



# D2.9 SESAR Innovation Days 2019 Report

Deliverable 2.9

Engage

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# Engage

## THE SESAR KNOWLEDGE TRANSFER NETWORK

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### Abstract

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This report describes the ninth edition of the SESAR Innovation Days, which took place in Athens, Greece, 02 – 06 December 2019.

The opinions expressed herein reflect the authors' views 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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## Executive Summary

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The ninth edition of the SESAR Innovation Days took place 02 – 06 December 2019, in Athens, Greece. As in 2018, Engage took responsibility of the programmatic, i.e. scientific content of the conference, tightly collaborating with the SJU as main sponsor.

Over 300 participants attended the SIDs, which featured technical presentations, plenary talks, panel discussions and numerous networking activities. The Digital Sky Challenge took place at Athens airport at the same time and, although not formally part of the SESAR Innovation Days, the SJU decided to tie these two events together.

# 1 Introduction

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## 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 2019 edition of the SESAR Innovation Days.

## 1.3 Scope of D2.9

The following sections describe the:

- Programme Committee;
- Call for Contributions;
- Paper selection process;
- Conference programme;
- Website and mobile phone application;
- 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. Figure 1 shows the participant numbers of the SIDs between 2011 and 2019.

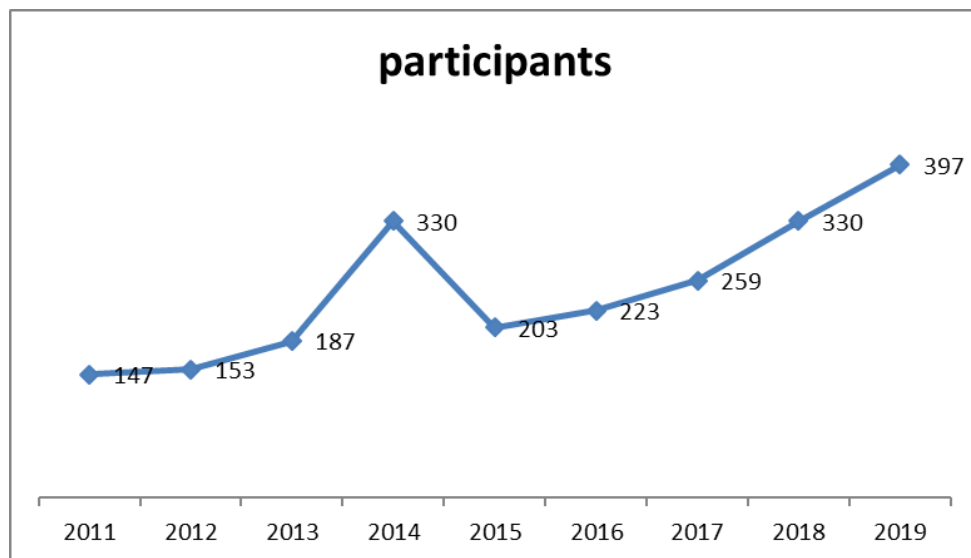


Figure 1. SIDs participant numbers

Note that the participants of the Digital Sky Challenge located at Athens airport (around 100) also registered to the SIDs and most of them did not attend the conference itself. In this sense, the number 397 does not reflect the actual audience of the SIDs.



## 3 Programme Committee

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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:** George Vouros – University of Piraeus

**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 – Technical University Braunschweig

Jacco Hoekstra – Technical University Delft

Gokhan Inalhan – Technical University Istanbul

Christopher Johnson – University of Glasgow

Radosav Jovanovic – University of Belgrade

Dirk Kuegler – DLR

Javier Lopes – Boeing Research & Technology Europe

Guglielmo Lulli – Lancaster University

Max Mulder – Technical University Delft

Jose Muñoz – ASLogic

Eric Nantier – Swiss Airlines

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**Additional Reviewers from the SESAR Scientific Committee:**

Juan Besada – Universidad Politécnica de Madrid

Henk Blom – NLR

Tatjana Bolic – University of Trieste

Rita Markovits-Somogyi – Hungarocontrol

Vojin Tomic – University of Belgrade

## 4 Call for Contributions

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The Call for Contributions was published in May 2019 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 for Contributions is depicted below:

# 9th SESAR Innovation Days

Inspiring long-term research in the field of air traffic management

2 – 6 December 2019

Hosted by University of Piraeus &  
the National Centre of Scientific Research "Demokritos" Athens, Greece



## About SESAR Innovation Days

The SESAR Innovation Days (SIDs) are the main vehicle for SESAR Joint Undertaking to share progress and disseminate results of its exploratory research programme. 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 the National Centre of Scientific Research (NCSR) "Demokritos" in Athens, Greece from 2-to 6 December, with the main conference running from 3 to 5 December. The aim will be 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.

This year's SIDS will host once again the annual Young Scientist Award, recognising young scientific talent in the field. It will also for first time welcome teams of data scientists and software developers to participate in a hackathon aimed at finding new ideas and solutions to ATM-related challenges.

## Call for contributions

Researchers from universities, research institutions, airlines, air traffic 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 optimization 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



Find out how to contribute at  
[www.sesarinnovationdays.eu](http://www.sesarinnovationdays.eu)

founding members



Founding Members



### Call for posters and exhibits

Partners from academia and industry are invited to submit proposals for posters (max 2 posters per subject) and technical exhibits or demonstrations. 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, including drone traffic management. Proposals of one page shall be submitted with a detailed description of the subject matter.

*All papers (including SESAR contributions) will be triple peer-reviewed. The proceedings will be available for download in electronic form on both the event website and SESAR JU website prior to the event. All SIDs papers are listed in Elsevier's Scopus database.*

*A special edition in a renowned ATM research journal will be published with selected articles from SIDs 2019.*

**Paper submission deadline: 27 September 2019**  
**Notification of acceptance: 7 November 2019**

**Poster/exhibits submission deadline:**  
**13 September 2019**  
**Notification of acceptance:**  
**27 September 2019**

#### General chair

David Bowen, SESAR Joint Undertaking

#### Programme chair

Dirk Schaefer, EUROCONTROL

#### Local organisation chair

George Vouros, University of Piraeus

#### 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 – Technical University Braunschweig  
 Jacco Hoekstra – Technical University Delft

Gokhan Inalhan – Technical University Istanbul  
 Christopher Johnson – University of Glasgow  
 Radosav Jovanovic – University of Belgrade  
 Dirk Kuegler – DLR  
 Javier Lopes – Boeing Research & Technology Europe  
 Guglielmo Lulli – Lancaster University  
 Max Mulder – Technical University Delft  
 Jose Muñoz – ASLogic  
 Eric Nantier – Swiss International Air Lines  
 David Perez – Innaxis  
 Hans Plets – Belgocontrol  
 Simone Pozzi – Deep Blue  
 Jose Javier Ramasco – University of the Balearic Islands  
 Damián Rivas – University of Seville  
 Francisco Javier Saez – Cranfield University  
 Georg Trausmuth – Frequentis



**Location**  
 National Centre of Scientific Research NCSR Demokritos



Founding Members



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## 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 71 full papers (2018: 57) and 23 posters (2018: 33) were submitted and reviewed by the Programme Committee (including reviewers from the SESAR Scientific Committee).

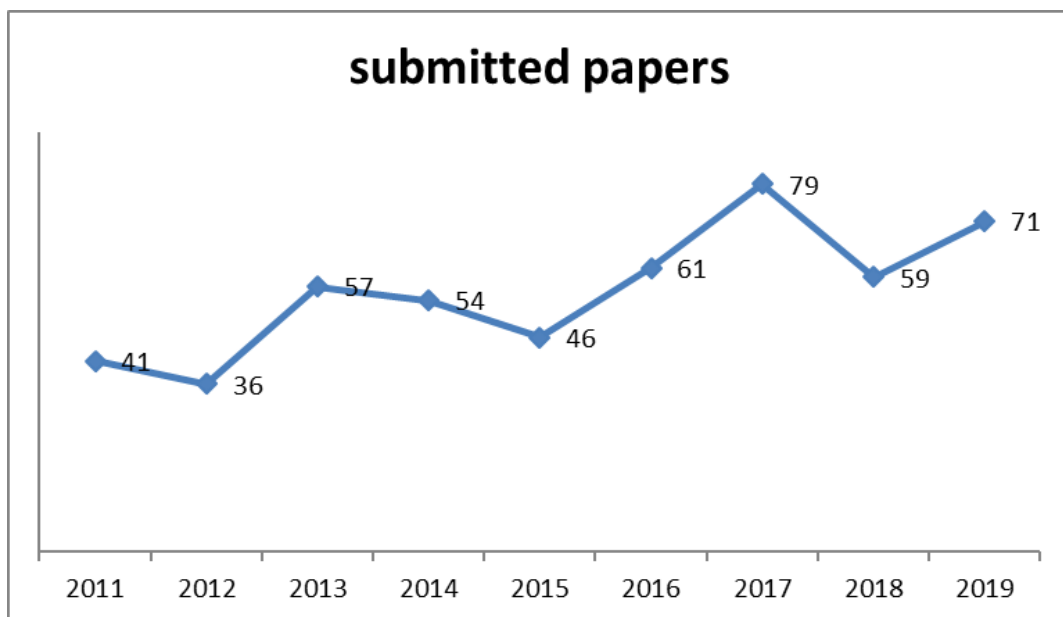


Figure 2. SIDs Number of submissions

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 further attempt to 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 38 papers were accepted; this corresponds to a paper acceptance rate of 53% (2018: 60%).

