MACQUARIE University

Faculty of Science and Engineering

DEPARTMENT OF COMPUTING

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ASSIGNMENT ONE

Strategic Digital Transformation Project Report

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COMP8790: Strategic Project Management

1. Business Context & Transformation Strategy

1.1 Organization Background

Qantas is an Australian airline operating both passenger and freight services domestically and internationally. Qantas Airlines is a part of Qantas Group (Figure 1), which owns and operates numerous other companies such as Jetstar Airlines, QantasLink, Qantas Freight, and Jet connect. It is one of the world's oldest airlines. Qantas operates long-haul international flights and regional routes. Its operations span cargo logistics and related services, making it a complex enterprise that relies on efficient, mission-critical operational and IT systems.

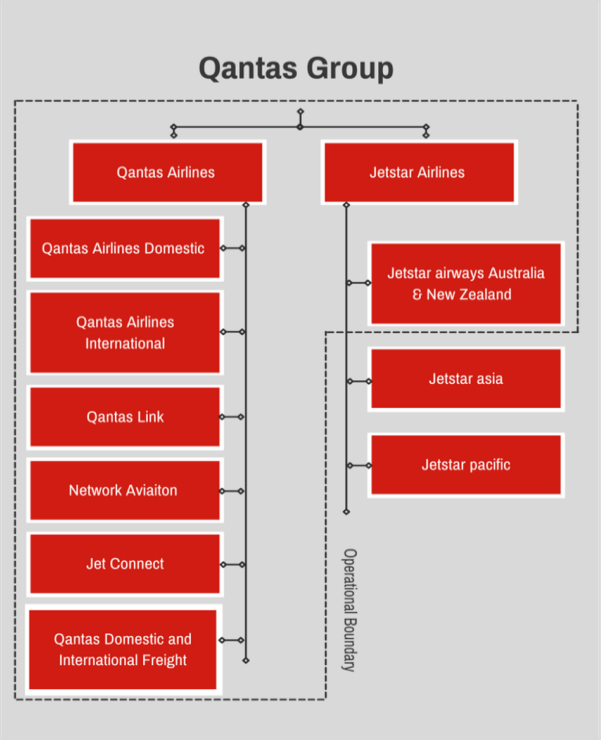

Figure 1: Qantas Group (Moo, Dargusch and Hill, 2022)

1.2 Current Challenges

Qantas faces several inefficiencies and challenges, such as rising fuel prices (Major, 2024) and intense competition from other international airlines (Morningstar, 2024), leading to diminishing profitability. Legacy IT systems and processes contribute to operational gaps, for instance, Qantas's 30-year-old flight planning system called Capricorn could only analyze a single fixed flight path at one time, limiting optimization (Riegler, 2020). Similarly, support processes like internal IT service desk requests and airline contact center enquiries are manual and time-consuming, leading to higher wait times for customers and employees (Graham, 2016). The COVID-19 pandemic amplified these issues, Qantas had to scale back its operations and reduce service center hours from 24/7 to standard business hours. The service center handled 18,000 calls per month, with over half, more than 9,000 calls, simple requests like password resets (kineticit.com.au, n.d.). This high volume, combined with reduced agent capacity, led to longer waiting times and required rapid adaptations to maintain critical IT systems, cut costs, and sustain service quality. These gaps in efficiency pose significant risks to service quality and revenue.

1.3 Strategic Fit

Embracing digital transformation is essential for Qantas to address these challenges and remain competitive in the industry. In the past, Qantas launched numerous group-wide digital transformation programs aimed at redefining operating models and creating a competitive advantage (Digital Travel APAC, 2024). As part of this long-term strategy, Qantas has focused on cutting-edge technologies, such as AI, big data, cloud, and other emerging digital technologies, to boost operational efficiency and enhance customer experience (Crozier, 2024). In this context, digital initiatives such as automating repetitive tasks and leveraging data-driven decision systems align perfectly with Qantas's strategy to cut costs, streamline operations, and improve overall service quality.

1.4 Initiate Overview

In line with Qantas's border digital transformation mindset and strategy, the following two initiatives have been identified as potential strategic projects for growth and efficiency.

1.4.1. 4D Flight Planning System

The 4D Flight planning system (4D FPS) initiative involves the deployment of an advanced AI-powered flight planning system that calculates optimal flight routes using four dimensions, which are, lateral path, altitude, speed, and time along with considering weather conditions. This initiative will be developed in collaboration with research partners and will replace legacy flight planning tools like Capricorn with dynamic, data driven routing systems. Utilizing cloud computing, the system would be able to evaluate millions of data points to assess thousands of potential routes and selects the optimal flight path based on aircraft performance and weather conditions.

1.4.1.1. Expected Impact

The new flight-planning system is predicted to considerably cut fuel consumption, Qantas's largest operating expense, which reached $5.4 billion in the 2023-24 period (Major, 2024), while also lowering CO2 emissions, saving up to $40 million (~1% reduction in fuel burn) annually in operational costs, and enhancing flight efficiency.

1.4.2. Automated Virtual Agent

The second initiative is the Automated Virtual Agent (AVA), which is a cloud-based AI-driven virtual assistant designed to handle internal service requests providing identity verification and simple requests like password resets. Therefore, allowing human agents to focus on more complex tasks such as escalations, process activities, and incident management. AVA is a serverless solution built on Amazon Web Services, integrating securely with Qantas's on-premise

systems and ServiceNow by automating repetitive support tasks. This initiative would enhance staff productivity, reduce the workload on personnel and enhance employee satisfaction.

1.4.2.1. Expected Impact

The Automated Virtual Agent initiative is expected to enhance internal efficiency, accelerate response times for routine service requests, reduce IT support costs, and improve employee satisfaction. Overall, delivering an operational cost savings of up to ~$1 million annually.

2. Feasibility & Strategic Evaluation

The two initiatives are evaluated in depth for their feasibility of implementation and strategic importance. The following sections present a comparative analysis of 4D FPS and AVA initiatives using SWOT analysis, cost-benefit analysis, and risk assessment with mitigation strategies. This comparison will help in deciding to proceed with the project that offers the greatest long-term business value and justifies the investment required to implement it.

2.1. SWOT Analysis

2.1.1. 4D Flight Planning System

The detailed SWOT analysis for the 4D FPS is shown in Table 1 below.

SWOT - 4D Flight Planning System	
Strengths	1. Significant fuel cost savings (~$40M/year) 2. Reduces CO2 emissions (~50 million kg annually) 3. Improves flight efficiency and on-time performance
Weaknesses	1. High initial development and implementation costs 2. Complex integration with operational systems and regulatory constraints 3. Long implementation timeline (~2 years+)

Opportunities	1. Scalability across all fleets and potential licensing to partner airlines 2. Could integrate more real-time variables (e.g. dynamic weather, air traffic)
Threats	1. Algorithm errors or outages could disrupt flight operations or safety 2. Dependency on accurate data and system reliability

Table 1: SWOT Analysis of 4D Flight Planning System

2.1.2. Automated Virtual Agent

The detailed SWOT analysis for AVA is shown in Table 2 below.

SWOT - Automated Virtual Agent	
Strengths	1. Provides 24/7 support for employees. 2. Automates high-volume, low-complexity support tasks. 3. Reduces IT support workload and costs. 4. Increase employee satisfaction.
Weaknesses	1. Limited to simple, predefined tasks (e.g. password resets). 2. Dependency on underlying systems (AWS cloud, ServiceNow integration) 3. Initial training and gaining user acceptance required careful change management.
Opportunities	1. Possibility to extend capabilities to customer-facing contexts (Qantas Contact Center) 2. Potential expansion to address a broader range of queries.
Threats	1. Risk of misunderstanding requests or security verification failures, which could frustrate users. 2. Cybersecurity concerns, especially since the system handles sensitive account authentication tasks.

Table 2: SWOT Analysis of AVA

2.2. Cost-Benefit Analysis

Cost-benefit analysis begins by defining the project scope and estimating required resources. Next, all associated costs and benefits like direct, indirect, intangible, and opportunity, are

evaluated. The analysis includes ROI, NPV, and payback calculations. The CBA of both initiatives is detailed in the following sections.

