

THE LEADING JOURNAL IN GLOBAL CNS/ATM COVERAGE

# Air Traffic Safety ELECTRONICS INTERNATIONAL

January/March 2024, Vol. 2, No. 1

<https://dextermarie.com/atsei-journal/>

**ONE-ON-ONE WITH  
SKYRADAR CEO  
DR. ULRICH SCHOLTEN**

**REGIONAL FOCUS:  
AFRICA**

**CHOUGBALI:  
Aviation in the  
Kingdom of Morocco**

## Artificial Intelligence in Aviation: The Good, the Bad and the Ugly



9 771115 210905



Make your visions take wing –  
anytime and anywhere

Advertise with us!



# Air Traffic Safety ELECTRONICS INTERNATIONAL

Launch into visibility with Air traffic Safety Electronics International

Air Traffic Safety Electronics International is one of the world's leading global air navigation journals, providing the latest insights, news, in-depth industry analysis and up-to-date reports to meet the needs of those involved in communications, navigation, surveillance/air traffic management (CNS/ATM) and the entire air navigation spectrum in the global aviation industry. The journal is dedicated to the air traffic safety electronics, air traffic management and other air navigation-related terrains.

**Air Traffic Safety Electronics International** provides the most comprehensive platforms regarding new developments, new technologies, future ATM systems, regulatory and compliance issues as well as sustainable air navigation and air traffic safety electronics solutions.

To get in touch, contact us at: [adverts@dextermarie.com](mailto:adverts@dextermarie.com) or call +2348156705036.

To access our MEDIA KIT and discover the various options we offer to enhance your visibility and grow your business, please SCAN the QR Code below:



<https://dextermarie.com>

For more information, log on to: <https://dextermarie.com/atsei-journal/>





**04**  
**EDITORIAL**

**05**  
**EXECUTIVE PLATFORM**  
One-on-One with Dr. Ulrich Scholten,  
CEO of SKYRADAR.

**08**  
**AMAZONS IN AVIATION**  
Juliet Agypomaa Okae: Innovative  
Approaches to Aviation Safety Regulation.

**10**  
**INDUSTRY ROUNDUP**  
Industry Headline News

**12**  
**CONTEXT**  
Artificial Intelligence in Aviation:  
The Good, the Bad, and the Ugly

**18**  
**HORIZONS**  
Chougдали: Aviation in the  
Kingdom of Morocco

**21**  
**INDUSTRY ANALYSIS**  
**REGIONAL FOCUS:**  
**Africa in Pursuit of Safety**

**24**  
**SPECIAL REPORT**  
51st IFATSEA General Assembly,  
Buenos Aires, in Pictures

**26**  
**VISIONS**  
SkyRadar's Dennis Vasilev:  
ATSEP Competencies and Skills

**28**  
**POLICY AND REGULATION**  
Human-Technology Interactivities in Aviation

**29**  
**CALENDAR**  
Calendar of Events and Trainings

*Air Traffic Safety Electronics International* (ISSN 1115-2109) is published quarterly for a worldwide circulation by DexterMarie Company Limited, P.O. Box 17336, Ikeja GPO 100001, Lagos State, Nigeria. All correspondence should be directed to: P.O. Box 17336, Ikeja GPO 100001, Lagos State, Nigeria; Tel: +2348156705036/ +2348067461324; +2348156705036 (WhatsApp); E-mail: atsei@dextermarie.com. Subscription is free to qualified senior officials, executives and other qualified stakeholders directly involved in the CNS/ATM, air navigation and air transport industries. All other subscriptions attract annual subscriptions of ₦9,000 (Nigeria), \$37 (West/Central Africa), \$39 (East Africa), \$41 (Southern Africa), \$41 (North Africa), and \$49 (Rest of the World). All subscriptions are treated as bundle subscriptions, incorporating both the print and digital versions of the journal except where a subscription request is for either the print or the digital version. For detailed subscription information, please visit: <https://dextermarie.com/atsei-subscription/>. The publisher makes no warranty, either implied or express, as to the accuracy or nature of the content of this journal. No part of this publication may be reproduced in any form or by any means without the prior written permission of the publisher.

View digital format and additional content on our website [<https://dextermarie.com>].

Cover: Vintage Buenos Aires city, Argentina. Photo credit: Senthilvel Balasubramanian.

## WHAT HAS AVIATION GOT TO DO WITH AI AND ML?



The global aviation system has acquired a distinct air of notoriety for its glaring affinity with technological innovations. From digitalization and automation technologies to virtualization and cloud computing technologies, the aviation ecosystem continues to revel in its traditional addition to technologies and techniques that have shown some kind of potential in driving the safety, security, modernization, harmonization, interoperability, efficiency, and sustainability of international civil aviation operation.

With the buzz of artificial intelligence (AI) incrementally pervading virtually all the spheres of human engagement, attention is again shifting to the highly hounded aviation realms and legitimate questions are being asked regarding how the aviation ecosystem is likely to fare as it continues in its increasingly desperate attempt to catch up with the advancing AI train. That aviation's ongoing flirtatious tendency towards AI - and its derivative, Machine Learning (ML) - is increasing is no longer debatable and those gentlemen and ladies in and out of the industry who are currently lending their voices in a flurry of emotion to the emerging incursion of AI and ML into the aviation landscape actually know what they are talking about given the nuances and affordances of AI. The flurry of emotion is even bound to heighten with the imminence of Artificial General Intelligence (AGI) - an AI variant with the ability to understand as well as perform cognitive functions to the level of a human being - coupled with the fear that aviation will most likely come to the embrace of this AI variant.

To be sure, AI is all about non-human intelligence and that's what makes it artificial. Dr. Sallami Chougaldi, Head of Laboratories Management Unit at the Moroccan Airports Authority's Mohammed VI International Academy of Civil Aviation in Casablanca, describes it in the interview featured in this edition's Horizon as "the development of computer systems that can perform tasks that typically require human intelligence."

The ability of AI applications to perform tasks that typically require human intelligence is, perhaps, what has been driving the fears about job displacement and all that wot. Recently, the Managing Director of the International Monetary Fund (IMF), Kristalina Georgieva, remarked that AI will affect almost 40 percent of jobs around the world, with the likelihood of about 60 percent of jobs being impacted by AI in advanced countries and 40 percent and 26 percent in emerging markets and low-income countries respectively. And speaking on Thursday, 2 November 2023 on the sidelines of the First Global AI Summit, which held at England's Bletchley Park from 1 to 2 November 2023, owner of Tesla, SpaceX, X (formerly Twitter), and the AI startup, xAI, Elon Musk, had warned that AI can potentially become the "most disruptive force in history" with the capability of putting everyone out of a job.

In debating the question of exactly what aviation has got to do with AI and ML, the preponderance of expert opinions admits to sympathy with the fact that the adoption of AI in aviation means quite a lot for the industry in terms of efficiency, environmental sustainability, safety, innovation, growth, and automated operations. However, every piece of opinion about AI opportunities in aviation has always carried a caveat. Captain Sully Sullenberger, the hero of the 'Miracle on the Hudson River', had, in a December 2023 edition of his LinkedIn newsletter, stressed the need to "balance technological prowess with the indispensable human element" while also recognizing, among other opportunities for aviation, the potential of AI to optimize flight paths, reduce fuel consumption and help in critical decision-making.

Clearly, the International Civil Aviation Organization (ICAO) recognizes and continues to advocate the indispensability of the human element in every sphere of civil aviation operations irrespective of the sophistication of the technology deployed or the levels of automation implemented. That much has been affirmed in one of the organization's documents - the ICAO Doc 9694.

No doubt, the adoption of AI in aviation is a good thing to do. But, given the nature of civil aviation operation and the complex web of operational, technical, safety, compliance, and regulatory frameworks in which the aviation ecosystem is cocooned, any AI adoption strategy must be propped against a framework of governance and regulation. ■

Adeyinka Olumuyiwa Osunwusi, Ph.D.

### Managing Editor

Adeyinka Olumuyiwa Osunwusi  
[aosunwusi@dextermarie.com](mailto:aosunwusi@dextermarie.com)

### Associate Editors

Julius Babajide Osunwusi  
James Ajibola Osunwusi

### Contributors

Ivani Valente  
*Angola*  
Costas Christoforou  
*Cyprus*  
Engr. Abdulaziz Maiwada  
*Germany*  
Ing. Frank Kofi Apeageyi (SPE)  
*Ghana*  
Theodore Kiritisi  
*Greece*  
Senthilvel Balasubramanian  
*India*  
Chikere Okorapor  
*Nigeria*  
Sam Mahlangu  
*South Africa*  
Eng. Emmanuel Mikongoti  
*Tanzania*  
Enia Kakombu  
*Zambia*

### Design and Production

DexterMarie Company Limited  
[info@dextermarie.com](mailto:info@dextermarie.com)

### Circulation

[atsei-subscription@dextermarie.com](mailto:atsei-subscription@dextermarie.com)  
[publications@dextermarie.com](mailto:publications@dextermarie.com)

### Advertising

[adverts@dextermarie.com](mailto:adverts@dextermarie.com)  
[atsei@dextermarie.com](mailto:atsei@dextermarie.com)

### DexterMarie Company Limited

Adeyinka Olumuyiwa Osunwusi  
(CEO)

AIR TRAFFIC SAFETY ELECTRONICS  
INTERNATIONAL is published by:



DexterMarie Company Limited  
P.O.Box 17336, Ikeja GPO 100001, Lagos State, Nigeria  
Phone: +2348156705036  
E-mail: [info@dextermarie.com](mailto:info@dextermarie.com)  
Website: <https://dextermarie.com>

Printed in Nigeria  
© 2024. All Rights Reserved. ISSN 1115-2109.

<https://www.linkedin.com/company/atsei>

## HARNESSING TECHNOLOGIES TO ENHANCE ATSEP COMPETENCIES: DR. ULRICH SCHOLTEN, SKYRADAR CEO.

The growing complexity of aviation technical and operational environments – driven, to a large extent, by the increasing automation and digitalization of aviation systems – is, no doubt, redefining the body of strategies and procedures for standardizing personnel competencies and certification. The obvious fallout of the unfolding scenario is the burgeoning need for the adoption, in the aviation training environments, of robust technologies that can help to provide sustainable solutions for developing the competencies and honing the skills of aviation trainees.

Whereas the vast majority of aviation training equipment in today's aviation training solutions markets are dedicated to the aircraft maintenance, aircraft piloting, and, to some extent, air traffic control training realms, one company, SkyRadar, stands out the world over in terms of its productive focus on manufacturing and distributing state-of-the-art training solutions for honing the skills of air traffic safety electronics personnel (ATSEP). Ever since its founding over a decade ago, SkyRadar has been providing universities and aviation academies with disruptive solutions for enhancing competencies and honing skills. The company's portfolios of real or virtualized hardware-complemented training equipment for the ATSEP training environments are compliant with Europe's EASA's Easy Access Rules for ATM-ANS (Regulation (EU) 2017/373) and ICAO Doc 10057.

Dr. Ulrich Scholten – a renowned Cloud Scientist and patent holder – is the Chief Executive Officer (CEO) of SkyRadar. In this interview with *Air Traffic Safety Electronics International* Managing Editor, Adeyinka Olumuyiwa Osunwusi, Dr. Scholten shared his thoughts on a number of issues, including SkyRadar business portfolios, the increasing digitalization, automation and interoperability of CNS/ATM systems, ATSEP competencies, and the aviation training equipment markets.

**How significant is the growing digitalization and interoperability of CNS/ATM systems to the roles and responsibilities of ATSEPs in the 21<sup>st</sup> century?**

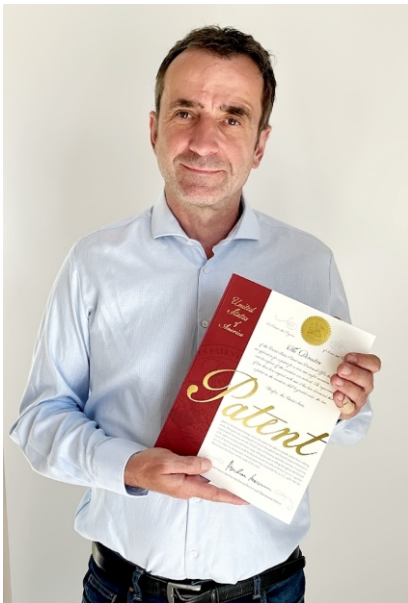
I think it will completely reshape the CNS/ATM infrastructure and in consequence the ATSEP job profile. When you talk about digitalization and interoperability, you should not forget the aspect of automation. It is this trio that will impact it all. Ground-Air and Ground-Ground interoperability will go together with automation.

Having said this, messages and tasks will be exchanged much faster than the current sporadic exchange of information between ATCO and pilot. It also means that the ATSEP's realm does not stop at the perimeter of his or her own premises. Ground-to-Air and Ground-to-Ground implies cross boundary systems. But also geographically distributed architectures like remote towers will necessarily lead to a shift in paradigm. So, the ATSEP's role will necessarily move more towards a system-health supervisor, with a stronger share of his ATSEP/SMC role (system monitoring and control) in a faster, decentralized, virtualized and highly automated environment.

The ATSEP's predominant action will most likely become switching rather than replacing, and re-parametrization. Potentially, replacement and fixing - in particular in the remote locations - will become the task of companies.

**SkyRadar has been in the business of manufacturing next generation aviation training systems for over a decade. What changes are you seeing in regard to the air traffic control market, customer requirements and aviation training needs?**

Let me start pinpointing a lack of change. We still see strong vendor-lock-ins through the ATM system manufacturers. In consequence, interoperability across manufacturer borders is still very limited. I am not talking about system health, performance and parameterization data. Whereas the manufacturing world SCADA (Surveillance, Control and Data Acquisition) has long established standardized communication protocols and process, the oil and gas industry is working with distributed control systems based on standardized data-exchange protocols. The inertia of the big manufacturers to open up slows down progress, with all the



negative impact in missed efficiency gains and unaccomplished reduction of the carbon footprint. However, we see that the user-side is more and more pushing for open interoperable systems across vendor boundaries.

ANSPs and ATSEP are in search of monitoring solutions across distributed architectures. This comes along with an increased sensibility for cybersecurity risks, given the enlarged attack surface of a larger, interconnected architecture. The ATSEP's expressed requirements are responding to that. There is an increased demand for system monitoring and control as well as cybersecurity training. Also, service-oriented infrastructure has become an issue. Digitalization in the connected ATC world means that systems like radars or navigation systems are abstracted as "digital services". Given the series of crisis that we are living through, the budget is tight. So, there is an increasing need for distance learning solutions, to allow for training without expensive traveling costs.

**And how is SkyRadar responding to these dynamics?**

Actually, I am a Cloud Scientist, having researched and practiced in this field at the Karlsruhe Institute of Technology for almost 5



years. Interoperability, service-oriented architecture and Next-Generation radars have been part of our thinking from day one.

Cybersecurity became a focus in 2015. To stay ahead of the status quo - as today we qualify tomorrow's experts - we continue participating in research projects with renowned universities and also publish from

**"SO, THE ATSEP'S ROLE WILL NECESSARILY MOVE MORE TOWARDS A SYSTEM-HEALTH SUPERVISOR, WITH A STRONGER SHARE OF HIS ATSEP/SMC ROLE (SYSTEM MONITORING AND CONTROL) IN A FASTER, DECENTRALIZED, VIRTUALIZED AND HIGHLY AUTOMATED ENVIRONMENT. THE ATSEP'S PREDOMINANT ACTION WILL MOST LIKELY BECOME SWITCHING RATHER THAN REPLACING, AND RE-PARAMETRIZATION".**

time to time in academic journals. AI is the next big thing hiding at the horizon. So we have to bring it in. AI-driven Auto-adaptive Systems, automated pattern analysis and autonomous system optimization become an issue. We are on it.

**What is SkyRadar's focus as far as providing aviation training solutions is concerned?**

From the beginning we were offering radar training environments, implemented in what EUROCONTROL calls the Next Generation architecture. SkyRadar is also offering System Monitoring and Control Training and cybersecurity. Apart from the latter, EASA's Easy Access Rules give us a good guideline. We provide training solutions answering on ICAO 10057 and EASA Easy Access Rules, including simulation environments for qualification training in SUR, NAV, COM, DPR and SMC.

