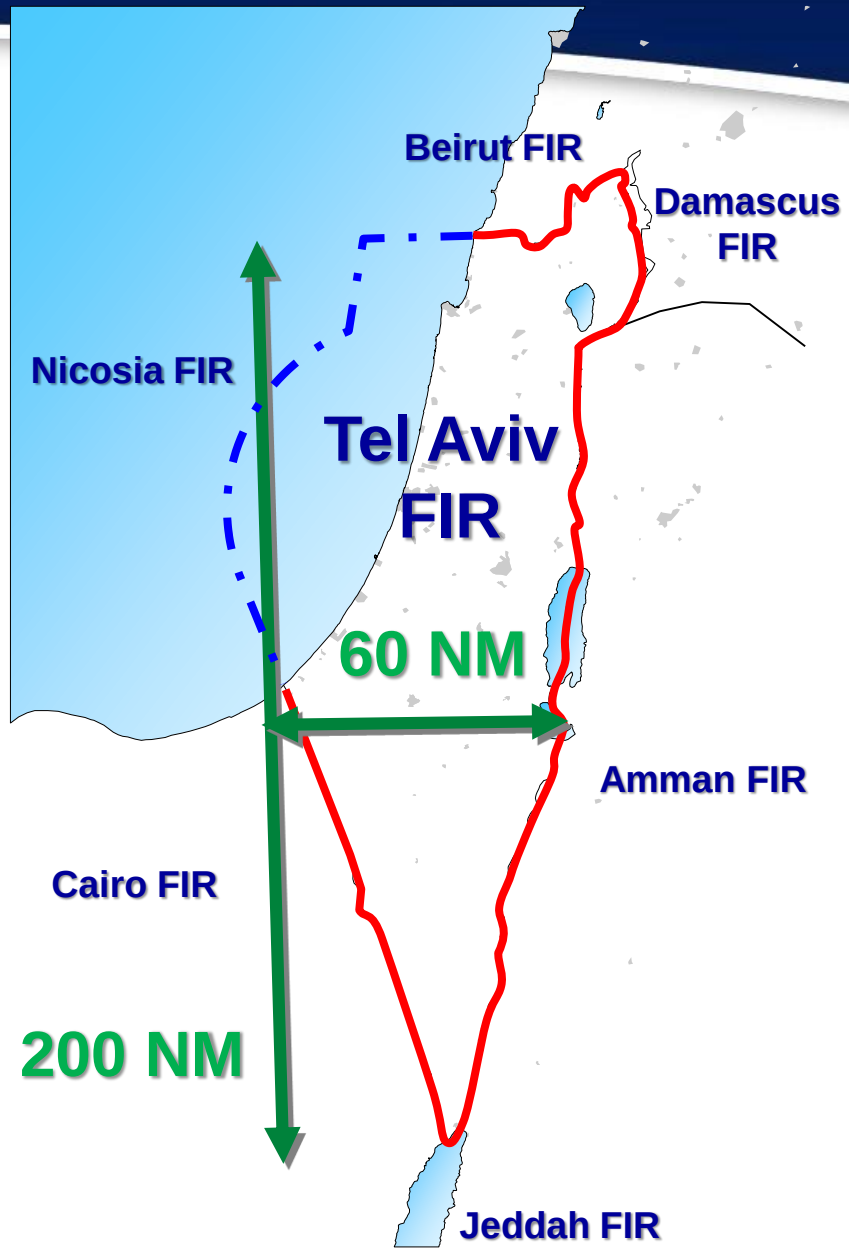
Full UAS Integration to State's Airspace

Operating UAS Safely within a Congested Airspace: Regulation, Airspace Design and Safety Assessment

- Small Airspace: **1/3** the size of Hong Kong TMA
- Complex “neighborhood”
- Aviation is the **only bridge** to the world
- Israeli Air Force (IAF) similar in size to German Air Force
- More than 50% of IAF sorties are unmanned
- **VERY** congested airspace



