



ato

AIR TRAFFIC ORGANIZATION

# Federal Aviation Administration Aeronautical Information Management Mission Support Services

ICAO Electronic Terrain and  
Obstacle Data

Amendments 33 & 36

# **Amendment 33 to ICAO Annex 15, Chapter 10**

**Published July 2004, ICAO Annex 15  
(Aeronautical Information Services) added  
a new Chapter 10 introducing Standard and  
Recommended Practices (SARPS) for the  
provision of electronic Terrain and  
Obstacle Data (eTOD)**



# ***Electronic terrain and obstacle data may be used in the following air navigation applications***

- ***Ground proximity warning system with forward looking terrain avoidance function and Minimum Safe Altitude Warning (MSAW) system;***
- ***Determination of contingency procedures for use in the event of an emergency during a missed approach or take-off;***
- ***Aircraft operating limitations analysis;***
- ***Instrument procedure design (including circling procedure);***
- ***Determination of en-route “drift-down” procedure and en-route emergency landing location;***
- ***Advanced Surface Movement Guidance and Control System (A-SMGCS); and***
- ***Aeronautical chart production and on-board databases.***
- ***In addition, the data may also be used in flight simulator and synthetic vision systems, and may assist in the height restriction or removal of obstacles that pose a hazard to aviation.***



# Amendment 33 to ICAO Annex 15, Chapter 10

Technical Requirements  
“Standards”



# Area 1 Obstacles & Terrain Entire Territory of a State

- **Post Spacing (terrain) – 3 arc seconds (approx 90 meters)**
- **Vertical Accuracy – 30 meters**
- **Vertical Resolution – 1 meter**
- **Horizontal Accuracy – 50 meters**
- **Confidence Level – 90%**
- **Data Classification-routine**
- **Integrity Level –  $1 \times 10^{-3}$**
- **Maintenance Period – as required**