2.2.1. 4D Flight Planning System

2.2.1.1. Project Scope

The project aims to develop and implement an AI-driven 4D Flight Planning System to optimize routes using real-time data on path, altitude, time, and speed. Scheduled over 2.5 years, it will be developed in partnership with the Australian Centre for Robotics (ACFR), University of Sydney. The scope includes acquiring essential hardware, software, IT infrastructure, and data APIs, addressing integration with legacy systems, regulatory compliance, budget constraints, and phased delivery, and allocating specialists in aviation, AI, IT, and project management.

2.2.1.2. Estimated Costs

Cost Type	Description	Costs
Direct Costs	Development Costs	~$5.45M
Indirect Costs	Annual Operating Costs	~$1.1M
Intangible Costs	Productivity Loss During Initial System Rollout	Not directly quantifiable
	New System Adoption Resistance	Not directly quantifiable
Opportunity Costs	Benefits lost for not choosing AVA	~$1M annually

Table 3: Estimated Costs for 4D Flight Planning System Project

2.2.1.3. Estimated Benefits

Benefit Type		Description	Benefits
Direct Benefits	Fuel Savings	Reduction in fuel usage	~$40M/year
	Emission Savings	Reduced CO2 emissions	50 million kg/year

Indirect Benefits	Operational Efficiency	Improved scheduling, on-time performance
	Improved Reputation	Strengthened brand due to sustainability efforts
Intangible Benefits	Employee Morale	Improved dispatcher productivity, job satisfaction

Table 4: Estimated Benefits for 4D Flight Planning System Project

2.2.1.4. CBA Calculations

Cost Breakdown for 4D Flight Planning System			
Development Costs			
Internal Project Team			
Personnel			
QTY	**Resource Name**	**Rate/hr**	**Total**
2	Program Manager	$150	$ 244,800.00
1	Project Manager	$130	$ 634,400.00
3	Solution Architects	$140	$ 601,066.67
3	Business Analysts	$100	$ 478,933.33
1	Test Manager	$120	$ 134,400.00
2	Testers	$85	$ 88,400.00
2	Software Engineers	$110	$ 246,400.00
2	Training Managers	$90	$ 100,800.00
2	Change Managers	$100	$ 32,000.00
3	Subject Matter Experts	$170	$ 478,720.00
External ACFR Team			
Personnel			
QTY	**Resource Name**	**Rate/hr**	**Total**
4	Aeronautical Research Fellows	$80	$ 200,533.33
3	PhD Candidates	$30	$ 24,000.00
10	Software Engineers - ACFR	$90	$ 373,440.00
2	External UI/UX Designers	$120	$ 32,000.00
New Hardware and Software			

	High-Performance Computing/Server Infrastructure		$ 400,000.00
~20	Development Workstations		$ 50,000.00
	Development & Collaboration Tools		$ 90,000.00
	Specialized Simulation/Analytics & AI/ML Frameworks		$ 80,000.00
	Cloud Services		$ 200,000.00
	Data Warehouse/Storage/Processing		$ 150,000.00
	Data Subscriptions & API Licensing		$ 200,000.00
Others			
	Contingency		$ 500,000.00
	Regulatory Compliance		$ 100,000.00
	TOTAL DEVELOPMENT COSTS		**$ 5,439,893.33**
Projected Annual Operating Costs			
Personnel			
QTY	**Resource Name**	**Rate/hr**	**Total**
1	Systems Analyst	$90	$ 187,200.00
2	IT Support Engineer	$60	$ 250,000.00
Expenses			
1 year	Cloud Services (AWS)		$ 400,000.00
1 year	Data Subscriptions & API Licensing		$ 130,000.00
1 year	Data Warehouse/Storage/Processing		$ 70,000.00
1 year	Monitoring & SLA Tools		$ 50,000.00
	TOTAL PROJECTED ANNUAL COSTS		**$ 1,087,200.00**

Table 5: Cost Breakdown for 4D Flight Planning System Project

Payback Analysis - 4D Flight Planning System						
Year	Costs	Accumulated Costs	Benefits	Accumulated Benefits	Payback Period	
0	$ 5,439,893.33	$ 5,439,893.33	$ -	$ -	-$ 5,439,893.33	
1	$ 1,087,200.00	$ 6,527,093.33	$ 40,000,000.00	$ 40,000,000.00	$ 33,472,906.67	**Break Even Point**
2	$ 1,100,000.00	$ 7,627,093.33	$ 35,000,000.00	$ 75,000,000.00	$ 67,372,906.67	
3	$ 1,100,000.00	$ 8,727,093.33	$ 35,000,000.00	$ 110,000,000.00	$ 101,272,906.67	
4	$ 1,100,000.00	$ 9,827,093.33	$ 35,000,000.00	$ 145,000,000.00	$ 135,172,906.67	
5	$ 1,100,000.00	$ 10,927,093.33	$ 35,000,000.00	$ 180,000,000.00	$ 169,072,906.67	
6	$ 1,100,000.00	**$ 12,027,093.33**	$ 35,000,000.00	**$ 215,000,000.00**	$ 202,972,906.67	

Table 6: Payback analysis for 4D Flight Planning System Project

NPV Calculation - 4D Flight Planning System								
	Year 0	1	2	3	4	5	6	
Benefits		$ 40,000,000.00	$ 35,000,000.00	$ 35,000,000.00	$ 35,000,000.00	$ 35,000,000.00	$ 35,000,000.00	
Factor (10%)	1	0.909090909	0.826446281	0.751314801	0.683013455	0.620921323	0.56447393	
Present Value		$ 36,363,636.36	$ 28,925,619.83	$ 26,296,018.03	$ 23,905,470.94	$ 21,732,246.31	$ 19,756,587.55	$ 156,979,579.03
Dev Costs	$ 5,439,893.33							
Ongoing Costs		$ 1,087,200.00	$ 1,100,000.00	$ 1,100,000.00	$ 1,100,000.00	$ 1,100,000.00	$ 1,100,000.00	
Factor (10%)	1	0.909090909	0.826446281	0.751314801	0.683013455	0.620921323	0.56447393	
Present Value	$ 5,439,893.33	$ 988,363.64	$ 909,090.91	$ 826,446.28	$ 751,314.80	$ 683,013.46	$ 620,921.32	$ 10,219,043.74
Net Present Val	**-$ 5,439,893.33**	**$ 35,375,272.73**	**$ 28,016,528.93**	**$ 25,469,571.75**	**$ 23,154,156.14**	**$ 21,049,232.85**	**$ 19,135,666.23**	**$ 146,760,535.29**
Cumulative NPV	**-$5,439,893.33**	**$29,935,379.40**	**$57,951,908.32**	**$83,421,480.07**	**$106,575,636.21**	**$127,624,869.06**	**$146,760,535.29**	
NPV =	$ 146,760,535.29	= (I9)	Total Benefits - Total Costs					
Payback Period =	-6.67	=G10/(G10-H10)	Payback Period = 5.37 years					
ROI =	1436%	=(I4-I8)/I8	(Total Benefits - Total Costs) / Total Costs					

Table 7: NPV Calculation for 4D Flight Planning System Project

2.2.2. Automated Virtual Assistant

2.2.2.1. Project Scope

This project aims to develop and deploy AVA, a cloud-based, serverless AI virtual assistant on AWS, to manage internal IT support tasks. AVA will handle identity verification and process routine requests, such as password resets. The scope covers procuring AWS services, chatbot platform licenses, and integrating AVA with existing IT systems. It also involves ensuring compliance with Qantas's IT security policies, addressing legacy system integration through middleware, and meeting performance targets. Required personnel include AI/NLP experts, engineers, testers, IT support teams, and training staff for adoption and change management.