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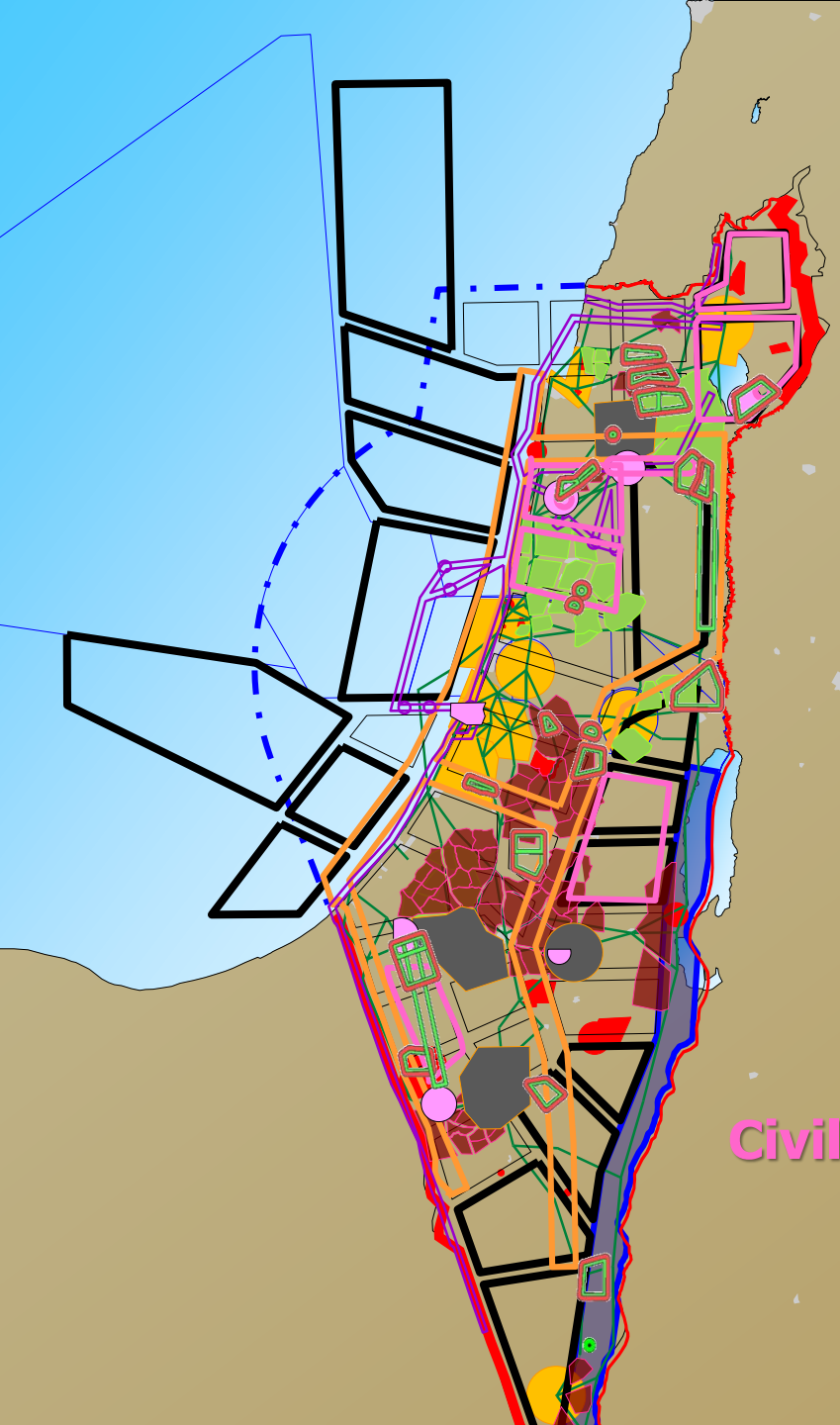


