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# United AVIATION

With the European Union's drive for a Single European Sky, air traffic management in Europe is changing rapidly. EUROCONTROL is bringing significant technological and operational innovation to the industry.

Images courtesy of EUROCONTROL

Aviation is only a century old but it has rapidly become a vital part of the modern economy. It has long been recognised that it is necessary not just to have air traffic control—with controllers giving detailed instructions to pilots to make sure that they stay safe—but also to have a proactive approach to air traffic management (ATM): organising the airspace, setting procedures, managing the overall air traffic flows across a continent, and responding to problems such as bad weather.

ATM is largely organised on a national state level, with each country having its own air

navigation service provider (ANSP). In Europe, however, ATM is changing rapidly, not just technically but also structurally, mainly driven by the European Union's Single European Sky initiative. This aims at improving the performance of ATM in Europe, as well as enhancing the competitiveness of the European aviation industry. Some of the most innovative changes are being developed by EUROCONTROL, which has been involved in ATM since 1960.

Initially, EUROCONTROL had just six members—Germany, Belgium, France, Luxembourg, the Netherlands, and the United Kingdom—and the original

intention was to provide air traffic control services for the upper airspace across these countries. But even though the mission has evolved to being one of coordination with a strong technical emphasis, the scale of the organisation has expanded massively, as explained by Director General Frank Brenner: "EUROCONTROL was founded to overcome fragmentation in European ATM. Europe is a relatively small continent compared to other continents on this earth. But in this small continent, we have 41 states that are all EUROCONTROL members. The political changes in the nineties in Europe have supported this growth in >





Frank Brenner taking part in a panel at ATCA's 59th Annual Conference



"Working with EUROCONTROL is a most enriching experience. Through this cooperation we are part of the pan-European ATM stage. The knowledge we gain there is most important for the provision of an excellent service and achieving highest-level customer satisfaction."  
- Heinz-Michael Kraft, CEO, GroupEAD Europe S.L.

membership, with countries from Eastern Europe joining EUROCONTROL in significant numbers."

Frank is well known in the aviation industry and in air traffic control in particular, with the majority of his career being spent in this industry. "I have worked in air traffic management for over 30 years, so I am not a newcomer or coming from the outside. I started in the German air navigation service provider company as an air traffic controller and moved up through the ranks of different managerial positions of very different natures; commercial activities, pure air traffic management, sovereign activities, up to the position of the Director General of EUROCONTROL, which I took on the first of January 2013. I think the English expression could be 'I started at the coalface' and moved through the ranks up to my current position."



"My experience has helped me a lot because I bring with me an understanding of the business, how the business evolved over time and what we need to do to increase our competitiveness in aviation. I use this in the current position to see what we have been suffering from in the past and how we can improve the future in order to move our business forward."

The challenge of tackling the fragmentation of the industry is still at the heart of improving performance in Europe. Each country is responsible for managing its own sovereign airspace, which results in major inefficiencies, as well as the difficulties of achieving consensus.

"With 41 member states and their national air navigation service provider companies—that are mainly all state owned—trying to achieve a common way forward and reach common positions, and in many cases we need unanimous agreements, that's a challenge. The political and the air traffic situations in these countries, and also the economies in the 41 member states, are very different, and of course the sizes of those countries and the associated

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interests are very different. We have Monaco as one of the smallest member states, and then of course that goes up to the big states like Spain, Germany, or Ukraine.

"The first important issue is to understand the needs of the different stakeholders and that is achieved best through communication in both directions; we ask what is their aim, what is their agenda, what are their needs. We have created a variety of different communication channels, a lot of consultations with the stakeholders on specific subjects, and bringing, subject by subject, the different stakeholders together. When it comes to airspace design, then, of course, the military might have different interests in the airspace design than a general aviation representative, than a charter airline representative, than a regular airline representative."

