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Development of a Dashboard to Assess the Performance of an Engineering Customer Support Team

(Versão final após defesa)

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Resumo

Esta tese explora o desenvolvimento e a implementação de um *dashboard* para monitorizar e analisar os pedidos e questões, sobre o sistema de combustível das aeronaves da Airbus, recebidos através da aplicação Techrequest.

O principal objetivo é desenvolver um *dashboard* baseado em indicadores de desempenho chave relevantes para fornecer informações que permitam melhorar o desempenho de uma determinada equipa de apoio ao cliente da Airbus (1SYPF).

Foi realizada uma revisão bibliográfica sobre temas como *Customer Support*, *Key Performance Indicators*, *Project Management*, *Skywise software* e *Big Data*. Isto foi seguido pelo desenvolvimento do *dashboard*, onde são considerados os requisitos e objectivos da equipa.

Com recurso ao *Contour*, uma aplicação da Palantir, e utilizando conjuntos de dados da plataforma *Skywise*, o *dashboard* integra vários indicadores chave de desempenho (KPIs) para melhorar as operações de apoio ao cliente.

Esta tese não só apresenta o desenvolvimento bem-sucedido da ferramenta, como também reflete sobre os principais conquitas e aponta possíveis melhorias futuras. O percurso desde a concetualização até à implementação serve de ilustração do poder transformador de *data* na elevação e otimização das operações de apoio ao cliente na indústria da aviação.

Palavras-chave

Apoio ao Cliente, Desenvolvimento de *Dashboards*, Plataforma *Skywise*, Indicadores Chave de Desempenho (KPIs), Análise de Dados

Abstract

This thesis explores the development and implementation of a comprehensive dashboard for monitoring and analyzing Techrequest customer queries regarding the Airbus aircrafts fuel system.

The main objective is to develop a Dashboard based on relevant Key Performance Indicators to provide insights for improving the performance of a particular Airbus Customer Support Team (1SYPF).

A literature review was carried out on topics such as Customer Support, Key Performance Indicators, Project Management, Skywise software and Big Data. This was followed by the development of the dashboard, where the team's requirements and objectives were taken into account.

Leveraging Contour, an application from Palantir, and utilizing datasets from the Skywise platform, the dashboard integrates multiple key performance indicators (KPIs) to enhance customer support operations.

This thesis not only showcases the successful development of a data-driven tool for customer support but also reflects on key achievements and outlining potential avenues for future enhancements. The journey from conceptualization to implementation serves as a compelling illustration of the transformative power of data in elevating and optimizing customer support operations within the aviation industry.

Keywords

Customer Support, Dashboard Development, Skywise Platform, Key Performance Indicators (KPIs), Data Analytics

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Acronyms

A/C	Aircraft
AI	Artificial Intelligence
AIRTAC	Airbus Technical AOG Centre
AOG	Aircraft on Ground
ASAC	Airbus Statement of Airworthiness Compliance
ATA	Air Transportation Association
CSAT	Customer Satisfaction Score
DO	Design Office
DOA	Design Organization Approval
EIS	Entry-Into-Service
FAQs	Frequently Asked Questions
FCD	Flight Conditions Document
FOSD	Flight Ops Support Director
FSR	Field Service Representatives
GSE	Ground Support Equipment
ICAO	International Civil Aviation Organisation
IT	Information Technology
MCC	Maintenance Control Centre
MRO	Maintenance, Repair, and Overhaul
MSN	Manufacturer Serial Number
NPS	Net Promoter Score
OTD	On Time Delivery
PLM	Product Life Management
PMO	Project Management Office
P&S	Parking and Storage
R&D	Research and Development
RDAF	Repair and Design Approval Form
RDAS	Repair and Design Approval Sheet
ROI	Return on Investment
SLA	Service Level Agreement
TA	Technical Adaptation
UBI	Universidade da Beira Interior

Chapter 1

Introduction

1.1 Motivation

Being one of the biggest aircraft manufactures in the world, Airbus has a big responsibility ensuring safety and airworthiness, not only when delivering aircraft but also during their life cycle. From the moment any Airbus aircraft enters into service, being it commercial or a cargo aircraft, Airbus provides the customer/airline with support to resolve any queries that they may have about their fleet. With Customer Care portals such as AirbusWorld, airnavX and TechRequest, Airbus provides experts in very different areas such as Repairs, Engineering, Tech Data, Flight Ops, Scheduled Maintenance, Supplier Support, Simulators or software services.

Alten's 1Sx Engineering Support team is a team sub-contracted by Airbus to provide support to airlines through TechRequest. This Alten team is multi-skilled, which means it offers expertise in very different engineering topics such as avionics (1SYA), structures (1SAE) and propulsion (1SYP), amongst others. These "sub-teams" work alongside and in compliance with their respective team in Airbus. In this work it will be given focus to the 1SYPF team which is responsible for any type of queries related to the fuel system of any of the Airbus aircraft families.

The support this team provides can have direct impact in aircraft safety and airworthiness and so, there is a need to always monitor, analyse and improve its performance. The use of KPI's is a great way to do so. Although the use of KPI's is already common practice at Airbus, the 1SYPF team managers felt the need to implement more KPI's and improve their analysis by developing a Dashboard.

The topic chosen to be developed within the scope of this dissertation arose from this request and the main motivation is the development and implementation of this tool.

1.2 Objective

Develop and implement a tool to quickly and easily assess the performance of a particular Airbus Customer Support Team (1SYPF).

The main objective is to develop a Dashboard based on relevant Key Performance Indicators to provide insights for improving the performance of the team. Presenting key data and metrics in an accessible way will enable Airbus to make informed decisions and take actions

that will lead to better outcomes.

1.3 Scope of the Dissertation

Given the objective outlined, the scope of this dissertation falls within the aeronautical engineering department of ALTEN SO, a company that provides engineering and technology consulting services. The work will be conducted in accordance with the objectives of the 1Sx Engineering Support team, with a particular emphasis on the 1SYPF team.

1.4 Methodology

The elaboration of this dissertation was primarily through the completion of an internship lasting approximately 6 months, in an international company - ALTEN -, which operates in various and distinct sectors, one of them being the aeronautical sector. The internship planning, outlined by the company, consisted of the following 4 main steps:

- **Step 1:** Introduction to 1S Engineering Support
- **Step 2:** 1SYPF (front-office FUEL) Dashboard specification
- **Step 3:** 1SYPF (front-office FUEL) Dashboard preparation
- **Step 4:** 1SYPF (front-office FUEL) Dashboard procedure

In the first step - Introduction to 1S Engineering Support - an introduction to the focal points of each activity was made in order to have an overview of all projects addressed in the 1S - Engineering Support team.

In the second step - 1SYPF (front-office FUEL) Dashboard specification – there was the opportunity to participate in the collection and understanding of 1SYPF AIRBUS team managers needs and objectives. In this phase there was also the chance to create the dashboard specification. In other words, translate the AIRBUS needs and objectives into an initial draft of the process to complete them.

The third step - 1SYPF (front-office FUEL) Dashboard preparation - was to develop and implement the dashboard. Firstly, research was carried out to determine how to collect the necessary data for its development. Subsequently, this data were filtered and analysed to meet the requirements presented in the dashboard specification. And finally, the key performance indicators were created using an application - Contour - available on the Skywise software. The Dahsboard was then presented to the responsible people at Airbus.

In the fourth and last step - 1SYPF (front-office FUEL) Dashboard procedure -, a step-by-step procedure has been written to explain ‘How to use’, ‘How to update’ and ‘How to edit’ the dashboard.

In parallel to the above and as a way to enrich the knowledge already acquired, there was the opportunity to develop additional activities such as:

- Extend the dashboard to other perimeters according to needs (for example, the cabin)
- Propose capitalisation materials: presentation of the fuel system, etc.
- Capture needs, write specifications, write step-by-step procedures of other back-office activities requested by AIRBUS (depending on needs)

1.5 Dissertation Structure

In order to show the project in a continuous way and for a better lecture and comprehension, this dissertation is divided into five chapters, organised as follows:

- In the present chapter, the first chapter, the motivation for this dissertation is presented. It also includes the objective, methodology and scope of the dissertation. Lastly, the dissertation structure is also presented;
- The second chapter consists of a brief introduction of ALTEN in historical terms and, further, the description of the operations and scope of activities of 1S Engineering Support;
- The third chapter focuses on the state of the art of topics whose knowledge was considered relevant for the development of this thesis. It introduces different topics such as Customer Support, how it is performed by Airbus (Airbus Customer Care) and Key Performance Indicators and their importance in managing an Aeronautical Engineering Project. In addition, the topics of Skywise software and Big Data are included, their definition, historical context and application in the aeronautical industry;
- The fourth chapter is devoted to the case study, where the different steps for the development and implementation of the dashboard are presented. This contains an overview of the different possibilities considered with regards to data sources and software to design the dashboard. Furthermore, the chapter also details how the dashboard works, the variety of applications it can be used for, and how the information it holds can be updated.
- The last chapter, the fifth, presents the main conclusions.

Chapter 2

ALTEN

ALTEN is a global technology consulting and engineering company headquartered in Boulogne-Billancourt, France, that was founded in 1988 by three engineers with top-ranking higher education, including Simon Azoulay (current President of the Group).

Over the years, as the demand for engineering and technology services grew across various industries, ALTEN diversified its portfolio and expanded into new sectors such as Aeronautics & Space, Defence & Naval, Security, Automotive, Rail, Energy, Life Sciences, Finance, Retail, Telecommunications and Services.

