SIA EDUCATION at ISC

Safely Securing Diverse Environments and Sectors from the Threat of Common, Commercial Off-the-Shelf (COTS) Drones

Brett Feddersen, Vice President for Strategy and Government Affairs, D-Fend Solutions

In partnership with SIA EDUCATION at ISC

Built by RX In the business of building businesses

About D-Fend Solutions

Leading global provider of field-proven RF cyber-based, non-kinetic, non-jamming, counter-drone takeover solutions for sensitive & challenging environments

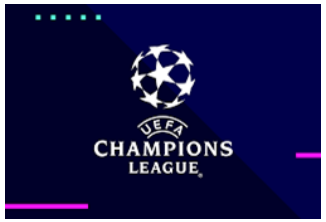
Global Presence and Success

- **Thousands** of successful deployments performed by top-tier government agencies and at major global events
- **28** countries, **5** continents (four “Five Eyes” countries, seven G7 countries)

Selected & Proven

- Selected as **best-in-class RF cyber system** & deployed by high-level governmental agencies in defense, homeland security, and law enforcement
- Entrusted **to protect** international airports, critical infrastructure, and large, complex events with tens of thousands of attendees

DoD DHS DoJ



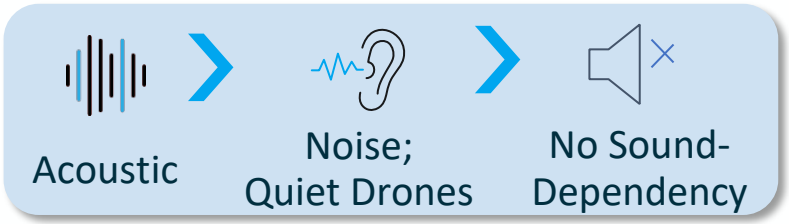
Our Team

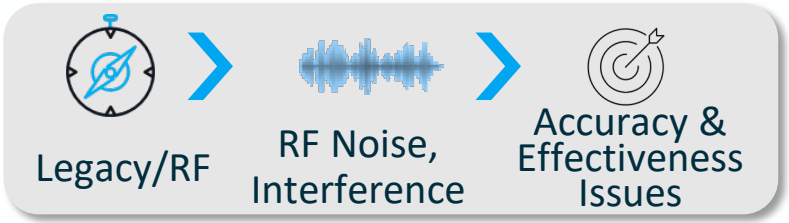
- **180+** employees, in the USA, Canada, UK, Netherlands, Japan, Korea & Israel

D-FEND SOLUTIONS

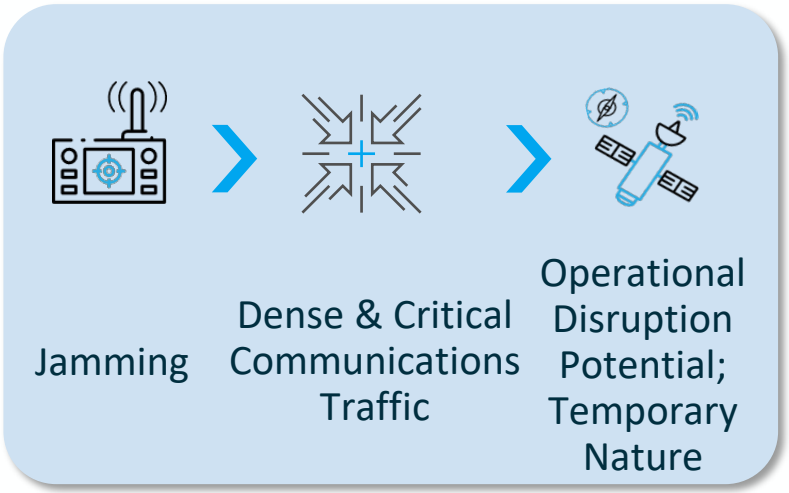
Special C-UAS Challenges in Sensitive Environments