FIR

Terminal Area, Int. Airport LLBG

ATS Airway to the south

Civilian Domestic Airports CTR

Prohibited, Restricted and Danger

Military CTR

Fighters Airway

Military Fighters Training Areas

Controlled VFR Routes

Civilian General Aviation Areas

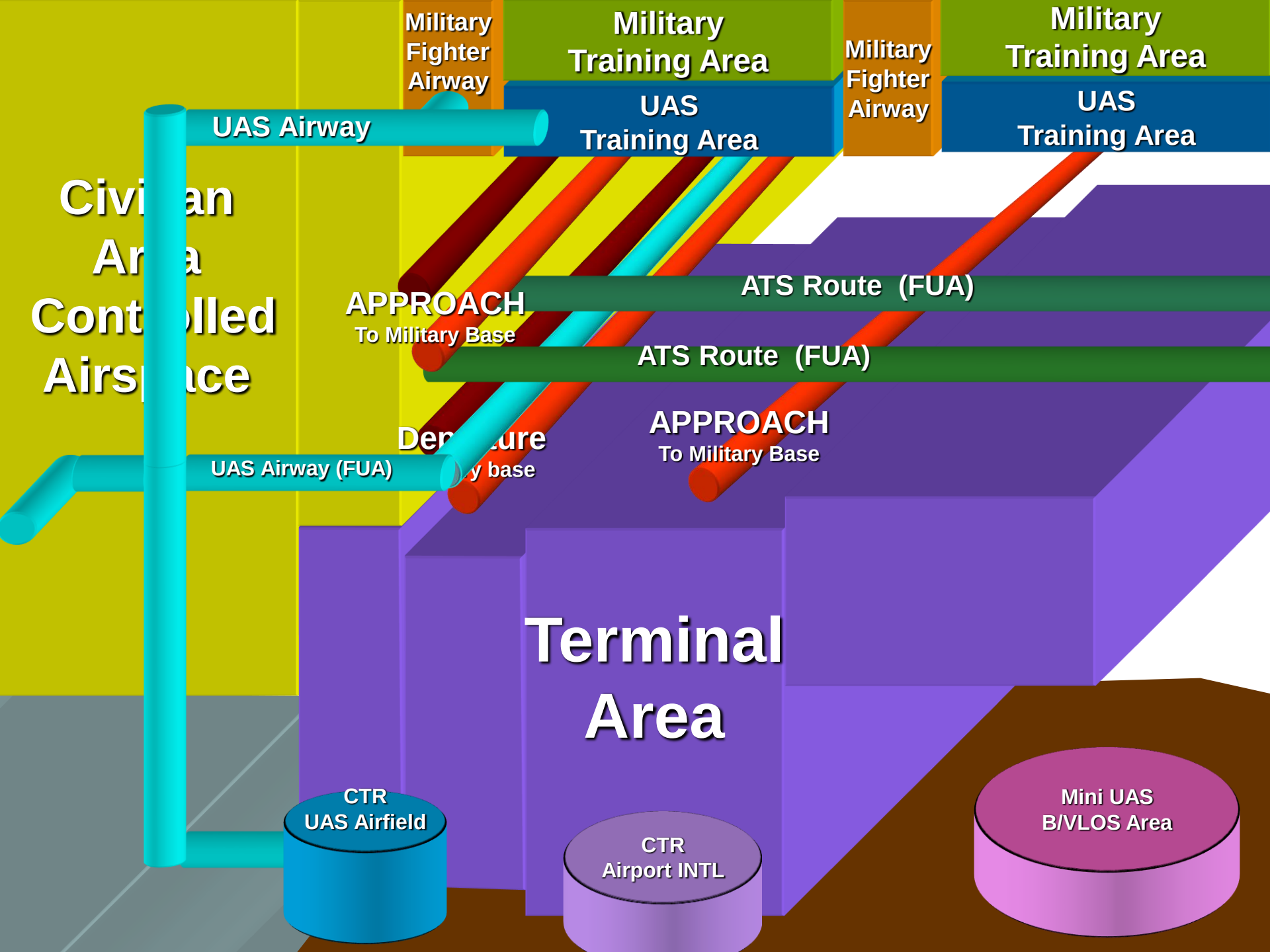
Helicopter Training Areas

Civilian UAS Airfields & Test Sites

Civilian UAS BVLOS Areas (Military/Civil)

UAS Routes (Military/Civil)

Mini UAS B/VLOS Areas (Civilian)


Military Fighter Airway
Military Training Area
Military Fighter Airway
Military Training Area
UAS Training Area
UAS Training Area
UAS Airway
Civi an Ar a Cont lled Airsp ace
APPROACH
To Military Base
ATS Route (FUA)
ATS Route (FUA)
Dep ture
y base
APPROACH
To Military Base
UAS Airway (FUA)
Terminal Area
CTR
UAS Airfield
CTR
Airport INTL
Mini UAS
B/VLOS Area

Israeli UAS Industry

- 1970's - US made military drones
- Today
  - More than 20 local UAS manufactures
  - 0.1kg < MTOW < +2000kg
  - Development, Testing, Maturing, Demos, Customer Training, Crowd Control, Police, HLS and more…
- 10% of worldwide UAS sales in 2011 (Teal Group)
- Largest UAS exporter in 2001-13 Worldwide (SIPRI, Frost & Sullivan, Jane's iHS)
- Dozens (!) of unmanned flights daily
- Exporting airspace – training and development

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ISRAELDEFENSE

Unmanned Aerial Vehicles made in Israel - 2012

The beginning

- Until 2003 unmanned vehicles were ignored, flights were military or development for military purpose
- 2003 - Military-Civilian Committee established
- 2007 - National Committee for certification of UAS
- 2010 - CAA takes full responsibility for UAS regulation

