NA'AMA Initiative
Israel Urban Air Mobility

Suppliers Meeting
February 25th, 2020

AYALON HIGHWAYS | State of Israel Ministry of Transport and Road Safety | Fuel Choices and Smart Mobility Initiative | רשות החדשנות Israel Innovation Authority | CAAI רתא

Meeting Outline

10:30 - 10:40 Registration

10:40 - 11:40 RFI/RFD Outline, Emphases and Clarifications -**Ayalon Highways**

11:40 - 12:00 CAA Assessments for Arranging “Urban Bubbles” for the Benefit of the UMAD Initiative - **CAA**

12:00 - 12:15 The National Initiative of the Fuel Choices and Smart Mobility Administration - **Smart Mobility Administration**

12:15 - 12:25 Smart Mobility Test Center - **Ayalon Highways**

12:25 - 12:35 The Center for Regulating Innovative Technologies - **Innovation Authority**

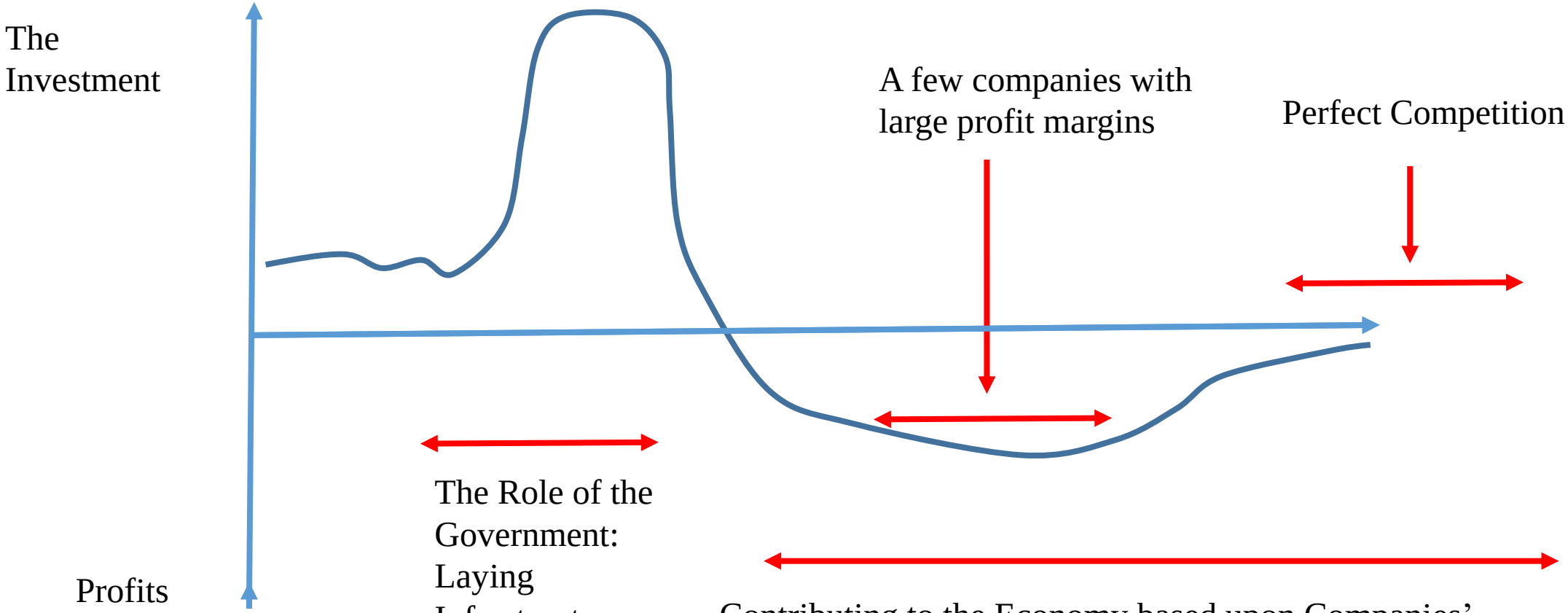
12:35 - 12:50 Calls for Proposals as part of the European Framework **ISERD** - Horizon 2020 Program, **Innovation Authority**

12:50 -13:00 Summary - **Ayalon Highways**

Meeting’s Objectives

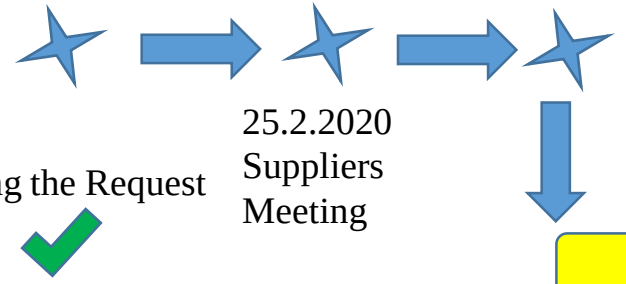
- **Presenting the Initiative**
- **RFI/RFD review and clarifications**
- **Presenting the Partners in the Initiative**
- **Questions Concerning the Process**
- **Continuing Process**

The Government - Laying Infrastructure and Removing Obstacles



Relieving Transportation by Diverting "Light Deliveries" - to the Third Dimension

NA'AMA Initiative



2.2.2020
Publishing the Request

25.2.2020
Suppliers Meeting

25.3.2020
A Conference Open to the Public

01.05.2020
Contracting with Companies

Analyzing the Response

- UAV System
- Landing and Object Pick-up Points
- Business Model

Obtaining Permits: Company, System, Operators, In Visual Range, Above People, Emergency Landing Capability

Flights in UAV Bubbles - Yes or No

Preparing UMAD Bubbles and their Certification

Demonstration Flights as part of the UMAD Initiative

Safety Distances from Buildings

RFI 1.7.2020

Flight Above Railroad Tracks

Analyzing "Smart Space"

Flight Above Roads

FUA, Information Sharing

Weather Limitations

Flights in a Joint Space?

Characterizing "Smart Space" - Command and Controlling the C2ers

Helicopter Lines*, Broadband Communications Between Aircraft?

Background

Issue of an RFI/RFD regarding transporting light cargo using UAVs (Unmanned Aerial Vehicle)

01

Transportation Infrastructures are in Short Supply Relative to their Demand

As part of the excess demand on the existing transportation infrastructure in Israel there is an increasing need for optimal utilization of the infrastructure as well as an examination of alternative transport methods

02

A Review of the Airspace as an Alternate Mobility Infrastructure in the Urban Space

Considering this, the company seeks to conduct a review of the operational & economic feasibility for commercial use of the airspace for the benefit of transporting light cargo utilizing UAVs

03

The essence of the appeal - testing the applicability of transporting cargo in UAVs

The purpose of appeal is to develop an operating concept including removal of barriers to allow the use of drones for diverse functions & cargo transport, over time and as soon as possible

Objectives

Get information about the aspects of the operation of UAVs for transporting cargo in the urban space

An assessment of the scope of permits required for operating such an alignment

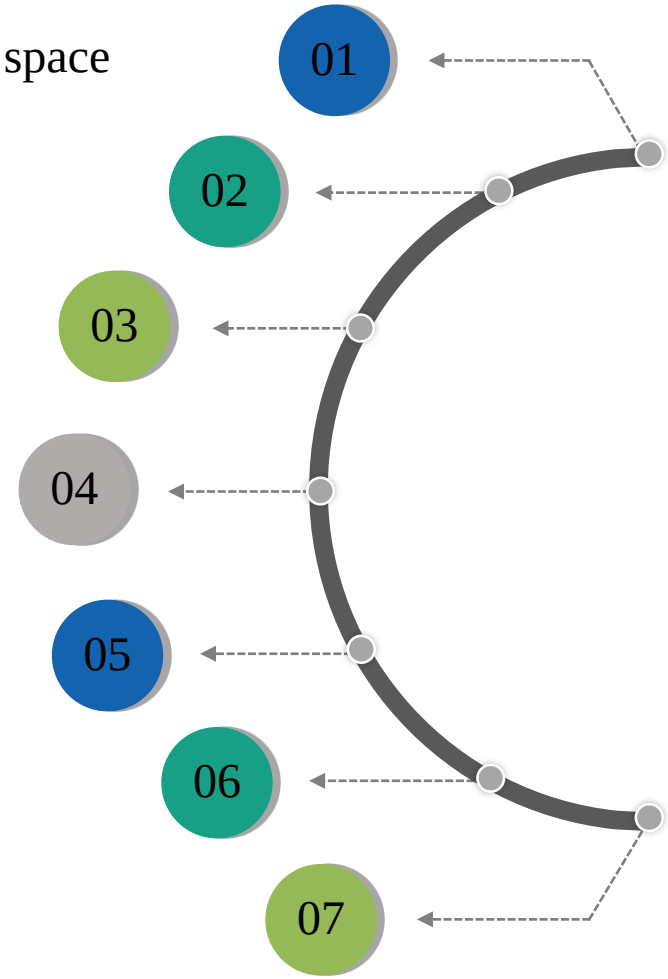
Receive information concerning possible business models

Examine the regulatory adjustments required for the system’s safe and secure operation

A proposal for the required supportive infrastructures (logistics center, landing zones etc.)

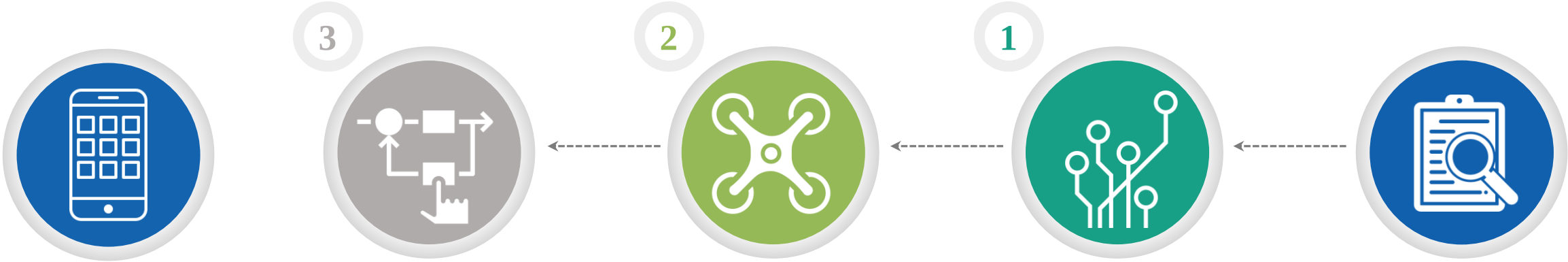
Mapping the necessary aerial infrastructure (flight paths, landing zone access funnels, etc.)

A proposal for a C2 alignment to provide coverage over air traffic activity in the urban space



The Process

Preconditions for flying in an urban area according to the stages presented below:



Preliminary Stage
Review the received response
Complete the permit attainment processes

Stage I
Proof of Technological Feasibility POC in a designated UAV bubble

Stage II
Flights in an urban area in accordance with a SORA[1] analysis

Stage III
Proof of a Command & Control (C2) System in an urban airspace

Additional Applications
Proof of the Business Application

1. Special details regarding the process of obtaining a permit based on operational risk management

Required Materials

Vendors will be required to provide materials that will be divided between detailing requested information (i) and detailing demonstrations (d)

Detailing the demonstrations (d)

The process for attaining certification as a "UAV/Drone Beyond Visual Line of Sight Operating Company"

The process for receiving aircraft flight certification

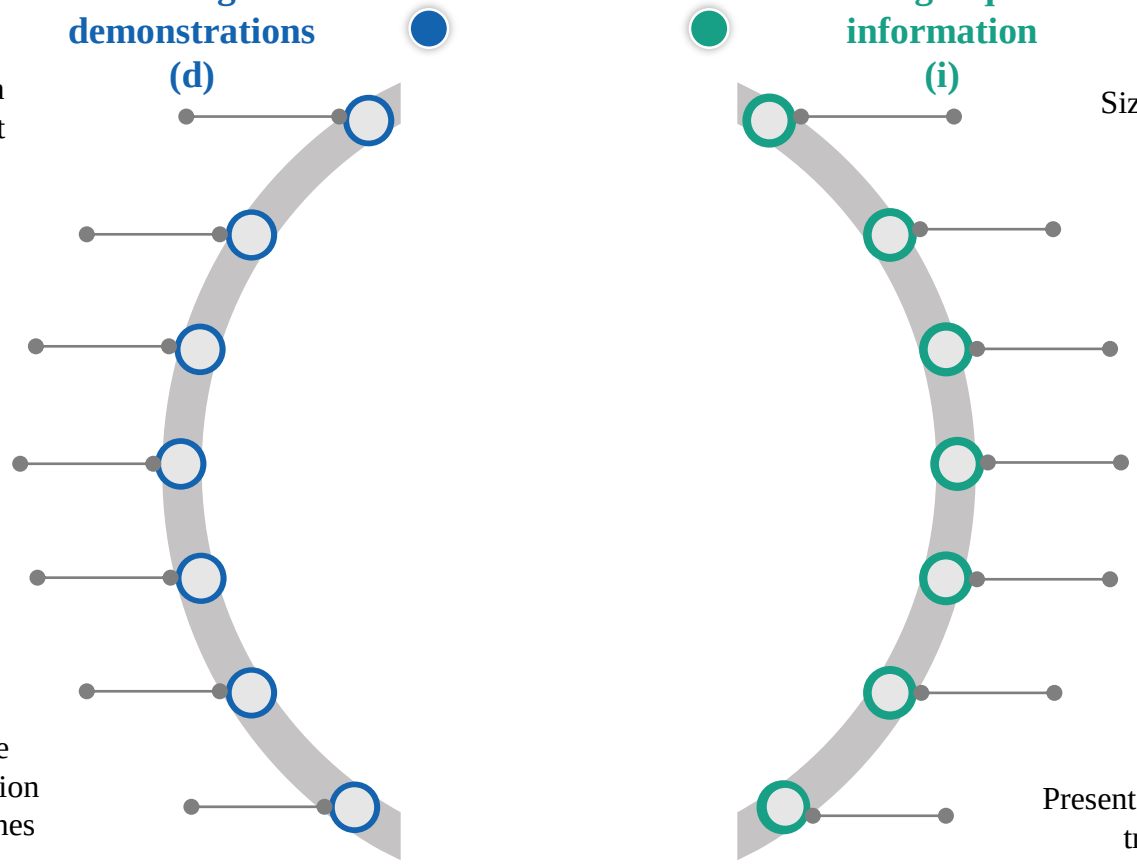
The process for receiving certification for pilots/operators and the required labor force

A description of the physical infrastructure that will be constructed as part of the experiments.

