

# Challenges with obstacle data for manned and unmanned aviation

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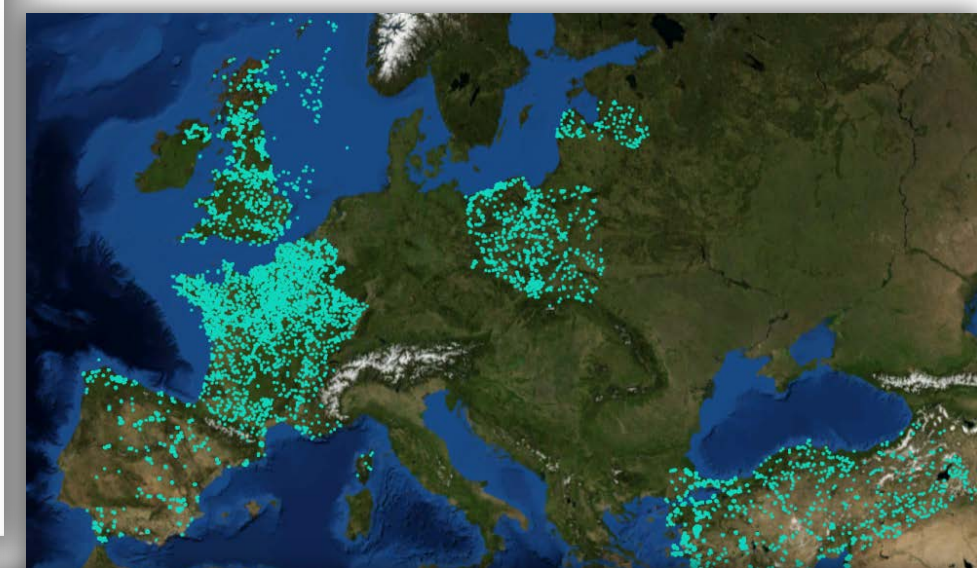
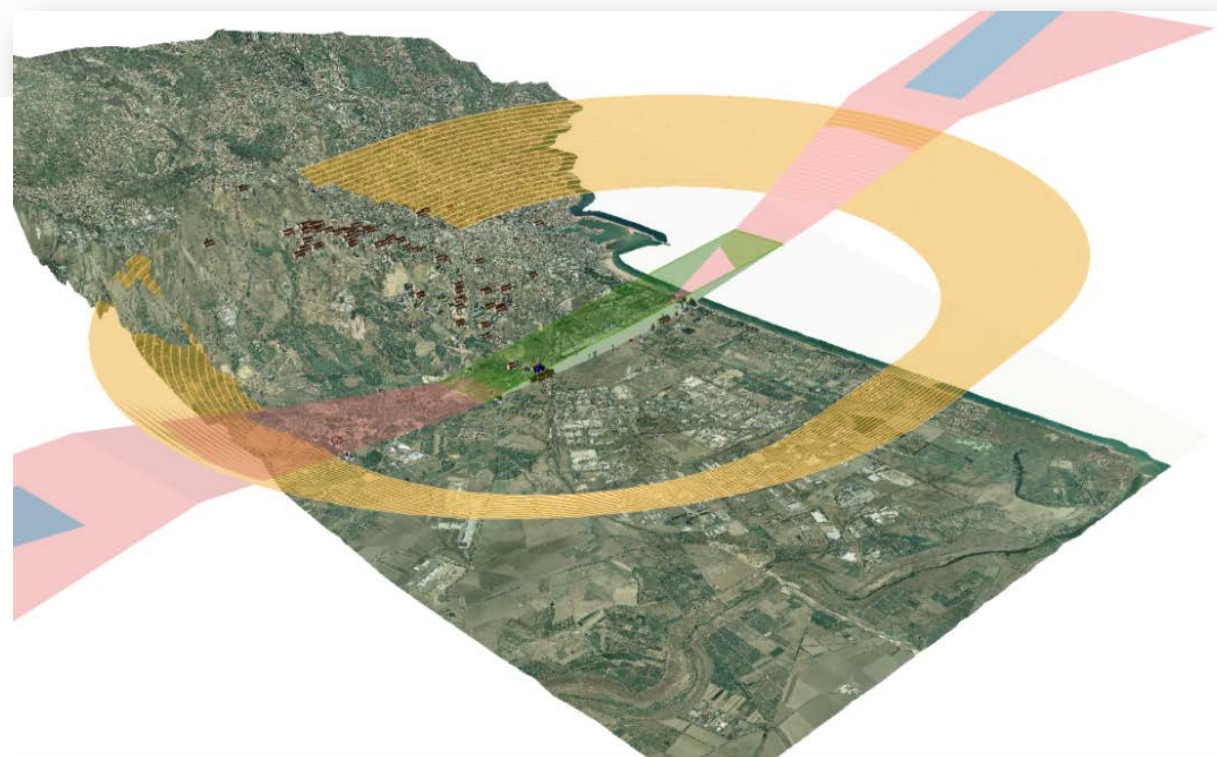
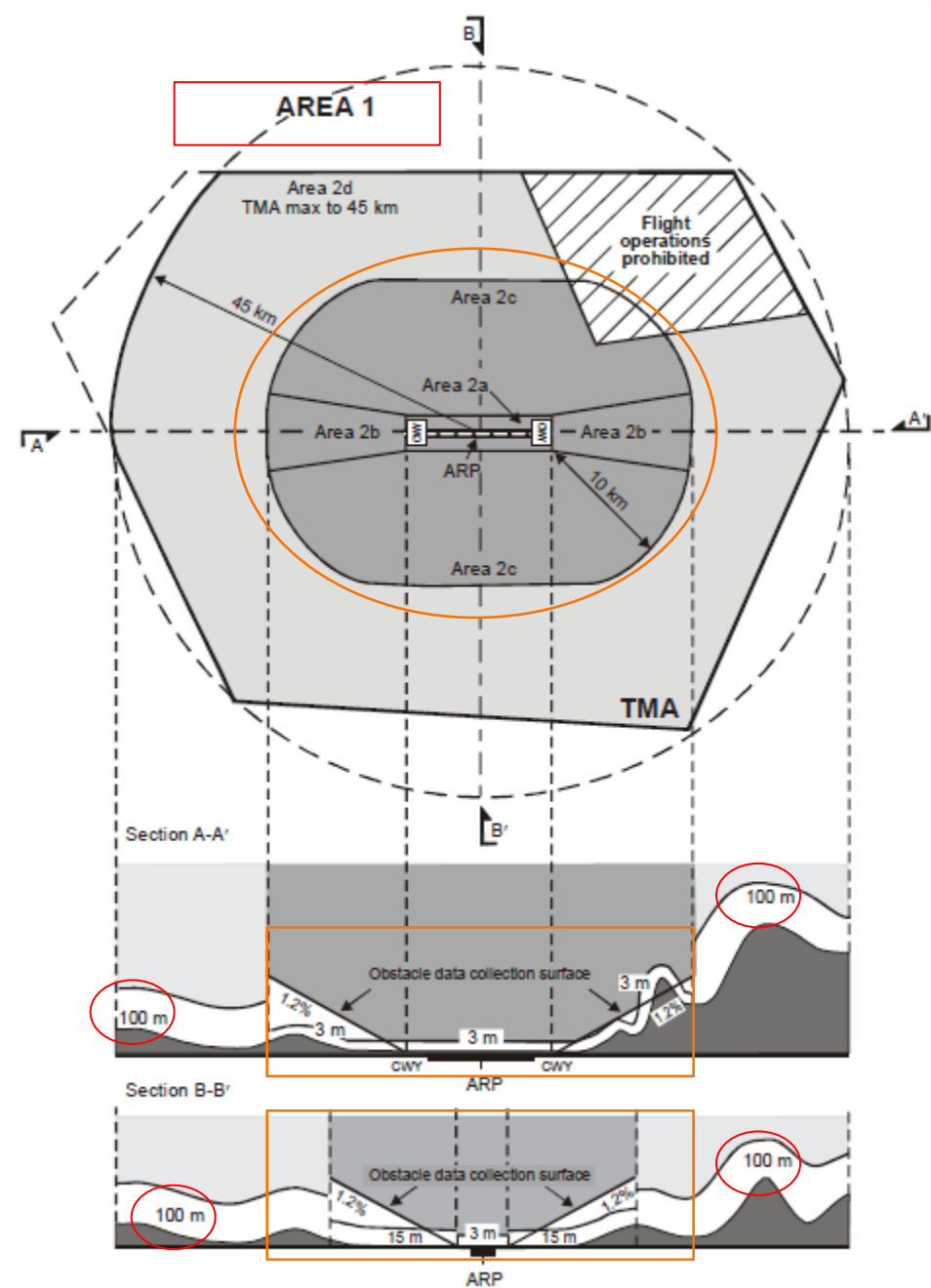