Created more than 30 years ago and based in 30 countries, the Group has established itself as a world leader in Engineering and IT Services. [1]

Figure 2.1: ALTEN Logo [1]

2.1 Enterprise overview

2.1.1 Services

The ALTEN Group provides support to its customers in the areas of Research and Development (R&D) and digital strategies. It contributes to develop innovative products and services, as well as optimize business organizations, tools, and processes. The Group covers a wide range of technological projects in Engineering and IT Services.

Here are some of the services they provide[2]:

- Engineering and R&D outsourcing

  - Innovation & Digital Transformation
  - Product design & development – Outsourced R&D
  - Manufacturing engineering
  - Supply chain & Quality
  - Customer Services & Training
  - Project Management & Change Management

- IT Services
  - Consulting & Digital Transformation
  - Technical expertise: Digital, Big Data, Data Science & AI
  - Applications: Development, Maintenance & Testing
  - Infrastructures: Cloud, Networks and Security

- Consulting, Expertise and Support through our specialized offers
  - Consulting:
    - MI-GSO | PCUBED (PMO and Change Management)
    - Avenir Conseil (Training)
    - C Prime (Agile methods)
  - Expertises:
    - Lincoln and SDG Group (Big Data, Data Sciences, Modern BI)
    - Aixial and Caduceum (Life Sciences)
  - Customer Support and Maintenance in Operational Condition:
    - Atexis (Customer support)
    - Anotech (Oil & Gas Solutions)

ALTEN has built a strong technical organization with projects that are recognized on an international scale. This includes a Technical Department comprising project managers, directors, technical experts, and a dedicated Quality and Methods Department. They also provide training centres and academies to enhance the skills of their engineers and consultants. ALTEN emphasizes knowledge sharing through engineering communities within their organization.

2.1.2 Market Sectors

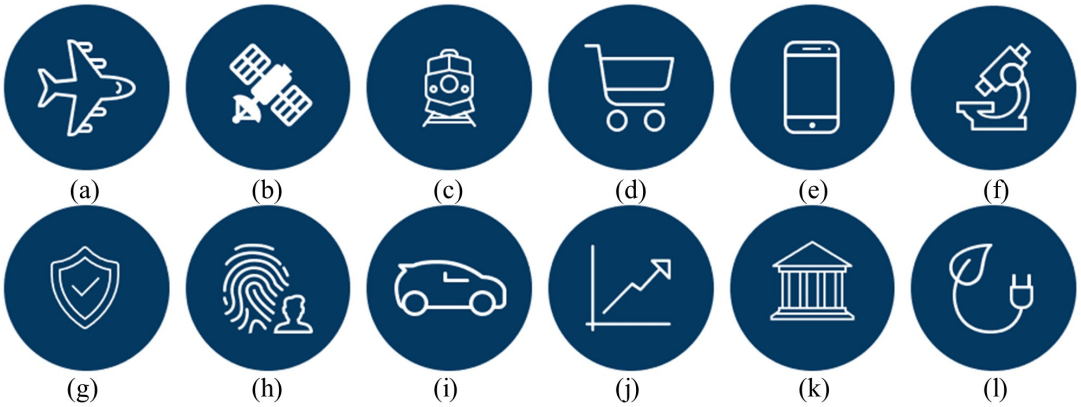

Figure 2.2: Sectors of Activity [2]

Alten offers full coverage of key market sectors such as:

(a) Aeronautics

(b) Space

(c) Rail & Mobility

(d) Retail & Consumer Services

(e) Telecoms & Media

(f) Life Sciences

(g) Defense & Naval

(h) Security

(i) Automotive

(j) Banking, Finance & Insurance

(k) Public Sector & Government Services

(l) Energy & Environment

2.1.3 ALTEN in the World

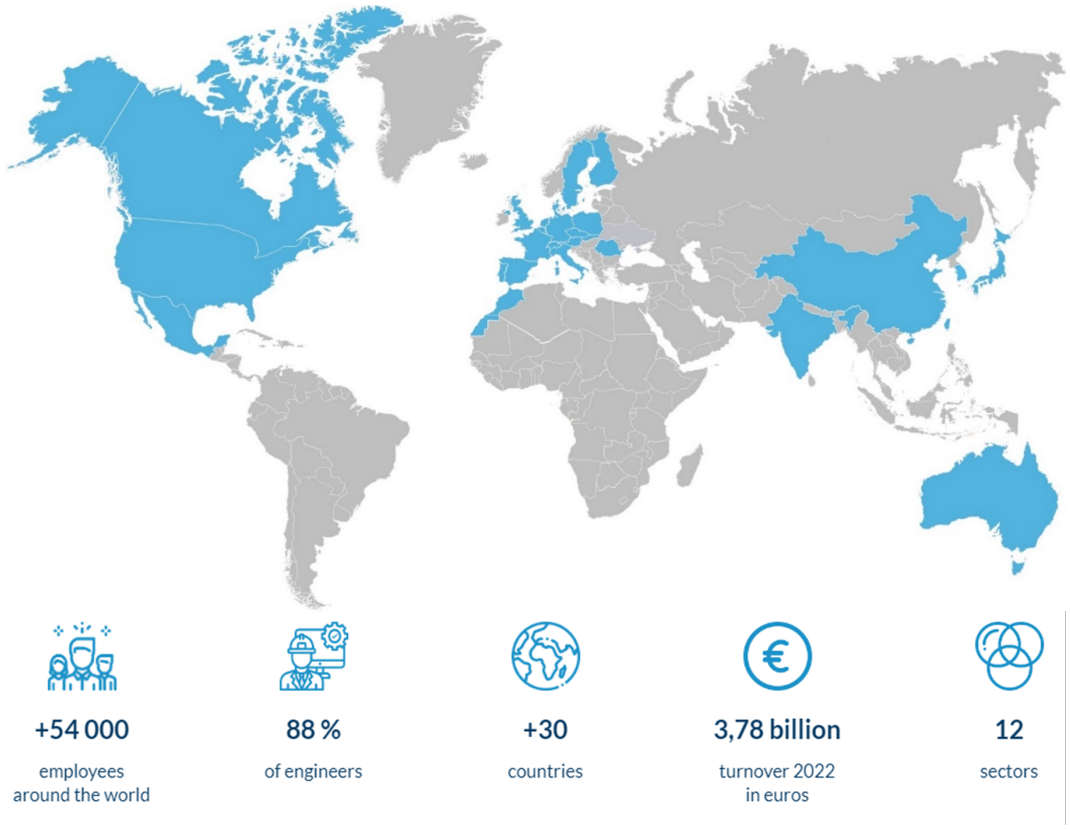

Figure 2.3: Enterprise Overview [2][3]

ALTEN's global presence expanded rapidly through a combination of organic growth and strategic acquisitions. It established operations in several countries, including Germany, the United Kingdom, the United States, Spain, Italy, India, China, and many others. Today, ALTEN operates in over 30 countries worldwide, with a network of offices and delivery centres.

The company's success can be attributed to its focus on technical excellence, customer satisfaction, and its ability to adapt to changing market demands.

2.2 1S Engineering Support

1S Engineering Support creates the bridge between Engineering and Customer Support, to deliver fast and simple technical solutions to Airbus in-service fleet. It delivers the right technical solutions at the right time to airlines Worldwide.

In Engineering Support, aircraft operations safety is the priority: approved In-Service technical solutions are delivered to the Customers through Design Organization Approval Documents (DOA) to cope with, for example, unforeseen or undocumented events.

Such DOA Documents are:

- Consulting & Digital Transformation
- Technical Adaptation (TA)
- Airbus Statement of Airworthiness Compliance (ASAC)
- Flight Conditions Document (FCD)
- RDAS/RDAF (Repair and Design Approval Sheet/Form)

To anticipate and investigate In-Service fleet wide issues, Airbus Engineering Support launches events' analysis, leads and develops corrective actions or product improvements by collaborating with the Airbus Engineering function (Design Office) and Suppliers.

Chapter 3

State of Art

3.1 Customer Support

3.1.1 Introduction to Customer Support

3.1.1.1 What is Customer Support? [9]

Customer Support refers to a set of practices and procedures that involve providing assistance, guidance, and solutions to customers who have questions, concerns, or issues related to a company's products or services. It is designed to ensure that customers have a positive and satisfying experience when interacting with a business.

Key elements of customer support

1. **Communication:** Interacting with customers through various channels such as phone, email, live chat, social media, or in-person to address their inquiries or issues.
2. **Problem Resolution:** Effectively identifying, troubleshooting, and resolving customer problems or concerns. This may involve technical support, product information, or assistance with using a service.
3. **Information Provision:** Offering information about products and services, including features, pricing, and specifications.
4. **Feedback Collection:** Actively seeking feedback from customers to understand their experiences, gather insights for improvement, and assess overall satisfaction
5. **Empathy and Relationship Building:** Demonstrating empathy and building rapport with customers to create a positive and trusting customer-provider relationship.
6. **Self-Service Resources:** Providing customers with self-help resources like FAQs, knowledge bases, or online tutorials to enable them to find answers independently.
7. **Continuous Improvement:** Regularly assessing the success of the customer support processes with the help of metrics such as response time, resolution time, CSAT (Customer Satisfaction Score), NPS (Net Promoter Score), etc. This helps identify areas for improvement and track progress over time.

Effective customer support plays a significant role in shaping a company's reputation and can impact its long-term success.

3.1.1.2 What is the role of Customer Support? [9]

The role of customer support is to assist customers with technical problems when using a company's product or services. Customer support specialists are professionals who are responsible for handling questions, comments, and complaints regarding a particular business. They help customers complete purchases, upgrades/returns, and frequently provide necessary technical assistance.