**What exactly is the idea behind this focus and SkyRadar's mission statement?**

Our goal is to bring hands-on, modular, applied and state-of-the-art training solutions to the learners wherever they are. The challenge with this mission is that we do not

**"OUR GOAL IS TO BRING HANDS-ON, MODULAR, APPLIED AND STATE-OF-THE-ART TRAINING SOLUTIONS TO THE LEARNERS WHEREVER THEY ARE. THE CHALLENGE WITH THIS MISSION IS THAT WE DO NOT WANT TO BRING TOY SOLUTIONS. OFTEN WHAT WE SEE IN THE MARKET IS WHAT WE WOULD CALL ANIMATION. OUR OBJECTIVE IS TO PROVIDE REAL SOLUTIONS WHEREVER POSSIBLE. SO, WE PROVIDE REAL MINIATURIZED RADARS AND REAL SMC SYSTEMS AND REAL INFRASTRUCTURE".**

want to bring toy solutions. Often what we see in the market is what we would call animation. Our objective is to provide real solutions wherever possible. So, we provide real miniaturized radars and real SMC systems and real infrastructure.

In many cases, we added high-quality simulation, to be able to go further, to simulate mistakes, or in the military or cybersecurity training, to simulate attacks. We even developed a vast amount of virtual reality environments so that students can practice in a familiar non-abstract world, even when they do distance learning. To allow students access concurrently and to handle the big number of students requiring qualification, we also had to

rethink the training approach completely. In incumbent training solutions, there was only a place for one or maximum two students. This made training costly. Most trainees never had the chance to really work with the system, to familiarize with it and to develop a feeling for it. So, we allow countless students to access

the infrastructure concurrently, even remotely from a distant location. We call this the democratization of ATSEP training. Safety and security become affordable to all ANSPs.

**What tools and technologies is SkyRadar offering to the global aviation training market?**

SkyRadar provides training radars, System Monitoring and Control Solutions, training hardware and simulators for SUR, NAV, COM, DPR and SMC training as required in ICAO 10057 and EASA Easy Access Rules for ATM.

**How do you rate aviation training providers across the world in terms of the deployment of state-of-the-art training systems to facilitate the training of aviation personnel?**

We have a close and fruitful cooperation with training academies, no matter whether they are part of the ANSPs, military organizations or third party service providers. They are all doing their best to provide high quality training in times of rapid technical change and limited budgets. As we are not a training provider, but a provider of training equipment,

there is no fear of contact and close and trustful cooperation.

**Talking about the SkySMC and other training solutions, are your customers restricted to the civil aviation training sphere?**

A good part of our clientele are military customers. Here, electronic warfare, air defense, and rapid recovery in combat situations require specific military solutions, which we developed and keep on expanding. However, export is restricted and needs to be in compliance with EU Regulation like the Dual Use Regulation.

**Is SkyRadar exploring other areas of competencies besides the aviation training equipment domain?**

Yes, indeed. We even own several patents in medical radar applications. My dream is one day to expand some of the solutions into an operational context. But you can always dream. Today, the quick evolution of training requirements keeps us busy enough.

**In relation to the skills and competencies of ATSEPs, how relevant is the integration of technological tools into the ATSEP training environments?**

I keep on telling the joke of the aircraft pilot, who enters an aircraft and says: "Good morning, ladies and gentlemen. Welcome to my first flight. Until now, I only trained on PowerPoint".

Imagine how many guests would leave the aircraft. The serious side of it is that the job of the ATSEP is as important for passenger safety as the job of the pilot. Consequently, it should be evident that they get trained practically with sufficient depth.

**ICAO Doc 10057 defines four ATSEP training phases, namely: Initial training, Unit training, Continuation training and Development training? Which phase or phases would you describe as the most important and which phase demonstrates closer affinity with practical training?**

This is really difficult to say. Our focus is on the qualification training as an advanced part of the initial training. Unit training and on the job training is getting more and more important in our product portfolio, especially in the context of training SMC use cases online. But, coming back to your initial question: In a lifelong learning context, all phases are equally important. It just depends in which part of your learning process you are.

**How significant is practical training for the enhancement of the competencies of ATSEPs and what role can technology play in this respect?**

Coming back to the previous question on ATSEP skills and competencies vis-à-vis technologies, it is vital. Let me answer with the taxonomy levels used by EASA, which are building on Benjamin Bloom's Cognitive Learning Taxonomy. Benjamin Bloom's taxonomy is a hierarchical framework for classifying educational objectives and cognitive skills into a series of distinct levels. It comprises six levels, starting from the lowest to the highest: Knowledge (remembering facts and information), Comprehension (understanding concepts and principles), Application (using knowledge in practical situations), Analysis (breaking down information into its components for deeper understanding), Synthesis (combining



elements to create something new), and Evaluation (judging the value or validity of ideas).

This taxonomy provides trainers with a structured approach to designing curriculum and assessments, enabling them to target specific cognitive skills and promote critical thinking and learning at various levels of complexity. ATSEP are tasked with critical responsibilities in maintaining and ensuring the safety of airspace systems. So, the application of knowledge in real-world scenarios is paramount. Practical training serves as the bridge that facilitates the transition from theoretical understanding to proficient application. It enables ATSEPs to hone their skills, develop the ability to make informed decisions under pressure, and effectively handle complex, dynamic situations that are inherent in air traffic management.

EASA's taxonomy level 3 is equivalent to Bloom's "application" level. When we go to level 4 and 5, we really get to the analysis, synthesis and evaluation levels. In short, students learn to transfer skills from one use case to another, even if the latter is completely new. Ideally this happens intuitively. Application, analysis, synthesis and evaluation require intensive training sessions in open systems. Open means, it should not be a behaviorist animation that represents a simple stimulus-response schema.

Higher learning objectives require complex infrastructures with real (miniaturized) systems or very well-crafted animations. To get to the level of "intuitive" behavior and synthesis, lots of practice is required. The time slots for practical training in the learning laboratories will not be enough. Therefore, our solutions offer the possibility of remote access or remote learning possibilities. Students can continue learning after class. They might simply record the raw data of their experiments and replay them in their revision time.

**The COVID-19 era elevated the status of virtual learning. Do you see virtual learning serving any purpose in the aviation training sphere?**

Our solutions have always been distance-learning enabled. To be honest, until COVID only few academies used it. During COVID-19 our clients instantly started using it. Some ran exercises with precordored solutions, others

blended it with Zoom or Google Classroom. While the trainer operated the live system, students were able to access remotely. Unfortunately at that time we only had a limited range of simulators. But COVID pushed us to enlarge our simulator portfolio, and it is still growing.

**And what more needs to be done in regard to the wholesale adoption of the virtual learning environment in aviation?**

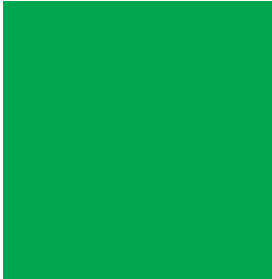
It is a continuous journey. For us virtual learning implies practical learning - talking in the language of Benjamin Bloom to reach higher learning goals (application, analysis, synthesis, evaluation). Teachers ideally use a good infrastructure like Moodle to manage the courses. For most teachers it means leapingfrogging from instructor-led theoretical training to application-oriented blended learning implemented for virtually connected teams. The biggest challenge for the teacher is the change in mindset. You shift from the role of an instructor to the role of a coach working in a very technical environment. Being a coach is more difficult.

Working in virtual teams needs experience. And in contrast to repeating prefabricated knowledge in an instructor-led teaching context, application based learning may lead to many challenging questions where the trainer has no immediate answer. So when confronted with such a question, best start with: "I do not know yet. But let's find out together!" ■

## AIR TRAFFIC SAFETY ELECTRONICS INTERNATIONAL READERS



Members of the technical arm of ATEPSA, the Argentine affiliate of the International Federation of Air Traffic Safety Electronics Associations (IFATSEA), takes a moment to display their copies of Air Traffic Safety Electronics International on the sidelines of the 51<sup>st</sup> IFATSEA General Assembly, Buenos Aires, Argentina, 12-17 November, 2023.



### JULIET AGYAPOMAA OKAE: INNOVATIVE APPROACHES TO AVIATION SAFETY REGULATION



**W**omen in predominantly male-dominated fields of aviation have been striving quite admirably to earn their wings and display their mettle ever since 1932 – and even quite earlier – when the American aviator, Amelia Mary Earhart, became the first female aviator to fly solo nonstop across the Atlantic Ocean, piloting a Lockheed Vega 5B aeroplane. And to say the least, these amazing Amazons of Aviation have also – all by dint of hard work and diligence – been adorning their epaulettes in gold in a bid, perhaps, to sustain the replication of the astonishing feats enacted by amazons such as Lady Mary Heath – the first woman to clinch a commercial flying licence in Britain – and Mrs. Chinyere Kalu (nee Onyenucheya) – the first Nigerian female commercial pilot and the first woman to fly an aircraft in Nigeria.

And what's more – these Amazons in Aviation cut across socio-cultural and geo-political boundaries. Africa, of course, has no shortage of these amazons, who can be found carving enviable niches in virtually all the largely patriarchal fields of the aviation industry from administration, air traffic control and piloting to air traffic safety electronics engineering, research and development, aircraft maintenance engineering and aviation instruction.

One of these remarkable African aviation amazons is Ms. Juliet Agyapomaa Okae, the Deputy Director General for Finance and Administration in the Ghana Civil Aviation Authority (GCAA), whose passion and dedication to upscaling regulatory administration and finance in pursuance of the continuing safety, efficiency and security of civil aviation is widely recognized and acknowledged. Little wonder, then, that the International Federation of Air Traffic Safety Electronics Associations (IFATSEA) extended an invitation to this Aviation Amazon from Ghana to address the fifty-first edition of the world's annual largest gathering of air traffic safety electronics personnel (ATSEP), air navigation service/air traffic management stakeholders, CNS/ATM original equipment manufacturers (OEMs), CNS/ATM training organisations and other aviation safety stakeholders, which took place in Buenos Aires, Argentina from 12 to 17 November, 2023.

Air Traffic Safety Electronics International, the leading journal in global CNS/ATM coverage, is proud to reproduce the speech delivered by Ms. Juliet Agyapomaa Okae at the 51<sup>st</sup> IFATSEA General Assembly on the adjoining page (Page 9).





# Amazons in Aviation



Ms. Juliet A. Okae addressing the Assembly



Juliet Okae with IFATSEA President, Theodore Kirtisis.



Ms. Juliet Okae presenting the "2023 Thorsten Wehe Award" to Air Traffic Safety Electronics International publisher, Adeyinka Osunwusi. At the extreme right is the President of the National Association of Air Traffic



Ms. Okae with GhatSEA President, Ing. Abdullahi Mahama (Extreme Left) and IFATSEA Executive Secretary, Ing. Frank Apegyei (Extreme Right).

## SPEECH DELIVERED BY MS. JULIET AGYAPOMAA OKAE AT THE 51<sup>ST</sup> IFATSEA GENERAL ASSEMBLY (BUENOS AIRES, ARGENTINA), 13 NOVEMBER 2023.

**The Representative of ICAO Secretary General, Dr. Saulo Da Silva, Chief, Global Interoperable Systems, Air Navigation Bureau,  
The Secretary of Transport Management, Argentina Transport, Maria Jimena Lopez,  
The ITF Civil Aviation Secretary, Mr. Gabriel Mocho Rodriguez,  
The President of IFATSEA, Mr. Theodore Kyrtsis,  
The Hosts of this General Assembly, Esteemed Affiliates, and Delegates,  
Distinguished Ladies and Gentlemen,**

bring you warm compliments from the people of Ghana, the Board, and the Director-General as well as the management of the Ghana Civil Aviation Authority. I am grateful to be among the hosts of Air Traffic Safety Electronics Personnel (ATSEP) this morning and for the opportunity to speak at this year's General Assembly. This is very inspiring for me. My effusive gratitude goes to ATEPSA of Argentina and to IFATSEA for making this Assembly possible. I am much thankful to the local Association in Ghana, the Ghana Air Traffic Safety Electronics Association (GhATSEA) for involving the top management of the regulatory authority in such fora. For the few days I have been here, I have seen the dedication and passion of the ATSEP fraternity in ensuring a successful conference. Above all, there is the expression of love and camaraderie that is binding the IFATSEA community and the world of aviation.

Distinguished Ladies and Gentlemen, since the 49<sup>th</sup> General Assembly, which held in Ghana in 2019, the management of the Ghana Civil Aviation Authority had wished for an opportunity to express her appreciation for the honour done to Ghana in hosting the event on our land. However, the advent of the COVID 19 pandemic and the subsequent closure of international skies brought in its wake unprecedented challenges to the global community and our effort in completing that task. I was told that this annual event was also suspended for a while due to the same reason.

Ladies and Gentlemen, this morning I have the singular honour to convey to the management of IFATSEA and the entire ATSEP community the appreciation and gratitude, in copious measure, of the people of Ghana, the Board, Director General, and management of the Ghana Civil Aviation Authority. We remain grateful and hope to have the event hosted by Ghana one more time.

Our condolences to the IFATSEA family for the passing onto glory of the late Thorsten Wehe, the erstwhile IFATSEA President in the early month of 2022. The news was quite shocking but I am glad that you have pulled yourselves together to pursue your collective agenda and goals for the profession.

Distinguished Ladies and Gentlemen, the theme for the event is "ATSEP: Sustaining safety, performance and cyber resilience of global ANS". It is important to remember that your work has a direct impact on the safety and efficiency of air traffic systems around the world. Moreso, we are in an environment that is changing continually with technological advancements. Each time and each day begins with the development of sophisticated technology. New and emerging technologies find their way into our industry especially in the ATM environment, thus making the safety of air travel such a complex and challenging task that requires the collaboration of experts from various fields. I am honoured to be among such distinguished professionals and look forward to learning from your insights and experiences.

ATSEP all over the world are involved in the management of aviation mission-critical systems to ensure a safe sky for the expeditious flow of air traffic. Your job impacts greatly on safety and as administrators, we will provide you with the required support to maintain the highest safety standard for a safer sky.

Distinguished Ladies and Gentlemen, as I draw down the curtain on my speech, let me remind this Assembly that the theme highlights the importance of sustaining the safety, the performance, and the cyber resilience of global air navigation systems. As we continue to face new challenges and emerging threats, it is essential that we remain vigilant and proactive in our efforts to maintain the highest standards of safety and security. We must embrace new technologies and best practices, and work together to develop innovative solutions to the complex problems that confront the industry.

I thank you for your attention and wish you a successful Assembly.  
Les agradezco su atención y les deseo una exitosa Asamblea.

# Industry Roundup

## PEOPLE

### GHANA AIRPORTS COMPANY GETS NEW MANAGING DIRECTOR



The President of Ghana, H.E. Nana Addo Dankwa Akufo-Addo, recently nominated Mrs. Yvonne Nana Afriyie Opare for appointment as the new Managing Director of the Ghana Airports Company Limited (GACL). The appointment, which took effect from 24<sup>th</sup> December, 2023, followed the retirement on 23<sup>rd</sup> December 2023 of the erstwhile Managing Director, Mrs. Pamela Djamson-Tettery.

Mrs. Opare comes to GACL with extensive experience and an enviable professional track record incorporating a multiplicity of areas including corporate leadership, strategic stakeholder management, corporate governance and diplomacy, project management and resource harmonization. She was, at some time, the CEO and General Manager of Vantage Real Estate Group and Blackwell Realty Limited, where she led and played leading roles in mainstreaming business management practices as well as transforming business operations, among other roles.

Mrs. Opare holds a bachelor's degree in Computer Information Systems from DeVry University, Atlanta, Georgia, USA and a Master of Business Administration (MBA) with specialisation in Operations Management from American Intercontinental University, Illinois, USA. She also earned a professional real estate licence in the US State of Georgia and won the North American Association of Realtors Million Dollar Sales Club award consecutively in 2006 and 2007.

### POPPY KHOZA RE-APPOINTED AS SACAA CHIEF



The South African Government Cabinet approved the re-appointment of Ms. Poppy Khoza to serve another five-year term as the Director of Civil Aviation (DCA) for South Africa's civil aviation regulator – the South African Civil Aviation Authority (SACAA). The re-appointment – effective from 1 December 2023 until 30 November 2028 – marked the beginning of Ms. Khoza's third term as SACAA's DCA.

Ms. Khoza has recorded a number of firsts in the aviation industry. She bears the laurel of being the first black female DCA and was also the first woman globally to be elected to preside

over the ICAO General Assembly at the 41<sup>st</sup> General Assembly Session in 2022.

"As the SACAA Board, we see this as a vote of confidence for the exemplary leadership the DCA has demonstrated over the past eleven years being at the helm of the organisation," says Ernest Khosa, SACAA Board Chairperson. "Ms. Khoza is an aviation trailblazer who is internationally recognized and supported. It is through her work that our South African aviation sector continues to hold a critical voice on global aviation dialogues. With this, I look forward to what 2024 will offer and towards an even more successful five-year cycle for the SACAA."

