ICAO NAM/CAR and SAM Workshop on Cybersecurity in Aviation
ICAO NACC Regional Office, Mexico City, from 4 to 6 December 2018

Summary of Discussions

Date **Location** **Opening** **Ceremony**	4-6 December 2018 ICAO NACC Regional Office, Mexico City The Workshop was attended by 59 delegates from 16 States/Territories and 5 International Organizations from the NAM/CAR and SAM Regions. The list of participants is shown in **Appendix A.** Mr. Julio Siu, Deputy Regional Director of the NACC Regional Office, provided the welcome address of the Workshop.
1.	**References** • Amendment 16 of Annex 17 • ICAO Doc 8973 - Aviation Security Manual • ICAO Doc 9985 - ATM Security Manual
2.	**Objectives** • Develop and promote common understanding of cyber threats, vulnerabilities, and resultant risk across the air transport system; • identify gaps and improvements in current ICAO cybersecurity Standards and Recommended Practices (SARPs) and guidance material; and • share experience and identify best practice for a better response and coordination in the event of a cyber-attack.
3.	**Introduction** The organization of the Workshop on Cybersecurity comes as a decision of the ICAO/LACAC NAM/CAR and SAM Aviation Security and Facilitation Regional Group in its last meeting (AVSEC/FAL/RG/8, 13-17 August 2018) and counted with the funding of the Multi-Regional Civil Aviation Assistance Programme (MCAAP), a Technical Cooperation Project focused on the CAR Region.
4.	**Workshop Schedule and Activities** The Workshop on Cybersecurity in Aviation was held at ICAO NACC Regional Office, Mexico City, from 4 to 6 December 2018. The workshop, conducted in English and Spanish, counted with speakers from the States, international organizations, civil aviation stakeholders and industry, and was organized in four different sessions as follows:

- **Session I: International Initiatives and legal provisions regarding Cybersecurity**
  This session focused on the work done on cybersecurity by international organisations, and presented existing structures for coordination on cybersecurity issues and current guidance material and provisions on the subject concerning international civil aviation.
- **Session II: Air Navigation Services (ANS) Cybersecurity**
  This session focused on ANS, the area in which the concept of operations and supporting technology is probably changing more rapidly and where the framework of Cybersecurity recommendations is more developed.
- **Session III: Cybersecurity and airlines**
  The airline industry relies on computer systems extensively in their ground and flight operations. This session covered how airlines implement automation and new technologies and protect their systems against cyber-threats.
- **Session IV: Cybersecurity at airports**
  This session focused on securing airport systems and protecting the increasing amount of information and data that these systems manage.

There was also a breakout session in order to provoke the exchange of ideas and discuss the current regulatory framework on cybersecurity, potential initiatives in the NAM/CAR and SAM regions and the role that ICAO could play.

The complete programme, with details of the speakers can be found in the **Appendix B**. The workshop webpage is located at:
https://www.icao.int/NACC/Pages/meetings-2018-csec.aspx

5.

Outcomes/Recommendations

Below are some of the observations and general recommendations made during the workshop, together with key items in which future work can be oriented:

- There was a broad consensus on the fact that civil aviation stakeholders already apply elemental cybersecurity practices (e.g. security by design, and network separation). However, the extent to which these practices are applied and their knowledge varies broadly between stakeholders and between areas of the same organization. **At this point, ICAO SARPs could not be more prescriptive on the obligations imposed to the industry**.
- Amendment 16 of Annex 17, which became applicable on 16 November 2018, contains the first standard on measures related to cybersecurity (4.9.1) but overall, SARPs and guidance material (i.e. Aviation Security Manual – Doc 8973, ICAO ATM Security Manual – Doc 9985) are considered high-level and there is an **urgent need for more specific guidance** that can be applied by States.
- Considering current initiatives in the region conducted by **international agencies** with knowledge and resources on this domain (e.g. ITU, OAS), ICAO should coordinate their **collaboration and active involvement**, in order to avoid duplication and properly address civil aviation through activities on this sector (e.g. training, cybersecurity exercises).

- Participants agreed on certain **basic elements** that are required within a State in order to develop capabilities to ensure that civil aviation stakeholders adequately protect their critical information and communications technology and data used for civil aviation purposes. Having national cybersecurity legislations, regulations and strategies involving also other sectors and means of transport; establishing a national Computer Emergency Response Team/Computer Security Incident Response Team (CERT/CSIRT) for reporting computer security incidents; or carrying out a cyber-risk assessment (in accordance with Annex 17 Standard 4.9.1 and Recommended Practice 4.9.2) appear to be necessary steps for a correct supervision of the operators.

