

Research and development with UAV/Drones

UAV/UAS Navigation, Sensors & Communications Systems

Drone Center Sweden Västervik

PNK4UTM Cellular & UAV – UTM Innovation Zone

AFarCloud Aggregate Farming in the Cloud

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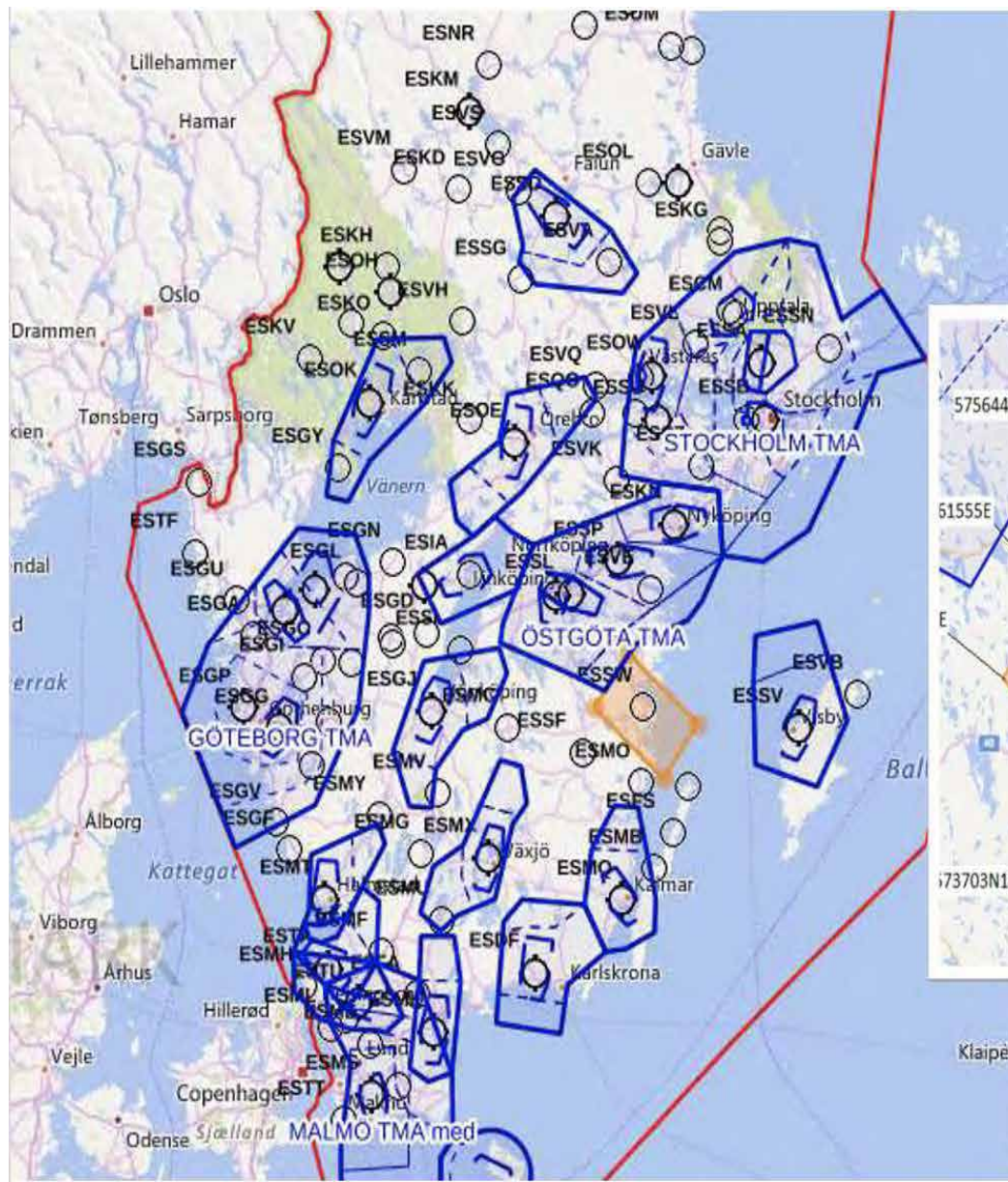
Research Institutes of Sweden ,RISE
Vinnova, EU, Trafikverket, GSA