10 years of experience,

Encouraging Innovation while Serving the Public Interest

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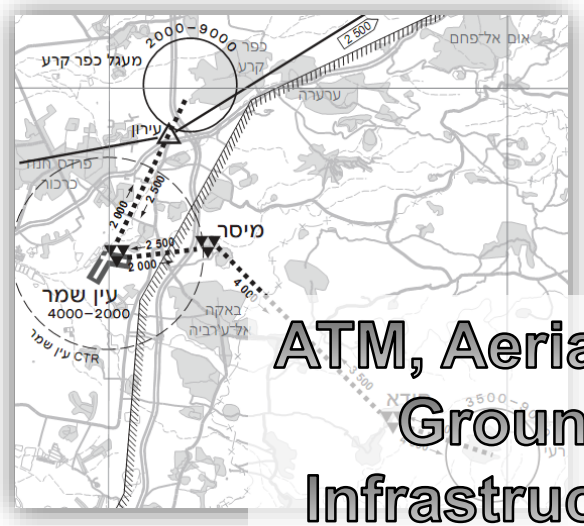
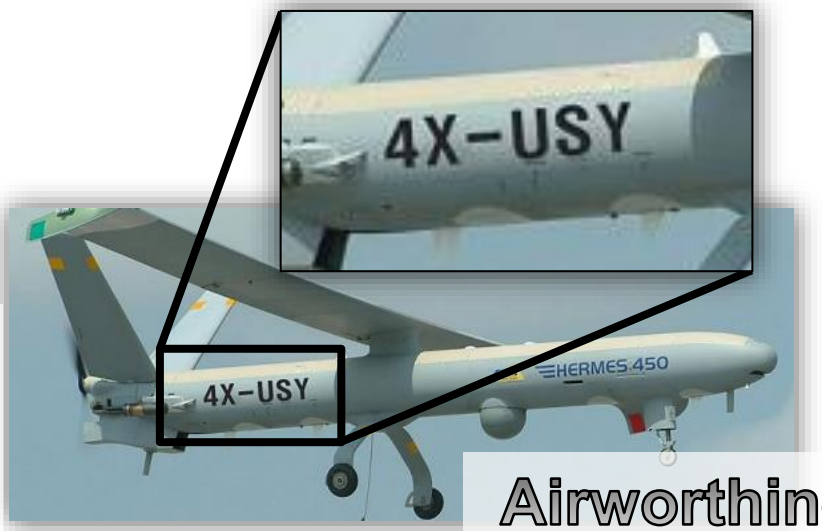
Existing Framework and Regulation in Israel



ATM, Aerial and Ground Infrastructure



Airworthiness

Personal Licensing

Operator & Service Provider certification, Accident reporting, Security

ATM - Framework

- Dedicated AIP chapter
  - Definitions
  - Separation
  - Flight Rules and Procedures (DAY & NIGHT)
- Aerial & Ground Infrastructure
  - Aerial Infrastructure for all platforms, Controlled and approved (SID, STAR, Airspace operation)
  - Operational Procedures & Requirements for Test Sites, Airfields, Airports