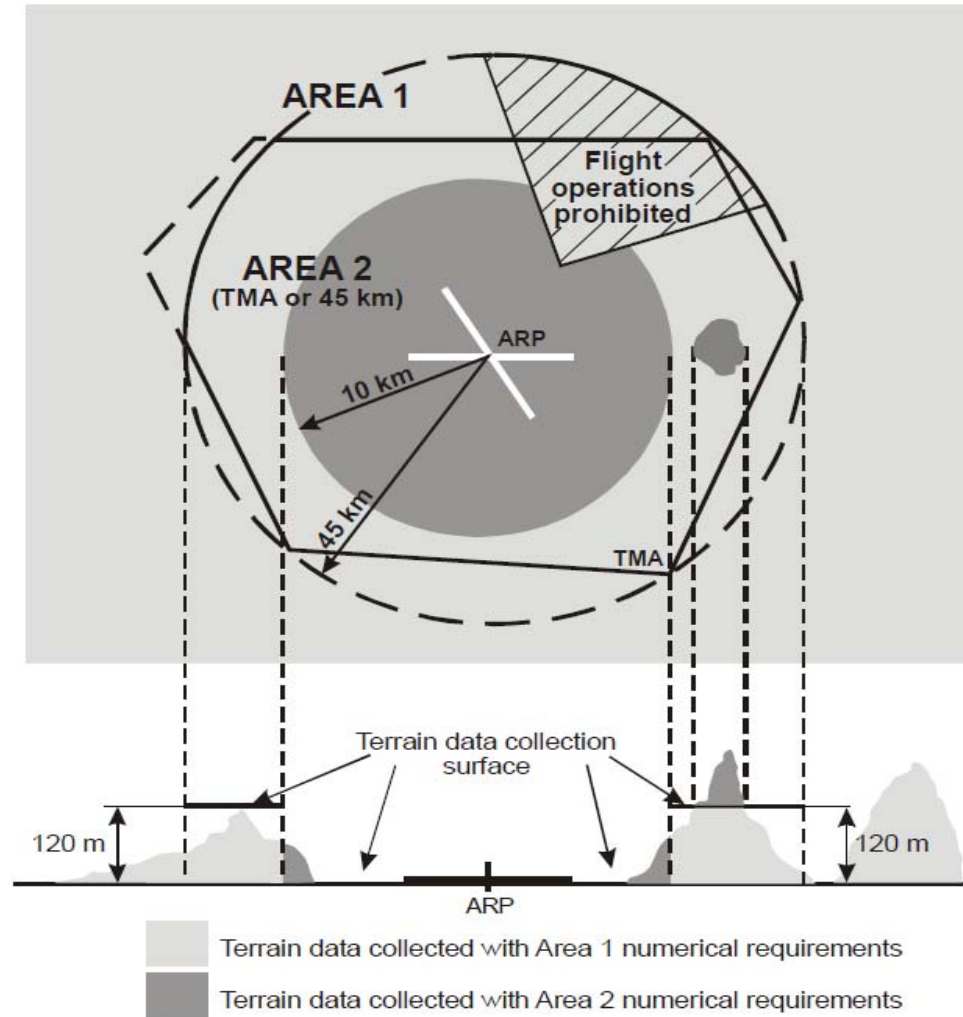


# Area 2 Obstacles & Terrain Terminal Control Area

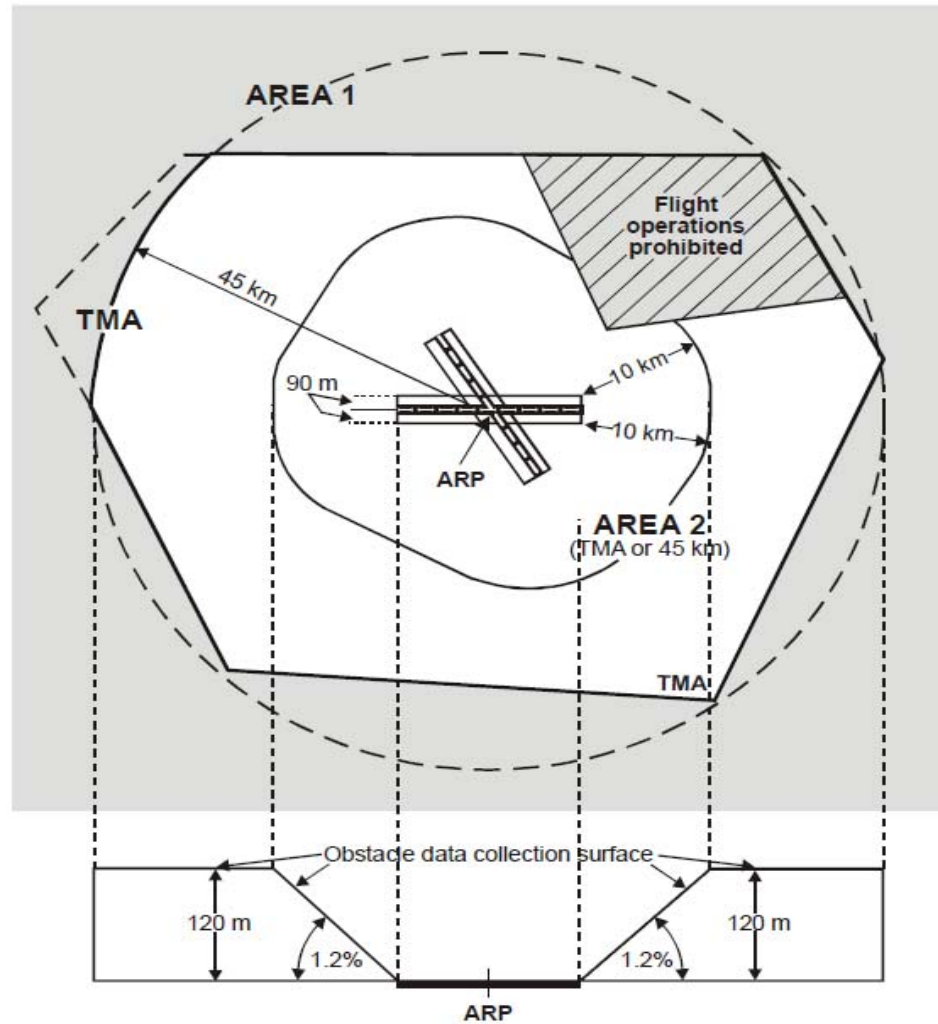
- **Post Spacing (terrain) – 1 arc second (approx 30 meters)**
- **Vertical Accuracy – 3 meters**
- **Vertical Resolution – 0.1 meter**
- **Horizontal Accuracy – 5 meters**
- **Confidence Level – 90%**
- **Data Classification-essential**
- **Integrity Level –  $1 \times 10^{-5}$**
- **Maintenance Period – as required**



# Areas 1 & 2 Terrain



# Areas 1 & 2 Obstacles

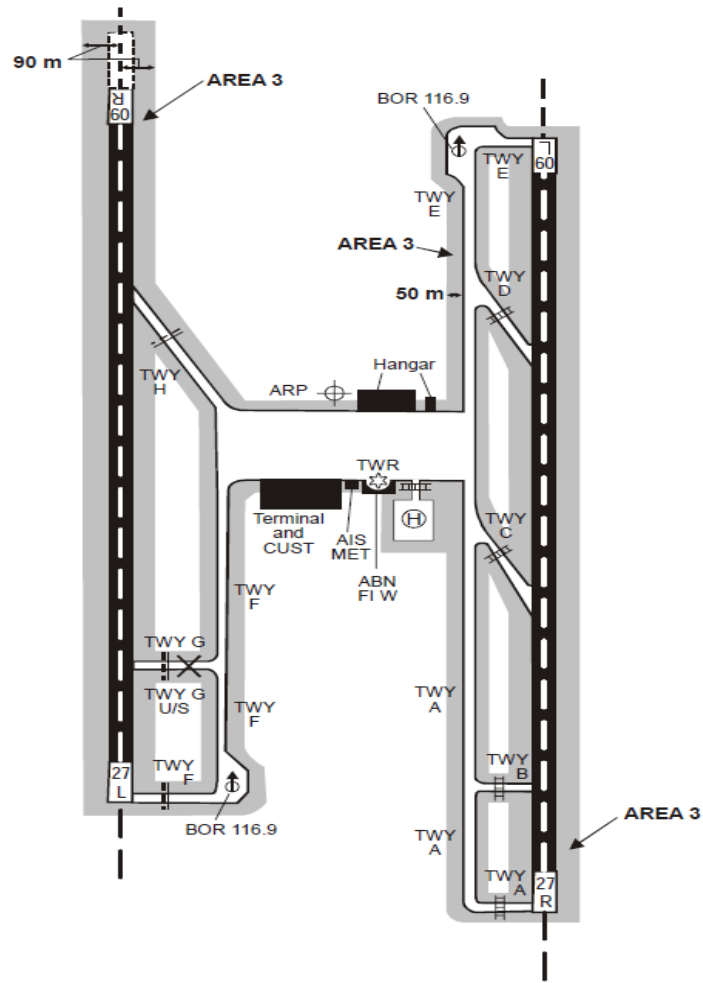


# Area 3 Aerodrome/Heliport Area Obstacles & Terrain

- **Post Spacing (terrain) – 0.6 arc second (approx 20 meters)**
- **Vertical Accuracy – 0.5 meters**
- **Vertical Resolution – 0.01 meter**
- **Horizontal Accuracy – 0.5 meter**
- **Confidence Level – 90%**
- **Data Classification-essential**
- **Integrity Level –  $1 \times 10^{-5}$**
- **Maintenance Period – as required**



