

# Experiences and Best Practices – INDI (Israel National Drone Initiative)



## Drone Enable 2022

# Agenda

- 01 Introduction
- 02 INDI Project background & regulatory aspects
- 03 INDI Project technical aspects and lessons learned
- 04 Next steps & Conclusions
- 05 Open Discussion/Q&A

# Introduction

- 1 Tight and complex national airspace
- 2 Entrepreneurship spirit
- 3 Understanding that the market is global
- 4 Government supporting the industry by developing a sandbox
- 5 Unique cooperation of various government entities
- 6 Pragmatic approach in adoption of regulation

# Project Principles

- Based on U-space CONOP and European Regulatory Framework (EU 2021/664 665 666)
  - NPA 2021-14
  - ASTM 3548-22
  - ASTM 4511-19
- Adapt international regulation to the Israeli environment
- 8 quarterly very large-scale demonstration (VLD) (2 weeks per quarter)
- Data collection and detailed debriefing to serve effective data driven regulation
- Government support in expenses and enabling the project operations (CAAI as a partner)
- Centralized project management



# Our Vision

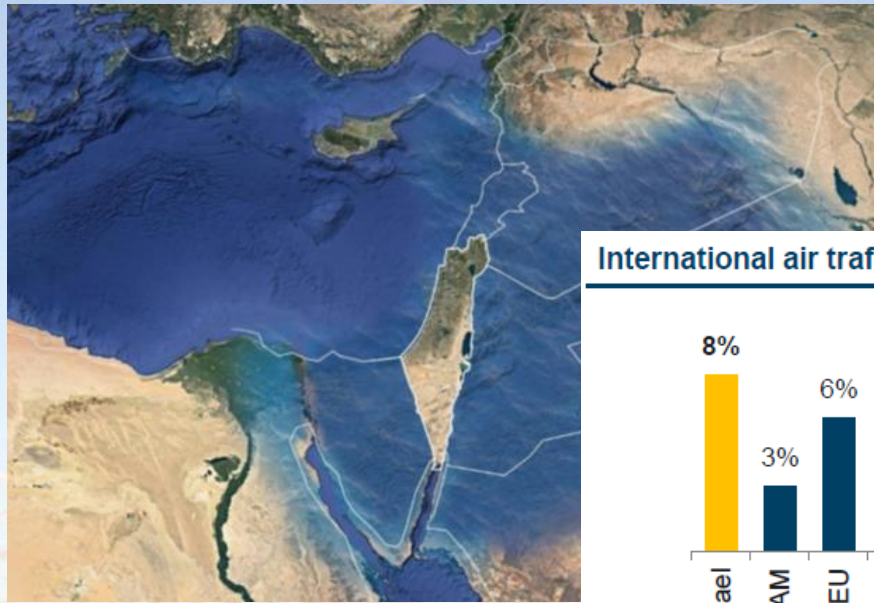
Promote the use of **drones in commercial applications** for **societal environmental** and **economical** impacts.

Allow flights in an urban environment, by **integrating** with the national ATM and other airspace users efficiently and safely

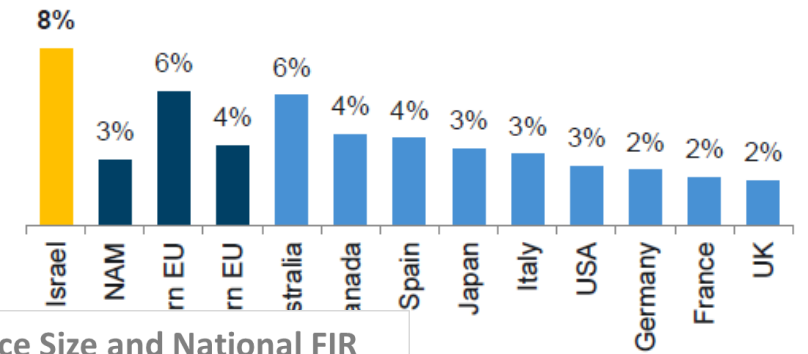


# Israeli Airspace

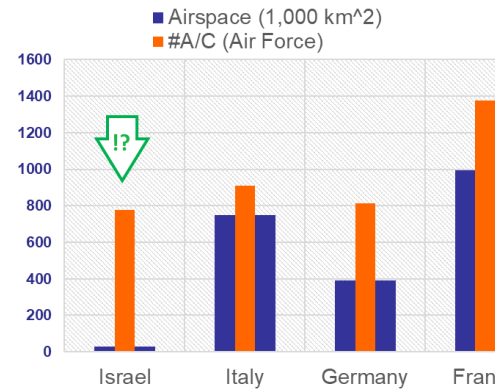
- Total dependency in the aviation industry for intl. mass transportation
- Air Carrier traffic doubled in the decade prior to COVID-19
- ~90% Military Airspace (size of IAF <> national airspace)
- Several FUA applications implemented
- Complex Neighborhood (Air Defense)



