

# U-Space Tracking and Drone Connectivity System

Innovation in the field of Drone intercommunication and Connectivity

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# Scope of the presentation

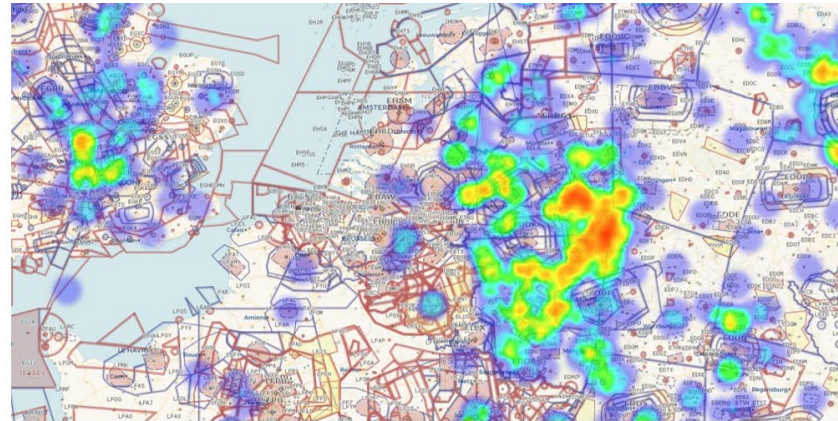
***Present the Status of the U-Space and Conspicuity Solutions and further possible improvements in the fields of UAV and Other Flying Objects***

# Introduction to e-Conspicuity

## Conspicuity of manned aircraft in U-space (no ATC)

Required by U-space regulations, SERA.6005(c):

All manned aircraft not subject to air traffic control to be continuously electronically conspicuous to U-space service providers (e-conspicuity)



## U-space

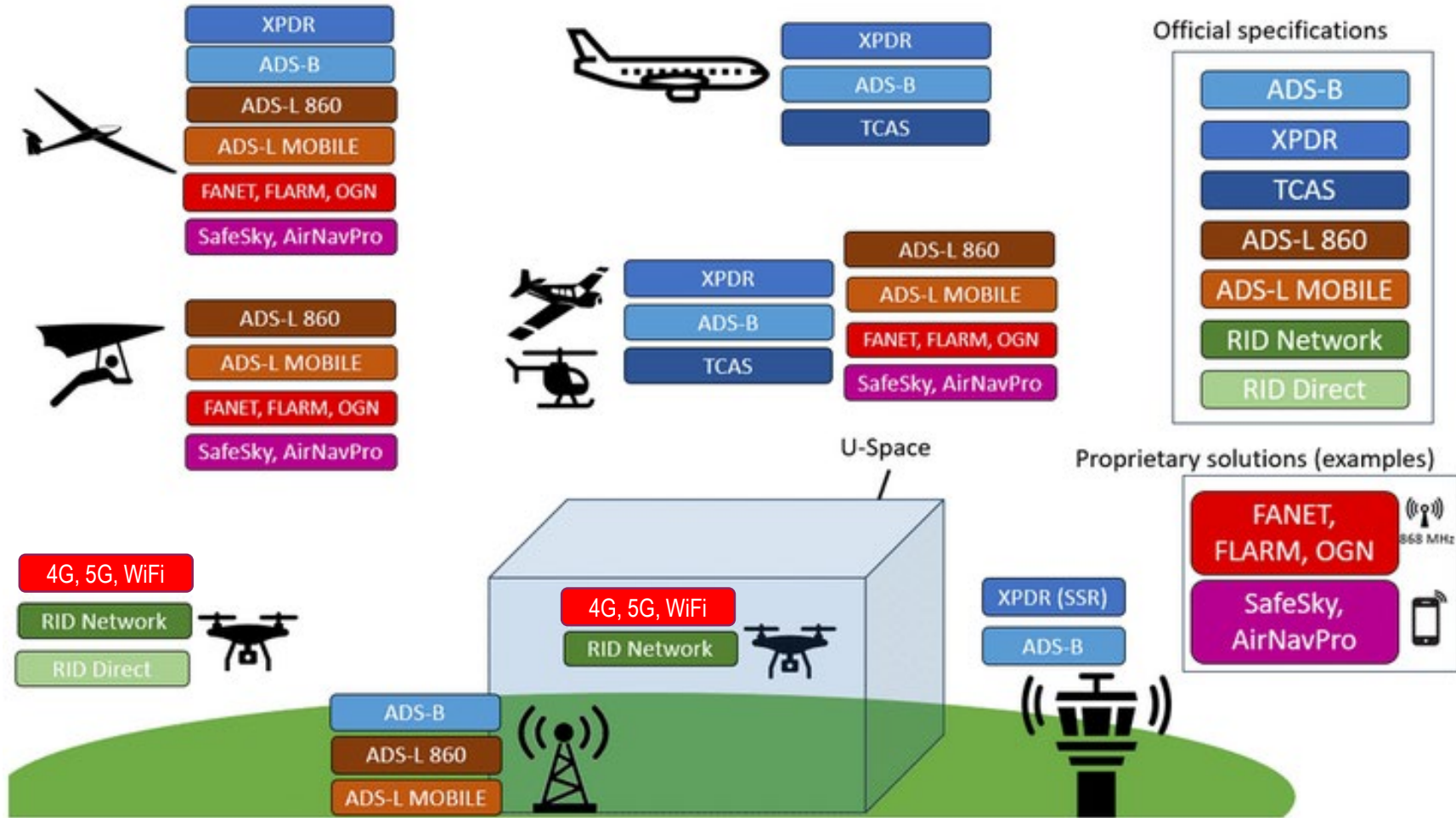
A set of **'new services'** and **'specific procedures'** designed **to support** safe, efficient and secure **access to airspace** for large numbers of **drones**

