



CANSO Safety and Operations Forum 2020

Tuesday 10 November 2020

13:00-17:30 CET

CANSO Safety and Operations Forum 2020

How automation in aviation and air traffic management can contribute to improved safety, efficiency and sustainability



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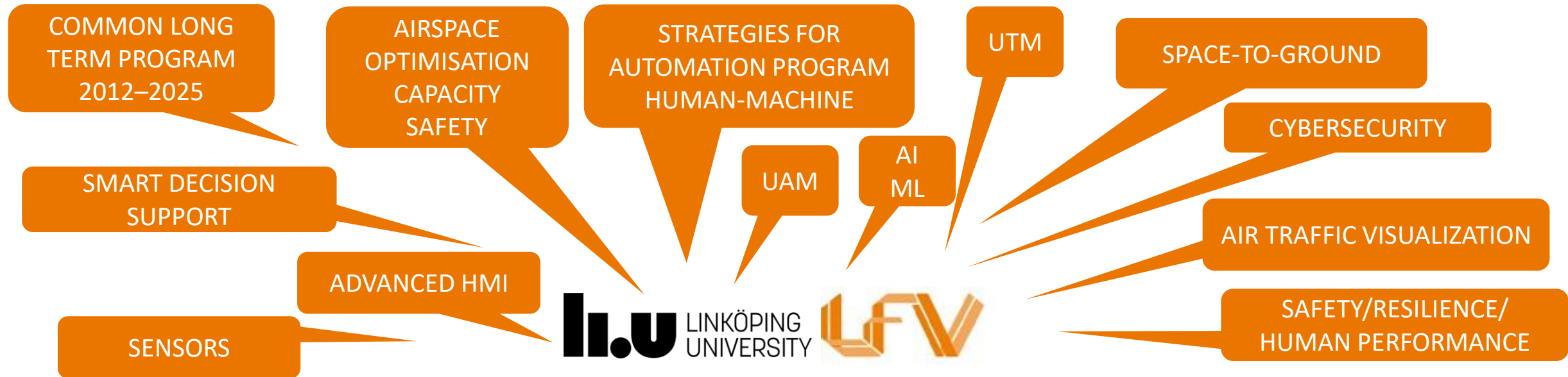


Billy Josefsson

Head Automation & Human
Performance

LFV, Sweden

Collaboration LFV and LiU since 2012 → Science & Applied research for the aviation of tomorrow



30+ projects, 5 PhD, PostDoc, MsC

Cross border
operations &
maintenance

Legal challenges

COVID 19

GAME CHANGER

Harmonized vision

Advanced automation

Global standards

Hybrid interfaces

Automation in training

Common synergies,
developments, trade offs

ATCO will be transformed
to Airspace Manager

COVID IMPACTS & OPPORTUNITIES

Ahead of the first Egis webinar we conducted an Industry wide survey to assess the Impacts and opportunities arising from the COVID-19 crisis. The findings will be shared shortly, but this Infographic picks out some headline figures.

Data suppliers=

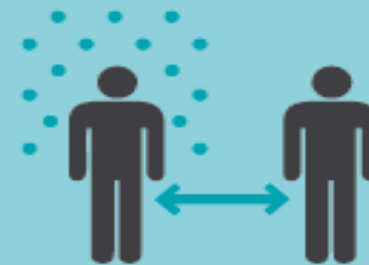
= top collaboration partner outside the aviation industry



Top 3 risks

to recovery:

- (1) state-level imposed travel restrictions
- (2) public perception & trust
- (3) threat of a second-wave of the pandemic



2023

the year when recovery to pre-pandemic levels is expected

8 out of 10

expect >30%
reduction in revenues



Top 3 opportunities

to emerge from the crisis:

- (1) more focus on improving service scalability & resilience
- (2) better collaboration within the aviation industry
- (3) faster uptake of technology



Poll Question

Have you as a consequence of COVID19 changed your priorities for Research, Innovation & Development efforts?


- No
 - Yes
 - Will do
- 
- A decorative blue geometric shape, consisting of several overlapping triangles, is located in the bottom right corner of the slide.



