Topic 1: Overview of EO requirements for drone flight planning and safety assessment

European Commission

EUSPA
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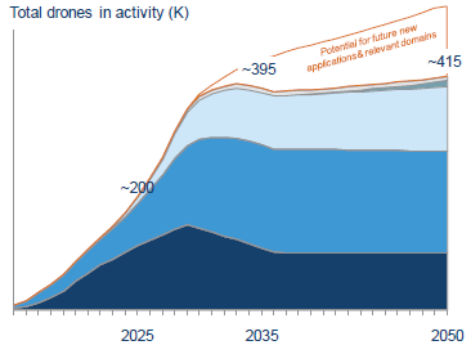
The importance of the drone market

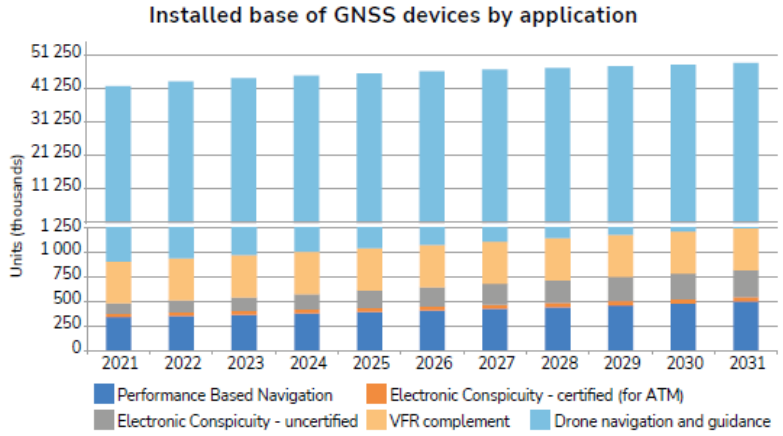
Drone Outlook Study



Split between 'certified' and other, primarily 'specific', drones under EASA framework

	2035		2050	
	Specific	Certified	Specific	Certified
Others - tethered	--	~5	--	~5
Unmanned aviation	--	<1	--	~10
Long endurance surveying	--	<1	--	<1
BVLOS with light load[1]	~95	--	~115	--
BVLOS surveying[2]	~185	--	~180	--
Localized VLOS surveying[3]	~110	--	~100	--
Total	**~390**	**~5**	**~400**	**~15**
excl. tethered	*~390*	*~1*	*~400*	*~10*

Market Report



Regulatory framework

Specific category – myriads of use cases

Aerial photography	Data collection
Shipping and delivery	Traffic monitoring
Geographic mapping	Medical transportation
Disaster management	Disease control
Surveillance	Filming
Precision agriculture	Terrain modelling
Search and Rescue	Insurance
Weather Forecast	Sports
Law enforcement	Wildlife monitoring
Infrastructure inspection	Repair and maintenance

Enabling specific category operations

- Specific Operations Risk Assessment (SORA) – applicable to EASA specific category drones

- Objectives:
  - Third parties on the ground
  - Third parties in the air
  - Critical infrastructure

- Risks to consider:
  - Of the operational environment
  - Of the geographical area
  - To the overflown population

- Opportunity for EO data to provide necessary insight

UAS dimensions *(known)*

Type of operation *(known)*

Intrinsic UAS Ground Risk Class				
Max UAS characteristics dimension	1 m / approx. 3ft	3 m / approx. 10ft	8 m / approx. 25ft	>8 m / approx. 25ft
Typical kinetic energy expected	*< 700 J (approx. 529 Ft Lb)*	*< 34 KJ (approx. 25000 Ft Lb)*	*< 1084 KJ (approx. 800000 Ft Lb)*	*> 1084 KJ (approx. 800000 Ft Lb)*
Operational scenarios				
VLOS over controlled area, located inside a sparsely populated environment	1	2	3	5
BVLOS over sparsely populated environment (over-flown areas uniformly inhabited)	2	3	4	6
VLOS over controlled area, located inside a populated environment	3	4	6	8
VLOS over populated environment	4	5	7	9
BVLOS over controlled area, located inside a populated environment	5	6	8	10
BVLOS over populated environment	6	7	9	11
VLOS over gathering of people	7			
BVLOS over gathering of people	8			

Population overflow *(manual process)*

iGRC

How is it done today?

