This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 824323





European forum and oBsErvatory for OPEN science in transport

10th EASN Virtual Conference

4 September 2020

Use cases towards future Open Science model for air transport

Presenter: Afroditi Anagnostopoulou (CERTH/HIT)

Authors: Afroditi Anagnostopoulou, Maria Boile (CERTH/HIT)

Gabriele Pistilli, Fabio Cartolano, Michela Fioretto (FIT)

Kristel Palts (DLR)

Introduction

	Project website	https://beopen-project.eu/
	Start date	01-01-2019
	End date	30-06-2021
BEOPEN	Social Media	<u>BE OPEN Twitter</u>
		@OpenScTransport
•••		BE OPEN LinkedIn Group
		ZENODO BE OPEN
		community

Goal → establish a common understanding in the research context related to air transport

- a systematic review of current scientific production for air transport mode by assessing the activity of Technology Platforms and main influential research organizations
- different positioning based on the attributes and/or roles (i.e. public/private, operators, industries etc.)

Objectives

Provide an overall assessment of scientific production against innovation uptakes

Propose relevant recommendations for the definition of future Open Science services and infrastructures in air transport mode

Methodology

A systematic review of **current scientific production** for air transport mode by assessing activity of relevant Technology Platforms and the main influential organizations.

Positioning of **different key actors** based on the attributes and roles of the key actors (i.e. industry, research community, and public authorities)

A **"bottom-up" modelling approach** utilizing scenes, scenarios and use cases in air transport mode and interrelation of use cases with current research trends

"Bottom-up" modelling approach



"Bottom-up" modelling approach

- scenes are situations occurring in particular contexts. Scenes show a snapshot in the considered environment and consider the relationship of all involved entities;
- scenarios are chronological sequences of scenes describing a temporal development based on events and actions. Within a scenario, goals and intentions of actors get explicit;
- use cases are combination of several scenarios, sometimes alternatives that fully materialize needs and objective of actors in a descriptive and structured mode.



Key actors providing input

Technology Platforms that stand for Industry sector:

□ DLR Chamber represents more than 800 companies, from start-ups to multi-nationals, connecting over 50 industry sectors through a membership programme designed to engage every level and discipline.

HUMANIST:

Research centres, universities and SMEs active in Human Machine Interface across transport modes; 22 members from 15 countries.

Main influential Research Organizations:

Common forum for European aviation training and aviation education providers; 25 members from EU and US countries.

Public authorities:

Association representative of the urban, suburban and regional passenger public transport operators and organizing authorities; 1400 members from 96 countries.

Competence areas





Business modelling area	An engine aircraft manufactures decides to produce electric engines for the aircrafts			
Environmental area	A major airport hub wants to update the pricing scheme for the use of its infrastructure			
Legal/ Regulatory area	Air Taxi between country A and B			
Socio-economic area	Public authorities want to improve accessibility of population that has fear of flight, to the air transport			
Technological area	Reduction of noise and emissions produced by aircrafts			
Transport planning area	Aviation company wants to offer a new passenger service experience			

Systematic assessment



Research Trends

BUSINESS AREA	ENVIRONMENTAL AREA
Harmonize the European Intermodal Education & Training Curriculum	Research in air emissions and noise pollution
Future Airport Layout	Optimising fuel burn
System and journey resilience	Inflight refuelling
integrated information, communication, navigation and surveillance platform	Affordable alternative energy
Small launch space vehicles showing a promising commercial potential	Aviation's climate impact
Develop New Methods of Intermodal Learning and Training.	Adapt to climate change

Research Trends

LEGAL/REGULATORY AREA	SOCIO-ECONOMIC AREA
Efficient and effective policy and regulatory frameworks which ensure a global level playing field	Increasing safety
TECHNOLOGICAL AREA	TRANSPORT PLANNING AREA
Harmonisation of the Security Policy Framework	Small Aircraft and Personal Air Transport
Alternative aircraft configurations	Organization and management of mobility and global transport system with GNSS, not only for navigation but also for tracking and tracing of vehicles
Alternative Propulsion	
Alternative Aircraft Systems	
Air Traffic Control (ATC)	
Design, manufacture and certify for safety	
Augmented reality systems	
Proactive safety management programmes	

Research Topics

ORIGINAL RESEARCH DATA

Transport regulation

Integration with other transport mode

ITS applications

Intermodal travel information

Information services

Information services

intermodal travel information

OPERATIONAL DATA
Aviation Accidents/Incidents
Zero fatalities
Emissions reduction
Traffic congestion
Increasing safety
Effective transport management system
Cost-effectiveness and productivity for ANSPs in Europe
Economic impact
Increased efficiency
Job creation
Public participation
Resilient transport systems
Aviation Weather Service
Zero fatalities
Aviation Digital Data Service (ADDS)
Airworthiness
Airworthiness
Aviation Digital Data Service (ADDS)
Zero fatalities

