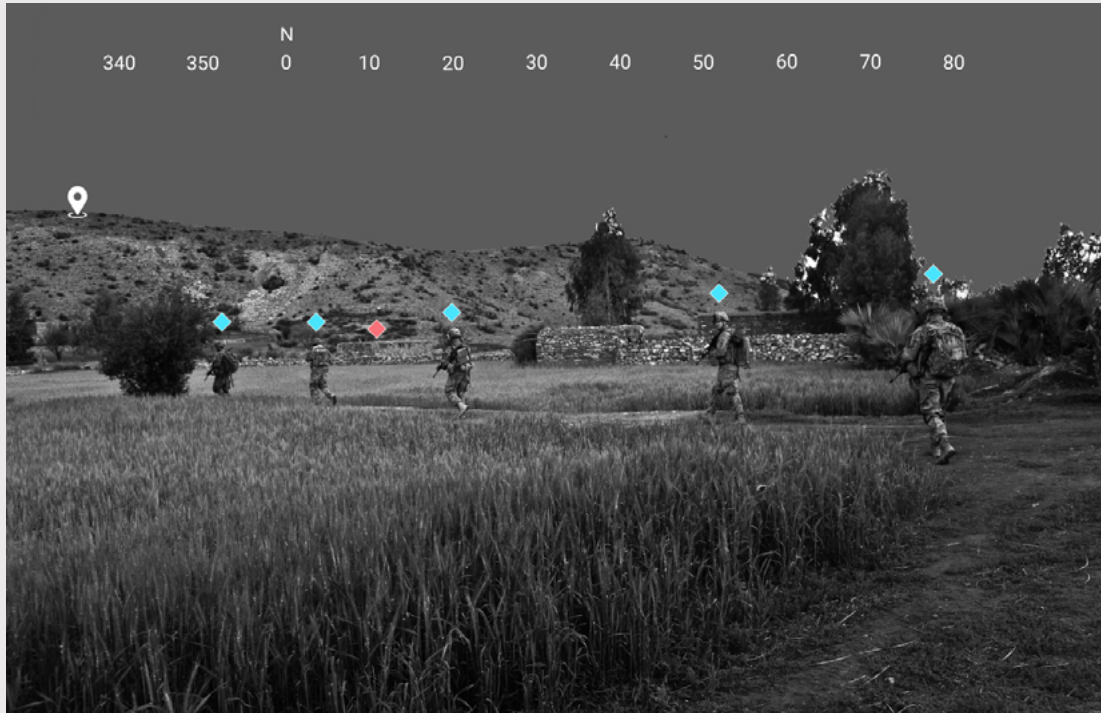
12. DETECTION AND NEUTRALIZATION OF BOOBY TRAPS, IMPROVISED EXPLOSIVE DEVICES (IEDS) AND ANTI-PERSONNEL MINES

- Locate concealed or remotely triggered IEDs.
- Identify electronic devices or chemical triggers.
- Neutralize or avoid these threats.

13. RESCUE OR RECOVERY OF CRITICAL INFORMATION

- Extract an individual or sensitive data (computer, document, hard disk)
- Ensure the integrity of the data or the life of the target.

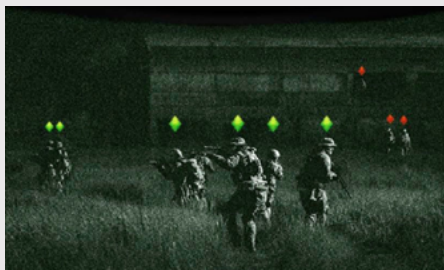
EXAMPLES OF MISSIONS



A MIXED REALITY NIGHT VISION SYSTEM (and more) FOR SOLDIERS

Features related to ENVIRONMENTAL PERCEPTION

- Night + LWIR/Thermal + 3D vision
- Blue force localization (avoid blue-on-blue)
- Navigation (GNSS)
- Others sensors : temperature, pressure, humidity, toxic gaz, particulate matters



