



The Aviation & Space Journal

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TOTAL SYSTEM APPROACH

Filippo Tomasello*

Historically, safety rules and standards for aerodromes, air operations, air traffic, airworthiness and space systems have been developed by separate groups of experts, using different semantics and different approaches, leading sometimes to safety concerns (e.g. lack of clarity on the responsibilities at the organisational interfaces) and diseconomies: e.g. duplicated regulatory processes and mismatch among redundancies of systems inside aircraft, in the space segment or in the ground infrastructure.

The need to harmonise redundancy and performance (e.g. availability, integrity, etc.) requirements looking not only at the avionics, but also at the space and ground segment, emerged in the early '70s of last century (programmes AEROSAT and GPS NAVSTAR). Engineers involved in AEROSAT started to speak about the 'total system', so encompassing ground, space and airborne segments for satellite communications.

The ICAO Special Committee on Future Air Navigation System, whose last meeting was held in Montreal in 1988,¹ introduced the idea of performance based regulation for systems (again availability, integrity, etc.) and concurred the need to encompass not only the avionics on board aircraft, but also the equipment on board satellites and the ground infrastructures, not only for Communications, but also for Navigation and Surveillance (the acronym CNS was in fashion at the time).

So in the last decade of last century, the expression 'total system' spread across the experts around the world. In particular the idea of a 'total system approach' to safety regulation (i.e. coordination between the airworthiness/ops authorities and the ATM authorities, separated at the time) was enshrined in the EUROCONTROL ATM 2000+ strategy,² adopted by the Ministries of Transport of the European Civil Aviation Conference (ECAC) in February 2000: *'In order to support a total system approach to the safety regulation of ATM/CNS, co-operation with aircraft regulatory authorities will need to be strengthened and enlarged'*.

The political statement in said strategy, was, one year later, translated into safety regulatory requirement 5.1 in the first edition of EUROCONTROL ESARR 4³: 'An ATM service provider shall ensure that hazard identification as well as risk assessment and mitigation are systematically conducted for any changes to those parts of the ATM System and supporting services within his managerial control, in a manner which:

- a. addresses the **complete life-cycle** of the constituent part of the ATM System under consideration, from initial planning and definition to post-implementation operations, maintenance and de-commissioning;
- b. addresses the **airborne, space and ground components** of the ATM System, through cooperation with responsible parties (i.e. 'inter-organisational' safety management); and
- c. addresses the **three different types of ATM elements (human, procedures**

*Professor aviation safety regulation at Parthenope University - Italy

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and equipment), the interactions between these elements and the interactions between the constituent part under consideration and the remainder of the ATM system.

The greatest achievement of ESARR 4 was to include humans and procedures (implicitly then also organisations) in the 'total system', while the major shortcoming was to omit the role of regulators. The ESARR 4 vision is depicted in Figure 1 below:

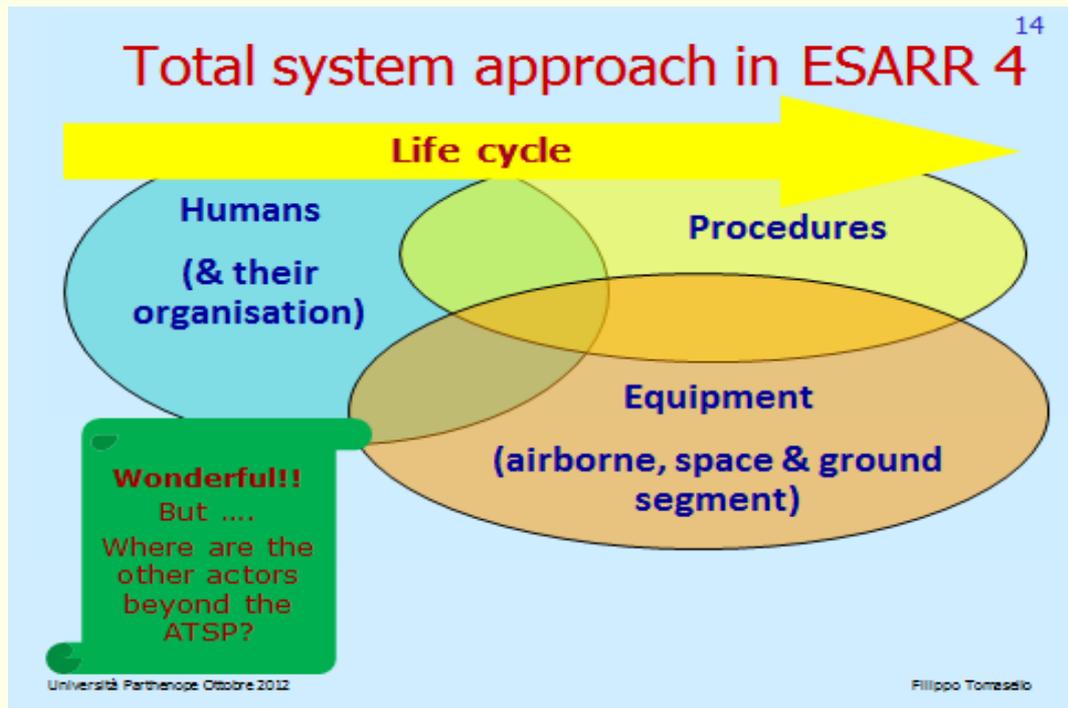


Figure 1

The developments summarised above were taken on board by the European Commission (EC) in its Communication 578⁴ of 2005, which announced the intention of extending the competencies of the European Aviation Safety Agency (EASA) to the aerodromes and Air Traffic Management (ATM) in an *'integrated approach'*, the importance of which had in fact long been recognised by ICAO. This approach was intended to improve the safety and efficiency of civil aviation by handling in a coordinated fashion the ground, air (and, where appropriate, satellite) aspects of air operations and by relying on the latest technological developments which enable computer systems, whether on board or on the ground, to interact. Its aim was to ensure the interoperability of the systems and the synchronisation of their implementation. According to the EC *'the application of this concept at Community level will make it possible to remedy the current shortcomings by resolving the problem of coordination between the ground-based and air-based aspects of air safety. A single, consistent regulatory framework is required for this purpose'*.

EC Vice President Jacques Barrot, in the foreword to the subsequent report of the high level group (HLG; 2007⁵) on the extension of the competencies of EASA to ATM, stated that: *"EASA will be able to cover the entire aviation safety chain in a total system perspective."*

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In paragraph 1.3 of said report, the HLG clarified that *“the aviation system behaves as a network with most parts having an impact on most other parts. Fragmentation at any level, be it service provision, regulation or policy, is a significant impediment to the efficient functioning of the overall network. The High Level Group has therefore adopted the total system perspective as the cornerstone of its work. The total system approach means creating a system that gets all of the different parts to work together in a complementary way to improve system efficiency and avoid overlaps.”*

In the vision of the HLG total system approach meant to consider, in a multi-disciplinary perspective, all aviation domains (i.e. Aerodromes, ATM/ANS, Operations and airworthiness) and for each of them, in a coordinated way, all the regulatory perspectives: safety, security, environment, economic, network and capacity management and social aspects.

