THE CONTROLLER

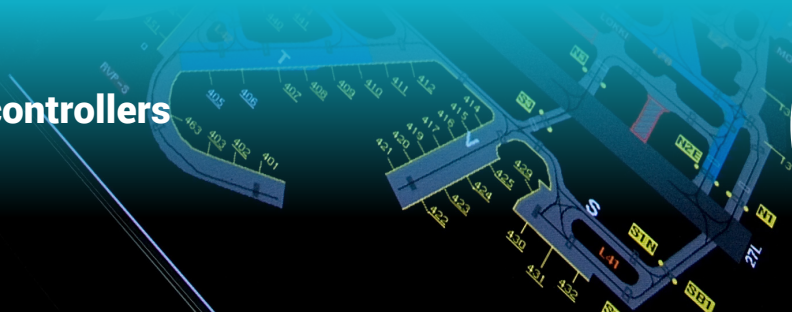
OCTOBER 2017

JOURNAL OF AIR TRAFFIC CONTROL

ATC TECHNOLOGY - TIME TO RE-THINK?

ALSO IN THIS ISSUE

- Duty of care for controllers
- Oshkosh 2017



IFATCA

KVM FROM G&D

IT control that towers above the rest

LEADING THE WAY IN DIGITAL KVM

From the ANSP to the controller to the technician, everyone's better off with KVM.

For the service provider, KVM adds flexibility to IT infrastructure. It enables emergency work-arounds, improves workflows, adds reliability to redundancy concepts and provides continuous, uninterrupted IT availability.

ATCOs enjoy a computer-free environment. Moving the computers to a central location creates less noise, less heat and more space to create better working conditions in the control room. And the system's more reliable too!

With KVM, technicians can access several systems from a range of locations - not just their workplace. Administration is made easier and maintenance too: the computers are stored centrally so no more crawling under desks. There's also more time for maintenance because ATCOs can be simply switched to a back-up system whenever it's required.

For optimum IT system control, improved working conditions and increased system safety, there's only one all-round answer – KVM from G&D.

www.gdsys.de

seit 1985

Guntermann & Drunck GmbH

THE CONTROLLER

OCTOBER 2017
VOLUME 56 ISSUE 3 – ISSN 0010-8073

Cover photo: © NATS UK, via Flickr

IN THIS ISSUE

PUBLISHER
IFATCA, International Federation of
Air Traffic Controllers' Associations
360, St Jacques · Suite 2002
Montreal, Quebec · H2Y 1P5 · CANADA

Phone: +1514 866 7040
Fax: +1514 866 7612
Email: office@ifatca.org

EDITOR-IN-CHIEF
Philip Marien
Van Dijcklaan 31
B-3500 Hasselt, Belgium
email: editor@ifatca.org

DEPUTY EDITOR &
CORPORATE MEMBERS COORDINATOR
Philippe Domogala
email: philippe.domogala@ifatca.org

REGIONAL EDITORS
Phil Parker, Asia Pacific
Serge Tchanda, Africa & Middle East
Ignacio Baca, Technical

COPY EDITORS
Paul Robinson, Jez Pigden, Brent Cash,
David Guerin Alasdair Shaw & Helena Sjöström

The editorial team has endeavored to include all owner information, or at least source information for the images used in this issue. If you believe that an image was used without permission, please contact the editor via http://www.the-controller.net

VISIT THE IFATCA WEB SITES:

WWW.IFATCA.ORG AND WWW.THE-CONTROLLER.NET

ASSISTANCE REQUIRED!?

BY PATRIK PETERS, IFATCA PRESIDENT & CEO

These are busy times for the Federation. The IFATCA Executive Board just returned from its meeting in Moscow and is now amidst the four regional meetings. For many of our members these regional meetings are the opportunity to seek direct input from Executive Board members and other attending officers. Being less official and more casual, these gatherings can tie us closer to the delegates than annual conference where a tight schedule leaves only limited possibility to connect. The larger audience for example during the committee sessions makes some of us feel a little uncomfortable in addressing their issues, but please - I strongly encourage all members to step forward and share concerns with us.

IFATCA is a strong body because we are built on mutual trust and information sharing. By maintaining and improving direct connections between members and leadership we will be able to continue our successful work. It is therefore imperative to be called upon before matters hit the ceiling and appear unsolvable. Unfortunately we witness all too often the Federation being asked for assistance only once regional issues have grown out of hand.

Whilst we can reassure you that every case is being treated seriously and with utmost care, it's important to understand that we won't always be able to offer a solution right away. Our committees, representatives and members of the Executive Board work hard to provide guidance material, develop processes and strengthen our networks to offer the assistance wanted. And whilst we are professionals, we all are volunteers! It is this volunteer network with many faces behind the scenes that has built the foundation of the Federation!

I want to take this opportunity and thank all those who have been tirelessly contributing to our Federation! Thank you to all those member associations and their individual air traffic controllers who stepped up to host the regional meetings in 2017.

As a global organization the IFATCA Executive Board is determined to extend, in alignment with our strategy, the Federation's influence to parts of the world where we are little known or used, such as South America, Russia, and Malaysia to name just a few. Meeting venues are selected from among the offers made by various member associations. Offers are gathered after which the IFATCA Executive Board decides on the final meeting location. This is not only valid for Executive Board meetings but also for the meetings held by our standing committees, our Technical and Operations Committee (TOC) and the Professional and Legal Committee (PLC) in particular.

Very often MAs are experiencing issues, which compel them to invite the committees to meet in their country. The same is true of the IFATCA Executive Board, which is very often invited to meet in a country experiencing specific issues, which the Board addresses. When this is the case the TOC, PLC and the IFATCA Executive Board not only complete their assigned work but also engage in local issues, which they may be able to assist on. The vast knowledge available in these committees has proved to be of great help in such cases. It is not unusual for TOC and PLC meetings to take place in different regions. This practice allows representatives and non-committee members to attend the meetings, provide input and thereby contribute to the final quality of the working papers. This is also necessary for purposes of fairness, so that smaller MAs can benefit from the presence of the committees as well.

From Munich to Aruba, from Moscow to Kuala Lumpur, our committees and the IFATCA Executive Boards endeavor to balance all factors when deciding where and when to meet. As an example, tiny Aruba kindly offered to organize the TOC and PLC meetings this fall out of their interest in meeting with IFATCA subject matter experts to address local issues.

The work of all committees is essential for IFATCA to continue to grow and exert influence on the international stage. All MAs are encouraged to assist these committees by not only participating as members but also organizing and hosting their coordination meetings. And as always, we are always looking for new people willing to volunteer their own time and efforts for the betterment of the Federation, because – we're all in this together!

Professionally yours,

patrik.peters@ifatca.org

MORE OF THE SAME?

BY PHILIPPE DOMOGALA, DEPUTY EDITOR

After listening to all the presentations at the European Regional Meeting and having visited many ACC facilities across Europe over the last years, I come to the conclusion that as far as the Single European Sky (SES) commitments and promises made in 2004, virtually nothing has been implemented. With two years left to go – the SES was supposed to Cover the period until 2020 – there are hardly any new revolutionary technologies implemented. The so-called Functional Airspace Blocks (FABs) that were planned, are either dead or at least are looking terminally ill. The only thing that these FABs have brought is an extra layer of complexity and administration. Data link is not nearly performant enough to enable advanced functionality. Without it, airspace optimisations using 4D-trajectories cannot materialise. Anyway, if the airlines continue to fly routes differently to what they plan, as they do today, and refuse to equip (some of our low-cost airlines) or retrofit, very few of the ambitions of the European Commission make any sense whatsoever.

Taking a step back and looking at Europe's ATM scene objectively, one can only conclude that any capacity gains made during the past decades have come mainly from local initiatives: by the air traffic controllers, either with or without the cooperation from their management. The EUROCONTROL Network Manager has helped a lot, but involvement of the European Union has had little or no real effect whatsoever. Claims that they facilitated Flexible Use of Airspace (FUA), flexible ATCO rostering, flexible sector opening times are misleading at best. FUA existed long before SES and ATCO and sector flexibility came from the staff rather than being facilitated or enabled by SES initiatives. Those initiatives would be there today with our without SES.

In the meantime, the system in the USA is finally taking huge strides after trailed Europe for the last few decades. Mandating ADS-B will solve most of their VRF/IFR collision woes in one go. Weather information is freely available via the ADS-B displays and providing access to uncontrolled airports frees controllers for other tasks. They also cleverly offered financial incentives for the General Aviation community to equip, ensuring a faster transition and early benefits. All-in-all, it would appear that common sense rules in the USA, while Europe is still pouring tons of money (billions) into projects that promise the moon, but deliver little.

For years, European airlines and politicians have quoted the USA as an example for Europe to follow. Yet, rather than looking at the entire setup, they seem to be rather selective in choosing which bits and pieces they want to implement. Rather than spending billions on new projects that most probably will not deliver the promises they were indented to bring, perhaps it is time to look at how the USA is making things happen: through common sense and by involving all stakeholders, including the controllers, as equal partners. After all we are the ones that know what need to improve the system

For Europe, it is clear that time is running out fast: traffic is rising spectacularly again in many European regions. Having chosen to sponsor industry over investing in staff, many ANSPs in Europe are struggling badly to staff sectors correctly. Training controllers on using new technology is becoming increasingly difficult for many service providers.

As former IFATCA President Marc Baumgartner argues: a radical turnaround is urgently required. It may well be that this, and the changes it brings, will come from the outside - in other words: not driven by the service providers, staff or the users/stakeholders. Personally, I sincerely doubt any benefit will come from SES II, III or even IV. After all the other acronyms - EATCHIP, FEATS, ATLAS, ATM2000, ATM2000+, and other long forgotten ones that came and went - is it not time to radically rethink our approach? After all, doing the same thing over and over again and expecting a different outcome, is a sign of insanity...

philippe.domogala@ifatca.org

DIGITATMISATION

IS A RADICAL REFORM OF THE TECHNOLOGICAL PILLAR NEEDED? OR IS IT TOO LATE?

BY MARC BAUMGARTNER, IFATCA SESAR COORDINATOR

With the advent of digital technologies, plenty of our current daily realities are undergoing radical changes. Jobs and work dramatically evolve and may even disappear over time. It is not known if there will be more or fewer jobs in the future. New concepts, such as pairing processing power with human ingenuity, are slowly emerging.

While we can all agree that digitalisation fundamentally changes our society, nobody knows what will happen to Air Traffic Control and Air Traffic Management. The question WHETHER our domain will benefit from the increased computing power and networking has been replaced by WHEN and HOW.

ATM needs to evolve

Plenty of documents have addressed the outdated status of ATM infrastructure, the obsolete state of Air Traffic management and the need for reform. It is therefore understandable that a lot of hope is being put into digitalisation, uberisation and/or disruptive technology by those pushing for the reform of air traffic management. There is a clear need for ATM to evolve: it is one of the last elements of the aviation value chain waiting to undergo changes of institutional and economic optimisation. The increased optimisation will most probably unfold via technology, enabled by digitalisation.

It is difficult to foresee what kind of technology or disruptive element could trigger a revolution in European Air Traffic management, and what this will mean for the current system. NextGen and SESAR have consolidated and streamlined the Research and Development in ATM. The European funds from Horizon2020 allow investment into the modernisation of existing technology and spreading the best practices thereof. Technology itself has not changed from a conceptual point of view and follows existing CNS/ATM logic.

Struggle

A silent struggle is ongoing between the insiders, which are transparent and evolving in the peripheries of the SESAR program (in form of Virtual Air Traffic Control and Cloud Based Services (CBS), Remote Towers and Centralised Services) and outsiders who are waiting to assess whether the current ATM stakeholders will move fast enough or whether they will miss opportunities (such as in CPDLC) to survive with the legacy systems. The new giants like Google, Microsoft, Amazon and telecommunications companies, as well as NASA are experimenting with autonomous solutions for unmanned aerial vehicles. Their solutions to standards and operational procedures may also have the potential not only to transform ATM, but perhaps even to replace current ATM.

Updated masterplan

Is it too late to re-think the European modernisation roadmap or the SESAR Masterplan? Or are we right on time? Only time will tell. Though not necessarily new, this time the change will be substantial as it is made possible by computing capacities unimagined before. Once the first standards for virtualisations will be patented and certified, the transformation is likely to be radical and rapid. During the Digital Transport Days in November 2017 in Tallinn, the Estonian EU Presidency will introduce the 4th Edition of the European ATM Masterplan. Under the heading "Digitalisation of the European Aviation Infrastructure", the European Commission plans to launch a revamped European roadmap for technological change. The missing elements in the current edition of the ATM Masterplan regarding Artificial Intelligence, Cloud Based Network operations to block-chain projects in ATM, will have to be included.