Dark night vision & friends localization

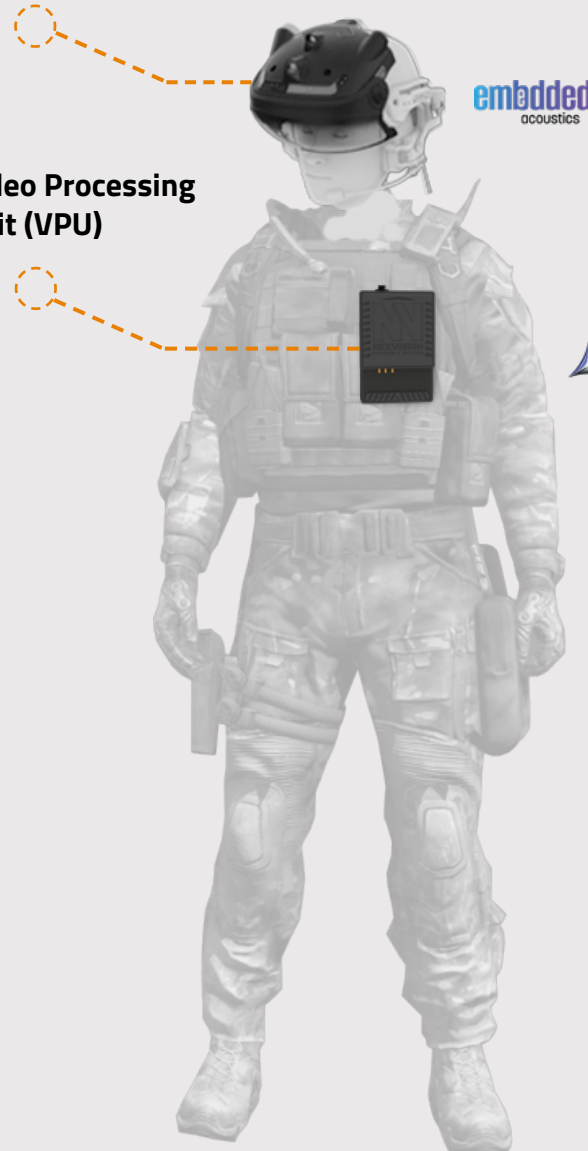
Features related to THE SOLDIER'S STATE OF HEALTH

Health monitoring & predictive status

- External body temperature, brain activity / BCI, soldier's attention (gaze tracking), pupillometry, heart rate variability, blood oxymetry, head & body movement, perspiration

Omni Sense Unit (OSU)

Video Processing Unit (VPU)



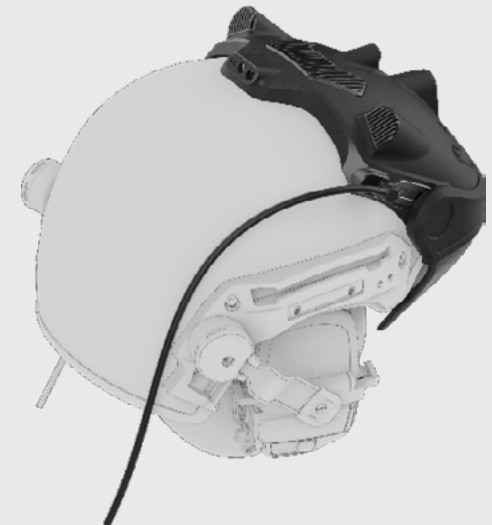
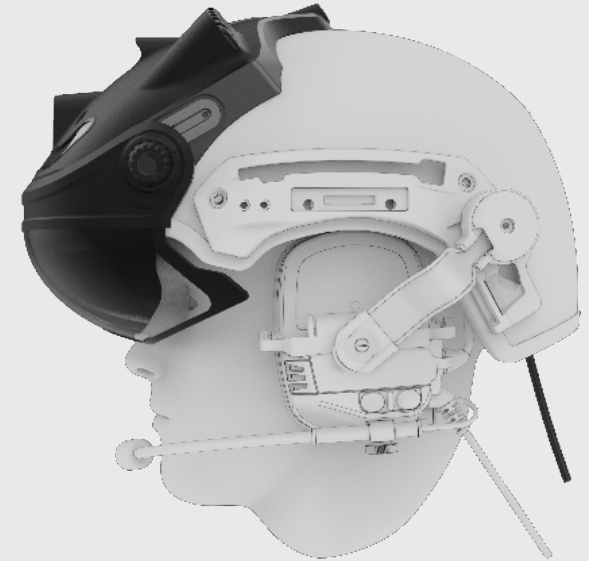
Features related to INTERCONNECTION WITH SOLDIERS OR OBJECTS