The idea of the ‘total system’ was finally endorsed by the EU legislator in recital (1) of EU Regulation 1108/2009⁶ (extension of EASA to ATM/ANS): *‘In its communication of 15 November 2005 to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions entitled ‘Extending the tasks of the European Aviation Safety Agency – an agenda for 2010’, the Commission announced its intention to progressively extend the tasks of the European Aviation Safety Agency (the Agency), with a view towards a ‘total system approach’, to aerodrome/airport safety and interoperability, air navigation services (ANS) and air traffic management (ATM)’.*

In summary it is clear that the ‘total system’ vision encompasses:

- a. the entire life cycle of each system;
- b. the space, ground and airborne segments; and
- c. the humans and organisations involved.

The corollaries of the above conclusion are that:

- a. there should be a unique rulemaking authority in charge to define the roles, responsibilities and privileges of each involved organisation, since only the regulator has responsibility on the ‘total system’ (no single manufacturer produces it; no single operator manages it: for example the multiplicity of organisations involved in performance based navigation is sketched in Figure 2);
- b. the essential requirements in EU Regulation 216/2008 (as amended by 1108/2009) already provide a legal basis for the ‘inter-organisational’ safety management, at the top of the ‘Tomasello’s pyramid’ reproduced in Figure 3, which means that risk assessment and mitigation, in certain cases, has to involve more than one organisation (e.g. aerodrome operator, air operators and ATS for runway safety);
- c. only the rulemaking authority can ‘apportion’ the performance objectives across systems operated by different organisations: e.g. the design objectives for ‘detect and avoid’ for unmanned aircraft, which have to take into account system on board the encountering aircraft, as well as ATC and other factors; or availability requirements for satellite and ground-based communications and navigation infrastructures, provided by different organisations, in order to avoid excessive, costly and unnecessary redundancies (i.e. losing

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- d. satellite serviceability does not mean having lost communication from the aircraft if the area is covered by an alternative system, such as HF or VHF); finally, if the approach is common across all aviation domains for all involved organisations (e.g. accountable manager, post holders, safety management, records, etc.), it becomes possible to progress towards a more cost-efficient regulation, applying the principle 'one organisation = one certificate', depicted in Figure 4 and already applied in the JARUS-ORG⁷.

7

not only equipment for safe Navigation

Segment	Constituents/Elements	Responsibility of
Airspace	Classification and borders of airspace volumes	State aviation authority
	ATS routes (including instrument procedures)	Airspace designers**
	Published AIS	AIS Providers*
Airborne	Navigation Data	Data providers**
	Integrated Nav. (avionics)	Air Operator (supported by manufacturers)
	Navigation receiver(s)	
Space	Nav. Signal in Space (SIS)	NAV SP*
Ground	Ground segment GNSS	ATS provider*
	Information to ATCOs	
	Airport Lights	Aerodrome operators**

*in original Regulations on SES (2004)
** in 2nd EASA extension (2009)

Università Parthenope Ottobre 2012 Filippo Tomesilio

Figure 2

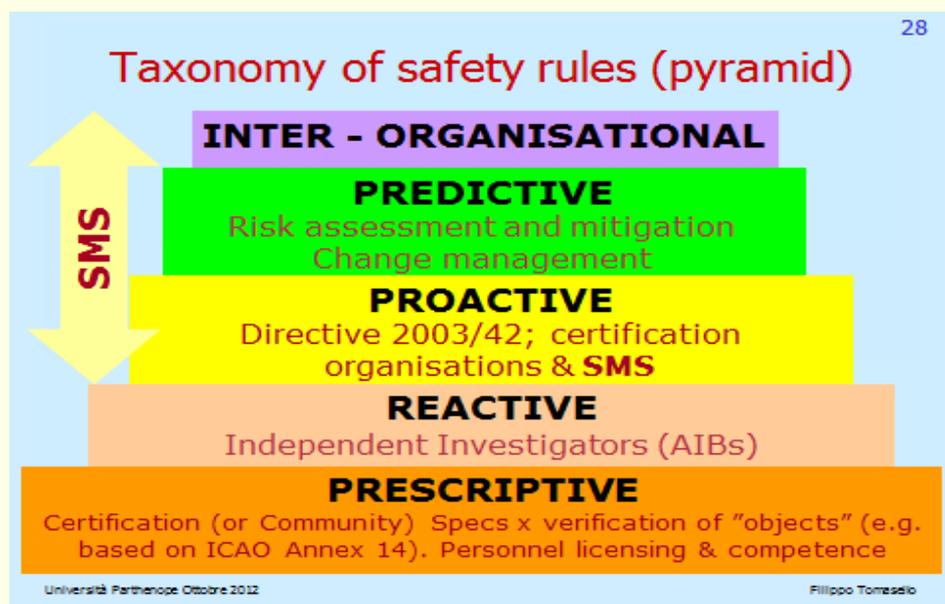


Figure 3

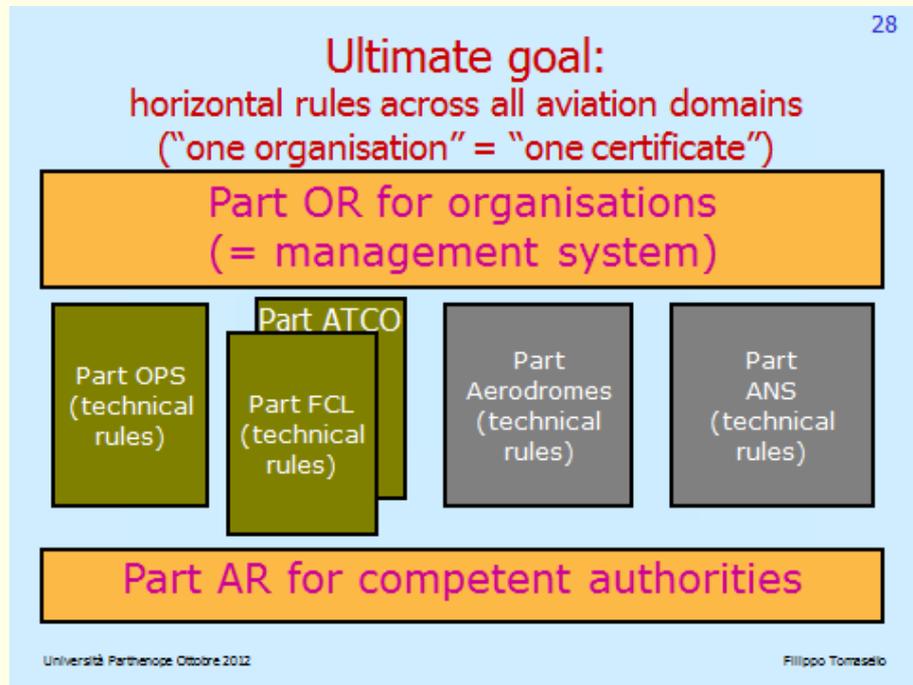


Figure 4

¹ICAO Doc 9524 (the author of these notes was representing Italy in that forum).