## e-Conspicuity

- Involves all flying objects in a defined airspace
- Is very important for U-Space operations
- It is focused on non-controlled airspace
- It shall provide feasible solutions
- It shall be agreed by all the participants
- Cost of the equipment is a very important variable



# Overview of the situation



Only some of these solutions are installed

Different protocols

Different operating frequencies

Different power and ranges

Different costs

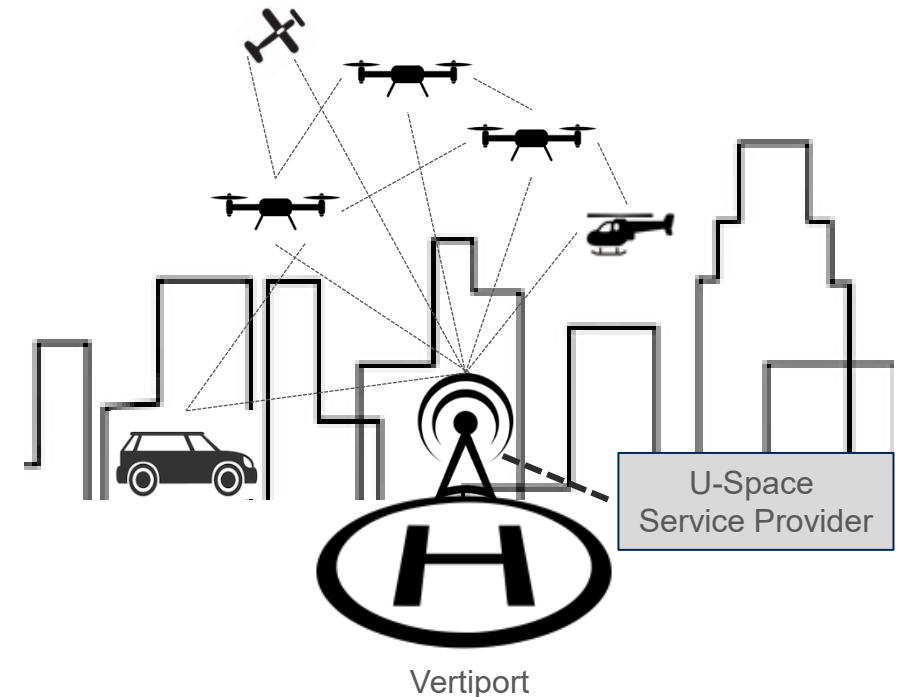
# The implementation costs

## Factors influencing the costs

Certification/ Qualification Level	Cost increase with Complexity/Specificity Open Communication with Open Standards
Frequency Range	Approval Protection Use authorization
Transmission Power	Powerful transmitter cost more Power transmitter have higher ranges More sensible receivers are more expensive
Type of Information	More complex information are more expensive Qualified information sources are more expensive
Transmission Protocol	More complex transmission protocols are more expensive to develop Some industry protocols have yearly subscriptions

More than 50% of the equipment costs are due to Certification/Qualification topics (standards, tests, organization)

The difference between professional UAV Solution and GA (Certified Solutions) is getting thinner



# The existing solutions – Flight

## f.u.n.k.e. AVIONICS TM 350

- Traffic reception and Proximity Warning
- Multisystem (FLARM, ADS-B In, Mode S transponder)
- Upgradeable (Other e-Conspicuity protocols may be installed, e.g. ADS-L)
- Different Output protocols (GDL90, FLARM, NMEA, TIS)
- Different output interfaces (ARINC429, RS2323, WiFi)
- Compact and portable (250g and 35 x 65 x 115)
- Developed in accordance with Aeronautical Standards (Certifiable)