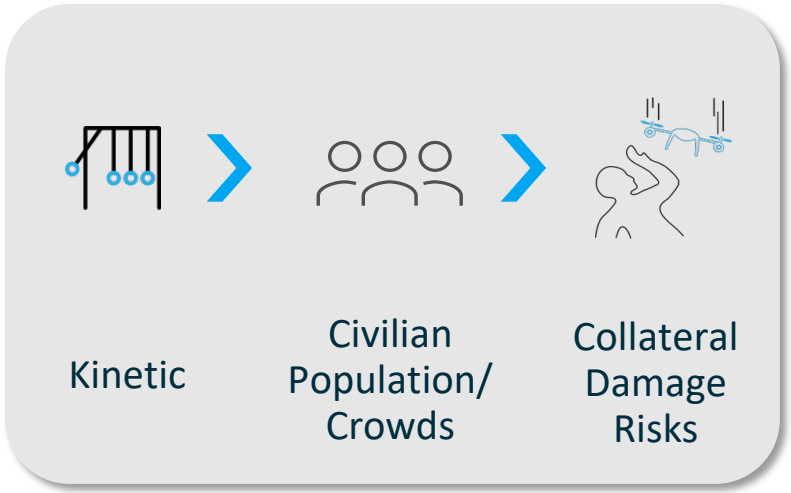
Detection





Mitigation





C-UAS Goals

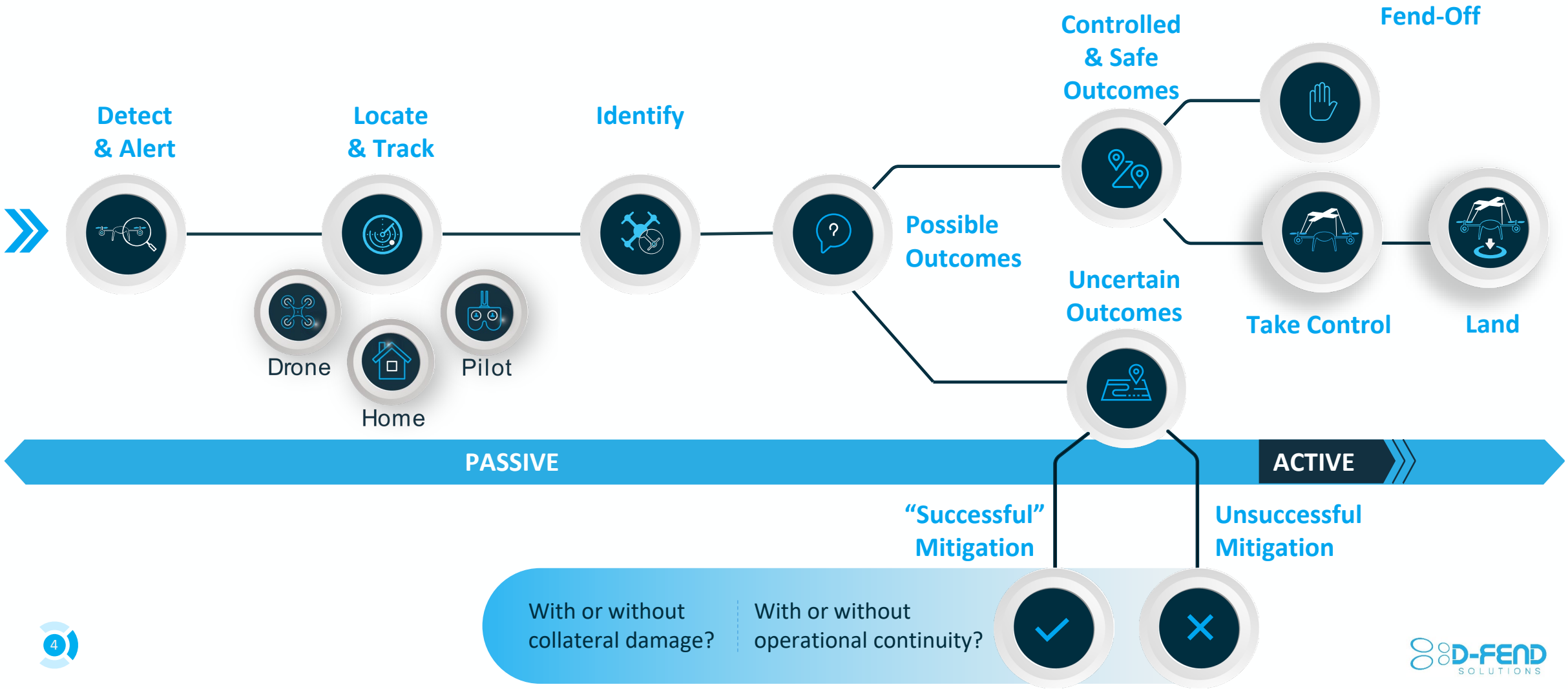
Overcome Sensitive Environment Challenges to Achieve:

- Fast & Accurate Detection
- Safety & Efficient
- Continuity of Operations

D-FEND SOLUTIONS

How it Plays Out – The Sensitive Environment Rogue Drone Incident Lifecycle

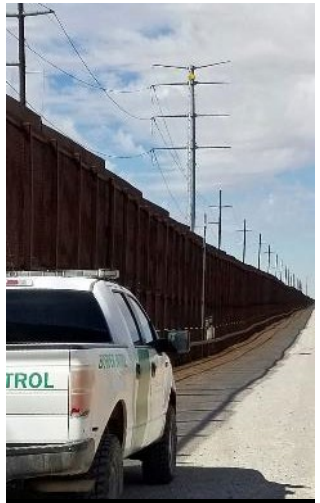
Rapid deployment, accurate detection, fast mitigation, and controlled (or not) outcomes