ECSEL Joint Undertaking

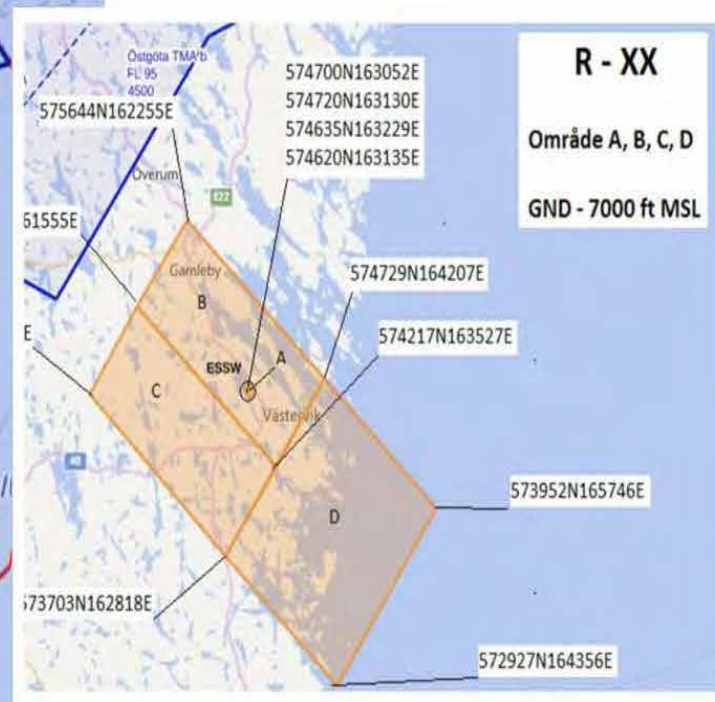
[Electronic Components and Systems for European Leadership](#)