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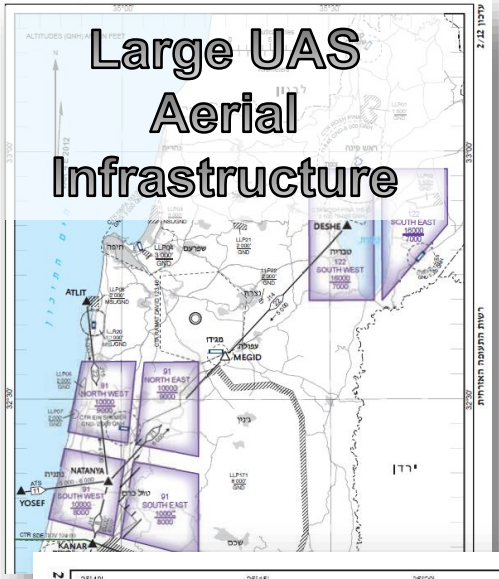
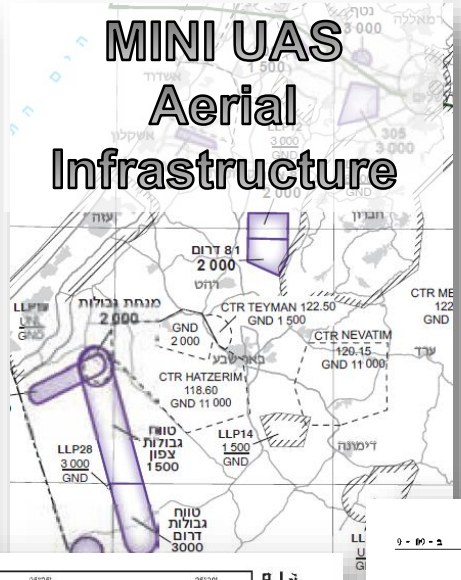
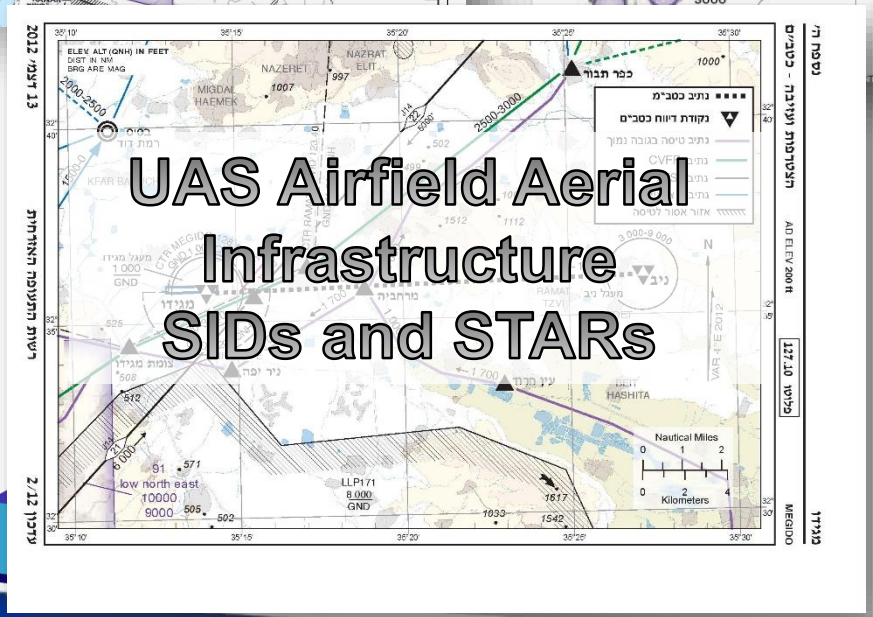
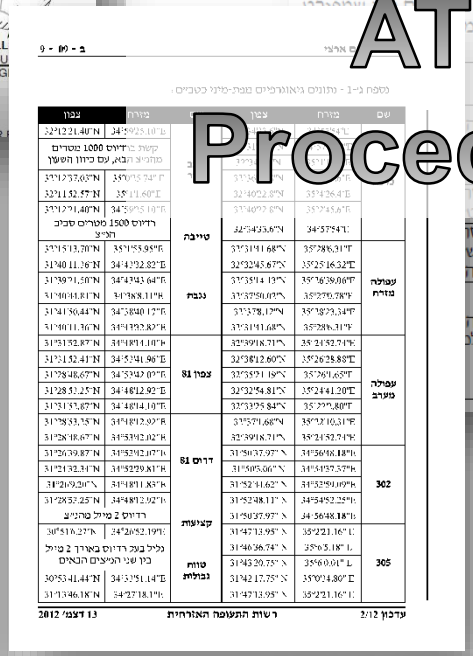
Examples of Published Regulation









Detailed UAS
ATM
Procedures

ATM - Rules and Regulations

- RT Procedures
- Malfunctions – Com. Loss & Return Home requirements
- Procedures for special operations (Time, Airspace)
- Adapted Flight-plan form and coordination requirements
- Integration to the state’s Flow Control system
- Security procedures

Personal Licensing & Operator Certificate

- Requirements for Remote Pilot License
  - Approx. 150 licenses issued
  - 5 Knowledge Tests (CAA), Medical, Checkride
- Certification
  - Commercial Manufacture
  - Service Providers for Aerial Work
  - Training Organization
- Operational Manuals Templates

Airworthiness and Technical Req.

