

Program Management – Risk Management



SKILLION
CASE STUDY

Program Management

How to manage 20,000 parts, 2,200 drawings, 1,800 task cards, engineering problems on nine aircraft with a \$250m budget, and turn the first aircraft around in 42 days. Program Risk Management is critical.

Program Management is not simple. It can occasionally be challenging. But there are several things that a PM can do to improve your chances of success. Having a safe flight is something we all care about when we travel by air. Still, when it is your responsibility as the lead project manager on a Qantas Boeing 747 reconfiguration – it takes on a whole new meaning.

Qantas officially started its Boeing 747 reconfiguration project in 2012. Six B747-400 ERs and three of the B747-400 aircraft were affected. Our team upgraded all the passenger seating and many cabin monuments. The new cabin layout required 58 Business (lie-flat Skybeds), 36 Premium Economy, 270 Economy seats, and a new Inflight Entertainment system. Designing a new cabin layout is called a LOPA, or layout of passenger accommodation—all to offer a similar user experience as the award-winning Airbus A380

Qantas Airways is an Australian airline company and one of the world's largest airlines. It is the second oldest airline worldwide, after KLM, and the oldest in Australia. The airline was founded in 1920 as Queensland and Northern Territory Aerial Services Limited (QANTAS), and it began international passenger flights in 1935. The airline has a strong reputation for safety, with no fatal accidents in the jet era. Qantas was mentioned in the 1988 movie *Rain Man* because of the airline's strong safety record. In the film, Dustin Hoffman's character, Raymond Babbit, says he will only fly on Qantas because it "never crashed." This line helped to solidify Qantas' reputation as the safest airline in the world, and to this day, Qantas has "never lost an airframe."

I joined Qantas in 2010 as the lead project manager mid-way through the lead-up to the project, and the pressure was on. The first aircraft VH-OEG (the tail number), was due in the hanger in 18 months, and we had a lot to do. I remember reviewing a Gantt chart with hundreds of tasks and wading into an issue after issue, not to mention coming up to speed on all the Qantas systems, processes, and people – the days were long.

Of key concern to us was the risks that this project had categorized broadly into the following areas Engineering, Certification, Supply, Financial, and Staffing. At one point, I measured over 140 risks identified. How to manage all that risk?

Fortunately, Qantas is an expert at Risk Management, and as a Program Manager, I learned the best practice in this field. They follow a process developed under the Qantas Risk Management Policy for risk and includes identifying risks > ranking risks >



planning mitigations > implementing the plans then monitoring and reviewing. By following this process, threats to Qantas and the projects they undertake are significantly reduced.

One example we encountered in engineering was that the increased seating capacity would apply more load onto the floor structure and seat tracks. Using the Qantas process to rank this risk, we defined it as a medium likelihood of occurrence and a high cost (consequence). This extra weight could introduce a higher rate of metal fatigue in service and lead to costly repairs or even structural floor failure. The resulting ranking was, therefore, medium-high. Any risk ranking that is not low requires a mitigation plan.

The engineering team swung into action to analyze in depth the seat load. In cooperation with our contractor, Heath-Techna, and Boeing, the aircraft manufacturer, we were able to design several structural upgrades. They included upgrading wider and stronger seat tracks and additional floor bracing in key underfloor areas. The risk ranking for this item was subsequently reduced to “very low.”

Risk Matrix

Likelihood	Consequence					
	1. Negligible	2. Insignificant	3. Minor	4. Moderate	5. Major	6. Catastrophic
A. Almost certain	L	M	H	E	E	E
B. Likely	L	M	H	H	E	E
C. Possible	VL	L	M	H	H	E
D. Unlikely	VL	L	L	M	H	H
E. Rare	VL	VL	L	L	M	H
F. Very rare	VL	VL	VL	L	M	M

Risk level	VL	Very low	L	Low	M	Medium	H	High	E	Extreme
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However, this action introduced more costs and another risk – the Certification. Due to the significant number of changes to the aircraft, the FAA, the international aviation regulator, and CASA, the Australian regulator, would have to approve the changes to the plane. They would include a Supplementary Type Certificate (STC). Adding more changes to the application always brings some additional risk that the aircraft will not be approved. However, we ranked this risk as having a “Low” likelihood and having “Low” consequences as we already have a strong team at Qantas, Boeing, and Heath-Techna, including our FAA-approved certifiers reviewing the changes as we progressed.

