

REGIONAL FOCUS

Emergence of Remotely Piloted Aircraft Systems, ATM Integration, Benefits and Hazards in Africa

Part 3 – Global Experience and Best Practice

Thursday 26 August 2021

12:00 – 14:00 CAT



Ms. Boni Dibate

Director Africa Affairs

CANSO



Ms. Coleen Hawrysko

Operations Programme Manager

CANSO



**Ms. Melissa
Rusanganwa**



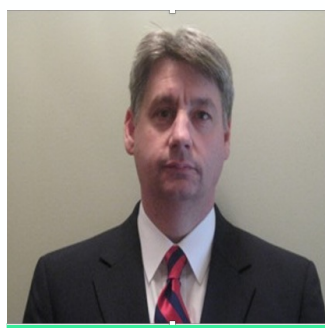
Mr. Larry Ley



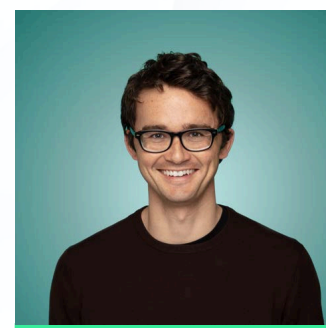
Ms. Angela Kies



Mr. Lance King



Mr. Randy Willis



Mr. Ben Brooks




Ms. Melissa Rusanganwa

Africa Regulatory Lead

Zipline

What is Zipline?

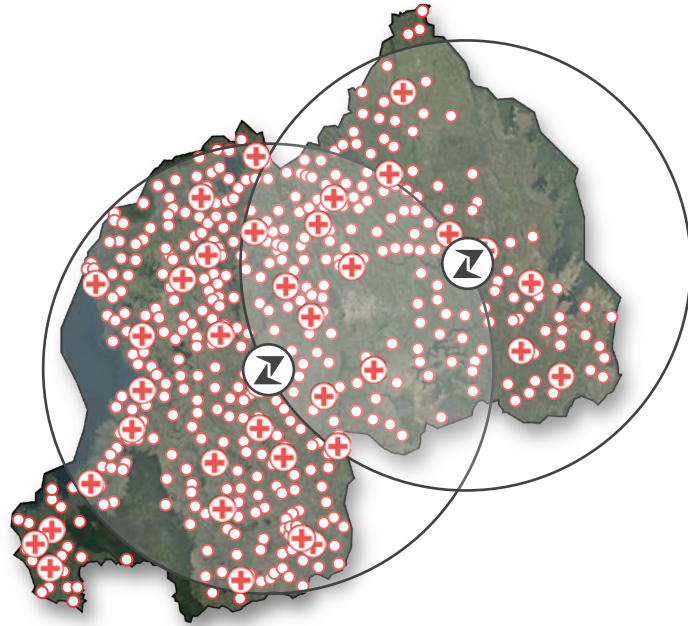


A photograph of a Zipline facility. In the center is a small, light-colored building with a black upper section featuring the 'zipline' logo in white. To the left of the building is a tall metal frame holding a large black water tank. To the right is a white container with a red roof, also featuring the 'zipline' logo in red. The background shows a large hangar-like structure and some trees under a clear sky.

zipline

zipline

Zipline's National Operations



50 mi

Rwanda

2 Zipline Distribution Centers

473 health facilities served; 10 million people covered

172 blood products, vaccines, essential medicines

Up to 300 flights a day (500+ kg/day)



Ghana

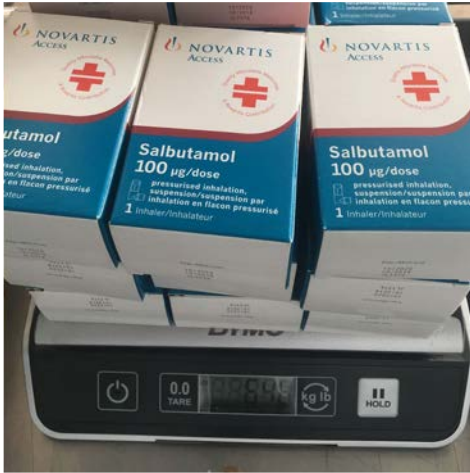
8 Zipline Distribution Centers (4 complete, 4 in process)

2,000 health facilities served; 12 million people covered

148 blood products, vaccines, essential medicines

Up to 600 flights a day (1,000+ kg/day)

Zipline brings universal health coverage within everyone's reach



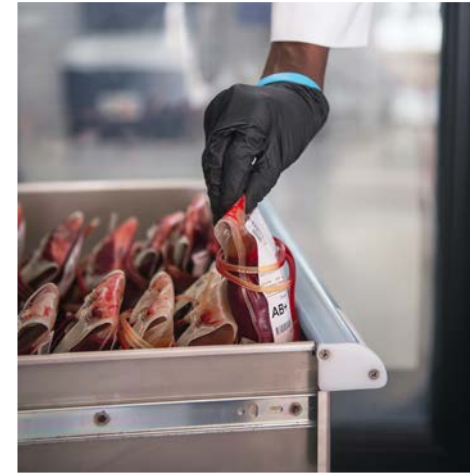
Instant access to medical supplies

Deliveries precisely where and when they are needed irrespective of time and weather/road conditions: **unrivalled reliability and speed**



Cost savings to the health system

Fast, autonomous, cold-chain enabled JIT logistics **eliminate overstocking, stockouts, unnecessary referrals and wastage**



Stronger emergency and disaster response

Centralize, pre-position and rapidly deliver crucial commodities, even in dangerous or challenging conditions such as the current pandemic



Improved health outcomes

Better medical product availability equals better health. We help reduce avoidable deaths, increase vaccination rates and adherence to treatments

COVID-19 Response: Responsive and agile supply chains can flex to support emergencies

Efforts in Ghana and Rwanda to date

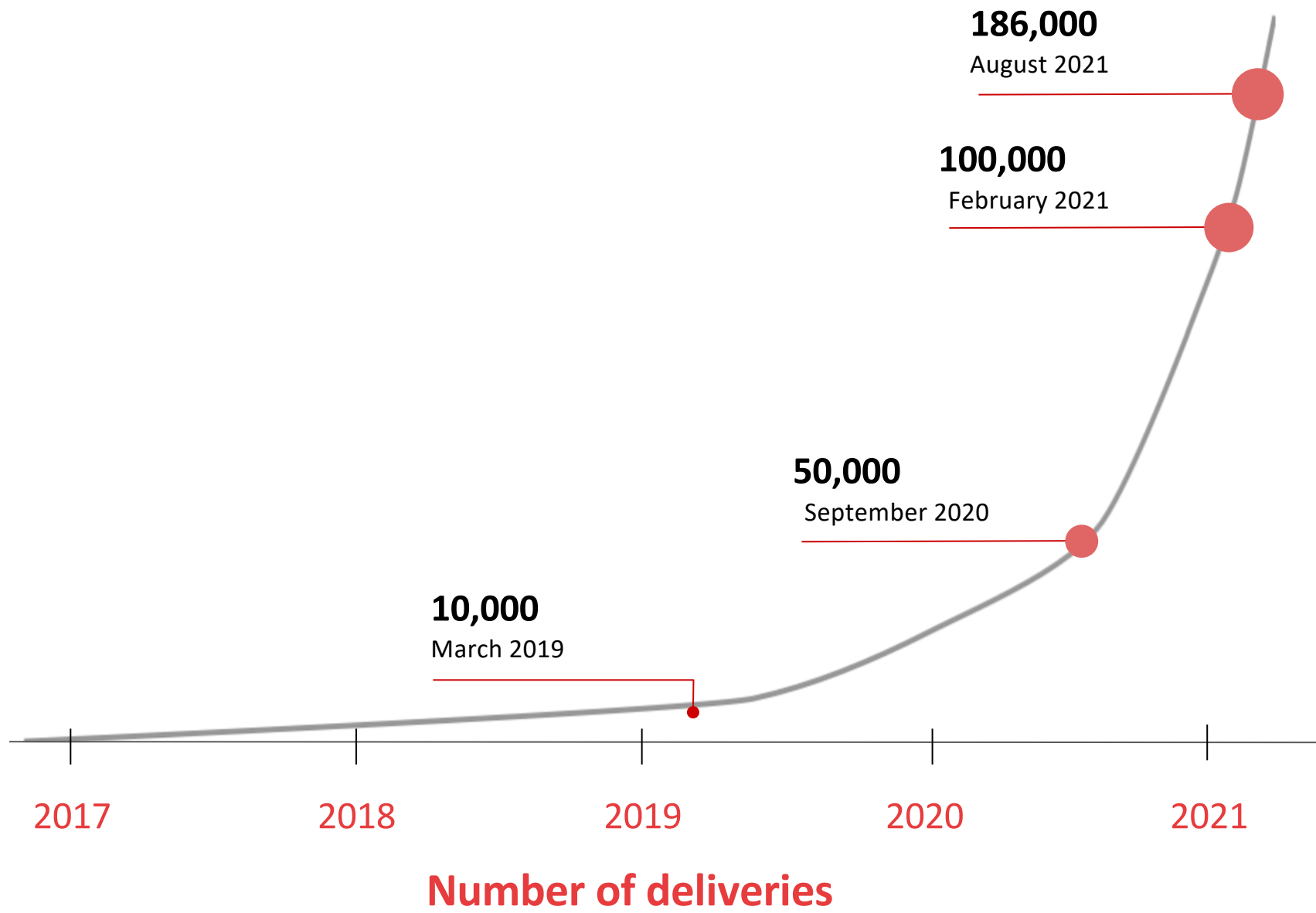


- [Delivery of COVID test samples in urban areas:](#) Zipline is flying COVID-19 test samples collected from more than 1,000 health facilities in rural areas to laboratories in Accra and Kumasi. This cuts the delivery time from days to minutes.
- [Serving patients close to home:](#) Zipline deliveries ensure continuity of the supply chain for routine treatments and reduces referrals to larger hospitals. As Ghana began its lockdown, Zipline delivered 4x the number of vaccines as in the previous week - ensuring routine immunizations continue.
- [Delivery of speciality pharmaceutical products with Partners in Health:](#) Zipline is excited to support Partners in Health in Rwanda by delivering cancer drugs to health facilities in close proximity to their patient population.
- [Centralized distribution of critical response supplies:](#) In Ghana, Zipline centrally holds each region's emergency stock of PPE, gloves, hand sanitizer, and other supplies at our distribution centers.
- [Delivery of COVID Vaccines in Africa:](#) *The new partnership with Zipline and UPS Foundation will see 2.5 million doses delivered in Ghana*

Zipline Deliveries are quickly becoming the new Normal

Zipline by the numbers

- 2,500 Healthcare facilities served
- 145,000 Commercial deliveries
- 2 Million Vaccine doses delivered
- 160+ Medical products in inventory



How does it work?

1. Flight launch



2. Package delivery



3. Zip Recovery



Airspace Segregation

- Separation of all air traffic (manned or unmanned) is necessary for safe and efficient management of the airspace
- Zipline therefore takes a multi-layered approach to strategic airspace design that vertically segregates manned and unmanned air traffic
- This method is minimally disruptive to the airspace since it incorporates restrictions that our regulators has already defined

Zip Route Design – Design Goals

- **Safety** - paths must not intersect any obstacles, and must avoid flying over densely populated areas whenever possible.
- **Efficiency** - The amount of airspace used should be minimized. The amount of energy required to fly a path should be minimized. Existing paths should be reused whenever possible.
- **Regulatory requirements** - The paths must stay inside the given regulatory boundaries & must not enter any keep out zones.
- **Vehicle constraints** - The paths must be compatible with the vehicle's performance envelope, even in bad weather.

