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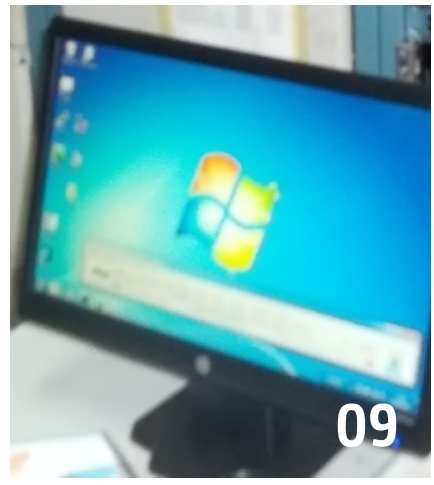

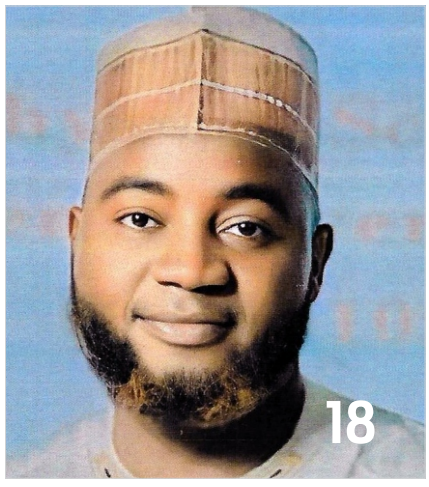

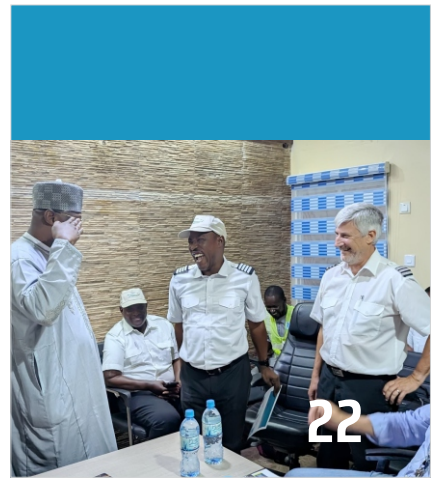

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Cover Photo: A multi-rotor drone equipped with Rohde and Schwarz's R&S® EVSD 1000 VHF/UHF NAV/Drone Analyzer. Photo Credit: Rohde & Schwarz GmbH & Co. KG.

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Editorial

THE CNS/ATM INDUSTRY: GOING DIGITAL

The unprecedented explosion of the digital age and the frenzied digitalisation, automation, virtualisation, and interoperability of all the spheres of the aviation industry are creating novel and highly innovative opportunities for virtually all the operational realms of the global aviation industry, particularly critical air navigation service (ANS) sectors whose appetite for technological innovations, in recent times, has assumed an uncommon dimension. From increasingly versatile automated air traffic services message handling systems, smart flight plan display systems, digital VoIP radios and cutting-edge digital remote tower technologies to modularised digital aviation information broadcast solutions, the emerging L-band digital aeronautical datalink communication system (LDACS) and state-of-the-art software and hardware for advancing the capability of drones for flight calibration as well as for aircraft and airport inspection use cases, both existing and emerging technological innovations continue to present a wide array of new opportunities for addressing growing industry demands for robust data integration platforms and innovative ANS/ATM systems for driving the continuing safety, efficiency, and environmental sustainability of the global air navigation system.

This scenario clearly underlines the relevance of the theme, "Digital Transformation in CNS/ATM: Strengthening ATSEP Competencies for a Safer and Sustainable Future", adopted by the IFATSEA (International Federation of Air Traffic Safety Electronics Associations) Africa Regional Office and the Uganda Air Transport Safety Engineering Association (UGATSEA) for the 15th Africa Region Meeting (ARM) scheduled to hold in Kampala, Uganda from 17 to 20 June, 2025. Although targeting just the implication of the digitalisation of the CNS/ATM (communication, navigation, and surveillance/air traffic management) space on the competency aspect of air traffic safety electronics personnel (ATSEP), the theme, nevertheless, calls attention to the potentially diverse ramifications of CNS/ATM digitalisation.

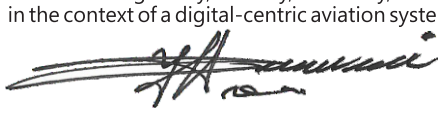
To be sure, the increasing digitalisation, virtualisation and automation of the air navigation services provision realms can impact the ANS industry in a wide variety of ways. There is the question surrounding the need to upgrade and transition from legacy systems to modern digital technology-driven terrains in a seamless manner. This transition expectedly occasions concerns surrounding systems and protocol compatibilities as well as the feasibility of interoperability and data integration. Another defining attribute of aviation system digitalisation, virtualisation and automation are concerns revolving around the susceptibility of the industry to 'digital attacks' within the global cyberspace coupled with worries linked to the prospect of a wholesale adoption of AI (artificial intelligence) technologies and techniques.

Now, coming to the focal point of the 15th ARM's theme in relation to the digitalisation of the CNS/ATM operational space, the increasing adoption of digital technologies in the air traffic safety electronics personnel (ATSEP) working environments definitely directs attention to issues surrounding ATSEP training and competency. In this vein, the significance of the adoption of competency elements and competency units that take due cognizance of an in-depth understanding of the nuances of digitalisation cannot possibly be overemphasized. Allied with this need is the importance of a clear understanding of the nuances and affordances of automation and virtualisation, with an unalloyed appreciation of the levels of automation appropriate for operational efficiency and safety in the context of the CNS/ATM techno-operational space.

This argument in no small measure underscores the need to take a second look at ICAO Doc 10057 (*Manual of Air Traffic Safety Electronics Personnel Competency-based Training and Assessment*) with a view to aligning its content with contemporary and emerging realities within the air traffic safety engineering operational milieu. The emphasis here is on the overarching need to incorporate vital competencies relating to cybersecurity and emerging ATM virtualisation, spiced with drills and cognitive elements focused on sharpening the understanding of ATSEP regarding the nuances and affordances of automated air navigation systems.

The importance of the role of the International Federation of Air Traffic Safety Electronics Associations (IFATSEA) in ensuring this much needed rejigging of Doc 10057 cannot be possibly overstated. To be fair, the Federation has been making remarkable interventions not only with respect to the aspects in question but also in relation to other subject matters including the operational safety of ATSEP and the need for the global standardization of ATSEP certification.

With so much on the horizon regarding the future of CNS/ATM practices, now, perhaps, is the appropriate time for stakeholders in the CNS/ATM techno-operational space all over the world to start thinking seriously about the systems and personnel components of CNS/ATM vis-à-vis the role they play in promoting the continuing safety, security, efficiency, and sustainable development of aviation in the context of a digital-centric aviation system. ■



Adeyinka Olumuyiwa Osunwusi, PhD.

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DRIVING COLLABORATION, TRANSPARENCY, AND PROFESSIONALISM IN THE AFRICAN CNS/ATM DOMAINS: SAM MAHLANGU, IFATSEA DIRECTOR FOR THE AFRICA REGION

Sam Mahlangu is the Head of Training Delivery and Systems at the ATNS's Aviation Training Academy (ATA) of South Africa. He leads a portfolio that incorporates the formulation, planning, implementation, and governance of the training delivery and aviation training infrastructure management (CNS/ATM systems). He has over 20 years of experience in the aviation industry, including 12 years in the aviation training environment. He holds a Master's degree in Business Administration (MBA) and the International Executive Development qualification. Sam serves as an industry Advisory Board Member in the Department of Electrical and Electronic Engineering at various universities in South Africa. He also serves as the International Federation of Air Traffic Safety Electronics Associations (IFATSEA) Director for the Africa Region.

In this interview with *Air Traffic Safety Electronics International* Managing Editor, Adeyinka Olumuyiwa Osunwusi, Sam shared his insights regarding a wide array of aviation-safety and –efficiency issues including the dynamic changes in terms of the techno-operational aspects of African aviation, the impact of the increasing digitalisation of the CNS/ATM working environment on air traffic safety electronics personnel (ATSEP), and the implications of the growing occurrence of GPS spoofing and jamming.

As the Regional Director of the Africa region of the International Federation of Air Traffic Safety Electronics Associations (IFATSEA), what are some of the dynamic changes you are seeing today across the African aviation sectors in terms of the CNS/ATM techno-operational landscapes?

African ANSPs are increasingly aligning with ICAO's ASBUs, with growing regional collaboration through various industry bodies. There are concerted efforts to increase the level of cross-border coordination, particularly with regional FIR realignment and the implementation of seamless African Sky initiatives, aimed at harmonising ATM systems. There are also tangible initiatives to implement the shift towards digitised tower and en-route operations, with some airports beginning to explore digital remote towers. Amidst all these interventions, the ATSEP roles are evolving as systems become more software-centric and integrated, requiring continuous upskilling and retraining in systems engineering, cybersecurity, and automation.

The 15th IFATSEA Africa Region Meeting's theme is focused on digital transformation in the CNS/ATM realm. How would you assess the African ANSPs, CAAs, and airport authorities today in terms of the adoption of digitalisation in the air navigation cum air traffic management terrains?

In assessing the current state of digitalisation among African ANSPs, CAAs and airport authorities, the picture is mixed and marked by both commendable progress and recurring challenges. Countries with high traffic volumes, such as Kenya and Egypt, have made significant investments in modernising the CNS/ATM infrastructure. Some countries, such as South Africa, have adopted the ADS-B and are on the journey of transitioning from AIS to AIM, which is another significant milestone. Additionally, collaborative efforts are being made to achieve vital initiatives such as AFI Seamless Sky to support harmonised digital goals.

There are still growing concerns about cybersecurity as systems become more interconnected and digital. Therefore, cybersecurity continues to be a growing concern. Human capital and training are also key areas of concern attributable to high shortages of critical skills to manage, maintain and upgrade digital systems.

What would you say about issues surrounding the training and competence of ATSEPs vis-à-vis the prospect of working in an increasingly digitalised and automated environment?

The training and competence of ATSEPs remain a critical concern, especially as the industry continues to evolve toward greater digitalisation and automation. The proliferation of digital systems, which heavily rely on complex software, sophisticated data communication and integration, continues to outpace the training interventions earmarked at closing the rapid technological gaps. Training platforms or available courses are still oriented toward the legacy systems and may not be evolving rapidly to prepare for this significant shift.

The glaring system integration and service-oriented architectures not only require ATSEPs to have strong foundational knowledge of electronics and engineering, but also competence in software engineering, data analytics and system integration. All these changes require a deeper understanding of systems and the need to be conscientious about safety interdependence. Automation and digitalisation are not one-time shifts but continuous processes. Training must be seen as an ongoing professional requirement, not a one-time event. Organisational culture and budgeting often do not support continuous upskilling, which is essential to keep ATSEPs current and competent.

And how would you describe the potential impact of the increasing adoption of digitalisation technologies in CNS/ATM on the tasks and responsibilities of ATSEPs?

The increasing adoption of digitalisation technologies in CNS/ATM systems has a significant and evolving impact on the responsibilities undertaken by ATSEPs. For instance, the shift towards software-intensive systems requires these professionals to be proficient in software management, cybersecurity, and system integration, rather than only maintaining hardware components.

The integration of emerging technologies such as AI, Machine Learning,

and Augmented Reality is being introduced for system management and training. This, in a sense, requires the ATSEPs to adapt to supervising these tools, which require continuous learning and upskilling.

Still talking about CNS/ATM digitalisation and automation and the adoption of automated technologies, what do you see as the major challenges as far as Africa is concerned?

Many African countries face limited or outdated infrastructure for both aviation and digital communication. These infrastructure gaps continue to be a stumbling block for Africa to thrive in technology deployment. The challenge even extends to ancillary systems such as electricity and broadband networks, which are paramount to effective system operations.

Funding for the acquisition of these technologies also remains a major challenge. The CNS/ATM modernisation requires significant capital investment, which many African states struggle to prioritise amid competing national development needs. There are funding mechanisms available. However, there is limited access to them, which results in slow progress in the implementation of any technological revolution.

Another major challenge is the lack of harmonised policies and regulatory frameworks across the continent, which complicates interoperability and regional integration. This bureaucratic inertia and slow institutional reform delay the adoption of modern aviation technologies. For Africa, the successful digitalisation of CNS/ATM systems depends not just on acquiring technology, but also on addressing systemic challenges—from infrastructure and investment to governance and training. A coordinated, well-funded, and inclusive approach—supported by regional bodies like AFCAC and international partners—will be critical to overcome these hurdles.

The industry's attention is gradually shifting to the utility of drones for the purpose of conducting flight checks. What is your take regarding this emerging technological solution?

The use of drones for conducting flight checks represents a promising and innovative shift in aviation maintenance and safety practices. Drones can bring efficiencies in conducting human-intensive activities and cover large areas in a fraction of the time, minimising aircraft downtime and increasing operational efficiency. In the medium to long term, significant cost reduction could be realized through reduced labour hours, accelerating turnaround and circumventing prolonged grounding of aircraft.

The use of drones for flight checks is a forward-thinking solution that aligns well with the industry's goals of enhancing safety, efficiency, and data-driven maintenance. While there are implementation hurdles to overcome, the long-term benefits make it a compelling innovation worth adopting, with the right safeguards and training in place.

How, then, would you rate the future of the conventional flight calibration technique in relation to a drone-enabled technique?

The future of conventional flight calibration techniques, when compared to drone-enabled techniques, appears to be increasingly limited, though not obsolete in the short term. The conventional flight calibration is still highly accurate, well-established and certified by aviation authorities. However, focusing on accuracy and precision, drones carry sophisticated payloads, for example GNSS and LDAR, for high precision measurements, though regulatory acceptance is still catching up.

Conventional flight calibration techniques are likely to remain relevant for high-stakes, large-scale, or internationally regulated operations in the near term. However, drone-enabled calibration techniques represent the future, offering cost efficiency, flexibility, and safety, especially for localised, routine, or emerging aviation environments, for example regional airports and urban air mobility.

"GPS JAMMING AND SPOOFING HAVE EMERGED AS SIGNIFICANT THREATS TO GLOBAL AVIATION SAFETY, AND THEIR IMPLICATIONS FOR THE AIRSPACE ARE INCREASINGLY CONCERNING."

Just recently, Egyptian ATSEPs formally joined IFATSEA under the PAS umbrella. How do you see this development and how significant is it to the visibility and strength of the African continent in the context of the global ATSEP community?