"I am deeply honoured and grateful for this opportunity to again serve as the Director of Civil Aviation," says Ms. Khoza. "It is an exciting time for me personally and I pledge my commitment once again to drive positive change and promoting safety, efficiency, gender equality and innovation in our skies."

### BOEING APPOINTS CEO, CSO

Boeing, the leading global aerospace company, named Chris Raymond as president and CEO of Boeing Global Services (BGS) and Brian Moran as Boeing's Chief Sustainability Officer, succeeding Chris Raymond. Raymond succeeds and will report to



Chris Raymond, President/CEO, BGS.

Stephanie Pope, who was recently appointed Boeing's Chief Operating Officer (COO). The two appointments are effective 1 January 2024.

Brian Moran will be based

in Boeing's Amsterdam office and will report to Dave Calhoun, Boeing president and CEO as well as to the Governance and Public Policy Committee of the Boeing Board of Directors.

"Chris brings more than 30 years of Boeing expertise in nearly every aspect of our operations and has strong employee, customer and supplier connections across our commercial and government markets," says Stephanie Pope. "I'm confident he will continue the strong operational performance with our Services team and remain focused on delivering on our customer commitments."

"With more than 20 years of Boeing service, Brian has wide-ranging expertise within nearly every aspect of our operations and businesses, including a deep understanding of



Brian Moran, CSO.

a n d commitment to our partners and stakeholders around the globe," says D a v e Calhoun.

## CORRIGENDUM: IFATSEA'S EUROPEAN AFFILIATES



In the 4<sup>th</sup> Quarter 2023 edition of *Air Traffic Safety Electronics International*, Georgia and Romania were excluded from the list of European affiliates of IFATSEA on page 18 of the edition. The Editor hereby tenders an unreserved apology to the Georgian and Romanian ATSEP communities for this oversight.



Georgia



Romania

## SERVICES

### DFS Completes Aeronautical Radio Modernisation Project

DFS Deutsche Flugsicherung GmbH, Germany's State-owned air navigation service provider, has completed a Germany-wide aeronautical radio project with the recent commissioning of the last radio in Auderath (Rhineland-Palatinate). The RASUM 8.33 Project, which began in 2010, involved the installation of around 4,000 radios supplied by the Rohde and Schwarz Group at close to 100 radio sites throughout Germany. These radio sites are connected to the four DFS control centres and the 15 designated international German airports under DFS.

The project enables DFS to convert the radio sites to the new 8.33-kilohertz channel spacing in compliance with Commission Implementing Regulation (EU) No. 1079/2012. The goal is to eliminate the frequency shortage in Europe through channel spacing reduction.

"The modernised sites will enable DFS to meet new challenges, such as voice transmission via Voice-over-IP (VoIP)," said Friedrich-Wilhelm Menge, Chief Technology Officer on the DFS Executive Board.

## TECHNOLOGY

### German Research Project Deploys AI to Designate No-Fly Zones

A research project, the fAIRport project, utilizing artificial intelligence to automatically identify and designate no-fly zones in German airspace, has been completed. Conceived with the aim of ensuring the safe integration of unmanned aerial vehicles (UAVs) or drones into German airspace, the project received funding of €1,205,000 from the German Federal Ministry for Digital and Transport as part of the mFUND innovation initiative.

The fAIRport project is a collaboration involving experts from DFS Deutsche Flugsicherung GmbH (German ANSP), wetransform GmbH and the Fraunhofer Institute for Computer Graphics Research (IGD), which has developed a variety of object-specific artificial neural networks (ANNs) to automatically identify no-fly zones for the safe integration of drones. The resulting geodata platform for local authorities, which is based on open standards, is now operated by wetransform GmbH, a Fraunhofer IGD spin-off.

The safe operation of drones requires much more precise information about the ground they overfly when compared with manned vehicles. "The better the data situation in an area, the more precisely can no-fly zones be displayed," said Hardy Polevka, Head of Geodata Management at DFS. "This also guarantees legal compliance with Section 21 of the German Aviation Regulation. Thanks to the additional information from the fAIRport project, we are significantly enhancing our data for manned and unmanned aviation and thus making decisive progress in the safe and equitable integration of drones into German airspace."

## INDUSTRY

### Skyguide and Intersoft Sign Agreement for CNS Drone Equipment

The Swiss air navigation service provider (ANSP), Skyguide, and Belgian provider of state-of-the-art technology for the aerospace industry, Intersoft Electronics Services, have signed a Cooperation Agreement for the development and delivery of CNS Drone SkyRF<sup>®</sup> for purchase or measurement-as-a-service. CNS Drone SkyRF<sup>®</sup> supports commissioning, certification and maintenance of ILS, DME, TACAN, VOR, RADAR and PAPI/VASIS.

With the signing of the agreement, Skyguide and Intersoft will complement each other, with Skyguide bringing its renowned CNS expertise molded into the ILS DME Drone Checker and VOR DME Drone Checker software, and Intersoft Services bringing its decades of experience in the CNS domain.

With the new product line SkyRF<sup>®</sup>, CNS measurements-as-a-service enable customers to eliminate the training and investment previously required. The SkyRF<sup>®</sup> platform is manufacturer independent and is available for ANSPs and military operators of CNS equipment.

## STANDARDS

### ANSSI Renews Qualification of Thales' Cybels Sensor Version 2.0.X

The French national cybersecurity agency, ANSSI, has renewed the qualification of Thales' Group's Cybels Sensor Version 2.0.X – the company's sovereign intrusion-detection solution providing cyberattack protection for the information systems of governments, enterprise customers and critical infrastructure providers. It is a futureproof solution designed to incorporate the latest innovations as they are developed, and to ensure long-term compliance with the highest security standards.

To provide maximum network protection, the sensor analyses huge volumes of data in real time, immediately alerting security supervision teams if a potential cyber threat is detected. With its modular architecture, Cybels Sensor is designed to evolve as new AI algorithms become available. Thales continues to innovate with the sensor. The company has filed a patent for the techniques used to decode specific protocols, enabling Cybels Sensor to provide tailored cyber threat detection capabilities for OT, industrial and space systems, or for applications in air traffic management and military vehicles.

## ACQUISITIONS

### Indra and Grupo Oesia Acquire 60% of Epicom

Indra, a leading global technology and consultancy company, and Grupo Oesia, a

Spanish multinational dedicated to industrial and digital engineering, have each taken a 30% stake in Epicom, a Duro Felguera defence company specializing in cryptographic solutions. SEPI, which holds 40%, has assigned its purchase option in 30% to each company.

This operation strengthens the position of both companies in a critical area for security and defence. The financial strength brought to Epicom by its two new partners will enable it to further its own development of new technologies, such as post-quantum systems, as well as new private-sector markets. Epicom will thus be able to continue to evolve its technological expertise in encryption systems with the highest levels of security.

"This operation consolidates the national leadership of Oesia Group in the secure communications sector. With Ciperbit, Oesia holds 65% of this market," says Luis Furnells, Executive Chairman of Grupo Oesia. "This operation continues the path of collaboration between the main Spanish companies in the defence sector, which was sealed in the agreement signed with Indra last July."

"Indra continues to strengthen its role as a driving force in the defence and security industry in Spain, supporting the growth and competitiveness of the entire industrial ecosystem," says Indra's CEO, Jose Vicente de los Mozos. "To this end, it is necessary to leverage capabilities, such as Epicom's, which are critical for security and defence in an increasingly digital environment."

## CONTRACTS

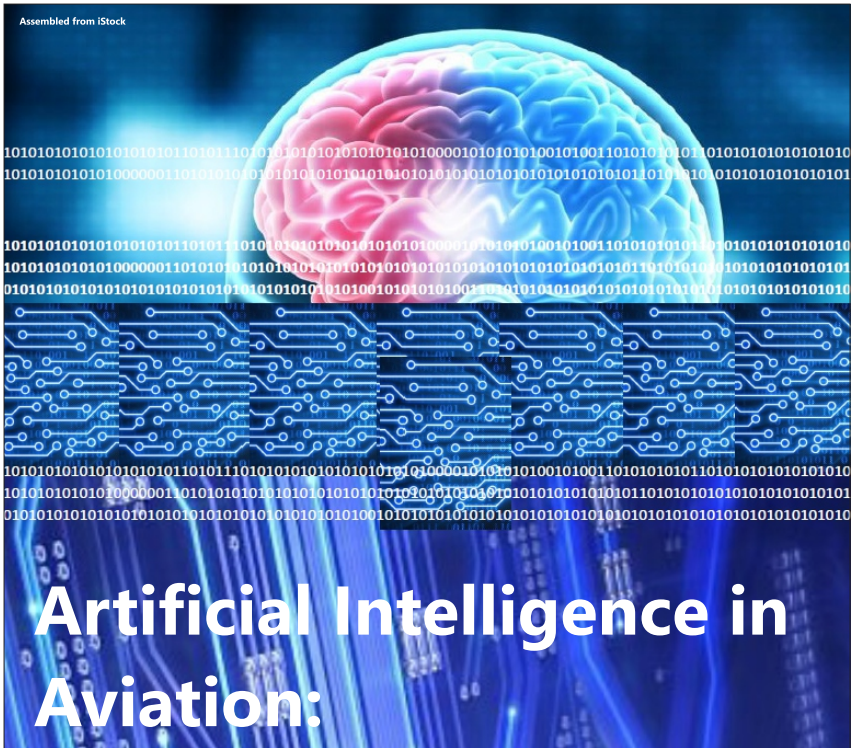
### Thales Alenia Space Signs a Multi-Mission Contract with PT Len Industri

Thales Alenia Space, the joint venture between Thales and Leonardo, has signed a multi-satellite contract with Indonesia's PT Len Industri. The contract is for the provision of a state-of-the-art Earth observation constellation combining both radar and optical sensors and dedicated to the Indonesian Ministry of Defence (MoD). The Earth observation constellation, which will be operated by PT Len Industri in line with MoD's requirements, includes optical and radar satellites seamlessly integrated and operated through a multi-mission ground segment in which Telespazio is contributing.

"Thales Alenia Space, which has a long history of working with Indonesian satellite operators, is honored to be given the opportunity to work on a crucial program for the Indonesian Defence Ministry for the first time," said Hervé Derrey, CEO of Thales Alenia Space. "I would like to thank PT Len Industri for putting its trust in our company. Leveraging our long-standing expertise in Earth observation, we are proud to celebrate a new milestone towards Indonesia's sovereignty and safety needs, providing a one-of-a-kind integrated optical and radar system."

"Cooperation between Len and Thales Alenia Space is a positive way to increase our independence in the defence industry," said Bobby Rasyidin, President-Director of PT Len Industri. ■





## Artificial Intelligence in Aviation:

### The Good, the Bad and the Ugly

By Adeyinka Olumuyiwa Osunwusi

FROM DIGITALIZATION AND AUTOMATION TECHNOLOGIES TO VIRTUALIZATION AND CLOUD COMPUTING TECHNOLOGIES, THE AVIATION ECOSYSTEM CONTINUES TO NAVIGATE THE NUANCES AND AFFORDANCES OF TECHNOLOGICAL INNOVATIONS IN AN ATTEMPT TO BOLSTER UP ITS GOAL OF A MODERNIZED, GLOBALLY HARMONIZED, OPERATIONALLY EFFICIENT, INTEROPERABLE, AND ENVIRONMENTALLY SUSTAINABLE AIR NAVIGATION SYSTEM. AND NOW THAT THE BUZZ OF ARTIFICIAL INTELLIGENCE (AI) IS INCREMENTALLY PERVADEING EVERY SPHERE OF HUMAN ENGAGEMENT, ATTENTION IS TURNING TO THE QUESTION OF WHETHER AI PORTENDS ANYTHING GOOD FOR MANKIND. A MUCH MORE GERMANE POSER HAS TO DO WITH WHETHER THE AVIATION ECOSYSTEM WILL FARE BETTER RIDING ON THE AI TRAIN.

Of course, the ongoing debates and discourses about artificial intelligence (AI) are not just about what AI tools, applications and techniques portend for the safety-sensitive and efficiency-driven aviation landscape. Rather, the crux of the matter is about what AI and its derivative, Machine Learning (ML), portend in everyday life, be it from the way we conduct businesses, the way we organise the economy, the way we navigate issues of health and wellbeing, the way we commute, the way we communicate and all what not. To put it mildly, AI is becoming more and more popular by the day if not incrementally inching towards becoming a ubiquitous technology just as Goldman Sachs projects around \$200 billion investment in AI technologies and techniques globally by 2025. And what's more: this is raising questions surrounding the potential benefits of this rapidly unfolding technological innovation.

"The rapid growth of AI raises existential problems about its future impact on

mankind, and it is critical to strike a balance between innovation and ethical considerations," says Dr. Ifeanyi Frank Ogochukwu, a CNS/ATM and Cybersecurity Expert and Managing Director of Aviation Africa Plate-forme. "By managing these difficulties with foresight, empathy, and teamwork, we may maximise AI's revolutionary power while minimising its risks. AI has the potential to greatly impact the future of various industries, which brings with it both significant opportunities and concerns."

Dr. Ogochukwu expects the AI train to continue to move ahead with its large-scale incursion into mankind's everyday life.

"Artificial intelligence (AI) provides tremendous prospects for innovation, efficiency, and growth in a variety of industries, including healthcare, finance, education, and transportation, which aviation is an integral part of," says Dr.



**Dr. Ifeanyi Frank Ogochukwu**, Managing Director, Aviation Africa Plate-forme.

Ogochukwu. "It is capable of analysing massive volumes of data, identifying patterns, and providing previously inconceivable insights. AI can also help with global issues such as climate change, disease diagnostics, and poverty alleviation."

Dr. Sallami Chougali, an air traffic safety electronics engineer and Head of Laboratories Management Unit at the Moroccan Airports Authority's Mohammed VI International Academy of Civil Aviation in Casablanca is really upbeat about the potential of AI. Dr. Chougali says: "Indeed, by 2030, AI will be a determining factor and its incursion will affect all spheres of human life, such as: one, for problem solving whereby AI systems can analyze large datasets and identify patterns or trends that may be challenging humans to discern, thus aiding problem solving and decision-making; two, for efficiency and automation where AI has the potential to automate repetitive tasks, increasing efficiency and

productivity in various industries; three, for innovation through which AI facilitates innovation by enabling the development of new technologies, products, and services that can improve the overall quality of life; four, for improved safety in sectors like transportation where AI can enhance safety through systems like autonomous vehicles, thus reducing accidents caused by human error; and five, through medical advances where AI is making significant contributions to healthcare, assisting in diagnosis, drug discovery, and personalized treatment plans."

Some people out there would readily give AI the thumbs up, while some would want to maintain a cautious approach to the emerging nuances and affordances of AI. There is also the school of thought that would rather choose to straddle the two sides of the aisle. Doreen Bogdan-Martin, Secretary General of the International Telecommunication Union (ITU), for example, had, sometime in June 2023, raised eyebrows when she credited AI with the potential to help rescue the failing Sustainable Development Goals (SDGs) across the globe. Bogdan-Martin, however, itemised the four areas that the pursuit of AI must address as inclusive participation, social inequalities, transparency and accountability, as well as data access, harmonization and interoperability.

At the inaugural AI Summit that took place in Bletchley Park, England from 1-2 November, 2023, Elon Musk, owner of Tesla, SpaceX, X (formerly Twitter) and xAI, told UK Prime Minister, Rishi Sunak, that there is 80% chance AI will turn out to be a force for good. However, at an event at Lancashire House on November 2, 2023 on the sidelines of the AI Summit, Musk cautioned that AI could potentially become history's most disruptive force with the capability of putting everyone out of a job.

countries by actually shifting more investment to advanced economies where automation is already an established technology.

For Dr. Ogochukwu, AI concerns cover a wide spectrum of areas from ethical, security, and privacy concerns to job displacement and autonomy issues.

"AI decision-making raises ethical questions about bias, responsibility, and possibly unexpected effects. Ensuring fairness, transparency, and accountability is crucial for ethical AI development," says Dr. Ogochukwu. "AI's vast data repositories raise privacy and security concerns, with unauthorised access to personal or sensitive information posing significant risks. Significant privacy violations occurring will undermine trust in AI technologies. As AI systems become more sophisticated, robust cybersecurity measures and comprehensive data protection regulations are needed."