ATC Coordination

- Zipline provides ATC with access to the “Birdwatch” User Interface (“UI”) – Zipline’s unified traffic management system for real time flight monitoring, flight restriction issuing and auditing
- ATC can use this UI to check flight plans and status and monitor flight data in real-time
- ATC can communicate in real-time with the Zipline Controller over the telephone via pre-programmed switchboard call button that calls Zipline Control directly, toll-free
- A Zipline Controller can issue commands that override a Zip’s pre-programmed flight plan, as conditions require, and can command the Zip to RTH, Hold, or deploy its parachute and land.

ATC has multiple ways to manage Zipline flights

Note: Nominally, minimal interaction with Zipline should be required because we maintain segregated airspace. In the edge cases where aircraft may be flying across our routes and below the manned aircraft floor, ATC has multiple options.

If ATC is aware in advance that a manned aircraft will need to occupy airspace that overlaps with a Zipline route, ATC can issue a **temporary flight restriction** using the Birdwatch application.

ATC can also issue three types of short-term commands to Zipline aircraft that have already taken off

1. Hold at Predetermined Location
2. Return to Distribution Center
3. Terminate Flight Using Safety Parachute

**Thank you for your
continued support!**

Melissa Rusanganwa

Head of Africa Regulatory Affairs





Mr. Larry Ley

Senior Portfolio Manager, Airspace & Operational Efficiency / Co-Chair UTM Taskforce
Boeing / CANSO

CAN SO UTM TASK FORCE

Understand, Capture, and Share
UTM Global Experiences & Best Practices with CAN SO
Members

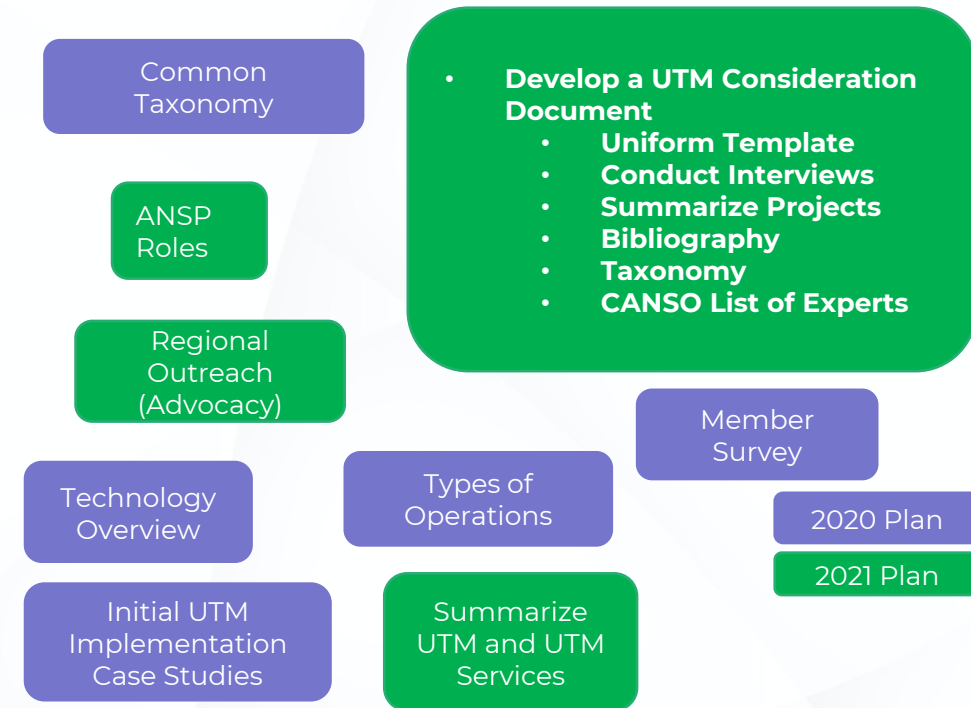
AGENDA

- CAN SO UTM Task Force Purpose and Goals
- UTM Survey 2021
- Survey Conclusions

UTM TASK FORCE (TF) PURPOSE AND GOAL

- Mandate from CANSO Global
 - Co-chairs: A. Kies (DFS)/L. Ley (Boeing)
 - Broad and Diverse Membership
 - ANSPs and Industry
 - Europe, North America, Middle East, Asia, & Africa
- Advise members on issues arising from the UAS integration into the airspace with a focus on low level operations
- Advance members' knowledge of UTM technologies, issues, and operational application
- Apply internationally harmonised solutions for ATM/UTM synchronisation
- Ensure a safe and efficient integrated airspace

UTM TF Integrated Two Year Plan



Survey Represents Initial Outreach to Members

UTM SURVEY 2021 STRUCTURE

CAN SO Global UTM Task Force

- Demographics
- UTM Definition
- ANSP Organization Activities & Needs
- Operational Concepts
- Commercial Issues
- Statistics
- Airspace Security

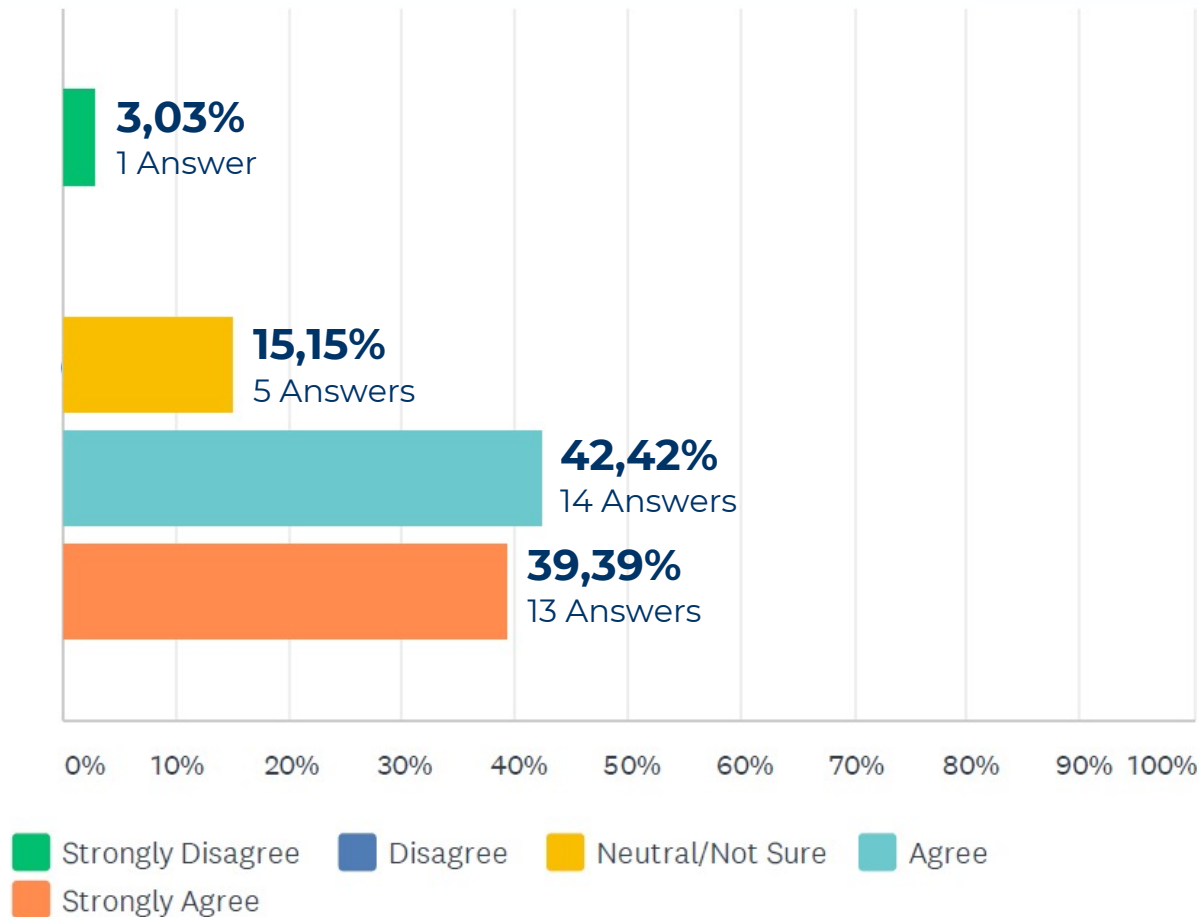
UTM SURVEY SUMMARY

CANSO Global UTM Task Force

- **38** total responses
- **3** responses come from industry
(Egis, FREQUENTIS AG, Indra Navia AS)
- **16** responses can not be assigned to sender
- **19** responses come from ANSPs
- 22% of CANSO members (19 of 85)
 - Europe: 14 ANSPs
 - North America: no responses
 - South America: 1 ANSP
 - Asia: 2 ANSPs
 - Middle East: no responses
 - Africa: 2 ANSPs

IMPRESSION OF THE RESULTS

Q3 My ANSP has started UTM planning and implementation.



Answered: 33 Skipped: 5

Findings:

- About 82% (27 answers) of the participants confirm the UTM planning and implementation in their ANSPs.
- About 18% of the participants (6 answers) have currently not started any activities for UTM planning and implementation.

CONCLUSIONS

- 22% of CAN SO members took part in the survey, but only 2 from Africa Region.
- UTM development survey viewed as valuable.
- Development of a UTM system as important and sensible.
- UTM system is not only to be used for unmanned aviation.
- Further CAN SO support required to strengthen the common understanding.
- Need for more exchange at the working level and information exchange on the CAN SO media.
- Awareness that UTM Services will generate additional revenue.
- UTM System development and operating costs borne primarily by the UTM Service Providers, ANSPs and Operators.