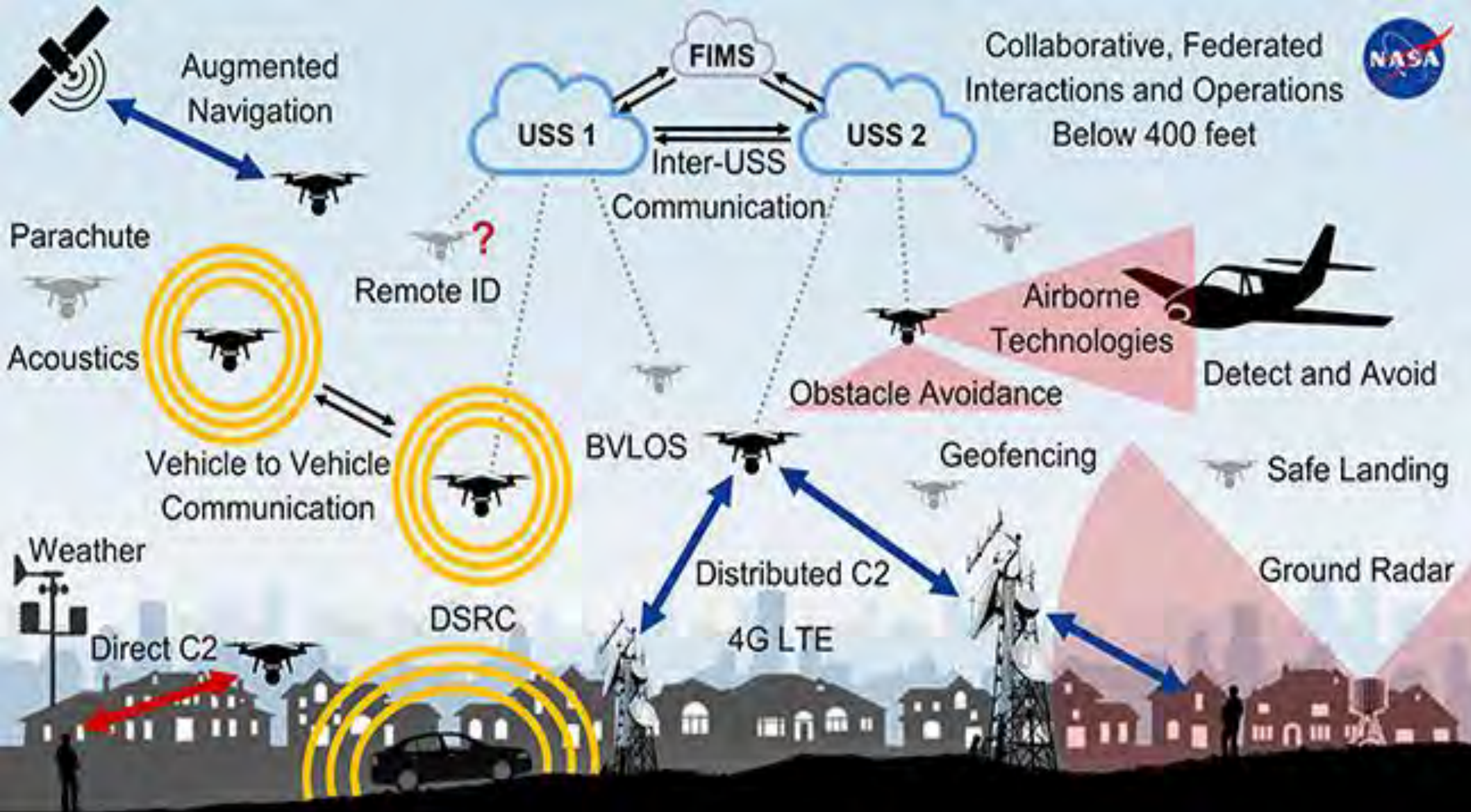




Västervik
Is the place important?

Västervik
safe airspace
40 x 50 km
Geographical UAS
zone with
permission to fly
UAVs 120–2000 m
above sea level
BVLOS and
autonomous





JANUARY 10, 2023

Europe is Leading the World in the Growth of BVLOS Drone Services Via Cellular

[Eszter Kovács](#) [International](#). [Regulations](#)



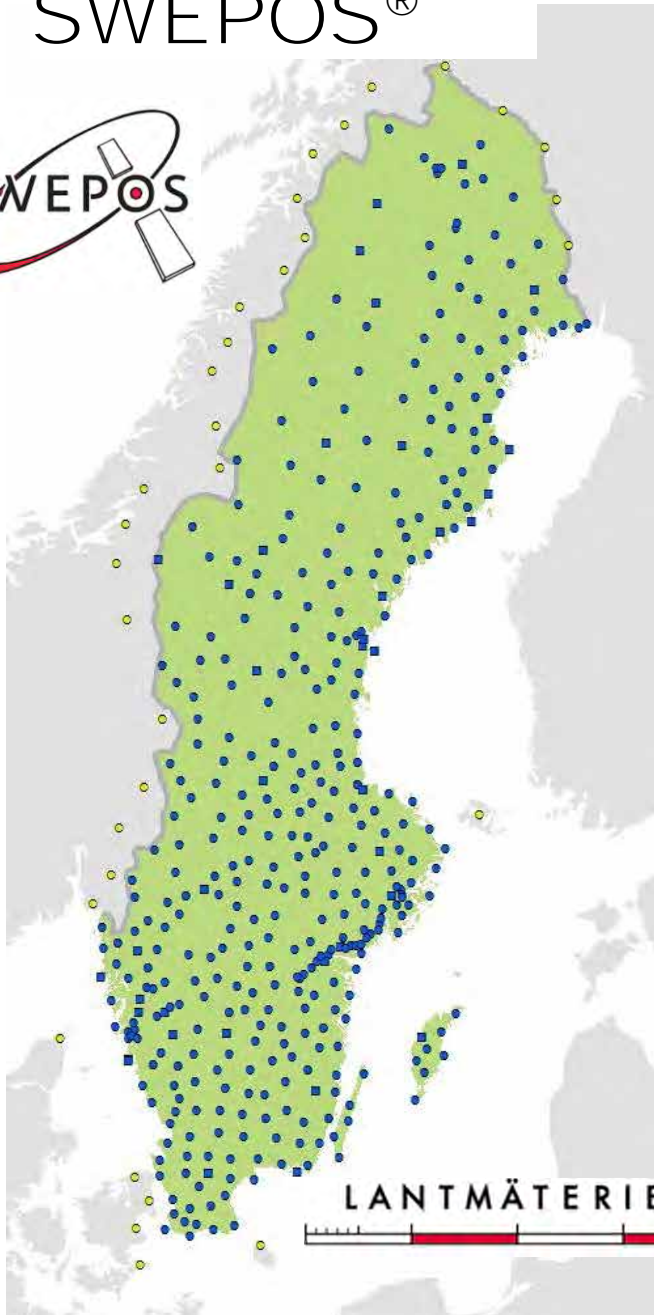
In that document, the Aerial Connectivity Joint Activity work, (a joint collaboration between GSMA – GSM Association and GUTMA - Global UTM Association), has recognized as one of the key contributors to "Building the Union drone services market:"