2.2.2.2. Estimated Costs

Cost Type	Description	Costs
Direct Costs	Development Costs	~$1.07M
Indirect Costs	Annual Operating Costs	~$145,000.00
Intangible Costs	Employee Resistance	Not directly quantifiable
Opportunity Costs	Benefits lost for not choosing 4D FPS	~$40M annual fuel cost savings

Table 8: Estimated Costs for AVA Project

2.2.2.3. Benefits Categories

Benefit Type		Description	Benefits
Direct Benefits	Labor Cost Savings	Reducing IT support labor costs	~$225,000.00
	Productivity Gains	Reduced waiting times and faster issue resolution	~$120,000.00
	Extended Departmental Savings	AVA deployed across contact centers and customer service channels.	~$750,000.00
Indirect Benefits	Enhanced Availability	24/7 automated employee and customer support	Not directly quantifiable
Intangible Benefits	Employee Satisfaction	Improved employee satisfaction	Not directly quantifiable

Table 9: Estimated Benefits for the AVA Project

2.2.2.4. CBA Calculations

Cost Breakdown - Automated Virtual Agent			
Development Costs			
Internal Project Team			
Personnel			
QTY	**Resource Name**	**Rate/hr**	**Total**
1	Project Manager	$130	$250,986.67
2	Systems Analysts	$90	$120,240.00
3	Programmer/Analysts	$110	$365,200.00
1	NLP Specialist	$110	$70,400.00

1	Integration Engineer	$90	$60,000.00
1	UI/UX Designer	$80	$12,800.00
1	QA Manager	$120	$96,000.00
2	Quality Analysts	$85	$54,400.00
Expense			
QTY	**Resource Name**	**Rate/hr**	**Total**
3	Training Costs	$2,500	$ 7,500.00
New Hardware and Software			
1	Cloud Development Environment Setup		$5,000.00
1	Chatbot Platform License		$15,000.00
1	Cloud Hosting & Setup (AWS/ServiceNow Integration)		$20,000.00
	TOTAL DEVELOPMENT COSTS		**$1,077,526.67**
Projected Annual Operating Costs			
Personnel			
QTY	**Resource Name**	**Rate/hr**	**Total**
2	Application Support Engineers (Part time)	$80	$125,000
Expenses			
	Chatbot Platform Maintenance		$ 7,000.00
	Cloud Hosting & Monitoring		$ 10,000.00
	TOTAL PROJECTED ANNUAL COSTS		**$ 142,000.00**

Table 10: Cost Breakdown for AVA Project

Payback Analysis - Automated Virtual Agent						
Year	Costs	Accumulated Costs	Benefits	Accumulated Benefits	Payback Period	
0	$ 1,077,526.00	$ 1,077,526.00	$ -	$ -	-$ 1,077,526.00	
1	$ 142,000.00	$ 1,219,526.00	$ 1,095,000.00	$ 1,095,000.00	-$ 124,526.00	
2	$ 145,000.00	$ 1,364,526.00	$ 1,095,000.00	$ 2,190,000.00	$ 825,474.00	**Break Even Point**
3	$ 145,000.00	$ 1,509,526.00	$ 1,095,000.00	$ 3,285,000.00	$ 1,775,474.00	
4	$ 145,000.00	$ 1,654,526.00	$ 1,095,000.00	$ 4,380,000.00	$ 2,725,474.00	
5	$ 145,000.00	$ 1,799,526.00	$ 1,095,000.00	$ 5,475,000.00	$ 3,675,474.00	
6	$ 145,000.00	**$ 1,944,526.00**	$ 1,095,000.00	**$ 6,570,000.00**	$ 4,625,474.00	

Table 11: Payback analysis for AVA Project

NPV Calculation - Automated Virtual Agent								
	Year 0	1	2	3	4	5	6	
Benefits		$ 1,095,000.00	$ 1,095,000.00	$ 1,095,000.00	$ 1,095,000.00	$ 1,095,000.00	$ 1,095,000.00	
Factor (8%)	1	0.925925926	0.85733882	0.793832241	0.735029853	0.680583197	0.630169627	
Present Value		$ 1,013,888.89	$ 938,786.01	$ 869,246.30	$ 804,857.69	$ 745,238.60	$ 690,035.74	$ 5,062,053.23
Dev Costs	$ 1,077,526.00							
Ongoing Costs		$ 142,000.00	$ 145,000.00	$ 145,000.00	$ 145,000.00	$ 145,000.00	$ 145,000.00	
Factor (8%)	1	0.925925926	0.85733882	0.793832241	0.735029853	0.680583197	0.630169627	
Present Value	$ 1,077,526.00	$ 131,481.48	$ 124,314.13	$ 115,105.67	$ 106,579.33	$ 98,684.56	$ 91,374.60	$ 1,745,065.77
Net Present Value	**-$ 1,077,526.00**	**$ 882,407.41**	**$ 814,471.88**	**$ 754,140.63**	**$ 698,278.36**	**$ 646,554.04**	**$ 598,661.15**	**$ 3,316,987.46**
Cumulative NPV	**-$1,077,526.00**	**-$195,118.59**	**$619,353.29**	**$1,373,493.92**	**$2,071,772.28**	**$2,718,326.31**	**$3,316,987.46**	
NPV =	$ 3,316,987.46	= (I9)	Total Benefits - Total Costs					
Payback Period =	-4.54	=G10/(G10-H10)	Payback Period = 5.37 years					
ROI =	190%	=(I4-I8)/I8	(Total Benefits - Total Costs) / Total Costs					

Table 12: NPV Calculation for AVA Project

2.3. Risk Assessment & Mitigation

This section presents a comprehensive risk assessment of both initiatives. The risks are identified and assessed based on their severity, likelihood of occurrence, and controllability. Using PMBOK principles, risks have been categorized into five clusters: Financial, Technical, Commercial, Execution, and Contractual/Legal. For each risk, tailored mitigation strategies are proposed to reduce impact and ensure project success.

2.3.1. Risk Identification

Tables 13 and 14 below present the identified risks for the 4D FPS and AVA projects, respectively.

Risk Id	Risk Category	Risk	Risk Description
F1P1	Financial	High Initial Investment & Budget Overruns	High initial investment may lead to budget overruns
T1P1	Technical	Algorithm Complexity & Data Processing	Algorithm complexity might result in suboptimal flight paths
T2P1	Technical	System Reliability & Integration Challenges	Integration challenges with legacy systems could disrupt operations
C1P1	Commercial	Partner Collaboration	Delays with research and technology partners could affect project milestones
E1P1	Execution	Change Management	Ineffective change management may disrupt operations during the transition
E2P1	Execution	Project Delays	Project delays due to the complex development and testing phases
L1P1	Contractual/Legal	Aviation Regulatory Compliance	Non-compliance with aviation regulations could lead to legal issues
L2P1	Contractual/Legal	Technology Partner Disputes	Contractual disputes with technology partners might impact project progress

Table 13: Risks for 4D Flight planning system project

Risk Id	Risk Category	Risk	Risk Description
F1P2	Financial	Investment & ROI Uncertainty	If anticipated cost savings and efficiency gains are not fully realized, ROI becomes uncertain.
T1P2	Technical	Integration Complexities	Integrating with Qantas's on-premise systems and ServiceNow may lead to compatibility issues.

T2P2	Technical	Algorithm Accuracy & Security	Deploying AI for identity verification might result in poor accuracy and expose cybersecurity vulnerabilities.
C1P2	Commercial	User Adoption & Service Quality	If the chatbot interface is unintuitive, employee adoption may be low.
E1P2	Execution	Change Management & Training	Resistance to the new system could hinder operational efficiency and cost benefits.
L1P2	Contractual/Legal	Data Privacy & Compliance	Mishandling sensitive internal service data may lead to compliance issues or legal liabilities.

Table 14: Risk for 4D Automated Virtual Agent project

2.3.2. Risk Analysis

Project risks have been evaluated across three dimensions: severity (impact), likelihood (probability of occurrence), and controllability. Tables 15 and 16 present the qualitative values assigned to each dimension, aligned with the corresponding Risk Ids for both initiatives.

