

REPORT OF ICAO / IAC AIRCRAFT ACCIDENT AND INCIDENT (AIG) INVESTIGATION WORKSHOP

(Teleconference (Webex), 12-14 April 2021)

1. Introduction

1.1 A workshop on Aircraft Accident and Incident Investigation (AIG) was held by teleconference (Webex platform) by the ICAO EUR/NAT Regional Office together with the Interstate Aviation Committee (IAC) on 12-14 April 2021, from 09:00 to 11:00 CET every day. The workshop was conducted in English and Russian languages.

1.2 The objectives of the workshop were to:

- Develop competencies to enable States to conduct independent and effective investigations of aircraft accidents and incidents;
- Support the implementation of ADREP/ECCAIRS compatible taxonomies and databases;
- Support States in better fulfilling their investigation obligations within the context of Annex 13; and
- Share information and experience in aircraft accident and incident investigation (AIG).

1.3 A total of 130 participants from 32 States and 3 international organizations attended the workshop. The list of participants is contained in **Appendix A**.

2. Updates in AIG area from ICAO, IAC and ENCASIA

2.1 Mr. Arnaud Desjardin from the ICAO EUR/NAT Regional Office provided the workshop with information about the content of the latest amendments of Annex 13 applicable since 5 November 2020 and of the Manual of Aircraft Accident and Incident Investigation Doc 9756, Part IV – Reporting, Third Edition, 2020. He provided an overview of the new or amended provisions pertaining to safety recommendation of global concern (SRGC), recorded data for accident and incident investigations, timely investigation of accidents and serious incidents, release of the Final Report when the State conducting the investigation does not publish the Final Report within a “reasonable timeframe”, new format for the notification of serious incidents (SINCID), a risk-based approach to assess incidents, investigation delegation agreements, format and content of the written preliminary report, Accident/Incident Data Reporting (ADREP). He also updated the meeting on outcomes of the Flight Recorder Specific Working Group.

2.2 Mr. Arnaud Desjardin provided information about the 2020-2022 edition of the GASP and the EUR Regional Aviation Safety Plan (EUR RASP) 2020-2022. He reminded the workshop about two of the EUR RASP targets:

- Maintain a decreasing trend of regional accident rate. The achievement of this target is measured in particular with the number of accidents to aircraft of 2250 kg or more in the EUR Region.
- EUR States to improve their score for the effective implementation (EI) of the critical elements (CEs) of the State’s safety oversight system (with focus on priority PQs) as follows: by 2022 – 75%; by 2026 – 85%; by 2030 – 95%. The achievement of this target is measured using in particular the EI score in AIG for EUR States (along with all the other audit domains).

2.3 Mr. Arnaud Desjardin informed the workshop on the regional results of USOAP CMA in AIG for States in the EUR/NAT Regions. He pointed out in particular that the average Effective Implementation (EI)

of the priority Protocol Questions (PQ) in AIG for States in EUR/NAT was 66% (March 2021) and that only 9% of EUR/NAT States have fully implemented the AIG priority PQs. The AIG topics with the lowest EI in the region are the forwarding of ADREP reports as well as the organization, staffing and training.

2.4 A report on the activities and technical capabilities of the IAC laboratory was presented to the workshop. The presented capabilities of IAC laboratory included the recovery of data from non-crash-protected devices, the flight path data reconstruction from video recordings, the reconstitution of accident sites using drones, voice analysis to detect stress levels, examination of aircraft parts using non-destructive testing, use of endoscopy for examination of piston or gas turbine engines. The IAC also underlined the outstanding collaboration it maintains with the laboratory of BEA, France for the sharing of experience and techniques in the areas of aircraft part examination and data read-outs.

2.5 The deputy chair of ENCASIA, Mr. Jurgen Whyte, provided an update about the European Network of Civil Aviation Safety Investigation Authorities (ENCASIA). He reminded the workshop that Regulation (EU) No 996/2010 on the investigation and prevention of accidents and incidents in civil aviation came into force on 2 December 2010 and that its article 7 created ENCASIA. He added that ENCASIA formalises and strengthens the existing cooperation between safety investigation authorities of EU Member States, but is not an agency. ENCASIA seeks to further improve the quality of investigations by a stronger cooperation between safety investigation authorities. Mr. Jurgen Whyte also provided a detailed update on ENCASIA core work programme in the areas of Management of Communication, Cooperation (incl. Family Assistance), ENCASIA Mutual Support System (EMSS), Planning and Resources, Peer Reviews, Safety Recommendations and ICAO Matters (under development).