D-FEND SOLUTIONS

Airports & Aviation

Critical Infrastructure & Industry

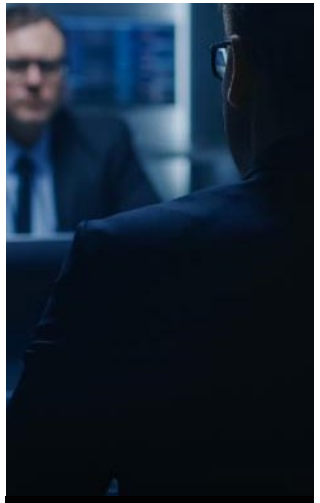


Borders

Prisons

Events, Stadiums, Arenas

Military



National & Homeland Security

Law Enforcement & First Responders

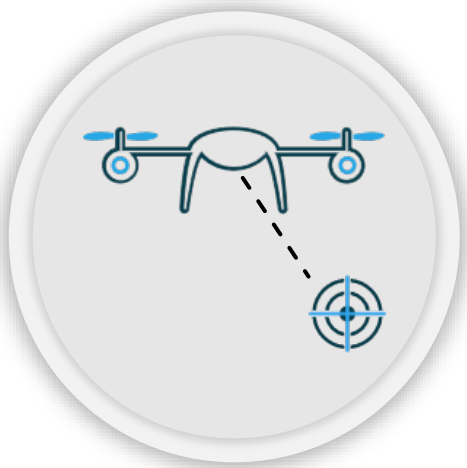
VIP Protection

Maritime

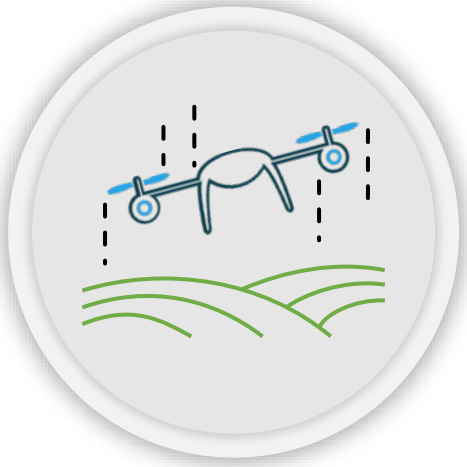
Counter-Drone Deployment Environments

D-FEND SOLUTIONS

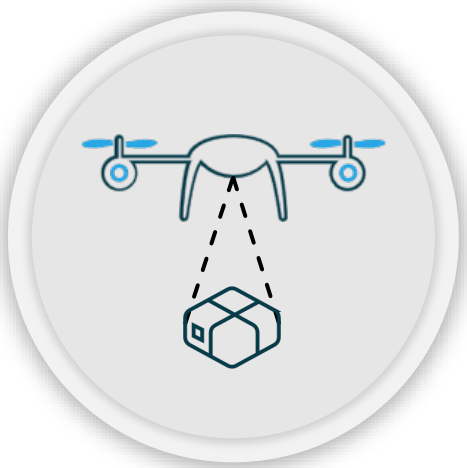
Different Drone Threat Cases



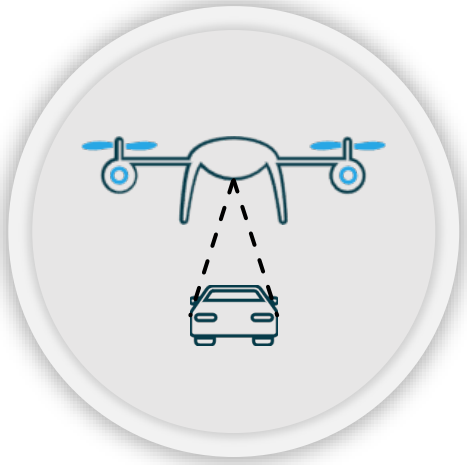
Attack



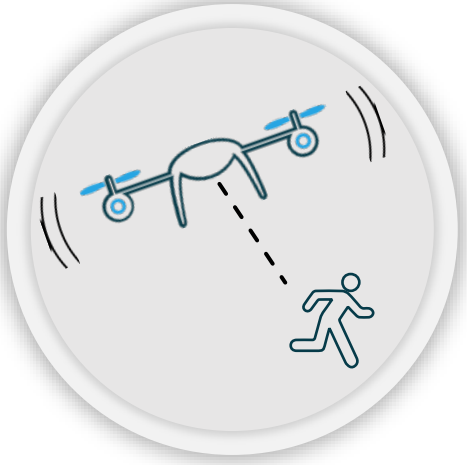
Collision



Smuggling



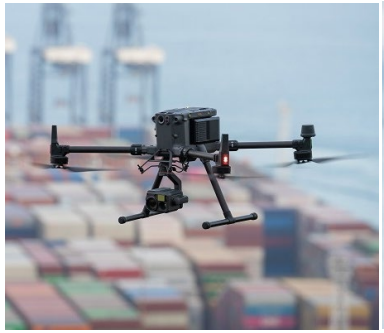
Espionage



Harassment & Nuisance

Wide Range of Commercial & DIY Drone Threats

Commercial Long-Range, Advanced-Protocol Drones



DIY Drones

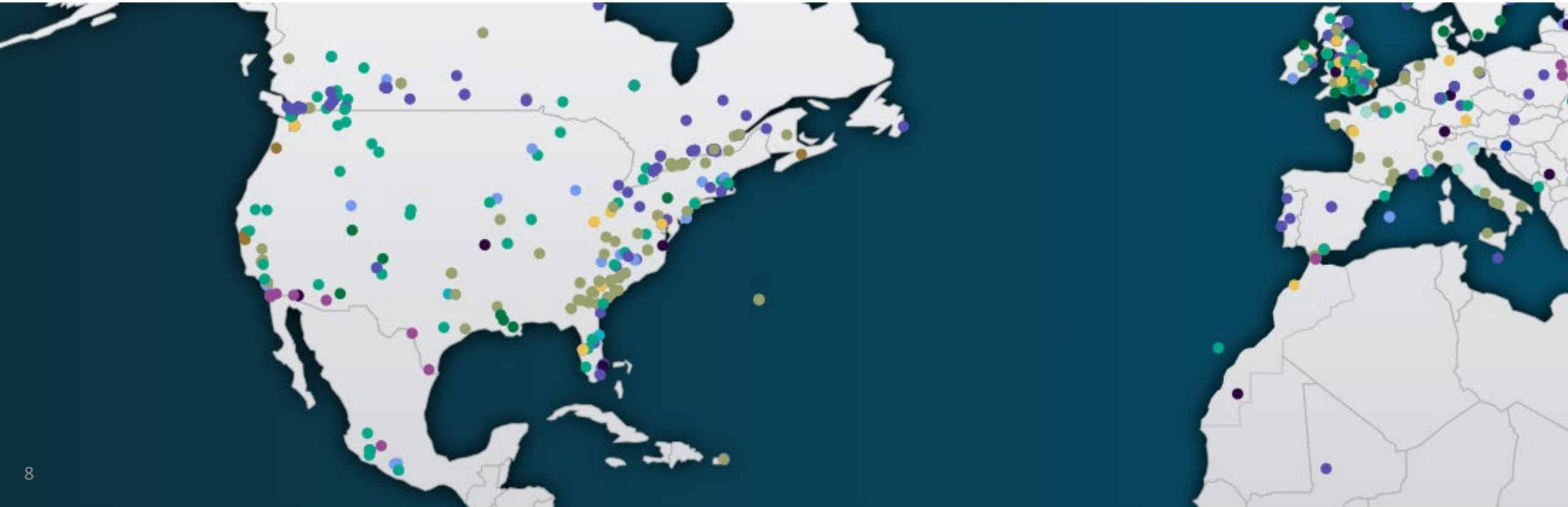


Primary Focus on MAJOR Drone Threats

US DOD Group I and II; EU NATO Class I and II

Different Sectors, Different C-UAS, Use Case Descriptive Framework

- Incidents – frequency, locations, types



ALL SECTORS | AIRPORTS | BORDERS | COMMUNITY AND NEIGHBORHOOD | CRITICAL FACILITIES AND INFRASTRUCTURE | ENTERPRISE

Drone Attack & Incident Tracker

https://d-fendsolutions.com/drone-incident-tracker/

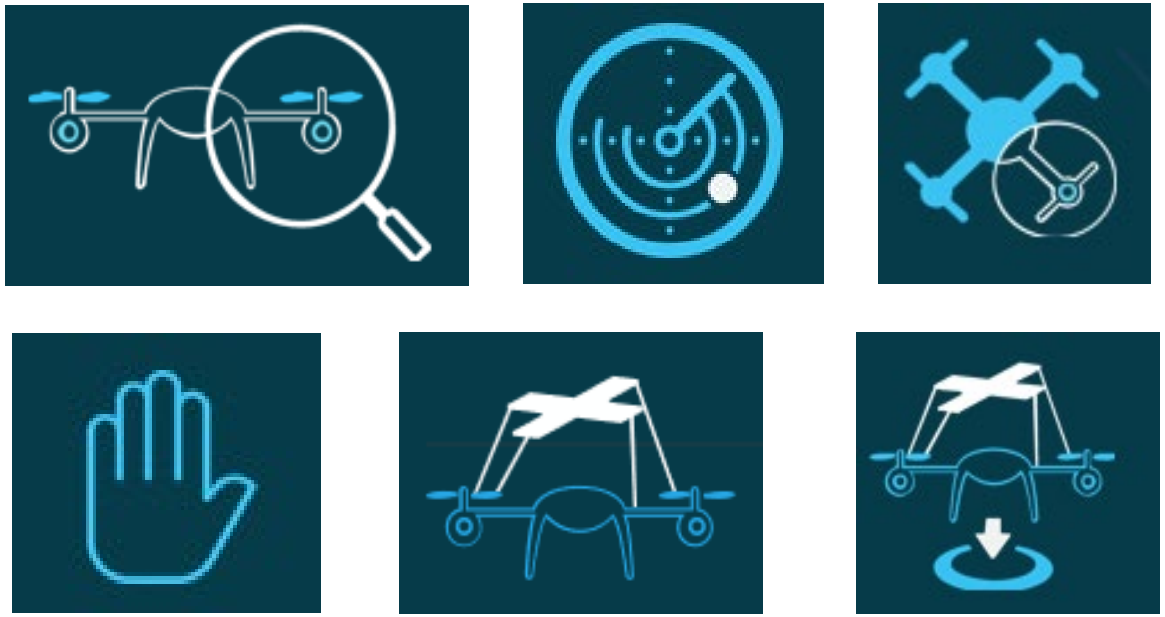
ATTACK / INCIDENT	DATE	LOCATION	SECTOR	TYPE	ARTICLE LINK
Staff at Dorchester Penitentiary seized a suspected drone-dropped package worth nearly $1 million, containing drugs, and cellphones.	March 3, 2025	Dorchester, New Brunswick, Canada	Other	Smuggling	View Article
Firefighters reported an unauthorized drone over a structure fire interfered with their drone pilot's efforts to assist incident command.	March 1, 2025	Colorado Springs, Colorado, USA	Law Enforcement Agencies and First Responders	Harassment and Nuisance	View Article

