

Supporting
European
Aviation



Integrated way forward ...to come to drone incursion prevention

High-level Workshop on: Drone incursion and detection at and around airports
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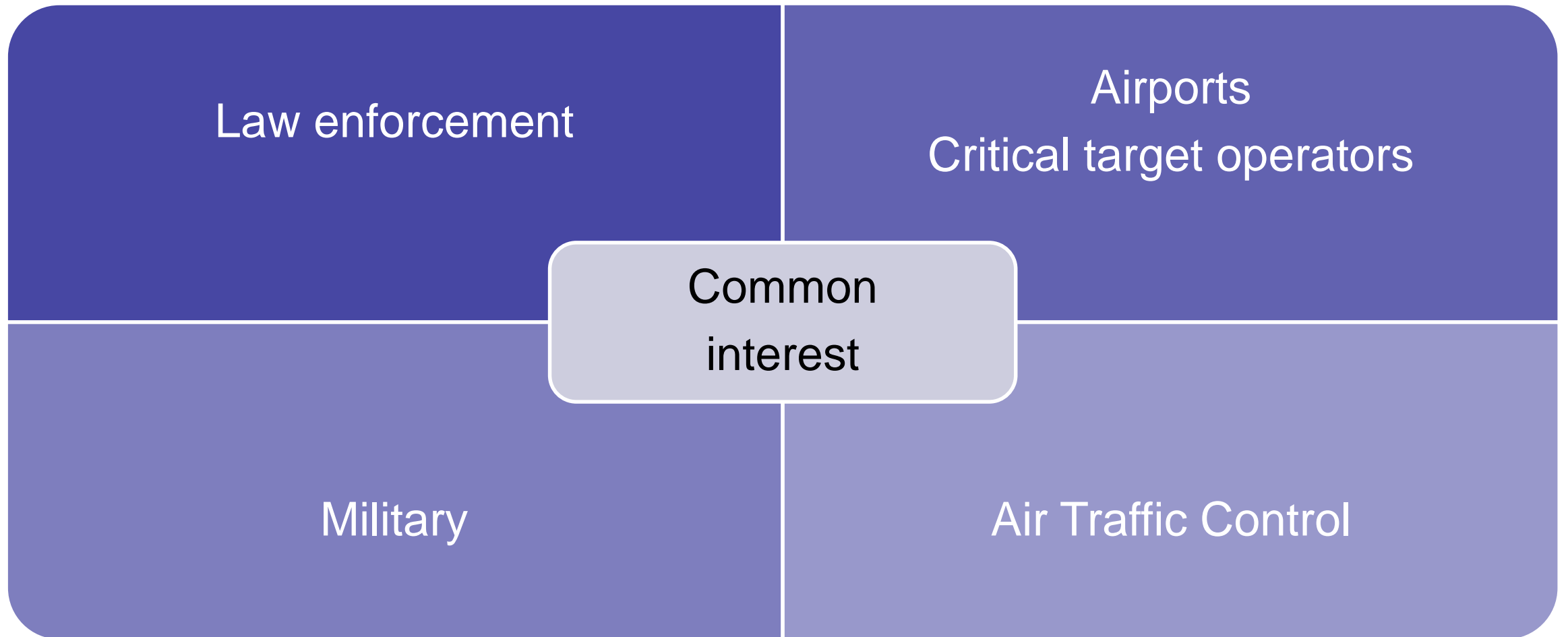
THE CHALLENGES

What are the challenges?

- We have to be able to protect critical targets with a minimum of interference with legitimate airspace users
- We have to bring a multitude of stakeholders together
- We have to be able to provide solutions in time-frames that are significantly shorter than usual

