



D2.10 SESAR Innovation Days 2020 Report

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Founding Members



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Engage

THE SESAR KNOWLEDGE TRANSFER NETWORK

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



Abstract

This report describes the tenth edition of the SESAR Innovation Days, which took place as a virtual event between 7th and 10th December 2020.

The opinions expressed herein reflect the authors' view only. Under no circumstances shall the SESAR Joint Undertaking be responsible for any use that may be made of the information contained herein.

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1 Introduction

The tenth edition of the SESAR Innovation Days took as a virtual event between 7th and 10th December 2020. As in previous years, Engage took responsibility of the programmatic, i.e. scientific content of the conference, tightly collaborating with the SJU as main sponsor. The other aspects of the conference were organised by the SESAR Joint Undertaking, especially SJU Communications. This includes the selection and preparation of the keynotes, the configuration of the virtual conferencing system, the virtual networking activities and communications.

The conference was initially planned to take place in Budapest hosted by HungaroControl; a site visit had already taken place, the conference location was selected as well as the premises of the networking event and contracts were virtually ready to sign when the Covid-19 crisis hit the preparations. After some discussions, consultation and revised planning the decision was taken to host the SESAR Innovation Days on a virtual platform. This was new for most involved and a number of lessons were learnt; some of these can be found in Section 9.

Over 350 participants attended the SIDs, which featured technical presentations, plenary talks, panel discussions and numerous networking activities. The SIDs included a number of specific opportunities for networking, including the ATCA Virtual Coffee and the Chat Roulette as well as a virtual poster session in an innovative format.

1.1 Engage support for the SESAR Innovation Days

Engage is the SESAR Knowledge Transfer Network (KTN), established to promote and facilitate the development of air traffic management research in Europe. The organisation of the SESAR Innovation Days receives support and expertise from Engage consortium members (led by EUROCONTROL), from initial planning through to post-conference activities.

1.2 Objectives of this document

This document describes the 2020 edition of the SESAR Innovation Days.

1.3 Scope of D2.10

The following sections describe the:

- Programme Committee;
- Call for Contributions;
- Paper selection process;
- Conference programme;
- Virtual Conference Format and associated electronic tools;
- Results of a participant satisfaction survey; and
- Some lessons learned for future editions.

2 The SESAR Innovation Days

The SESAR Innovation Days are a scientific conference based on an open Call for papers and the peer-review of paper submissions through the SIDs Programme Committee (PC); members of the PC, supported by the SESAR Scientific Committee, perform a triple review of all submissions on the basis of which a decision about acceptance and rejection is made. The SIDs have taken place annually since 2011, usually in late November or early December and in varying locations.

Table 1: Unique visits SIDs 2020

OVERVIEW: Unique visits SIDs 2020	
Day 1	470
Day 2	334
Day 3	684
Day 4	313
Total	1060

Note that owing to the virtual format of the conference and unlike in previous years the attendance varied greatly over the days and the different sessions. In 2020, the SIDs 2020 welcomed a total of 1060 unique visitors to the conference. This means that 1060 participants attended at least one of the session/events of the SIDs conference, which featured technical presentations, plenary talks, panel discussions and numerous networking activities. However, an average of 200 participants attended any one session at any time. The SIDs also included a number of specific opportunities for networking, including the ATCA Virtual Coffee and the Chat Roulette as well as a virtual poster session in an innovative format. Note that the highest count of unique visitors was on Day 3, the day the virtual panel on Higher Airspace Operations jointly organised with ICAO and ATCA took place.

The maximum attendance in the technical sessions was 360 participants (two technical sessions took place in parallel); the opening keynote was attended by 338 (day 1), 123 (day 2), 97 (day 3), 83 (day 4); the virtual networking activity was attended by 119 (day 1), 42 (day 2); the virtual social activity was attended by 72 (day 2), 40 (day 3), 37 (day 4).

Table 2: Attendees Technical Sessions SIDs 2020

Day		Attendees
Day 1	Economics & Performance	174
	Arrival & Departures	186
	Management	
Day 2	Advances Air Traffic Services	126
	Network & Flow Management	131
	ATM Architecture & Operations	128
	Modelling & Optimization	80
Day 3	Airports	67
	Trajectory Prediction	127
	Machine Learning I	138
	Environment & Meteorology	95
Day 4	Machine Learning II	111
	UAS & UAS Traffic Management	111

Table 3: Attendees Opening Keynotes SIDs 2020

Day	Attendees
Day 1	338
Day 2	123
Day 3	97
Day 4	83

Figure 1 shows the average dwell time on during the virtual networking events on day 1 (total attendees in the networking event: 119) and day 2 (42 attendees). As can be seen, the majority of participants left within ten minutes, suggesting initial curiosity but a consequent lack of engagement.

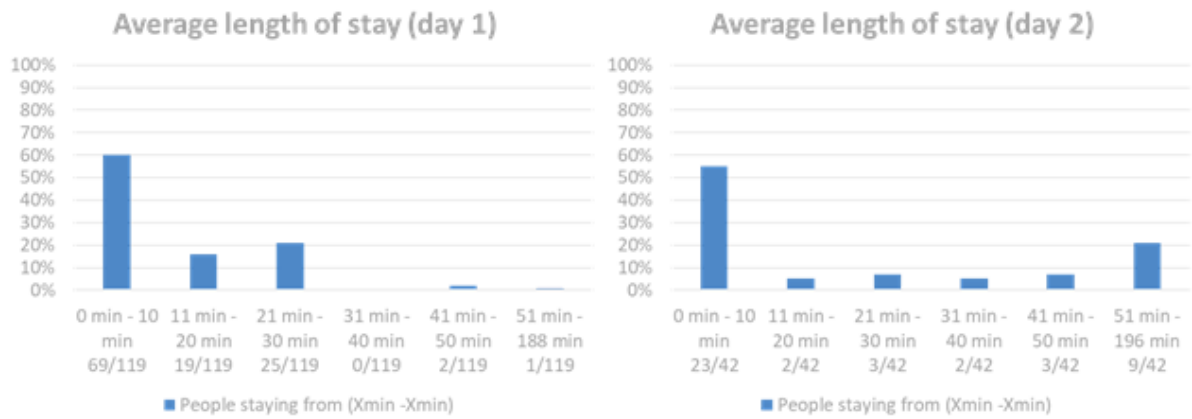


Figure 1: Attendance to virtual networking sessions

3 Programme Committee

The Programme Committee is composed of selected researchers from academia and industry; its main tasks are the review of paper and poster submissions leading to decisions about acceptance and rejection of all submissions. The Programme Committee was supported in the review process by the SESAR Scientific Committee. The PC comprised the following members:

General Chair: David Bowen – SESAR JU

Programme Chair: Dirk Schaefer – EUROCONTROL

Local Organisation Chair: Rita Somogyi – HungaroControl

Programme Committee:

Marc Bourgois – EUROCONTROL

Lorenzo Castelli – University of Trieste

Andrew Cook – University of Westminster

Francesca De Crescenzo – University of Bologna

Daniel Delahaye – ENAC

Peter Hecker – TU Braunschweig

Jacco Hoekstra – TU Delft

Gokhan Inalhan – Cranfield University

Chris Johnson – Queen’s University Belfast

Radosav Jovanovic – University of Belgrade

Dirk Kuegler – DLR

Javier Lopes – Boeing Research & Technology Europe

Guglielmo Lulli – Lancaster University

Max Mulder – TU Delft

Jose Muñoz – ASLogic

Eric Nantier – Swiss International Air Lines

David Perez – Innaxis

Founding Members





Hans Plets – Skeyes

Simone Pozzi – Deep Blue

Jose Javier Ramasco – University of the Balearic Island

Damián Rivas – University of Seville

Stephane Marché – Honeywell Aerospace

Francisco Javier Saez – Cranfield University

Georg Trausmuth – Frequentis

George Vouros – University of Piraeus

Paul Ravenhill – Think Research

Arnau Folch – Barcelona Supercomputing Center

Paola Pellegrini – IFSTTAR

Oliver Kranz – PACE

Andrea Ranieri – ALG

Bruno Lamiscarre – NeoMetSys

Xavier Prats – UPC

Additional Reviewers from the SESAR Scientific Committee:

Juan Besada – Universidad Politécnica de Madrid

Henk Blom – NLR

Tatjana Bolic – University of Westminster

Vojin Tomic – University of Belgrade

Olivia Nunez – SESAR JU

4 Call for Contributions

The Call for Contributions was published in May 2020 soliciting paper and poster submissions; submissions through SESAR ER and IR projects were encouraged but the Call was by no means limited to SESAR projects but open to all relevant ATM research.