Currently it is difficult to estimate what these changes will look like. As some of the European controllers embrace the concepts of virtualisation and cloud based services, interesting new issues will probably surface. Outsourcing of core activities, such as flight data processing will become the norm, physical implementation of ATM units will only be dependent on political and social issues and not anymore on technological or geographical challenges. Software updates are massive prototyping exercises with a lot of bug fixing, during live operations. Safety management systems cannot capture these new ways of updating the system in its entirety. Imagining issues which will become future challenges, we might become trapped within our own current limited scope of thinking. Elements like bug fixing are carried out on live systems and more trial and error methods are used. The need for development platforms in parallel to the real operations has been identified as only one of the future challenges.

IFATCA's role

As professionals, are we aware that we are in the eye of the digitalisation storm? Do we still believe that the second technological revolution of our Industry, a.k.a. ATM 4.0, will be for others and not for us? Currently, none of the modernisation projects around the globe look at the

Some examples of disruptive technology[1]

A lot has been written about **Remote Towers** and their potential to revolutionise some of the aerodrome flight information services. The overall performance benefits are still to be proven on the larger scale and this will determine whether this concept is to become a trendsetter for aerodrome control or remain a niche product for special ATM circumstances (public service or redundancy needs).

Virtualisation and Cloud Based Services constitute the beginning of the change in ATM. More precisely, virtualisation and cloud based services are methods of providing air traffic control services through common and standardized interfaces this from a location-independent virtualised environment, using the principle of shared allocation of computing resources, such as processing power, storage and services.

This technology, originating from the IT industry, enables the service provision of dynamic computing resources regardless of location. Future ATM systems will indeed rely on integration and automation, using the ATM information cloud as the backbone. Currently, large ANSPs are migrating from legacy Flight Data Processing (FDP) systems to cloud-based FDP services. These services also make standardisation and consolidation processes possible among ANSPs). Reducing the number of systems by way of consolidation will bring economies of scale and increase performance. In effect, small ANSPs will be able to benefit from modern high-performance architectures. This will, in turn, create new business opportunities, ANSPs will consolidate data processing and supply services between one another, using a common information cloud.

1 (Baumgartner Finger Engin Zeki) The need to evolve air traffic management: Europe as a laboratory [to be published]

potential to disrupt the established and highly regulated industry with new ways of data gathering and management. In the current edition (2015) of the masterplan, IFATCA together with the other professional staff drafted Chapter 4.7 on the role of the human. In the light of the new challenges, digitalisation will bring the need to plan the transition and change management in a business transformation way, including social and political dimensions of this change. IFATCA will have to play a significant role, which is a challenge for the Federation, as we maybe already too late with developing a digitalisation strategy that addresses the changes to the working environment that are about to hit our colleagues worldwide.

This strategy should identify the technical, operational and professional legal policies that can enable change and influence the discussion on, for example, the future edition of the ATM Masterplan.

Tsunami

The digitalisation tsunami will unfold its power in ATM very rapidly and IFATCA will have to provide assistance and guidance to its member association as soon as possible.

Though difficult to imagine what kind of new challenges will affect the sector, and in particular the Air Traffic Controllers working environments, some have imagined an at home office-like approach. Others are convinced that ATM will be fully automated and the changes will impact the fundamentals of our profession. IFATCA's global statement on the future of ATM has highlighted some of these issues:

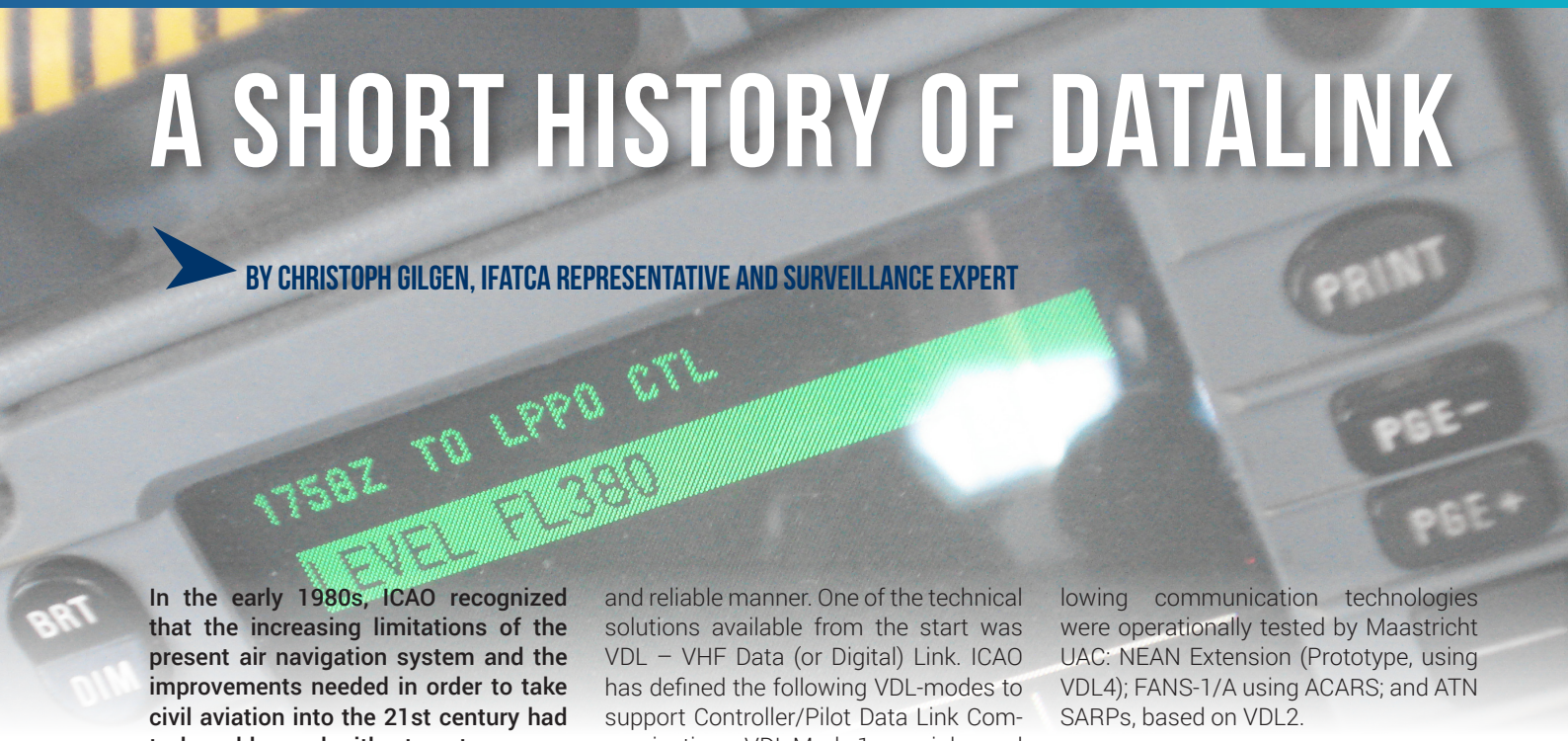
- Multiple separator
- Reliance on automation without knowing what automation does
- Legal liability shifting from the individual ATCOs to the machine, the system or the IT cloud
- Test platforms allowing low cost and mobile ATC
- New business models with or without ATCOs
- Innovation will lead to shorter life cycles from design to deployment then we are currently used to.

Digitalisation will transform air traffic control in a radical manner over the coming 5 to 10 years. Together with the other stakeholders, IFATCA must work on the best possible solutions using our professional expertise. The key to the future, is in part, managing change and changing the mind-set at the same time!

sesar.coord@ifatca.org

A SHORT HISTORY OF DATALINK

BY CHRISTOPH GILGEN, IFATCA REPRESENTATIVE AND SURVEILLANCE EXPERT



In the early 1980s, ICAO recognized that the increasing limitations of the present air navigation system and the improvements needed in order to take civil aviation into the 21st century had to be addressed with utmost urgency. Based on this, the Special Committee on Future Air Navigation Systems (FANS) was established in 1983. The committee was tasked to make recommendations for the coordinated evolutionary development of air navigation valid for the next 25 years to come.

When looking at controller-pilot datalink communications (CPDLC), the first operational datalink implementations and practical data-link tests took place in the 1980s. They were conducted by the FAA in the USA and by EUROCONTROL, in Europe. ICAO had started to define a harmonized message-set for the future CPDLC system with over 200 data-link messages, as part of the Aeronautical Telecommunication Network (ATN).

ATN

ATN was intended to be an ICAO-defined standard with a set of specific applications and a general-purpose set of communication services to allow ground, air-to-ground and avionics data subnetworks to inter-operate. While this ATN standard was perhaps well-defined and published, it was rather theoretical rather than operationally validated.

One of the obvious challenges for all CPDLC-applications is to link the airborne layer to the ground layer. To achieve this, the various layers need to be connected through so-called ATN-routers. These pass messages between the air/ground and ground/ground components. These layers obviously need to interact in a fast and reliable manner. One of the technical solutions available from the start was VDL – VHF Data (or Digital) Link. ICAO has defined the following VDL-modes to support Controller/Pilot Data Link Communications: VDL Mode 1 – mainly used for validation purposes only; VDL Mode 2 – the principal system of VDL; VDL Mode 3 – used both for data, but also digitized voice communication; and VDL Mode 4 – the most sophisticated VDL-Mode, specifying a protocol enabling aircraft to exchange data with ground stations as well as with other aircraft.

The ATN protocol provides positive feedback on the status of the connection, even when no operational messages are transmitted, which is a major benefit that was omitted from other systems and technologies deployed in Europe (for instance for AOA or FANS).

Early tests in Maastricht and Miami

The FAA started its data-link testing in the early 2000s in Miami. These tests were clearly labeled as testing, and the results were not very conclusive. This FAA test program was a CPDLC, Build I, and it was operational from October 7, 2002 until September 30, 2004 (in Miami and surrounding airspace). It provided limited functionality: Transfer of Communications (TOC); Initial Contact (IC); Altimeter Setting (AS); and Menu Text (MT) for uplinking a predefined set of free-text messages.

The European CPDLC trials were called PETAL - Preliminary EUROCONTROL Test of Air/Ground Datalink. These began as early as 1995 at EUROCONTROL's Maastricht UAC. At the start of the second phase in 2001, the following communication technologies were operationally tested by Maastricht UAC: NEAN Extension (Prototype, using VDL4); FANS-1/A using ACARS; and ATN SARPs, based on VDL2.

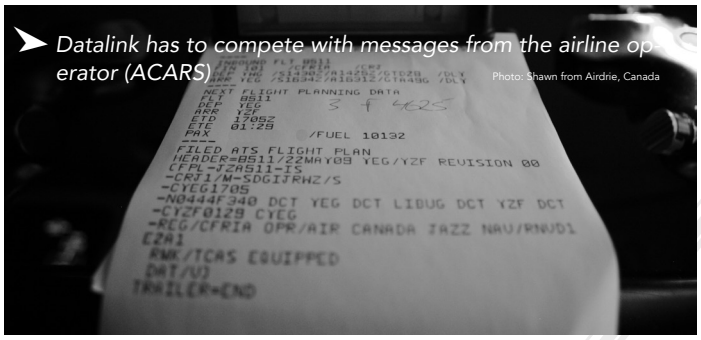
Worth noting is that if more than one data-link service/communication service or network is used for CPDLC, it means that two different communications links (or networks) must be maintained and be managed by the crew, which can be very tricky. Currently, only the newer generation of long-range aircraft have this so-called 'multi-stack' capability.

In order to avoid the same problem on the ground, EUROCONTROL developed a so-called gateway, tasked to translate CPDLC-communications transparently for the controllers, i.e. independent from which communication protocol (stack) was used.

A major drawback was that in accommodating legacy technologies, the system's performance and reliability wasn't terribly impressive. As Volker Stuhlsatz, who manages the operational side of Datalink in Maastricht, wrote back in 2012 in The Controller: "Accommodating FANS-1/A services in high-density airspace is not straightforward. There are performance issues, both of how fast messages are delivered as well as concerning the robustness of the system in coping with late or even mis-addressing of messages"

Remote and low-density oceanic airspaces

In the early 1990s, Boeing developed FANS, mainly in oceanic- and remote airspaces' where procedural control is used. It was intended as an alternative



Datalink has to compete with messages from the airline operator (ACARS)

to HF voice communications and based on a system that was readily available: the Airline Communications and Reporting System – ACARS.