Despite the difficulties caused by all these competing interests, the need for performance improvement is clear. Traffic growth is returning to Europe, with the latest forecast showing an extra 1.7 million flights a year by 2021. Without action, that translates to increased delays, unnecessary fuel burn/emissions and the potential for an impact on safety. The cost of the system is already an issue.

"At the moment, our air traffic management in Europe costs the users, the passengers, €9 billion per year," Frank explains. "That's significant. The air traffic management fees are about 6 per cent of the cost structure of the airlines, so they are much higher than a potential profit margin, which at the moment can range for good companies up to around 3 per cent. A lot of them don't make any money, but 3 per cent is already a >

"Indra has been collaborating with EUROCONTROL for more than 20 years. In particular, Indra has successfully developed a new-generation Flight Data Processing system. Today EUROCONTROL Maastricht and Indra are successfully working together, including on future concepts developed in the SESAR program." - Rafael Gallego, Director General, Indra



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## Enabling AIM since 2003

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Indra is one of the global leading companies in the Air Traffic Management business, with more than 90 years of experience in the most demanding environments.

Indra is one of the more relevant suppliers of very advanced ground systems for the Single European Sky (SES), being one of the founding members of the R&D pillar of the SES: The SESAR Joint Undertaking (SJU).

Indra is the Technological Partner of one of the more solid European Alliances to build up the SES: the iTEC (interoperability Trough European Collaboration) made up by DFS of Germany, NATS of UK, Enaire of Spain and LVNL of The Netherlands. Today there are some iTEC Systems in operation, and during the coming five years some of the more complex and largest ATM centers of Europe will deploy the next generation of iTEC Systems.

Indra is also a world leader in supplying CNS (Surveillance, Navigation and Communications) equipments with more than 3,500 installations all over the world. The MSSR of Indra provide surveillance radar coverage to countries like Australia, China, Turkey, India, Poland, Spain, and Latin America countries, among many others, and the NORMARC brand of Nav aids is one reference in the industry.

Indra is a global technology company having over 43,000 employees all over the world, subsidiaries in more than 40 countries, with sales over 3,000 M€.

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# CONSULTANCY AND TECHNOLOGY WORLDWIDE

At Indra we are passionate about what we do. We have an in-depth understanding of our client's needs, and we find ways to make the most difficult tasks seem easy. Fulfilling commitments is not an option, but rather a habit we have acquired through our technical and management expertise. Innovation is our cornerstone, and we use our experience to exceed expectations in each and every solution and service we offer. When faced with a major technical challenge, Indra is the answer.





good margin and 6 per cent is what air traffic management costs. Whatever we can do to reduce the 6 per cent is a significant contribution to the competitiveness of Europe and of the airline industry in the first place, but then of all of Europe. We do regular benchmarks in EUROCONTROL, with, for example, the Americans. The Americans with their single structure have 30 per cent fewer costs for the same kind of product. This means that flying for the same distance with the same aircraft and being controlled by the American Air Traffic Control, the Federal Aviation Administration (FAA) costs in the end 30 per cent less than here in Europe. We see the reasons for that in the fragmented approach, in the national monopolistic approach. So the goal must be to overcome that to make Europe more competitive. The airlines coming out of Europe suffer from these higher costs. That gives them a significant disadvantage in a worldwide competition."

A part of the vision of the Single European Sky was to address this situation by bringing together neighbouring countries in so-called 'functional airspace blocks' (FABs). However, although these FABs have been created, they have not yet generated the level of operational savings that the European Commission had hoped for. In fact, at a political level, the difficulties involved in reducing fragmentation by bringing together the operations of neighbouring countries have been enormous, with issues of sovereignty, national pride, technical compatibility, working conditions, and language. All these make the concept of merging air traffic control centres across borders less and less likely to happen.

Frank, who has experience of merging air traffic control centres within Germany, recognises these challenges. "It is impossible to



convince a state that has only one air traffic control centre to consolidate that facility with a centre from another country, thereby basically going out of business. This would be a situation that is hardly survivable for any politician facing questions from the public, parliament, or the military. Therefore, in order to reduce costs, we need to find other intelligent solutions."