The Call was published via the SIDs website [2], and announced through emails, SESAR Newsletters and the Engage website [3]. The call can be found under the following URL: [SESAR Joint Undertaking | Call for contributions to the 10th SESAR Innovation Days \(sesarju.eu\)](#) Unlike in previous years, there was not a pdf version of the Call.

A screenshot from the Call for Contributions is depicted below:



Call for contributions to the 10th SESAR Innovation Days

Apr. 6, 2020

INSPIRING LONG-TERM RESEARCH IN THE FIELD OF AIR TRAFFIC MANAGEMENT

During the week of 7-10 December 2020, hosted by Hungarian Academy of Sciences in Budapest.

ABOUT SESAR INNOVATION DAYS

The SESAR Innovation Days (SIDs) are the main vehicle for SESAR Joint Undertaking to share progress and disseminate exploratory research results. Unlike other scientific events in air traffic management (ATM) research, the SIDs focus explicitly on exploratory research. Organised annually since 2011, the SIDs have become a landmark event in the European aviation research calendar. The SIDs will be further strengthened with the support of Engage, the SESAR knowledge transfer network.

This year's SIDs will be hosted by HungaroControl and take place at the Hungarian Academy of Sciences in Budapest, Hungary from 7th to 10th December. The aim is to showcase results from European exploratory research and to discuss how to advance promising concepts towards industrial research within the SESAR innovation pipeline.

The SIDs are based on an open call soliciting contributions from ATM research. Exhibitions and poster, keynotes and networking events will provide further opportunities to learn about interesting projects and meet like-minded researchers.

Once again, this year's SIDs will host the annual Young Scientist Award, recognising young scientific talent in the field.

Founding Members



CALL FOR CONTRIBUTIONS

Researchers from universities, research institutions, airlines, air navigation service providers and industry are invited to submit papers (up to 8 pages) presenting exploratory research within the areas of interest listed below. Papers will be evaluated based on the innovative nature of the ideas, as well as the approach and methods applied.

Areas of interest include:

- Safety, security and resilience
- Automation, autonomy and robotics
- Human factors and decision support tools
- Uncertainty, applied modelling and optimisation techniques
- Complexity, data science and information management
- Machine learning and artificial intelligence
- Aviation economics and business models
- Legal and regulatory aspects and the ATM innovation process
- ATM operations, architecture and performance
- Airspace design and network and flow management
- High performing airport operations
- Advanced air traffic services
- Innovative approaches in environment and meteorology
- Integrated solutions for communications, navigation and surveillance (iCNS)
- Unmanned aerial systems (UAS) and UAS traffic management

All papers (including SESAR contributions) will be triple peer reviewed. The proceedings will be available for download in electronic format on the SESAR Innovation Days website prior to the event. All SID's papers are listed in Elsevier's Scopus database.

A special edition in a renowned ATM research journal will be published with selected articles from SID's 2020.

Paper submission deadline: 30 September 2020

Notification of acceptance: 13 November 2020

CALL FOR POSTERS AND EXHIBITS

Partners from academia and industry are invited to submit proposals for posters and technical exhibits or demonstrations (max one poster/exhibit/demonstration per presenter, three per organisation). As well as showing innovative solutions to traditional problems of air traffic management, posters and exhibits may also address wider air transport and air traffic issues. Proposals of one page shall be submitted with a detailed description of the subject matter. In the case of SESAR, submissions are welcome from all strands of research (i.e. exploratory, industrial and large-scale demonstrations). Proposals of one page shall be submitted with a detailed description of the subject matter.

Poster/exhibits submission deadline: 14 September 2020

Notification of acceptance: 27 September 2020

HOW TO SUBMIT A PAPER OR POSTER/EXHIBIT

Full papers (up to eight pages) and proposals for posters/exhibits (1-2 pages) should be submitted via this [dedicated EasyChair page](#)

All papers and posters/exhibits will be triple peer-reviewed by members of the SID's Programme Committee.

Templates in both word and latex format can be found on the [EasyChair page](#) and should be used for both papers (full paper of up to eight pages) and proposals for poster/exhibits (1-2 page extended abstract of the poster/exhibit; do not submit the poster itself!).

Posters will be printed by the SJU – details will be provided together with the notification for accepted posters/exhibits end of September.

Notification of acceptance of papers will be sent early November.

5 Paper selection process

Two types of submissions were solicited: full paper submissions (up to eight pages) and poster abstracts (up to two pages). A submission template based on IEEE conference style was made available for full papers and poster abstracts alike. Papers and poster abstracts had to be submitted via a dedicated page on the EasyChair conference management website (a professional licence was therefore purchased). The paper template was available for download on the EasyChair page in both Word and LaTeX format. Papers had to be submitted in pdf format.

A total of 48 full papers (2019: 71; 2018: 59) and 23 posters (2019: 23; 2018: 33) were submitted and triple-reviewed by the Programme Committee (including reviewers from the SESAR Scientific Committee).

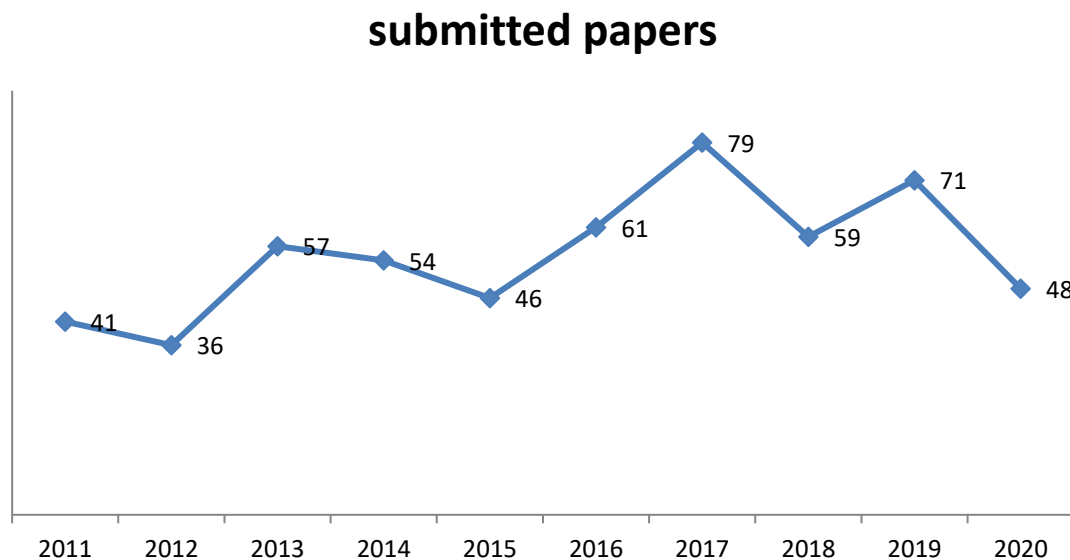


Figure 2: SIDs number of submissions

EasyChair's paper bidding function was used which allowed all reviewers to specify which papers they would prefer to review and to declare conflicts of interest, e.g. in cases in which they authored or co-authored a paper. The review assignment was done by the Programme Chair respecting the preferences as much as possible.

The review was based on the following criteria:

- Overall evaluation;
- Innovativeness;
- Technical quality;
- References.

The overall evaluation was based on a score (strong reject; reject; weak reject; borderline paper; weak accept; accept; strong accept) as well as a free text field. The review comments provided in this field were sent to the authors with the email notification or acceptance or rejection. Reviewers were

instructed to provide detailed and constructive feedback. Another free text field allowed committee members to provide confidential remarks for other Programme Committee members – comments provided here were not sent to authors.

Each paper was reviewed by three reviewers who entered their reviews via EasyChair. In cases where reviews came to different conclusions a dialogue between the three reviewers was initiated by the Programme Chair. In most cases this led to a consensus between the reviewers; in the few cases where this was not possible, a decision was taken based on the review comments.

Poster submissions were reviewed by two members of the PC; 21 out of 23 poster submissions were accepted and we attempted to further raise the profile of posters, for example by including all posters on the website and the App. Notification emails were sent to inform authors whether their paper or poster as accepted or rejected. A total of 30 papers were accepted (2019: 38); this corresponds to a paper acceptance rate of 62.5 % (2019: 53.1%).

