



Rialtas na hÉireann  
Government of Ireland

# Focus on Aerospace & Aviation

December 2018

# Aerospace & Aviation

Ireland - a centre of excellence for the aircraft leasing sector and growing capability in supplying the industry



## GLOBAL MARKET SIZE

**4bn**

passengers 2017

↑ Growth Forecast:  
7.8 billion by 2036

**\$709bn**

revenues 2016

↑ Growth Forecast:  
\$824 billion by 2018

Source: Passengers - IATA, Revenues (passenger and cargo) - IATA Factsheet

## IRISH LEASING SECTOR

**€12.7bn**

The leasing sector generated total income of €12.7 billion in 2016

Source: CSO Aircraft leasing in Ireland 2007-2016

The UK is the most important origin and destination for international passengers to and from Ireland.

Air traffic between the UK and Ireland is approximately 12.8 million passengers a year

The Dublin to London route is the 2nd busiest international route globally by number of passengers with almost 4.5 million passengers a year

Source: Department of Transport, Tourism and Sport, Annual Report, 2017



## EMPLOYMENT

**18,000** 

Employment is estimated at 18,000 (in manufacturing and services, MRO, leasing and space activities)

Source: Shannon Group plc

 **14** OUT OF 15

14 of the world's top 15 largest leasing companies have significant operations based in Ireland

Source: IDA Ireland



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Prepared by the Department of Business, Enterprise and Innovation

## The sector in numbers

		Market Size	Growth Forecast
Global <sup>i</sup>	Passenger Numbers	4bn passengers (2017)	7.8bn by 2036
	Revenues	\$709bn (passenger and cargo) 2016	\$824bn (passenger and cargo) 2018 forecast
Ireland <sup>ii</sup>	Employment		
		Estimated at 18,000 (in manufacturing and services, MRO, leasing and space activities)	

i) Passengers - IATA, Revenues - IATA, Factsheet

ii) Shannon Group

## Description of the sector globally

- The aviation industry encompasses aircraft-related enterprises and includes activities such as aircraft assembly and related parts manufacturing, aircraft and engine finance, aircraft MRO (maintenance, repair, overhaul), after-market support services and recruitment.
- It is a major contributor to global economic growth and prosperity and has had a major impact on the rise of globalisation by facilitating movement across the globe for businesses and people.<sup>1</sup>
- The term aerospace is used to encapsulate all activities relating to the production of aircraft and space equipment from the initial research and design to the manufacture and delivery to its end user. The aerospace industry mainly consists of manufacturers of engine, airframe, components, and related software systems.

## Global developments and implications

- Growing demand for airline travel due to rising disposable income in emerging markets and expanding numbers globally of well-off retirees with a propensity to travel will mean more requirement for aircraft. An increase in digital connectivity worldwide, greater Wi-Fi accessibility, and on-board tablet usage that makes flying easier, provides opportunity for airlines in the provision of more onboard services.
- The two biggest manufacturers, Boeing and Airbus, have reported they expect their production of Boeing 737s and A320s to reach an unprecedented 60 aircraft per month each in 2019. This compares with 42 per month as recently as 2015, a jump of 43 percent in just four years. Global demand for newer, more efficient and less maintenance intensive aircraft is rising with Asia (China) being the main market.

