



# Aerospace Wiring: Market Trends

The size and trends in the Electrical Wiring Interconnect System (EWIS) Market

*Stephen Bennington*

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## Summary

This report looks at the size and the trends that are driving the growth in the aerospace Electrical Wiring Interconnect System (EWIS) market.

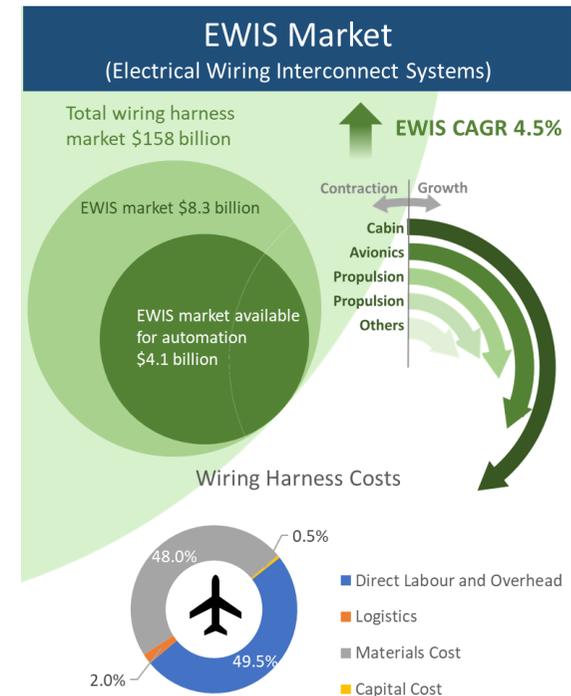
EWIS is the wiring system of an aircraft, it includes any wire, termination or wiring device, for transmitting electrical power or data. In the past few years, the complexity has increased dramatically making the aircraft wiring one of the most difficult parts of aircraft design.

The quantity of wire in a widebody jet is staggering, a typical wide-body jet will have as much as 500 km of wire, enough to reach from London to Edinburgh, weighing of the order 7,400 kilograms and making up some 3% of the weight of the aircraft. Although there is a strong desire to drive down this weight, increasing noise regulation, and the need for greater efficiency means that many of the aircraft’s systems are becoming electrical, this coupled with increasingly complex avionics and more sophisticated entertainment systems means that the wiring load is increasing.

## Size of the market

Despite the short-term slow down caused by Covid-19, there is optimism the wiring markets will see strong growth. It is estimated that the global wiring harness market will be larger than \$159 billion by 2027 with an average CAGR of ~6%<sup>1</sup>, largely because of the electrification of the automotive sector. The global market for the Aerospace Electrical Wiring Interconnection System (EWIS) market was estimated to be \$6.1 billion in 2020 and is projected to grow to \$8.3 billion by 2027, with an average CAGR of 4.5%<sup>2</sup>.

The commercial aviation sector is set to grow the fastest, driven in a large part by the growth in cabin interiors segment. North America is the largest regional market but the Asia-Pacific market is expected to show the fastest growth rates<sup>3</sup>. The biggest risk to the market is the increasing costs of labour and materials, coupled with the disruptions of the supply chain, caused by the pandemic and trade tensions.



While the manufacture of other elements of an aircraft has been subject to considerable automation, the production of the electrical wire harness remains a highly labour-intensive process, with some 50% or more of the cost of a harness coming from labour and overheads.

<sup>1</sup> [Transparency Market Research, Wire Harness Market](#)

<sup>2</sup> [Business Wire, Global Electrical Wiring Interconnection System Industry \(2020 to 2027\), May 2021.](#)

<sup>3</sup> [Market Research Futures, Global Wiring Interconnection \(EWIS\) Market research report, 2021](#)

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### Market Trends

Although the Covid-19 pandemic caused a contraction early in 2020, the markets began to improve towards the end of the year and are expected to stabilise during 2021. Longer term there is considerable optimism that underlying demand due to increased air-travel, backlogs, and demand for replacement aircraft. Longer term new markets such as unmanned aircraft systems “drones”, short-range vertical take-off electrical air-taxis and increasing use of electrical propulsion will drive growth.

