Best Practices in Three Key Areas of Aviation Safety: National Safety Oversight; Runway Safety; and Accident & Incident Investigation

ECAC.CEAC

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Contents

INTRODUCTION

For some years now, the Co-ordinating Committee of the European Civil Aviation Conference (ECAC) and a delegation of senior US aviation officials, always including senior representation from the Federal Aviation Administration (FAA), have met once or twice each year, alternately in Paris and Washington DC, in order to share views and perspectives on developments in international air transport, sometimes to determine how the two regions might work together towards particular objectives, and sometimes to challenge each other's positions, on issues where they differ. The relationship is one that each side very much values.

In 2011, in the course of a discussion at one of these regular ECAC/US meetings, the idea was advanced that the two sides should seek to collaborate in some very concrete way in promoting enhanced aviation safety. That was the genesis of the ECAC/FAA safety workshop that took place in Istanbul on 29-30 May 2013, reported upon here.

The presentations given during the workshop ranged across three critically important aspects of aviation safety – national safety oversight, runway safety, and accident and incident investigation. Speakers from ECAC States and from the FAA talked about how they each approached these issues, and what they believed were best practices, as well as actions that were less successful. Discussions following the presentations focused on how matters might go forward. This was very much a 'mutual learning' event, with no suggestion that anyone present had all the answers. Participants included representatives from the ECAC States, and from a number of States neighbouring the ECAC region.

The workshop was opened by welcoming remarks by Mr Bilal Eksi (Director General of Civil Aviation for Turkey), by the ECAC President Mr Catalin Radu (Director General of Civil Aviation for Romania) and by Mr Steve Creamer (Director of the FAA's Europe, Africa and Middle East Office). A presentation on recent developments in Turkish civil aviation was given by Mr Haydar Yalcin, Deputy Director General of Civil Aviation for Turkey.

The content of the three working sessions are reported here. The presentations used in the course of them, together with that given by Mr Yalcin, can be found on the ECAC Web site, at https://www.ecac-ceac.org/index.php/workshop/EN_Safety_WS/event_presentations.   The Workshop Programme is reproduced at Attachment A to this report.

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Workshop Session One

National Safety Oversight

1.1   The opening session of the workshop was moderated by Mr Trevor Woods, Director of Approvals and Standardisation at the European Aviation Safety Agency (EASA).

1.2   Mr Woods introduced the session, the wider context for which had been set out in general terms in the Conference Programme –

Safety oversight is an essential part of the aviation safety regulatory process, dedicated to ensuring that regulatory requirements are met. Unless prescribed otherwise, it is a national responsibility, and a State obligation under the Chicago Convention. The growing complexity of the aviation industry and of its systems, exacerbated by a difficult global economic climate, are making the delivery of effective safety oversight increasingly challenging for many States.

In 2011 ICAO began a two year transition from the USOAP Comprehensive Systems Approach audits to a safety management-based 'Continuous Monitoring Approach' (CMA), a flexible and proactive form of auditing which incorporates the analysis of safety risk factors. CMA was launched formally at the beginning of 2013, replacing cyclical audits with an ongoing process of gathering safety information which will allow aviation stakeholders to base their decisions on full and current information.

In Europe, and in the USA too through the FAA's 'Safety Assurance System', a performance-based approach is recognised as the way forward in safety oversight, enabling organisations to better understand the potential risks they face and the implications for their activities, whilst also allowing aviation authorities to better target their oversight programmes. It is an approach designed to deliver improved resource efficiency for industry and oversight authorities alike.

1.3   Mr Woods reminded the workshop's participants of the national responsibility for the regulation and oversight of safety, and the regional dimension this might take. At a time of technological change and industry globalisation, and in difficult economic conditions, discharging this responsibility was challenging.

1.4   Change was also manifest in the evolution of ICAO's auditing, with the shift to the Continuous Monitoring Approach, and parallel changes could be seen in European and US arrangements. All of this had the effect of placing a premium on the efficient use of resources.

1.5   Mr Woods then handed the floor to the Session One speakers, explaining that their presentations would be followed by a panel discussion, and then by an open forum exchange.

1.6   The first speaker was Mr Roberto Gonzalez, FAA Senior Representative in London, who spoke about the Safety Assurance System approach adopted by the FAA's Safety Oversight Programme Office.

1.7   The Safety Assurance System (SAS) is the next evolution of Flight Standards' certification and surveillance system, Mr Gonzales first explained, adopting a risk-based approach that incorporated a data-supported decision-making form of oversight. The current FAA oversight processes had contributed to an outstanding safety record, but there was a need to anticipate future needs and challenges and to target oversight priorities and resources by moving to this new approach.

1.8   SAS built on the success of the FAA's Air Transportation Oversight System (ATOS) for CFR Part 121 Air Carriers. It applied the same data-supported, risk-based, decision-making approach to all other certificate holders (e.g. Part 135 Commuter and On-demand Operators, General Aviation, and training facilities, etc). As an integrated system, SAS encompassed the people, processes, and technology that, together, drive confidence in the system safety of certificate holders and new applicants. SAS kept the best of what worked in the present day ATOS and expands the approach to improve the FAA's ability to adapt to industry's needs. SAS used hazard identification and risk assessment strategies to formulate surveillance plans and target resources, bringing system safety and safety risk management oversight to such operations as Repair Stations and Part 135 Air Operators not currently covered under ATOS.

1.9   Mr Gonzalez then described the component parts of the SAS (see slide 8 of his presentation, on the ECAC Web site for the workshop), emphasising that it did not represent a separate safety standard and did not impose additional requirements. Rather it represented a proactive approach, based on the explicit policy of the FAA, which states that the Administration "…will pursue a regulatory policy, which recognises the obligation of the certificate holder to maintain the highest possible degree of safety." The initial implementation of SAS would standardise the oversight of airlines, commuter and on-demand operators, and MROs, with the last two receiving the same type of risk-based surveillance as had airline operators under ATOS.

1.10   Planned future iterations of SAS would see it expanded to more aviation entities, under additional FAR parts. As a foundation for regulatory compliance, SAS was believed to be capable of influencing a certificate holder's safety culture and actions by basing oversight on system safety and safety management principles. To accomplish this, SAS would be supported by data to assist the FAA in certificate holder risk assessments and oversight planning; standardise safety oversight in accordance with the principles of SMS requirements; and improve communication capabilities between certificate holders and the FAA. The SAS would tailor oversight to the size and complexity of each certificate holder; prioritise inspection tasks based on oversight priorities at the certificate holder; and allow the FAA to consolidate and analyse data at a national level, in order to identify areas of greatest oversight priority.

1.11   Safety Management Systems (SMS) consisted of four main components: policy, promotion, assurance and risk management, and supported the "assurance" component by ensuring that inspectors had the latest tools and training to evaluate a certificate holder's SMS and overall operation. They categorised certificate holders into "peer groups" organised by 14 CFR parts and type of operation, with the major functions of the certificate holder then grouped into systems, subsystems and elements, known as the "Master List of Functions" (see slides 15-17 for detail).

1.12   "Inspection Job Aids" (Data Collection Tools) had been created to collect the data necessary for inspectors to verify that the Certificate Holder is capable of operating safely and complies with the regulations and standards before approving or accepting programmes; verify that it continues to meet regulatory requirements when changes occur, by conducting periodic reviews; and validate the Certificate Holder's ongoing performance.

1.13   For element design the data collection tools contained detailed design questions, completed during initial certification, when changes happened, weakness were found, or when inspectors determined there to be a need.

1.14   The element performance data collection tools contained detailed performance questions that mirrored the design content, and were completed during initial certification and any time the inspector determined there was a need to perform a detailed performance assessment.

1.15   The system/subsystem performance data collection tool contained seven key questions that provided a comprehensive review of the system/subsystem, while the customised data collection tool was specifically tailored to a specific inspection need with standard and customised questions.