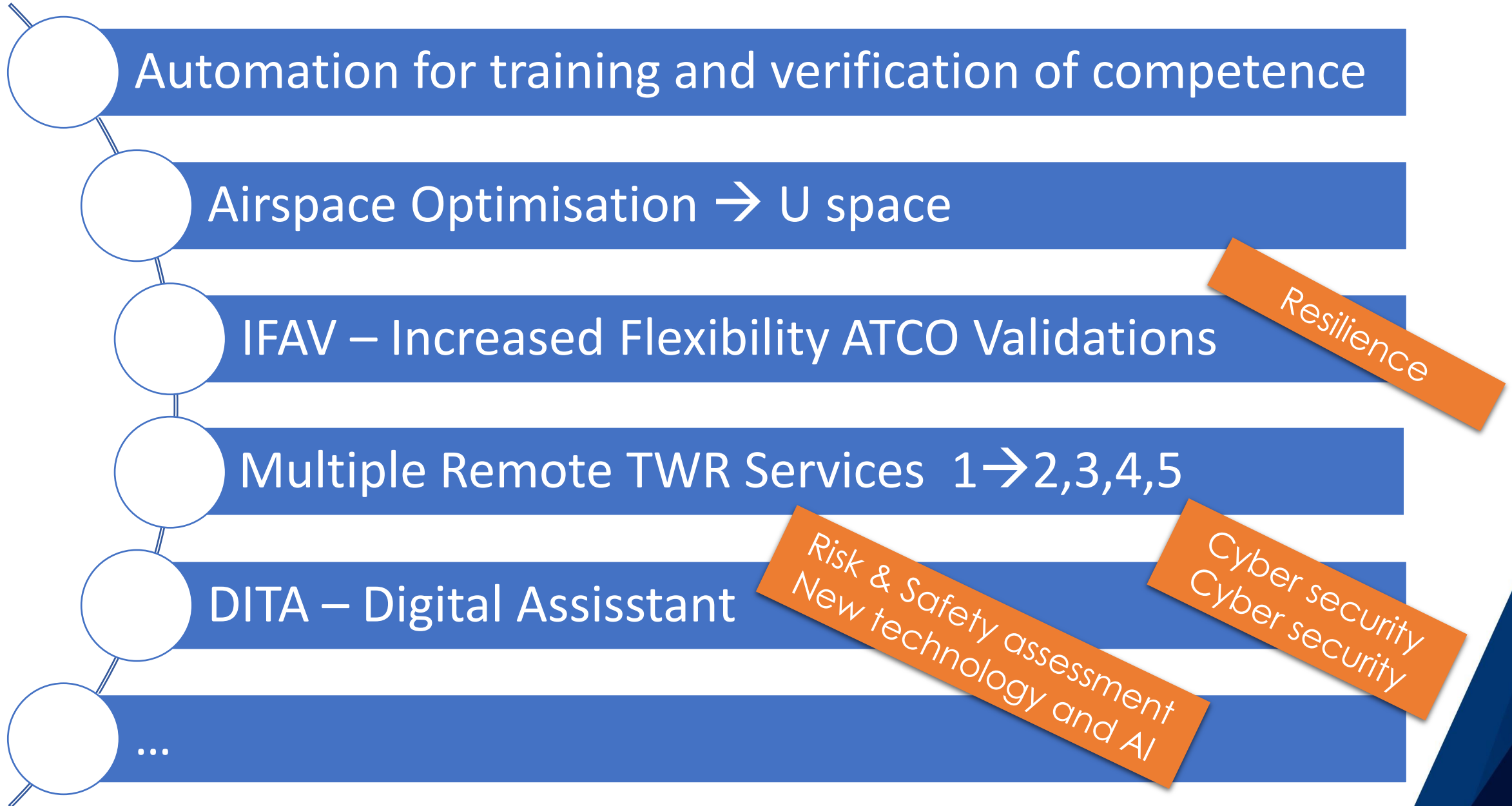
FIGURE 4. LEVELS OF AUTOMATION

	Definition	Definition of level of automation per task				Automation level targets per MP phase (A,B,C,D)		
		Information acquisition and exchange	Information analysis	Decision and action selection	Action implementation	Autonomy	Air traffic control	U-space services
Action can only be initiated by human	LEVEL 0 LOW AUTOMATION Automation supports the human operator in information acquisition and exchange and information analysis							
	LEVEL 1 DECISION SUPPORT Automation supports the human operator in information acquisition and exchange and information analysis and action selection for some tasks/functions							
	LEVEL 2 TASK EXECUTION SUPPORT Automation supports the human operator in information acquisition and exchange, information analysis, action selection and action implementation for some tasks/functions . Actions are always initiated by Human Operator. Adaptable/adaptive automation concepts support optimal socio-technical system performance.							
Action can be initiated by automation	LEVEL 3 CONDITIONAL AUTOMATION Automation supports the human operator in information acquisition and exchange, information analysis, action selection and action implementation for most tasks/functions . Automation can initiate actions for some tasks . Adaptable/adaptive automation concepts support optimal socio-technical system performance.							
	LEVEL 4 HIGH AUTOMATION Automation supports the human operator in information acquisition and exchange, information analysis, action selection and action implementation for all tasks/functions. Automation can initiate actions for most tasks . Adaptable/adaptive automation concepts support optimal socio-technical system performance.							
	LEVEL 5 FULL AUTOMATION Automation performs all tasks/functions in all conditions. There is no human operator.							

Degree of automation support for each type of task




Suggested Focus for Research, Innovation & Developments



Poll Question

What is your top 3 areas for research → operations?

- Automation in training & verification of competence
 - Airspace optimisation for all airspace users
 - Increased flexibility ATCO validations
 - Multiple remote TWR services
 - Digital assistant
- 
- A blue geometric graphic consisting of several overlapping triangles and polygons, located in the bottom right corner of the slide.

COVID 19 → Digitalisation → Automation → Increased Productivity & Safety

RISKS

- Lack of funding
- Lack of Competencies
- To slow
- To conservative
- To much focus on your own business

REAL CHALLENGE;

COLLABORATION CROSS INDUSTRY - CROSS BORDER CROSS
ADMINISTRATION - CROSS RESEARCH & INNOVATION



PARADOXES & OPPORTUNITIES





AMPLIFY TEAMWORK WITH AUTOMATION





Valentin Polishchuk

Associate Professor, Air Traffic
Management Research

Linköping University

Drone TMA intrusion

Poll:
Feasible/crazy/fixable?