This recent development of PAS formally joining IFATSEA is a significant milestone for both Egypt and the African continent within the global ATSEP community. It is very much in line with our strategic objective, as a region, to grow our footprint on the continent. Egypt joins Zambia and Seychelles as one of the affiliates that have recently joined this rapidly growing federation. Our strategy is to increase our footprint by 50% before the end of our tenure in 2026. The continent has 54 states, and only 19 countries are affiliates of IFATSEA. You can therefore see that work is cut out for us to achieve our objective.

Egypt is a major aviation hub in Africa, strategically positioned between the Middle East, Europe, and the rest of Africa. By officially joining IFATSEA, Egyptian ATSEPs bring both technical expertise and geopolitical relevance to the African voice within the federation. This strengthens the continent's representation in global forums where standards, safety protocols, and professional development agendas are shaped. This move sets a precedent and can act as a catalyst for other African countries where ATSEPs may still be working in fragmented or unrecognised capacities.

Egypt's formal engagement could inspire similar commitments, promoting the professionalisation and recognition of ATSEPs across Africa. We are very excited to be joined by PAS and look forward to working closely with them in our pursuit to improve safety performance on the continent and beyond.

At the recently concluded Airspace World 2025 in Lisbon. From the Right: Sam Mahlangu, Frank Kofi Apeagyei (IFATSEA President), Umesh, and SKYRADAR CEO, Dr. Ulrich Scholten.

Now, let's talk about the growing global concerns regarding GPS jamming and spoofing. How significant is this for the safety of the African airspace in particular?

GPS jamming and spoofing have emerged as significant threats to global aviation safety, and their implications for the airspace are increasingly concerning. Africa's aviation sector is expanding rapidly, with increased reliance on satellite-based navigation systems for efficiency and safety. However, the continent's vast and often remote airspace can make it challenging to detect and mitigate GPS interference promptly. While specific incidents in African airspace have been less frequently reported, the global nature of GPS signals means that disruptions elsewhere can have cascading effects. Moreover, the potential for malicious actors to exploit vulnerabilities in less monitored regions cannot be overlooked.

While GPS jamming and spoofing have been more prevalent in certain global hotspots, the interconnected nature of aviation systems means that no region is immune. For Africa, proactive measures, technological investments, and regional cooperation are essential to safeguard its airspace against these evolving threats.

And would you support the growing call for a multi-stakeholder approach to mitigating the challenges surrounding GNSS signal interference?

Yes, I fully support the growing call for a multi-stakeholder approach to mitigating the challenges surrounding GNSS signal interference. Given the critical role GNSS plays in everything from aviation to telecommunications and emergency services, we have seen the impact this is starting to have on the safe operation of flights. Therefore, ensuring its reliability and resilience is not the responsibility of a single party or an isolated response plan. Collaborative efforts involving Member States, industry stakeholders, researchers, and international bodies are essential to develop robust policies, share best practices, advance technological solutions, and coordinate effective responses to both unintentional and intentional interference. A unified, cooperative strategy is the most effective way to safeguard GNSS infrastructure and maintain global trust in its integrity.

Finally and talking about your role as the IFATSEA Regional Director for Africa, how would you describe your guiding principles as you continue to pilot the affairs of IFATSEA Africa?

As the IFATSEA Regional Director for Africa, my guiding principles are rooted in collaboration, focused and intentional leadership, inclusivity, integrity, and strategic vision. I hold the view that the strength of IFATSEA Africa lies in the collective expertise and unity of its affiliates. Therefore, I prioritise open communication and continuous engagement through established forums such the well-coordinated Africa Region Affiliate Committee (ARAC), which meets bi-monthly to deliberate on strategic imperatives for the advancement of the profession, and the Research and Advisory Councils in my office, ensuring that every voice is heard and all contributions are considered for the advancement of the profession and our strategic initiatives in our pursuit of excellence in air traffic safety electronics.

I am committed to transparency and accountability in every decision and initiative, as these are vital to building trust and driving sustainable progress. I also emphasise capacity building and knowledge sharing, because empowering our professionals with the right tools and training is key to advancing aviation safety and technology across the continent. Above all, I strive to lead with purpose — aligning our activities with IFATSEA's global objectives while being sensitive to the unique challenges and opportunities within our region. My role is not just to lead, but to serve and inspire my region — connecting ATSEPs, ideas, and innovative interventions to build a stronger, safer aviation ecosystem for Africa. ■

"I AM COMMITTED TO TRANSPARENCY AND ACCOUNTABILITY IN EVERY DECISION AND INITIATIVE, AS THESE ARE VITAL TO BUILDING TRUST AND DRIVING SUSTAINABLE PROGRESS."

AIR TRAFFIC SAFETY ELECTRONICS INTERNATIONAL READERS

The immediate past President of IFATSEA, Theodore Kiritsis, receiving copies of Air Traffic Safety Electronics International from the President of Nigeria's National Association of Air Traffic Engineers, Selzing Miri, during the 52nd IFATSEA General Assembly, Las Vegas, USA in October 2024.

ATS MESSAGE HANDLING SYSTEM:

Exploring the Functionalities

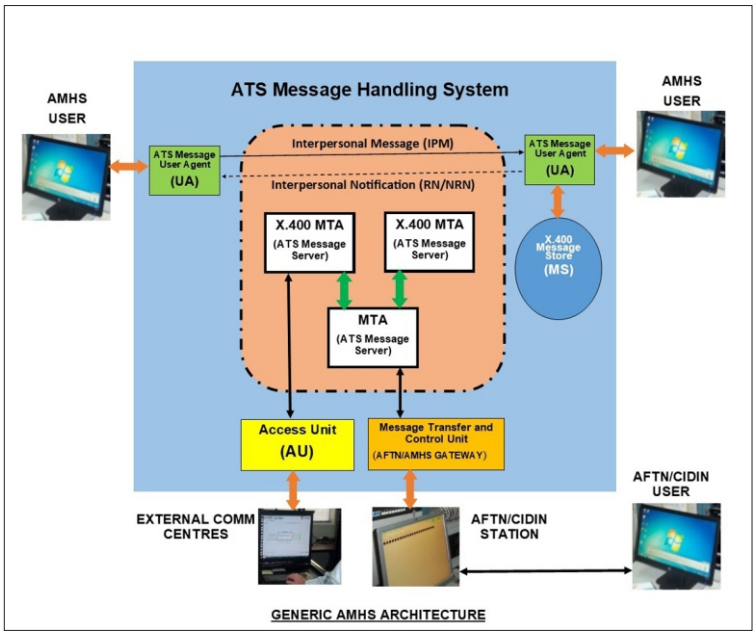
By Adeyinka Olumuyiwa Osunwusi, PhD, FIMC.

The Aeronautical Fixed Service (AFS) is central to operational efficiency in the air traffic management (ATM) domain as it ensures the efficient and timely exchange of information and data that are critical to guaranteeing the continuing safety, regularity and efficiency of international air navigation. It is also a crucial element for delivering on the responsibility that all Contracting States of ICAO incur under Article 28 to the Convention on International Civil Aviation, otherwise referred to as the Chicago Convention of 1944, in relation to the provision of necessary facilities and services to facilitate international air navigation.

Traditionally, AFS has been provided using the X.25 protocol based Aeronautical Fixed Telecommunication Network (AFTN), which is specified in Volume II of ICAO Annex 10, and complemented in Europe by the X.25-based CIDIN (Common ICAO Data Interchange Network). Although the X.25 protocol used for AFTN is compatible with the lower layers of the modern and largely Internet protocol-driven Aeronautical Telecommunication Network (ATN), AFTN presents a number of limitations, including the fact that AFTN operates on only character-oriented procedures, which renders it inadequate for delivering contemporary aeronautical messaging services. There are also obvious limitations in the areas of capacity, protocols, speeds, throughput, functionality, versatility and interoperability.

AFTN provides point-to-point communication based on the legacy X.25 or asynchronous protocols with a communication model that is based on the store-and-forward messaging principle, which allows for the forwarding of only the relevant addresses in a process known as "address stripping". There are also AFTN systems that support message exchange over a variety of other physical layers and standards such as HDLC (High-level Data Link Control), TCP (Transmission Control Protocol) including MEP (Message Exchange Protocol), TP4 (ISO Transport Protocol class 4), and CIDIN. There are also other relatively low speed AFTN variants that feature the long-outdated telegraph technology.

The AFTN addressing scheme is built upon a fixed hierarchical address format composed of 8 upper case letters designating: ICAO Region, ICAO State Code, Location, Organisation, and Organisational Unit or the Communication Terminal. With this, the AFTN is capable of handling multiple addressing of just up to a maximum of 21 with one of five message priority levels, namely SS, DD, FF, GG, and KK. The AFTN message is largely byte-based consisting of character strings. Generally, the system supports two message formats (ITA-2 and IA5) with the character set consisting of only characters that are available for typewriters. What this means, in essence, is that information handled on AFTN are mainly static and textual. For both ITA-2 and IA5 formats, a maximum message text length of 1800 characters or a maximum of 2100 characters, if inclusive of heading, is allowed. However, messages with a text part longer than 1800 are usually segmented in parts, in accordance with ICAO Annex 10, Volume II (Attachment C).



GENERIC AMHS ARCHITECTURE

In recent times, the incremental paces of global air traffic and the increasing complexities of the operational, technical, and regulatory aspects of the global air navigation system have been forcing industry stakeholders, particularly air navigation service providers (ANSPs), to turn to new and emerging technologies in an attempt to keep pace with contemporary and emerging techno-operational realities.

Although the industry has been weighing a number of technological options from digital remote tower offerings to the emerging L-Band Digital Aeronautical Communication System (LDACS), one obvious technology that has been attracting the industry's attention as a viable option for delivering efficient aeronautical messaging services is the Air Traffic Service (ATS) Message Handling System or AMHS.

AMHS ARCHITECTURE

The AMHS is intended as a replacement for AFTN/CIDIN and is fully compliant with ISO/IEC 10021 standards. It is also based essentially on the X.400 messaging standards introduced in 1984 by ITU-T with a Directory Service that is based on the X.500 standards as well as routing and transmission that are largely based on TCP/IP (Transmission Control Protocol/Internet Protocol) as specified in ICAO Doc. 9896. Specifications relating to AMHS architecture and operation are contained in ICAO Doc. 9880, Part II.

As identified in ICAO Doc 9880 Part II, the functional objects of an AMHS End System include: 1) a Message Transfer System (MTS), which also integrates ATS Message Servers containing X.500 Directory Servers and X.400 Message Transfer Agents (MTAs), which serve as message switches using the store-and-forward principles; 2) ATS Message User Agents (UAs) for accessing MTAs and AMHS users. An UA may also incorporate a Directory User Agent (DUA) for access to a Directory; 3) a Message Store (MS), which takes delivery of messages for the UA as well as store messages for an AMHS user; and 4) an Access Unit (AU), which provides access to external communication centres. An ATS Message Handling System may also include an AFTN/AMHS gateway, known as an MTCU (Message Transfer and Conversion Unit) for conversion of AFTN/CIDIN messages to AMHS messages and vice versa.

AMHS INTERCONNECTIVITY

The AFTN is a global aeronautical messaging network consisting of an integrated system of aeronautical fixed stations operating on duplex or half-duplex or simplex mode and connecting a wide array of aviation users worldwide via AFTN message handling switches. AMHS, on its part, is an integral part of the ground to ground communication application of the ATN, which also integrates other ground-ground, ground-air, and airborne applications such as AIDC (Air Traffic Services Inter-facility Data Communication), CPDLC (Controller-Pilot Data Link Communications), CM (Context Management), FIS (Flight Information Service),

and ADS (Automatic Dependent Surveillance).

As specified in ICAO Doc 9880 Part II, the interconnection of AMHS End Systems on the ATN is facilitated using either the ATN/IPS – operating over the TCP/IP protocol stack – or the ATN/OSI, operating over the TP4/CLNP protocol stack-based ATN Internet Protocol. There are regional preferences, however, regarding the implementation of network infrastructure for the interconnections of AMHS End Systems. The Asia Pacific region of ICAO, for example, has adopted a ground-ground infrastructure based on ATN/OSI's TP4/CLNP and the lower layer profile of ATN/IPS' TCP/IP for interconnecting backbone MTAs of ANSPs within the region and non-backbone MTAs within the local domain of an Asia Pacific ANSP or MTAs in other regions respectively using the CAAS addressing scheme. As specified in ICAO EUR Doc 020, a ground-ground network infrastructure based on ATN/IPS' TCP/IP as defined in ICAO Doc 9896 is recommended for implementation in Europe. The AFI (Africa-Indian Ocean) region of ICAO has also adopted – following the outcome of the AFI AMHS/I/TF Meeting held in Nairobi, Kenya in May of 2011 – the ATN/IPS based on the TCP/IP suite.

AMHS SERVICE LEVELS

As specified in ICAO Doc. 9880, Part II, AMHS features two service levels, namely a Basic Service level and an extended service level. The Basic AMHS Service Level is usually featured for AFTN/AMHS migration. It provides ATS messaging services equivalent to AFTN and CIDIN functionalities, although it also provides additional functionalities to support AFTN services including unlimited numbers of message addressees and message length.

The Extended AMHS Service Level features additional X.400 capabilities including binary and large file attachments, security services based on digital signatures, the use of ATN/AMHS Directory services, and the use of standard Interpersonal Message (IPM) heading extensions.

For AMHS operations, 3 message priority levels are possible as against the 5 levels for AFTN messaging. These are: the *Urgent* priority (equivalent to the AFTN 'SS' priority; the *Normal* priority (equivalent to both the 'DD' and 'FF' priorities for AFTN); and the *Non-Urgent* priority (representing the AFTN's 'GG' and 'KK' priorities).

AMHS FEATURES

AMHS operates over IP-based network infrastructure using modern, COTS (commercial off-the-shelf) components and open standards to provide standardized, extensible, real-time digital ATS messaging environments with enhanced security capabilities that include message origin authentication through digital signature of content, message sequence integrity and content integrity using security protocols such as IPSec.

AMHS also features both character sets and binary contents as it also offers higher data speed with unlimited message length and the capacity to accommodate any form of digital information or file attachments containing information such as graphics, texts, images, audio, video, and databases. This makes AMHS more suitable for more demanding bit-oriented applications such as the transfer of binary information using a Store-and-Forward functionality that not only supports message retrieval and repetition but also ensures zero message loss. The capability of X.400 AMHS to retrieve information from a global directory is germane to ensuring the interoperability of AMHS with other protocols and applications.

By and large, AMHS is famed for its relatively higher functionality particularly regarding Directory Access, which allows for the verification of a recipient's message handling capability. This helps to ensure zero message loss.

