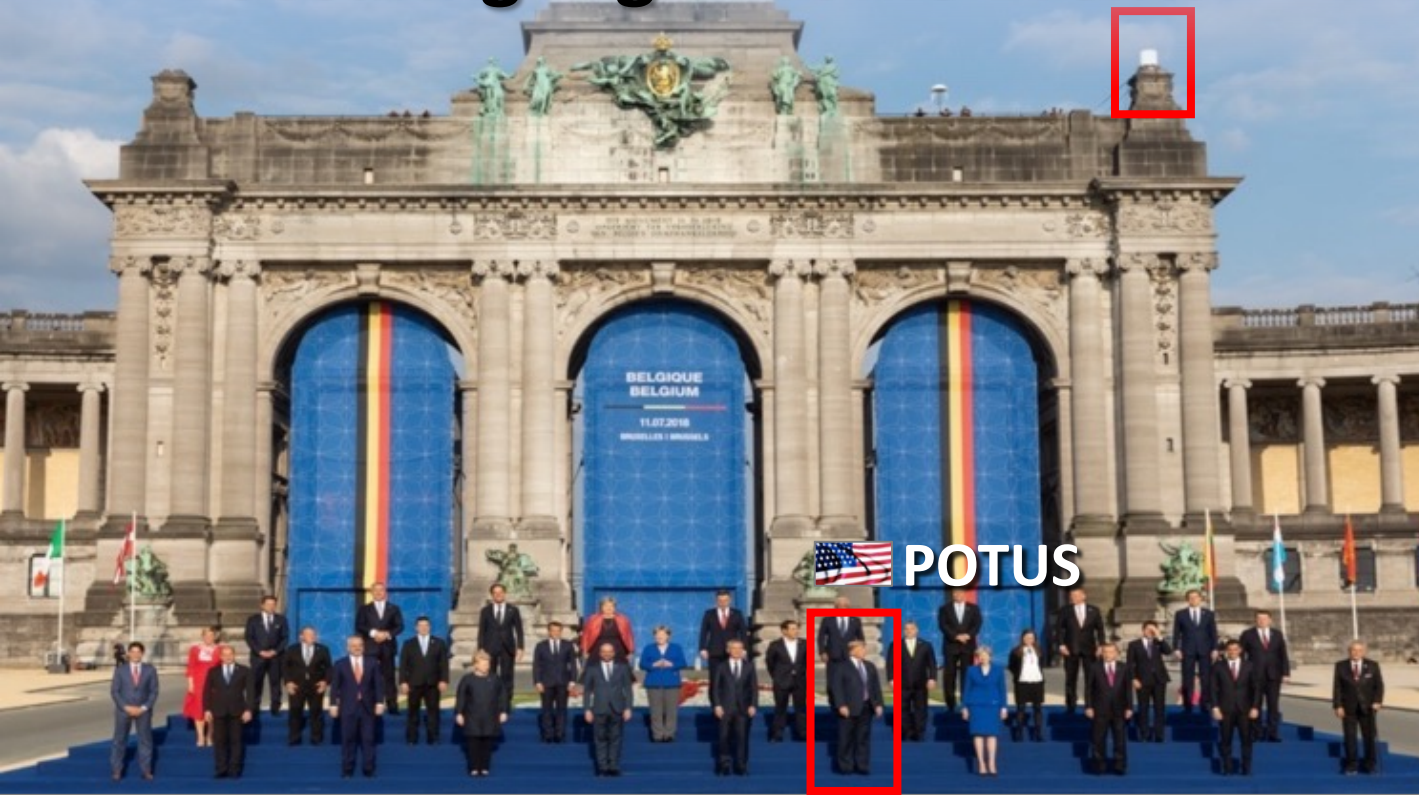


# IRIS® Counter Drone Radar

## Securing High-Profile Events

**robin**  
radar systems



International  
Security Expo

September 28<sup>th</sup>, 2021

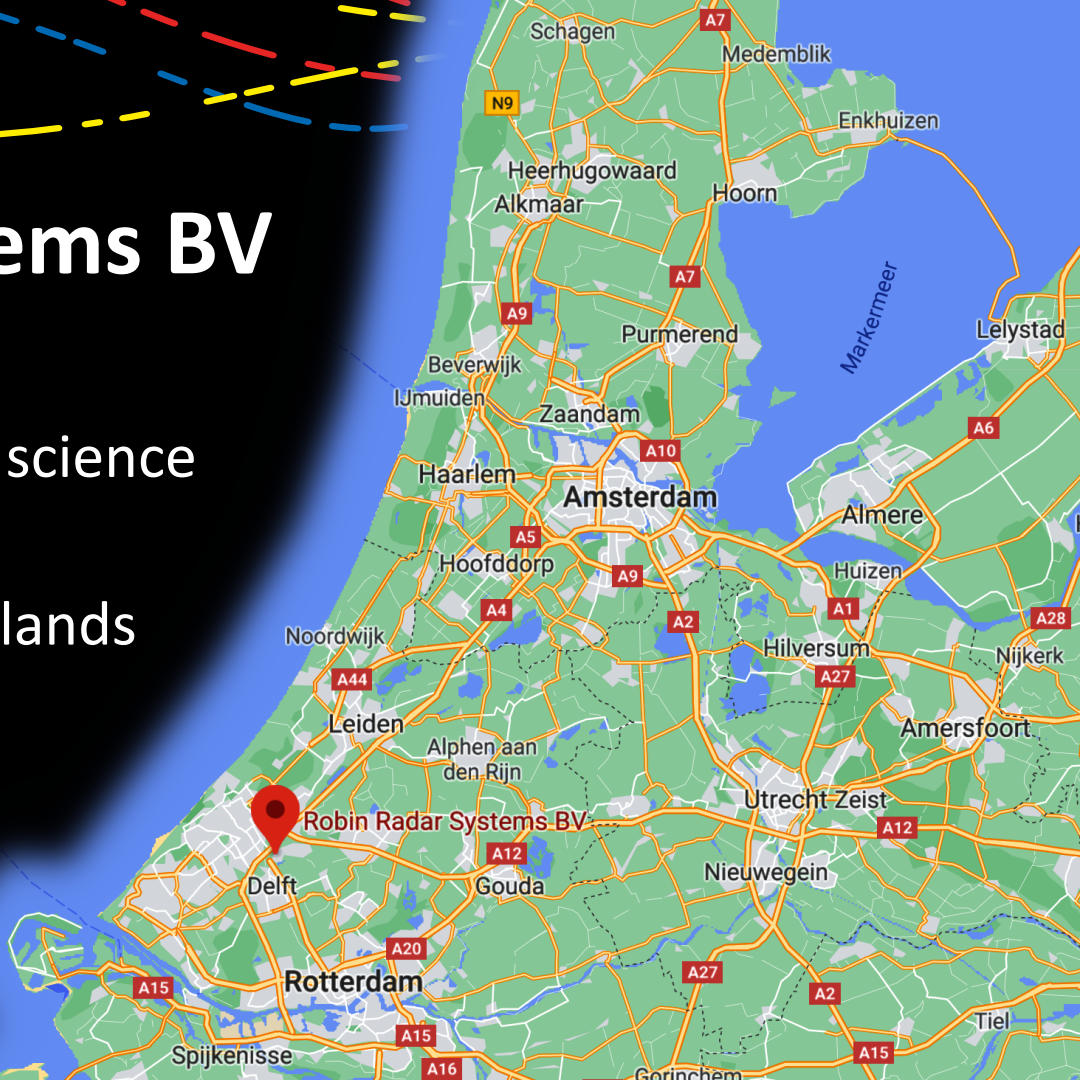


# Agenda

1. About Robin Radar Systems
2. The Emerging Drone Threat
3. IRIS® Counter Drone Radar  
monitoring, detection, tracking, classification and alerting  
of drone intrusions
4. Counter Drone Use Case – high profile events