1.16   A set of System Performance Assessment Baseline Intervals had been determined (see slide 21), and an SAS Oversight Model (shown below) established.
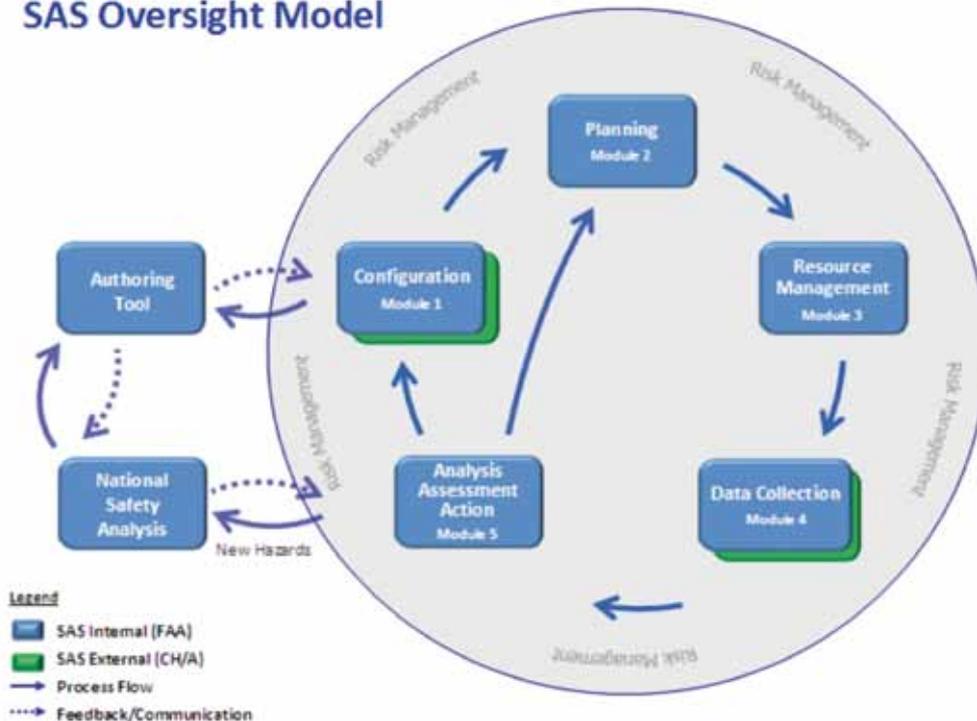
1.17   The SAS implementation schedule anticipated Phase II "Alpha" (all Part 121, 135 and 145 Certificate Holders) being fully deployed by 2015, and Phase II "Beta" (all remaining FAR Parts such as 141, 142, 137 and General Aviation) developed and deployed between 2015 and 18.

1.18   In the ensuing discussion it was confirmed that the US national data repository would be the main source of safety information available to drive the CMA process, to be used in turn by ICAO, once it had been cleaned up and de-identified. Data mining techniques were used by the FAA for trend analysis.

1.19   The second presentation in this first session, focused on the Continuous Monitoring Approach (CMA), was given by Dr RoseMarie Heftberger, Standards and Procedures Officer in ICAO's Continuous Monitoring and Oversight Section.

1.20   Dr Heftberger first reminded participants that safety oversight was a State's responsibility to ensure the effective implementation of ICAO SARPS, the critical elements of a safety oversight system, and relevant safety practices and procedures. The aim of CMA was to promote global aviation safety through continuously monitoring States' safety oversight capabilities. It represented a transition from a one-time assessment to a process of continuous monitoring of States' oversight capabilities, promoting and encouraging the sharing of safety information by regional and international organisations. It was a long-term, cost effective, resource efficient and sustainable approach, consistent with ICAO's policy of pursuing a proactive approach to safety under the safety management concept.

1.21   Dr Heftberger described the CMA's detailed components and external stakeholders (see slides 4 and 5 of her presentation on the ECAC Web site's page for the workshop),

explaining that information sharing is critical to the success of ICAO's approach. An MoU on a Global Safety Information Exchange had been signed in 2010 between ICAO, FAA, IATA and the European Union, aimed at assisting in the identification and reduction of risks to international civil aviation, by exchanging and pooling information. A Memorandum of Cooperation had been signed in 2011 between ICAO and the EU, with a dedicated Safety Annex that enabled cooperation in the fields of safety, security, environment and air traffic management, as well as better use of resources, by sharing information and co-ordinating effort. MOUs related to USOAP had also been concluded by ICAO with ACI, CANSO, EASA, EUROCONTROL, the FSF, IAC and IATA.

1.22   Dr Heftberger explained that the State Safety Risk Profile was based on various safety risk indicators, identifying specific information related to a State, and was considered in the planning and prioritising of USOAP CMA activities and then monitored on a continuing basis. The online CMA framework provided ICAO, its Member States and other authorised users with a set of Web-integrated applications for the continuous monitoring of safety-related information and documentation received from different sources.

1.23   The challenge with CMA, Dr Heftberger explained, was that States had a wide range of safety oversight capabilities, and air transport systems that varied considerably in size, complexity and growth. The maturity of State safety oversight systems likewise varied significantly, with 45% of all Member States lacking basic capabilities to certify their service providers. The evolution to a risk-based approach required that States first implement basic safety oversight functions, as a pre-requisite to SSP development. Safety oversight functions then needed to evolve further to support the ATM systems of the future.

1.24   Under an optimum compliance programme, States would progressively increase compliance to a proper level through the phased implementation of the SSP, covering safety policy and objectives; State safety risk management; State safety assurance; and State safety promotion.

1.25   ICAO's plan was to develop additional Protocol Questions to address SSP implementation. These were divided into sections and aligned with the phases of SSP implementation, complementing those already existing. The related Protocol Questions will be aligned with the phases of SSP implementation (as recommended in the third version of the Safety Management Manual, Doc 9859).

1.26   The third presentation, this time on 'regional safety oversight', was given by Ms CLAUDIA VIRLAN, Deputy Supervision Director of the Romanian Civil Aeronautical Authority.

1.27   Ms Virlan first gave an overview of aviation in Romania, and the State's safety oversight arrangements. These saw the deployment of over 150 inspectors and technical assistants (from a total staff of 204), a 10% increase over the last four years, equipped with all necessary facilities and equipment, including ready access to technical documents via an electronic library, and an intranet forum. There was an annual training plan, with a budget of some 250,000 euros.

1.28   Internal procedures governed the certification, qualification and training of the aeronautical inspectors, and provided a legal framework to access, inspect and levy fines. Certification activities encompassed the annual and multiannual planning of audits; site inspections; use of dedicated check-lists; reports an follow-up activities; plus specific processes in line with regulations and procedures. Mechanisms were in place to ensure acceptability and conformity with the defined requirements, verification of prescribed documentation to comply with the applicable regulatory requirements; evaluation of operational activities; collection of objective evidence

of implementation; verification that personnel were trained in the procedures in place; and SMS and QMS implementation verification. In its initial phase, safety surveillance was by means of a reactive system approach, based on a mandatory reporting system, with dedicated safety analysis and an annual safety report (see slide 18 for detail).

1.29   The Romanian State Safety Programme had been approved in 2012, with the RCAA DG as 'Accountable Manager'. Also in place were a Safety Review Committee and Technical Safety Committee; a safety policy consistent with the EASP; and monitoring mechanisms. Proposed safety indicators were now in consultation, including with the industry, and there was a move in train towards to a performance based environment.

1.30   The final presentation in the first session, again focused on the experience of an ECAC State, was given by Mr Haydar Yalcin, Deputy Director General of Civil Aviation for Turkey. His slides too can be found on the workshop's page on the ECAC Web site.

1.31   Mr Haydar described the legal basis of Turkish aviation safety oversight, responsibility for which was discharged through an independent body which gave full authority to auditors within an autonomous budget fed from the income from services provided. It had proved possible to recruit qualified personnel, including pilots and technicians from industry, engineers and other expert staff. Manpower planning and training arrangements were in place, with an objective to ensure effective implementation of the eight Critical Elements as defined by ICAO.

1.32   Implementation of oversight was conducted via the clear establishment of the necessary authorities, duties and responsibilities, and the classification of audit findings. Under the new approach, there was a nominated Inspector for each organisation, planning and continuous surveillance, follow-up actions, a SAFA Programme, and new software to facilitate continuous monitoring. Findings were shared periodically with industry, on a confidential basis and to raise awareness. Enforcement powers were available under the Civil Aviation Act, other related public laws, and an Administrative Fine Regulation.