# Area 3 Aerodrome/Heliport Area

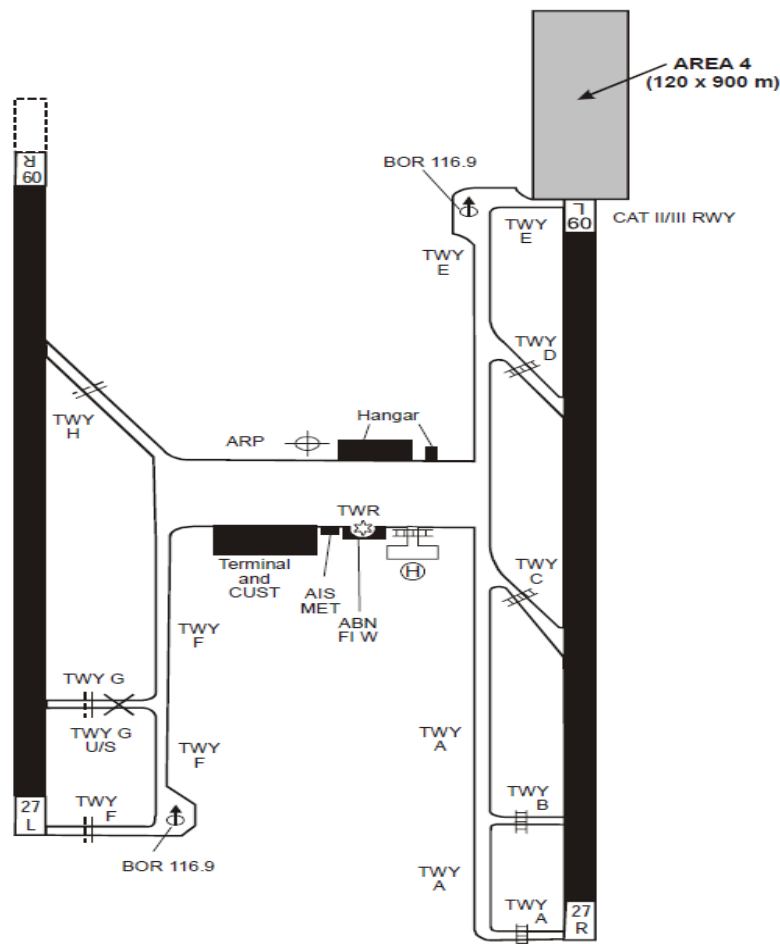


# Area 4 Category II or III Operations Area Terrain Only

- **Post Spacing – 0.3 arc second (approx 9 meters)**
- **Vertical Accuracy – 1.0 meter**
- **Vertical Resolution – 0.1 meter**
- **Horizontal Accuracy – 2.5 meter**
- **Confidence Level – 90%**
- **Data Classification-essential**
- **Integrity Level –  $1 \times 10^{-5}$**
- **Maintenance Period – as required**



# Area 4 Category II or III Operations Area



# Amendment 33

## To ICAO Annex 15, Chapter 10

Administrative  
Requirements



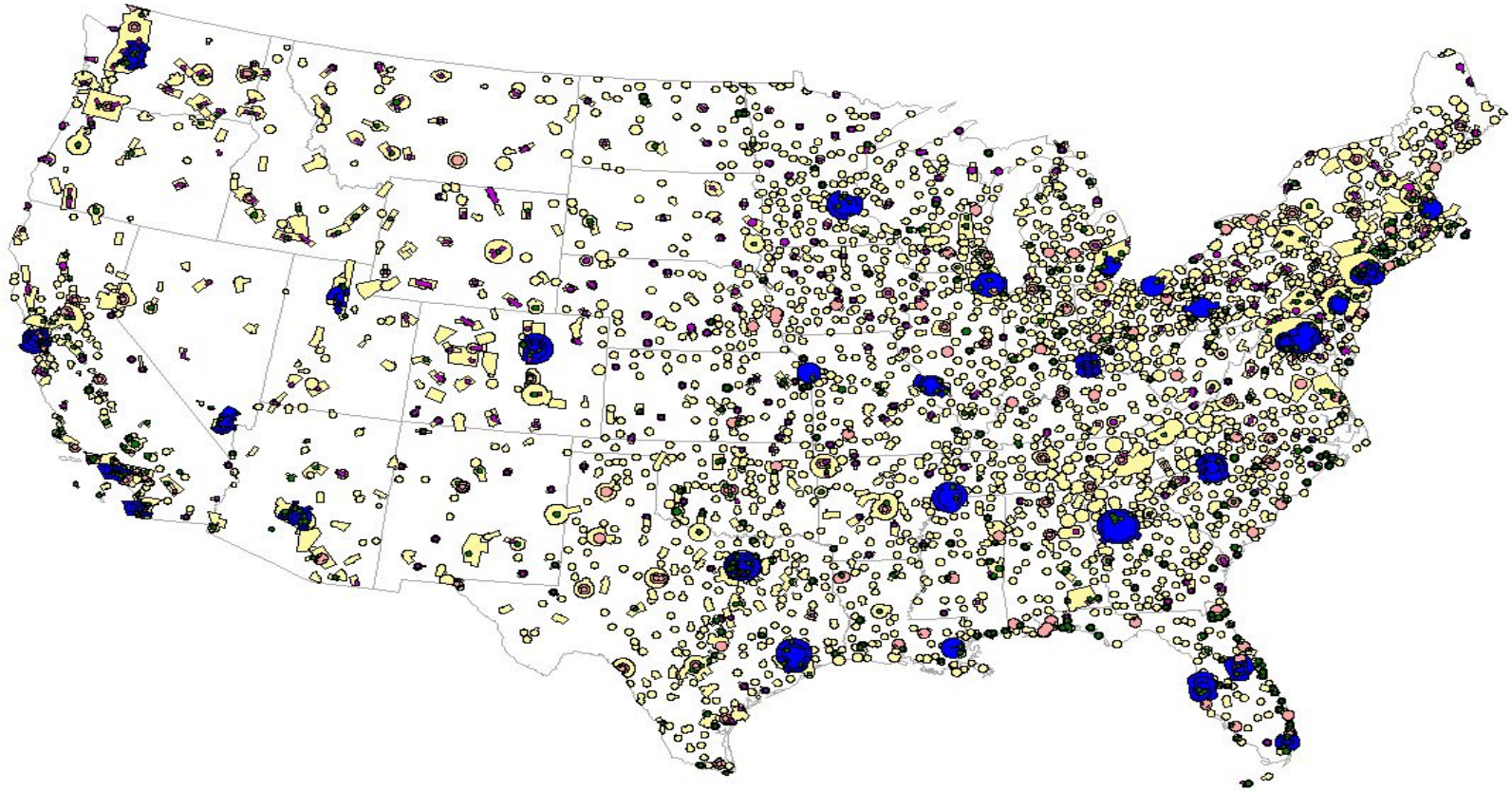
# Where?

