UNIVERSITY OF
FORWARD
THINKING
WESTMINSTER▦

Performance assessment in ATM– towards better collaborative methods

Cook, A.J.

Conference Keynote presented at the Performance Assessment Work Forum, Brussels, Belgium. 07 Feb 2018.

Performance assessment in ATM – towards better collaborative methods

Andrew Cook

07 February 2018
SJU, Brussels

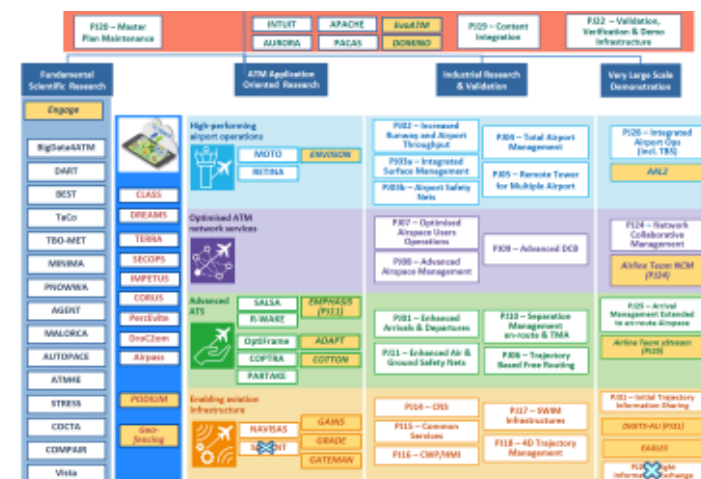SESAR
JOINT UNDERTAKING

Overview

- Background (three aligned perspectives)

- Objectives

- The bigger picture

- The smaller picture

- Wrap-up and next steps (1640ish)

Background

Background

SJU perspective

- SESAR1

  - 100% bottom-up, from projects to MP

- SESAR 2020

  - bottom-up and top-down

- Initially ER 'performance projects' and PJ.19-04; widened ...

- Planning underway from Sept. 2017

- Already an achievement
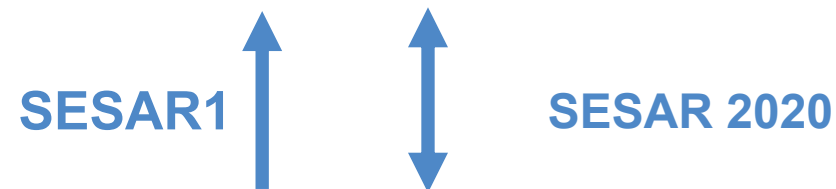
SESAR1   **SESAR 2020**

Background

SESAR 2020 Scientific Committee, Task Force 3

- First meeting 14-15FEB17

- 10 members, plus observers from ECTL, PC and DG MOVE

- Task Force 3: Performance Measurement

- Focus on horizon scanning (e.g. defining new indicator requirements beyond 2035) and refining/repairing existing indicators

Background

SESAR 2020 Scientific Committee, Task Force 3

- Objectives

  - identify key challenges in performance measurement in wider context of air transport, especially regarding **missing indicators for future system**

  - establish performance measurement **'scoping framework'** to capture state of the art re. existing & new indicator development

  - use scoping framework to inform the **Scientific Research Agenda** TF

  - select indicators for future work; identify initial solutions for developing missing indicators, outlining specifications for **potential further research**

- Wider context of 'scoping framework': horizontally (beyo... vertically (including the intermodal context)

- Differentiation from PJ.19-04 "performance framework"