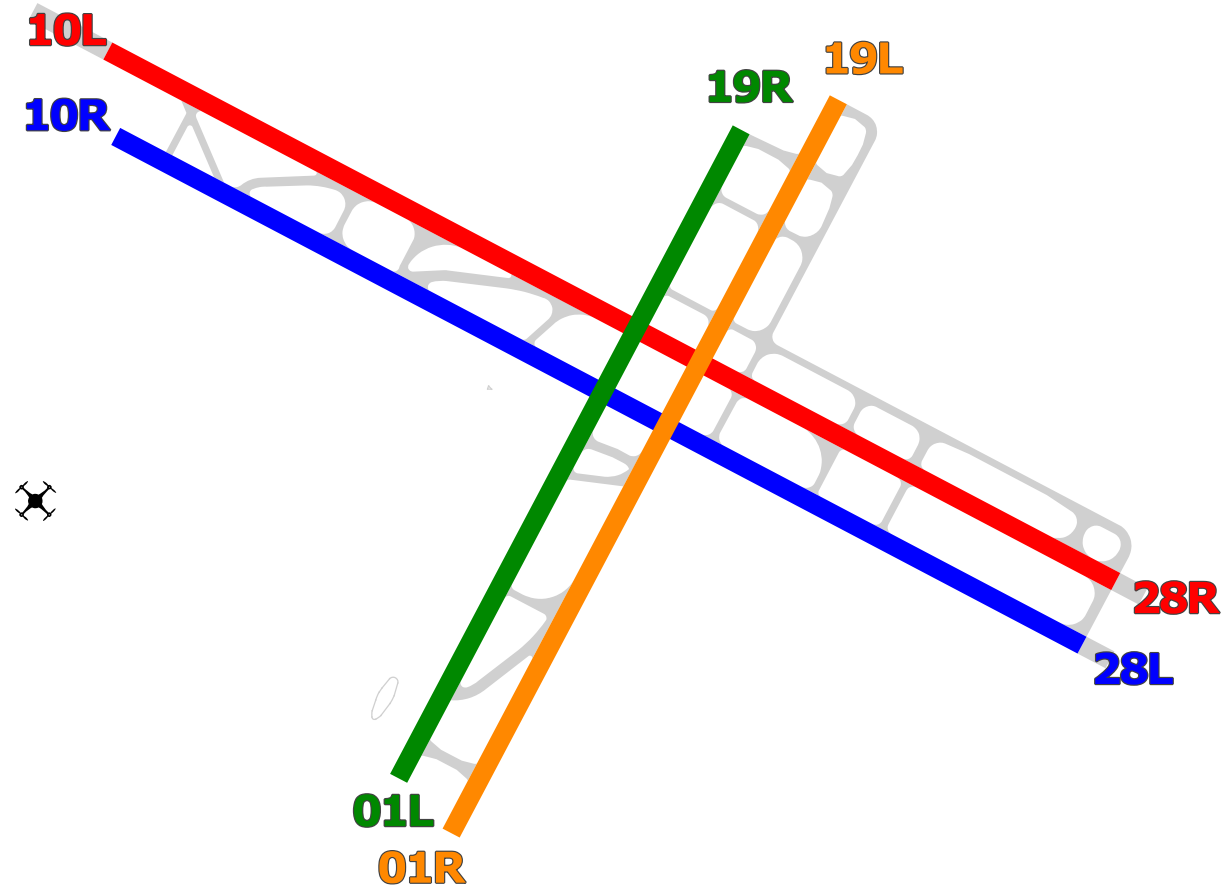
THE NEED FOR INTEGRATION

Stakeholders

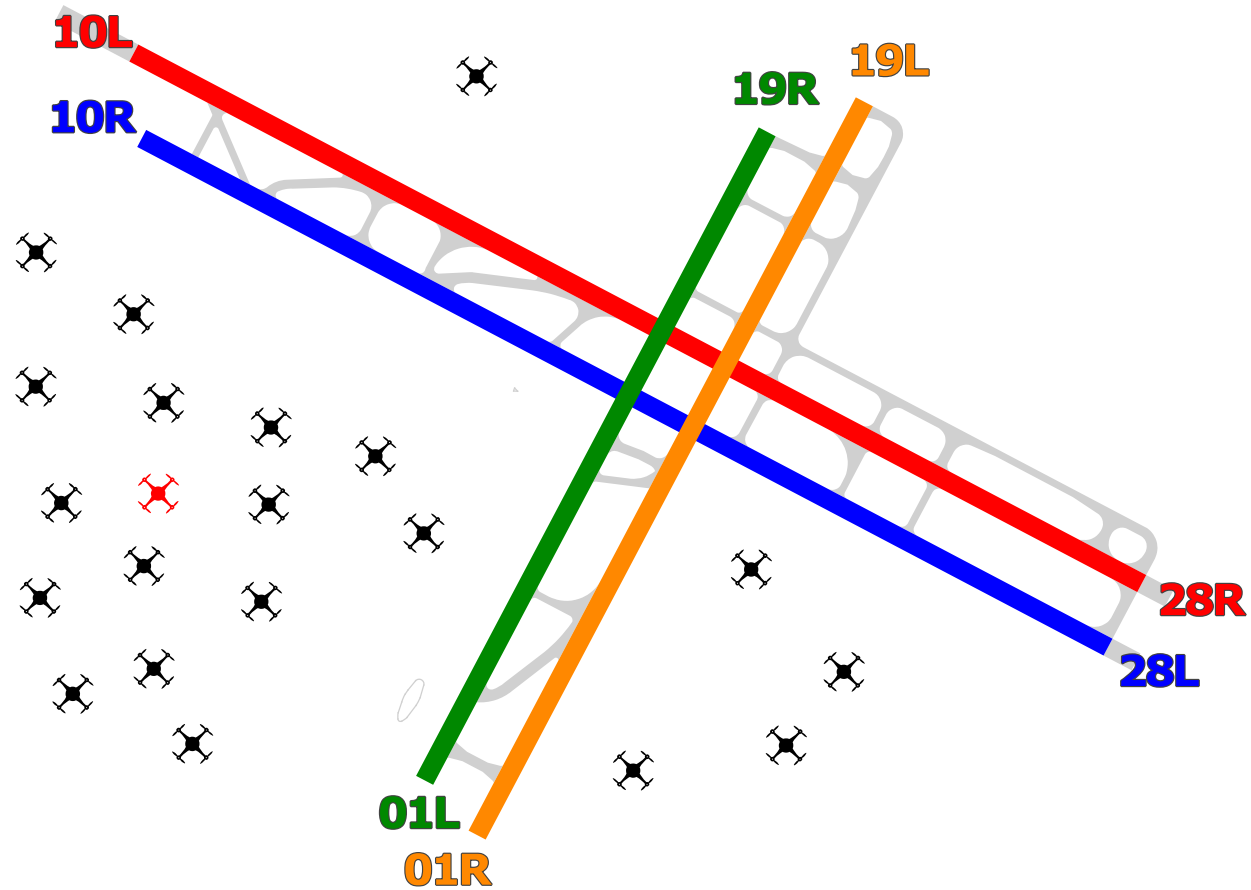


Protect sensitive areas

Now: Only 1 drone



In future...



Separate the bad folks from the good folks

- It requires a suite of surveillance systems that supports:
 - detection,
 - tracking and
 - classification
- It also requires a registration and authorization system that is:
 - Accessible by all relevant stakeholders
 - Competent authorities
 - Law enforcement agencies
 - Air traffic control
 - Airport authorities (or other critical target operators)
 - Drone operators
 - Is harmonized across Europe

HARMONISATION

Harmonisation as pre-requisite

- Harmonisation in two areas:
 - Existing data formats
 - New data formats
- Re-use (e.g. from conventional aviation) would be preferred
- In some cases this would require some adaptation
- Possibly replace (near) obsolete existing standards by new ones
 - starting in the U-Space domain
- New formats wouldn't need harmonisation, but should be easy to integrate into existing systems

Examples of harmonisation areas

- Surveillance data (e.g. ASTERIX)
- Flight plans
- Airspace restrictions (e.g. ADEXP)
- Coordination messages (e.g. OLDI)
- NOTAM exchange

INTEGRATION

Reason for integration



- Ensure complete and consistent situation picture across all stakeholders
- Enable efficient communication across the stakeholders
- Enable efficient oversight



ADVANCED AUTOMATION

Advanced tracking systems

- New requirements:
 - Drones have more complex flight dynamics models
 - The number of drones in a given airspace can be very large
 - Tracking systems need to support non-cooperative drones
 - Tracking systems need the capability to detect “rogue” behaviour