Different Sectors, Different C-UAS, Use Case Descriptive Framework

- Incidents
- **Challenges and Risks**

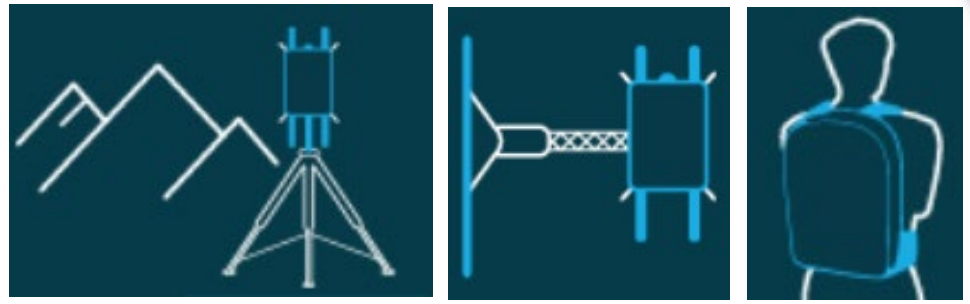
Different Sectors, Different C-UAS, Use Case Descriptive Framework

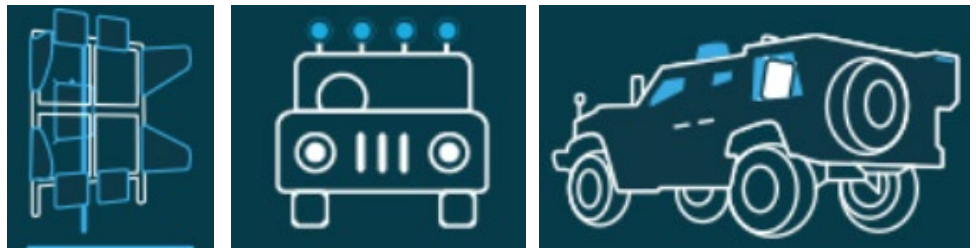
- Incidents
- Challenges and Risks
- **Required C-UAS Capabilities**



Different Sectors, Different C-UAS, Use Case Descriptive Framework

- Incidents
- Challenges and Risks
- Required C-UAS Capabilities
- **Relevant Deployments and Configurations**





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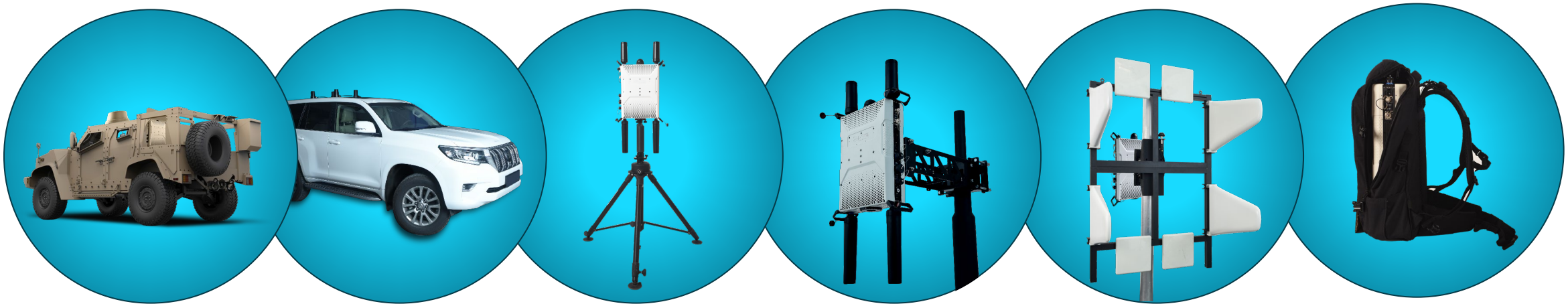
Multiple Deployment Options Needed for Operational Flexibility