## “All IFR Aerodromes”

10.2.2 Area 1 shall cover the entire territory of a State, including aerodromes/heliports. Area 2 shall be the terminal control area as published in a State's aeronautical information publication (AIP) or limited to a 45-km radius from the aerodrome/heliport reference point (whichever is smaller). At IFR aerodromes/heliports where a terminal control area has not been established, Area 2 shall be the area within a 45-km radius of the aerodrome/heliport reference point.



# Terminal Airspace Aerodromes



# When?

10.6.1.1 States shall ensure that as of 20 November 2008, electronic terrain and obstacle data are made available in accordance with Area 1 specifications and terrain data in accordance with Area 4 specifications.

10.6.1.2 States shall ensure that as of 18 November 2010, electronic terrain and obstacle data are made available in accordance with Area 2 and Area 3 specifications.



# Discussion

**Since their introduction in 2004, the eTOD requirements sparked discussion world wide. Major themes include data collection and processing costs, liability issues, cross border harmonization, and cost recovery. There was also discussion as to are requirements even necessary? These issues discussed by the ICAO Air Navigation Commission and significant changes to the Standard and Recommended Practices (SARPs) have occurred reflected in publication of Annex 15, Amendment 36.**



# Amendment 36

## To ICAO Annex 15, Chapter 10

Technical Changes  
“Standards verse Recommendations”



# Area 4 Change Obstacle data now required

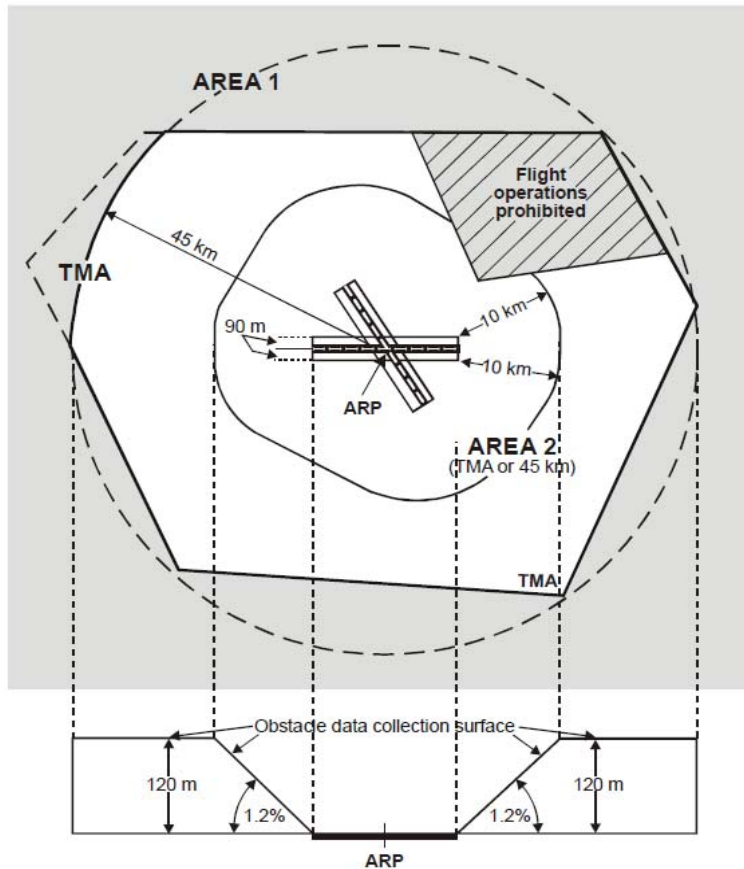
- **Vertical Accuracy – 1.0 meter**
- **Vertical Resolution – 0.1 meter**
- **Horizontal Accuracy – 2.5 meter**
- **Confidence Level – 90%**
- **Data Classification-essential**
- **Integrity Level –  $1 \times 10^{-5}$**
- **Maintenance Period – as required**