A proposed network of package landing/pick-up points

Skeletal business plan

An illustration of the active scope in the framework of the current RFD (an activation scenario relative to package carrying drones (including two years of flights)



Detailing requested information (i)

Size of the proposed fleet for each operations point

Proposed specifications for a drone landing facility

A proposal for organizing the airspace

The scope of work required for planning and constructing package landing/pick-up points [1]

Present a plan to develop an information support system containing map layers including dynamic flight lanes and real-time information concerning weather, and various obstacles, etc.

A presentation of "replication capabilities" for packages of up to 2 kg

Present the maximum scope of traffic ("Rounds")

1. Including reference to physical obstacles, information security, privacy, weather, quality control and road safety, etc.

Target Audience

Local Authurity

Suppling companies

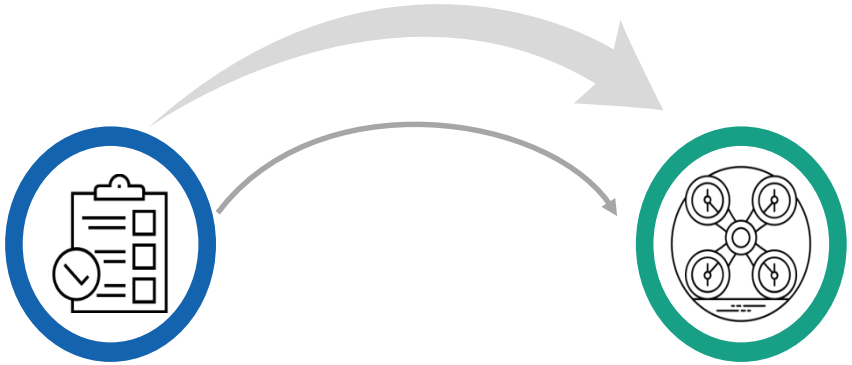
UAV (Unmanned Aerial Vehicle) technology company

Submission

Vendors will respond to Ayalon Highways request according to the stages detailed below:

Stage I - Vendors' Response and Information Provision

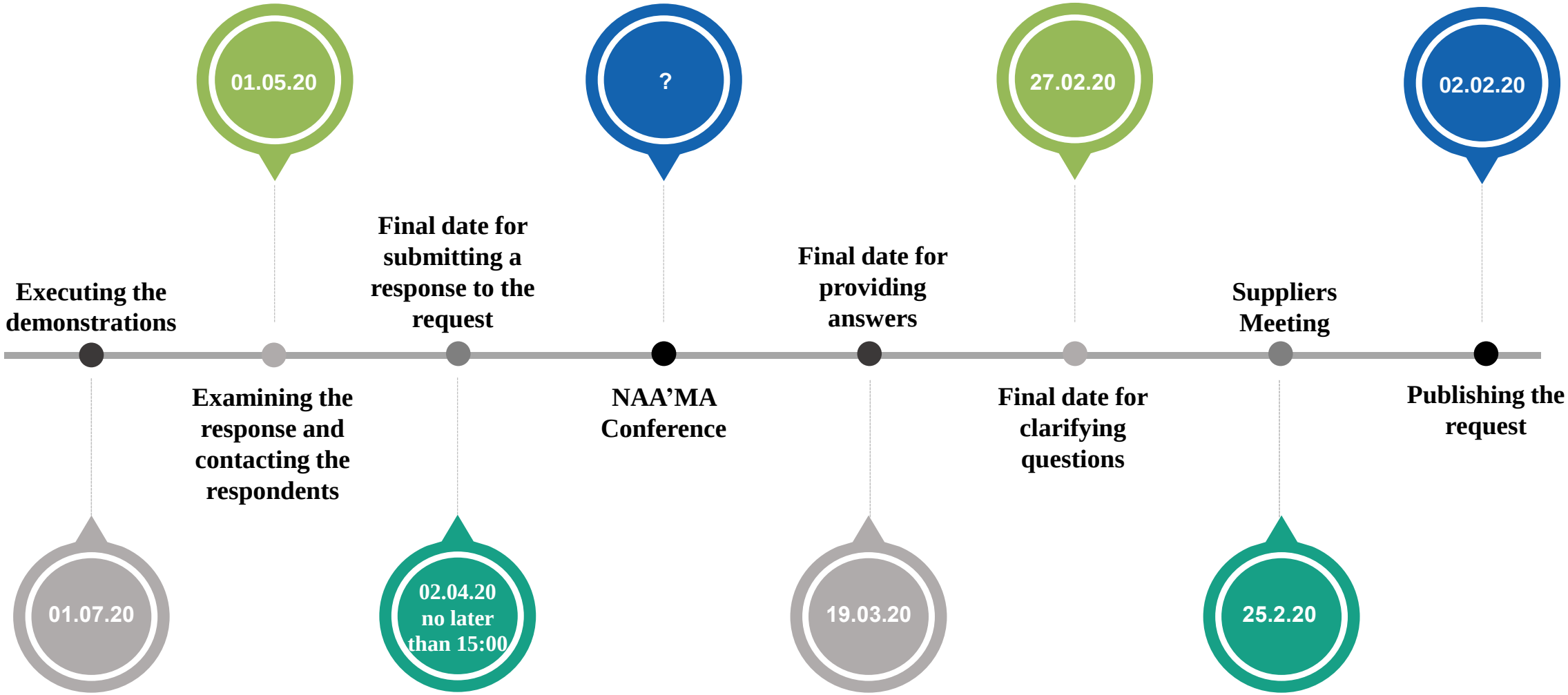
- The vendor will response in accordance with the specifications of the submission structure detailed in the RFI/RFD
- After receiving the information from the various vendors, Ayalon Highways will examine each of the proposals by means of a dedicated Advisory Committee



Stage II - Demonstration Phase

- Ayalon Highways will turn to the relevant vendors concerning execution of the demonstration phase
- Preference will be given to those vendors capable of executing the demonstration as part of a "one stop shop" configuration
- In coordination with the CAA, the company will accompany the companies in the process of obtaining the necessary operational permits
- As part of this appeal, Ayalon Highways, does not define the manner of future engagement

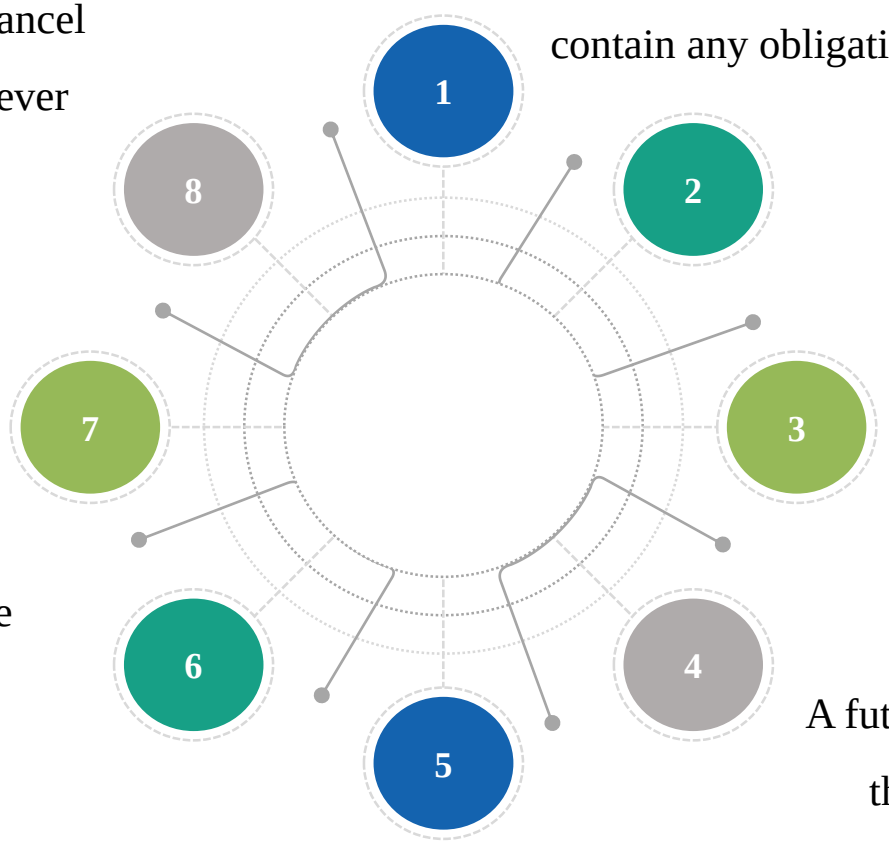
Timetable


01.05.20
?
27.02.20
02.02.20
Executing the demonstrations
Examining the response and contacting the respondents
Final date for submitting a response to the request
NAA'MA Conference
Final date for providing answers
Final date for clarifying questions
Suppliers Meeting
Publishing the request
01.07.20
02.04.20 no later than 15:00
19.03.20
25.2.20

Legal reservations

Kindly note the following legal reservations:

1. The appeal is not part of a tender procedure and does not contain any obligation on the part of Ayalon Highways Co.
2. There is nothing in this request that obligates publication of a future tender
3. Response to the request does not afford or impart any advantage in any such future tender
4. A future tender may contain services other than those presented in this request
5. The company may require clarifications or completions from the respondent vendors, including their summons to meet with company representatives
6. Respondents agree that the company can use the information provided by them in the preparation of any such future tender
7. The expenses involved in preparing a response to the request are at the expense of the responding suppliers
8. The company is authorized to cancel its request at any stage whatsoever



Potentional Air Bubbles areas

1 Be’er Sheva
2. Ashdod
3. Carmiel
4. Jerusalem
5. Haifa
6. Hedera
7.Nethanya
8.Eilat
9.Tel Aviv
10.Requested areas
11.Special cases

The more the merrier

The format for submitting a response

- **Strict Diligence:**

  - ✓ **Preserve clause numbering.**
  - ✓ **Every clause labeled with the letter (D) - Maximum detail, including everything that is to be demonstrated**
  - ✓ **Every clause labeled with the letter (I) - Detailed relevant information**

Connecting companies

- **Whoever is interested in a referral to “a type” of potential company to complete the group :UAV Operations Companies, Manufacturers, Municipalities, Potential Shippers, UTMS companies – contact through Reut/ Dror.**

Videos

- "Google Wings"
- Flytrex
- Maternet

CAAI -Airworthiness (1)

- Initiative Limitation - 25kg max takeoff weight for the aerial vehicle (a small UAV).
- AV Registration is required (4X-) and a single value ID of the system's components (hardware and software).
- During every phase - obligatory to report any faults, glitches and mishaps that might affect flight safety according to the law.
- Payment of all legally mandated fees as a precondition for receiving the certification.
- The licensing/proof process will be built during Build-Up:
  - Phase 1: Flight worthiness for experimental use certificate - proof of a suitable system in an organized process.
  - Phase 2: Completion of documentation and reception of a certificate for permanent special flight authorization - enables commercial operation (valid for 12 months, renewable).
  - Phase 3: Requests to approve system modifications.

CAAI -Airworthiness (2)

- Submission of official documents - approved, signed, ID'd (Date/Version).
- The scope of the preliminary documentation:
  - The Essence of the Request - Detailed Flight Plan - Areas, Envelope, Routes, Scopes and Times.
  - Defining the System - A single value setting is required - product description specifications, Bill of Materials. For a system in the development phase, the information will be completed.
  - Risk analysis of the initiative in its various phases (recommended according to the SORA methodology).
  - Proof of Compliance with UAV safety criteria.
- Readiness for a Permanent Special Flight Authorization Certificate:
  - Configuration Freeze - Bill of Materials and Production Files.
  - Logistic Capability - Maintenance literature, tools, testing equipment, spare parts, training.
  - Operational Capability - Routine and Emergency Operational Literature.
  - Testing and approval of the specific UAV system.

