



New benefits for a modernised ATM system:

“How is the evolving ATM landscape being assessed?”

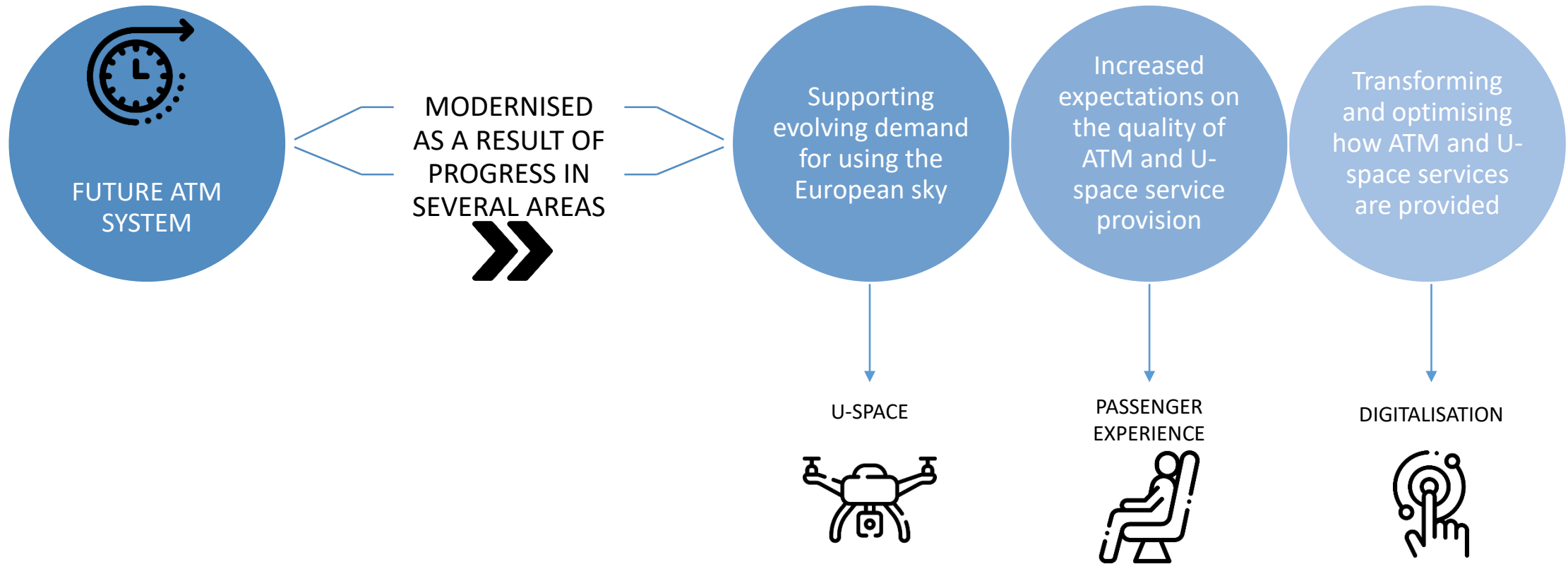
Icíar García-Ovies



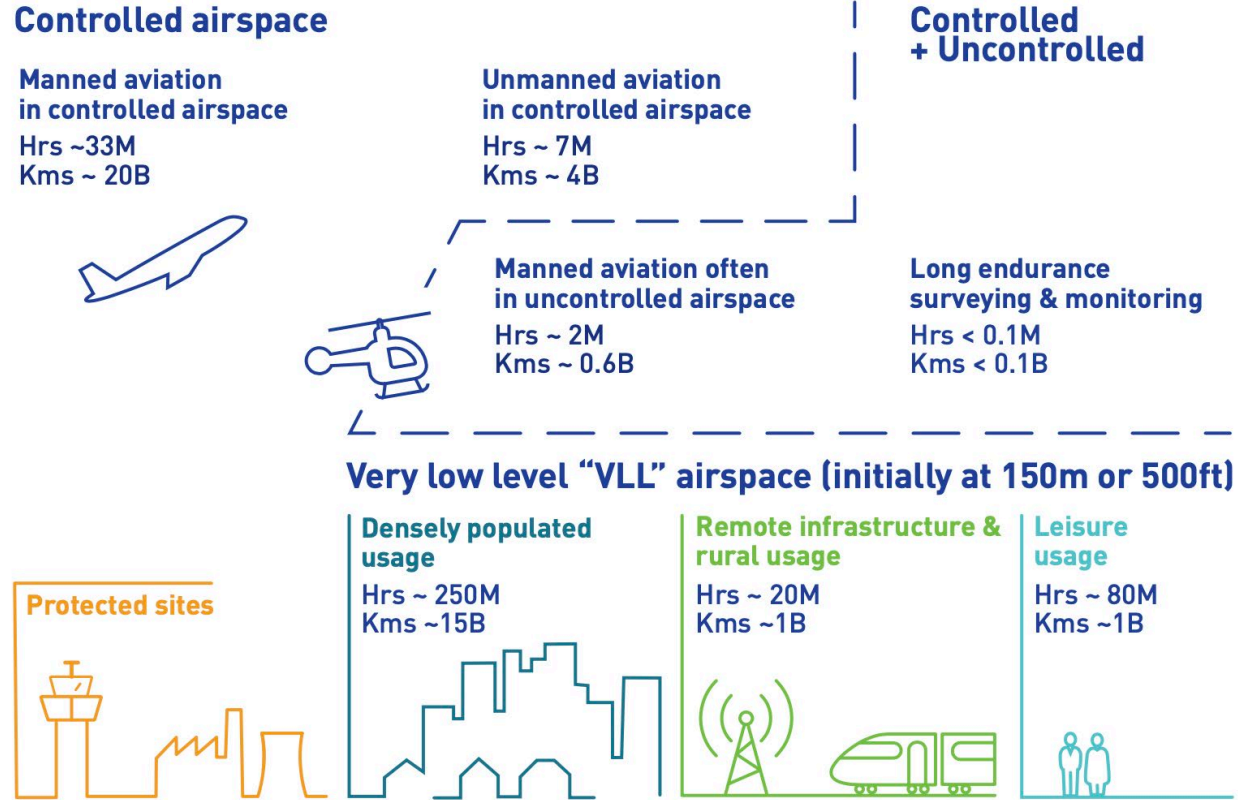
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EVOLVING ATM SYSTEM



U-SPACE: NEED FOR A NEW FRAMEWORK (I)



- By 2050 there will be tens of millions of flights annually.
- The vast majority of this traffic will fly in VLL, below 500ft (an airspace less used in today's operation).
- Drone operation will be implemented gradually, with a significant scale-up expected by 2030.



WHAT WILL BE THE IMPACT OF THE U-SPACE IN THE FUTURE AVIATION SYSTEM?

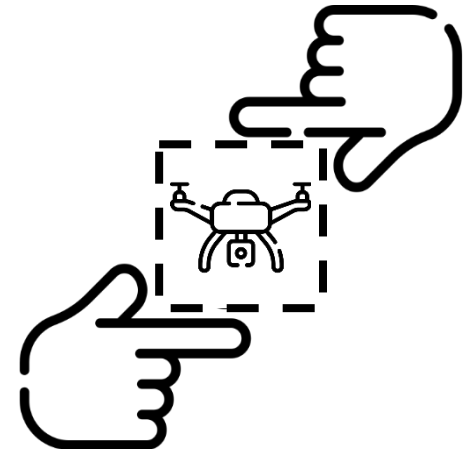
Source: European drones outlook study, 2016

U-SPACE: NEED FOR A NEW FRAMEWORK (II)

- The ATM Performance Framework (PF) provides support to the SESAR ATM projects in using metrics and indicators with the main objective to achieve the Performance Ambitions of the ATM Master Plan.

However, it does not support the evolving use of the European sky

- To adapt to the future and support the evolving demand in the European sky, a U-space Performance Framework is needed as a common reference to the SESAR U-space projects.



U-SPACE PERFORMANCE FRAMEWORK KPAs

- U-space will have to integrate seamlessly with the ATM system.
- The U-space Performance Framework will assess and guide the deployment process based on objective and quantifiable performance measurements.