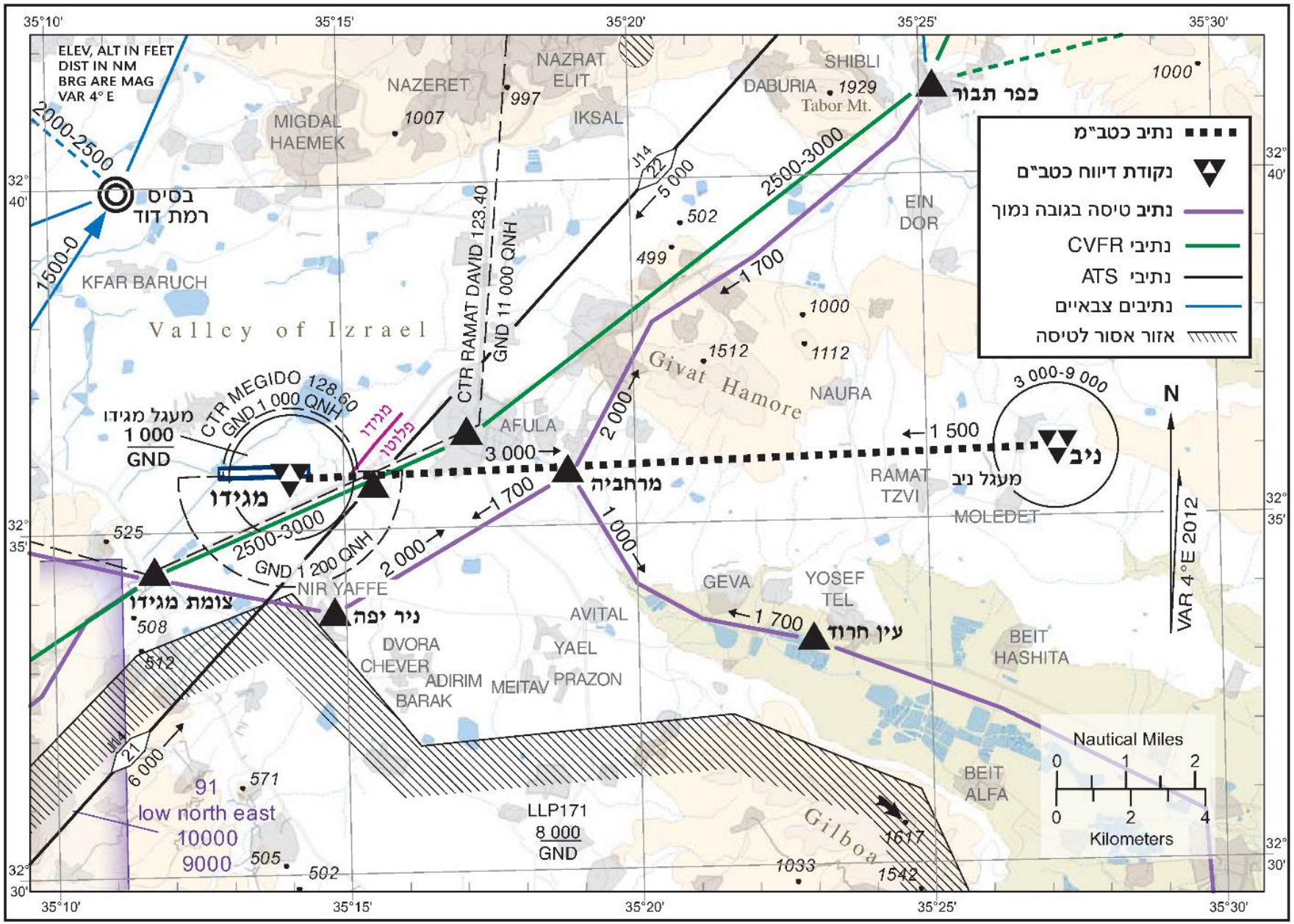
- Airworthiness Certificate
  - UAS Registration procedures

- Technical articles and Advisory Pamphlets
  - C&C, Comm. Requirements from RPS
  - Operations Manuals
  - Approval of Training Organization
  - Safety Guidelines for the Development and Operation of UAS

Incident & Accident Reporting and Investigation

- Incident and Accident reporting procedures
  - Published requirements for the operators
  - Published investigations of several severe incidents
- AIAI is developing a group of experts in the field of UAS operation
- Detailed statistics, leading to a clear picture of safety status

Airspace Integration – Every-Day Reality



נספח ה'