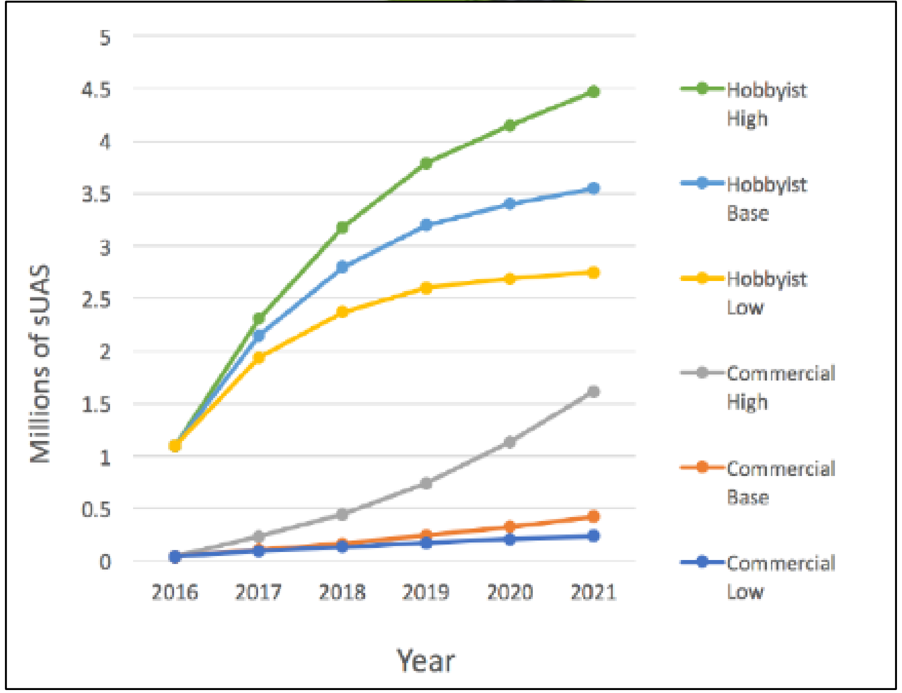
Airspace Assessment - Tel Aviv And Netanya Case Study

Airspace Assessment for the operation of UAS in an urban environment

February 25th, 2020

Background

- Continuous global growth of the demand and operation of UAV, accompanied with a high motivation to operate multiple UAS in urbane airspaces for a variety of purposes.
- These desired operations constitute a regulative challenge, that is faced by international authorities including Eurocontrol, and the FAA in collaboration with NASA.
- The concept of an airspace designated for the operation of multiple UAS is generally referred to as the UAS Traffic Management System – or the UTM concept.
- Preforming an Airspace Assessment is the basis of the UTM system.
- As part of the urban air mobility project, assessment was made for the enabling of UAV operations in the vicinity of Shuk Tzafon shopping center in Tel Aviv, and HaSharon mall in Netanya.

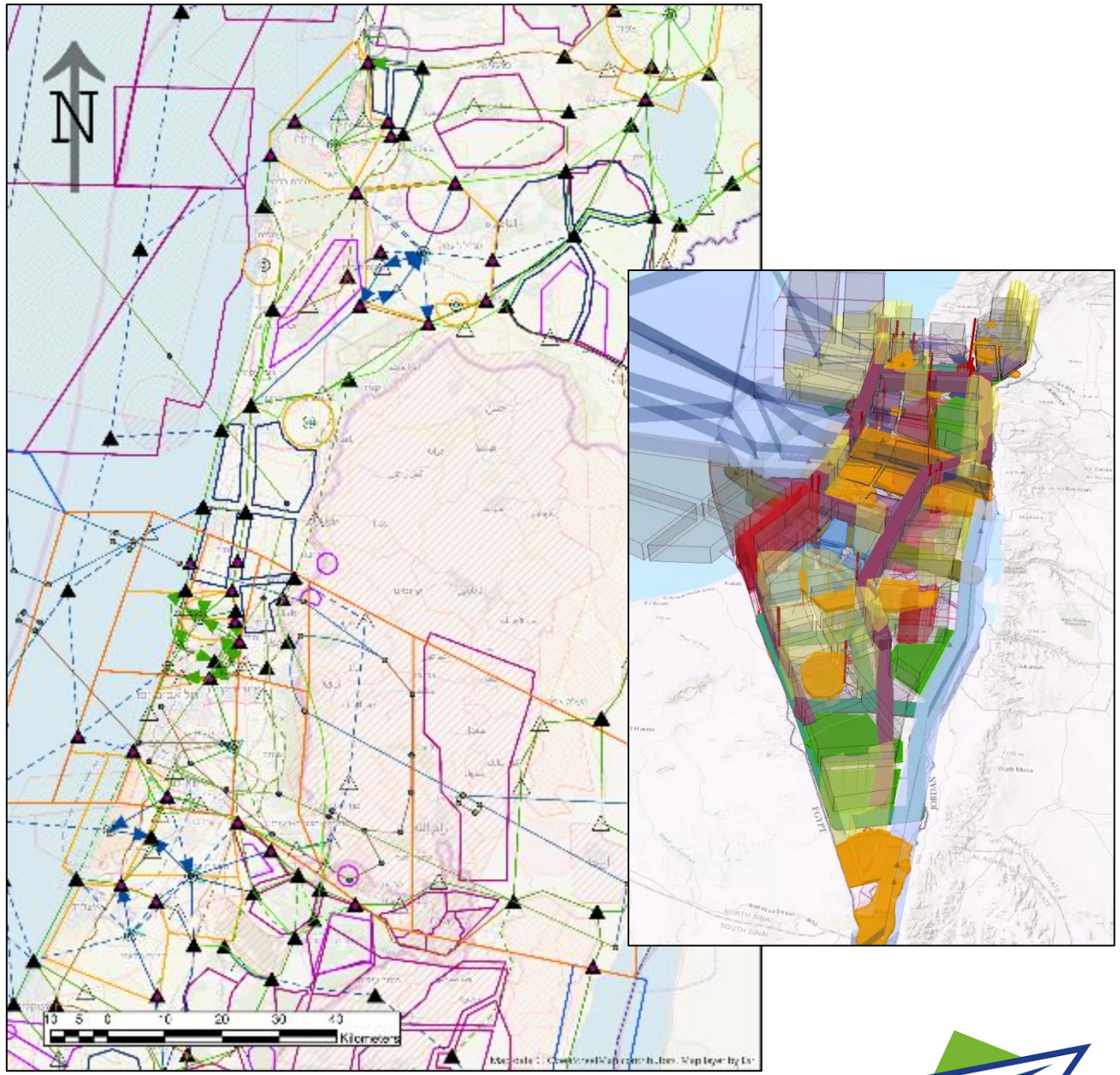


Methodology

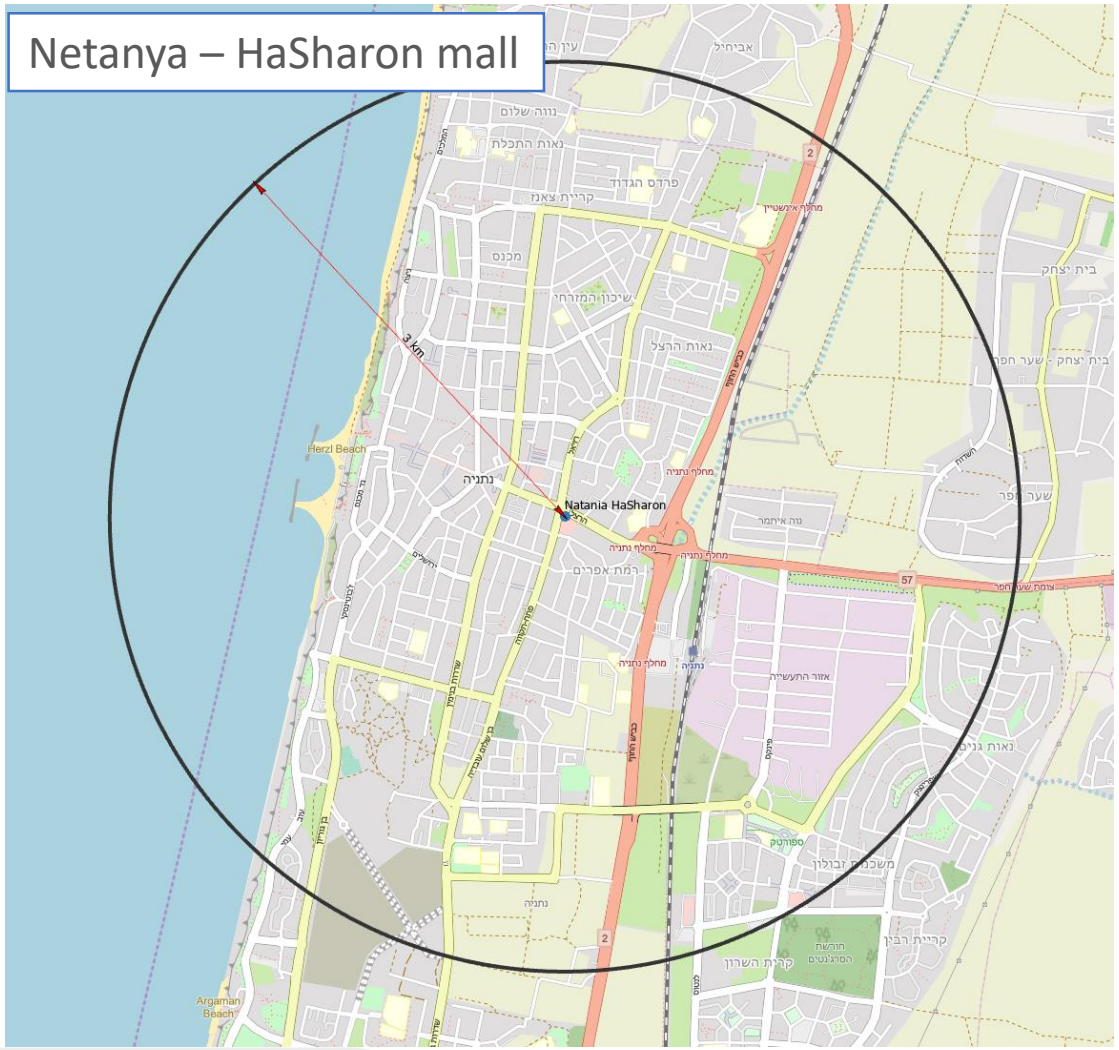
- The areas of interest are within the radius of 3 Km (1.9 Miles) around Shuk Tzafon in Tel Aviv and around HaSharon mall in Netanya, starting at 40 meters (130 ft.) AGL

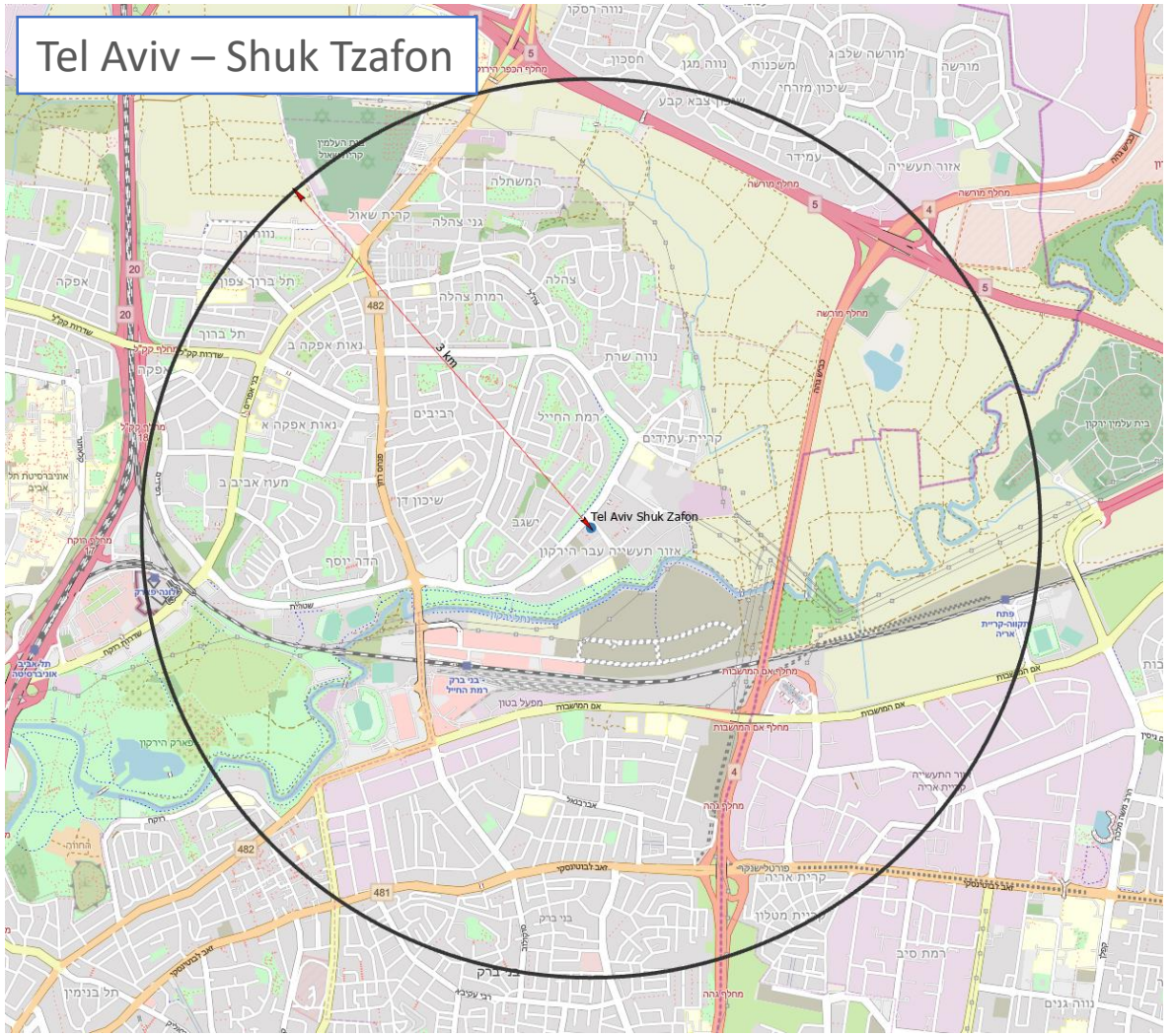
- Assessing the area of operation consists of two stages – assessing the aerial infrastructure, and assessing the terrain and the existing obstacles