 - Tracking systems need to support different detection technologies
- Technological options
 - Tracking based on
 - Atomic tracker with individual higher order (non-linear) dynamic models
 - Particle filtering
 - Classification and behaviour prediction based on machine learning
 - Bayesian learning
 - Neural networks

Decentral flight handling

- New requirements:
 - Stricter traceability of:
 - Licenses
 - Authorisation
 - Flight execution
 - Decentral control
- Technological options:
 - Conventional technology provides sufficient capabilities
 - Blockchain technology may be easier to implement
 - Immutable transactions
 - Decentral approach
 - Scalable
 - Flexible through smart contracts

New opportunities

- Drones → Disruptive development
- Drones are more depending on automation
- The number of drones also require more automation
- This opens opportunities for the introduction of new technologies
- Some of these technologies are necessary
- Others may be interesting innovations for conventional aviation as well

HOW TO COME TO IMPLEMENTATION?

We need solutions soon...



- The “normal” timeframes in aviation are prohibitively long
 - This requires new views on cooperation
- We have many stakeholders with common interests
- Speed up development through “efficient” harmonisation
- Create consortia involving all stakeholder categories

Collaborative Development Initiatives (CDI)

- Complexity and scale of required developments requires collaboration
- Focus on:
 - Harmonisation
 - Efficient dissemination of developed solutions
- IPR models should meet demands:
 - Proprietary vs shared
- Consortium management:
 - Lean organization
 - Broad stakeholder involvement

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