Customer support representatives' basic skills involve (see fig. 3.1):

1. **Empathy:** Demonstrating empathy and understanding toward customers' concerns is key to building trust.
2. **Problem-Solving Skills:** Developing the ability to identify and resolve customer issues effectively and efficiently [10].
3. **Patience:** Being patient, especially when dealing with frustrated or upset customers.
4. **Active Listening:** Paying close attention to what the customer is saying, asking clarifying questions, and showing a genuine interest in their concerns.
5. **Timeliness/Time Management:** Striving to provide quick responses and resolutions. Customers appreciate a timely resolution to their problems.
6. **Product/Service Knowledge:** Thoroughly understanding the products or services is a crucial step in providing accurate and helpful information.

Figure 3.1: Customer Support Skills [4]

In summary, the role of customer support is to provide customers with a positive and helpful experience when they interact with a company. Effective customer support can lead to increased customer satisfaction and loyalty.

3.1.1.3 Customer Support vs Customer Service [11]

”Customer Support” and ”Customer Service” are related terms, but they can have slightly different meanings depending on the context. Here is a general distinction between the two:

Customer service comprehends the entire range of interactions between a company and its customers. It includes both initiative-taking efforts to meet customer needs and reactive responses to customer inquiries, concerns, and issues. Customer service focuses on building and maintaining long-term relationships with customers by ensuring their satisfaction throughout the entire customer journey. Examples: It includes activities like marketing, sales, onboarding, and post-purchase support, all of which contribute to the overall customer experience.

Customer support is a subset of customer service that specifically addresses customer inquiries, concerns, or issues related to a company’s products or services. It is typically reactive, responding to customer requests or problems. Customer support deals primarily with troubleshooting, technical assistance, and problem resolution. Examples: It includes activities like responding to product-related questions, providing technical support, managing warranty claims, and offering after-sales support. In summary, while customer service encompasses the entire customer experience, including sales and marketing efforts, customer support is a specialized component of customer service that specifically deals with post-sales support, problem resolution, and technical assistance. Both are crucial for maintaining customer satisfaction and loyalty, and the boundary between the two may vary from one organization to another.

3.1.2 Customer Support in Aviation

“Compared with other industries, the customer base of the aerospace industry is quite small. The main customer base in the commercial aircraft sector, consisting of three main groups: airline companies, aircraft leasing companies, and air freight companies” (Horng, 2007, p. 24) [12].

Nevertheless, customer support is a vital aspect of the aviation industry, as it ensures the safety, reliability and efficiency of the aircraft and their operators. Customer support in aviation has evolved significantly throughout the years to meet the changing needs of the industry. In the early days of aviation, manufacturers focused on producing aircraft, and customer relationships were less formalized. The manufacturers also supplied spare parts and repair services, but these were often limited by the availability of resources and the geographical distance between the manufacturer and the customer, therefore airlines and operators re-

lied heavily on their in-house maintenance teams.

As the aviation industry grew and became more complex, customer support also expanded and diversified. The manufacturers started to offer more proactive and preventive services, such as maintenance planning, inspection, overhaul, modification and upgrade of the aircraft. They also developed more specialized and customized solutions for different segments of the market, such as military, commercial, regional, and business aviation. The manufacturers also invested in developing their global network of customer support centres, service providers and partners, to ensure faster and more efficient delivery of services and parts to their customers.

In recent years, customer support in aviation by aircraft manufacturers has reached a new level of sophistication and innovation. The manufacturers are leveraging digital technologies, such as data analytics, artificial intelligence, cloud computing and internet of things, to enhance their customer support capabilities and offerings. A variety of customer support services provided to operators include:

1. **Technical Assistance:** Provide technical support to airlines for their fleets such as assistance with aircraft maintenance, troubleshooting technical issues, and providing documentation and manuals for maintenance and repair procedures.
2. **Training:** "Customer training should satisfy both customer needs and aviation regulations. Establish integrated training in the management of certification, outline preparation, curriculum development, learning management, effectiveness evaluation" (Rong Ren, Lin Zhu, Zhiqiang Wang, Qi Xi, 2017, p. 219) [13].
3. **Spare Parts:** "Establish lifetime cycle management for spares including manufacturing, delivery, usage, repair/maintenance, till retirement. The use of spares and status records shall be used to achieve daily management, Air cargo support, air cargo maintenance and other diversified functions. The spares support shall provide online query and virtual sharing services to improve the quality assurance and service level" (Rong Ren, Lin Zhu, Zhiqiang Wang, Qi Xi, 2017, p. 219) [13].
4. **Software and Systems Support:** Aircraft manufacturers provide support for the software and systems integrated into their aircraft. This includes avionics, flight control systems, and navigation systems.
5. **Engineering Support:** Manufacturers may offer engineering support to help airlines optimize the performance of their aircraft. This can include advice on aircraft configurations, modifications, and upgrades.
6. **Reliability and Performance Analysis:** Collect data on the performance and reliability of in-service aircraft. This data are later used to analyse trends, identify areas for improvement, and work with airlines to enhance aircraft performance and reliability.
7. **Fleet Management Solutions:** Help airlines monitor and manage the health and performance of their entire fleet of aircraft. Predictive maintenance is an example of a

fleet management solution.

8. **Aircraft Documentation:** Manufacturers supply airlines with comprehensive documentation for their aircraft, including maintenance manuals, operating manuals, and technical publications. This documentation is crucial for safe and efficient operation.

9. **Safety and Regulatory Compliance:** Manufacturers support airlines in maintaining compliance with aviation safety regulations and airworthiness directives. They provide guidance and updates on regulatory requirements.

10. **Customer Portal and Support Tools:** Online portals and support tools that allow airlines to access technical information, request support, and track the status of ongoing issues.

11. **On-Site Support:** In some cases, manufacturers deploy technical experts to airlines' facilities for on-site support during maintenance and troubleshooting activities.

The evolution of customer support in aviation reflects the industry's growth, technological advancements, and the increasing complexity of modern aircraft.

3.1.3 Airbus Customer Care

"We believe that operators, lessors and MROs deserve first-class customer care. And this is what Airbus offers long before, during and after the delivery of an aircraft" (Airbus, 2023) [14]. "Throughout the aircraft life cycle, [Airbus assists airlines] with Engineering and Flight Operations expertise, supported by Airbus' unique Aircraft Manufacturer position. Every day, [Airbus'] people listen and help customers operate fleets efficiently while maintaining aircraft in safe and airworthy conditions" (Airbus, 2023) [15].

Airbus provides Customers with a large set of technical data products, applications & services which includes all the information, instructions and solutions required to operate, maintain and repair their Airbus fleet safely & efficiently. Some of these services are:

- **Aircraft Entry-into-Service** [16] Airbus Customer Care is committed to providing support to airlines before the delivery of their aircraft, ensuring a smooth transition into service. Services included within EIS are:
  - Privileged Customer Care partners
  - On-site technical & engineering relay with Airbus Customer Care
  - Initial provisioning solutions & Material support
  - Training Standard
- **AOG and Aircraft Care** [17]

  - 24/7 support with AIRTAC: The Airbus Technical AOG Centre (AIRTAC) is a modern facility with dedicated specialised engineers providing global around-the-clock assistance for AOGs and work stoppages.
  - Airbus Airworthiness Documentation
  - Major repairs

- **Fleet Wide Care** [18]
  - Fleet Operations
    - Aircraft Technical Documentation: Airbus Customer Care delivers all the manuals required for cabin and cockpit operations, as well as line and heavy maintenance activities.
    - Planned Maintenance expertise: optimised scheduled maintenance programmes adapted to every aircraft type.
    - Ground Support Equipment (GSE): Airbus designs Ground Support Equipment tailored to Airbus aircraft, optimising the application of maintenance instructions issued in aircraft manuals.
  - Fleet Operations
    - Support Programmes' mission
    - Close cooperation with customers & suppliers

"The Customer Care key interfaces provide guidance while managing the coordination with other Airbus teams in order to resolve issues and ensure customer satisfaction.

The Airbus Customer Care team is here to deliver customers an end to end, day to day, 24/7 support throughout the aircraft life cycle.

The Customer Care portals (...) deliver effective and timely answers to any issue [airlines] may face, as well as providing [them] with key information needed to operate [their] fleet in the best conditions" (Airbus, 2023) [5].

The Customer Care teams:

1. **Customer Support Director**

   "The Airbus Customer Support Director is there to support customer aircraft operations, from Entry-Into-Service preparation and continues into the operational life, ensuring the highest level of customer satisfaction. [Airbus'] 80 Customer Support Directors are positioned around the world. In collaboration with the In-Service Core team and the whole Airbus Services ecosystem, they provide end-to-end support to 600+ Customers, be it airlines, lessors or MROs. Constantly focusing on how Airbus can improve its day-to-day in-service assistance, the Customer Support Director manages the transversal coordination across Airbus, employing a global way of working at regional level. The Customer Support Director creates the link between the Airbus and

customer worlds to simplify exchanges, securing the involvement of the right Airbus stakeholders and optimising the timeframe to get a fix, while ensuring the highest level of safety and reliability" (Airbus, 2023) [5].

2. **Field Service Representative**

"The Field Service Representative's responsibilities include excellence in customer support, ensuring optimal safety and continuous airworthiness of the fleet operated and positioning added value services to assist customers in improving their operational performance. [Airbus'] 300+ Field Service Representatives (FSR) assist you by providing dedicated technical assistance and guidance, within all levels of your organisation, in a global setup. The Field Service Representative (FSR) provides on-site assistance for technical incidents including 24/7 availability during AOG situations. The Field Service coverage is included in the Purchase Agreement through specific support contractual allocation" (Airbus, 2023) [5].