- The Israeli airspace is congested with aerial infrastructure, that facilitate different airspace users
    - Every aerial infrastructure has a designated volume that complies with the separation minima required to operate in the acceptable level of safety
- Assessing the ground surface requires preforming a compilation of the natural terrain and man-made obstacles



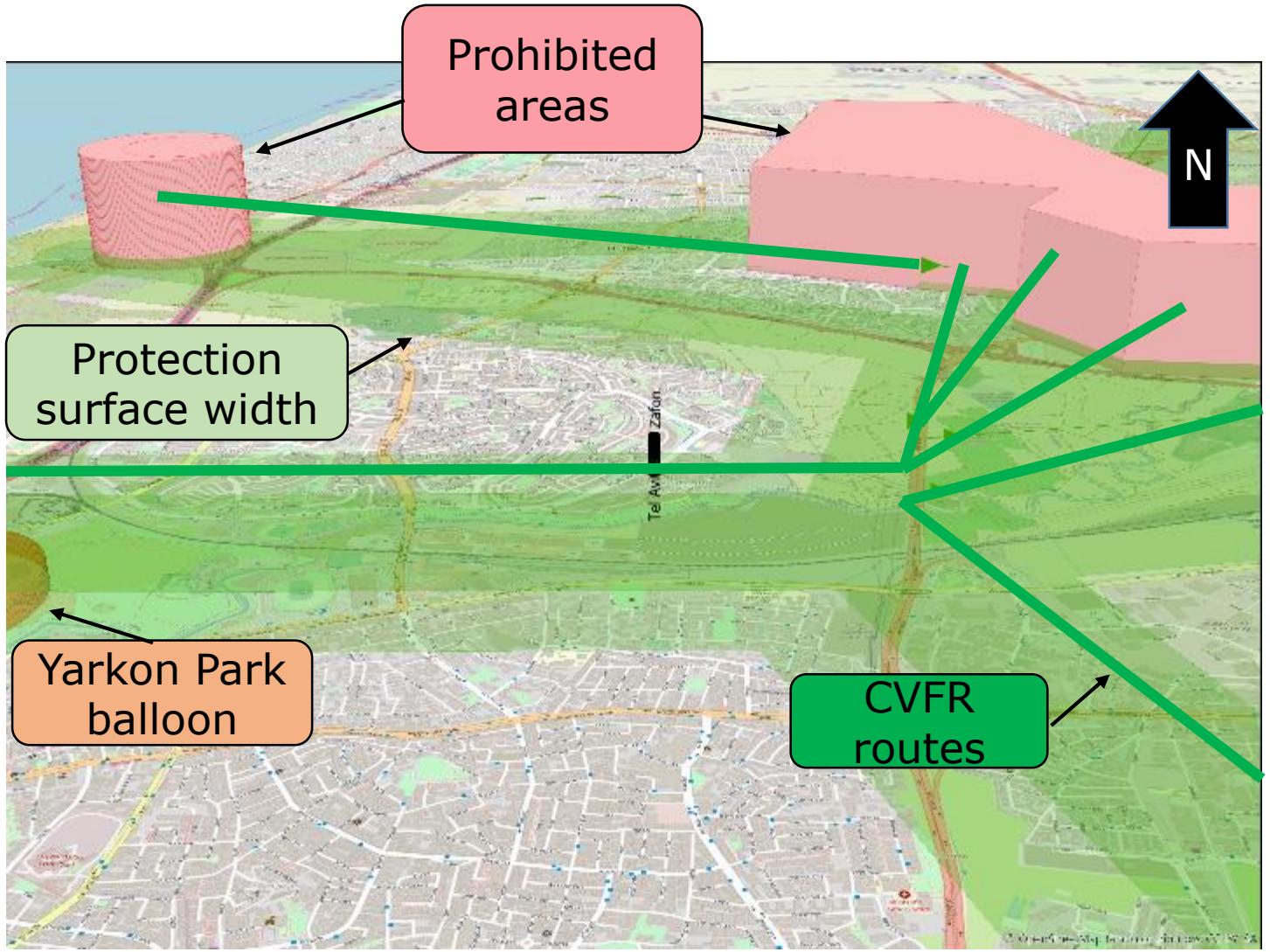
Tel Aviv and Netanya Case Study



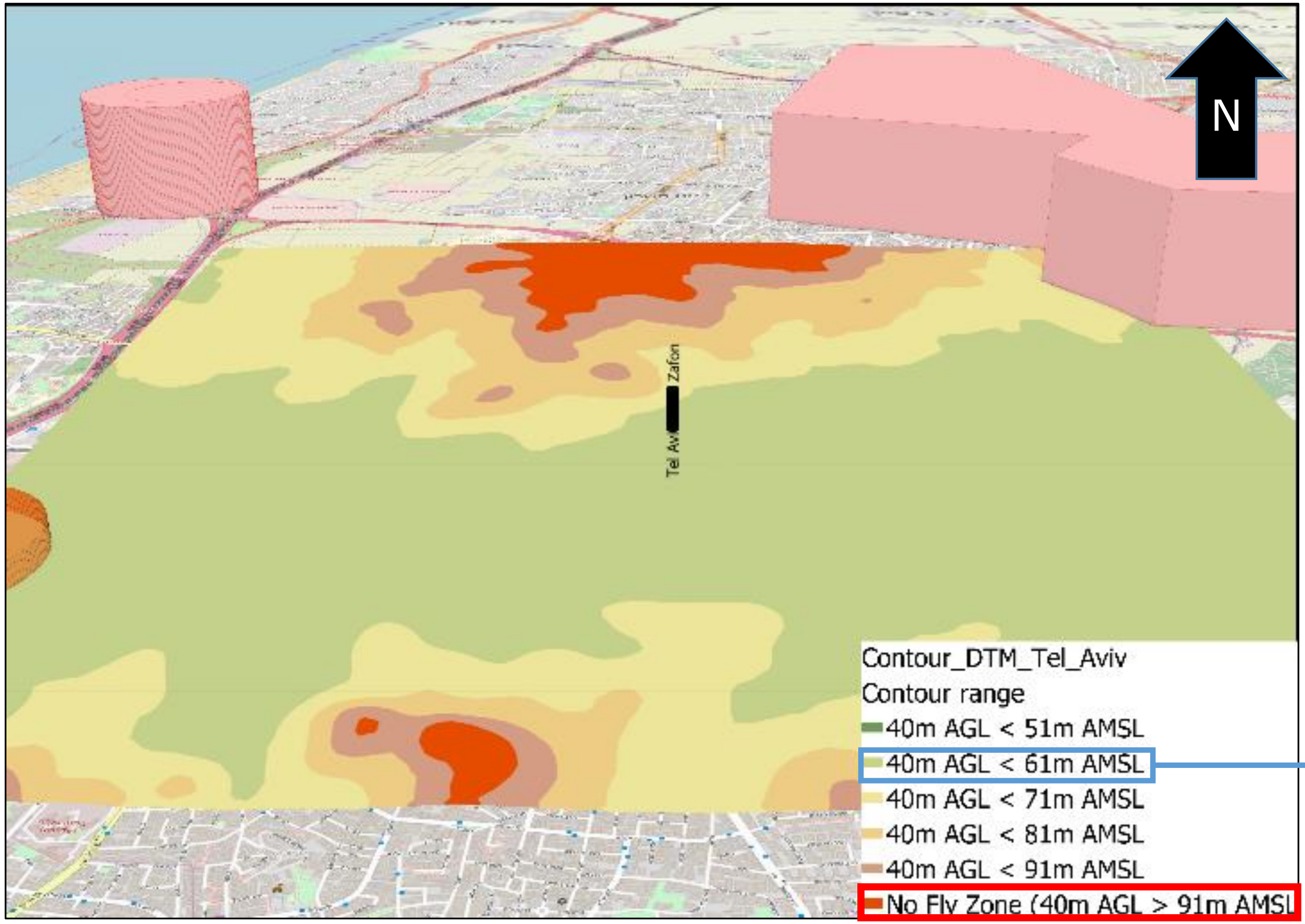


Aerial infrastructure in the area of interest – Tel Aviv

- Within the area of interest around Shuk Tzafon (Tel Aviv), there are several aerial infrastructures
  - Prohibited areas (no fly zones)
  - Permanent air volumes in use – such as the tethered balloon in the Yarkon Park
  - CVFR routes at a minimum altitude of 800 ft. AMSL, that requires a protection area 2 km wide at an altitude of 300 ft. / 91 m AMSL



Initial Assessment of the terrain in the area of interest – Tel Aviv



Assessing the terrain in the area of interest reveals that it is possible to fly at a minimum altitude of 40 m AGL for the most parts without intruding the 91 m AMSL protection surface

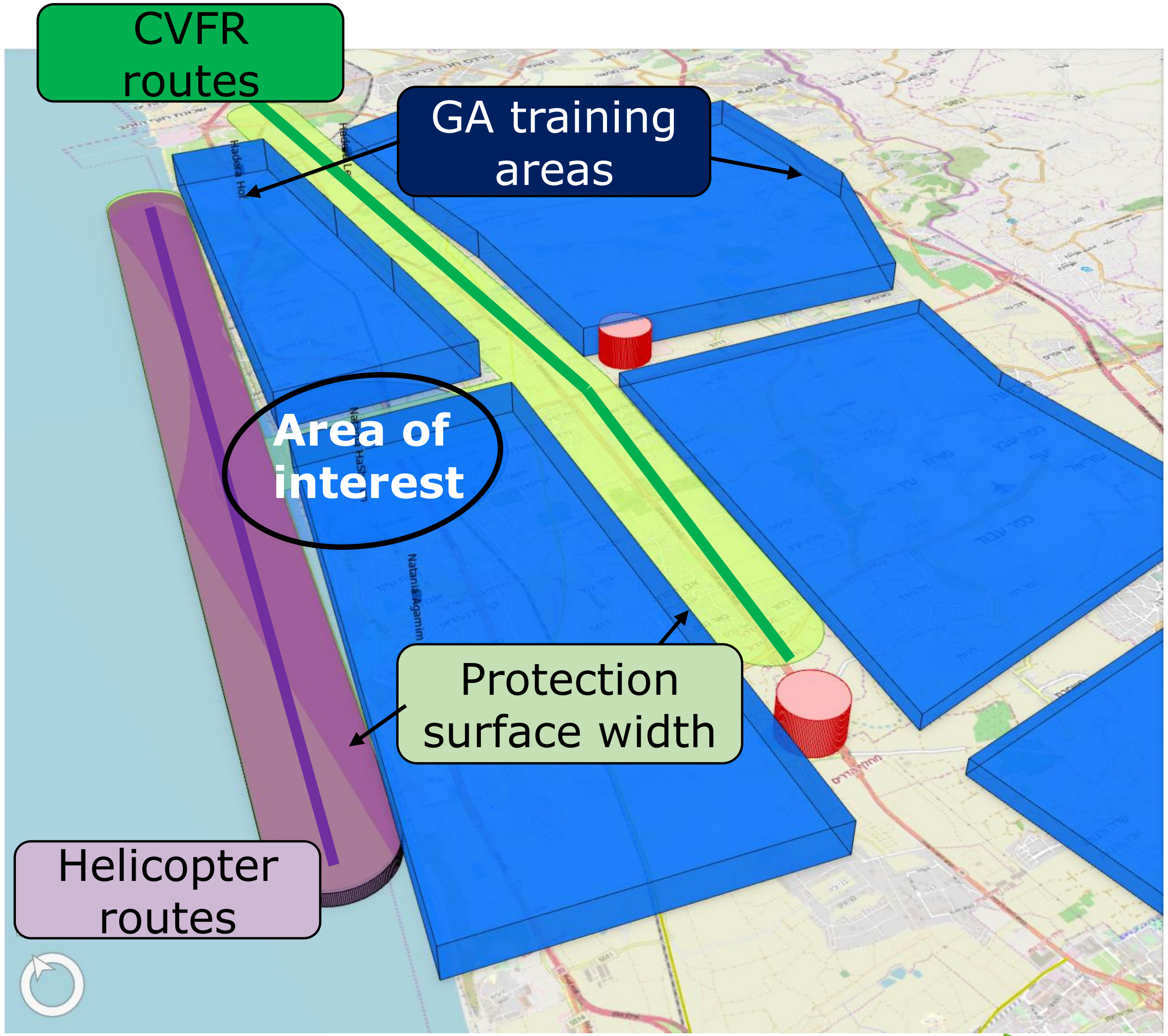
- In the figure to the left, operating within the red/brown marked areas is prohibited

Operating at a minimum height of 40 m AGL, and a restriction for a maximum altitude of 91 m AMSL (as a result of the CVFR route protection surface) a 30 m vertical volume can be made available for UAV operation