Working through the 140+ risks was a long process, and I had to involve many engineering, marketing, and operational staff to support the many mitigations we put in place. As a side note, this explains why aviation projects are costly, expensive, and time-consuming. An enormous effort is required to ensure the risks are “low” and people are safe at 35,000’ and 660mph!

We (a Qantas pilot) landed the first aircraft, tail number VH-OEG in Avalon in August 2011, a city near Melbourne, Australia. A team of aerospace engineers, aviation mechanics, and supporting staff swung into action. I remember my first impression when I witnessed a massive aircraft hangar housing the 747 and thousands of parts from inside the aircraft laid out along with all the new parts. I thought to myself,

“how will we ever get this back together again, let alone fly”!

The fleet’s first aircraft to be reconfigured was always the most difficult, as we were trying new things all the way through. We had to include aircraft weighing, certification testing, certification approval, and flight testing. We had planned 45 days or less for the aircraft to be on the ground – emphasizing “or less.” The costs of grounding any airliner can be very high, and a Boeing 747 aircraft can cost around **\$400,000 per day** when it is not in service.



One issue did arise with the business class seats. We knew there was some risk as the seats were new and had to pass flammability testing. This test applies a specified flame to parts of the seat for a set period, and it is necessary to resist burning for that time. Unfortunately, the seat failed the test in multiple areas and started to burn. The pressure was on. The aircraft already had the seats installed. In the worst case, we would have to change the seat design or replace them. Requiring months of reengineering, and the costs to the airline with this aircraft in the hangar and not in service would be astronomical.

How did this risk slip through the cracks of our Qantas process and diligence? Risk Management is both an art and a science. For example, identifying risks has a defined process that is to be followed but has no scientific method. Common sense and experience are required. In this case, the risk was identified, but the ranking was not correctly assigned. Ranking can also be subjective; in this case, the likelihood was defined as “low” as both the seat manufacturer and our team believed the chances of not passing the flammability tests were “very low.” This example unpins the nature of risk. It is about predicting the future, and though the past is a guide, it does not mean it is foolproof.



As it turned out, there was an engineering solution, applying a Kydex coating, a flame-resistant film, to the affected area and retesting. Also, the testing was repeated multiple times, and this had the effect of increasing the average resistance times. Ultimately the seats passed the test. Seats in production were modified to the new requirements, and the seats already installed in the aircraft were swapped with new seats.

This is an example of managing an issue rather than a risk. The risk was misunderstood and became an issue. One of our goals was to reduce the risk to passengers but also that the aircraft could not get back in service quickly. Many of the previous years’ engineering and program management efforts were to reduce risks to a low enough level that any issues that came up would have the complete resources of the engineering and management team without being overloaded with problems.

I remained at Qantas until we completed the first three aircraft in 2012; at this point, all significant risks were managed, and the project engineering team was winding down as it became operational. The program continued into 2013, and all nine aircraft went into service with great success and a highlight of my career as a Program Manager.

Risk Management is a crucial tool for Qantas and is part of how it maintains its high safety reputation. Program Managers should always consider the risks in any program, perhaps not to the degree that Qantas demand, but conducting a risk analysis and enacting mitigations is highly valuable.

(*) The numbers in the Case Study are illustrative only and not intended to be accurate.



Pete Cooper is a CEO Program Manager with 20+ years of diverse experience. He has worked in Aviation, Hi-Tech, Telehealth, Semiconductors, IoT, App development, and more. He has held roles as a design engineer, an executive, and many roles in between, including customer-facing, and is a Start-Up CEO, not to mention the many Program Manager roles.

Pete is a thought leader in applying Program Management methodology as a CEO and has been awarded for his skills in managing complex programs in diverse fields. He holds an Engineering Degree, MBA, an Airline Pilot's Licence, and multiple Program Management Certifications, including FAIPM.

At Skillion, where Pete is the CEO, we pride ourselves on our ability to implement and educate Program Management woven into our customer projects. If you need more than just a technical solution but need it managed end to end, don't hesitate to get in touch with us today to learn more. [**info@skillion.tech**](mailto:info@skillion.tech)



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