International air traffic capacity growth (Seats CAGR: 2007-16)



Populistic Comparison of Air Force Size and National FIR



# Israeli Airspace

- Extremely Heterogenic
  - Intense Civil-Military interface
  - Contribution of Civil Aviation in trade, tourism and economic growth
  - Unproportionally large UAS industry
- Relatively large number of Prohibited/Restricted/Danger Areas
- IAF (Military ATM) is the ANSP for the majority of domestic traffic
- Airspace Risk Assessment – assistance from EuroControl (STS)



# Project Objectives



Promote a large-scale economical impact by developing an economically viable ecosystem



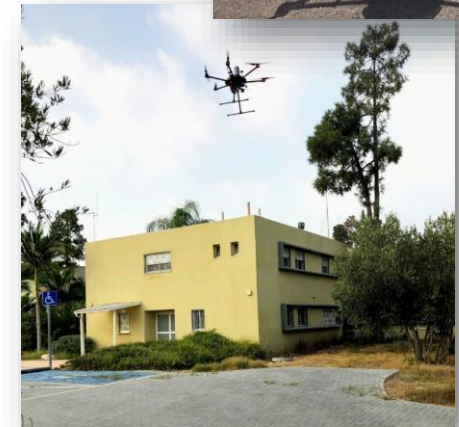
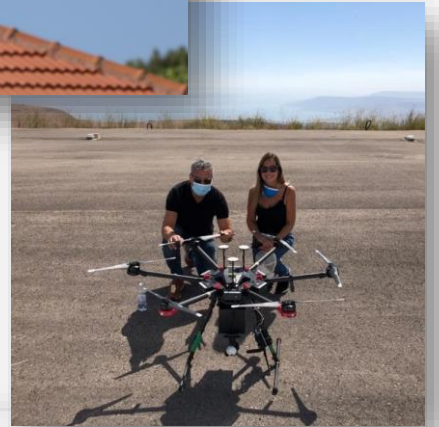
Create a versatile sandbox to enable effective development of regulation and industry growth



Create a safe, leading, enabling, government regulatory framework vis-à-vis all the stakeholders