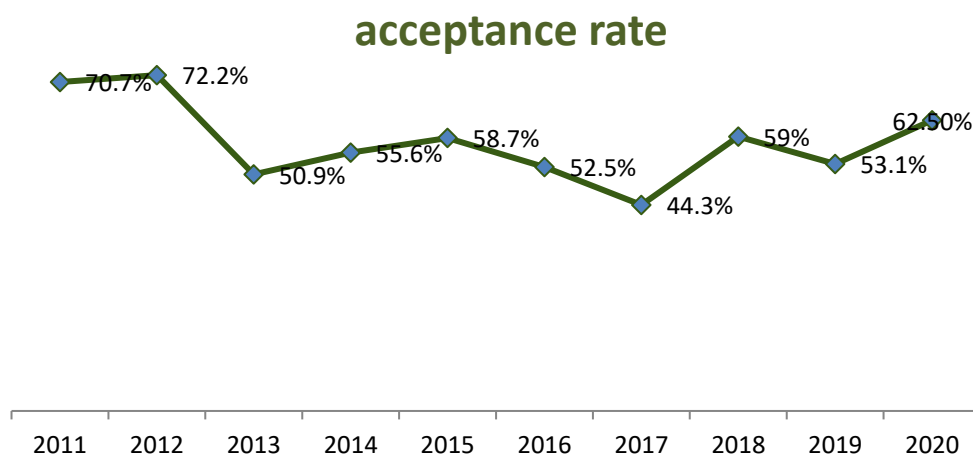


Figure 3: Paper acceptance rate

6 Conference programme

All papers were assigned to thematic tracks and integrated as sessions of three/two paper presentations into the programme. Whilst keynotes, plenary talks and discussion panels took place in plenary sessions, i.e. were attended by the entire audience, technical sessions were conducted in parallel sessions. The Zoom platform was used for the main conference programme throughout the SESAR Innovation Days with the exception of special events such as the ATCA Networking Coffee. The EUROCONTROL Aviation Hardtalk was independent of the SIDs.

Participants' links to the main session and all embedded events were posted in the conference programme on the SIDs website and on the SIDs App.

Monday 7 December

WELCOME AND OPENING (https://zoom.us/j/98418745816)			
10:00 – 10:30	WELCOME <ul style="list-style-type: none"> Florian Guillermet, Executive Director, SESAR Joint Undertaking Andrew Cook, University of Westminster, Leader of Engage, SESAR Knowledge Transfer Network 		
10:30 – 11:00	OPENING KEYNOTES <ul style="list-style-type: none"> Henrik Hololei, Director-General, Mobility and Transport, European Commission Eamonn Brennan, Director General, EUROCONTROL 		
11:00 - 11:05	PROGRAMME OVERVIEW <ul style="list-style-type: none"> Dirk Schaefer, SESAR Innovation Days Programme Committee Chair 		
11:05 - 11:35	VIRTUAL NETWORKING (https://zoom.us/j/92020556457)		
TECHNICAL SESSION 1			
11:35 - 13:00	<table border="0"> <tr> <td style="vertical-align: top;"> <p><u>Arrival and Departure Management</u> (https://zoom.us/j/96651712789)</p> <p><i>Session Chair: Paola Pellegrini, University Gustave Eiffel</i></p> <p>Devising Strategies for Aircraft Arrival Processes via Distance-based Queuing Models Eri Itoh, University of Tokyo/ENRI</p> <p>Algorithmic Efficiency Comparison of Centralised and Distributed Arrival Management (AMAN) Problem In Terminal Airspace Ying Huo, ENAC</p> <p>Fine-Grained Evaluation of Arrival Operations Henrik Hardell, Linköping University</p> </td> <td style="vertical-align: top;"> <p><u>Economics and Performance</u> (https://zoom.us/j/97178472648)</p> <p><i>Session Chair: Radosav Jovanovic, University of Belgrade</i></p> <p>Traffic Complexity in ANSP Evaluation - Applicability of Current Metrics for Benchmarking Purposes Thomas Standfuss, TU Dresden</p> <p>ACC Capacity, Cost and Overload Avoidance Trade-Offs Sebastian Wangnick, EUROCONTROL</p> <p>Arrival Flight Efficiency in Numbers: What New the Covid-19 Crisis is Bringing to the Picture? Anastasia Lemetti, Linköping University</p> </td> </tr> </table>	<p><u>Arrival and Departure Management</u> (https://zoom.us/j/96651712789)</p> <p><i>Session Chair: Paola Pellegrini, University Gustave Eiffel</i></p> <p>Devising Strategies for Aircraft Arrival Processes via Distance-based Queuing Models Eri Itoh, University of Tokyo/ENRI</p> <p>Algorithmic Efficiency Comparison of Centralised and Distributed Arrival Management (AMAN) Problem In Terminal Airspace Ying Huo, ENAC</p> <p>Fine-Grained Evaluation of Arrival Operations Henrik Hardell, Linköping University</p>	<p><u>Economics and Performance</u> (https://zoom.us/j/97178472648)</p> <p><i>Session Chair: Radosav Jovanovic, University of Belgrade</i></p> <p>Traffic Complexity in ANSP Evaluation - Applicability of Current Metrics for Benchmarking Purposes Thomas Standfuss, TU Dresden</p> <p>ACC Capacity, Cost and Overload Avoidance Trade-Offs Sebastian Wangnick, EUROCONTROL</p> <p>Arrival Flight Efficiency in Numbers: What New the Covid-19 Crisis is Bringing to the Picture? Anastasia Lemetti, Linköping University</p>
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13:00 – 15:00	COMFORT BREAK		
15:00 - 15:45	<p><u>EUROCONTROL Aviation Hardtalk Live</u></p> <p><i>An exclusive interview with Michael O'Leary, CEO of Ryanair Holdings</i></p> <p>(https://www.eurocontrol.int/event/eurocontrol-aviation-hardtalk-live-Ryanair)</p>		
15:45 - 16:30	VIRTUAL EXHIBITION <i>Connect to the dedicated Whova platform to discover the SIDs2020 posters. Our poster presenters will be available to connect with you and some have also organised dedicated webinars.</i>		

Tuesday 8 December

OPENING SESSION DAY 2 (https://zoom.us/j/92416121487)			
09:30 – 10:20	<p>WELCOME DAY 2</p> <ul style="list-style-type: none"> Florian Guillermet, Executive Director, SESAR Joint Undertaking <p>KEYNOTES</p> <ul style="list-style-type: none"> Simon Hocquard, Director General, CANSO Marc Baumgartner, Air Traffic Controller, IFATCA <p>PROGRAMME OVERVIEW</p> <ul style="list-style-type: none"> Dirk Schaefer, SESAR Innovation Days Programme Committee Chair 		
TECHNICAL SESSION 2			
10:20 - 11:20	<table border="1"> <tr> <td> <p>Advanced Air Traffic Services (https://zoom.us/j/96535547009)</p> <p><i>Session Chair: Tatjana Bolić, University of Westminster</i></p> <p>Volcanic SO2 height SWIM service Hugues Brenot, Royal Belgium Institute for Space Aeronomy</p> <p>How to Achieve CDOs for All Aircraft: Automated Separation in TMAs Christiane Schmidt, Linköping University</p> </td> <td> <p>Network and Flow Management (https://zoom.us/j/94908471644)</p> <p><i>Session Chair: Guglielmo Lulli, Lancaster University</i></p> <p>Concept of a Long-Range Air Traffic Flow Management Michael Schultz, TU Dresden</p> <p>Air Traffic Structuration based on Linear Dynamical Systems Paveen Juntama, ENAC</p> </td> </tr> </table>	<p>Advanced Air Traffic Services (https://zoom.us/j/96535547009)</p> <p><i>Session Chair: Tatjana Bolić, University of Westminster</i></p> <p>Volcanic SO2 height SWIM service Hugues Brenot, Royal Belgium Institute for Space Aeronomy</p> <p>How to Achieve CDOs for All Aircraft: Automated Separation in TMAs Christiane Schmidt, Linköping University</p>	<p>Network and Flow Management (https://zoom.us/j/94908471644)</p> <p><i>Session Chair: Guglielmo Lulli, Lancaster University</i></p> <p>Concept of a Long-Range Air Traffic Flow Management Michael Schultz, TU Dresden</p> <p>Air Traffic Structuration based on Linear Dynamical Systems Paveen Juntama, ENAC</p>
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11:20 - 12:00	<p>VIRTUAL NETWORKING (https://zoom.us/j/92172838540)</p>		
12:00 - 13:30	<p>COMFORT BREAK</p>		
13:30 - 14:00	<p>VIRTUAL EXHIBITION <i>Connect to the dedicated Whova platform to discover the SIDs2020 posters. Our poster presenters will be available to connect with you and some have also organised dedicated webinars.</i></p>		
14:00 - 15:00	<p>GLOBAL NETWORKING COFFEE https://live.remco.co/e/international-networking-coffee-</p>		
TECHNICAL SESSION 3			
15:00 - 16:30	<table border="1"> <tr> <td> <p>ATM Architecture and Operations (https://zoom.us/j/98069518680)</p> <p><i>Session Chair: Henk Blom, TU Delft</i></p> <p>Influence of FRA Implementation on Traffic, Safety, Complexity, and Workload in MUAC Airspace. Fedja Netjasov, University of Belgrade</p> <p>Integrating Weather Impact in RTC Staff Scheduling. Tatiana Polishchuk, Linköping University</p> <p>Evaluation of Flight Prioritisation Mechanisms through Agent-based Modelling David Mocholí González, Nommon</p> </td> <td> <p>Modelling and Optimization (https://zoom.us/j/94940480802)</p> <p><i>Session Chair: Daniel Delahaye, ENAC</i></p> <p>Parallelized RRT for Flight Planning Considering Ensemble Forecasting of Thunderstorms Eduardo Andrés, University Carlos III Madrid</p> <p>Speed Control Strategies for E-AMAN using Holding Detection-Delay Prediction Model Imen Dhief, Nanyang Technological University</p> <p>Real-time Identification of High-Lift Devices Deployment in Aircraft Descents Homeyra Khaledian, Technical University of Catalonia</p> </td> </tr> </table>	<p>ATM Architecture and Operations (https://zoom.us/j/98069518680)</p> <p><i>Session Chair: Henk Blom, TU Delft</i></p> <p>Influence of FRA Implementation on Traffic, Safety, Complexity, and Workload in MUAC Airspace. Fedja Netjasov, University of Belgrade</p> <p>Integrating Weather Impact in RTC Staff Scheduling. Tatiana Polishchuk, Linköping University</p> <p>Evaluation of Flight Prioritisation Mechanisms through Agent-based Modelling David Mocholí González, Nommon</p>	<p>Modelling and Optimization (https://zoom.us/j/94940480802)</p> <p><i>Session Chair: Daniel Delahaye, ENAC</i></p> <p>Parallelized RRT for Flight Planning Considering Ensemble Forecasting of Thunderstorms Eduardo Andrés, University Carlos III Madrid</p> <p>Speed Control Strategies for E-AMAN using Holding Detection-Delay Prediction Model Imen Dhief, Nanyang Technological University</p> <p>Real-time Identification of High-Lift Devices Deployment in Aircraft Descents Homeyra Khaledian, Technical University of Catalonia</p>
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16:30 - 17:30	<p>VIRTUAL SOCIAL ACTIVITY Join the SESAR Quiz at: https://zoom.us/j/92521452263</p>		