Risk Id	Severity	Likelihood	Controllability
F1P1	High	Medium	Medium
T1P1	High	Medium	Medium
T2P1	High	Medium	Medium
C1P1	Medium	Medium	Medium
E1P1	Medium	Medium	High
E2P1	High	Medium	Medium
L1P1	High	Low	High
L2P1	Medium	Medium	Medium

Table 15: Risk Assessment for 4D FPS project

Risk Id	Severity	Likelihood	Controllability
F1P2	High	Medium	Medium
T1P2	High	Medium	Medium
T2P2	High	Medium	Medium
C1P2	Medium	Medium	High
E1P2	Medium	Medium	High
L1P2	High	Low	High

Table 16: Risk Assessment for AVA project

2.3.2.1. Risk Scoring

The risk score for each risk is calculated by multiplying its severity by its likelihood, based on the custom risk impact matrix shown in Table 17. For clarity and ease of interpretation, the resulting scores are classified into four categories; low, medium, high, and extreme; corresponding to values from 1 to 4.

		Severity			
		Low	**Medium**	**High**	**Extreme**
Likelihood	**Low**	1	2	3	4
	Medium	2	4	6	8
	High	3	6	9	12
	Extreme	4	8	12	16

Key:

	1 to 3	Low
	4 to 6	Medium
	8 to 9	High
	12 to 16	Extreme

Table 17: Risk Impact Rating table

The final risk assessment for the 4D FPS project, including calculated risk scores and assigned priority levels, is presented in Table 18 below.

Risk Id	Severity	Likelihood	Controllability	Risk Score	Priority
F1P1	High	Medium	Medium	6	Medium
T1P1	High	Medium	Medium	6	Medium
T2P1	High	Medium	Medium	6	Medium
C1P1	Medium	Medium	Medium	4	Medium
E1P1	Medium	Medium	High	4	Medium
E2P1	High	Medium	Medium	6	Medium
L1P1	High	Low	High	3	Low
L2P1	Medium	Medium	Medium	6	Medium

Table 18: Risk Assessment for 4D FDS project

Table 19 below shows the risk assessment for AVA project.

Risk Id	Severity	Likelihood	Controllability	Risk Score	Priority
F1P2	High	Medium	Medium	6	Medium
T1P2	High	Medium	Medium	6	Medium
T2P2	High	Medium	Medium	6	Medium
C1P2	Medium	Medium	High	4	Medium
E1P2	Medium	Medium	High	4	Medium
L1P2	High	Low	High	3	Low

Table 19: Risk Assessment for AVA project

2.3.3. Risk Mitigation

Tables 20 & 21 below detail the risk mitigation methods for both initiatives risks identified.

Risk Id	Mitigation Strategy	Mitigation Type
F1P1	Establish a detailed budget, allocate contingency reserves	Contingency Reserves
T1P1	Agile development, POC, pilot testing	Minimize Risk
T2P1	Phased integration, rigorous testing, fallback procedures	Minimize Risk
C1P1	Partner communication protocols, clear contracts, regular meetings	Share Risk
E1P1	Change management plan with training and stakeholder engagement	Change management
E2P1	Track milestones, allocate resources, adjust timeline as needed	Task contingency
L1P1	Engage regulatory experts, compliance audits, legal reviews	Control and Documentation
L2P1	Define contracts, dispute resolution, active vendor management	Transfer Risk

Table 20: Risk Mitigation Strategies for 4D FPS

Risk Id	Mitigation Strategy	Mitigation Type
F1P2	Conduct detailed ROI analysis, establish financial contingencies, and monitor budget regularly.	Contingency Reserves, Managerial Contingency
T1P2	Implement a phased integration plan with rigorous testing and fallback procedures.	Minimize Risk
T2P2	Use iterative development with extensive testing, pilot trials, and regular security audits.	Minimize Risk, Control and Documentation
C1P2	Engage end users early, incorporate feedback through pilot testing, and refine the interface accordingly.	Change Management

E1P2	Develop and implement a comprehensive training and change management program to facilitate the transition.	Change Management
L1P2	Conduct regular compliance audits, engage legal experts, and implement robust data security measures.	Control and Documentation

Table 21: Risk Mitigation Strategies table for AVA

2.4. Work Breakdown Structure

Figure 2 & Figure 3 below are the WBS for both the initiatives. The WBS consists of different phases with tasks and sub-tasks within each phase.

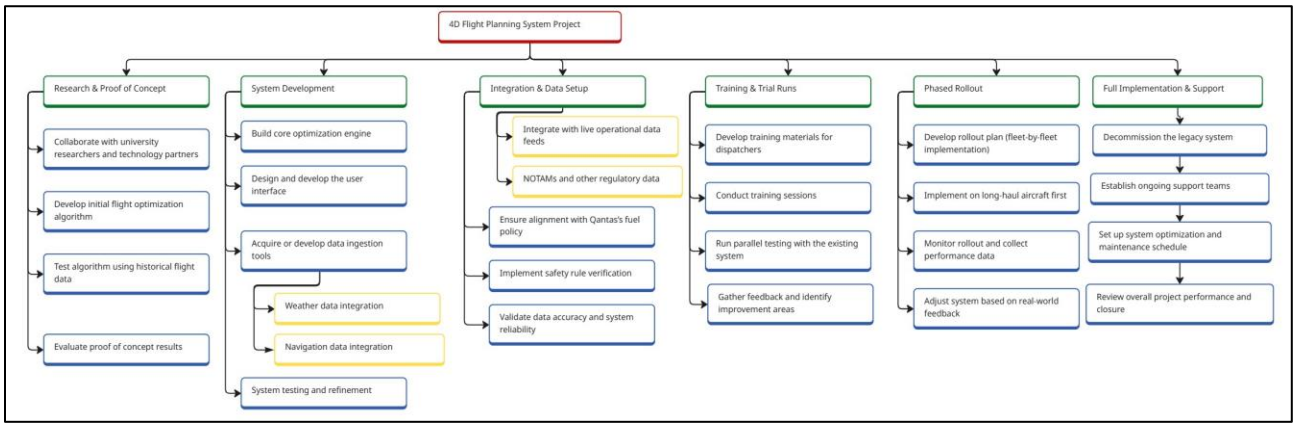

Figure 2: WBS for 4D Flight Planning System

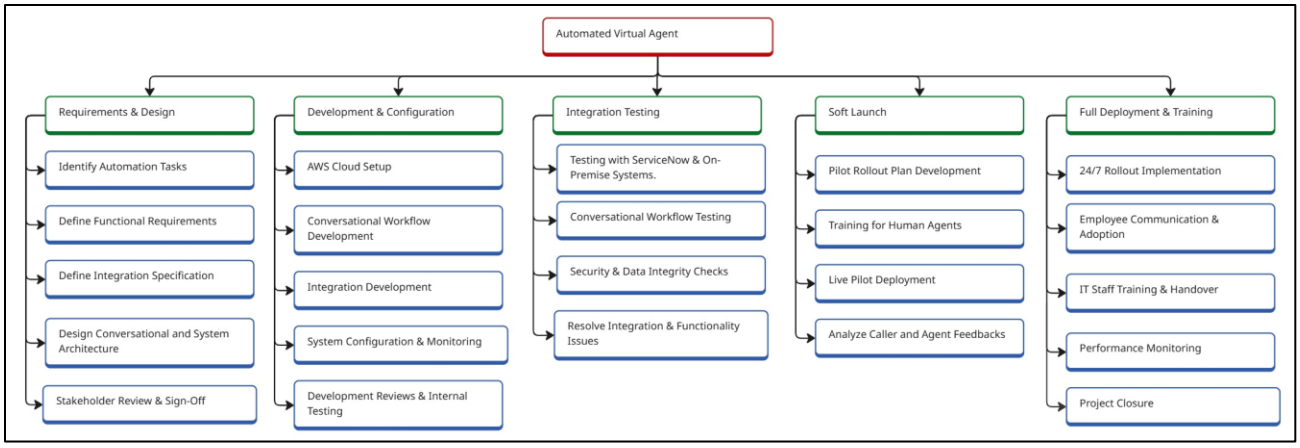

Figure 3: WBS for Automated Virtual Agent

2.5. Risk Register

Table 22 & 23 below details the risk register for both initiatives.