<sup>1</sup> KPMG The Aviation Industry Leaders Report 2018

- The worldwide commercial fleet, estimated at approximately 25,000 in-service aircraft, is forecast to expand to 37,800 over the next decade (excluding aircraft being retired and replaced which has an impact on MRO activity and after-market parts demand).<sup>2</sup>
- The significant increase in aircraft numbers will see a global requirement for an additional 800,000 new pilots, 750,000 engineers and c.900,000 cabin crew over the next twenty years. Europe alone will require an additional 146,000 new pilots, 135,000 engineers and technicians and 187,000 cabin crew by 2037. It can take up to five years plus to train engineers and pilots to the required level for commercial aviation.<sup>3</sup>
- Despite some airline bankruptcies, mainly in Europe, and other areas of stress around the world created by terrorism, war, sanctions and regulatory pressures, the airline industry remains cyclically profitable. The global industry net profit is forecast to rise to \$38.4 billion in 2018 (from \$34.5 billion expected in 2017<sup>4</sup>) and passenger demand continues to rise.
- Airlines, aircraft and engine lessors and aviation banks have grown with projections currently estimating that over \$5 trillion worth of new aircraft will be needed in the next 20 years and aircraft leasing companies are expected to finance up to \$2.5trillion of this amount.<sup>5</sup>
- The growth of the middle class in the Asia-Pacific region, which is now similar in size to middle class citizens in North America and Europe combined, is expected to further increase demand for air travel in the region and should result in additional opportunities for the aviation leasing industry to expand its offering to Asian airlines.<sup>6</sup>
- The industry is being transformed by advances in new engineering processes, equipment and technology as well as digitalisation. Key technologies include 3D printing, advanced polymers and metal material sciences (including nanotechnologies), industry 4.0, automation and data analytics. For lessors, the onus has been on digitalising aircraft maintenance records for asset management and regulatory efficiency as well as how to manage and commoditise big data. More firms (airlines and MRO's) are leveraging software tools to streamline processes and have better visibility on the information they have.<sup>7</sup>
- The global space sector is undergoing major change with increasing private investment and increased activity by entrepreneurs and technology start-ups, driven by new business models.

<sup>2</sup> ibid

<sup>3</sup> <https://www.reuters.com/article/us-airbus-group-forecast/airbus-raises-20-year-market-forecast-in-revamped-format-idUSKBN1JWOS9?il=0>

<sup>4</sup> <http://www.iata.org/pressroom/pr/Pages/2017-12-05-01.aspx> International Air Transport Association

<sup>5</sup> <https://www.mhc.ie/latest/insights/10-things-to-know-about-the-aviation-industry-in-ireland>

<sup>6</sup> <https://www.pwc.ie/publications/2018/taking-flight-2018-aviation-leasing-ireland-survey.pdf>

<sup>7</sup> KPMG, Challenges for the Airline Industry, <https://home.kpmg.com/ie/en/home/insights/2018/01/main-challenges.html>

## The sector in Ireland

### Aircraft leasing

- Ireland is a centre of excellence for the air finance and leasing sector with 14 of the world's top 15 largest leasing companies having significant operations based here. The leasing community consists of lessors of commercial aircraft, regional jets, helicopters and aircraft engines. Ireland now has +60% share of the global leasing market with a total estimated value of US\$125 billion.
- From 2007- 2016, 13.7% of income generated from aircraft leasing came from China, 6.3% from Russia and 11.2% from UK/USA.<sup>8</sup>
- There are almost 1,500 people employed in aircraft leasing activities in Ireland<sup>9</sup>, having grown from 400 in 2007. These are highly paid jobs, with annual pay averaging more than €165k in 2016.
- The leasing sector generated total income of €12.7 billion in 2016 (primarily from operational leasing, and other sources including Fees & Commissions and Interest & Dividends) with taxes paid averaging €164 million per year over the period 2007-2016<sup>10</sup>.
- Lessors are attracted to Ireland for: its stable corporate taxation environment; the volume of double-taxation treaties that are in place worldwide (over 70); the pool of world class legal, taxation and financial professionals, and; access to a Tier-1 safety regulatory regime.
- Ireland is a signatory to the Cape Town Convention on International Interests in Mobile Equipment which creates a standardised legal framework for transactions relating to high-value assets such as aircraft.

### Aerospace

- There is growing Irish capability in Aerospace around the sub supply of precision engineered components, fabrication, pressings, plastics, composites, coatings and cutting tools.
- There are over 30 Enterprise Ireland client companies targeting the Aerospace sub supply industry and are gaining standards such as AS9100, NADCAP and SC21 in order to compete and grow their exports.
- Many sub suppliers have migrated from other key sectors such as Medtech and Automotive to gain industry certification, supply contracts and recognition in terms of quality of supply.
- Ireland primarily invests in space through its membership of the European Space Agency (ESA) and the European Union space programmes, Copernicus, Galileo and Horizon 2020.
- There are over 60 Irish companies active with ESA in both space segment and “downstream” activities, developing products, services and applications of satellite systems including for in flight communications. There is a degree of synergy in technologies developed for both the “aero” and “space” parts of aerospace.