"AI-driven automation could disrupt labour markets, leading to job displacement particularly in industries reliant on routine or repetitive tasks. Fear of economic disparities and societal divides intensifies. Proactive measures to reskill and upskill workforce are needed," Dr. Ogochukwu adds. "AI's increasing autonomy also raises concerns about human oversight and control, especially in safety-critical domains like aviation, autonomous vehicles, and healthcare, where errors can have severe consequences."

Looking at the scenarios playing out across industries, businesses and entities, there seems to be no end to AI's potential when it comes to its versatility, diffusion and developmental paces. For example, sometime in the third quarter of 2023, Huawei Cloud launched its new AI-powered Pangu-Weather model with the capability of making more accurate weather forecasts with a 10,000x improvement in prediction speeds. A German collaborative research project, the fAIRport project, involving German air navigation service provider, DFS, wetransform GmbH and the Fraunhofer Institute for Computer Graphics Research (IGD), is also using AI to automatically

**"Artificial intelligence (AI) provides tremendous prospects for innovation, efficiency, and growth in a variety of industries, including healthcare, finance, education, and transportation, which aviation is an integral part of." - Dr. Ifeanyi Frank Ogochukwu**

"It's hard to say exactly what that moment is, but there will come a point where no job is needed," Musk had been quoted by CNBC as saying. "You can have a job if you want to have a job for personal satisfaction. But the AI would be able to do everything."

Still on the flip side of the AI debate, the trio of Cristian Alonso, Siddharth Kothari, and Sidra Rehman, had described, in a December 2, 2020 IMF Blog, how AI could widen the gap between rich and poor

identify and designate no-fly zones in German airspace as part of efforts to ensure the safe integration of unmanned aerial vehicles (UAVs).

One particularly interesting aspect of the development of AI is the increasing emergence of AI assistants - artificial intelligence applications that assist humans in a wide variety of areas. They are coming in various shades from AI assistants that perform accounting or financial functions



**Dr. Sallami Chougali**, Moroccan Airports Authority.

and those that offer legal assistance to assistants that assist medical centres in the speedy assessment of patients. These AI assistants are actually navigating the AI train towards the artificial general intelligence (AGI) realm, so to say.

#### THE FACES OF ARTIFICIAL INTELLIGENCE

AI is not just about computers and digital technologies. It is neither about a conglomeration of computer networks deployed to perform the traditional jobs that computers are famed for. Rather, it is about upscaling computers in a way that they are able to perform those tasks and functions that ordinarily would require human intelligence.

"Certainly! AI or artificial intelligence refers to the development of computer systems that can perform tasks that typically require human intelligence. These tasks include things like learning from experience (machine learning), understanding natural language, recognizing patterns, solving problems, and making decisions," says Dr. Sallami Chougali. "In essence, AI aims to create machines or software that can imitate cognitive functions that we associate with human minds, allowing them to handle various tasks and adapt to new situations. AI can be found in everyday technologies like voice assistants, recommendation systems, and autonomous vehicles, among others."

In specific terms, according to Dr. Ifeanyi Frank Ogochukwu, AI presents a wide array of opportunities cutting across industries and disciplines. Says Dr. Ogochukwu: "Therefore, AI opportunities in specific terms include automation and enhanced efficiency, data analysis and decision making, personalization and customer experience, smart cities, innovation, creativity and problem solving, health care advancements, autonomous vehicles and environmental sustainability." One remarkable face of AI is machine learning (ML), which speaks to the ability of a

computer to learn largely from a huge volume of datasets, using ML algorithms in learning and analyzing those datasets in a bid to identify patterns, which are used to make decisions or predictions. A much more complex variant of ML is what is referred to as deep learning. Says Dr. Ogochukwu: "Continued advances in deep learning algorithms will allow AI systems to reach improved levels of accuracy and performance across a wide range of applications."

#### GENERATIVE AI: WHAT ARE THE CONCERNS?

The increasing availability and capability of generative AI (gen AI or GenAI) is directing attention to questions revolving around associated risks, challenges, opportunities, and concerns. Gita Bhatt, in a November 30, 2023 IMF Blog story, indicated that Generative AI has introduced "tantalizing new possibilities in both public and private spheres", with the initial excitement giving way to genuine and growing concerns.

According to a recent report, "Generative Artificial Intelligence and the Workplace", from the Society for Human Resource

concerns, the United Nations (UN), sometime in 2022, endorsed a document prescribing a set of principles, which are complementary and mutually reinforcing, for the ethical use of AI in the UN system. The document, which was developed by the Inter-Agency Working Group on AI co-chaired by UNESCO and ITU, is meant to serve as a guide for the use of AI across all UN organizations. It comprises 10 principles premised on the following pedestals: Do no harm; Defined purpose, necessity and proportionality; Safety and security; Fairness and non-discrimination; Sustainability; Right to privacy, data protection and data governance; Human autonomy and oversight; Transparency and explainability; Responsibility and accountability, as well as Inclusion and participation.

Developments in AI technology, to put it mildly, is not really the problem when it comes to concerns about AI development. Rather, the problem is one of control and the UK Prime Minister, Rishi Sunak, spared no effort at the inaugural AI Summit, which took place in Bletchley Park, England from 1<sup>st</sup> to 2<sup>nd</sup>, November 2023, in ensuring that AI developers work with governments when it comes to testing new AI tools and application before they are released.

"Until now the only people testing the safety of new AI models have been the very companies developing it," said Sunak. "We should not rely on them to mark their own homework, as many of them agree."

**"In essence, AI aims to create machines or software that can imitate cognitive functions that we associate with human minds, allowing them to handle various tasks and adapt to new situations. AI can be found in everyday technologies like voice assistants, recommendation systems, and autonomous vehicles, among others." – Dr. Sallami Chougali.**

Management (SHRM) and the Burning Glass Institute, GenAI will pose challenges in the human resources spheres over the next decade, including potential widespread reductions in workforce (which may be temporary and driven more by economic growth lagging behind worker productivity) and the need to retrain employees to adapt to the rapid changes in technology. The report also observes that blue-collar roles are not likely to be automated by GenAI and are, therefore, shielded from any AI disruption, while nearly all categories of white-collar roles will be broadly transformed and impacted by the disruption.

Of particular importance has been risks associated with misinformation, a wide range of operational and regulatory issues as well as concerns surrounding governance and ethical issues. AI's increasing encroachment on Social Media content is bringing up the question of content transparency just as new AI capabilities emerge, including AI auto-agents, AI video, ChatGPT, and AI-enabled text-to-video

From the prism of governance and ethical

This underscores the urgent need for a strong governance framework and the need for responsible and accountable AI implementation strategies and management frameworks that factor in a wide variety of ethical and governance elements from privacy, transparency, and explainability to inclusivity and fairness.

"AI provides great prospects for innovation, but resolving issues and adopting strong regulatory frameworks is critical for responsible and ethical use, assuring humanity's future success," says Dr. Ogochukwu. "The rapid evolution of AI has overtaken regulatory frameworks, raising worries about the absence of standardised norms for ethical AI development and implementation."

#### AI AND AVIATION: ANY AFFINITY?

There appears to be unanimity regarding the fact that the wholesale adoption of AI in aviation would represent quite a fascinating idea worth exploring.



"AI couldn't have arrived at the best time for the aviation industry. The technology would enhance the safety and security of the aviation ecosystem while preserving the freedom of operations," says Sam Mahlangu, the International Federation of Air Traffic Safety Electronics Associations (IFATSEA) African Regional Director and Executive Board Member of IFATSEA. "The optimal and informed collaborative decision-making will be fully realised by looking at how the aviation ecosystem is configured. The system thinking approach would be easily implemented and interrogated as AI enables predictive scenarios and potential solutions before, they could even be released."

"The aviation industry is known for employing incremental innovation, and I do not see any deviation from this strategy, apart from the rapid implementation, given the evolving environment we find ourselves in," adds Sam Mahlangu. "There shouldn't be any concerns, but a sense of comfort that the exorbitant data that is mined within the industry would be gainfully utilised, and all the decisions will be data-driven. There are ample opportunities to leverage AI for the benefit of safer skies."

"Artificial Intelligence (AI) is reshaping industries across the globe, and the aviation sector is no exception. From

widespread deployment of artificial intelligence (AI) in the aviation industry creates a complicated interplay of opportunities and potential risks. Advocating for such a transformative shift requires a nuanced understanding of the benefits AI can offer, along with a vigilant awareness of the associated risks."

"AI's numerous uses in aviation highlight its promise to improve efficiency, safety, and passenger experience, with further developments projected to dramatically alter the future of air travel," adds Dr. Ogochukwu. "The use of AI in aviation necessitates a planned, coordinated strategy that balances its promise for transformation with possible risks, assuring safety and efficiency."

"While the potential benefits of AI adoption in aviation are significant, it's important to address challenges such as regulatory concerns, cybersecurity, and ethical considerations," says Moroccan Airports Authority's Dr. Sallami Chougдали. "Striking a balance between innovation and safety is crucial to ensuring the successful integration of AI solutions in the aviation industry."

## AI AND AVIATION: THE GOOD

That said, the critical question should be: Can any good ever come from AI for aviation? And to be sure, an increasing number of industry stakeholders believe that AI holds a world of benefits for aviation.

"The wholesale adoption of AI solutions in aviation holds great potential for transforming the industry in several ways," says Dr. Sallami Chougдали.



Doreen Bogdan-Martin, ITU Secretary General.

**"AI couldn't have arrived at the best time for the aviation industry. The technology would enhance the safety and security of the aviation ecosystem while preserving the freedom of operations. The optimal and informed collaborative decision-making will be fully realised by looking at how the aviation ecosystem is configured." – Sam Mahlangu, IFATSEA African Regional Director.**

enhancing safety protocols to optimizing operational efficiency, AI is becoming a transformative force in aviation," says Dr. Ifeanyi Frank Ogochukwu, Aviation Africa Plate-forme Managing Director. "And so,

"One is in air traffic management where AI technologies can enhance air traffic control systems, making them more adaptive and responsive to real-time changes. This could lead to more efficient routing, reduced



Sam Mahlangu, IFATSEA African Regional Director.

congestion, and improved overall airspace management. The second area is in predictive maintenance where AI can be used to analyze vast amounts of data from aircraft systems and sensors to predict potential issues and schedule maintenance before components fail. This predictive maintenance approach can help airlines reduce downtime, improve safety, and optimize maintenance costs."

As far as Dr. Ifeanyi Frank Ogochukwu is concerned, the good that can come to aviation from AI is multi-dimensional. Says Dr. Ogochukwu: "Generally speaking, AI adoption in aviation has the potential for tremendous benefits enabling the following amongst others: safety and security enhancements, operational efficiency, predictive maintenance, enhanced decision-making, customer experience improvement, autonomous systems, air traffic management, crew assistance systems, supply chain optimization, weather forecasting and disruption management, data analytics for decision-making, training and simulation, environmental impact reduction, customs and immigration processes and drone integration."

Now, that we know that a world of good can accrue to aviation from AI, it is good to know whether the goodies apply to just specific sectors of aviation.

"The airline industry stands to benefit in terms of fleet maintenance and management, and CNS/ATM would realise significant savings in preventative and corrective maintenance, to which AI enable predictive maintenance and enhances safety performance," says IFATSEA African Regional Director, Sam Mahlangu.

"The aviation industry can benefit from the adoption of AI solutions across various operational sectors due to the unique challenges and complexities involved in air transportation," says Dr. Sallami Chougдали. "In ATM, AI can enhance air traffic control systems by analyzing real-time data,



Image Credit: pexel-thisengineering (www.pexels.com)

optimizing routing, and improving overall airspace management. For aircraft maintenance and diagnostics, AI can analyze vast amounts of data from aircraft sensors and systems to predict maintenance needs, identify potential issues, and optimize maintenance schedules, thus reducing unplanned downtime, increase aircraft reliability, and minimize operational disruptions. In flight operations and planning, AI can assist in flight planning by analyzing weather data, airspace conditions, and historical flight data to optimize routes for fuel efficiency and minimize environmental impact."

"For ATSEP and ATCO Training and Simulation, AI can be integrated into flight simulators to create more realistic and challenging training scenarios for pilots and flight crews. This can improve pilot skills,

decision-making abilities, and overall safety preparedness," adds Dr. Choug dali. "Passenger Services and Experience is another sector in which AI can enhance the passenger experience through personalized services, efficient booking processes, and improved in-flight services. In the area of security and threat detection, AI can improve security measures at airports by analyzing passenger data, identifying potential security threats, and enhancing screening processes. For Supply Chain and Logistics, AI can optimize the supply chain and logistics operations in the aviation industry by improving inventory management, reducing lead times, and enhancing overall efficiency. This is crucial for minimizing delays and ensuring a smooth flow of parts and components for maintenance and repairs."

"For air traffic management, AI can

optimize air traffic routes, predict congestion, and enhance overall air traffic management efficiency," says Dr. Ogochukwu. "The Federal Aviation Administration (FAA) in the United States is implementing AI in its NextGen initiative."

Dr. Ogochukwu cited a number of other aviation operational sectors, including: the airlines in the areas of customer service chatbots, crew scheduling and optimization, personalized passenger services, flight route optimization, and baggage handling; cargo logistics; predictive maintenance for MROs and other maintenance organizations; aircraft design and aerodynamics in the aircraft manufacturing sectors; and security and threat detection in the airports sector.

Notwithstanding the catalogue of goodies accruing to AI adoption in aviation, there is agreement that such adoption should be done cautiously. AI is undoubtedly finding its way into the terrain of autonomous driving with an uncommon flurry of excitement. One, therefore, wonders what AI can do for autonomous flying.

Writing in the article 'Reflection on AI and Travel Etiquette Survey' in the December 2023 edition of his monthly LinkedIn newsletter, 'My View from the Left Seat', Capt. Sully Sullenberger, the legendary Flight 1549 champion, stressed the significance of caution when integrating AI in aviation.

"The integration of AI in aviation is a fascinating development, much like its transformative impact across various sectors," wrote Capt. Sully Sullenberger. "However, as we chat this new territory, it is crucial to balance technological prowess with the indispensable human element."

"AI in aviation can optimize flight paths, reduce fuel consumption, and even assist in critical decision-making," Capt. Sullenberger added. "However, the pilot's role remains irreplaceable—their judgement, experience, and ability to react to unforeseen situations are beyond AI's capabilities."

#### AI AND AVIATION: THE BAD AND THE UGLY

AI will no doubt be beneficial for aviation operations. However, there is a catalogue of concerns, dangers and challenges that the industry will need to pay attention. This is more so given the safety-critical and security-conscious nature of aviation.

"AI's potential to improve safety is questioned due to its robustness and potential vulnerabilities, especially in complex aviation contexts where AI is largely used for critical tasks such as autopilots and decision-making," says Dr. Ifeanyi Frank Ogochukwu. "The aviation industry faces cybersecurity threats, and the integration of AI adds additional risks from bad actors targeting AI systems, necessitating the secure handling of personal and sensitive data to maintain trust and avoid disruptions." "The incorporation of AI into aviation operations poses regulatory problems, demanding coordination among industry



An AI-generated image. Credit: Pixabay ([www.pixabay.com](http://www.pixabay.com)).

**WHEN IT COMES TO THE WHOLESALE ADOPTION OF AI IN AVIATION, PARTICULARLY IN THE AIR TRAFFIC MANAGEMENT (ATM) ENVIRONMENT, ONE CHALLENGE THAT WOULD BE CRITICAL TO CLEAR IS THE LACK OF INDUSTRY-WIDE CUM INDUSTRY-SPECIFIC REGULATORY AND POLICY FRAMEWORKS REGARDING THE USE OF AI FOR INTERNATIONAL AIR NAVIGATION.**



AI in business. Credit: Pixabay ([www.pixabay.com](http://www.pixabay.com)).

stakeholders and regulatory organisations to develop comprehensive regulations and compliance mechanisms. AI algorithms also pose ethical challenges in aviation safety and security, necessitating careful attention to accountability, transparency, and addressing biases within these critical decisions," adds Dr. Ogochukwu. "The use of AI necessitates a professional workforce capable of administering, maintaining, and debugging AI systems. There may be difficulties addressing possible skill gaps and providing appropriate training. The integration of AI into aviation systems may also raise interoperability concerns, necessitating seamless communication between AI systems and traditional infrastructure for

successful deployment. Additionally, AI automation may result in job displacement in operational areas such as pilots, air traffic controllers, engineers, and maintenance people, causing a shift in their roles requiring comprehensive workforce planning."

#### THE FUTURE OF AI

Talking from the vantage point of ongoing advancements in AI technologies and techniques, the future of AI will certainly be defined by a wide variety of new opportunities and possibilities in all aspects of life.