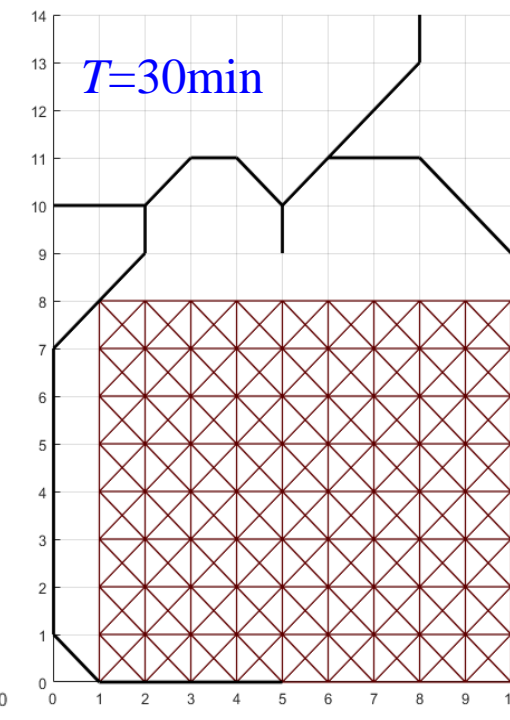
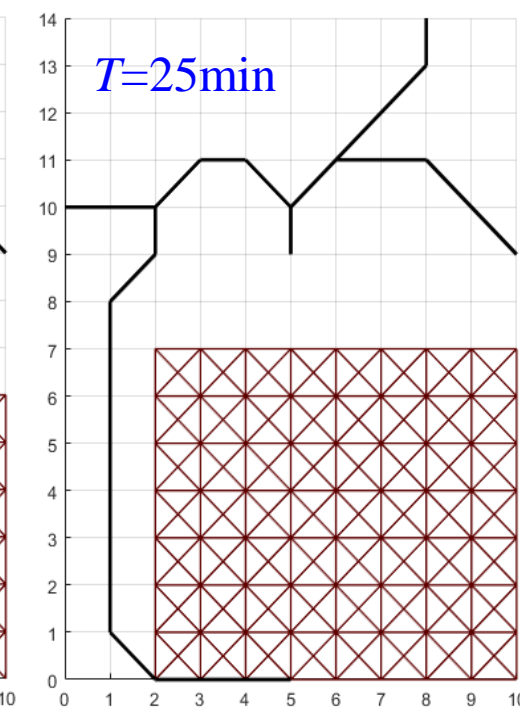
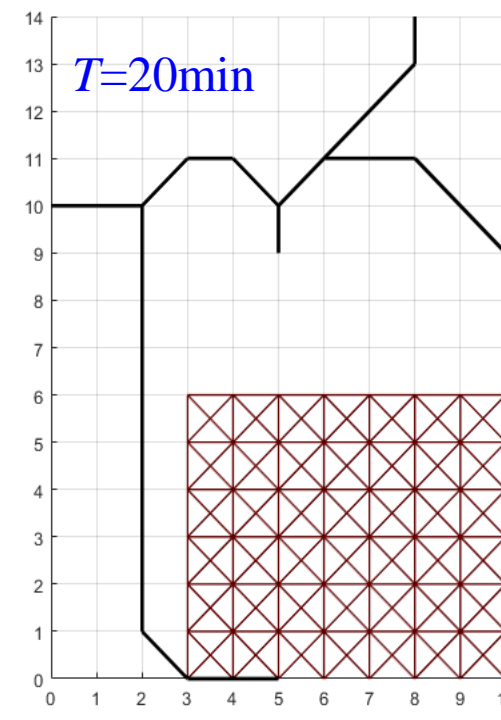
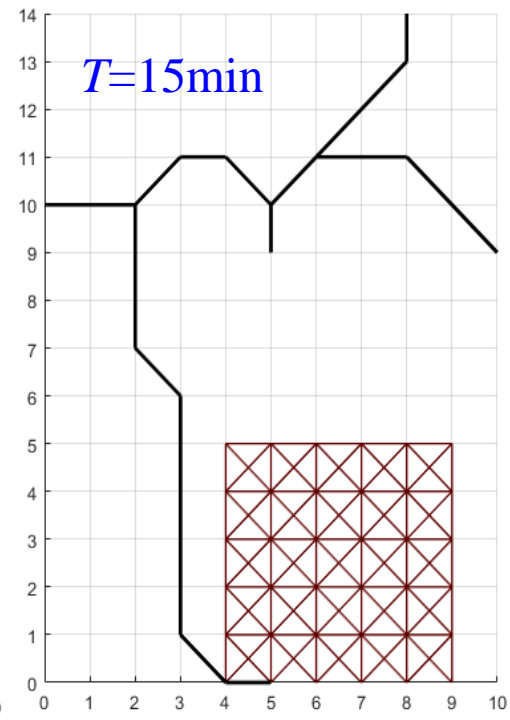