Seek Greater Task Force Engagement and Input from Africa Region to Deliver Value to Members' Specific Challenges and Needs



THANK YOU

CANSO

SHAPING OUR FUTURE SKIES



Ms. Angela Kies

Head Unmanned Aircraft Systems / Chair UTM Taskforce
DFS Deutsche Flugsicherung GmbH / CANSO

SOLUTIONS FOR SAFE AND FAIR INTEGRATION OF UAS INTO GERMAN AIRSPACE

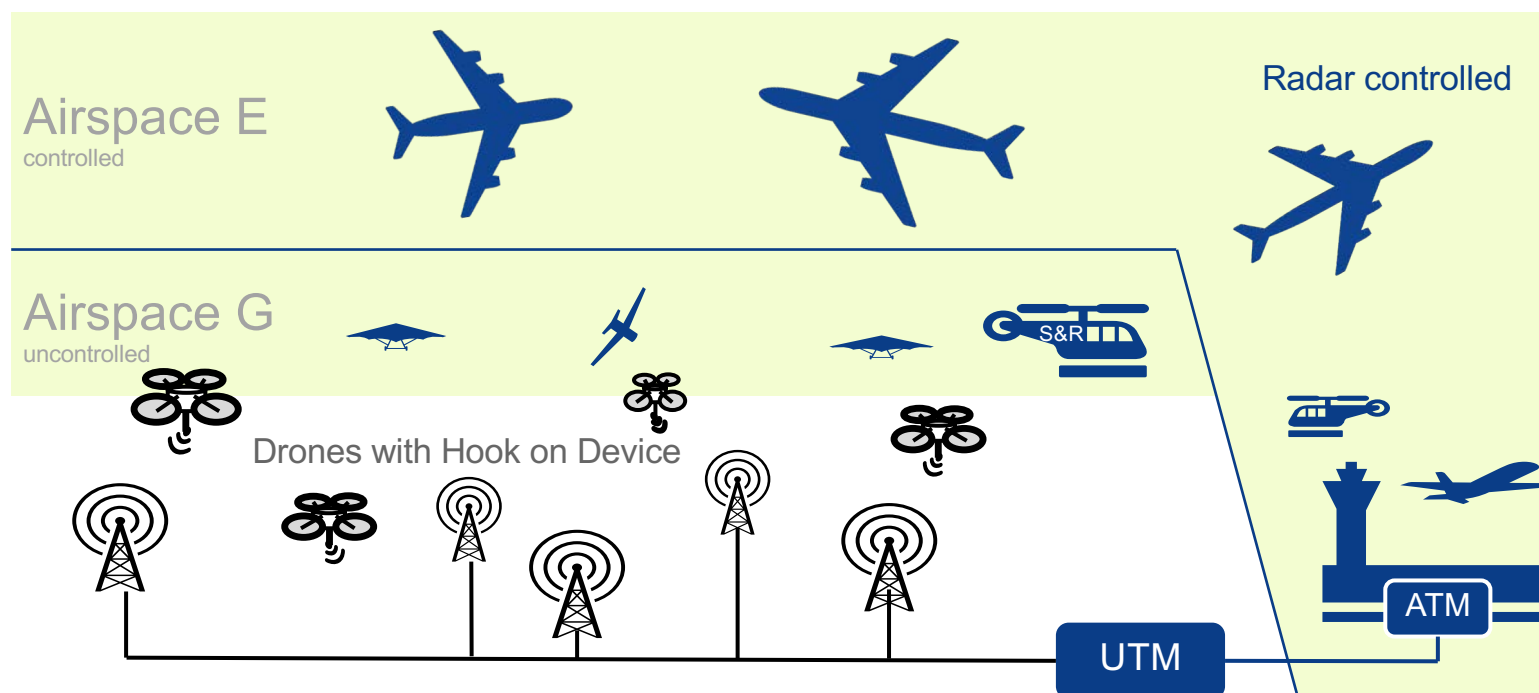
AGENDA

- (1) Purpose of UTM Development
- (2) Business Rationale
- (3) System Development & Performed Activities
- (4) UTM Framework Development
- (5) UTM – DDS – Tests
- (6) Lessons Learnt - Maturity

To face the drone challenge, DFS teamed with Deutsche Telekom for UTM development in very low level airspace

Project Objectives

- Provide evidence that efficient connectivity, surveillance and tracking as well as command and control of UAV in very low level airspace via the mobile communications network is possible
- Define operational and technical requirements for systems and infrastructure (incl. system architecture)
- Identify the relevant elements for a Concept of Operations (ConOps)
- Develop a business case for establishment and operation of an UTM System



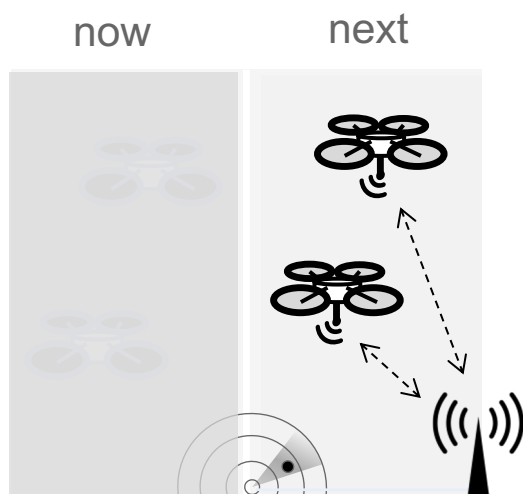
The U:CON UTM SYSTEM APPROACH FOR VLL AIRSPACE



The step-wise approach will enable market development in Germany for all kinds of drone operations

Three components will boost commercial drone market:

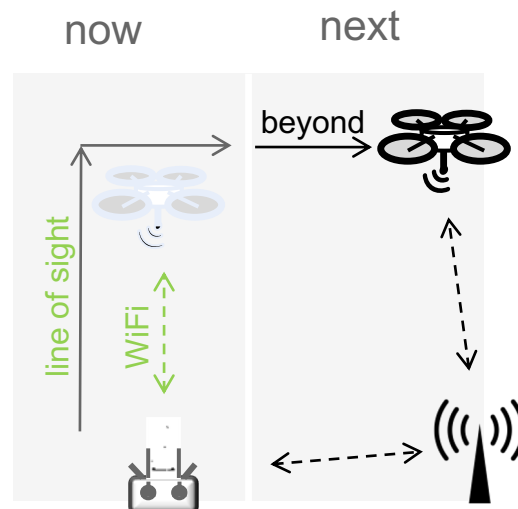
① Air Traffic Management (UTM)