Risk Category	Risk	Risk Description	Severity	Likelihood	Controllability	Risk Score	Priority	Mitigation Strategy	Mitigation Type	Risk Owner	Status
Financial	High Initial Investment & Budget Overruns	High initial investment may lead to budget overruns	High	Medium	Medium	6	Medium	Establish a detailed budget, allocate contingency reserves	Contingency Reserves	Project Manager/Program Manager	Open
Technical	Algorithm Complexity & Data Processing	Algorithm complexity might result in suboptimal flight paths	High	Medium	Medium	6	Medium	Agile development, POC, pilot testing	Minimize Risk	Project Manager/Solution Architect	Open
Technical	System Reliability & Integration Challenges	Integration challenges with legacy systems could disrupt operations	High	Medium	Medium	6	Medium	Phased integration, rigorous testing, fallback procedures	Minimize Risk	Project Manager	Open
Commercial	Partner Collaboration	Delays with research and technology partners could affect project milestones	Medium	Medium	Medium	4	Medium	Partner communication protocols, clear contracts, regular meetings	Share Risk	Project Manager/Program Manager	Open
Execution	Change Management	Ineffective change management may disrupt operations during the transition	Medium	Medium	High	4	Medium	Change management plan with training and stakeholder engagement	Change management	Program Manager/Training Team	Open
Execution	Project Delays	Project delays due to the complex development and testing phases	High	Medium	Medium	6	Medium	Track milestones, allocate resources, adjust timeline as needed	Task contingency	Project Manager	Open
Contractual/Legal	Aviation Regulatory Compliance	Non-compliance with aviation regulations could lead to legal issues	High	Low	High	3	Low	Engage regulatory experts, compliance audits, legal reviews	Control and Documentation	Legal Team	Open
Contractual/Legal	Technology Partner Disputes	Contractual disputes with technology partners might impact project progress	Medium	Medium	Medium	6	Medium	Define contracts, dispute resolution, active vendor management	Transfer Risk	Program Manager	Open

Table 22: Risk Register for 4D FPS

Risk Id	Risk Category	Risk	Risk Description	Severity	Likelihood	Controllability	Risk Score	Priority	Mitigation Strategy	Mitigation Type	Risk Owner	Status
F1P2	Financial	Investment & ROI Uncertainty	If anticipated cost savings and efficiency gains are not fully realized, ROI becomes uncertain.	High	Medium	Medium	6	Medium	Conduct detailed ROI analysis, establish financial contingencies, and monitor budget regularly.	Contingency Reserves, Managerial Contingency	Project Manager	Open
T1P2	Technical	Integration Complexities	Integrating with Qantas's on-premise systems and ServiceNow may lead to compatibility issues.	High	Medium	Medium	6	Medium	Implement a phased integration plan with rigorous testing and fallback procedures.	Minimize Risk	Project Manager/Integration Engineer	Open
T2P2	Technical	Algorithm Accuracy & Security	Deploying AI for identity verification might result in poor accuracy and expose cybersecurity vulnerabilities.	High	Medium	Medium	6	Medium	Use iterative development with extensive testing, pilot trials, and regular security audits.	Minimize Risk, Control and Documentation	NLP Specialists	Open
C1P2	Commercial	User Adoption & Service Quality	If the chatbot interface is unintuitive, employee adoption may be low.	Medium	Medium	High	4	Medium	Engage end users early, incorporate feedback through pilot testing, and refine the interface accordingly.	Change Management	Project Manager/UI-UX Designer	Open
E1P2	Execution	Change Management & Training	Resistance to new technology could hinder operational efficiency and cost benefits.	Medium	Medium	High	4	Medium	Develop and implement a comprehensive training and change management program to facilitate the transition.	Change Management	Project Manager/Training Team	Open
L1P2	Contractual/ Legal	Data Privacy & Compliance	Mishandling sensitive internal service data may lead to compliance issues or legal liabilities.	High	Low	High	3	Low	Conduct regular compliance audits, engage legal experts, and implement robust data security measures.	Control and Documentation	Legal Team	Open

Table 23: Risk Register for AVA

2.6 Estimated Costs & Implementation Timeline

2.6.1. 4D Flight Planning System

2.6.1.1. Project Timeline

Estimated Total Duration: 24 months			
Phase	**Start Month**	**End Month**	**Duration**
1. Research & Proof of Concept	1	6	6 months
2. System Development	7	14	8 months
3. Integration & Data Setup	15	18	4 months
4. Training & Trial Runs	19	21	3 months
5. Phased Rollout	22	23	2 months
6. Full Implementation & Support	24	24	1 month

