

DATA-LED RISK MANAGEMENT

Clive Wright reports on the 21st century tool for aircraft operators

Aircraft operators, from the largest scheduled carriers through cargo aircraft, air ambulances to single business jet owners need a modern, effective risk management tool covering security, safety and regulatory issues. A tool that also ensures maximum efficiency and profitability for an operation. This may sound like an impossible dream, but with the application of cutting-edge computing techniques, not only is it realistic, but the potential benefits exceed even the most optimistic of predictions.

The democratisation of information, enabled by hyperconnectivity, artificial intelligence capabilities and the Internet of Things has led to the birth of a new field of risk management that offers potentially huge benefits, both operationally and commercially for the industry. These techniques do not rely on the subjective and relatively slow output from a human analyst, but use a myriad of data sources, managed through machine-learning algorithms that ensure extremely high levels of data cleanliness, producing near-real time, quantified assessments and analytics of the risks that a flight operation may face.

FAR MORE DATA CAN BE GATHERED AND ANALYSED THAN A HUMAN SERVICE COULD EVER ACHIEVE

This is data-led risk management and it provides precisely that capability: substantive, tailored analysis, delivered in an objective, exceptionally fast and near real-time manner. This methodology, delivered through appropriate interfaces can provide the operator, at the simple click of a button, with a bespoke, detailed risk assessment, fully quantified and qualified via substantive supporting data.

Data-led risk management is an exciting, emerging field in both academic study and operational support. Modern computing techniques and capabilities such as AI, advanced web-scraping and data-gathering, new visualisation techniques and standardised cross-platform integration enable huge amounts of data to be collated, structured, analysed and visualised far more quickly than a purely human system could. Concepts such as Predictive Maintenance Analysis – the gathering of large amounts of structured data from hundreds of sensors to detect tiny pre-indicators of failure for large machinery – are the kernel for the development of more proactive risk management capabilities that, as a start, could forecast the probability of incidents and events that have an impact on aviation operations.

Traditionally, risk management has relied on the expertise of analysts and consultants to understand

the environment and make connections between incidents and events based on limited information. This was the only option; there was simply not enough data to quantify these connections. Even if there had been, computers were not powerful enough to deal with the amount of data needed. That has changed. There is so much open-source data available that there is no longer a need to fill the gaps with assumptions. Computers can gather, filter and analyse millions – even billions – of data points a second.

DATA-LED REALITY

This is the fundamental basis behind data-led risk assessment and management; using as much data as possible to develop an analysis of a particular location or environment based on the quantified likelihood and impact. This ensures that the analysis is objective, consistent, accurate and extremely fast, in near real-time. With these capabilities, it is no longer necessary to rely on risk management support provided solely by a human, based on assumptions that have been biased by their own environment and the limitations of the small number of information sources they have the capacity to access in a reasonable time frame. Nor is it necessary to wait a day, two days, or even a week when an operator is conducting 10, 100 or 1,000 flights every single day. And surely it is no longer acceptable for there to be no operationally and financially practicable mechanism to assess every one of these flights. Enabled by data-led risk assessment process, this capability is now a reality for operators.

Data-led risk management has the potential to break down all the barriers that operators face in conducting proper and effective risk management. It should not be a complicated, burdensome, time-consuming, expensive process. The ability to click a button and instantaneously receive a full, quantified and qualified risk assessment, with all the supporting data, bespoke to any flight operation and fed through an operator's existing software tools, is already here.

While the methodology behind the process is complex and comprehensive and the analysis capability behind the assessments among the highest quality across the industry, the burden on an operator is negligible and actually improves efficiency. This means that a systematic, effective risk assessment of every single flight is available to every operator, from the smallest, single-aircraft corporate flight department, through non-scheduled air ambulance or cargo operations, right to the largest, scheduled passenger carriers.

