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**Fence of unmanned aircraft system
(English Translation)**

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Table of Contents

- Foreword
- 1 Scope
- 2 Normative references
- 3 Terms, definitions and abbreviations
 - 3.1 Terms and definitions
- 4 Description of drone fence model
 - 4.1 UAV fence model
 - 4.2 Classification and configuration of drone fences
 - 4.3 Effective time of drone fence
- 5 Metadata data structure of drone fence model
 - 5.1 Data type
 - 5.2 Data structure description of drone fence metadata
- 6 Performance requirements for UAV systems and UAV cloud systems
 - 6.1 UAV system requirements
 - 6.2 UAV cloud system requirements
 - 6.3 Trigger conditions for drone fence
- 7 UAV fence test
 - 7.1 UAV system test
 - 7.2 UAV cloud system test

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed by the Flight Standards Department of the Civil Aviation Administration of China.

This standard is under the jurisdiction of the China Academy of Civil Aviation Science and Technology.

The organization responsible for drafting this standard. China Civil Aviation Science and Technology Research Institute.

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Limited company.

1 Scope

This standard specifies the scope, configuration, data structure, performance requirements and test requirements of UAV fences.

This standard is applicable to UAV fences in UAV systems and UAV cloud systems.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

3.1 Terms and definitions

The terms defined in AC-91-FS-2015-31 and the following terms apply to this document.

3.1.1

In order to ensure the safety of the area, the area boundary shall be drawn in the corresponding geographic area with an electronic information model. In the UAV system or UAV cloud system in the system, the software and hardware systems that use electronic information models to prevent drones from flying in or out of specific areas.

3.1.2

Online authorization Before the drone takes off, the authorization of the drone is completed through data update, network authentication and other methods.

3.1.3

Location-Based Service Obtain the location information (geographical coordinates or geodetic coordinates) of mobile terminal users through the cellular radio communication network of the telecommunications mobile operator.

4.1 UAV fence model

The UAV fence model uses a 4-dimensional space structure. As shown in Figure 1, it includes.

4.2.1 Classification of UAV fences

UAV fence configurations can be divided into the following three types according to their projection geometry on the horizontal plane.

- Restricted surface of civil airport obstacles;
- Sector shape;
- Polygon.

The longitude and latitude coordinate points used by the drone fence are all WGS-84 coordinates.

4.2.2 Typical configuration of obstacle restriction surface protection area of civil airport

The obstacle restriction surface of the civil airport is shown as the solid line in Figure 2, and the obstacle restriction surface protection area of the civil airport is shown as the dashed line in Figure 2. Civil airport barrier the obstacle limit surface protection zone is A1-A2-C2-arc C2B2-B2-B2-B3-arc B3C3-C3-A3-A4-C4-arc C4B4-B4-B1-arc B1C1-C1-A1 in Figure 2 the coordinates of each point and the arc connection range; the arc radius is 7 070 m. The solid line in Figure 2 is the vertical projection of the obstacle restriction surface of the civil airport.

The space between the dotted line and the solid line is the tolerance buffer zone, and the technical parameters of the buffer zone should meet the requirements announced by the air traffic control department.

Figure 2 Schematic diagram of the obstacle restriction surface protection area and boundary points of the civil airport

4.2.3 Space geometric configuration of polygonal drone fence

The spatial geometric configuration of the polygonal drone fence is composed of cubes composed of bottom and top surfaces at different altitudes. The schematic diagram is shown in Figure 3.

Show. A surface of the spatial geometric configuration is a closed space area composed of N space points on the same plane, and the space points start from true north.

Name them clockwise on the horizontal surface. The vertex sequence is clockwise. The number of vertices constituting the top surface and the bottom surface is equal.

4.2.4 Space geometric configuration of sector-shaped UAV fence

4.2.4.1

The spatial geometric configuration of the sector-shaped UAV fence is composed of a cube composed of sector-shaped bottom and top surfaces at different altitudes.

The schematic diagram is shown in Figure 4. The sector surface of a space consists of the sector origin, sector radius, and sector start and end azimuth (sector opening) on the same plane.

The real direction of the beginning and the real direction of the sector end) constitute a closed space area.

4.2.4.2

The origin of the sector is defined by the latitude and longitude of the geographic point.

4.2.4.3

The radius of the sector is centered at the origin of the sector, and the distance unit is meters.

4.2.4.4

The start and end direction of a sector is the true direction of the beginning and end of the sector.

4.2.4.5

The sector height is the relative height range that is prohibited from entering the area.

Note: m1~m5 are the vertex numbers of the top surface of the fence;

4.3 Effective time of drone fence

The time used by the drone fence is UTC time. The effective time of the drone fence refers to the prohibition of drones from flying in the space the time period (including the start time and end time), the effective time can be multiple time periods. Each drone fence has a valid time.

5.1.2 Data Types of Obstacle Restriction Area Protected Areas at Civil Airports

The typical configuration data type of the civil airport obstacle restriction surface protection area is represented by A, and its data structure is shown in Table 2.

5.1.3 Polygon data type description

The polygon data type is represented by P, and its data structure is shown in Table 3.