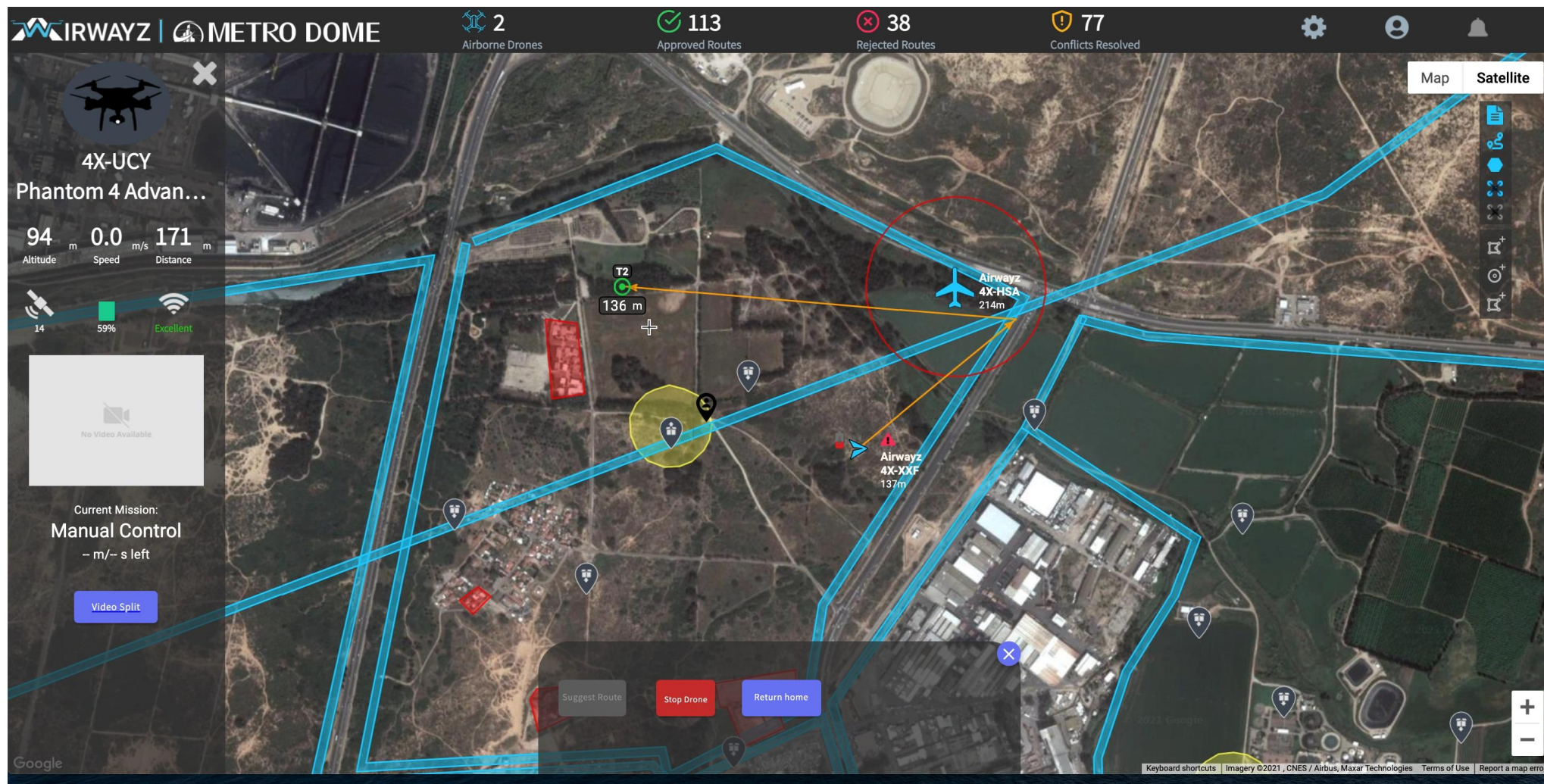


Timely and safe removal of constrains through data-oriented rulemaking