AMHS ADDRESSING SCHEMES

ICAO Doc. 9880, Part II contains specifications relating to AFTN/AMHS gateway and Originator/Recipient Address (OR-Address) formats. O/R addresses are used to identify and locate MHS users within the MTS. As opposed to the hierarchical 8-character AFTN-Form (AF) addressing scheme, AMHS adopts a structured and complex X.400 addressing scheme, which is typically used in conjunction with an ATN Global Directory based on ITU X.500 specifications. Much as AMHS can be deployed with or without an ATN Directory support, a directory support is required in extended services. Also, because of the glaring differences between AF and MHS-form (MF) addressing formats, a directory is important for the integration of an AFTN/AMHS gateway. This is necessary not only for automating address conversion process using either a Directory Service or Look-up tables but also for simplifying AMHS users' task. The Frequentis-Comsoft's AIDA-NG AMHS solution, for example, integrates three Look-up Tables, namely Management Domain Look-Up Table, CAAS Look-up Table and User-address Look-up Table.

O/R addresses are integral to the AMHS Management Domains (MDs) administered by ICAO states and organizations with all addresses sharing the C=XX and A=ICAO attributes. An integral aspect of MDs is the AMHS MD Register administered by ICAO in accordance with Doc. 9880, Part II with states nationality letters used as default address values.

States are under the obligation to declare and register an AMHS PRMD (AMHS Private Management Domain) value based on one of two AMHS addressing schemes, namely: the XF Addressing Scheme and the CAAS (Common AMHS Addressing Scheme). The XF features 5 address attributes – C, A, P, O, and OU fields. The 0-field has a fixed value (AFTN), while the OU field bears the equivalent 8-letter AF address. Although this scheme is simple, it is not suitable for an AMHS environment with multiple MTAs. An example of an XF-scheme MF address is: ***/C=XX/A=ICAO/P=DN/O=AFTN/OU=DNMMYFYX***.

The CAAS scheme, on its part, features 6 address attributes – C, A, P, O, OU, and CN fields. This scheme is often recommended and is suitable for complex AMHS environments with multiple MTAs in line with ICAO Doc. 9705. An example of a CAAS MF address is: **/C=XX/A=ICAO/P=GERMANY/O=EDFF/OU=EDDD/CN=EDDDYFYX**.

In order to resolve an OR-address based on the XF Scheme from a known 8-character AF address, the PRMD value is determined from the ICAO AMHS Management Domain Identifiers and Addressing Scheme Document, *Table of PRMDs and Addressing Schemes*. Using the state's nationality letters, the XF OR-address is then determined from the States PRMD declarations listed.

Resolving an OR-address based on the CAAS takes two steps. Firstly, the PRMD value is derived from the ICAO Document, *Table of PRMDs and Addressing Schemes*, using the state's nationality letters. Secondly, the O-field value is derived from the ICAO Document, *Detailed Addressing Information for AMHS Management Domains (MDs) implementing the Common AMHS Addressing Scheme* by determining the Geographic Identifier listed for the particular O-field using the Location Indicator of the 8-character AF address.

AFTN/CIDIN-AMHS TRANSITION

Migration from an AFTN/CIDIN terrain to an AMHS environment takes cognizance of the implementation three key components – AFTN/CIDIN servers, AFTN/AMHS gateways, and AMHS servers.

The AFTN/AMHS Gateway, also known as MTCU (Message Transfer and Control Unit), is an outcome of a project called the universal message handling system European ATM Communication Gateway (ECG) initiated and executed by EUROCONTROL member states. The MTCU is very critical to enabling AFTN/AMHS co-existence and full connectivity in accordance with the standards specified in Chapter 4 of ICAO Doc. 9880-AN/466, Part IIB. Its purpose includes providing a gateway between AMHS and AFTN, controlling message flow, converting addresses and contents, traffic logging, generating AFTN service messages, generating AMHS reports and reporting errors.

AFTN/CIDIN-AMHS transition projects typically require a consideration of certain techno-operational details. Of particular significance is a decision regarding the choice of an appropriate management architecture. Two management typologies have been advanced, namely the component management and the integrated management typologies. Component management architecture involves a techno-operational design whereby the AFTN servers, the AMHS servers and the MTCU are separately managed, while the integrated management approach involves an integrated management of the components. ■

PEOPLE

SAAB'S CEO ELECTED EUROPE ASD PRESIDENT

The Aerospace, Security and Defence Industries Association of Europe (ASD), the leading voice for the European aerospace, security and defence industries, elected SAAB CEO and President, Micael Johansson, as its new President and Chairman of the Board during the Association's Board Meeting and 2025 Convention in London recently. Johansson as appointed for a 2-year term, beginning on 15 June, 2025.

As Europe faces unprecedented security challenges, Micael Johansson's appointment comes at a pivotal moment for the continent's security. He is committed to leading ASD in a way that promotes innovation, collaboration, sustainability and a shared vision for a secure Europe.

"I am honoured to accept this position and will work to ensure that ASD plays a leading role in strengthening Europe capabilities and competitiveness," said Micael Johansson, President and CEO of Saab. "I am determined to further reinforce ASD as a driving force to secure the interests of our industry, whilst ensuring a strategic alignment across the European defence, security and aerospace sectors."

ASD represents over 4,000 companies across 21 European countries, working closely with policymakers and institutions to foster a secure and innovative industry ecosystem in Europe.

ACQUISITIONS

SITA ACQUIRES AIRPORT INTERIORS LEADER CCM

SITA, the global leader in air transport technology, has completed the acquisition of Milan, Italy headquartered airport interiors leader, CCM. This acquisition is a strategic move at a time when airports are coming under increasing pressure to invest heavily in seamless service integration, where smart technology and intelligent design work together to reduce congestion and make the most out of every square meter of airport terminal layouts.

"This isn't just about expanding airports. It's about reimagining them," said David Lavorel, CEO of SITA. "With CCM's deep design and execution expertise, we're transforming airports to maximize their existing footprint, optimize passenger flow, and create smarter, more flexible and valuable airport terminal environments that evolve with the changing needs of the industry."

According to SITA's 2024 Air Transport IT Insights report, 63% of airports are prioritizing self-service, biometrics, mobile apps, and IT spending has surged to $8.9 billion as airports focus on automation, AI, and digitalization.

"Building efficient tech-enabled environments is crucial for the future of travel," said Lavorel. "Airports are not just transit points; they mark a moment in a journey, no matter the destination. By integrating our expertise, we bring to life the airports of the future – architecture that is built on tech solutions and driven by efficiency to improve the overall travel experience for passengers and the operations of airport staff."

"For too long, airports have had to choose between efficiency and passenger experience," said Monica Oberti, interim CEO of CCM. "Now, they don't have to. By joining forces with SITA, we can finally bring together the best of both worlds – smart technology, intelligent design, and quality production. Together, we're not just improving airports, we're reshaping them for the future."

SITA and CCM are moving fast to integrate their expertise, ensuring that existing customers experience no disruption in service, while opening up new opportunities to optimize their airport environments.

JOTRON AS ACQUIRES MEP

Jotron AS, the Norway headquartered leading provider of communications solutions, has completed the acquisition of Amsterdam-headquartered Voice Communication Systems (VCS) experts, Micro Elektronische Producten B.V. (MEP). This acquisition expands Jotron's portfolio and reinforces its global presence, enabling even greater value for customers worldwide.

"MEP is excited to join the Jotron group," said Werner van Eck, CEO of MEP. "It will provide us with a faster growth path to reach more customers with our award-winning VCS portfolio. The cultures of Jotron and MEP are very similar, especially in our customer-centric approach and strong focus on quality in everything we do. The combined engineering strengths will lead to even better product propositions for Air Traffic and Maritime Traffic Controllers, helping to make every journey safer."

"We are excited about the acquisition of MEP, which complements our existing portfolio and enables Jotron to deliver a more comprehensive suite of products and services, enhancing safety and operational efficiency for ATC and maritime operators worldwide," said Merete Berdal, Jotron's Managing Director.

TECHNOLOGY

ROHDE & SCHWARZ INTRODUCES ARDRONIS WI-FI

Rohde and Schwarz, the Munich-Germany headquartered leading provider of test and measurement, networks and cyber security solutions, has launched its comprehensive solution, the ARDRONIS Wi-Fi, for detecting, locating, and mitigating Wi-Fi-controlled drones. This innovative solution is part of the ARDRONIS family of solutions, which offers a comprehensive range of new capabilities.

One of the key features of ARDRONIS Wi-Fi is its ability to interrupt the connection between specific pilots and their drones, providing an effective countermeasure against potential threats, completely without interference with other drones or signals. Furthermore, ARDRONIS Wi-Fi can identify drones by decoding the transmitted Remote ID, which provides detailed information about the drone, including its location, speed, altitude, and more. The system also comes with the capability to intercept the video signal transmitted from the drone to the pilot by some Wi-Fi drones and display it to the ARDRONIS operator.

"ARDRONIS Wi-Fi is a game-changer in the field of drone detection and mitigation," said Anne Stephan, Rohde & Schwarz's Vice President, Monitoring and Analytics. "This system offers a robust and intuitive solution for the detection, localization, and neutralization of Wi-Fi-controlled drones, thanks to its cutting-edge features and user-centric design, making it a vital asset for organizations focused on security and surveillance." ■

National Association of Air Traffic Engineers

Nigeria

"We certify Air Safety"

NAAE
We certify air safety

NATIONAL ASSOCIATION OF AIR TRAFFIC ENGINEERS (NAAE)

Affiliated to
International Federation of Air Traffic Safety Electronics Association (IFATSEA)

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NAAE:
Certifying Air Safety, Promoting Seamless Global Airspace

The developmental paces of technological innovations and the frenzied adoption of emerging technologies in the air navigation services (ANS) and the air traffic management (ATM) domains are, no doubt, pushing back the frontiers of air traffic safety electronics practices, redefining the tasks and responsibilities of air traffic safety electronics personnel (ATSEP) and opening up whole new vistas of opportunities for the modernisation, harmonisation, and sustainable development of the global air navigation system. The National Association of Air Traffic Engineers (NAAE) – the authoritative voice for the professional development of Nigerian ATSEP and an affiliate of the International Federation of Air Traffic Safety Electronics Associations (IFATSEA) – occupies quite an enviable niche among the leagues of professional organisations that strive to promote aviation safety and the competence of aviation safety professionals the world over. Officially registered as a professional association on 10 January, 1992 under the then Companies and Allied Matters Decree No. 1 of 1990 with a body of trustees comprising T.O. Ogunshola, P.A.T. Olley, E. Famuyiro and A.C. Ogbuji, NAAE has recorded quite a huge number of milestones that clearly define the professionalism, resilience, techno-operational efficiency, and integrity that are characteristic of aviation professionals in the Nigerian CNS/ATM (communication, navigation, and surveillance/air traffic management) professional milieu.

Engr. Selzing Miri, NAAE President.

A FOCUSED VISION

NAAE's major vision is strongly wedded to professionalism, competence, efficiency, strategic collaboration, and integrity. These attributes have remained and still endure as the guiding principles of the Association.

"NAAE is a professional association and as such our major vision is to promote safe, efficient, effective, and economic air navigation, particularly in Nigeria," says Engr. Selzing Miri, NAAE President. "Our major focal point is to uphold a high standard of professionalism in the discharge of our duties. NAAE strives to ensure that its members are competent and that they discharge their duties with high level of professionalism."

Interactions and collaborations are key to the actualisation of this vision and as such NAAE has adopted a strategy that is premised upon advocacy and symbiotic partnerships.

"We strive to maintain a high standard of knowledge and competence in our members. So, we interact with management to ensure that our members are given the necessary enabling environment through trainings, the provision of necessary tools, and the necessary exposure to emerging technologies in order to be able to discharge their duties creditably," Engr. Miri continues. "So, we are more focused on ensuring that we are a leading ATSEP body not only in Nigeria but globally in terms of maintaining high level of professionalism."

DEFINING MILESTONES

The National Association of Air Traffic Engineers has been playing and continues to play leading roles both at the global and regional levels of the air traffic safety engineering sectors. Within the fabrics of the Africa region of IFATSEA, NAAE has been playing a major role in establishing an ATSEP Licensing Template for Africa as the Chair of an ATSEP Licensing Template Task Team that includes Uganda, Kenya, Ghana, and Burkina Faso. NAAE also commands significant presence within the governance framework of the IFATSEA Regional Office's Research Council, the ARD (Africa Regional Director) Advisory Council and the Africa Region Affiliates Committee (ARAC), which meets bi-monthly to shape IFATSEA Africa's strategic paths. The ARD office has also entrusted NAAE with the all-important task of conducting research on the impact of radiation on ATSEP working on various CNS/ATM systems.

COLLABORATION AND STRATEGIC PARTNERSHIPS

Collaborations and strategic partnerships are key elements of NAAE's organisational philosophy. In this direction, NAAE has established and is actively striving to sustain partnerships with industry organisations such as the Nigerian Air Traffic Controllers Association (NATCA), the Aeronautical Information Management Association of Nigeria (AIMAN), and the National Airtraffic Communicators Association of Nigeria (NACAN).

The collaborative retreat involving NATCA and NAAE, which took place in Port Harcourt, Nigeria from 14 to 16 April 2025, actually marked a new era in the annals of NAAE's strategic partnership drives. Commenting on this forward-looking retreat, Engr. Miri said: "It's actually a collaborative meeting to strengthen our relationship that has not been too good in the past. So, the Port Harcourt retreat has actually put some hope in the drive to unite the two professional bodies."

"The major take-home from that retreat is that these two professional bodies have agreed to work together in the interest of the aviation industry, focusing on collaboration in ensuring that the necessary enabling environments are given to members of the associations to discharge their duties creditably," Engr. Miri adds. "So, the retreat came up with a communique that highlighted some very important points for the management's consideration. What I can say here invariably is that there is a brighter hope for greater collaboration between the two associations resulting in greater benefits to the aviation industry. What I can also say is that better days lie ahead for both the management of the Nigerian Airspace Management Agency (NAMA) and the two professional bodies as we now have a better working relationship among ourselves."

Drones or RPAS: Exploring the Flight Inspections Capabilities

By Adeyinka Olumuyiwa Osunwusi, PhD.

