

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 The question WHETHER our domain will benefit from the increased computing power and networking has been replaced by WHEN and HOW.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Plenty of documents have addressed the outdated status of ATM infrastructure, the obsolete state of Air Traffic management and the need for reform.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 Hori-

zon2020 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 Infra-

structure", 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 technology¹

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 master-plan, 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