3. Capacity building related to organization, staffing and training – AIG

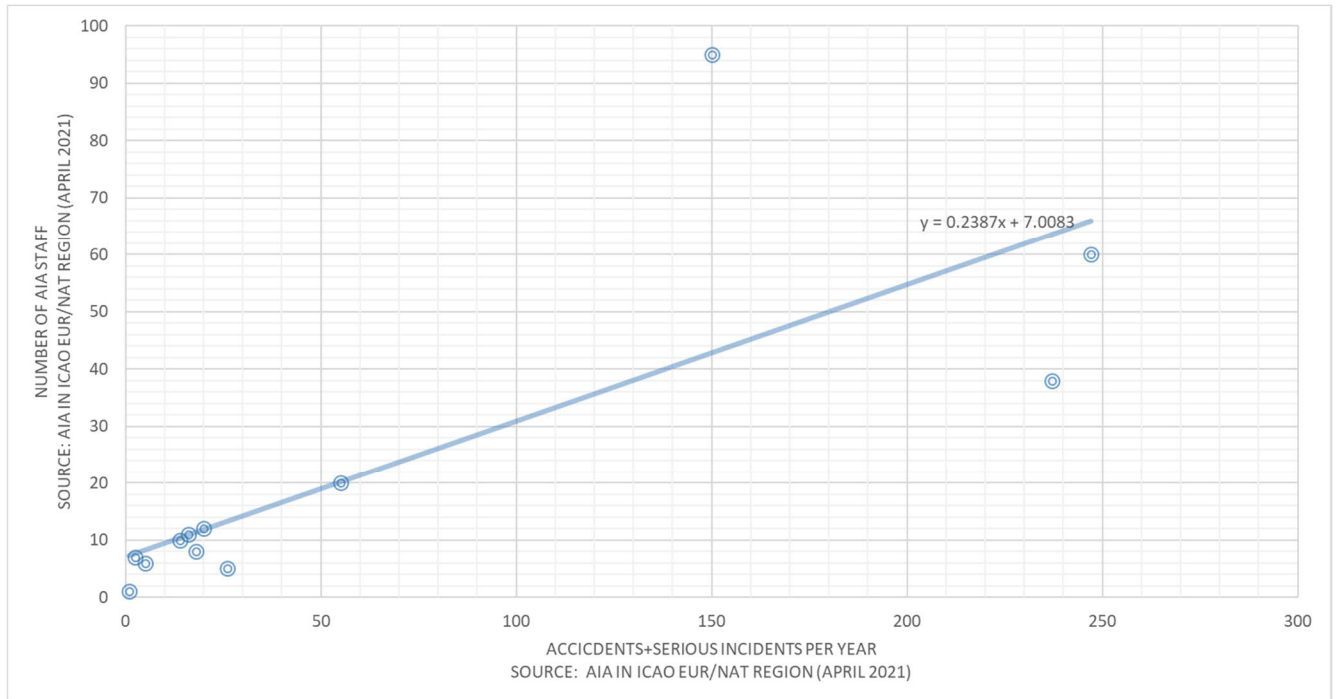
3.1 In view of the relatively low effective implementation of AIG organization, staffing and training in the States of the accredited area of the ICAO EUR/NAT Regional Office, Mr. Arnaud Desjardin provided some guidance to address some of the USOAP CMA AIG PQs related to these themes. The workshop reviewed guidance that can help address the following Protocol Questions (PQ) from the 2017 version:

- **6.101** - Has the State established an investigation authority with a clear and documented structure and in a manner that ensures independence from State aviation authorities and other entities that could interfere with the conduct or objectivity of an investigation?
- **6.103** - If the investigation authority has regional offices, is there a system in place for coordination and standardization?
- **6.105** - Has the State established and implemented a process to ensure that the accident investigation authority have sufficient financial resources to investigate accidents and serious incidents?
- **6.107** - Has the State established and implemented a process for supplementary funding of accident investigations when required (major accidents)? (*Note: this PQ has been deleted and merged with 6.105 in 2020 Edition of AIG PQs*)
- **6.111** - Does the State have its own appropriately qualified personnel identified and charged with aircraft accident and serious incident investigation duties?
- **6.113** - Has the State implemented a mechanism to ensure that the accident investigation authority has sufficient personnel to meet its national and international obligations related to aircraft accident investigations?