THE CONDUCT OF PERIODIC GROUND AND FLIGHT CHECKS ON RADIO-BASED NAVIGATION AIDS IS A MANDATORY REGULATORY REQUIREMENT ENSHRINED IN ANNEX 10 TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION. TRADITIONALLY, THESE PERIODIC CHECKS ARE CONDUCTED USING CREWED FLIGHT INSPECTION AIRCRAFT CARRYING THE REQUIRED SYSTEMS, INCLUDING ANALYZERS OR RECEIVERS AND AN INTEGRATED AIR-TO-GROUND DATALINK SYSTEM CONNECTING THE ONBOARD SYSTEM TO A GROUND MEASUREMENT SYSTEM. HOWEVER, TECHNOLOGICAL INNOVATIONS IN THE REALM OF UNCREWED AERIAL VEHICLES ARE PUSHING THE TIME-TESTED ART OF GROUND AND FLIGHT INSPECTIONS INTO A BRAND NEW AGE.

That age is an age that will be largely characterised by the dominance of uncrewed aerial vehicles in the global flight inspections arena. It is an age that is, perhaps, better described as the Age of Unmanned Calibration Aerial Vehicles.

To say the least, drones, remotely piloted aircraft systems (RPAS), unmanned aerial systems (UAS), or unmanned aerial vehicles (UAVs) are becoming increasingly ubiquitous, opening up whole new vistas of utilities particularly for tasks and missions where precision, affordability, timeliness, accessibility, security and ease of operation are the defining attributes. Today, drone use cases that can be described as commonplace are in the areas of aerial photography and videography, traffic monitoring, disaster management, emergency medical support, search and rescue, precision agriculture, remote sensing mapping and surveying, supplies delivery, aerial photogrammetry, infrastructure inspection, security surveillance and environmental monitoring.

One other obvious area, which is just in the aviation safety, security and operational efficiency realms, is the use of drones for airport and aircraft inspections. But, debate regarding the utility of drones for aviation-related missions does not appear to be so riveted on the aircraft and airport inspection use cases as is presently the case for debates regarding drones use cases that are connected with activities in the flight inspections or air navigation systems verification realms.

DRONES IN AIRCRAFT AND AIRPORT INSPECTIONS

The use of sensors-and-cameras-equipped drones for inspecting aeronautical infrastructures in airports such as runway conditions and the structures of aircraft has become very commonplace in recent times, although the utility of drones in these terrains are largely supplementary and not intended to replace the conventional, time-consuming, often human-error prone and complex visual-inspection dependent methods. In this area of utility, drones are known for efficiency and that can't be contested.

"Drones can bring efficiencies in conducting human-intensive activities and cover large areas in a fraction of the time, minimising aircraft downtime and increasing operational efficiency," says Sam Mahlangu, the International Federation of Air Traffic Safety Electronics Associations (IFATSEA) Regional Director for Africa. "In the medium to long term, significant cost reduction could be realized through reduced labour hours, accelerating turnaround and circumventing prolonged grounding of aircraft."

For aircraft inspection, drones play a key role in what is often referred to in the industry as a non-destructive testing (NDT) technique for the inspection of aircraft with a view to detecting surface and subsurface structural flaws and discontinuities. This presupposes that drones utilised for aircraft and airport inspection must carry a range of equipment such as cameras, Infrared Thermography and Laser Imaging Detection and Ranging (LiDAR).

ENTER THE FLIGHT INSPECTION DRONES

The conduct of periodic ground and flight checks on radio navigation infrastructure is a mandatory operational requirement. It is a responsibility that all Contracting States of the International Civil Aviation Organization (ICAO) incur under section 2.2.1 (Chapter 2) of ICAO Annex 10, Volume I.

Generally speaking, drones come in different forms and sometimes with varying levels of automation. There are the fixed-wing horizontal takeoff and landing (HTOL) typologies that fly just in the same manner as fixed-wing aeroplanes. There are the single-rotor VTOL (vertical takeoff and landing) and the multi-rotor VTOL variants that fly exactly like helicopters. The single-rotor VTOL aircraft are sometimes classified as helicopters while the multi-rotor variants, which are often used for aircraft and airport inspections, are called multicopters, although, in terms of speed, they are much slower than the HTOL variants. And there are also the emerging fixed-wing hybrid VTOL typologies that combine the flight capabilities of HTOL and VTOL aircraft.

Notwithstanding the form or shape a drone assumes, it must exhibit certain features and be equipped with a set of systems (both hardware and software) in other to qualify for a role in the flight inspection realms. Basically, three subsystems are essential: one, the drone system along with a payload (analyzer, console or receiver); two, a ground control subsystem; and three, a communications link connecting the ground system and the aerial vehicle along with its payload.

That said, the raging debate regarding the utility of drones for flight calibration activities has nothing to do with matters of typology. Neither is it connected with the dilemma that both air navigation service providers (ANSPs) and civil aviation regulators are currently confronted with in relation to the safe and seamless integration of the growing number of uncrewed traffic into an already crowded controlled airspace as well as the regulation of the activities of unmanned aerial vehicles. Rather, it is all about whether these uncrewed contrivances of modern technology can actually deliver cutting-edge calibration solutions to the standards specified in the relevant ICAO Annex and guidance manuals such as ICAO Annex 10, and ICAO Doc 8071 (Manual on Testing of Radio Navigation Aids) Volume I (Testing of Ground-based Radio Navigation Systems). And this is exactly where the debate actually gets trickier.

Of course, there is also the debate regarding whether drones are meant to play just a supplementary role or assume a truly mainstream functionality when it comes to ground and flight inspections. On this pedestal, Sam Mahlangu is quite upbeat about the utility of drones for flight checks. Says he: "The use of drones for conducting flight checks represents a promising and innovative shift in aviation maintenance and safety practices."

ICAO ANNEX 10, CHAPTER 2, SECTION 2.2.1

"Radio navigation aids of the types covered by the specifications in Chapter 3 and available for use by aircraft engaged in international air navigation shall be the subject of periodic ground and flight tests."

Engr. Selzing Miri, NAAE President.

Engr. Selzing Miri, President of Nigeria's National Association of Air Traffic Engineers (NAAE), and General Manager, Flight Calibration Department at the Nigerian Airspace Management Agency (NAMA), Nigeria's ANSP, is truly unequivocal about what the reality is currently. Says he: "Although a good support, a drone is actually a complementary aspect of flight calibration now. Definitely, drones cannot replace flight calibration aircraft presently, except it's a situation where the regulations have been amended. Most regulators don't have drone regulations. In terms of range, the capability of drones is 1 to 1.5 nautical miles (NM) on line of sight whereas flight calibration aircraft can do a range that is in excess of 20 NM. As such drones cannot perform most of the specifications in Doc 8071."

The implication of this range limitation on the part of drones, according to Dr. Ifeanyi Frank Ogochukwu, the Managing Director of Aviation Africa Platform is that: "High-altitude or long-range checks may still require traditional platforms."

Talking about ICAO Doc 8071, a 2018 amendment to the guidance manual actually suggests the need for an assessment of the utility and capability of drones in terms of payload, speed and range for ground and flight inspections for navigational aids.

"Doc 8071 does not capture drone activities, but only gives detailed specifications regarding what it takes during flight calibration," Engr. Miri submits. "The Doc does not see a future where, one day, drones will be used. So, most of the specifications like measurements from 6 NM, 12 NM, 17 NM and 25 NM are specific for flight calibration aircraft. And for now, it's known that drones cannot provide those services. But now that drones are coming, there may be amendments to regulations that will allow drones to be accepted."

THE PROS AND THE CONS

The traditional or conventional methods of ground and flight inspections deploy the typical crewed – usually manned by two pilots and at least one flight calibration engineer – flight inspection aircraft, which are typically multi-engine turbo-prop or jet aircraft that are fully equipped with the required equipment in terms of avionics, consoles, and receivers or analyzers. The emerging drone-based flight inspection methods, however, deploy smaller unmanned aerial vehicles, which are typically the multi-rotor variants that usually come with a composite measurement system that integrates measurement receivers, analyzers and antennas.

That said, the important question is whether the prospects and challenges attributable to each of these two flight inspection methods can be properly balanced on a fair scale of probability.

"The future of conventional flight calibration techniques, when compared to drone-enabled techniques, appears to be increasingly limited, though not obsolete in the short term," Sam Mahlangu opines. "The conventional flight calibration is still highly accurate, well-established and certified by aviation authorities. However, focusing on accuracy and precision, drones carry sophisticated payloads, for example GNSS and LDAR, for high precision measurements, though regulatory acceptance is still catching up."

Some experts who spoke to *Air Traffic Safety Electronics International* credit drone-based calibration systems with the capability to detect and measure variations in ILS (Instrument Landing System) signals in a manner unmatched by conventional measurement methods. Some experts also credit the improved measurements from drone use with the added advantage of helping to reduce the periodicity of flight inspections particularly in respect of ILS systems, which are becoming increasingly stable in terms of performance. Another plus that flight inspection experts are wont to bring out are the time-saving and cost-saving advantages of drone's flight inspection use case. Experts also refer to other benefits, including reduction of noise pollution, reduction of CO^2 emission, and reduction of airport downtime.

"For a fact, drones are increasingly being recognized as viable alternatives, or at least significant complements, to legacy flight calibration techniques," says Dr. Ifeanyi Frank Ogochukwu, Aviation Africa Platform (AAP) Managing Director and a CNS/ATM cum cybersecurity expert. "Their use in aeronautical

systems calibration, particularly for navigational aids and airport infrastructure checks, offers several advantages such as lower operational costs, improved safety, and faster deployment. Drones can executive precise, pre-programmed flight paths to collect data in a consistent and repeatable manner, which is especially useful for calibrating ground-based equipment like ILS, VOR and radar systems. In controlled scenarios, they provide sufficient accuracy to support some categories of checks without requiring full-scale aircraft."

"When you use a drone, you are able to reduce the time that the calibration aircraft will use to check that system if the errors detected are corrected. Thus, you will save a lot of flight time and resources because globally flight calibration is charged per hour," says Engr. Miri. "Even now, we also charge per hour. I think the last charge ASECNA billed us when we were using them was 8,500 Euros per hour. I don't know what they charge now per hour. So, if you are able to use drone to cut off three or four flight hours, you save a lot of money. That's one advantage of using a drone."

And that's as far as the prospects and pluses can go. What about the challenges?

"One major challenge that I can see for now is that most of the drones in the public domain for flight calibration do not have an alerting system that would enable the air traffic controllers to know the position of the drones and be able to effect aircraft control with reasonable separation of the drones," opines Engr. Miri. "So, if the manufacturers of flight calibration drones can start thinking of an alerting system like ADS-B or whatever that can provide that information to the controllers when drones are being used for the calibration of navigational facilities."

Dr. Ogochukwu, AAP Managing Director.

"The other challenge has to do with unmanned traffic management and aerodrome cum approach procedures. You know that our approach phases are designed for aircraft," Engr. Miri adds. "So, when you are going to use a drone for full flight calibration, there should be aerodrome procedures that would give consideration to drone activities because most of the approach procedures we have now are for aircraft approach."

The question of the utility of drones for either routine checks or the inspection of new navigational aids for commissioning purposes is another issue in contention when it comes to discussing the pluses and minuses of drone use cases for ground and flight inspections.

"Now, I am not too sure about the performance of drones when it comes to commissioning of a new aid because that process typically calls for a thorough check," says Engr. Miri. "For routine checks, though, I have high ratings for drones. But, when it comes to commissioning of aids, we have to consider that the checks have to be thorough and meet all ICAO specifications. I am not too sure drones have those capabilities."

The COLIBREX's COL-X8 Drone.

Dr. Ogochukwu also sees quite a number of challenges confronting the use of drones for flight calibration. Says he: "While the use of drones is promising, the integration of drones into flight calibration activities faces several challenges, including regulatory constraints, technical limitations, signal fidelity and accuracy, interference and electromagnetic compatibility as well as data validation and standardization issues."

"In relation to regulations, obtaining necessary approvals can be complex and time-consuming because aviation authorities globally are still developing frameworks that allow drones to operate in controlled airspace, especially in proximity to runways and NAVAIDS," Dr. Ogochukwu adds. "Drone currently have payload, endurance, and range limitations compared to manned calibration aircraft. Another challenge is ensuring that drones can replicate the flight profiles and data fidelity of crewed aircraft, especially for dynamic tests like glide slope or DME signal evaluation. This is still an evolving technical area. Other two areas are the assurances that drones themselves do not introduce signal interference plus ensuring that any drone-derived data must be validated to ensure it meets ICAO and national regulatory standards."

But, what about issues surrounding the utility of drone-based calibration reports for extending the periodicity of facilities, given the conventional practices whereby the periodicity of a facility is extended after the successful conduct of flight checks?

On the issue of periodicity extension, Engr. Miri has this to say: "For now, you cannot use drones report to extend the periodicity of your facility. After flight check, you extend the periodicity or the currency of that particular facility. If you have used drones, you don't have the authority to use the report to extend the periodicity of your facility because such is not specified in any ICAO document now."

GROWING ARMIES OF INDUSTRY PLAYERS

The drone flight calibration arena is blossoming by the day with an increasing number of industry players offering a wide variety of service portfolios from the provision of consoles to the provision of complete complements of the hardware and software required for meaningful drone-driven flight inspection. One of the popular and reputable original equipment manufacturers (OEMs) in the drone-enabled flight inspection arena is the Rheinmünster-Germany headquartered Colibrex GmbH, a leading provider of drone-based RF measurement solutions, which is famed for providing smart drone solutions for flight inspection using its UAS platforms – the COL-X8 drones.

Sam Mahlangu, IFATSEA Africa Regional Director

On March 27, 2025, Colibrex, in partnership with Abuja-Nigeria based technology company, LiviaSoft Technologies

A representative of the German company, COLIBREX, addressing the pre-drone demonstration workshop held at the Abuja International Airport on 27 March 2025.

Ltd, undertook a demonstration of its drone calibration system as part of a workshop tagged "One-Day Executive Workshop on NAVAID Drone: Advancement in Air Navigation and Safety", which was organized by Nigeria's sole ANSP, the Nigerian Airspace Management Agency (NAMA) at the Nnamdi Azikiwe International Airport, Abuja, Nigeria with the full support of the Federal Ministry of Aviation and Aerospace Development.

Colibrex's NAVAID drone solution is unique because it is a fully integrated solution that comes with the capability of providing field measurements required for the verification of navigational aids such as the instrument landing systems (ILS), the VHF Omnidirectional Radio Range (VOR) and the Doppler VOR (DVOR). The company has obviously been making tremendous market in-roads with its COL-X8 drone-enabled calibration system. It is on record that Colibrex, in the first month of 2024, completed the delivery of a total of 11 of its NavAidDrone systems to SENEAM, the Mexican ANSP, for the inspection and maintenance of ILS and VOR systems at all Mexican airports.