Limitations

Manual assessment

- Authorities do not receive consistent formats
- Manual review of SORA
- Authorities expected to be “data experts”
- Lengthy process

Time Certainty

- Operations are planned for a specific date and the approval needs to be granted beforehand

Subjective

- Operators performing assessments with non-defined steps
- Varying sources of data with no data-quality guarantees
- Approval dependent on reviewer’s view (uncertainty)

Merits of quantitative approach

- Currently there are no targets for SORA – operators do not know if they get approval

The Copernicus Land Monitoring Service (CLMS)

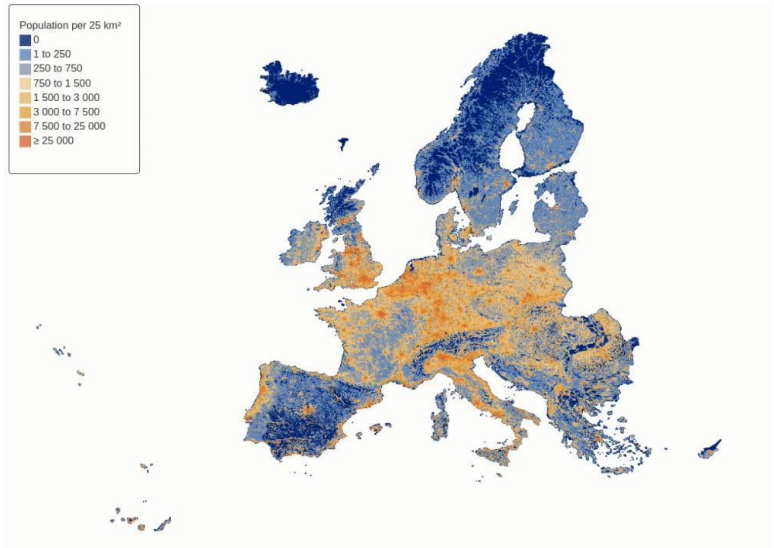
- Provision of data sets:
  - Measuring land use (LU) and land cover (LC) (mergeable with population data)
  - Building heights in urban areas
  - Environmental datasets including forecasts
- Possible functions:
  - Feeding into automated services providing a quantitative approach to the SORA process
  - Contribution to understanding the environmental conditions of the operation
  - Performing post-flight assessment of track-keeping performance

Copernicus Building Height Model (BHM)

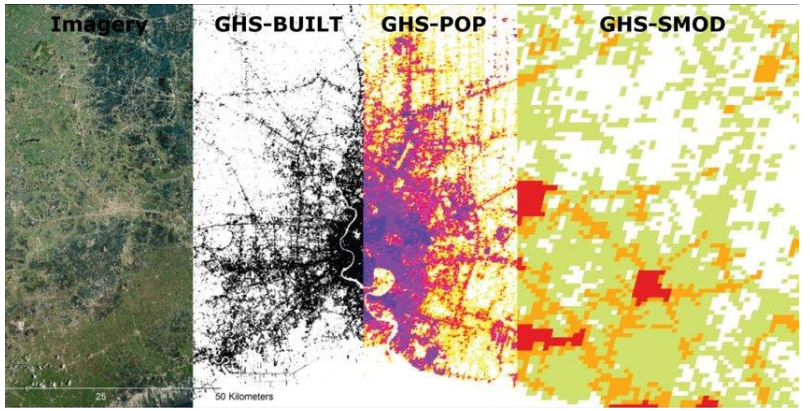
Copernicus Urban Atlas (UA) – land use & land cover classifications

Monitoring the population

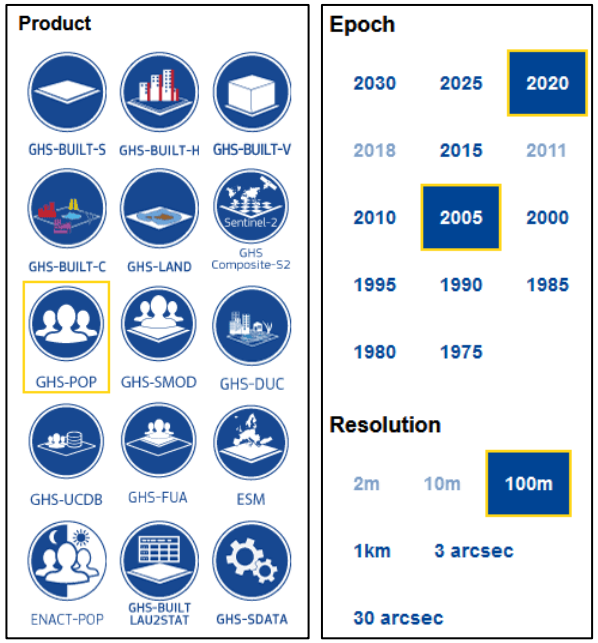
- Global Human Settlement Layer (GHSL)
- EUROSTAT POPULATION 2018



EUROSTAT Population data



GHSL – various products



GHS data specification

Geospatial characteristics relevant for drones

1) **Data resolution** – *critical for small scale drone operations*
2) **Data coverage** – *availability of good quality data in areas of interest*
3) **Revising times** (update rates) – *data being up to date to provide sufficient value*
4) **Data format** – *data in a format that is easily accessible by wide public*
5) **Availability of data** – *easy access and overview of relevant data sets*