Learn more about the EU drone strategy 2.0 here:

https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7076

<https://www.commercialuavnews.com/regulations/europe-is-leading-the-world-in-the-growth-of-bvlos-drone-services-europe-is-leading-the-world-in-the-growth-of-bvlos-drone-services-via-cellular-cellular>

SWEPOS®



Most of the receivers in SWEPOS stations are:

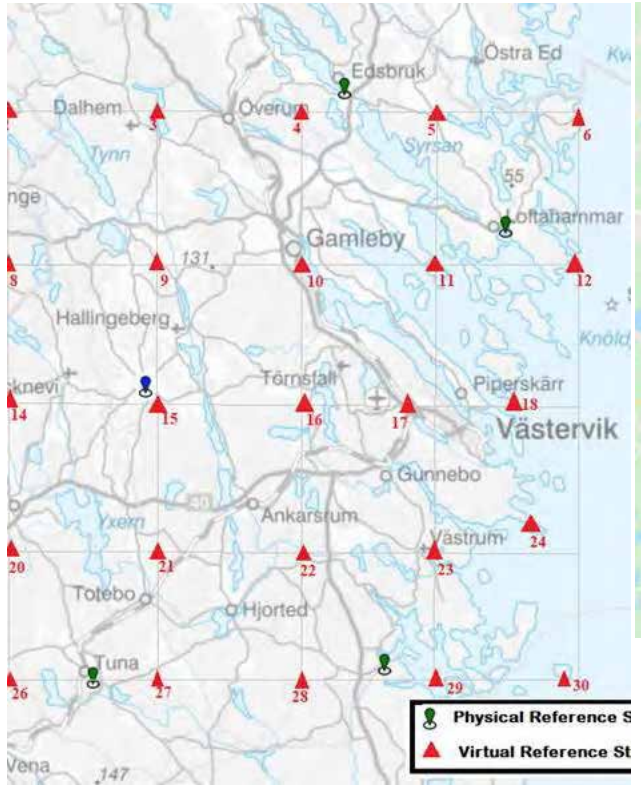
- Trimble Alloy
- Septentrio PolaRx5



- Introduced, GPS only, 2004
- GPS+Glonass, 2006
- GPS+Glonass+Galileo, februari 2018
- GPS+Glonass+Galileo+BeiDou 2021
- RTCM SC 104 & 134



Established SWEPOS nRTK + mobile IoT & UAV + UTM In the 40 x 60 km Västervik geographical UAS zone



Redundant cm positioning, navigation and communication in real Time for UAVs and other autonomous vehicles also when GNSS – GPS/ /Galileo /Glonass / Bei Dou / are not available or disrupted

Inspection of electricity production and distribution, roads, bridges, railways, telecom, constructions, dams ...