3. **Flight Ops Support Director**

"The Flight Ops Support Director (FOSD) is the Airbus Services expert that manages all queries linked to Flight Operations and Flight Training activities. The FOSD exchanges with customers to identify and coordinate on specific issues, needs or expectations linked to Flight Operations. The FOSD facilitates and speeds up communication within Airbus' organisation, managing specific needs, expectations and escalating major issues to enhance Flight Operations efficiency and safety beyond the standards. [Airbus'] customers can rely on a network of 29 FOSD deployed across 7 offices worldwide. The FOSD's objective is to help airlines operate as efficiently as possible thanks to Airbus Services and its subsidiary NAVBLUE's unrivalled offer with best in-class Flight Operations solutions for all aircraft types" (Airbus, 2023) [5].

The Customer Care portals:

1. **AirbusWorld**

"The primary entry point to Airbus digital portals and services for customers. Relying on a wide range of applications and functionalities, AirbusWorld (see fig. 3.2) allows quick and easy access to all Airbus technical data and services to help customers define, receive, operate, maintain, upgrade and optimise their fleet, as well as collaborate with Airbus in a timely manner" (Airbus, 2023) [5].

Figure 3.2: Airbus World [5]

2. **AirnavX**

   "AirnavX is the smart digital solution allowing Airbus customers to list, download, browse and search complete Airbus technical documentation. AirnavX has three setup options, via Online Browsing (accessible from AirbusWorld), via Intranet for customers' in-house installation or via Stand-alone for an offline computer usage.

   AirnavX (see fig. 3.3) provides accessible and accurate Tech Data:

   - All manuals and technical data
   - Available on-ground, on-line and on-board
   - Compliant with International Civil Aviation standards" (Airbus, 2023) [5]

Figure 3.3: AirnavX [5]

3. **TechRequest**

   "Online collaborative platform to manage (…) technical queries with Airbus Customer Care experts.

Experts from Repairs, Engineering, Tech Data, Flight Ops, Scheduled Maintenance, Supplier Support, Simulators or software services are dedicated to resolve any queries that [operators] may have on [their] Airbus fleet.

When necessary, TechRequest also ensures the interaction with all key internal and external stakeholders such as the Airbus Office of Airworthiness, design offices and suppliers.

TechRequest is available 24/7 through the Airbus portals with the following access points: Airbus World (for requestors) and Airbus Supply (for suppliers)" (Airbus, 2023) [5].

3.1.4 TechRequest Daily Queries

The TechRequest tool (see fig. 3.4) is a Customer Service web-based application that is used to track and respond to in-service queries from airlines (Annex A.1 provides an example of a query), a Reactive support activity known as TechRequest Management (TRM).

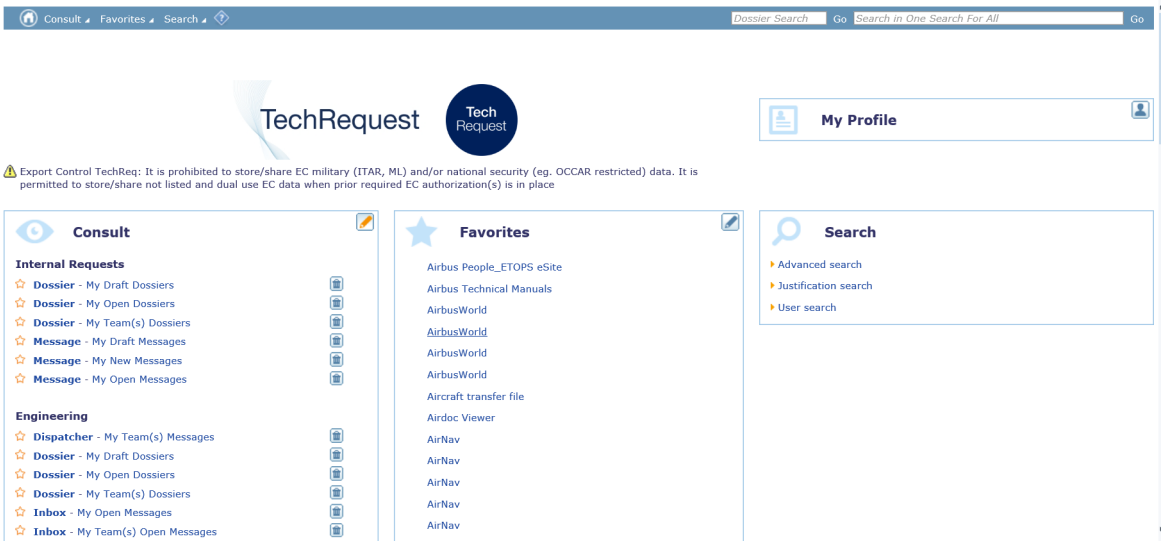

Figure 3.4: TechRequest Homepage

3.1.4.1 Answer Individual In-Service Queries

In Service Queries (ISQ also called Daily request) are technical queries related to Airbus in-service Aircraft, sent by an operator to Customer Services.

ISQ are identified with three urgency levels:

1. **Regular:** A/C operation is not affected at a very short term. Answer expected within 7 days.
2. **Critical:** A/C scheduled operation is not impacted yet but could be impacted if no action is performed during the requested time. It covers proactive support, Urgent or

Work stoppage queries. Answer expected within 2/3 days.

3. **AOG:** A/C is unable to continue or returned to service until the appropriate action is taken. Airbus shall take all necessary actions to help the airline to recover normal A/C operation. Answer expected within 4 hours or 1 day.

When answering ISQs the objectives are:

- to provide in-service engineering solutions, potentially airworthiness approved, to Customers following engineering technical queries related to Airbus in-service A/C.
- to complete the individual in-service Event/Query dossier in order to prepare further analysis and related actions within post-treatment phase.

3.1.4.2 Process

Figure 3.5 provides a simplified overview on the process to answer TechRequest daily queries from the moment they are sent by the operator. For a more detailed flowchart refer to annex A.2.

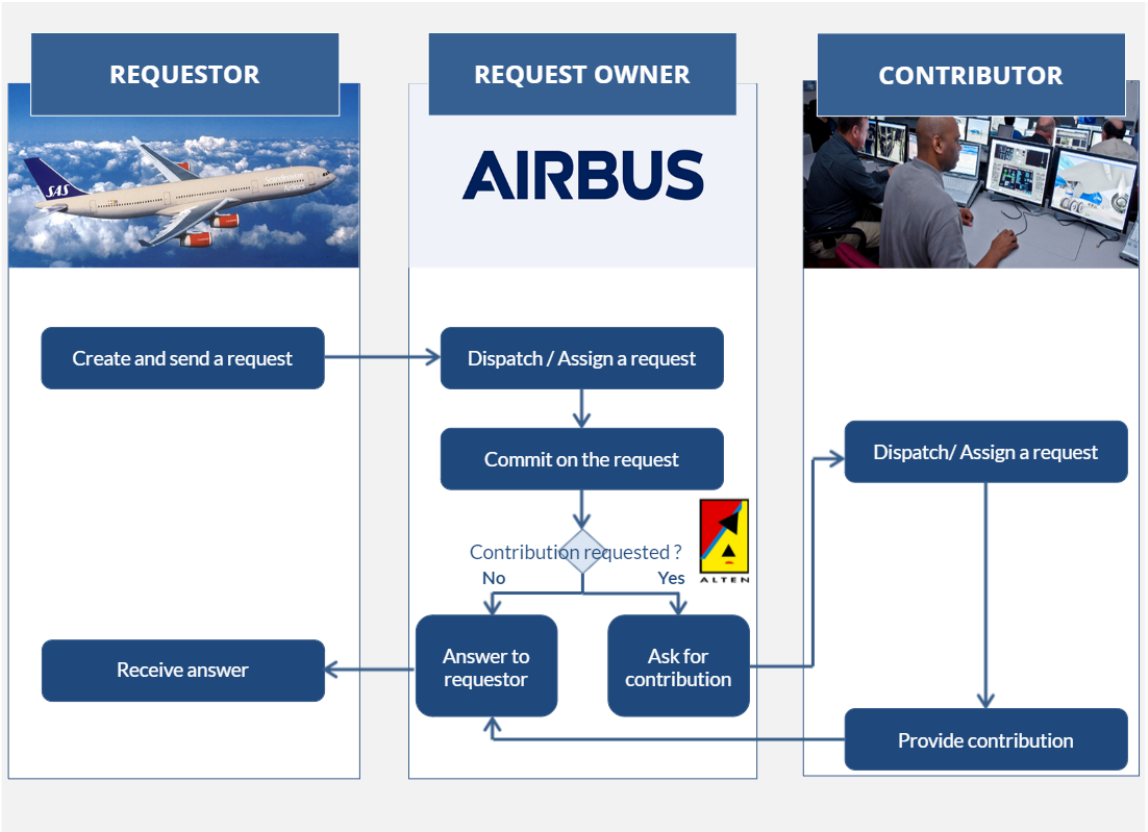

Figure 3.5: ISQs Flowchart

3.2 Big Data & Analytics

Big Data & Analytics represent a new way to deliver value from data by blending traditional deterministic, assumption-based approaches with statistical & probabilistic methods based on real world observations. This approach is based on the advert of cheap sensors, scalable computing and storage which generate massive volume of real-world data.

What is Big Data?

"Big data is high-volume, and high-velocity or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation." (Gartner, 2023) [19]. Big data refers to significant volumes of data, both unstructured and structured, that cannot be processed effectively with the traditional applications that are currently used. The processing of big data begins with raw data that isn't aggregated and is most often impossible to store in the memory of a single computer.

What is Data Analytics?

Data analytics is the process of analysing raw data in order to draw out meaningful, actionable insights. Data analytics can help businesses, scientists, and social scientists make better decisions, test hypotheses, and discover new patterns or trends. Data analytics can be divided into different types, such as descriptive, exploratory, confirmatory, predictive, and text analytics. Each type has a different purpose and technique. Data analysts use various tools and techniques to collect, clean, transform, and model data, such as statistical methods, data mining, data visualization, and machine learning. Data analysts need to have skills in mathematics, programming, problem-solving, communication, and domain knowledge.