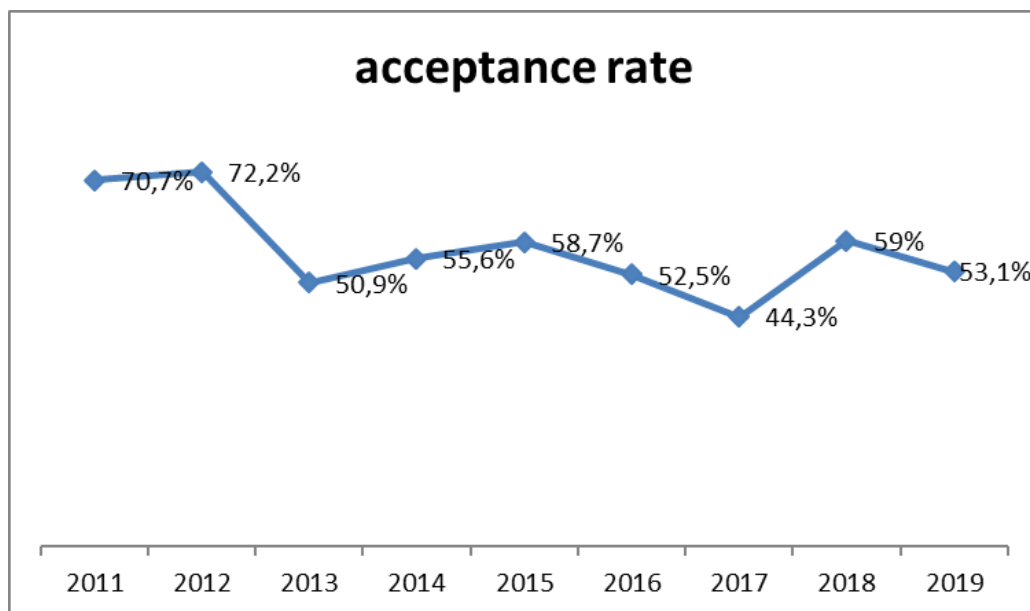
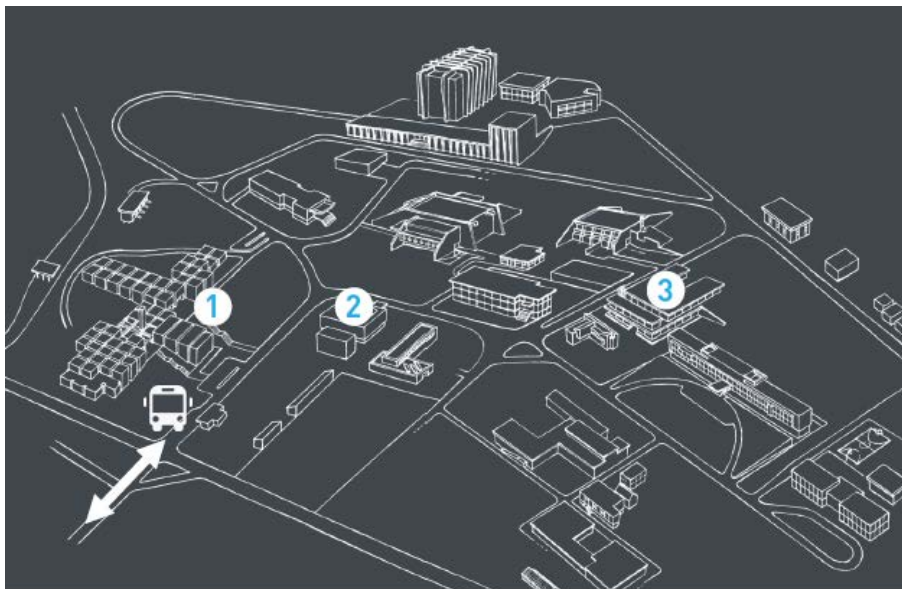


Figure 3. Paper acceptance rate

## 6 Conference programme

All 38 papers were assigned to thematic tracks and integrated as sessions of 2-4 paper presentations into the conference 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 conference took place at the National Centre for Scientific Research (NCSR) Demokritos in Athens (Patr. Gregoriou E & 27 Neapoleos Str, 15341 Agia Paraskevi, Athens).



**National Centre of Scientific Research "Demokritos"**  
Neapoleos 10 Ag. Paraskevi 153 10  
Athens

Building 1	Building 2	Building 3
Foyer	Library	Main lecture room
Auditorium		Aegean lecture room
Conference room		

Plenary talks and technical paper sessions took place in the Auditorium and the Conference Room in Building 1. The conference registration desk was also set up in this area. Posters were installed in the library. Coffee and lunch was also served in this area in order to encourage conference participants to visit the posters and exhibits.



The conference started with the inauguration of the poster exhibition on Monday. Two workshops and a number of additional meetings were organised in association with the SIDs; these were not part of the official programme but co-located seeking synergies with the main conference. The COTTON workshop and the Engage Thematic Challenge workshop 'TC2 - Data-driven trajectory prediction' took place at NCSR on Monday 02 December.

## Monday, 2 December

09:30 – 16:30	<b>Engage Thematic Challenge 2 Workshop – Data-driven Trajectory Prediction</b> The second data-driven trajectory prediction workshop organised by the Engage KTN will build on the success of the first workshop, hosted by the Universitat Politècnica de Catalunya, where ATM stakeholders and data scientists discussed the methodologies and benefits of improved trajectory prediction in the context of airspace users' needs. The second workshop will present research being undertaken within the Engage KTN (PhDs and catalyst-funded projects), with a focus on advanced methodologies such as adaptive prediction, agent-based deconfliction, and machine learning, with a facilitated session to debate the ways forward.	<i>Conference room</i>
10:00 – 16:30	<b>COTTON workshop</b> COTTON builds an integrated view of future Capacity Management (CM) processes by exploring how complexity assessment can help Dynamic Airspace Configuration (DAC) and Flight Centric ATC (FCA) and their integration, taking advantage of the trajectory information. COTTON Final Workshop aims at disseminating its results with the ultimate goal of facilitating their proper integration within the future DCB processes.	<i>Auditorium</i>
14:30 – 16:30	<b>Registration</b>	<i>Foyer</i>

The official opening of the SIDs took place on Monday 02 December followed by a networking cocktail. The posters were already installed in the library in an area adjacent to where the opening addresses were given and participants had the opportunity to visit the posters whilst having their cocktails.

16:30 – 19:00	<b>Official opening ceremony and networking cocktail – poster exhibition</b> Peter Hotham, Deputy Executive Director, SESAR Joint Undertaking <i>(Master of ceremonies)</i> Prof. Aggelos Kotios, Rector of the University of Piraeus Dr. George Nounesis, Research Director, Head of Innovation, NCSR "Demokritos" Dr Kostas Iatrou, Director General, Hermes – Air Transport Organisation	<i>Library</i>
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Tuesday morning started with a number of plenary talks in the opening session, including a keynote by Konstantinos Lintzerakos, Governor of the Hellenic Civil Aviation Authority.

## Tuesday, 3 December

09:00 – 09:30	Registration and welcome coffee	Foyer
09:30 – 10:30	<p><b>Opening</b> Dean Prof. Yannis Theodoridis, The University of Piraeus School of Information and Communication Technologies</p> <p><b>Keynote</b> Konstantinos Lintzerakos, Governor of the Hellenic Civil Aviation Authority</p> <p><b>Overview of conference proceedings</b> David Bowen, Chief ATM, SESAR Joint Undertaking (<i>Master of ceremonies</i>) Dirk Schaefer, EUROCONTROL, Chair, SIDs Programme Committee</p>	Auditorium
10:30 – 11:00	Coffee & exhibition	Library

The first two parallel sessions took place after the morning coffee; all technical sessions were led by a session chair, in most cases a member of the SIDs Programme Committee or the SESAR Scientific Committee.

11:00 – 13:00	<p><b>Airports I Technical Paper Session</b> Chair: Dirk Schaefer, EUROCONTROL <i>Auditorium</i></p>	<p><b>Network and Flow Management Technical Paper Session</b> Chair: Radosav Jovanovic, University of Belgrade <i>Conference room</i></p>
	<p><b>Evaluation of Departure Pushback Time Assignment Considering Uncertainty Using Real Operational Data</b> Ryota Mori, ENRI</p>	<p><b>Analysis of Relationship between Air Traffic Demand, Safety and Complexity in FABEC Airspace</b> Fedja Netjasov, University of Belgrade</p>
	<p><b>Validating LiDAR Sensor Surveillance Technology versus conventional Out-the-Window View for Safety-critical Airport Operations</b> Hannes Brassel, TU Dresden</p>	<p><b>An Innovative Safety-neutral Slot Overloading Technique to improve Airspace Capacity Utilisation</b> Sergio Ruiz, EUROCONTROL</p>
	<p><b>A LiDAR Interactive Data Visualization for Ground Aircraft Detection in Small Airports</b> Mathieu Cousy, ENAC</p>	<p><b>Integrated Traffic Flow Based Optimization of Airport and Terminal Area</b> Ying Huo, ENAC</p>
	<p><b>A-CDM Lite: Situation Awareness and Decision-making for small Airports based on ADS-B Data</b> Michael Schultz, TU Dresden</p>	<p><b>Reducing Impact of Delays using Airspace User-Driven Flight Prioritisation</b> Nadine Pilon, EUROCONTROL</p>

The afternoon was kicked off with a plenary panel discussion on the topic of ‘automation’; it was followed by technical sessions in two parallel tracks.