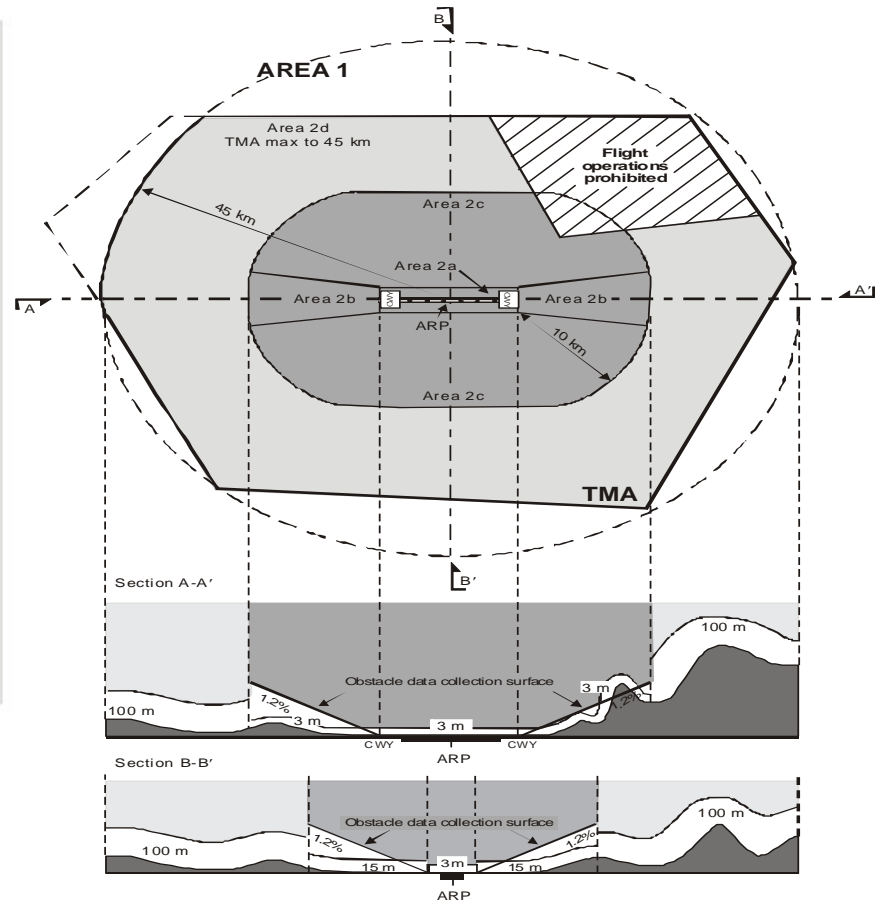
# Area 2 Obstacles Change

## Divided into 4 sub areas

OLD

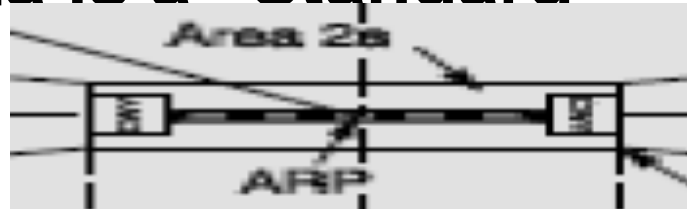


NEW



# Area 2 Obstacles Change

- Only Area 2a is a “Standard”



- Areas 2b, 2c, & 2d become “Recommendations”
- Penetrations of the take-off flight path area obstacle identifications (Annex 4, 3.8.2.1) and aerodrome obstacle limitation surfaces (Annex 14, Volume 1, Chapter 4)