"In Aviation Industry, insights from Big Data are useful to both manufacturers and to airline companies. About the advantages of manufacturers are included Engineering, Supply chain, Aftermarket, and Program Management. And for airlines ones are refered to Flight Operations, Fleet Management, Maintenance, Inventory Management, Pilot and Crew Management" (Izzo, 2019) [20]. "With the data provided by the newest aircraft, fuel consumption, crew deployment, and flight operations could be optimized to account for varying conditions; maintenance could anticipate when parts need replacing; air congestion could be reduced; flight routes could be altered well in advance of take-off to avoid storms; systems could back up pilots by handling routine cockpit tasks; and passengers could be kept informed about schedules and options from the minute they leave their home for the airport. It would make the planes easier to fly and maintain and more efficient. It also may reduce crew fatigue with more precise scheduling to help fill in the gaps from anticipated pilot shortages. Ultimately, the data could help with the next iteration of aircraft and systems by providing information about how their design and manufacture could be improved" (Oliver Wyman, 2017) [21]. However, Airline Industry does not seem able to fully exploit data information for lack of technological skills and infrastructure of companies. In fact (...) the major obstacles to use of Big Data Analytics in Aviation Industry are the lack of time, resources, skills, tools and

systems needed to derive value from the data" (Izzo, 2019) [20].

3.3 Skywise & Palantir

"Today's business decisions depend on the insights that big data can offer. But massive volumes of complex and unstructured data require high-performance analytics to extract value." (Airbus, 2023) [22].

"In 2017, Airbus officially launched [their own] open data platform, [Skywise]" (Airbus, 2023) [22]. "The Skywise (see fig. 3.6) platform is based on a data lake[1] that allows [Airbus, airlines, and suppliers] to store, manage and analyse their data and that of their ecosystem more efficiently. Offering visualization, alert management, predictive and machine learning capabilities, Skywise makes it possible to manage a fleet of aircraft over its entire lifespan, integrating all its operations and maintenance. One of the tangible benefits of the platform is to maximize the availability of a fleet of aircraft, increasing the operational and economic performance of the airline" (Ranger, 2019) [7].

Figure 3.6: Skywise Ecosystem [6]

3.3.1 Skywise Digital Solutions:

1. **"Predictive Maintenance +":** "anticipates component failure by analysing abnormal behaviour thanks to the analysis of aircraft sensors data. "Predictive Maintenance +" is a set of algorithms designed by Airbus engineering and Digital Alliance partners covering a wide scope of failure modes across all ATA chapters" [23].
2. **Health Monitoring:** "supports Line Maintenance, MCC (Maintenance Control Center) and Engineering in identifying, prioritising, handling and analysing in-service events, increasing their reactivity, efficiency and decision-making" [23].

[1] A data lake is a large repository for data storage.

3. **Fleet Reliability:** "automatically integrates all relevant reliability data, enables benchmarking of fleet performance with the Airbus worldwide fleet and identifies root causes and solutions" [23].

Figure 3.7 outlines the value the platform seeks to create for the key stakeholders in the aircraft ecosystem:

Figure 3.7: Values Skywise seeks to create [7]

"In order to build the platform, Airbus partnered with Palantir (a global technology innovator in the data analytics pace). By partnering with an existing organization rather than building the entire platform for scratch, Airbus was able to speed up the development cycle, reduce the upfront financial and time outlays needed to roll-out the system" (Ranger, 2019) [7]. The Skywise system is powered by the Palantir Foundry platform. "Foundry is an operations platform that brings together data, analytics, and operational teams. Designed for both technical and non-technical users, Foundry enables diverse teams to work together on an organization's hardest problems" (Palantir, 2023) [24].

3.3.2 Introduction to Palantir Foundry

"Foundry consists of hundreds of distinct services that cover a wide range of functionality. Together, these services combine to form a modular, end-to-end operations platform with minimal configuration" (Palantir, 2023) [24]. Foundry's services are the following:

- Data integration
- Model integration
- The Ontology
- Application frameworks
- Analytics
- DevOps
- Security

3.3.2.1 Analytics

"Foundry provides analytical capabilities for every type of user in an organization, integrated with the Foundry Ontology. Out of the box, Foundry contains both point-and-click and code-based tools that enable table-based analysis, top-down visual analysis, geospatial analysis, temporal analysis, and more. Analytics in Foundry are designed to go beyond conventional "read-only" paradigms to write data back into the Ontology, producing valuable new insights within unified security, lineage, and governance models" (Palantir, 2023) [24].

Foundry's core Analytics applications include (Palantir, 2023) [25]:

- **Contour**, a top-down analysis application for rapidly exploring tabular data at scale, deriving new datasets through visual transformations, and creating charts.
- **Quiver**, a multimodal charting application that allows for object-driven analysis, time series-driven analysis, point-and-click machine learning, and dashboard building.
- **Code Workbook**, an application that blends data engineering and data science motifs, allowing for Python-, R-, or SQL-driven transformations to be rapidly constructed, building and training machine learning models, and much more.
- **Notepad**, an integrated solution for embedding dynamic analytical, visual, and operational artifacts from across Foundry, alongside formatted text and media.
- **Fusion**, a spreadsheet-driven application that synthesizes tabular computation with the power of Foundry's Ontology and object-driven query system.

3.3.2.2 Contour

"Contour (see fig. 3.8) provides a point-and-click user interface to perform data analysis on tables at scale. These analyses can be used to create interactive dashboards that allow others to explore and investigate the data in a guided, structured way" (Palantir, 2023) [8].

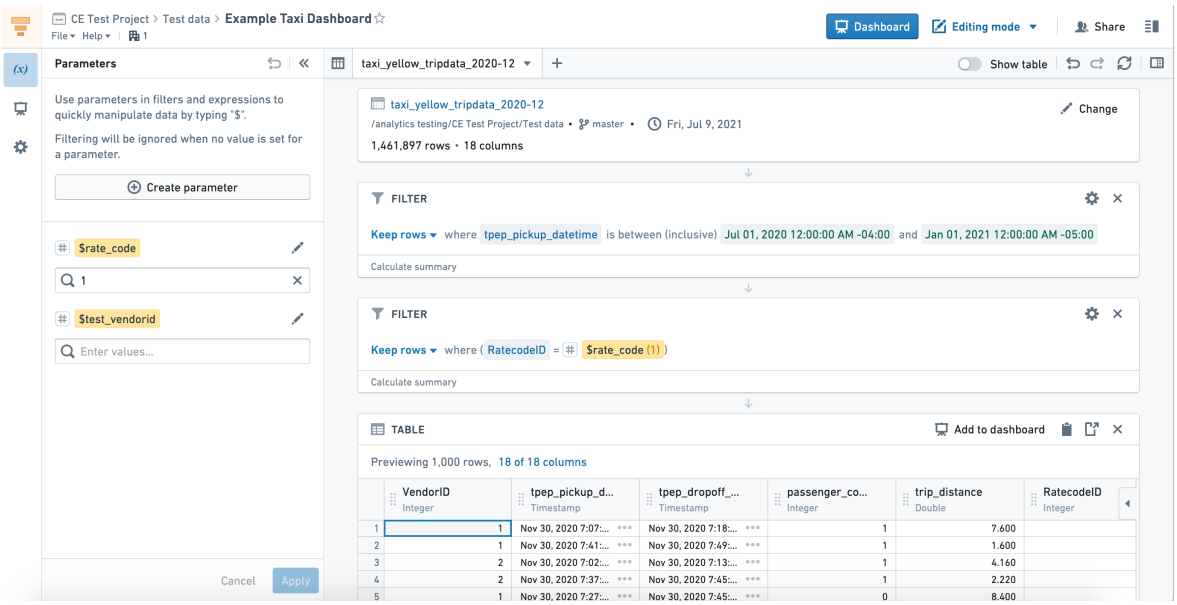

Figure 3.8: Contour [8]

Key features of Contour (Palantir, 2023) [8]:

- Visualize, filter, and transform data without code.
- Organize complex analyses into analytical paths.
- Parameterize analyses to easily switch between different views of the data and results.
- Create interactive dashboards to share findings.
- Save analysis results as a new dataset for use in other Foundry tools.
- Leverage Contour expression language for more advanced transformations and aggregations.

3.4 Project Management and Performance Metrics

"Project management is the process of leading the work of a team to achieve all project goals within the given constraints. This information is usually described in project documentation, created at the beginning of the development process. The primary constraints are scope, time, and budget. The secondary challenge is to optimize the allocation of necessary inputs and apply them to meet pre-defined objectives. The objective of project management is to produce a complete project which complies with the client's objectives. In many cases, the objective of project management is also to shape or reform the client's brief to feasibly address the client's objectives. Once the client's objectives are clearly established, they should influence all decisions made by other people involved in the project – for example, project managers, designers, contractors, and subcontractors. Ill-defined or too tightly prescribed

project management objectives are detrimental to decision-making. A project is a temporary and unique endeavour designed to produce a product, service, or result with a defined beginning and end (usually time-constrained, and often constrained by funding or staffing) undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value" (Wikipedia, 2023) [26]. Project management is applicable to a wide range of industries and can vary in its methodologies. Popular project management methodologies include Waterfall, Agile, Scrum, and Kanban, each with its own set of principles and practices. The goal of effective project management is to achieve the project objectives while balancing the constraints of scope, time, cost, quality, and risk. To meet with these constrains, project managers commonly consult performance metrics or KPI (Key performance Indicators).