ACARS uses VHF-band, satellite or HF to send text messages and it is a global system that permits the communication between the airline OPS-Centre/ airline headquarters and the cockpit of properly equipped airframes. Boeing's initial idea was to develop this system further: FANS-1 (Boeing) and FANS-A (Airbus) enabled direct data link communications between the cockpit (the crew) and the Air Traffic Controllers (ATCO) in remote areas. The system requires a communication service provider to deliver the messages: in Europe, this is SITA, in North America, it is AIRINC. The FANS-communications over remote and oceanic airspaces' included air traffic control clearances, pilot requests and automatic position reporting (referred to as ADS-C, Automatic Dependent Surveillance – Contract). This automatically reports the actual position according to a contract concluded at the entry into a sector or an area. Mainly the position reporting (ADS-C) is of importance, as it permitted the replacement of the old HF-voice and SELCAL systems.

The first region/area to see FANS-1/A operationally was the South Pacific Ocean. All these technological advances helped ATC to recreate a much better picture of the traffic in each of the blocks of FANS-1/A System components, and so to enhance the service provision and the flight efficiency in the whole region. Also, the communications with all aircraft became better and easier. It cannot be denied that the implementation of FANS-1/A brought many operational advantages, but also considerable drawbacks. One of which is that – once an aircraft has started-up and initiated a given data-link communication solution, it's not easy to switch to another data-link channel (or network, stack or knot). And of course, all the FANS-1/A exchanges are not done according to ICAO standards, but to industry-standards (via private operators). In addition, the transaction times (latency of the messages) is rather slow. While this maybe be acceptable for remote and low-density airspace, it is not really suitable for high-density continental airspace where quick and fast communications are essential.

CPDLC issues in Europe

IFATCA has always advocated that CPDLC-implementations for ATC should be done according to ICAO-Standards, i.e. ATN. As such, the rapid expansion of FANS-1/A from the South Pacific area to the North Atlantic (NAT), the Asian continent (e.g. the Bay of Bengal) and eventually to South Atlantic region was of concern for the Federation.

When IFATCA's Technical Committee developed policy against the further spread of FANS-1/A, despite some of its obvious benefits in certain regions, it was met with vigorous resistance from many stakeholders including some service providers. In the early 2000s, there were frequent "clashes" and heated discussions between EUROCONTROL/Maastricht UAC and IFATCA, as the centre was accommodating FANS-1/A aircraft within the high-density airspace of Europe.

Datalink interface in the current Maastricht UAC system

The IFATCA-policy regarding CPDLC, adopted in 1996, reads:

- *All implementations of CPDLC must demonstrate full compliance with ICAO ATN SARPs. However, in Ocean and Remote Regions, where it can be demonstrated that CPDLC implementation improves controller pilot communications, it is recognized that non ATN compliant technologies may be deployed during a transitional phase.*
- *The ICAO ATN SARPs and their progressive development form the definitive basis for any future CPDLC implementation.*
- *In high density ATN CPDLC airspace, FANS aircraft shall be handled via voice R/T for safety reasons*

High-density airspace

Amidst these discussions, the initial data-link implementation in Europe began through an EUROCONTROL program called LINK2000+. Given that it was intended to be used for time-critical tactical ATC-clearances (without voice readback), such a system required much higher performance, in both speed and reliability. That meant there was not only the discussion of whether FANS-1/A should be accommodated but also what technologies and networks would be suitable to deliver the required performance.

It was clear that any CPDLC-implementation in Europe would be a very costly undertaking – not only for airlines – but also for the European Air Navigation Service Providers (ANSPs). Even if the LINK2000+ program promised a staggering 11% capacity increase (if 75% of the aircraft flying above FL 285 were CPDLC-equipped), the airline operators remained very cautious. Led mainly by Lufthansa, they came up with options and alternatives to make the deal more interesting for them (financially speaking). They proposed to combine the European CPDLC-Implementation for ATC-messages with the urgently required upgrade of ACARS? The LINK2000+ program-management therefore adopted an interim architecture known as "AOA", or "ACARS over VDL AVLC" as an intermediate step towards ATN. It allows existing ACARS applications to benefit from the higher bandwidth offered by VDL Mode 2. No changes (read: no investments) were required to the interface of airlines and/or ATS ground systems. Airframes only required a software upgrade to

their avionics. So, for VDL2/AOA to become compliant with ATN, an ISO 8208 layer (ISO equivalent of X.25) needed to be added on top of the AVLC layer. This "encapsulation" of the ACARS packets with the AVLC-frame meant ACARS on VDL-2 became possible.

It made a compelling business case, but this solution was, at least partially, the start of the European CPDLC-misery.

Other issues

A critical issue at the start of the European CPDLC-implementation was CPDLC-messages being delivered to the wrong aircraft. In high density continental airspace and without the need for voice-readback, it was clearly a no-go item. A second issue related to the lack of a technical acknowledgement of received CPDLC-messages. This lead to the specification of PM-CPDLC or "CPDLC Protected Mode", which is now in ICAO Document 9880 Part I Chapter 3. In 2001 at the annual IFATCA World Conference in Geneva the following IFATCA Policy was carried:

When Air Traffic Services are provided via Aeronautical Telecommunications Network (ATN) Controller Pilot Data Link Communications (CPDLC), the use of LACKs (Logical Acknowledgements) shall be considered mandatory.

When Air Traffic Services are provided via any CPDLC other than ATN, a capability which meets the Operational Requirements of LACKs shall be considered mandatory.

IFATCA's strong resistance to a CPDLC-implementation with these known safety issues was essential in getting PM-CPLDC adopted. In time, safety cases developed for CPDLC services have placed emphasis on the need to demonstrate that messages are processed in sequence, without error, at the appropriate time and received by the intended recipient. This sounds like common sense, but it was seen by many as nothing but overhead that would delay the implementation unnecessarily. It is worth mentioning two of IFATCA's data-link experts: Cedric Robin and Jaël Roustan, both active ATCOs working in Marseille ACC. At the time, they were instrumental that our critical voice was heard.

A recovery plan to introduce datalink services in the upper European Airspace was presented to the Single European Sky Committee meeting in June 2017(SSC/17/65/19) outlining the next steps to recover from a potentially costly and "limited in design" technological system, for which the initial implementation date slipped from 2013 to 2022 (approximately) for the first step and to 2026 for the final step.

Europe is in a double bind: SESAR's performance improvements rely heavily on a functioning Datalink Service. The current available solution (Link 2000+) does not meet the required future ICAO performance standards for more complex data exchange. IFATCA argues that the recovery plan as presented is not fit for purpose and should be modified to accommodate a long term and viable solution. Failing to adjust the recovery plan to the new realities might lead the European ATM infrastructure into a dead-end- street. It is fair to say, that when the datalink strategy was developed, nobody could imagine that new technology and digitalization would open new opportunities. As in the development of TCAS, the European actors need to be bold and endorse a forward-looking, new technology that translates into an action plan so that Europe can compete with the new opportunities that will hit the global Datalink scene in 2030 (or even earlier).

The future Datalink Service Requirements have been defined by ICAO and are part of ASBU Block upgrades. The future global CPDLC system will be a harmonized, high performance and all-inclusive datalink, meaning goodbye to FANS 1/A and dual stack. This solution is forward-looking and will be integrated by 2030 at the latest: CPDLC, ADS-C, Airline AOC and it will be working via a multi system and multi-network using the Internet Protocol with VDL-2, SATCOM, HF and other systems (see the article on pages 5 & 6).

Global solutions lay the foundation for this, opening the discussion at ICAO on advanced integration of ATM systems into avionics and the cockpit architecture, for full benefit of the future ATM, as described in the ASBU, SESAR and Next-gen scenarios.

The LINK2000+ program and the European Implementation Rule (29/2009)

In thanking people in his article, Christoph Gilgen modestly overlooks his own contributions in promoting our Federation and its policies over the past decades. Whether at national, European or worldwide level, Christoph continues to defend our profession with a passion that many have come to appreciate over the years.

Besides his vast technical knowledge, his involvement and expertise was instrumental in a number of high profile accidents. His insights undoubtedly changed minds and contributed to less bias and, eventually more effective safety improvements.

At the 2017 Annual Conference, he was awarded the Federation's highest recognition: the Scroll of Honour. Despite having retired from active controlling this year, his vast knowledge will hopefully remain a valuable resource for the Federation for many more years.

RECOVERING DATALINK

BY MARC BAUMGARTNER, IFATCA SESAR COORDINATOR,
AND CHRISTOPH GILGEN, FORMER IFATCA REPRESENTATIVE ICAO ASP

were the foundation for CPDLC-services in its high-density continental airspace (above FL 285). Besides many requirements, it also set firm implementation deadlines for all involved stakeholders. But users lobbied for cheaper, multi-use and low-standard solutions. The program management allowed these compromises, though they were known to be slower, less reliable and/or prone to disturbances. The problems encountered caused the strict deadlines to slip several times.

As a leading engineer working for a big Air/Ground Communication Service Provider commented: "*The LINK2000+ Program had merely a coordination task, as it had no power to enforce actions. For this, the IR from the European Commission was needed. Secondly LINK2000+ had no financial means to ensure large-scale validation activities.*"

CPDLC-implementation in Europe only came about as a "spin-of" of other developments, which were airline driven. So, no clear and urgently required quality and performance goals were defined, let alone implemented – even if these were known. All stakeholders were aware that the implementation of performant and "highly reliable" CPDLC-service in continental high-density airspace was clearly a technically challenging undertaking – if anything the Miami and MUAC trials had demonstrated this – especially if they were meant to provide real benefits (e.g. capacity gain).

So, the decision to piggy-back on other networks was a very risky one. It was especially regrettable not to have a priority mechanism for the different messages, given the high data volume generated by some services. The same goes for relying on external/commercial service providers that have other priorities than providing fast and time-critical ATC-communications.

The initial European CPDLC set-up prioritized cost-benefit over performance, with predictable results: many technical problems and performance shortcomings. Large ACARS messages adapted to pass via the VDL-2 network can cause major issues and transmission problems. While this may be acceptable for AOC messages, it doesn't work for time critical messages, such as ATC clearances.

Even if the mandated solution is based on VDL mode 2 technology (ATN), the interface in the cockpit remains problematic. To start CPDLC-operations in Europe with only a single frequency is another decision that affected performance and reliability. Reportedly, the European data-link system was already saturated by 2015 – so virtually from the start of the European CPDLC-implementation. And as early as 2008, Maastricht experienced problems with provider aborts (PA – a sustained loss of ATN connectivity that is greater than 6 minutes).

Other problems arise from using the service providers' existing infrastructure: their ground stations are not located where they would allow flawless ATC-messaging service but are mainly placed at major airports, where AOC-traffic by airlines is very dense. It's no coincidence that many hot-spots of provider aborts appear to be linked to the positioning of the ground antennas.

While it is possible to set-up VDL-2 connections directly from the airframes in an area to the various ANSPs, it was never envisaged to bypass the communication providers.

The ELSA Project

SESAR JU launched a VDL Mode 2 Measurement, Analysis and Simulation Campaign, more commonly known as the ELSA project. The project was been able to identify a number of key issues in Europe's datalink approach:

- VDL2 over one single frequency would already reach its capacity limits in 2015, therefore, Multi-frequency deployment in Europe is a "MUST";
- A 4 frequencies implementation is a minimum requirement to support VDL 2 deployment until 2025 in high density area;
- Further optimisation options under investigation by ELSA may extend the viability of VDL2 over 4 frequencies beyond 2025 in high density area;
- It highly recommended to anticipate the evolution of the European datalink infrastructure in the ATM masterplan and to prioritize the development of the next generation datalink technology within SESAR.

The full report can be found **here**

A possible route to recovery

LINK2000+ should be optimised (low rate of Provider Aborts, minimal lost communications, good transaction times), without spending many millions of Euros to "repair" the system. As it's an intermediate solution, target date should be from 2025 onwards, bearing in mind ATN/IPS. With only basic functionality, many operations, such as Time-Based instructions or 4D operations will need to be postponed.

The airborne components must be able to accommodate for ATN/IPS in the future with minimal or no changes. Once ATN/IPS can be fielded, LINK2000+ must be transitioned to run on ATN/IPS. As such, it shall not impede the speed and progress of ATN/IPS. The aim is speed, safety and performance.

European Ground systems (ANSPs) must be prepared to switch quickly to ATN/IPS, once it has proven to work well. Model P should have its own infrastructure, independent from commercial communication service providers. Legacy technologies slowing down the speed and the system performance of CPDLC (or technologies complicating and "loading" the system) must be withdrawn as quickly as possible (ACARS or AOA/AVLC). Technologies and other communication networks working as good and safe as VDL2 must be considered.