<b>13:00 – 14:00</b>	<b>Lunch and exhibition</b>	<i>Library</i>
<b>14:00 – 15:00</b>	<p><b>Plenary session 1: Automation</b> Introducing advanced levels of automation into the ATM system offers benefits but also brings with it certain risks and questions that must be addressed. Change management is a critical part of the process of this introduction where the evolving role of the human in particular has to be considered. Increased dependency on automation along with connectivity between systems emphasises the issue of cyber security. This panel will discuss the positive steps the ATM community needs to take to ensure the smooth adoption of advanced automation in the future.</p> <p><b>Speakers</b> Moderator: David Bowen, Chief ATM, SESAR Joint Undertaking Ignacio Baca, Executive Vice President Technical, IFATCA Dimitra Liveri, Network and Information Security Expert Secure Infrastructures and Services Unit, ENISA Theodore Kiritsis, Vice-President, IFATSEA Vaios Lappas, University of Patras, EuroDRONE</p>	<i>Auditorium</i>

The technical paper session in the afternoon included a ‘poster teaser session’ in which the presenters of the posters were allowed to ‘tease’ the audience, i.e. instil their curiosity, with a 1-slide/1-minute introduction to the topic of their poster. The first day ended with a poster and exhibits cocktail.

<b>15:00 – 16:30</b>	<p><b>Airports II</b> <b>Technical Paper Session</b> Chair: Marc Bourgois, EUROCONTROL <i>Auditorium</i></p> <p><b>Encoder-Decoder Approach to Predict Airport Operational Runway Configuration</b> Ramon Dalmau, EUROCONTROL</p> <p><b>Innovative and Low-cost Technique to identify Airport Taxi Congestion Points</b> Alan Groskreutz, CRIDA</p> <p><b>Validation of the Runway Utilisation Concept at Vienna Airport</b> Floris Herrema, EUROCONTROL</p>	<p><b>Complexity, Data Science and Data Sources</b> <b>Technical Paper Session</b> Chair: George Vouros, University of Piraeus <i>Conference room</i></p> <p><b>Door-to-door Travel Time Analysis from Paris to London and Amsterdam using Uber Data</b> Philippe Monmousseau, ENAC</p> <p><b>Network-wide Assessment of 4D Trajectory Adjustments using an Agent-based Model</b> Gérald Gurtner, University of Westminster</p> <p><b>Enhanced Passenger Characterisation through the Fusion of Mobile Phone Records and Airport Surveys</b> Pedro García, Nommon</p>
<b>16:30 – 17:00</b>	<b>Poster teaser session</b>	
<b>17:00 – 19:00</b>	<b>Posters and exhibition, Cocktail</b>	<i>Library</i>

Day 2 started with a two parallel technical paper sessions followed by an ‘artistic interlude’ – a tradition established during the 2013 edition of the SIDs in Stockholm. Note that the artistic interlude took place after the coffee break so as to allow the participants to reconvene in plenary configuration.

## Wednesday, 4 December

<b>08:30 – 09:00</b>	<b>Registration and welcome coffee</b>	<b>Foyer</b>
<b>09:00 – 11:00</b>	<b>Human Factors Technical Paper Session</b> Chair: Francesca De Crescenzo, University of Bologna <i>Auditorium</i>	<b>Modelling, Simulation and Performance Analysis Technical Paper Session</b> Chair: Dirk Kuegler, DLR <i>Conference room</i>
	<b>A Quantum-Inspired Model for Human-Automation Trust in Air Traffic Control derived from Functional Magnetic Resonance Imaging</b> Kiranraj Pushparaj, Nanyang Technological University	<b>Trajectory Approach Analysis: a post-operational aircraft approach analysis tool</b> Gabriel Jarry, ENAC
	<b>Please have a Look here: Successful Guidance of Air Traffic Controller's Attention</b> Oliver Ohneiser, DLR	<b>Reconstructing Aircraft Turn Manoeuvres for Trajectory Analyses using ADS-B Data</b> Junzi Sun, TU Delft
	<b>Visual Scan Patterns in Tower Control: Foundations for an Instructor Support Tool</b> Carl Westin, Linköping University	<b>The New Flight Efficiency Performance Approach: Partitioned Efficiency Index</b> Antonio Lazarovski, ATOS
	<b>Feasibility Study of Flight Centric Mode of Operations - A Human Performance Approach</b> Fanni Kling, HungaroControl	<b>Towards Reproducibility in ANS Performance</b> Enrico Spinielli, EUROCONTROL
	<b>11:00 – 11:30</b>	<b>Coffee and exhibition</b>
<b>11:30 – 12:00</b>	<b>Artistic Interlude</b>	<b>Auditorium</b>

A second panel took place after the interlude, dedicated to ‘Global research collaboration and championing young talent in aviation’.

**Plenary session 2: Global research collaboration and championing young talent in aviation**

Innovation and environment were high on the agenda of the 40th ICAO Assembly that took place in Montreal recently. What are the key priorities globally in Aviation and ATM, how do we manage to keep pace with coming technology advances while ensuring global interoperability and meeting expectations of even higher levels of performance? What are the implications for global research and development collaboration? The panel will also consider how international research collaboration can provide new opportunities for young researchers.

12:00 – 13:00

*Auditorium*

**Speakers**

Moderator: David Bowen, Chief ATM, SESAR Joint Undertaking  
 Tatjana Bolic, Postdoctoral fellow at University of Trieste, and Aviation Director at Symopt S.r.l.  
 Saulo Da Silva, Chief Global Interoperable Systems Section, ICAO  
 Vu Duong, Director - ATM Research Institute, Nanyang Technological University, Singapore  
 Parimal Kopardekar, Director, NASA Aeronautics Research Institute (NARI)

13:00 – 14:00

**Lunch and exhibition**

*Library*

The afternoon started with technical sessions. The programme closed at 16.00 to allow participants to get ready for the networking event.

14:00 – 16:00

**Machine Learning**

**Technical Paper Sessions**

Chair: Daniel Delahaye, ENAC  
*Auditorium*

**Improving the Predictability of Take-off Times with Machine Learning**

Ramon Dalmau, EUROCONTROL

**Flight Data Monitoring (FDM) Unknown Hazards detection during Approach Phase using Clustering Techniques and AutoEncoders**

Antonio Fernández, Innaxis

**Simulation-Free Runway Balancing Optimization Under Uncertainty Using Neural Network**

Ryota Mori, ENRI

**Forecasting Unstable Approaches with Boosting Frameworks and LSTM Networks**

Dario Martínez, Innaxis

**Decision Support Tools**

**Technical Paper Sessions**

Chair: Fedja Netjasov, University of Belgrade  
*Conference room*

**Supporting ATCOs During Sector Configuration Changes in Dynamic Air Space Configuration**

Amela Karahasanovic, SINTEF

**GRADE Practice for Designing Pilot's HMI and Experimental Procedures for General Aviation Enhanced Terminal Operations Based on GNSS**

Edoardo Filippone, CIRA, Antonio Vitale, CIRA, and Gabriella Duca, ISSSNOVA

**Reducing Controller Workload by Automatic Speech Recognition Assisted Radar Label Maintenance**

Hartmut Helmke, DLR

**Tower Controller Command Prediction for Future Speech Recognition Applications**

Oliver Ohneiser, DLR

The networking dinner took place at the Stavros Niarchos Foundation Cultural Centre, Leof. Andrea Siggrou 364, Kallithea 176 74, Greece and was largely dedicated to the awards ceremony of the Digital Sky Challenge organised by ACI EUROPE in parallel with the SIDs.

<b>19:00 – 19:30</b>	<b>Welcome drink</b>
<b>19:30 – 20:00</b>	<b>Toast by Digital Sky Challenge organisers:</b> Florian Guillermet, Executive Director, SESAR Joint Undertaking ( <i>Master of ceremonies</i> ) Olivier Jankovec, Director General, ACI EUROPE Dr Yiannis Paraschis, CEO Athens International Airport
<b>20:00 – 21:00</b>	<b>Dinner</b>
<b>21:00 – 21:30</b>	<b>Digital Sky Challenge awards ceremony</b>  Florian Guillermet, Executive Director, SESAR Joint Undertaking - <i>Master of the ceremonies</i>  <b>Digital Sky Challenge recap video – the best moments of the event</b>  <b>Passenger Experience</b> Olivier Jankovec, Director General, ACI EUROPE and Dr Yiannis Paraschis, CEO Athens International Airport  <b>Safety</b> Marco De Sciscio, Policy Officer, Directorate-General for Mobility and Transport (DG MOVE)  <b>Environment</b> Philippe Merlo, Director DECMA, EUROCONTROL  <b>Special recognition</b> Rostislav Barina, Senior Technical Manager, Honeywell Dr. Clément Bouttier, Digital Transformation Office - Trajectory Optimization Team Leader, Airbus Paula Lopez, Programme Director, Innaxis  Group photo
<b>21:30 – 23:00</b>	<b>Networking drink</b>

The programme for Thursday morning incorporated four technical paper sessions, two before morning coffee two thereafter. The closing session thereafter included an update from the Engage Knowledge Transfer Network, the Young Scientist Award ceremony and the announcement of SIDs 2019 which will take place in Budapest, kindly hosted by HungaroControl.