Risk management is often considered distinct from operations. Forward-looking operators see the value of proper risk management, but even then the security department is not integrated with operations as well as it could be. Effective risk management should keep everyone as safe and secure as possible,



Predictive Maintenance Analysis can forecast the probability of incidents that have an impact on aviation operations

while also reflecting a proper understanding of the commercial imperative of operators; be integrated across all risk types – security, safety, regulatory – and should therefore be an operational tool to maximise the safety, efficiency and profitability of an operation.

MAXIMISING PROFITABILITY

Data-led techniques enable this, as they allow integration with software tools such as flight planning solutions to visualise information and support operational decision-making. This should also enable operators to maximise the profitability of their operations while maintaining the highest standards of safety and security. Data-led risk management techniques allow this by being far more accurate about the risks operators face, therefore enabling more efficient yet still effective mitigating measures.

Poor risk analysis is worse than no analysis. Subjective and inconsistent assumptions and conclusions can lead at best to the need for a significant margin of error to be taken into account, adding cost and burden to operators, at worst to the wrong decisions being taken, putting people's lives in danger. Data-led risk management techniques are inherently objective and, using modern computing techniques, far more data can be gathered and analysed than a purely human service could ever achieve, making it more accurate, consistent, faster and comprehensive.

The aviation industry has different requirements and operates in a different environment than any other. Risk management support needs first to understand those requirements and secondly to deliver them through mechanisms that are aligned

with the operational tempo and environment. There is no point in seeking support from a business travel analyst, who would not understand the environment or the requirements. Aviation expertise is essential, and so is the right methodology.

CHANGING THE APPROACH

It is a fact that risk analysis remains a concept more often honoured in the breach, globally. The worldwide aviation community, through the auspices of – and the training and publications provided by – the International Civil Aviation Organisation understands the need for such analysis and heavily promotes its utility and efficiency. ICAO's principal aviation security manual, Annex 17 of the Chicago Convention, is littered with recommendations, advice and requirements to conduct risk analysis. Yet the reality for many government and aviation operators is that no such risk assessment exists.

Data-led risk management has the potential to change that approach, making good risk analysis the rule for ICAO Member States and industry, not the exception applied by a minority. Through radical approaches to information sharing, it is a reality that the information needed to properly understand the likelihood and impact of a manifested threat, and therefore to properly calculate and quantify the risk is possible for all states and operators, no matter their size and resource. This is a major step forward in breaking down those barriers to risk assessment that have historically ensured that proper risk management is the purview of the highly resourced or the obsessively conscientious.

It is important to note that data-led risk management recognises and utilises the strengths of the human aspect of risk management. No matter how much data is gathered, there will always be

regions or themes for which there are gaps. People still out-perform computers in these situations, although recent advances in deep learning may ultimately change that. However, for the foreseeable future a computer needs to be told what to do, where to look, what data to gather and, most importantly, what question needs to be answered. There is also a critical need for quality assurance. As human beings we are generally forgiving of the fallibility of other humans, but we demand 100 percent accuracy, error-free output from machines. Just look at the resistance to autonomous vehicles and the outcry at a single accident, compared with the thousands of human-caused accidents that occur every day. So, even if purely as a comfort blanket

COMPUTERS CAN NOW GATHER, FILTER AND ANALYSE MILLIONS OF DATA POINTS A SECOND

(well-trained machine learning algorithms outperform human analysis in almost every case), having a human ensure data being gathered is accurate, validated and consistent is a vital component of a data-led system.

In an otherwise uncertain modern world, there are at least two irrefutable facts: the global aviation industry will continue to expand and the risks that it faces – from terrorists, conflicts, social strife and other factors – will not diminish any time soon. Terrorist organisations will continue to view commercial aviation as a totemic target. Conflict zones will remain a threat to many operators, including via the simple act of overflying. Having the latest, most accurate and detailed assessment of those and other risks is not just optimal, it's common sense ●

Clive Wright –

Chairman, Advisory Board, Osprey Flight Solutions – is a career diplomat with over 40 years of experience. He has extensive dealings with foreign governments in the Middle East, North America and Europe and was awarded Member of British Empire (MBE) medal in 1993, for services in South African townships.

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