Three Reasons for using Copernicus EO data in Aviation industry

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Reason number ONE

Creation of regularly updated, large-area (e.g. countrywide) DSM models, necessary for:

- for CARS (Common Altitude Reference System) conversion within CARA*
- for consistent and uniform recalculation of planned mission heights/altitudes by all connected USSPs - *all systems should use same data*
- *Provide the possibility of management of the DSM model according to Competent Authority expectations (like e.g. AIRAC cycle). In other words definition of once source of truth far all connected systems*

** CARA - Common Altitude Reference Area - concept proposed by a SESAR JU ICARUS project*

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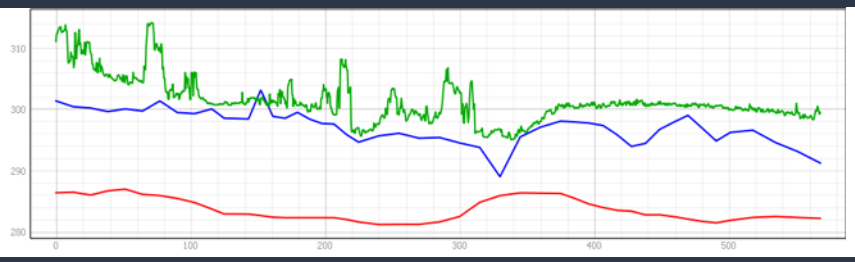
DSM Models: Performance of Sentinel data respect to reference data in different terrain profile versus SRTM

Sentinel-1 imaging can be used to provide information about the current state of topography in human activity areas (build-up, industrial plots), the areas where envision pace of change is higher.

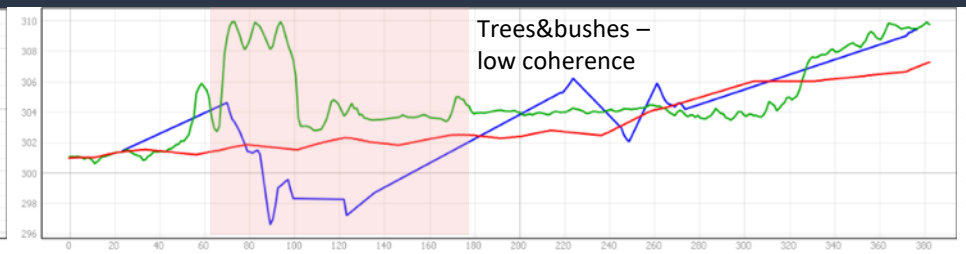
We would recommend using Sentinel data in particular to patch the SRTM model with up-to-date information in changing areas of human activity (e.g. build up areas, industrial facilities) to create the added value for drone flight risk management.

Industrial area



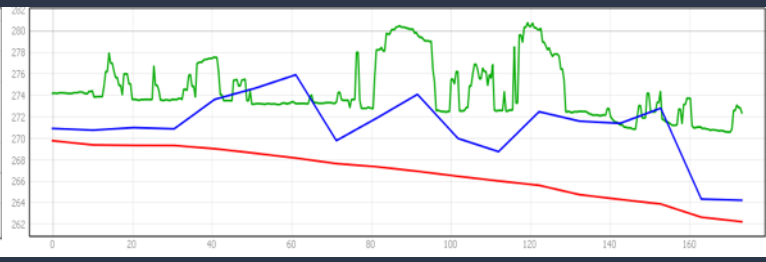
RMSE: SRTM 18.1m Sentinel 5.0m

Rural area



RMSE: SRTM 4.9m Sentinel 5,8m

Housing area



RMSE: SRTM 8.3m Sentinel 4.5m

However, it should be remembered that in places with high traffic intensity, the DSM model must be updated with more accurate data, e.g. LIDAR

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Reason number TWO

Automatic Discovery of Earth Surface changes

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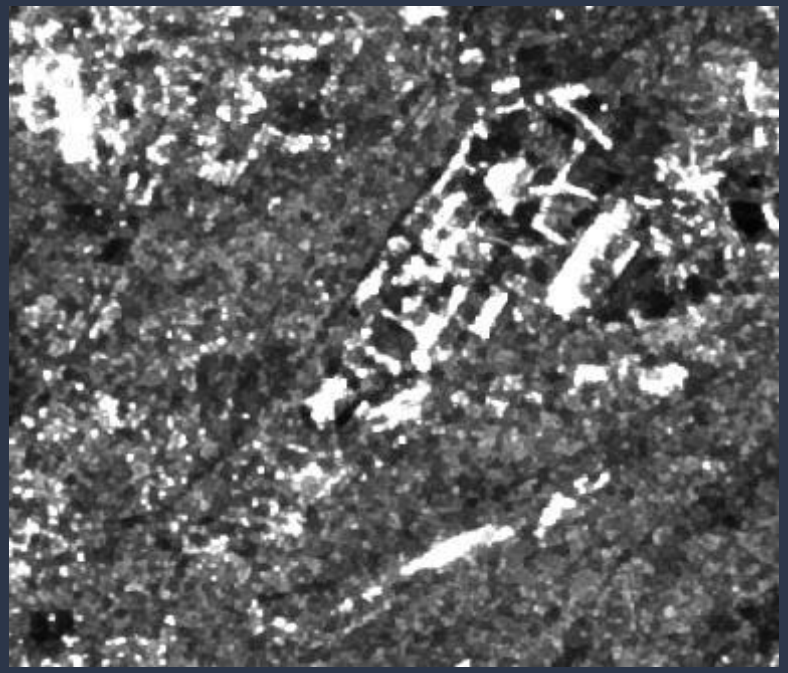
Reason number TWO

Continous, weather resistant, monitoring of land surface changes.