10TH EASN VIRTUAL CONFERENCE

Research Topics

DATA FROM PUBLIC RESEARCH

Development of critical technologies	
Growing of mobility demand	
Increasing safety	
Integration with other transport modes	
Interoperability	Eully integrated management systems
Vehicle efficiency	Navigation and control systems for optimised planning
Rational use of motorised transport	and routing
Clean maintenance	Adverse health effects
Emissions abatement	Dependence on fossil fuels
Alternative and cleaner fuels	Competitiveness
More efficient transport	Accessibility
More efficient transport	Forward-looking activities
Alternative and cleaner fuels	Air quality
	Multi-disciplinary collaborations

New materials and processes

New materials and processes

Multi-disciplinary collaborations



Business	Engine aircraft manufactures decide to produce electric
modelling area	engines for the aircrafts

- Reorganization of the production process (e.g. time required for finishing the element, resources required, work flow);
- □ Training of employees within the work time
- □ An emergency plan with the minor losses for the company
- Reconsideration of the initial decision should be considered by the company.



Environmental
areaA major airport hub wants to update the pricing scheme
for the use of its infrastructure

- A sustainable business plan is needed in order to figure out how much the fees should decrease for electric aircraft and how much they should be increased for conventional aircrafts.
- □ The increase margin should be decided based on the policy of the airport shareholders.

Legal/ Regulatory	Air Taxi between country A and B
area	

inform ATC when entering in the other countries aerospace;

- L tune radio frequencies to the ATC of the other country;
- find a station to land from where to continue with the other transportation mean



Socio-economic	Public	authorities	want	to	improve	accessibility	of
area	popula	tion that has	fear of	fligh	t, to the ai	r transport	

- □ assess the status of the airports regarding the accessibility
- check the regulations linked to the accessibility at international, national and regional level
- define the target to be achieved
- create a budget for executing the approved plan
- create a plan to implement the measurements (tender, time frame, etc.);
- force aviation companies to order aircrafts with the disability seats options



Technological	Reduction of noise and emissions produced by aircrafts			
area				
develop innovative aircrafts with environmental friendly engines and				
low noise and	emissions			

Transport	Aviation company wants to offer a new passenger service
planning area	experience

- identify the required aircraft characteristics (e.g. number of seats, energy consumption, approximate price) and the number of aircraft required
- examine and decide financial resources to be compromised and contract conditions (with maintenance included in the contract or not) for the tender/leasing contract
- agree with the supplier the delivery conditions (e.g. place, time)

Assessment

enhanced system predictability

Ensuring safety and security:

Electrical aircraft and Drones

Passenger Data protection

Maintain the safety level

monitoring the risks

system integration

Artificial Intelligence

overview of opportunities

strategies

unit (EASA)

SOCIO-ECONOMIC AREA

Meeting societal and market needs

Ensuring safety and security Efficient security and boarding measures trough

Ensure and promote higher security rules by

developing efficient Cyber security rules and

BUSINESS AREA Maintaining and extending industrial leadership

Integration and deployment of new technologies:

Competitive products, leading-edge design and

Knowledge the benefits of Big Data technologies and

Joint collaboration, implementation and coordination

in definition of European research and innovation

Identification of stakeholders involved: Industry,

Research Organisation, Education and science Facility,

Government and public authority, other, regulatory

Stimulate the interest of children and motivate

students to pick up interest in aerospace engineering by different international program and commercial

Promote carrier in aviation by creating an clear

Reduce gender bias in the field of aviation and

Support and enforce talent pool of students

ncourage girls to take aeronautical degree

Promote open and fair market for aircraft

Promote flying as the safest mode of transport

TECHNOLOGICAL AREA

Prioritising research, testing capability and education

Innovative aircraft design, certification, operation and maintenance

Faster up-take and implementation of new technology

Investment in the research and Innovation to answer the environmental goals

LEGAL/REGULATORY AREA

Maintaining and extending industrial leadership

Ease the Certification procedure and foster Regulatory framework

New generation of standards - harmonized Certification process

private Enhance cooperation between public partnership in local as well as international level

ENVIRONMENTAL AREA

Protecting the environment and energy supply

Reduction of environmental impact in global level

Major reduction of CO2 emissions and NOx emissions

Sustainable Alternative Fuels

Aircraft development

Aircraft movements emission free - taxiing

Prioritisation of environmental action plans and

establishment of global environmental standards

Analyse and predictability of extreme weather

TRANSPORT PLANNING AREA

Comparable and reliable travel data

Multimodal use of transport

Interoperable and networked systems for seamless air transport

Reduction of delays

Knowledge the benefits of Big Data technologies and **Artificial Intelligence**

Knowledge the benefits of Big Data technologies and

10TH EASN VIRTUAL CONFERENCE

reduce gender bias in the neid of aviation and

ncourage girls to take aeronautical degree

Recommendations (1)

Enhance technological innovation in designing aircrafts in order to reduce the environmental impact and invest into sustainable environment.