"Performance metrics are measurable data used to track processes within a business using activities, employee behaviour and productivity as key metrics. These metrics track and measure the achievement of overall business goals. Performance metrics are a collection of data that employers evaluate against an established objective (like employee productivity or sales objectives). It is important to note the difference between a performance metric and a key performance indicator (KPI). Performance metrics are measured within an area of a business against an established objective or goal. Performance metrics result in broader data than a key performance indicator. A KPI will use a specific target metric to measure performance. For example, a performance metric might measure the productivity of a marketing department compared to a set goal, whereas a KPI would measure how a marketing department contributed to sales from an email campaign" (Indeed Editorial Team, 2023) [27].

The benefits of using project management metrics are listed below (Haynes, 2021) [28]:

1. **Measure team productivity** "Relevant metrics in project management can demonstrate the productivity of a team. For instance, the on-time delivery (OTD) rate or service level agreement (SLA) rate can measure the ROI of the project".
2. **Optimize team performance** "While it is imperative to ensure the team's performance level, forward-looking management looks for areas of improvement. Relevant project metrics allow you to expand your knowledge of project-related details. Overall, project performance measurement eradicates uncertainty and creates avenues for better, more informed decisions".
3. **Track ongoing progress** "Management performance metrics also measure the ongoing progress of a project. This is vital so you can identify the roadblocks early and ensure that there is time to course-correct as needed".

Chapter 4

Case Study

4.1 Methodology

As mentioned in Chapter 2, Alten is a company that provides engineering and technology consulting services. Alten is subcontracted to provide services to companies such as Airbus. One of the projects on which Alten provides consultancy services to Airbus is customer service.

ALTEN's 1Sx Engineering Support team provides support to airlines on various engineering topics such as avionics, structures, and propulsion. As highlighted in Chapter 1 of this work, the focus will be on the 1SYPF team. This team is responsible for handling queries related to the fuel system of any of the Airbus aircraft families. The support this team provides can directly impact aircraft safety and airworthiness. Hence there is a need to always monitor, analyse and enhance its performance.

Therefore, to monitor and improve 1SYPF team's performance within the project, the presented work proposed the development and implementation of a Dashboard designed to monitor specific Key Performance Indicators (KPIs). Although the use of KPIs is already common practice at Airbus, the 1SYPF team managers felt the necessity to implement additional KPIs and improve their analysis through this Dashboard.

The process described in this chapter begins with the identification of the needs and objectives of the 1SYPF Airbus team managers. These objectives were determined through meetings with Airbus representatives. Subsequently, a dashboard specification file was created, translating Airbus' needs and objectives into an initial draft of the process require to fulfil them.

Following this, the Dashboard development and implementation phase commenced. Initially, a study was conducted to identify how to collect the necessary data for its development. Consequently, this data were filtered and analysed to meet the requirements outlined in the dashboard specification. Finally, the Key Performance Indicators dashboard was created using the Contour application, available on the Skywise/Palantir.

4.2 Dashboard Specification

In order to initiate this activity, it was crucial to firstly comprehend what was the primary objective of this Dashboard and the subsequent steps to follow in its development. Follow-

ing a couple of meetings with Airbus representatives, a specification document was drafted. This document encompasses the objective, the process, the tools, and the initial criteria to establish the Key Performance Indicators. There was more than one version drafted of this document due to changes discussed during the meetings. For simplicity purposes only the latest version is exposed in this work.

This specification was as follows:

4.2.1 Objective

The aim of the activity was to:

- Analyse all 1SYPF queries received since January 2023 (monthly update).
- Classify and sort them according to different criteria.
- Share the outcomes on a monthly basis.

4.2.2 Process

Figure 4.1 details the process defined, in an initial phase, to perform this activity. This was not the mandatory process to follow and as it will be presented in afterwards there were some changes at the time of the development.

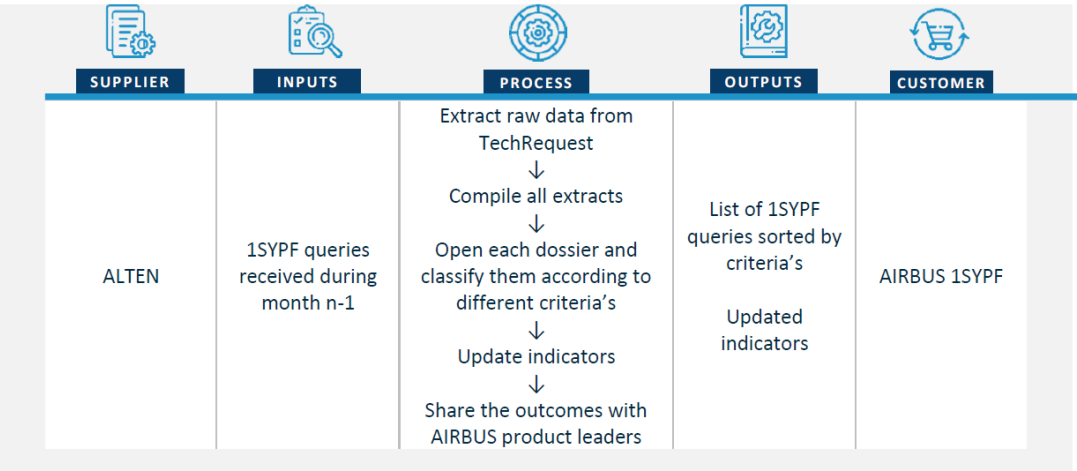

Figure 4.1: Dashboard Development Process

4.2.3 List of Tools

Airbus gave a preferred list of tools/applications to be used in the development process:

- TechRequest

- Excel
- Skywise

4.2.4 Criteria

Airbus made a preliminary list of criteria to classify and sort the queries that were being analysed. This list was later adapted and translated to KPI's.

The list was as follows:

- Program
- Operator
- DO Contribution
- RDAF
- Level of signature (1,2,3)
- Tags (e.g. P&S; Fuel leaks... etc.)
- Urgency
- Number of queries versus the MSN
- Post-treatment status

This specification was key to start with the development the KPI and the dashboard.

4.3 Development/Implementation

4.3.1 Excel and TechRequest extracts

As highlighted in Chapter 3, a web-based application named TechRequest is utilized for tracking and responding to in-service queries. Initially, the most effective method for analyzing these queries was through an extract directly from TechRequest, which was then saved as an Excel file (see fig. 4.2). The study of KPIs commenced in Excel. So, in the initial phase, the dashboard was developed using Excel.

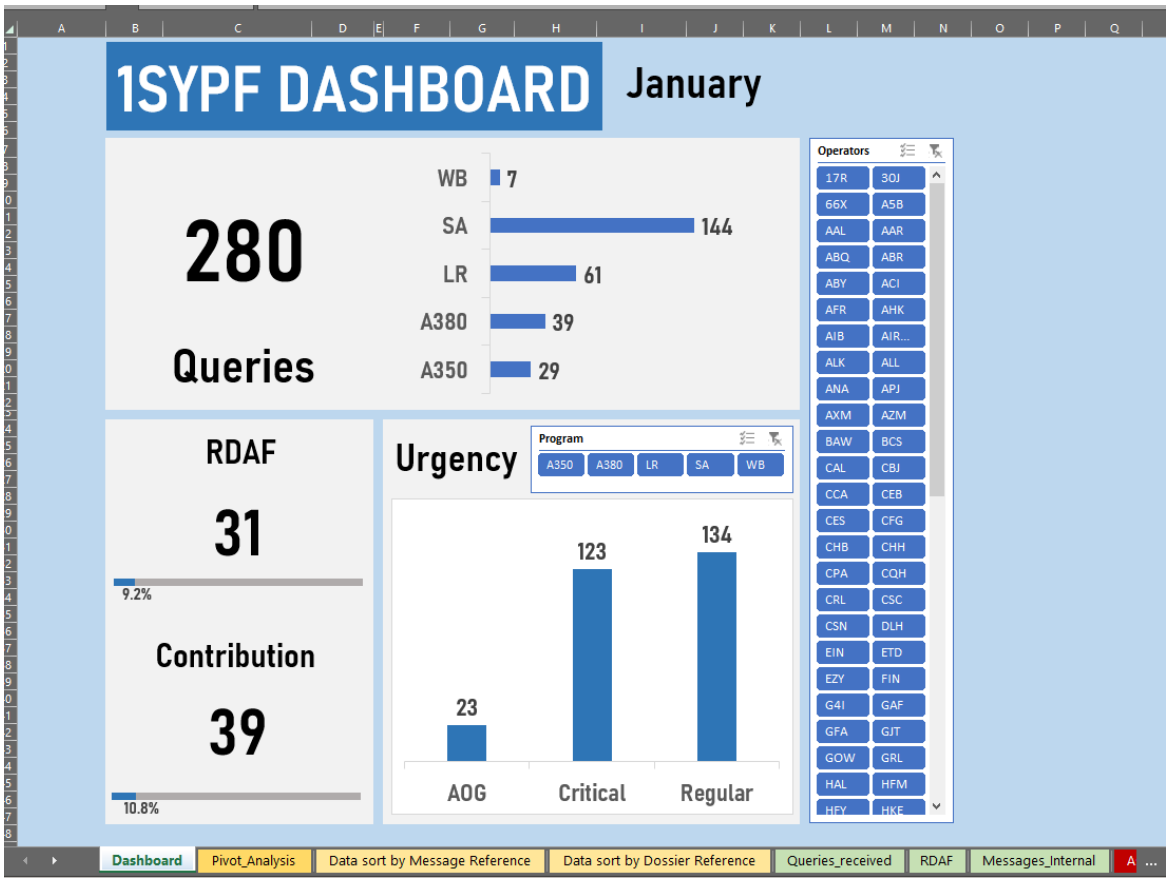

Figure 4.2: Early stages of the Dashboard in Excel

However, the Excel dashboard was eventually discontinued. As specified in the dashboard requirements, there was the need to update it on a monthly basis. This process would consume significant man-hours each month, involving manual extraction of data and manual creation of KPI graphs and charts each time. Recognizing this as an impractical solution, the decision was made to opt for a dashboard that could update automatically. Skywise, was the second option chosen for development.