RADAR DATA TIMESERIES (SENTINEL 1)

2015

2019

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Reason number THREE

Human mobility and population density prediction

GREy

HOPE – Human Mobility Prediction

ESA funded feasibility study carried out by

The Wroclaw Institute supported by DroneRadar

(To be concluded by Sep-2022)

WROCŁAWSKI INSTYTUT ZASTOSOWAŃ INFORMACJI PRZESTRZENNEJ I SZTUCZNEJ INTELIGENCJI

droneradar

esa space solutions

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Annex F to SORA

424 **3 Determination of Population to Support iGRC**

425 **3.1 Introduction and Selecting the Appropriate Overflown Population Density**

426 This section outlines key information that is relevant to the accurate determination of population
427 density for the purposes of the SORA iGRC assessment.

Census data

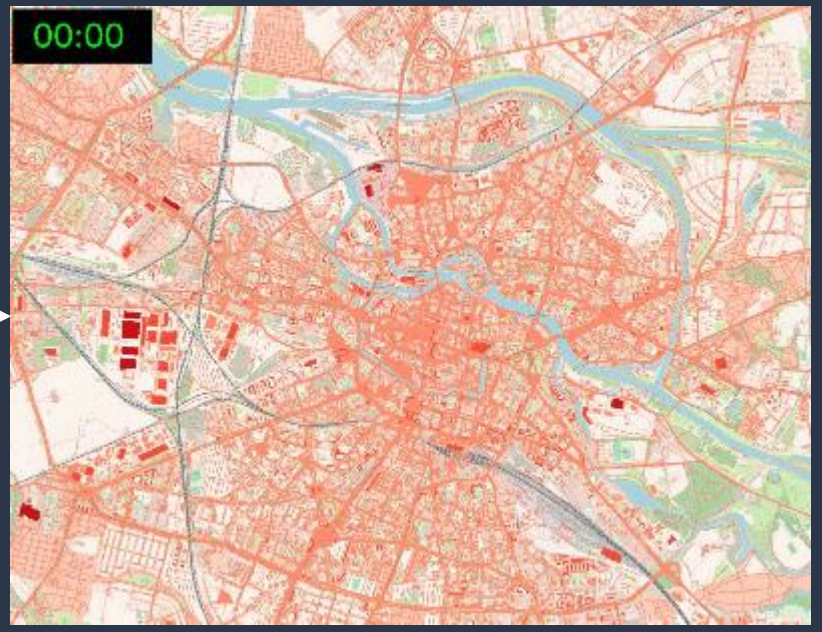
Open data

CCTV cameras

Copernicus data (Sentinel)

Other

AI assisted processing



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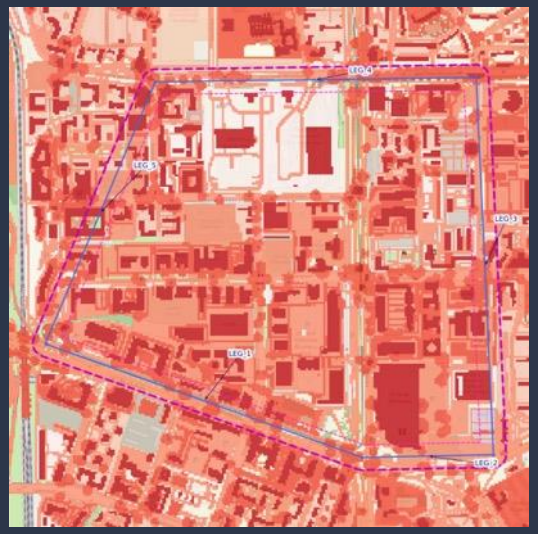
2022-06-26 23:00 (Sunday)

iGRC	Flight geography	Ground Risk Buffer
iGRC 1 quota	0.0%	0.0%
iGRC 2 quota	7.3%	0.0%
iGRC 3 quota	5.0%	0.2%
iGRC 4 quota	84.5%	76.5%
iGRC 5 quota	0.0%	0.9%
iGRC 6 quota	3.2%	22.4%
iGRC 7 quota	0.0%	0.0%
iGRC 8 quota	0.0%	0.0%
iGRC 9 quota	0.0%	0.0%
iGRC 10 quota	0.0%	0.0%
iGRC 11 quota	0.0%	0.0%
no part of SORA quota	0.0%	0.0%

2022-06-27 08:30 (Monday)



iGRC	Flight geography	Ground Risk Buffer
iGRC 1 quota	0.0%	0.0%
iGRC 2 quota	3.7%	0.0%
iGRC 3 quota	3.4%	0.0%
iGRC 4 quota	40.7%	8.6%
iGRC 5 quota	42.2%	41.3%
iGRC 6 quota	9.9%	50.2%
iGRC 7 quota	0.0%	0.0%
iGRC 8 quota	0.0%	0.0%
iGRC 9 quota	0.0%	0.0%
iGRC 10 quota	0.0%	0.0%
iGRC 11 quota	0.0%	0.0%
no part of SORA quota	0.0%	0.0%

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Advantages

- Prediction quality increases with input data completness but model works with basic data available for entire planet for free
- Intependence to mobile networks data (expensive, hardly available)

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