Even if all the shortcomings were addressed, it is more than doubtful that the CPDLC-system could ever reach the anticipated and promised performance levels (e.g. 1 PA per 100 CPDLC-hours). These PAs are just the worst case – the tip of iceberg. There are also lost messages, delays in transmission, partially transmitted messages etc. All this means that the 11% increase in capacity will never materialize, even if 75% of the traffic would actually communicate via CPDLC. Why? Because the capacity increase cannot be guaranteed, if the data-link channel must be kept (due to bad and unreliable performance) as a secondary means of communication only. This is simply impossible. This is very worrying – especially if we see how much money was spent for the CPDLC implementation so far in Europe. Estimates go into several billion Euro spent on a system that is failing to perform and to bring the anticipated benefits. Actually, the current benefits are close to "ZERO". Any private company running on its own money and on private investments would have pulled the plug well before....

We have to face the fact that the current CPDLC-solution deployed in Europe (and covered by IR 29/2009), will NEVER be capable to deliver the data-throughput and the performance to permit more advanced airspace procedures and future and next generation ATC-modules.

So, the key question is: what now? Contain the damage and try to regroup with all the other stakeholders (including ICAO) to implement a new CPDLC solution that is likely to work in all airspace's – with one single technology – and also likely to support the future planned ATM operations? Or to continue to spend more money and employ heavy resources on a solution that is clearly showing its problems, shortcomings and performance limits? Or have the courage to stop the development and declare the current system as development (for CPDLC-testing and validations)?

As a global and world-wide data-link solution, fully harmonized with all the regions and areas of ICAO, is already in the pipeline, it would make sense to redirect all European CPDLC-money into that new undertaking. It would require courage (and a degree of humility) to admit openly that what was mandated and implemented in Europe is maybe not the solution, but just a step towards a better and more performant CPDLC-solution needed for the future.

It would also help to avoid big frustrations (which are currently growing) as the money spent is ever increasing, but the performance and benefits are not following. This not only creates frustrations, but also gives CPDLC a bad reputation and bad press.

But within the European set-up and with the current mentality of the European stakeholders, it seems `very unlikely that this will actually happen. A huge face-saving exercise seems to be more likely – and the money drain will continue on and on.... For benefits that will be either not materialise, or will not even be proportionally close to the investments made.

sesar.coord@ifatca.org

50 YEARS EUROCONTROL EXPERIMENTAL CENTRE

BY MARC BAUMGARTNER, FORMER CHAIRMAN OF THE EEC CONSULTATION GROUP AND AGENCY RESEARCH TEAM

Many European controllers involved in simulation of any airspace in Europe will be familiar with a place called Brétigny-sûr-Orge, located to the southwest of Paris, France. Beside a former military airport, it is home to EUROCONTROL's Experimental Centre (EEC).

On 14 September 2017, the centre celebrated its 50th anniversary. Around 150 invited guests attended the event. They heard presentations on the research that was carried out at the EEC over the years: from APOC (Airport Operations Centre), BADA (Base of Aircraft Data, GNSS satellite navigation to STAMS or UDPP. This research has been carried out as EUROCONTROL's contribution to SESAR. A point merge simulation for Istanbul airspace was ongoing in their OPS room, which houses a simulator with some 40 controller working positions. Over the years, this has been the scene of many of the European reorganisation projects simulated in Brétigny.

In February 1963, EEC report No 1 reported on the simulation trials of EUROCONTROL Sector 3 in Brussels. Simulations had thus started before the laying of the foundation stone and even before the ratification of the original EUROCONTROL convention. The first simulation was conducted at NAFEC, Atlantic city, USA. Subsequent trials were conducted at partners' premises, including those of the UK and ENAC or CEV in France.

The construction at the location in Brétigny started in September 1964. The first simulation was run in April 1967. Most of the centre's early activities focussed on the various elements being developed for EUROCONTROL's operational air traffic control centres, planned in Maastricht (NL), Karlsruhe (DE) and Shannon (IE).

The current head of the EUROCONTROL Experimental Centre, Pierre Andribet, explained that the choice for the location of the EEC was deliberate, neighbouring the first flight test centre for French military aviation, which was later joined by the technical services of Centre national d'Etudes Spatiales (CNES), and the Space Centre of Brétigny which was created to manage France's space program.

EUROCONTROL was pivotal in the transposing the decisions of the MATSE meeting 1 and 2 in the late 80s, namely in creating a central flow management unit (in 1988) and the European ATC Harmonisation and Integration Programme (EATCHIP). The IFPU-2, the back-up system for EUROCONTROL's Network Management,

is located on the premises of the EEC.

Many airspace changes that have taken place in Europe have used the fast time simulation capabilities of the EEC. This type of simulation used operational ATCOs to define the working methods of ATC in fine detail.

The EEC changed the focus in the 90s, and focussed on large-scale collaborative research. Any innovation or modernisation in the European airspace went at a certain stage through the influence sphere of the Experimental Centre. From RVSM, to Human Machine Interface (ODID) to TCAS, hot spot identification and airport issues, as well as some future concepts such as ARC 2000, just to name a few.

Together with a wide range of industry stakeholders, the Programme for Harmonised ATM Research in Europe (PHARE) was the first joint ATM R&D program. This was before the European Commission began its Framework Programmes for ATM. PHARE developed some common methods, tools and platforms and included the air/ground dimension. In several ways, it anticipated the ATM 2000+ and SESAR ideas, in particular the 4-dimension elements. Benefiting from its large research network, the EEC was pivotal when it came to launch the SESAR program: the operational concept, SESAME (the provisional names of SESAR) was developed during a gathering in the abbey of Vaux de Cernay, under the leadership of Jean-Marc Garot (EEC Director 1995-2005). A list of 10 "commandments" for automation in ATM were created and a black box approach was presented. The outcome of the seminar led to the creation of the operational concept that was formalised in the SESAR deliverables.

➤ A gathering in the abbey of Vaux de Cernay, under the leadership of EEC Director Jean-Marc Garot, developed leading principles for SESAME/SESAR

EUROCONTROL became the co-founder of the Single European Sky ATM Research (SESAR – Joint Undertaking), ten years ago. The EEC was deeply involved in the first phase of SESAR (SESAR 1) which was completed at the end of 2016, with its contribution to 50 out of the 63 deliverables in phase one.

Another landmark was the start of transatlantic R&D Seminars. The Federal Aviation Administration and EUROCONTROL have jointly been organizing an international seminar for Air Traffic Management Research and Development (ATM R&D) since 1997. These seminars are held every two years, alternating between the USA and Europe, and have become the top event for ATM researchers. After the 12th Seminar which was held in 2017 in Seattle nearly 800 peer reviewed papers constituted the most valuable and widely used records of ATM research available.

The very nicely organised event to celebrate the EEC's 50th anniversary offered a welcome occasion to meet all the relevant key stakeholders in European ATM Research. ➤

The presentations highlighting the EEC's work over the past 50 years can be found on **http://eec50.EUROCONTROL.int**

➤ Staff and dignitaries, including Frank Brenner - current Director General of EUROCONTROL - and his successor Eamonn Brennan, staff celebrated the 50th anniversary of the EUROCONTROL EEC

Photo: EUROCONTROL

OSHKOSH AIRVENTURE

BY PHILIPPE DOMOGALA, DEPUTY EDITOR

It's been on my bucket list for more than 20 years and this year, I finally made it. Together with Eric Risdon, IFATCA's EVP Professional, we decided to visit the EAA AirVenture Oshkosh (formerly the EAA Annual Convention and Fly-In). This annual gathering of aviation enthusiasts is held each summer at Wittman Regional Airport (43°59'04"N 088°33'25"W) in Oshkosh, Wisconsin, United States. The event is sponsored by the very influential Experimental Aircraft Association (EAA), an international organization based in Oshkosh. The event lasts a week, usually beginning on the last Monday in July.

Oshkosh official name is "AirVenture" but everyone refers to it as Oshkosh or simply OSH, the airport code (KOSH for us). This year's event was the 65th edition as they started this in 1953 though originally on a smaller airfield nearby. In 1970, they moved to the current location.

Preparing the trip took several months: planning our route, studying the NOTAMs, watching webinars on line, etc… To keep the costs under control, another friend, Jacques, joined us. The initial plan was for me to rent an aircraft near Toronto. As this fell through at a very late stage, fortunately Eric was able to jump in by taking a share in a beautiful Cessna 172 RG, a Cutlass II with retractable gear and a constant speed prop. That meant that Eric had to start from Quebec, and we joined up near Toronto as Jacques and I already booked our tickets that way.

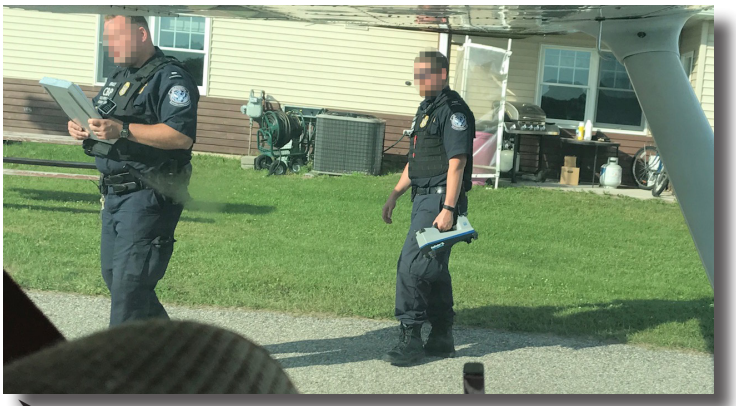
Customs

We met up in Muskoka, a small airfield 200 km north of Toronto. From there, we flew to Sault Ste Marie on the north side of Lake Huron, where we could clear US Customs. That was an interesting exercise in itself: one Canadian and two Frenchmen entering the United States using a small VFR aircraft is not straightforward.

Amongst other things, you need to apply for a travel visa, rather than the visa waiver that's more common on commercial flights. You also need to buy a customs stamp for the aircraft, and just before you arrive, an on-line advance passengers manifest must be completed. While we knew all this, we had overlooked that before you can use the online form, you needed to register on the US Customs portal.

That took a good hour on an iPhone, standing beside our aircraft on the tarmac in Muskoka. They kept requesting very detailed info, some of it three times over! When we finally finished registering, came a message telling us that we would get confirmation and a password within 5 days. Fortunately, the confirmation mail came a couple of minutes later, washing away our initial disbelief and frustration. Filing our advance passenger manifest took another 20 minutes on a dying telephone battery. That form had to be sent at least three hours prior to our arrival, but with only a two hour flight, we wondered whether we had to wait another hour. To eliminate all doubt, Eric phoned ahead to the custom office at our destination airport and got them to accept us early.

The flight itself to Sault Ste Marie, Sanderson Field in USA was easy. The weather was good and the landscape was scattered with nice lakes. Crossing the border was easy as we remained on a Canadian frequency until over the field. We had the circuit to ourselves and without wind, we taxied to the custom office after a perfect landing. The US customs procedure is rather strict: you



Ready for customs inspection

Photo: DP

have to park in front of the customs building and everyone must remain inside the aircraft until the officers come..

There was no customs building at this small airport, but we spotted 2 officers dressed as if they were on mission in a war-zone already waiting for us besides a huge pickup truck full of coloured lights on top. No doubt, we were in the USA! As they approached us, they looked suspicious at first, asking if we were carrying drugs... When we said we were going to Oshkosh, they relaxed a bit and invited us to follow them to the "terminal" for the paperwork. The terminal was in fact the local aeroclub's clubhouse, where we got our passports stamped, etc. With this out of the way, in 10 minutes or so, they relaxed even more, saying that normally they have one or two aircraft per week. Now, it's ten to twenty per day because of Oshkosh! In the clubhouse, there was a cooler box with chilled water and plate full of apples with a sign: "Welcome to our friends going to Oshkosh. Please help yourself!" A good start!

Curfew and weather

We had originally planned to continue to Oshkosh, but we would not be able to reach it before they closed operations for the day. So we decided to spend the night here and leave first thing the next morning to arrive very early before the rush. We wanted a chance to get a parking-camping spot: as it is first come first served, it fills up very quickly.

The next morning delivered a cold shower, literally: torrential rain with a ceiling of a few hundred feet! There was no way we could take off. We left the hotel and spent the day hanging around the Airfield clubhouse waiting for an opening in the weather. The airport caretaker took pity on us and offered to grill some burgers for lunch. When we offered to pay, he adamantly refused showing that the great American hospitality is still alive and kicking in places!