4.3.2 Skywise datasets and Contour

Recognizing the need for a more streamlined and automated approach, the decision was made to leverage Skywise, a platform that offered the functionality required for real-time updates. Skywise provided a dynamic environment where data could be seamlessly integrated, and the dashboard could evolve without the recurrent need for manual intervention. The migration to Skywise not only addressed the monthly update challenge but also aligned with the broader objective of enhancing overall efficiency in monitoring and analysing the 1SYPF team's performance. The platform's capabilities allowed for a more sophisticated and responsive representation of Key Performance Indicators, fostering a proactive approach to performance management within the Airbus project. The transition process involved adapting the existing specifications to the capabilities of Skywise and ensuring a smooth integra-

tion of data sources. This evolution from an Excel-based system to a dynamic, automated platform reflected a commitment to continuous improvement and a proactive stance in meeting the evolving needs of the project.

4.3.2.1 Dataset Description

Data Source

Skywise features an extensive data catalog, storing information from various different projects within Airbus. It serves as a comprehensive platform for collecting and managing aircraft operational data, which is instrumental in performing predictive maintenance—one of the diverse applications highlighted in Chapter 3. Within the Skywise platform, specific datasets pertinent to TechRequest customer queries are available for analysis. These datasets encompass information related to each query submitted to Airbus's customer support teams.

Data Composition

For the development of this dashboard, a primary dataset and nine supplementary datasets were employed to comprehensively address the data required to display the Key Performance Indicators (KPIs). These datasets collectively cover a broad range of information related to customer queries. At the core of this data are details associated with each customer query, including:

- Query ID
- Title
- Urgency
- Aircraft Program
- Operator ICAO Code
- Query submit date
- Query first planned answer date
- Query answer date

Data challenges and Considerations

The primary difficulty encountered during the development of the dashboard revolved around data quality. While the datasets originated from a source within Skywise they were developed by another party, so the accuracy of the data was not consistently accompanied by all the necessary information for plotting the KPIs effectively. To address this challenge, nine additional datasets were incorporated to supplement the main dataset, as illustrated in the data lineage (figure 4.3). This strategic inclusion aimed to ensure a comprehensive and

reliable foundation for KPI analysis, mitigating any potential gaps in the primary dataset and enhancing the overall robustness of the dashboard's data framework.

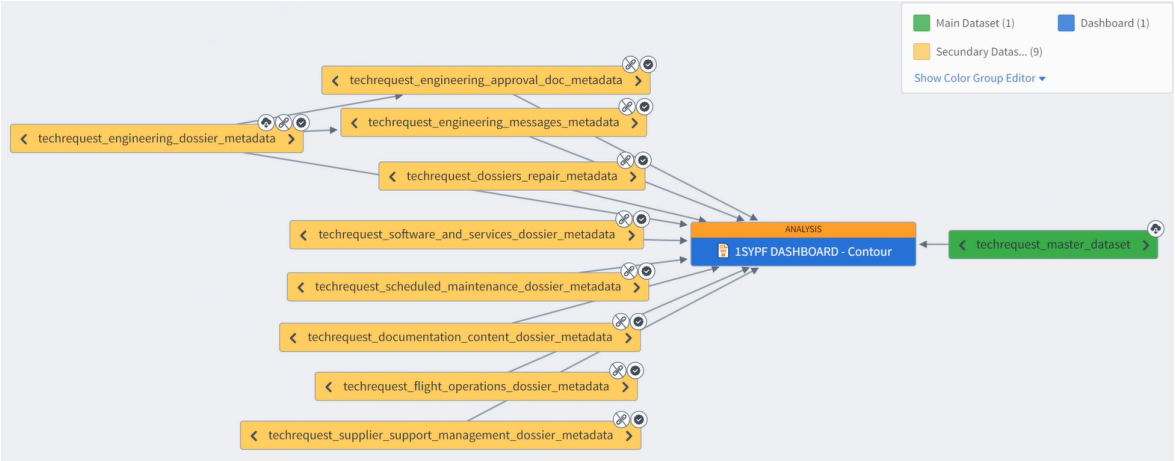

Figure 4.3: Dashboard Data Lineage

Sample Data Illustration

Figure 4.4 provides a glimpse into the main dataset.

techrequest_master_dataset — Showing 300 rows — 73 columns — Search columns…

	id_message String · Message…	messageUrgency String · Message…	messageTitle String · Message…	aircraftProgram String · Aircraf…	aircraftModel String · Message…	msn String · MSN in …	operatorICAOCode String · Operato…
1	80687671/001	Regular	HARNESS PART NUMBER	A380 FAMILY	A380-861	142	UAE
2	80687670/001	Regular	Missing Document	A350 FAMILY	A350-941	358	*empty string*
3	80687669/001	Regular	SL request for PNR D	A320 FAMILY	*empty string*	*null*	*empty string*
4	80687668/003	Regular	FIN 247RH250UG not	A380 FAMILY	A380-842	162	UAE
5	80687668/001	Regular	FIN MISSING IN AWL2	A380 FAMILY	A380-842	162	UAE
6	80687666/003	Regular	DO advice request	A300/A310 FAMILY	*empty string*	445	RJA
7	80687666/001	Regular	A310 / JY-AGQ / EASA	A300/A310 FAMILY	*empty string*	445	RJA
8	80687665/001	Critical	SB SEMB: SB 31-3263R	A330/A340 FAMILY	*empty string*	*null*	*empty string*
9	80687663/001	Regular	SBIT-19-0072 FOR MNB	A330/A340 FAMILY	A330-243F	1332	MNB
10	80687662/001	Critical	Interchangeable P/N	A320 FAMILY	A320-214	5943	ABQ
11	80687661/001	Regular	SL request for PNR F	A330/A340 FAMILY	*empty string*	*null*	*empty string*
12	80687659/003	Regular	PD F21298010-007 A	A330/A340 FAMILY	A330-243	1968,1965	*empty string*
13	80687659/001	Regular	SDR_DO_Mismatch of p	A330/A340 FAMILY	A330-243	1968,1965	*empty string*
14	80687658/001	Regular	Acknowledgement	A320 FAMILY	*null*	*null*	*null*
15	80687656/001	Regular	ETD - A350 - change	A350 FAMILY	*empty string*	*null*	*empty string*
16	80687654/032/2019_Is	Critical	Crack Damage, Metall	A380 FAMILY	A380-861	134	UAE
17	80687654/031	Regular	Request for RDTAS	A380 FAMILY	A380-861	134	UAE
18	80687654/028	Regular	Repair feedback w/o	A380 FAMILY	A380-861	134	UAE
19	80687654/027	Regular	Repair feedback w/o	A380 FAMILY	A380-861	134	UAE
20	80687654/021	Regular	Request for further	A380 FAMILY	A380-861	134	UAE
21	80687654/019	Regular	Feedback on addition	A380 FAMILY	A380-861	134	UAE
22	80687654/016	Regular	Request for further	A380 FAMILY	A380-861	134	UAE
23	80687654/014	Regular	Additional damage	A380 FAMILY	A380-861	134	UAE
24	80687654/006	Regular	Request for repair i	A380 FAMILY	A380-861	134	UAE
25	80687654/005/2019_Is	Critical	Crack Damage, Metall	A380 FAMILY	A380-861	134	UAE
26	80687654/002	Regular	Damage report - Rib	A380 FAMILY	A380-861	134	UAE
27	80687654/001	Regular	Damage report - Rib4	A380 FAMILY	A380-861	134	UAE
28	80687653/003	Regular	PD F352-93034-683A	A330/A340 FAMILY	A330-841	1969,1964	*empty string*
29	80687653/001	Regular	SDR_DO_Mismatch of c	A330/A340 FAMILY	A330-841	1969,1964	*empty string*
30	80687652/001	Critical	Torque Wrench Period	A320 FAMILY	*empty string*	*null*	AIB
31	80687650/001	Regular	"F/CTL AILERON SERVO	A320 FAMILY	A320-216	5501	IBS
32	80687649/007	Regular	Addition of info to	A380 FAMILY	*null*	*null*	
33	80687649/005	Regular	T.O SPEED TOO LOW FM	A380 FAMILY	*null*	*null*	

Calculate row count

Figure 4.4: Dashboard Main Dataset

4.3.2.2 Dashboard Development

Overview of the Dashboard Design

The design of the dashboard (see fig. 4.5) was guided by a user-centric philosophy, aiming to deliver an intuitive and informative interface. The following key principles shaped the design

process:

- User-Friendly Interface: Prioritizing simplicity and ease of use to ensure that both technical and non-technical users can navigate the dashboard seamlessly.

- Visual Clarity: Employing clear and visually appealing representations of data to enhance comprehension and facilitate quick insights into customer query trends.