הצטרפות ועזיבה - כטב"ם

AD ELEV 200 ft

פלוטו 127.10

מגידו MEGIDO

עדכון 1/13

רשות התעופה האזרחית

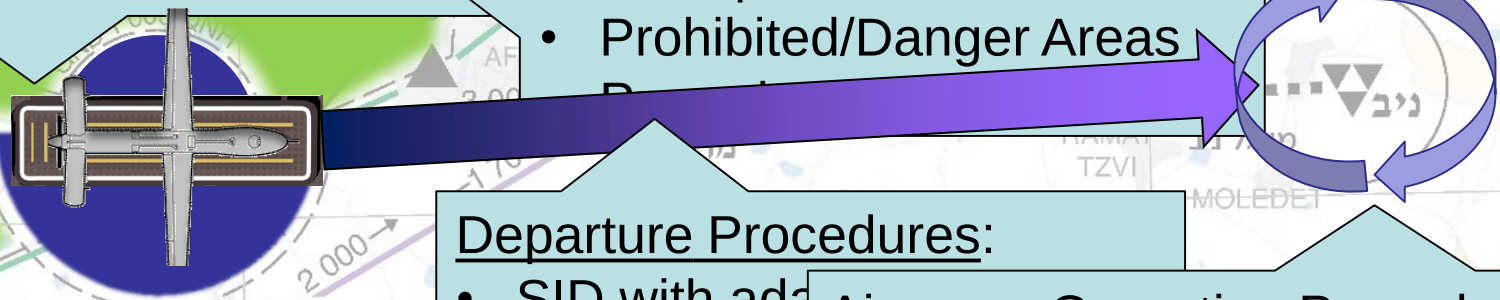
30 מאי 2013

Climbing to Operative Altitude

Pre-Flight Procedures:

- Specially Adapted FP
- Com. Check Procedures
- Coordination with other users of Airfield
- Taxi & Ground Op. Procedures

- Adapted Circling Procedure
- Coordination with Military Base Tower (Radio)
- Coordination with Area Control Center (Radio)
- Transponder Check
- Prohibited/Danger Areas



Departure Procedures:

- SID with ada parameters
- Com. Proce
- Com. Loss F
- Procedures from GA & L
- ATS route ve separated

Airspace Operation Procedures:

- Separation from manned-aviation routes and other infrastructure
- Connect to route network and reach working area
- Working area procedures

Prohib

Main Lessons Learned

- Complicated? Yes – **Achievable?** Definitely
- Analysis of **Present & Future** is the Key to Success
- **Policy Guidance** and Prioritization - Limited Resource, Needs are Conflicting
- **Involvement** of all Stakeholders in Centralized Process Ensures Coherence and Effectiveness
- **Security** is an integral part of the solution
- **Flexible Use of Airspace**, unique application
- Process Should be based on well-defined **Safety Guidelines** and **integration objectives**

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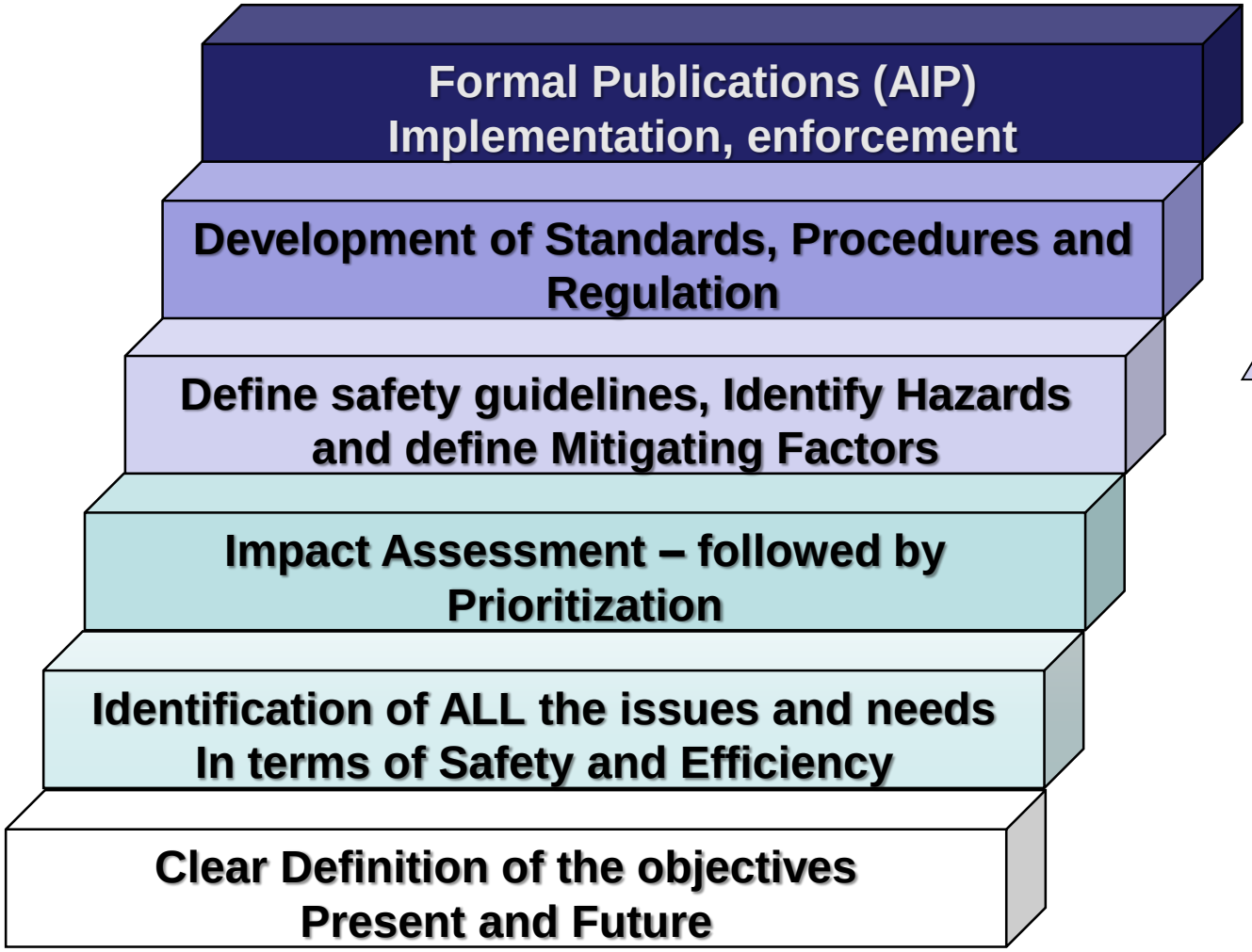
Steps Along the Road