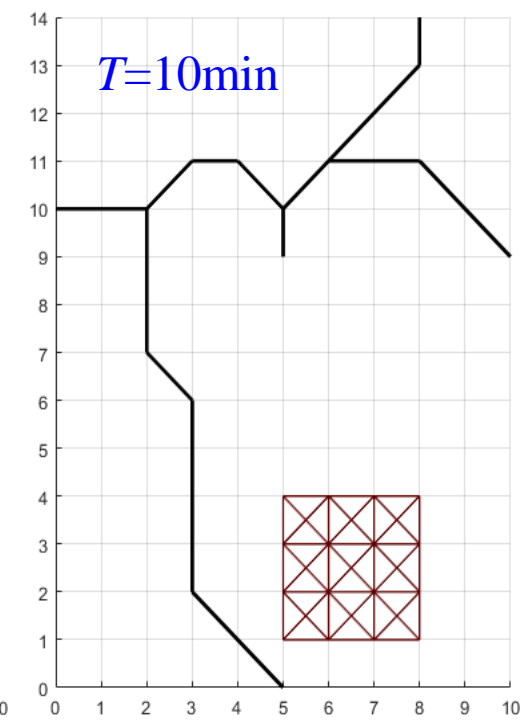
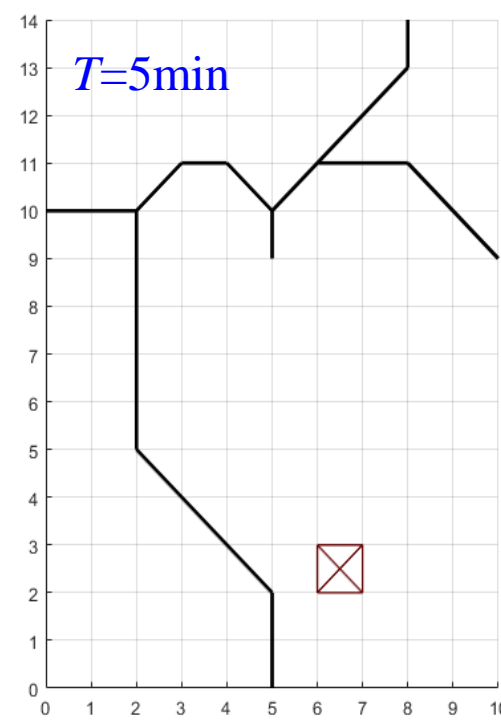
Computer-assisted solution:
morphing STARs