VATTENFALL



The Police need a guaranteed time and place also for crime scene documentation

UAS RÄDDNINGSTJÄNSTEN



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Polisen



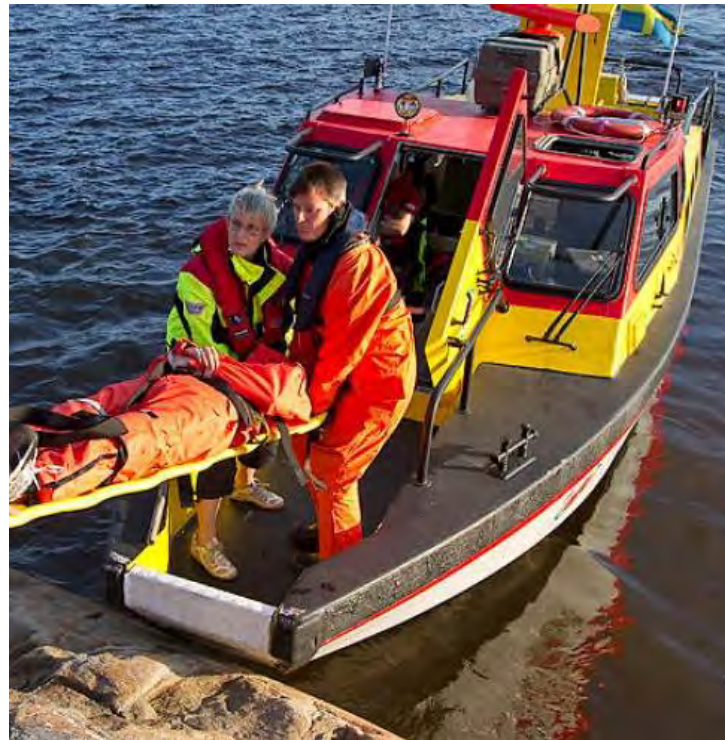
VINNOVA
Sveriges innovationsmyndighet



Västerviks Kommun



SAR – UAS - Maritime rescue assisted with UAS



The forest industry is expected to earn SEK 100 billion / year with UAVs and improved information processing - Requires unmanned navigation beyond line of sight