Table 24: Project Timeline for 4D FPS

2.6.1.2. Gantt Chart

ID	Task Name	Duration	Start	Finish	Predecessors	Cost	Resource Names
1	**4D Flight Planning System Project**	**610 days**	**Mon 3/10/25**	**Tue 7/6/27**		**$5,439,893.33**	**Project Manager,High-Performance Computing/Server Infrastructu**
2	**Research & Proof of Concept**	**120 days**	**Mon 3/10/25**	**Tue 8/19/25**		**$404,133.33**	
3	Collaborate with university researchers	4 mons	Mon 3/10/25	Tue 6/24/25		$152,533.33	Program Manager[200%],Subject Matter Experts[300%],Aeronautical Resear
4	Develop initial flight optimization algorithm	4 mons	Mon 3/10/25	Tue 6/24/25		$134,400.00	Subject Matter Experts,Aeronautical Research Fellows[300%]
5	Test algorithm using historical flight data	1 mon	Wed 6/25/25	Tue 7/22/25	3,4	$38,800.00	Test Manager,Testers[200%],Aeronautical Research Fellows
6	Evaluate proof of concept results	1 mon	Wed 7/23/25	Tue 8/19/25	5	$78,400.00	Program Manager[200%],PhD Candidates[300%],Aeronautical Research Fell
7	**Milestone - Prototype algorithm validated**	**0 days**	**Tue 8/19/25**	**Tue 8/19/25**	**6**	**$0.00**	
8	**System Development**	**220 days**	**Wed 8/20/25**	**Tue 6/23/26**		**$755,200.00**	
9	Build core optimization engine	4 mons	Wed 8/20/25	Tue 12/9/25	7	$179,200.00	Software Engineers,Software Engineers - ACFR,Aeronautical Research Fellow
10	Design and develop the user interface	5 mons	Wed 8/20/25	Tue 1/6/26	7	$88,000.00	Software Engineers[33%],Business Analysts[33%],External UI/UX Designers[
11	**Acquire or develop data ingestion tools**	**80 days**	**Wed 1/7/26**	**Tue 4/28/26**		**$422,400.00**	
12	Weather data integration	4 mons	Wed 1/7/26	Tue 4/28/26	10,9	$211,200.00	Business Analysts,Software Engineers - ACFR,Solution Architects
13	Navigation data integration	4 mons	Wed 1/7/26	Tue 4/28/26	10,9	$211,200.00	Business Analysts,Software Engineers - ACFR,Solution Architects
14	System testing and refinement	2 mons	Wed 4/29/26	Tue 6/23/26	12,13	$65,600.00	Test Manager,Testers[200%]
15	**Milestone - Internal release generating test flig**	**0 days**	**Tue 6/23/26**	**Tue 6/23/26**	**14**	**$0.00**	
16	**Integration & Data Setup**	**80 days**	**Wed 6/24/26**	**Tue 10/13/26**		**$403,733.33**	
17	**Integrate with live operational data feeds**	**40 days**	**Wed 6/24/26**	**Tue 8/18/26**		**$181,333.33**	
18	Aircraft performance databases	2 mons	Wed 6/24/26	Tue 8/18/26	15	$72,533.33	Software Engineers[67%],Solution Architects[67%],Software Engineers - ACF
19	NOTAMs and other regulatory data	2 mons	Wed 6/24/26	Tue 8/18/26	15	$108,800.00	Software Engineers,Solution Architects,Software Engineers - ACFR
20	Ensure alignment with Qantas's fuel policy	2 mons	Wed 6/24/26	Tue 8/18/26	15	$86,400.00	Business Analysts,Subject Matter Experts
21	Implement safety rule verification	1 mon	Wed 8/19/26	Tue 9/15/26	20	$76,000.00	Business Analysts,Subject Matter Experts,Test Manager,Testers
22	Validate data accuracy and system reliability	1 mon	Wed 9/16/26	Tue 10/13/26	21	$60,000.00	Business Analysts,Solution Architects[50%],Test Manager,Testers
23	**Milestone - Regulatory approval and safety sign-off achieved**	**0 days**	**Tue 10/13/26**	**Tue 10/13/26**	**22**	**$0.00**	
24	**Training & Trial Runs**	**60 days**	**Wed 10/14/2**	**Tue 1/5/27**		**$286,826.67**	
25	Develop training materials for dispatchers	1 mon	Wed 10/14/26	Tue 11/10/26	23	$57,600.00	Business Analysts,Subject Matter Experts,Training Managers
26	Conduct training sessions	2 mons	Wed 11/11/26	Tue 1/5/27	25	$57,600.00	Training Managers[200%]
27	Run parallel testing with the existing system	2 mons	Wed 11/11/26	Tue 1/5/27	25	$108,266.67	Business Analysts[300%],Test Manager,Testers[200%]
28	Gather feedback and identify improvement areas	1 mon	Wed 11/11/26	Tue 12/8/26	25	$63,360.00	Business Analysts[180%],Program Manager[120%],Software Engineers - ACF
29	**Milestone - Training completed, and trial feedback validated**	**0 days**	**Tue 1/5/27**	**Tue 1/5/27**	**28,26,27**	**$0.00**	
30	**Phased Rollout**	**100 days**	**Wed 1/6/27**	**Tue 5/25/27**		**$985,600.00**	
31	Develop rollout plan (fleet-by-fleet implementation)	1 mon	Wed 1/6/27	Tue 2/2/27	29	$129,600.00	Program Manager[200%],Subject Matter Experts[300%]
32	Implement on long-haul aircraft first	2 mons	Wed 2/3/27	Tue 3/30/27	31	$572,800.00	Business Analysts[300%],Software Engineers,Software Engineers - ACFR[500
33	Monitor rollout and collect performance data	1 mon	Wed 3/31/27	Tue 4/27/27	32	$141,600.00	Business Analysts[300%],Software Engineers[150%],Solution Architects[300
34	Adjust system based on real-world feedback	1 mon	Wed 4/28/27	Tue 5/25/27	33	$141,600.00	Business Analysts[300%],Software Engineers[150%],Solution Architects[300
35	**Milestone: System operational (live)**	**0 days**	**Tue 5/25/27**	**Tue 5/25/27**	**34**	**$0.00**	
36	**Full Implementation & Support**	**30 days**	**Tue 5/25/27**	**Tue 7/6/27**		**$200,000.00**	
37	Retire the legacy system	1 mon	Tue 5/25/27	Tue 6/22/27	35	$124,800.00	Change Managers[200%],Program Manager[200%],Project Manager[0%],So
38	Establish ongoing support teams	1 mon	Tue 5/25/27	Tue 6/22/27	35	$28,800.00	Project Manager,Training Managers[200%]
39	Set up system optimization and maintenance sched	0.33 mons	Wed 5/26/27	Thu 6/3/27	35	$22,400.00	Solution Architects[300%]
40	Review overall project performance and close out	0.5 mons	Wed 6/23/27	Tue 7/6/27	35	$24,000.00	Program Manager[200%]
41	**Milestone - Fully adopted live system with support in place**	**0 days**	**Tue 7/6/27**	**Tue 7/6/27**	**37,38,39,40**	**$0.00**	

Figure 4: Gantt Chart for 4D FPS

2.6.1.3. Estimated Costs – Per Tasks

ID	Task Name	Fixed Cost Accrual	Total Cost
1	**4D Flight Planning System Project**	**Prorated**	**$5,439,893.33**
2	**Research & Proof of Concept**	**Prorated**	**$404,133.33**
3	Collaborate with university researchers	Prorated	$152,533.33
4	Develop initial flight optimization algorithm	Prorated	$134,400.00
5	Test algorithm using historical flight data	Prorated	$38,800.00
6	Evaluate proof of concept results	Prorated	$78,400.00
7	**Milestone - Prototype algorithm validated**	**Prorated**	**$0.00**
8	**System Development**	**Prorated**	**$755,200.00**
9	Build core optimization engine	Prorated	$179,200.00
10	Design and develop the user interface	Prorated	$88,000.00
11	**Acquire or develop data ingestion tools**	**Prorated**	**$422,400.00**
12	Weather data integration	Prorated	$211,200.00
13	Navigation data integration	Prorated	$211,200.00
14	System testing and refinement	Prorated	$65,600.00
15	**Milestone - Internal release generating test flight pla**	**Prorated**	**$0.00**
16	**Integration & Data Setup**	**Prorated**	**$403,733.33**
17	**Integrate with live operational data feeds**	**Prorated**	**$181,333.33**
18	Aircraft performance databases	Prorated	$72,533.33
19	NOTAMs and other regulatory data	Prorated	$108,800.00
20	Ensure alignment with Qantas's fuel policy	Prorated	$86,400.00
21	Implement safety rule verification	Prorated	$76,000.00
22	Validate data accuracy and system reliability	Prorated	$60,000.00
23	**Milestone - Regulatory approval and safety sign-off achieved**	**Prorated**	**$0.00**
24	**Training & Trial Runs**	**Prorated**	**$286,826.67**
25	Develop training materials for dispatchers	Prorated	$57,600.00
26	Conduct training sessions	Prorated	$57,600.00
27	Run parallel testing with the existing system	Prorated	$108,266.67
28	Gather feedback and identify improvement areas	Prorated	$63,360.00
29	**Milestone - Training completed, and trial feedback validated**	**Prorated**	**$0.00**
30	**Phased Rollout**	**Prorated**	**$985,600.00**
31	Develop rollout plan (fleet-by-fleet implementation)	Prorated	$129,600.00
32	Implement on long-haul aircraft first	Prorated	$572,800.00
33	Monitor rollout and collect performance data	Prorated	$141,600.00
34	Adjust system based on real-world feedback	Prorated	$141,600.00
35	**Milestone: System operational (live)**	**Prorated**	**$0.00**
36	**Full Implementation & Support**	**Prorated**	**$200,000.00**
37	Retire the legacy system	Prorated	$124,800.00
38	Establish ongoing support teams	Prorated	$28,800.00
39	Set up system optimization and maintenance schedule	Prorated	$22,400.00
40	Review overall project performance and close out	Prorated	$24,000.00
41	**Milestone - Fully adopted live system with support in place**	**Prorated**	**$0.00**

Figure 5: Costs for 4D FPS – Per Tasks

2.6.1.4. Estimated Costs – Per Resource

ID	Resource Name	Max Units	Type	Cost
1	Program Manager	200%	Work	$244,800.00
2	Project Manager	100%	Work	$634,400.00
3	Solution Architects	300%	Work	$601,066.67
4	Business Analysts	300%	Work	$478,933.33
5	Test Manager	100%	Work	$134,400.00
6	Testers	200%	Work	$88,400.00
7	Software Engineers	200%	Work	$246,400.00
8	Training Managers	200%	Work	$100,800.00
9	Change Managers	200%	Work	$32,000.00
10	Subject Matter Experts	300%	Work	$478,720.00
11	Aeronautical Research Fellows	400%	Work	$200,533.33
12	PhD Candidates	300%	Work	$24,000.00
13	Software Engineers - ACFR	1,000%	Work	$373,440.00
14	External UI/UX Designers	200%	Work	$32,000.00
15				
16	High-Performance Computing/Server Infrastructure		Cost	$400,000.00
17	Development Workstations		Cost	$50,000.00
18	Development & Collaboration Tools		Cost	$90,000.00
19	Specialized Simulation/Analytics & AI/ML Frameworks		Cost	$80,000.00
20	Cloud Services		Cost	$200,000.00
21	Data Warehouse/Storage/Processing		Cost	$150,000.00
22	Data Subscriptions & API Licensing		Cost	$200,000.00
23	Contingency		Cost	$500,000.00
24	Regulatory Compliance		Cost	$100,000.00