Regulatory imperative

Make drones visible on the radar

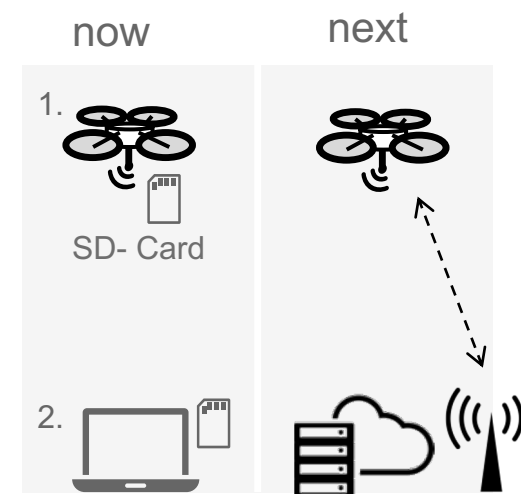
② BVLOS Operations



Business need

Make them fly beyond visual line of sight

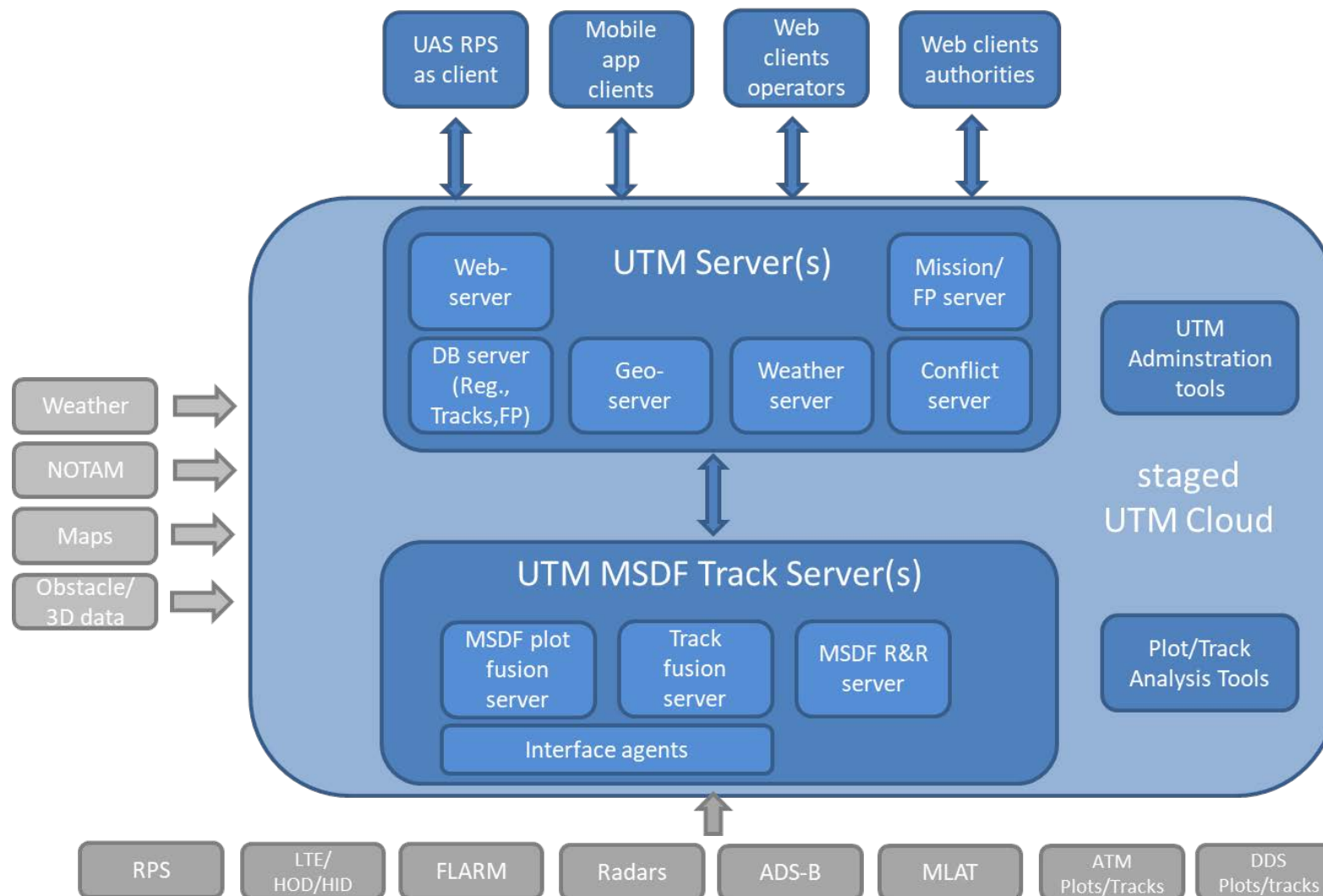
③ Real-time Data Transfer



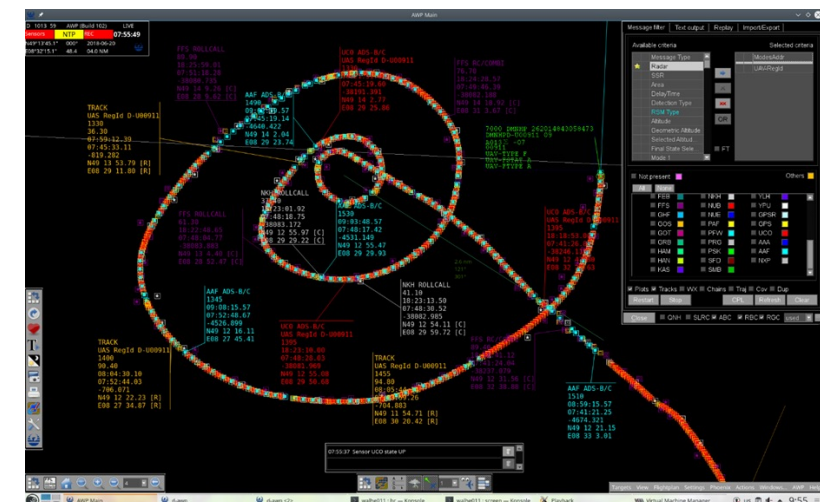
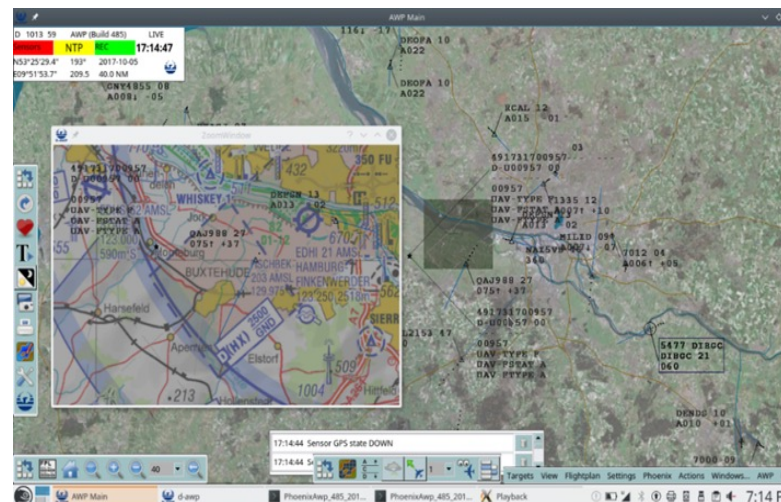
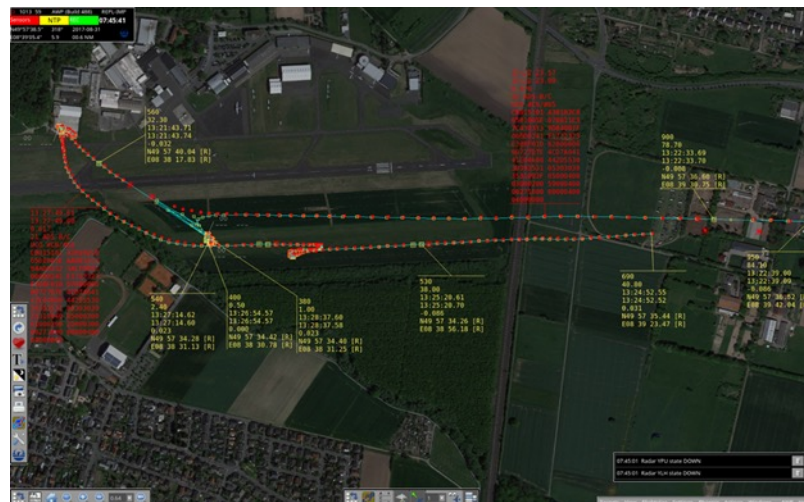
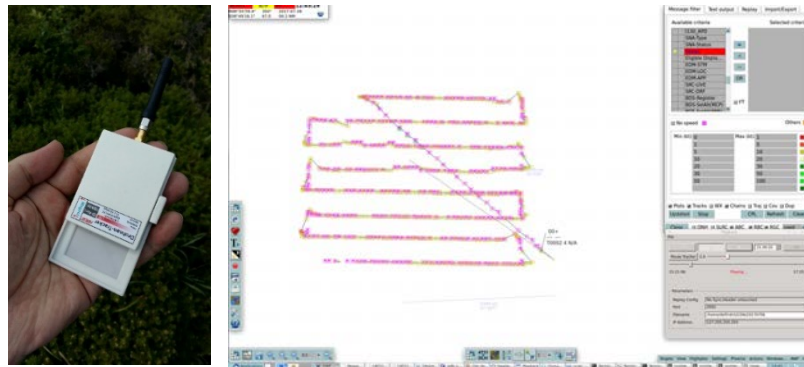
Business Need

Real-time transfer & analytics of pictures, videos and other sensor data

UTM reference architecture is developed in line with the CORUS definitions at European level

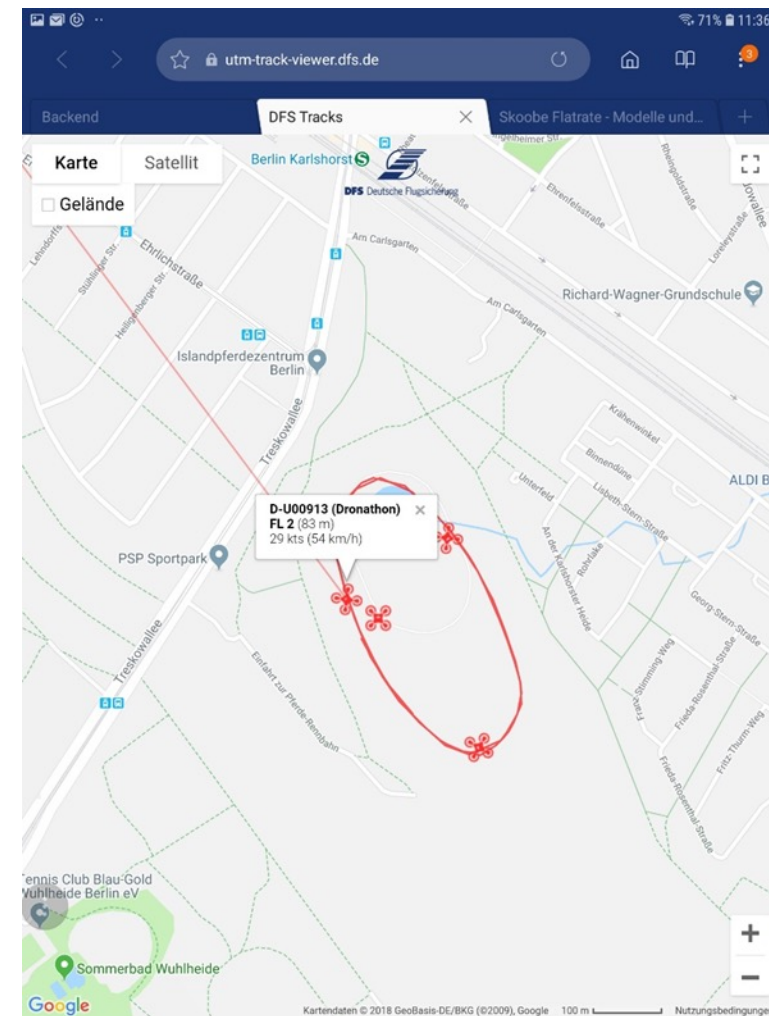
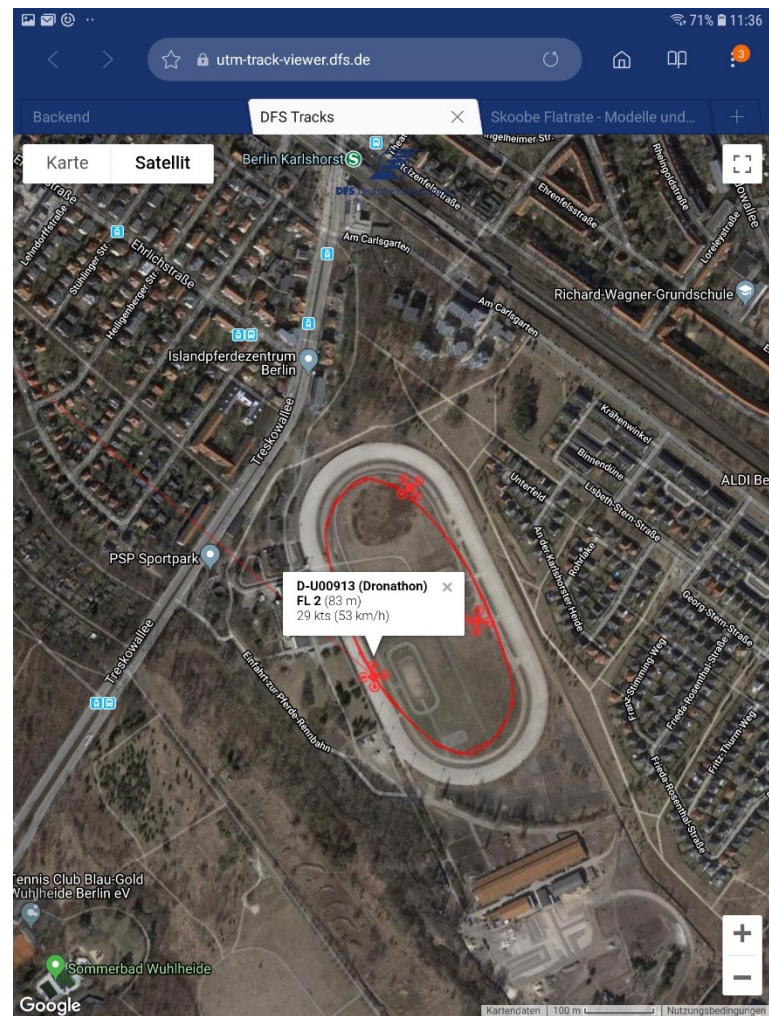
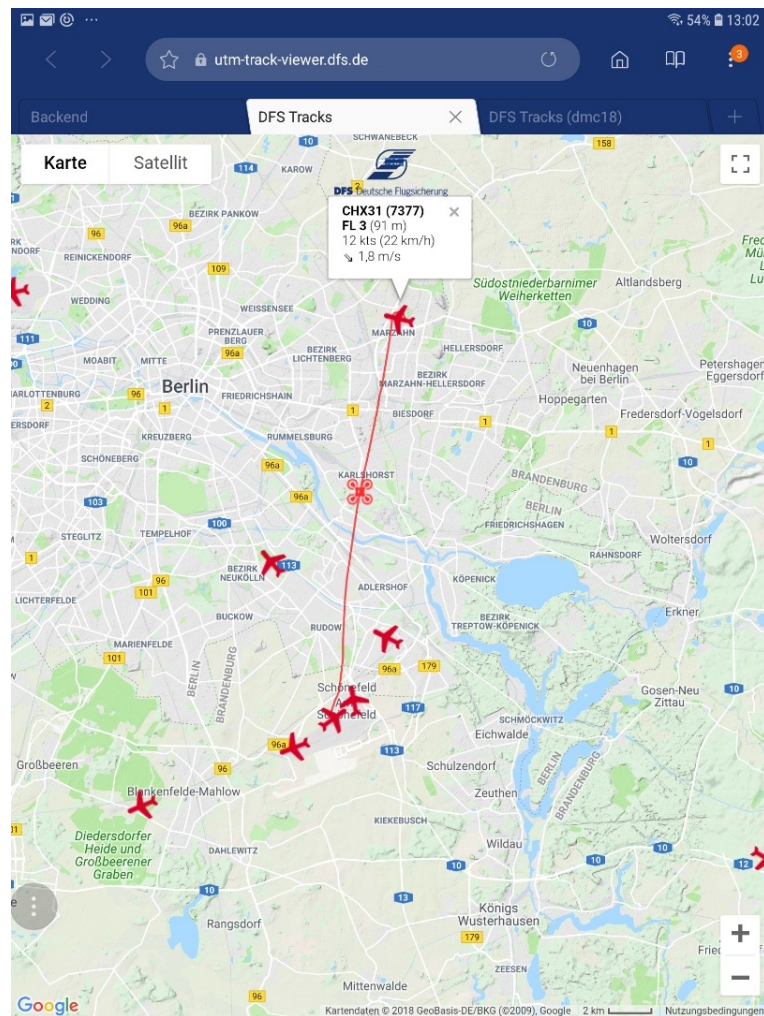


Feasibility of drone tracking (here PHOENIX AWP screenshots) using mobile telecom & HOD is proven



