Electronic Conspicuity

Agenda

- Introduction uAvionix
- Electronic Conspicuity (EC)
- Introduction of possible EC technologies and solutions
- Concerns about existing standards and technology
- Latest Electronic Conspicuity developments in Europe
- The Open Connected Cockpit
- Questions

Passionate Innovators and Aviators

Jon Damush
CEO
Former VP Insitu Inc,
Director Boeing,
CEO Iris Automation Inc
Flight Instructor

Christian Ramsey
Managing Director unmanned/Infra
Former Deputy PM Harris
FAA ADS-B Program, UAS
PM Rockwell Collins

Rudy Muller
Managing Director uAvionix Europe
Former IT Mgr APM terminals,
Automation consultant,
Electronics Engineer,
Private Pilot,
Certified RPAS Operator,
Acc. Mgr Dutch Drone Centre Aviolanda

Paul Beard
Cofounder + CTO
Fellow Cypress Semiconductor, Former CTO at Horizon, Founder Alation Systems, IDEO
Developed: 2.4 Ghz spread spectrum C2 technology

Ryan Braun
Managing Director General Aviation
Former Software Engineer
Dell, Honeywell, PacketMotion
Private Pilot

Cyriel Kronenburg
Vice President International Development & Strategic Partnerships
Aireon – VP Aviation
IATA-Global Head of ATC
AF / KLM - Director Strategy
Martinair - OPS
LVNL - ATC
Private Pilot