  - activities complementary & mutually aligned

- Very much in **listening mode** today

Background

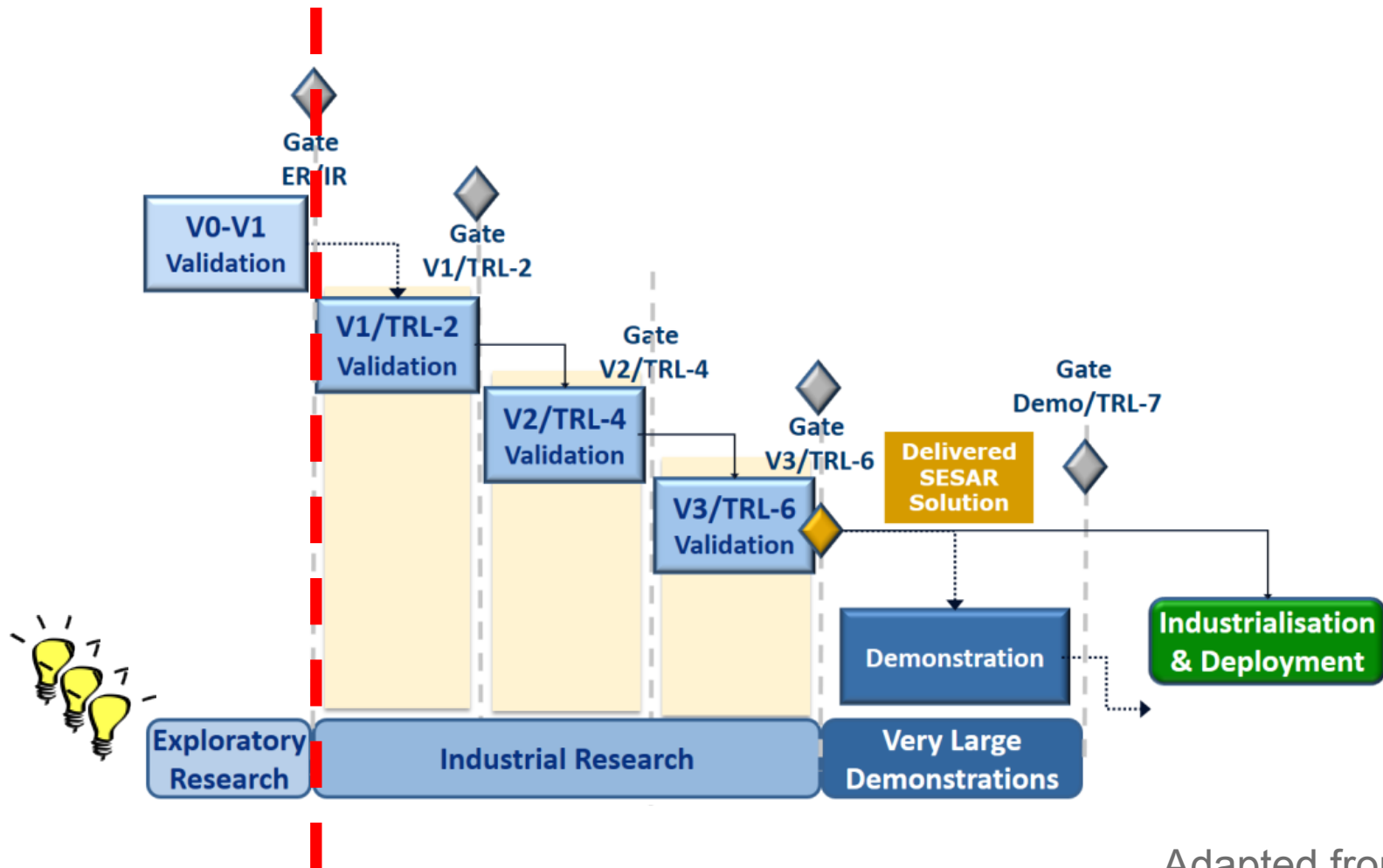## SESAR 2020 KTN – Engage

www.engagektn.net

Background

SESAR 2020 KTN – Engage

Advanced Logistics Group (ALG)
AGIFORS - Airline Group of the International Federation of Operational Research Societies
Air Traffic Controllers European Unions' Coordination (ATCEUC)
airBaltic
Airport Regions Conference (ARC)
American Airlines
ANS Czech Republic
Association for the Scientific Development of ATM in Europe (ASDA)
Autoridade Nacional da Aviação Civil (ANAC)
Barcelona Supercomputing Center (BSC)
Belgocontrol
Boeing Research and Technology Europe (BR&T-Europe)
Bundesaufsichtsamt für Flugsicherung (BAF)
Civil Aviation Authority (CAA)
COOPANS Consortium
Department for Transport (UK)
Direktorat Civilnog Vazduhoplovstva Republike Srbije (DCV)
European Meteorological Services Network (EUMETNET)
European Passengers' Federation (EPF)
Executive Airlines
Ferrovial Agroman
Finnair
FlightGlobal
Flughafen München / Munich Airport
Gestair SL
Helios
HEMAV - High Endurance Multipurpose Aerial Vehicles
Honeywell Aerospace
HungaroControl
Icelandair
IFSTTAR - Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux
INFORM - Institut für Operations Research und Management GmbH
International Air Transport Passenger Association (IATPA)
International Federation of Air Traffic Controllers' Associations (IFATCA)
Irish Aviation Authority (IAA)
LFV - Luftfartsverket
London Luton Airport
Lufthansa Systems
Manchester Airport
Monarch Airlines
NATS
Naviair
Network Manager - nominated by the European Commission
NEXTOR II Consortium - University of California, Berkeley and University of Maryland
PACE Aerospace Engineering & Information Technology
Pegasus Airlines
QinetiQ Ltd
Raytheon UK
Sabre Airline Solutions
SWISS - Swiss International Air Lines
Thomas Cook Airlines
TÜBİTAK - The Scientific and Technological Research Council of Turkey
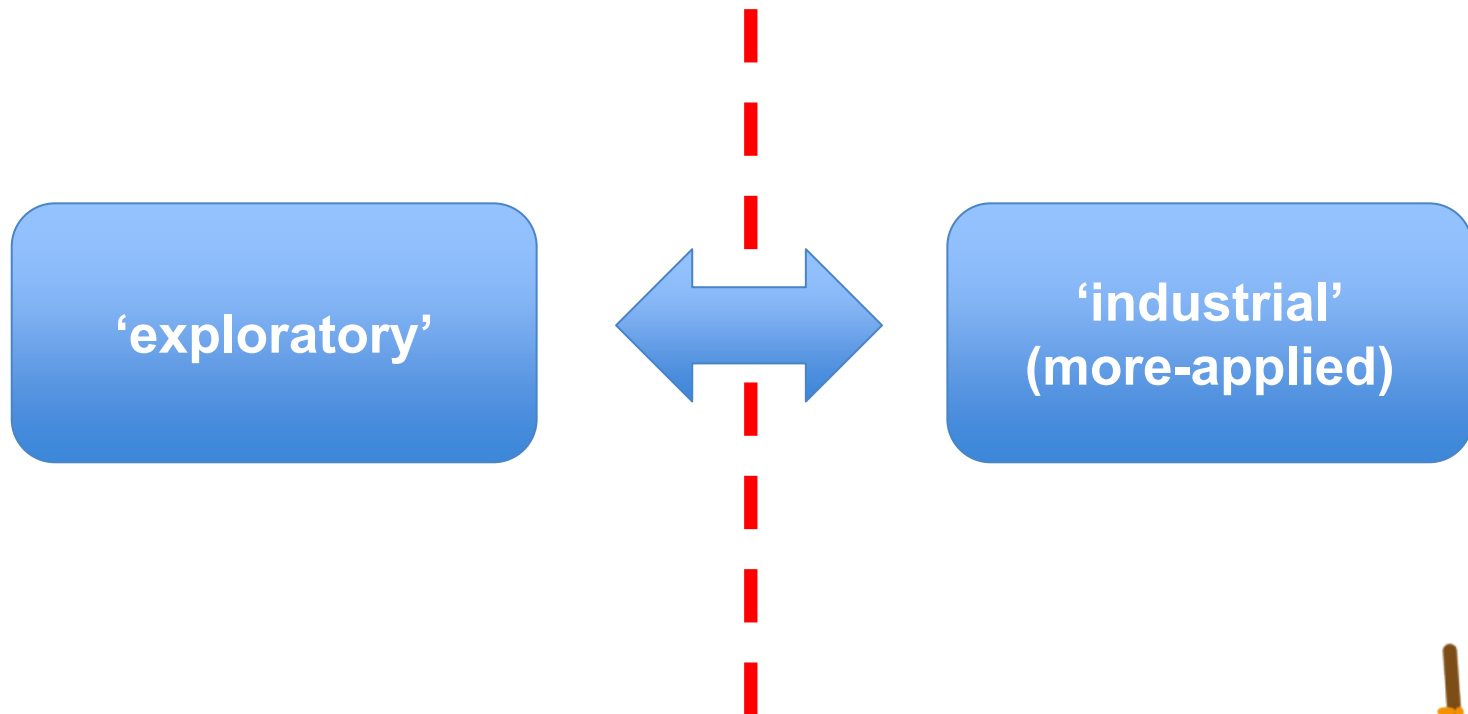Turkish Airlines