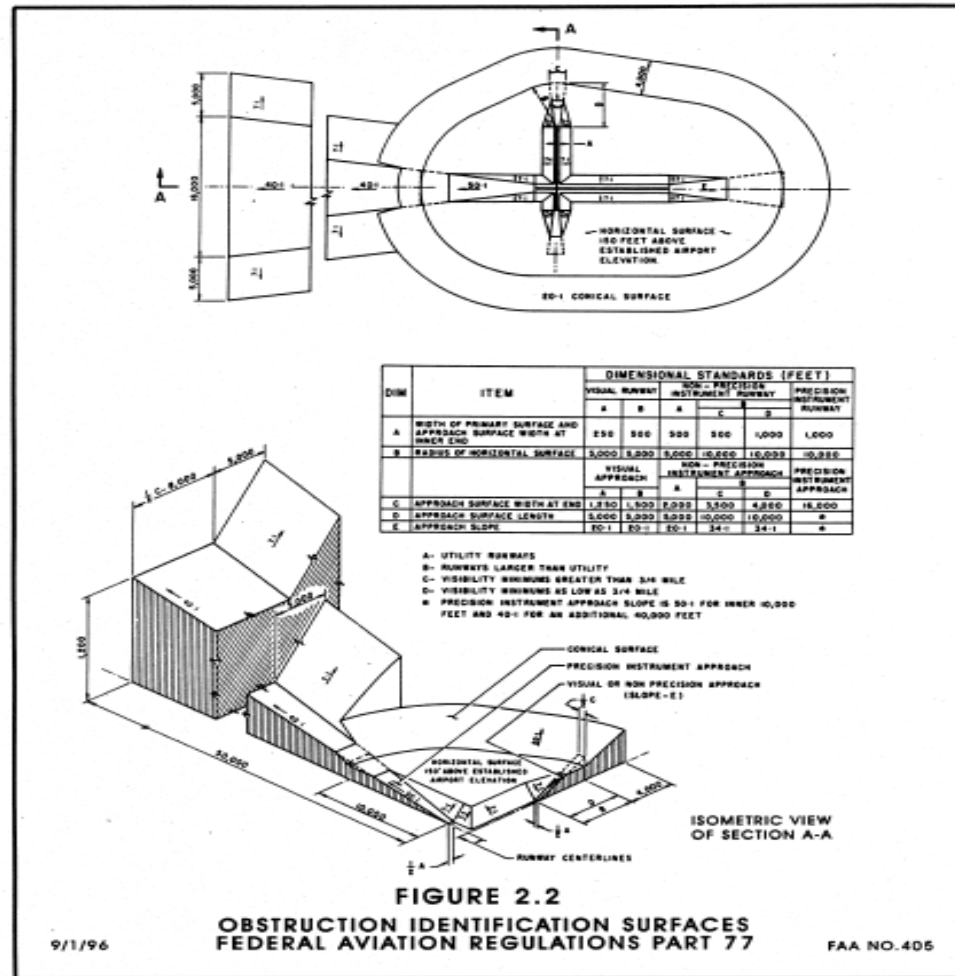




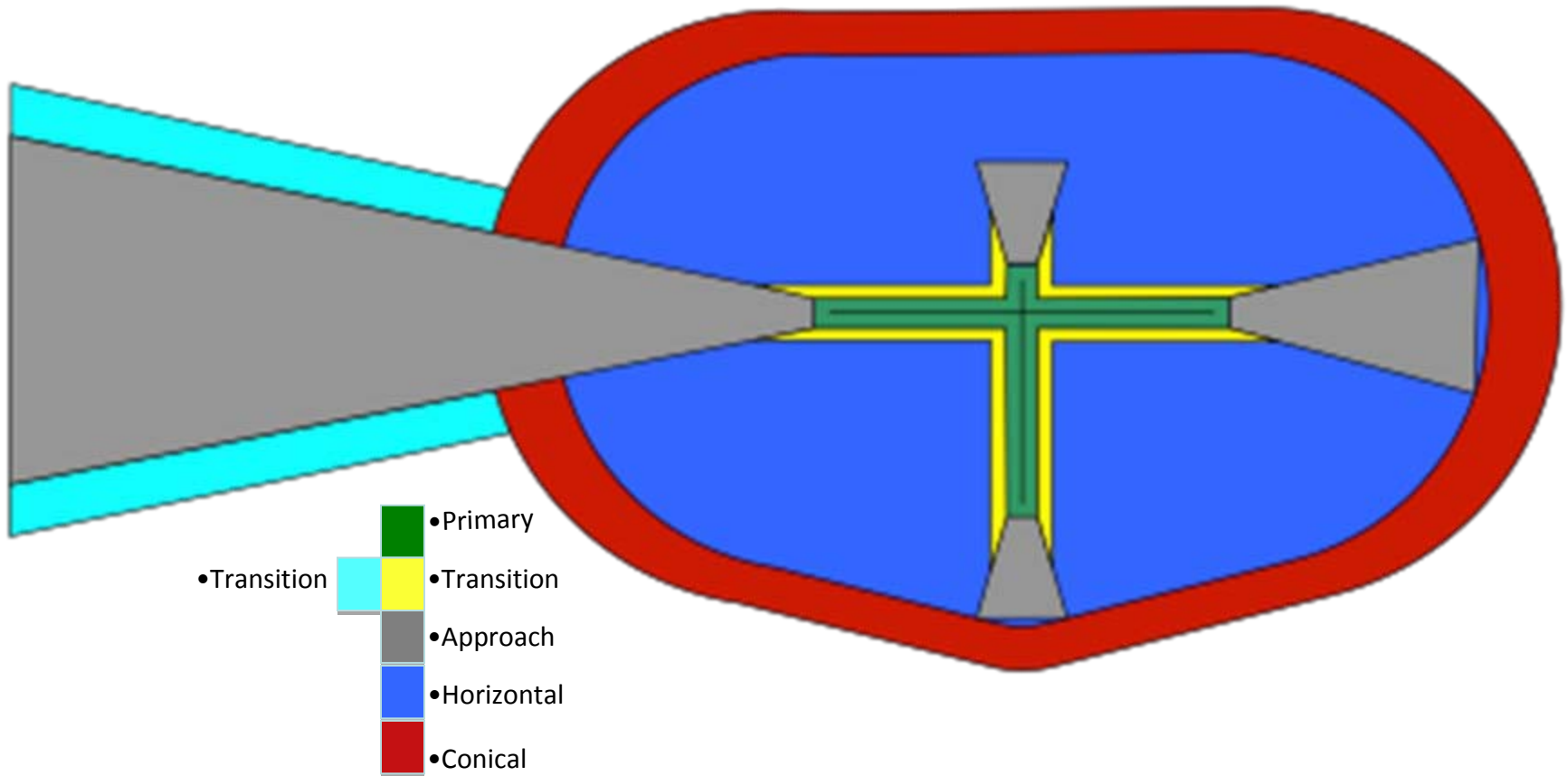


# Code of Federal Regulations (CFR)

## Part 77

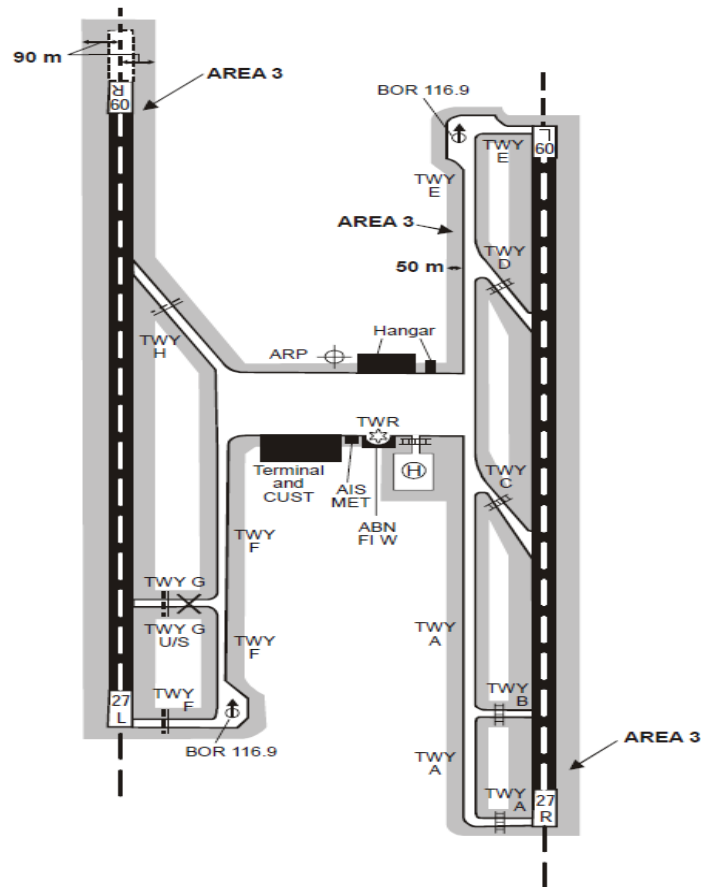


# CFR Part 77 Surfaces

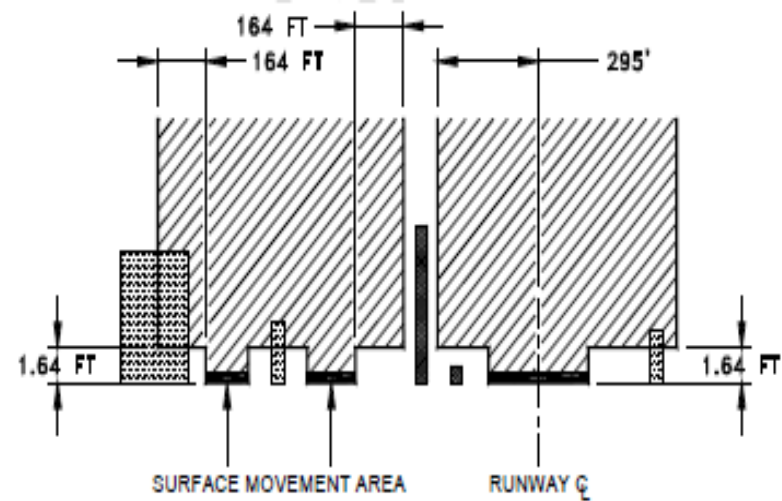
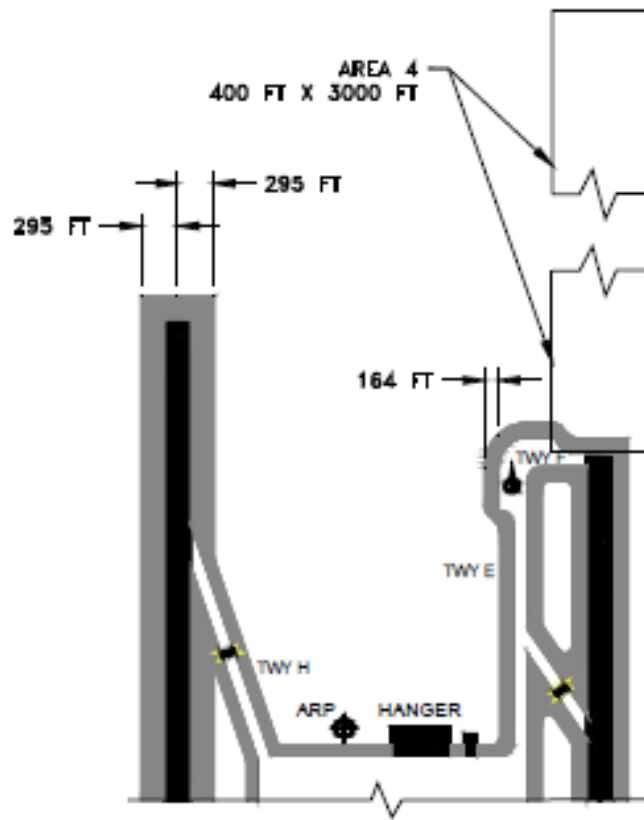


# Area 3 Change



Area 3 becomes a “Recommendation”



