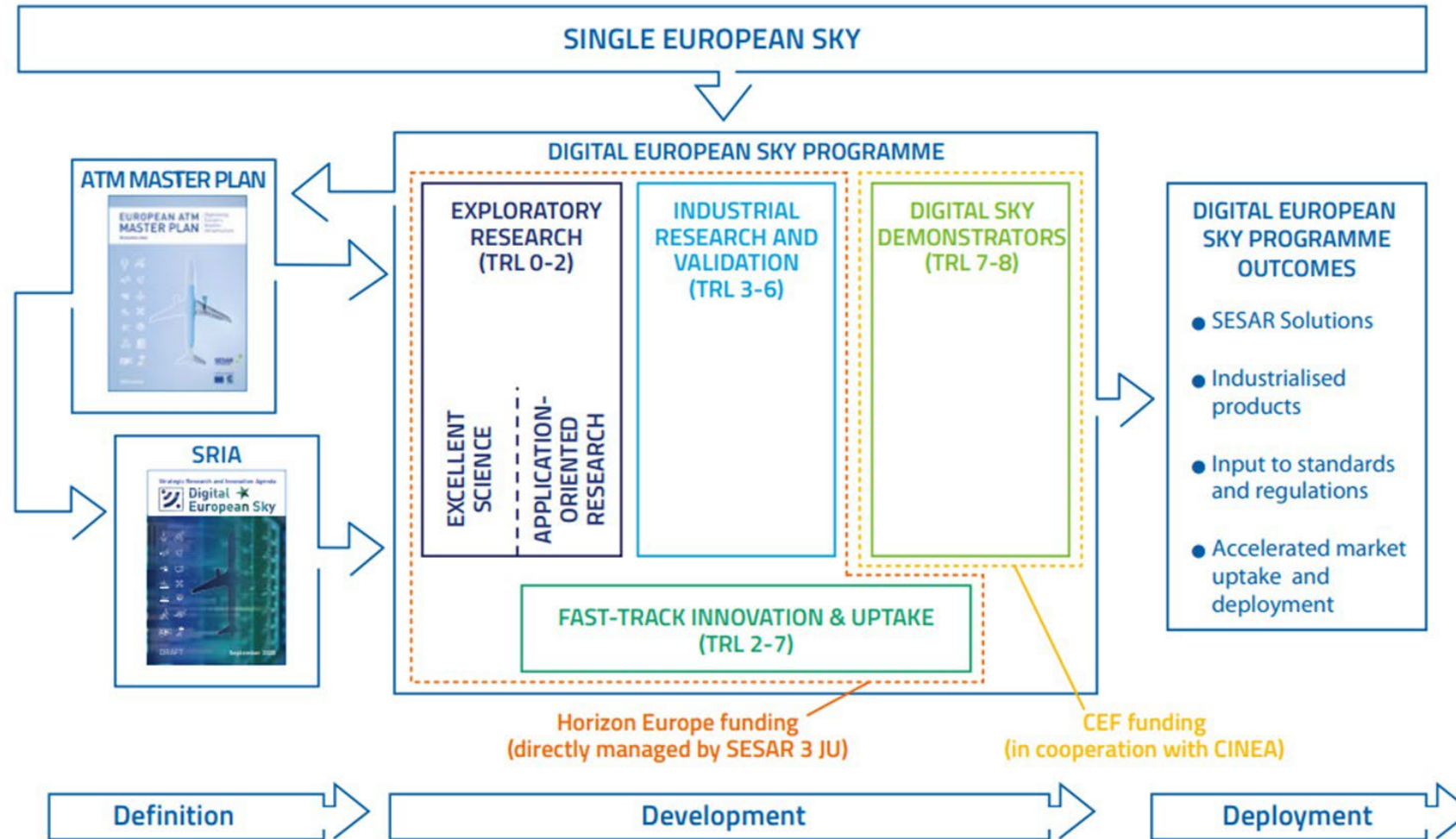


FLY AI CONFERENCE 2024

Alessandro Prister – SJU Programme Manager
jointly with Astra, Trusty, Hypersolver, AI4HyDrop, Hucan

SESAR JU Artificial Intelligence Work Programme
29 April 2024

SESAR JU – research clusters



SESAR JU Digital European Sky Programme – Status 2024

AI PROJECTS

FLAGSHIPS

FUNDAMENTAL RESEARCH

ATM APPLICATION - ORIENTED RESEARCH

INDUSTRIAL RESEARCH
PHASE D PHASE C

FAST TRACK INNOVATION AND UPTAKE

DIGITAL SKY DEMONSTRATORS



| | | | |
|---------------------------------------------|-------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <p>ASTAIR</p> <p>HYPERSOLVER</p> | <p>CODA</p> | <p>FCDI</p> <p>ISNAP</p> <p>ATC-TBO</p> <p>MIAR</p> <p>FCA</p> | <p>ESMA</p> |
| | | <p>SOLO</p> <p>ECHO 2</p> <p>IRINA</p> <p>NETWORK TBO</p> | |
| <p>HUCAN</p> | <p>SMARTS</p> | <p>ISLAND</p> <p>IFAV3</p> | <p>FASTNET</p> <p>KAIROS</p> |
| <p>IMAFUSA</p> <p>MUSE</p> | <p>AI4HYDROP</p> | | <p>EUREKA</p> <p>ENSURE</p> <p>OPERA</p> <p>SPATIO</p> <p>SAFIR-READY</p> <p>BURDI</p> <p>EALU-AER</p> <p>U-ELCOM</p> |
| <p>SEC-AIRSPACE</p> | | | <p>CNS DSP</p> <p>VITACY</p> <p>EXODUS</p> <p>DEVICE</p> |
| <p>MAIA</p> | <p>MULTIMODX</p> | | <p>SIGN-AIR</p> |
| <p>AEROPLANE</p> <p>E-CONTRAIL</p> | <p>GREEN-GEAR</p> | <p>CICONIA</p> <p>CONCERTO</p> <p>GALAAD</p> <p>GEESE</p> <p>DYN-MARS</p> | <p>ECHOES</p> <p>HERON</p> |
| <p>SYNTHAIR</p> <p>TRUSTY</p> | <p>ASTRA</p> | <p>JARVIS</p> | <p>DARWIN</p> |
| | | <p>MITRANO</p> | <p>HARMONIC</p> |