High Adaptability, Operational on Multiple Platforms



Military Vehicle

Vehicle

Tactical

Stationary

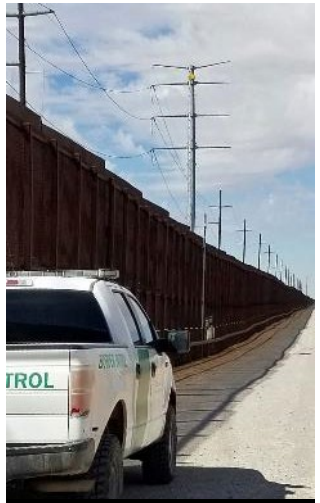
Long-Range Directional

Backpack

D-FEND SOLUTIONS

Airports & Aviation

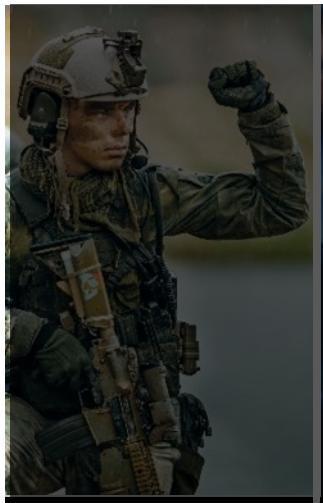
Critical Infrastructure & Industry



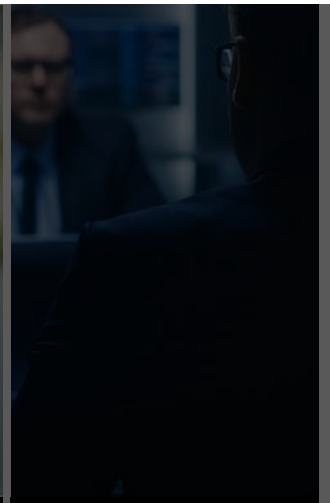
Borders

Prisons

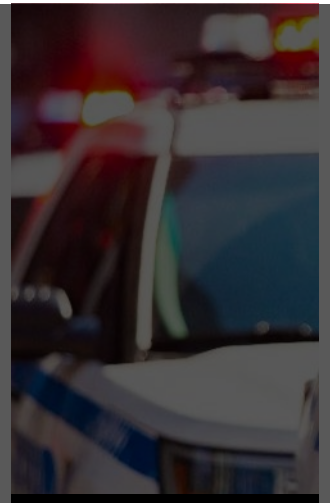
Events, Stadiums, Arenas



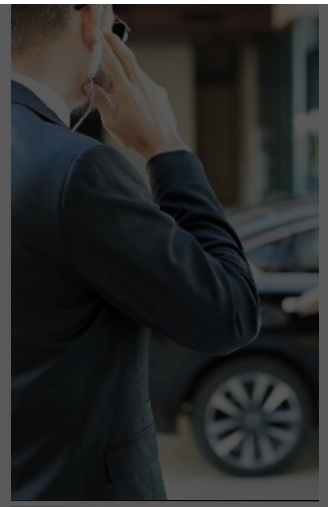
Military



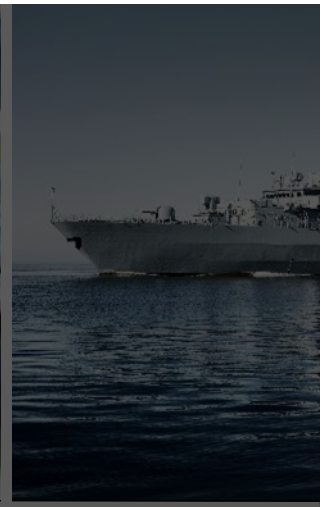
National & Homeland Security



Law Enforcement & First Responders



VIP Protection



Maritime

Counter-Drone Deployment Environments

D-FEND SOLUTIONS

Airports & Aviation

Incidents | Challenges & Risks | Required C-UAS Capabilities | Relevant Deployments & Configurations

- **February 7, 2025 –** Drone near **Sofia Airport** halted air traffic, causing delays and an emergency declaration
- **January 13, 2025 –** Drones at **Riga International Airport** caused flight diversions and multiple delays
- **September 13, 2024 –** Unauthorized drone caused operations to be halted for 48 minutes, resulting in delays, cancellations, and diversions for 30 flights at **Jeju International Airport in South Korea**
- **September 8, 2024 – Arlanda Airport, Sweden**'s largest, halted air traffic for 2.5 hours after four drones were spotted
- **July 28, 2024 –** A British Airways Airbus A321 narrowly avoided a potentially catastrophic collision with 2 drones flying 50 feet above the aircraft during its final approach to **London Heathrow**
- **June 30, 2024 –** An unauthorized drone flying near **Edinburgh Airport** caused a landing plane to perform a "missed approach"

January 9, 2025 – A civilian drone collided with a "Super Scooper" firefighting aircraft over the **Palisades Fire in Los Angeles**, damaging the plane's wing and grounding it during critical firefighting efforts (photo from FBI via L.A. Times)

Airports & Aviation

Incidents | **Challenges & Risks** | Required C-UAS Capabilities | Relevant Deployments & Configurations

- Grounded and Diverted Flights
- Missed Connections
- Customer dissatisfaction and damage to reputation
- Lost Revenue
- Risk of Collision and Serious Damage
- Sensitive Environment
  - Communications
  - Operations
  - Safety

Airports & Aviation

Incidents | Challenges & Risks | **Required C-UAS Capabilities** | Relevant Deployments & Configurations

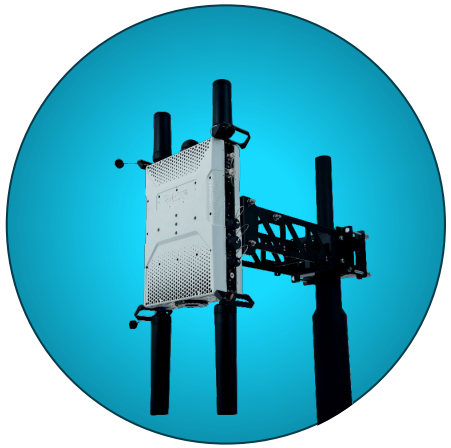
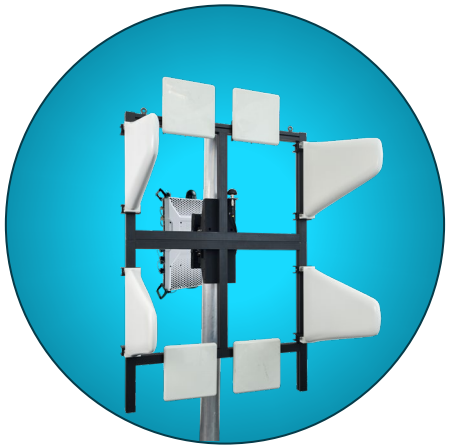
- Effective & optimized technology for safe operations in highly sensitive environment
- Compliance with evolving regulations
- Accurate tracking of drone location, home location, and drone operator location
- Migration path from passive detection to mitigation, as regulations permit

D-FEND SOLUTIONS

Airports & Aviation

Incidents | Challenges & Risks | Required C-UAS Capabilities | **Relevant Deployments & Configurations**

- **Stationary –** omnidirectional coverage of the airspace around facilities such as control tower and terminals
- **Long-Range Directional –** focused on specific avenues of approach – takeoff and landing air corridors
- **Vehicle –** for patrolling around facility for patrolling around facility
- **Command & Control** – for integration of multiple sensors

Critical Infrastructure & Industry

Incidents | Challenges & Risks | Required C-UAS Capabilities | Relevant Deployments & Configurations