3.2 A special focus was performed on PQ 6.113. The workshop reviewed how to establish a mechanism or methodology to be able to compute the “ideal” number of staff for the actual number of investigations conducted and for the various investigation activities. The workshop agreed that the methodology should include the ability to accomplish not only investigation-related tasks, but also the participation in investigations as Accredited Representatives, the development of national regulations/procedures/guidance material, training, ADREP/accident /incident database and safety studies.

3.3 Some of the AIAs participating at the workshop were able to provide the total number of staff in their AIAs as well as the average number of accidents and serious incidents per year for their State. The

following graph summarizes this data in an attempt to quantify the correlation between the number of investigations per year and the number of AIA staff.



3.4 It worth noting that the AIAs who have provided the data for the above graph are France, Georgia, Germany, Greece, Ireland, Israel, Italy, Portugal, Romania, Switzerland, and the United Kingdom. The slope of the obtained trendline is approximately 0.25, which can be interpreted as an average number of AIA staff necessary to conduct one investigation per year. In other words, one AIA staff would allow for 4 ($=1/0.25$) investigations per year. This number is just an average and is the results of the available data. The validity of the data points to be used in such analysis should be assessed against the capacity of the AIA used in the dataset to actually complete within a reasonable timeframe all the required investigations falling under their responsibility within the context of Annex 13. It is however interesting to note that ENCASIA’s peer review phase 1 report 2014-2018 indicated that “(...) on average, at EU level, there are about 4.2 final reports/investigator/year. If we discard the highest and lowest values, then this global average becomes 3.04 final reports/investigator/year. This ballpark number does not reflect other activities, such as ACCREP activities, technical assistance to third countries, safety promotion, safety studies etc. Nevertheless, this number of 3 yearly final reports per investigator may represent an initial basis to compare resources.”

3.5 The results of the ENCASIA peer review phase 1 and the results from this workshop tend to show that an average number of 4 AIA staff, including 3 investigators, could be used as a basis when a State is establishing its methodology to determine the number of sufficient personnel to meet its national and international obligations related to aircraft accident investigations, as stipulated in USOAP CMA AIG PQ 6.113. An illustration of a possible methodology was provided by using the following parameters:

- Number of AIA staff necessary per conducted investigation per year: between 0.2 and 0.3 (average 0.25)
- Number of AIA staff per participation as Accredited Representative (ACCREP) per year: half of the rate above
- Number of man-hours for the development of regulations, procedures and guidance material: 240
- Training for 2 work weeks (80 hours) per staff per year
- ADREP and accident/incident database: 8 man.hours per investigations (conducted+ACCREP)
- Number of AIA staff necessary for one safety study per year: between 0.2 and 0.3 (like the conduct of investigations)

3.6 Mr. Jens Friedemann (BFU Germany) provided information about the human resources of the BFU. He also indicated the number of occurrences on a 10-year average in Germany. In response to a question regarding the relationship between media and investigation authorities, he provided the BFU media policy. Lastly, he presented two accidents that had occurred in Germany in 2020 involving an Embraer 505 on 20 Jan 2020 and a Cessna 401A on 28 Aug 2020.

4. ECCAIRS user information

4.1 A status update on the use of ECCAIRS was provided by ICAO EUR/NAT. Mr Arnaud Desjardin indicated that 42 (75%) States (out of 56 in the EUR/NAT Regions) use ECCAIRS to manage their aircraft accident and incident database, according to the information provided by States in their State Aviation Activity Questionnaire (SAAQ) on the USOAP CMA online framework (OLF).