# Robin Radar Systems BV

- Founded 2010
- >30 years applied radar science
- >60 staff
- The Hague, The Netherlands
- 2020 turnover >10 M€





# Robin Radar Systems BV – booth G23

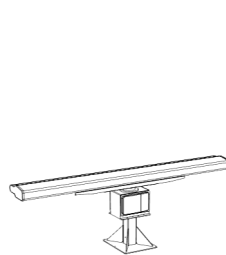


# Robin Radar Systems Netherlands

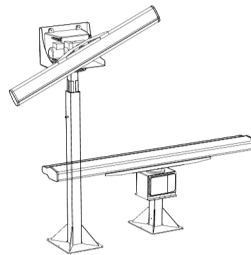
## 3 Business Lines



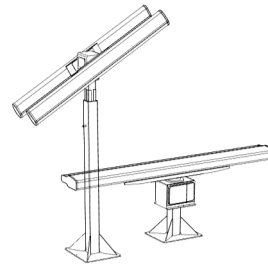
## 6 Radar Solutions



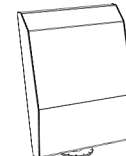
2D Lite



3D Fixed

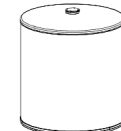


3D Flex



Max

### C-UAS Radars



Elvira®



Iris®

# Defence & Security Segments

DRONE  
DETECTION  
for  
Land Sea Air  
**MILITARY**

DRONE  
DETECTION  
for  
**ENERGY**

DRONE  
DETECTION  
for  
**MARITIME**

DRONE  
DETECTION  
for  
**PERIMETER  
SECURITY**



**robin**  
radar systems

# ROBIN protects Military and Civil critical assets against Drone Threats with over 120 Radars 24/7 fully operational

World-wide Market Leader of Drone Detection Radar sensor systems in counter-UAS applications



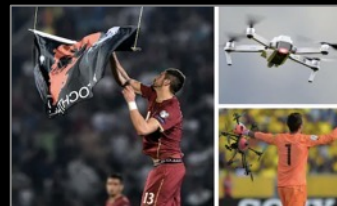
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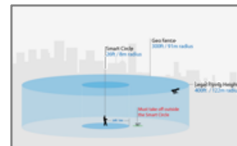
# Drone Threat

- Terrorism
- Propaganda
- Attacks on Politicians
- Contraband Smuggle
- Cyber Security



# Technological Progress

- Smaller, faster, accessible, affordable
- Swarming
- Alternative communication technologies to WiFi
  - 5G, satcom
- Geofencing, transponders
- UTM
- Unsupervised / man-out-of-the-loop flights
  - GPS waypoints, fully autonomous



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# C-UAS Building Blocks

## DETECTION

Human Surveillance

Passive Electro-Optical / InfraRed

Acoustic

Electronic Support Measures (ESM)

**Active Radar (radar detects all UAS)**



## INTERVENTION

Jamming

Spoofing

Hacking

Laser

High Power EM

Water canons

Shooting nettings

Counter drones

Falcons

Guns

Missile systems

## LIMITATIONS

Hinder to other communications

**Autonomous flying drone**

Time to reload

Collateral damage

Range

Accuracy

Price

Ease of use

Organizational fit

A-symmetric warfare

# C-UAS Concept of Operations

## Step 3. Alerting

The ability to alert drone intrusion

## Step 2. Classification

The ability to distinguish rogue drones from other small objects like friendly drones, manned airplanes and birds

## Step 1. Monitoring, Detection and Tracking

The ability to detect non-cooperative small targets

## Step 0. Prevention

Government(s) have the responsibility to inform the public about the do's, don'ts and consequences when flying drones in public and non-public areas