²<http://www.seguridadaaerea.gob.es/media/Migracion/PDF/89594/25524.pdf> (the author of these notes was member of the Committee that developed the strategy).

³<https://www.eurocontrol.int/sites/default/files/article/content/documents/single-sky/src/esarr4/esarr4-e1.0.pdf>

⁴<http://eur-lex.europa.eu/legal-content/AUTO/?uri=CELEX:52005DC0578&qid=1408636116525&rid=1> (the author of these notes drafted it).

⁵http://ec.europa.eu/transport/modes/air/doc/hlg_2007_07_03_report.pdf

⁶<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:309:0051:0070:EN:PDF>

⁷<http://jarus-rpas.org/index.php/deliverable/category/11-external-consultation-on-jarus-org?download=52:draft-jarus-org-v0-17-27-apr-2014-for-ext-consult> (the author of these notes was the rapporteur of JARUS WG-2 which developed the first edition of JARUS-ORG).

MEXICAN AVIATION INDUSTRY: A GENERAL OVERVIEW

Samuel Chacon* and Kaynicté Pérez**

1. Introduction

With an average 20% annual growth rate since 2004,¹ the aeronautical industry in Mexico has registered a significant increase and it continues to expand over other productive industries in Mexico. Such growth can be identified by analysing the imports and exports that the aeronautical industry has recently performed. In 2012, exports from Mexico's aeronautical industry reached 5,040 billion US dollars, representing a 16.3% increase compared to 2011.² In 2011, the imports in the aeronautical industry reached a total of 3,781.60 million dollars, representing an increase of 32% with respect to 2010.

Mexico has become a global leader in this industry, housing more than 270 national and international companies directly associated with the aviation industry, including research centres,³ manufacturing and engineering, service providers for commercial and military aircraft, such as Bombardier, Honeywell, Safran Group, Eaton Aerospace or Goodrich.

The growth of the aviation sector in Mexico can be explained by considering some of its competitive advantages, such as geographical location, experience and competitiveness, operational costs and certified quality.⁴ These advantages will be better described further in this article.

Globally, there are other factors contributing to the growth of the aeronautical industry in Mexico. After 9/11 terrorist attacks, the aviation industry felt into a recession due to the decrease of commercial air transport operations. However, since 2004 it has been noted an expansion of the aviation industry as a result of the creation of new airlines and an increased demand for new aircraft, resulting in a proportional increase of sales and air traffic. For example, in Latin America and the Caribbean the aggregate number of air passengers to March 2014 increased by 6.4% over the same period in 2013, reaching 41.3 million passengers.⁵

It should be considered that the aeronautical industry in Mexico, similarly to other countries, is highly regulated. The aviation sector is supervised by the Ministry of Communications and Transportation ("SCT"), through the Mexican Civil Aviation Authority ("DGAC"). In Mexico there are a number of laws and provisions directly and indirectly associated with the aviation industry, including international conventions and treaties, laws, regulations, Mexican Official Standards ("NOM"), policy letters,

*J.D. LL.M., Partner at Chacón & Rodríguez, Aviation Law Professor. Author of the book "Mexican Aviation Law and its Regulation".

** J.D., LL.M., Lawyer at Chacón & Rodríguez, graduate student from Anglia Ruskin University, Cambridge, in the International Business

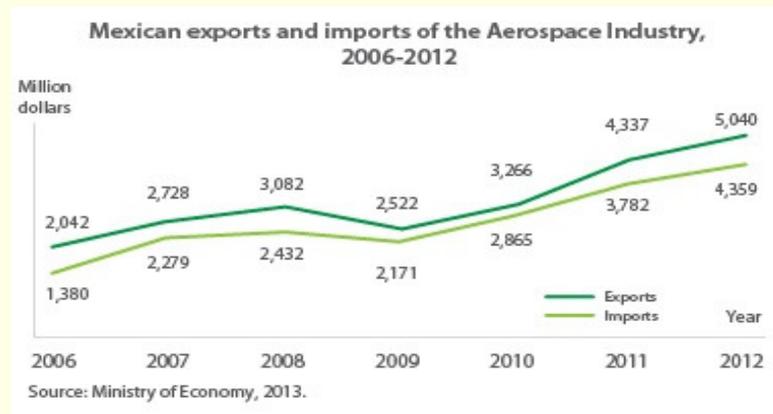
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circulars, directives and more than 81 proceedings that can take place before the DGAC.

The purpose of this article is to: (i) give a description of the growth perspective of the aviation industry in Mexico; and (ii) provide a general overview of the Mexican legal framework related to such industry.

2. Growth Perspective.

As mentioned above the growth of the aeronautical industry in Mexico can be identified through recent analysis of exports and imports of this sector. In 2013, Mexico's trade balance, showed a surplus of over 1,041 million US dollars.⁶ The chart here below shows the growth of those Mexican exports and imports for the aerospace industry.



In Mexico, the aeronautical industry mainly serves an international demand; 79% of the companies established in Mexico are specialized in the manufacturing or assembly of aircraft components and 81% of the Mexican aeronautical goods' production is destined to satisfy the US demand. In 2011, Mexico was the sixth supplier of the US⁷ and the fifth supplier of the European Union in aerospace industry.⁸

Given the growth of the aerospace industry in Mexico, that Mexico has occupied the first place in manufacturing investments worldwide from 1999 to 2009. According to the Mexican Economy Ministry in 2011, foreign and domestic investment in this sector exceeded one billion dollars for a total of more than three billion dollars in the last four years.⁹

We provide now a more detailed analysis of the competitive factors offered by Mexico to the aeronautical industry.

2.a. Geographical Location.

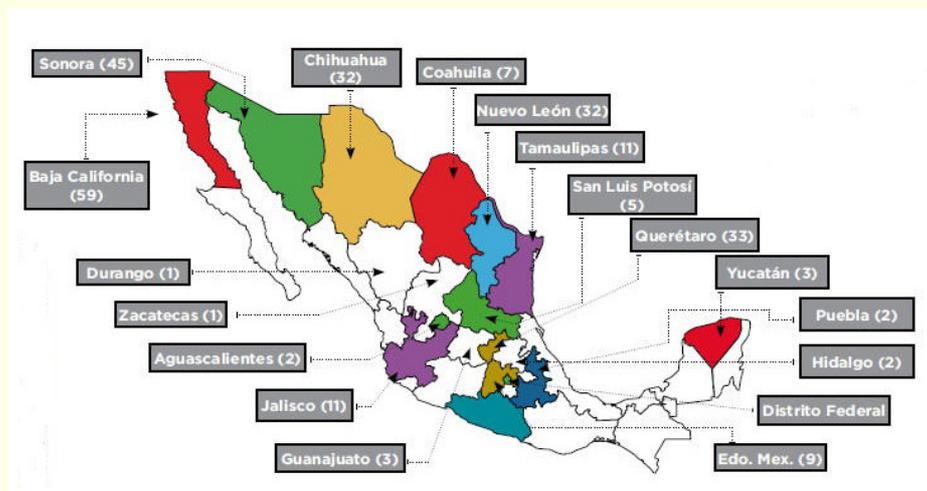
The geographical location of Mexico is one of the major competitive advantages since: (i) it is located where two of the main aerospace manufacturing corridors concur (North to South and East to West); and (ii) it has access to the European, Asian and American markets. Considering this competitive advantage, Mexico is considered as the Americas' logistical hub.¹⁰ In addition to the above, it is worth mentioning that

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the proximity of Mexico to the US, that is the world's biggest market, enables foreign companies established in Mexico to reduce the production, maintenance and export costs to US. Additionally, foreign companies established in Mexico may benefit from certain provisions set forth in the North American Free Trade Agreement (NAFTA) or other free trade agreements that Mexico has entered into with other countries.

