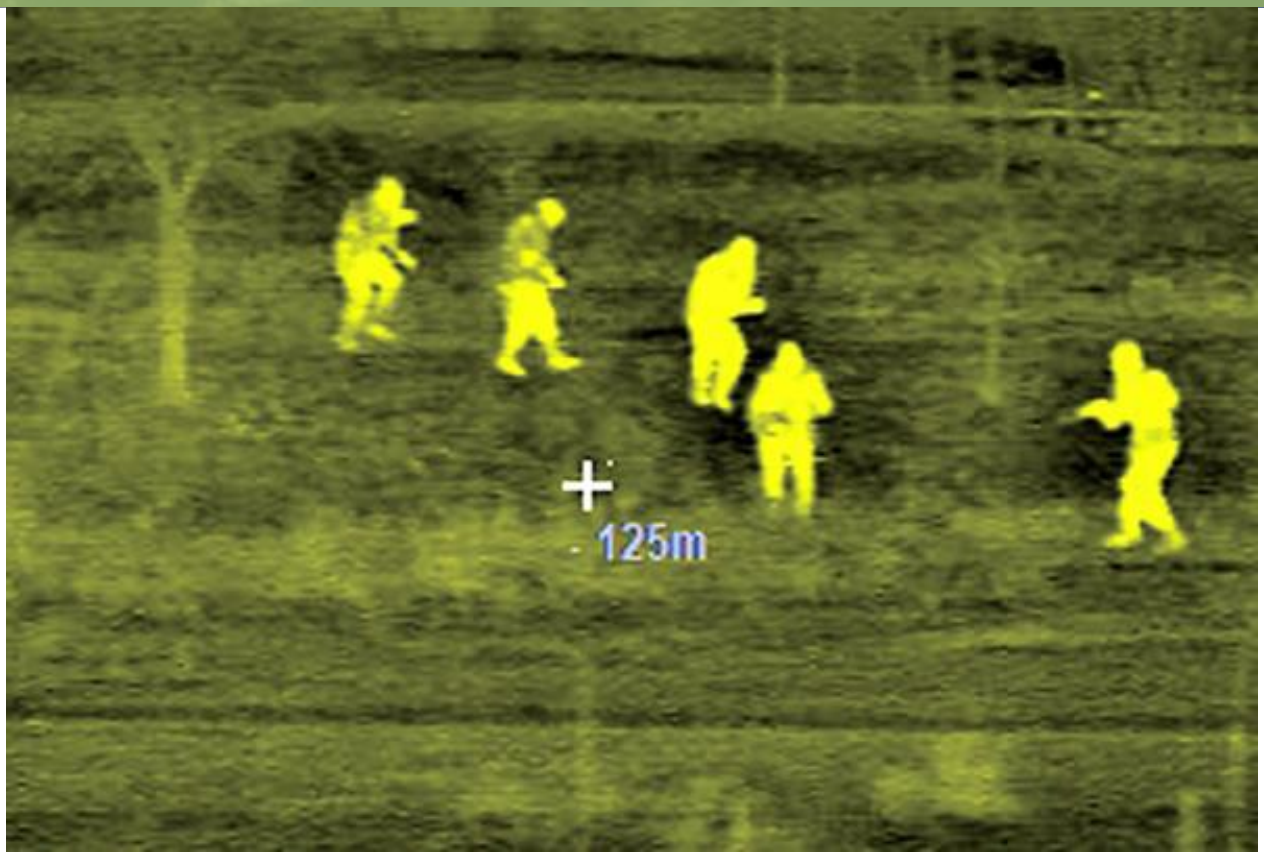
# Ultra-light UAV monitoring system with vertical take-off “Zilant”

# Personnel identification




**How it works:** copter is able to fly in autonomous mode in order to detect people.

**Practical case:** the operator inputs fly over route. The copters flies along designated route and transmits video feed to the operator (thermal imager video feed). In case if human heat signatures are detected, the operator can engage “target lock” and zoom into area of interest in order to get a positive ID on targets.