- **Cybersecurity** is a topic that should be included in the security culture through the **training** delivered to the staff of the air transport ecosystem (i.e. Air Navigation Services Providers [ANSPs], airlines, and airports). Technology and the internet of things are affecting all type of unsuspected equipment. Basic good practice could hinder cyber-attacks, which could represent little safety risks but affect public confidence.

- As the manufacturer presentations stressed, **outsourcing cybersecurity and monitoring tasks** (e.g. through a Security Operation Centre [SOC]) could be the better and economic solution depending on the size of the organization and the criticality of the information and communication systems, mostly when there is a lack of knowledge of this matter in the State. However, third-party providers should be knowledgeable of the sector and staff within the organization should always be aware of systems architecture and protection in place.

- Although new equipment could be better prepared against cyber-attacks, older equipment is still in use at airports, airlines and ANSPs. **Cybersecurity is a cross-related subject** that should be considered not only under Annex 17, as it affects aerodromes, airworthiness or air navigation. In view of this, participants support the creation of a cybersecurity panel with the appropriate expertise and representatives from safety and security, civil aviation and industry.

- The establishment of a **global trust framework**, as it is stated in the recommendations made during the ICAO Thirteenth Air Navigation Conference (Montreal, 9-19 October 2018), would definitely **improve safety and resilience** of air traffic management and aircraft operations. The development of a **global aviation internet network** to support exchange of information in a digital environment is part of this project, but in order to be a useful tool it is necessary to involve key stakeholders and ensure confidentiality and speed of response.

- Same principles as above should be considered for building a **cybersecurity point of contact (POC) network**. Such network requires immediacy and it would become ineffective if ICAO applies the same terms of reference and structure as the Aviation Security Point of Contact (AVSEC POC) network.
- **ICAO Regional Offices could play a key role in promoting cybersecurity** practices among States. They can facilitate States' interaction with programmes and initiatives on cybersecurity from other international organizations that can help build capability (e.g. development of a national cybersecurity strategy); coordinate the participation of the States in cybersecurity exercises; or help in conducting cyber-risk assessments.
- **Air Navigation Services (ANS) Recommendations**
  - States need to identify their communications, navigation and surveillance infrastructure that supports their air traffic services and, accordingly, identify their critical infrastructure vulnerable to cyber-attacks. Protect critical infrastructure must be a priority for States.
  - Automated systems such as Air Traffic Control (ATC) centres or aeronautical information systems, among others, base their operation on databases that support decisions based in real time information. These systems should be adequately protected to ensure the confidentiality, integrity and availability of the information.
  - The risk analysis on cybersecurity should encompass air traffic services and be carried out on a continuous basis, in order to provide States with a complete view of risks and threats on cybersecurity in air transport operations.
  - The new technologies implemented on air traffic services provide greater efficiency and simplify operations management. However, they could be vulnerable to new cyber threats and in order to mitigate this and ensure redundancy, States should review and update the technical and operational specifications of their systems.
  - Monitoring and analysing the exchange of information and the connections are essential to identify cyber-attacks and establish the adequate protection measures for air traffic systems.
  - States and industry should partner in order to adapt technical requirements to the development pace of new technologies and to ensure that hardware and software of air traffic systems are updated and prepared against cyber threats. Also, all interested parties (i.e. States, ANSPs and industry) need to collaborate in the design of the Standard Operating Procedures (SOPs) for ensuring an adequate protection of the operations.
  - The qualification and the adequate training of the personnel that manages ANS technical and operational areas are essential for a correct provision of the services. Staff should be knowledgeable and need to have the skills to carry out recovery plans in the event of a cyber incident.

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APPENDIX A / APÉNDICE A

ICAO NAM/CAR and SAM Workshop on Cybersecurity in Aviation
Taller de OACI NAM/CAR y SAM de Ciberseguridad de la Aviación
ICAO NACC Regional Office, Mexico City, from 4 to 6 December 2018 /
Ciudad de México, México, del 4 al 6 de diciembre 2018

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ICAO NAM/CAR and SAM Workshop on Cybersecurity in Aviation / Taller de OACI NAM/CAR y SAM de Ciberseguridad de la Aviación

Mexico City, 4-6 December 2018 / Ciudad de México, 4-6 de diciembre de 2018

Programme / Programa

Tuesday, 4 December 2018 / Martes, 4 de diciembre de 2018

08:30 – 09:00 **Registration at the ICAO NACC Regional Office**
Registro en la Oficina Regional NACC de la OACI

