3GPP SA WG1 Meeting #95e
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Additional capabilities of mobile networks for drone operations and management

China Mobile

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Motivation

- 5G mobile networks are well suited to support low-altitude drone communication and to be integrated with drone traffic management systems, in order to enhance the safety and security of drone operations.

- In some industrial UAV scenarios, high precision positioning service and other new functions and capabilities of 5G can be applied to UAV flight management and application.

- There have already been some topics focusing on the support of UAV application in 3GPP,for example, TS 23.256: Support of Unmanned Aerial Systems (UAS); connectivity, identification and tracking; TS 23.255: Application layer support for Unmanned Aerial System (UAS); Functional architecture and information flows.

- However, there has not proposed any requirements related to additional capabilities of mobile networks for drone operations and management as listed below.

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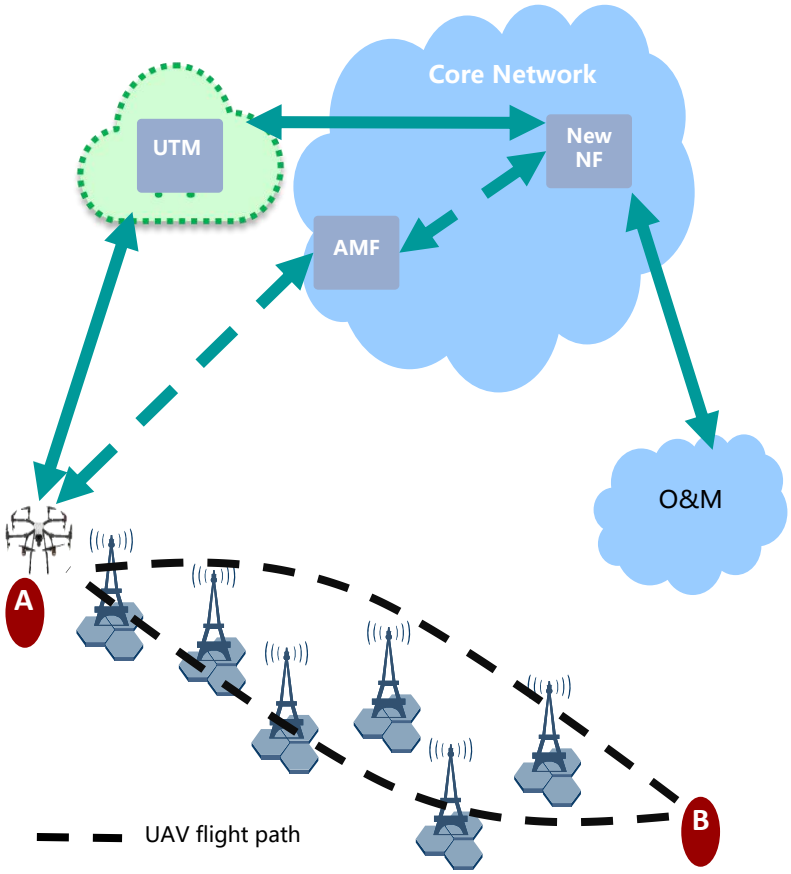
Example Use Cases

- - There has already defined the parameter ' flightPathInfoReport' in TS 36.331 that will be reported by UAV to eNB. Mobile network can utilize these location information resource to optimize the UAV fight path scheduling based on UAV tracking. The analysis for UAV trajectory can be predicted by the 5GS via aggregating and analysing different types of data in 5GS.
- - 5G network can provide wide-area, high-quality and secure connectivity that can enable cost-efficient drone operations beyond visual line-of-sight (BVLOS) range. A mechanism is needed to determine whether the UAV can access the network to execute the flight mission, or if already accessed, to continue the flight operation, according to the network capacity and load condition on the flight path.
- - UAV service monitoring in mobile network needs further discussion, especially while the flight path change, or the handover occurrences during the long-distance flight, or QoS guarantee on UAV flight path to ensure service quality.
- - Compared with the traditional mechanism of Detect and Avoid (DAA) between UAVs, DAA between networked UAVs can also be realized by mobile network, e.g., collision warning may be notified by the 5GS.



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Gap analysis

Existing works
TS 23.256: Support of Uncrewed Aerial Systems (UAS); connectivity, identification and tracking
TS 23.255: Application layer support for Unmanned Aerial System (UAS); Functional architecture and information flows

Scope for Rel-19

- - Network architecture level requirements on facilitating UAV flight efficiency, such as optimize UAV flight control and management logical architecture;
- - UAV location management related requirements that needs more precise positioning than currently defined in RAN or Core Network solution;
- - UAV flight management requirement related to the network capacity and load/QoS condition on the flight path;
- - Service optimization related requirements to achieve better UAV flight control and service experience;
- - Requirements about Detect and Avoid (DAA) between networked and non-networked UAVs by mobile network;
- - Identify potential new service requirements to achieve efficient interaction between UAS/UTM and 5G system;

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Thank you

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