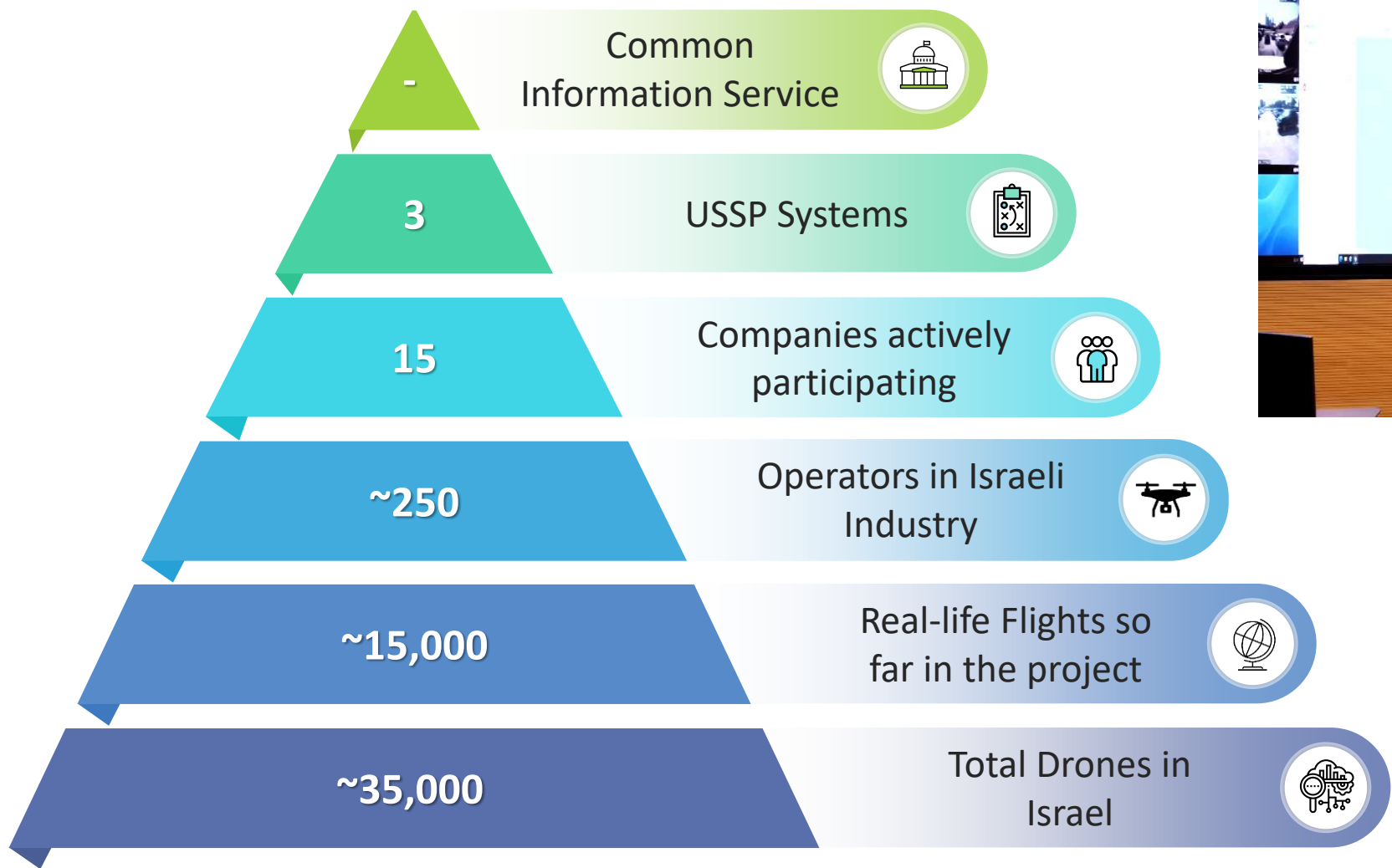




# Manned and Unmanned Aircraft Separation via UTM

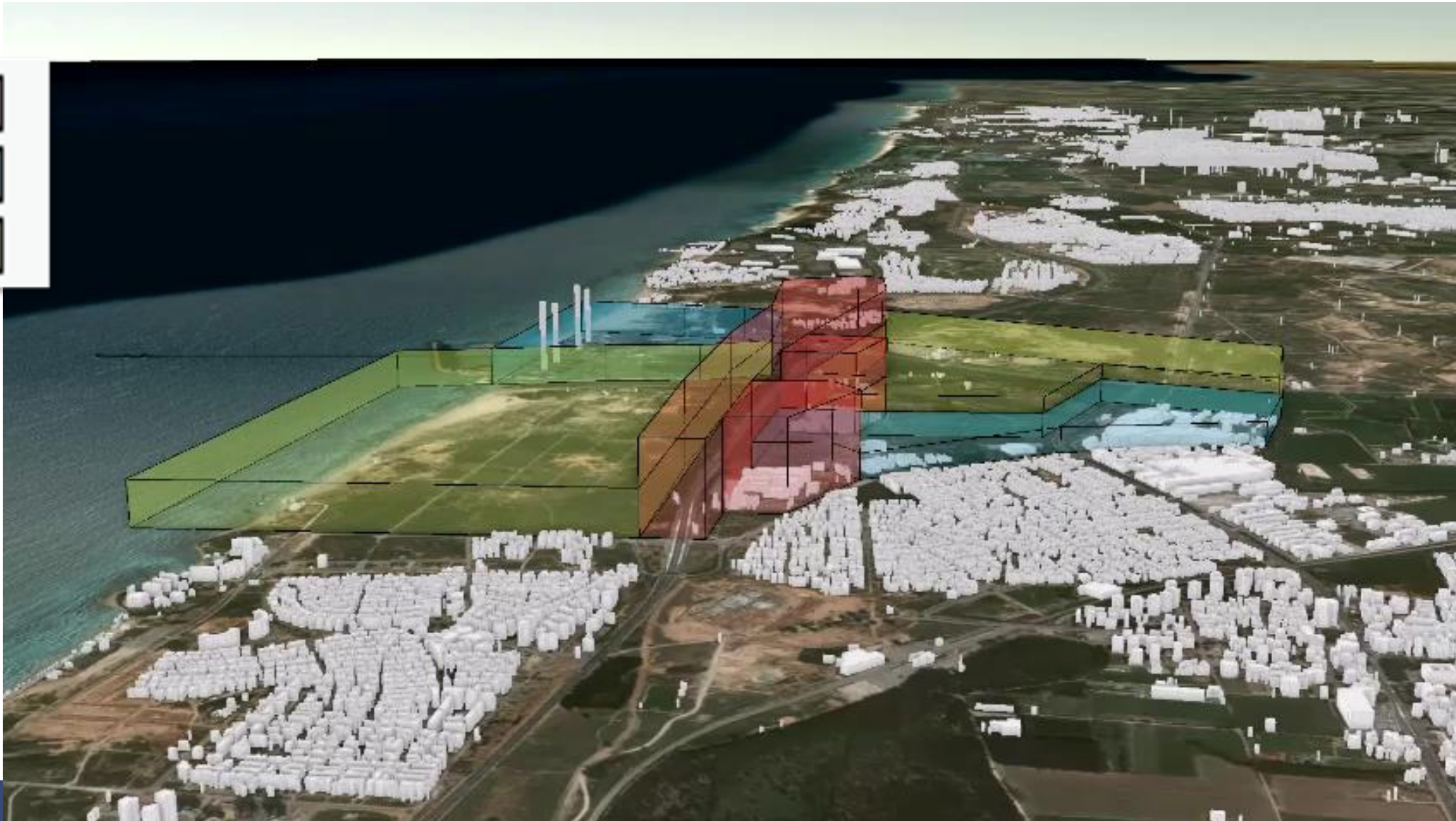