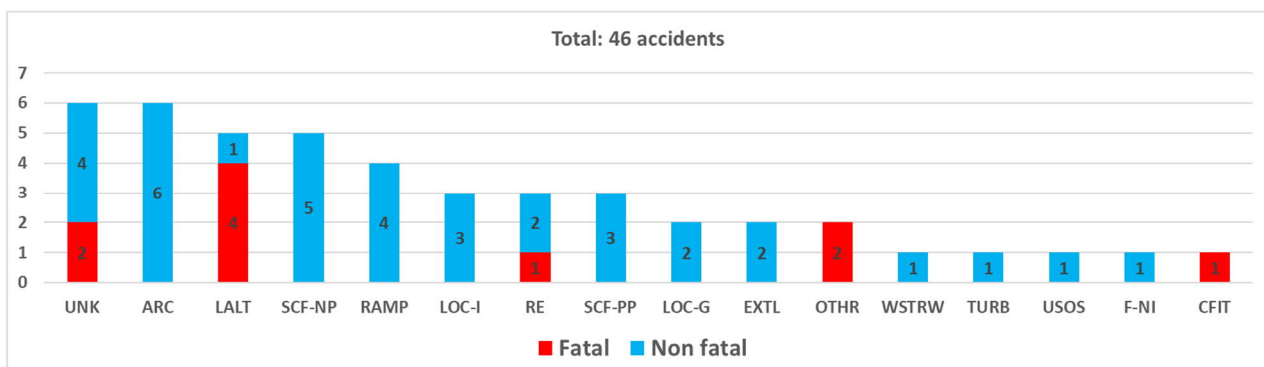
4.2 Mr Arnaud Desjardin indicated that by the end of Q1 2021, ECCAIRS would be reinstated as the definitive source of ADREP data in ICAO. He also presented the planning for the deployment of ECCAIRS 2 (E2), which includes in Q2/2021 the re-establishment of the link between ADREP and iSTARS applications, as well as in Q3/2021 the provision to non-EASA States of an online brief on E2 (jointly with EASA). Mr. Geert Kinders (EASA) indicated in addition that:

- E2 will be planned to be fully operational for EASA Member States by mid-2021
- EASA will make available an information package on E2 in Q3 for non-EASA States interested in E2
- E2 will also be available to non-EASA States on request and will require signature of an agreement between the State and EASA which will include yearly operations fee to be paid to EASA.
- Small/medium/Large packages (basis being number of users and data volumes) with their respective fees will be available in the information package as well.
- E2 will not be able to be run as a local single State solution on a small-sized local Webserver setup, with one or more “web-clients”, unlike what was presented at the last AIG workshop in April 2019. The IT Solution Architecture which underpins the final E2 version is too complex for this.
- E2 has provisions to be run in RSOO mode if all the States which are part of that RSOO are already all E2 users. So the RSOO implementation has to happen after the individual States have joined E2
- The envisaged date for potential onboarding any non-EASA State into E2 is 2022.
- ICAO HQ will use E2 for their Annex 13 ADREP database. ICAO States also running E2 will benefit from facilitated and automated Annex 13 reporting once ICAO HQ is live in E2.

5. Review of accidents of 2020

5.1 The IAC presented a safety review of a number of aircraft accidents and serious incidents investigations, carried out with the participation of IAC in the States of the region.

5.2 The workshop reviewed the list of accidents involving aircraft of maximum mass of over 2 250 kg that have occurred in 2020 in one of the States of the accredited area of the ICAO EUR/NAT Regional Office. There were 46 such accidents, including 10 fatal accidents causing 19 fatalities. A link to the complete list of these accidents is available in **Appendix B**.



6. Investigations and safety recommendations of interest

6.1 IAC presented the investigation and safety recommendations from the accident to the Boeing 747 registered TC-MCL and operated by ACT Airlines on 16/01/2017 near Manas International Airport, Bishkek in the Kyrgyz Republic. The preliminary report is available on the IAC website in both Russian and English and contains 6 safety recommendations.

6.2 Mr Mikael Armura (ANSV, Italy) presented a serious incident involving an engine failure on a Boeing 787 (LN-LND) on 10-08-2019. As the investigation into this serious incident is still ongoing at the time of drafting of this workshop report, the material presented by ANSV cannot be made publicly available.

6.3 Mr. Philippe Plantin de Hugues (BEA, France) presented the lessons learned from General Aviation accident investigation reports issued in 2020 by the BEA. He detailed particular safety lessons drawn from 148 final reports following General Aviation accidents in four main areas: Helicopters, Aeroplanes, Balloons, and Gliders.

6.4 Mr. Dominique Verdoni (BEA, France) presented the investigation and safety recommendations from the accident to the Airbus A380-861 registered F-HPJE and operated by Air France on 30/09/2017 en route over Greenland, when the fan-rotor of engine #4 separated during climb to FL 370. The analysis of the accident revealed that dwell effect starts preferentially within large macrozones, and that Ti-6-4 material was considered not susceptible to dwell-fatigue, but the investigation revealed this was not the case. The first urgent response was the repetitive inspection on GP7000 engines, and the BEA, in its final report, issued safety recommendations to EASA and the FAA regarding in-service monitoring.

7. Conclusion and way forward

7.1 The material presented during the workshop are listed in Appendix B with, when available, hyperlinks to download from the ICAO EUR/NAT website or the IAC website.