This competitive advantage has been exploited by 270 companies operating in Mexico,¹¹ distributed throughout the country in 5 aeronautic regions:

The aeronautical industry in Mexico¹²



Figures:

- 270 Companies.
- 18 States.
- 43,000 Employments.

The five aeronautic regions of Mexico are:

1. The Northwest Region which includes the states of Baja California, Sonora and Chihuahua;
2. The Northeast Region comprising the states of Coahuila, Nuevo Leon and Tamaulipas;
3. The Western Region which includes the states of Aguascalientes, Durango, Jalisco and Zacatecas;
4. The Central Region comprising the states of Federal District, State of Mexico, Querétaro, Guanajuato, San Luis Potosi and Puebla; and
5. The Southeast Region which is composed only by the state of Yucatán.

In the future, it is estimated that to the extent in which other emerging economies of Latin America and the Caribbean develop, the Southeast region may have a significant growth considering its proximity to the Latin American countries.

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2.b. Experience and Competitiveness.

Mexico has reached high levels of experience and competitiveness in other industries such as the automotive, electrical and appliance manufacturing, which are industries that may be easily shifted towards the aviation industry, which may be considered as a competitive advantage compared with other countries.

Due to the experience obtained from other industries and in the aeronautical industry itself, Mexico knows what other countries require in the manufacturing of aeronautic components. The admission of Mexico as member of Wassenaar Agreement¹³ confirms the reliability attributed by the international market to Mexican aviation industry.¹⁴ It is expected that the incorporation of Mexico to Wassenaar Agreement, boost the investment in the automotive, information technologies and aerospace industries, resulting in a faster development of Mexican aviation sector.^{15 16}

As a result of the qualified Mexican workforce and professionals, several leading aeronautical industry have installed in Mexico their development and technological innovation centres. Such as the case of Honeywell, which established in Mexico a research and technology centre with 370 employees, whose 75% have an engineering qualification. Likewise, in 1999 General Electric Infrastructure Queretaro established a research centre in Queretaro (part of the Central Aeronautic Region) which is considered the largest research centre in the world, outside US, employing over 1,300 engineers.¹⁷

2.c. Certified Quality.

The certified quality should be considered as the fourth competitive advantage of Mexico in the aeronautical industry. Certifications of production processes are necessary in order to ensure that the operation, manufacturing, assembly and materials used in the aviation industry meet the required quality and safety international standards. In accordance with the Mexican legal framework, the aerospace company must be certified by either (i) the aeronautical authorities and (ii) private certification organisms authorized by the government. Additionally, each company may implement internal certification processes that the services provider needs to meet in order to become an authorized provider of such company.

The SCT through the DGAC is the dedicated Mexican government agency, responsible for granting permits for the establishment of aircraft, engines, parts and components manufacturing facilities and for regulating the control and surveillance of such facilities. Similarly, the DGAC has the authority to certify, validate and authorize the maintenance and manufacturing programs including the modification projects of aircrafts and their components.¹⁸

The DGAC in its authority has issued different provisions or guidelines to be complied by manufacturers in connection with the aviation industry. For instance, the "Policy letter No. CP AV-005/05 R2", "Standards Accepted by the Aviation Authority for the Certification of Aviation Products", dated 25^t July 2008, sets forth the accepted standards by the DGAC for the certification and approval for the manufacturing of aviation products designed or manufactured in Mexico, or to be imported for their com-

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mercialization.¹⁹

In addition, Mexico is one of the few countries that have signed an agreement with the US Aviation Authority, the Federal Aviation Administration (“FAA”), on mutual recognition of certification aviation systems called Bilateral Aviation Safety Agreement (“BASA”). This agreement entered into force on 18 September 2007 with the purpose of mutual recognition between the certifications granted to aerospace components by aviation authorities of both countries.²⁰

By virtue of the BASA the companies located in Mexico are able to standardize the certifications granted by the DGAC with those granted by the FAA, which facilitates the export of aeronautical products and designs to the US market. The implementation of the BASA results in the reduction of production processes and costs, since the manufacturers may not be requested to certify products and/or components in both countries.²¹ The BASA confirms the high degree of reliability that the companies established in Mexico have reached considering that the US aviation authority recognizes the certification granted by Mexican DGAC as those released in the US.

Moreover, it is estimated that nearly 50% of the aerospace companies operating in Mexico have obtained the ISO-9001²² and almost a third of such companies also obtained the AS9100 and the NADCAP certifications²³ (National Aerospace and Defense Contractor Accreditation Program)²⁴. Thus, it is expected that in the coming years the number of companies which obtain these certifications will increase.

3. Mexican Legal Framework Overview.

Due to its technical complexity and the interests to safeguard the security and integrity of the users of the air transportation services, both nationally and internationally, the Mexican aviation industry is a highly regulated industry.

Mexico has entered into more than 50 international treaties directly related with the aviation sector; also more than 14 federal laws are directly associated with the aviation industry. These are also regulations, NOMs, policy letters, circulars and directives issued by Mexican authorities and the DGAC.

The provisions governing the aeronautical industry must be flexible in order to adequate themselves to the needs of this sector as well as to the technological progress.

For the reasons mentioned above, a multiplicity of obligations applicable to air transport providers and manufacturers are contained in the NOMs, policy letters, circulars and directives, all having a less complex legislative procedure than a federal law or regulations, if any.²⁵

Mexico has entered into the most relevant international treaties related with the aviation industry including (i) the Warsaw Convention for the Unification of Certain Rules Relating to International Carriage by Air and its additional Protocol; (ii) the Convention on Aircraft Traffic; (iii) the Convention on International Civil Aviation (Chicago Convention); (iv) the Convention for the Unification of Certain Rules for International Carriage by Air (Montreal Convention); and (v) Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Aircraft Equipment (Cape

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Town Convention).

Additionally, Mexico and the European Union have signed an Agreement regarding certain aspects of air services. This Agreement was adopted on 15 December 2010 and entered into force on 22 June 2012. Once this treaty entered into force, some existing bilateral treaties regarding air transportation between Mexico and other European countries were amended, such as those with Austria, Belgium, France, Germany, Italy, Netherlands, Poland, Portugal and Spain.