Apart from these more general market forces there are more specific trends that are the wiring harness market: such as advancements in technology, the drive to greater fuel efficiency and changes in the supply chain.

*The electrification of non-propulsion aircraft systems*, such as actuation systems, cabin pressurisation and air-conditioning, wing de-icing, ground taxiing, has been an important trend in the industry for several decades, but it still has a long way to go. Apart from the need to replace the hydraulic and pneumatic systems, electrification provides greater design freedom and a chance to improve the aircrafts overall energy efficiency.

All these changes require more complex wiring systems, not just to distribute the high-voltage power, but because much of the efficient handling of the power requires more sophisticated monitoring and an increase in data flow.

*The rapid increase sophistication of avionics is set to continue.* The so called ‘glass cockpit’ is now standard in new aircraft and a popular retrofit for older planes. It allows the pilots to access more information, but more importantly information that is curated, with greater emphasis on threats such as TWAS (Traffic Awareness and Warning Systems), or aircraft systems that are non-standard or outside normal limits. These and other advanced flight control systems require wiring with faster data rates.



*For commercial airlines, the entertainment system has become a key differentiator* not only to attract greater market share, but also as a source of additional revenue, through access to premium content, product sales, access to the internet and perhaps even e-learning. This will inevitably mean more screens and potentially a shift from seat back displays to allowing passengers to use their own devices.

Better control of the passenger’s environment, lighting, climate, noise, and perhaps even smell is going to be an important trend for business and first-class seating. This cabins segment is

predicted to be the fastest growth part of the EWIS market<sup>4</sup>.

*The pandemic has created a need for increased biosecurity.* Whilst this has mostly meant enhanced cleaning regimes, ensuring that the wiring and electrical components are protected from harsh cleaning agents is going to be necessary and the design of the cabin furniture will need to eliminate gaps and crevices that are difficult to sterilise.

*Increased sustainability has become an import goal for all industries.* In the aerospace sector this will mean that the whole

life carbon footprint and the recyclability of materials is going to be an important consideration as long as it does not compromise safety.

However, the over-riding driving force is the need to reduce and ultimately remove the burning of fossil fuels. Electric power trains, either battery or fuel cell, are going to provide the wiring harness industry with exciting high-growth markets in the medium term. In the short term there is going to be a relentless focus weight reduction and efficiency. The use of high- voltage low-current cabling, greater use of optical-fibre and

<sup>4</sup> [Market Research Future, Global Wiring Interconnection \(EWIS\) market research report, Feb 2021.](#)

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potentially the use of new technologies like wireless and printed electronics.

Half of all flights are below 500km, and it is likely that electrical power, will take an increasing share of this market over the next 5-10 years. Almost certainly accelerated by national and regional zero-emission and noise regulations. Vertical take-off electric air-taxis for short city journeys are a new market segment that are likely to see significant growth in a similar timeframe.

Longer-term the continued growth of the airline industry may well hinge on the use of

hybrid power trains and the development of renewable sources of jet fuel.

*The fragility of supply chains has become a key business risk.* As a result, OEMS have diversified their supply chains. This and the increase in labour costs in countries where work is usually outsourced, has meant greater investment in automation and much greater emphasis on the use of CAD/CAE tools in wiring harness design to reduce the need for multiple prototypes and accelerate the product development.

### Q5D Technology Limited

Q5D is a robotics and software company that automates the manufacture of wiring harnesses in the aerospace and other markets.

Q5D uses a combination of additive manufacturing, high-quality laser-sintered printed electronics, and embedded wiring to add electrical function to products such as airline seating or battery electric vehicles.

Using this technology, it is possible to take an existing component, such as a composite panel, an injection moulded part, or a pressed metal sheet of any geometry and add polymer for structure or insulation, wiring for electrical power circuitry and fibre-optics or printed electronics for data and sensors.

Q5D's automation is aimed at replacing the labour part of the manufacturing process. Providing the ability to robotically manufacture a component or product from a CAD design that incorporates both the structure and the electrical wiring.

E: [stephen@q5dtechnology.com](mailto:stephen@q5dtechnology.com)

W: [www.q5dtechnology.com](http://www.q5dtechnology.com)