09:00 – 09:30 **Welcome and opening / Bienvenida y apertura**
Melvin Cintron, ICAO NACC Regional Director / Director Regional Oficina NACC OACI

Presentation of the workshop / Presentación del taller
Moderators / Moderadores – **José María Peral Pecharromán** and / y **Mayda Ávila**,
ICAO NACC Regional Officers / Especialistas Regionales de la NACC OACI

Session I: **International initiatives and legal provisions regarding Cybersecurity**
Sesión I: **Iniciativas internacionales y disposiciones legales en Ciberseguridad**

EN: This session will focus on the work done on cybersecurity by international organisations, and will present existing structures for coordination on cybersecurity issues and current guidance material and provisions on the subject concerning international civil aviation.

ES: Esta sesión se centrará en el trabajo realizado en ciberseguridad por parte de organizaciones internacionales, y presentará las estructuras existentes para la coordinación de incidentes de ciberseguridad y material de guía y disposiciones en la materia que afecten a la aviación civil.

09:30 – 10:30 **Pablo Andrés Palacios**
International Telecommunication Union (ITU) /
Unión Internacional de Telecomunicaciones (UIT)
Programme Officer, Chile Area Office / Oficial de Programa, Oficina de Área Chile
ITU Cybersecurity activities and the Global Cybersecurity Index /
Actividades de ciberseguridad de la UIT y el Índice Global de Ciberseguridad

10:30 – 11:00 *Refreshments and Group Picture / Refrigerios y foto de grupo*

11:00 – 11:55 **Roberto Sánchez**
Information Security Coordination (CSI), UNAM-CERT, Mexico /
Coordinación de Seguridad de la Información (CSI), UNAM-CERT, México
Information security coordinator / Coordinador de Seguridad de la Información
What is a CERT/CSIRT and its functions / Qué es un CERT/CSIRT y sus funciones

11:55 – 13:10   **Jaime Fuentes**
OAS Inter-American Committee against Terrorism (OAS-CICTE) /
Comité Interamericano contra el Terrorismo de la OEA (OEA-CICTE)
Cybersecurity Technical Consultant / Consultor Técnico en Ciberseguridad
**Cybersecurity Cooperation in the Americas /
Cooperación en ciberseguridad en las Américas**

13:10 – 14:00   *Refreshments / Refrigerios*

Session II: **ANS Cybersecurity**
Sesión II: **Ciberseguridad ANS**

EN: This session will focus on ANS, the area in which the concept of operations and supporting technology is probably changing more rapidly and where the framework of Cybersecurity recommendations is more developed.

ES: Esta sesión se centrará en ANS, el área donde probablemente el concepto de operaciones y la tecnología de soporte están cambiando más rápidamente y donde el marco de recomendaciones de ciberseguridad está más desarrollado.

14:00 – 14:40   **Rodrigo San Martín**
INDRA
ATM International / ATM Internacional,
**Cyber Resilience of ANSP systems /
Ciber-resiliencia de los sistemas de ANSP**

14:40 – 15:20   **Frédéric Cuq**
THALES
ATM Business Development / Desarrollo de Negocios ATM
Cybersecurity for Air Traffic Management
Ciberseguridad para la gestión de tránsito aéreo

15:20 – 15:30   **Close of Day 1 / Cierre día 1**

Wednesday, 5 December 2018 / Miércoles, 5 de diciembre de 2018

09:00 – 10:30 | **Ricardo Aguilar**
Civil Air Navigation Services Organization (CANSO)/
Organización Civil de Proveedores de Servicios de Navegación Aérea (CANSO)
Director of Aeronautics and Security Strategic Systems /
Director de Sistemas Estratégicos de Aeronáutica y Seguridad
Cybersecurity the new challenge
Ciberseguridad el nuevo desafío

10:30 – 11:00   Refreshments / Refrigerios

11:00 – 11:40 | **Ravo Randria**
General Direction of Civil Aviation, France / Dirección General de Aviación Civil, Francia
Director Cooperation Americas / Directora de Cooperación Américas
Cybersecurity in Civil Aviation for France /
Ciberseguridad en aviación civil para Francia

11:40 – 12:10 | **Luci Holemans**
Federal Aviation Administration (FAA, USA) / Administración Federal de Aviación (FAA, EUA)
National Airspace System Information Security Group Manager /
Gerente del Grupo de Seguridad de la Información del Sistema Nacional del Espacio Aéreo
National Airspace System (NAS) – Cybersecurity exercises
Espacio Aéreo Nacional (NAS) – Simulacros de ciberseguridad

12:10 – 12:40 | **Andrea Freeburg**
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Oficina de Asuntos Internacionales, Especialista en Asuntos Exteriores
2018 FAA Caribbean Cybersecurity Tabletop Exercise
2018 Simulacro teórico en ciberseguridad de FAA en el Caribe

Session III: Cybersecurity and airlines
Sesión III: Ciberseguridad y aerolíneas

EN: The airline industry relies on computer systems extensively in their ground and flight operations. This session will cover how airlines implement automation and new technologies and protect their systems against cyber-threats.