**Basic functions:**

1. People detection via thermal imager.
2. Target lock&tracking.
3. Use of built-in flashlights.
4. Loudspeakers.
5. Camera control and light direction control.

**Used payload:**

1. Thermal imager
2. Digital camera with zoom
3. Night vision camera

**System is able to detect people on a distance up to 4 km**

# Vehicle identification


**How it works:** copter flies along roads and detects cars and other vehicles.

**Practical case**the operator inputs fly over route. The copters flies along designated route and transmits video feed to the operator (thermal imager video feed). In case if vehicles are detected, the operator can engage “target lock” and zoom into area of interest in order to get a positive ID on targets.

**Basic functions:**

1. Car detection via thermal imager.
2. Target lock&tracking.
3. Use of built-in flashlights.
4. Loudspeakers.
5. Camera control and light direction control.

**Used payload:**

1. Thermal imager
2. Digital camera with zoom
3. Night vision camera

**System is able to detect vehicles on a distance up to 6 km**

# Search for people using cellular IDs

**How it works:** copter with built-in cellular base station detects people using unique cellular IDs

**Practical case:** the operator inputs fly-over route. Copter flies along the designated route and detects cellular IDs. In case cellphones were found, it is possible to make a call or send an SMS message.

**Basic functions:**

1. People detection via cellphone IDs.
2. Sending SMS (without knowing recipient's phone number)
3. Calls (without knowing recipient's phone number)
4. Found phone blocking.
5. Reception of precise GPS coordinates (doesn't support all phone models)

**Used payload:**

1. Thermal imager
2. Virtual base station

**System detects cellular phones on a distance up to 3km.**
**The signal is able to penetrate debris up to 10m deep.**
**The system is currently undergoing tests.**

# Coast Guard


**How it works:** copter detects people on the vessel within monitored sector, transmits audio message through a megaphone

**Practical case:** a ship appears within the monitored area, the copter detects it and moves forward to intercept. The copter is outfitted with a thermal imaging camera that allows the operator to see the ship's crew even at night. After approaching the vessel, copter engages its built-in flashlight pointed directly to a person standing on the deck. Operator (i.e., Coast Guard) transmits warning message via megaphone. Additionally, the copter can be outfitted with "Tucan" base station which allows the Coast Guard to call cellphones detected on the vessel, as well as to collect IMEI and IMSI of people trespassing the monitored area. All data collected by the copter is sent for storage and analysis to an encrypted server.

**Basic Functions:**

1. People detection via thermal imaging
2. Built-in projector/flashlight
3. Verbal commands from operator via loudspeakers/megaphone
4. Remote camera and lights control

**Additional Features:**

1. Suppression of cellular signals in designated area (denial of service)
2. Cellular calls within Tucan's internal network
3. Software for automatic camera focus on targets (needs R&D)
4. Cellular IDs storage
5. Creation of a secure server

# Border Control

**How it works:** copter detects trespassers within designated are, transmits audio message through a megaphone

**Practical case:** a group of trespassers appears within the monitored area, the copter detects them and moves forward to intercept. The copter is outfitted with a thermal imaging camera that allows the operator to see the trespassers even at night. After approaching the group, copter engages its built-in flashlight pointed directly to people who trespassed. Operator (i.e., Border Control) transmits warning message via megaphone. Additionally, the copter can be outfitted with "Tucan" base station which allows the Coast Guard to call cellphones detected in the area, as well as to collect IMEI and IMSI of people trespassing the monitored area. All data collected by the copter is sent for storage and analysis to an encrypted server.

**Basic Functions:**

1. People detection via thermal imaging
2. Built-in projector/flashlight
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**Additional Features:**

1. Suppression of cellular signals in designated area (denial of service)
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# Express Special Delivery

**How it works:** the container is filled with necessary payload, after which it is mounted to the copter. The operator determines a point on the map (drop zone). The drone delivers the container to the designated delivery point (drop zone).