"That said, the future of AI holds immense promise and potential, shaping various

aspects of human society and transforming industries across the globe along a number of broad lines," opines Dr. Ogochukwu. "However, there are concerns about employment displacement, economic inequality, prejudices, discrimination, data privacy, security breaches, and the abuse of AI technologies."

Dr. Ogochukwu believes that the future of AI would be defined by AI advancements covering areas such as deep learning breakthroughs, advances in Explainable AI (XAI), which will be critical in making AI systems more comprehensible and interpretable, AI-assisted creativity and collaboration as well as AI hardware innovation characterized by the ubiquity of specialised AI processors and hardware accelerators, allowing for quicker and more energy-efficient AI computations.

"Specialised AI processors and hardware accelerators will become more ubiquitous, allowing for quicker and more energy-efficient AI computations," says Dr. Ogochukwu. "AI-powered tools and platforms will enable producers and artists to improve their creative processes and generate innovative and compelling material. The future envisions humans and AI working together in a synergistic way, with AI enhancing rather than replacing human talents."

To be sure, one tantalizing AI variant that will be the determinant of AI future is artificial general intelligence (AGI) – the AI variant possessing the ability to learn, to perceive, to plan and control, to understand, and to perform any intellectual task to the level and with the precision of a human being. Dr. Ogochukwu describes it as an AI innovation "which has human-level intelligence and cognitive capacities". The emergence of AGI, however, poses a number of ethical, safety, privacy, and security questions.

"The pursuit of AGI will pose complicated ethical issues and existential hazards, necessitating close monitoring and regulation," Dr. Ogochukwu opines. "The rise of AGI may open up new vistas in science, technology, and human understanding, but it also brings tremendous problems and uncertainty."

#### AI AND AVIATION: GOING FORWARD

When it comes to the wholesale adoption of AI in aviation, particularly in the air traffic management (ATM) environment, one challenge that would be critical to clear is the lack of industry-wide cum industry-specific regulatory and policy frameworks regarding the use of AI for international air navigation. More than anything, human oversight and autonomy must be an overriding regulatory and policy thrust when conceptualising the adoption of any level of automation in aviation. As far as the International Civil Aviation Organization is concerned the human element of civil aviation operations remains sacrosanct no matter the level of automation integrated into civil aviation operations. ■

## SALLAMI CHOUGDALI: AVIATION IN THE KINGDOM OF MOROCCO

**D**r. Sallami Chougдали, a full-fledged Moroccan national, can, no doubt, feel the pulses of civil aviation operations in the Kingdom of Morocco. An experienced and well-travelled Air Traffic Safety Electronics Engineer specializing in air traffic management (ATM), artificial intelligence (AI), machine learning (ML), distributed systems and real-time systems, Chougдали holds a Bachelor's degree, a Master's degree and a Doctoral degree, all in Computer Science. With an additional Diploma in Air Traffic Safety Electronics Engineering, Chougдали's air traffic safety electronics experience traverses the entire CNS (communication, navigation and surveillance) systems spectrum, including the flight data processing systems (FDPS), the cybersecurity, the information systems and the data processing systems (DPS) terrains.

Dr. Chougдали currently serves in the Moroccan civil aviation sector as the Head of Laboratories Management Unit at Moroccan Airports Authority's Mohammed VI International Academy of Civil Aviation in Casablanca, Morocco. In this interview with *Air Traffic Safety Electronics International* Managing Editor, Adeyinka Oluymiwa Osunwusi, Chougдали shares his insights regarding the Moroccan civil aviation landscape.

### **How would you describe the present state of aviation in Morocco in terms of the availability and adequacy of air navigation and air traffic management (ATM) systems?**

Let's consider the Open Sky agreement signed between the Kingdom of Morocco and the European Union in 2006, and the bilateral agreements concluded between Morocco and several Arab as well as African, Asian and American countries, including an Open Sky agreement with the United States concluded in 2001. As a result of the sector's liberalization policy, air traffic in Morocco has increased by an average of 6.6% a year, with passenger numbers rising from 10.4 million in 2006 to 27 million in 2023, representing an increase of 32% compared with 2022 and 8% compared with 2019.

Since 2005, air traffic between Morocco and the other African countries has risen considerably, with an average annual increase of around 9.58%. In addition, the Royal Air Maroc Group is positioning itself as a leading company at the continental level, working on the creation of a new network to the African market covering around 30 destinations in 27 African countries, which translates to an average of 180 weekly flights.

In order to ensure the control and safety of air navigation in Morocco, we have an important CNS/ATM systems pact. In addition, every year, the Moroccan Airport Authority commits significant budgetary allocation to renewing equipment and implementing new ATM

systems, all with the aim of ensuring the control and safety of air navigation and absorbing this growth in air traffic. Also, Morocco has just acquired one of the most advanced air traffic management systems in the world. On 6 July 2023, the National Airports Office (ONDA) acquired *ManagAir*, a system used by several European, African and Gulf countries, as well as India and China.

### **And what about airport infrastructures and civil aviation regulation?**

Morocco has eighteen international airports and six national airports. The Civil Aviation Authority confirms that the policy of liberalizing the aviation sector has led to the entry of many foreign companies into the Moroccan airspace alongside national players, including low-cost airlines. Indeed, more than 51 companies offer scheduled flights to Morocco, including 19 low-cost airlines, and this has enabled especially the Mohammed V Airport to position itself as an international and regional hub, offering flights to some 98 international airports and 54 countries on four continents.

Morocco also has two air traffic control centers or ICC. The old one is in Casablanca and the new one is in Agadir. The Moroccan Airports Authority (ONDA) is Morocco's ANSP. Its core mandates include: ensuring the safety of air navigation at airports and in the airspace under national jurisdiction; planning, operating, maintaining and developing the State's civil airports, including embarkation, disembarkation, transit and routing on land for passengers, goods and mail transported by air, as well as any service intended to satisfy the needs of users and the public; liaising with international organizations and airports to meet air traffic needs; and training civil aeronautics engineers, air traffic controllers and air traffic safety electronics technicians. The Moroccan Civil Aviation Authority, DAC or Direction de l'Aviation Civile, is responsible for regulating the aviation sector.



### **And what about the ATSEP professional sector in Morocco? Is there a professional body serving the interests of Moroccan ATSEPs?**

In Morocco, there are around 300 ATSEPs, including 98 women ATSEPs; that is 30% women ATSEPs. Moroccan ATSEPs are assigned to the Kingdom's two air traffic control centers or ICC and various airports. All Moroccan ATSEPs are members of the Association des Cadres et Ingénieurs de Sécurité des Systèmes de la Circulation Aérienne (ACISSCA). Our association was founded in 1981 and became a member of IFATSEA in 1990.

Since its creation, the association has set itself several objectives. The first objective is to enable ATSEPs to meet and exchange experiences in a professional context as well as represent our country on international bodies such as IFATSEA, IFATSEA Africa and so on. The second objective is to monitor developments and emerging technologies in the CNS/ATM field and provide a technology watch. Then there is also the objective of supporting ATSEPs in their development based on knowledge management and continuous training. The association also has the mandate to organize all para- or extra-professional activities that could help to reaffirm the personality of ATSEPs and ensure their development.

### **What is being done in Morocco in order to continue to advance the course of ATSEPs particularly in respect of training, certification and the availability of the necessary tools and spare parts?**

Initial training for ATSEPs takes place at the Mohammed VI International Civil Aviation



Academy in Casablanca (AIAC) and lasts 3 years. The third year is devoted to training in CNS and ATM systems specialties, which is the equivalent of basic training for EUROCONTROL ATSEPs. ATSEP engineers who pass the AIAC are then assigned to an operational unit (airport or ICC control center).

Thereafter, the ATSEP will follow a qualification process, consisting of five levels (QT1, QT2, QT3, QT5 and QTA). Before taking the exam for each qualification, the ATSEP undergoes training (OJT). The ATSEP can also benefit from ongoing training and training on newly installed CNS/ATM equipment. All the qualification process takes 10 years.

The AIAC is a school for training ATCO and ATSEP engineers and other related disciplines from Morocco and friendly African countries. We will have the opportunity to visit this Academy during the ARM 2024 works.

**As a Computer Scientist and a doctoral degree holder, what are your thoughts about artificial intelligence (AI) and its**

## increasing incursion into virtually all spheres of human engagement?

Indeed, by 2030, AI will be a determining factor and its incursion will affect all spheres of human life, such as: one, for problem solving whereby AI systems can analyze large datasets and identify patterns or trends that may be challenging humans to discern, thus aiding problem solving and decision-making; two, for efficiency and automation where AI has the potential to automate repetitive tasks, increasing efficiency and productivity in various industries; three, for innovation through which AI facilitates innovation by enabling the development of new technologies, products, and services that can improve the overall quality of life; four, for improved safety in sectors like transportation where AI can enhance safety through systems like autonomous vehicles, thus reducing accidents caused by human error; and five, through medical advances where AI is making significant contributions to healthcare, assisting in diagnosis, drug discovery, and personalized treatment plans.

great potential for transforming the industry in several ways. Here are some key areas where AI could have a significant impact. One is in Air Traffic Management where AI technologies can enhance air traffic control systems, making them more adaptive and responsive to real-time changes. This could lead to more efficient routing, reduced congestion, and improved overall airspace management. The second area is in predictive maintenance where AI can be used to analyze vast amounts of data from aircraft systems and sensors to predict potential issues and schedule maintenance before components fail. This predictive maintenance approach can help airlines reduce downtime, improve safety, and optimize maintenance costs.

The third is for autonomous systems in which AI can play a crucial role in the development of autonomous or semi-autonomous aircraft, contributing to advancements in unmanned aerial vehicles (UAVs) and reducing the need for human intervention in certain flight operations. This could enhance safety, efficiency, and open up new possibilities for air transportation. Fourthly, there is weather prediction and routing for which AI-powered systems can analyze weather patterns and conditions in real-time, providing pilots with more accurate and timely information for route planning. This can lead to fuel savings, increased operational efficiency, and improved passenger comfort.

The fifth area is crew training and simulation where AI can be integrated into flight simulators to create more realistic and dynamic training environments for pilots and flight crews. This can enhance training effectiveness, improve decision-making skills, and prepare aviation professionals for a wide range of scenarios.

Another area is customer service and personalization for which AI can be utilized to enhance customer experiences in aviation, providing personalized recommendations, streamlined booking processes, and improved in-flight services. Chatbots and virtual assistants powered by AI can assist passengers with inquiries and provide real-time updates. There is also the area of security screening and threat detection where AI can improve security measures at airports by enhancing the analysis of passenger data, identifying potential threats through advanced imaging and sensor technologies, and automating security-screening processes.

While the potential benefits of AI adoption in aviation are significant, it's important to address challenges such as regulatory concerns, cybersecurity, and ethical considerations. Striking a balance between innovation and safety is crucial to ensuring the successful integration of AI solutions in the aviation industry.

**In which operational sectors of aviation do you see the need for the adoption of AI solutions and why?**

The aviation industry can benefit from the adoption of AI solutions across various

## Initial training for ATSEPs takes place at the Mohammed VI International Civil Aviation Academy in Casablanca (AIAC) and lasts 3 years. The third year is devoted to training in CNS and ATM systems specialties, which is the equivalent of basic training for EUROCONTROL ATSEPs.



How would you define AI to a layman?

Certainly! AI or artificial intelligence refers to the development of computer systems that can perform tasks that typically require human intelligence. These tasks include things like learning from experience (machine learning), understanding natural language, recognizing patterns, solving problems, and making decisions. In essence, AI aims to create machines or software that can imitate cognitive functions that we associate with human minds, allowing them to handle various tasks and adapt to new situations. AI can be found in everyday technologies like voice assistants, recommendation systems, and autonomous vehicles, among others.

How do you see the possible wholesale adoption of AI solutions in aviation?

The wholesale adoption of AI solutions in aviation holds



Dr. Chougali at the 51<sup>st</sup> General Assembly of IFATSEA, Buenos Aires, Argentina.

operational sectors due to the unique challenges and complexities involved in air transportation. Here are some operational sectors where the integration of AI can bring significant advantages. In ATM, AI can enhance air traffic control systems by analyzing real-time data, optimizing routing, and improving overall airspace management. For aircraft maintenance and diagnostics, AI can analyze vast amounts of data from aircraft sensors and systems to predict maintenance needs, identify potential issues, and optimize maintenance schedules, thus reducing unplanned downtime, increase aircraft reliability, and minimize operational disruptions. In flight operations and planning, AI can assist in flight planning by analyzing weather data, airspace conditions, and historical flight data to optimize routes for fuel efficiency and minimize environmental impact.

For ATSEP and ATCO Training and Simulation, AI can be integrated into flight simulators to create more realistic and challenging training scenarios for pilots and flight crews. This can improve pilot skills, decision-making abilities, and overall safety preparedness.

Passenger Services and Experience is another sector in which AI can enhance the passenger experience through personalized services, efficient booking processes, and improved in-flight services. In the area of security and threat detection, AI can improve security measures at airports by analyzing passenger data, identifying potential security threats, and enhancing screening processes. For Supply Chain and Logistics, AI can optimize the supply chain and logistics operations in the aviation industry by improving inventory management, reducing lead times, and enhancing overall efficiency. This is crucial for minimizing delays and ensuring a smooth flow of parts and components for maintenance and repairs.

Finally, in communication and collaboration environment, AI-powered communication tools can improve collaboration between different stakeholders in the aviation ecosystem, such as airlines, airports, air traffic control, and maintenance providers. This can lead to better coordination, faster response times, and improved overall operational efficiency.

**Cybersecurity is now an important subject-matter in aviation. What would be your advice on how the aviation sector can best confront cyber threats?**

Addressing cybersecurity threats in the aviation sector is crucial to ensure the safety and integrity of air transportation systems. Here are several pieces of advice for the aviation sector to confront cyber threats effectively. Risk assessment and vulnerability analysis, the implementation of robust cybersecurity policies and continuous monitoring and incident response are key to confronting cyber threats in aviation. In addition, there is a need for secure network architecture involving the design and maintenance of a secure network architecture, segregating critical systems

from less critical ones to minimize the potential impact of a breach, implementing firewalls, intrusion detection systems, and encryption protocols.

There is also the need for regular software updates and patch management backed up with collaboration within the aviation industry to share information about emerging threats and best practices. Third-Party Security Assessments are also important with the conduct of thorough security assessments of third-party vendors and suppliers, especially those providing critical components and services.

Regulatory compliance is important as well as the implementation of secure supply chain practices to verify the integrity and security of components and systems at every stage of the supply chain. This includes ensuring the cybersecurity resilience of aviation equipment and software.

I should also mention employee awareness and training through educating employees about the potential risks associated with cybersecurity threats, emphasizing the importance of following security protocols and encouraging a culture of cybersecurity awareness and responsibility.

Redundancy and resilience planning are also essential through implementing redundancy and resilience measures to ensure that critical systems can continue to operate in the event of a cyber incident.

Finally, engage cybersecurity experts. Work with cybersecurity experts and professionals to stay updated on the latest threats and best practices. Engage in regular cybersecurity audits and assessments to identify and address potential weaknesses.

**Is the Moroccan aviation sector doing anything at the moment to confront these threats?**

The cybersecurity field and the associated threats have attracted the attention of our ANSP since 2010 and to deal with these threats, the Moroccan ANSP has created an operational entity specializing in cybersecurity, and carried out audits to analyze and identify cyber risks and threats. The ANSP has, in addition, conducted not only awareness campaigns for all employees but also scheduled training sessions on the subject.

**Now, let's talk about the 2024 edition of the IFATSEA African Regional Meeting. Is Morocco still in the hosting race?**

Indeed, we have the honour of bringing together from 25 to 28 June our ATSEP brothers from friendly African countries in Casablanca with the aim of exchanging experiences, expertise and discussing the future of this noble profession. We are in the process of finalizing some administrative procedures to officially declare the hosting of the IFATSEA ARM 2024.

**You were in Buenos Aires, Argentina last year November for the 51<sup>st</sup> edition of the IFATSEA General Assembly. Based on what happened in Argentina, how would you assess the future of ATSEPs in the context of global air traffic safety?**

With the rapid technological emergence of CNS and ATM systems and the integration of AI in the CNS/ATM equipment and systems, I believe that the new responsibilities for air traffic safety are being transferred to ATSEPs. So the ATSEP has become a decisive link in the air traffic safety chain. Through the management of ATM systems, the ATSEP ensures optimum air traffic management and is the guarantor of increased capacity and airspace safety.