Frank is considering an alternative way of tackling the problem. He feels that the underlying issue is that ATM is regarded as a monolithic activity. Monolithic meaning that each nation and each service provider is a 'full service' ATM provider. "This was not only the habit, but technically necessary in the past. But these times are gone. Instead, it is possible to diversify, meaning that ANSP specialise in specific areas they want to provide themselves or even offer on the market, while in other areas they buy the services from other ANSPs or from industry. Such specialisation can be in relation to support services and data provision, up to gathering and processing the position data on individual aircraft, generating identification codes, handling the communication between aircraft and ground and also between air traffic control centres—the list goes on. With new technology and communications now available, there is the opportunity to move to a very different business model.

"In the past, the equipment used on the ground in about 60 civil area control centres in Europe was

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Maastricht Upper Area Control Centre, the Netherlands

put into the cellars of this infrastructure. This was an approach that we will see go away with new technologies using big data being processed at other locations and not necessarily all at the local locations; this will reduce costs and will make use of an approach which we call system-wide information management. So that's a completely different approach, to be relying on service providers to generate the data needed for the air traffic controllers and in real time have them transmitted with secure lines, secure cloud approaches, to the locations where the controllers work. Now with that we open up the national approach, we open up the possibility of market being generated, which from our point of view will immediately have an impact on the cost structures and also in the competitiveness, which will be increased. That is a game changer, which is supported by the new technologies that do not work in isolation at the national level. The 41 member states of EUROCONTROL all do a brilliant job in air traffic management but they all do it only on their national territory. Now, if you ask the CEOs of these air navigation service providers, they all would

immediately agree that they could provide the services beyond their national borders—the problem is there's another one already doing that business in the same way and same quality. We need to generate market possibilities where they actually can move beyond their national borders."

Such an approach has been proved in practice in the past for a limited number of services, such as the billing of route charges (EUROCONTROL's Central Route Charges Office collects charges across Europe on behalf of the member states) and the provision of aeronautical data (the EAD, or European AIS Database provides data to users around the world). EUROCONTROL is building on this by creating up to 18 new 'centralised services' that will provide coherent, reliable, and cost-effective solutions to all 41 of its member states. These are building on technological developments coming out of the Single European Sky research program via the SESAR Joint Undertaking (of which EUROCONTROL is a founding member, together with the European Union).



Experimental Centre, Brétigny-sur-Orge, France

"We looked at the developments coming out of SESAR and asked the very simple question as to whether it made more sense to implement these at a local level, at, for example, the level of functional airspace blocks, or whether we could get better performance at a lower cost if we went for implementation at the central, pan-European level. For some, this centralised approach made a lot of sense. In fact, when we ran some very conservative cost benefit analyses, we found that they would >

"The challenging ambitions of EUROCONTROL and continuous evolution of their needs due to regulations strengthen our ability to adapt our delivery model. The transparency and trustful collaboration between our teams lead to a true partnership." - Antoine Kerrinckx, Managing Director, Atos Belgium

# Digital has changed everything. Your business needs to change too



Are you ready to realise the full power of the digital age? Start your journey today at: [atos.net/digitaljourney](https://atos.net/digitaljourney)

Simply relying on technology isn't enough. That's why Atos goes further, reinventing business around a new digital model that drives top line growth, increases agility and creates competitive advantage. Our practical approach puts digital at the heart of the organisation, creating an integrated strategy that delivers seamless customer experiences backed by secure and agile operations - with solutions that encompass your entire ecosystem of employees, customers and suppliers.

## Digital empowerment: a new model of business reinvention

Organisations need to look beyond technology if they're to fully exploit the digital world

Every business has been touched by the transformation to a digital world. Social media, mobile internet, big data and the cloud have redefined the way we work, communicate, shop and relax. But it takes more than the implementation of new technology for an organisation to exploit the opportunities of the digital era. It requires a radical shift in approach that reviews and reinvents culture, processes and behaviours across the entire business to create a new model that realises the full value of the investment in digital technology.