Globally approx. 60 employees, numerous resellers and (certified) installers

Unrivaled Portfolio of Solutions

UNMANNED AVIATION

Command & Control

Transponders & DAA Receivers

Autopilot

Micro IFF

Certified GPS

MANNED AVIATION

ADS-B Transceivers & Receivers

Portable Receivers & Transceivers

Transponders

Multi-Function Panel Displays

INFRASTRUCTURE & SERVICES

Command & Control Infrastructure

DAA / Surveillance Receivers

Broadcast Services

Airport Surface Vehicle Transceivers

Electronic Conspicuity

uAvionix

NVAV
AMATEUR VLIEGTUIGBOUWERS

Electronic Conspicuity

Easier example

Even easier using Electronic Conspicuity equipment

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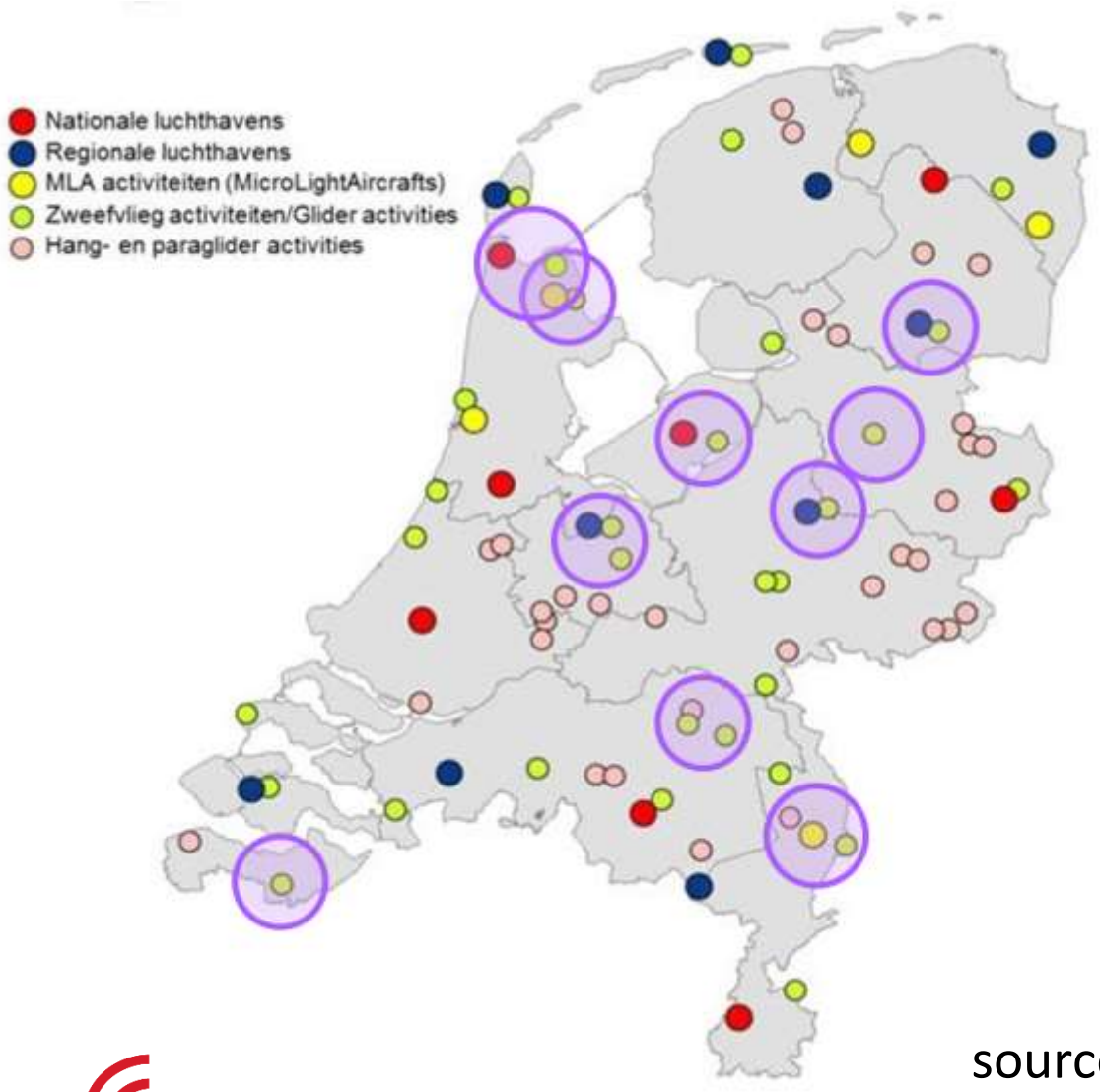
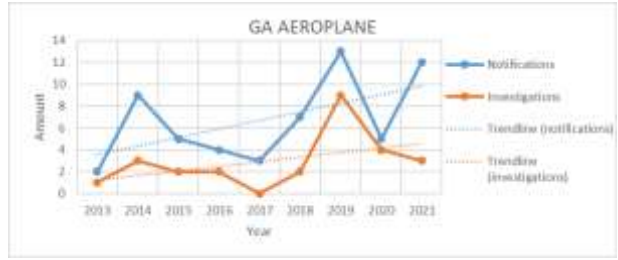
Electronic Conspicuity: Where does an airprox occur?