Background

SESAR 2020 KTN – Engage

Adapted from SJU (2018

Background

SESAR 2020 KTN – Engage

'exploratory' ⟷ 'industrial'
(more-applied)

Brick wall? Conspiracy?
Mechanism & motivation ... dialogue

Objectives

Objectives

Agenda (1/2)

- Increase awareness of ER projects working on performance
    - exchange of materials, slides this morning
- Discuss issues and needs related to evolution of the performance framework to ensure alignment with **stakeholder expectations**, future policy objectives, and development of (e.g. decision-support) tools
    - initiated by presentation from PJ.19-04
    - interactive sessions this afternoon (**stakeholder focus**)
- Identify potential direct uptake by PJ.19-04 of results (e.g. KPIs, open models, datasets, tools, etc.) from ER performance projects
    - interactive sessions this afternoon
    - not constrained by funding and time just yet – focus on *what*
    - budgets etc. in follow-up
        (indicative funding in a moment)
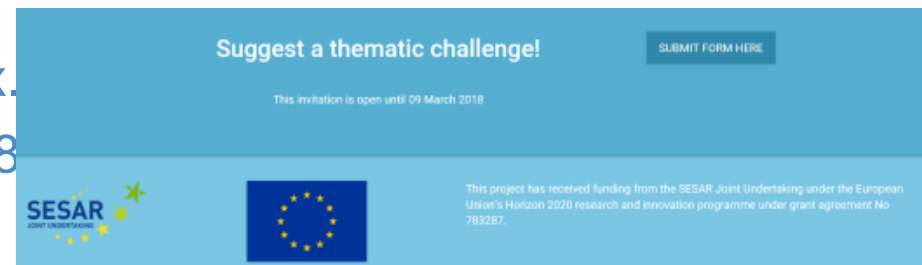
Objectives

Agenda (2/2)

- How to exploit results of ER performance projects in Wave 2
  - wider perspective than PJ.19-04 (unconstrained brainstorming)
  - 'barriers and enablers' in ER slides
- Identify research needs that could be addressed by ER4 projects to:

  (i) drive evolution of performance f'work: better aligned stakeholders' expectations

  (ii) support gaps identified by PJ.19-04 where further support beneficial
  - push-pull, dialogue
  - mutual complementarity

- 3-hour session this afternoon
  - planned scope for ample dialogue and debate
  - something to add? (cookaj@westminster.ac.uk)
  - next steps