Another key player in the drones-for-flight inspections field is Chelyabinsk, Russia-based company, CURSIR, which produces NAVAID calibration drones for extended ground and flight tests covering the main profiles of VOR, DVOR, ILS, RDF, MLAT, PAPI, and runway lights.

And, then, enter the Germany headquartered tests and measurements giant, Rohde and Schwarz, which manufactures and supplies a wide range of signal level and modulation analyzers that can be used as measurement drone payloads. The R&S® EVSD1000 VHF/UHF Nav/Drone Analyzer is especially famed for drone-based inspection of terrestrial navigation and ATC communications systems in the frequency range from 70 MHz to 410 MHz. The analyzer also comes with the capability to carry out accurate measurements covering VOR, ILS, DME/TACAN, GBAS and ATC communications systems at a measurement rate of 100 data records per second. Featuring an integrated air-to-ground WiFi datalink communication module and weighing just 1.5 kg, the Rohde & Schwarz's R&S® EVSD1000 is typically suitable for use aboard medium-sized drones.

In partnership with Rohde and Schwarz, Techno Sky, a spin-off ATM infrastructure company from the Italian Civil Aviation Authority, ENAC, secured, a couple of years or so ago, ENAC approvals for the provision of drone-based ILS and VOR ground inspections at all Italian civil airports using the R&S® EVSD1000. The ENAC approvals followed the regulator's February 2020 declaration regarding the full compatibility of the drone-based measurements carried out using the R&S® EVSD1000 at the Italian airports at Brescia Montichiari and Forti with ICAO standards.

Prepping the Colibrex COL-X8 flight calibration drone for flight inspections demonstration at the Abuja International Airport on 27 March, 2025.

THE FUTURE OF DRONE-BASED FLIGHT INSPECTIONS

Industry stakeholders are unanimous about the prospects of a brighter future for the large-scale use of drones for ground and flight checks.

"While drones are not yet a complete replacement for legacy flight calibration systems, they represent a transformative tool with growing utility, especially for periodic maintenance checks, system diagnostics, and hard-to-reach site assessments," says Dr. Ogochukwu. "Over time, with continued regulatory harmonization and technological advancement, they are likely to play a central role in modern CNS/ATM infrastructure management."

"The use of drones for flight checks is a forward-thinking solution that aligns well with the industry's goals of enhancing safety, efficiency, and data-driven maintenance," says Sam Mahlangu. "While there are implementation hurdles to overcome, the long-term benefits make it a compelling innovation worth adopting, with the right safeguards and training in place."

"Conventional flight calibration techniques are likely to remain relevant for high-stakes, large-scale, or internationally regulated operations in the near term," Sam Mahlangu adds. "However, drone-enabled calibration techniques represent the future, offering cost efficiency, flexibility, and safety, especially for localised, routine, or emerging aviation environments, for example regional airports and urban air mobility."

Engr. Miri was especially upbeat about the salient nature of the report of the drone demonstration conducted at the Abuja airport on 27 March, 2025 involving the German company, Colibrex. "But, in fairness, I witnessed the drone calibration demonstration that was done recently in Abuja airport," he says. "In fairness, when you look at the report from that demonstration and compare it with the results from an aircraft calibration, quite a lot of things are salient particularly in respect of the measurements done at close range.

Quite a lot of things are salient, which means that drone-based calibration is actually on the right track." ■

RABIU MUHAMMAD SANI: Empowering Safer Skies with Efficient Air Traffic Communication Solutions

The efficiency, safety, security and sustainable development of air navigation services are contigent upon the availability as well as the efficient and timely communication of time-critical and safety-critical aeronautical and non-aeronautical information. Communications centres (COM CENTRES) the world over, staffed by trained, competent, and duly certified air traffic communicators in ICAO Contracting States, incur this huge responsibility under Volumes II and III of Annex 10 to the Convention on International Civil Aviation, otherwise refered to as the Chicago Convention. Rabiu Muhammad Sani is the President of the National Association of Airtraffic Communicators Association of Nigeria (NACAN), an affiliate of the International Federation of Airtraffic Communicators Associations (IFACA). *Air Traffic Safety Electronics International* recently caught up with Rabiu and here's what he had to say:

For starters, could you paint a picture of what the National Airtraffic Communicators Association of Nigeria (NACAN) stands for today as a critical stakeholder in ICAO Annex 10, Volumes II and III?

The National Airtraffic Communicators Association of Nigeria (NACAN) is a professional association at the Nigerian Airspace Management Agency (NAMA), Nigeria's air navigation service provider. Its members are saddled with the great responsibilities of communicating and/or exchanging all air traffic service messages with all aviation stakeholders concerned in accordance with the standards and recommended practices laid out in ICAO Annex 10 Volumes II and III.

"THE MAJOR AGENDAS OF NACAN UNDER MY WATCH INCLUDE ENSURING THE WELFARE AND WELLBEING OF ALL THE MEMBERS WITHOUT ANY FORM OF DISCRIMINATION WHATSOEVER."

What are the major agendas of NACAN under your watch?

The Major Agendas of NACAN under my watch include ensuring the welfare and wellbeing of all the members without any form of discrimination whatsoever. One other critical area of focus, of course, is the facilitation of the timely and regular training of all Aeronautical Communications (Aero-

Comms) personnel engaged with the Nigerian Airspace Management Agency. Collaboration and advocacy are another focal points as we aim to continue to collaborate with the Nigerian Airspace Management Agency management in providing modern communications equipment across all communication centres and offices nationwide.

From your perspective as the President of NACAN, what major challenges are you seeing today regarding the air traffic communications working environments both in Nigeria and the African continent?

As far as I am concerned, the current leadership of the Nigerian Airspace Management Agency under Engr. Ahmed Umar Farouk has done and continues to do so much for the Aero-Comms department of the Agency's Air Traffic Services directorate in terms of staff welfare, manpower development, renovations and furnishing of operational centres. However, I must admit that more need to be done to improve the working environments and make the atmosphere more conducive for seamless operations.

"AS FAR AS I AM CONCERNED, THE CURRENT LEADERSHIP OF THE NIGERIAN AIRSPACE MANAGEMENT AGENCY UNDER ENGR. AHMED UMAR FAROUK HAS DONE AND CONTINUES TO DO SO MUCH FOR THE AERO-COMMS DEPARTMENT OF THE AGENCY'S AIR TRAFFIC SERVICES DIRECTORATE IN TERMS OF STAFF WELFARE, MANPOWER DEVELOPMENT, RENOVATIONS AND FURNISHING OF OPERATIONAL CENTRES."

And how is NACAN responding to these challenges?

NACAN has been engaging all stakeholders such as the Nigerian Airspace Management Agency, the Nigeria Civil Aviation Authority (NCAA), and the Nigerian College of Aviation Technology (NCAT). These engagements are aimed at identifying some of the challenges and proffering proper solutions to them. And to God be the glory, the managements are gearing up towards addressing most of the issues raised during any interactions.

"MY GUIDING PRINCIPLES ARE STRICTLY BASED ON TRANSPARENCY, ACCOUNTABILITY, FAIRNESS, INCLUSIVITY, AND EFFECTIVE GOVERNANCE."

What strategic and policy interventions would you advise that the Nigerian Airspace Management Agency (NAMA) should put in place in order to adequately and sustainably respond to these challenges?

NAMA needs to adopt a multi-pronged strategy focusing on modernization, safety, and funding as well as human capital development through leveraging technology, partnerships and policy reforms. By so doing, NAMA can sustainably overcome its challenges and align with global best practices in terms of aviation standards.

How would you describe NACAN's relationship with sister professional associations in Nigeria as well as external aviation agencies and organizations?

NACAN has for long established a strong bond and excellent working relationships with all the sister professional associations, aviation unions and organizations. We have been actively strengthening these relationships through workshops, seminars and collaborative meetings.

One would recall with nostalgia those good old times when the then visionary executive governors of Kano and Yobe states, His Excellency Engr. Rabiu Musa Kwankawaso and His Excellency Mai Mala Buni, sponsored many airtraffic communicators to the Nigerian College of Aviation Technology. Do you foresee a reenactment of these good old times?

That initiative was highly commendable. It has since been enacted into law by the two governors mentioned and will likely be sustained by any forward-thinking administration. The policy revitalized the Aero-Comms department of NAMA, which had gone 20 years without new hires. Under the leadership of the late Philip Aderosoye of blessed memory, NACAN appealed to state governors across Nigeria for sponsorship of communications trainees at the Nigerian College of Aviation Technology. Kano, Yobe, Bauchi, Kaduna, and Gombe responded by sending their indigenes for training, thus effectively reviving the Aero-Comms department.

The airtraffic communications landscape is no doubt changing globally with the increasing adoption of innovative technologies in the air navigation domains. How prepared, in your view, are Nigerian airtraffic communicators in terms of coping with the changing technological terrains?

I must admit that the level of preparedness of Nigerian airtraffic communicators is contingent upon and will be directly proportional to the timely deployment of ATS Message Handling System, provision of a modernized HF radio and staff trainings on those modernized equipment. However, the AMHS installation project is ongoing across major Nigerian airports.

One area of significant concern in NAMA remains the delay in completing the AIS automation project, the contract for which was perfected sometimes in the early 2000's. How would you describe the operational status of ATS Message Handling services in Nigeria today?

Unfortunately, the ATS Message Handling System is not yet operational, but we are optimistic. The current NAMA administration is doing everything possible to actualize the implementation and service commencement this year or next.

And what would you say about the readiness of Nigerian airtraffic communicators to operate the systems in terms of training and competence?

Many officers have obtained trainings and competencies to man those systems. As we speak, three batches of officers are set to proceed to Cairo and Germany for their AMHS foreign courses.

What are your guiding principles as you continue to oversee the affairs of NACAN?

My guiding principles are strictly based on transparency, accountability, fairness, inclusivity, and effective governance.

Overall, how would you assess the future of airtraffic communicators within the framework of the Nigerian air navigation system?

The future would be brighter than what we are seeing today. The current Nigeria Civil Aviation Authority boss has come to fully understand the safety-critical functions performed by Air Traffic Communicators and he is presently doing everything possible to integrate those functions into the Nigeria Civil Aviation Regulations and provide all the necessary requirements for the oversight and technical expertise for communications operations. ■

NATIONAL AIRTRAFFIC COMMUNICATORS ASSOCIATION OF NIGERIA (NACAN)
AN AFFLIATE OF INTERNATIONAL FEDERATION OF AIRTRAFFIC COMMUNICATORS ASSOCIATION (IFACA)

Empowering Safe Skies

Ensuring Safety, Security and Efficiency in Air Navigation Services

We promote the safety, security and efficiency of air navigation services by ensuring the timely and efficient communication of safety related and critical safety information at Nigerian Airspace Management Agency, NAMA

Communications Centre, Nnamdi aziki-we international airport, abuja, FCT

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NACAN:
Pushing the Boundaries of Aviation Safety, Empowering Safe Skies

Data and information are a critical element for ensuring and assuring the safety and efficiency of civil aviation operations. This underscores the widely acknowledged fact that the provision of timely, reliable, and efficient aeronautical communications services is critical not only for promoting the safety, reliability, and efficiency of air navigation services, but also for ensuring the continuing safety, security, efficiency, regularity, and sustainable development of the global civil aviation ecosystem. Airline operations centres, pilots, air traffic controllers, meteorological service providers and other air navigation services (ANS) and air transportation stakeholders all rely on the services provided and the safety-critical information communicated by Aeronautical Communicators. As the professional association representing the interests of Nigerian aeronautical communicators, the greater chunk of whom are engaged with the Nigerian Airspace Management Agency (Nigeria's Air Navigation Service Provider), the National Airtraffic Communicators Association of Nigeria (NACAN) – a critical ICAO Annex 10, Volumes II and III stakeholder registered as a professional body under Nigeria's Companies and Allied Matters Act – assumes huge responsibilities focused on raising the ante in relation to aeronautical communications practices in Nigeria.

"The National Airtraffic Communicators Association of Nigeria (NACAN) is a professional association at the Nigerian Airspace Management Agency (NAMA), Nigeria's air navigation service provider," says Rabiu Muhammad Sani, President of NACAN. "Its members are saddled with the great responsibilities of communicating and/or exchanging all air traffic service messages with all aviation stakeholders concerned in accordance with the standards and recommended practices laid out in ICAO Annex 10 Volumes II and III."

The increasing pace of technological advancements is no doubt changing the way airtraffic communicators are discharging the huge responsibilities relating to the communication of air traffic service messages within the air traffic management/air navigation service (ATM/ANS) framework. One notable area is the industry's transition from the legacy X.25 protocol-based AFTN (Aeronautical Fixed Telecommunications Network) to the X.400-compliant and Aeronautical Telecommunication Network-dependent (ATN) Air Traffic Services Message Handling System (AMHS), driven largely by the year-on-year growth in global air traffic volumes. Although, the extensive AMHS project embarked upon by NAMA is yet to become operational, the NACAN President is clearly upbeat about the actualisation of the ATM upgrade project.

"Unfortunately, the ATS Message Handling System is not yet operational, but we are optimistic," says Rabiu. "The current NAMA administration is doing everything possible to actualize the implementation and service commencement this year or next."

LEVERAGING PARTNERSHIPS, PROMOTING ADVOCACY

Given the imperativeness of cordial handshakes between and among the critical stakeholders in the air navigation services domain and beyond, NACAN has established and is continuing to establish enduring partnerships with sister associations, agencies and other relevant organizations in the Nigerian aviation industry. NACAN has also established solid relationships with international bodies in an attempt to shore up the global visibility and professional relevance of the Association.

"NACAN has for long established a strong bond and excellent working relationships with all the sister professional associations, aviation unions and organizations," says Rabiu. "We have been actively strengthening these relationships through workshops, seminars and collaborative meetings."

A significant milestone in NACAN's advocacy and collaboration drives was clearly the outcome of the Association's outreach to Executive Governors of States in Nigeria, requesting for their interventions to break the employment jinx affecting the Aeronautical Communications Department of NAMA with resultant phenomenal manpower shortages over a period of close to two decades. This innovative strategy resulted in the then Executive Governors of Kano and Yobe States, amongst others, sponsoring their indigenes for Aeronautical Communications training at the Nigerian College of Aviation Technology (NCAT).

"That initiative was highly commendable. It has since been enacted into law by the two governors mentioned and will likely be sustained by any forward-thinking administration. The policy revitalized the Aero-Comms department of NAMA, which had gone 20 years without new hires," says Rabiu. "Under the leadership of the late Philip Aderosoye of blessed memory, NACAN appealed to state governors across Nigeria for sponsorship of communications trainees at the Nigerian College of Aviation Technology. Kano, Yobe, Bauchi, Kaduna, and Gombe responded by sending their indigenes for training, thus effectively reviving the Aero-Comms department."