Active

involvement of Airspace users and UAS industry

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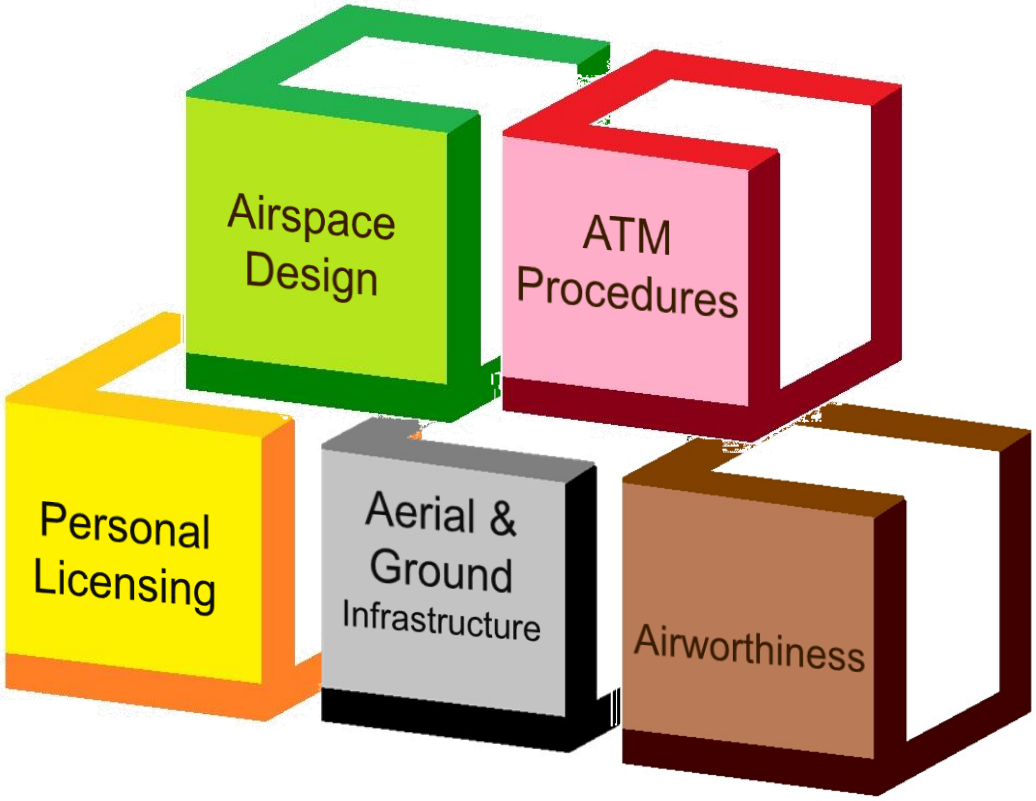
Strategic approach: bringing the pieces together



Services

- Detailed Airspace Analysis, Impact Assessment
- Airspace Design – Infrastructure (Air & Ground)
- Proposed Regulation & Procedures
- Safety Analysis (SMS)
- Training of ATM personnel and UAS operators to comply with procedures
- UAS State Implementation Plan

The benefits of a complete regulative framework

- **Productive industry**, advancing efficiently
- Developing Aerial Work **Service Providers**
- Allow the State the economical **benefits of UAS services**
- **Free the regulator** to improve and enforce regulation
- Decrease in illegal & unsafe operation

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… And most important: SAFETY

Opening The Sky to Unmanned Aircraft: Safe and Efficient Airspace Integration

Contact us - info@uaspace.net

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