As mentioned at the beginning of this section, the Mexican aeronautical legal framework is quite large. Nevertheless, there are three main laws on aerospace:

- a. The Civil Aviation Law and its Regulations (LAC), govern the exploitation, use or application of the Mexican airspace regarding the rendering and development of air transportation services.
- b. The Airports Law and its Regulations (LA), regulate the construction, administration and operations of airports.
- c. The Civil Aircraft Operation Regulations (ROAC), governs flight operations and the functioning of civil aircrafts.

Moreover, the Mexican Congress is currently analyzing several bills to amend the LAC. Such bills have been filed before the Congress during 2013 and 2014; the latest bill was filed on April 2014:

- a. Sanction in case of delay of air transportation services (April 1, 2014). The purpose of this bill is to amend the LAC setting forth that if there is a delay in the rendering of an air transportation service attributable to an air service provider, the service provider must compensate the passengers with the equivalent of 10% of the ticket price for each hour of delay.
- b. Update of the compensation for destruction or loss of hand and checked luggage (February 25, 2014). This bill seeks to update the coverage amount of compensation for the destruction, damage or loss of hand and/or checked baggage.
- c. Temporary Suspension of Operations (December 13, 2013). The bill aims to amend the LAC, providing that in the event of an order of temporary suspension of operations -when required in order to carry out any activity involving the use of airspace by national aircraft-, the SCT shall be obliged to give written notice at least 30 days in advance to the Mexican Airports.
- d. Remedies for airlines' overbooking in case of late or no show of passengers (December 5, 2013). The bill proposes to amend the LAC, providing that in case of late or no show of passengers for checking in, and their boarding right is denied by the airline; passengers shall have the right to be transported on a subsequent flight, if available and if not, in a later date agreed with the service provider.
- e. Remedies for overbooking (November 28, 2013). The purpose of this bill is to avoid or restrict the overbooking practice and non-compliance by the airlines of the air service agreement concluded between passengers and airlines. The bill proposes that (i) in the event of force majeure the air service

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provider shall pay compensation to the affected passenger. Such compensation shall be no less than 50% of the ticket price.

- f. Guidelines for granting permits for the establishment of aeronautical workshops (October 3, 2013). This bill aims (i) to set forth that foreign permit holders rendering commercial private air transportation services may not perform cabotage practices throughout national territory; (ii) that the SCT shall set forth a State Safety Operational Program intended for safety management operated by Mexico in order to reach an optimal performance in terms of operational safety in civil aviation.

Additionally, the SCT has issued 23 NOMs associated with the aviation sector. NOMs are mandatory technical regulations issued in order to regulate products, processes and services when these may constitute a risk to people, animals, vegetables and the environment in general. NOMs are relatively easy to amend or update in comparison with the procedure to amend laws. Notwithstanding the above, NOMs are not issued as fast as the aviation sector requires, therefore the Mexican Aviation Authority issues other legal provisions such as policy letter and circulars. The process to issue policy letters and circulars is faster and simpler than the one necessary to issue NOMs.

The DGAC has issued a total of 9 Policy Letter. Policy Letters shall comply with the NOM-011-SCT3-2001 and are classified into 4 groups, namely:

- a. Aircraft, Workshops and Products. Currently there are 4 of this type in effect.
- b. Training. At present, there is only 1 in force.
- c. Licensees, permit holders and aircraft operators. There are currently 3 in full force and effect.
- d. Aeronautical technical personnel and training centres. As well as for training there is only 1 policy letter issued at the present time.

Furthermore, as in the case of the policy letters, there are 74 circulars on Aeronautical Law issued by the DGAC; these are divided in 4 types, being:

- a. Counselling. This kind of circular can be subdivided into 5 groups: for (a) aircraft, workshops and products; (b) airports, aerodromes and heliports; (c) concessionaries, permit holders and flight operators; (d) aviation technical personnel and training centres; and (e) air navigation services. As a general rule, the compliance with the counselling circulars is optional.
- b. Mandatory. Also, this type of circular can be subdivided into 4 groups for: (a) airports, aerodromes and heliports; (b) concessionaries, permit holders and flight operators; (c) aviation technical personnel and training centres; and (d) air navigation services. Law requires the compliance with these circulars.
- c. Order. There is only one order circular issued so far. Its purpose is the establishment of operational procedures, among Mexico, US and Canada, regarding infectious diseases and emergencies caused by on board epidemics; it is based on the recommendations and standards of various international organizations.
- d. Internal. Currently there are only 2 in force. These circulars are administrative guidelines to be followed by the DGAC personnel.

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As a conclusion of this article, is worthy to say that Mexico is considered as the aviation hub of the Americas and the centre of investment in aviation. Considering the economic perspective of the aviation industry, Mexico has the opportunity to continue growing and strengthen its position as a leading country in the aviation industry. The challenge of the Mexican authorities may be to analyse the current legal framework applicable to the aviation industry and amend the laws to have a solid and dynamic legal system in order to satisfy the requirement of the industry players and to include in the analysis certain legal matters such as open skies and environmental policies, among other matters that may redefine the aviation industry in Mexico and its relevant legislation.

¹ Promexico, "Mexican aerospace: an industry on the rise" (Mexico) <<http://negocios.promexico.gob.mx/english/05-2013/art01.html>> accessed on June 20, 2014.

² Idem

³ Lourdes Durán, "Elevarían contenido nacional en exportaciones aeronáuticas" *El Economista* (Mexico, May 28, 2014) <<http://eleconomista.com.mx/estados/2014/05/28/elevarian-contenido-nacional-exportaciones-aeronauticas>> accessed on June 22, 2014.

⁴ Secretaría de Economía y FEMIA, "Pro-Aéreo 2012-2020 Programa Estratégico de la Industria Aeroespacial" <<http://www.promexico.gob.mx/work/models/promexico/Resource/2353/1/images/Proaereo.pdf>> page 25, accessed on June 15, 2014.

⁵ See: ALTA "Asociación Latinoamericana y del Caribe de Transporte Aéreo".

⁶ Valentina González, "Positiva balanza comercial de industria aeroespacial" *Manufactura* (Mexico, March 5, 2014) <<http://www.manufactura.mx/industria/2014/03/05/positiva-balanza-comercial-de-industria-aeroespacial>> accessed June 23, 2014.

⁷ Academia de ingeniería de México, "La ingeniería en la industria aeroespacial" (Mexico, January 2013) <<http://www.observatoriodelaingenieria.org.mx/docs/pdf/5ta.%20Etapa/15.La%20ingenier%C3%ADa%20en%20la%20industria%20aeroespacial%20en%20M%C3%A9xico.pdf>> accessed June 20, 2014, page 21.

⁸ Universidad Nacional Aeronáutica de Querétaro, "Industria aeroespacial mexicana crece en 20% anual" *El Semanario* (Mexico, January 20, 2014) <<http://elsemanario.com/18836/la-industria-aeroespacial-mexicana-para-de-elevarse/>> accessed June 19, 2014.

⁹ Promexico, "Inversión y comercio en el sector aeroespacial" (Mexico) <http://www.promexico.gob.mx/es_us/promexico/Aeroespacial> accessed June 19, 2014.