# The Project in Numbers



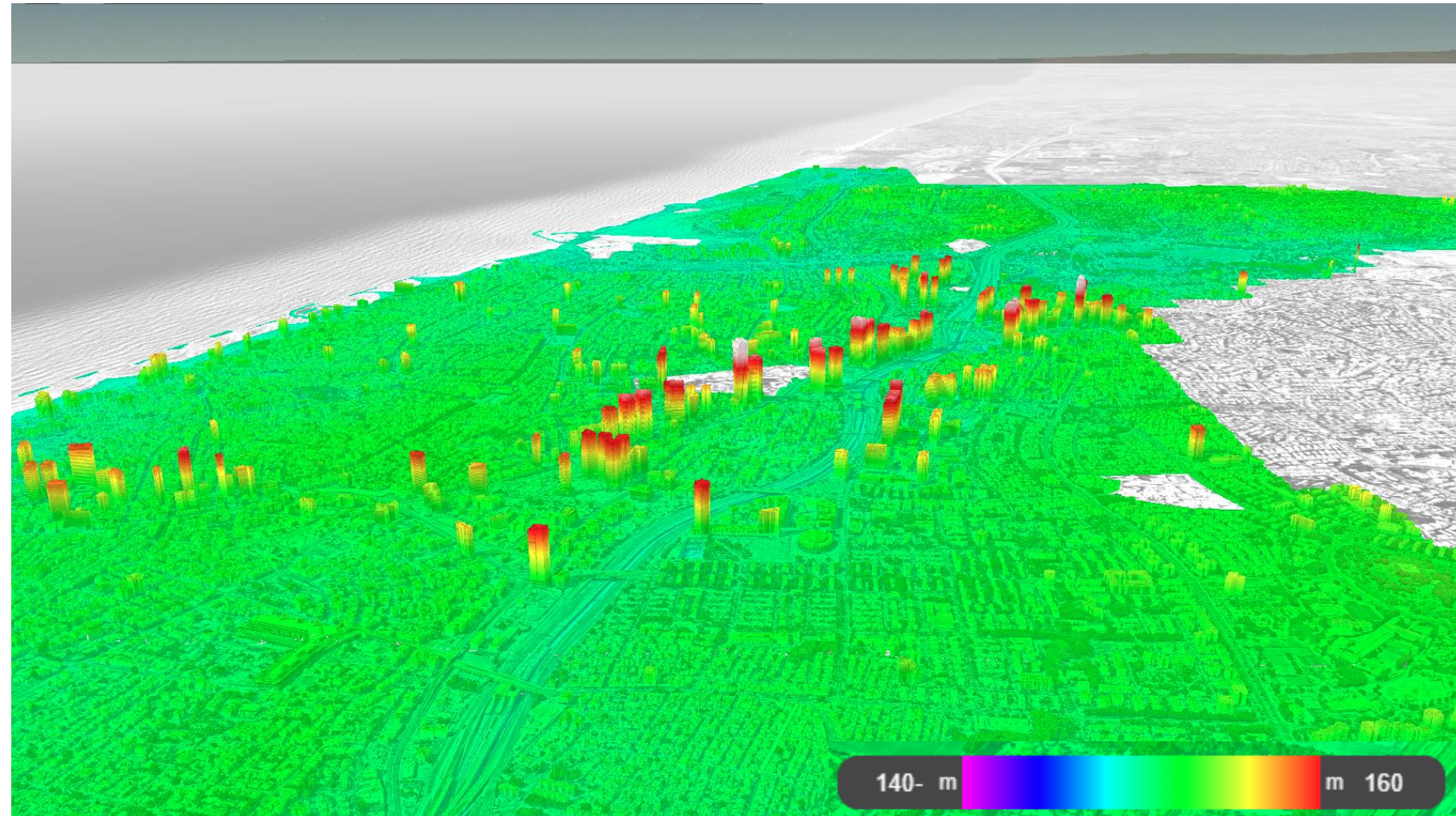
# Hadera city U-Space – airspace classification & assessment