We used the time to rehearse the arrival procedures: these are laid out in a 30 page NOTAM that you have to read and follow. The NOTAM is in fact an illustrated booklet that explains the VFR procedures, which is 95% of the traffic coming to OSH. There is a single point of entry for everyone, which is the little Town of RIPON, some 15 NM south of OSH. Before arriving there, you have to switch off your transponder – to avoid garbling and saturating the system – and turn on your landing lights. You must get there at 1800 feet at 90 kts and monitor

(not call!) the Fisk Approach frequency. You have to integrate into the flow and separate yourself from the others.

The idea is that you then follow the preceding traffic, or at least the one you think is in front of you, at half a nautical mile. This stream of aircraft follows the railroad tracks until passing the next point: a village called FISK where a group of controllers with binoculars will spot you. They'll instruct you using visual markings: "The white and red Cessna passing FISK, rock your wings." When you comply, you'll get acknowledged and get an instruction like : "Nice rock, welcome to OSH. Follow the tracks for runway 27, or alternatively, the Avenue to 36", etc.

Aiming for the green dot

Photo: DP

You're not expected to reply and will later be told to monitor the tower frequency, where you will receive your landing clearance. This tells you which coloured dot along the runway is your touchdown point. You're expected to turn onto the grass as soon as you can and follow one of marshallers (called volunteers) who will direct you to a parking spot, requested by a big sign we printed and had to place on our windscreen. Ours read GAC for General Aviation Camping.

The weather was forecast to only open up late afternoon. A five o'clock departure would be our limit as Oshkosh closes at 20:00 sharp due to the night airshow starting at that time. At 16.30, it looked like we had a 1000 ft ceiling, which was expected to improve as the front moved to the south east. We could even see blue sky towards the north.

We decided to take off at 17:00 and give it our best. At first, it was OK as we had a 1500 ft ceiling without any real obstacles, just flat grazing land below... The weather en-route was what they describe as "Marginal VFR" in the USA. But it held and we were on a "Flight Following" frequency. Our only concern was fuel: after one and half hours and with some 45min to go, any diversion or holding would become critical, so we decided to make a quick refueling stop in Manamee, some 70 miles from before OSH. The place was abandoned, but it had an automatic fuel pump with credit card. We were airborne again at 19:02, but because we had to avoid green bay class C airspace, meaning routing towards the south to Ripon to come back North to Oshkosh, flying time was around 55 minutes – in other words, very tight!

Favours

Time to call a few favours! First, we called Green Bay: "Approach, C-GNFJ a Cessna 172 with 2 controllers in a bit of a rush to get to OSH before it closes. Any possibility to cross your airspace at 2000 ft ?" The immediate answer came back: "FJ, squawk 3204 and fly direct to OSH!" Thanks to this great guy, we had just saved 5 minutes! Leaving the zone, we spotted OSH on the horizon, but with only ten minutes to spare, it would still be a close call. In the worst case, our plan was to divert to Appelton, some 15 miles from OSH. But we used a second joker: monitoring OSH tower frequency, we discovered it was relatively quiet. So we decide to call them: "OSH tower, two controllers coming from Canada, 10 NM north of your field, delayed by weather and in a bit in a rush. Any chance of getting a shortcut?".

Fortunately, the immediate answer was: "Sure! I think I can see you. Turn south immediately to join downwind Runway 27! And welcome to OSH guys, nice to have you! Where do you guys want to park ?" We exchanged a few more niceties before being cleared to land on the "green dot" in the middle of runway 27! Eric made a perfect landing and I put our

Philippe Domogala and Eric Risdon

Photo: DP

GAC sign on the windscreen. A volunteer directed us between thousands of other aircraft to a nice parking spot near the shower building! We had arrived and had realized one of our dreams! As we tied down the aircraft for the night, the night airshow began – we believe we were the last aircraft that landed that day!

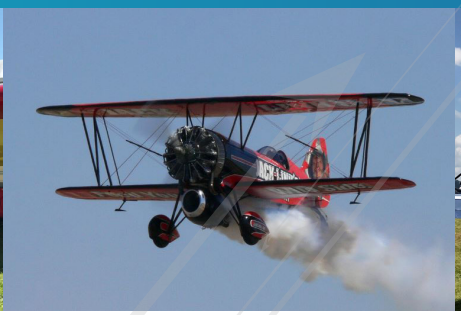
You have to see Oshkosh to believe it: this year, they welcomed 590.000 visitors. More than 10,000 aircraft arrived at Wittman Regional Airport in Oshkosh and other airports in east-central Wisconsin. At Wittman alone, there were 17,223 aircraft operations in the 10-day period from July 21-30, which is an average of approximately 123 takeoffs/landings per hour.

In order to attend, people must abide by the 3 Oshkosh rules:

1. Treat everyone with kindness
2. Be respectful around all aircraft
3. Pick up any piece of garbage you may see laying on the ground.

Aerial view of the airfield

Photo: DP



And this works really well: it's very friendly and clean, and everyone let you approach and touch their aircraft. You can approach the pilots, and they often even let you climb in to see the cockpit. There's a very special atmosphere, as everyone is completely passionate about aviation.

Oshkosh show highlights

There are so many things to see and experience there that describing all of them here would be impossible. First of all, there are a lot of stands, with the latest innovations, lectures, presentations, interviews, … There's also a unique museum with a collection of 150 historic aircraft like the Wright Brothers Flyer, Lindbergh's Spirtit of St Louis, the whole collection of Burt Rutan's aircraft, etc. Talking about Rutan, lots of Varieze were flown here this time as well as the Protetus space plane. The B-1 and B-52 bombers were on the Boeing display and yes, you could go inside to see the cockpit. Between 40 and 50 Mustangs P51s were parked alongside one another in a field. A couple of WWII-era B-29 bombers were there. These performed a fly-by, escorted by some of the Mustangs P51s. They even dropped a big (pyrotechnic) bomb on the runway to commemorate the dropping of the atomic bombs that ended WW2. The Blue Angels performed everyday, overflying the crowd at 200ft with everyone cheering! Other oddities included an aircraft which has storage space for two bicycles under its wings, or an old Waco biplane fitted with an extra jet engine stolen from a Lear jet, performing aerobatics. Only in America!

Departing Osh

With favourable weather predicted for Saturday all the way to Montreal and even Quebec, we planned to leave early that morning and complete the three legs in one day.The first one to Sault Ste Marie again but to the Canadian side of the airport to clear customs. Then onto Muskoka to pick up the car and a last leg solo for Eric to Quebec city.

Having packed everything into the aircraft, we phoned ahead to arrange customs in Canada. Fortunately, this was possible with a simple phone call.

A few hundred other aircraft had the same idea as us. But flow control is as easy as listening to the ATIS, and then push the aircraft by hand to the middle row of the camping area to avoid blowing away the tents behind you when starting the engine. After starting the engine, you taxi towards the runways, as directed by the volunteers in orange jackets. You have to put a big sign on your windscreen to indicate whether you want to depart IFR or VFR. You do not call anyone, but just monitor a frequency. Soon we found ourselves in a queue on a taxi way, just following the others. The guy in front of us was in a red RV8 and we were behind him for the next 40 minutes! When arriving at the end of the line, there's an elevated platform with a big sign on it. Ours said: "MONITOR 118.9". On that frequency was a controller lining aircraft in pairs of four, calling them by name and call sign. "White-Red 172 FJ line up Runway 36L, right behind the blue RV. Use left side runway and hold". One by one, he then cleared them for take-off, with about 15 seconds intervals: " C172 FJ, cleared for take-off , turn heading 150 as soon as you can , do not pass beyond the Tower, maintain 1300ft maximum until leaving CTR". Those were the only two communications addressed to us during the whole departure procedure.

The rest was as easy: maintain 500ft above the lake, look sharply for the others and when out of the CTR, call Green Bay for "normal" Flight Information Service. It was then back to "normal ATC" again until destination.

In Muskoka, it was time to say goodbye to Eric, taking a moment to reflect on this extraordinary experience. And before you ask, yes, I plan to go back and do it again! No doubt about it!

philippe.domogala@ifatca.org

Boeing B-29 bomber

Photo: DP

THE WORLD'S BUSIEST CONTROL TOWER

BY PHILIPPE DOMOGALA, DEPUTY EDITOR

During the gathering, the Oshkosh airport control tower is the busiest in the world: up to 4000 movements per day (14 hours of operations), it handles a near-unimaginable amount of traffic.

As detailed in the previous article, the arrival and departure rates are impressive. So, what's it like for the controllers? Thanks to Kelly Richardson of NATCA, who arranged for me to visit the tower during the event, I was able to see it for myself and talk to one of the controllers up there. During one of his breaks, Grant Anderson explained how they are able to pull it off.

First of all, the tower is an FAA facility only for the duration of the show. The rest of the year it is manned by private "contract" controllers, which is relatively common in the USA for small and mid-sized airports. During the week of the show, 64 controllers from all around the US take over the operation. They are the "best of the best" – hand-picked from a long list of volunteers.

Grant: "*It is a challenging and highly sought-after assignment where the FAA culls through large numbers of controllers requesting to be posted to the event. However, if selected, it is a duty assignment where the travel and salary expenses of controllers, management and technical support personnel are reimbursed by the EAA, organizers of the show.*"

An air traffic controller team consists of four controllers, typically a team lead, a veteran, a limited and a rookie. Each member is rated by management at several points through the event based on their proficiency and experience level. A rookie slot is hard to get but if successful, those individuals may be allowed back again as a limited (1-2 years previous experience) and then as a veteran (3 or more years previous experience).

A team will get a daily assignment to either the tower, to one of the two departure positions (the so-called Moocows) on the runways, to Fisk Approach or to the temporary tower at Fond Du Lac airport.

The airport layout is adapted for the show: the tower manages the three active main runways, one (27) is perpendicular to the other 2 (36L & R). The two remaining paved runways in the middle are designated as taxiways during the show. There is also a grass runway in the middle of all this, referred to as Pioneer Airport. It's used by helicopters at pilot's discretion: they only have to monitor the tower frequency and check the ATIS. Lastly, there's also a small ultralight runway set up near the threshold of Runway 36L. This can even be used without radio, but only at specific times (early morning and late evening), and again at pilot's discretion.

Grant: "*This ultralight strip and pattern is very close to the approach of 36L. Because of that, it's not very popular amongst controllers. Over the years, some of the obvious paraplanes, ultralights, etc have given way to realistic looking, if smaller, "plane" fuselages which are referred to as flying monkeys. This is as I understand a tribute to the Wizard of Oz, in which these creatures terrified many of us as 6 year olds. Even veteran controllers, working as the RWY 36 base spotter, will occasionally utter a startled cry when they spot one of these. It easy to take them for a non-acquired aircraft from Fisk Approach about to blow up the sequencing on final. This is usually followed by a somewhat sheepish 'disregard, it's just a monkey'*".

Managing the arrivals on the three main

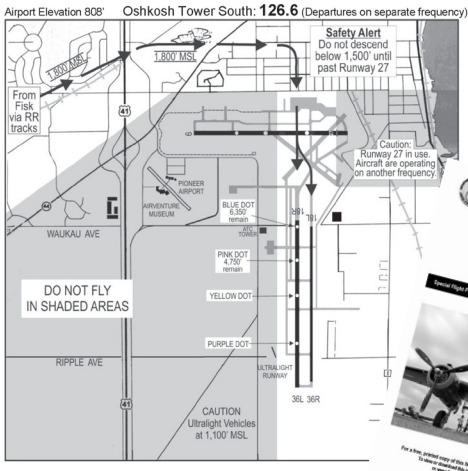
runways, the tower is divided into a North and South Local with a team assigned to each to work the two runways flows on separate frequencies.

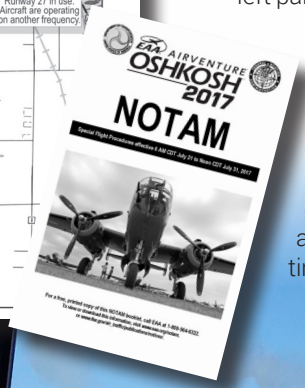
At the threshold of each runways, the two Moocows (Mobile Operations & Communications Workstations) minitowers have three controllers with binoculars and an another one handling the frequency.

Grant: "*The Moocows are sometimes just referred to as 'Cows'. They are decorated in a Wisconsin dairy cow motive for a bit of visual levity for the pilots*".

Interestingly enough, the departure controllers in there do not listen to the arrival frequencies. Everything is visual here and they just use gaps between arrivals, or receive block times to get departures going.