## Thursday, 5 December

08:30 – 09:00	Welcome coffee	<i>Foyer</i>
09:00 – 10:00	<b>ATM Architecture and Airspace Design Technical Paper Session</b> Chair: Rita Markovits, HungaroControl <i>Auditorium</i>	<b>Conflict Detection and Resolution Technical Paper Session</b> Chair: Xavier Fron, EUROCONTROL <i>Conference room</i>
	<b>An Assessment of the Safety and Complexity of the Innovative Design of Istanbul's New TMA</b> Arife Aycan Mutlu, DHMI	<b>Analysis of Conflict Resolution Methods for Manned and Unmanned Aviation Using Fast-Time Simulations</b> Marta Ribeiro, TU Delft
	<b>Impact of Free Route Airspace Implementation on Safety Performance - Ex-post Analysis of Northern Europe Free Route Airspace (NEFRA)</b> Goran Pavlovic, EUROCONTROL	<b>Strategies to Mitigate Tight Spatial Bounds between Conflicts in dense Traffic Situations</b> Timjo Koca, UA Barcelona
10:00 – 10:30	Coffee and exhibition	<i>Library</i>
10:30 – 11:30	<b>UAS and UTM Technical Paper Session</b> Chair: Peter Hecker, TU Braunschweig <i>Auditorium</i>	<b>Meteorology Technical Paper Session</b> Chair: Damian Rivas, University of Seville <i>Conference room</i>
	<b>Noise Abatement Trajectories for a UAV Delivery Fleet</b> Geoffrey Scozzaro, ENAC	<b>Metaheuristic approach to probabilistic aircraft conflict detection and resolution considering Ensemble Prediction Systems</b> Eulalia Hernández, University of Seville
	<b>EGNOS-based Navigation and Surveillance System to support the Approval of RPAS Operations</b> Francisco Alarcon, FADA-CATEC	<b>Data Driven Occupancy Prediction in Adverse Weather Conditions using Thunderstorm and Traffic Observations</b> Aniel Jardines, University Carlos III Madrid
11:30 – 12:00	<b>SESAR Knowledge Transfer Network – Engage</b> Andrew Cook, University of Westminster	<i>Auditorium</i>
12:00 – 12:45	<b>Young Scientist Award ceremony</b> David Bowen, Chief ATM, SESAR Joint Undertaking ( <i>Master of ceremonies</i> )	<i>Auditorium</i>
12:45 – 13:00	<b>Wrap-up and next SESAR Innovation Days</b> Florian Guillermet, Executive Director SESAR Joint Undertaking	<i>Auditorium</i>
13:00 – 14:00	Lunch and exhibition	<i>Library</i>

## 7 Website and SIDs app

The following URL was communicated as the official SESAR Innovation Days website: [www.sesarinnovationdays.eu](http://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.

### 9th SESAR Innovation Days

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

The SESAR Innovation Days (SIDs) are the main vehicle for SESAR Joint Undertaking to share progress and disseminate results of its exploratory research programme. 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 was hosted by the **National Centre of Scientific Research (NCSR) "Demokritos" in Athens, Greece from 2 to 5 December**, with the main conference running from 3 to 5 December. The aim was 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.

This year's SIDs hosted once again the annual **Young Scientist Award**, recognising young scientific talent in the field. For the first time it also welcomed teams of data scientists and software developers to **participate in a hackathon** aimed at finding new ideas and solutions to ATM-related challenges.



[Read the SIDs 2019 news](#)

## SIDs2019

PRESENTATIONS, PAPERS...

DIGITAL CHALLENGE

YOUNG SCIENTIST AWARD

VENUE & LOGISTICS

PROGRAMME COMMITTEE

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.

PRESENTATIONS, PAPERS... DIGITAL CHALLENGE YOUNG SCIENTIST AWARD VENUE & LOGISTICS PROGRAMME COMMITTEE

From 2-6 December 2019, over 350 participants gathered for the SIDs 2019 event, which was kindly hosted by the University of Demokritos in Athens.

Posters are at the bottom of this table (to read Posters' Abstracts, click here)

Title & Papers	Presenter	Presentation
<a href="#">Elver</a>		
<a href="#">Agenda</a>		
Posters Abstracts		
Pictures from the event		<a href="#">SID2019</a> <a href="#">Networking dinner and DigitalSkyChallenge award ceremony</a>
ENGAGE workshop		
COTTON workshop		
<b>Opening session</b> - Keynote speeches		<a href="#">Dirk Schaefer</a>
<b>Airports 1</b>		
<a href="#">Evaluation of Departure Pushback Time Assignment Considering Uncertainty Using Real Operational Data (2019-21)</a>	Ryota Mori	<a href="#">Download</a>
<a href="#">Validating LIDAR sensor surveillance technology versus conventional out-the-window view for safety critical airport operations (2019-41)</a>	Hannes Brassel	<a href="#">Download</a>
<a href="#">A LIDAR Interactive Data Visualization for Ground Aircraft Detection in Small Airports (2019-47)</a>	Mathieu Cousy	<a href="#">Download</a>
<a href="#">A-CDM Lite: situation awareness and decision making for small airports based on ADS-B data (2019-76)</a>	Michael Schultz	<a href="#">Download</a>

Figure 5. Website archive of papers and presentations

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

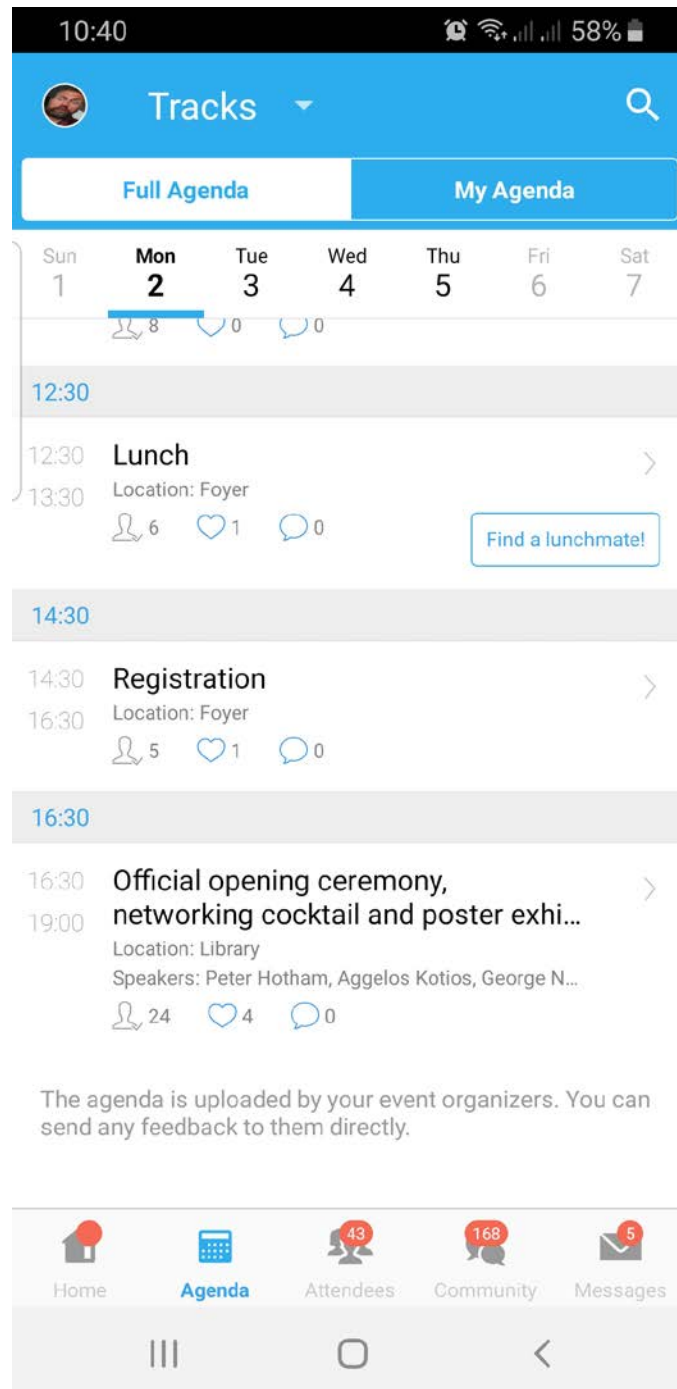


Figure 6. Conference smart phone application available from Whova

## 8 Participant satisfaction survey results

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Participants were requested to provide feedback about the 2019 SESAR Innovation Days through an on-line questionnaire. For sake of comparability the questionnaire used in previous years was used which encompassed questions in the following areas:

- Before the SIDs 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 25 participants were received (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

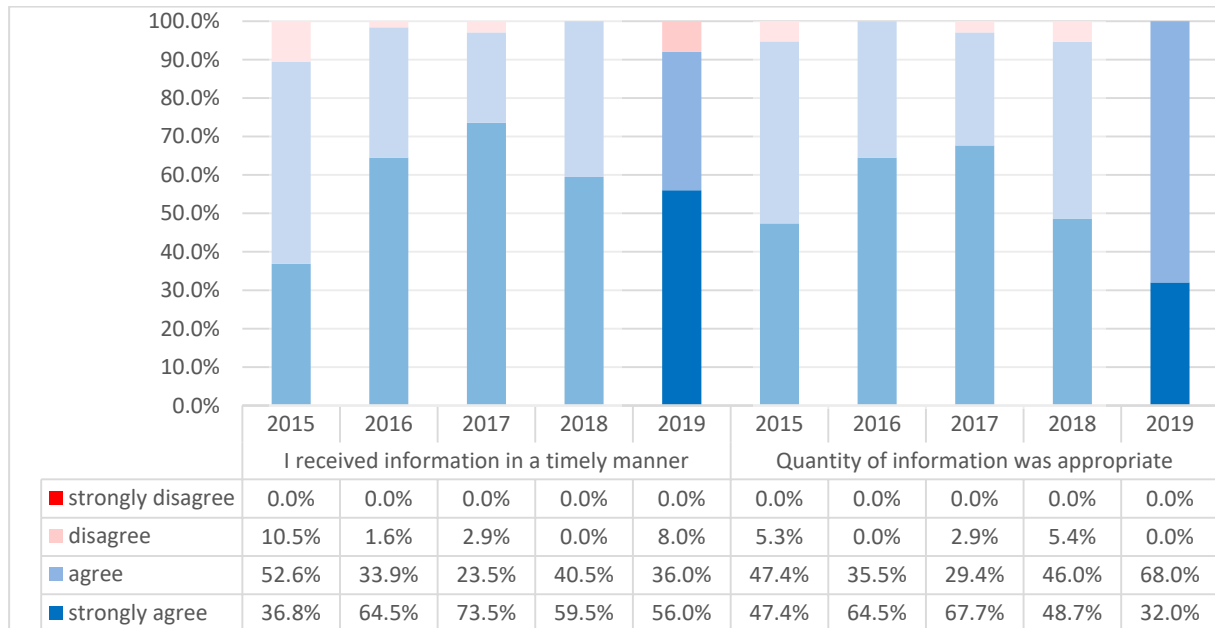


Figure 7. 'I received information in a timely manner' and 'Quantity of information was appropriate'

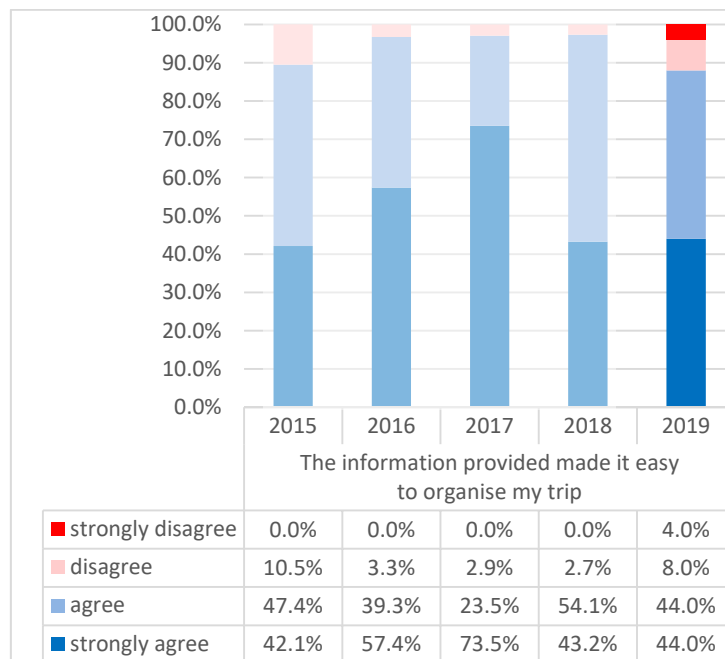


Figure 8. 'The information provided made it easy to organise my trip'

The following comments were received in this category:

- The information regarding the shuttle from the hotel to the conference centre was missing/unclear/not seen in time.
- Common choice of hotel to be communicated earlier please.
- Hotel information was very late.
- This year it was too long. I couldn't stay the whole period.
- Information on papers, presentations and basic directions was very well; however information on hotel recommendation and shuttle bus was too late, but would have been much more convenient.

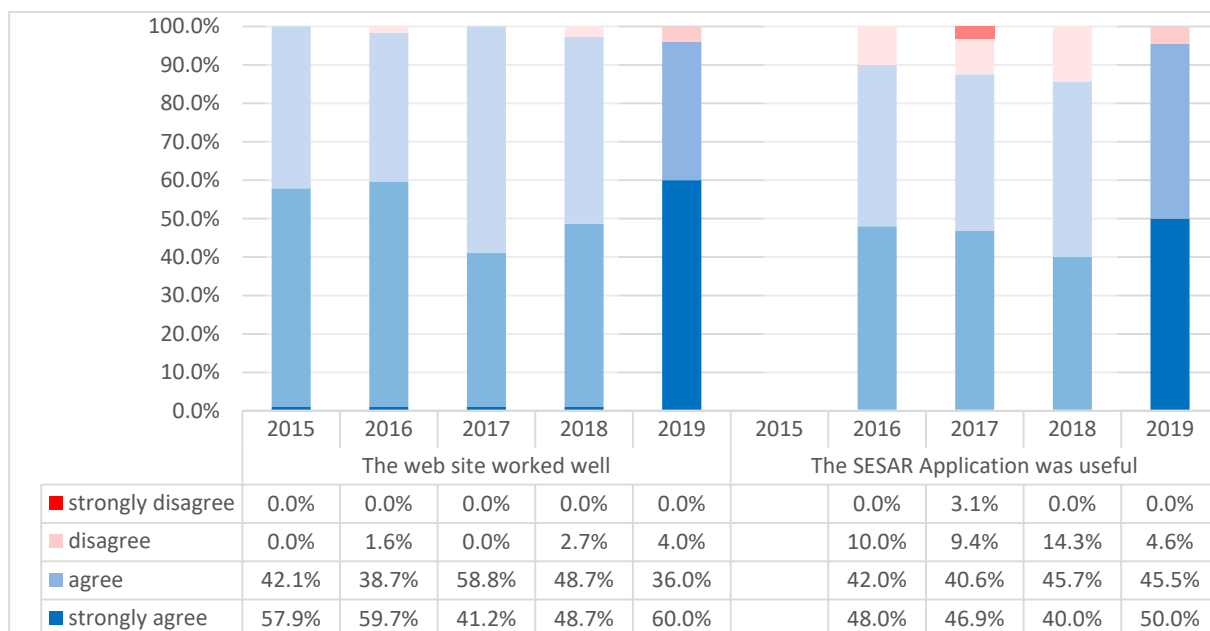


Figure 9. 'The web site worked well' and 'The SESAR Application was useful'

**Discussion**

Feedback from the questionnaire and oral feedback received during the SIDs suggested that participants found that information about shuttle buses and recommended hotel was communicated too late.

Participant satisfaction with the SIDs app is increasing and very high at 95.5%; at the same time the overall satisfaction with the website is slightly decreasing. Two potential explanations come to mind: much effort has been dedicated to making the app the main primary source of information for the SIDs, perhaps to the detriment of the website; the dissatisfaction about shuttle and hotel info being communicated late may have carried over to the satisfaction with the website.