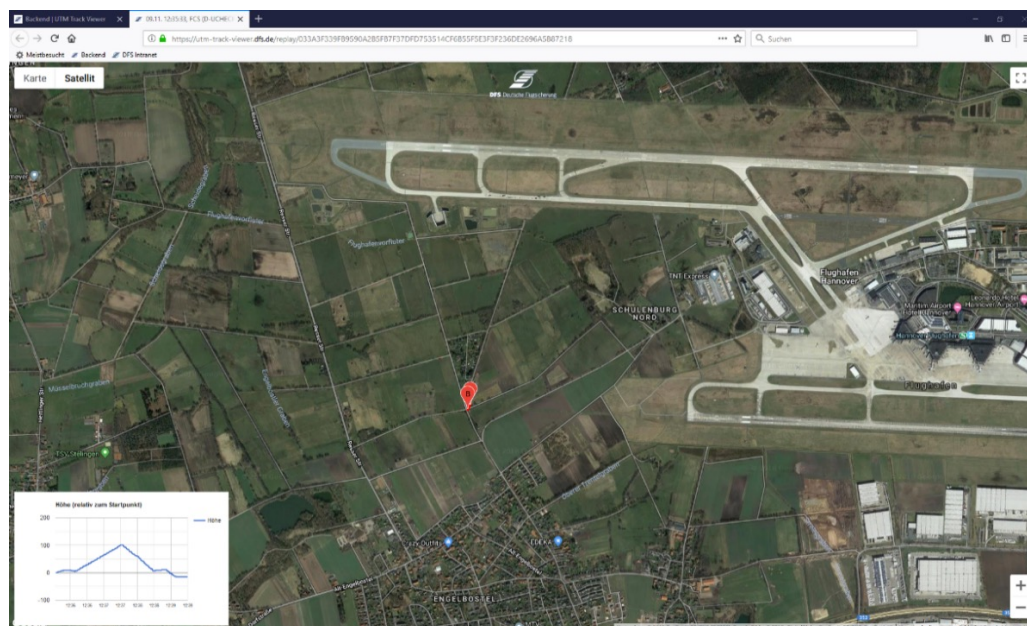
Use case experiences: DroneMasters Berlin 2018

Web frontend traffic displays for at-site mission support

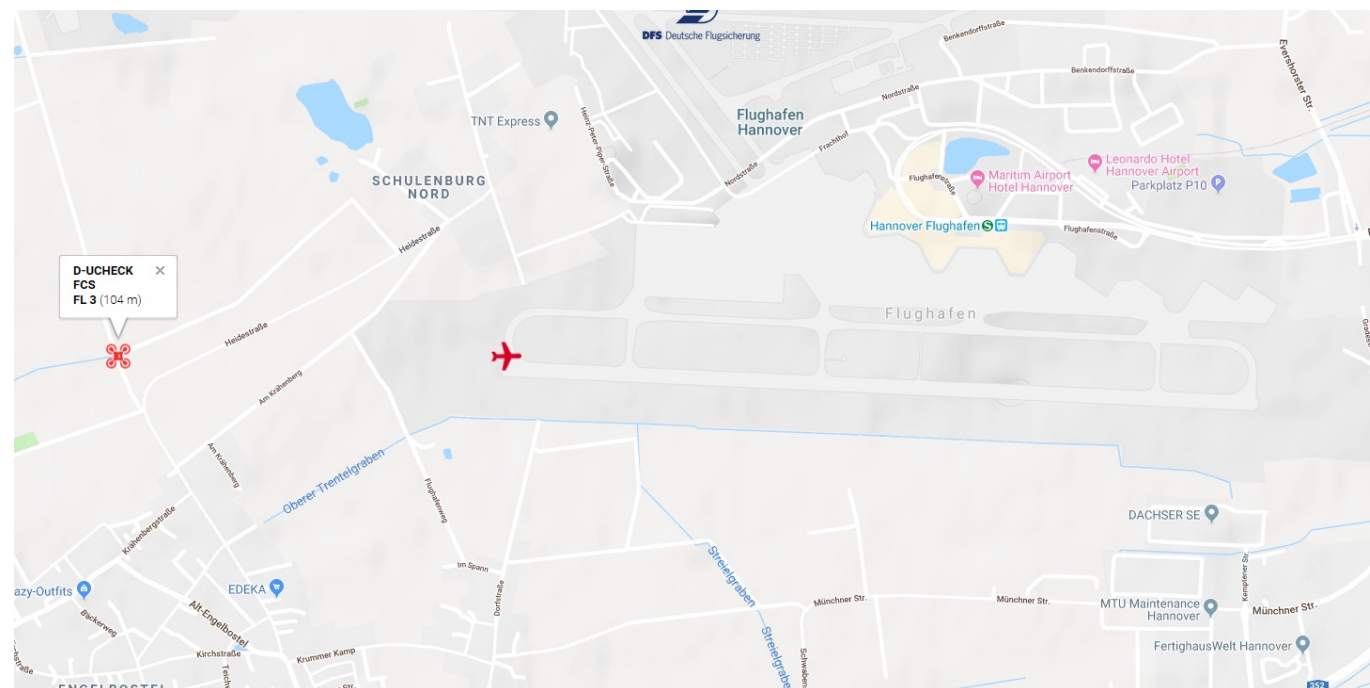


Use case experiences: FCS measurement of ILS at Hannover Airport

World premiere 9.11.2018 at Airport Hannover

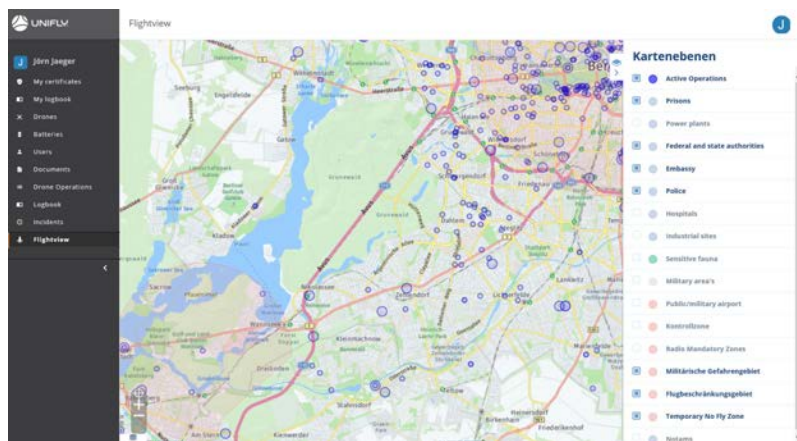


- FCS Flight Calibration Services GmbH, Colibrex GmbH in collaboration with Tower Hannover and the UTM development at VE/U and Systemhouse
- 8 flights with flight altitude up to 140 in PHOENIX and TrackViewer of U:CON, both at Tower Hannover and in the labs at DFS Langen

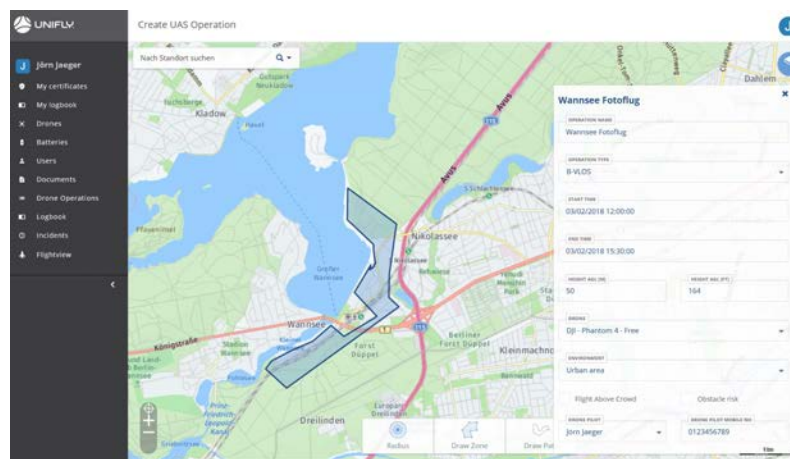


The available UTM provides a comprehensive set of functionalities

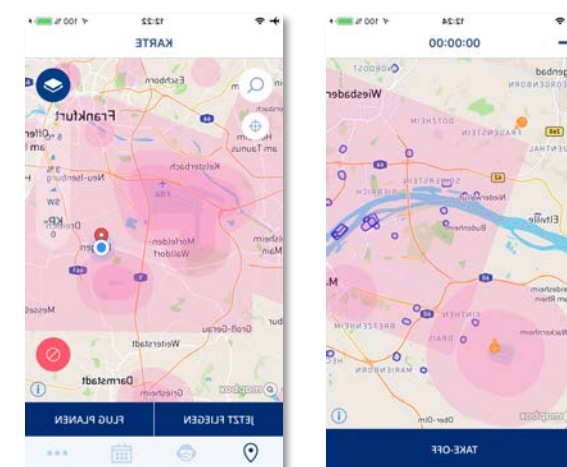
Situational Awareness



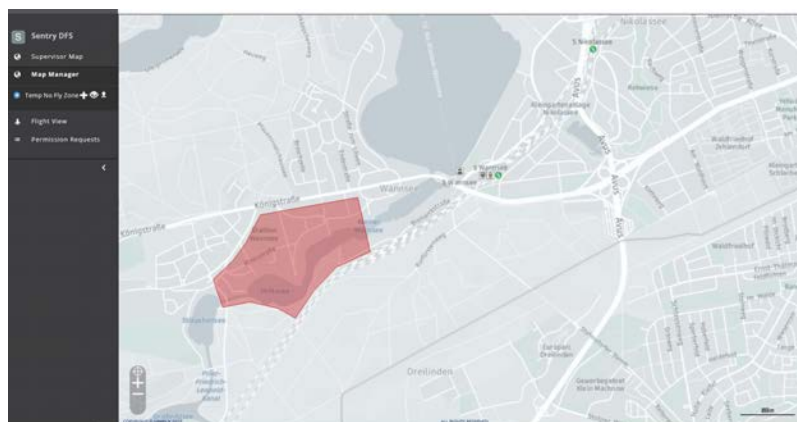
Mission planning for UAS Operators



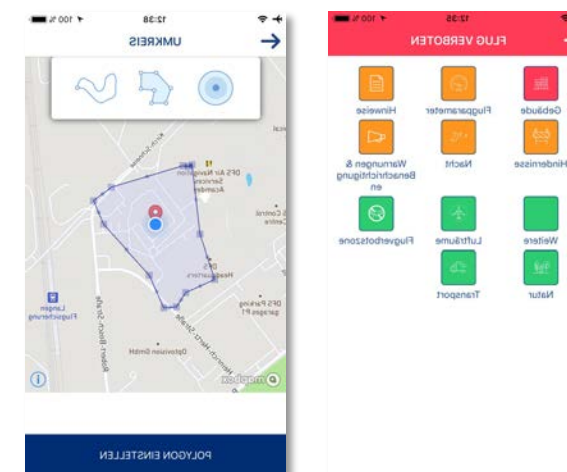
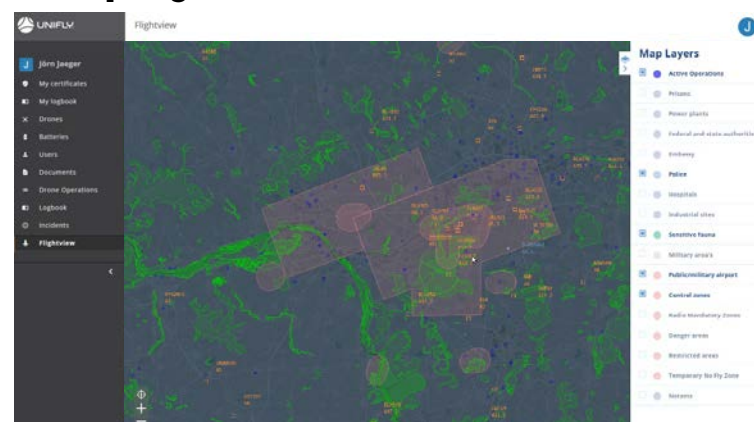
Mobile Apps for Pilots in the Field