Foster cooperation between scientists and regulatory units in order to regulate and certify new technology without jeopardizing security and safety issues.

Fragmentation of European Sky is one of the problems to cause congestion in the airspace and therefore delays in the air traffic. Further development of Single European Sky needs to be fostered, to harmonize the procedures and therefore reduce the delays in the air traffic management.



Recommendations (2)

"Multi-modal connected" Europe needs to be created in order to fulfil the passengers' needs. A build up of passenger centric transport network, instead of transport mode centric network could be considered.

Enhance cyber-security & efficient data exchange to create a more resilient and faster aviation environment.

Foster cooperation at national and international level for the aviation sector.

Support innovation and research in aviation sector to remain on the competitive level.

OS Perspectives



Source: Burgelman, J. C., Pascu, C., Szkuta, K., Von Schomberg, R., Karalopoulos, A., Repanas, K., & Schouppe, M. (2019). Open science, open data and open scholarship: European policies to make science fit for the 21st century. Frontiers in Big Data, 2, 43.

OS Services for Transport Research

- □ TOPOS (Transport Observatory/fOrum for Promoting Open Science) aims to operationalise Open Science principles in transport research.
- TOPOS Forum aims to support the engagement of a broad range of stakeholders.
- TOPOS Forum aims to foster an evidence-based discussion and crossfertilization of ideas among researchers in transport.
- TOPOS Observatory is a collaborative effort with OpenAIRE (which is currently developing the European Open Science Observatory -EOSC).
- TOPOS Observatory aims to be a portal area to gather all research results.
- □ TOPOS Governance Scheme
- **TOPOS Membership Scheme**

OS Services for Transport Research

- TOPOS Observatory aims to promote territorial and cross-border cooperation for an integrated and sustainable transport research observatory.
- TOPOS Forum aims to support researchers in exchanging ideas and discuss issues.
- Competence areas will be used as categories for air transport in order to group discussions about research trends.
- Recommendations will be used for topics in order users to be able to post, read, and reply to messages. Conversations are messages or threads of discussion posted within a topic.

OS services for Transport Research



TOPOS OBSERVATORYTOPOS OBSERVATORYTOPOS FORUMFOR ORGANISATIONSFOR INDIVIDUALS



The BE OPEN project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824323.

Υ

10TH EASN VIRTUAL CONFERENCE

OS services for Transport Research

http://www.topos-observatory.eu/index.php

BE OPEN				DEPOSIT	LINK SEARCH	about sign in A
Transport Rese	earch					
	Research outcomes 🔹 Search	by title, author, abstract, D	Ol, orcid	Ad	SEARCH vanced Search	Subscribe 2
SUMMARY PUB	ICATIONS RESEARCH DATA	SOFTWARE	OTHER RESEARCH ANALYTI	cs		
4,71	35 2		19,516 			i
Publications						
39,215 Total	1,336 Total linked projects	34,580 Open access	909 Closed access	11 Embargoed	2,654 Restricted	

	S services for Profile Library My network Grou	or Trar	nsport Re	search	Search	1.9
JOINEDIA	Activity Profile My publications I	Experience Analytics				
	ANALYTICS					
	Reputation Scor	e 0/2	Score percentile	Mossages sont	Messages sent	
		70	33			
	6	•	0	PROFILE STRENGTH	33%	
				33%	i	
	Impact Score	e 0/ 0	Impact Score		F	
		/0	percentile	You must complete your profile by doing the		
				following:		
	Link to Google scholar		0	Upload your photo		
				Add your experience a	nd skills	
	Times cite			Complete your profile		
				Add your previous publications		
	Web of Science Core Collection®			Submit your paper		
				Become a journal editor		
		Last earne	d Reputation points	Create a new collection		
	+1 Welcome point (211 days ago)			Create an organization p	rofile	
				Open access		

10TH EASN VIRTUAL CONFERENCE

OS services for Transport Research



10TH EASN VIRTUAL CONFERENCE



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 824323



Promote, regulate and standardise Open Science in Transport

Thanks for your attention!