MILESTONES

Ever since celebrating its 25th anniversary in November of 2021, NACAN has been witnessing positive transformations in relation to not only the way airtraffic communication is practiced but also in relation to welfare and governance issues within the fabrics of the Association. One noticeable milestone is the outcome of

Rabiu Muhammad Sani, NACAN President

NACAN's manpower advocacy drives, culminating in the absorption by NAMA of a total of nine Aeronautical Communications personnel earlier trained at NCAT. Another milestone is an increase in the frequency of local and foreign training programmes particularly in AMHS, thanks to the positive staff development climate subsisting at the Nigerian Airspace Management Agency. On its own part, NACAN has also been active in providing orientation programmes for airtraffic communicators participating in the Aeronautical Station Operator Licence (ASOL) examinations conducted by the Nigeria Civil Aviation Authority.

The NACAN President, Rabiu Muhammad Sani, foresees a very bright future for the air traffic communications profession in Nigeria. It is a forecast that thrives on the resilience of the aeronautical communications profession over time. "The future would be brighter than what we are seeing today. The current Nigeria Civil Aviation Authority boss has come to fully understand the safety-critical functions performed by Air Traffic Communicators and he is presently doing everything possible to integrate those functions into the Nigeria Civil Aviation Regulations and provide all the necessary requirements for the oversight and technical expertise for communications operations," Rabiu concludes.

Nigerian Airspace Management Agency (NAMA): Set to Provide Complete Ground and Flight Inspections Services to ANSPs

FULLY KITTED WITH A FULL COMPLEMENT OF COMPETENT PERSONNEL, ADEQUATELY KITTED AIRCRAFT, AND CUTTING-EDGE FLIGHT INSPECTIONS SYSTEMS, NAMA IS NO DOUBT FULLY REVVED UP TO PROVIDE STATE-OF-THE-ART AND STANDARDS-COMPLIANT GROUND AND FLIGHT INSPECTIONS SERVICES.

The NAMA Flight Calibration Crew with the NAMA Managing Director/Chief Executive, Engr. Ahmed Umar Farouk. Behind is the Beechcraft 350i calibration aircraft.

The Nigerian Airspace Management Agency (NAMA) is no doubt living up to its vision of becoming one of the leading air navigation service providers (ANSPs) in the world with a mission that is steadily focused on the provision of safe, efficient and economic air navigation services to airspace users. To stay right on top of the global air navigation game, the Agency has been keying on a strategy that is premised upon unwavering reliance on the dedication of its highly competent workforce whilst leveraging innovative technologies. This strategic move has been ensuring the crystallization of a wide variety of organizational achievements, including the recent attainment of the status of a world-

1st Photo: *The crew with the Permanent Secretary, FMA&AD and AD; 2nd Photo: Crew with the DSEES, NAMA, Engr. (Mrs.) Ihenachor; 3rd Photo: Head of Flight Calibration NAMA, Engr. Miri, receiving a salute from the NAMA MD/CEO, Engr. Farouk; and Last Photo: DSEES NAMA with the NAMA crew.*

class provider of ground and flight inspection solutions.

With this, NAMA has secured an enviable niche in the global flight calibration arena as an aircraft flight calibration solutions provider of choice for continental Africa and beyond. With a full complement of the systems, equipment and human resources required to carry out ground and flight inspections to the standards specified in relevant ICAO SARPs and guidance materials, NAMA has no doubt become one of the leading providers of ground and flight inspection services in the world.

The Agency's flight calibration portfolio currently boasts a sizeable number of competent flight and technical crew as well as a wholly-owned Beechcraft 350i twin-engine turbo prop aircraft equipped with the state-of-the-art Airfield Technology's AT940 onboard console for flight calibration, complete with a ground-reference system or analyzer. The NAMA flight calibration department currently boasts a team made up of a four-man flight crew, two of whom are fully trained and checked-out, while the remaining two pilots are currently undergoing the relevant qualification and type-rating trainings. The aircraft maintenance team is made up of four competent and appropriately rated aircraft maintenance engineers, while the flight inspection technical team, headed by Engr. Selzing Miri, boasts 8 competent flight inspectors, five of whom are fully checked-out and rated at different levels, while three inspectors are currently under training. With this capability, NAMA is fully capable of handling the ground and flight calibration of navigational and communication systems at all levels and in line with international best practices. The Abuja-Nigeria headquartered Nigerian Airspace Management Agency is Nigeria's sole air navigation service provider (ANSP). Established through the Nigerian Airspace Management Agency (Establishment, Etc.) Act No. 48 with commencement date of 29th May, 1999, the Agency is supervised by the Federal Ministry of Aviation and Aerospace Development, and is currently operating under the Nigerian Airspace Management Agency Act of 2022. The functions of the Agency include: the provision of air traffic services in Nigeria; the provision of necessary navigation and air traffic management services to all aerodromes operating in Nigeria; and the promotion of the continuing safety, efficiency and regularity of air navigation.

To ensure top-notch performance in a bid to professionally respond to customer needs at all times, the Flight Calibration arm of the Agency is under the Office of the Managing Director/Chief Executive Officer, Engr. Ahmed Umar Farouk. ■

ISAAC KAMUGO:
Leveraging Professionalism to Drive Safety and Service Excellence

The Uganda Air Transport Safety Engineering Association (UGATSEA) is playing a key role not only in the context of its membership within the fold of the Africa region of the International Federation of Air Traffic Safety Electronics Associations (IFATSEA) but also in relation to sharpening the competence and honing the skills of Ugandan air traffic safety electronics personnel (ATSEP). In partnership with critical Ugandan aviation stakeholders and the IFATSEA Africa Regional Office, UGATSEA is hosting the 15th IFATSEA Africa Region Meeting (ARM) in Kampala, Uganda from 17 to 20 June, 2025. Isaac Kamugo, a distinguished air traffic safety engineer with a wealth of professional experience, is the President of UGATSEA. The *Air Traffic Safety Electronics International's* Visions Team caught up with Engr. Kamugo and here's what he had to say:

As the President of the Uganda Air Transport Safety Engineering Association (UGATSEA), how would you describe the developmental changes you are seeing today across the Ugandan aviation landscapes?

Uganda's aviation landscape is undergoing transformative development driven by infrastructure modernization and technological advancement. Key among these changes is the expansion and upgrading of Entebbe International Airport and the construction of Kabaale International Airport in the oil-rich Albertine region. There are also a number of Public-Private Partnership projects to develop international airports within the Ugandan tourist circuit including Arua, Kidepo and others.

There is also an emphasis on safety and

"UGANDA'S AVIATION LANDSCAPE IS UNDERGOING TRANSFORMATIVE DEVELOPMENT DRIVEN BY INFRASTRUCTURE MODERNIZATION AND TECHNOLOGICAL ADVANCEMENT."

efficiency improvements through the implementation of modern Communication, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) systems. This includes replacement of obsolete systems as well as expansion of service coverage to expand system capacity.

And how would you compare these changes with recent and current developmental patterns in the African aviation ecosystem as a whole?

The developmental changes we're seeing in Uganda closely mirror broader trends across the African aviation ecosystem, where many nations are investing heavily in modernizing their infrastructure, improving safety, and enhancing connectivity. Like many African countries, Uganda is leveraging Public-Private Partnerships and aligning with ICAO standards to enhance safety and efficiency.

Talking about ATSEP's competence, training and certification, what is the status of Uganda today regarding the licensing or certification of Ugandan ATSEP?

In Uganda, the certification and licensing of Air Traffic Safety Electronics Personnel (ATSEP) are currently in a developmental phase. The Civil Aviation Regulations have recently been amended to officially recognize and include ATSEPs, marking a major step forward in aligning with ICAO standards.

Currently, training programs aimed at developing the necessary competencies to manage and implement the ATSEP certification system are underway. In parallel, manuals, procedures, and training materials are being developed to support a structured and sustainable certification process.

What are your thoughts regarding the lingering agitation by IFATSEA for the inclusion of ATSEP in ICAO Annex 1?

The call by IFATSEA for the inclusion of ATSEP in ICAO Annex 1 is both timely and justified. ATSEPs play a critical role in the safety chain of air navigation services, ensuring the functionality, reliability, and integrity of CNS/ATM systems. Despite this, ATSEPs remain the only safety-critical aviation professionals not yet recognized under Annex 1, which outlines licensing standards for personnel such as pilots, air traffic controllers, and aircraft maintenance engineers.

In my view, the lack of inclusion has led to inconsistent approaches globally in training, certification, and regulatory oversight of ATSEP functions. This gap affects harmonization and, in some regions, may undermine safety standards. Including ATSEPs in Annex 1 would provide a globally accepted framework for competency requirements, licensing, and continuous professional development, strengthening aviation safety worldwide.

At UGATSEA, we stand in full support of IFATSEA's position and believe that inclusion in Annex 1 is not only a matter of equity, but a strategic necessity for the future of safe, seamless, and sustainable air navigation services.

The theme of the 15th IFATSEA Africa Region Meeting, which your association is hosting, is centered on the digitalization of the CNS/ATM space. How would you describe the roles and responsibilities of ATSEP in a highly digitalized and automated CNS/ATM environment?

"THE DEVELOPMENTAL CHANGES WE'RE SEEING IN UGANDA CLOSELY MIRROR BROADER TRENDS ACROSS THE AFRICAN AVIATION ECOSYSTEM, WHERE MANY NATIONS ARE INVESTING HEAVILY IN MODERNIZING THEIR INFRASTRUCTURE, IMPROVING SAFETY, AND ENHANCING CONNECTIVITY."

With the current advancements in technology, ATSEPs have taken on greater responsibilities beyond traditional maintenance and monitoring. They are now actively involved in planning and designing CNS/ATM systems, analyzing technical and operational requirements, and managing cybersecurity risks to protect critical aviation infrastructure. Additionally, ATSEPs support safety management processes, participate in incident investigations, and contribute to system upgrades and testing. Their expanded role makes them essential contributors to ensuring safe, efficient, and secure air navigation in today's highly digitalized and automated aviation environment.

"IN UGANDA, THE CERTIFICATION AND LICENSING OF AIR TRAFFIC SAFETY ELECTRONICS PERSONNEL (ATSEP) ARE CURRENTLY IN A DEVELOPMENTAL PHASE."

As the President of UGATSEA, what are your visions and mission for both UGATSEA and air traffic safety systems operations in Uganda?

The vision of UGATSEA is "To be the leading platform where aviation engineering professionals can leverage their expertise to drive safety and service excellence in the aviation industry." And the mission is "To unite aviation engineering professionals in CAA Uganda for their professional growth and to promote the highest standards of safety, service, and innovation in the industry."

Personally, my dream is to see African ATSEPs play a leading role in advancing operational systems technology across the continent through research and development. I envision ATSEPs contributing more actively to solving challenges within our domain and driving innovation.

Finally, how would you describe the future of Africa in relation to the safety and efficiency of civil aviation operations?

The future of Africa's civil aviation sector holds great promise, fueled by increasing investments in infrastructure, adoption of modern CNS/ATM technologies, and stronger regulatory frameworks. As African countries continue to collaborate under initiatives like the Single African Air Transport Market (SAATM), we expect to see enhanced regional connectivity, improved safety standards, and more efficient airspace management. However, realizing this future requires sustained commitment to training, certification, and harmonization of standards across the continent. It also calls for investment in research, development, and technology tailored to Africa's unique operational challenges.

I am confident that with collective effort, Africa will emerge as a leader in safe, efficient, and sustainable civil aviation, contributing significantly to the continent's economic growth and integration. ■

LEGAL AND OPERATIONAL FRAMEWORKS OF AERONAUTICAL COMMUNICATIONS' JOBS AND FUNCTIONS

By Adeyinka Olumuyiwa Osunwusi, PhD

Being an abridged version of the paper presented by the author at the 10TH Annual General Meeting/ Conference of the National Airtraffic Communicators' Association of Nigeria (NACAN) at the Bristol Palace Hotel, Kano, Nigeria on 29th November, 2023.

I have been called upon to speak to the topic "The Legal Framework of Aeronautical Communications Functions as Embedded in ICAO, NCARs and Other Countries' Regulations". However, having regard to the distinctiveness of this audience and the thrust of this Annual General Meeting/Conference, I have been led to adjust the topic and have chosen rather to speak on the topic "The Legal and Operational Frameworks of Aeronautical Communications' Jobs and Functions". This is because it will be practically impossible to conceive of the legal dimensions of a set of functionalities without having the need to paint a vivid picture of the operational ramifications of the functionalities. On the other hand, operational issues cannot possibly be conceptualized without exploring the legal and regulatory framework within which the operational contexts are situated.

Aside from this, the subject-matter of aeronautical communications revolves around the safety-critical nature of appropriately formatted and channeled data and information in furtherance of the safety and efficiency of air navigation. So, practices and performance are guided by procedural and regulatory signposts.

A yet another motivation for the choice of this topic may well be the ongoing unhealthy practices within the ANSP environment regarding certain jobs and functionalities that have been unambiguously defined by international SARPs.

THE GLOBAL FRAMEWORK OF CIVIL AVIATION

The global framework of civil aviation operations is anchored on a set of clearly defined and internationally agreed legal, policy, regulatory, methodological and operational frameworks, which prescribe advisory, mandatory, prescriptive or discretionary requirements in respect of activities and interactions within the international civil aviation ecosystem. The overall intention, of course, is the promotion of the safety, security, efficiency, regularity and sustainable development of civil aviation operations.

From both the legal and operational vantage points, the *locus classicus* of the global framework of civil aviation operations is the Convention on International Civil Aviation, otherwise referred to as the Chicago Convention 1944. Aside from being the instrument that established the International Civil Aviation Organization (ICAO) as a specialized United Nations (UN) agency in accordance with Articles 91(b) and 92(b) of the Convention, the Chicago Convention also embodies Annexes which have the status of international Standards and Recommended Practices (SARPs); Standards being specifications in terms of personnel, procedures, performance, characteristics, material and configuration the uniform application of which is necessary or mandatory for the safety or regularity of international air navigation. Recommended Practices, on the other hand, are specifications in terms of personnel, procedures, performance, characteristics, material and configuration, the uniform application of which is desirable for the safety, efficiency and regularity of international air navigation. All Contracting States of the International Civil Aviation Organization have an obligation in terms of conformance with both Standards and Recommended Practices, pursuant to the provisions of Article 37 to the Convention on International Civil Aviation.