## Step 5. Forensics

Determine origins and motive

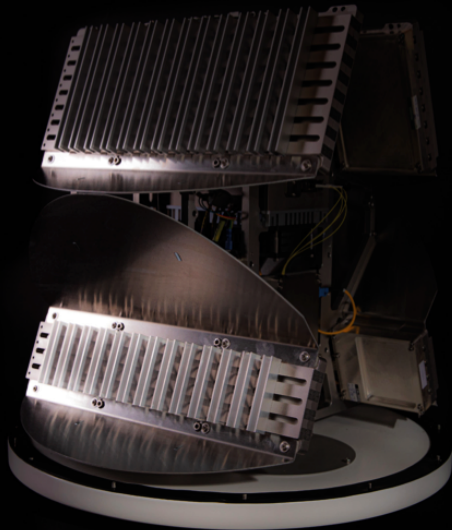
## Step 4. Intervention/Mitigation (Police & Emergency services)

The ability to take appropriate actions to mitigate risk

**The Intervention Challenge:  
Balancing threat with collateral  
damage within a legal framework**



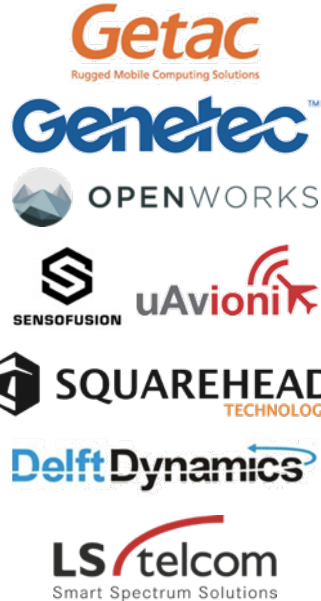
# IRIS<sup>®</sup> System Specifications



Technology	FMCW Solid State Radar, 3D
Frequency	X-band
Power Output	2x 12 Watt
Scan Speed	1 s
Instrumented Range	5 km
Azimuth Coverage	360°
Elevation Coverage	60°
Classification Method	Micro-Doppler
Dimensions	554 mm diameter, 623 mm height
Weight	25 kg

# Business Partners

## TECHNOLOGY



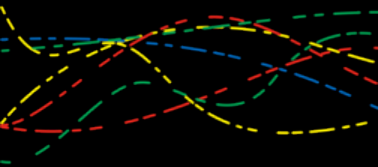
## DISTRIBUTION





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# Counter Drone Use Case Securing High-Profile Events



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radar systems



# C-UAS Protection

- Locations at permanent risk

- Airports
- Military bases
- Prisons
- Harbors
- Energy plants (nuclear, oil & gas, wind, ...)
- Governmental buildings
- Court houses

- Locations at intermittent / temporary risk

- **Forward deployed military**
- **Political summits**
- **(V)VIP gatherings**
- **Sports events**