PROPOSED KEY PERFORMANCE AREAS

• CAPACITY	(+)	• ENVIRONMENT	(=)
• COST EFFICIENCY	(=)	• HUMAN PERFORMANCE	(=)
• MISSION EFFICIENCY	(+)	• FLEXIBILITY	(+)
• SAFETY	(=)	• ACCESS AND EQUITY	(+)
• SECURITY	(=)	 • INTEROPERABILITY	(+)

U-SPACE PERFORMANCE FRAMEWORK CHALLENGES

PERFORMANCE AMBITIONS

- *No applicability of the existent ATM Performance Ambitions*

SCENARIOS

- *No Baseline/Reference Scenario*

PASSENGER EXPERIENCE CHALLENGE

- Flightpath 2050, Europe's long-term vision document on aviation research, has set the goal that 90% of travellers within Europe should be able to complete their journey, door-to-door (D2D), within 4 hours by 2050.
- The role of ATM in the door-to-door chain of a passenger's journey may seem small, but the punctuality of flights and passengers' perception of flying is highly dependent on the smooth functioning of the entire journey.



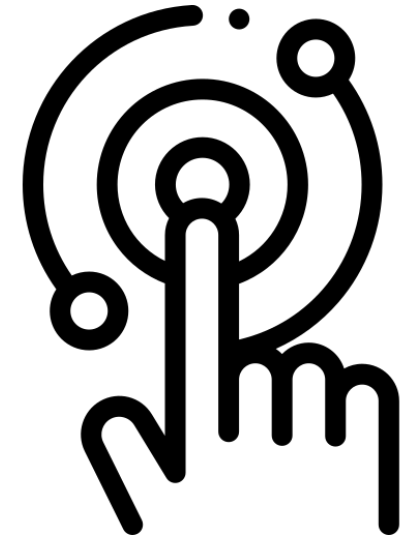
HOW TO ASSES THE ATM CONTRIBUTION TO THE
ACHIEVEMENT OF THE PASSENGER EXPERIENCE GOAL?

PASSENGER EXPERIENCE: MEASURING IT THROUGH THE PERFORMANCE FRAMEWORK

- **(OPS/CEF)** Increased predictability of traffic flows coupled with increased network flexibility and resilience.
- **(CAP)** Reduce departure while improving IFR movement numbers at congested airports.
- **(ENV)** Optimised operations due to improved gate-to-gate planning contribute to the optimisation of fuel-burn and therefore of CO₂ emissions per flight.
- **(SAF)** Better integration of UAS, UAM and GA operations at airports and within TMAs will directly contribute to increased, seamless, and hassle-free mobility while enhancing operational safety.

DIGITALISATION: BACKGROUND (I)

- Future European ATM system will rely on increasingly interconnected systems that utilise modern technologies. There will be a shift from a fragmented system operating at a low level of automation support and data exchange intensity.
- Digitalisation is seen as an enabler to achieve the goals of the SRIA (Strategic Research and Innovation Agenda)

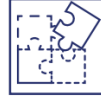


HOW TO ASSESS THE CHANGE OF PARADIGM IN THE ATM SYSTEM?