<sup>8</sup> CSO Aircraft Leasing Infographic

<sup>9</sup> CSO Aircraft leasing in Ireland 2007-2016 . IBEC and PWC estimate that the aircraft leasing sector supports approx. 5,000 FTE employees.

<sup>10</sup> CSO Aircraft leasing in Ireland 2007-2016

**Brexit**

- The UK is the most important origin and destination for international passengers to and from Ireland. Air traffic between the UK and Ireland is approximately 12.8 million passengers per annum, 39% of total passengers handled by Irish airports, which is more than 100,000 aircraft movements each year. The Dublin to London route is the second busiest international route globally by number of passengers with almost 4.5 million passengers per year.<sup>11</sup>
- The unique legal regime which governs international civil aviation makes the legalities around Brexit quite complex. Unlike many other sectors, trade in aviation services are usually excluded from general international trade and investment agreements and instead are governed by a network of bilateral agreements between states.
- Ireland's priority when involved in the negotiation of any new aviation agreement will be to protect a fully liberalised and deregulated market to ensure no erosion of our connectivity or disruption to airlines, airports, business, tourism and personal travel.
- A key issue is that UK CAA (Civil Aviation Authority) certified Pilots, MRO engineers and AOC's (aircraft operators) would not be able to operate or service aircraft into or from the EU (including Ireland) as they would be outside the EASA (European Aeronautical Safety Association) regulatory environment.

*See also Focus on Transport & Logistics and Focus on Tourism & Hospitality*

**Ecosystem**

- The National Civil Aviation Development Forum (NCADF) was launched by the Minister for Transport, Tourism and Sport in February 2016<sup>12</sup>. In November 2017, the NCADF published actions to advance the implementation of the National Aviation Policy.
- There are a range of third level courses in Ireland focused on various aspects of aviation, including aeronautical engineering, aviation technology, aircraft systems and aviation management and finance. University of Limerick (UL) offers graduate and postgraduate programmes from Level 6 (certificate) through to Level 10 (PhD), including an aerospace degree programme; MEng. in Aeronautical Engineering; Corporate MBA in Aviation Management, and; B.Sc. in Aircraft Maintenance and Airworthiness Engineering. (CAMO) UCD offer an MSc in Aviation Finance whilst also catering for conversion of craft apprentices and adult and continuing education. UCD also offers an MSc in Space Science and Technology to assist in the development of space related support activities.

<sup>11</sup> DTTAS, Annual Report, 2017

<sup>12</sup> Arising from a recommendation in National Aviation Policy for Ireland which was published in August 2015

- Traineeships for Aircraft Maintenance Technician and Aircraft Structures Technician are available and from 2019 an apprenticeship in Science Aircraft Asset Management will be available. There are also a range of Financial Services courses available through the IFS Skillnet.
- College Ireland Aviation Services signed a partnership agreement with MATA (Mega Aviation Training Academy) in Johannesburg to deliver world class aviation training and academic programmes in South Africa.
- Shannon Training Centre, part of the Limerick and Clare Education and Training Board (LCETB) offers training in aircraft apprenticeships, transportation, distribution and logistics. It is worth noting that an EASA qualification is required to qualify an aircraft as airworthy. Irish airlines and MRO's including Dublin Aerospace, Lufthansa, Ryanair, ASL, Aer Lingus and Eirtech develop the majority of skilled and EASA (European Aviation Safety Agency) regulatory qualified engineers which support the airlines, lessors and other after-market services here.
- Increased investment in building RD&I capabilities of relevance to manufacturing/engineering including:
  - I-Form - focusing on Additive Manufacturing and 3D Printing;
  - CONFIRM - Smart Manufacturing Centre focused on the convergence of IT systems and industrial automation systems;
  - IPIC Irish Photonic Integration Centre (to develop new light-enabled technologies)
  - AMBER Advanced Materials and Bio-engineering Research
  - Irish Manufacturing Research (IMR) specialises in Advanced Manufacturing Technologies in Industry 4.0, Collaborative Robotics, Industrial IoT, Data Analytics, Energy Efficiency, Additive Manufacturing/3D printing, Design Thinking and Knowledge Management. IMR's Centre in Mullingar is focused on Cobotics, Artificial Reality and Additive Manufacturing
  - Component research capability - the Irish Centre for Composites Research (ICOMP), a Technology Centre based in UL provides R&D and networking opportunities for aviation and aerospace, that use composite materials and associated technologies. UL has won more than €25 million in aerospace research funding and collaborates with every major aerospace company in Europe, although these centres are small.
- The Propeller Shannon start-up accelerator is a partnership between Shannon Group's International Aviation Services Centre (IASC), DCU Ryan Academy for Entrepreneurs, Boeing, and Datalex that aims to drive the development of innovative start-ups in the aviation sector. Teams will be able to build and commercially validate their technologies by working with existing networks and mentors from global aviation companies like Boeing and Datalex.
- The Aviation and Aerospace Incubation Centre in Shannon and the ESA Space Business Incubator offers facilities and support to entrepreneurs and start-up companies.
- Aircraft Leasing Ireland (ALI) is an industry body dedicated to the continued development and success of Ireland's aircraft leasing industry. It is composed of C-suite executives from leasing companies with a presence in Ireland.