Objectives

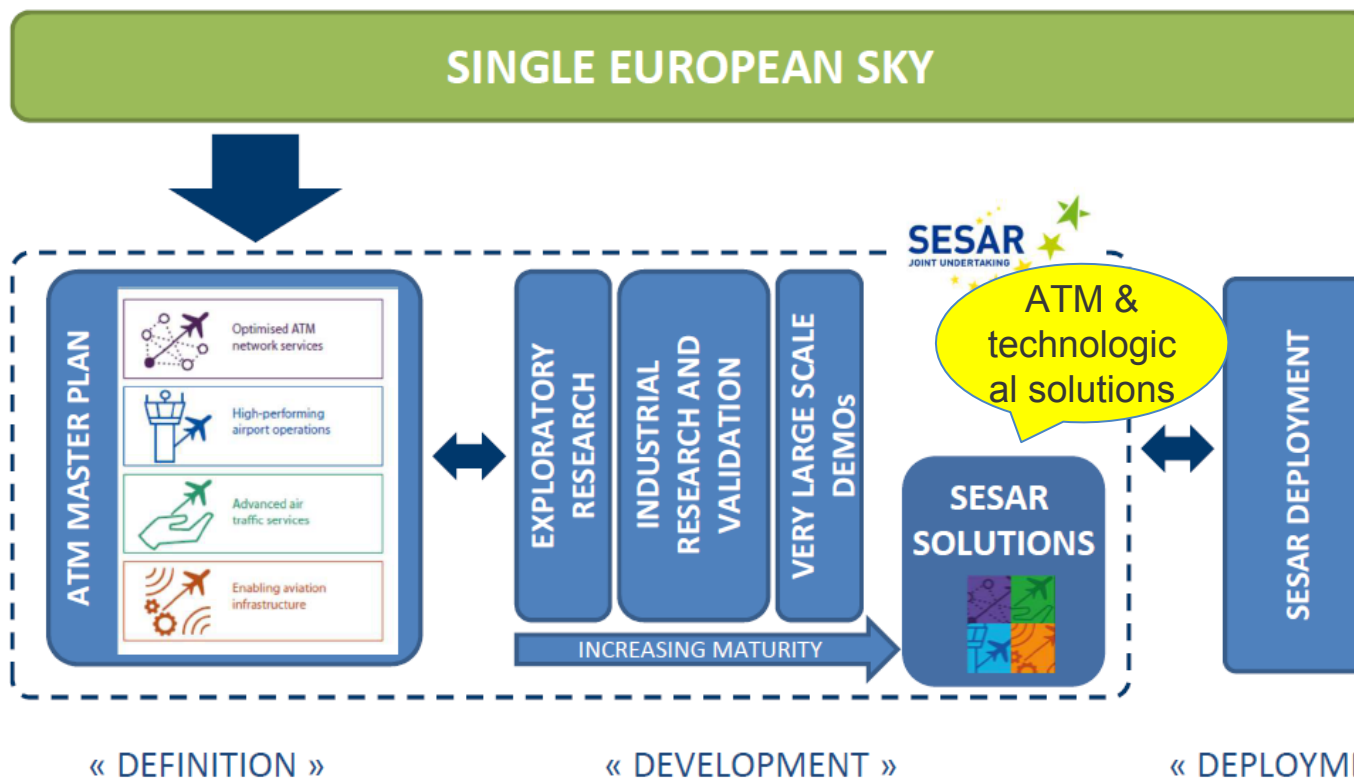## Forthcoming funding

- ER4
    - expected call: Q1 2019
    - expected start: early 2020
    - overall planned budget: appx. €40M
    - budget per project? – views today; exploiting ER in Wave 2
        (previous ER contributions: typically €600k-1M)
- Engage KTN
    - catalyst funding, 16 (appx.
    - first call: (appx.) Oct. 2018
    - up to €60k, 'light touch'
    - submit your 'thematic challenge' ideas by 09 March!

Suggest a thematic challenge!   SUBMIT FORM HERE

This invitation is open until 09 March 2018

This project has received funding from the SESAR Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 783287.

www.engagektn.net

The bigger picture

Bigger picture

SINGLE EUROPEAN SKY

ATM MASTER PLAN
- Optimised ATM network services
- High-performing airport operations
- Advanced air traffic services
- Enabling aviation infrastructure

EXPLORATORY RESEARCH

INDUSTRIAL RESEARCH AND VALIDATION

VERY LARGE SCALE DEMOs

SESAR SOLUTIONS

ATM & technological solutions

SESAR DEPLOYMENT

INCREASING MATURITY

« DEFINITION »   « DEVELOPMENT »   « DEPLOYMENT »

D. Bowen, SESAR update (201

The bigger picture

Innovation Investment Package

Ten partnerships with the industry and Member States were proposed as part of the Innovation Investment Package, and one more followed. The EU's contribution of €9 billion to the package will unlock a €10 billion investment from the private sector and €4 billion from Member States.

Public-Private Partnerships

Most of the funding will go to Joint Technology Initiatives (JTIs). These are run as Joint Undertakings that organise their own research agenda and award funding for projects on the basis of open calls.

The new Joint Technology Initiatives are active in a number of areas of strategic importance for the EU:

- **Innovative Medicines 2 (IMI2):** to develop next generation vaccines, medicines and treatments, such as new antibiotics (website | factsheet)
- **Fuel Cells and Hydrogen 2 (FCH2):** to accelerate market introduction of clean and efficient technologies in energy and transport (website | factsheet)
- **Clean Sky 2 (CS2):** to develop cleaner, quieter aircraft with significantly less CO2 emissions (website | factsheet)
- **Bio-based Industries (BBI):** to use renewable natural resources and innovative technologies for greener everyday products (website | factsheet)
- **Electronic Components and Systems for European Leadership (ECSEL):** to boost Europe's electronics manufacturing capabilities (website | factsheet)
- **Shift2Rail:** to develop better trains and railway infrastructure that will drastically reduce costs and improve capacity, reliability and punctuality (website | factsheet)

A related type of initiative is

- **Single European Sky ATM Research (SESAR) 2020:** to develop the new generation of European Air Traffic Management system that will enhance the performance of air transport (website | factsheet)

Horizon 2020
@EU_H2020

With funding totalling €2.4 billion since 2007, European #cancer research has been leading personalised medicine efforts on understanding cancer biology as well as better prevention, treatment & care solutions #WorldCancerDay #InvestEUresearch EU #EUHealthResearch twitter.com/EU_H2020/statu...