Today, there are a total of 19 Annexes to the Chicago Convention, up from 18 Annexes following the addition of Annex 19 on Safety Management System. It is worth noting that with the 19 Annexes to the Chicago Convention, there are also over 12,000 SARPs, which may be prescriptive, practice or procedure-related and performance-related, although some of these SARPs may assume better representation within a PANS (Procedures for Air Navigation Services) document.

An integral part of the global civil aviation legal framework are a total of five (5) Procedures for Air Navigation Services (PANS), which, frankly speaking, do not enjoy the same status as SARPs. This is because while SARPs are adopted by the ICAO Council in line with Article 37 to the Chicago Convention, subject to the full procedure enshrined in Article 90 to the Convention, PANS are rather approved by the Council and subsequently recommended to Contracting States for worldwide application.

It is worth stating at this juncture that the regulatory, operational and procedural frameworks in place at national, sub-regional and regional levels of civil aviation operations are indeed a domestication of the Chicago Convention, its Annexes and PANS, subject, of course, to the requirements for uniformity imposed by Article 37 to the Convention as well as the waiver enshrined in Article 38 to the Convention.

FRAMEWORKS OF AERONAUTICAL COMMUNICATIONS OPERATIONS

The operational imperatives of aeronautical communications operations are premised upon the safety, efficiency and security of air navigation, which form the crux of a number of Articles to the Chicago Convention, particularly Articles 12, 21, 23, 25, 26, 28, 32 and 37. Of particular significance is Article 28, which defines the obligations of States, as far as they may find practicable, in accordance with the SARPs established under the Convention and in respect of:

- The provision of airports, radio services, meteorological services and other navigation facilities to facilitate international air navigation;
- The adoption and operationalization of the appropriate standard systems of communications procedures, codes, markings, signals, lighting and other operational practices; and
- Collaboration in international measures aimed at securing the publication of aeronautical maps and charts in accordance with established or recommended standards.

Consequently, the aeronautical communications jobs and functionalities are rooted in the Convention on International Civil Aviation. Specifically, the regulatory, procedural and operational frameworks for the provision of aeronautical communications services are established in Annex 10 to the Chicago Convention. These frameworks remain in place as far as the Annex establishing them are in force. Volumes II (*Communication Procedures including those with PANS Status*) and III (*Communication System*) of the Annex as well as other technical and guidance documents outline and define the legal, procedural and operational frameworks for the provision of aeronautical communications services by States, pursuant to the obligations provided for in Article 28 to the Convention. These established frameworks relate directly to communication via the Aeronautical Fixed Service (AFS) involving the processing, storage, transmission and reception of aeronautical and non-aeronautical messages including all forms of ATS messages. Nothing has impeached the performance of these functions by aeronautical communicators as long as Annex 10 to the Chicago Convention remains in force.

And coming to talk about it, there are clearly no ambiguities when it comes to the prescriptions established in the Annexes to the Convention on International Civil Aviation. Rather, consequential adjustments or amendments are provided to maintain coherence among the Annexes.

THE NIGERIAN REGULATORY FRAMEWORKS

It is important, at this juncture, to examine the legal and operational frameworks for the provision of aeronautical communications services in Nigeria vis-à-vis the regulatory, organizational and oversight structures established by the Nigeria Civil Aviation Authority (NCAA). It is also important to interrogate the robustness and adequacy of the regulatory structures in place as far as the provision of aeronautical communications services is concerned.

In exercise of its obligations under the Convention on International Civil Aviation, the Nigeria Civil Aviation Authority (NCAA) promulgates the Nigeria Civil Aviation Regulations, Nig. CARs, which are essentially a domestication of international SARPs and procedures for air navigation. The promulgation of these regulations as well as issues surrounding their amendment are facilitated by a rule making process defined in the Authority's Rule Making Policy and Procedure Manual (PPM), which may be amended every twelve (12) months to sustain its dynamism.

As far as the provision of aeronautical communications services in Nigeria is concerned, the NCAA has, since 2006, been implementing standards for certifying the competence of aeronautical communications personnel in the discharge of its responsibility under Annex 1 – *Personnel Licensing* - to the Convention and in the exercise of the priviledge under Article 32 to the Chicago Convention.

The legal framework for a standardized system for regulating issues relating to the competence and the certification or licensing of aeronautical communications personnel is enshrined in Nigeria Civil Aviation Regulations (Nig. CARs) Part 2. Sub-section 2.2.1.1 (a) (10) of this Part, which essentially aligns with subsection 1.2 (b) of Annex 1 to the Chicago Convention, provides for the issuance by NCAA of the Aeronautical Station Operator (ASO) licence to aeronautical communications personnel who satisfactorily accomplish the requirements in the same Part. Section 2.9 of the same Part, which aligns with Section 4.7 of Annex 1 – *Personnel Licensing* – to the Chicago Convention, prescribes the requirements for the issue, renewal or re-issue of the ASO licence. It should be stressed here that section 4.7 of Annex 1 to the Chicago Convention clearly precludes personnel providing Aerodrome Flight Information Service (AFIS) as far as the holding of ASO licence is concerned, while making reference to Circular 211 (Aerodrome Flight Information Service – AFIS) for the necessary guidance relating to the qualifications to be met by AFIS personnel.

It should be noted that Subsection 2.2.2 of the same Part of Nig. CARs provides the legal framework for the identification of an aeronautical station operator (ASO) licence holder as an integral part of airmen that are required to demonstrate the ability to speak and understand the language used for radio telephony communications in English Language to the Operational Level (s) specified in the language proficiency requirements in the IS (Implementing Standards) 2.2.2 of the same Part of the Nig. CARs. It is highly instructive to observe here that in Kenya, where a robust regulatory framework exists for the oversight of aeronautical communications services, aeronautical communicators are actively involved in the control of air traffic over the Kenyan oceanic airspace, deploying their proficiency in radio telephony communications as prescribed in ICAO Annex 10 Volume II, ICAO Doc 9432 (*Manual of Radiotelephony*) and other technical and guidance documents.

And that's as far as what's in the Nigerian regulatory framework is concerned. As far as what's out is concerned, it is important to point out here a great omission in the Nigerian regulatory and organizational frameworks, which the NCAA has a duty to rectify using its Rule Making Process, Policy and Procedures as defined in the Authority's MPP. This phenomenal omission relates to the absence of a regulatory cum organizational framework as well as an oversight mechanism for a set of jobs and functionalities that has been legally authorized through a licence regime administered by the Authority, especially under its obligations as reflected in Annex 1 to the Chicago Convention.

It is quite alarming that Part 14 – *Air Navigation Services* – of Nig. CARs inadvertently excludes a safety-critical professional area that forms an integral part of the functionalities that drive the safety, efficiency and sustainable development of international air navigation through the timely interchange of safety-critical aeronautical messages. In sharp contrast to what is applicable in a number of States, for example Sri Lanka and Kenya where appropriate regulatory and oversight prescriptions are in place for the provision of aeronautical communications services, Part 14 of Nig. CARs clearly excludes Aeronautical Communications Services. The direct implications of this are:

- The absence of regulatory requirements for the provision of Aeronautical Communications Services in Nigeria, the existence of a mechanism for certifying the competence of aeronautical communications personnel notwithstanding;
- The absence of regulatory, procedural and operational frameworks for the establishment of oversight technical expertise and administrative structures for the regulation of aeronautical communications services.
- The non-inclusion of specific regulatory and operational requirements for the provision of aeronautical communications services in Nig. CARs Part 14, based on standards prescribed in ICAO Annex 10 Volumes II and III.

The exclusion of Aeronautical Communications Services from Part 14 Nig. CARs negates Articles 22, 28 and 32 to the Chicago Convention, which separately speaks to: the adoption of measures to facilitate the safety of international air navigation through the establishment of specific regulations; the provision of services necessary for promoting safe, secure and regular air transport; and the certification of personnel.

The exclusion also negates Section 1.3, Part I of Doc 9379 – *Manual of Procedures for Establishment and Management of a State's Personnel Licensing System* – which mandates States to establish appropriate regulatory and organizational structures as well as the necessary technical expertise in a situation of a set of critical functions whose performance has been authorized through the issuance of licences. It should be stressed that the inclusion of Aeronautical Communications Services in Nig. CARs Part 14 will help the Authority in satisfactorily accomplishing the critical elements of safety oversight under its obligations in respect of Doc 9734 (Safety Oversight Manual), especially CE-1, CE-2, CE-3, CE-4 and CE-6.

NIGERIA: A TALE OF TWO ANNEXES

Historically, the Annexes to the Chicago Convention are established to be unambiguous and explicit, with no Annex encroaching on the other while at the same time reflecting enduring interrelationships that are targeted at harmonizing the procedures, characteristics and legal pathways for ensuring the continuing safety, security, efficiency, regularity and sustainable development of international civil aviation operations.

The international aviation community has always reiterated the need to structure SARPs and PANS in a manner that illuminates their clarity and simplicity of language. Against the backdrop of this, it is a matter for great concern when a service provider in an ICAO Contracting State deliberately ascribe wrong interpretations to specific SARPs in an Annex to the Chicago Convention. In 2007, the General Assembly of the International Civil Aviation Organization, through Resolution A36-13, reaffirmed the need for SARPs and PANS to reflect clarity, coherence and simplicity.

The ICAO Assembly Resolution A36-13 states:

> *The Assembly resolves that:*
> *SARPs and PANS shall be drafted in clear, simple and concise language. SARPs shall consist of broad, mature and stable provisions specifying functional and performance requirements that provide for the requisite levels of safety, efficiency and interoperability. Supporting technical specifications, when developed by ICAO, shall be placed in separate documents to the extent possible.*

It has become necessary to cite this Assembly Resolution in the light of the ripples going on in Nigeria in respect of functionalities, the functional and performance requirements for which are domiciled in two different Annexes – Annex 15 (originally adopted by the ICAO Council on 15 May 1953) and Annex 10, which today boasts a total of six Volumes. From the wordings of the Resolution, it is clear that the reading of SARPs and PANS can only be open to the Literal Rule of Interpretation rather than the Golden or Mischief rules.

At this juncture, it is important to interrogate issues surrounding the terms "aeronautical data", "aeronautical information" and "aeronautical communication". The intention is to find out whether there are differences between and among the terms in relation to the regulatory, operational and performance requirements prescribed in the appropriate SARPs.

It is an incontrovertible fact that data and information are critical to the safety, security and efficiency of international air navigation. However, as gathered from a number of incidents and accidents, the procedures for the formatting, the communication and exchange or transmission of these data and information are much more significant. This is because communications, when conducted by personnel who have not been trained and authorized to communicate safety, can result in the degradation of the required safety levels. This fact, perhaps, may explain why there are separate Annexes specifying functional and performance requirements for aeronautical data and aeronautical information as well as the communication of aeronautical data and aeronautical information.

I would like to say that an aeronautical information service is expected to be provided only as aeronautical information products and associated services. It is a service established within the defined area of coverage responsible for the provision of aeronautical data and aeronautical information necessary for the safety, efficiency and regularity of air navigation, pursuant to the functional and performance requirements prescribed in Annex 15 to the Chicago Convention. The provision of this service has nothing to do with message transmission and all the elements of communication procedure that are the exclusive preserve of functions regulated under Annex 10 to the Chicago Convention.

In relation to Amendment 37 to Annex 15 to the Chicago Convention, **aeronautical data** is defined as a representation of aeronautical facts, concepts or instructions in a formalized

manner suitable for communication, interpretation or processing, while **aeronautical information** is defined as information resulting from the assembly, analysis and formatting of aeronautical data. For purpose of clarity, aeronautical data and aeronautical information are provided as aeronautical information products, which brings to the fore the question of what actually constitutes an aeronautical information product within the framework of the definition advanced in Annex 15.

The import of the definitions of aeronautical data and aeronautical information is that these safety-critical resources are not useful unless they are interpreted, processed and communicated or transmitted by those trained and certified in line with the functional and performance requirements prescribed in Annex 10 to the Chicago Convention. There can never be two ways about this. The only air navigation personnel legally empowered to transmit or communicate ATS messages are the aeronautical communications personnel. Their functions and performance have the backing of a validly established legal instrument of international civil aviation.

In relation to aeronautical communications jobs and functionalities, SARPs specifying functional and performance requirements for the provision of aeronautical communications services are embedded in Annex 10, specifically Volumes II and III. The communication of aeronautical data and aeronautical information are by regulations undertaken in communications centres and are strictly subject to the functional and performance requirements prescribed in Annex 10. Nig. CARs Part 14, Subpart 14.0.2 defines a communications centre as "an aeronautical fixed station which relays or retransmits telecommunication traffic from (or to) a number of other aeronautical fixed stations directly connected to it". It is, therefore, a wrong operational policy to claim that the AIS can transmit ATS messages, which, by regulations, falls solely under the remit of aeronautical communications personnel.

At this juncture, it is important to interrogate questions surrounding the official decision that AIS, by virtue of Amendment 37 to Annex 15, can transmit ATS messages. It is also significant to interrogate issues surrounding what actually constitute aeronautical information products.

To be sure, Amendment 37 to Annex 15, which was adopted by the ICAO Council at the sixth meeting of its 198th Session on 1 March 2013, arose from the work of the ICAO Secretariat in conjunction with the Aeronautical Information Services-Aeronautical Information management Study Group (AIS-AIMSG) and the Aerodromes Panel (AP). The amendment has not in any way impeached or delegated the responsibilities and functions that are explicitly defined in Annex 10. Nor has it significantly altered the object of AIS. As a matter of fact, the subject of Amendment 37 to Annex 15 pertains only to the following areas:

- The re-organization of chapters 1 to 3 of the Annex. This re-organization was an evolutionary initiative intended to accommodate AIM-related provisions in subsequent amendments.
- Additional definitions in respect of aerodrome mapping data (AMD), aerodrome mapping database (AMDB), aeronautical information management (AIM), air traffic management (ATM), Confidence Level, and Integrity Classification (Aeronautical Data).
- Revision of the definitions in respect of aeronautical information service (AIS), AIS Product, integrated aeronautical information package and metadata.
- Changes regarding the use of the terms "data" and "information".
- State and AIS provider responsibilities and functions.
- Relocation of specifications related to prohibited, restricted and danger areas to Annex 11
- Information management requirements; data quality; use of automation; aerodrome mapping data; AIP specifications; SNOWTAM; terrain and obstacle data; integrity classifications.

In relation to the question of what constitutes AIS products, the 37th amendment to Annex 15 defines aeronautical information product as aeronautical data and aeronautical information provided either as digital data sets or as a standardized presentation in paper or electronic media. Aeronautical information products include:

- Aeronautical Information Publication (AIP), its amendments and its supplements;
- Aeronautical Information Circulars (AIC);
- Aeronautical Charts;
- NOTAM; and
- Digital data sets.