- **January 21, 2025 –** Drones within a no-fly zone near the Nammo-owned Vihtavuori **propellant plant in Finland**
- **December 14, 2024 –** Drone near PSE&G's Salem and Hope Creek **Nuclear Generating Stations in New Jersey**
- **November 2, 2024 –** Man arrested for plan to attack a **Nashville, USA power substation** using a drone equipped with explosives
- **September 22, 2024 –** Drone activity over **ChemCoast Park, Germany** prompted Bundeswehr to deploy helicopters for aerial searches
- **August 9, 2024 –** Illegal drone activity around **BP Cherry Point Refinery** in Whatcom County, Washington State, **USA**
- **July 19, 2024 –** 70-kilogram agricultural drone collided with a power line above a vineyard, causing damage to the line, drone, and vines in **Veldenz, Germany**

Critical Infrastructure & Industry

Incidents | **Challenges & Risks** | Required C-UAS Capabilities | Relevant Deployments & Configurations

- Potentially Devastating Consequences
- Power Disruptions
- Transportation Chaos
- System Outages
- Economic Damage
- Civil Unrest and Uncertainty
- Sensitive Facilities and Technology

Critical Infrastructure & Industry

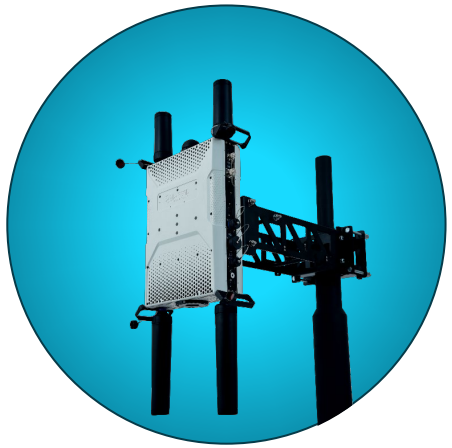
Incidents | Challenges & Risks | **Required C-UAS Capabilities** | Relevant Deployments & Configurations

- Environmentally Safe
- High-performance, mission-critical reliability
- Ability to automatically distinguish between authorized/unauthorized drones
- Control over unauthorized drones to prevent collateral damage and maintain continuity
- Seamless Operational Flexibility
- Capability to centrally manage multiple sites

Critical Infrastructure & Industry

Incidents | Challenges & Risks | Required C-UAS Capabilities | **Relevant Deployments & Configurations**

- **Stationary –** fixed deployment for wired-in integration with existing security systems
- **Vehicle –** for patrolling around facility
- **Command & Control** – for integration of multiple sensors



Borders

Incidents | Challenges & Risks | Required C-UAS Capabilities | Relevant Deployments & Configurations

- **November 28, 2024 –** Criminal organization using drones to smuggle hashish from Morocco to Spain
- **May 16, 2024 –** Drones transporting MDMA (ecstasy) across the Niagara River from Canada to New York
- **February 28, 2024 –** Indian border police neutralized a drone attempting to smuggle drugs and mobile phones across the International Border
- **February 11, 2024 –** Ukraine's Border Patrol intercepted a drone smuggling 22.5 kilograms of hashish near Poland and Belarus borders

Borders

Incidents | **Challenges & Risks** | Required C-UAS Capabilities | Relevant Deployments & Configurations

- Smuggling
- Attacks
- Vulnerability Probes, Hostile Reconnaissance
- Human Trafficking
- Long Borders across Varying and Difficult Terrains

Borders

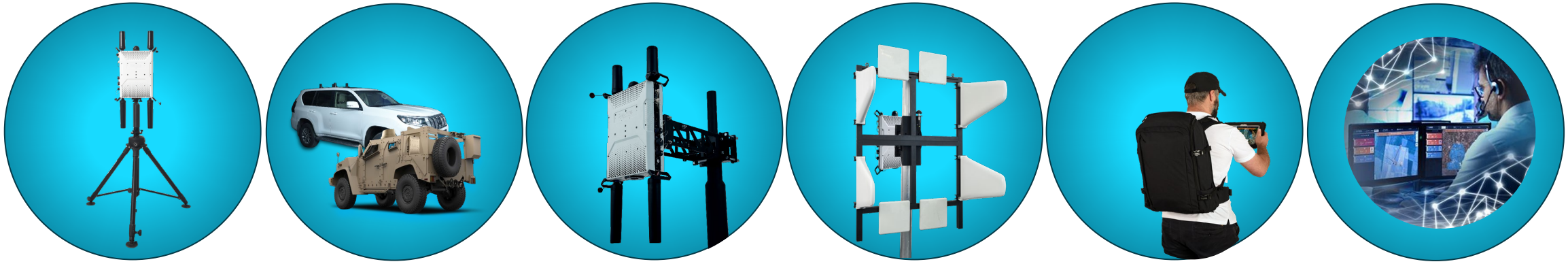
Incidents | Challenges & Risks | **Required C-UAS Capabilities** | Relevant Deployments & Configurations

- Cover long, linear areas
- Compliance with evolving and diverse regulations
- Ability to automatically distinguish between authorized/unauthorized drones
- Mitigation must avoid collateral damage and border communication disruption
- Retrieval of rogue drone payloads
- Identification and tracking of remote controls and take-off positions
- Centralized C2 for multiple sensors across the coverage area

Borders

Incidents | Challenges & Risks | Required C-UAS Capabilities | **Relevant Deployments & Configurations**

- **Tactical –** easy and flexible deployment
- **Vehicle –** for border patrol vehicles, to respond as needed
- **Stationary –** to protect border facilities with wired-in integration with existing C2 systems
- **Long-range Directional –** controlling the airspace over common border approaches
- **Man-portable (Backpack) –** for coverage in rugged border areas during missions and patrols
- **Command & Control** – for integration of multiple sensors



Prisons

Incidents | Challenges & Risks | Required C-UAS Capabilities | Relevant Deployments & Configurations

- **January 26, 2025 –** Five people were arrested for using drones to smuggle drugs and cell phones into Pollock Federal Prison, USA
- **January 14, 2025 –** Drone suspected of carrying contraband crashed and was seized near HMP Isle of Wight prison, UK
- **January 13, 2025 –** Contraband valued at nearly $80K seized at Joyceville Institutions in Canada following suspected drone drop
- **January 10, 2025 –** Drone seized and drugs intercepted following a failed drop off into HMP Lowdham Grange, UK
- **January 1, 2025 –** Drone dropped a package containing narcotics and contraband at Collins Bay Institution, Canada