Precision farming, sensors and mapping require nRTK within 1 – 10 cm



Here several vehicles and sensors need to be harmonised in their operations

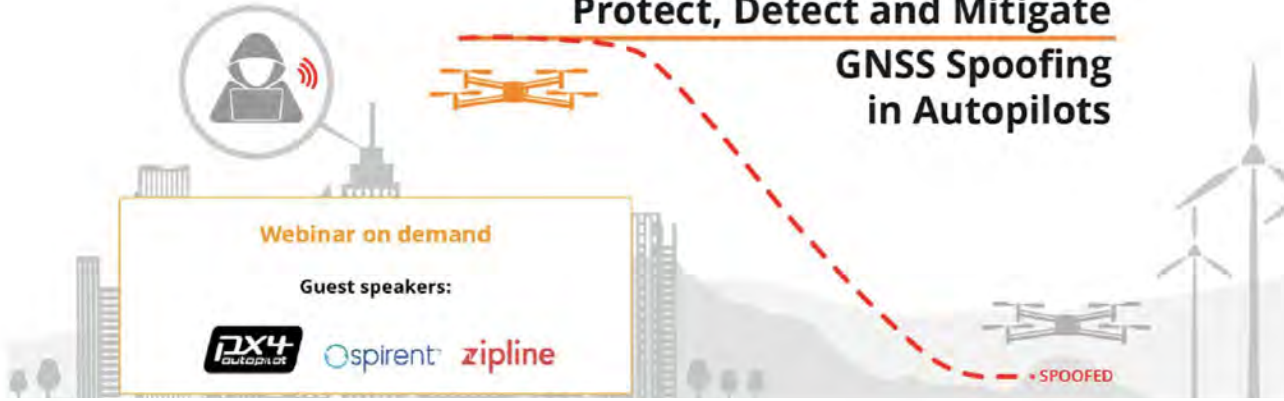


Autonomous driving machines and equipment

Autonomous UAVs with sensors



Protect, Detect and Mitigate GNSS Spoofing in Autopilots

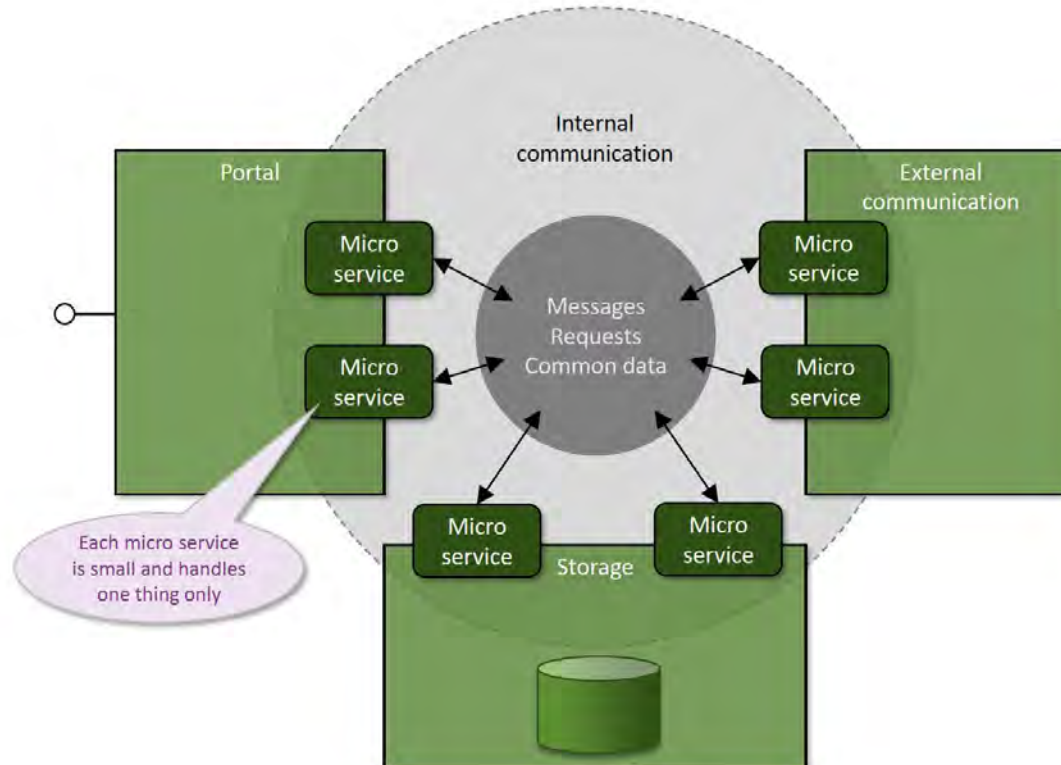


SWEPOS to Detect and Mitigate Cyber safe eID, navigation, positioning and C3

Instead of building a monolithic component the Spatmos server is broken down into a number of internal micro services, sharing well defined interfaces. This makes it easy to expand or replace parts of the system.

Micro service advantages:

- Modular
- Flexible
- Adaptable
- Scalable



Telia's industry engagement, addressing harmonized and standardized UAS solutions

- Defining technical and regulatory challenges
- Address the challenges as new improvements (standards)
- Increase stakeholders' understanding of benefits the global-standardized cellular capabilities bring for UAS & UTM
- Paving the way for innovation and proof-of-concepts of enhanced and new telco-grade features for aviation