Wednesday 9 December

WELCOME AND OPENING DAY 3 (https://zoom.us/j/94133959340)	
10:00 - 10:20	WELCOME DAY 3 <ul style="list-style-type: none"> Florian Guillermet, Executive Director, SESAR Joint Undertaking KEYNOTE <ul style="list-style-type: none"> Vanessa Rullier-Francaud, Senior Manager ATM and Special Projects, European Business Aviation Association (EBAA) PROGRAMME OVERVIEW <ul style="list-style-type: none"> Dirk Schaefer, SESAR Innovation Days Programme Committee Chair
TECHNICAL SESSION 4	
10:20 - 11:20	<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> Airports (https://zoom.us/j/93169937744) <i>Session Chair: Bruno Lamiscarre, NeoMetSys</i> Development of Stochastic Delay Cost Functions Jan Evler, TU Dresden Adaptive Point Sampling for LiDAR-based Detection and Tracking of Fast-moving Vehicles using a Virtual Airport Environment Hannes Braßel, TU Dresden </div> <div style="width: 48%;"> Trajectory Prediction (https://zoom.us/j/95737170769) <i>Session Chair: Lorenzo Castelli, University of Trieste</i> Traffic Characterisation for a Dynamic and Adaptive Trajectory Prediction Data-Driven Approach José Manuel Cordero, CRIDA Clustering Climb Profiles for Vertical Trajectory Analysis Matthias Poppe, DFS </div> </div>
11:20 - 12:00	VIRTUAL NETWORKING (https://zoom.us/j/96454896454)
12:00 - 13:30	COMFORT BREAK
13:30 - 14:00	VIRTUAL EXHIBITION <i>Connect to the dedicated Whova platform to discover the SIDs2020 posters. Our poster presenters will be available to connect with you and some have also organised dedicated webinars.</i>
14:00 - 15:30	GLOBAL PANEL ON HIGHER AIRSPACE OPERATIONS , in collaboration with ICAO and ATCA (https://zoom.us/j/99467084146) <ul style="list-style-type: none"> Steve Bradford, Office of Chief Scientist, NextGen, FAA Henk Hof, Manager ICAO and Concepts, EUROCONTROL; and Manager European Concept for Higher Airspace Operations (ECHO) project Dragos Tonea, Manager iNEO – Integration of new entrants in European ATM Network operations, EUROCONTROL David Hansell, Head of Global Policy for Loon LLC Paulo Vila, Air Navigation Coordinator, Civil Aviation Authority of Peru Marc Vales, Space Programs Senior Vice President, Dassault Aviation <i>Moderated by Silas Udahemuka, Director General Rwanda Civil Aviation Authority</i>
15:30 - 16:00	GLOBAL NETWORKING COFFEE (https://live.remco.co/e/atca-annual-networking-pavilion)
TECHNICAL SESSION 5	
16:00 - 17:30	<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> Machine Learning I (https://zoom.us/j/94023026641) <i>Session Chair: George Vouros, University of Piraeus</i> Air Traffic Control Using Message Passing Neural Networks and Multi-Agent Reinforcement Learning Ramon Dalmau, EUROCONTROL A Novel Methodology to Predict Regulations using Deep Learning Sergi Mas-Pujol, Technical University of Catalonia Determining Optimal Conflict Avoidance Manoeuvres At High Densities With Reinforcement Learning Marta Ribeiro, TU Delft </div> <div style="width: 48%;"> Environment and Meteorology (https://zoom.us/j/96283304577) <i>Session Chair: Dirk Schaefer, EUROCONTROL</i> A Probabilistic Storm Avoidance Concept for En-Route Flight Antonio Franco, University of Seville Dynamic Noise Maps for Ljubljana Airport Emir Ganić, University of Belgrade Strategic and Probabilistic Aircraft Conflict Detection and Resolution for Three-dimensional Trajectories Eulalia Hernández-Romero, University of Seville </div> </div>

Thursday 10 December

WELCOME AND OPENING DAY 4 (https://zoom.us/j/95812535507)			
10:00 – 10:20	WELCOME DAY 4 <ul style="list-style-type: none"> Florian Guillermet, Executive Director, SESAR Joint Undertaking KEYNOTE <ul style="list-style-type: none"> Olivier Jankovec, Director General, ACI EUROPE PROGRAMME OVERVIEW <ul style="list-style-type: none"> Dirk Schaefer, SESAR Innovation Days Programme Committee Chair 		
TECHNICAL SESSION 6			
10:20 – 11:20	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> Machine Learning II (https://zoom.us/j/99186345441) <i>Session Chair: Marc Bourgois, EUROCONTROL</i> Predicting Requested Flight Levels with Machine Learning Manuel Mateos, Nommon Aircraft Push-back Prediction and Turnaround Monitoring by Vision-based Object Detection and Activity Identification Phat Thai, Nanyang Technological University </td> <td style="width: 50%; vertical-align: top;"> UAS and UAS Traffic Management (https://zoom.us/j/99831518844) <i>Session Chair: Javier Lopez Leones, Boeing Research & Technology Europe</i> Altitude Zoning for UTM Leonid Sedov, Linköping University Towards a Continuous Demand and Capacity Balancing Process for U-space Chris Forster, Altitude Angel & Pablo Sánchez Escalonilla, CRIDA </td> </tr> </table>	Machine Learning II (https://zoom.us/j/99186345441) <i>Session Chair: Marc Bourgois, EUROCONTROL</i> Predicting Requested Flight Levels with Machine Learning Manuel Mateos, Nommon Aircraft Push-back Prediction and Turnaround Monitoring by Vision-based Object Detection and Activity Identification Phat Thai, Nanyang Technological University	UAS and UAS Traffic Management (https://zoom.us/j/99831518844) <i>Session Chair: Javier Lopez Leones, Boeing Research & Technology Europe</i> Altitude Zoning for UTM Leonid Sedov, Linköping University Towards a Continuous Demand and Capacity Balancing Process for U-space Chris Forster, Altitude Angel & Pablo Sánchez Escalonilla, CRIDA
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11:20 – 12:00	VIRTUAL NETWORKING (https://zoom.us/j/92751868353)		
12:00 - 14:00	COMFORT BREAK		
14:00 - 14:30	VIRTUAL EXHIBITION <i>Connect to the dedicated Whova platform to discover the SIDs2020 posters. Our poster presenters will be available to connect with you and some have also organised dedicated webinars.</i>		
SIDS2020 CLOSING CEREMONY (https://zoom.us/j/95478064936)			
14:30 - 15:45	YOUNG SCIENTIST AWARD CEREMONY		
15:45 - 16:30	CLOSING KEYNOTE SESSION <ul style="list-style-type: none"> Isabel Del Pozo de Poza, Head of UTM, Airbus Bernhard Quendt, CTO, Thales Laurent Renou, Head of Air Transport Innovation, EUROCONTROL <i>Chaired by Florian Guillermet, Executive Director, SESAR Joint Undertaking</i>		
16:30– 17:00	What's coming up for SESAR? <ul style="list-style-type: none"> Florian Guillermet, Executive Director, SESAR Joint Undertaking Engage: how to get involved in 2021 <ul style="list-style-type: none"> Andrew Cook, University of Westminster, Leader of Engage, SESAR Knowledge Transfer Network Closing remarks <ul style="list-style-type: none"> Florian Guillermet, Executive Director, SESAR Joint Undertaking 		