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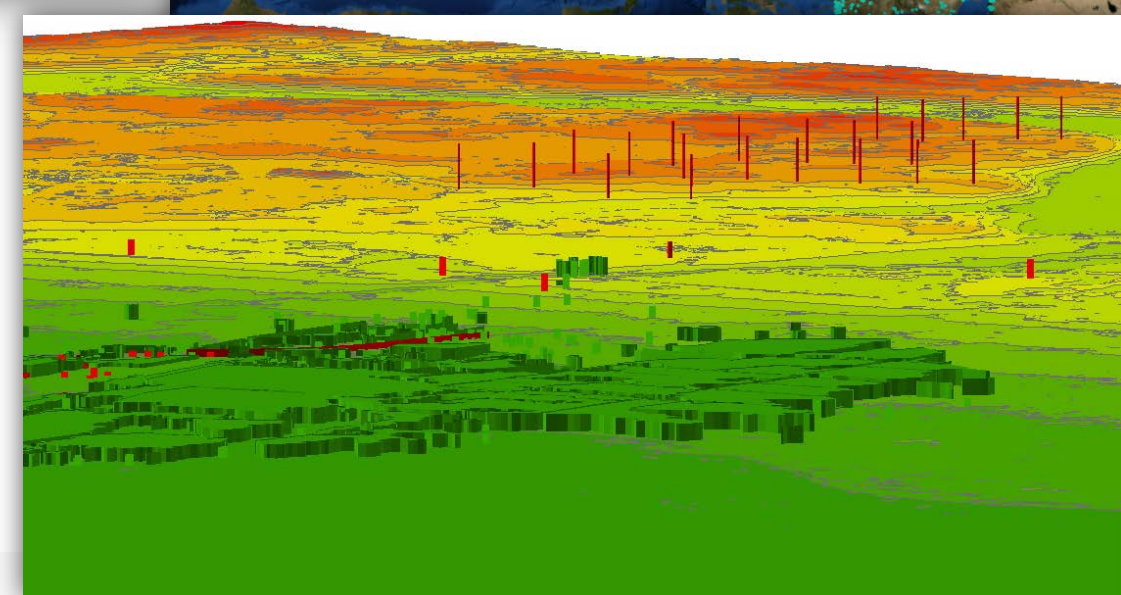