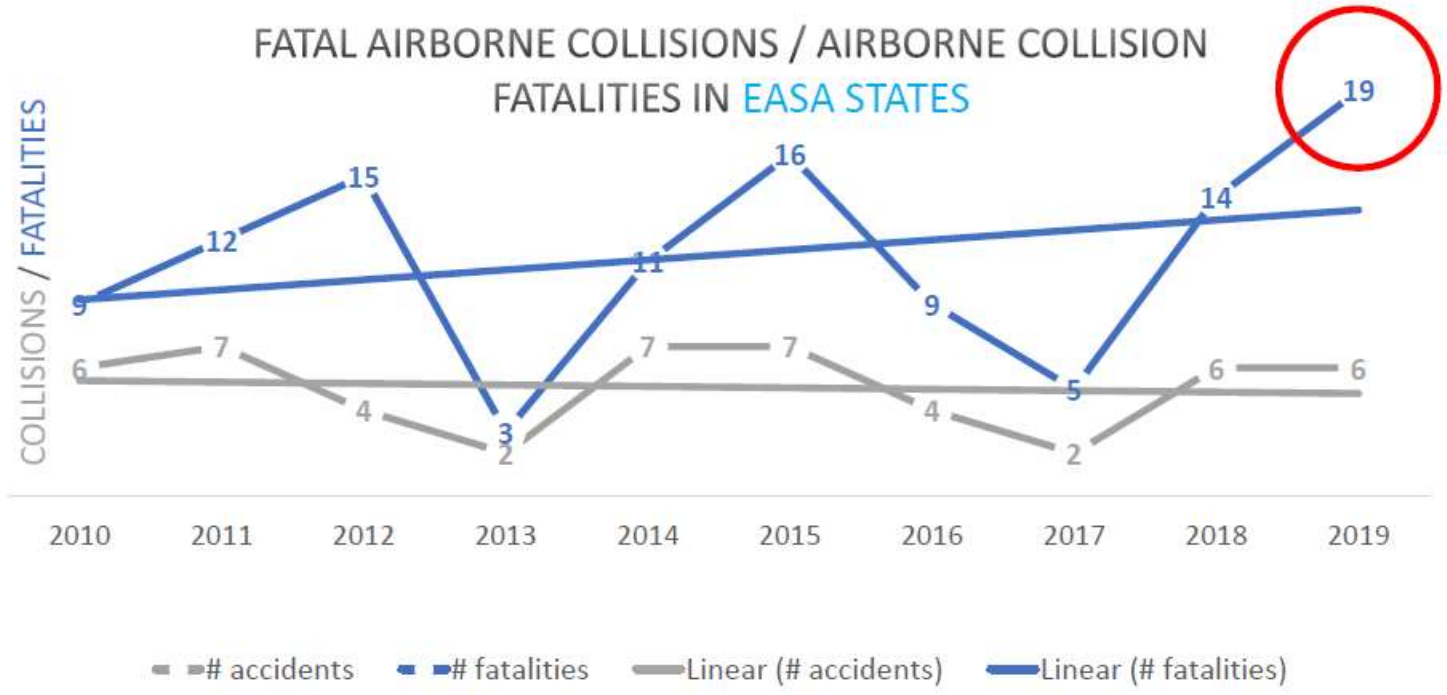
source ONDERZOEKSRAAD VOOR VEILIGHEID

Electronic Conspicuity: How often does an airprox occur?



source

Electronic Conspicuity: Safety data 2009 - 2019



60 FATAL COLLISIONS ~ 6 PER YEAR

137 FATALITIES ~ 13 PER YEAR

ALL UNCONTROLLED TRAFFIC

ALL SMALL AIRCRAFT*

*MANY ROTORCRAFT

source EASA

Electronic Conspicuity

Electronically signal the presence to other airspace users

Thereby turning the “see-and-avoid” concept into “see-BE SEEN-and-avoid”

… to mitigate Mid Air Collision risk

EASA – iConspicuity => Inflight Electronic Conspicuity

Introduction of possible EC technologies and solutions

UK CAP1391

uAvionix SkyEcho 2

Foreflight Sentry

Other 1090 MHz

Trig TABS & TSAA

Garmin GDL 50

uAvionix TailbeaconX

ADS-B UAT 978 MHz

uAvionix SkyBeacon

uAvionix Tailbeacon

uAvionix VTU-20

TIS-B

Non ADS-B

FLARM & Power FLARM

Pilot Aware

4G/5G Devices & APPs

OGN
glidernet.org

plus Extended Squitter capable Mode S transponders with GPS

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Concerns about existing standards and technology

- 1090 Spectrum congestion
  - ICAO instructed member states to check 1090 spectrum use
  - Eurocontrol and EASA confirmed that 1090 spectrum is not the issue but 1030, interrogation TCAS

- Use of non protected frequencies
  - Flarm/ADS-L on 860 Mhz band very low power/range, other users on the frequency band

- Mobile telephony - coverage issues on higher altitudes, no air-to-air solution
- Internet sources like OGN, Flight radar – latency, redundancy, spoofing, private networks
- Networked private receiver's not always in operation, redundancy, blank spots, spoofing

Latest Electronic Conspicuity developments in Europe

EASA iConspicuity

- First step: Crewed Aviation to enter U-Space
- U-space is piece of airspace which is managed by Unmanned Traffic Management (UTM)
- Crewed aircraft to fly there:
  - Certified Mode S + ADS-B transponder
  - ADS-L transmitter on 860 MHz (ADS-B dataset on non protected frequency, GPS altitude)
  - ADS-L transmitted via Mobile App to UTM system

- BUT there is NO traffic information to Crewed Aviation…… unless flying with 4G/5G