It should be noted that this definition does not in any way identify Flight Plans and other ATS messages as aeronautical information products. And come to talk about it, Subsection 5.3.2.1 of Annex 15 recommends that the AFS should be used, whenever practicable, for distributing NOTAM. This is interesting when juxtaposed against the fact that, by the provisions in Annex 10 Volume II, aeronautical communicators are the only professionals trained and certified to communicate using the AFS channels and infrastructures provided by air traffic safety electronics personnel (ATSEP). The definition of a communications centre in Subpart 14.0.2, Nig. CARs Part 14 clearly supports this.

CONCLUDING REMARKS

Against the backdrop of the discussions so far, it is pertinent to say that established international civil aviation legal and functional frameworks are robust and explicit in terms of their prescriptions, recommendations and specifications. SARPs and PANS are drafted to provide for the requisite levels of safety, efficiency and operational sustainability. They are not established to be ambiguous. For this reason, it is important that the application and interpretation of these legal and functional instruments should be done for the purpose of promoting the continuing safety, security, efficiency, regularity and sustainable development of civil aviation operations. Safety is civil aviation's first priority. And permit me to add that air traffic management's singular business is safety.

It was a former President of the Council of ICAO, the late Dr. Assad Kotaite, who, in his opening address to the 2006 Directors General of Civil Aviation Conference on a Global Strategy for Aviation Safety, made the following time-tested remarks: *"There is absolutely no room for complacency where safety is concerned, there never was and there never will be".*

Leveraging on this seminal pronouncement and borrowing from the late Dr. Kotaite, I would like to say in conclusion that when it comes to the safety and efficiency of air navigation, there is absolutely no room for politicking and complacency. There never was and there never will be. ■

EVENTS

JULY/ AUGUST 202 5		
08 - 09 /0 7 /202 5	**Wings of Change Focus Africa (WOCFA)).** *Venue: Centre International de Conférences Abdou Diouf (CICAD), Dakar.*	Dakar, Senegal
	www.iata.org/en/events/all/wings -of-change-focus-afriva/	
08 - 11/07 /202 5	**AI for Good Global Summit 2025 .**	Geneva, Switzerland.
	https://aiforgood.itu.int/summit25/	
15 - 17/0 7/ 202 5	**3rd Annual Asia Pacific Summit for Aviation Safety (AP -SAS 2025) .** *Theme: "Future-proofing Aviation Safety: Adapt, Innovate, Excel." Venue: Suntec Singapore Convention & Exhibition Centre, Singapore.*	Singapore, Singapore.
	https:// flightsafety.swoogo.com/ap -sas-2025	
16 - 17/0 7/202 5	**ICAO APAC Regional Training Symposium .** *Venue: Suntec Singapore Convention & Exhibition Centre, Singapore.*	Singapore, Singapore.
	www.icao.int/Meetings/ irtsapac2025/Pages/default.aspx	
12 - 14/0 8/202 5	**Next Generation of Aviation Professionals (NGAP) Global Summit.** *Venue: Durban International Conference Centre (ICC Durban), South Africa.*	Durban, South Africa.
	https:// www.icao.int/Meetings/NGAPsummit2025/Pages/default.aspx	
SEPTEMBER/ OCTOBER 202 5		
08 - 11/ 09 /202 5	**Airport Experience Summit 2025.**	Guangzhou, China
	https://aci.aero/events/airport -experience -summit -2025/	
12 - 15/ 09 /202 5	**IBC 2025 Conference .** *RAI, Amsterdam.*	Amsterdam.
	https:// show.ibc.org	
13 - 19/ 09 /202 5	**ACI Africa Conference 2025 .** *Theme: "Powering African Airports for Strategic Growth".*	Lusaka, Zambia
	www.aci -africa.aero/events/upcoming -conference/	
15 - 17/ 09 /202 5	**CILT (Chartered Institute of Logistics and Transport) International Convention 2025 .**	Colombo, Sri Lanka.
	https:// ciltinternational.org/events/cilt -international -convention -2025/ Pages/default.aspx	
21 - 22/ 09 /202 5	**ICAO Innovation Fair 2025 .** *Venue: ICAO Headquarters, 999 Robert-Bourassa Boulevard, Montreal, Canada.*	Montreal, Canada
	https://www. icao.int/Meetings/ICAOInnovationFair2025/	
23/09 - 03/10 /202 5	**The 42nd Int ernational Civi l Aviation Organization (ICAO) General Assembly .** *Venue: ICAO Headquarters, 999 Robert-Bourassa Boulevard, Montreal, Canada.*	Montreal, Canada
	https://www. icao.int/Meetings/a42/Pages/default.aspx	
14 - 16/10/202 5	**IFATCA European Regional Meeting (ERM) 2025 .**	Bologna, Italy.
	https:// erm2025.com	
14 - 16/10/202 5	**World Safety and Operations C onference (WSOC) 2025 .**	Xiamen, China
	https:// www.iata.org/en/events/all/wsoc/	
20 - 22/10 /202 5	**IFATCA Asia Pacific Regional Meeting (APRM) 2025 .** *Venue: Banyan Tree Hotel, Macau*	Macau
	https:// aprm2025.org/preview/	
20 - 23/1 0/202 5	**International Telemetry Conference (ITC) 2025 .** *Venue: Horseshoe, Las Vegas*	Las Vegas, Nevada USA.
	https:// telemetry.org	
21 - 22/10 /202 5	**World Sustainability Symposium (WSS) .** *Venue: Kerry Hotel, Hong Kong.*	Hong Kong, China
	www. iata.org/e n/events /all/world -sustainability -symposium/	
22 - 23/10 /202 5	**CILT (Chartered Institute of Logistics and Transport) Nigeria 2025 National Conference and Annual General Meeting (AGM) .**	Lagos, Nigeria
	https://ciltinternational.org/ev ents/cilt -nigeria -2025 -national -conference -agm/	
25 - 28/10 /202 5	**ACI-NA and ACI World Annual General Assembly, Conference and Exhibition 2025 .** *Hosted by Toronto Pearson Airport and Ports Toronto.*	Toronto, Canada
	https ://aci.aero/events/aci -na-aci-world -annual -general -assembly-conference-and-exhibition -2025/	
NOVEMBER 202 5		
04 - 06/ 11 /202 5	**78th Annual International Aviation Safety Summit (IASS25) .**	Lisbon, Portugal.
	https://flightsafety.org/events -at-flight -safety -foundation/	
09 - 14/ 11 /202 5	**53rd IFATSEA General Assembly 2025.** *Hosted by: ATNSand SAATSEPA. Venue: Cape Town Marriot Hotel Crystal Towers, Century City, Cape Town.*	Cape Town, South Africa.
	www.ifatsea.org ; www.ifatsea53ga.org	
12 - 13/ 11 /202 5	**International Conference on Managing the Impact of Weather on Air and Space Launch Operations.** *Venue: EUROCONTROLHeadquarters, Brussels.*	Brussels, Belgium.
	https://academieairespace.com/meteopsconference/preliminary -programme/	
17 - 28/ 11 /202 5	**ITU World Telecommunication Development Conference 2025 (WTDC -25).** *Hosted by: The Government of Azerbaijan.*	Baku, Azerbaijan.
	https://www.itu.int/itu -d/meetings/wtdc25/	
18 - 19/ 11 /202 5	**Wings of Change Europe (WOCE).**	Brussels, Belgium.
	www.iata.org/en/events/all/wings -of-change-europe/	
25 - 27/ 11 /202 5	**Airports Innovate 2025.**	Busan, Republic of Korea.
	https://aci.aero/events/airports -innovate -2025/	
DECEMBER 2025		
09 - 11/ 12/2025	**Airspace Asia Pacific 2025 .**	Hong Kong, China.
	https:// canso.org/event/airspace -asia-pacific/	
APRIL 202 6		
20 - 24/0 4/202 6	**65th IFATCA (2026) Annual Conference .**	Bucharest, Romania.
	https:// ifatca.org/events -annual -conferences/	

CALENDAR

TRAINING & DEVELOPMENT

JULY/AUGUST 2025		
FLEXIBLE	**Air Traffic Safety Electronics Personnel (ATSEP) Basic (Online).** *Institution: Nigerian College of Aviation Technology (NCAT), Zaria, Nigeria.*	Nigeria (Online).
	https://igat.icao.int/ated/TrainingCatalogue/Course/2472	
09-11/07/2025	**Operational Cyber Security in Aviation (An IATA Course) .** *Venue: IATA Singapore Training Center, Pasir Panjang Rd., Singapore*	Singapore, Singapore.
	www.iata.org/en/training/courses/operational-cyber-security/tscs64/en/	
14-18/07/2025	**Managing Aviation Policy and Regulation (An IATA Course) .** *Venue: IATA's Geneva Training Center, Route de l'Aeroport 33, Geneva.*	Geneva, Switzerland
	www.iata.org/en/training/courses/aviation-policy-regulation/tcvg26/en/	
28/07 - 01/08/2025	**ATM Incident Investigation Techniques. (ICAO TRAINAIR PLUS ITP)** *Institution: Global Air Navigation Services (GANS), Abu Dhabi.*	Abu Dhabi, U.A.E.
	https://igat.icao.int/ated/TrainingCatalogue/Course/466	
AUGUST/ SEPTEMBER 2025		
13-15/08/2025	**Just Culture in Civil Aviation.** *Venue: IATA Training Center, Yas Creative Hub, Yas Island, Abu Dhabi*	Abu Dhabi, U.A.E.
	www.iata.org/en/training/courses/just-culture-aviation/tcvt06/en/	
25-29/08/2025	**Project Management Essentials .** *Venue: Aviation Training Academy (ATNS), Kempton Park, Johannesburg*	Johannesburg, South Africa.
	www.iata.org/en/training/courses/project-management-essentials-virtual/taph05/en/	
18/08 - 05/09/2025	**ATSEP Basic Course.** *Institution: Skyguide Academy, Wangen.*	Switzerland.
	https://www.dfs.de/homepage/en/services/training/	
01-12/09/2025	**ATSEP Basic Course.** *Institution: Entry Point North.*	Sweden.
	www.entrypointnorth.com/services/atsep-basic/	
08-10/09/2025	**Aviation Cyber Security (An IATA Course) .** *Venue: IATA's Geneva Training Center, Route de l'Aeroport 33, Geneva.*	Geneva, Switzerland
	www.iata.org/en/training/courses/aviation-cyber-security/tcscs59/en/	
08-12/09/2025	**Human Factors in Aviation (An IATA Course) .** *Venue: IATA's Montreal Training Center, SS135800 rue du Square-Victoria, Montreal.*	Montreal, Canada.
	www.iata.org/en/training/courses/aviation-human-factors/tcvt05/en/	
08-12/09/2025	**Safety Management for ANS Providers (An IATA Course) .** *Venue: IATA Singapore Training Center, Pasir Panjang Rd., Singapore*	Singapore, Singapore.
	www.iata.org/en/training/courses/sms-ansp/tcvl07/en/	
10-12/09/2025	**Data Science for Decision Making in Aviation (An IATA Course) .** *Venue: IATA Singapore Training Center, Pasir Panjang Rd., Singapore*	Singapore, Singapore.
	www.iata.org/en/training/courses/decision-support-finance/talf93/en/	
08-19/09/2025	**ATSEP Qualification SMC .** *Institution: DFS Air Navigation Services Academy, Langen.*	Langen, Germany.
	https://www.dfs.de/homepage/en/services/training/	
SEPTEMBER/ OCTOBER 2025		
22/09 - 03/10/2025	**ATSEP Qualification SUR Combined .** *Institution: Entry Point North.*	Sweden.
	www.entrypointnorth.com/services/atsep-basic/	
06-15/10/2025	**ATSEP Qualification – COM Combined .** *Institution: Entry Point North.*	Sweden.
	www.entrypointnorth.com/services/atsep-qualification-com-combined/	
13-17/10/2025	**ATSEP OJTI and Assessor .** *Institution: Czech Air Navigation Institute, Prague.*	Prague, Czech Republic
	https://www.dfs.de/homepage/en/services/training/	
13-31/10/2025	**ATSEP Qualification Surveillance .** *Institution: DFS Air Navigation Services Academy, Langen.*	Langen, Germany.
	https://www.dfs.de/homepage/en/services/training/	
20-24/10/2025	**ATSEP OJTI and Assessor .** *Institution: Entry Point North.*	Sweden.
	www.entrypointnorth.com/services/atsep-ojti-and-assessor/	
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OCTOBER/ NOVEMBER 2025		
13/10 - 07/11/2025	**ATSEP Qualification – Comm. (Voice & Data) .** *Institution: DFS Air Navigation Services Academy, Langen.*	Germany.
	www.dfs.de/homepage/en/services/training/	
20/10 - 07/11/2025	**ATSEP Basic Course.** *Institution: MATS, Malta.*	Imqabba, Malta.
	www.dfs.de/homepage/en/services/training/	
NOVEMBER/ DECEMBER 2025		
10-19/11/2025	**ATSEP Qualification - Shared .** *Institution: Skyguide Academy, Wangen.*	Switzerland.
	www.dfs.de/homepage/en/services/training/	
12-21/11/2025	**ATSEP Qualification DPR-DP**	Sweden
	www.entrypointnorth.com/services/atsep-qualification-dpr-dp/	
FLEXIBLE	**Air Traffic Safety Electronics Personnel (ATSEP) Basic (Online).** *Institution: Nigerian College of Aviation Technology (NCAT), Zaria, Nigeria.*	Nigeria (Online).
	https://igat.icao.int/ated/TrainingCatalogue/Course/2472	
24/11 - 12/12/2025	**ATSEP Qualification - Navigation .** *Institution: DFS Air Navigation Services Academy, Langen.*	Germany.
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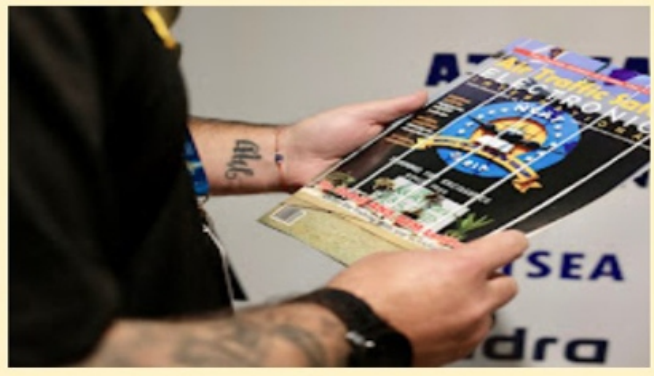

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