Prisons

Incidents | **Challenges & Risks** | Required C-UAS Capabilities | Relevant Deployments & Configurations

- Contraband deliveries
- Illegal trade
- Increased criminal activity
- Difficult detection
- Surveillance to facilitate escape
- Weaponized or weapon-carrying

Prisons

Incidents | Challenges & Risks | **Required C-UAS Capabilities** | Relevant Deployments & Configurations

- Integrations with other C2 solutions and law enforcement systems
- Ability to differentiate between small drones and other flying objects
- Non-interference with critical communications
- Ability to automatically distinguish between authorized/unauthorized drones
- Identification of drone take-off position and pilot remote control location
- Drone capture to confiscate contraband and collect evidence, as permitted

Prisons

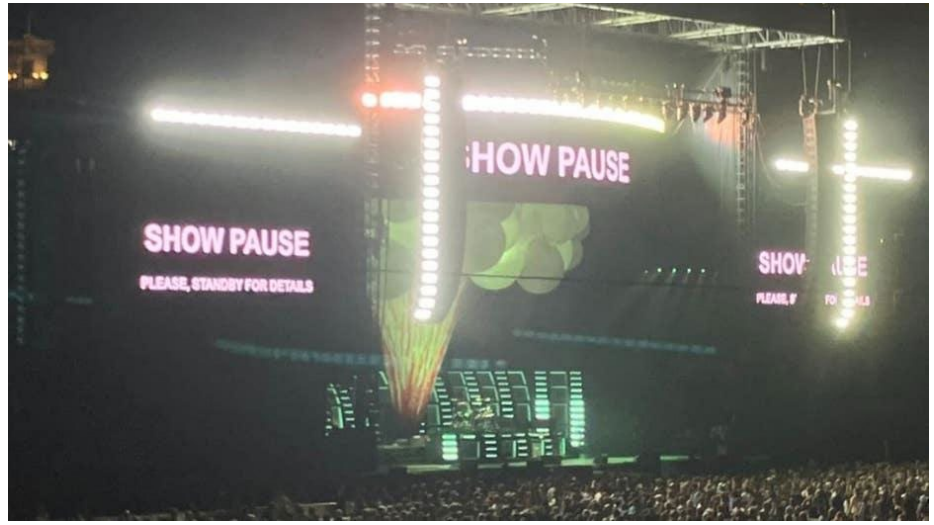
Incidents | Challenges & Risks | Required C-UAS Capabilities | **Relevant Deployments & Configurations**

- **Covert and Law Enforcement Vehicle –** for patrolling perimeter
- **Stationary –** to detect and mitigate rogue drones at the prison facility
- **Command & Control** – for integration of multiple sensors

Events, Stadiums, Arenas

Incidents | Challenges & Risks | Required C-UAS Capabilities | Relevant Deployments & Configurations

- **January 26, 2025 –** Drone disturbed Swiss skier Stefan Rogentin at the **Hahnenkamm race, Austria**
- **January 15, 2025 –** Drone interrupted the Ravens vs. Steelers NFL game at **M&T Bank Stadium, USA**
- **August 24, 2024 –** Drone carrying a Palestinian flag crashed into the stands during a US college football game at **Aviva Stadium, Ireland**
- **July 23, 2024 –** French security forces intercept unauthorized drones near **Paris Olympic sites**



September 4, 2024 – Green Day's concert at Comerica Park in **Detroit, USA** was interrupted by a drone flying over the venue

Events, Stadiums, Arenas

Incidents | Challenges & Risks | Required C-UAS Capabilities | Relevant Deployments & Configurations

THE HILL

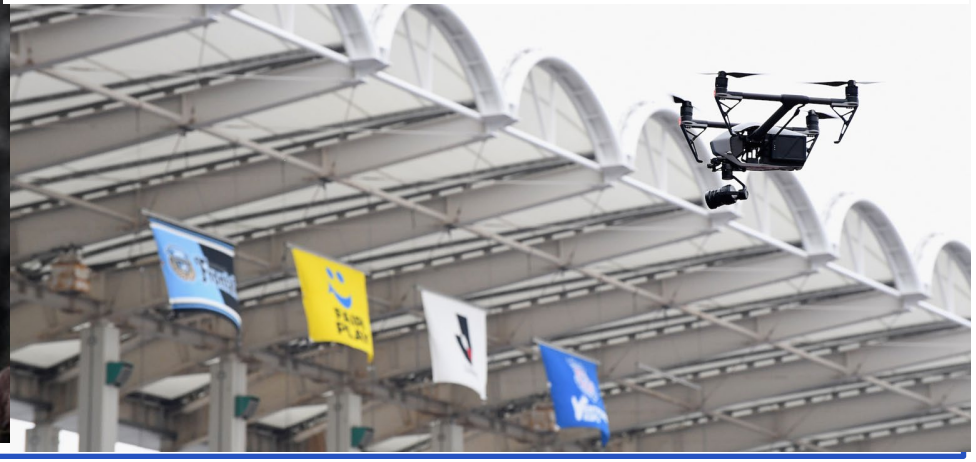
Rogue Drone Removed from Pope's Mass, Sept. 2021

Drone Disrupts Green Day Concert, Detroit, Sept. 2024

Drones Fly Over NCAA Games

NASCAR Warns of Drone Threat

Drones Drop Leaflets at NFL Games



Events, Stadiums, Arenas

Incidents | **Challenges & Risks** | Required C-UAS Capabilities | Relevant Deployments & Configurations

- Delayed and canceled events
- Financial losses
- Complex security coordination
- Dangerous payloads and risk of high-profile mass casualty events
- Illegal streaming and recording
- Interference with official broadcasts as well as game play
- Risk of panic and trampling

D-FEND SOLUTIONS

Events, Stadiums, Arenas

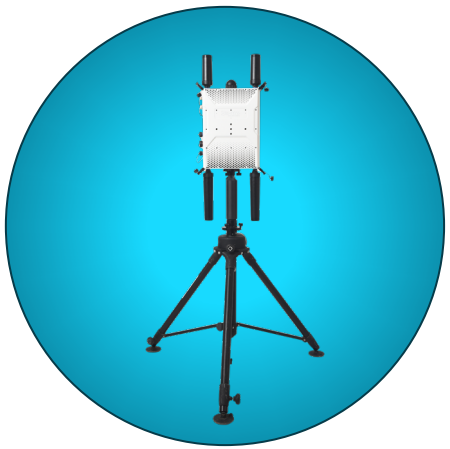
Incidents | Challenges & Risks | **Required C-UAS Capabilities** | Relevant Deployments & Configurations