It's just that sort of deep insight that Atos brings to Eurocontrol, the organisation responsible for coordinating and improving air traffic management services over Europe - the busiest area worldwide. Tasked with reducing delays whilst ensuring the safety, security, efficiency and reliability of this mission-critical environment, Atos is working to accelerate the development of new methods of operation. These will not only secure business continuity and bring innovation to existing services, but also enable extended flight efficiency in the rapidly growing markets of the Middle East, South East Asia and China.

### Change needs to embrace the entire ecosystem

Realising this vision requires the development of collaborative processes across a much broader group of stakeholders - including the national air navigation service providers, airports and airlines. This is being enabled by Atos' investment in a virtual Air Traffic Management Competence Centre with its operational headquarters in Brussels. Through this Atos is able bring together communication, navigation and surveillance infrastructure via an integrated solution that addresses Eurocontrol's key business objectives.

### A clear vision for the future

Atos helps organisations to reinvent their business, delivering seamless customer experiences whilst ensuring trustworthy and secure operations. At the same time we complement traditional IT with more agile and open digital models as part of an end-to-end structure that helps businesses to do more with the technology available. This complete view of the organisation is based on the understanding that digital change needs to be an ongoing process, with new technologies being tested and processes constantly reviewed and refined.

Transformation of this nature requires a radical shift for many organisations and it's companies like Atos, with a willingness to challenge the status quo, that are helping redefine the way we look at business today.

“Our objective is to apply our global experience, our know-how and our most valuable resource – our people – to drive innovation and deliver the best results for our customers across every area of their operation.”

Antoine Kerrinckx, Managing Director Atos Belgium

Your business technologists. Powering progress

# Atos





save more than €1.5 billion over 10 years.”

The services will not be run by EUROCONTROL (in fact, the agency will give up some of its existing activities) but instead they are being put out to tender to make sure that they achieve value for money. Frank is very clear that the intention is not to create new monopolies. Instead, he expects that the ‘centralised services’ will be a catalyst for the creation of a true market in ATM services.

“We’ve seen the airline industry evolve from when there were single national carriers with a stranglehold on the routes in and out of their country. Now, in Europe, we have a single competitive market which has resulted in a much more efficient airline industry and which has benefited the passengers and the European economy. We see the possibility to bring market forces in air traffic management, to create

a more competitive, service-orientated infrastructure. Overcoming monopolistic structures goes along with technical innovation, as new technology means that you can control aircraft without having a local infrastructure dedicated to that specific airspace. For example, the airspace over Kosovo is now controlled by HungaroControl—in a country that isn’t even contiguous.”

Frank is encouraging ANSPs to examine their businesses and to see what elements might be more efficient using a different business model. “We expect that the best solution in some cases will be joint operation—with a number of ANSPs joining together to run a service for all of them. This might be in a FAB or it might even be a group of ANSPs across Europe that all use the same type of systems. In other cases, ANSPs might group together to jointly procure a service. Or an ANSP

might feel that it performs a service particularly well and so it offers to do that for others.”

Of course, such an approach is not new in the business world. However, in the largely state-owned and state-controlled world of ATM, it’s revolutionary. When asked whether there was real interest for this, Frank was cautiously optimistic. “It’s still early days and ANSPs have different drivers and objectives, although the emphasis that the European Union is placing on performance is helping to focus minds. However, if we look at the Centralised Services program and the response to the calls for interest and the calls for tenders, then I am very encouraged by the extent and breadth of interest, with hundreds of expressions of interest being registered. Time will tell how this will translate into a more general change in the industry. We cannot tell ANSPs how they should operate; we can



only show them the possibilities that are available.”