1.33   Regional cooperation had been found to contribute to effective oversight by means of the exchange of experts, sharing safety data and expertise, and conducting common audits. The main objective was to secure regional and global safety by using resources more effectively. A Memorandum of Cooperation was in place with Germany and a number of other CAAs.
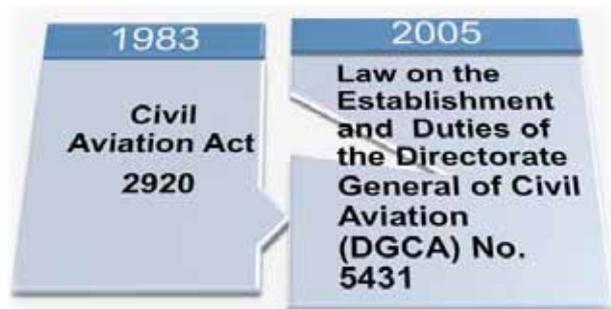
1.34   To ensure full compliance with new ICAO Annex 19, an independent AIB had been established, an Incident Reports Analysis Board constituted, and training provided to personnel. SSP/SMS workshops had been organised, and relevant legal and regulatory studies were in progress.

Session One Panel and Open Forum Discussion

1.35   The Session One presentations were followed by a panel discussion, which was then opened to the floor. In the course of these exchanges the following points emerged –

a)   In each of the past five years, the Turkish CAA had been able to reduce its charges on industry by some 9-10%.

b)   The still growing maturity of SMS within organisations made the construction of reliable safety indicators problematic, and likewise the interpretation of risk.

c)   What the oversight picture would look like when SMS was a fully deployed, understood and applied concept was still hard to say. There was nonetheless some confidence that sufficient data would become available to make such systems successful.

d)   ICAO audits were revealing different levels of SMS adoption, with few as yet fully implemented. States were measuring outputs under advanced but variously named reporting systems. State Safety Programmes remained new for all, and their establishment too would naturally present challenges.

e)   Training for SMS application was likewise a challenge, with different inspectors bringing their different perspectives to the discipline. A "softer" and more collaborative approach to compliance monitoring would be needed, requiring of inspectors some different skill sets, including better oral and written communications and less of a focus on being "the cop on the block".

f)   Practical, hand-on workshop SMS training events were proving valuable, and although different States would have different needs, global and regional cooperation would be important.

g)   There was a concern that those States which had scored well under the "traditional" USOAP approach would continue to do so under CMA, while those which had struggled might struggle still more with the new arrangements. As things stood, nearly half of the ICAO States lacked appropriate safety oversight criteria: setting CMA aside, more needed to be done to get these States to where they needed to be.

h)   Support to States needed to be provided in different ways, on different channels, and would be a long-term task. It had to start with compliance, rather than SSP or SMS. The organisations were many in number, and moving at different speeds: if over-elaborate systems were pressed, some of these organisations would go backwards.

i)   Defining "high" and "low" levels of safety was problematic in itself. An operator needed to have in place arrangements which ensured that failure in one area would not be catastrophic. If such a failure did not take the operator out of compliance, that would be the sign of a high standard of safety.

j)   For small operators, of eg a very small "fleet", SMS had to be proportionate, but still provided a valuable discipline.

k)   Risk perception was identified as a factor that might tend to militate against a level playing field, where SMS application was concerned. It

was the role of the CAA to ensure that operators' SMSs were consistent – while naturally differing in detail - in this respect. It remained at all times necessary to be compliant with all safety requirements, even if different operators chose to focus their attention in different areas.

l) ICAO had often been asked to advise States on the volume of resource needed to ensure that a national oversight programme was properly equipped. The question was equally relevant in respect of RSOOs. But it remained for the States themselves to identify the relevant risks, based for example on its geographical/environmental/industrial circumstances: the resourcing level could not simply be dictated from outside. Guidance was nonetheless able to be provided, and indicators identified, and this might indeed usefully be made the subject of a theme within a future workshop.

1.38 Drawing the first session to a close, its moderator Mr TREVOR WOODS thanked all concerned for their excellent and information-rich presentations, and all who had contributed to the discussion, and noted that while a lot of good work was being directed into the development and implementation of new oversight systems it would be important not to let what had been learned so far in this area fall by the wayside, and be lost.

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WORKSHOP SESSION TWO

RUNWAY SAFETY

2.1   The second session of the workshop was moderated by Mr STEPHEN CREAMER, Director Europe, Africa and Middle East in the FAA's Office of International Affairs, based in Brussels.

2.2   Mr Creamer introduced the session, the context for which had likewise been set out in general terms in the Conference Programme –

Within the global accident rate, runway-related events consistently represent the largest grouping, and ICAO has identified them as one of the main "killers" in civil aviation. Between 2006 and 2010, runway-related accidents represented 59% of all accidents, and 29% of all fatal accidents. ICAO Assembly Resolution 37-6 urges States to take measures to enhance runway safety, to prevent and mitigate the effects of runway 'incursions' and 'excursions', and other runway-related safety events.

A past survey suggested that some twenty per cent of air traffic controllers, thirty per cent of airport vehicle drivers, and fifty per cent of pilots had reported being involved in runway incursions. The deadliest accident in aviation history, at Tenerife Airport in 1977, was an incursion event. Against a background of generally improved aviation safety overall, the number of approach and landing accidents has proved difficult to drive down. Accidents involving runway excursions, i.e. aircraft running off the end/veering off the side of the runway, also remain stubbornly frequent, and can have catastrophic consequences for life and property.

Improvements in runway safety are described by ICAO in its 2011 report on the State of Global Aviation Safety, as being essential if the objective of continually reducing the accident rate, as well as the related fatalities, is to be achieved in the face of the projected growth in air traffic.

2.3   The first presentation, on the prevention of runway incursions and excursions, was given by Mr TZVETOMIR BLAJEV, Co-ordinator of Safety Improvement Initiatives at EUROCONTROL.

2.4   Mr Blajev explained that he would be focusing on the new European Action Plan for the Prevention of Runway Excursion, and in particular on the "Top 5" operational safety priorities.

2.5   The first had been a Joint EUROCONTROL/ECAST project, drawing also on the work of the European Working Group for Runway Safety, and a deliverable of the European Aviation Safety Plan. Published in January 2013, the Action Plan contained 77 recommendations, addressed variously to general and local Runway Safety Teams, airport operators, ANSPs, aircraft operators and manufacturers, regulators, oversight bodies and EASA. Its implementation was to be supported by seminars, industry (IATA and FSF) guidance, and through the devising of tools, presentations, and templates for local action plans.

2.6   The operational safety priorities had been arrived at by means of studies of runway incursion and loss of separation en-route, workshops with six ANSPS during

Summer 2012, a review of severity A and B incidents for 2011, and by mapping the incidents on Safety Functions Maps. The process was considered to be representative, informative, consistent, valid and statistically significant (See Runway Collision and other examples at slides 16-23).

2.7   As a result, five main operational safety priorities had emerged:

a)   The first was to address the risk of **operations without a transponder**, or operating with a dysfunctional transponder. It represented a single threat which removed all the barriers to a 'see and avoid' event, owing to the loss of ATC awareness; STCA; and TCAS/ACAS.

b)   The second priority was **landing without clearance**, which could happen for various reasons and resulted in runway incursions that were often only resolved through 'providence'.

c)   **Failure to detect that a runway was occupied** represented a sizeable share of the severe runway incursion incidents, and ones that might have been prevented. Controllers needed to detect occupation when giving clearance for the next aircraft to use the runway.

d)   **"Blind spot"** events arose when conflict was not detected with the closest aircraft, typically after clearance to descend. Typically these were rapidly developing situations, often with between 1000ft and 15 Nm between the conflicting aircraft.

e)   **Conflict detection** with adjacent sectors involved "inadequate co-ordination" of clearance with an adjacent sector. These typically involved either an early (ie premature) transfer of control to or from the neighbouring sector.

2.8   It was noticeable that two of the 'top five" operational safety priorities involved runway safety. The studies which identified the five situations had provided additional insights on causal/contributory factors, suggested actions to reduce or eliminate risk factors and identified industry 'best' practice and lessons learned, and had informed the development of SKYbrary material.

2.9   See slides for greater detail of conflict scenarios and local adaptation.

2.10   The next presentation in this session focused on reducing safety risks during runway construction, and was given jointly by Mr JEAN-MARC FLON, head of operations at Paris CDG airport and Mr DAVID KNORR, the FAA's Senior Representative in Paris.

2.11   The experience of the French DSNA in relation to the risks associated with runway construction was founded on the experience of such work undertaken at Paris CDG in August 2008, Basle May-July 2011, and CDG April-June 2012. It had proved a challenge to maintain the goal of safe operations on an active runway during such work.

