UTM Infrastructure and Connected Society

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Unmanned Aerial Vehicles in smart society

- IoT in the air, flying sensors
- Increasing ability for critical missions and emergency response
- Safety by confining high risks in dangerous occupations
- Reducing carbon dioxide emissions

IoT and Mobile Network increase safety, efficiency, business productivity, and sustainability
UTM ecosystem

- Public Safety Authorities (fire brigade, police)
- Information Service Providers. E.g. weather information services
- Mobile Network Operators & mobile services
- UAS Operators (drone services or hobby drone pilot)
- Regulators
- UAS Registration & Certification Services
- UTM Service Provider (UTMSP) (manages and operates the UTM)
- UAS Vendors
- Aviation bodies (ICAO, EASA, etc)
- Standardization bodies to ensure UTM and mobile network smooth interconnecting (APIs etc)
- UTM Systems Technologies vendors

Air Navigation Service Provider (ANSP) manages manned air traffic

General Public (Landlords) - renting space for e.g. drone charging stations

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Today UAVs are operated manually

- Pilot controls UAV manually
- UAVs are not connected to the Internet
- UAVs cannot be monitored
- UAVs cannot exchange data
- No centralized intelligence
Today mobile networks are not optimized for UAVs

- Networks are deployed for ground-level coverage
- Limited coverage and mobility in the sky
Targets for mobile network design to enable connected Unmanned Aerial Vehicles (UAV)

- Mobile networks reconfigured to support connectivity for UAVs and users on the ground.
- UAVs can be controlled and monitored with UAV Traffic Management (UTM).
- Significant improvements in applications and data transfer from UAVs.
Nokia Multi Access Edge Computing (MEC) enables UAV Traffic Management (UTM) and more

Low latency communications between UAVs and infrastructure

Nokia Multi Access Edge Computing
- Vehicle to anything (V2X) communication
- Low latency communication
- Data analytics platform
- Video analytics algorithms

UAV Traffic Management
- Fleet management
- Automated UAV missions
- 3D navigation
- Collision avoidance
UTM Architecture based on Multi Access Edge Computing (MEC)

Mobile LTE/Cellular Network

- LTE Mobile Base Stations
- LTE / Cellular Network
- UTM modem LTE + proprietary C2
- Pilot app LTE + proprietary C2
- Generic Internet access + proprietary C2
- Authorities Web- or app-based via generic Internet access

Clouds

- UTM Cloud(s)
- Service Provider Cloud(s)
- UAS Vendor A Cloud
- UAS Vendor Z Cloud
- Map services

NOTE: central operator cloud not shown
Connecting society: Internet of Drones is the future