Static and dynamic Airspace Management

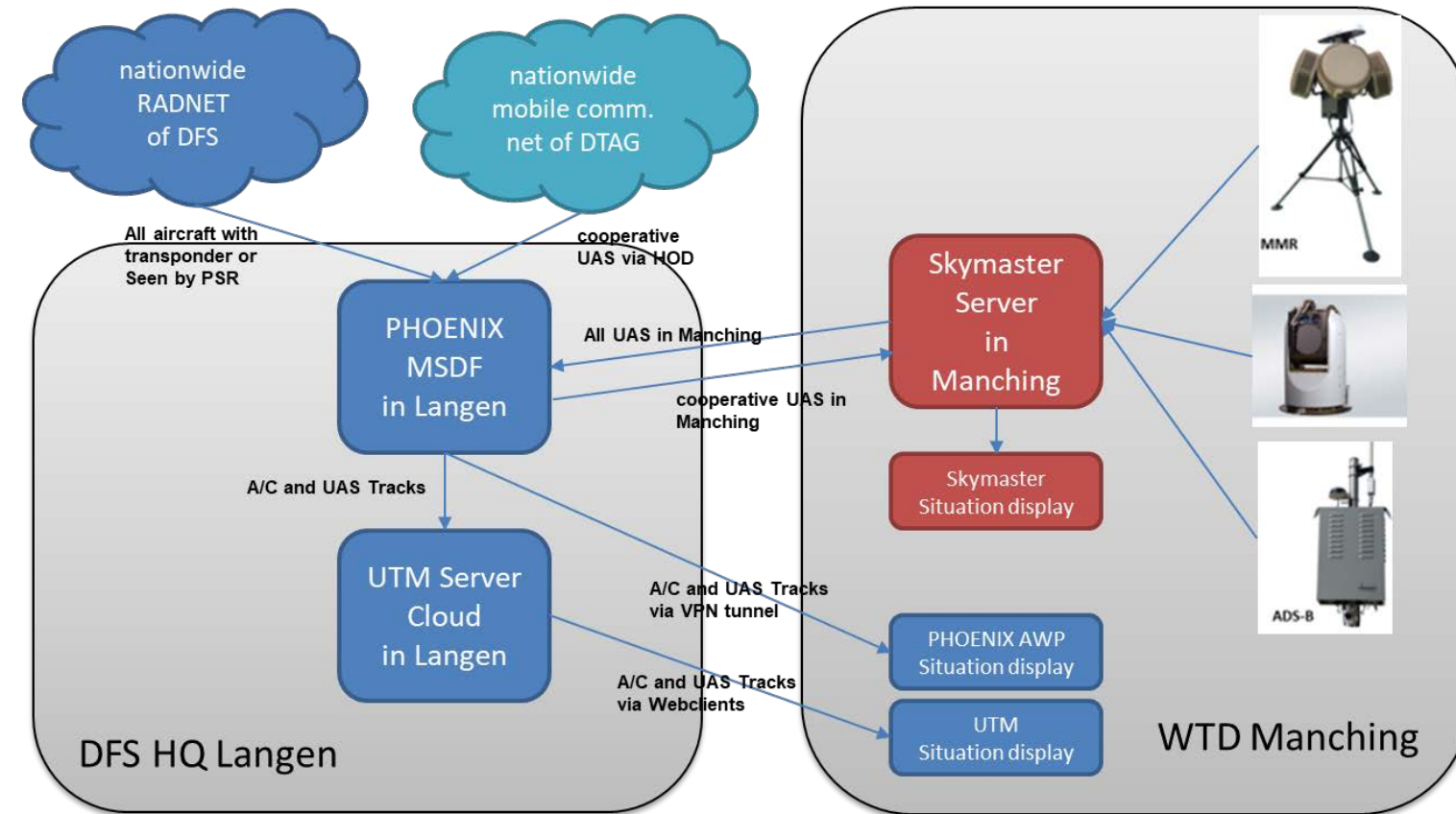


Integrated Situational Awareness Display

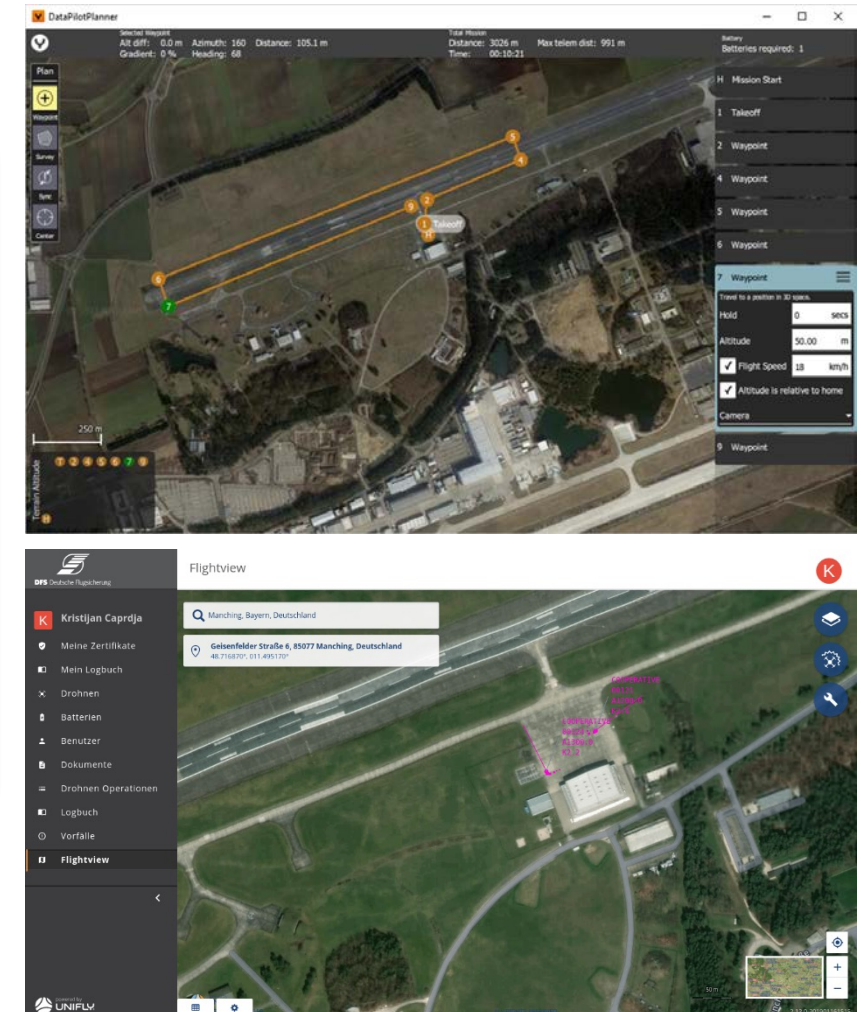


UTM and a local drone detection system may cooperate to identify cooperative and uncooperative UAS

Architecture



Screenshots

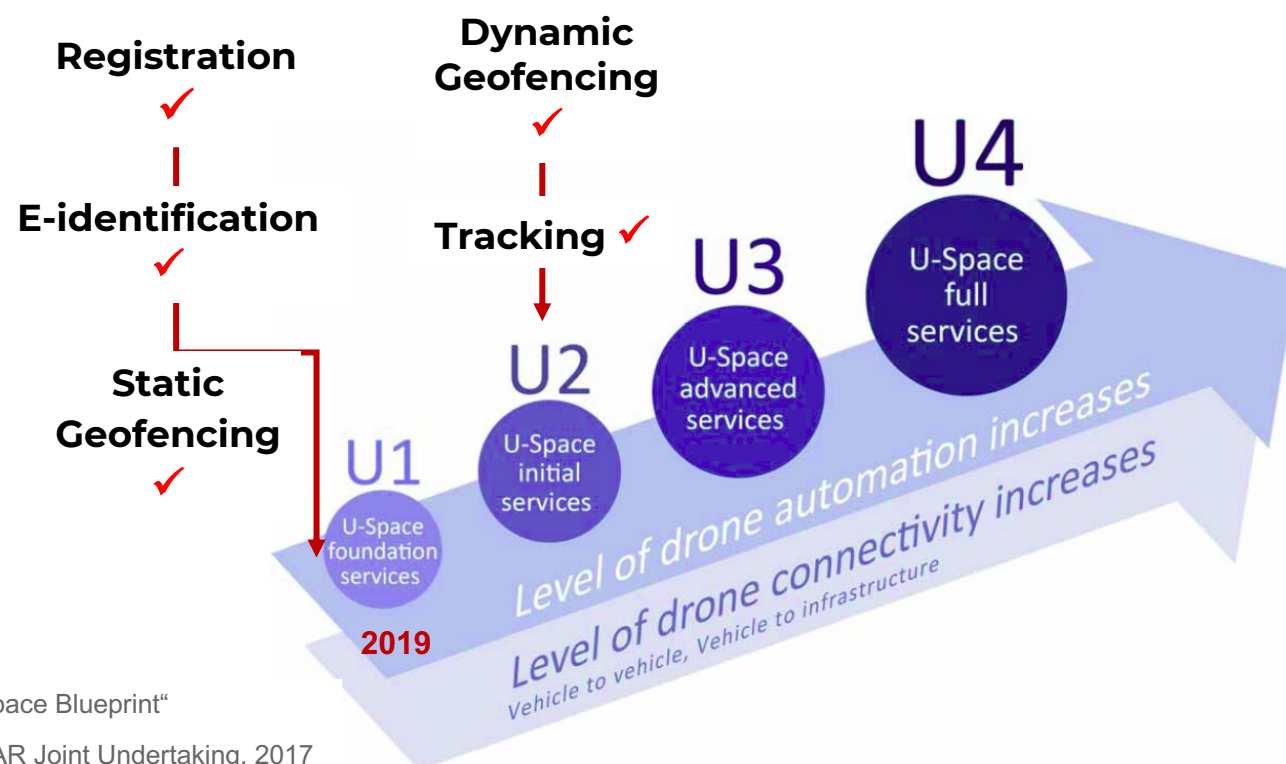


Therewith, DFS UTM System approach is synchronised with European regulative requirements

U-space “is a set of **new services** and specific procedures designed to support safe, efficient and secure access to airspace **for large numbers of drones**.”

These services rely on a high level of **digitalisation and automation** of functions, whether they are on board the drone itself, or are part of the ground-based environment.

U-Space provides what is needed to enable and support **routine drone operations**, as well as a clear and effective interface to manned aviation, ATM/ANS service providers and authorities.”*



German UTM System available since 2019 commercialized by



* „U-Space Blueprint“

SESAR Joint Undertaking, 2017

THANK YOU FOR YOUR ATTENTION

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Mr. Ben Brooks

Public Policy

Wing



THANK YOU





Mr. Lance King

Senior Policy Advisor

Northrop Grumman Aeronautics Systems

UAS/Emerging Technologies Working Group

Considerations for UAS Operations



Lance King, Northrop Grumman Corp.