Aerial infrastructure in the area of interest – Netanya

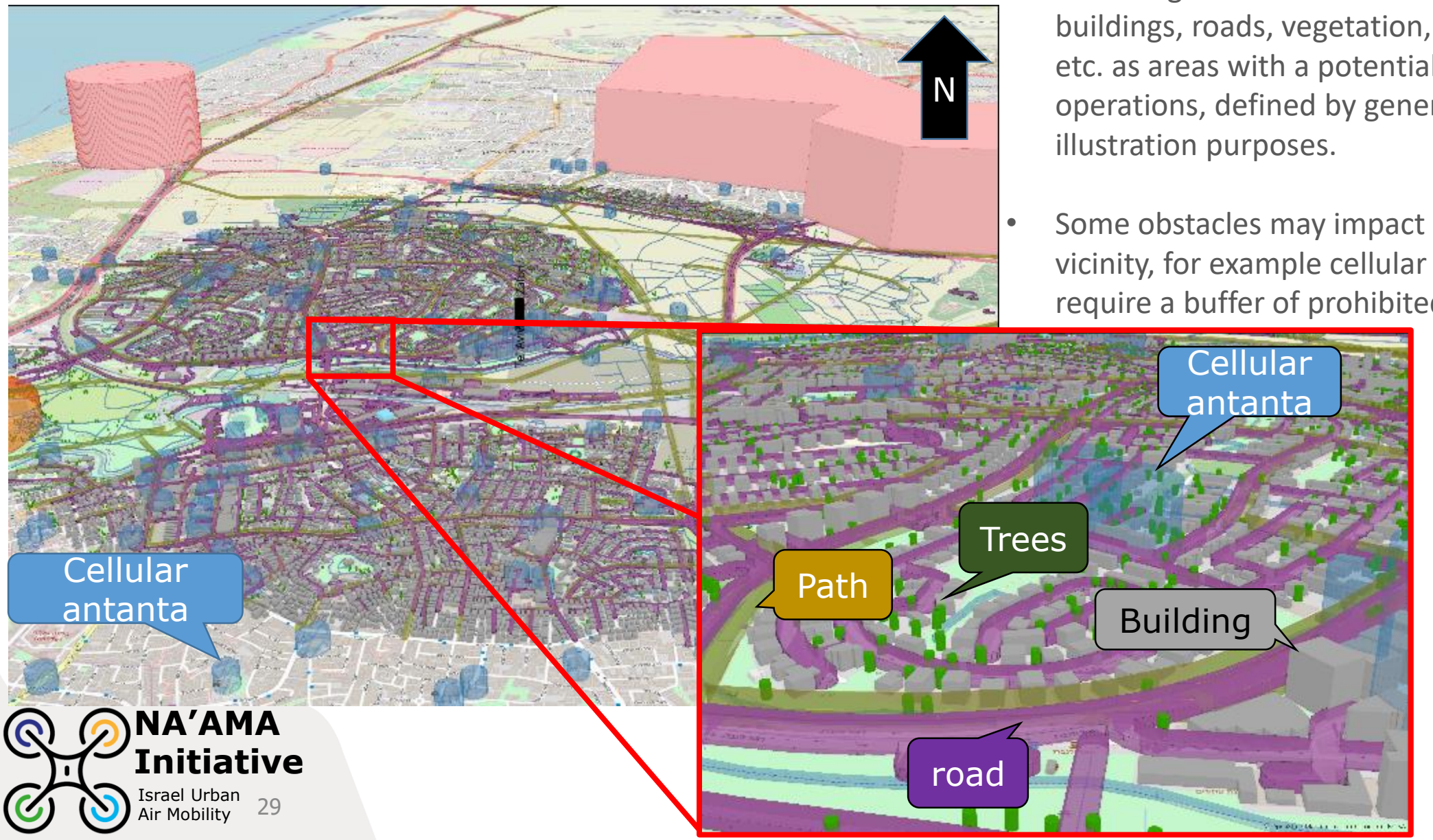
Within the area of interest around HaSharon mall in Netanya, there are several aerial infrastructures

- GA training areas at a minimum altitude of 500 ft. AMSL. The minimum altitude might be restricted during UTM operations.
- CVFR routes that requires a protection area 2 km wide at an altitude of 300 m AMSL – not expected to have an impact on UAV activity within the Area of interest.
- Helicopter routes along the shoreline, at an altitude of 400 ft. AMSL. The routes protection area may restrict the UTM operation, so that they will be limited to east of the shoreline only.
- A VFR area for the use of LSA, that borders in the west with route 2, from the ground and up to 700 ft. AMSL.



Initial Assessment of the obstacles in the area of interest – Tel Aviv

- Assessing the obstacles on the ground includes buildings, roads, vegetation, pedestrian paths etc. as areas with a potential to obstruct the operations, defined by generic criteria for illustration purposes.
- Some obstacles may impact operations in their vicinity, for example cellular antennas that may require a buffer of prohibited airspace.

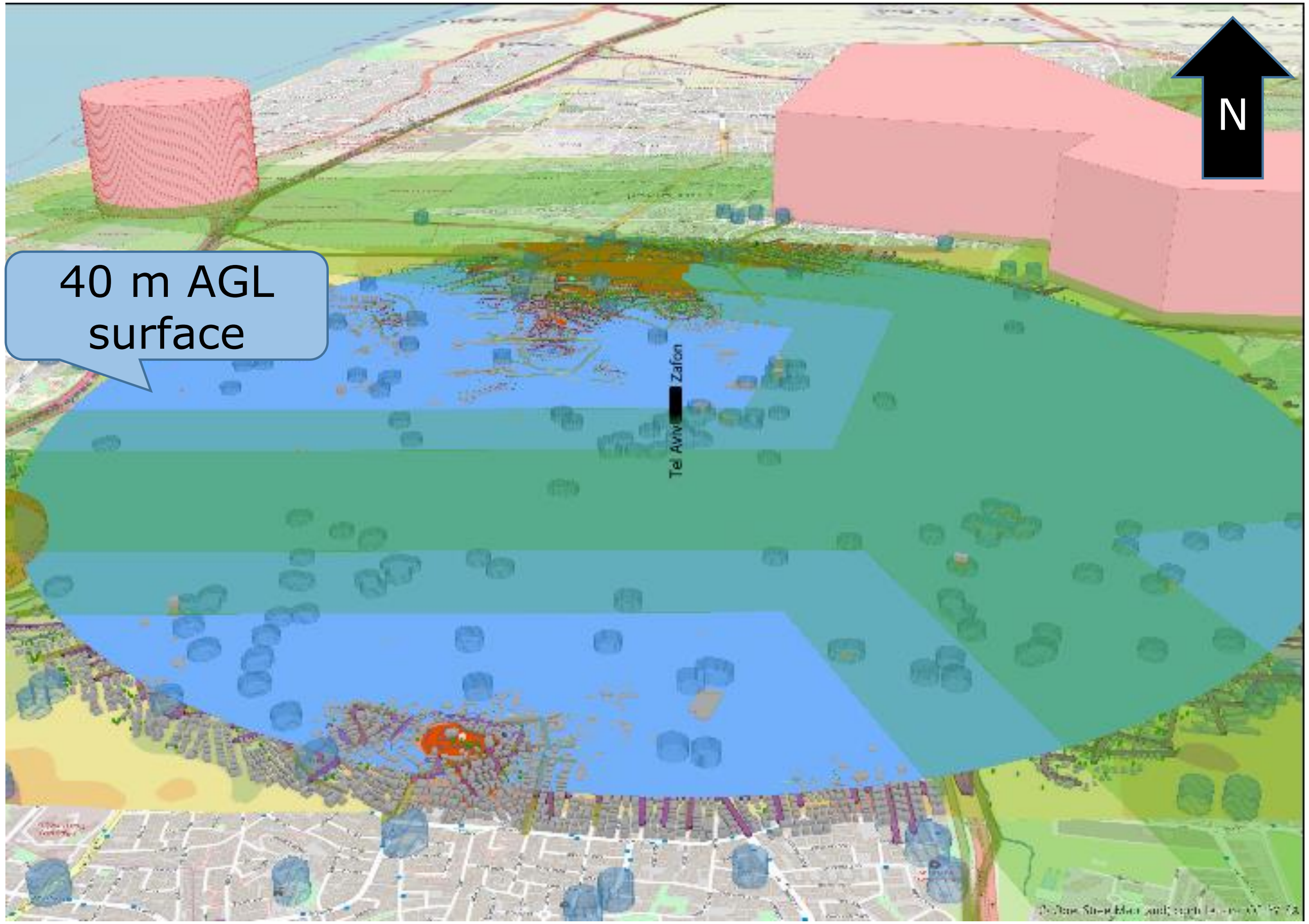


Initial assessment results of the area of interest – Tel Aviv

- Within a 3 km radius from Shuk Tzafon, the terrain enables operating at 40 m AGL in the most part of the area of interest.

- Initial assessment of the obstacle reveals that there is an effect on the available airspace for the operation, but it is possible to operate freely at the most part of the area of interest.

- It is feasible to operate in a higher altitude outside the CVFR protection areas, thus enabling additional available airspace in the south part of the area of interest.



NA'AMA Initiative
Israel Urban Air Mobility

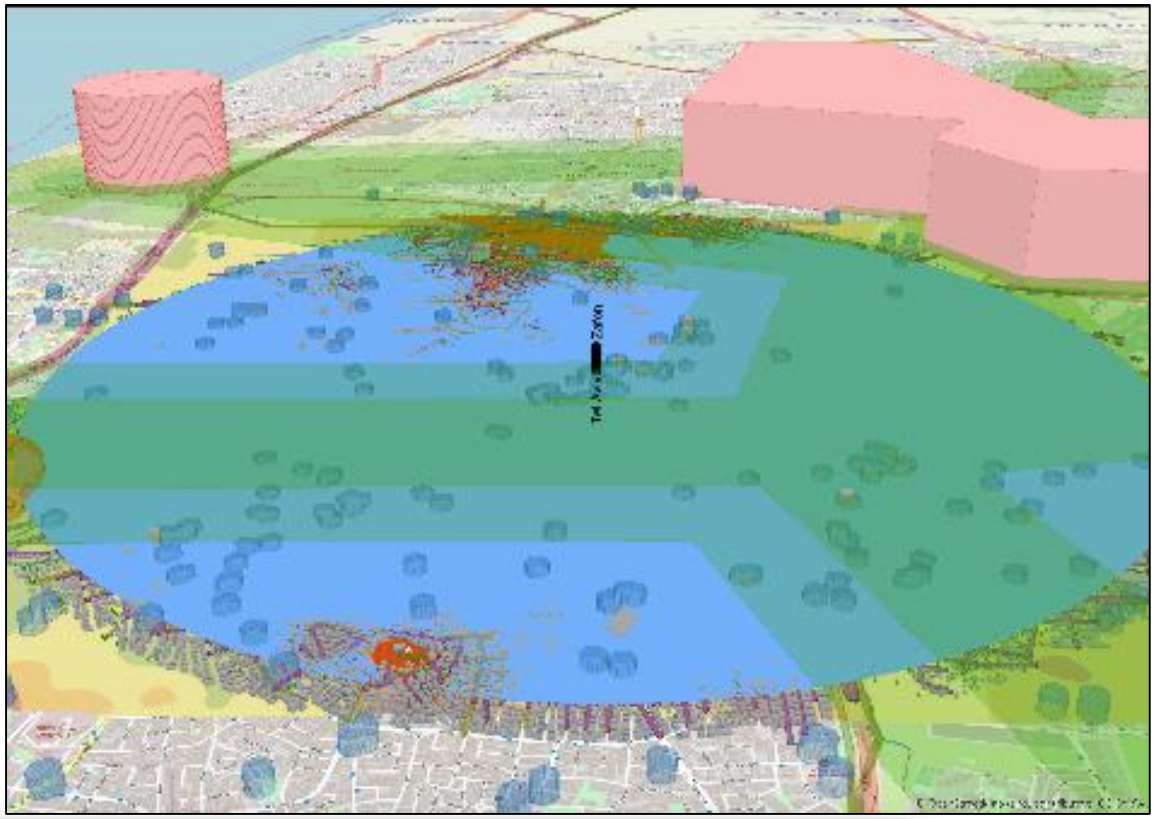
CAAI

Summery

- Airspace assessment is a fundamental stage in any process aiming to enable the operation of UAS in an urban environment, that consists of dense infrastructures, and multiple airspace users.

- The methods used to preform such assessments are being developed worldwide, as a part of the UTM concept projects, led by Eurocontrol and the FAA.

- Initial Airspace Assessment, conducted by AGL Aviation, of the areas of interest around Shuk Tzafon in Tel Aviv and HaSharon mall in Netanya reveals it is feasible to accommodate the required UTM operation, whilst maintaining an acceptable level of safety, in this aspect, with minimal to none impact on other airspace users.



Thank you for your time

The Fuel Choices and Smart Mobility Initiative

AYALON HIGHWAYS

State of Israel
Ministry of Transport and Road Safety

Fuel Choices and Smart Mobility Initiative

רשות החדשנות
Israel Innovation Authority

CAAI רתא

Initiative Goals

1. Making the State of Israel a center for technology-oriented research knowledge and industry in the field of alternative fuels and smart mobility.

2. Leading solutions for local market assimilation

3. Promoting the vision and knowledge across the globe. Cooperative ventures for accelerating the rate of global progress in the field of alternative fuels and smart mobility.