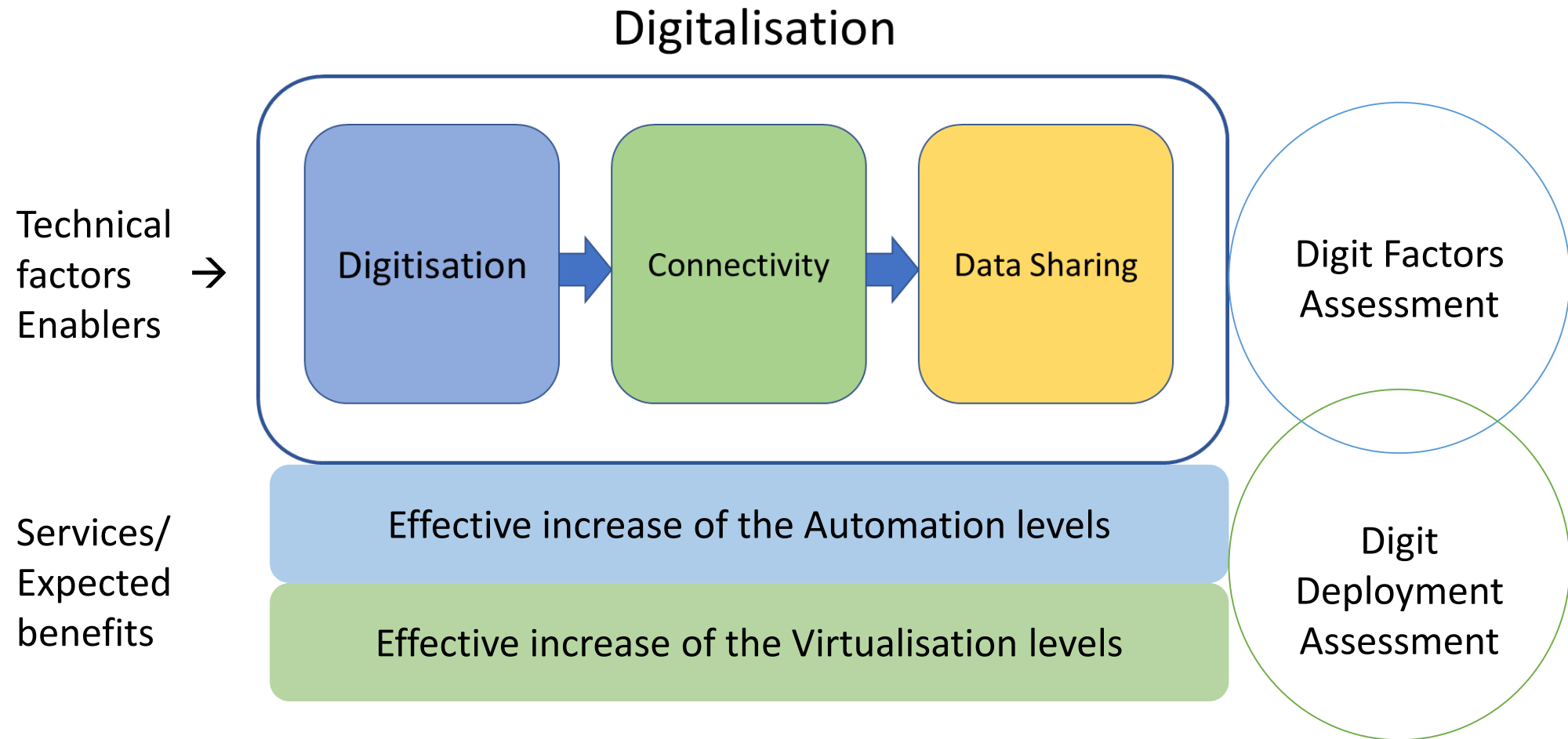
DIGITALISATION: BACKGROUND (II)

PRECURSORS:

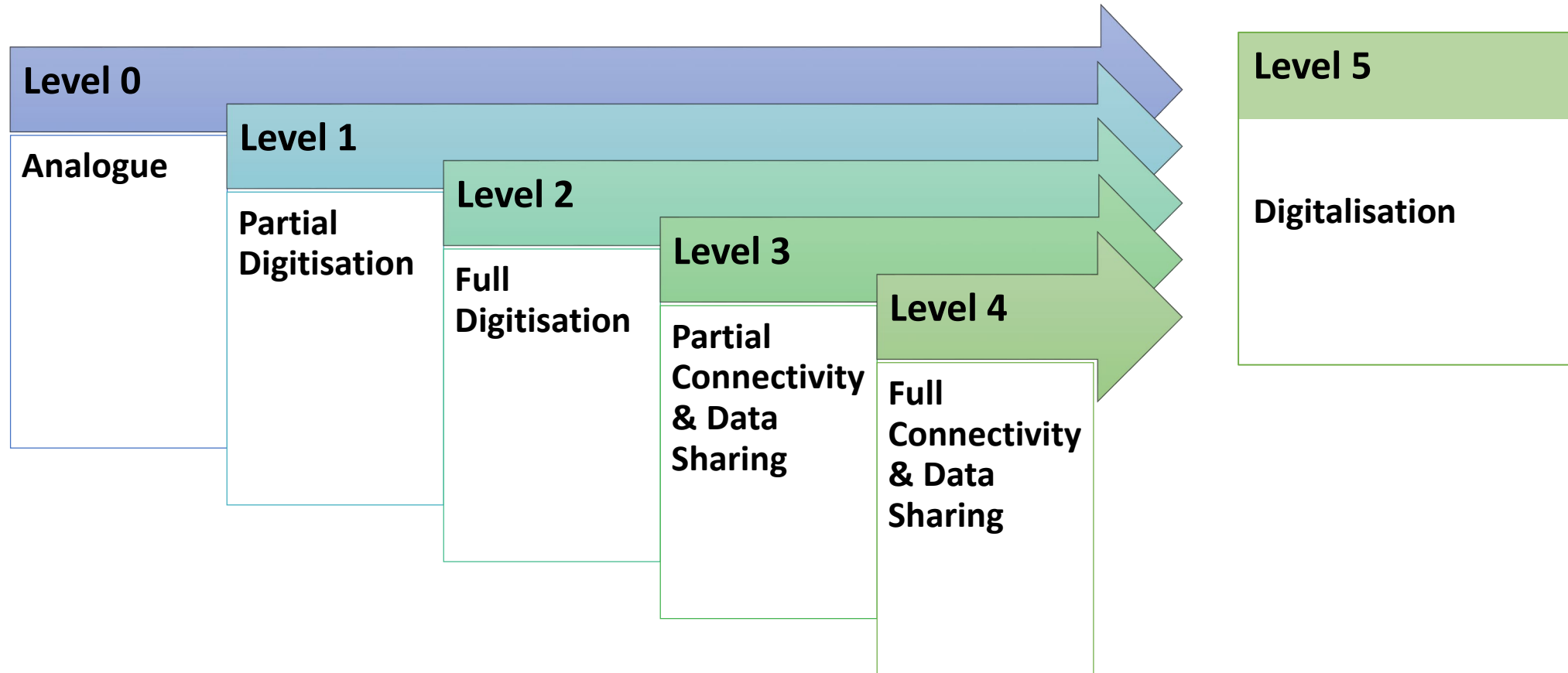
- DESI (Digital Economy and Society Index) from the EU Digital Market Strategy
- ATM Digital Index from the ATM Master Plan

Dimension	Sub-dimension	Indicator	Description	KPI measured per	Unit	Weight
1. Connectivity & information sharing 	1a Ground to ground connectivity	1a1 Implementation of IP based connectivity	Existence or not of connection to an ATM IP backbone	All stakeholders, including airspace users	Score [0 -1] -> 0-100%	1
		1a2 Usage of IP based connectivity	Share of external interfaces for ATM related operations implemented on SWIM/IP infrastructure	All stakeholders, including airspace users	0-100 %	1
	1b Air to ground connectivity	1b1 Datalink implementation and coverage	Three level indicator: 0=Use of voice communication only 1= Use of datalink but not IP based 2= Use of IP based datalink	ANSPs AUs	Score [0 -2] -> 0=0% 1=50% 2=100%	1
		1b2 Datalink usage against full datalink services	Share of information that is shared using datalink	ANSPs	0-100%	1
2. Automation 	2a Degree of automation	2a1 Level of ATCO work automation	Working position (ATCO + automation) productivity improvement driven by system automation	ANSPs	1 = 0% 10=100%	2
3. Virtualisation 	3a Remote provision of ANS	3a1 Implementation of virtual and remote centers	Share of capabilities that are implemented independently from the geographical location where they are delivered (i.e., virtual centres & remote towers)	ANSPs	0-100%	2
4. Industry liberalisation 	4a Open industry policy	4a1 Availability of API interfaces	Existence or not of well-defined and affordable API interfaces provided to external stakeholders (e.g., SMEs)	ANSPs, NM	Score [0 -1] 0 = 0% 1 = 100%	1