Vision of remote tactical optronics (vis/IR cam on a weapon/UAV/UGV, wireless spy cam)





A MIXED REALITY NIGHT VISION SYSTEM (and more) **FOR SOLDIERS**



Picatinny rail
compatible

MIL-STD
810 - 1275B



Thermal InfraRed
video camera
(LWIR)

Night vision vidéo camera
Visible & Visible-Near IR
NATO Night Level 5
(deep dark / overcast night)

3D sensor
(depth cam / ToF)
Time of Flight

HD mini color daylight
video camera (x2)

Eye tracker (x2)

7Mpix OLED display (x2)

Standard protective helmet

Processing board :

- Image analysis from all the helmet video cameras
- State and activity of the soldier analysis : head tracking, brain activity (EEG), cardiac activity (PPG), sweat/glucose, body temperature
- Environment analysis : sound, ambient temperature, humidity, barometry, gas and matter particles detection, radio emission

Rotary knob

InfraRed and white front LED (x2)

Flip-up augmented reality visor



Standard protective helmet

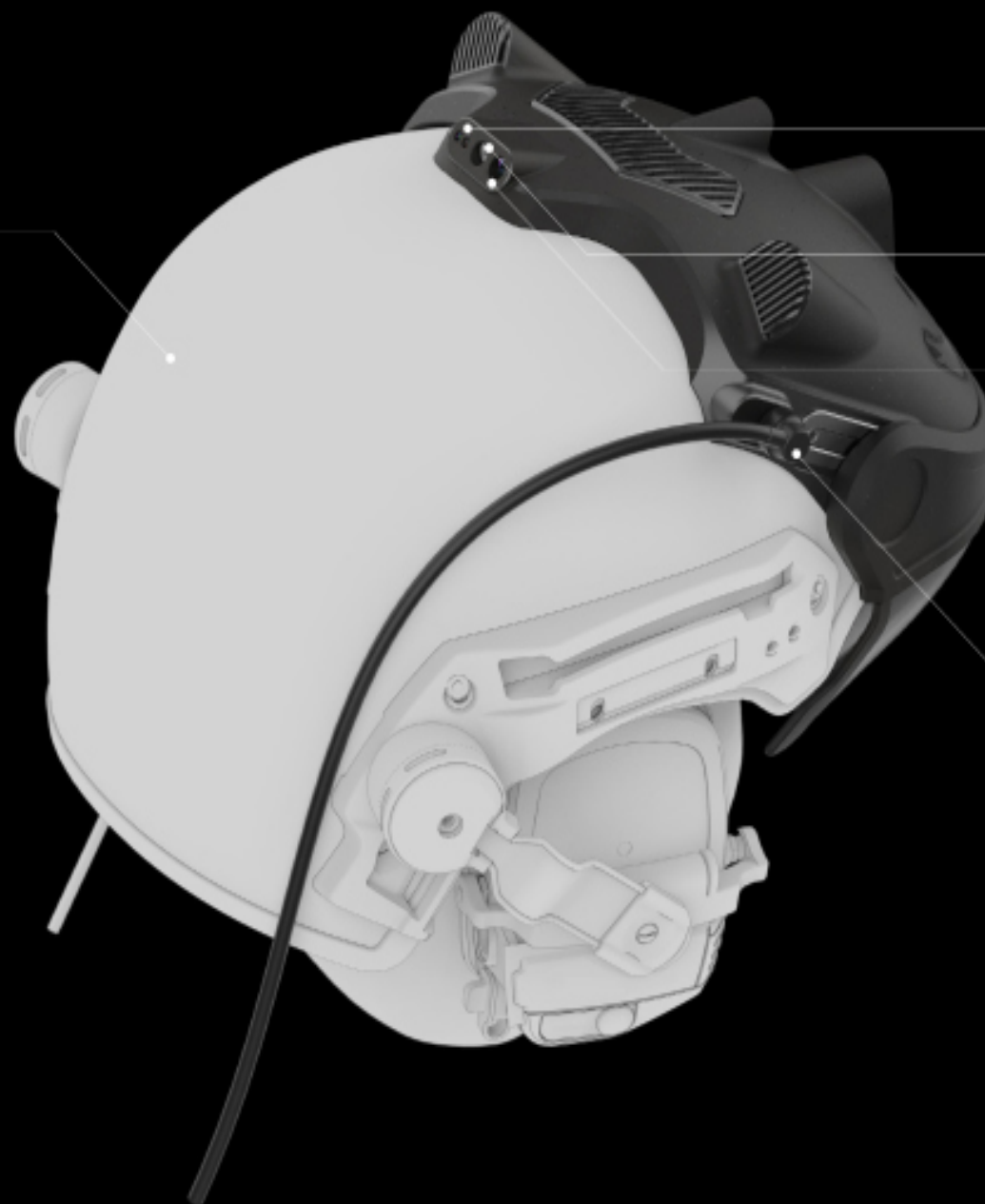
InfraRed and white
backlighting LED (x2)