14h

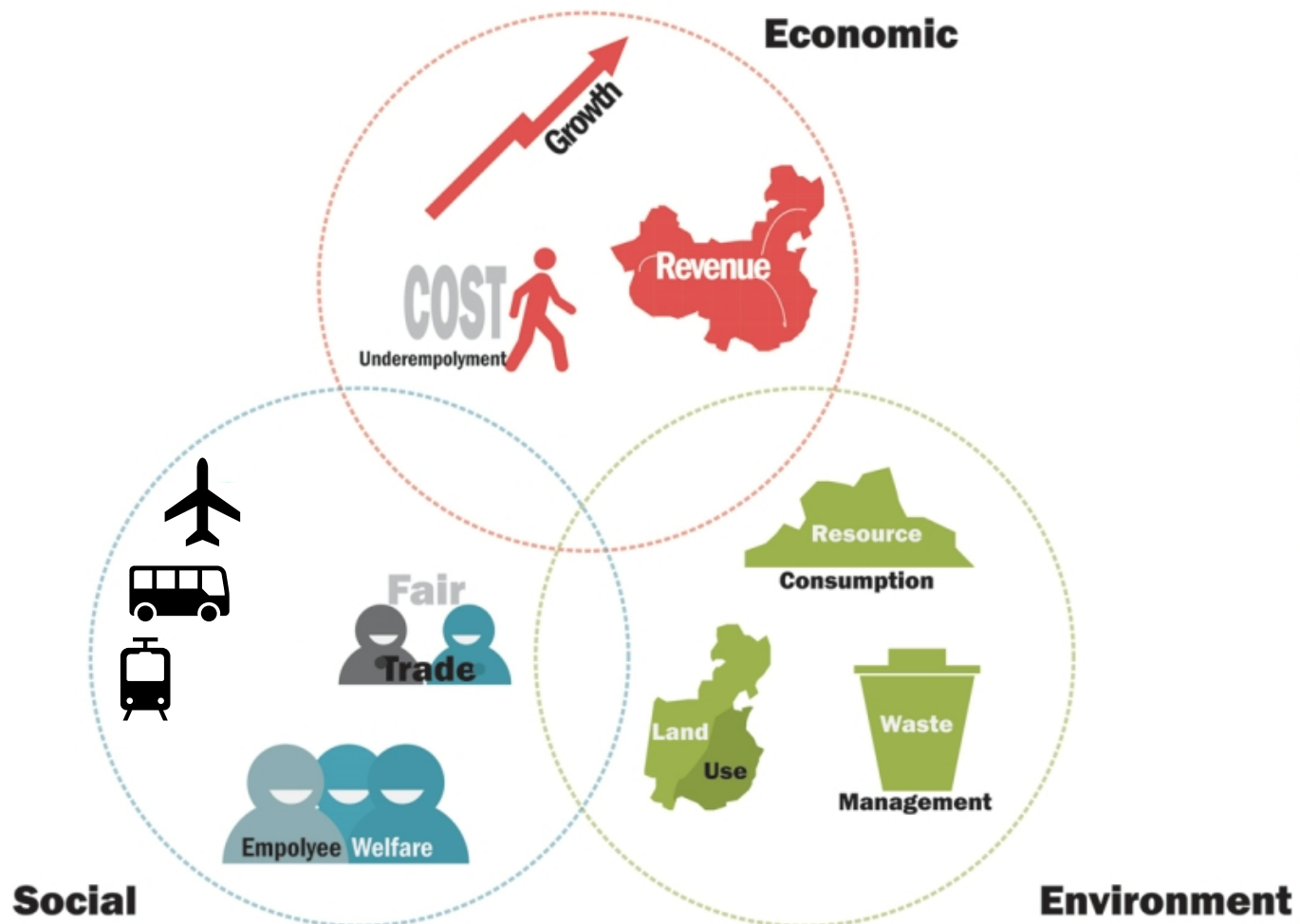**Horizon 2020**
@EU_H2020

Applicants will find ample funding opportunities

The bigger picture
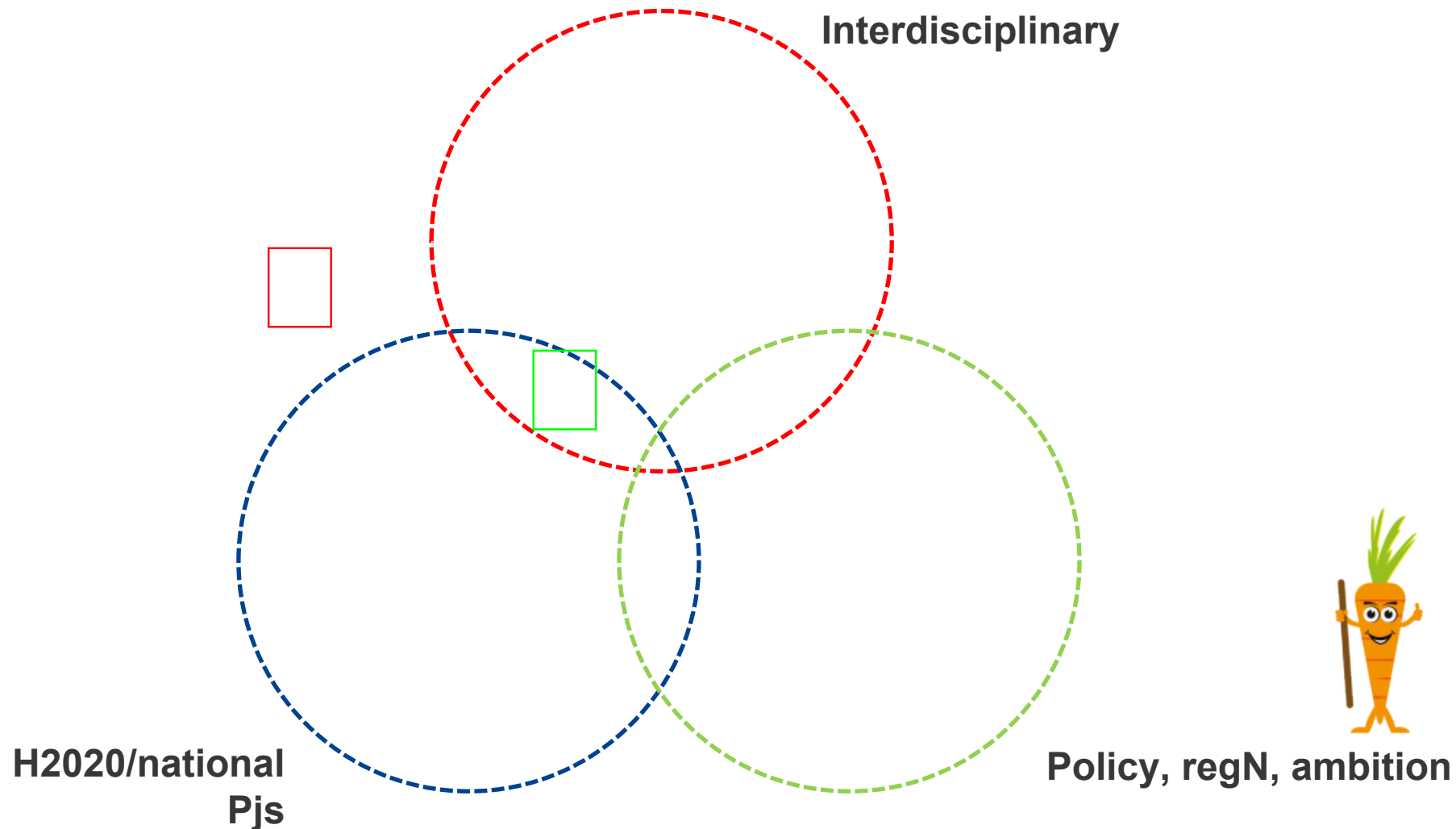
Triple bottom line approach

The bigger picture

Complementarity and gaps

Interdisciplinary

H2020/national Pjs

Policy, regN, ambition

The smaller picture

The smaller picture

Planning for this afternoon

- Please note your stakeholder group

  - stars (*) and hats (^)

  - please bear in mind during the presentations

  - room allocations

  - each group will need a spokesperson (*) and a timekeeper (^?)

- We will reconvene in Beluga, after lunch, for a briefing

  - then disperse into the breakout groups

- *Please* do try to get back from lunch promptly – thank you!

Over to Jose Manuel ...

Wrap-up and next steps

Next steps

This was just the start ...

- Write up results of today (including discussions this morning)

- Add a brief synthesis of the slides (action points and ideas)

- SC and SJU to discuss best way(s) forward and identify actions

- Will be considered in planning for ER4

- Please e-mail me if you think of anything (polite!) on way

home

Performance assessment in ATM
– towards better collaborative methods

Thank you *very much*!

SESAR
JOINT UNDERTAKING

Founding Members

EUROPEAN UNION   EUROCONTROL

Stand-bys

SESAR call TRLs

The level of achievement and consequent maturity at each level is described below:

Exploratory Research covers:

Pre-TRL1 Scientific Research: Fundamental exploratory research investigating relevant scientific subjects and conducting feasibility studies looking for potential application areas in ATM, concentrating both on out-reach to other disciplines as well as educating within.

TRL 1 Basic principles observed and reported: Exploring the transition from scientific research to applied research by bringing together a wide range of stakeholders to investigate the essential characteristics and behaviours of applications, systems and architectures. Descriptive tools are mathematical formulations or algorithms.

TRL 2 Technology concept and/or application formulated: Applied research. Theory and scientific principles are focused on very specific application area(s) to perform the analysis to define the concept. Characteristics of the application are described. Analytical tools are developed for simulation or analysis of the application.

Industrial Research & Validation (outside the scope of this Call) covers:

TRL 3 Analytical and experimental critical function and/or characteristic proof-of-concept: Proof of concept validation. Active Research and Development (R&D) is initiated with analytical and laboratory studies including verification of technical feasibility using early prototype implementations that are exercised with representative data.