## 8.2 Conference content

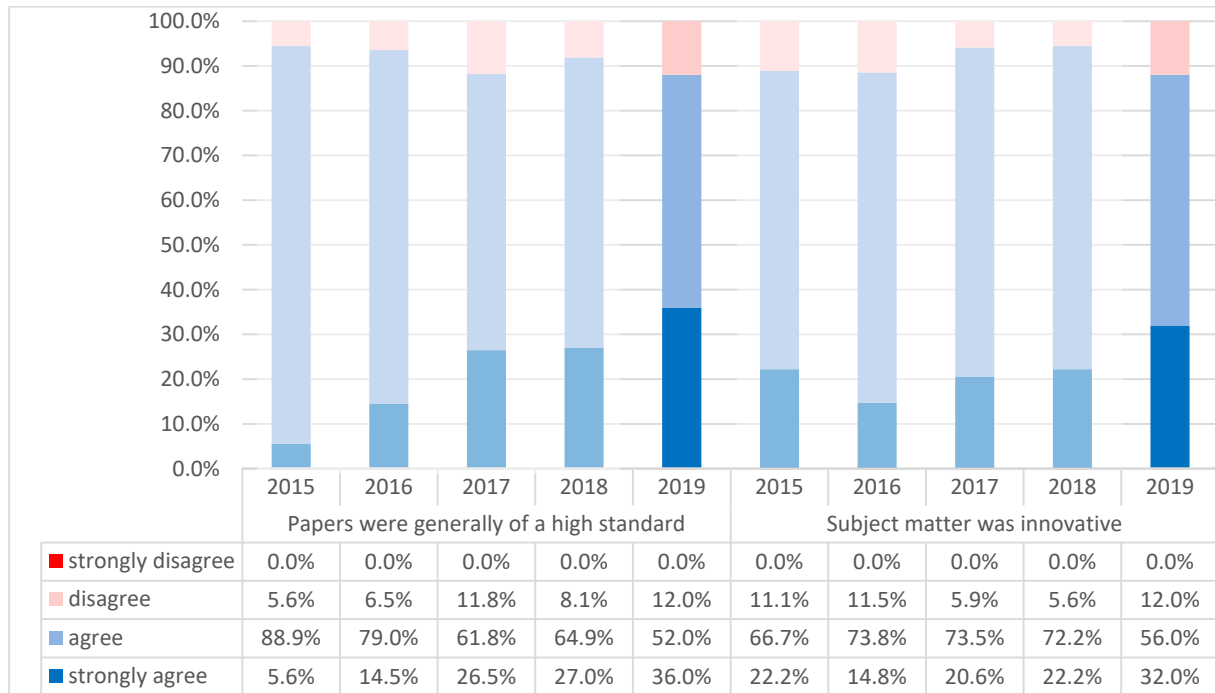


Figure 10. ‘Papers were generally of a high standard’ and ‘Subject matter was innovative’

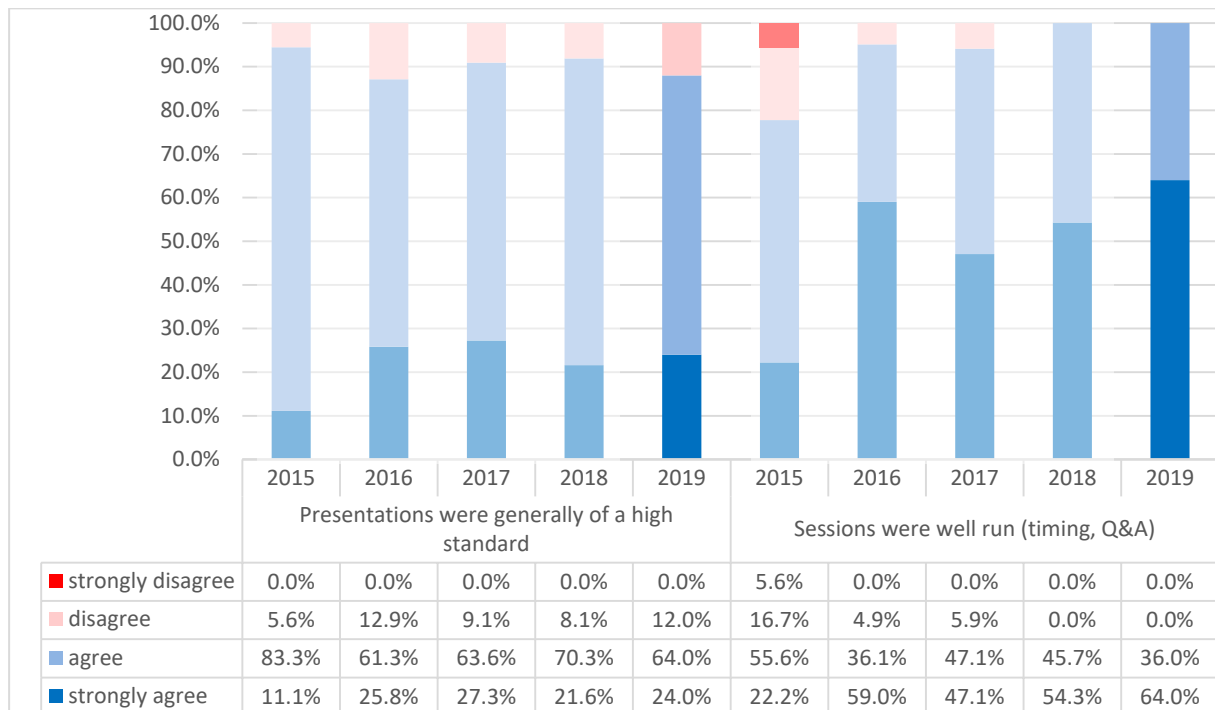


Figure 11. ‘Presentations were generally of a high standard’ and ‘Sessions were well run (timing, Q&A)’



Figure 12. Appreciation of the plenary sessions

The following comments were received in this category:

- Did not participate in all days.
- Too many days.
- Plenary sessions were too high level. Some of the speakers not real experts on the matter.

**Discussion**

A small minority of participants does not agree that the subject matter was innovative; at the same time an increasing number of participants strongly agree that the subject matter is innovative. This is consistent with oral comments received and should be monitored in the future.

Questions related to the plenary sessions received a significantly lower level of agreement than most other questions and this is consistent with oral feedback received which suggests that conference attendants value the technical paper sessions more than the plenary sessions.

### 8.3 Logistics

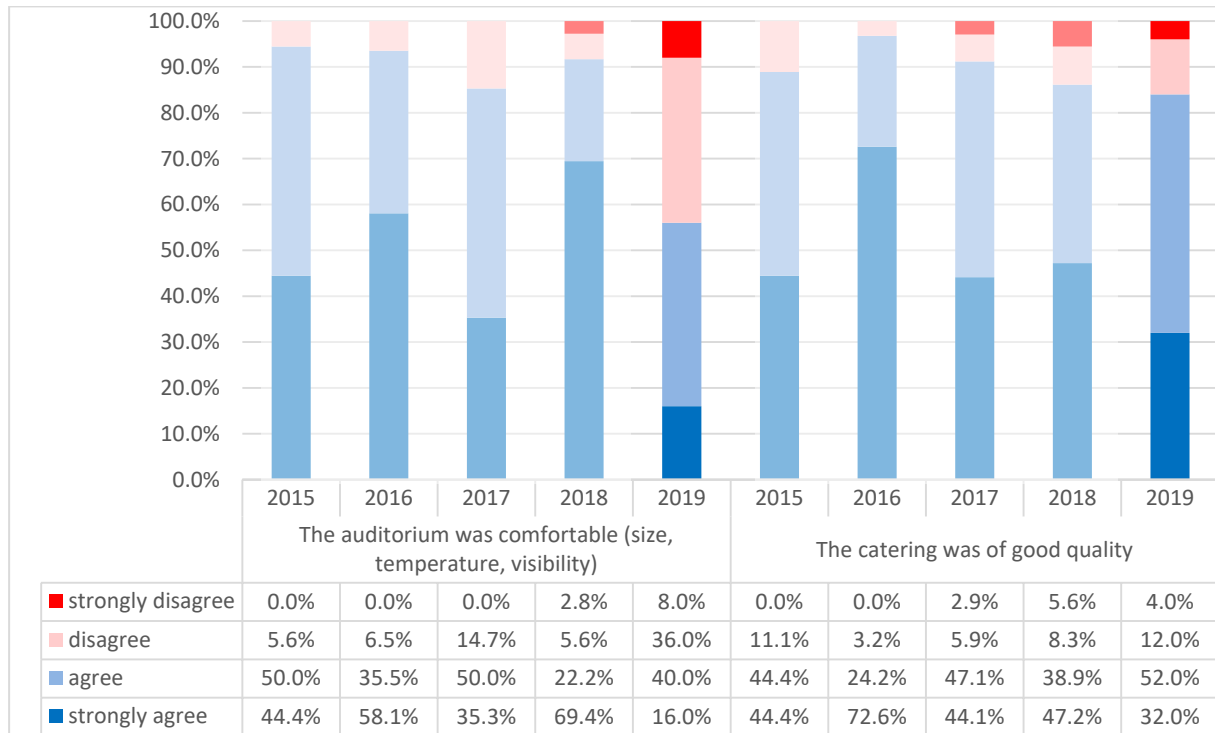


Figure 13. ‘The auditorium was comfortable (size, temperature, visibility)’ and ‘The catering was of good quality’

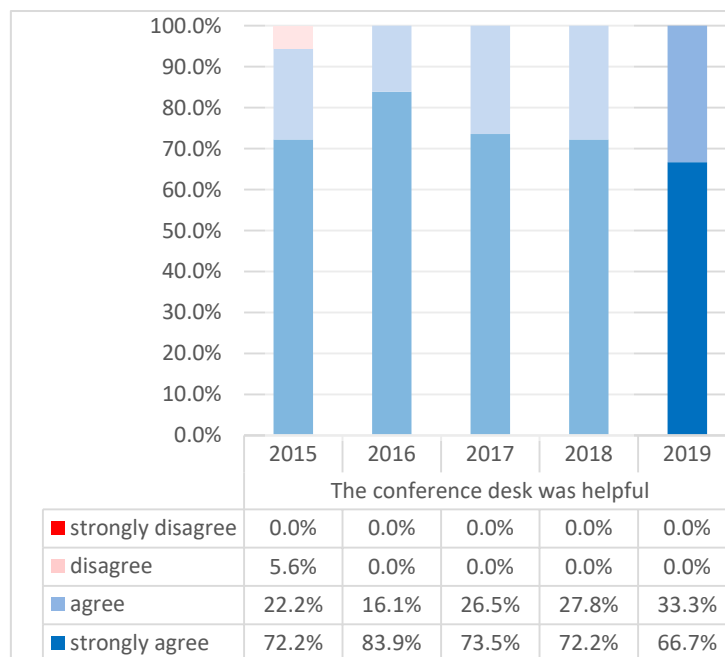


Figure 14. ‘The conference desk was helpful’