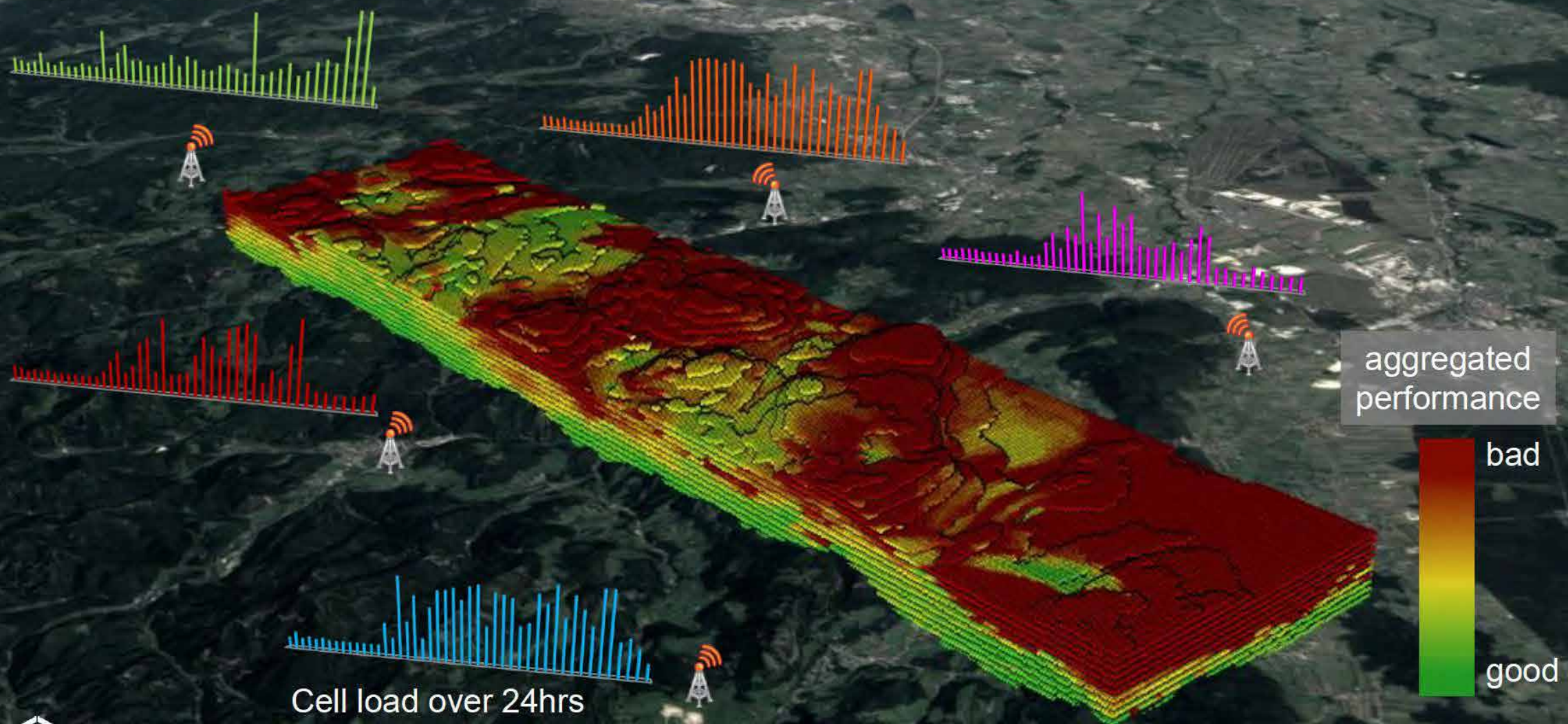
International



National



Need to understand airspace connectivity at scale





Process automation for different flight phases

Flight planning

- Connectivity data
- Ground risk data
- Automated risk assessment process
- Digital SORA

Flight clearing

- Connectivity data
- Ground risk data
- SORA validation
- Conformance monitoring