Grant Anderson
Photo: DP





And then there's the infamous "Fisk Approach" unit: from this container, three controllers try to identify the inbound traffic using binoculars. This is done by asking pilots to rock their wings. They then pass that info to a fourth colleague operating the frequency. Besides all this, some controllers are also sent to the tower of the nearby Fond-du-Lac airport, that gets a lot of stand-by traffic.

Picking which runway is assigned to each flight is arbitrary and depends mainly on the wind and workload/density. The runways have big coloured dots painted on them, which are 1500ft apart. The controllers can use a minimum of 1500ft separation between single engine aircraft and 3000ft between twins. Jet aircraft need normal separation. This means that it's possible to have two or even three aircraft at the same time on the same runway.

On Runway 18/36, the smaller parallel taxi way is designated 36 Right. For departures, there is also a waiver for closer hold short lines to facilitate departure feeding, except when aircraft 12,500 pounds or heavier are on final: it then reverts back to standard hold short markings. Similar waivers exist at Fond-du-Lac airport as well. Lining up four aircraft at the same time on the runway is a common thing, using the right part of the runway and the left part as separate lanes. Landing on the dots means that often two or even three approaches are done at same time on the same runway. It's the only way to move 12.000 aircraft in and out of the airport in a short period of time.

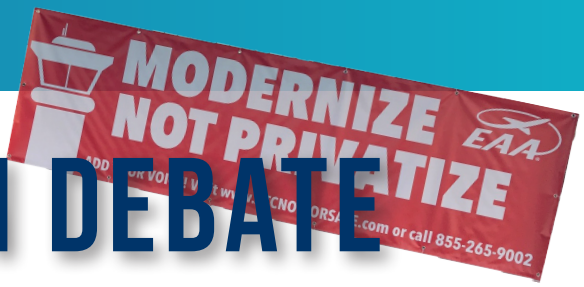
Grant: "*It is worth mentioning that there is order hidden within all the seeming craziness of such outrageous amounts of aircraft. Visual controlling is used at Fisk, the tower and departure positions. However, procedures and restrictions are built-in to provide vertical and/or lateral separation from departures and arrivals, Pioneer airport, ultralight, demos, overflights etc. There are defined approach procedures for aircraft from Fisk, demo aircraft, warbirds, local aircraft and IFR's etc. to get them to a defined area to be acquired visually.*"

Overwhelming as it sounds and looks, it all works extremely well, especially considering the sheer amount of traffic: the day before my visit they handled 2800 movements. Considering the airport only opened at 06:00, closed between 10:00 and 11:00 for a Blue Angels acrobatics practice, then again later for the main air show between 14:30 and 18:30 to finally close at 20: 00, it meant just 9 hours of operations.

As if this wasn't complex enough, there's a wide range of aircraft types to take into account: a B1 strategic Bomber, ultralights, a Mig 15, the Blue Angel F18s, a 1930 Ford Trimotor, a patrol of B29s, lots of P51s. This means approach speeds ranging from 35 Kts to 200 Kts…

And yet all of this is very safe, with very few mishaps: some runway excursions, aircraft landing too fast, mechanical failures, runway loops… But no collisions! It is safe because people know they have to watch out and are given responsibilities.

philippe.domogala@ifatca.org



FAA PRIVATISATION DEBATE

BY PHILIPPE DOMOGALA, DEPUTY EDITOR

In June 2017, US president Donald Trump triggered the House Transportation and Infrastructure Committee to consider the 21st Century Aviation Innovation, Reform, and Reauthorization (AIRR) Act. Part of the act seeks to transfer the nation's air traffic control system from the Federal Aviation Authority (FAA) to a separate and possibly privatised entity. As evident from the banners all over the Oshkosh event, there's strong opposition mainly from General Aviation, who fear that it will reduce general aviation access to airports and airspace. Our US Member Association NATCA however has decided to support the bill. NATCA's Executive Vice-President Trish Gilbert, who was also at Oshkosh, explains the reasoning behind their support.

Philippe: The talk of the town here in OSH this year seems to be this infamous bill called "21st Century Aviation Innovation Reform" that, amongst other things, promotes separating Air Traffic Control from the FAA into a non-profit corporation. NATCA has decided to support the bill because "it fully supports NATCA policies, practices and core principles". Yet the EAA, organizer of this show together with AOPA and the whole General Aviation community, fiercely oppose the bill. They call it "the most serious threat ever to face general aviation". We see these huge red and white banners everywhere that say: "*Modernize, not Privatize*". Do you feel a bit uneasy here?

Trish: No, we understand their concerns and everybody needs a good slogan. This is their campaign. We have, and always had, good relations with all users and that includes general aviation. Remember that the main goal of NATCA is to maintain a robust aviation system for all users. In fact NATCA agrees with the slogan.

Philippe: But on the subject of privatization ?

Trish: NATCA does not support privatization as a concept. What we do support is a set up similar to the Canadian model. You see, in the USA, our current system is based on public funding. This is managed by our Congress, which has led to shutdowns and even sequestration when no political consensus could be reached on our budget. Our main concern is also that due to cuts and stop-and-go funding, we are getting into major difficulties. We are now at a 28-year low in the number of certified controllers. We are down to 10.500 certified controllers with 3000 eligible to retire right now. This is becoming critical. Further cuts in the budget have a direct impact on facilities, equipment, modernization, etc. It may result in the closure of some facilities and to reductions of hours of operations of others.

Philippe: I understand, but are you able to convince your General aviation counterparts of the need to change?

Trish: I believe so. We have a good dialogue with General aviation. Proof is our welcomed presence in and the tremendous support we get in manning the tower, the NATCA booth and venues here al Oshkosh for instance. NATCA wants to keep up the good relations with general aviation and if all users work together, we will get the changes that we need to make our system better. Together we will make this happen!

philippe.domogala@ifatca.org

SENEGAL COLLISION UPDATE

BY PHILIP MARIEN, EDITOR

ON 5th September 2015, a Senegalair ambulance jet (HS-125, registration 6V-AIM) lost contact with ATC. Rather than landing at Dakar airport, the aircraft began a shallow descent, left radar coverage and apparently crashed into the Atlantic Ocean. Despite recovery efforts, no wreckage was ever recovered. There were seven people on board.

It became clear over the next days that the aircraft was likely involved in a mid-air collision. A Ceiba Intercontinental B737-800 had landed in Malabo with a damaged wingtip. The crew had reported a jolt while cruising at FL350 and a cabin crew member had warned the cockpit crew about the damage to the wing. Rather than landing at the original destination (Cotonou, Benin), the crew decided to head straight to their home base, Malabo in Equatorial Guinea. The accident was subject of an article in The Controller, December 2015, pages 6 & 7.

The event was investigated by Senegal's accident investigation bureau (BEA), assisted by their French counterparts. They released their **final report (french, 385 pages)** on their findings on August 21st 2017.

The BEA reported that 6V-AIM had initially been cleared to climb to FL340 and levelled off at FL340. The aircraft was handed off to Bamako Center, where it struggled with turbulence and build-ups, requesting a number of different levels. At 17:28UTC, Bamako cleared the flight to descend from FL400 to FL360, and then to the requested FL340. Some 24 minutes later, the flight reported passing waypoint ENINO at FL340 and was told to contact Dakar once he passed GATIL. Just before reaching GATIL, the aircraft requested a deviation to the left because of weather, which was approved. Minutes later, it established contact with Dakar, asking to deviate 10 Nm left of track for weather. Rather than approve the deviation, the controller instructed the aircraft to maintain FL340, to call when passing TD and to change the transponder code.

The Ceiba Boeing 737-800 was travelling in the opposite direction, maintaining FL350. The captain of the flight stated that they understood from monitoring the Bamako frequency that there would be traffic opposite at FL340 near GATIL. They did a visual scan, expecting to see traffic one thousand feet below, but couldn't spot it. A little later, our TCAS display showed traffic that was one thousand above us, so at FL360. Acquiring visual contact was difficult with the thunderstorm clouds in the background. When they spotted the aircraft, it was really very close and looked as if it was descending through their flight level. There were no TCAS announcements or advisories. When the traffic passed, they felt a sharp but not strong bump, which they attributed to wake from the passing aircraft. Only after the aircraft had passed did they get a TCAS traffic advisory. They tried to communicate with Dakar but they were nearly out of range and communication came in broken. As they passed GATIL, they changed to Bamako, who confirmed that the opposite traffic was expected to be at FL340 and was flying from Bamako to Dakar Airspace.

The extensive report focuses on the airworthiness of the HS-125, as it appears that a fault in the air data may have contributed to the collision. The airframe had a history of altitude deviations. On Jul 23rd 2015, six weeks before the accident, the aircraft nearly collided with an Arik Jet Boeing 737. The aircraft was at FL310 instead of the assigned FL320. The transcripts from that incident show that the cockpit instruments indicated they were at FL320 while the transponder showed FL310.

Following the significant altitude deviation of July 23rd 2015, no entry was made in the technical logs and the aircraft continued operations without interruption or intervention by maintenance until Sep 5th 2015. On Aug 31st 2015 ATC detected the aircraft at FL350 instead of assigned FL360 indicated by the altimeter(s). On Sep 5th 2015 during the flight from Dakar to Ouagadougou, the autopilot acquired FL311 when flight level 330 was assigned and later acquired FL333 when flight level 330 was assigned.

If procedures had been followed correctly, they would have grounded the aircraft following anyone of the flights with the suspected defective altimeter system(s). In addition to the problems with the aircraft, there was an issue with the license of one of the pilots. The report makes recommendations reminding the involved parties to adhere to procedures, but serious concerns seem to remain on the lack of regulatory overview, in particular on the monitoring of RVSM equipment/compliance.

LE BOURGET 2017

The Embraer eagle livery
Photo: DP

BY PHILIPPE DOMOGALA, DEPUTY EDITOR

Every two years, the Paris Airshow, also known as le Salon international de l'aéronautique et de l'espace, Paris-Le Bourget, is the perfect occasion to see the latest developments in aviation and to meet and talk to the people that basically influence our future.

This year, unlike more recent editions, there wasn't anything new really standing out: no big new aircraft or revolutionary technologies were presented and there were no real announcements that will instantly change our world. It was mainly just a confirmation of what was already known and visible before. In absence of genuine innovation, some manufacturers went to extraordinary lengths to attract the media. A good example was Embraer, that had an eagle livery on their 190s.

Remote

Like in Singapore last year, large attention grabbers were remote operations and drones. It's clear that this evolution is unstoppable for both military and civil operations. The next generation of utility helicopters will be piloted from the ground, just like construction cranes. The same is happening for fighter aircraft: Dassault confirmed that their next fighter jet will be a drone. They've called it Neuron and it is a sleek flying wing design, kind of mini B2 bomber. The idea is that it will be operated remotely from a Rafale fighter, which stay behind the firing lines. Aerial combat will be fought by proxy.

Hercules

On the civil side, Lockheed introduced of a civil version of the Hercules, the LM-100J. Previously only available to civil operators via the second hand military market, you can now buy the latest version of the Hercules directly. This version is equipped with Rolls-Royce engines and six blades curved props. It has the latest cockpit technology, full of flat screens, as well as a head-up display. Unlike the military version, it is white rather than green, but other than that, it is largely the same aircraft. Together with the Beech Bonanza, the Hercules is the oldest aircraft still in production. It's first flight was in 1954, meaning it's been in continuous production for over sixty years. It'll be an additional factor for upper airspace controllers, as it is relatively slow. But it can deliver up to 26 tons of freight nearly anywhere, so it might become quite popular in certain regions.

Low Cost

In Europe, all focus remains on the low-cost operators, with an increasing number of airlines choosing this path. The large orders that are normally announced during these events, all came from European low-cost carriers.

In the Boeing pavilion, talk was mainly about Ryanair: it has now 110 orders with a further 100 options on the B737-Max (197 seats). It has taken a further 65 options on the B737-800 (189 seats). Now they just need to find a way to hold on to their crews...

The Dassault Neuron comes with a free, if somewhat oversized laptop...
Photo: Dassault Aviation –A.Bonfort

With these new orders, Ryanair has ordered a total of 640 aircraft from Boeing. It makes it the largest 737 operator in the world and the largest Boeing customer in Europe. No wonder that Ryanair got the red carpet rolled out!