7 Virtual conference format

The following URL was communicated as the official SESAR Innovation Days website: www.sesarinnovationdays.eu. This URL redirected visitors to a dedicated page on the SJU website.

All relevant information including Call for papers, submission instructions, logistical information and, at a later stage, programme and conference registration were available via the SIDs website.



Figure 4: SIDs website

All papers are available for download from the website [2], together with the presentations. The website also maintains an archive of all papers and presentations at the SIDs since 2011. At the time of writing this report the presentations were not available on the website.

SIDs2020



Paper	More
Influence of FRA implementation on Traffic, Safety, Complexity, and Workload in MUAC Airspace	
A Probabilistic Storm Avoidance Concept for En-Route Flight	
Traffic Complexity in ANSP Evaluation - Applicability of Current Metrics for Benchmarking Purposes	
Devising Strategies for Aircraft Arrival Processes via Distance-based Queuing Models	
Air Traffic Control Using Message Passing Neural Networks and Multi-Agent Reinforcement Learning	
Concept of a Long-Range Air Traffic Flow Management	
Integrating Weather Impact in RTC Staff Scheduling	
A novel methodology to predict regulations using Deep Learning	
Altitude zoning for UTM	
ACC Capacity, Cost and Overload Avoidance Trade-Offs	
GPU-Accelerated RRT for Flight Planning Considering Ensemble Forecasting of Thunderstorms	
Traffic Characterization for a Dynamic and Adaptive Trajectory Prediction Data-Driven Approach	

Figure 5: Website archive of papers

A dedicated smart phone application (provided by Whova) was also available, which included relevant information and allowed users to comment and engage in dialogue. The Whova application was available both as a smartphone application and as a desktop application.

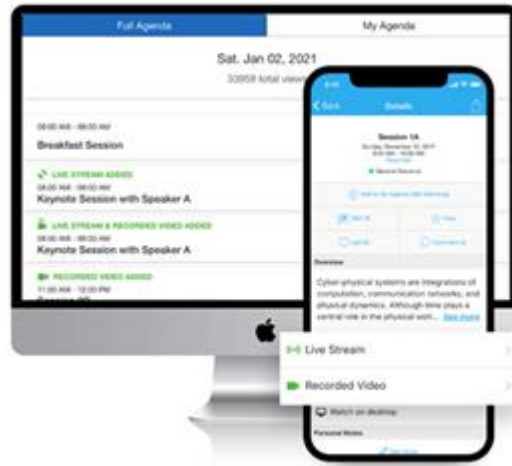


Figure 6: Conference smart phone application available from Whova

8 Participant survey results

Participants were requested to provide feedback about the 2020 SESAR Innovation Days through an on-line questionnaire. For sake of comparability, the questionnaire used in previous years was used – with some adaptations to cater for the specific conference format – which encompassed questions in the following areas:

- Before the SID,s including website and app;
- Content;
- Logistics; and
- Benefits.

In addition to providing their agreement to each question on a four-point Likert scale (strongly disagree, disagree, agree, strongly agree) a free-text field was provided in each category for explanations and further comments.

Responses from a total of 43 participants were received (2019: 25; 2018: 37); the results are provided below compared to the results from previous years. Unlike in previous years the results are presented in a segmented fashion for the last five years to discriminate the four categories of agreement rather than collapsing the positive and negative responses. This was done because most questions received high and sustained agreement and it was assumed that displaying strong agreement and agreement in a separate fashion might offer some additional insights.

8.1 Before the SIDs including website and app

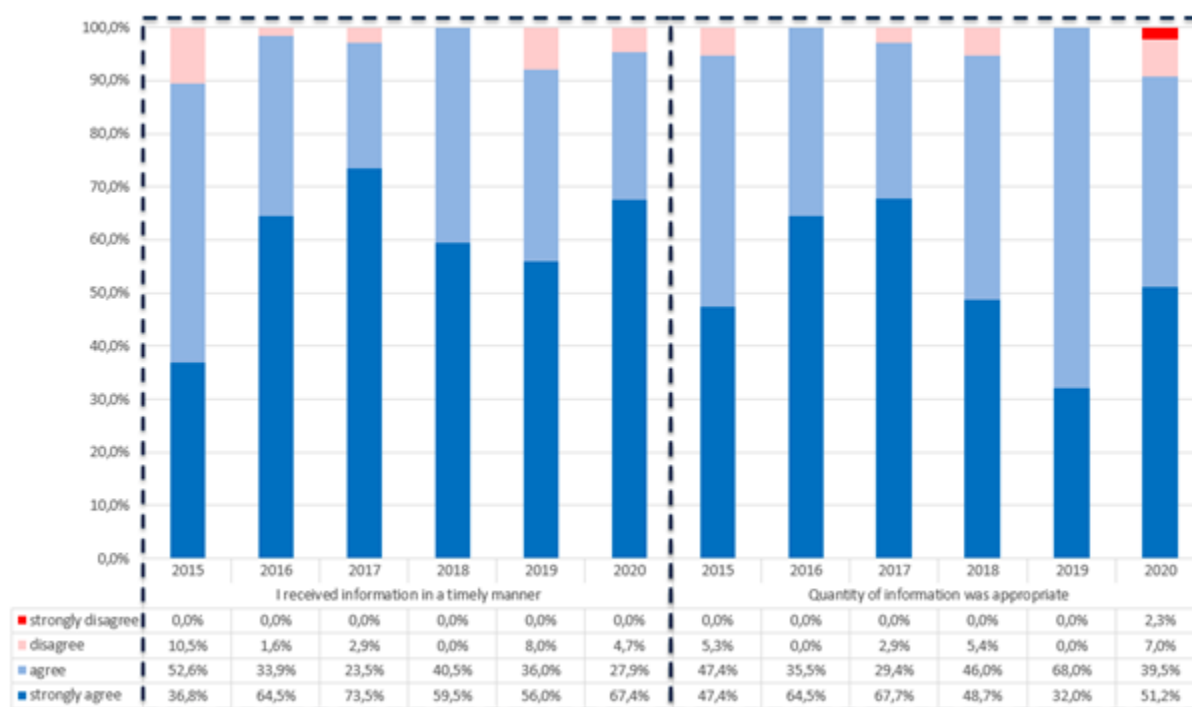


Figure 7: 'I received information in a timely manner' and 'Quantity of information was appropriate'

The following comments were received in this category:

- Sheer amount of Emails before and during the Event could have been considered as spam.
- Could you please send the Whova event code when we submitted via website to attend?
- The agenda was frozen too late for appropriate planning. Late, slight changes (by 15-30 minutes) of the schedules were very irritating.
- My best thanks for you.
- Communication on platform and agenda with the Zoom links was received relatively late.
- Web site not very user friendly, especially during the seminar itself. Lot of information missing how to use it or get the videos, documentation, etc., Not clear information on seminar agenda. Must as been user friendly such a Teams for instance.
- I would like to see or review some of the conferences or presentations which I missed during those days, but not all of them appear. I would also like the possibility to download the videos.
- Relying on the Whova app was a mistake. The agenda should have been published in a simple form in good time.



Figure 8: ‘The web site worked well’ and ‘The Event Application worked well’

Discussion

Not all participants seem to have felt at ease with the on-line agenda, especially on the SIDs event application where the links to all sessions were provided. Whilst there are certainly little adaptations that can be done to the website and event app to improve participants satisfaction, the global impression is that perhaps the complexity should be reduced and the website and app streamlined with a view to a simpler access.