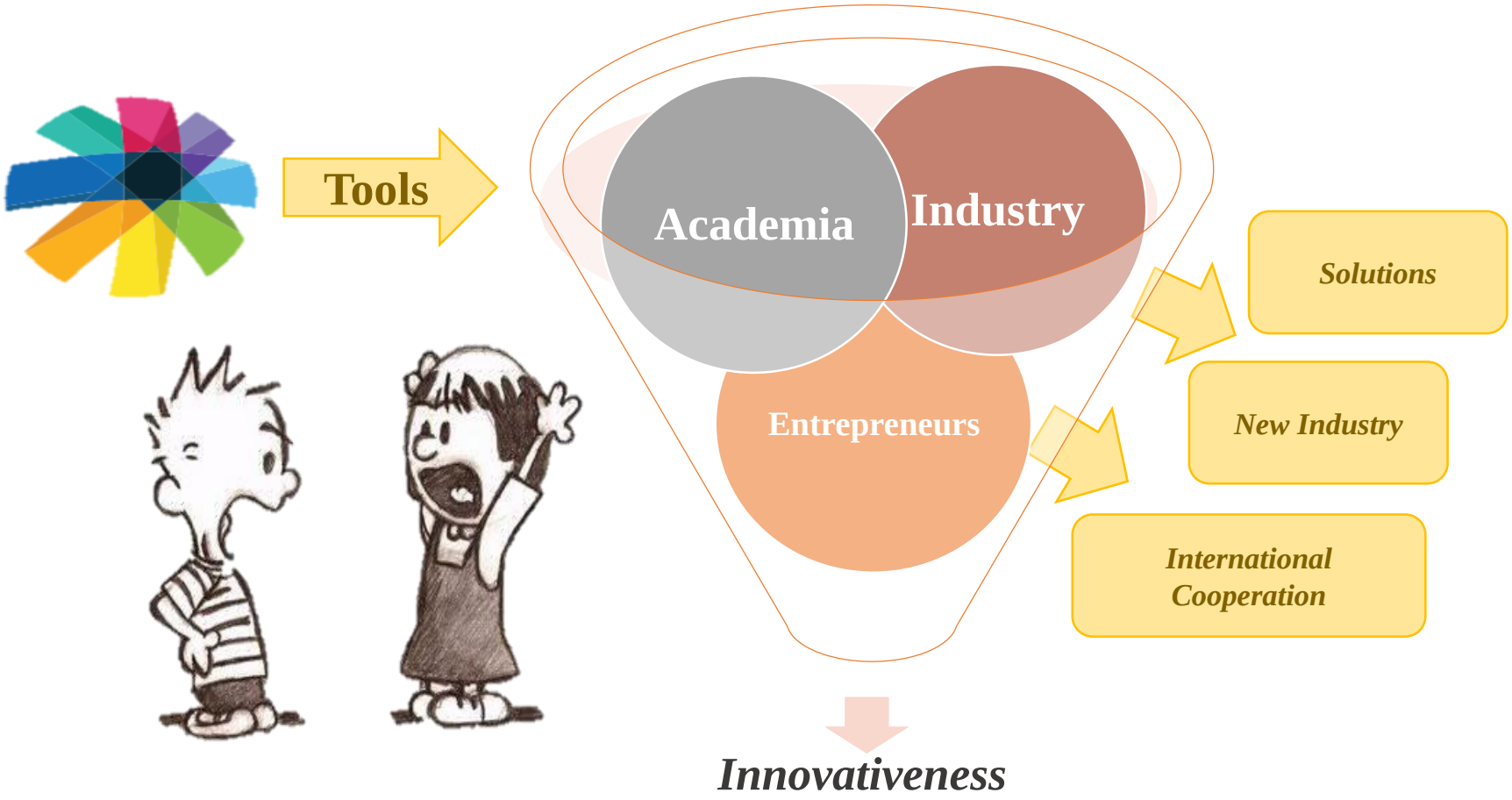
The Administration as an Inclusive, Accelerating and Motivating Professional Entity

Promote supportive and enabling regulations

Identifying trends, challenges, obstacles, failures and necessary intervention

With a finger on the pulse, the eyes and ears for industry and abroad

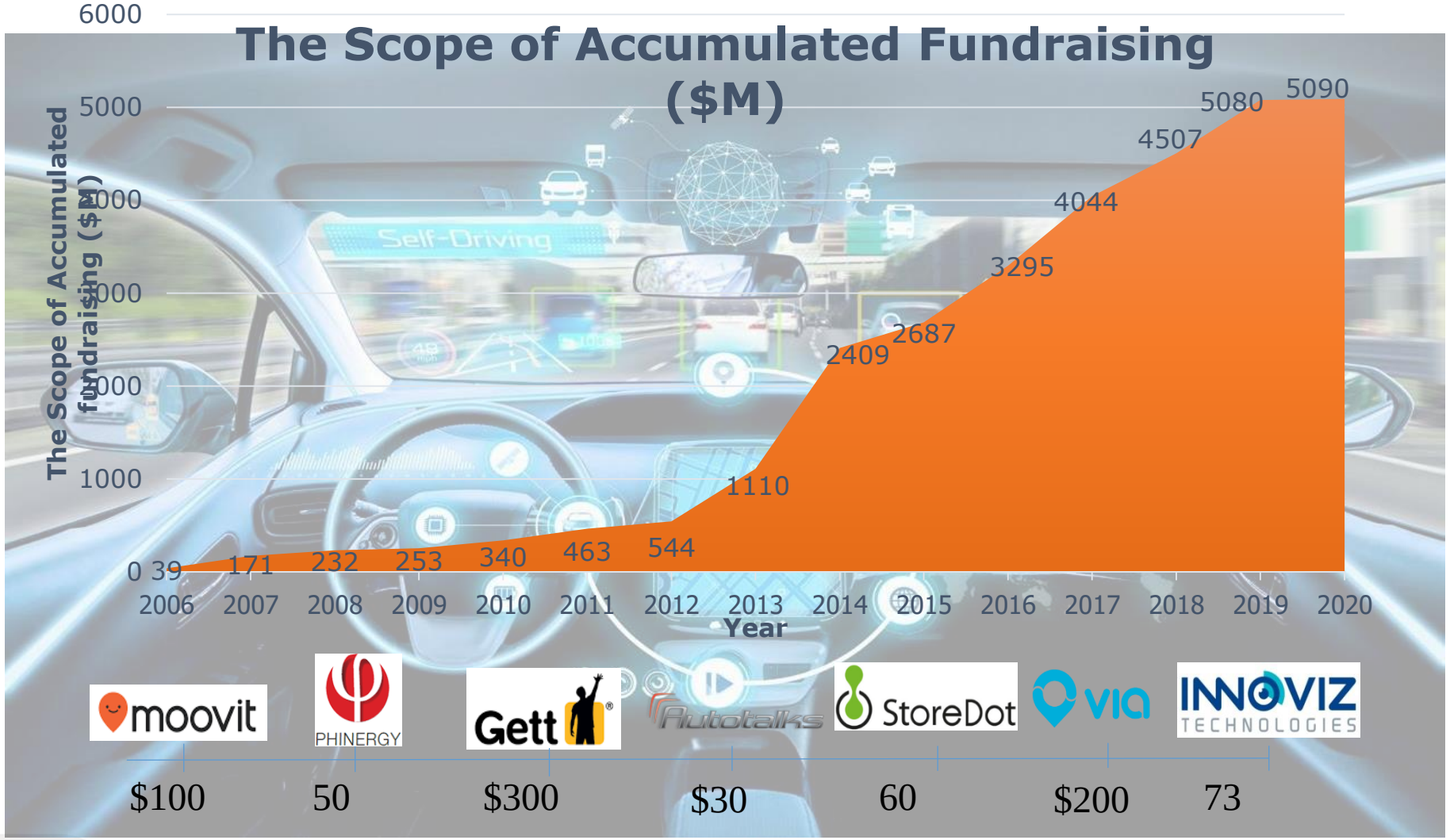
Promoting Innovativeness



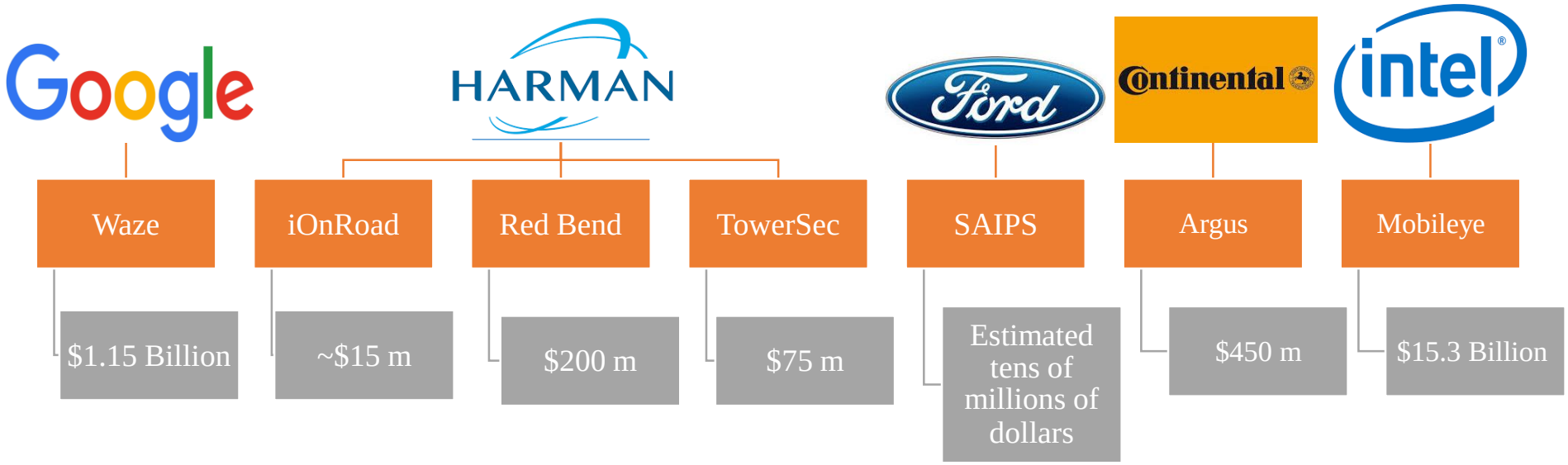
A National Plan for Smart Mobility
Government Resolution No. 2316, January 2017

Academic Cooperation	Databases and Mapping	Experimental Center
International Cooperation	Regulations	Pilots
Sectoral Cooperation	Global Marketing	Supportive Business Environment

The Scope of Accumulated Fundraising



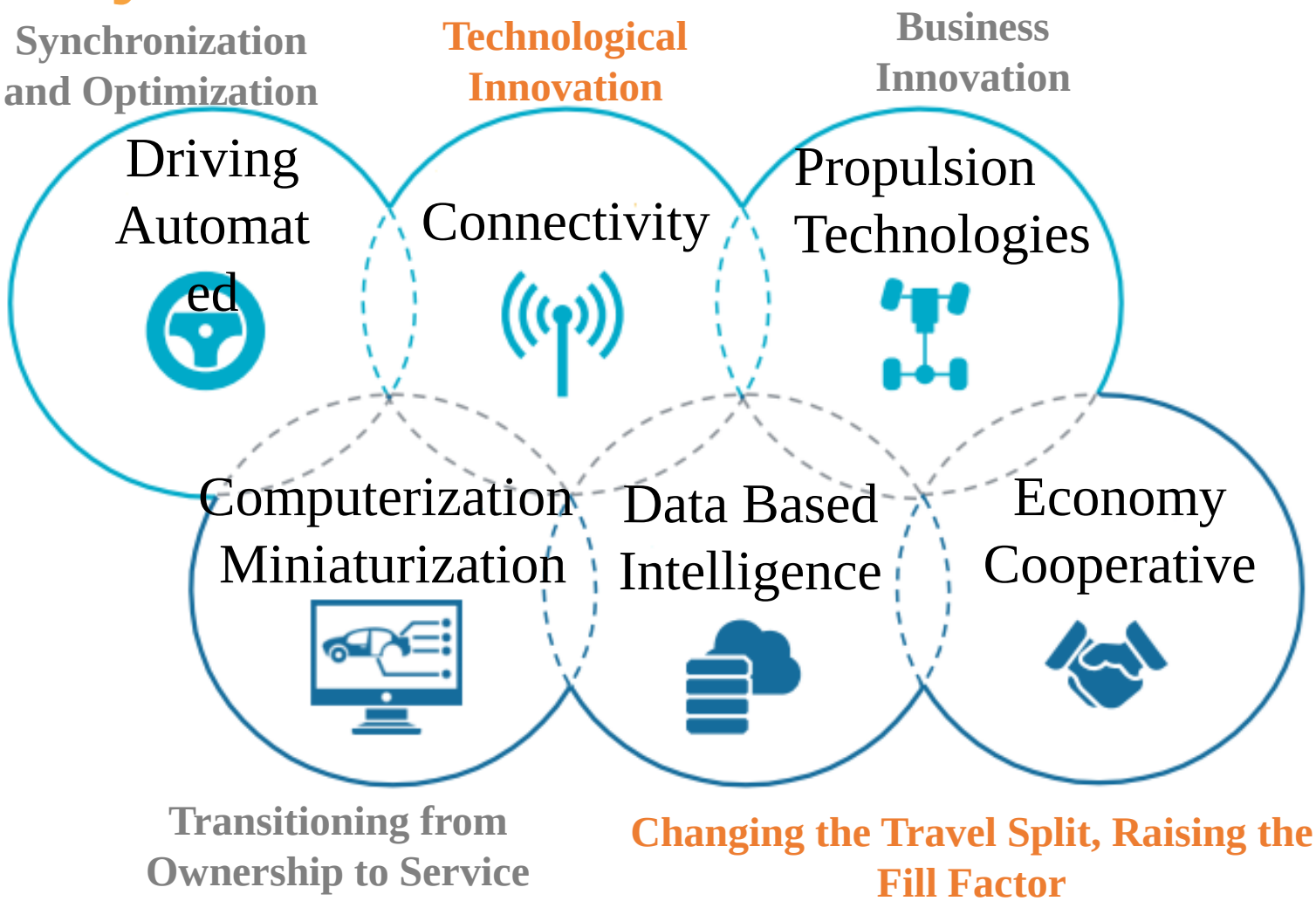
Acquisitions



International Activity in Israel

		Technology scouting	Local investment	Local R&D center	Comments
OEM	BMW	■	■		Several investments, e.g. Moovit
	Daimler	■	■	■	R&D center opened in Q4/2017, startup investments
	Fiat	■	■	■	Several collaborations with startups & regional dev.
	Ford	■	■		Invested in SAIPS, tech. scouting activities
	GM	■	■	■	R&D center, founded 2008, today > 250 employees
	Hyundai	■	■		Plans R&D center, invested in Autotalks, Technion
	Renault	■	■	■	Launched USD 1 billion VC fund & Innovation Lab
	Seat	■		■	Tech scouting operations via Seat Xplora project
	Skoda	■		■	Invested in DRIVE, several other investments
	Volvo	■	■		Invested in DRIVE, several other investments
	VW Group	■	■	■	Invested in cyber security, Gett, Tel Aviv campus
OES	Bosch	■	■	■	Opened R&D center in 2016, invested in AnyVision
	Denso	■		■	R&D center focusing on AI and autonomous driving
	LG	■	■	■	R&D for IoT, wellness devices, entertainment.
	Plastic Omnium	■	■		Investment in Elbit Energy, POCellTech
	Samsung / Harman	■	■	■	R&D centers, some acquisitions by Harman