¹⁰ Idem.

¹¹ Fernando Franco, "Aeronáutica toma pista en 17 entidades" *El Economista* (Mexico, July 12, 2012) <<http://eleconomista.com.mx/industrias/2012/07/12/aeronautica-toma-pista-17-entidades>> accessed June 10, 2014.

¹² FEMIA, "La industria aeroespacial en México" (Mexico) <https://docs.google.com/viewer?url=http://femia.com.mx/themes/femia/ppt/mapa_esp.pdf> accessed June 15, 2014.

¹³ Wassenaar Arrangement, "Introduction" <<http://www.wassenaar.org/introduction/index.html>> accessed on June 9, 2014.

¹⁴ The Wassenaar Agreement is a multilateral agreement regulating a voluntary export control regime, which includes 41 countries (including Mexico, Germany, France, Portugal, United Kingdom among others) and seeks to contribute to the security and stability by promoting transparency and responsibility in transfers of conventional arms, dual-use goods and technologies.

¹⁵ CNNExpansión, "México se integra al acuerdo Wassenaar" *Notimex* (Mexico, January 20, 2012) <<http://www.cnnexpansion.com/economia/2012/01/20/mexico-se-integra-al-acuerdo-wassenaar>> accessed on June 12, 2014.

¹⁶ Given the above, it comes as no coincidence that Mexico has a qualified and skilled workforce as well as professionals specialized in the aviation industry, particularly engineers. According to the Mexican Education Ministry, more than 115 thousand students of engineering and tech graduate every year nology . Promexico, "Perfil del Sector" (Mexico, 2013) <http://mim.promexico.gob.mx/wb/mim/perfil_del_sector> accessed on June 22, 2014.

¹⁷ Secretaría de Economía, Dirección General de Industrias Pesadas y de Alta Tecnología, "Industria Aero-náutica en México" Op.Cit.

¹⁸ See: Article 21 of the Regulations of the Ministry of Communications and Transport (published in the Federal Official Gazette on January 8, 2009).

¹⁹ See: Policy letter "CP AV-05/05 R2" that sets forth the standards for the following certifications: (i) Type Certification; (ii) Production's approval Certification; (iii) Airworthiness Certification for Aeronautical Products related to; (iv) Assessment Program Aircraft Certification Systems; and (v) procedures for the using of airworthiness certification for aeronautical products related to.

²⁰ See: Agreement Between the Government of the United States of America and the Government of the United Mexican States for the Promotion of Aviation Safety", dated September 18, 2007.

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²¹ The Offshore Group, “U.S.-Mexico Bilateral Aviation Safety Agreement”, <<http://offshoregroup.com/2012/06/05/u-s-mexico-bilateral-aviation-safety-agreement/>> accessed on June 22, 2014.

²² The 9100 Series is a model for quality management systems within the aeronautical industry based on ISO 9001:2000. The AS9100 certification validates the quality, safety and technology of the stages of the civil and military supply chain.

²³ The NADCAP validates or approves special processes and products. The NADCAP certification is mainly required by engines and aircraft manufacturers and once that certification is obtained, the certified company shall be free of other audits.

²⁴ Secretaría de Economía y FEMIA, “Pro-Aéreo 2012-2020 Programa Estratégico de la Industria Aeroespacial” Op. Cit.

²⁵ Samuel Chacón, “Derecho Aeronáutico Mexicano y su Legislación”, (Ed. Tirant Lo Blanch, Mexico, 2014), page 167.

**COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE
AND ITS MAIN RESULTS IN 2014**

Annette Froehlich *

The Committee on the Peaceful Uses of Outer Space (COPUOS) held its annual sessions in 2014 in Vienna at the United Nations. 63 representatives of the nowadays 76 member countries (Ghana and Belarus joined the Committee in 2013) participated at the fifty-seventh session on 11 to 20 June. Earlier the Scientific and Technical Subcommittee (10 to 21 February 2014) and the Legal Subcommittee (24 March to 4 April 2014) held their sessions. In particular, the session of the Main Committee (policy-oriented) took place against the backdrop of the recent events in Ukraine and the resulting tensions. Under the agenda point "Ways and means of maintaining outer space for peaceful purposes" Russia put forward emphatically what it contributed by means of international cooperation to international space activities and underlined that the successful operation of the International Space Station would not be possible without Russia's contribution. The United States also emphasized in its statement a multitude of international missions. France stressed during the general debate that the implementation of the rules set by outer space agreements has to be improved, particularly with respect to the three principles that should govern space activities: freedom of access to space for peaceful uses; preserving the security and integrity of satellites in orbit; and considering the right of self-defence of States.

The right of self-defense and safety and security of space activities

During the discussions about the sustainable use of outer space (agenda point "Long-term sustainability of outer space activities" of the Scientific and Technical Subcommittee) and related to the current debate on the International Code of Conduct for Outer Space Activities, Russia and some of the members of the Group of 77 had initiated the discussion about the significance of the right of self-defense in outer space. The draft proposal of the International Code of Conduct for Outer Space Activities declares that a State has no right to interfere with a space object, intentionally or indirectly, except when such action is justified by one of the three exceptions: "i) by imperative safety considerations, in particular if human life or health is at risk; or ii) by the Charter of the United Nations, including the inherent right of individual or collective self-defense; or iii) in order to reduce the creation of space debris" (art. 4.2). Concerning the UN Charter it is article 51 which comprises a right of individual or collective self-defense. If this exceptional measure is necessary, it must be done in such a way that a minimum of space debris is created and that the risk of collision is minimal. Although the sustainable use of outer space is a growing concern of the whole community of states, it appears that the danger that this unique resource may be affected by space debris is not yet recognized as a global priority. Hence Russia and some countries of the Group of 77 retain only the reference to the UN Charter. This means that only the right of self-defense could be applied as a case of exception. At the same time, they insist that the notion of "self-defense" should be discussed and

*Resident Fellow at the European Space Policy Institute (Vienna)

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clarified within the UNCOPUOS. In general, a broad consensus had been established among member states that this term should not be interpreted improperly giving the opportunity for a state to eliminate a space object of another state. Indeed, the Outer Space Treaty does not allow to do so without the consent of the launching state of the other space object.

Reorganization of the Legal Subcommittee

During the session of the Legal Subcommittee the need for tightening and improving the work of this subcommittee has been suggested once again in order to increase its productivity. Several proposals had been made in this regard by diverse member states. The proposal of Germany for example had foreseen a comprehensive approach. This proposal included two structural elements: the restructuring of both the agenda and the process (division of the Committee into two groups, one consisting of experts entrusted with the preparatory work and afterwards bottom-up one with representatives of Member States). This proposal was much debated because this is the first time a holistic approach has been suggested. It should increase the efficiency of the committee by giving it a new structure and way of working, while in the last fifteen years only proposals for introducing new agenda items were raised. Moreover, the new agenda item "Review of international mechanisms for cooperation in the peaceful exploration and use of outer space" has to be highlighted. This overview is intended to help member states understand the different approaches of international mechanisms for cooperation in space in order to generate and facilitate future cooperation. In line with the five year work plan of the Subcommittee, the results of this analysis should be available on the 50th anniversary of the Outer Space Treaty (2017). In addition, the Subcommittee welcomed a compendium of space debris mitigation standards adopted by States and international organizations which was presented by Canada, the Czech Republic and Germany and which will be accessible worldwide via a web page of the Office for Outer Space Affairs. The Committee agreed that Member States should provide updated information on relevant legislation and standards for this compendium.