Video-recording of all sessions may be desirable for later viewing, especially since there were parallel sessions but this would require the consent of all speakers, panellists and session chairs. A strategic decision may need to be taken at the level of the SJU or the SESAR Scientific Committee.

8.2 Conference content

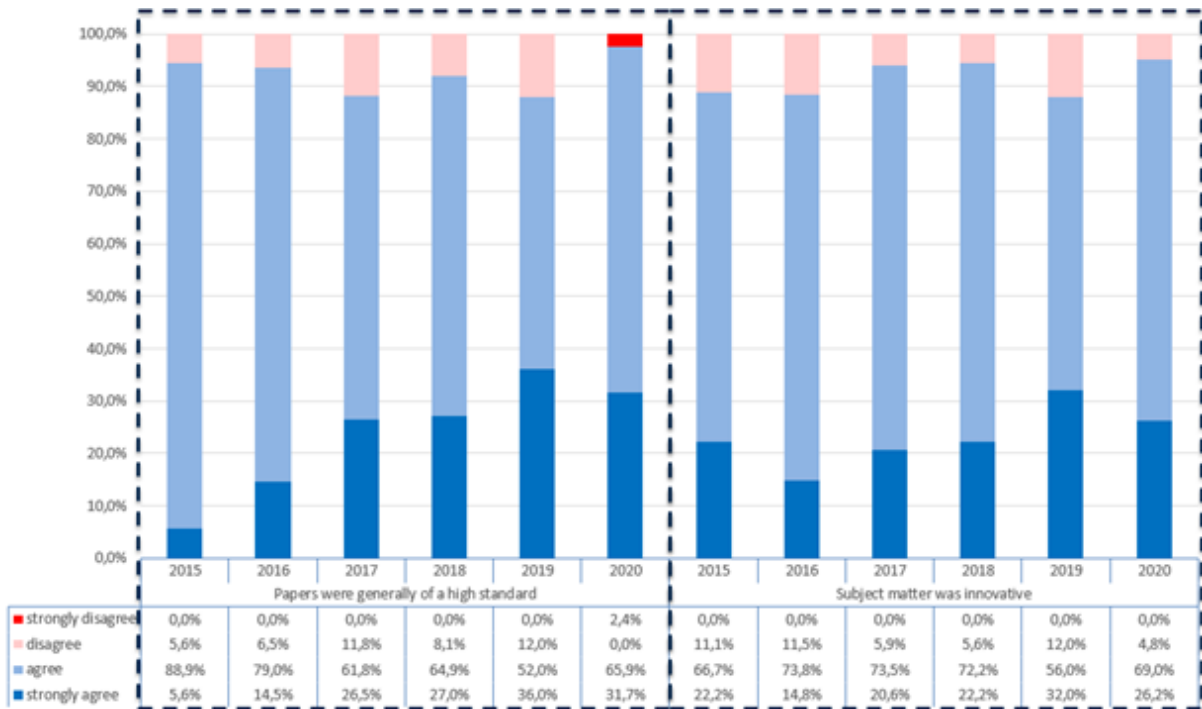


Figure 9: ‘Papers were generally of a high standard’ and ‘Subject matter was innovative’

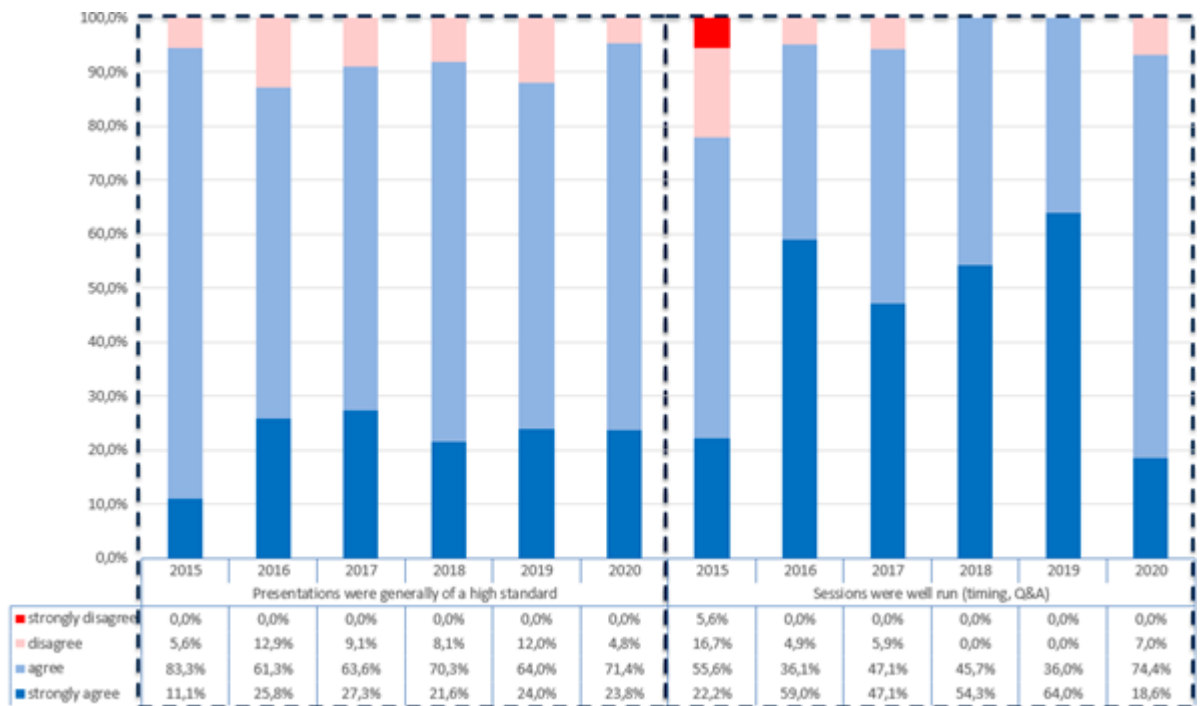


Figure 10: ‘Presentations were generally of a high standard’ and ‘Sessions were well run (timing, Q&A)’

As can be seen in Figure 9 and Figure 10 participant satisfaction with the quality of the papers, the innovativeness of the subject matter and the quality of presentations exceeded the high level of previous years. A slight downturn in the satisfaction with the way the sessions were managed may be attributable to the fact that whilst the session chairs were all experienced in chairing conference sessions, Zoom was relatively new to most if not all of them.

The Global Panel on Higher Airspace Operations was organised jointly with ICAO and ATCA and the SJU took a lead in this. Since a comparison with the plenary sessions in previous editions of the SIDs is debatable the appreciation with the Global Panel 2020 is depicted in Figure 11 whilst the Figure 12 provides the appreciation of plenary session in the years 2018 – 2019 as reference. The Global Panels was attended by 444 participants.

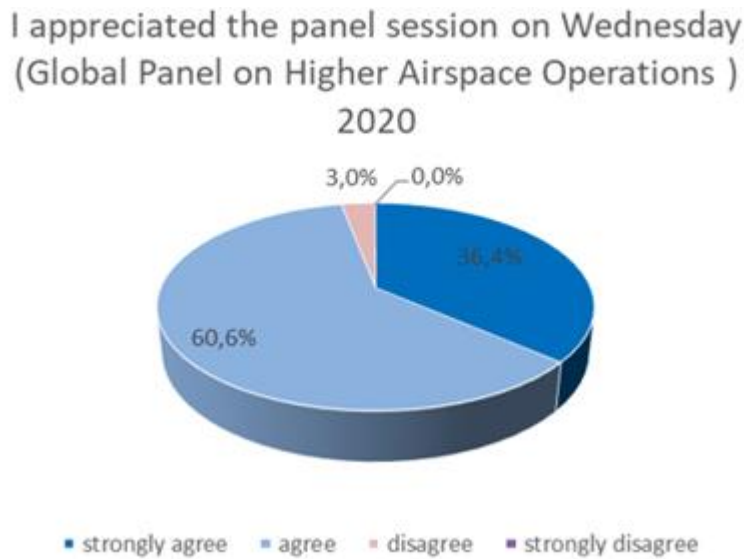


Figure 11: Appreciation of the Global Panel on Higher Airspace Operations



Figure 12: Appreciation of the plenary sessions (2015-2019)