Since 2000, the ATSEP profession has undergone rapid change and today, in addition to the standard activities of installing and maintaining CNS/ATM equipment, the ATSEP is faced with new challenges such as security against cyber-attacks that can threaten the operation of CNS/ATM systems and disrupt or even halt air navigation services, for example the cyber-attack that completely blocked air navigation services in Switzerland at the end of 2022. Also, the deployment of new ATM systems based on AI, Machine Learning and Big Data processing, and the use of new concepts such as free route, 4D trajectory, and so on has brought ATSEPs face to face with complex systems.

I believe that IFATSEA and ATSEPs around the world are aware of the challenges of this profession and we are on the right way to succeed in this transition.

**And what about the future of the air traffic safety electronics profession in Morocco?**

In Morocco, since 2006, we have noted that the ATSEP profession is constantly evolving. Our ANSP and the social partners have worked on enhancing the value of the ATSEP profession through the following actions: 1) The Moroccan ANSP requires an academic training of state engineer in Air Traffic Safety Electronics (Bac + 5) to recruit ATSEPs, 2) Upgrading the qualification system for ATSEPs, 3) Finalising the project to introduce a licence for ATSEPs, and 4) Planning OJTs for ATSEPs to bring their skills into line with technological developments in the CNS/ATM field.

As far as the future of this noble profession is concerned, and as a professional association and social partner, we have a project to develop R&D skills among Moroccan ATSEPs so that the ATSEP becomes a generator of value. We plan to present this project during the African meeting, and I would like to take this opportunity to ask you and the ATSEPs of Nigeria to work together to develop this aspect among our ATSEPs. ■

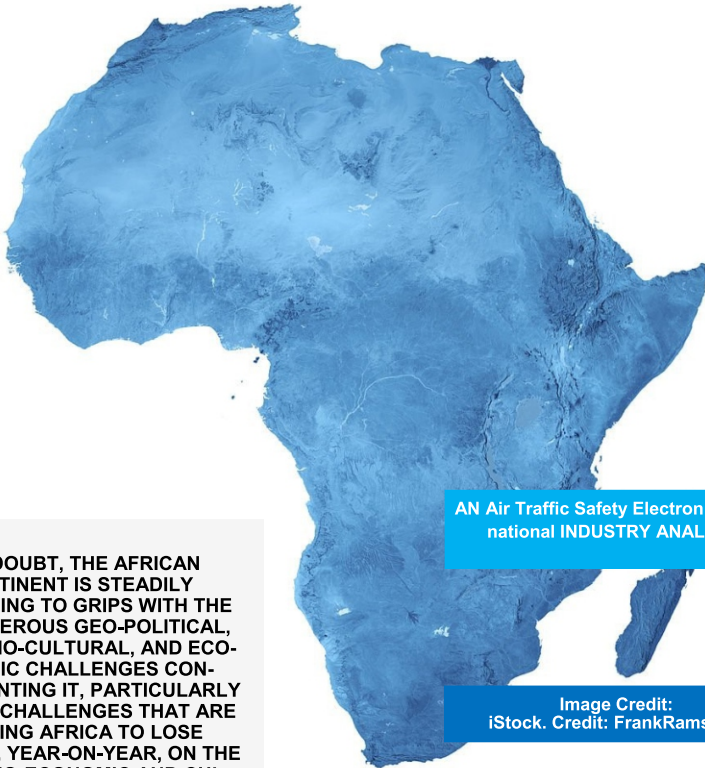


## ATSEI REGIONAL FOCUS



# AFRICA:

## In Pursuit of Aviation Safety and Efficiency



AN Air Traffic Safety Electronics International INDUSTRY ANALYSIS

Image Credit:  
iStock. Credit: FrankRamspott

**NO DOUBT, THE AFRICAN CONTINENT IS STEADILY COMING TO GRIPS WITH THE NUMEROUS GEO-POLITICAL, SOCIO-CULTURAL, AND ECONOMIC CHALLENGES CONFRONTING IT, PARTICULARLY THE CHALLENGES THAT ARE MAKING AFRICA TO LOSE OUT, YEAR-ON-YEAR, ON THE SOCIO-ECONOMIC AND CULTURAL BENEFITS OF AVIATION OPERATIONS. FROM SAFETY AND SECURITY TO EFFICIENCY AND AIR CONNECTIVITY, INDUSTRY STAKEHOLDERS ARE MAKING SPIRITED EFFORTS TO REJIG THE NASCENT AFRICAN AVIATION LANDSCAPE.**

**B**ut, the question should not be about whether industry stakeholders are making spirited efforts to rejig African aviation. Rather, the question should be whether adequate and sustainable steps are being taken to actually grasp the nettle.

The sustainability and adequacy of any attempt at refocusing African aviation, perhaps, will be determined by the operational elements of the aviation industry. The air transport operational realm is known to be characteristically cyclical aside from being highly capital intensive. What's more: aviation is a technology-savvy industry. And so, the availability of modern technology and the capacity and ability of African aviation to acquire the needed technology are critical determinants. So, the question is one that would continue to revolve around how versed the African aviation realm is when it comes to determining and acquiring appropriate technologies as well as selecting appropriate techniques.

"The African aviation landscape is very much versed in operational aspects and what technologies are appropriate to respond to the environment the industry finds itself in," says Sam

Mahlanu, the International Federation of Air Traffic Safety Electronics Associations (IFATSEA) African Regional Director. "There is, however, an opportunity to relook at the strategy of technology acquisition and deployment. There seems to be a worrying trend of high reliance on systems that are acquired from well-established institutions and less focus on development of industry solutions that would fit our African environment. We are almost continuing with the trajectory of being technology adopters and not so many developers. The talent is there and equally capable of innovating and contributing to the body of knowledge, given the necessary resources and capital to enter these frontiers." To be sure, clear differences exist in the African aviation landscape along regional and national lines. These differences also cut across a wide spectrum of operational, technical and regulatory areas. This scenario, perhaps, may be a reflection of the quantum of efforts being expended by African aviation stakeholders in terms of the growth and sustainability of aviation operations in their respective jurisdictions.

The availability of the required wherewithal may also be playing a critical role. In terms of air traffic passenger share per region, for example, the Airports Council International (ACI), in its "Air Traffic Performance for Africa 2022", paints the following scenario: West Africa (16%), Central Africa (1%), East



The New Face of Kotoka International, Accra, Ghana.



Front View of Kotoka International Accra

Africa (17%), North Africa (45%), and South Africa (21%). On a country-by-country basis, the ACI 2022 ranking listed top five African countries with Egypt leading with 37,942,427 passengers, followed by South Africa, Morocco, Nigeria, and Kenya with 30,087,353 passengers, 20,549,844 passengers, 14,193,600 passengers, and 8,957,594 passengers respectively.

### LIBERALISATION OF AFRICAN AVIATION MARKETS

Africa is currently home to over 1.48 billion people – representing about 17.9% of the total world population and up from the 1.21 billion figure recorded for 2016 – with a population density of 49 Km<sup>2</sup> and a total land area of 29.65 million Km<sup>2</sup>. Despite accounting for about 17.9 percent of world's total population, the African continent contributed, as at June 2023, just 2.1% share of the global passenger traffic in the last 12 months, according to the International Air Transport Association (IATA). The Vice President of Africa for Qatar Airways, Hendrik du Preez, also echoed this percentage point in a recent press statement.

According to IATA, Africa's paltry 2.1% share is in spite of the continent accounting for a 34.7% surge in passenger traffic over the same period of time. But all seems not to be lost for African aviation if Boeing's projection that domestic

passenger air traffic in Africa will more than quadruple in the next 20 years is anything to hold on to. The US front-runner aircraft manufacturing giant, in its 2023 *Commercial Market Outlook*, pegs the forecast for Africa's domestic air traffic growth at 7.4%, which is far above the global average of 6.1 percent. In its "Air Traffic Performance for Africa 2022", the Airports Council International (ACI) also reports that passenger traffic for African airports has continued to rise in 2022 compared to 2021 (+56%), although this still falls below the 2019 traffic level (-22%). "In terms of total passengers and aircraft movements (ATMs), the third quarter of 2022 has witnessed the highest figures at 51,696,274 passengers and 712,518 ATMs respectively," ACI notes in the 2022 report. "However, in terms of traffic recovery compared to 2019, the fourth quarter of 2022 has witnessed the highest rate of recovery at 85% for passengers and 82% for ATMs."

Liberalisation movements have a long history in Africa where the aviation industry is still pretty young, whether on the intra-African or the inter-African fronts. In 2006, for example, the Kingdom of Morocco inked an Open Skies agreement with the European Union. In 2000, Kenya and the Republic of South Africa signed a liberalised air services agreement culminating, in 2003, in the removal of all forms of restrictions on capacity. In

2005, Ethiopia inked an Open Skies agreement with the United States of America. Confirming the gains that liberalisation has brought for the Kingdom of Morocco's aviation spheres, Dr. Sallami Chougali, Head of Laboratories Management Unit at the Moroccan Airports Authority's Mohammed VI International Academy of Civil Aviation in Casablanca, says: "The Civil Aviation Authority confirms that the policy of liberalizing the aviation sector has led to the entry of many foreign companies into the Moroccan airspace alongside national players, including low-cost airlines. Indeed, more than 51 companies offer scheduled flights to Morocco, including 19 low-cost airlines, and this has enabled especially the Mohammed V Airport to position itself as an international and regional hub, offering flights to some 98 international airports and 54 countries on four continents."

Talking about the availability of the necessary instruments for upscaling aviation operations, Africa is comfortably home to a long line-up of decisions, declarations, treaties, collaborative arrangements, and policies institutionalized for the purpose of liberalising or simply upscaling the continent's transportation markets following the realisation of the socio-economic benefits of transportation in general and aviation in particular. It will, therefore, be far from the truth to blame the challenges confronting the African aviation realms on a lack of initiatives because there is a long line-up of these initiatives. The truth, of course, is that quite a number of these initiatives have exhibited much more glamour in terms of their theatricality than their practicality and sustainability.

Let's take, for example, that potentially revolutionary initiative called the Yamoussoukro Declaration (YD) of 1988, whose primary intent is the liberalisation of access to intra-African and inter-African air transport markets through air services deregulation. In September 1994, the decisions of African Ministers Responsible for Civil Aviation was adopted in Mauritius in order to pay the way for the acceleration of the implementation of the YD. This was followed up with the adoption, in November of 1999, of the Yamoussoukro Decision with 44 signatory countries. The Yamoussoukro Decision established the arrangement among State Parties for the gradual liberalisation of scheduled and non-scheduled intra-African air transport services. On 12 July 2000, the Assembly of the AU Heads of State and Government further endorsed the YD in Lomé,



Togo whilst also granting the African Civil Aviation Commission (AFAC) the mandate to serve as the Executive Agency in an attempt to ensure coordinated and meaningful implementation of the Declaration.

There is also the Single African Air Transport Market (SAATM) initiative, which was established on 28 January 2018 during the 30<sup>th</sup> Ordinary Session of the African Union (AU) Assembly held in Addis Ababa, Ethiopia. Essential one of the flagship projects of the AU Agenda 2063 (dubbed the *Africa We Want*) adopted by AU Heads of State and Government during the 24<sup>th</sup> Ordinary Session of the AU Assembly, SAATM is intended to quicken the pace of implementation of the YD in order to enhance air connectivity, induce competition in air services, and grow the African tourism landscape with potential contributions to the promotion of job creation, economic growth and socio-cultural integration across the continent. In this vein, SAATM is effectively an evolution from the Yamoussoukro Decision. Aside from YD and SAATM, there are also regional and sub-regional economic initiatives such as the Banjul Accord Group (BAG) for Western and Central Africa, and the Southern Africa Development Community (SADC) for the south of Africa.

#### THE NORTH AFRICA REGION

The North Africa has witnessed increasing activities in the aviation sector. Countries like Egypt, Algeria, Morocco, and Tunisia have witnessed increased activities. Egypt's Cairo International Airport, according to Airports Council International (ACI), has been the only African airport in the top ten airports ranking in Africa that has exceeded its 2019 passenger traffic in terms of the evolution of passenger traffic in 2022. ACI reports that its *Air Traffic Performance for Africa 2022* in that "Cairo International" has been in first place for the past two years, taking over from OR Tambo International Airport of South Africa, which was first in 2019 and was then in second place in 2021 and 2022. In terms of international passenger for 2022, ACI International maintains the ACI topmost ranking with 16,452,148 international passengers, representing a 76% change compared to 2021.

Although, it failed to register an appearance in the ACI 2022 ranking in terms of passenger traffic, Tunisia's Tunis Carthage International Airport clinched the 5<sup>th</sup> position in the international passenger ranking with 5,346,870 passengers, representing a whopping 109.4% improvement over the 2021 performance. Algeria's Alger Houari Boumediene Airport, of course, assumed the 9<sup>th</sup> position in the passenger traffic ranking (6,317,793 passengers) whilst also settling for the 8<sup>th</sup> position in terms of international passenger traffic with 4,129,715 passengers, representing a whopping 444% improvement over the 2021 performance. Morocco appears to have made considerable gains from air services liberalisation agreements it entered into with the European Union, some Asian and Arab countries as well as the United States of America. "Let's consider the Open Sky agreement signed between the Kingdom of Morocco and the European Union in 2006, and the bilateral agreements concluded between Morocco and several Arab as well as African, Asian and American countries, including an Open Sky agreement with the United States concluded in 2007," says Dr. Sidami Chougaldi. "As a result of the sector's liberalization policy, air traffic in Morocco has increased by an average of 6.6% a year, with passenger numbers rising from 10.4 million in 2006 to 27 million in 2023, representing an increase of 32% compared with 2022 and 8% compared with 2019." "Since 2005, air traffic between Morocco and the other African countries has risen considerably, with an average annual increase of around 9.58%. Dr. Chougaldi adds. "In addition, the Royal Air Maroc Group is positioning itself as a leading company at the continental level, working on the creation of a new network to the African market covering around

30 destinations in 27 African countries, which translates to an average of 180 weekly flights." With two air traffic control centres (ATCs) in Casablanca and Agadir, eighteen international airports and six national airports, Morocco's aviation successes are not limited to the air transport or air services terrains, but also covers the other aspects of civil aviation operations, including air traffic management, air traffic safety electronics engineering and airport services provision. For example, the Mohammed V Airport maintains the fourth rank in the Airports Council International's Top 10 African Airports Ranking in terms of 2022 passenger traffic with 7,559,854 passengers, representing an 82.6 percentage point change compared to 2021. Says Dr. Chougaldi: "In addition, every year, the Moroccan Airport Authority commits significant budgetary allocation to renewing equipment and implementing new ATM systems, all with the aim of ensuring the control and safety of air navigation and absorbing this growth in air traffic. Also, Morocco has just acquired one of the most advanced air traffic management systems in the world. On 6 July 2023, the National Airports Office (ONDA) acquired *ManagAir*, a system used by several European, African and Gulf countries, as well as India and China."

#### THE SOUTH AFRICA REGION

Southern Africa takes the second place after northern Africa when it comes to air traffic passenger shares for 2022, according to the Airports Council International. In the region, the Republic of South Africa is clearly at the front when it comes to aviation growth and development. Aside from this, South Africa is continuing to shine in the international aviation community. As an example, South Africa, a Part II ICAO Council member alongside Nigeria and Egypt, retained its seat – first gained in 2003 – on the Governing Council of the 41<sup>st</sup> ICAO (International Civil Aviation Organization) Assembly in Montreal, Canada with 151 votes, which represented the fourth highest in the second round of voting at the Assembly.

On the airports operation side, the Airports Council International's Top 10 African Airports Ranking in terms of passenger traffic in 2022 situate the OR Tambo International Airport and the Cape Town International Airport at the second and third positions with 14,789,508 and 7,875,425 passengers, representing 80.3% change and 65.5% change respectively compared to 2021. Unfortunately, no other southern Africa country has been able to claim a slot in the ACI ranking and it would be glaringly unfair to say that these countries and their aviation entities have not learnt sufficiently to grasp the nettle when it comes to advancing aviation development and sustainability. Perhaps, South Africa's commendable outings among the leagues of African and international aviation players could be tied to the availability of highly ambitious performance plans year-on-year. The South African Civil Aviation Authority (SACAA) Annual Performance Plan for 2023/2024 as well as the SACAA Strategic Plan 2020/21-2024/25, for example, contains elements that are intended to revolutionise the South African civil aviation space. As part of South Africa's plan is the target to reduce accident rate by 50% from the 2020/2021 to the 2024/2025 period. Under the strategic plan components all the performance plans in the context of the internal strategies for accomplishing the plan, SACAA has premised its focus on three key elements, namely: Client-centricity; building organisational capability and capacity; and holistic administration and governance factors.