2.12   Thus August 2008 had seen a B737 depart from RWY 27L with reduced distance available and from the wrong intersection, breaking a lighting marking the temporary end of the runway. The aircraft had become airborne 160m after the end of the runway, just before the concrete jet blast fences, with damage reported to an engine hood, the lower part of the leading edge, and the main left landing gear and tyres.

2.13   Learning from experience, runway construction at CDG on Runway 08L in 2012 had been supported by the integrated management of the whole process, involving the creation of a joint Task Force involving all stakeholders, a common decision making process between airport operator and ANSP, and additional specific means of information dissemination. A proactive approach had been taken, including the benchmarking of worldwide safety related events in similar conditions, and the establishment of a Safety Assurance Process with specific operational risk mitigation measures, a durable assurance process, a helpdesk, and the daily monitoring of safety related events, with random ramp checks and frequency monitoring to ensure awareness by crews.

2.14   There had nonetheless been safety events (see slides for detail). Some related to jet blast, and others to a lack of aeronautical information and misunderstandings of ATC clearances. Crew Situational Awareness proved to be the "Achille's Heel" of the arrangements, with ATCOs the effective means of maintaining a high level of safety, as the last defence line before mere "providence". The French DSNA had therefore taken a great interest in the FAA's own approach in this area, and in sharing learning.

2.15   The FAA's own experience of construction events had led it to establish an Airport Construction Advisory Council (ACAC), which reviewed US and worldwide runway/ taxiway construction incidents to identify systematic errors and root causes. It sought to promote awareness of runway construction risks by sharing lessons learned and best practices. Risks had been found to lie in underestimating the impact of "temporary" change, resulting in poorly prioritised, faulty, incomplete and/or conflicting information delivery to pilots. Additional risks included misleading markings on runways and taxiways, and terminological confusion (eg "full length").

2.16   Under the leadership of ACAC, a process had been established requiring all construction events to be made known to FAA Headquarters. ACAC best practices dictated that taxiway and runway related changes must be highlighted at each step of the construction process, including in the training of pilots and controllers, the installation of more signage, in addition to NOTAMs and ATIS, and making changes clear (the use of colours had proved key). For the FAA, airport construction events required the formal tracking of incidents, with more vigilance and awareness. The use of checklists, and continuous building on best practices and lessons learned, were strongly encouraged, and important learning had been captured in the phrase "Don't assume it is ok, if it feels wrong". A best practice guide had been published at http://www.faa.gov/airportst/runway_safety/runway_construction, where could be found inter alia a 'Runway Construction Checklist" (see slide 35).

2.17   The conclusions reached by the FAA were that risk management in this area was a joint responsibility of airports, airlines, pilots, controllers, dispatchers, and all of the involved authorities. Risks had to be continually assessed, with temporary conditions

perhaps needing to be treated as carefully as those more permanent. It was necessary to adopt best practices and share information, with appropriate and up to date information in the cockpit and a readiness to challenge what was assumed safe. ATC provided the last line of defence.

2.18   Looking ahead, the goal should be a process to ensure the availability of up to date information on board aircraft (through data base providers), and these specific issues should be addressed in the changes to come in the ATC/crew interface as a consequence of the implementation of SESAR and NEXTGEN.

2.19   The next presentation was given by Mr Alessandro Cardi, Central Director of Airport Infrastructure at ENAC (Italy), who spoke about the Italian national runway safety programme.

2.20   Mr Cardi first described an important change there had been in Italian arrangements in respect of runway safety policy, from direct management of runways to the management of a system for runway safety. Until the 1990s, most airport runways in Italy were the direct responsibility of the Minister of Transport and the DGAC. This led different actors to have unclear roles, potentially unsafe. Since the establishment of ENAC as the Regulatory Authority from the end of 1998 this had been addressed, with the allocation of runways to airport operators, and today the airport system was managed by these operators, working within a "privatisation scheme" under a public concession lasting 40 years. This had provided a clear division between the regulatory authority and operators.

2.21   The fatal accident at Milan Linate airport in October 2001, in which 118 had died, had exposed a shortfall in the national regulatory system and led to legislative change affecting the competences and responsibilities of ENAC, the ANSP and airport operators.   Runway incursion remained an under-estimated phenomenon, now addressed in the new "European Action Plan for Prevention of Runway Incursions".

2.22   The Italian National Runway Safety Programme encompassed immediate action (3 months) through a Safety Team Project, short term action (1 year) via the adoption of regulation for better implementation of Annex 14 SARPS, and medium term action (4 years) through the certification of airport operators.

2.23   The Safety Team Project approach involved the creation of seven inspection teams, which undertook a conformity check based on ICAO Annex 14 (Amendment 3), at 36 airports; analysis of the status of main areas of concern, including runways, visual aids, taxiways, aprons, emergency plans, the classification of instances of "non compliance" observed during the verfication; and short-term intervention plans (see example at slide 6).

2.24   The adoption of regulation for better implementation of Annex 14 SARPs involved the transposition of any Standard or Recommended Practice as requirements, ensuring a high level of safety, uniform and consolidated application at all airports, and applicability in relation to existing infrastructure and systems.

2.25   Thirdly, the certification of airport infrastructure set challenging requirements as a motivation to improve the level of safety, accepting the need for exemptions in order to manage deviations either on a temporary basis or as permanent measures. Such exemptions were granted on the basis of experience and of a safety assessment,

accompanied by the management of deviations through a recovery plan for non-compliance. Airport operator certification activities encompassed the definition of requirements for airport management organisations, including of a post holder for the different areas (Design, Maintenance etc), a Safety Manager, and Accountable Manager with Corporate Responsibilities; the clear definition of roles, responsibilities and accountability for any managerial position; and a certification exercise carried out by a multidisciplinary team of technicians, engineers and flight inspectors. There was also the implementation of a Safety Management System, a tool which had shown itself to be very effective in developing a synergistic use of resources and cultural growth for participants.

2.26   The safety oversight programme comprised the audit of a complete organisation, on a three-year basis, with an emphasis on SMS effectiveness. A recovery plan for runway safety might still be in force, given the long times required for the modification of infrastructure.

2.27   The State Safety Programme involved, so far as runway safety was concerned, the containment of incursions. ENAC had completed the adoption of the measures provided by the European Action Plan for the Prevention of Runway Incursions. Containing excursions required a multidisciplinary effort involving regulators, ATC, pilots, airport operators, training providers. Passive measures had a role in containing accident consequences, through eg STRIP and RESA.

2.28   In recent years ENAC had defined and developed new tools based on statistical data to manage aspects of runway safety. These included a predictive model for third party risk assessments based on ICAO documentation, to help identify risk exposure levels for surroundings and to establish a Public Safety Zone. The model considered types of aircraft and the associated risk, traffic volume, route configuration.

2.29   These tools also included a database of accidents observed worldwide in the fifteen years to 2011, named the "Spatial Distribution of Aircraft Crashes" (SDAC) database. The accident information was taken from databases available on the internet, and the SDAC had been created principally in order to manage "land use planning" around an airport. It had also however proved useful in studying the characteristics of occurrences such as runway excursions, containing (as it did at present) more than 800 accidents, including to aircraft of north American and western European carriers. The database allowed analysis of the accident data, including by graphical representation of the point of impact in relation to the runway. For analytical purposes it could be filtered by year, type of operation, phase of flight (approach, landing, take off), aircraft size, consequences, and country.

2.30   The final presentation in the second session, entitled "Runway safety best practices", was given by Mr JAMES WHITE, Deputy Director of Airport Safety and Standards at the US FAA.

2.31   Mr White first ran through the tools available to improve runway safety: airport certification and inspection; airport Safety Management Systems: Runway Safety Action Teams; markings and lighting; runway safety areas; aircraft rescue and firefighting facilities; wildlife hazard management; FOD detection systems and pavement management.

2.32   Mr White described the US "Runway Safety Action Team" (RSAT) initiative and its role in reducing runway incursions. The primary role of the RSAT Team was to conduct a non-regulatory assessment of an airport for potential incursion issues, by identifying problem areas and recommending mitigation measures. The RSAT team also worked with stakeholders to implement changes in procedures, operations and facilities to prevent runway incursions. RSAT recommendations, which were generally considered voluntary, may provide additional justification for funding from Federal, State, or local jurisdictions.

2.33   A RSAT team might include personnel from the FAA's Runway Safety, Airports, Air Traffic, Technical Operations and Flight Standards sections. Industry personnel included airport management, operations and maintenance staff, FBOs, airlines, tenants and other local users[1].