Strengthening Transparency and Confidence-Building Measures

The Committee also welcomed the adoption of resolution 68/50 of 5 December 2013 by the General Assembly and the report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (A/68/189). This group had started its work in accordance with resolution 65/68 of the General Assembly. The report contains recommendations for possible measures of transparency and confidence-building in space activities which can be adopted by States on a voluntary basis at uni-, bi- or multilateral level. This comprises an exchange of information about national strategies relating to space activities including security aspects and space applications in the military field. In this regard, the United States proposed that COPUOS serves as a platform for further discussions.

The next meetings of UNCOPUOS will be held in 2015 in Vienna according to the following schedule:

Scientific and Technical Subcommittee: from 2 to 13 February 2015

Legal Subcommittee: from 13 to 24 April 2015

Committee on the Peaceful Uses of Outer Space: From 10 to 19 June 2015

The report of the Committee on the Peaceful Uses of Outer Space may be accessed on

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on the Internet page: <http://www.oosa.unvienna.org/oosa/en/COPUOS/2014/docs.htm>

The article has been published in French in *Revue Française de Droit Aérien et Spatial*, Paris 2014.

EU COURT CLARIFIES 'ACTUAL ARRIVAL TIME' OF A FLIGHT

(Judgment in Case C-452/13 - Germanwings GmbH. vs Ronny Henning)

Isabella Colucci

On September 4th, 2014 the Court of Justice of the European Union issued a judgment on a preliminary ruling concerning the interpretation of the concept of 'actual arrival time' in proceedings between the air carrier Germanwings GmbH. ('Germanwings') and the passenger Mr Henning.

The dispute, in the main proceedings, concerns the carrier's refusal to compensate Mr Henning for the alleged delay with which his flight arrived at Cologne/Bonn airport (Germany). Said aircraft took off with a delay of three hours and ten minutes and touched down on the tarmac of the runway at Cologne/Bonn airport with a delay of two hours and fifty-eight minutes. Upon reaching the parking position, the doors of the aircraft were opened three hours and three minutes later than the scheduled arrival time.

Mr Henning maintained that the final destination was reached with a delay of more than three hours in relation to the scheduled arrival time and that he could therefore claim a compensation of € 250 according to Articles 5, 6 and 7 of Regulation No 261/2004. On the contrary, Germanwings affirmed that the actual arrival time was the time at which the plane touched down on the tarmac at Cologne/Bonn airport, with the result that the delay in relation to the scheduled arrival time was just two hours and fifty-eight minutes; so compensation was not due.

First of all, the Court highlights that the concept of 'actual arrival time' may not be defined on a contractual basis but must be interpreted in an independent and uniform manner. In that regard, the Court points out that *"during a flight, passengers remain confined in an enclosed space, under the instructions and control of the air carrier, in which, for technical and safety reasons, their possibilities of communicating with the outside world are considerably restricted. In such circumstances, passengers are unable to carry on, without interruption, their personal, domestic, social or business activities. Although such inconveniences must be regarded as unavoidable as long as a flight does not exceed the scheduled duration, the same is not true if there is a delay, in view, inter alia, the fact that the passengers cannot use the 'lost time' to achieve the objectives which led them to choose"*. It follows that the concept of 'actual arrival time' must be understood as the time at which such a situation of constraint comes to an end.

Indeed, passengers' situation on a flight does not change substantially when the aircraft touches down on the runway or when the aircraft reaches its parking position, if they must remain seated without any possibility to communicate with the external world. It is only when the carrier gives orders to open the doors and authorizes passengers to leave the aircraft that they cease to be subject to those constraints and may resume their normal activities.

Therefore, in the light of the foregoing considerations the Court ruled that the concept of 'arrival time', which is used to determine the length of the delay to which

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passengers on a flight have been subjected, refers to the time at which at least one of the doors of the aircraft is opened, the assumption being that, only from that moment onwards, passengers are permitted to leave the aircraft.

THE ITALIAN COURT CONFIRMS AUTHORIZATION TO QATAR AIRWAYS TO FLY FROM MILANO TO NEW YORK

Francesca Grassi

Today's flight services operated by airlines in the international aviation market are strongly affected by the commercial dynamics resulting from the fact that many flight services are offered by many competitors in the same international market. Also, the economic crisis has contributed to heighten commercial competition between market operators. This is the reason why today's market operators are particularly attentive to preserve and ensure fairness and legality of the commercial strategies/practises in the international aviation market.

In 2014, the company Cargolux Italia S.p.A. filed a case before the Regional Administrative Court of Lazio (TAR - Lazio) against the Italian Civil Aviation Authority (ENAC). The subject matter concerned the fact that, according to the petitioner, market fair competitiveness was prejudiced by ENAC, illegitimately granting Qatar Airways authorization to fly on the route Chicago-Milan-Doha under the fifth freedom right.

Such right was established by the Chicago Convention on International Civil Aviation of 1944 and it is defined by the International Civil Organization (ICAO) as "the right or privilege, in respect of scheduled international air services, granted by one State to another State to put down and to take on, in the territory of the first State, traffic coming from or destined to a third State".

In particular, Cargolux asked the Court to suspend the ENAC authorization in question. In that respect, it is noteworthy that in order to perform those services in Italy, ENAC authorization is necessary for international airlines as article 6 of the Chicago Convention states that all international air services, in order to operate in a foreign state, must be given authorization from that state ("No scheduled international air service may be operated over or into the territory of a contracting State, except with the special permission or other authorization of that State, and in accordance with the terms of such permission or authorization"). Accordingly, Qatar Airways started to operate at Milan-Malpensa airport with ENAC authorization starting spring 2013.

The Court of first instance found in favor of the petitioner thus suspended ENAC authorization preventing Qatar Airways from operating in one of the major air transportation hubs of the country.

Qatar Airways appealed against such decision before the Council of State (Consiglio di Stato) asking the precautionary measure to revoke the suspension decided by the Court of first instance. The precautionary measure was asked on the grounds that the lacking of ENAC authorization to a major competitor such as Qatar Airways would cause great prejudice to the market principle of free and fair competition.

Finally, on July 21, 2014, the Council of State issued the decree on the precautionary request; the Council of State found in favor of the appellant. Therefore, the suspension of the ENAC authorization decided by TAR - Lazio was revoked and Qatar Airways

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was allowed again to operate at Milan-Malpensa airport.