Za/Zu   
Y   
X 



# Obstacle and Sensitive Land Uses Mapping (1)

- Existing 3D high-resolution mapping databases were used to identify potential obstacles
- Digital databases can be embedded simply in UTM



Source: Simplex 3D Model, Tel Aviv Yaffo

# Obstacle and Sensitive Land Uses Mapping (2)

Existing Databases were identified and studied (format, quality, integrity, accuracy, timeliness)

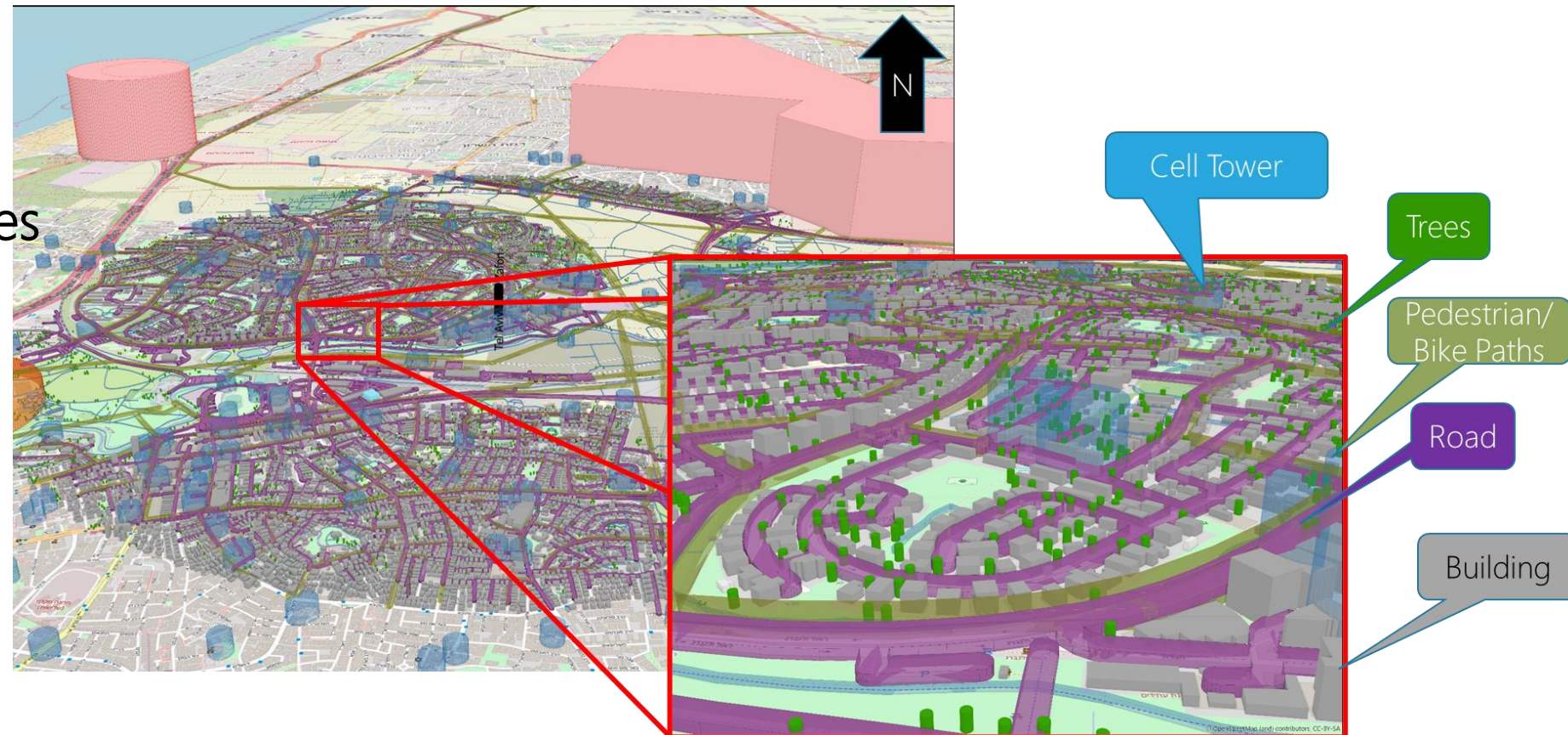
Building Contours

Cellular Towers

Electricity Poles/Lines

Trees

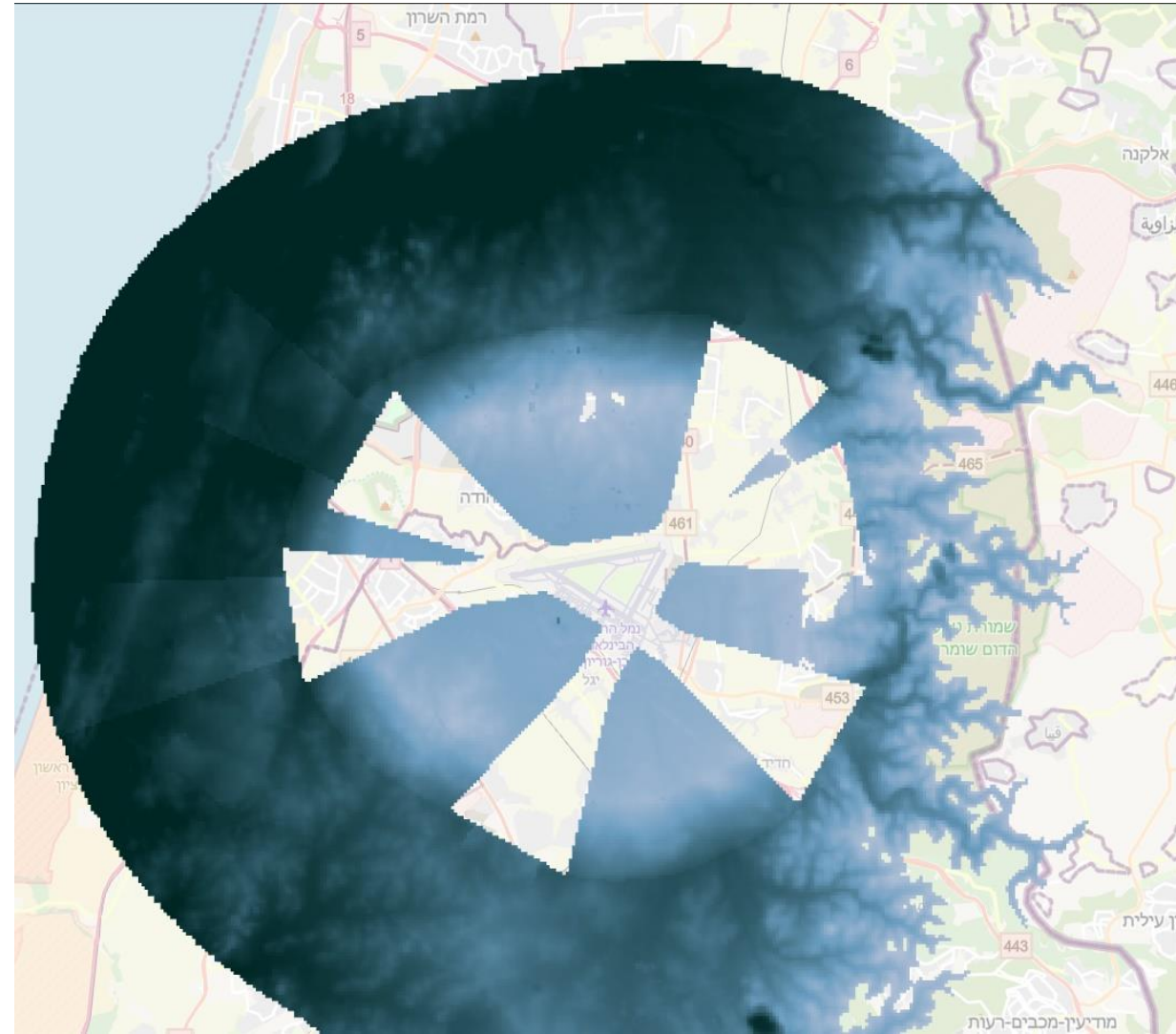
Etc..



Source: AGL Aviation

# Tel Aviv city U-Space – Development of Shielding Model

- ✈ Implementation of the shielding concept (NZ, Australia) and ICAO Annex 14 Obstacle Limitation Surfaces
- ✈ View of available airspace below 400 QNH



# Tel Aviv city U-Space – Development of Shielding Model



# Main Technical Challenges

- Risks:**
1. **Safety assessment** – who should do it? Who can do it?  
**Same SA for all?** (USSP/U-Space simple/ temporary vs. permanent/ complex)?
  2. Economical;
  3. ATM system;