**Scenario:** a container needs to be delivered in a timely manner over a treacherous terrain (forest, river, etc.). The operator designates the drop zone on the map the drone delivers the package without further inputs from the operator.

**Basic Functions:**

1. Autonomous patrol
2. Delivery of up to 15 kgs to 10 km
3. Automated payload drop
4. Battery control, automated return to base

**Additional Features:**

1. Automated maneuvering around objects
2. Automated calculation of container drop time so it gets within the drop zone
3. Creation of a delivery system that drops payload in several batches
4. Upgrade to 30kg of payload for 10 km flight distance

# Zilant

Recon Drone

Max. time of flight: 90 min
Max. distance: 30 km

| Copter's Technical Specifications | |
|---|---|
| **Frame structure** | Carbon fiber composite material |
| **Maximum strength of the frame** | 110 kg |
| **Motor Power** | 12 kW |
| **Cruising speed** | 45 km / h and 60 km / h |
| **Maximum lift weight** | 70 kg (before separation) and 15 kg (working) |
| **Soldering** | GOST 17325-79 |
| **Material wires** | Copper |
| **The degree of vibration reduction frame** | High |

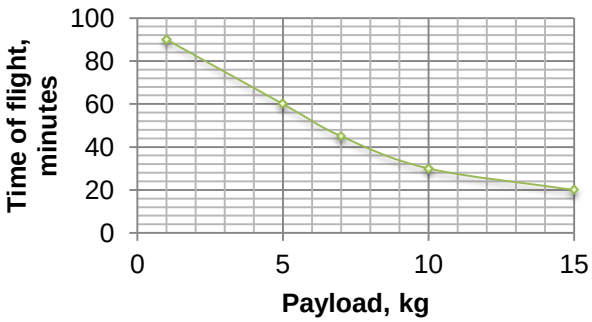


Figure
Flight time with payload

# «REVERS»

Radio-controlled chanel

Range: 15 км
Max power: 800 mWt
Working freq.: 433 mHz

| Tech specs | |
|---|---|
| **Frequency range** | Manual 410-510 mHz<br>(default 431-441 mHz) |
| **Amount of channels** | 16 channels (8 physical on the receiver<br>and 16 via S.BUS) |
| **Output** | 400 mWt / 800 mWt with switch options |
| **Sensitivity** | High (115 Dbl) |
| **Data transfer algorithm** | RAFHSS unique algorithm with “jumps” between channels |
| **System setup** | Via MicroUSB, no drivers needed |
| **Foolproof features** | Various audio signals (wrong connection, battery is low, etc.) |
| **Bridge** | Ability to set up a bridge with a 2,4 GHz receiver with LRS(!) |
| **Image type** | Digital |

# Recon modules

## «Zoom»

Digital camera:

- Allows to transfer video feed of high quality
- Track moving and stationery objects
- 30x image magnification

## «Falcon Eye»

Thermal imaging module, made in Russia.

:

- Detects people up to  4 km
- Detects cars up to 6 km
- Refresh rate 25 fps

## «Hawk’s Head»

- gyro stabilized optronic observation system consisting of a thermal imaging channel with an uncooled detector and the visible range Full HD camera mounted on a gyro-stabilized turntable. The system is designed for use on manned and unmanned aerial vehicles:

- Detects people up to  4 km
- Detects cars up to 6 km м
- Gyro image stabilizer
- Image lock and tracking

# Special modules

For specific types of recon ops


## Signal jammer:

- Allows to shut down cellular network
- Designated angle jamming
- Disarming of radio activated units (IMDs, etc.)
- Blocking of cellphones used as detonators on improvised bombs

## “Tucan” base station

Virtual base station “Tucan” allows to:

- Record IMAE and IMSI IDs of phones in the area
- Allows to reroute phones to “Tucan”
- Give limited access to network within region
- Enables to launch limited internal network