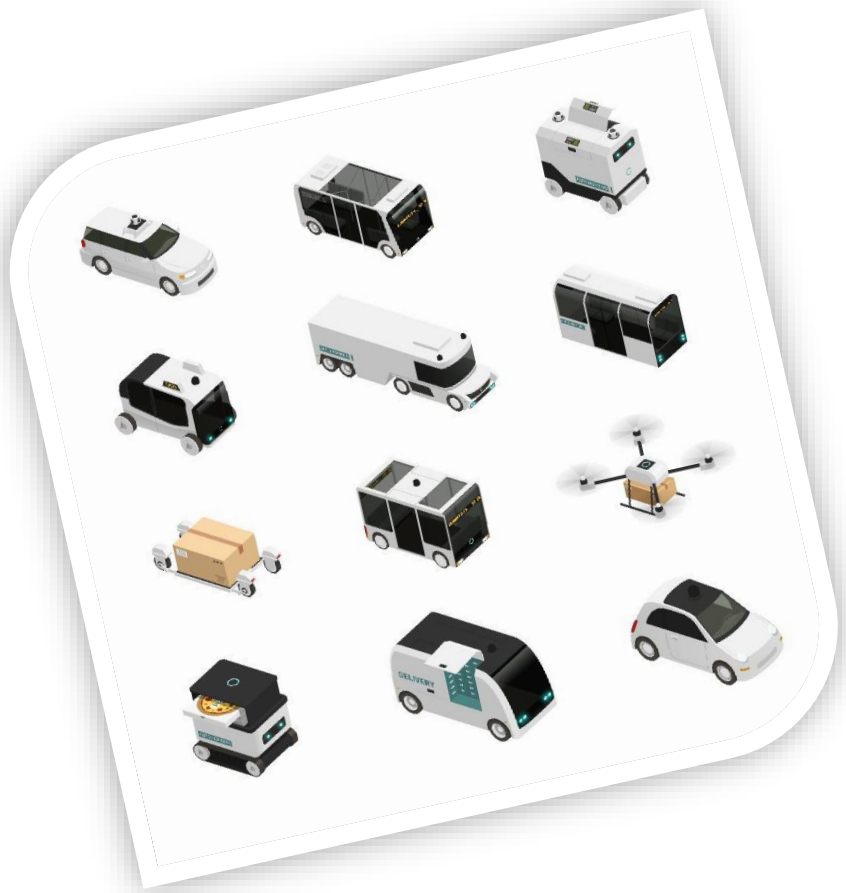
Smart Mobility



Macro Economics and Smart Mobility (A Closing Thought)

Great Challenges:

- Low Productivity
- Cost of Living
- Housing Distress - Periphery - Center
- Inequality - Accessibility
- Congestion
- Traffic Accidents
- Pollution



Thank you !
We Are Social

Daniel Gabbay - 0542100318
Danielga@pmo.gov.il

Smart Mobility Test Center Capabilities - Ayalon Highways

The center is a conceptual (not physical) center

Work Concept:

- Sunk Costs - the Government's Investment
- Current Costs - at the expense of the experimenters

The center is operated by franchisees

- Two franchisees - BWR and IAI
- The franchisee provides experimental services upon demand
- The company executed regular and periodic monitoring

Components of an Experimental Site Folder

- Active sites and under construction
- Cooperation with the MOD
- The process for entering a permanent site
- Cyber Center

Technological Accelerators

- The Transportation Ministry Program to Promote Demonstration Projects of Innovative Transportation Technologies
- Ayalon Highways leads in the program's implementation
- The program's objective **- to locate and integrate technologies necessary for improving traffic safety and management in the State of Israel**

Program Partners

Global Transportation Player

Or

A Consortium of Players

Ministry of Transport and Road Safety — Regulator

AYALON HIGHWAYS — Test sites

סייבר ישראל Cyber Israel — Cyber knowledge, guidance & data

מתי THE STANDARDS INSTITUTION OF ISRAEL; TÜV SÜD — Standards knowledge and regulations

סייבר ישראל Cyber Israel
AYALON HIGHWAYS
Ministry of Transport and Road Safety
45

Testing Center Capabilities - Ayalon Highways

Israel Innovation Authority

AYALON HIGHWAYS

State of Israel
Ministry of Transport and Road Safety

Fuel Choices and Smart Mobility Initiative

רשות החדשנות
Israel Innovation Authority

CAAI רתא

המינהלת הישראלית למו"פ האירופי
Israel-Europe R&I Directorate

R&D Plans of the European Union
Urban Air Mobility

for the UMAD Presentation - 17.2.2020

Dr. Nili Mendleblit

Direction of the Department for **Aviation, Space, Transportation, Materials & Advanced Manufacturing**

Innovation Authority - ISERD

רשות החדשנות
Israel Innovation Authority

Ministry of Science Technology & Space

Israel Innovation Authority\ ISERD

Israel Innovation Authority:

- A statutory authority, created in November 2016 (replacing the “Office of the Chief Scientist in the Economy Ministry + the Israeli Industry Center for R&D)
- Responsible for planning and implementing Israel’s policy on innovation
  - Operates programs to promote entrepreneurism and innovation in Israeli industry
  - Monitors and analyzes the changes taking place in the global innovation environment
  - Advises government and Knesset committees on the subject of innovation in Israel

ISERD - ISrael Europe Research and Innovation Directorate

- An inter-ministry directorate, operating under the Innovation Authority
  - The Economy and Industry Ministry, Planning and Budgeting Committee, the Science, Technology and Space Ministry, the Foreign Affairs Ministry, the Finance Ministry;
- ISERD serves as an interface between the Israeli Government and the EU in all matters pertaining to European R&D
- The Role of ISERD: Promote the participation of Israeli entities in the European R&D programs
  - Represent the State of Israel on the management committees of the European Programs
  - Serve as a National Contact Point for Israeli participants Facilitate the programs’ accessibility, and enhance the quantity and quality of the submissions

The European Union Framework Program for Research and Innovation

The European Union Central R&D Fund is the world's largest,

- since 1984, every program continues for 7 years
- "**Horizon 2020**" = The Eighth Program 2014-2020
- "**Horizon Europe**" - The Ninth Program 2021-2027

44 countries currently participate in the program (28 EU members + 16 affiliates)

The Objectives:

1. To strengthen the competitiveness of European industry
2. Cope with societal challenges
3. Create a Joint European R&D Zone

The program's management: By the European Commission

- Construction of a perennial work plan, while consulting with representatives of the program's member countries

Funding members of Horizon 2020

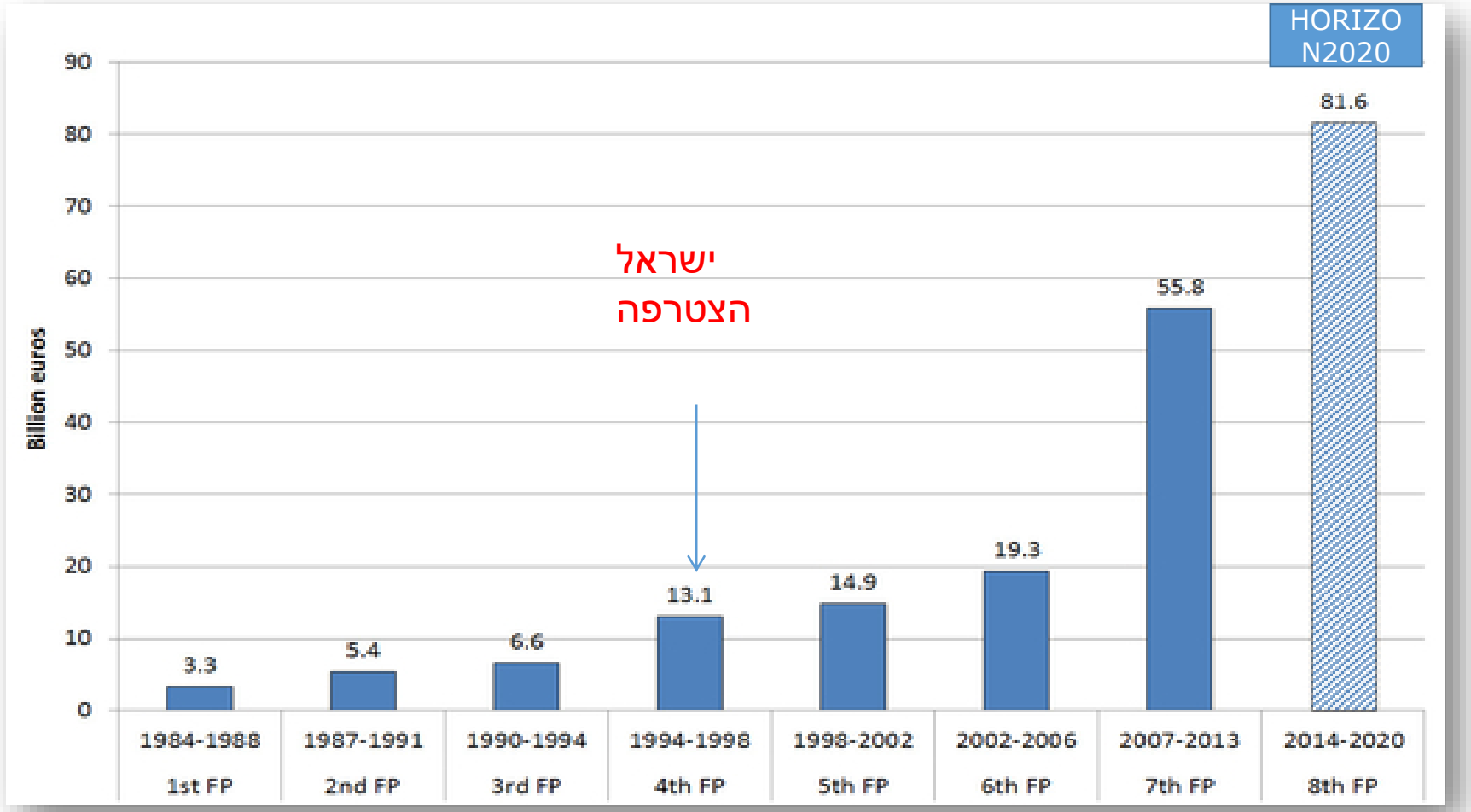
EU MEMBER STATES (28)

- Austria
- Belgium
- Bulgaria
- Croatia
- Cyprus
- Czech Rep.
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Ireland
- Italy
- Latvia
- Lithuania
- Luxembourg
- Malta
- Netherlands
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia
- Spain
- Sweden
- UK

ASSOCIATED COUNTRIES (16)

- Albania
- Bosnia and Herzegovina
- Faroe Islands
- FYROM – Macedonia
- Iceland
- Israel
- Moldova
- Montenegro
- Norway
- Serbia
- Switzerland
- Turkey
- Ukraine
- Tunisia
- Georgia
- Armenia

The Program Budget Framework Over the Years



For who is the program intended? - For everyone!

For any legal entity - university, company, government agency… That is registered in:

- An EU member state
- A country associated to the program
- Any third country mentioned in an appeal/request

Funding for all phases of the R&D process - from basic science to close to market applied R&D.