V 1.1 dated 24 March 2015

E-OCVM
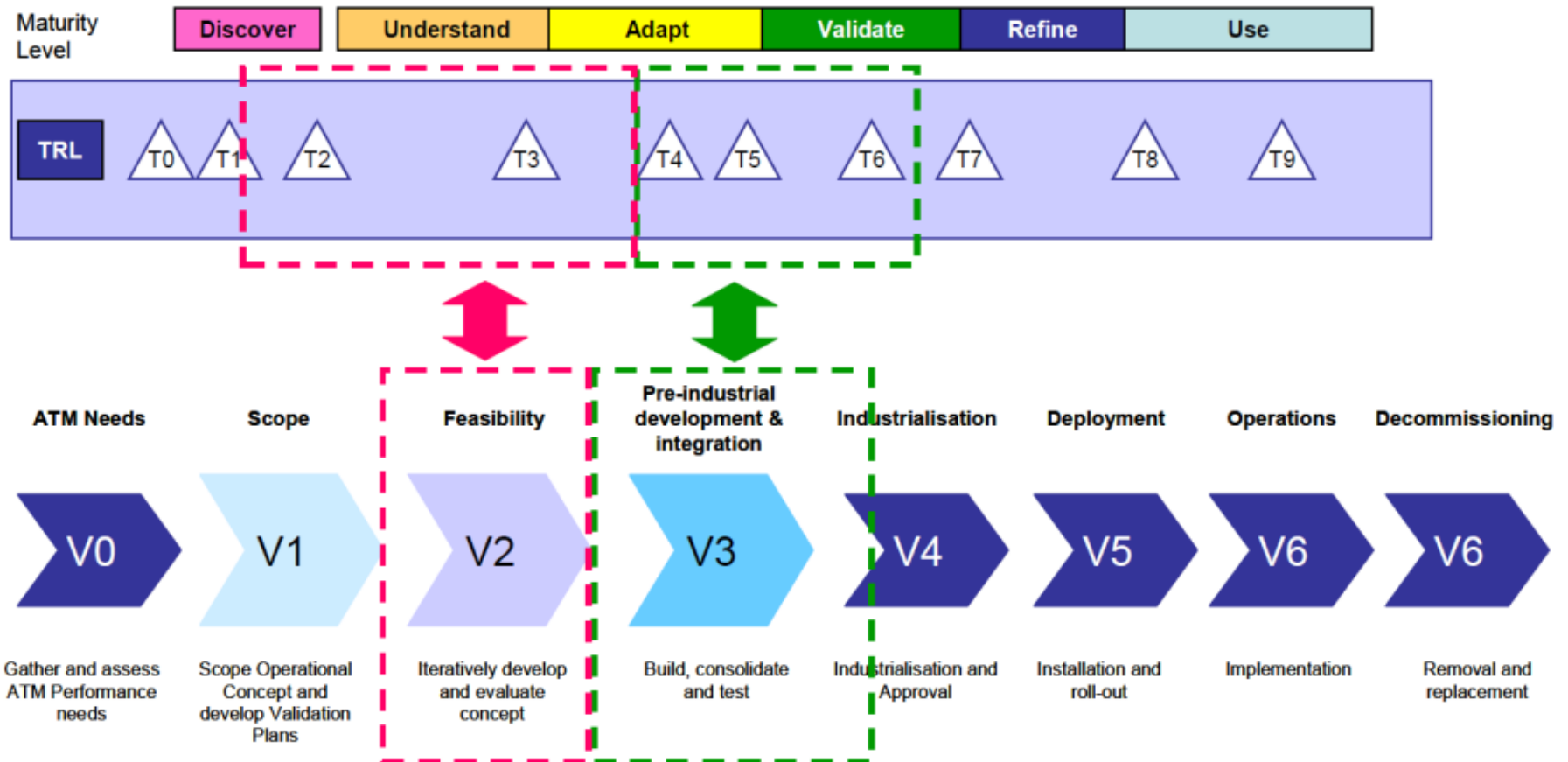
Source: European Operational Concept Validation Methodology Version 3.0, Volume II Annexes, EUROCONTRO