Previous Markings   Enhanced Markings

2.34   Runway Status Lights (RWSL) configuration was an important aspect of tackling potential runway excursion events. RWSL would be installed at 15 ASDE-X airports, as a system owned, operated and maintained in its entirety by the FAA, due to reach initial operational readiness by Summer 2014.

2.35   Runway Safety Areas were also very important, and RSA improvements were being improved at all US-certificated airports, to the extent practicable, by the end of 2015. Airports needed to purchase any necessary land, relocate NAVAIDs or make them frangible, move roads if necessary, and install arresting systems. Engineered Material Arresting System (EMAS) installations had a role here, and were currently installed at 75 runway ends, at 49 US airports.

2.36   An increasing challenge in the US was posed by bird strikes. Bird populations were increasing (Canada Geese had increased from 1 million in 1990 to over 3.5 million in 2000), with 13 of 14 species averaging over 8 pounds in weight, this having increased significantly. Birds were staying in urban areas rather than migrating. At the same time, commercial aircraft movements were increasing in the US, from 25 million operations in 2011 to an estimated 37 million in 2030. Reported bird strikes in the US had increased five-fold since 1990, from 1,748 in that year to 9,730 in 2011.

2.37   In the US, Wildlife Hazard Assessment involved the identification of the species, with numbers, locations, and local movements; an account of daily and seasonal occurrences of observed wildlife; plotting the existing wildlife hazards to air carrier operations; reviewing the strike records, Identifying the wildlife "attractants" on and off airport, and providing recommendations for reducing wildlife hazards. It was then necessary to provide measures to alleviate or eliminate these hazards, by first identifying the persons who had authority for implementing the plan, establishing priorities for habitat modification, finding resources for the plan and drawing up procedures to be followed during air carrier operations. This plan would be reviewed and approved (or not) by the FAA. The second edition of the FAA's "Wildlife Hazard Management at Airports" Manual, 2005) could be downloaded from http://wildlife.faa.gov.

2.38   The FAA was also interested in Automated Foreign Object Debris (FOD) detection, for which various systems now existed. It would be installing such systems on primary departure runways at Boston and Miami, subsequent to competitive bidding, with 50% of the cost being met by FAA grant. It would collect data to evaluate the system performance as compared with standard visual detection methods. A mobile automated FOD detection system was in place at Minneapolis Airport.

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1   See slides 19-28 for examples/illustrations of RSAT recommendations/implementation.

2.39   Finally, a National Airport Pavement Test Facility had been developed at the FAA's Technical Centre. Details are at http://www.faa.gov/airports/engineering/pavement_design/.

Session Two Panel and Open Forum Discussion

2.40   The Session Two presentations being concluded, there followed a panel and open forum discussion, in the course of which the following points emerged –

a)   In the US, a Runway Safety Area must as a minimum extend 1,000 feet beyond the end of the runway and 500 feet to either side. In practice, not all of the older airports had this space available, and in these cases the FAA pushed for the installation of EMAS, which might in simple form cost $4m. Different EMAS systems were designed to arrest aircraft of different weights travelling at different speeds. It was for once-only use, although insurance companies were often prepared to fund the re-laying of those EMAS sections damaged during an event.

b)   It was observed that excursions were sometimes a consequence of imperfect information being available to flight crew about the present condition of the runway. The FAA was conducting a study in this area in concert with ICAO and Alaskan Airlines, following an overrun at Chicago Midway, and was trying to arrive at a standard terminology for use in describing runway condition.

c)   Decisions to go around were not taken lightly, given that they could themselves have safety consequences. Pilots would sometimes prefer to go ahead and land straight away, rather than pursue an unfamiliar option. Surveys had shown that much depended on whether the captain was in the flying seat, the weather conditions, and the flight's energy level. It was also apparent that not all pilots regarded stabilisation criteria in the same way, and here more input from ATC could be valuable. Moreover, few of the scenarios encountered in real life had been addressed in simulators.

d)   Of all the stakeholders with an interest in the safety implications of runway construction work, flight crew had proved hardest to reach with the necessary information.

e)   The possibility of deploying EMAS for undershoots had been considered by the FAA, but aircraft were typically moving too fast or with too much energy for it to be effective. EMAS tended to be designed to work at speeds under 75 knots.

2.41   Closing the second session, its moderator Mr Steve Creamer thanked all concerned for their contributions and drew two broad conclusions: (i) while one should always look to act in collaboration with others, rather than expect to be able to solve the problem oneself, it was important for the work to have clear leadership. This need not be the regulator; and (ii) the culture of identifying errors was different to the culture of doing something about them. Society had come a long way towards reaching a position in which its members would reach out and help, and not look to blame…. but more work in this line was still needed.

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Workshop Session Three

Accident and Incident Investigation

3.1 This final session of the workshop was moderated by Mr Jurgen Whyte, Head of the Irish Air Accident Investigation Unit and Chairman of ECAC's Accident/Incident Investigation Expert Group. Mr Whyte also gave one of the Session's presentations.

3.2 Mr Whyte introduced the session by describing ECAC's activities in relation to the accident and incident investigation discipline, delivered through its ACC Expert Group. He drew particular attention in this context to two recent ACC publications: its Guidance on The Underwater Location and Recovery of Aircraft Wreckage and Flight Recorders, and the report of its 2012 workshop on The Treatment of Incidents. Copies of each were available in the room; via the ECAC Web site; or could be obtained on application to the ECAC Secretariat.

3.3 The wider context for this final session had likewise been set in the Conference Programme –

The findings and recommendations from aircraft accident investigations are a critical driver of improvements in aviation safety. Accidents being thankfully infrequent, the investigation of incidents - which are very much more numerous - is no less important, for the lessons they too may contain, including about potential precursors to accidents.

Only when conducted by an independent safety investigation authority can accident and incident investigations be safeguarded against potential conflicts of interest and external interference in the determination of causes and contributory factors. The sole objective of safety investigations should be the prevention of future accidents and incidents, without any apportionment of blame or liability.

It is important that safety investigation authorities possess sufficient financial and human resources to be able to operate effectively and efficiently.

An aviation accident may engage a number of different public interests, notably the need to prevent future accidents but also the need to ensure the proper administration of justice. Such interests will sometimes be in tension, and the right balance must be found between them. A non-punitive environment ("just culture") is conducive to the spontaneous reporting of occurrences, something fundamentally important for effective safety investigation.

3.4 The first presentation in this session was a scene-setter given by Mr Philip Taylor, Principal Inspector of Air Accidents with UK Air Accident Investigation Branch, on the role of accident/incident investigation in aviation safety, and key principles for an effective accident/incident investigation body.

3.5 Mr Taylor led off by reminding the workshop's EU participants that according to EU Regulation 996/2010, "the reporting, analysis, and dissemination of (the) findings of safety related incidents are fundamentally important to improving air safety".

3.6 Under ICAO Annex 13, accident and incident investigation was a process, conducted for the purpose of accident prevention, which included the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations. The sole objective of the investigation of an accident or incident, again according to Annex 13, was the prevention of accidents and incidents: it was not the purpose of this activity to apportion blame or liability.

3.7 Mr Taylor noted that the key principles underpinning an effective accident/incident investigation body, derived from a reading of Annex 13, could be described in the following terms:

- the accident investigation authority shall have independence in the conducting of the investigation and have unrestricted authority over its conduct, consistent with the provisions of [ICAO Annex 13].

- Its investigations shall normally include:

  a) the gathering, recording and analysis of all relevant information on the accident or incident;
  b) if appropriate, the issuance of safety recommendations;
  c) if possible, the determination of the event's causes and/or contributing factors; and
  d) the completion of a final report.

3.8 EU Regulation 996/2012 built upon these principles, laying down that safety investigation authorities play a core role in the safety investigation process, their work being of the utmost importance in determining the causes of an accident or incident, and that it was therefore essential that they should be able to conduct their investigations entirely independently, and also that they should possess the financial and human resources required to conduct effective and efficient investigations.

3.9 The second presentation, entitled "The respective roles of the safety authority and the safety investigator" was given by Mr François Hochart, Head of the Investigations Department at the French *Bureau d'Enquêtes et d'Analyses (BEA) pour la sécurité de l'aviation civile.*

3.10 Mr Hochart noted first that the role of safety authority might be summed up as the identification of dangers and safety risks, rulemaking and safety monitoring, and that in discharging this role it took into account a risk assessment (seriousness of occurrence cf its probability), corrective rules (cost cf effectiveness) and national monitoring capacities (requirements cf means).