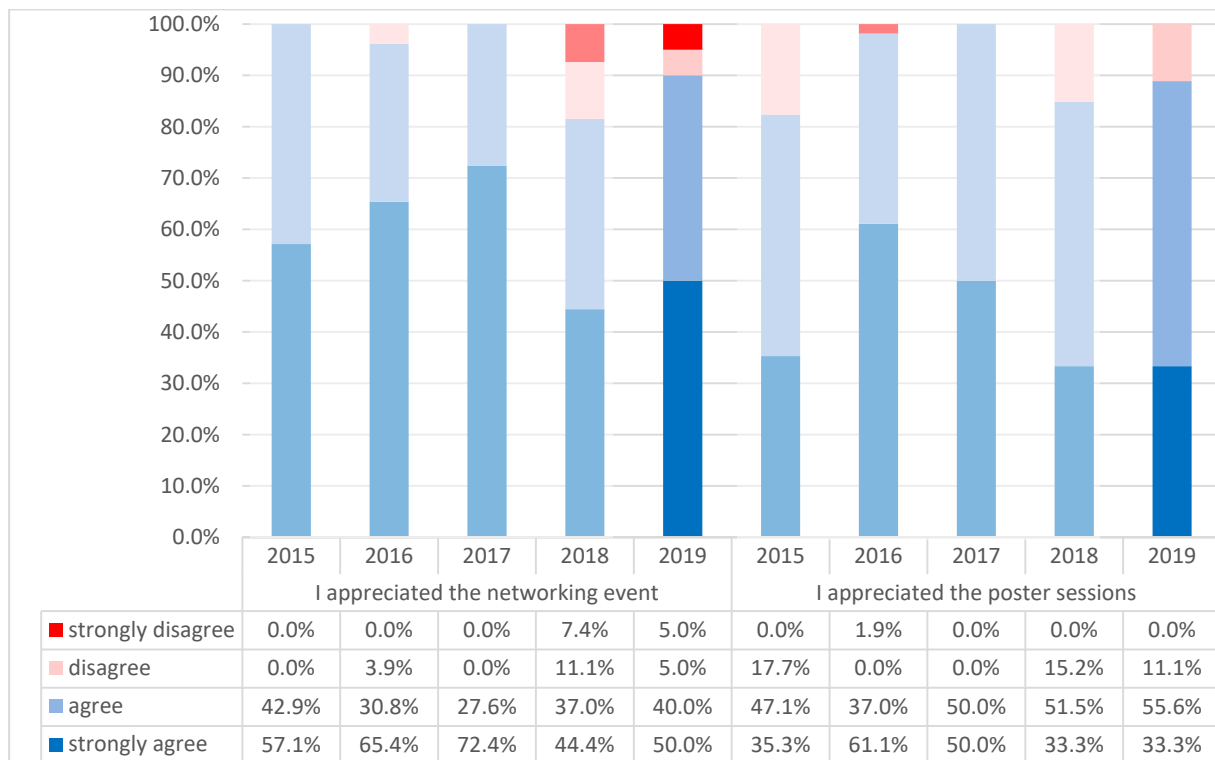


Figure 15. 'I appreciated the networking event' and 'I appreciated the poster sessions'

The following comments were received in this category:

- Regarding the poster sessions: the fact that the posters were located at a different place from the conferences was inconvenient. In my opinion, they didn't get a good visibility.
- The posters were not very conveniently located - the place was not big enough for visiting the posters.
- The conference room (not the Auditorium) screen was too low, the content at the end of the presentations was not visible from the back of the room.
- The smaller lecture room was not adapted for presentations: a higher ceiling would have allowed the presentations to be more visible from the entire room.
- Ideally, the activities should be held in one single building. This would make the networking even more efficient.
- Networking event with loud disco music did prevent from networking and discussions, coffee should be served closer to the presentation rooms and not in a separate building.
- The "Conference Room" was too small to accommodate everybody comfortably.
- Rooms were too warm, taking a walk from one building to another was refreshing, if not raining...

- "This questionnaire has some weakness in its design: The big lecture hall for paper presentations was great, the small one was pretty bad due to visibility of the screen for the audience; how to combine this feedback in one value?"
- If there is the answer choice "I did not attend" for the networking event, it should also be there for other sessions, etc. By the way, it was far too loud in the room.
- Great networking event!
- Spam mails send automatically from SID application should be banned. Networking event was everything but networking event neither Gala dinner. Techno music was so loud people could not communicate. Big disappointment.

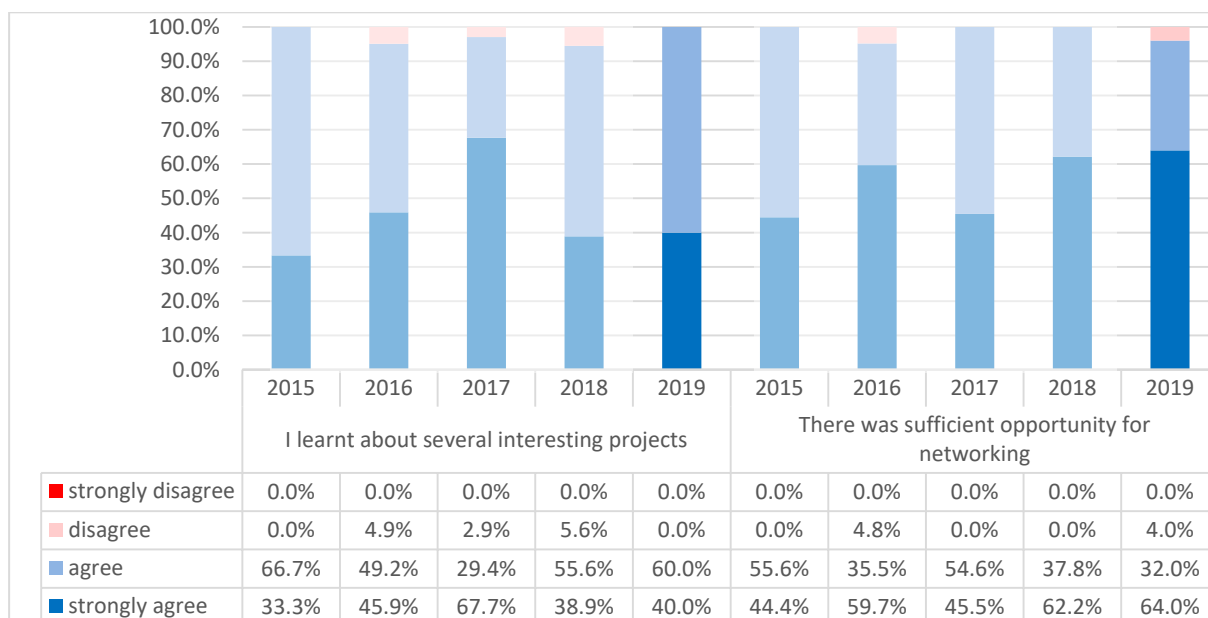
**Discussion**

It seems that the physical separation between the main conference area and the library was a point of concern, especially relating to the poster sessions.

It seems that the smaller lecture room was too small to accommodate all participants of the parallel technical paper sessions.

Survey responses and free text comments, again consistent with oral feedback, seems to suggest that the 'new' format of the networking event introduced in 2018 and continued in 2019 as an exciting event rather than a more calm opportunity for networking was not appreciated by all participants. This should be a point of concern as one of the main aspirations of the SIDs, apart from presenting newest research results, is to provide a forum for networking.