On the Airbus side, Hungarian operator Wizz Air has 110 Airbus A321 on order. They plan to double their fleet in just 7 years to 240 aircraft. Two-thirds will be A321s with up to 236 seats - not for tall people... Meeting with and listening to Wizzair CEO, Jozsef Varadi, one can see he has a vision and a goal. Passengers are following him and his model and with over twenty percent growth per year, we have to take these kinds of airlines very seriously and pay attention to their needs. Their social model and salaries that enable these "low cost operations" are also something to remain very wary of.

Market Forecast

The traditional presentation of the Boeing forecast for the aviation market did not differ very much from the one two years ago. It confirmed that focus will be shifting from the traditional American and European market other parts of the world. Over the next twenty years (2017-2036), Boeing expects 41.000 new aircraft will be sold. Asia will get 16.000 of those about the same as the USA and Europe combined. Of course some of them will just replacements for actual older types, but not all those old types will be scrapped. Most will still fly in other colours somewhere. Interesting is that they expect some 30.000 of these new airframes will be of the short and medium range B737/A320 category, which of course means more aircraft for ATC to handle...

Terrorism

Finally, the threat of terrorism and the increasing instability of the world were also very much in focus: a lot of military equipment and weapons systems. It also seems that this will have an impact on the industry and that we'll need to take it into account when considering the future.

philippe.domogala@ifatca.org

The Lockheed LM-100J
Photo: DP

2017 IFATCA EUROPEAN REGIONAL MEETING

BY PHILIPPE DOMOGALA, DEPUTY EDITOR

The meeting was organized by our Austrian Member Association (MA) and was attended by some 150 controllers. These represented 35 associations from a total of 45 in the region. This was the first time that the meeting followed a new format, combining very interesting presentations from experts with reports from our Member Associations explaining their situation, challenges and difficulties.

Increasing delays

After the meeting was opened by Thomas Hoffmann, the COO of AustroControl, Joe Sultana, Head of EUROCONTROL's Network Manager, gave an overview of the current situation in Europe. The region is confronted with an unforeseen rise in traffic - sometimes more than twice the increase that was forecast. Over the past summer, this has resulted in a significant increase in delays, attributed to a lack of capacity and control staff to open more sectors. Underlying causes are the so-called Reference Periods (RP) 2 and 3, which the European Union (EU) forces onto service providers, in an attempt to 'improve' things, i.e. reduce costs. Having to adhere to fixed targets across 5 years, based on questionable predictions, service providers have mainly economized on staffing. This is resulting in more frequent staff shortages, which in turn in causing more and more delay, especially in peak periods. And since most of them have stopped the intake of new controllers, the problem is set to only get worse. Airlines and their lobby groups will have to realize that their drive to (over-)economise has limits and it is affecting capacity. If they want ANSPs to cater for rapid growth and their very dynamic scheduling, the system has to be sufficiently staffed to handle this demand.

In that respect, Marek Bekier, a consultant from ACR (Sweden) made a study and found out that the cost in Europe of a controller is 112 €/hour. But the cost of ATM support staff is 292 €/hour. There are 17.600 controllers in Europe and 39.000 ATM support staff. You can guess where the problem is. He also said that traffic has tripled since the 1970s while airfares reduced 3 times in that period. Safety was not affected and controllers' salaries have also not reduced, contrary to those in other industries.

SESAR

Marc Baumgartner, our IFATCA SESAR Coordinator very clearly explained the interaction between all the players in Europe today: the European Commission/Union, EUROCONTROL, EASA and SESAR. Over time, EUROCONTROL appears to be losing influence on the EU and the EC. The problem is that the EU lacks EUROCONTROL's expertise and all too often, the "experts" at EU level show a lack of understanding of the realities of ATM. This doesn't look like it will improve things in the future.

Marc's excellent presentation is a real help for our IFATCA representatives, who attend the various meetings, and for our member Associations to help them realize what lays ahead of us. Marc also warned us about the dangers of digitalisation, both in data sharing (Cloud Based Data/Services) and in cyber security. Those concerns come on top of the other problems and we are seemingly not prepared for it.

Tom Laursen, IFATCA EVP Europe, gave an appreciated overview of the interactions between the various IFATCA representatives. Some of these later got the floor to explain their input and the challenges they have to address. Renee Pauptit, Chair of the Tech committee explained the committee's working program and its highlights. Patrik Peters, IFATCA President and CEO and Ignacio Baca, EVP Technical, both presented a more global point of view and the policies IFATCA is pursuing.

Problems

Romania reported a legacy of issues following consecutive ex-military CEOs with little to no understanding of the business and a new, recently appointed minister that diverted money from the service provider's reserves to finance other projects in the country. Currently, their company has no CEO and there are fears that there's not enough cash left to pay the controllers salaries at the end of the year.

Several MAs reported that staff shortages and traffic levels are taking their toll amongst their members. The EUROCONTROL Guild reported the Maastricht Centre faces a constant high traffic demand and continued pressure to keep delays as low as possible. Controllers are increasingly reporting being fatigued and sickness rates are up as a result. It is an increasingly familiar story amongst other MAs in the region. Others reported significant traffic shifts due to airlines routing around or avoiding conflict zones.

IFATCA EVP EUR Tom Laursen (L) and EUROCONTROL Network Manager Joe Sultana (R)

The participants' group photo

All photo: AATCA

Kosovo still encounters a lot of difficulties controlling their airspace. We plan to make a special report on the Kosovo situation in the next issue of the Controller. Some more remarks from the meeting worth considering: in Europe, only 30% of the airports are profitable. Of the 70% that are not, the vast majority are airports with less than one million passengers per year, mainly used by low cost carriers.

Privatisation

Privatization of ATS services brings new interesting scenarios: DFS of Germany have recently won the contract to provide ATC at Gatwick airport, beating UK NATS. Integrating the controllers is apparently causing some serious friction between the two service providers. So much for cooperation/integration in Europe.

It's not only service provision that is being 'sold': Fraport of Germany has bought a small Greek airport. It has expanded the available tarmac and parking space, but not the runway/taxiway infrastructure. It has resulted in more flights being scheduled, but vastly increased delays as every movement needs to backtrack on the runway…

RP3

The EU plans to finalise the Reporting Period 3 criteria by the end of this year. This period will start in 2020 will last until 2025. There are currently no plans to have a mid-term review of those criteria, which is arguably one of the critical problems with RP2 (since the specifics were for the current period were drawn up mid-economic crisis). Given the approach ANSPs took to the current reporting period, it can only mean that more problems are ahead. The airline lobby can apparently not grasp why an ANSP cannot respond within months to radically different demands in how they provide a service…

Final thanks to Arno Leimlehner, president of our Austrian MA AATCA who, together with his team, did an excellent job in showing us the culture (and food) from Styria, a lesser-known and undervalued part of Austria.

The next Regional Meeting will be held in Dublin, Ireland, 10-12 October 2018. The year after, Jordan offered to host the meeting in Aqaba between 8 and 10 October 2019.

philippe.domogala@ifatca.org

The organising team

DUTY OF CARE FOR CONTROLLERS

BY DAVID PERKS, IFATCA PROFESSIONAL & LEGAL COMMITTEE

Air traffic control can be regarded by some as a rule driven profession. Air traffic controllers are taught what rules to apply and when to apply them. ATC operations manuals are full of instructions such as 'must', 'shall', 'ensure', 'apply'. Indeed, the task of separating aircraft by prescribed standards lends itself to the application of a rigid set of rules that are easily understood and applied. It is also well understood that when a controller deviates from these rules, he or she may be held accountable.

However, despite the best efforts of rule makers, rules cannot cover every possible situation and scenario. Confronted with such situations, ATCOs are expected to deduct a principle from existing rules, and then adapt and apply it to the scenario at hand. When faced with these 'novel' situations, the concept 'duty of care' is often invoked.

While the concept may be well recognised, its meaning and, importantly, its application varies widely from jurisdiction to jurisdiction (state to state). Even within jurisdictions, where duty of care as a legal concept is relatively settled, the understanding of the concept outside legal circles can be patchy at best.

Legal systems

Increasingly, domestic legal systems are a combination of several legal systems. We'll examine the two most prominent ones.

The civil law system is the most common legal system. It has its origins in Roman times and is often referred to as 'Roman law'. Rules and laws were arranged into a collection of written laws, or codes. This gave certainty to judges, jurists and those subject to the law as to what the law was and how it was to be applied. This 'codification' of the law is a basic principle of the civil law system.

A civil law judge takes an active role in judicial proceedings, questioning parties and lawyers to determine the facts of the case. Where there is no applicable law, or there are 'gaps' in the law, the judge will be reluctant to create new legal principles to fill them. Although a judge may refer to previous decisions, or precedents, they are generally not bound to follow these decisions. The source of the law is in the letter and spirit of the written codes and the legal scholars that created and analysed them. Most European countries have adopted a civil law system and it has spread to, or at least influenced, large parts of Asia, South America and Africa.

The common law system has its roots in Great Britain. Prior to the Norman Conquest (1066 AD), disputes were settled by subjects petitioning the aristocracy. This resulted in 'fragmentation' of the law and decisions were often made at the whim of those with power. In an effort to unify the law, a so-called 'common law' was conceived – a law common to the whole country.

To ensure consistency of application, and in the absence of written laws, courts applied the principle of precedent: that similar fact scenarios should result in similar outcomes. As the body of judicial decisions grew and became permanently recorded on paper, precedents became easier to apply and offered predictability for future disputes. Eventually a system of courts with a defined hierarchy evolved with the 'lower' courts legally compelled to follow the decisions of 'higher' courts.

Laws made by parliament are commonly referred to as statutory law. Judges are required to follow statutory law. However, when faced with situations where statutory law does not apply, a judge

may look at previous decisions made by the courts in comparable cases (precedents) and from them attempt to discern a common principle. They then apply this principle to the facts at hand to reach a decision. The is often referred to as 'judge made law' or 'common law'.

In such a system, a judge will take a more passive role during the proceedings and it will be up to the lawyers of the different parties to present their legal arguments with the judge being an 'independent umpire'.

The common law is still an integral part of the British legal system and as such, is also still applied in most of their former territories, including Canada, the US, Australia and New Zealand.

With the onset of globalisation, the distinctions between the two systems are eroding. Some European jurisdictions are starting to apply precedent and most common law countries rely on written law or codes. Judges in European Constitutional Courts have the power to deliver decisions with precedential weight and administrative courts in civil law nations have gained greater persuasive weight over the years. However, it should be acknowledged that convergence is not uniform, even amongst European States, so caution should always be used when attempting to apply universal legal principles to multiple jurisdictions.

The law of torts

The word 'tort' has generally come to mean a 'wrong'. In English, tort has a purely legal meaning – it is a legal wrong performed by one party on another for which the law provides a remedy.

Tort law's most important feature is that duties imposed on and between parties are fixed by the law. Unlike in a contracted agreement, where by definition parties to the contract are aware of the terms and conditions, in tort law, the parties may not be aware of the law and therefore less likely to know to whom they owe a duty and what that duty is.

For civil law countries, these duties will be primarily defined in legislation. While common law countries are moving towards codification of tortious duties, there is still the opportunity for a court to define new duties between parties.

Unlike a crime, which is a wrong against the common good, a tort is a wrong against a particular individual. There are a number of established torts, including trespass to land, goods and person, defamation, slander and privacy. The tort of negligence is however the most commonly litigated tort.

Tort of negligence

In the common law, four elements must be proven for an action to be considered negligent:

- A duty of care must be owed by one party to another;
- The requisite standard of care must have been breached;
- The breach of the standard of care must have caused damage; and
- The damage caused must be allowable at law.

Civil law has always recognised the general obligation not to act unreasonably in situations not governed by contracts. The general concept of duty of care has therefore existed in such legal systems long before its recognition in common law jurisdictions. Formal recognition in the United Kingdom can be traced to a 1932 ruling of the High Court in which the court found that "you must take reasonable care to avoid acts or omissions which you can reasonably foresee would be likely to injure your neighbour".

Summarising, one person, the tortfeasor, must have neglected a duty of care which a reasonable person would have observed and that damage resulted from the neglect of that duty of care. Or in other words, in circumstances where personal injury is involved, in all legal systems there must be conduct that is intentional or careless, that cannot be justifiable and that causes harm to another party.

Given the similarities of the general duty of care in both legal systems, it's convenient to look at negligence with respect to the common law elements.

Establishing a duty of care

In common law legal systems, a duty of care is owed by one party to another if it's reasonably foreseeable that not performing a duty with reasonable care could result in damage to another party. Over time, a number of 'relationships' have been identified as giving rise to a duty of care including doctor-patient, driver-passenger and chef-patron. It should be noted that in the vast majority of negligence cases there is no dispute about the existence of a duty of care between parties – it is often self-evident.