3.11 The (complementary) role of an investigation board was participation in the identification of deviations and root causes, and the issuing of recommendations. The board must act in compliance with ICAO Annex 13, notably in respect of its independence and its commitment to non-disclosure.

3.12 The challenges experienced by investigation authorities typically lay in difficulties around means (ie lack of resources, lack of activity, "consanguinity") or culture (ie connection with safety authority or hierarchy, connection with judicial authority, or relationships with other players such as manufacturers or airlines). Other challenges arose in relation to event classification.

3.13 The keys to meeting these challenges successfully could be seen to lie in standardising the safety culture; Just Culture adoption; information sharing; international cooperation; consolidation of independence; the development of modern tools; better flight data analysis; SMS adoption; and the use of a positive taxonomy.

3.14 In concluding, Mr Hochart noted that new challenges were on the way, relating for example to the increasing number of operators with only a small number of aircraft, some of which would be older types. This was a scenario that might promise additional accidents and incidents, he suggested.

3.15 Next came a presentation on "the FAA and NTSB roles in accident investigation", given by Mr Elie T. Nasr, the US FAA's Senior Representative in Moscow.

3.16   Mr Nasr first explained that the US National Transportation Safety Board (NTSB) was an independent agency, not part of the Department of Transportation, nor associated in any way with the FAA. It was composed of five board members and about 400 employees, headquartered in Washington DC, but with nine Regional Offices. The NTSB, which maintained a "Go Team" for major investigations, had no regulatory authority over civil aviation, being responsible rather for accident investigations in all modes of transport - aviation, highway, marine, railroad, and pipeline/hazmat. It investigated and determined the facts, conditions, and circumstances of aviation accidents, determined 'probable cause', and made recommendations to prevent similar accidents in the future. It also conducted special safety studies.

3.17   These responsibilities were quite distinct from those of the FAA, which was part of the Department of Transportation and had responsibility to ensure the safety and efficiency of the United States National Airspace System. The FAA participated in NTSB investigations, but not in the determination of probable cause. It would determine whether any of its FAA's Nine Responsibilities were involved, and if required would initiate corrective action. These nine comprised –

- Performance of FAA facilities
- Non-FAA ATC facilities or NAVAIDS
- Airworthiness of aircraft
- Competency of airmen, air carriers
- Adequacy of FARs
- Airport certification standards
- Security Standards/Hazardous Materials Involvement
- Airman medical qualifications
- Violation of FARs
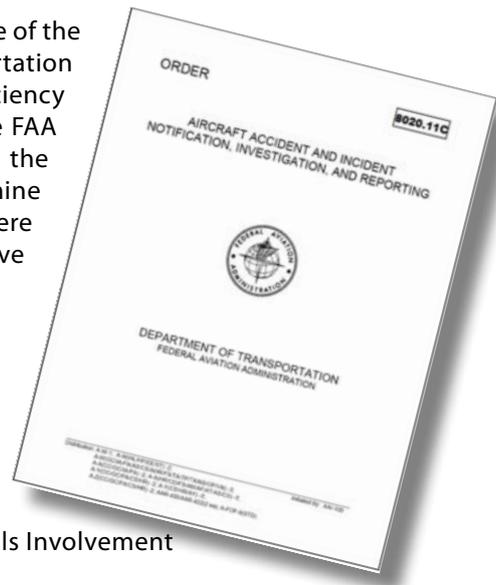
3.18   The FAA's policy in relation to accident investigation was laid down in 'FAA Order 8020.11C, Aircraft Accident and Incident Notification, Investigation and Reporting', as approved by the FAA Administrator. For a major investigation there would therefore be an NTSB Investigator in Charge (IIC), and a FAA IIC (known to the NTSB as the "FAA Co-ordinator") usually drawn from the Washington DC Headquarters, together with other FAA specialists as requested by NTSB (often at the FAA's own suggestion).

3.19   It was the role of the FAA IIC/FAA Co-ordinator to assist the NTSB investigator on-scene, providing additional FAA personnel for the investigation if necessary; populate the Investigation Groups; obtain any FAA-controlled information requested by the NTSB IIC, during and after the on-scene investigation; arrange interviews with FAA personnel; and identify areas of FAA responsibility.

3.20   If one took as an example an imaginary accident in which a helicopter tried to land on the back of a truck, the NTSB might determine that the Probable Cause was the pilot's failure to properly control the helicopter during the attempted landing, with the pilot's lack of experience in performing similar landings perhaps a contributing factor. For the FAA there would be issues around possible FAR Violations, by the pilot and/or the operator (see slides for detail).

3.21   The NTSB's Air Safety Investigators came from diverse backgrounds, and might previously have been air carrier or General Aviation pilots and mechanics, Flight Standards Inspectors (OPS, AW, Cabin, etc.), Air Traffic Controllers, aircraft engineers, or military or law enforcement personnel. Training was provided at the Transportation Safety Institute in Oklahoma City, in Basic Advanced Accident Investigation, Human Factors in Aircraft Accident Investigation, and through aircraft-specific courses.

3.22   Investigations other than major investigations were typically the responsibility of field Flight Standards personnel, often with no field NTSB presence, by Aviation Safety Inspectors or FAA Safety Team Specialists (FAAST). These too would have been trained at TSI and would have undertaken on-the-job training with senior AFS ASIs with operations, maintenance, and avionics, or air carrier and General Aviation responsibilities.

3.23   In the case of an accident or incident involving an aircraft of foreign registry, operator, manufacture or design, occurring in the territory of the United States, the NTSB would lead, with the FAA supporting, with participation from ICAO Member State(s)' appropriate investigative authorities as parties. In the case of one involving an aircraft of US registry, operator, manufacture or design, occurring in the territory of another ICAO State, the investigative authority for the State of Occurrence would lead the investigation, with the NTSB IIC serving as the US Accredited Representative and the FAA supporting the NTSB as a technical advisor.

3.24   The NTSB designated a US Accredited Representative (usually for major investigations) when the aircraft was US registered, operated by a US certificate holder, of US manufacture or with a component of US manufacture, or where a substantial number of US citizens had been injured or killed in the accident. The FAA would support the NTSB, and hence the State agency, through Technical Advisors. The roles of the FAA Senior Representative were three-fold: communication (he or she may very well be the first US Government aviation entity to know of an accident); co-ordination (of travel to locations requiring special authorisation/visa, and in securing invitations to participate): and consultation (providing the FAA Technical Representative and NTSB IIC with information concerning the State's aviation programmes which may support the investigation).

3.25   In international investigations, just as in domestic investigations, things learned by the FAA Investigator (technical advisor) might impact on the Administration's Nine Responsibilities. This then required co-ordination with the NTSB Accredited Representative and with the State Investigator in Charge.   Findings were communicated for disposition within the FAA as required. The FAA would recognise the State investigating agency's status as the lead, but had an obligation and responsibility to maintain the continued operational safety of the US NAS.

3.26   After an accident, the foreign State agency would issue a report, typically but not always co-ordinated with the NTSB and FAA. This would be sent officially to the US Government through the NTSB, usually copied to AVP. The State agency may issue safety recommendations to the FAA, but some foreign investigative agencies had made them directly to the operator. In some cases, the NTSB might re-iterate the recommendation formally to the FAA, which had a statutory responsibility to respond. The NTSB may provide an official response to the report, often with FAA, operator, and manufacturer input.

3.27   The session moderator Mr JURGEN WHYTE, Head of the Irish Air Accident Investigation Unit, then gave a presentation himself, taking as his title "Getting ahead of the accident: the importance, and challenges, of incident investigation"

3.28   Mr Whyte reminded participants of the key legislation in the field – ICAO Annex 13, European Regulation 996/2010 and for each State, its national law – and of the central obligation to investigate. In practice Safety Investigation Authorities (SIAs) in Europe varied very greatly in size, from a few as one person to as many as a hundred. The larger SIAs had the advantage of deploying a broad level of experience across a range of different specialisations, and of being able to investigate large scale or high profile accidents. The smaller SIAs had to be staffed by "all purpose" investigators, and might struggle to deal with the investigation of major events. The "Code of Conduct of Cooperation in the field of Civil Aviation Accident/incident Investigation" established by ECAC sought to provide a common approach to assistance in that regard.[2]

3.29   Mr Whyte next reminded the audience of the definitions of accident, serious incident and incident, before describing some of those with which had fallen to his own SIA to handle over recent years, and how it had been and still was a matter of achieving a continuous balancing act between remaining legally compliant with the obligation to investigate, and finding the resources to do so.