7.2 The workshop participants were informed of AIG workshops, seminars and training available in the Region and globally, including:

- ISASI 2021: Aug 30 – Sept 2, 2021 – Virtual Event
- ICAO AIGP/6 meeting: 10 – 21 May 2021 – Videoconference
- ESASI workshop: 1-2 July 2021 in Budapest, Hungary (TBC)
- ECAC/ACC54 : 30 June 2021, back-to-back with the ESASI workshop
- ICAO APAC Webinar on AIA Establishment - Sharing Regional experience and challenges in the establishment of Independent Accident Investigation Authority (AIA) (Video Teleconference, 10 June 2021)
- ICAO NACC Regional Office - Workshop on Accident and incident investigation (AIG) legal and procedural requirements 29 – 30 September 2021
- ICAO NACC Regional Office - Second NACC Virtual Meeting on Accident and Incident Investigation (NACC/AIG/2) 06 October 2021 – Online event

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**APPENDIX A - LIST OF REGISTERED PARTICIPANTS FROM STATES AND
INTERNATIONAL ORGANIZATIONS (para. 1.3 refers)**

ARMENIA	GERMANY	LATVIA	ROMANIA	EASA
Artur ARAKELYAN	Jens FRIEDEMANN	Svetlana FOMJAGINA	Laurentiu DRUMEA	Mario COLAVITA
Simon ASATRYAN	Ute GAUS	Olegs MORGACEVS	Sorin DUNA	Alessandro COMETA
Gegham BADALYAN	GREECE	Aris MUCENIEKS	Andreea FELCHER	Matthew HILSCHER
Vardan CHILINGARYAN	George AIVALIOTIS	Anna SCOGALA	Ionut FLORIAN	Geert KINDERS
Anatoli DAVTYAN	Emmanouil ALEXANDRAKIS	NETHERLANDS	Bianca GHEORGHE	Helder MENDES
Aida GABRIELIAN	Chrysoula Giannopoulou	Simone OUDAKKER	Dan Horatiu HOLBAN	Alvaro NEVES
Karen GYURJYAN	Nikolaos POULIEZOS	Marieke VAN HIJUM	Eduard IORDACHE	Susanne SCHRAMM
Nelly HARUTYUNYAN	ICELAND	NORTH MACEDONIA	Lucian IVAN	Simon SHELDON
Zakar HARUTYUNYAN	Thorkell AGUSTSSON	Ljupcho AVRAMOVSKI	Stefan MARTINESCU	David WALLER
Yurik ISKANDARYAN	IRELAND	Marija GEORGIEVSKA	RUSSIAN FEDERATION	Yngvi YNGVASON
Arman NIKOGHOSYAN	Jurgen WHYTE	Zoran ILIEVSKI	Aleksandr STEPANOV	IAC
Armen PAPIKYAN	ISRAEL	Pero LUPEVSKI	Konstantin SUPRUNOV	Victor RUKHLINSKIY
Matevos POGHOSYAN	Gil ARNON	Zorancho MIHAJLOV	V. CHERTOK	Roman VDOVENKO
Tatevik REVAZYAN	Nissan Yosef HAY	Sasho SHTERJOV	B. VERSUM	Serob KARAPETYAN
Aleksandr SARGSYAN	Sharon KATZIR	Valerija STREZOVSKI	I. BIKEEVA	Svetlana KOZLOVA
Sergey SENEKEREMYAN	ITALY	POLAND	V. KOVALSKIY	Kirill PANCHEV
Tigran SEROBYAN	Mikael AMURA	Anna CYMAN	Yu. FEDYUSHIN	
Ashot TERTERYAN	Vittorio BORSI	Klaudia CYRAN	A. ABAKUMOVA	ICAO
Karen TOVMASYAN	Carlo DEL VILLANO	Leszek CZESZEJKO-SOCHACKI	A. PALCHIKOV	Andre DE KOCK
Hayk YEGHIAZARYAN	Bruno FRANCHI	Tadeusz GRONO	V. MARKELOVA	Arnaud DESJARDIN
Aram YEGHOYAN	Marco GABUTTI	Piotr KACZMARCZYK	A. DANILENKO	Arkadii MERKULOV
AUSTRIA	Barbara MARZI	Iga KAROLAK	N. STEPANOVA	Leyla SULEYMANOVA
DI Tino SCHILL	Giulio ROSATI	Konrad KOŁODZIEJ	A. SOLOVIEV	
AZERBAIJAN	Ernesto VICINANZA	Lukas KORNAS	Anatoly PRIKHODKO	
Natavan AGAYEVA	KAZAKHSTAN	Dorota KOWALSKA	SWITZERLAND	
Rufat EYVAZOV	Dauletbay SERIKBAEV	Piotr MICHALAK	Katharina FECHNER	
Oktay HASANOV	Adilet MYRZAGARANOV	Anna NOWACZYK	Sandro RIZZO	
Karim LATIFOV	Chingiz MOLDABAEV	Minika ROHOZINSKA	TURKEY	
BELARUS	Bektursyn ABENOV	Mateusz RUDNICKI	Murat BENZES	
Vitaly SENKO	Nurlan AKKULOV	Izabela SIEGIEN	Abdurrahman GUZEY	
Alexandr SHIRSHOV	Ely KUZEMBAEV	Marcin SZCZYGIEL	UNITED KINGDOM	
Vladimir NAGULEVICH	Darkhan OSPANOV	Marek TYBURA	Nicolas ASH	
Vladimir BOBROV	Nurzhan RAPTAEV	Marlena WOLSKA	Simon CROOK	
Sergey SHERER	I. PETYASHIN	PORTUGAL	Stuart DOWNER	
BOSNIA AND HERZEGOVINA	T. SULEYMENOV	Nuno AGHDASSI	John McMILLAN	
Vladimir CEKLIC	Zh. ISIN	Luiz BASSANI	Crispin ORR	
Ilija SAVATIC	V. ALEKSANDROV	Jose FIGUEIREDO	Alex SEGENS	
Marinko SIMUNOVIC	KYRGYZSTAN	Carla GIRIO	Philip SLEIGHT	
CYPRUS	K ABDYLDAEV	Carlos LINO	UNITED STATES	
Marios EFTHYMIU	Vladimir AKSYONOV	REPUBLIC OF MOLDOVA	Heidi AMES	
John LOIZOU	Mukanbet ALAICHIEV	Valeriu BUZU	Chad BREWER	
DENMARK	Aybek BAIYSHBAEV	Octavian NICOLAESCU	Angel LUNA	
Jimmy Horskjær FALLESEN	Zhyldyz Seidzhaparovna BEKBASHEVA	Dan STRATAN	Corey STEPHENS	
FINLAND	Dmitry BELOV	REPUBLIC OF NORTH MACEDONIA	Olga VARFOLOMEYEVA	
Juho POSIO	Almaz BIIMURZAEV	Hekuran ASANI	UZBEKISTAN	
FRANCE	K EMILBAEV	Branko TRAJCHEVSKI	Rafik ABDURAKHMANOV	
Philippe PLANTIN DE HUGUES	M KAPAROV		Nurillo SALIKHOV	
Dominique VERDONI	Sh. KARAZAKOV			
GEORGIA	Usen KARIEV			
David GIUNASHVILI	G SEMENOV			
	Genadii SIZINTSEV			
	Sergei SOIKIN			
	Talant TURALIEV			