# FAA Advisory Circular 150/5300-18B



## LEGEND:

-  VERTICAL OBJECTS TO CAPTURE
-  VERTICAL OBJECTS NOT TO CAPTURE



# Amendment 36 To ICAO Annex 15, Chapter 10

Administrative  
Requirement Changes



# Where?

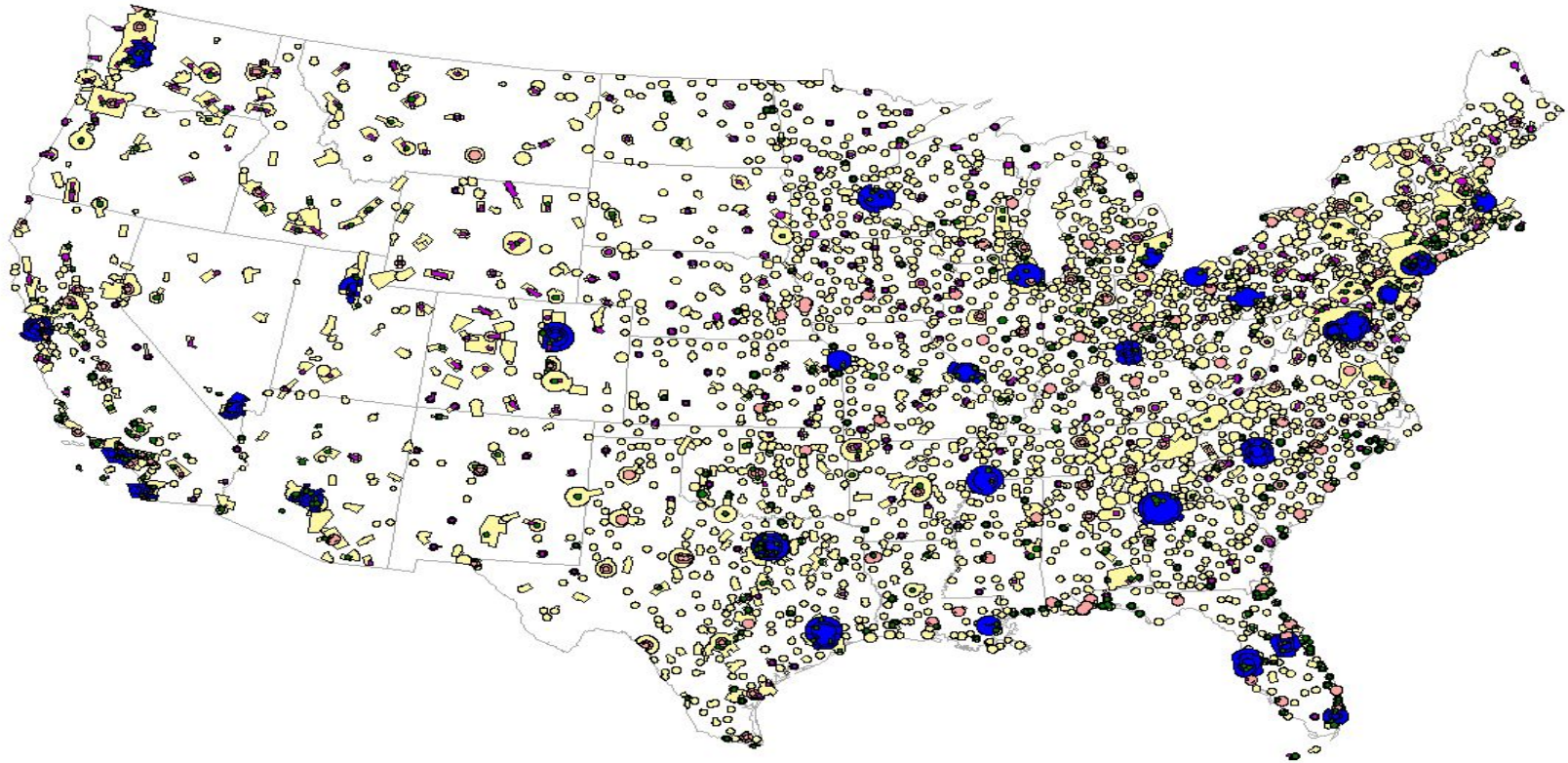
**“Aerodromes regularly used by international civil aviation”**