…… and having coverage ☺

SafeSky

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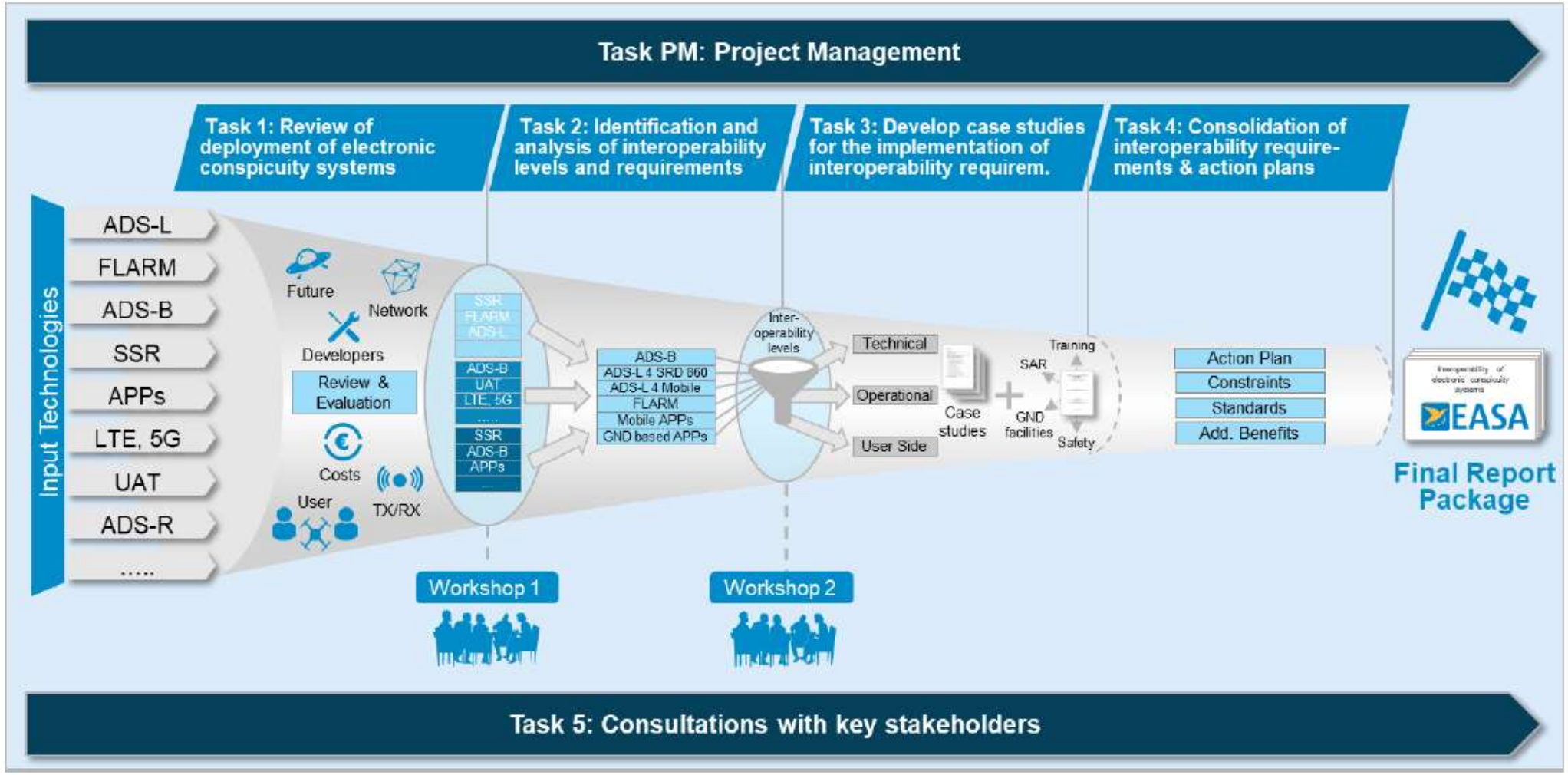
Latest Electronic Conspicuity developments in Europe