The African Regional Director of the International Federation of Air Traffic Safety Electronics Associations (IFATSEA), Sam Mahlangu, who is a renowned South African air traffic safety electronics professional (ATSEP), has anchored South Africa's gains in the aviation realms to the fact that the South African aviation industry has

been coming to terms with contemporary realities in the industry. "The South African aviation industry is coming to terms with the realisation that the industry is moving towards service architecture, whereby the technology acquisition and service consumption are also premised on satellite-based systems, as opposed to the traditional terrestrial architecture," says Sam Mahlangu. "These new frontiers of technology acquisition come with accuracy, reliability, and data integrity. We have recently seen partnerships with OEMs operating in this space, which should be for the greater benefit of the Southern African Development Community (SADC) Region." "The pertinent stakeholders in South Africa opined that the deployment of space-based technologies strengthens the industry's aspirations and commitment to remain competitive and uphold aviation safety and efficiency by harnessing innovation and creating spaces for enabling technologies," adds Mahlangu.

#### THE WEST AND CENTRAL AFRICA REGION

The western and central Africa region is no doubt exhibiting glaring potential in terms of an upswing in aviation activities. Nigeria, for example, was lucky enough to take the 8<sup>th</sup> (Murtala Muhammed International Airport, Lagos) and 10<sup>th</sup> (Nnamdi Azikiwe International Airport, Abuja) positions in the ACI 2022 ranking of top 10 African airports in terms of passenger traffic. And there are a good number of blue-chip projects ongoing and completed, whose primary aim is to improve air navigation, air passenger, and air traffic management (ATM) experiences. There is, for example, the AIS Automation Project (AAP) that targets the modernization of ATM terrains. There is the Wide Area Multilateration (WAM) project aimed at catering for oceanic airspace as well as contracts for the installation of modern navigation aids.

Although neither Ghana and Nigeria nor Senegal feature in the ACI 2022 ranking of top 10 African airports in terms of international passengers, the African countries can be cited for a number of high-brow aviation upgrade projects in recent times. Take, for example, Ghana. The country recorded a total of 26,072 air traffic movements (ATMs) in 2023, which represent a modest improvement on the 2022 figure of 24,627 ATMs. Total international passenger traffic (arrivals and departures) in 2022 stood at 1,800,341. The Kotoka International Airport in Accra is also wearing a new look as part of the plan to make it a West Africa hub. In terms of recognition in the international aviation community, Ghana was elected, at the 41<sup>st</sup> ICAO Assembly, a Part III member of the 36-member ICAO Council, joining Ethiopia, Zimbabwe, Equatorial Guinea, and Mauritius.

#### THE EAST AFRICA REGION

Ethiopia and Kenya are no doubt dictating the pace in the eastern part of the continent. Ethiopian airlines is comfortably at the top of the table in terms of air transport in Africa. The country's civil aviation regulatory, the Ethiopian Civil Aviation Authority (ECAA), is also excelling not only in the areas of safety oversight but also in the provision of air navigation services with over 97 percent of the Ethiopian airspace covered by reliable VSAT satellite network- and UHF link-enabled extended VHF radio communication.

With respect to the ACI 2022 ranking of top 10 African airports in terms of passenger traffic, Ethiopia and Kenya clinched the 6<sup>th</sup> and 7<sup>th</sup> positions with 6,656,516 passengers (Addis Ababa Bole International Airport) and 6,556,569 passengers (Nairobi's Jomo Kenyatta International Airport) respectively. The order is reversed for the 2022 international passengers ranking with Kenya grabbing the 7<sup>th</sup> position (4,692,753 passengers) while Ethiopia settled for the 9<sup>th</sup> position with 3,778,635 passengers. ■

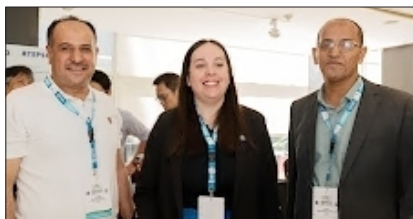
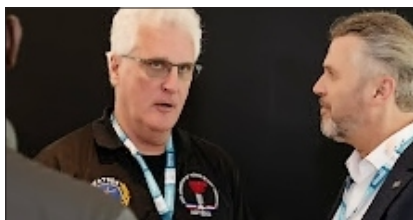
# Special Report



## 6 Days in Buenos Aires, Argentina: World's Biggest Annual Gathering of ATSEP



In Pictures







## DENNIS VASILEV: Pursuing ATSEP Competencies and Skills in a Technology-savvy CNS Environment

**D**ennis Vasilev is an executive in SkyRadar – the leading manufacturer and distributor of cutting-edge training solutions for developing the competencies and honing the skills of air navigation personnel. In this interview, Dennis discusses issues revolving around ATSEP competencies and skills, and the techniques for advancing ATSEP professionalism.

### **What training approach do you think is most appropriate for enhancing the competencies and skills of ATSEPs?**

A blended learning approach that combines both theoretical knowledge and practical experience would be most effective in enhancing the competencies and skills of Air Traffic Safety Electronics Personnel (ATSEPs). This approach involves a combination of classroom instruction, online courses, simulator-based training, on-the-job training, and mentorship programs.

When designing a training program for ATSEPs, it's essential to consider several key elements. The first element involves clearly defined objectives. The training program should have specific, measurable goals that align with industry standards and regulatory requirements. Secondly the content should be relevant and the curriculum must cover all relevant topics related to air traffic management systems, including software development, hardware maintenance, communication protocols, safety procedures, and so on.

Another element consists of hands-on practice consisting of practical exercises and simulations that are incorporated into the training program to provide ATSEPs with

hands-on experience in troubleshooting, repairing, and maintaining equipment. Then, there is continuous assessment. Regular testing and evaluation throughout the training process can help identify areas where trainees may need additional support or guidance.

Flexibility is another key element. The program should accommodate different learning styles and schedules by offering various modes of delivery such as self-paced e-learning modules, virtual classes, and face-to-face sessions. Collaboration is also important because encouraging collaboration among participants through group projects, discussions, and peer feedback can foster teamwork and problem-solving skills.

Finally, mentoring is also a key element. Pairing experienced ATSEPs with new recruits as mentors can provide valuable guidance and support during the training period.

### **What are your thoughts regarding the possible impact of the adoption of training technologies on the competence and productivity of ATSEPs?**

The adoption of advanced training technologies has the potential to significantly enhance the competence and productivity of Air Traffic Safety Electronics Personnel (ATSEPs) in multiple ways. One is in the area of improved access to information. Digital resources like interactive manuals, videos, animations, and simulation tools offer easy access to vast amounts of information, making it easier for ATSEPs to learn and stay updated about advancements in their field. There is also the potential of personalized learning experience as adaptive learning platforms can tailor the training material based on individual needs, abilities, and progress, providing a personalized learning experience that caters to each person's unique strengths and weaknesses.

Another area has to do with increased efficiency. Virtual and augmented reality technologies enable realistic



simulations of complex scenarios without requiring physical infrastructure, reducing costs and increasing efficiency in terms of time and resource utilization.

There is also the advantage of enhanced skills development. This is because simulation-based training allows ATSEPs to develop critical thinking, decision-making, and problem-solving skills in a risk-free environment, preparing them better for real-world situations. Collaborative learning is another area. Online platforms facilitate collaborative learning experiences, encouraging discussion, sharing of ideas, and peer review, which can lead to improved understanding and retention of information.

Yet another potential is Continual Professional Development. With digital resources available at their fingertips, ATSEPs can engage in continual professional

development, keeping up-to-date with emerging trends, best practices, and regulations in the aviation sector. Overall, embracing advanced training technologies can result in more efficient, cost-effective, and comprehensive training for ATSEPs, leading to increased competence and productivity within the aviation industry.

**Do you think the existing regulations governing the competency and training of ATSEPs are adequate?**

While I cannot determine whether existing regulations governing the competency and training of Air Traffic Safety Electronics Personnel (ATSEPs) are adequate, these regulations play a crucial role in ensuring the highest levels of safety and reliability in the aviation industry. These rules set minimum

standards for education, certification, continuing education, and performance monitoring, helping to establish consistent criteria across countries and regions. However, given the rapid pace of technological innovation and evolving operational environments, there might be room for improvement in certain aspects of these regulations. For instance, updating the regulations to reflect current and future challenges faced by ATSEPs could make them more adaptable to changing circumstances. Additionally, harmonizing international regulations and promoting crossborder recognition of qualifications could improve mobility and career opportunities for ATSEPs while also contributing to global standardization efforts.

**What are the pitfalls aviation training organizations should avoid when approaching the delivery of aviation professional trainings?**

Aviation training organizations must take care to avoid common pitfalls when delivering aviation professional trainings to ensure effective learning outcomes and compliance with industry standards. Here are some potential pitfalls to watch out for: One, Lack of Standardization: Failure to follow established guidelines, syllabuses, and course materials can lead to inconsistent quality and confusion among students. This lack of standardization can affect the overall effectiveness of the training program; and two, Outdated Curricula: Using obsolete or irrelevant course content can hinder student engagement and limit their ability to apply what they learned to real-life situations. Keeping courses up-to-date with the latest industry developments, technology, and regulations is crucial.

Thirdly, there is also the problem of inadequate instructor qualifications as employing instructors who do not possess the necessary knowledge, expertise, and teaching skills can negatively impact the learning experience. Ensuring that instructors meet or exceed industry standards is vital for delivering high-quality training. Poor facilities and equipment can also constitute a pitfall. Providing subpar facilities, simulators, and other training tools can hamper the effectiveness of the training program. Upgrading or replacing outdated equipment and investing in modern technology can greatly benefit both students and instructors. A lack of feedback and assessment is another problematic area. Without proper evaluation mechanisms, it becomes difficult to gauge the success of the training program and identify areas for improvement. Regular feedback from students and instructors, along with rigorous assessments, can help fine-tune the training approach. Additionally, absence of real-world applications can constitute a drawback. Training that fails to emphasize practical applications and real-world scenarios can leave students feeling disconnected from the subject matter. Integrating case studies, scenario-based learning, and hands-on activities can bridge this gap and increase learner motivation. Lastly, neglecting diversity and accessibility is a big drawback as ignoring diversity and inclusion issues can create barriers to learning. ■

# Air Traffic Safety ELECTRONICS INTERNATIONAL

The Leading Journal in Global CNS/ATM Coverage

- Air Traffic Safety Electronics International provides the most comprehensive platforms regarding new developments, new technologies, future ATM systems, regulatory and compliance issues as well as sustainable air navigation and air traffic safety electronics solutions.
- Leveraging on robust industry insights, *Air Traffic Safety Electronics International* provides OEMs, training organizations and other CNS/ATM players with an in-depth understanding of the needs of ANSPs and air traffic safety electronics stakeholders.



**REGISTER FOR YOUR FREE  
SUBSCRIPTION TODAY!**

VISIT: <https://dextermarie.com/atsei-subscription/>



**AVAILABLE IN PRINTED AND/OR  
DIGITAL FORMATS**



SCAN TO REGISTER FOR YOUR FREE COPY

# HUMAN-TECHNOLOGY INTERACTIVITIES IN AVIATION – HARNESSING REGULATIONS

By Adeyinka Olumuyiwa Osunwusi, PhD

**T**he increasing diffusion of innovative technologies into every sphere of societal life continues to raise serious questions relating to how humankind can safely and efficiently continue to navigate the labyrinth of intricacies, nuances and affordances that have become part and parcel of human-technology interactivities. But when it comes to aviation – that predominantly hounded industry with a focus that is chronically fixated on safety, efficiency, security and sustainability – the concerns normally become much more palpable. This is more so when one factors in aviation's growing inclination towards digitalisation and automation as well as the unmistakable imminence of artificial intelligence (AI), machine learning (ML), deep learning, and, of course, artificial general intelligence (AGI).

By its very nature, artificial intelligence – as well as its existing and emerging variants – comes with opportunities, challenges, concerns, and risks. The continuing realisation of this stark reality is actually precipitating tremendous discourses and debates targeted at defining strategies for the effective management of AI. The International Telecommunication Union (ITU) has been promoting discourses around how AI can be a technology for the good of humankind. From 30<sup>th</sup> to 31<sup>st</sup> May, the 2024 edition of the ITU's AI for Good Summit will hold in Geneva, Switzerland with the theme: "Accelerating the United Nations Sustainable Development Goals." This theme holds out a glimmer of hope and looks very much like a fortification of the June 2023 viewpoint of the ITU Secretary General, Doreen Bogdan-Martin, to the effect that AI has the potential of assisting in rescuing the failing Sustainable Development Goals across the globe.



From the angle of harnessing international standards to define techniques, strategies and administrative cum organisational processes for tackling AI issues, the International Standards Organisation (ISO) currently promotes three International Standards, namely: ISO/IEC 23053 (Framework for AI Systems using Machine Learning); ISO/IEC 23894 (AI Guidance on Risk Management); and ISO/IEC 42001 (AI Management Systems), which defines a set of requirements for implementing, maintaining, and improving organisational AI management systems. The European Aviation Safety Agency (EASA) has also published an 'Artificial Intelligence Roadmap 1.0', which emphasises a human-centric approach to dealing with the safety and ethical dimensions of the development of AI in the aviation environment.

The United Nations (UN) has equally taken concrete actions in an attempt to ensure the prioritisation of all the elements that would ensure that AI tools, applications, and techniques are deployed for the good of mankind, at least within the UN organisational framework. To this end, the UN endorsed, sometime in 2022, a document – developed by the Inter-Agency Working Group on AI co-chaired by ITU and UNESCO – which prescribes 10 principles that are intended as a guide for the use of AI across all UN organisations. This, of course, has implications for the International Civil Aviation Organization (ICAO), the UN Agency responsible for the regulation of international civil aviation. The implication is that in all attempts to get a grasp on AI issues as it affects international civil aviation operations, the ICAO incurs the responsibility of taking due cognizance of the 10 principles for AI use endorsed by the UN body.

Digitalisation and automation have been and are still

being integrated into aviation operations to a large extent. Innovative technologies are also things that aviation have been embracing and will continue to embrace. As a matter of fact, Resolution A40-27, adopted during the 40<sup>th</sup> Session of the ICAO General Assembly, clearly recognises the potential of innovative technologies in improving aviation safety, efficiency, security, facilitation, environmental sustainability, and economic development of air transport. But, all things being equal, this recognition comes with a caveat whatever the nature of the innovative technologies.

Historically, ICAO has always believed in a human-centric approach to the adoption of innovative technologies in aviation. That much reverberates through ICAO Doc 9694 – *Manual of Air Traffic Services Data Link Applications*. The document stresses the importance of the human components in the adoption of autonomous technologies and outlines 10 principles. Four of the principles are critical to developing principles that support a human-centric approach to the use of AI in aviation and these are that: the human bears the ultimate responsibility for the safety of the aviation system; the human operator must be in command; functions must be automated only if there is a good reason for doing so; and the human must be able to monitor the automated system.