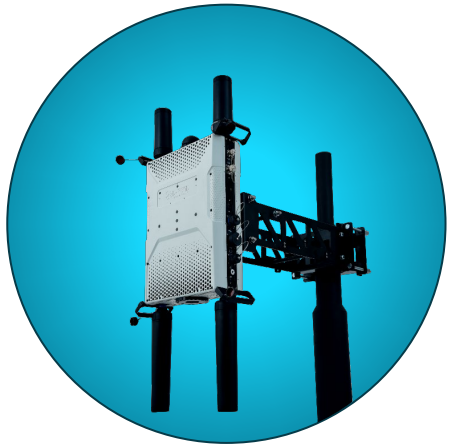
- Capability to differentiate between authorized and unauthorized drones
- Ability to recognized rogue drones vs. thrown, kicked and flying sports equipment, aerial cameras, pyrotechnics, and other flying objects
- Operation in noisy and crowded environments
- Non-interference with broadcast and security communications
- Avoidance of collateral damage ability to operate "in the background"
- Full control to protect players, performers, spectators, staff, broadcasters and others in and around the venue

Events, Stadiums, Arenas

Incidents | Challenges & Risks | Required C-UAS Capabilities | **Relevant Deployments & Configurations**

- **Tactical** – easy set up and take down for each event
- **Covert Vehicle** – “drone patrols” for event
- **Stationary** – fixed and “wired-in” to C2 system
- **Command & Control** – for integration of multiple sensors





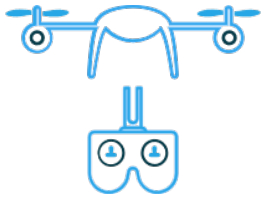

D-FEND SOLUTIONS

Sensitive Sectors Require a Next-Gen Approach

RF-Cyber Detection and Mitigation

Detection

Radio Frequency (RF) Cyber-Detection



Outcome:

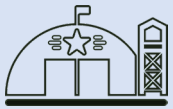
- Fast & accurate detection
- No false positives
- No line-of-sight required

Mitigation

RF Cyber-Takeover

Outcome:

- Disconnect, takeover & control
- Safe route to a safe landing
- Total continuity: No communication disruption, collateral damage, stoppages, etc.



Today's Sensitive & Complex Environments

D-FEND SOLUTIONS

A Next-Gen RF Cyber Approach

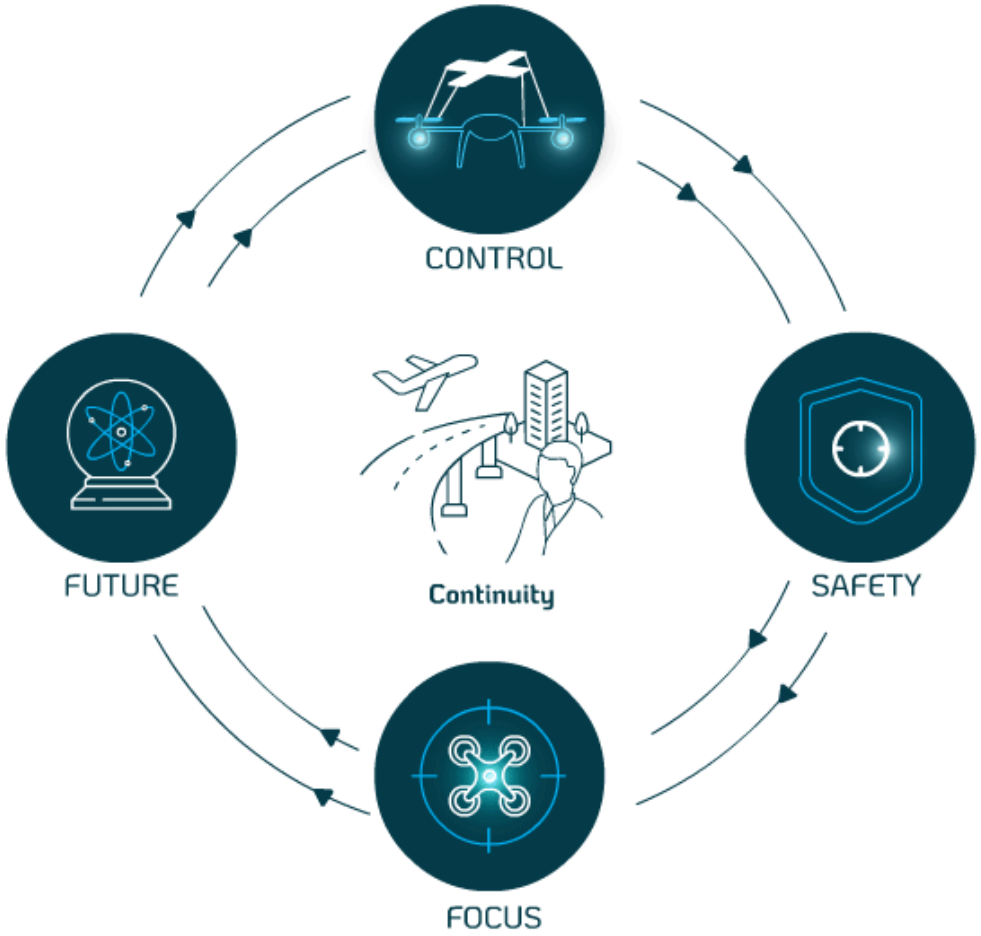
RF Cyber C-sUAS System

- Radio frequency (RF) cyber-takeover technology
- Surgically detects & takes control
- Lands drones safely in a designated zone

Without Traditional C-UAS Drawbacks

- ✓ Non-jamming; non-disruptive
- ✓ Non-kinetic; less collateral damage risk
- ✓ No line-of-sight required
- ✓ No false positives

Core Concepts for Continuity



CONTROL

The best way to **control** the drone threat is to **take control of the drone**

SAFETY

A **safe landing** or fending off of the rogue drone is the best possible outcome for **safe airspace and continuity**

FOCUS

Counter-drone measures must **focus on the real risk, the most dangerous drones**, and employ drone risk analysis, assessment, and prioritization

FUTURE

The constantly changing and increasingly complex drone threat requires foreseeing the drone future and **always staying a drone threat ahead**

Cyber Takeover Ensures Continuity…

…and Continuity is KEY

- Communications
- Transportation
- Commerce
- Everyday life

Thank you!

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