- NSAI provide certification to AS9100, this is a widely adopted and standardised quality management system for the Aviation, Space and Defense industry.

## Relevant Reports

*Click on the hyperlinks below*

- [A National Aviation Policy for Ireland \(August 2015\), Department of Transport Tourism and Sport](#)

## Key actors

**Government:** Department of Business Enterprise and Innovation (DBEI), Department of Finance (DoF), Department of Transport, Tourism and Sport (DTTAS)

**Agency and Regulatory:** Irish Aviation Authority (IAA), IDA Ireland, Enterprise Ireland, European Space Agency (ESA), National Standards Authority of Ireland (NSAI)

**Industry:** IBEC-Federation of Aerospace Enterprises in Ireland (FAEI), International Aviation Services Centre Shannon (IASC)

**Airports:** Dublin Airport Authority (DAA), Shannon Airport Authority (SAA), IrelandWest Airport

## Recent Developments

### Company Developments

- UTC received US approval for the purchase of Rockwell Collins subject to certain parts of the business being sold. The acquisition, announced in September 2017, would be the largest in aerospace history (October 2018)
- Aircraft maintenance company, Lufthansa Technik Shannon, has opened a new Aviation Training Campus in Shannon. The state-of-the-art facility is unique in that it provides a combination of classroom, workshop and on-the-job training facilities (May 2018)
- US company Viasat announced the opening of its expanded Dublin office, with nearly 100 team members located in Dublin primarily developing innovative software solutions for the commercial aviation industry. Viasat expects to more than double its headcount in Dublin over the next few years, and extend development beyond connected aircraft software to include broader software and mobile application support for international maritime customers, European residential broadband and Wi-Fi markets, government systems as well as support for Viasat's next-generation ultra-high capacity satellite platform, known as ViaSat-3 (April 2018)
- Dublin Aerospace, Ireland's largest independent aircraft maintenance provider, will create 150 new jobs over the next three years (November 2017)



- Henkel Ireland, will establish a major Additive Manufacturing project in Tallaght, Dublin. 40 highly skilled scientists and engineers will be employed to develop new advanced materials for use in precision manufacturing industries, such as medical devices, automotive and aerospace (October 2017)
- Dublin and Clonmel based, ENBIO received €1.52 million from the European Commission to develop a green alternative to the toxic chemicals necessary to coat metals. Their work will be focussed initially on the space sector but has wide-ranging applications in aerospace, automotive and general industry, as well as public infrastructure and civilian applications. The funding is provided under the EU's Horizon 2020 SME Instrument (September 2017)
- The DAA announced that from June 2018, Ireland is set to get its first ever direct Asia-Pacific air route to Hong Kong which shall be operated by Cathay Pacific (August 2017)
- CAE Parc Aviation, aviation recruitment company, announced 80 new jobs and a move to bigger offices in Dublin (May 2017)
- Curtiss-Wright's Defence Solutions division announced that its Ireland-based facility has been selected by Italy's ELV SpA (Avio Group), the prime contractor on the Vega-C Launcher System and GPM Development and Qualification Program for the European Space Agency (ESA), to provide a COTS-based telemetry data system for the new launcher. At €4.5 million, this is the largest ESA related contract ever awarded to an Irish based operation (February 2017)