# The existing solutions – Ground

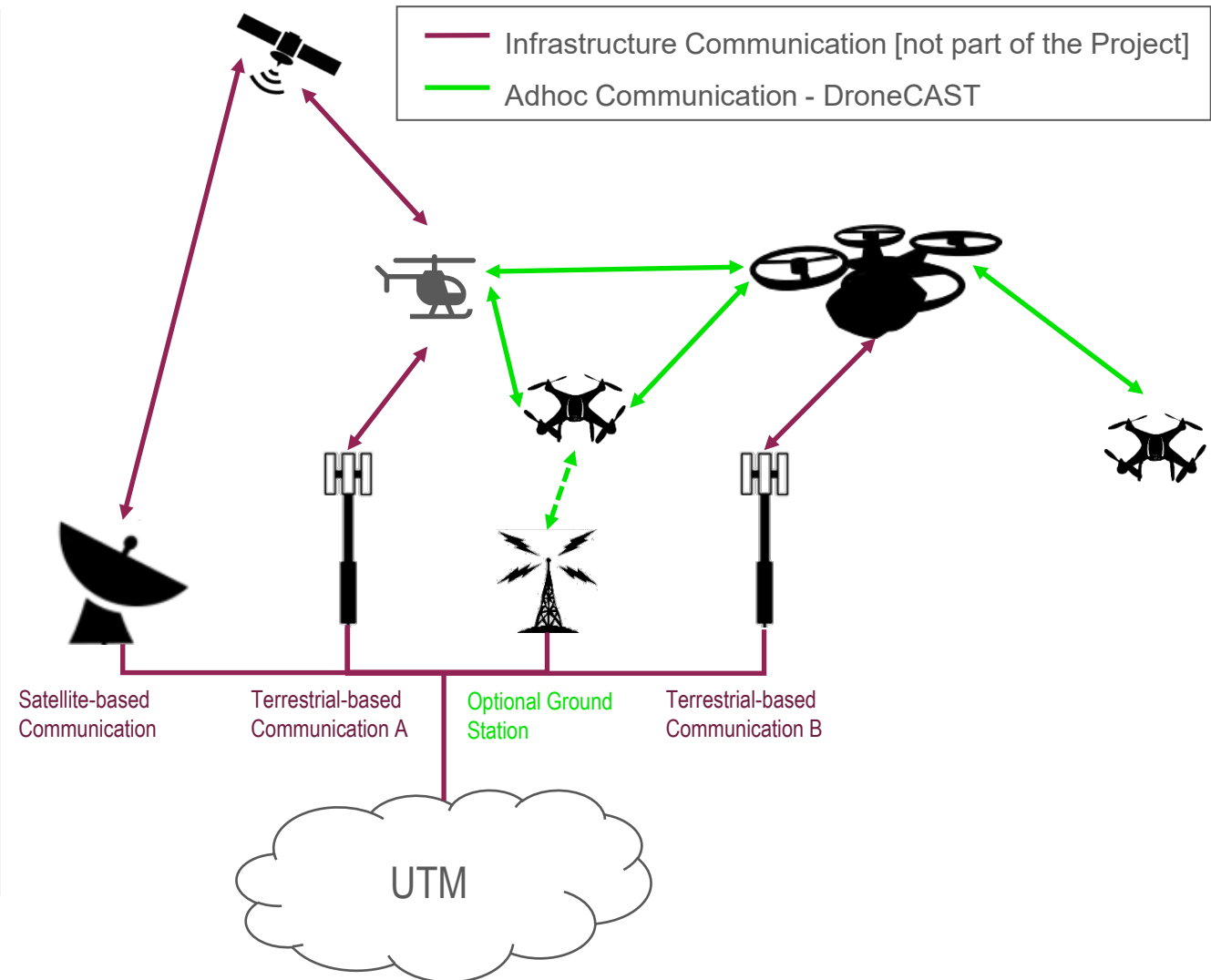
## f.u.n.k.e. AVIONICS DroneConnect - Ground

- Reception of all kind of traffic information (ADS-B, Mode S, FLARM, DRI (Direct Remote ID))
- Transfer of traffic information to a respective UTM ground server (JSON, ASTERIX Cat 21), compatible with German Droniq/DFS ground infrastructure
- Communication channels: Bluetooth, WiFi, LTE, Ethernet
- Remote Control Capability
- Upgradeable



# The future - DroneCAST-ID

- **Adhoc Broadcast** Communication and Traffic Monitoring for **direct data exchange** among Air traffic.
- **Multisystem**
- **Low Cost implementation** due to the use of **Commercial Hardware**
- **Protected frequencies** because use of the former MLS frequencies
- **Implement a V2X** low cost protocol to increase the range of the information





# Questions?



**Dott. Ing. Marco Festa**  
Director of Avionic Products

+49 731 975280-21  
[marco.festa@funkeavionics.de](mailto:marco.festa@funkeavionics.de)

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Heinz-Strachowitz-Str. 4, 86807 Buchloe, Germany  
Magirusstr. 39/1, 89077 Ulm, Germany