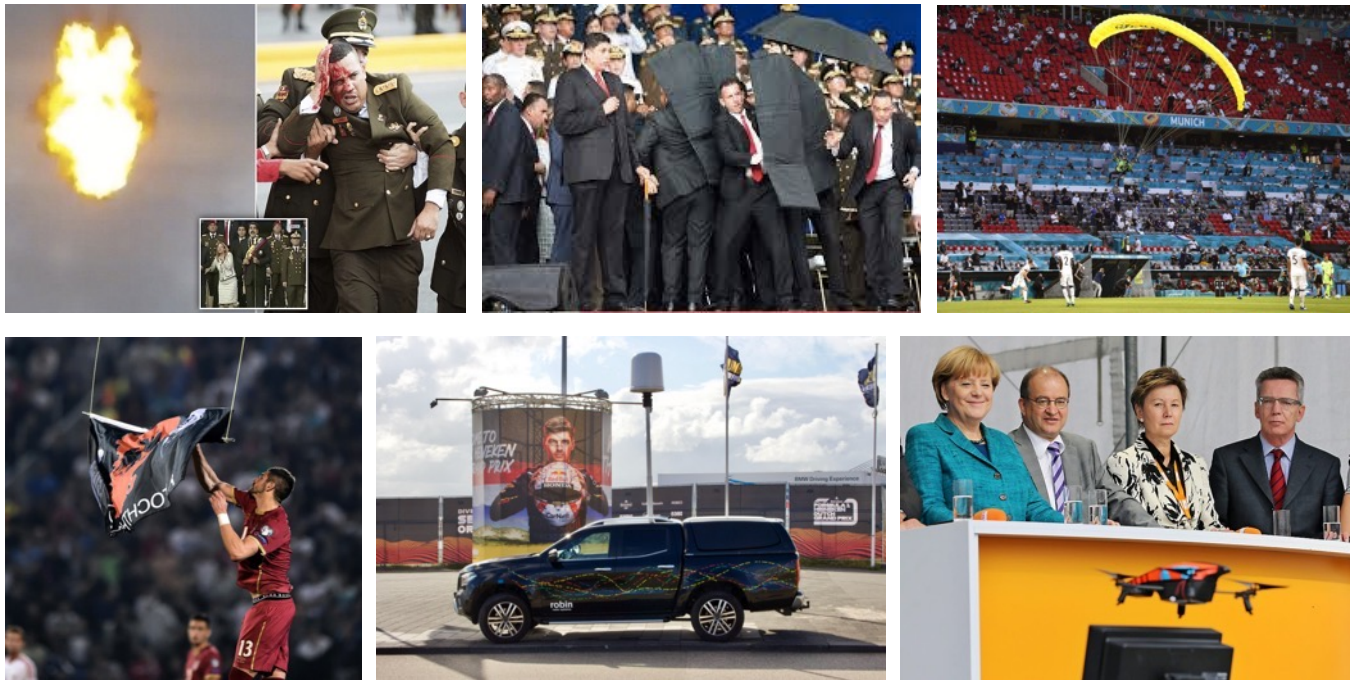
- Vehicles, convoys

- Military
- Valuables
- High profile prisoners





# C-UAS at High-Profile Events the 'new normal'



# C-UAS at High-Profile Events

Challenges	Impact
<b>Attracts large numbers of people</b>	
<ul style="list-style-type: none"><li>• Needle in the haystack</li><li>• Congested RF spectrum</li></ul>	<ul style="list-style-type: none"><li>• Frequency management</li><li>• Performance degradation of RF-based C-UAS sensors</li></ul>
<b>Urban environment</b>	
<ul style="list-style-type: none"><li>• Severe line-of-sight limitations</li><li>• Reflections of radar / RF signals off facades</li><li>• Ongoing daily life activities vs. potential threat</li></ul>	<ul style="list-style-type: none"><li>• Multiple sensor deployment sites</li><li>• Coverage optimization</li><li>• Radar clutter</li><li>• Degradation of localization accuracy</li></ul>
<b>Other legitimate users of air space</b>	
<ul style="list-style-type: none"><li>• Law enforcement UAS</li><li>• (V)VIPS arriving with aircraft / helicopter</li></ul>	<ul style="list-style-type: none"><li>• Unmanned Aircraft System Traffic Management (UTM)</li></ul>
<b>Ad-hoc C-UAS system deployment</b>	
<ul style="list-style-type: none"><li>• Poor accessibility of deployment locations</li><li>• Rooftops with A/C units, vents, antennae, ...</li><li>• Networking of C-UAS elements</li></ul>	<ul style="list-style-type: none"><li>• SWaP</li><li>• Mobile networking</li><li>• Auto-calibration</li><li>• False alarm suppression</li></ul>

# IRIS<sup>®</sup> Radar, Primary Sensor in C-UAS

## Demonstrated operational capability, also in challenging environments

- Detection, classification, localization & tracking
  - 360° x 60° field of view, minimal cone of silence
  - Advanced micro-Doppler processing to separate drones from birds
  - Simultaneous 3D-localization, tracking and classification of numerous targets
- Rapid (re-)deployable
  - Low SWaP, single cable connection (data, power)
  - Auto-calibration
- Active sensor, works against any drone type
  - No dependency on presence of RF up / downlink signal (e.g. fully autonomous drones)
  - No dependency on library containing decrypted of communication protocols
- Easy to integrate
  - C2-system and other sensors, supports open interface standards
  - Mounting on tripod, vehicle, ....



# Contact and Further Reading

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[www.robinradar.com](http://www.robinradar.com)