**US Customs airports are defined as:**

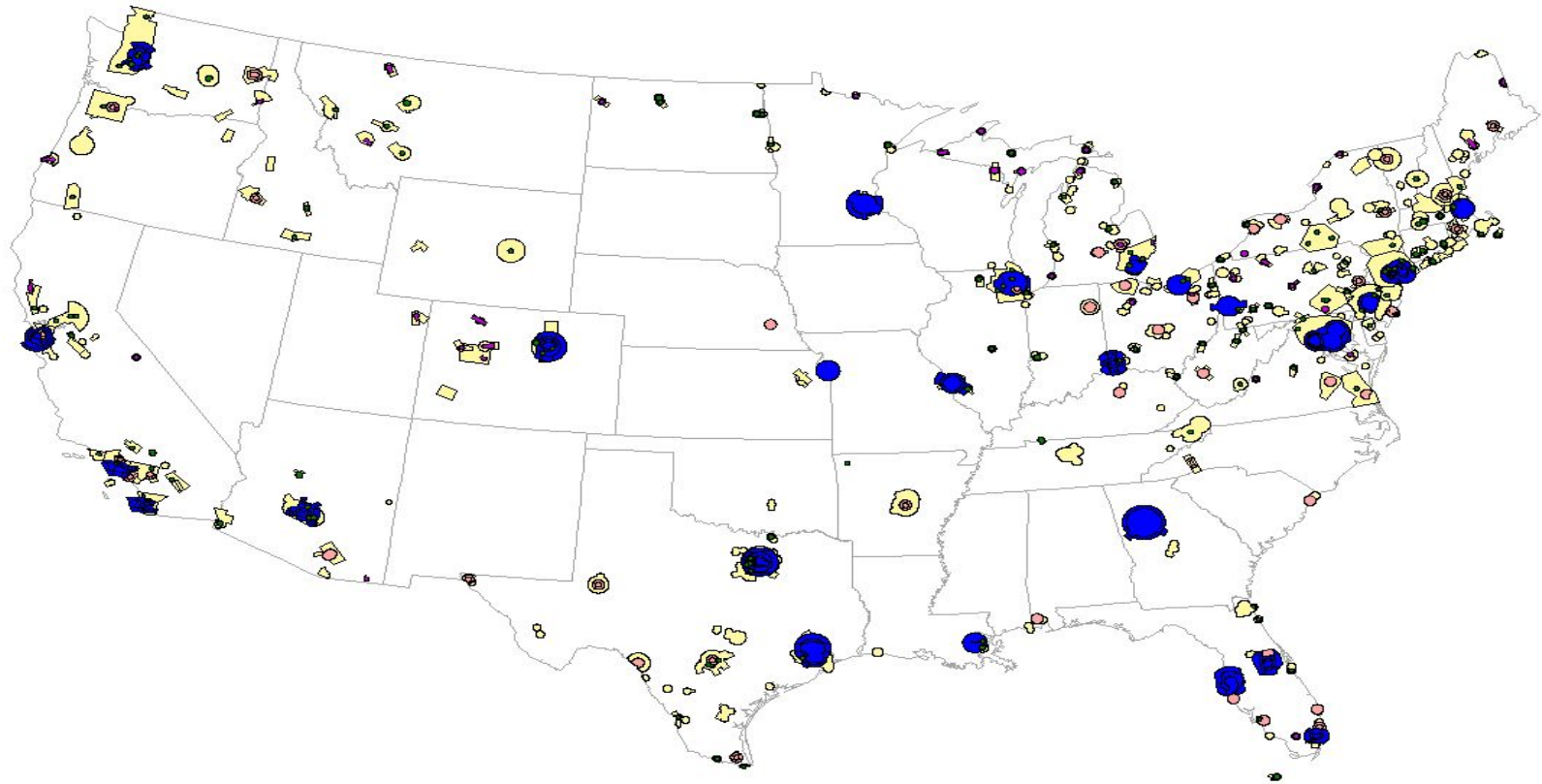
- **Airport of Entry (AOE)**
- **Landing Rights Authority (LRA)**
- **Fee for service (FEE)**



# OLD (Amendment 33) IFR Terminal Airspace



# NEW (Amendment 36) Customs Airspace



# When?

**November 18, 2010**

**except**

**Area 2a November 12, 2015**



# Thank You