Red: Drone-affected area

- centered on spot
- grows with time
- rate = drone speed

Black: STARs

- avoid **drone** at any T
- change slowly

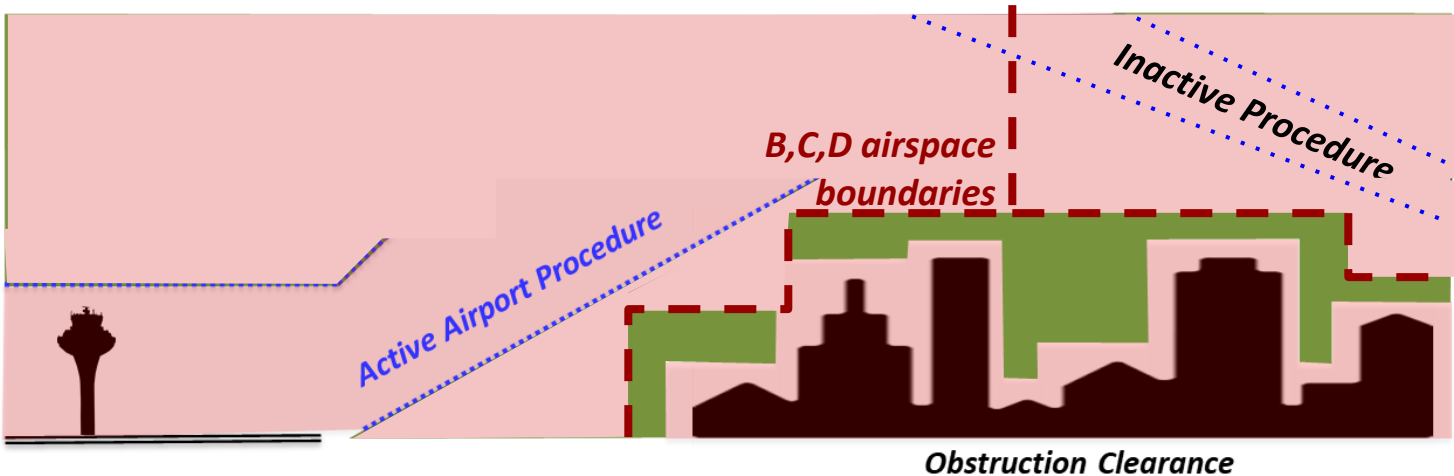


4 ConOpses (4 ATC Integration Scenarios)

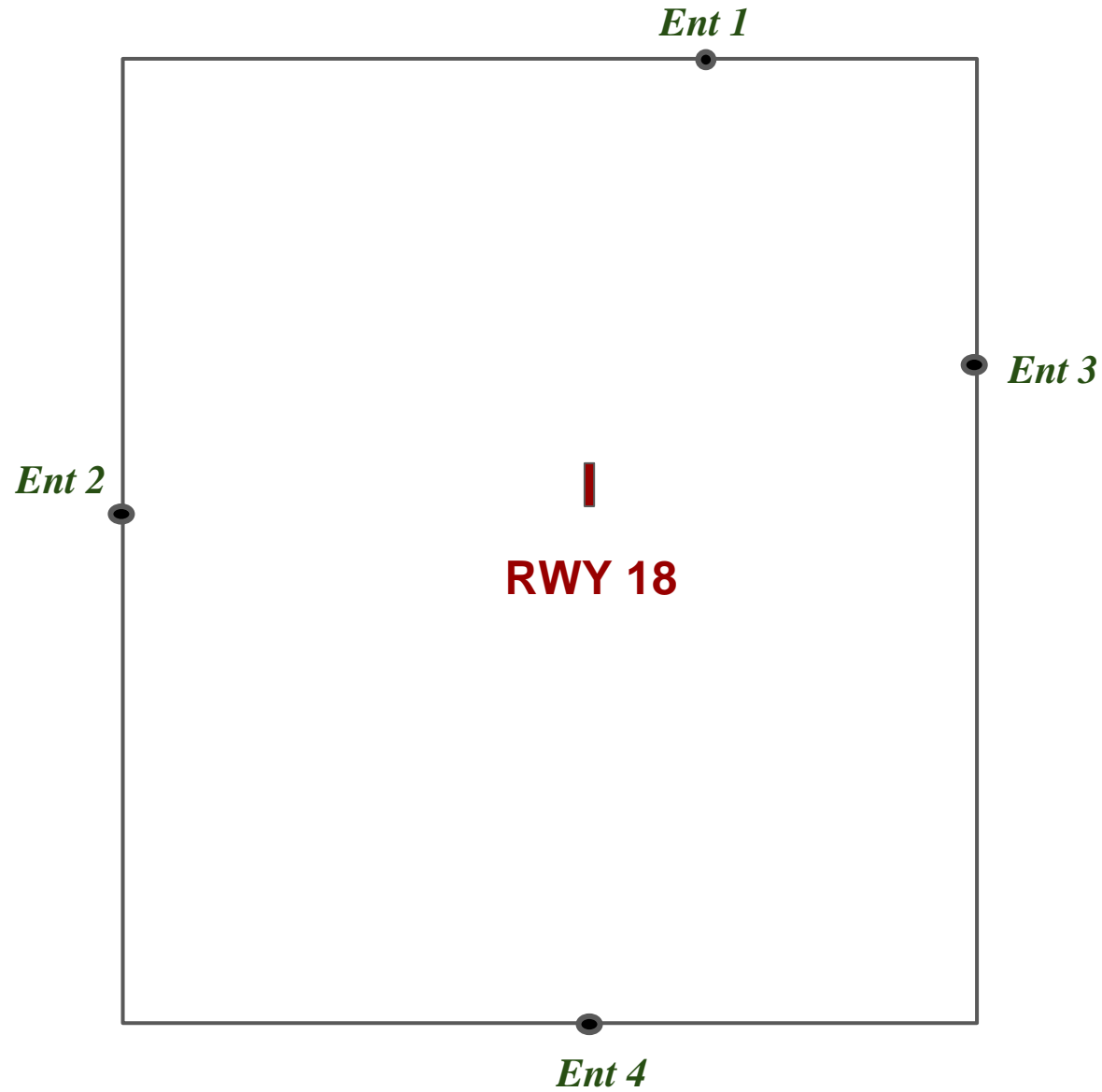
Airspace
Constructs

	ATC Integration Scenarios			
	ATC Excluded	Fully Segregated	Statically Integrated	Dynamically Integrated
Obstacle & Terrain Clearance	x	x	x	x
Special Flight Rule Areas	x	x	x	x
Active Airport Procedures	x	x	x	x
Inactive Airport Procedures	x	x	x	
Temporary Flight Restriction	x	x		
Minimum Vectoring Altitudes	x	x		
sUAS Part 107 Airspace		x		
Airport Controlled Airspace	x			

Poll:
Which concept would you
be comfortable with
(to be implemented now)?



Poll: How many CDO trajectories are possible from a given entry point?



- Clear blue sky (no weather events)
- One and only a/c in TMA
- Complete info, all equipment, etc



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