Figure 6: Costs for 4D FPS – Per Resource

2.6.2. Automated Virtual Agent

2.6.2.1 Project Timeline

Estimated Total Duration: 12 months			
Phase	**Start Month**	**End Month**	**Duration**
1. Requirements & Design	Month 1	Month 2	2 months
2. Development & Configuration	Month 3	Month 6	4 months
3. Integration Testing	Month 7	Month 8	2 months
4. Soft Launch	Month 9	Month 10	2 months
5. Full Deployment & Training	Month 11	Month 12	2 months

Table 25: Project Timeline for AVA

2.6.2.2. Gantt Chart

ID	Task Name	Duration	Start	Finish	Predecess	Cost	Resource Names
1	**Automated Virtual Agent (AVA) Project**	241.33 days	Mon 5/5/25	Tue 4/7/26		$1,077,526.67	Project Manager,Chatbot Platform License [$15,000.00],Cloud Developn
2	**Requirements & Design**	**32.5 days**	**Mon 5/5/25**	**Wed 6/18/25**		**$58,400.00**	
3	Identify Automation Tasks	0.5 mons	Mon 5/5/25	Fri 5/16/25		$14,400.00	Systems Analysts[200%]
4	Define Functional Requirements	0.25 mons	Mon 5/19/25	Fri 5/23/25	3	$7,200.00	Systems Analysts[200%]
5	Define Integration Specification	0.25 mons	Mon 5/26/25	Fri 5/30/25	4	$10,800.00	Integration Engineer,Systems Analysts[200%]
6	Design Conversational and Systems Architecture	0.5 mons	Mon 6/2/25	Fri 6/13/25	5	$22,400.00	Integration Engineer,NLP Specialist,UI/UX Designer
7	Stakeholder Review & Sign-off	0.13 mons	Mon 6/16/25	Wed 6/18/25	6	$3,600.00	Systems Analysts[200%]
8	**Milestone - Requirements & Design Completed**	**0 days**	**Wed 6/18/25**	**Wed 6/18/25**	**7**	**$0.00**	
9	**Development & Configuration**	**83.83 days**	**Wed 6/18/25**	**Tue 10/14/25**		**$275,840.00**	
10	AWS Cloud Setup	0.31 mons	Wed 6/18/25	Mon 8/18/25	8	$11,200.00	Programmer/Analysts[300%],Integration Engineer
11	Conversational Workflow Development	2 mons	Wed 6/18/25	Wed 8/13/25	8	$140,800.00	Programmer/Analysts[300%],NLP Specialist
12	Integration Development	1 mon	Mon 8/18/25	Mon 9/15/25	10	$50,400.00	Programmer/Analysts[225%],Integration Engineer[75%]
13	System Monitoring & Configuration	1 mon	Mon 9/15/25	Mon 10/13/25	11,12	$72,000.00	Programmer/Analysts[300%],QA Manager
14	Development Reviews & Internal Testing	1 day	Mon 10/13/25	Tue 10/14/25	13	$1,440.00	Systems Analysts[200%]
15	**Milestone - System Development Completed**	**0 days**	**Tue 10/14/25**	**Tue 10/14/25**	**14**	**$0.00**	
16	**Integration Testing**	**40 days**	**Tue 10/14/25**	**Tue 12/9/25**		**$144,000.00**	
17	Testing with ServiceNow & On-Premise Systems	0.5 mons	Tue 10/14/25	Tue 10/28/25	15	$32,000.00	QA Manager,Quality Analysts[200%],Programmer/Analysts
18	Conversational Workflow Testing	0.5 mons	Tue 10/28/25	Tue 11/11/25	17	$32,000.00	QA Manager,Quality Analysts[200%],NLP Specialist
19	Security & Data Integrity Checks	0.5 mons	Tue 11/11/25	Tue 11/25/25	18	$30,400.00	QA Manager,Quality Analysts[200%],Integration Engineer
20	Resolve Integration & Functionality Issue	0.5 mons	Tue 11/25/25	Tue 12/9/25	19	$49,600.00	Programmer/Analysts[300%],QA Manager,Quality Analysts[200%]
21	**Milestone - End to End Testing Completed**	**0 days**	**Tue 12/9/25**	**Tue 12/9/25**	**20**	**$0.00**	
22	**Soft Launch**	**40 days**	**Tue 12/9/25**	**Tue 2/3/26**		**$147,200.00**	
23	Pilot Rollout Plan Development	0.5 mons	Tue 12/9/25	Tue 12/23/25	21	$14,400.00	Systems Analysts[200%]
24	Training for Human Agents	0.5 mons	Tue 12/23/25	Tue 1/6/26	23	$24,000.00	Systems Analysts[200%],QA Manager
25	Live Pilot Execution	1 mon	Tue 1/6/26	Tue 2/3/26	24	$84,800.00	Programmer/Analysts[300%],Integration Engineer,NLP Specialist
26	Analyze Caller and Agent Feedback	0.5 mons	Tue 1/6/26	Tue 1/20/26	24	$24,000.00	Systems Analysts[200%],QA Manager
27	**Milestone - Pilot Lauch Completed**	**0 days**	**Tue 2/3/26**	**Tue 2/3/26**	**26,25**	**$0.00**	
28	**Full Deployment & Training**	**45 days**	**Tue 2/3/26**	**Tue 4/7/26**		**$161,100.00**	**Training Costs[$7,500.00]**
29	24/7 Rollout Implementation	1 mon	Tue 2/3/26	Tue 3/3/26	27	$67,200.00	Programmer/Analysts[300%],Integration Engineer
30	Employee Communication & Adoption	0.5 mons	Tue 2/3/26	Tue 2/17/26	27	$20,800.00	Systems Analysts[200%],UI/UX Designer
31	IT Staff Training & Handover	0.5 mons	Tue 3/3/26	Tue 3/17/26	29	$32,800.00	Systems Analysts[200%],QA Manager,Programmer/Analysts
32	Performance Monitoring	0.5 mons	Tue 3/17/26	Tue 3/31/26	31	$32,800.00	QA Manager,Systems Analysts[200%],Programmer/Analysts
33	Project Closure	1 wk	Tue 3/31/26	Tue 4/7/26	30,32	$0.00	

Figure 7: Gantt Chart for AVA

2.6.2.3. Estimated Costs – Per Tasks

ID	Task Name	Total Cost	Fixed Cost Accrual	Qtr A
1	**Automated Virtual Agent (AVA) Proje**	$1,077,526.67	Prorated	
2	**Requirements & Design**	**$58,400.00**	**Prorated**	
3	Identify Automation Tasks	$14,400.00	Prorated	
4	Define Functional Requirements	$7,200.00	Prorated	
5	Define Integration Specification	$10,800.00	Prorated	
6	Design Conversational and Systems Architecture	$22,400.00	Prorated	
7	Stakeholder Review & Sign-off	$3,600.00	Prorated	
8	**Milestone - Requirements & Design Completed**	**$0.00**	**Prorated**	
9	**Development & Configuration**	**$275,840.00**	**Prorated**	
10	AWS Cloud Setup	$11,200.00	Prorated	
11	Conversational Workflow Development	$140,800.00	Prorated	
12	Integration Development	$50,400.00	Prorated	
13	System Monitoring & Configuration	$72,000.00	Prorated	
14	Development Reviews & Internal Testi	$1,440.00	Prorated	
15	**Milestone - System Development Completed**	**$0.00**	**Prorated**	
16	**Integration Testing**	**$144,000.00**	**Prorated**	
17	Testing with ServiceNow & On-Premise Systems	$32,000.00	Prorated	
18	Conversational Workflow Testing	$32,000.00	Prorated	
19	Security & Data Integrity Checks	$30,400.00	Prorated	
20	Resolve Integration & Functionality Iss	$49,600.00	Prorated	
21	**Milestone - End to End Testing Completed**	**$0.00**	**Prorated**	
22	**Soft Launch**	**$147,200.00**	**Prorated**	
23	Pilot Rollout Plan Development	$14,400.00	Prorated	
24	Training for Human Agents	$24,000.00	Prorated	
25	Live Pilot Execution	$84,800.00	Prorated	
26	Analyze Caller and Agent Feedback	$24,000.00	Prorated	
27	**Milestone - Pilot Lauch Completed**	**$0.00**	**Prorated**	
28	**Full Deployment & Training**	**$161,100.00**	**Prorated**	
29	24/7 Rollout Implementation	$67,200.00	Prorated	
30	Employee Communication & Adoption	$20,800.00	Prorated	
31	IT Staff Training & Handover	$32,800.00	Prorated	
32	Performance Monitoring	$32,800.00	Prorated	
33	Project Closure	$0.00	Prorated	