**8.4 Overall benefits**



**Figure 16. 'I learnt about several interesting projects' and 'There was sufficient opportunity for networking'**

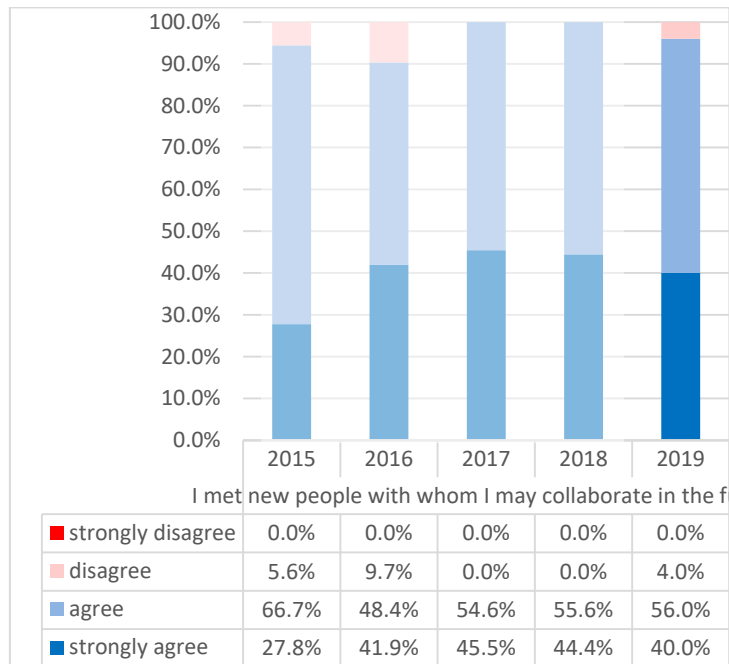


Figure 17. 'I met new people with whom I may collaborate in the future'

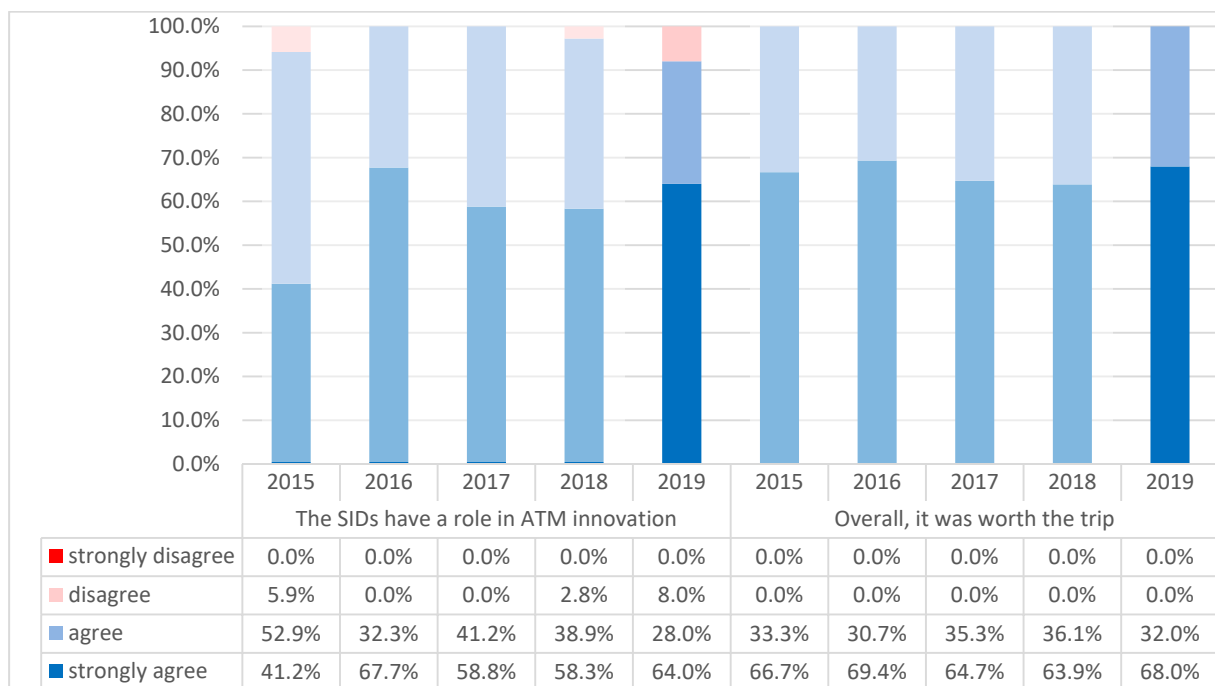


Figure 18. 'The SIDs have a role in ATM innovation' and 'Overall, it was worth the trip'

The following comments were received in this category:

- The Digital Sky Challenge was a good initiative. Giving an insight of the results of the challenges (during the SIDs dinner, for example) would be interesting.
- A better integration between Digital Sky Challenge and the SESAR. And maybe something more focused on experimentations, especially on bigger drones regulations.
- Earlier travel details; better questionnaires for feedback; unless that Dirk (and colleagues) did a great job.
- Give more room for Off-SESAR research.

#### Discussion

Despite consistently high ratings in the various categories it seems that a small yet increasing percentage of respondents do not agree that the SIDs have a role in ATM innovation. This is consistent with responses to the question “Subject matter was innovative” (see Figure 10) and should be monitored in the future.

The responses to the questions related to networking (“I learnt about several interesting projects” and “There was sufficient opportunity for networking”) seem to suggest that this year’s SIDs have been less successful to provide networking opportunities to participants.

## 9 Lessons learned

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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 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.

### 9.2 SIDs now an established and recognised scientific conference

Many indicators related to the scientific content, such as the number of submissions (Figure 2), the acceptance rate<sup>1</sup> (Figure 3) and the survey results related to the conference content (Figure 10, Figure 11) 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-

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<sup>1</sup> 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.

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 2018 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 & Lorenzo Castelli).

Collocating the Digital Sky Challenge with the SIDs and livening up the networking event to become ‘an experience’ rather than quiet dinner may be to the taste of some but not all SIDs participants and there are other SESAR events that perhaps lend themselves better to such activities.

### 9.3 Good industry involvement

The 2019 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 mainstream SESAR projects continues to appear desirable.

### 9.4 SIDs app very successful

The SIDs have gradually reduced printed material as much as possible and transitioned to a mobile phone application which, together with the website contains all relevant information. Apart from the conference programme – a specific request of many conference participants – no printed material was needed. The app is much appreciated by participants and presents a number of advantages:

- It reduces/eliminates the need for printed materials which is not only more sustainable but also reduces workload and costs for the organising team;
- The app allows much more rapid updates of the schedule, correction of errors and improves the availability of information;
- It introduces a degree of interactivity and participant involvement through various chat-options.

### 9.5 Review plenary sessions

The plenary panel sessions were introduced in 2018 to liven up the conference programme. Participant satisfaction (see Figure 12) and comments seem to suggest that given the right panellists and topic this can be achieved but that the main interest of SIDs participants is with the scientific content and that in their present form panel discussions are less appreciated than the technical

paper sessions. Perhaps a suitable group of participants could be polled to identify interesting and value-adding topics for panels?

## 9.6 Premises

The premises at NCSR were appreciated but two points of concern were expressed:

- The second conference room used for the parallel paper sessions was by far too small; the second conference room should be able to accommodate about half of the overall conference participants, in this case this number would have been about 150 (397 registrations minus about 100 participants of the Digital Sky Challenge divided by two). The actual capacity was 80. A stronger insistence on this requirement for future editions of the SIDs is necessary.
- It would seem very desirable to hold all activities, including plenary and technical paper sessions, but also poster sessions, coffee and lunch breaks in the same building. This would benefit convenience, networking, visibility of the posters and punctuality.

## 9.7 Use of templates

It is common practice for scientific conferences to provide (mandatory) templates and/or guidelines for papers; it is less common to provide templates for the presentations and many organisations insist on the use of their own presentation templates and formatting.

Roughly a third of all authors and presenters are used to (and insist on) using LaTeX to prepare their papers and often also their presentations and insisting on the use of Word for the papers, for example, presents an unacceptable inconvenience; material already existing in LaTeX is included in the paper and the authors may be much more skilled using LaTeX than Word. In order to accommodate these preferences paper templates are available both in Word and LaTeX and authors can choose freely according to their preferences.

This is not the case for the presentations or the posters and feedback received both from authors and members of the programme committee suggest that this is a great inconvenience. Note that the PowerPoint template is not even the same aspect ratio as the template projects are mandated to use for SESAR ER presentations – so projects cannot re-use those slides. Possible remedies to this problem could be (a) abandoning the (unusual) practice of insisting on templates for posters and presentations or (b) providing LaTeX templates for presentations and posters.

## 9.8 Registration process

Registration for the SIDs was via the SIDs website as in previous years and worked well. However, there are two areas for improvement:

- Registration was closed by the SJU at a certain point in time which led to a number of email requests for 'exceptional' admission which were all granted but which resulted in additional workload and inconvenience. Leaving the registration open until the weekend before the SIDs would have led to exactly the same participants but with less workload.
- The (roughly 100) participants of the Digital Sky Challenge registered for the conference in exactly the same fashion as the regular conference participants but did not attend the conference itself. Therefore the number of registrations was inflated and there was no way (upfront) to estimate the real number of conference attendants. This of course is important to correctly plan the facilities, catering, bus shuttles, etc.

## 9.9 Technical paper sessions with four papers

The conference programme included a number of technical paper sessions in which four papers were presented. This is undesirable because it is difficult for the audience to maintain concentration for four consecutive presentations; sessions with three papers are more convenient.



## 10 Outlook

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The tenth edition of the SESAR Innovation Days will take place in Budapest, 07-10 December 2020. These dates will be formally announced after the SIDs team has conducted a site visit to the premises.

# 11 References

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- [1] Engage project, 2017. Grant Agreement 783287, Ref. Ares (2017)6114946 - 13/12/2017.
- [2] SIDs website, 2019. <http://www.sesarju.eu/sesarinnovationdays>.
- [3] Engage website, 2019. <http://engagektn.com/>.
- [4] D Schaefer (Editor): *Proceedings of the 9<sup>th</sup> SESAR Innovation Days*. ISSN 0770-1268.

## 12 Acronyms

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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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