3.30   This had led the Irish AAIU to prioritise public transport accidents over those involving General Aviation (save where a fatality was involved), and fatal accidents over those involving only injury; which in turn took precedent over those involving only damage. Where it was a matter of the investigation of serious incidents, those to public transport took priority over those to General Aviation, with Annex C to Annex 13 then serving as a guide to choosing what to investigate. So far as non-serious incidents were concerned, it was a matter of collecting the data and subjecting them to an appropriate degree of analysis.

3.31   The question from the public in the aftermath of an accident was often "how could this have happened?" The answer too often lay in the loss of collective memory, as a consequence of which "old" serious incidents might occur in a more serious form – raising in turn the question of whether, first time round, the relevant past serious incident(s) had been appropriately detected, reported, assessed and investigated. There were very few genuinely "new" accidents.

3.32   Mr Whyte described a major workshop conducted by ECAC's ACC Expert Group in Accident and Incident Investigation, in Roskilde, Denmark in May 2012, copies of the report of which were available in the room[3]. This had focused on how best those incidents with most potential learning can be identified for subsequent investigation. Mr Whyte recalled some incidents from his own experience which had proved fruitful upon investigation.

3.33   The conclusions drawn by Mr Whyte were –

√   ALL Annex 13 Attachment C occurrences must be investigated;
√   Annex 13 Attachment C must be kept current and valid, but…
√   …to expand this list would have further implications for resources;

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2   Available from ECAC Web site at https://www.ecac-ceac.org///index.php/publications_events_news/ ecac_documents/codes_of_conduct

3   Also available without charge from the ECAC Web site, at https://www.ecac-ceac.org/index.php/activities/ safety/accident_investigation

√   Be alert – follow up on notifications, ask further questions and seek evidence before deciding whether or not to investigate; and

√   Use one's experience to assess the need to investigate.

3.34   In conclusion, Mr Whyte posed a question for the aviation safety community: are we doing enough in reviewing the results of Serious Incident reports on a global basis?

The final presentation of this third session was titled "The 'Just Culture" concept in accident/incident investigation, and was given by Mr Antonio Licu, Head of EUROCONTROL's Safety Unit.

3.35   Mr Licu first briefed the workshop on the European definition of a Just Culture, as one in which front line operators or others are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but where gross negligence, willful violations and destructive acts are not tolerated. The question then posed itself – who draws the line…?

3.36   Mr Licu explained that Just Culture was an old issue, and walked the participants through the Code of Hammurabi, a Babylonian law code dating back to about 1772 BC, which deals *inter alia* with what could be expected of physicians in their medical treatment of freemen and slaves at that time (see slide 4 for detail).

3.37   Why was a Just Culture needed? Because incident reports were essential to aviation safety and there was a need to ensure a flow of information, and to provide an environment of supporting and reporting. The Just Culture concept promoted such supporting and reporting, in ways that were "just" for all parties involved. Mr Licu presented the supporting models of "The Accountability Scale" and "The Learning Scale" (see slides for detail), before offering examples of the "criminalisation" of aviation/ATM events in modern times.

3.38   Mr Licu argued that criminalisation was the wrong term for what was a serious problem. It was a question of finding the balance between enhancing safety and the administration of justice, with no extremes and no immunities from prosecution. One must resolve at the root to protect reporting and the investigation process, and establish a prosecution policy: the result would be a "Just Culture", under whatever name. It was also important to proceed in different ways in relation to accidents and to incidents.

3.39   It was a matter of technical failures vs human failures. We tended to apportion responsibility and blame for the outcome of events, and to retrospectively judge humans as autonomous and volitional individuals, contrary to how we judged technical failures. Investigators treated existing social and organisational activities as irrelevant standing conditions, whereas operational complexity is not easy for the judiciary to take on board. There were moreover social pressures for open enquiries, accessible by the media.

3.40   Mr Licu went on to map very interestingly the "three ages of industrial safety (see slides 11-13), and to detail the fora in which Just Culture issues were presently being debated, within and beyond Europe itself. Returning to the central question of who draws the line, he noted that it might be broken down, into eg such questions as 'Who makes the first assessment of whether an action is tolerable or must be punished? Safety managers? the national CAA or ANSP? Should events be addressed "in house"

or be reported to a prosecutor? Should prosecutors receive all reports? Did they have sufficient "technical" understanding of incidents and of the impact of criminal investigations on aviation safety?

3.41   There was now general support, Mr Licu argued, for the generic concepts of "wilful misconduct" and "gross negligence", and a need to "translate" these into different national criminal legislation. Responsibility for "drawing the line" and the related processes must be explicitly recognised as remaining with the judiciary, he suggested. What was needed was a model for a National Aviation Prosecution Policy.

3.42   Just Culture and related activities had been debated in Europe within the EU, EASA, ECAC and elsewhere, and beyond Europe in ICAO and its regions. A Model National Aviation Prosecution Policy had been elaborated for discussion and then elaboration at either the national or regional level. There needed too to be support to the judiciary, from dedicated experts. European initiatives had been taken to promote a dialogue between safety and judicial experts. The main objective of a Model Policy would be –

"To provide directions regarding the criminal investigation and prosecution of potential criminal offences resulting from aviation accidents or incidents that come to the attention of prosecutors through the reporting of civil aviation incidents."

3.43   Such a model text could be implemented and adapted to reflect national specificities, with national implementation based on a unilateral decision by the State concerned, in particular the national judicial authorities. The main features of such an approach would be co-ordination between safety investigators and those authorities; recognition of the need to protect accident and incident reports, and for them not to be used by a prosecutor as evidence; to limit criminal prosecutions to cases of gross negligence and willful misconduct; and for there to be no prosecutions for actions, omissions or decisions of a reasonable person, even in the case of an unpremeditated or inadvertent infringement of the law.

3.44   Mr Licu spoke of the "Prosecutor Support Course", a joint EUROCONTROL/IFATCA initiative whose deliverables had been endorsed by EUROCONTROL and EU Member States, and were in line with EU Regulation 996/2010 and the draft EU Occurrence Reporting Regulation. The Just Culture concept had been enacted in the EU ATM Performance Regulation, with regional workshops held with groups of States on a model prosecution policy. There had also been regional seminars on Just Culture.

Session Three Panel and Open Forum Discussion

3.45   With the conclusion of the Session Three presentations there followed a panel discussion, which was then opened by the Moderator to the floor. In the course of these exchanges the following points emerged –

    a)   EASA's Safety Recommendations Information System (SRIS) database was judged not yet to be functioning as well as it would in due course, in being populated for the time being preponderantly by the French BEA and the UK AAIB, rather than by a wider range of bodies.

    b)   SRIS raised concerns around the wisdom of giving the material a higher public profile, given that the recommendations would have been

separated from the reports that gave them their proper context. The SIA community was therefore monitoring closely the implementation of SRIS and its access arrangements.

c)   ACREP activity formed a large part of the French BEA's workload, given the global presence of the products of Airbus, Eurocopter and others.

d)   Given the importance of SIA independence, it was better that they drafted their own investigation protocol, rather than have this task led by or shared with the national safety authority.

e)   The UK was considered probably to have made most progress in respect of establishing a Just Culture, in particular by establishing a dedicated Aviation Prosecutor role. Good progress was however being made elsewhere, including in some unpromising judicial environments such as that in France.

f)   In Ireland it was hoped that the law could be changed to prevent safety investigators being subpoened, and accident reports being used in court. Australian legislation and that in New Zealand might offer useful precedents in this respect.

g)   Although the US NTSB had no regulatory authority, its recommendations were tracked by Congress, which might find in them cause to legislate.

3.46   Closing the final session, its moderator Mr Jurgen Whyte thanked all involved for their contributions.

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Conclusions of Workshop

(i)   The workshop's co-Chairman Mr Stephen Creamer (Federal Aviation Administration) congratulated all concerned on what had proved a very interesting event, bringing forward a good deal of important and valuable information, across three very significant dimensions of aviation safety today. It was clear that for the aviation sector the future would bring further change, greater complexity and even more interdependency. The "easy wins" were all now behind us.