APPENDIX B - LIST OF WORKSHOP DOCUMENTS (*para. 7.1 refers*)

Num	Title	Presented by	Link
01	Welcome and introduction	ICAO EUR/NAT	ICAO EUR/NAT
02	ICAO update in AIG area	ICAO EUR/NAT	ICAO EUR/NAT
03a	IAC update / IAC Lab capabilities	IAC	IAC
03b	ENCASIA Presentation ICAO IAC	ENCASIA	ICAO EUR/NAT
04a	Guidance on USOAP CMA AIG PQs	ICAO EUR/NAT	ICAO EUR/NAT
04b	BFU Germany - ICAO IAC Workshop 12-14 April 2021	BFU Germany	ICAO EUR/NAT
05a	Safety review of IAC States	IAC	IAC
05b	List of 2020 Accidents in ICAO EURNAT	ICAO EUR/NAT	ICAO EUR/NAT
06	Update ECCAIRS2	ICAO EUR/NAT and EASA	ICAO EUR/NAT
07a	Accident to the Boeing 747 registered TC-MCL on 16-01-2017 in Kyrgyzstan	IAC	IAC
07b	Serious incident involving an engine failure on a Boeing 787 (LN-LND)	ANSV Italy	--
07c	BEA 2020 GA Lessons Learned 2021 04 09	BEA France	ICAO EUR/NAT
08	SRGC A380 Engine Alliance AF066 Greenland BEA	BEA France	ICAO EUR/NAT
09	Conclusion and way forward	ICAO EUR/NAT	ICAO EUR/NAT