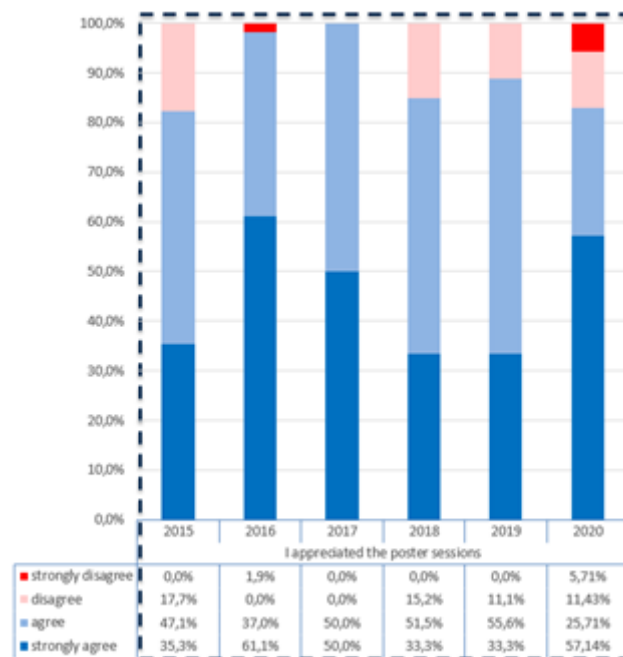


Figure 13: 'I appreciated the poster sessions'

Figure 13 suggests that the satisfaction with the poster sessions was slightly lower than in previous years; unfortunately the question does not allow us to conclude whether this was due to the set-up and the applications that were used for the poster sessions or the poster content. If virtual poster sessions are maintained in future conferences the participant survey should be adapted to allow separating contents and logistics of the poster sessions.

The following comments were received in this category:

- I tried a few poster sessions but did not get it to work.
- There is missing a "N/A" option, as the attendees may not attend all the sessions, and so do not have info to assess.
- Poster names should have been on the timetabling pdf/agenda. Not given a slot but the names should have been clarified on the agenda except the Whova app.
- Q&A section should have been by talking, because some questions need to give explanation but moderator could not ask for detail about questions. So, some questions left in air.
- There should be an option not applicable as I did not attend the Wednesday panel session.
- It was difficult to attract people to session and interact.
- We should have project with an A :-)
- Virtual sessions worked very well.
- An idea for the future could be to introduce double possibility for participation and presentation: in presence and virtual.
- Too many "failure" in the interaction seminar web site and individual participant.

- About the timing, which is key in aviation, it is good to start ON TIME, not a few minutes ahead of schedule (which was the case a couple times).
- It would be nice to access the presentations as pdfs or ppts afterwards.
- Add a “I don’t know/no reply” to the survey because not all of us attended to everything.
- No live broadcast available.
- No answer given for parts I did not view.

Discussion

The survey results and verbal feedback suggest the quality of the technical paper sessions was not impacted by the virtual format and that the scientific content continues to improve. This is not completely true for the poster sessions but to which degree (if at all) this is attributable to the content as opposed to the logistics is unclear.

The Global Panel on Higher Airspace Operations was attended by 444 participants and rated positively by SIDs participants. Organised together with ICAO and ATCA this event attracted a wealth of excellent speakers from both sides of the Atlantic; a similar panel could not easily have been organised as a physical event at the SIDs. This illustrates some of the promises of on-line conferencing.

8.3 Networking events

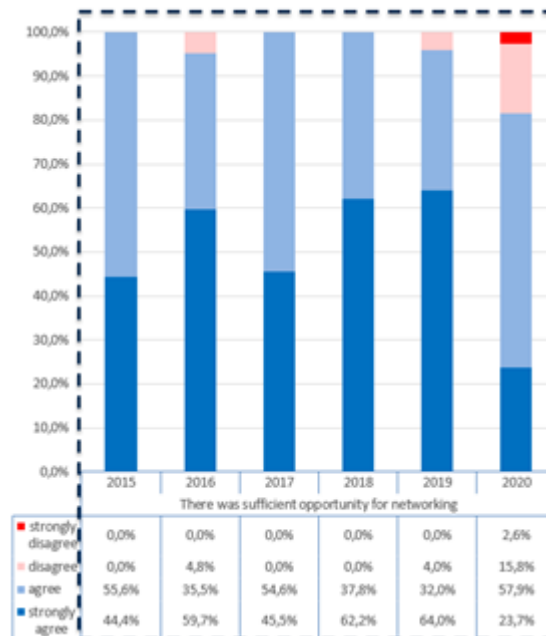


Figure 14: ‘There was sufficient opportunity for networking’

Figure 14 shows that in comparison to previous years the absence of a physical networking event led to a larger percentage of participants disagree with the statement that there was sufficient opportunity for networking. This is not totally surprising and despite best efforts to provide virtual networking opportunities these will probably never be as good as meeting people face to face. The satisfaction with the virtual networking events provided in 2020 is not plotted here since a meaningful comparison with previous years is not possible.

The following comments were received in this category:

- The phone and desktop Whova applications did not have exactly the same way of working. For example in the poster sessions - when the poster had a virtual room open - on the desktop the link to the room was under “watch the video” banner, while in the phone I think it said the link to the virtual room.
- It would also be good to be able to change the email of the participant - I changed jobs and as such emails, but could not find a way of just changing the email and attaching all other info to the profile. So I was receiving information for the conference to two emails - one as I was registered to the conference with the email, and the other as the profile information remained attached to the old email...
- Virtual poster live session process “how to” was not easy to catch.
- Even if the booth team was allowed to be more than 1 person, only a unique “direct” contact was able to be identified. Only chat could be “multi processed” by booth members.
- The virtual networking should be more on Whova app, instead of global chat. Because, the conversation is easier to discuss SID topics etc. after sessions with panelists/attendants.
- The Whova App was a bit overkill, there were too many options and links to be easy to understand and use. I would have preferred an application fully developed for desktop computers.
- Poor integration of Whova and Zoom.
- I was not at all happy to have to install the Whova app on my phone to access the conference. In particular I am not happy having to read yet another load of terms and conditions and agree to some American business having access to my personal data. If this is supposed to be a European event then I would like to see all parts of it fully supported by European technology. On one hand we are urged to take our privacy seriously and on the other you (and others) assume that nobody does. Stop considering that services being free of charge is an advantage.

Discussion

The survey results and verbal comments suggested that participants were confused with the wide offering of platforms and events for posters and networking and that simplification is desirable.

8.4 Overall benefits

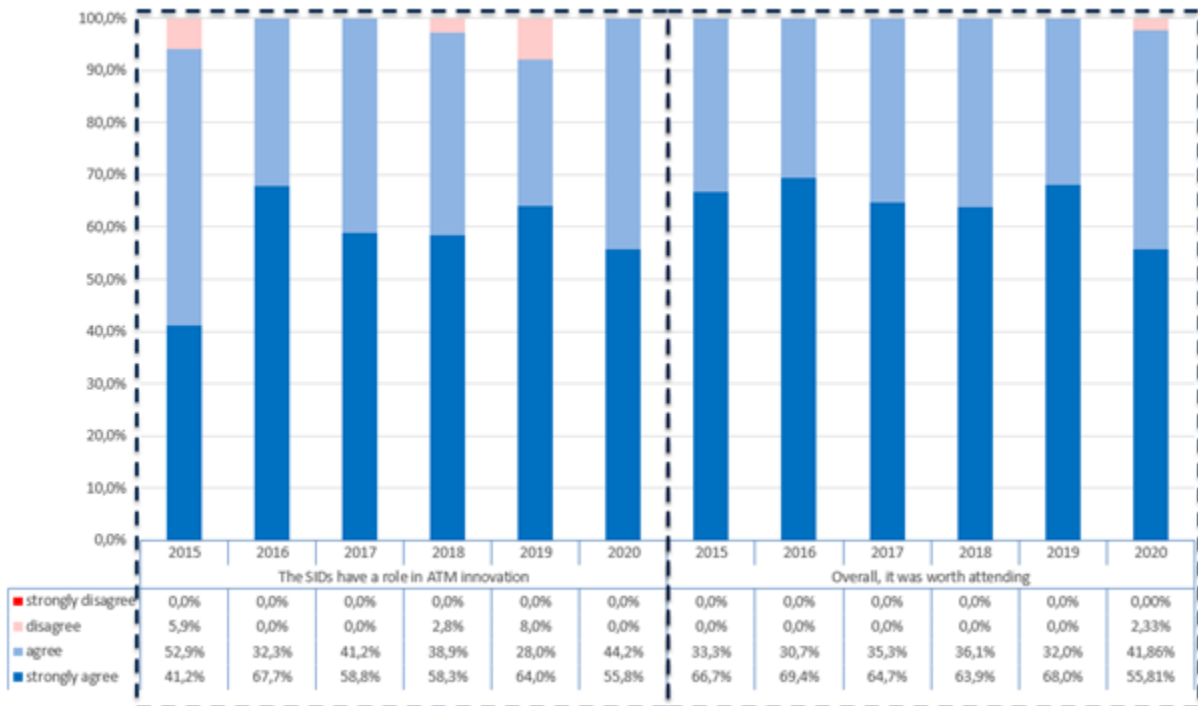


Figure 15: ‘The SIDs have a role in ATM innovation’ and ‘Overall, it was worth attending’

The following comments were received in this category:

- The virtual setting is not the best vehicle for the networking - I think it was as good as it could get, but that is still not good. The randomised chat rooms were a good idea, but not many people could attend - it is very different being away from home/office and network then, and sitting at home/office when you are expected to do other work as well.
- Using multiple applications is a bit confusing, especially if have to switch for successive events.
- Most presentation I listened to focused on research methods, on calculations, formulas etc. For me, as an operational expert, it was often difficult to see how it would fit into reality, what the benefits of development and implementation would be.
- Must improve the user friendliness of the interface, login, use of application, despatch of the registered videos (too long after the venue), etc.
- As soon as possible reinstate a face-to-face version. On-line networking does not work.