Thermal Infrared video camera

HD mini color daylight
video camera

Connector

Link to the vision and mission torso-worn
calculator (algorithm, analysis / AI)



OMNI SENSE UNIT (OSU)

ENVIRONMENT

1) Scene view sensors

- > Night vision 1.3Mpx (NATO level 5), 80° HFoV
- > Thermal IR 640x480px, 80° HFoV
- > 3x Color/VNIR 5.1Mpx : 360° threat detection
- > 3D : scene depth sensing

2) Atmosphere

- > Temperature
- > Pressure
- > Humidity
- > Toxic gaz
- > Particulate matters
- > Barometer

3) Microphones

- > Gunshoot and threat sound detection & localization

4) Navigation

- > GNSS, IMU

SOLDIER'S PHYSIOLOGY

1) Eye

- > Gaze tracking : target, scene designation, soldier's attention
- > Oculometry : pupil diameter, eyelids positions and blinking

2) Cardiac

- > Heart : heart pulse rate, Heart Rate Variability [HRV]
- > Respiratory : blood oxymetry

3) Brain

- > Electrical brain activity : cognitive charge, fatigue, stress
- > Brain Control Interface (BCI)

4) Body

- > Head : global orientation & head movement
- > Torso : body movement
- > Body skeletal posture
- > Temperature : external body temperature
- > Perspiration / lactate / glucose

VIDEO PROCESSING UNIT (VPU)

Image analysis processor

1000Tops FP8 SoC (CPU+GPU+NPU)

Image processor and data stream muxer

FPGA

Operating system

Linux based

Memory - storage

Embedded SSD : 4TByte

RF communication / GNSS

Embedded WIFI/BT RF link

Ultra wide Band (UWB)

Optional : GNSS, 4G broadband or private SDR µcell

Links

- IP Network link : ethernet type | 1Gbits/s
- USB link to any USB device : USB3.2 gen.2 speed | 10Gbits/s
- High speed link with HeadZone OST-HMSD : RX/TX serdes differential link NVType-C | 10Gbit/s (bidirectional)
- 3x High speed link with additional camera : RX/TX serdes differential link | 10Gbit/s (bi-directional)

DIMENSIONS, WEIGHT & POWER SUPPLY

Dimensions

VPU : 16cm x 11.5cm x 4cm

Weight (OSU + VPU)

OSU : 400g

VPU : 700g (including 500g battery pack)

Autonomy

10h

Connector type

Waterproof MIL-STD

Operating temperature

-20°C <> +50°C



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