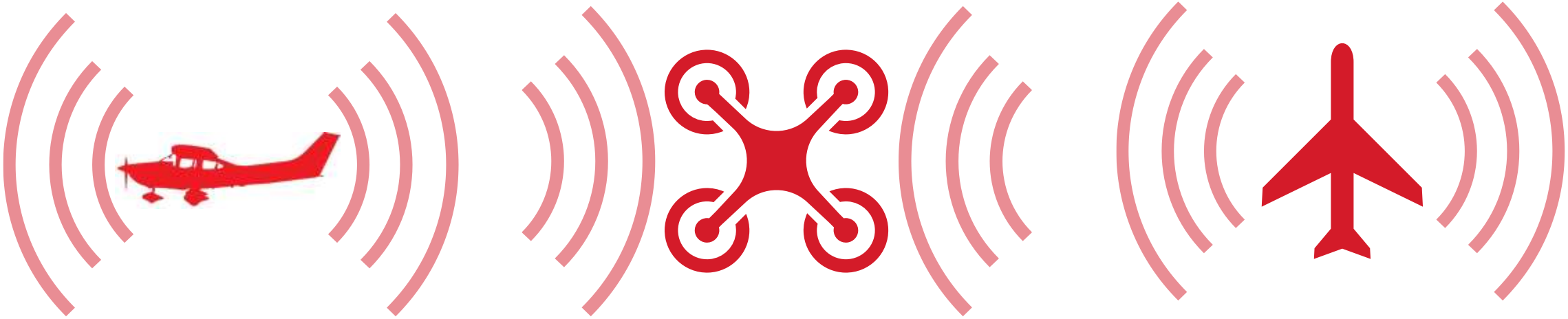
- EASA iConspicuity Study for interoperability of possible EC devices & technology



Latest Electronic Conspicuity developments in Europe

ADS-L is misleading, sounds like an existing technology but requires entirely new avionics and standards

A more global CONOPS is emerging



GA & Other Crewed

978 ADS-B OUT & IN

OR

1090 ADS-B OUT & IN

Unmanned Aircraft

ADS-B IN 1090/978

978 ADS-B OUT (UK)

Or

Validated Networked ADS-B

Commercial Aircraft

1090 ADS-B OUT & IN

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Latest Electronic Conspicuity developments in Europe

- iAOPA, EuropeAirsports, KNVvL, Naca, Eurocontrol disagree on ADS-L for Electronic Conspicuity
- Eurocontrol-uAvionix to develop European standard for low power ADS-B on 1090 MHz, by end 2024
- Build ground infrastructure, Skyline, with sensors for transmitting ADS-B UAT / TIS-B & FIS-B

  Sensor traffic sources for TIS-B

  - Mode S,
  - Electronic ID (consumer drones),
  - UTM (professional drones),
  - ADS-B
  - FLARM
  - Uncooperative (Robin Radar, Vision, C2 link radio).

- UAT TIS-B/FIS-B projects ongoing ……

Surveillance & Broadcast Services

- uAvionix & UK CAA have been conducting and expanding advisory FIS-B/TIS-B trials in support of UK's voluntary Electronic Conspicuity initiative.
- Locations: Milborne Port (SkyDemon Office), Goodwood Aerodrome, Redhill Aerodrome, Dunsfold Aerodrome, Wycombe Air Park, Popham, Farnborough, Manchester, Aberdeen coast (HeliOffshore), Wales coast (Bristow Trial)
- Broadcasting FIS-B (weather) and obstacle beacons in Scotland / North Sea area in support of offshore helicopter operations.
- Executed both FIS-B and TIS-B in SE England in support of BVLOS UAS Operations
- Leveraging 978MHz, which is also envisioned to be leveraged for UAS surveillance
- DJI, Autel, DeltaQuad, ……others with ADS-B IN (1090/978)
- Projects ongoing:
  - UK, Norway, Finland, Sweden, Denmark, Germany
  - France to follow