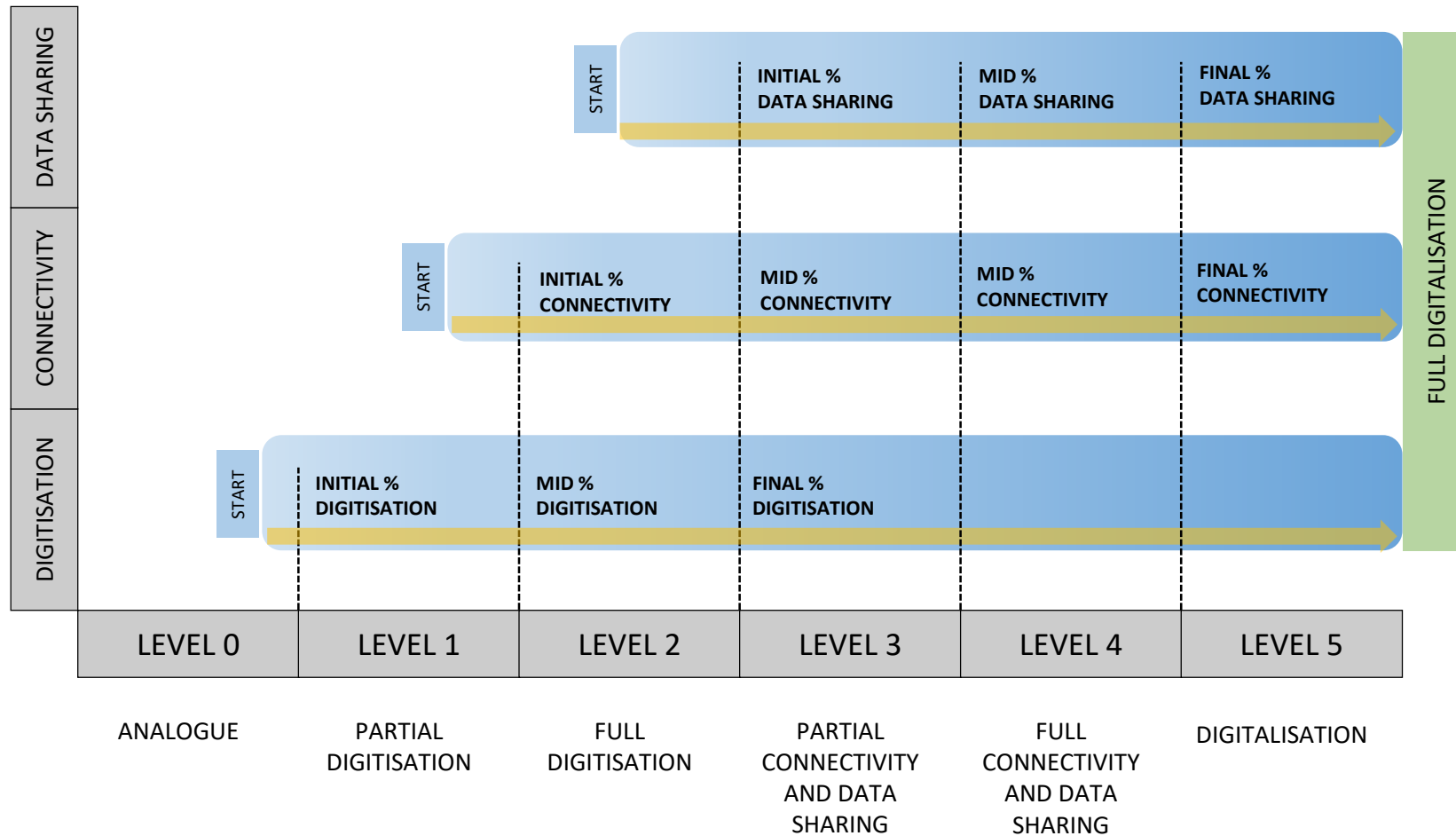
DIGITALISATION: BASIC CONCEPTS



SESAR DIGITALISATION MATURITY MODEL (I)



SESAR DIGITALISATION MATURITY MODEL (II)



WHAT WILL COME NEXT?

- Future will come with new improvement proposals to continue refining the ATM Industry.
- Whatever these new proposals will be, performance measurements will be put in place to assess them and quantify their impact.



The only way is up!

THANK YOU



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