# Obstacle data requirements

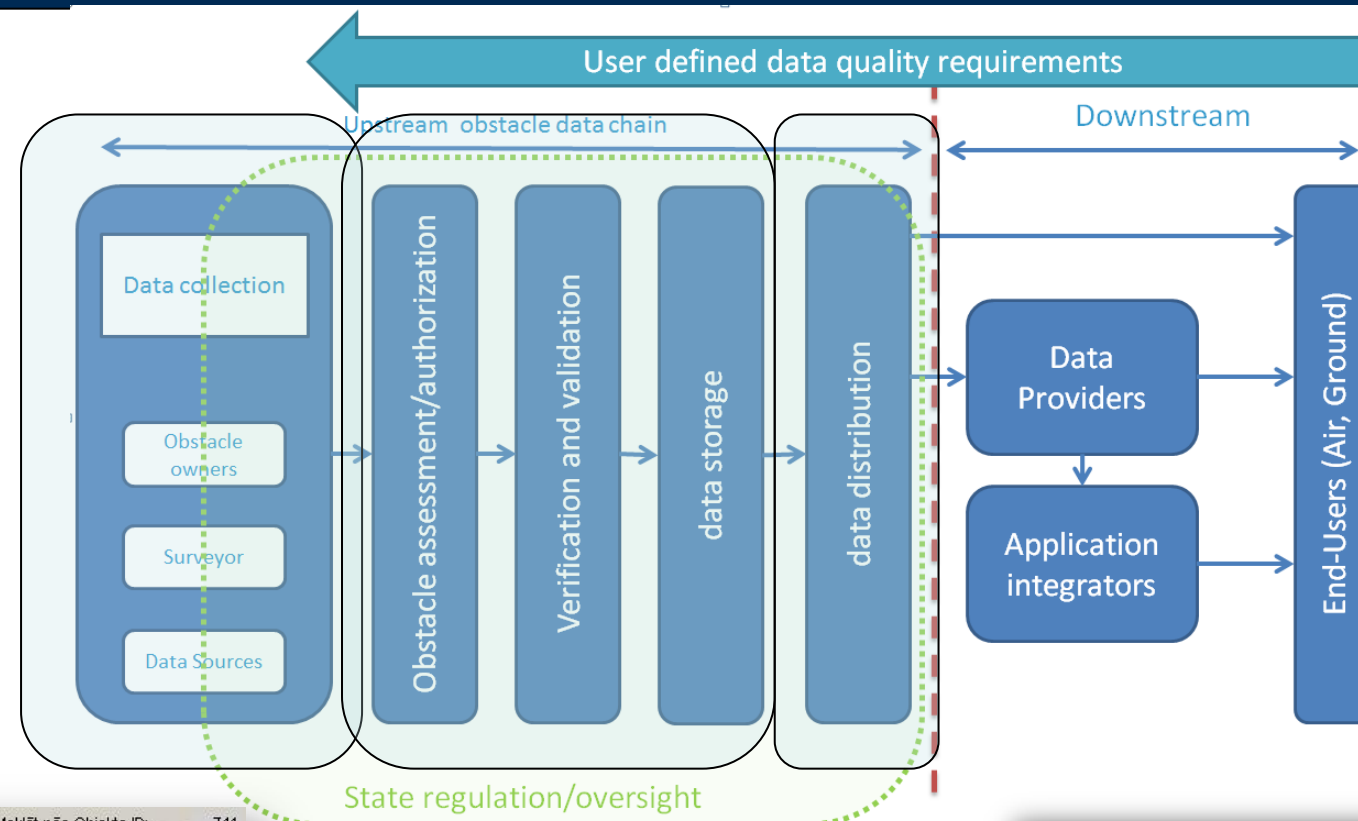


	Area 1	Area 2
Vertical accuracy	30 m	3 m
Vertical resolution	1 m	0.1 m
Horizontal accuracy	50 m	5 m
Confidence level	90%	90%
Integrity classification	routine	essential
Maintenance period	as required	as required





# Obstacle data collection



VO4443003 Ape

4443-APE  
Kartes lapas nomenklatura

1. Objekta tips	Tornis	
2. Objekta funkcionālā nozīme	Mobilu sakaru nodrošināšana	
3. Objekta nosaukums	Lācupu radiotornis	
4. Rajons	Alūksnes	
5. Pagasts / Pilsēta	Jaunlaicenes pagasts	
6. Objekta konstrukcijas kopējais augstums (m)	103	
7. Kombinētā objekta sastāvdaļu augstumi (m)	7.1. Pamatobjekts (m) 101 7.2. Papildkonstrukcija (m) 2	
8. Objekta augstuma noteikšanas metode un laiks:	Ģeometriski, ar datorteorodolitu Sokkia SET5 E 2004.g.	
9. Reljefa augstums virs Baltijas jūras līmeņa (m)	190	
10. Objekta + reljefa augstums virs Baltijas jūras līmeņa (m)	293	
11. Reljefa augstuma noteikšanas metode un laiks:	Pēc PSRS topogrāfiskās kartes M 1:10000 1963.g. izd. 03-053-027-2-4-1	
12. Objekta koordinātas:		
LKS 92 TM	X (B)	Y (L)
UTM WGS 84	382791	671922

TKS-93 nos.: Ape

TKS-93: 4443 Pases Nr.: 3

Objekta ID: VO4443003

Objekta tips: Sakaru tornis

Tips: Masts

Funkcija: Sakaru

Objekta nos.: Lācupu radiotornis

AIP nos.: JAUNLAICENE

Administratīvi teritoriālās vienība:

Vieta: Alūksnes rajons, Jaunlaicenes pagasts

Adm. ter.: Alūksnes rajons: Jaunlaicenes pagasts

Iela:

Objekta augstums (m)