Most of the submissions to the program are in the following cluster: **At least 3 participants from 3 different program member countries**

Israeli participation in the Horizon2020 Program (results from requests issued during 2014-2018)

Submitted Participations		10273
Successful Participations		1510
Success by sector:	Industry	656
	Universities	735
	Others	119
Submitted Proposals		8837
Successful Proposals		1233
Success Rate		14%
Value of Israeli grants: 880 M€	Industry	285.58 M€
	Universities	573.46 M€
	Others	21 M€

Advantages of the European R&D Program

- Generous funding grants without the need for repayment
- High percentages of support (70-100% of direct expenditures + 255 overhead)
- Participant ownership of the IP created in the project
- Support during all phases of research and innovation
- Dialogue with the leading parallel organizations in Europe
- Cooperative ventures vis-a-vis other sectors (academia, government, end-users…)
- Exposure to potential clients and suppliers - access to multiple countries
- Access to advanced infrastructures and research centers
- Influence on international policy and standardization processes

The Horizon 2020 Program (€ 81.6B)

Excellent Science (€24.4 B)

- European Research Council (€13.1B)
- Future & Emerging Technologies (€2.7B)
- Marie Sklodowska-Curie Actions (€6.1B)
- Research Infrastructures (€2.5B)

Industrial Leadership (€17 B)

Key Enabling Technologies (€13.5B)
- ICT
- Nano, Materials
- Manufacturing
- Biotech
- Space

- Access to Risk Finance (€2.9 B)
- Innovation in SMEs (€0.6 B)

Societal Challenges (€29.7 B)

- Health (€7.5 B)
- Food (€3.9 B)
- Energy (€6 B)
- Transport (€6.3 B)
- Climate (€3 B)
- Inclusive Societies (€1.3B)
- Security (€1.7 B)

Spreading Excellence (€0.8 B)

Science for Society (€0.5 B)

EIT (€2.7 B) | JRC (€1.9 B) | Euratom (€1.6 B)

ISERD המינהלת הישראלית למו"פ האירופי Israel-Europe R&I Directorate

רשות החדשנות Israel Innovation Authority

Ministry of Science Technology & Space

The Horizon 2020 Program (€ 81.6B) - Aviation Research

Excellent Science (€24.4 B)

- European Research Council (€13.1B)
- Future & Emerging Technologies (€2.7B)
- Marie Sklodowska-Curie Actions (€6.1B)
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Urban Air Mobility – 2 open calls in Y2020

1. Under the **Transport** Call
   - **Objective**: **European Industrial Leadership**: development of advanced technological capabilities to reinforce European global leadership and competitiveness …. investigate passenger-centric business cases, spanning multiple transport stakeholders.

2. Under the **SESAR** initiative (Single European Sky ATM Research).

   SESAR Objectives:
   - **Creating a Single European Sky**: Organizing airspace into functional blocks, according to traffic flow rather than to national borders;
   - **Modernization of the European air traffic management (ATM) system** by coordinating all relevant R&D efforts, and regulation.
   - Ensuring the **involvement of civil and military stakeholders** of the air traffic management sector in Europe (air navigation service providers, airports, the manufacturing industry, relevant scientific institutions)

Urban Air Mobility – Call #1 - Transport

MG-3-6-2020: Towards sustainable urban air mobility

Goals and Scope:

- Develop novel concepts, technologies and solutions for **Point-to-point air mobility** at urban / suburban & peri-urban / inter-urban level
- Focus on potential early **urban air mobility services** (e.g. for air medical emergencies, for safety & security services, for logistics, etc).
- **Cross-disciplinary** research activities on **autonomous systems** and on **efficient integration** with urban infrastructure, with energy and communication networks and with other transport modes
- Collaboration and communication with **local authorities**
- **TRL up to level 6 (**= technology demonstrated in relevant environment)
- **Synergies with other EU activities:**
  - **EIT on Urban Mobility, EIP on Smart Cities and Communities , Galileo, Copernicus , 5G**
- May include the explicit commitment from the European Aviation Safety Agency (**EASA**)
- **International cooperation encouraged** (eg sharing of practices with early adopters of urban air mobility in Singapore, Dubai, Sao Paulo, Mexico DF, etc.)
- Budget: 4-6M Euros per project (Total Budget 15M)

MG-3-6-2020: Towards sustainable urban air mobility – CONT.

Proposals should address all 3 research areas:

1. Safety and security: including adverse **weather** and airflow conditions at low altitudes, **human factors** and **automation**, **collision and avoidance**; electro-magnetic compatibility; detection and surveillance of **physical and cyber threats**, prevention, preparedness, response and recovery from threats…
2. Sustainability
    1. **Noise and visual pollution**
    2. **Overall Environmental footprint**: energy demand; local emissions and global greenhouse gas emissions)
3. Socio-Economic aspects:
    - **Regulation/Policy**: Pollution, privacy, land-use, liability, safety and security (including enforcement), dedicated certification schemes.
    - **Public Acceptance**: Anticipate the behavior, the blocking points, the needs and public tolerance/embracement for such a new mobility.

MG-3-6-2020: Towards sustainable urban air mobility – CONT.

In addition, address one or more of the following research areas:

1. Services: new door-to-door or emergency services concepts
   - approaches for regulatory due processes associated to the sign-off of urban air services
   - allowing UAM traffic to be interwoven with multi-modal urban transportation or emergency systems (e.g. ground/air ambulances),
2. Operations: new concepts of operations
   - safe and secure utilisation of the air space.
3. Power-plant/propulsion system development
   - high power/weight ratio, fast battery recharge/fuel-cell refill, high level of reliability and fail-safety and low level of noise, emissions and maintenance requirements.
4. Infrastructure adaptation
   - evolution and integration into transport, energy and ICT networks

MG-3-6-2020: Towards sustainable urban air mobility – CONT.

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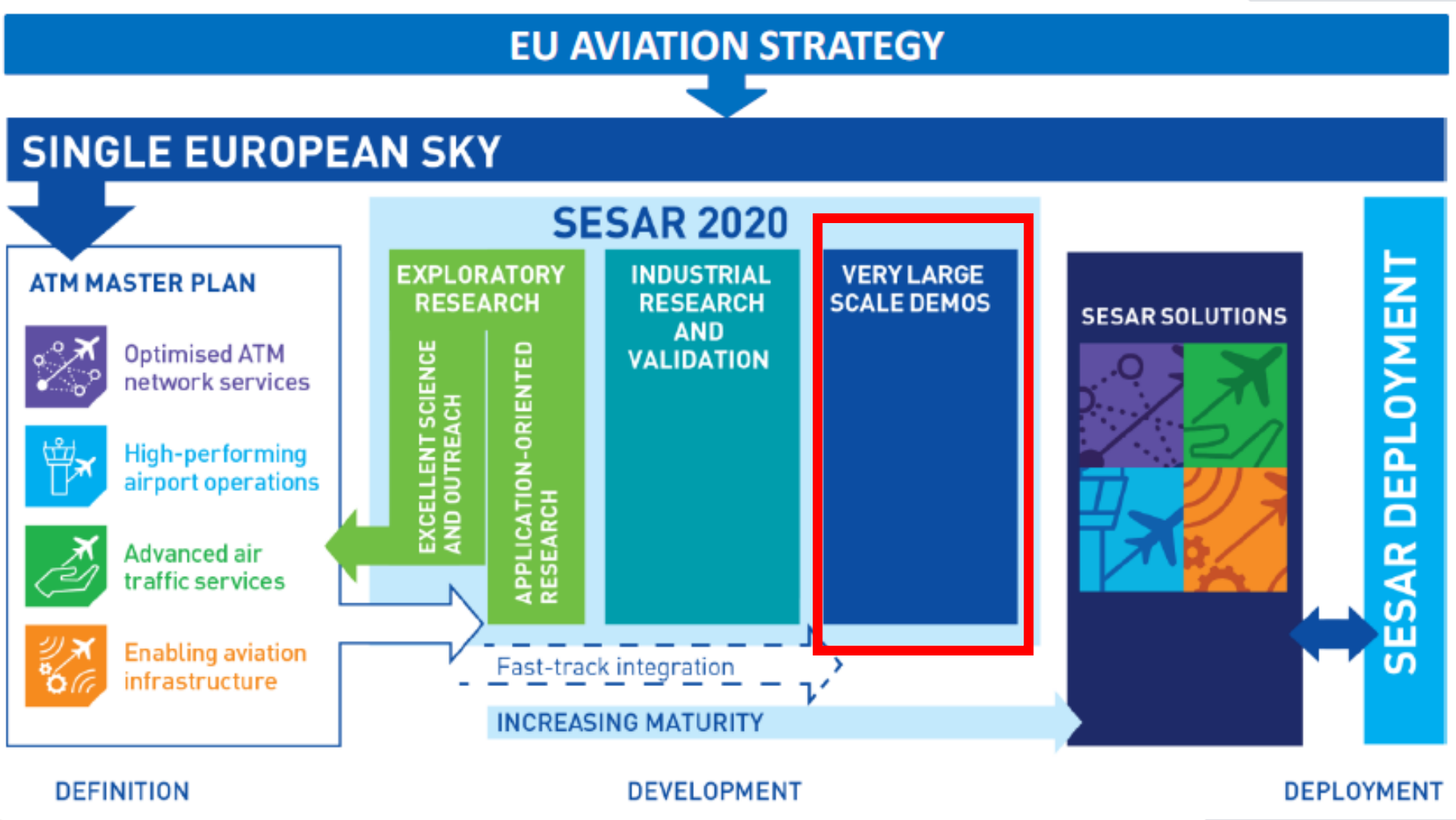
Urban Air Mobility – Call #2 – SESAR



Urban Air Mobility – Call #2 – SESAR

The SESAR 2020 program structure

The SESAR vision

OUR VISION

With SESAR, the future of air traffic management is characterised by:

Flight-centric operations, so airlines can fly their preferred routes

Improved information sharing, creating an intranet of services and applications accessible by all aviation stakeholders

Interoperable systems, allowing connectivity of systems across borders

Increased **virtualisation**, regarding provision of services irrespective of the location of physical infrastructure

Integration of all vehicles into Europe's airspace, including drones

NA'AMA

SESAR - Open VLD 2 call – Jan 2020

- VLDs
  - The role of VLDs is to bridge the R&D with implementation
  - VLDs integrate new technology elements into existing systems
  - The key stakeholders participate in the VLDs is essential to achieve the goals and secure commitment to operational roll-out.
  - 3 Goals:
    - Airspace **optimisation**
    - Safe integration of **drones** (demonstration of U-space capabilities and services to enable Urban Air Mobility)
    - **Environment**: demonstrating ATM operations mitigating aviation's environmental footprint and significantly contributing to the reduction of CO2 emissions

SESAR-VLD2-03-2020: U-space capabilities and services to enable Urban Air Mobility

Goals:

- The objective of this VLD is to demonstrate the **safe integration of UAM** as additional airspace user.
- **Integrating drones into all environments and classes of airspace**, operating safely and efficiently alongside manned aircraft, **for supporting door-to-door services for people and goods**.

SESAR-VLD2-03-2020: U-space capabilities and services to enable Urban Air Mobility

Scope:

The VLD will include the following activities:

Execution of **flight demonstrations in accordance with the safety conditions**, the demonstration flights should also include vehicles with full **autonomous capabilities**.

As a result of the demonstration flights, the Demonstration Report will:

✓Describe **guidelines for safe UAM operations**, proposals for **regulatory change**, propose **operational procedures** and mechanisms for an effective interface with ATC and U-Space service providers, address **safety, certification** and **regulatory needs**

SESAR-VLD2-03-2020: U-space capabilities and services to enable Urban Air Mobility

Scope:

The VLD will include the following activities:

Attention is drawn to consider existing references to ensure:

- **Building and possibly further extending U-space requirements** and CONOPS in order to address the specificities of UAM.
- Building on and proposing possible refinement to U-space architecture principles and to the first U-space **"State of the Art" report** integrating all SESAR U-Space projects outcomes.
- Consolidating requirements with the **concept of smart cities**.

Funded projects - AW-Drones

Contributing to a well-reasoned set of Airworthiness Standards for mass-market drones

(MG-2-3-2018 - Airworthiness of mass-market drones *CSA*)

- ✓**Budget:** 2.6 M Euro
- ✓**IAI Budget:** 94,910 Euro
- ✓**Consortium:** 13 partners (coordinate by Italy)

AW-Drones projects intends to contribute to the safe use of mass market drones by facilitating the on-going EU regulatory process for the definition of rules, technical standards and procedures. The Action will benefit from the contribution of the most relevant stakeholders in the drone value-chain including drone suppliers, operators, academia and regulators

Funded projects - AW-Drones

Specific objectives:

1. Current standardization activity and standard perspectives for evolution of drone products and services
2. Research works regarding safety and incidents involving drones
3. Local and regional solutions adopted by aviation safety regulators to address mass market drone operations
4. Application issues emerging from different market application of drones
5. And more..

Funded projects - SAFEDRONE

Activities on drone integration and demonstration in VLL operations

(SESAR-VLD1-10-2016 - Safe integration of drones)

- ✓**Budget:** 1,455,768 Euro
- ✓**IAI Budget:** 203,623 Euro
- ✓**Consortium:** 7 partners (coordinate by Spain)

SAFEDRONE project is to acquire practical experience in Very Low Level (VLL) operations where **general aviation, state aviation and optionally piloted aircrafts and drones will share the airspace.**

Funded projects - SAFEDRONE

Specific objectives:

1. Demonstrate how to integrate general aviation, state aviation, optionally piloted aircrafts and drones into non-segregated airspace in a multi-aircraft and manned flight environment.
2. Perform a large number of demonstrations in order to accumulate evidences and experience about the required services and procedures necessary to operate drones in a safe, efficient and secure way within U-Space.
3. Validate proof of concept implementations of a large variety of U-Space services and procedures.
4. Provide evidences to EASA and National Aviation Authorities to reinforce the safe integration of drones under U-Space for the different drone categories. Also, the lessons learnt and the technologies used during the project will be proposed to the different standardization bodies.
5. Coordination with the recently approved SESAR-RPAS projects in order to align the demonstrations with the CONOPS and technological developments of these projects.
6. Increase the awareness of the advances in U-Space within Europe through the dissemination of the obtained results.

Thank you!

AYALON HIGHWAYS

State of Israel
Ministry of Transport and Road Safety

Fuel Choices and Smart Mobility Initiative

רשות החדשנות
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CAAI רתא