

C-UAS Challenges

CROW: Indra C-UAS solution



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#1: Different threats... Different solutions

Different Threats...
Different Scenarios
Different Locations...
...

Different Use Cases...

Different C-UAS solutions

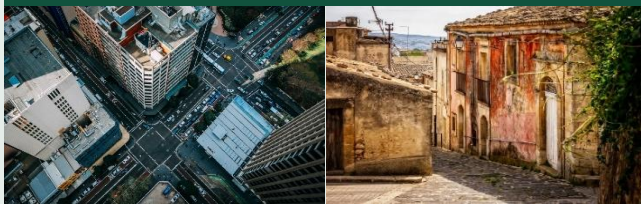
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graph TD; A[Different C-UAS solutions] --> B[Different Threats... Different Scenarios Different Locations... Different Use Cases...]; B --> C[There is no one-size-fits-all product, but a family based on a common core and "powerful" Command and Control.];
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There is no one-size-fits-all product, but a family based on a common core and "powerful" Command and Control.

Different threats... Different solutions

Examples...

In Urban vs. open area



Climate (rain, fog...)



Covering Small vs. Big area



Targets to protect



Collateral



Different threats... Different solutions



Commercial UAS & No-Commercial - DIY UAS



Isolated,
coordinated,
swarms attacks



Specialized system in UAS Class 1 threats

| UAS CLASSIFICATION | | | | | |
|-------------------------------|-----------------------|---|---------------------------|-----------------------|-----------|
| Class | Category | Normal Employment | Normal Operating Altitude | Normal Mission Radius | |
| Class III (≥ 600 kg) | Striker / Combat | Strategic/National | Up to 65,000 ft | Unlimited (E/LOR) | VSHORAD |
| | HALE | Strategic/National | Up to 65,000 ft | Unlimited (E/LOR) | |
| | MALE | Operational/Theatre | Up to 65,000 ft | Unlimited (E/LOR) | |
| Class II (50 kg - 600 kg) | Tactical | Tactical/Operational | Up to 18,000 ft | 200 km - 1000 km | |
| Class I (< 150 kg) | Small (≤ 15 kg) | Tactical Unit | Up to 5,000 ft AGL | 50 km (E/LOR) | ARMS Goal |
| | Mini (≤ 15 kg) | Tactical Sub-unit (manual or hand launch) | Up to 3,000 ft AGL | Up to 25 km (E/LOR) | |
| | Micro (≤ 15 kg) | Tactical Sub-unit (manual or hand launch) | Up to 200 ft AGL | Up to 5 km (E/LOR) | |

Different UAS

Remotely Controlled

Piloted by one operator (RF communications)



5G

RF Datalink Control

Datalink Images / Video

Based on Waypoints

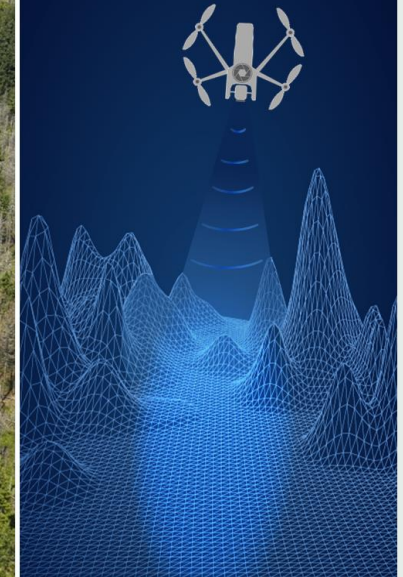
GNSS waypoints navigations (i.e.: GPS)



Waypoints GPS

Other methods

Video analytics, Sense and Avoid, IMU



Continuous evolution

C-UAS evolution
(new technology)

UAS evolution
(new threats)

Medium term.. Coexistence of..

Friend UAS

Foe UAS

Different Deployments

Semi-Static
Deployment
Example
(in shelter)

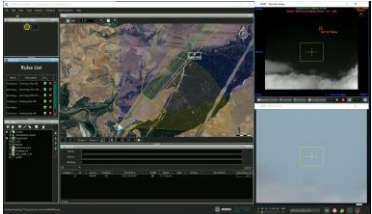


Challenges: continuous improvement of current solutions

Command & Control

The "brain and heart": Integrates and fusions the best sensors and effectors allowing the decision-making process.

Allowing Modular, Flexible & Scalable System



Integration with other systems
UTM/Air Defence/Security Forces



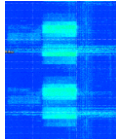
Situational Awareness

Counter-measures

Can incorporate Active and Passive sensors



Radar



RF Sensors



EOS System (Thermal & DayLight)

Others

Can incorporate Soft/Hard-Kill solutions



Jammer

Weapon-Stations

Laser
HEPM

Nets

Dron Catchers

Others



#3: Improved Detection Solutions

Multiple combination of sensor technologies (type, location, number, ...)

Improving detection technologies by increasing their range.

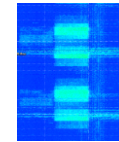
Improving detection technologies by increasing their accuracy.

Situational Awareness

Can incorporate Active and Passive sensors



Radar



RF Sensors



EOS System (Thermal & DayLight)

Others

We need to grant the needed end-to-end reaction time to the operator(s)

#4: Improved Neutralization solutions

Combination of counter-measures, soft-kill and hard-kill, considering the level of threat and associated collateral damage.

We need more “evolution” here. There is no perfect solution fitting all needs.

Counter-measures

Can incorporate Soft/Hard-Kill solutions

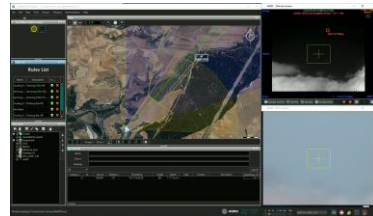
| | | | |
|---|--------------------------------------|---------------------------|--------|
|  Jammer | Weapon-Stations Laser HEPM | Nets Dron Catchers | Others |
|---|--------------------------------------|---------------------------|--------|

#5: The Command and Control System is key

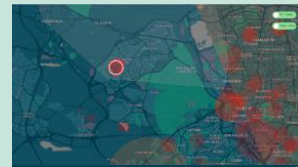
Command & Control

The “brain and heart”: Integrates and fusions the best sensors and effectors allowing the decision-making process.

Allowing Modular, Flexible & Scalable System



Integration with other systems
UTM/Defence/Security Forces



Enhanced capabilities for real-time threat analysis and dynamic assessment.

Support: Alerting system & CONOPs (well defined procedures)

Collaboration with complementary systems such as U-space/UTM, mobile operators, Security Forces, Perimetral security, etc.

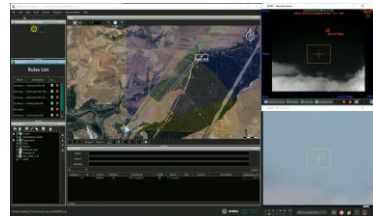
Integration with “hierarchical” higher level systems to grant a “global view”.

#6: Training! – simulation support

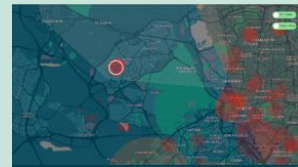
Command & Control

The “brain and heart”: Integrates and fusions the best sensors and effectors allowing the decision-making process.

Allowing Modular, Flexible & Scalable System



Integration with other systems
UTM/Defence/Security Forces



Helping the operator to face the real life.

indra

At the core

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