The ten principles in Doc 9694, when juxtaposed against the ten principles prescribed by the UN in relation to the use of AI across all UN organisations, should afford the ICAO the leverage upon which to build enduring principles for the regulation of AI in aviation. ■

ADEYINKA OLUMUYIWA OSUNWUSI IS THE MANAGING EDITOR OF AIR TRAFFIC SAFETY ELECTRONICS INTERNATIONAL

## EVENTS

### MARCH/APRIL/MAY 2024

12-14/03/2024	2024 ICAO Innovation Fair. Theme: "Digital Aviation: The Future is Now". Venue: ICAO Headquarters. <a href="http://www.icao.int/Meetings/InnovationFair2024/Pages/default.aspx">www.icao.int/Meetings/InnovationFair2024/Pages/default.aspx</a>	Montreal, Canada.
19-21/03/2024	Airspace World 2024. Venue: Palexpo Exhibition Centre, Geneva <a href="https://airspaceworld.com">https://airspaceworld.com</a>	Geneva, Switzerland
25-28/03/2024	International Wireless Communications Expo (IWCE) 2024. Venue: Orange County Convention Center, Orlando, Florida. <a href="https://iwceexpo.com">https://iwceexpo.com</a>	U.S.A
14-16/04/2024	CNS Partnership Conference 2024. Venue: Gaylord Resort & Convention Center, Dallas Fort Worth, Texas <a href="http://www.ata.org/en/events/all/cns-partnership-conference/">www.ata.org/en/events/all/cns-partnership-conference/</a>	U.S.A
15-19/04/2024	63 <sup>rd</sup> IFATCA Annual Conference. Theme: Invest in People: The Future of ATM. Venue: Grand Copthorne Waterfront Hotel, Singapore. <a href="http://www.ifatca2024.org">www.ifatca2024.org</a>	Singapore
22-24/04/2024	17 <sup>th</sup> CILT Annual Africa Forum. Theme: Unlocking Africa's Wealth Through Logistics and Transport. Venue: Elephant Hills Resort, Victoria Falls, Zimbabwe. <a href="https://ciltinternational.org/events/cilt-africa-forum-2024/">https://ciltinternational.org/events/cilt-africa-forum-2024/</a>	Zimbabwe
30/04 - 02/05/2024	ICAO Global Implementation Support Symposium. Venue: Barcabi Bivaro Convention Center, Punta Cana. <a href="http://www.icaogiss2024.com">www.icaogiss2024.com</a>	Dominican Republic
09-11/05/2024	IFATSEA Euro Conference 2024. Venue: Sun Hall Hotel, Larnaca, Cyprus. <a href="https://ifatseac2024.online">https://ifatseac2024.online</a>	Cyprus.
14-16/05/2024	23 <sup>rd</sup> Airport Show. Venue: DWTC, Dubai, United Arab Emirates <a href="http://www.theairportshow.com">www.theairportshow.com</a>	Dubai, UAE
27-31/05/2024	World Forum on the Information Society (WSIS) + 20 Forum High Level Event. Co-organized by ITU, UNESCO, UNDP and UNCTAD. <a href="https://www.itu.int/net4/wsis/forum/2024/en">https://www.itu.int/net4/wsis/forum/2024/en</a>	Geneva, Switzerland
28-30/05/2024	2024 CAAC-EASA Aviation Safety Conference. Hosted by the Civil Aviation Administration of China in cooperation with EASA <a href="http://www.easa.europa.eu/en/newsroom-and-events/events/2024-caac-easa-aviation-safety-conference">www.easa.europa.eu/en/newsroom-and-events/events/2024-caac-easa-aviation-safety-conference</a>	Xiamen, China
30-31/05/2024	AI for Good Summit 2024. Theme: "Accelerating the United Nations Sustainable Development Goals". Venue: CIGG, Geneva, Switzerland. <a href="https://aiforgood.itu.int/summit24/">https://aiforgood.itu.int/summit24/</a>	Geneva, Switzerland

### JUNE/ JULY 2024

04-06/06/2024	Global Trajectory -based Operations (TBO) Symposium. Venue: EUROCONTROL Headquarters/Brussels. <a href="http://www.euro-control.int/news/save-date-global-tbo-symposium">www.euro-control.int/news/save-date-global-tbo-symposium</a>	Brussels.
11-13/06/2024	Future Travel Experience EMEA 2024. Venue: The Dublin RDS, Merion Road, Ballsbridge, Dublin 4 <a href="http://www.futuretravelexperience.com/ft-e/emea/">www.futuretravelexperience.com/ft-e/emea/</a>	Dublin, Ireland.
11-13/06/2024	CANSO Global ATM Summit 2024 & 28 <sup>th</sup> AGM <a href="https://canso.org/event/canso-global-atm-summit-2024-and-28th-agm/">https://canso.org/event/canso-global-atm-summit-2024-and-28th-agm/</a>	Baku, Azerbaijan.
16-19/06/2024	CILT International Convention 2024. <a href="https://ciltinternational.org/events/cilt-2024-convention-in-china-save-the-date/">https://ciltinternational.org/events/cilt-2024-convention-in-china-save-the-date/</a>	Langfang, China.
19-20/06/2024	11 <sup>th</sup> Safety Forum. Theme: "Aviation Weather Resilience". Venue: EUROCONTROL Headquarters, Brussels. <a href="https://flightsafety.org/event/safety-forum-2024/">https://flightsafety.org/event/safety-forum-2024/</a>	Brussels.
02-03/07/2024	IATA Wings of Change Focus Africa. <a href="http://www.iata.org/en/events/all/focus-africa/">www.iata.org/en/events/all/focus-africa/</a>	Johannesburg, South Africa.
08-11/07/2024	CANSO Asia Pacific Conference 2024. Hosted by Air Traffic Management Bureau (ATMB), CAAC <a href="https://canso.org/event/canso-asia-pacific-conference-2024/">https://canso.org/event/canso-asia-pacific-conference-2024/</a>	Chengdu, China

### AUGUST/SEPTEMBER 2024

26/08 - 06/09 /2024	14 <sup>th</sup> Air Navigation Conference (AN -CONF/14). Theme: "Performance Improvement Driving Sustainability". Venue: ICAO Headquarters. <a href="http://www.icao.int/meetings/anconf14/Pages/default.aspx">www.icao.int/meetings/anconf14/Pages/default.aspx</a>	Montreal, Canada.
09-12/09/2024	First Advanced Air Mobility Symposium (AAM 2024). Theme: "Advanced Air Mobility (AAM) Global Harmonization and Interoperability: Challenges and Opportunities". Venue: ICAO Headquarters, Montreal, Canada <a href="http://www.icao.int/Meetings/AAM2024/Pages/default.aspx">www.icao.int/Meetings/AAM2024/Pages/default.aspx</a>	Montreal, Canada.
24-25/09/2024	World Sustainability Symposium (WSS). <a href="http://www.iata.org/en/events/all/world-sustainability-symposium/#tab-1">www.iata.org/en/events/all/world-sustainability-symposium/#tab-1</a>	Miami, U.S.A.

### OCTOBER/NOVEMBER 2024

01-03/10/2024	World Safety and Operations Conference (WSOC). <a href="http://www.iata.org/en/events/all/wsoc">www.iata.org/en/events/all/wsoc</a>	Marrakech, Morocco.
14/10/2024	Fifth Global Standards Symposium (GSS -24). Theme: Charting the Next Digital Wave: Emerging Technologies, Innovation, and International Standards. <a href="https://gss.itu.int">https://gss.itu.int</a>	New Delhi, India.
15-24/10/2024	World Telecommunication Standardization Assembly (WTS-24). <a href="http://www.itu.int/wtsa/2024/">www.itu.int/wtsa/2024/</a>	New Delhi, India.
19-20/11/2024	Wings of Change Europe (WoCE). <a href="http://www.iata.org/en/events/all/wings-europe/">www.iata.org/en/events/all/wings-europe/</a>	Rome, Italy.

### DECEMBER 2024

02-03/12/2024	Wings of Change Middle East (WoCME). <a href="http://www.iata.org/en/events/all/wings-of-change-middle-east/">www.iata.org/en/events/all/wings-of-change-middle-east/</a>	Riyadh, Saudi Arabia
---------------	--	----------------------

# CALENDAR

## TRAINING & DEVELOPMENT

### MARCH/APRIL/MAY 2024

18/03 - 03/05/2024	ATSEP Phase 1 programme. <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/index.php/course">www.easa.ac.ke/index.php/course</a> -calendar/atsep -phase-1-0	Nairobi, Kenya
01-05/04/2024	Advanced Safety Management Systems (SMS) in Civil Aviation – Classroom. <i>Institution: IATA Training Centre.</i> <a href="http://www.iata.org/en/training/courses/sms">www.iata.org/en/training/courses/sms</a> -advanced/tcv30/en/	Singapore.
15/04 - 03/05/2024	ATSEP Qualification – Navigation. <i>Institution: DFS Air Navigation Services Academy, Langen.</i> <a href="http://www.dfs.de/homepage/en/services/training/">www.dfs.de/homepage/en/services/training/</a>	Germany.
29/04 - 24/05/2024	Radar Mono Pulse/Mode -S Training Course. <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/index.php/course">www.easa.ac.ke/index.php/course</a> -calendar/radar -mono-pulsemode-s-0	Nairobi, Kenya
16-24/ 05/2024	Air Navigation Services Inspector – CNS Course. <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/course">www.easa.ac.ke/course</a> -calendar/air -navigation -services-inspector -communication -navigation -surveillance	Nairobi, Kenya
FLEXIBLE	Air Traffic Safety Electronics Personnel (ATSEP) Basic (Online) - <i>Institution: Nigerian College of Aviation Technology (NCAT), Zaria, Nigeria.</i> <a href="https://ligat.icao.int/ated/TrainingCatalogue/Course/2472">https://ligat.icao.int/ated/TrainingCatalogue/Course/2472</a>	Nigeria (Online).

### MAY/JUNE/JULY 2024

18/03 - 03/05/2024	Executive Civil Aviation Management. <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/index.php/course">www.easa.ac.ke/index.php/course</a> -calendar/executive -civil-aviation -management -1	Nairobi, Kenya.
15/04 - 03/05/2024	Air Navigation Services Inspector – CNS (Virtual Classroom). <i>Institution: East African School of Aviation (EASA), Embakasi Campus, Nairobi, Kenya.</i> <a href="http://www.easa.ac.ke/course">www.easa.ac.ke/course</a> -calendar/air -navigation -services-inspector -communication -navigation -surveillance -virtual	Nairobi, Kenya
29/04 - 24/05/2024	ATSEP Competency Assessor Course. <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/index.php/course">www.easa.ac.ke/index.php/course</a> -calendar/atsep -competency -assessor-atsepcca -course-new	Nairobi, Kenya.
03-14/0 6/2024	AMHS for ATSEP (Classroom). <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/course">www.easa.ac.ke/course</a> -catalogue/amhs -atsep-0	Nairobi, Kenya.
24/06 - 19/07 /2024	ATSEP Qualification Communication (Voice, Data). <i>Institution: DFS Air Navigation Services Academy, Langen.</i> <a href="https://dfs.de/homepage/de/services/training/dfs">https://dfs.de/homepage/de/services/training/dfs</a> -sg-atsep -training -schedule -221222 -v2.pdf?cid=14m	Germany
08-12/07/2024	ATSEP Competency Assessor (ATSEPCCA) Course. <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/course">www.easa.ac.ke/course</a> -calendar/atsep -competency -assessor-atsepcca -course-new	Nairobi, Kenya.
15-26/07/2024	Advanced NAVAIDS Training (Simulator –based). <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/course">www.easa.ac.ke/course</a> -calendar/advanced -navaids -training -simulator -based	Nairobi, Kenya.
17-24/07/2024	Aviation Foundation Programme – Under the Singapore-ICAO Developing Countries Fellowship Training Programme 2024/2025. <i>Institution: Singapore Aviation Academy.</i> <a href="http://www.caas.gov.sg/saa/fellowships">www.caas.gov.sg/saa/fellowships</a> ; <a href="http://www.caas.gov.sg/saa/saa">www.caas.gov.sg/saa/saa</a> -programmes	Singapore

### AUGUST/ SEPTEMBER 2024

12-16/08/2024	Aviation Crisis Management – Under the Fellowships for African Civil Aviation Commission Member States. <i>Institution: Singapore Aviation Academy.</i> <a href="http://www.caas.gov.sg/docs/default">www.caas.gov.sg/docs/default</a> -source/docs – saafcac -terms -of -award.pdf	Singapore.
19/08 - 06/09/2024	VSAT Training (Classroom) . <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/course">www.easa.ac.ke/course</a> -calendar/vsat -training	Nairobi, Kenya
19/08 - 06/09 /2024	ATSEP Basic Course. <i>Institution: Skyguide Academy, Wangen.</i> <a href="https://dfs.de/homepage/de/services/training/dfs">https://dfs.de/homepage/de/services/training/dfs</a> -sg-atsep -training -schedule -221222 -v2.pdf?cid=14m	Switzerland.
26/08 - 01/11 /2024	ATSEP Phase I Course. <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.dfs.de/homepage/en/services/training/">www.dfs.de/homepage/en/services/training/</a>	Nairobi, Kenya

### SEPTEMBER/OCTOBER 2024

09-27/09 /2024	ATSEP Qualification Navigation . <i>Institution: DFS Air Navigation Services Academy, Langen.</i> <a href="https://dfs.de/homepage/de/services/training/dfs">https://dfs.de/homepage/de/services/training/dfs</a> -sg-atsep -training -schedule -221222 -v2.pdf?cid=14m	Germany.
17-20/09 /2024	ATSEP Qualification – Shared. <i>Institution: Entry Point North.</i> <a href="http://www.entrypointnorth.com/services/atsep">www.entrypointnorth.com/services/atsep</a> -qualification -shared/	Sweden.
23/09 - 02/10 /2024	ATSEP Qualification SMC Combined (Virtual Classroom) . <i>Institution: Entry Point North.</i> <a href="http://www.entrypointnorth.com/services/atsep">www.entrypointnorth.com/services/atsep</a> -qualification -smc-combined/	Sweden.

### OCTOBER/NOVEMBER 2024

07 -25/10/2024	ATSEP Qualification – Surveillance. <i>Institution: DFS Air Navigation Services Academy, Langen.</i> <a href="http://www.dfs.de/homepage/en/services/training/">www.dfs.de/homepage/en/services/training/</a>	Germany.
14-18/10/2024	Safety Management System Implementation – Under the Fellowships for African Civil Aviation Commission Member States. <i>Institution: Singapore Aviation Academy.</i> <a href="http://www.caas.gov.sg/saa/fellowships">www.caas.gov.sg/saa/fellowships</a>	Singapore
28/10 - 08/11/2024	Executive Civil Aviation Management. <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/index.php/course">www.easa.ac.ke/index.php/course</a> -calendar/executive -civil-aviation -management -1	Nairobi, Kenya

### NOVEMBER/ DECEMBER 2024

11-20/11 /2024	ATSEP Qualification – Shared. <i>Institution: Skyguide Academy, Wangen.</i> <a href="https://dfs.de/homepage/de/services/training/dfs">https://dfs.de/homepage/de/services/training/dfs</a> -sg-atsep -training -schedule -221222 -v2.pdf?cid=14m	Switzerland.
11/11 - 06/12 /2024	DME Maintenance . <i>Institution: East African School of Aviation (EASA), Embakasi Campus.</i> <a href="http://www.easa.ac.ke/course">www.easa.ac.ke/course</a> -calendar/dme -maintenance	Nairobi, Kenya





training for excellence  
SINCE 1964



Elevate Your Expertise with Nigerian College of Aviation Technology: Where Excellence Meets Innovation in ATSEP Training!

Basic  
Training

Air Traffic Safety Electronics Personnel (ATSEP) – Basic (Online)  
*Member - ICAO Training Package (M-ITP)*

Qualification  
Training

ATSEP - Airport Power Systems and Facilities Maintenance (ICAO STP)  
ATSEP - Communication Equipment Maintenance (ICAO STP)  
ATSEP - Data Processing & Automation (ICAO STP)  
ATSEP - Surveillance Equipment Maintenance (ICAO STP)  
ATSEP - Systems Monitoring & Control (ICAO STP)  
ATSEP Navigation Aids Equipment Maintenance (ICAO STP)  
ATSEP Pre-On-the-Job Training Course (ICAO STP)

### Why Choose NCAT Zaria?

- World-Class Training:** Our cutting-edge facilities (Classroom & online) and experienced instructors guarantee you receive world-class competency-based aviation Training.
- Global Recognition:** Join a network of graduates who are highly sought after by Air Navigation service providers and aviation organizations worldwide.
- International Standards:** Be assured that your training at NCAT Zaria aligns with the strictest international regulations for safety and excellence.
- Diverse Programs:** From pilot training to air traffic management and maintenance engineering, we offer a wide range of programs to suit your aviation aspirations.
- A Legacy of Excellence:** With decades of experience, NCAT Zaria has been at the forefront of aviation training in Africa and beyond.

Contact Us Today!

Visit our website: [www.ncat.gov.ng](http://www.ncat.gov.ng)

Email: [info@ncat.gov.ng](mailto:info@ncat.gov.ng) ; [hisdu@ncat.gov.ng](mailto:hisdu@ncat.gov.ng)

Phone: +234-8187-177-025

Ready to Take the First Step?  
Sign Up Today!

[www.elearning.ncat.gov.ng](http://www.elearning.ncat.gov.ng)

Address: Zaria Aerodrome, Sokoto Road, P. M. B. 1031, Zaria, Kaduna State, Nigeria



## International Federation of Air Traffic Safety Electronics Associations

*The authoritative voice  
on the competence of air traffic safety electronics personnel.*

*Using our strong global network, we actively contribute to the improvement of the air traffic safety performance.*



NVU IFATSEA  
4. Jula br. 105/55,  
Podgorica  
Montenegro  
| Tel: +233 244 816782 |  
[www.ifatsea.org](http://www.ifatsea.org)