(ii)   Mr Creamer thanked Trevor Woods and Jurgen Whyte for having joined him in the Moderator role, noting that the workshop had brought into dialogue representatives of more than thirty States and three international organisations, comprising in all over seventy-five people from the regulatory, SIA and implementation communities. It was now for all concerned to take home the learning they had secured and incorporate it into their own priorities, plans and safety vision, and to build on the relationships they had formed or sustained over the course of the workshop.

(iii)   Finally, Mr Creamer thanked the Turkish aviation authorities for their kind hosting of the event, and ECAC for its detailed organisation, undertaken in concert with the FAA. Special mention in this context was made of Peter Kirk, Gillian Caw and Patricia Felden (ECAC Secretariat), and Dave Knorr (FAA).

(iv)   Speaking on behalf of the Turkish Director General of Civil Aviation, his Deputy Mr Haydar Yalcin thanked all present for their participation in the workshop, the staging of which represented in itself very good partnership working between several entities, a good portent for the future. He wished everybody a safe journey home.

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Attachment A

Workshop Programme

Best Practices in Three Key Areas of Aviation Safety: National Safety Oversight, Runway Safety and Accident & Incident Investigation

A workshop organised jointly by the European Civil Aviation Conference and the U.S. Federal Aviation Administration

Istanbul, Wednesday 29 - Thursday 30 May 2013

Programme

Day One – 29 May 2013

13:15   **Welcome and opening remarks by Bilal Ekşi (Director General of Civil Aviation, Turkey), ECAC President Catalin Radu (Director General of Civil Aviation, Romania) and Stephen Creamer (Director Europe, Africa and Middle East, Office of International Affairs, US Federal Aviation Administration)**

13:30   **Presentation on recent developments in civil aviation in Turkey**
               Haydar Yalcin, Deputy Director General of Civil Aviation, Turkey

Session 1:   **National safety oversight –
                 practical applications for national aviation authorities**

Safety oversight is an essential part of the aviation safety regulatory process, dedicated to ensuring that regulatory requirements are met. Unless prescribed otherwise, it is a national responsibility, and a State obligation under the Chicago Convention. The growing complexity of the aviation industry and of its systems, exacerbated by a difficult global economic climate, are making the delivery of effective safety oversight increasingly challenging for many States.

In 2011 ICAO began a two year transition from the USOAP Comprehensive Systems Approach audits to a safety management-based 'Continuous Monitoring Approach' (CMA), a flexible and proactive form of auditing which incorporates the analysis of safety risk factors. CMA was launched formally at the beginning of 2013, replacing cyclical audits with an ongoing process of gathering safety information which will allow aviation stakeholders to base their decisions on full and current information.

In Europe, and in the USA too through the FAA's 'System Approach for Safety Oversight' programme, a performance-based approach is recognised as the way forward in safety oversight, enabling organisations to better understand the potential risks they face and the implications for their activities, whilst also allowing aviation authorities to better target their oversight programmes. It is an approach designed also to deliver improved resource efficiency for industry and oversight authorities alike.

13:50   **Introductory remarks by Moderator
                 Trevor Woods, Director of Approvals & Standardisation, European Aviation Safety Agency**

14:00   **Best practices in air carrier oversight
                 Roberto Gonzalez, Senior Representative – London, US Federal Aviation Administration**

14:30	**The Continuous Monitoring Approach** **Dr RoseMarie Heftberger, Standards and Procedures Officer, Continuous Monitoring and Oversight Section, ICAO Montreal**
15:00	**Regional safety oversight** **Claudia Virlan, Deputy Supervision Director of the Romanian Civil Aeronautical Authority**
16:00	**The experience of an ECAC State** **Haydar Yalcin, Deputy Director General of Civil Aviation, Turkey**
16:30	**Panel discussion led by Moderator**
16:45	**Open forum, followed by Moderator's Conclusions**

Day Two – 30 May 2013

09:15	**Opening of Day Two of the Workshop**

Session 2:   Best practices in runway safety

Within the global accident rate, runway-related events consistently represent the largest grouping, and ICAO has identified them as one of the main "killers" in civil aviation. Between 2006 and 2010, runway-related accidents represented 59% of all accidents, and 29% of all fatal accidents. ICAO Assembly Resolution 37-6 urges States to take measures to enhance runway safety, to prevent and mitigate the effects of runway 'incursions' and 'excursions', and other runway-related safety events.

A past survey suggested that some twenty per cent of air traffic controllers, thirty per cent of airport vehicle drivers, and fifty per cent of pilots had reported being involved in runway incursions. The deadliest accident in aviation history, at Tenerife Airport in 1977, was an incursion event. Against a background of generally improved aviation safety overall, the number of approach and landing accidents has likewise proved difficult to drive down. Accidents involving runway excursions, i.e. aircraft running off the end/veering off the side of the runway, remain stubbornly frequent, and can have catastrophic consequences for life and property.

Improvements in runway safety are described by ICAO, in its 2011 report on the State of Global Aviation Safety, as essential if the objective of continually reducing the accident rate, as well as the related fatalities, is to be achieved in the face of the projected growth in air traffic.

09:25	**Introductory remarks by the Moderator** **Stephen Creamer, Director Europe, Africa and Middle East, Office of International Affairs, US Federal Aviation Administration**
09:35	**The Prevention of Runway Incursions and Excursions** **Tzvetomir Blajev, Co-ordinator Safety Improvement Initiatives, EUROCONTROL**
10:05	**Reducing safety risks during runway construction** **Jean-Marc Flon, Paris CDG Head of Operations, Direction des Services de la Navigation Aérienne (DSNA), France** **David Knorr, Senior Representative - Paris, US Federal Aviation Administration**
10:35	**A national runway safety programme** **Alessandro Cardi, Central Director of Airport Infrastructure, ENAC, Italy**
11:35	**Runway safety best practices** **James White, Deputy Director, Airport Safety & Standards, US Federal Aviation Administration**
12:05	**Panel discussion led by Moderator**
12:20	**Open forum, followed by Moderator's Conclusions**

Session 3:   Key principles and best practices in accident and incident Investigation

The findings and recommendations from aircraft accident investigations are a critical driver of improvements in aviation safety. Accidents being thankfully infrequent, the investigation of incidents - which are very much more numerous - is no less important, for the lessons they too may contain, including about potential precursors to accidents.

Only when conducted by an independent safety investigation authority can accident and incident investigations be safeguarded against potential conflicts of interest and external interference in the determination of causes and contributory factors. The sole objective of safety investigations should be the prevention of future accidents and incidents, without any apportionment of blame or liability. It is important that safety investigation authorities possess sufficient financial and human resources to be able to operate effectively and efficiently.

An aviation accident may engage a number of different public interests, notably the need to prevent future accidents but also the need to ensure the proper administration of justice. Such interests will sometimes be in tension, and the right balance must be found between them. A non-punitive environment ("just culture") is conducive to the spontaneous reporting of occurrences, something fundamentally important for effective safety investigation.

14:00   **Introductory remarks by the Moderator**
             Jurgen Whyte, Head of Irish Air Accident Investigation Unit and Chairman of ECAC's Accident/Incident Investigation Expert Group

14:10   **The role of accident/incident investigation in aviation safety, and key principles for an effective accident/incident investigation body**
             Philip Taylor, Principal Inspector of Air Accidents, UK Air Accident Investigation Branch

14:40   **The respective roles of the safety authority and the safety investigator**
             François Hochart, Head - Investigations Department, French *Bureau d'Enquêtes et d'Analyses (BEA) pour la sécurité de l'aviation civile*

15:10   **The FAA and NTSB roles in accident investigation**
             Elie T. Nasr, Senior Representative - Moscow, US Federal Aviation Administration

16:10   **Getting ahead of the accident: the importance, and challenges, of incident investigation**
             Jurgen Whyte, Head of Irish Air Accident Investigation Unit

16:40   **The "Just Culture" concept in accident/incident investigation**
             Antonio Licu, Head of Safety Unit, EUROCONTROL

17:10   **Panel discussion led by Moderator**

17:25   **Open forum, followed by Moderator's Conclusions**

17:55   **Workshop Conclusions**

18:10   **Closing remarks by Haydar Yalcin, Deputy Director General of Civil Aviation for Turkey**

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ATTACHMENT B

WORKSHOP PARTICIPANTS

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	Mohammed OUNNAS
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