The decision of the Council of State greatly took into account the public interests at stake in the matter. In particular, besides recognising the clear and immediate prejudice deriving from the suspension, the Council of State argued that granting Qatar Airways due authorization to fly and operate services was deemed necessary to safeguard the principle of free and fair competition within the Italian air transportation market (*"[...] avuto riguardo al pregiudizio, certo ed immediato lamentato da parte appellante che svolge l'attività autorizzata dalla primavera del 2013, a fronte di quello della Società appellata che allo stato opera nello stesso scalo, nonché alla considerazione degli interessi pubblici sottesi al provvedimento di autorizzazione sospeso in primo grado tutelati dalle Amministrazioni pubbliche, ed, in particolare, dalla necessità di tutelare ogni aspetto di maggiore concorrenza nel trasporto aereo nell'interesse dei fruitori di tale servizio"*).

ALITALIA FINALISES RESCUE DEAL WITH ETIHAD

Alessandra Laconi

On August 8th, the UAE's flag carrier Etihad Airways signed the "*Transaction Implementation Agreement*" (TIA) by which Etihad becomes the major shareholder of Alitalia-CAI owing 49% of its share capital.

The transaction strengthens Alitalia by providing the former flag carrier with new liquidity and a strong partnership, replacing Air France-KLM whose share-capital was diluted earlier this year¹.

With the injection of fresh capital, Alitalia will be able to invest in a comprehensive strategic business plan, based on a considerable increase of new long-haul routes from Rome-Fiumicino and Milan-Malpensa, while promoting a revitalised brand with a greater focus on Italian tourism and trade.

Etihad's investment is in the region of €560 million, complemented by a further equity investment of €300 million coming from existing Alitalia shareholders, €598 million deriving from the financial restructuring of short and medium term debts provided by financial institutions and existing bank-shareholders, and €300 million of new loan facilities extended by Italian institutions².

Apart from the 49% shareholding in Alitalia for €387.5 million, Etihad's investment also includes €112.5 million to acquire a 75% interest in Alitalia Loyalty S.p.A., which operates MilleMiglia, the airline's frequent flier programme, and the purchase of five pairs of slots at London Heathrow airport valued at €60 million.

Under the agreement, Alitalia's current investors - which include Poste Italiane, Air France-KLM, UniCredit and Intesa Sanpaolo banks - are going to group their holdings in a mid-company controlling 51% of the restructured airline, without taking on past debts and liabilities.

James Hogan, Etihad Airways president and chief executive officer, said the deal is a strategic, long-term commercial investment for the airline: "*On completion, we are committed with the other shareholders to build a reinvigorated Alitalia as a competitive, sustainable and profitable business that can operate successfully in the global air travel market. [...] We believe in Alitalia. It is great brand with enormous potential. With the right level of capitalisation and a strong, strategic business plan, we have the confidence the airline can be turned around and repositioned as a premium global airline once again*".

Hogan added that the winners of the successful strategy would be "*Italian and international travellers, who would see better service, new routes and greater competitive choice; Alitalia's employees, who can look forward to a brighter future over the long term, in a business which will grow again*³; and the Italian people, who can be

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proud once again of their national airline”.

Gabriele Del Torchio, Alitalia chief executive officer, acknowledged “*there is a long road ahead*” to complete the transaction, adding that the investment “*will provide financial stability and enable us to position Alitalia, and the travel and tourism industry in Italy, for long-term growth*”.

Maurizio Lupi, the Italian transport minister, described the agreement as an important sign that represents an injection of confidence in Italy.

The comprehensive business plan provides for the revitalisation of Alitalia’s brand⁴, to embody all the main features characterizing Italy - food, fashion, culture and lifestyle - in a “Made in Italy” premium service concept and guest experience.

Moreover, the deal focuses on the profitable growth of long-haul flying from both Rome-Fiumicino and Milan-Malpensa, while maintaining short haul routes⁵. This will include flights to new destinations, increased frequency to certain existing markets and an enhanced network to Abu Dhabi, in order to allow traffic between Italy and the UAE to grow, and provide Alitalia’s passengers with seamless connectivity to Etihad’s global network.

As a consequence of the above, Rome-Fiumicino will become a larger intercontinental hub with up to five new routes over the next four years, while long-haul flights from Milan-Malpensa will more than double to 25 flights a week by 2018. Alitalia’s cargo unit will also be re-launched and expanded. Consequently, the Alitalia’s wide-body fleet is expected to grow by a third, while its narrow body fleet will be managed to meet the requirements of the last network plan⁶.

The added practical benefits will be the streamlining of hub operations and the joint procurement in the areas of aircraft, engines, maintenance & repair operations, training, catering, ground handling and fuel.

On the other side, the agreement will allow Etihad - which already has shares in Air Seychelles, Aer Lingus, Air Berlin, Virgin Australia and Air Serbia - to pursue its plan for a new global alliance⁷.

The whole deal, which is subject to final regulatory approvals, is expected to be completed by the end of December 2014.

The described agreement will require the green light from the Italian antitrust authority and from the European Commission over the issues of state aid, ownership and effective control by non-EU residents.

Consequently, the board of Alitalia is due to approve a €300 million capital increase, with Poste Italiane - the state-owned postal service that holds a 20% stake - contributing € 75 million.

Moreover, the large stake acquired by Etihad initially triggered concerns with the European Commission, which warned Italian authorities to ensure the UAE carrier does not reach a majority holding or, above all, does not exercise an “*effective control*” of Alitalia. As known, EU rules (EU Regulation No. 1008/2008 of the European Parliament and of the Council of 24 September 2008 establishing common rules for

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the operation of air services in the Community) require that majority ownership and/or the effective control of European airlines remains in European hands.

EU Commissioner for Transport Siim Kallas recently affirmed that the Commission has required a detailed dossier on the Alitalia-Etihad agreement in order to assess its compliance with the European rules.

¹In 2009, Air France-KLM bought a 25% stake in Alitalia, but since then it has seen its investment considerably diluted.

²Up to one-third of the Italian carrier's €900 million debt will be written off by Alitalia's lenders – mainly UniCredit and Intesa Sanpaolo – while the remaining two-thirds will be swapped for equity. In 2013, the company lost €569 million.

³It must be specified that as a result of negotiations with the main unions of the sector, out of a total of 12.800 employees, 800 workers will be laid off and more than 1.300 will be reallocated within the company.

⁴James Hogan, Etihad Airways president and chief executive officer, recently said: *“Alitalia as a brand is a strong local brand, but the current style and livery of Alitalia is very dated. So we have been working with the Alitalia team on a new livery and a new service proposition and new uniforms”*.

⁵Domestic flights, where Alitalia struggles to compete against low-cost airlines and trains, are likely to be reduced in favour of more profitable long-haul routes, with new routes to be announced in the coming years.

⁶Alitalia has now a fleet of 112 aircrafts in total, of which 22 are wide-bodies.

⁷Saj Ahmad, chief analyst at UK-based Strategic Aero Research, said that the deal is *“the riskiest investment Etihad has made to date because of the ground-up problems that Alitalia is saddled with. [...] But the real litmus test of this deal is how quickly losses can be turned around since that is the true barometer of performance”*.