Obj. Kopējais: 103

Papildkonstr.: 2

Reljefa.: 190

Noteikšanas metode

Objektam: Ģeodēzisk

Reljefam: No kartes

Administratīvi teritoriālās vienība:

Vieta: Alūksnes rajons, Jaunlaicenes pagasts

Adm. ter.: Alūksnes rajons: Jaunlaicenes pagasts

Iela:

Objekta koordinātas

X (B)

Y (L)

LKS-92 (TM)

UTM

Ģeogrāfiskās

Noteikšanas metode: Ģeodēziskā

Būv. un ekspl. gads: 2004

Ipašnieks: LMT

SIA "LMT"

Papildinf:

Datu kvalitāte

Drukāt pasi

Ievades laiks: 7/5/2006 0:23 AM Sastādītājs: VZD VIDZEME

Izmaiņu laiks: 1/31/2011 12:25 PM Pases izveides datums: 2/20/2004



Funkcionalitātes status

Funkcionējošs

Obj. materiāls

Metāls (>=75%)

Signālgutuns eksistence

Ir

Marķējuma eksistence

Ir

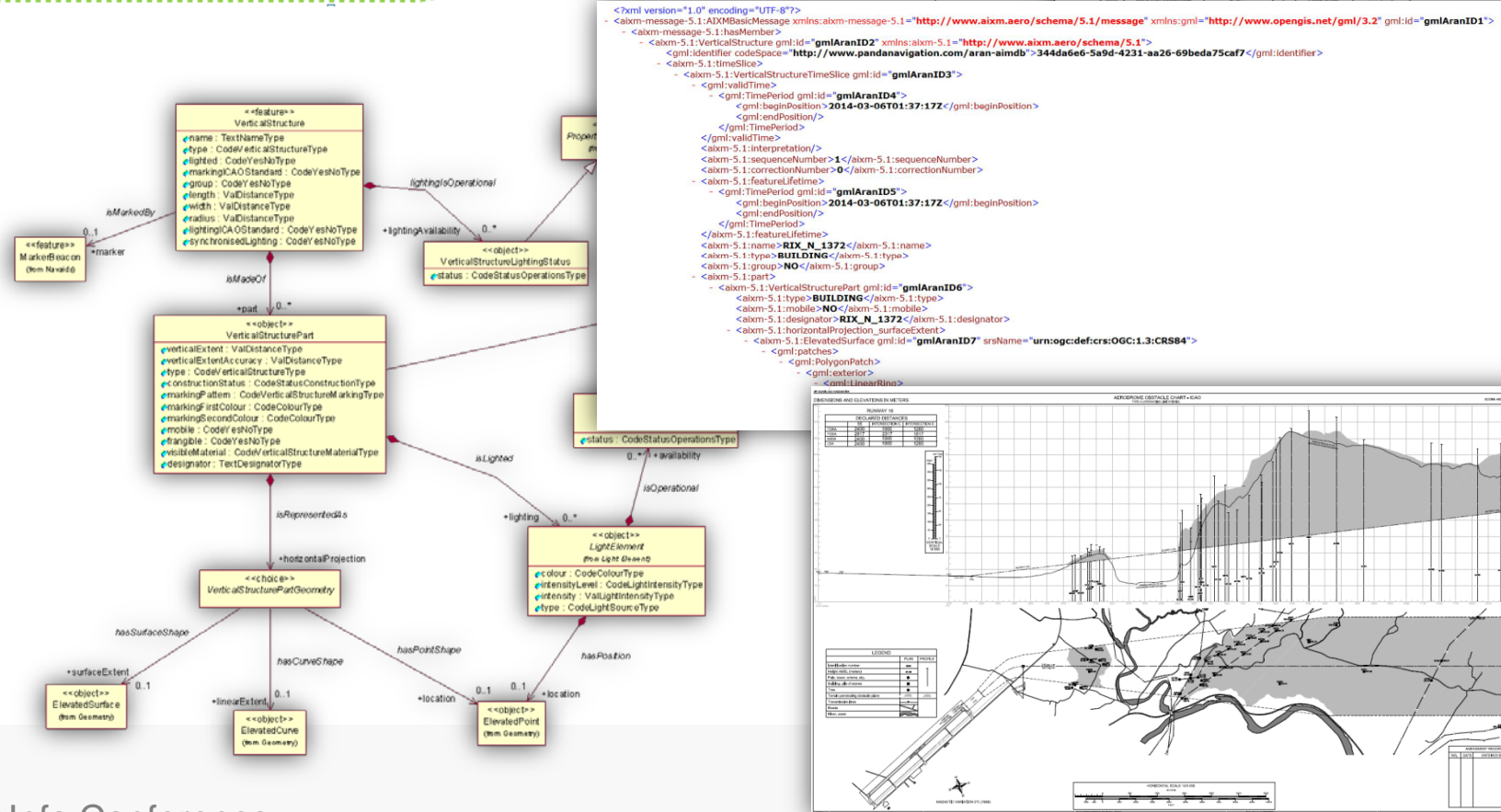
Kontroles status

Datums:

Izveidotājs:

Lēmums:

Piezīmes:





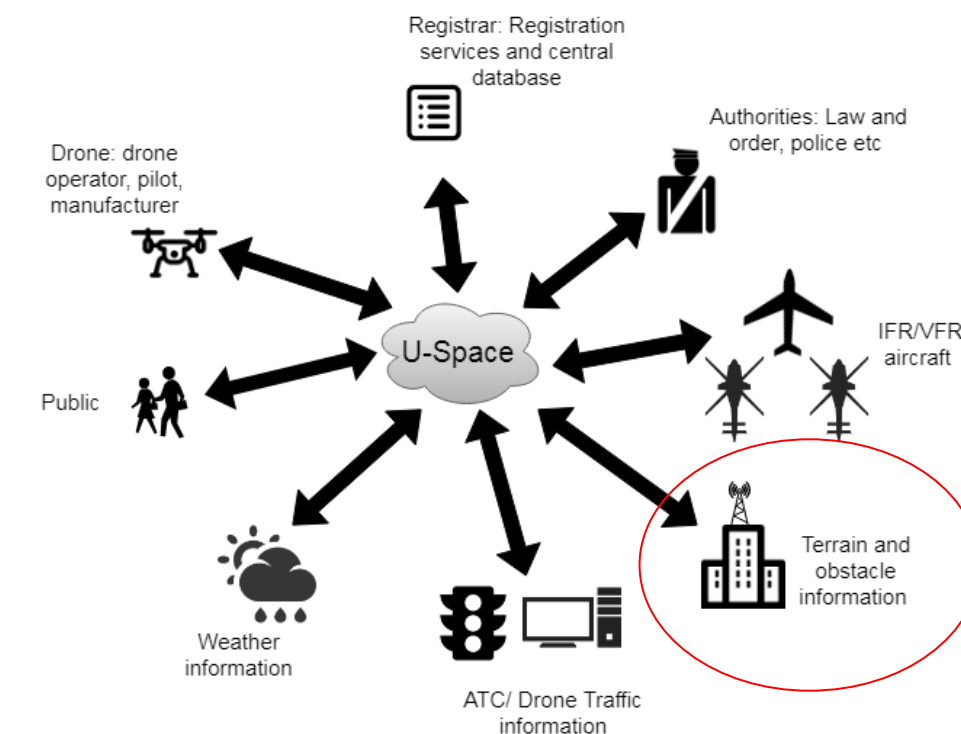
# Challenges for novel applications

- Helicopters
  - Missions closer to ground and obstacles
  - Higher accuracy is required v7m h16m
  - Lower collection surfaces 60m
- Drones and Personal Air Vehicles



# Drones and Personal Air Vehicles

- High-density drone traffic below 500ft
  - Urban environment operations (above and between buildings)
  - High density of static and dynamic obstacles in BVLOS\*
- U-Space
  - Unmanned Traffic Management system for Europe
  - Developed to integrate drones safely into the airspace
  - Requirement: Terrain and obstacle information
- Terrain and obstacle information
  - Needed for static and dynamic geofencing
    - 1 m accuracy (both vertical and horizontal)
    - confidence level of 95 percent
  - Challenge: How do we geofence a construction crane?
    - Tactical geofencing
    - Obstacle information needs to be timely



\*BVLOS – beyond visual line of sight



# Looking for solutions

- Accurate digital geometrical data on the man-made structures (obstacle)
    - Potentially 3D in populated areas
  - From authoritative sources (liability)
  - Regularly updated
  - Avoiding current cumbersome process for obstacle data collection
- 
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