Co-Chair UAS/Emerging Technologies Working Group



John Page, Federal Aviation Administration

Co-Chair UAS/Emerging Technologies Working Group

BACKGROUND

- First published in 2015
 - Focus on RPAS operations in controlled airspace
 - Developed from experience and from lessons learned from the RPAS Manual (ICAO Doc 10019)
- Updated and renamed in 2019
 - Expanded discussion to small UAS operations
 - Introduced UTM



ANSP Considerations for Unmanned Aircraft Systems (UAS) Operations

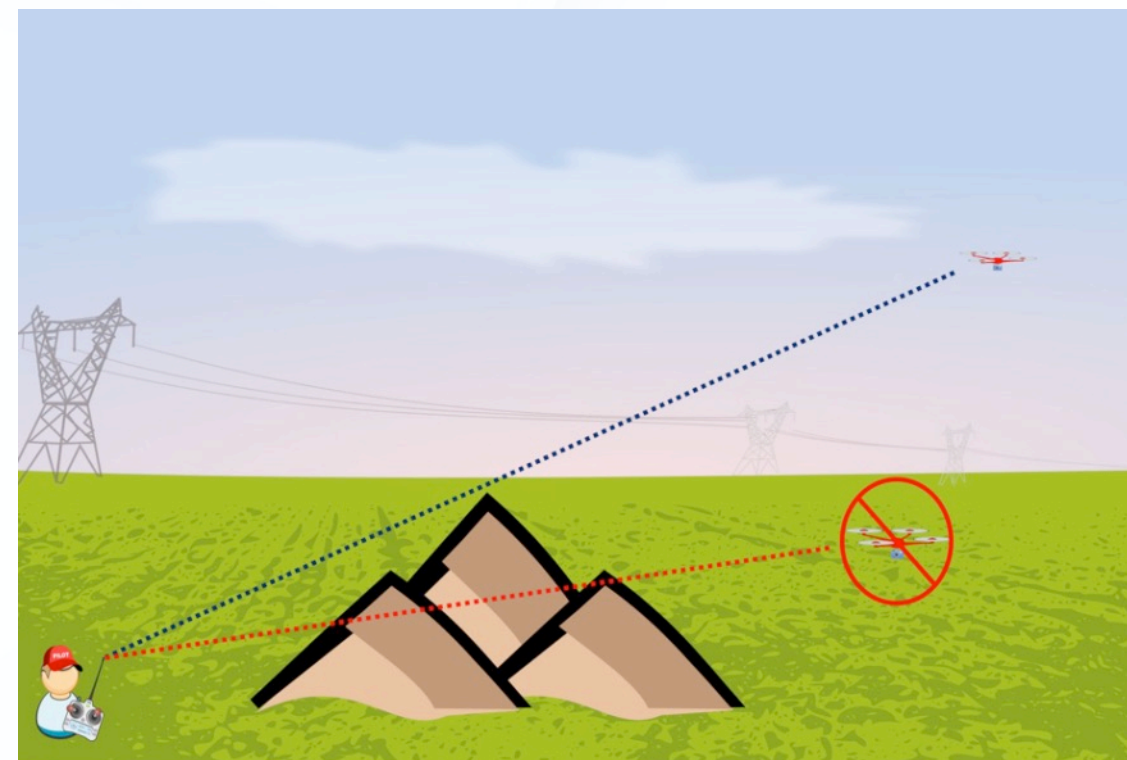
PURPOSE AND OBJECTIVE

- Written for ATM and ANSP policy makers, management and staff, including those specifically responsible for ATM procedures.
- Acknowledges that technical solutions (e.g. detect and avoid) and future concepts (e.g. UAS Traffic Management (UTM)) to address some of the challenges identified are under consideration or development.
- The objectives of the document are to:
 - Raise awareness of UAS operations to ANSPs
 - Inform ANSPs how UAS have been accommodated safely into Member State ATM systems to date
 - Identify some of the issues that need to be addressed to safely achieve greater UAS integration in the future
 - Provide information to assist in developing UAS training materials for ANSPs



OVERVIEW

- Introduction to modes of UAS operations
- UAS Data Link Configurations
- Current UAS Operations approved by States
- UAS Operations
- General UAS Requirements from an ANSP Perspective
- Separation
- Aerodrome and Terminal UAS Operations
- Special Handling
- Contingency and Emergency Operation Procedures



GOAL

- Explain some of the complexities of UAS Operations for ANSPs
- Decrease concerns regarding UAS operations while maintain an awareness of safety requirements
- Give ANSPs a tool to work with regulators to increase UAS flights in and around controlled airspace safely

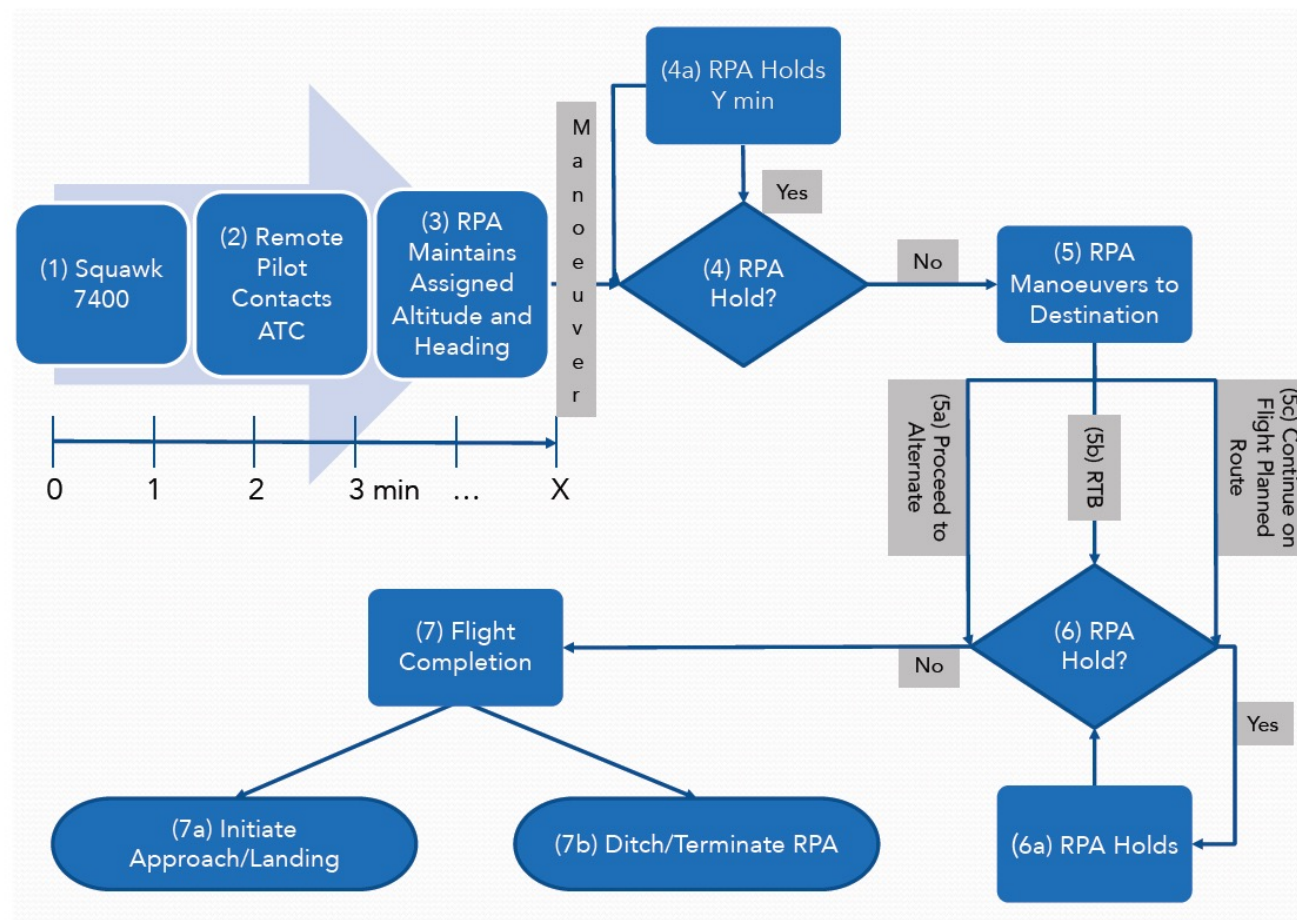


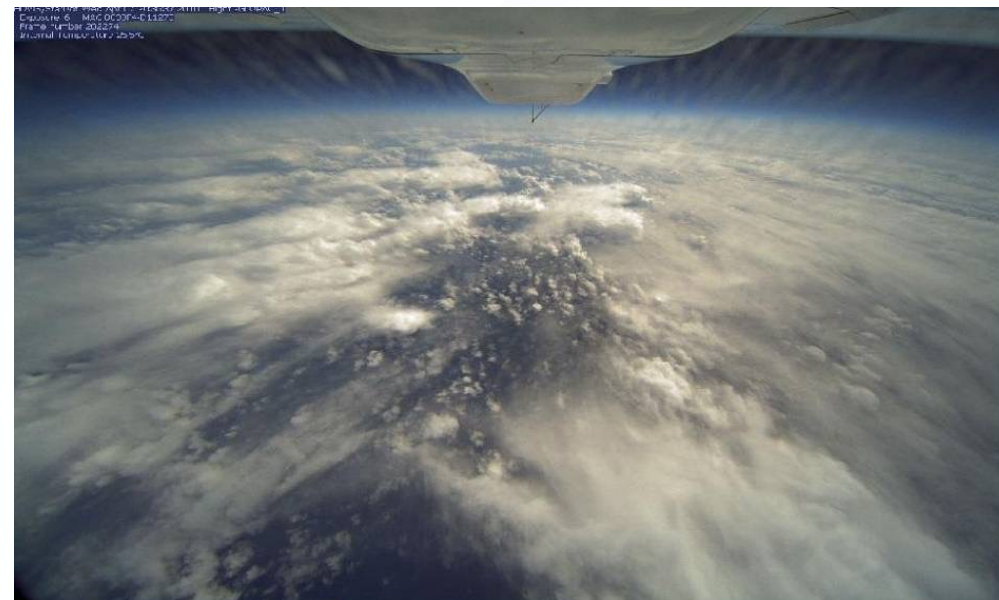
Figure 6: Typical Lost Link Procedures

RESOURCES

- Considerations document can be downloaded from CANSO website at:

[ANSP Considerations for Unmanned Aircraft Systems \(UAS\) Operations | CANSO](#)

- Expanding focus of the working group to include high altitude considerations
- Task Force established to further develop UTM considerations



JOIN US

- If your interested in helping with the Working Group contact Coleen Hawrysko at:

Coleen.Hawrysko@CANSO.org

- What we've learned about a Working Group with no members
 - Group photos can be done with a selfie stick
 - The entire Working Group can share a cab
 - Working Group dinners are easier to organize



- **We need help and experience**



THANK YOU





Mr. Randy Willis

Senior Policy Advisor

Northrop Grumman Aeronautics Systems

ICAO UAS ADVISORY GROUP UPDATE

By Randy Willis

CAN SO Member, ICAO UAS Advisory Group

CAN SO Member, ICAO RPAS Panel

Northrop Grumman Corporation

OUTLINE

- ICAO UAS Advisory Group
- ICAO UAS Toolkit
- ICAO UAS Model Regulations



ICAO UAS ADVISORY GROUP

- Formed in 2016
 - Over 20 States and international organizations as members
- Primary focus - UAS Traffic Management (UTM) Framework
- Supporting ICAO DRONE ENABLE 2017-2022
- Developing and maintaining ICAO UAS Toolkit
- Developing strategy to address new entrants (i.e. AAM)