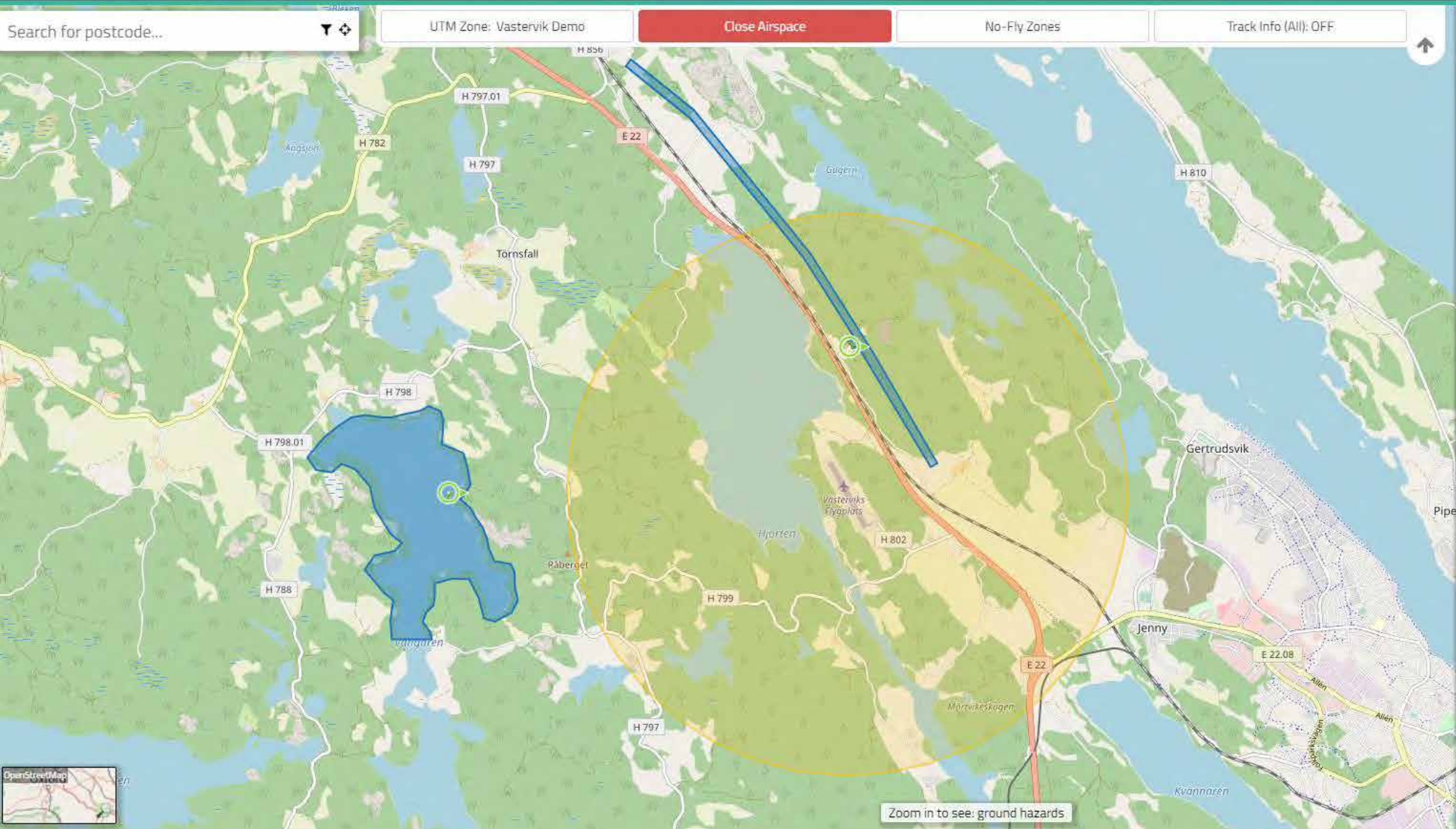
Flight operation

- Connectivity & SLA notifications
- Tactical mitigation
- Conformance monitoring, validation

Post-flight reconstruction

- Connectivity data
- Ground risk data
- Event reconstruction
- Analytics and detailed insights

Up and running Guardian UTM from Altitude Angel



Aircraft ID: SIMULATI...	
HEADING 90.00°	SPEED 0.00m/s
ALTITUDE 328ft	CLIMBING -
OPERATOR DETAILS	
George Stanford Contact Number: +44 7850 240655	
FLIGHT PLAN DETAILS	
Title: Simulated Flight 2.1: Powerline Inspection	
Description: BVLOS, x5 flights through the day assessing the powerline	
Start time: 07:30 GMT	End time: 20:30 GMT
Approved Flight Plan Id: fc9411b1-abb6-47b8-a4eb-02ad1f2441f9	
LOCATION:	
Latitude 57.79418°	Longitude 16.524467°
SOURCE: AA.Surveillance.EventHubs.Writer	
LAST UPDATED: 06:35:52	



Ministry
of Defence



ACC INNOVATION



Strategic
Partnership

Pioneering delivery of the heaviest
lift drone platform for the Royal Navy

**Congratulations to
ACC Innovation ThunderWasp
5 x 5 m 1000 kg Payload and
DronecenterSweden**

Thank you

Telia, Tre, Teracom, Ericsson
Lantmäteriverket/Swepos
T2-data, Västerviks kom.
RISE, WASP Wara PS, MSB,
Swedish Police, SOS-alarm,
SjV, Coast Gard, FOI, TrV,
Altitude Angle, DIMETOR
Vinnova, EU ECEL JU
and all other participants....

Thank you for your attention!

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