SESAR AI Projects overall Lifecycle

SESAR 2020

Fundamental ER

BigData4ATM
ASIA
TAPAS
MALORCA
ARTIMATION
DART
MAHALO
SAFEOPS
SINAPSE
SIMBAD

Applied ER

ISOBAR
COPTRA
HAAWAI
BUBBLE
USEPE
USPACE

Industrial Research

| | |
|----------------|----------------|
| PJ.01-W2-08B1 | PJ.05-W2-972 |
| PJ.01-W2-08B1 | PJ.09-W2-45 |
| PJ.02-W2-14.6a | PJ.09-W2-49 |
| PJ.02-W2-14.7 | PJ.10-W2-96 |
| PJ.02-W2-14.8 | PJ.14-W2-100 |
| PJ.02-W2-14.9 | PJ.14-W2-76 |
| PJ.02-W2-14.9a | PJ.18-W2-57 |
| PJ.02-W2-21.1 | SOL-TINDAiR-01 |
| PJ.04-W2-28.1 | SOL-TINDAiR-02 |

SESAR 3 DES

TRUSTY
SynthAIR
HUCAN
HYPER SOLVER
MAIA

ASTRA
AI4HYDROP
MultiModX
SMARTS

JARVIS
HARMONIC

Fast-Track

FASTNET
DARWIN
KAIROS

DSD

Grouping of SESAR Projects applying AI techniques 1/3

Airport / Tower surveillance

TRUSTY, JARVIS

Taxiway inspection (i.e., bird hazard, presence of drones and the need for drone protection, autonomous vehicle monitoring, human intrusion, etc.) and runway monitoring (approach and landing) misalignment warning.

Traffic hotspots

ARTIMATION, DART,
ASTRA, HARMONIC, HYPERSOLVER

AI-based Flow Management Position (FMP) function to predict and resolve traffic hotspots. Automatic support for hot spot analysis and resolution, integration of constraints and dynamic airspace configuration (DAC). Data driven trajectory prediction.

Network state monitoring

PJ.09-W2-49

Prediction and management of network critical states and degraded performance.

Smart sectorization

SMARTS

Dynamic airspace configuration and the design of “smart sectors”. This covers the design of basic volumes of airspace with optimal distribution of workload, tailored around specific safety and operational requirements, including complexity.

Optimised runway delivery

PJ.02-W2-14.6a

Enhanced optimised separation delivery with machine learning uses more accurate predictions of final speed profiles derived from advanced big data / machine learning techniques.

ATCO & Pilot decision support

TAPAS, MAHALO, AISA

JARVIS, DARWIN

Various AI solutions solutions (digital assistants) to support Pilots, ATC operators and Airport operators in non-safety and safety critical operations.

Grouping of SESAR Projects applying AI techniques 2/3

Dynamic reconfiguration of airport resources

FASTNet

Airport-Airport coordination in strategic and pre-tactical phases based on airport stakeholders and network requirements, including both information and predictions.

Generating synthetic data for feeding AI Machine Learning

SynthAIR

Improved adverse weather forecasting + impact on network management

ISOBAR, KAIROS

Integration of AI-based convection prediction models within ATFM operational tools. Improve prediction of additional weather phenomena impacting aviation. More Precise Characterisation of Demand and Capacity Imbalances due to Convective Weather.

Speech recognition

MALORCA, HAAWAI, PJ.05-W2-97, PJ.10-W2-96

Automatic speech recognition (ASR) to reduce the amount of manual data inputs by air-traffic controllers (using also airspace structure and radar data).

U-space

BUBBLES, USEPE, USPACE, AI4HyDrop

U-Space advanced (U3) 'separation management service'.

Grouping of SESAR Projects applying AI techniques 3/3

Understanding AUs' preferences and behavior

SIMBAD

Modelling of trajectories and estimation of non-observable variables from historical air traffic data. Particular attention will be paid to the estimation of variables related to AUs' preferences and behaviour (e.g., airline cost functions).

Passenger behaviour

IMHOTEP, BigData4ATM, MAIA, MultiModX

Characterisation of passengers and journeys attributes, aimed to capture relationships between the target variables missing in the mobile network data (i.e., number of persons travelling together and number of bags) and the explanatory variables that are present both in surveys and mobile network data (e.g., place of residence, purpose of the trip, last mode of transport used to access the airport).

ICT security

SINAPSE + others outside SESAR

AI based surveillance of network load distribution to detect anomalies. Usage of AI for PEN testing. Usage of AI for systems hardening. Software defined networking.

Novel methods and procedures of certification

HUCAN

Developed for ATM-related systems based on high levels of automation, including AI-powered ones.

SESARJU projects presented at FLY AI Conference

Pitches from ASTRA, HYPER SOLVER,
TRUSTY, AI4HyDrop, HUCAN + exhibition

JARVIS and DARWIN presented on
Day 2 and in the exhibition area



**THANK YOU FOR YOUR
ATTENTION**