Discussion

The virtual format posed some challenges and some adaptations to the platforms and logistics are desirable; however, the overall role of and satisfaction with the SESAR Innovation Days as an important scientific event was not questioned.

9 Lessons learned

The satisfaction of SIDs participants provides one angle on what went well and what could be improved and this view is presented in the previous section. In addition, the SIDs team reflects about lessons learned and has come to the conclusions presented in the following sub-sections.

9.1 The virtual conference format has upsides and downsides

The decision to host the SESAR Innovation Days on a virtual platform was borne out of the constraints imposed by Covid-19 and it was a year of great learning for everybody involved. It is certain that physical events are preferable for a variety of reasons, including the ability to concentrate more fully on the scientific presentations and discussions and the opportunity to network face-to-face and the absence of a ‘real’ conference was regretted by all of us who had been keenly looking forward to meeting in the beautiful city of Budapest and the wonderful facilities offered by HungaroControl. It is with great hope that we look forward to the SIDs 2021 and wish they will take place in Budapest in the way originally planned for 2020.

At the same time, we learned a great number of things about on-line conferencing and the various tools that can be exploited. It is not without pride that we can say the SIDs went relatively well for a first time as an on-line event; we also believe that a number of opportunities exist that should be exploited or at least considered in subsequent years. This includes the possibility of reaching out to other international conventions; attracting keynote speakers of such a standing that it would be difficult to convince them to attend the SIDs physically; the opportunities the virtual poster sessions offered and the possibility to live-stream the technical sessions and/or keynotes. At the same time hybrid events have a number of downsides, a major one being the risk that the ability to attend remotely makes it less attractive for participants to attend physically.

It would be rushed to offer an exhaustive view on the strengths and areas for improvement of the various on-line events and tools the SIDs included; perhaps a dedicated meeting including Engage, a small number of members of the Programme Committee, SJU Comms and selected members of the SESAR Scientific Committee could be convened to this purpose.

The possibility to hold hybrid events with varying degrees of ‘on-site-ness’ / ‘remoteness’ makes the planning for the SIDs less vulnerable to the evolution of the pandemic: a hybrid event can be announced safely now and the programme aspects of the SIDs started (inviting the Programme Committee, preparing and launching the Call for Contributions, submission review and selection process). At a later point in time, perhaps around the summer, with a somewhat clearer view on the epidemic, the progress of the vaccination campaigns and constraints (and willingness) on travelling internationally a checkpoint can be foreseen to decide about the exact format. Options include, as the most conservative scenario, a fully on-line event like in 2020 but we keep our fingers crossed that this will not be necessary.

9.2 The SIDs are an established and recognised scientific conference

Many indicators related to the scientific content, such as the number of submissions (Figure 2), the acceptance rate¹ (Figure 3) and the survey results related to the conference content (Figure 9, Figure 10) seem to suggest that the SESAR Innovation Days are now an established and recognised scientific event which many SESAR and non-SESAR research projects choose to disseminate their results. The inclusion of the SIDs in SCOPUS and the publication of a Special Issue in the Journal for Air Transport Management have been undertaken to further add to the scientific recognition of the SIDs.

The SIDs are foremost a scientific conference and attendance is largely composed of researchers. What attracts them to the SIDs are (a) the opportunity to expose their own research results and learn about other research; (b) opportunities for dialogue ideally leading to shared proposals with like-minded researchers; and (c) learning about funding opportunities. In its present form the SIDs seem to cater for these expectations and we must be careful to continue to do so; this includes a high scientific standard of the conference, visibility of the research publications (ISSN, SCOPUS, etc.) and a quality peer-review process.

In order to further strengthen the visibility of scientific contributions to the SIDs a Special Issue in a scientific journal should be considered – similar to the 2019 SIDs which have culminated in a Special Issue in Elsevier’s Journal of Air Transport Management (JATM) which is presently being finalised (Guest Editors: Dirk Schaefer, Andrew Cook and Lorenzo Castelli).

9.3 The peer-review process works well

The SIDs has established a triple peer-review process (many journals rely on double-review only) through a Programme Committee (PC) with recognised members of the research community. In addition, the SESAR Scientific Committee is involved in the peer review. Thanks to the Engage network, the PC has been reinforced with members of industry and this turned out to be particularly helpful.

As can be expected reviewers do not always have the same view but differences of opinion normally lead to a constructive dialogue and hence a much-improved feedback to authors. In this sense a triple-review process is particularly enriching and should be maintained.

¹ The paper acceptance rate is an important quality indicator of scientific conferences; a too high acceptance rate suggesting that also submissions of poor quality are accepted; on the other hand too low acceptance rates could discourage authors to submit to a conference where the chances of acceptance are slim.

9.4 Good industry involvement

The 2020 edition of the SIDs has been quite successful in ensuring involvement and presence of representatives of industry and the European Commission. In many cases dialogue between industry representatives and researchers has led to very tangible, beneficial outcomes.

A greater involvement of the SESAR Industrial Research and Very Large Demonstration projects continues to appear desirable.

9.5 Zoom and SIDs app very successful – but a plethora of applications and platforms

The SIDs have managed to survive the challenges of the pandemic quite successfully and the Zoom platform and the SIDs app can claim a part of the credit for this. The SIDs app is appreciated by participants and presents a number of advantages, including rapid updates of the schedule, correction of errors and better availability of information as well as greater degree of interactivity and participant involvement through various chat-options.

Yet, we tended to make overly optimistic assumptions about the readiness of participants to engage in and navigate through the various on-line channels, platforms and events. Feedback received verbally and thorough the participant survey suggests that a simpler and more easily accessible way engaging, especially in the various virtual networking events would seem desirable.

9.6 Virtual networking – an oxymoron?

Apart from the dissemination of research results and the exchanges of views and knowledge about ongoing research, it has always been one of the major aspirations of the SIDs to offer extensive opportunities for networking. We can be proud of ourselves to have been quite successful, not only judging from the participant survey but also from the fact that many new projects involve consortia member who met at previous editions of the SIDs.

This year's SIDs offered a range of events, including a chat roulette, an on-line quiz and a global networking coffee jointly organised with ATCA and ICAO. Whilst this was a good offering the update was somewhat disappointing (the virtual networking activity was attended by 119 (day 1) and 42 participants (day 2); the virtual social activity was attended by 72 (day 2), 40 (day 3) and 37 participants (day 4). There is certainly room for improvement and perhaps a slightly better engagement could be obtained but rather than being overly harsh on ourselves we may need to face the reality that 'virtual networking' is just not as good as looking somebody in the eyes and meeting all acquaintances over a cocktail.

10 Outlook

The eleventh edition of the SESAR Innovation Days will take place between 6th and 9th December 2021. Owing to the uncertainty around Covid-19 a hybrid format will be announced allowing both physical and virtual attendance. A checkpoint in the summer of 2021 will confirm whether the physical attendance is likely to be possible and determine the modalities of the hybrid event.

11 References

- [1] Engage project, 2017. Grant Agreement 783287, Ref. Ares(2017)6114946 - 13/12/2017.
- [2] SIDs website, 2020. <http://www.sesarju.eu/sesarinnovationdays>.
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12 Acronyms

ATM	Air traffic management
ER	Exploratory Research (within SESAR JU programme)
IR	Industrial Research (within SESAR JU programme)
JATM	Journal of Air Transport Management
KTN	Knowledge Transfer Network
NCSR	National Centre for Scientific Research
PC	SIDs Programme Committee
SESAR	Single European Sky ATM research
SIDs	SESAR Innovation Days
SJU	SESAR Joint Undertaking



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