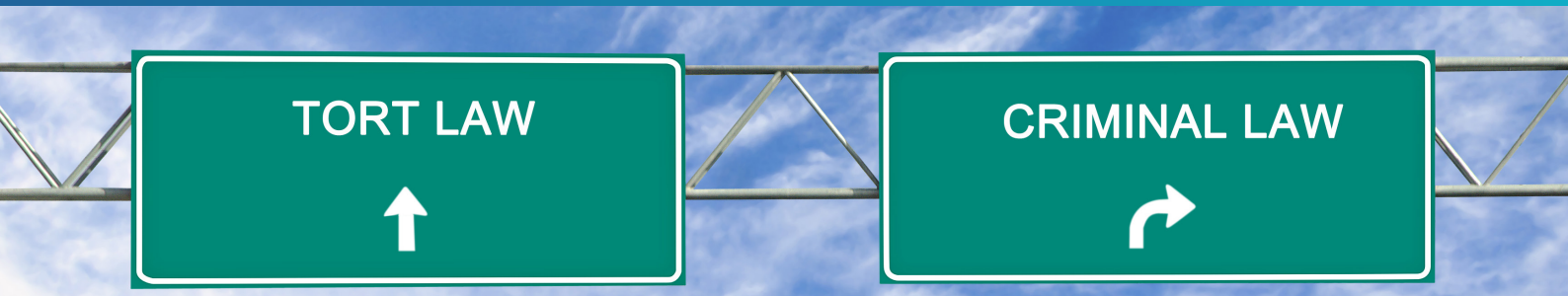
Applying this principle to ATC, if it's reasonably foreseeable that an ATCO that does not perform their duty to the requisite standard of care may cause damage to parties either in an aircraft or on the ground, then a duty of care exists. As clearly this is the case, the ATCO owes a duty of care to those who could suffer damage if that duty is not carried out to a reasonable standard.

Similarly, in civil law legal systems, the concept of duty of care also exists. If there is a breach of a rule of conduct imposed by legislation or regulation, or a failure to conform to a general standard of due care of diligence, liability can be established.

Reliance & the standard of care

What standard of care one party owes another lies at the very heart of negligence and is what most people are referring to when they use the phrase 'duty of care'. A duty of care is owed by the ATCO to those affected by their actions, but what is standard of care is owed?

In both common law and European civil law jurisdictions, the concept of an 'objective' standard care dominates. The requisite conduct is that of a fictitious reference person, the bon père de famille in France or the 'reasonable person' in common law jurisdictions. This objective standard attempts to remove the peculiarities of individual behaviour from



the standard of care. A party capable of inflicting damage on another must act in a way that reasonably prevents that damage regardless of any fallibilities they may have.

For the vast majority of scenarios, the standard of care is reasonably settled. The standard of care is either codified in legislation or, in common law jurisdictions, in precendents. From an ATC perspective, as much as possible, the requisite standard of care lies in the regulations, rules and standards prescribed by the State. It's reasonable for the ATCO to assume that as long as they comply with these, they will have met the required standard of care.

However, what is the requisite standard of care when there are no rules or following the rules will lead to a negative safety outcome? In these cases, the standard or care will differ depending on the situation.

It is well established that experts, professionals and people with special skills are expected to exercise a higher standard of care than lay people. That standard should be of the same high standard as others at a similar level or experience within the same field. Put in the language of the reasonable person, an expert is required to exercise the same standard of care as a reasonably competent person trained in the particular trade or profession. However, they 'need not possess the highest expert skill, just the ordinary skill of an ordinary competent man exercising a particular art'.

Once the requisite standard of care is established, it is for the judge or court to decide if this standard has been met. If it has, there may be no cause in negligence.

ATCOs and the standard of care

In an attempt to add certainty as to the standard of care owed by one to another, States, including those with common law legal systems, are increasingly codifying those requirements in regulation, rules and standards. ATC is no exception. Where they do not follow those rules, with or without intent, it's reasonable to assume in most cases they will not have met the standard required of the ATCO and therefore they may be found negligent for any damage that may result.

Where the rules don't or only partially apply, an ATCO might apply a 'lesson' from a previous experience or they might apply the principles that apply to more common situations to the novel situation at hand. However, if the party to which the ATCO owes the duty (i.e. the pilot and passengers on the aircraft the ATCO is controlling) were to suffer damage as a result of that ATCOs decision, a court will have to ultimately decide if they have met the requisite standard of care or if they were negligent.

As demonstrated, both common and civil law countries apply a similar objective test to determine the standard of care. For someone with the specialist skills and knowledge of an ATCO, that standard is that of a reasonably competent ATCO or the standard expected to be achieved by other ATCOs.

In Australia, the courts have endorsed that ATCOs have a duty 'to take reasonable care to give all such instructions and advice as may be necessary to promote the safety of aircraft within their area of responsibility'. The question then becomes what and how much 'instruction and advice', or information, must the ATCO give to promote the safety of aircraft? Every piece of information can potentially impact on aircraft safety. The following may provide a useful framework for ATCOs to assess what's required to meet and maintain the requisite standard of care.

Provide instructions and/or information that is accurate and not misleading

When air traffic controllers provide information to pilots knowing that the information will be relied upon, they have a duty to ensure that it is accurate. Courts are increasingly emphasising the importance of the concept of foreseeable and reasonable reliance as a crucial factor in determining whether negligence has occurred. In the context of the ATCO and the duty of care, the more reliant a pilot on an instruction or information, the higher the expectation that the ATCO will provide it. If the pilot doesn't act on the information, the ATCO may not be found negligent.

A duty to provide accurate, unambiguous and timely information

Information must also be given in a timely manner. This can be particularly pertinent to weather information. The passing of weather information is generally governed by operations manuals. However, it can still be at the discretion of the ATCO to provide weather information they may have and that the pilot may reasonably not have.

If the ATCO did not have access to information on turbulence, cloud tops and bases, lightning, etc., they could not be held to be negligent in not providing that to an aircraft that subsequently crashed. Of course, the implication is that where this information has been made available to the ATCO, perhaps by pilot report, then it may be incumbent on the ATCO to pass this information to pilots that the ATCO may reasonably assume may not be aware of it.

Duty to maintain a proper lookout

Courts have found that it is not enough for the ATCO to just issue correct clearances. They have consistently found that, where they have the means, the ATCO is required to monitor aircraft to ensure they are complying with the clearance.

A common consideration in such cases is that the ATCO had information at their disposal that arguably the pilot didn't have, or wasn't very familiar with. In other words, the ATCO was in possession of information that could have prevented an accident, if they had either acted upon it or advised the pilot of the information. Where an ATCO is not in possession of information, the standard of care is adjusted accordingly.

Acting in accordance with standards and rules may not absolve the ATCO of negligence

The primary purpose of an air traffic control service is to prevent collisions between
aircraft. The level of air traffic service will vary depending on the class of airspace aircraft are operating in. However, in some jurisdictions merely providing an ATC service commiserate with the class of airspace may not meet the requisite duty of care. It's not always enough for the controller to just apply the correct standards and rules. A controller has an overriding duty to keep a proper look out with the requisite care and a judge may rule that the controller could have acted to prevent a collision, even if he was not strictly responsible to ensure separation.

Concurrent duty between ATCOs and pilots

There is a concurrent duty between the ATCO and the pilot to ensure the safe operation of the flight. For example, even where a duty to see and avoid was explicitly put on the pilots of a VFR aircraft, as the pilots are also expected to follow ATC instructions (e.g. in class D airspace), this implies there was a corresponding duty for the ATCO to warn of any dangers they are or should be aware of.

Law cases in the USA recognise the concurrent duties of pilots and controllers and that the weight of duty will vary according to the circumstances. Pilots of aircraft operating under visual flight rules (VFR) in visual meteorological conditions (VMC) have been found to have primary responsibility for avoiding mid-air collisions. This does still not absolve the controller of a duty to prevent collisions, but it does place a heavier burden on the pilot in command to show that the controller's duty was not carried out with the requisite care because in such conditions the pilot is in a better position to identify the threat of a mid-air collision. Conversely, a controller owes a greater duty to pilots operating under instrument flight rules (IFR) conditions because more reliance is placed on the controller.

It is also the duty of the controller to inform the pilot of 'all those facts that are material to the operation of his plane'. A controller may be in possession of 'greater experience, superior observations facilities and localised information'. Or as enunciated in US court case: 'the air traffic controller, whether or not required by the manuals, must warn of dangers reasonably apparent to him [sic], but not apparent in the exercise of due care, to the pilot'.

Perhaps this can be summarised best by the concept of 'reliance'. The High Court of Australia has repeatedly stated that the element of reliance is paramount in determining the existence of a duty of care. For example, if a pilot has all relevant operational information pertaining to their flight and is aware of the nature and extent of any danger, and if the ATCO failed to provide such information, the ATCO may not have failed in their duty of care.

On the other hand, if the pilot could not obtain the information from any other source, then the ATCO may fail in their duty of care if they possessed the information but did not pass it on to the pilot. Reliance is therefore a key factor that establishes the existence of the Duty of Care owed by ATCOs. As one commentator has suggested "It is difficult to envisage any public authority in which the element of reliance is more prevalent than it is with the control of air traffic".

'Duty of care' considerations for ATCOs

In judging whether or not an ATCO has reached the requisite standard of care, a court will look at the information that is available to the ATCO, the information the ATCO can reasonably assume the pilot will have, and then decide whether the ATCO has either acted reasonably on the information or, where appropriate, passed the information to the pilot to act on. This principle has been referred to as the 'vantage point' test. The court will decide who was in a better position to reasonably identify hazards or foresee harm, ATCO or pilot, before deciding whether the requisite standard of care was achieved.

The principle can be used to develop a number of questions that ATCOs may find useful when considering whether they have met the requisite standard of care.

- Has the ATCO made reasonable efforts to obtain and maintain information to ensure the safety of aircraft in their area of responsibility?
- Has the ATCO reasonably acted on information so as to ensure the safety of aircraft in their area of responsibility?
- Has the ATCO passed to the pilot information that it's reasonable to assume the pilot will rely on to ensure the safety of their aircraft?

It cannot be emphasised enough that these questions are only offered as a tool that may be useful for ATCOs to measure their actions against decisions made by some courts in selected jurisdictions. They do not and cannot be an accurate reflection of the law in the different countries around the world.

'Duty of care' training for ATCOs

Some regulators and ANSPs provide duty of care training to ATCOs. However, the majority of ATCOs receive none. It is crucial that for ATCOs to be given the greatest chance of acquitting their duty of care obligations, they must be educated as to how and when it is applied.

perks.dw@gmail.com

CHARLIE'S COLUMN

BY CHARLIE@THE-CONTROLLER.NET

Journalism on a budget

During the various hurricanes that battered the Caribbean and the USA over the past weeks, you couldn't look past images on social media of flooded airports. In most cases, these looked quite convincing, though they were mostly still fakes. Prize for the worst one though goes to this 'photograph', alledgedly showing aircraft on the tarmac of the Houston, Texas International Airport in the aftermath of hurricane Harvey.

Apparently, the hurricane-force winds were strong enough to reverse the company logo on the fuselage to read ɐsuɐɥʇɟn⅂.

The combination on relatively humid weather and hot, Texas weather also appears to have shrunk the aircraft. Oddly, enough this seems to affect Airbus aircraft more than Boeing, with an A380 becoming a bit smaller than a B787.

AIRPORT ON A BUDGET

The constant pressures to keep budget low and under control is affecting more and more services. Sold as an improvement to the environmental footprint and helping to reduce global warming, the airport has had to impose stricter speed limits on its taxiways...

PR ON A BUDGET

Remember the adverts showing aircraft missing a nose wheel? Some time ago, this advert for Brazilian airline Oi feature an aircraft that appears to be missing a large part of its right wing... Though it does have two engines, we doubt that it will fly much further, as suggested by the slogan...

MODE S RADAR ON A BUDGET

Faced with a surprise visit from the regulator, the service provider at this airport went to great lengths to reassure the auditors that they were fully compliant with the requirements for surface movement radar surveillance.

Though satisfied with the airport's efforts, the audit team did raise a nonconformity for not having the radar antenna painted according to international standards.

BRINDISI RADAR CLUB

presents

Controllers' Music Festival

September 2018 - SALENTO - Italy

STAY TUNED

@CONTROLLERSMUSICFESTIVAL

www.brindisiradarclub.it and pre-register your BAND!!

IFATCA CONFERENCE, 2018.

ACCRA-GHANA

19TH MARCH - 23RD MARCH , 2018

www.ifatca57.com

Making the future Ours