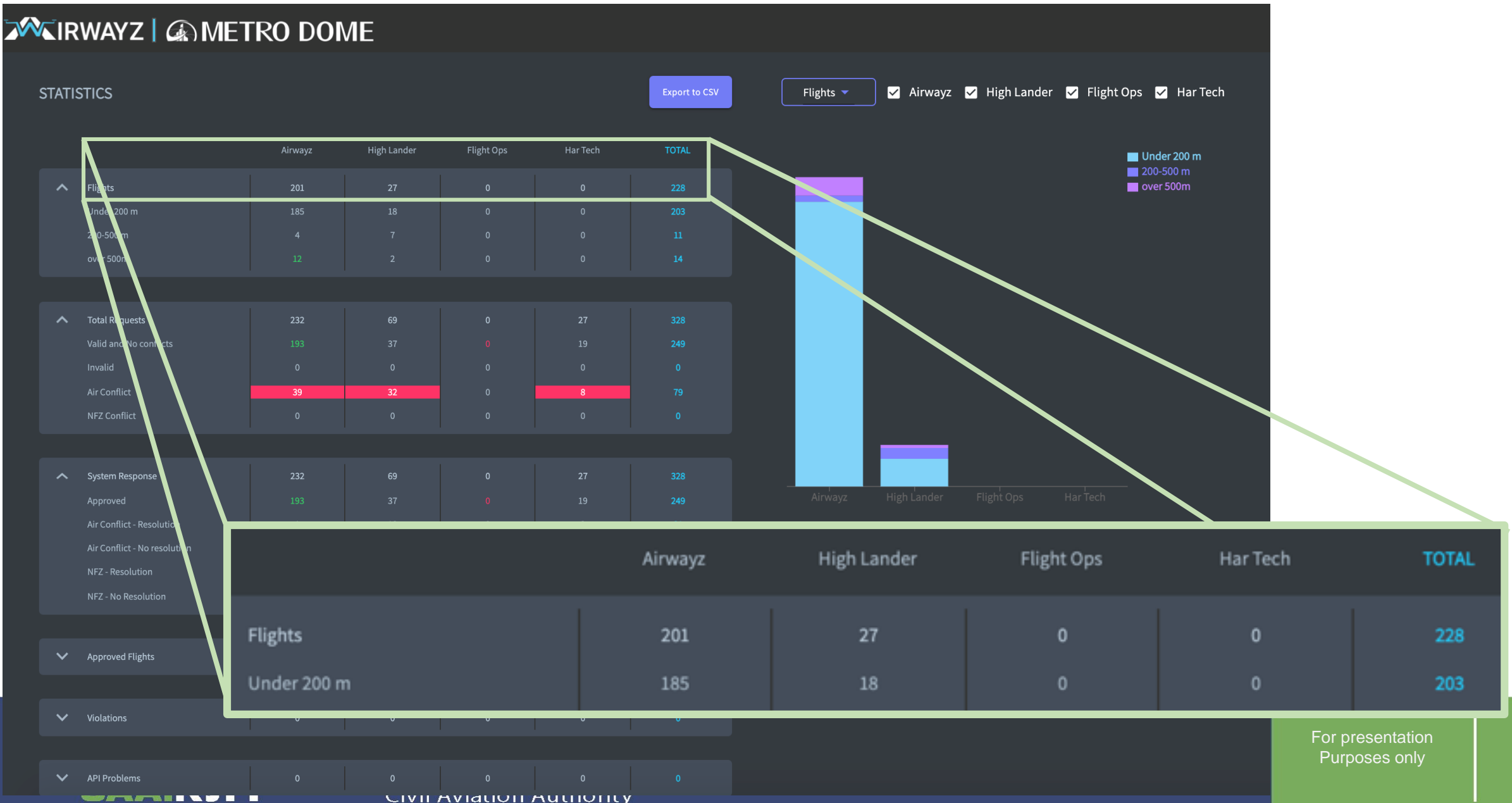




# Lessons Learned



# Lessons Learned – Data Driven Regulation



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Purposes only

# Next Steps

- ✈ Promote new use cases - long distance ops and eVTOL
- ✈ Expanding to more U-Spaces – operating several USSPs simultaneously
- ✈ Shielded & Monitored Operations (UTM) – Reduced coordination and transparency to manned traffic & ATM
- ✈ Further develop the ecosystem – CIS, ANSP, Manned Aviation integration, UAM
- ✈ No soup for you! (mainly government use)



# Conclusions

1. Start flying! Get your feet wet!
2. Government financial support is valuable, government involvement is priceless
3. Well distributed and balanced project leadership was key for success
4. End-to-end stakeholders and industry involvement, transparency and trust
5. Flexible planning and pragmatic goals, without jeopardizing safety
6. Safety events/crashes
7. All U-Space services needed mainly with complex services + urban/competitive environment. Other scenarios? Tailored suit (costs...)
8. Missing technical standards - ?
9. Public (non) acceptance – negligible. Local leadership/municipality – critical

# Q&A



רשות התעופה האזרחית  
Civil Aviation Authority



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