EUROCONTROL is widely recognised both for its technical expertise and its impartiality—something that Frank sees as a particular strength when dealing not just with so many countries but also with the military, with airspace users such as airlines, with ANSPs, and with airports. It also helps in relations between the EU and the rest of Europe, as Frank explains. “The Single European Sky is the way forward for ATM in Europe. The EU has the size, the resources, and the political mandate to bring about a dramatic improvement in our industry. But aircraft don’t stop when they reach the EU borders so it’s essential that we take a wider approach. EUROCONTROL is ideally placed to provide this pan-European perspective and our non-EU member states look to us to represent their interests.”

It is essential that aircraft do not have to carry different systems for each part of the world they visit. This would not only add to the cost, it would also be less safe as a result of the potential for confusion. So much of the future of ATM is decided at the global level, under the auspices of the International Civil Aviation Organization (ICAO). Europe not only has many states, it is also represented by several bodies—the European Commission, the European Civil Aviation conference, and EUROCONTROL. Despite this, it has a strong record of speaking with a single clear voice and, as a result, it has played a significant

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- Frank Brenner



part in shaping ICAO’s Global Air Navigation Plan. Frank ascribes this success to EUROCONTROL’s impartiality and technical expertise, together with a real willingness to cooperate from all the states and bodies involved.

This has practical implications, not just because it ensures that Europe’s ATM Master Plan is fully in line with the Global Air Navigation Plan, but also because of the impact on European industry. The complexity of Europe’s airspace, together with the sophistication of the solutions required, has meant that the companies providing Europe’s ATM technology are at the leading edge of technological innovation. However, with traffic growth in Asia far exceeding that in Europe or North America, this leading position cannot be taken for granted.

Frank notes, “The air traffic management industry in Europe is a world leader in technology, and our goal must be to secure that position for the GDP here in Europe, to continue to offer that around the world. But there is a second effect: whatever is being developed and showcased has a high probability to be accepted by the United Nations and the International Civil Aviation Organization as a world basis to be followed by all states. And by that, of course, not only harmonised solutions are being developed and promoted, but the manufacturing industry that has

developed those solutions has a clear commercial advantage to offer those solutions around the world. To work closely with the technical solutions with the manufacturers is key, then to help these solutions to be implemented and showcased, and then to use those solutions and operational concepts on a worldwide level to promote them and thereby giving them market opportunities.”

This approach of working with its stakeholders is central to all that EUROCONTROL does and can be most clearly seen in the practical, day-to-day activities of the Network Manager Operations Centre, located at EUROCONTROL’s headquarters in Brussels. Here, the organisation receives all the flight plans from the 10 million flights a year that fly in Europe’s busy airspace. It validates them against any routes or airspace that might be closed and checks whether all the flights mean that any particular part of airspace or airport will be overloaded. If so, a flight may be re-routed or delayed to make sure that safety is maintained and that aircraft don’t have to divert or go into a holding pattern while in the air—which costs money and burns fuel. The Operations Centre runs regular teleconferences on the expected issues for the following day and will also hold ad hoc teleconferences in response to particular events, such as industrial action, or an event such as the terminal fire at Rome’s Fiumicino >





airport earlier this year. Liaison officers for the airlines and also for the military are based at the Operations Centre—reflecting the fact that EUROCONTROL is a civil-military body.

“We have customers from very different areas of stakeholders: airports, manufacturers, military, the services, the airlines, and also the state representatives, so the focus on these different customers and their interests is of high importance to get them together,” Frank comments. “That means teamwork, that means bringing them to move forward together, and not work against each other, and that means that to move Europe forward a clear declaration of being ready to change and not only asking for change in the other’s gardens but also in their own framework is essential. This is change management, a readiness to change, with an integrity to the values of Europe. We are here not for our own organisation, not here only for our own employees; we are here to help Europe move forward because we see other parts of the world—be it the Gulf, be it Asia—moving forward and we must not lose our competitiveness towards them by being at a standstill here in Europe.”