The Open Connected Cockpit

Achieve Your Best Flying Experience

AV-30

AV-HSI
IFR

AV-APA
Autopilot

AV-20

TailbeaconX

AV-Link
WIFI

uAvionix

NVAV
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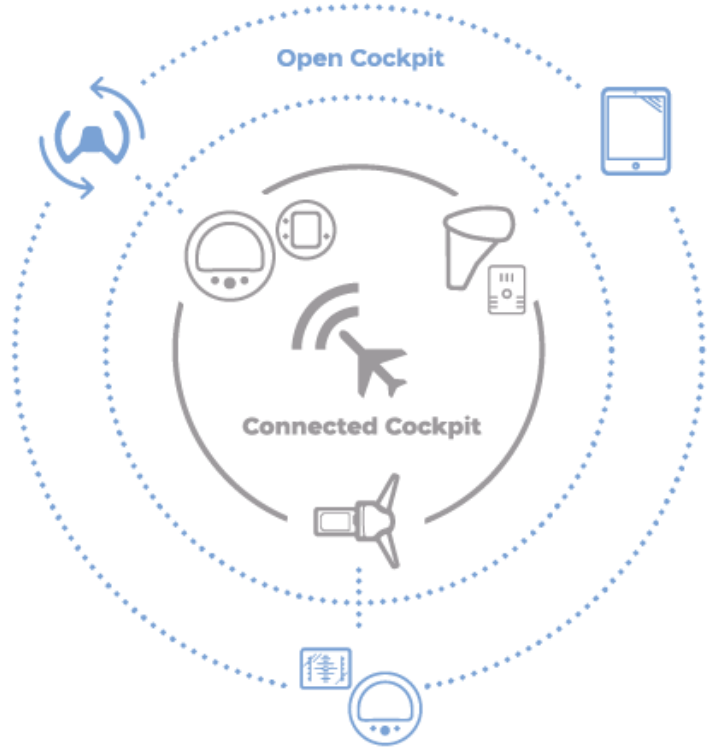
What is the Connected Cockpit?

Our AV-30, AV-20, tailBeaconX, and additional accessories form the backbone of the **Connected Cockpit**, seamlessly integrating critical flight data, navigation aids, and extending connectivity beyond the confines of the aircraft to streamline the pilot's workload.



AV-30 EFIS

Primary Replacement DG

External Magnetometer

Customizable Data Fields & Screens

Heading Bug, DG Trim

Auto or Manual Dimming

Declutter Mode & Skin Themes

Primary Replacement AI

Inner: AoA, Slip, DG, Vertical Trend

Outer: 6 Customizable Fields

1 hr Built-in, Rechargeable Battery

One Model, Dual Functionality

NAV Data Screen

Slaved GPS Nav Data

Flight Plan Legs / WPTs

Integration w/ panel or portable GPS

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AV-30 Transponder control

TailbeaconX
Mode S + ADS-B Transponder
with taillight

ADS-B IN 1090/978

AV-30 AV-Link

AV-HSI IFR GUIDANCE

- Adds course and glideslope IFR guidance information
- ARINC 429 (2 RX / 1 TX) and 4 serial ports
- Connects AV-30s

COURSE DEVIATION INDICATOR (CDI)

HORIZONTAL SITUATION INDICATOR (HSI)

AV-APA ANALOG PORT ADAPTER

Allows users to remove old vacuum driven DG being used to drive heading to analog autopilots
Emulates the analog heading outputs
Compatible with STEC 20/30/40/50
Working on future compatibility

DG Heading Hold
GPS Heading Hold
GPS Track Hold
GPS Waypoint Bearing Hold
GPS Steering

AeroCruze 100/ xCruze

See “Operating Handbook for Vizion PMA Autopilot TruTrak Doc. 167”

Trio Pro Pilot

See “Trio Avionics Pro Pilot Manual for Experimental Aircraft”

The Open Connected Cockpit

Primary functions installed in the panel

Multi-function capabilities provided by the EFB

PROPOSAL

AIRCRAFT OWNER AT EHSE OF EHMZ
(Preferred at Seppe)

Free of charge:

2 x AV30-C, EFIS, transponder control head	value	€ 5.445,00
1 x AV-MAG, external magnetometer	value	€ 400,00
1 x TailbeaconX, Mode S + ADS-B transponder	value	€ 2.995,00
1 x SkySensor, dualband ADS-B In, GPS, NAV Anti-collision light or SkyEcho 2	value	€ 745,00
1 x AV-Link for live traffic on AV-30 (via SkySensor or SkyEcho 2)	value	€ 400,00
		€ 9.985,00

Condition:
uAvionix PPL/SEP pilot can fly with interested pilot for demonstration or training for friendly hour-rate.

QUESTIONS?

Ready For The Future

Rudy Muller
Certified GA and UAS pilot + UAS operator
uAvionix Europe
info@uavionix.eu
www.uavionix.eu