ES: La industria de las compañías aéreas confía extensivamente en sistemas informáticos para sus operaciones en tierra y de vuelo. Esta sesión cubrirá como las compañías aéreas implementan la automatización y las nuevas tecnologías, y protegen sus sistemas contra amenazas cibernéticas.

12:40 – 13:20 | **Alicia Sorroza Blanco**
Grupo Aeroméxico
Corporate Security V.P. / Subdirector Corporativo Security
Gerardo Isaac Quintanilla Maldonado
Grupo Aeroméxico
Cibersecurity operations Manager / Gerente de operaciones de ciberseguridad
Cybersecurity on civil aviation. Airline perspectives.
La ciberseguridad en la aviación civil. Perspectivas desde una aerolínea

13:20 – 14:00   Refreshments / Refrigerios

14:00 – 14:30 | **José María Peral Pecharromán**
ICAO Regional Officer, Aviation Security and Facilitation /
Especialista Regional de la OACI, Seguridad de la Aviación y Facilitación
ICAO Cybersecurity Approach and Regional Initiatives /
Enfoque de la OACI en ciberseguridad e iniciativas regionales

14:30 — 16:00.	**Breakout session: National and international framework on Cybersecurity** **Sesión en grupos: Marco nacional e internacional en ciberseguridad**

Note: Participants in groups will exchange views and share experience regarding cybersecurity policies, directives and agreements applicable in their States, and reflect on existing ICAO mechanisms to address and report cybersecurity issues, identifying potential improvements to current ICAO's Standards and Recommended Practices (SARPs).

Nota: Los participantes en grupos intercambiarán puntos de vista y compartirán experiencias respecto a políticas, directivas y acuerdos en ciberseguridad aplicables en sus Estados, y reflexionarán sobre los actuales mecanismos de la OACI para hacer frente y reportar incidentes de ciberseguridad, identificando mejoras potenciales a las Normas y métodos recomendados (SARP) actuales de la OACI.

16:00 – 16:10	**Close of Day 2 / Cierre día 2**

Thursday, 6 December 2018 / Jueves, 6 de diciembre de 2018

Session IV:	**Cybersecurity at airports**
Sesión IV:	**Ciberseguridad en aeropuertos**

EN: This session will focus on securing airport systems and protecting the increasing amount of information and data that these systems manage.

ES: Esta sesión se centrará en la protección de los sistemas aeropuertos y en la protección de la creciente cantidad de información y datos que estos sistemas manejan.

09:00 – 09:40	**Murtaza Nisar,** SITA *Cybersecurity Lead, Americas / Líder de Ciberseguridad, Américas* **Importance of Combining Aviation Business Intelligence with Cyber Intelligence via the Case Study of Aviation SOC /** **Importancia de combinar la inteligencia empresarial de la aviación con la ciberinteligencia a través del Caso de Estudio de Aviation SOC**
09:40 – 10:20	**Althea C. Bartley,** Jamaica Civil Aviation Authority / Autoridad de Aviación Civil de Jamaica *Aviation Security and Facilitation Manager / Gerente de Seguridad de la Aviación y Facilitación* **Case Study: Jamaica / Caso de estudio: Jamaica**
10:20 —.11:00	**Jasiel Abreu López** Mexico City International Airport (AICM) / Aeropuerto Internacional de la Ciudad de México (AICM) *Monitoring Centre Supervisor / Supervisor de Centro de Monitoreo* **Gerardo Oseguera Caballero** AICM *Monitoring Centre Coordinator / Coordinador de Centro de Monitoreo* **AICM experience on cybersecurity** **Experiencia del AICM en ciberseguridad**
	11:00 – 11:40 *Refreshments / Refrigerios*

Session IV:	**Conclusions**
Sesión IV:	**Conclusiones**

11:40 – 12:00	**Concluding remarks / Observaciones finales** Moderators and speakers / Moderadores y Presentadores

— END / FIN —