ER reviews & gates
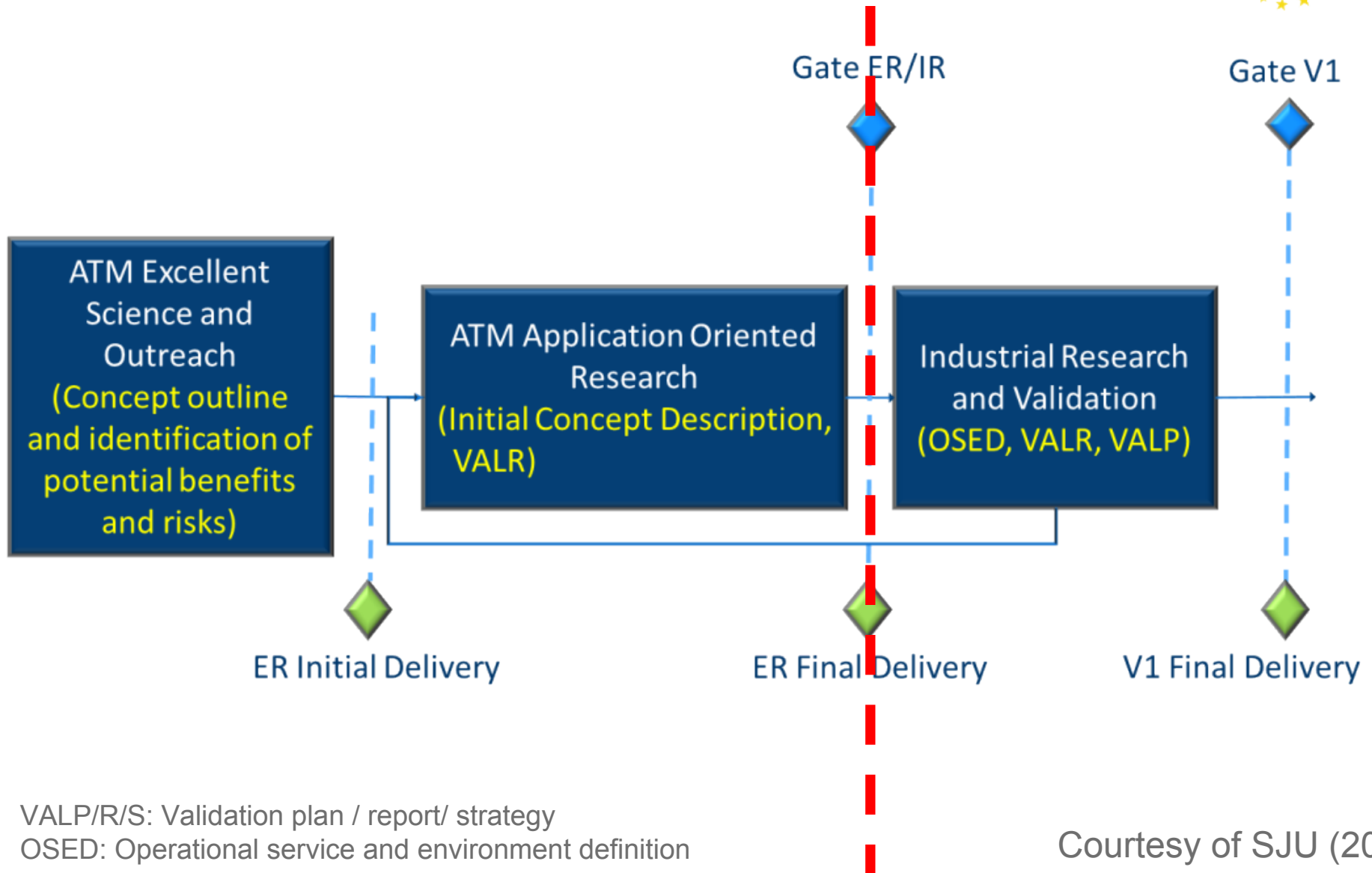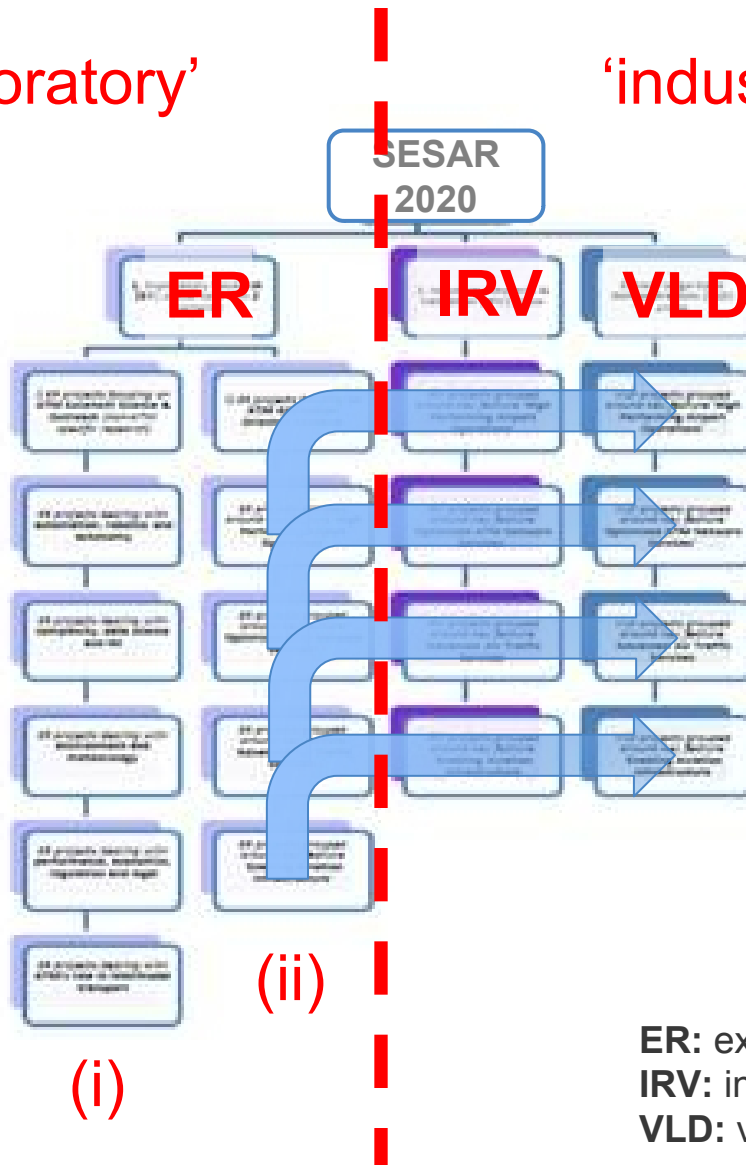

VALP/R/S: Validation plan / report/ strategy
OSED: Operational service and environment definition

Courtesy of SJU (2018

AWP 2016

'exploratory'   'industrial'

Exploratory research area
(i) Excellent science & outreach
Automation, robotics and autonomy
Complexity, data science and Information Management
Environment and meteorology
Performance, economics, regulation and legal
ATM's role in intermodal transport
(ii) Application-oriented research
High performing airport operations
Optimised ATM network services
Advanced air traffic services
Enabling aviation infrastructure

ER: exploratory research
IRV: industrial research and validation ('Wave 2')
VLD: very large-scale demonstrations
SESAR AWP 2016 (2015)