When there is a major event that has a lasting effect on the network, a crisis may be declared and the European Aviation Crisis Coordination Cell activated. Frank remembers that most dramatic crisis of recent years: the closure of much of Europe’s airspace as a

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result of the eruption of Eyjafjallajökull. “That was a crisis situation where we were not prepared because we did not consider at that time that such an ash cloud could basically bring all aviation to a standstill in Europe. We have learned from this event, we have seen there are national approaches that don’t fit with each other, and we have established more and better harmonised procedures. Most importantly, we have established, together with the European Union, a crisis coordination cell where everybody talks to each other in the same operations room here in Brussels. We have gone through an exercise only recently where we simulated such a crisis and saw how different and much better the impact was this time compared to the situation where we were all not prepared. It’s an evolving system; it’s a learning system.

“Although ATM has been seen as an industry where change is very slow—the term ‘glacial’ has been used—this is no longer the case. Change is now happening much more extensively and more rapidly than in the past. We see this technologically but, more significantly, we see it in the approach of the industry, which is becoming much more service orientated and customer focused. This is reflected in a much greater willingness to evolve our structures and our business models so that we can achieve the levels of performance that our airspace users are rightly demanding. It’s an exciting time for all of us and I am proud of the role that EUROCONTROL is playing—demonstrating that even one of the longest established bodies in the industry can be at the cutting edge when it comes to new ideas and new ways of working.”

# LEADING Technology Innovation

Air travel has gone through an amazing transformation. Technology is the enabler that has made it happen, but it promises so much more.

This year, more than 3.5 billion passengers will take a flight—double the number that flew at the turn of the century. In those 15 years we have seen a remarkable change to the way people fly. The connected technologies and services so avidly adopted by consumers on the ground are gradually becoming available to passengers and crew at 30,000 feet.



Driving this new era in air travel is the deployment of a new generation of connected aircraft filled with sophisticated IT equipment that has earned them the tag of ‘flying data centres’. Connected aircraft will enable passengers to use their own devices to access entertainment of their choice and stay in continual contact with life on the ground. Business travellers will be more productive with a virtual office in the sky.

Working to bring it to reality is SITA, an organisation owned by more than 430 members from across the air transport community.

Its communication network connects airlines with airports at 95 per cent of all international destinations and more than 14,500 commercial aircraft depend daily on SITA’s air-to-ground communications for their operation. In fact, with IT infrastructure at more than 1,000 international airports, SITA’s technology touches almost every passenger journey.

Air transport is a global 24/7 business requiring the smooth coordination and cooperation of a multitude of different organisations. SITA underpins these operations by partnering not just with airlines and airports but across the entire air transport ecosystem.

This position at the heart of air transport is underlined by EUROCONTROL, which this year marks its twenty-fifth anniversary as member of SITA. Working together, the two organisations are putting in place the building blocks to meet future air traffic needs. SITA deployed and manages the Pan European backbone network that meets the very strict, 99.99-per-cent uptime requirement for air traffic management in Europe.

Focusing on future air travel is very much built into SITA’s DNA. Its goal as an industry owned organisation is to explore new technologies, find the cutting edge, and see how it can



make the industry perform better. Often that can be taking existing technologies and integrating them to create a more seamless end-to-end travel process or working with other industry organisations to develop a collective approach to standards so that technologies work in multiple airports and across multiple aircraft types.

There’s no shortage of ideas coming through. For instance, location sensing technologies, such as beacons placed around airports that can trigger actions or information on a smartphone, hold exciting possibilities for improving the passenger’s journey to the aircraft, while driving the adoption of mobile boarding passes through mobile apps and near field communications (NFC) will cut paper use in travel processing and speed up boarding of aircraft.

Want to know more? Please visit [sita.aero](http://sita.aero) or watch our videos on our YouTube channel, [youtube.com/user/SITAOnline](https://www.youtube.com/user/SITAOnline). You can also connect to us through Facebook and LinkedIn.