ICAO UTM FRAMEWORK

- Based on outcomes for the various DRONE ENABLE symposia
- Developed in collaboration with industry and States
- A framework and core capabilities of a “typical” UTM system
Provides high level UTM requirements/considerations
 - Not a technical solutions document
 - Safety-focused
 - *Unmanned Aircraft Systems Traffic Management (UTM) – A Common Framework with Core Principles for Global Harmonization, Edition 3*
- Maintain safety and facilitate integration with existing aviation system
- Support technological developments while enabling stakeholders to grow safely and efficiently

ICAO UAS TOOLKIT

- Created to provide States, international organizations, and UAS operators information concerning UAS
 - State Rules/Regulations/Guidance
 - Operations
 - SMS
 - Training/General Education Recommendations
- Continuously updated



ICAO / Safety / Unmanned Aviation / UAS Toolkit

UAS Toolkit Home

Narrative ▶

Recreational
Operations

State Regulations

UAS Tools ▶

Frequently Used Terms

FAQ

News ▶

UAS Toolkit Home

Narrative



The narrative presents UAS best practices, lessons learned and... We believe that developing UAS guidance and regulations that... first, along with security and privacy protection while promoting

ICAO UAS MODEL REGULATIONS

- A compilation drawn from existing UAS regulations
 - Vanuatu, New Zealand, Australia, Canada and the U.S.
- Allows flexibility through the use of aviation organizations and manufacturers declaring UAS 'fit for purpose'
- Model Regulations articulate:
 - remote pilot licensing
 - UAS standard operating conditions
 - SMS requirements
 - operational risk assessment
- Guidance material provides best practice methods to develop scaled operational programs

RESOURCES / REFERENCES

ICAO Unmanned Aviation Website

<https://www.icao.int/safety/UA>



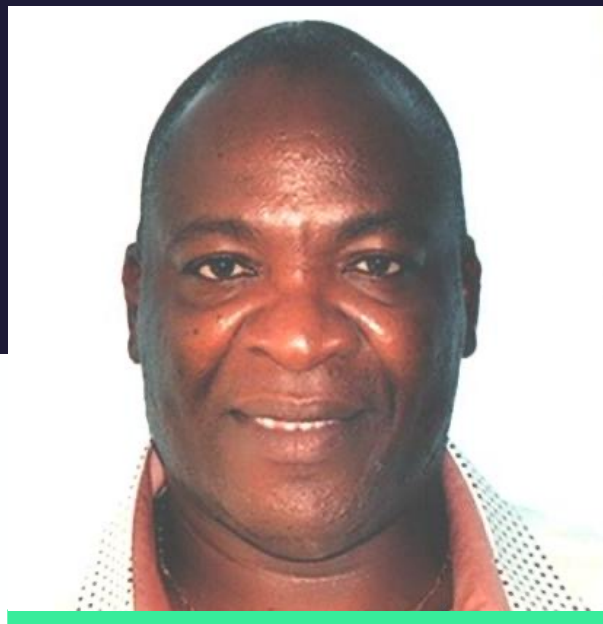
THANK YOU



SHAPING OUR FUTURE SKIES



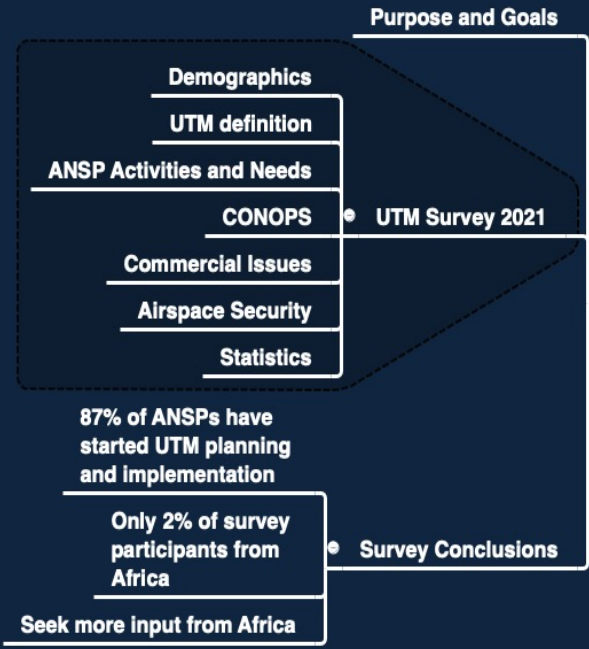
QUESTIONS AND ANSWERS



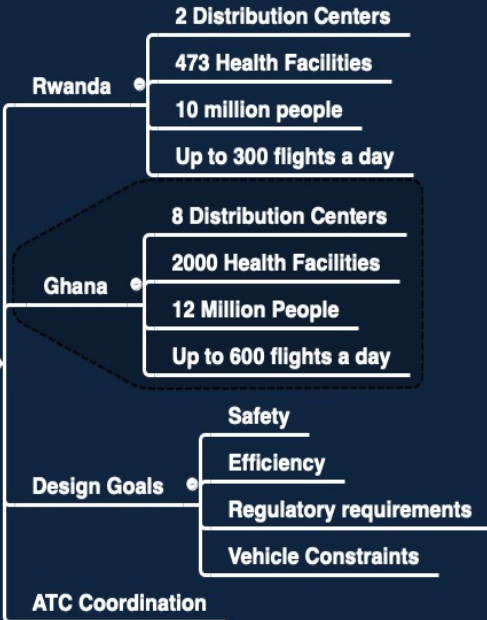
Mr. Kofi Kpodji

ATM/Airspace Planning Manager

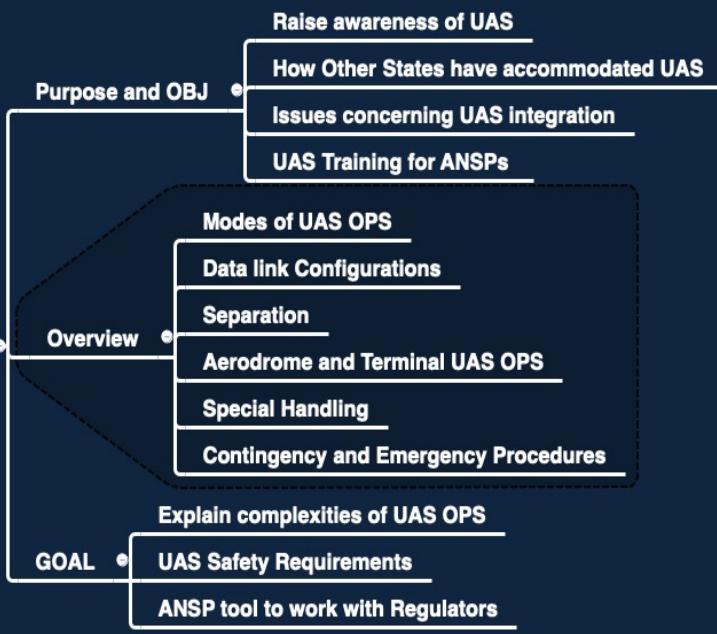
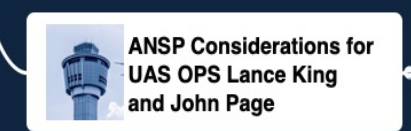
Ghana CAA



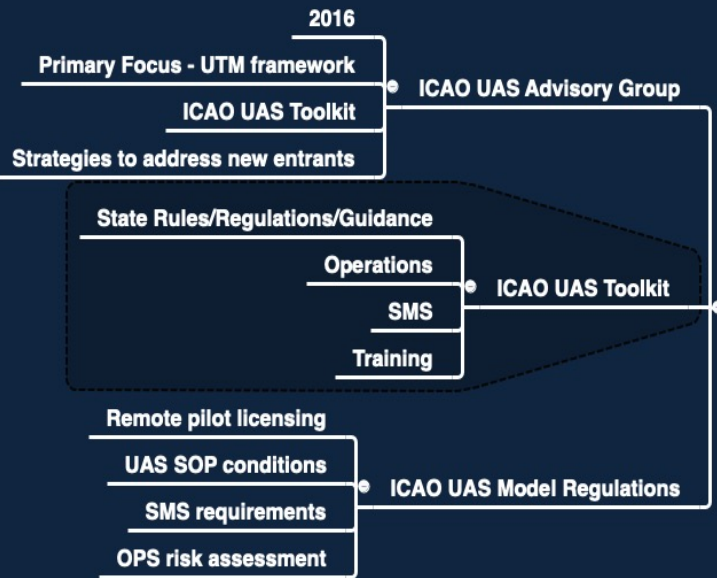
CANSO UTM Task Force
Mr. Larry Ley



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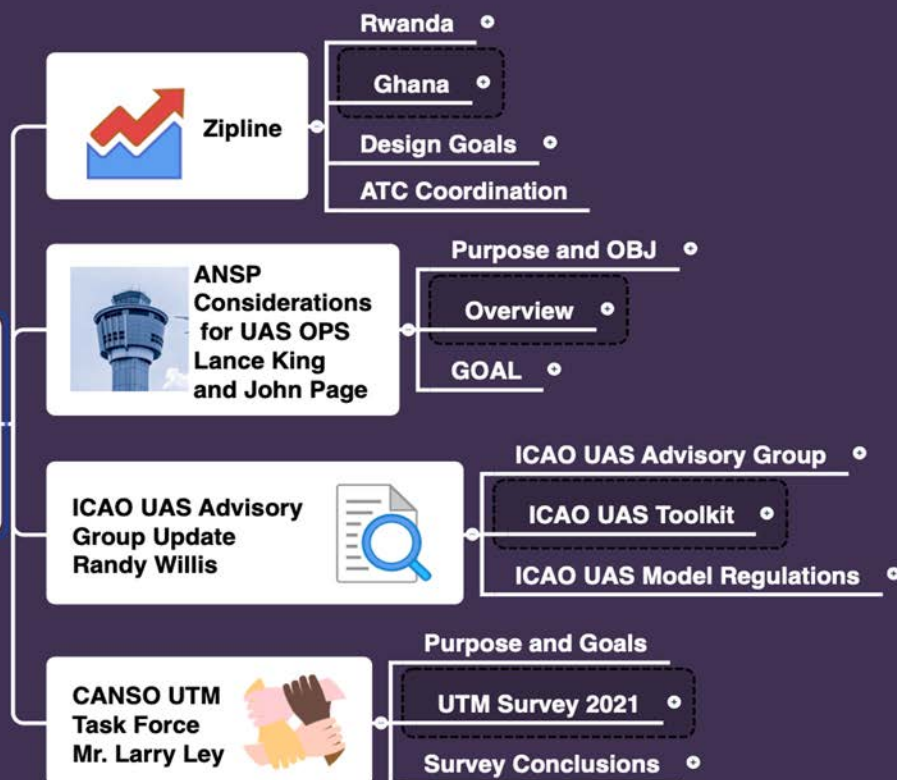
ICAO UAS Advisory Group Update
Randy Willis



Emergence of Remotely Piloted Aircraft Systems, ATM Integration, Benefits and Hazards in Africa

From this webinar, it is obvious that UAS integration is imperative, as aviation stakeholders, how prepared are we?

Thank you





Ms. Boni Dibate

Director Africa Affairs

CANSO



THANK YOU