Figure 8: Costs for AVA – Per Tasks

2.6.2.4. Estimated Costs – Per Resource

ID	Resource Name	Type	Max Units	Cost
1	Project Manager	Work	100%	$250,986.67
2	Systems Analysts	Work	200%	$120,240.00
3	Programmer/Analysts	Work	300%	$365,200.00
4	NLP Specialist	Work	100%	$70,400.00
5	Integration Engineer	Work	100%	$60,000.00
6	UI/UX Designer	Work	100%	$12,800.00
7	QA Manager	Work	100%	$96,000.00
8	Quality Analysts	Work	200%	$54,400.00
9				
10	Training Costs	Cost		$7,500.00
11	Cloud Development Environment Setup	Cost		$5,000.00
12	Chatbot Platform License	Cost		$15,000.00
13	Cloud Hosting & Setup (AWS/ServiceNow Integration)	Cost		$20,000.00

Figure 9: Costs for AVA – Per Resource

3. Recommendation & Project Plan

3.1. Final Project Selection

Both AVA and the 4D Flight Planning System provide significant value to Qantas. However, if prioritized, the 4D Flight Planning System is the recommended initiative due to its substantial impact on Qantas's core business. While AVA is highly feasible with less investment, its benefits are primarily internal. In contrast, the flight-planning system delivers transformative business value by directly reducing fuel costs and enhancing sustainability efforts, aligning with Qantas's long-term vision of being a leader in ultra-long-haul travel and operational excellence (Reuters Staff, 2025). Furthermore, the financial payback in millions saved per year significantly exceeds the cost savings offered by AVA. Although the 4D system presents more complex challenges in terms of feasibility, such as replacing a critical legacy system and managing regulatory compliance, the proof-of-concept phase and risk mitigation strategies ensure that the project's investment is on the right track. Additionally, the cost-benefit analysis illustrates that the benefits

outweigh the costs, challenges, and risks, making the 4D Flight Planning System the superior choice for long-term strategic growth.

1.2. Implementation Strategy

The 4D FPS will be implemented using a phased strategy spanning 24 months, as outlined in the project roadmap (Figure 10). Each phase, ranging from initial research and proof of concept to full-scale deployment, are tied to key milestones that validate project success. The Proof of Concept phase with ACFR will confirm core system capabilities before moving to development. Integration and data setup are planned with fallback options to reduce disruption. Cross-functional teams, including AI, aviation, and compliance experts, will coordinate deliverables. Change management and risk mitigation strategies, such as phased rollout and stakeholder training, throughout. Progress will be monitored at each stage using defined KPIs to ensure alignment with strategic goals and operational readiness.

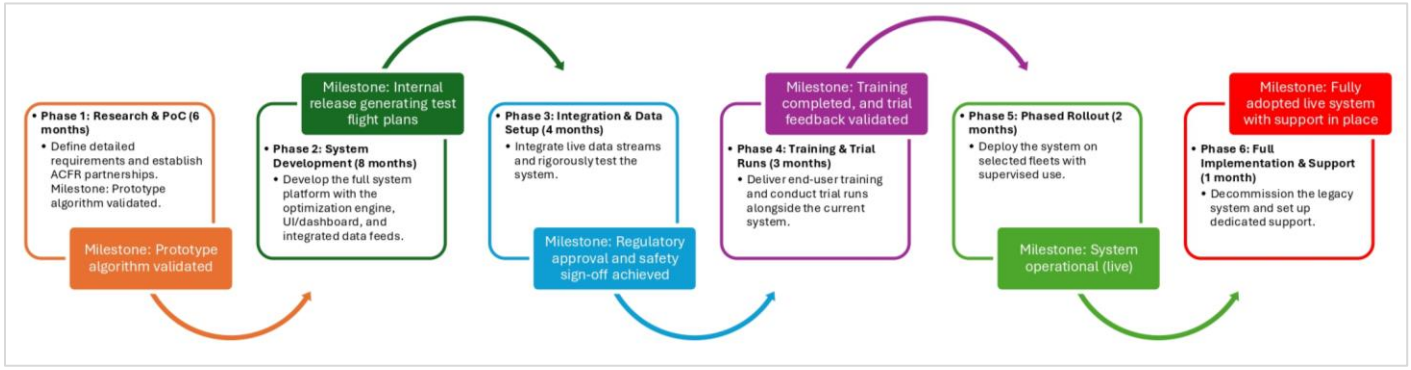

Figure 10: 4D FPS Implementation Roadmap

Name	Finish
Milestone - Prototype algorithm validated	Tue 8/19/25
Milestone - Internal release generating test flight plans	Tue 6/23/26
Milestone - Regulatory approval and safety sign-off achieved	Tue 10/13/26
Milestone - Training completed, and trial feedback validated	Tue 1/5/27
Milestone: System operational (live)	Tue 5/25/27
Milestone - Fully adopted live system with support in place	Tue 7/6/27

Figure 11: 4D FPS Implementation Milestones Due date from Gantt Chart

3.3. Performance Metrics

To effectively measure the success of the 4D Flight Planning initiative, the following performance metrics and associated KPIs are defined.

Metric	KPI
Fuel Savings	Percentage reduction in fuel consumption on key routes compared to baseline (target: 1% annual reduction)
Flight Efficiency	Achieve an average reduction of 5 minutes on long-haul flights due to optimized routing (e.g., ultra long-haul routes like PER-LHR, SYD-JFK).
CO2 Emissions Reduction	Kgs of CO2 emissions reduced per year (target: ~50,000 kg CO2 cut annually).
System Reliability	Achieve a minimum of 99.99% system uptime per month, limiting unplanned downtime (excluding scheduled maintenance periods).
Usage and Adoption	Percentage of flights planned using the new system without manual override (target: ~95% of flights).

Table 26: KPIs for 4D FPS

4. Conclusion & Recommendation

Both AVA and 4D FPS demonstrate how targeted digital investments can address Qantas's operational inefficiencies and align with its broader transformation strategy. AVA, a low-risk, cloud-based solution, automates routine internal IT support tasks, saving approximately $1 million annually while improving employee productivity and satisfaction. In contrast, the 4D FPS offers transformative benefits, including an estimated $40 million in annual fuel cost savings and a reduction of approximately 50 million kg in CO2 emissions, while enhancing scheduling efficiency and flight performance. Although 4D FPS involves higher complexity and risk, it provides greater long-term business value and supports Qantas's vision of sustainability. Both initiatives are valuable, but the final recommendation prioritizes the 4D FPS for its substantial strategic and financial impact.

To ensure long-term success:

- Qantas should pursue a phased implementation of the 4D FPS, aided by solid risk mitigation strategies focusing on integration challenges, regulatory compliance, and change management.
- Continuous upgrades of the system through periodic maintenance and adding new real-time operational data updates will enhance performance and reliability.
- Qantas should also consider scaling the system across its subsidiary airline fleet and licensing it to partner airlines for expanded strategic value & additional revenue.
- Regular monitoring of KPIs such as fuel savings, flight efficiency, and CO2 emission rates will be critical for long-term operational excellence and financial benefit.

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