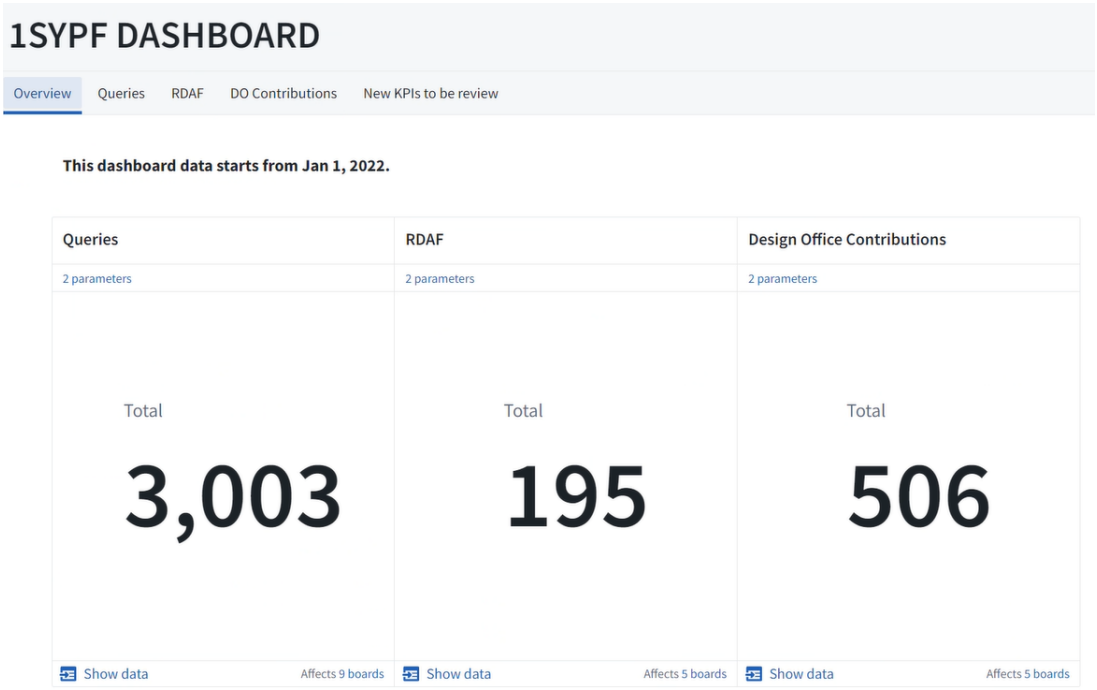

Figure 4.5: Dashboard's first page

The dashboard includes several key features to enhance usability and functionality:

- Real-time Data Updates: The dashboard is designed to receive real-time updates from the Skywise dataset, ensuring that the information presented is current.

- Interactive Charts and Graphs: Utilizing Contour's visualization capabilities to present data through interactive charts and graphs, allowing users to dynamically explore trends and patterns.

- Filtering Mechanisms (see fig. 4.6): Incorporating custom filters for time periods, urgency levels, aircraft programs, and operator codes, enabling users to narrow down the focus and extract targeted information.

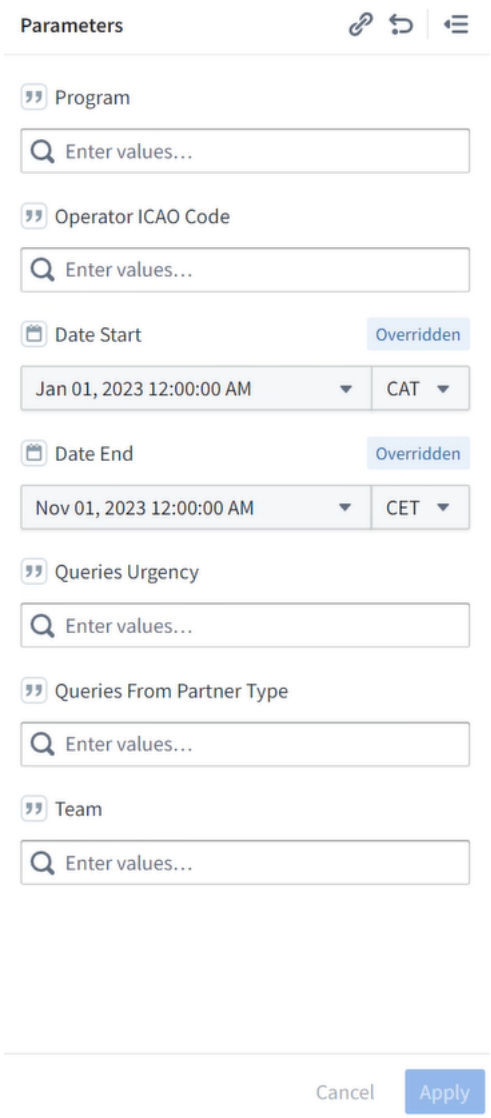

Figure 4.6: Dashboard's Filters

The design process involved close collaboration with Airbus representatives and end-users. Regular feedback loops ensured that the dashboard met the specific requirements and preferences of those who would be actively using it. Adopting an iterative development approach allowed for continuous refinement of the dashboard. Regular testing and feedback cycles ensured that any shortcomings or usability issues were addressed promptly, leading to an improved and polished final product.

4.3.2.3 KPI Selection

The selected KPIs were carefully chosen in alignment with the objectives outlined in the dashboard specification. Collaborative efforts with Airbus's customer support team played a pivotal role in the identification and selection of these KPIs. As the development process unfolded, additional KPIs were introduced, reflecting a responsive and iterative approach to ensure that the dashboard effectively captured and measured the key aspects essential for

monitoring and enhancing the performance of the 1SYPF team within the Airbus project.

Selected KPIs

This section will present some of the Key Performance Indicators (KPIs) to provide an overview of the developed metrics.

- **Volume of Queries**
  This KPI provides an overview of the total number of TechRequest customer queries answered by 1SYPF. Monitoring the volume of queries offers insights into the overall demand for support.

- **On Time Delivery**
  Refer to figure 4.7. On-time delivery measures the efficiency of the customer support team in providing responses within the planned timeframe. This KPI contributes to assessing the punctuality and effectiveness of query resolutions.

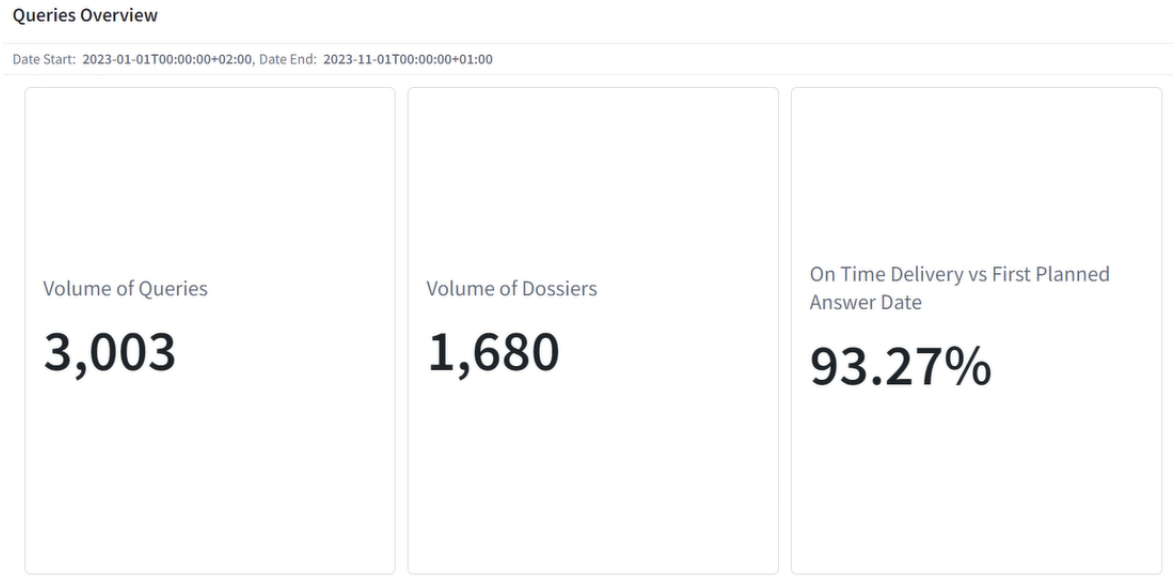

Figure 4.7: Volume of Queries and On time Delivery

- **Volume of Queries Answered vs Aircraft program**
  By categorizing queries based on the associated aircraft program, this KPI allows for a program-specific analysis of customer queries (see fig. 4.8).

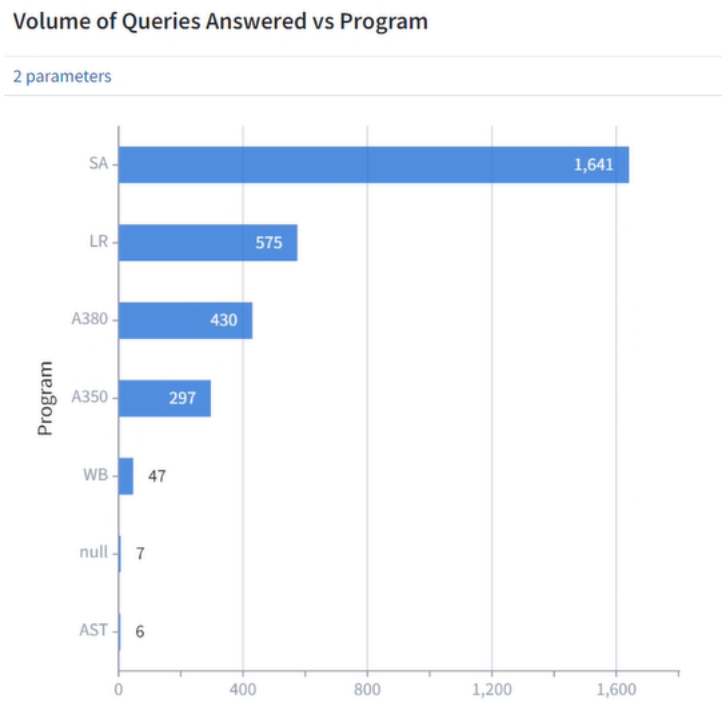

Figure 4.8: KPI for Queries vs Aircraft Program

- **Volume of queries answered by week**
  This KPI provides a temporal dimension to query resolution, allowing for the analysis of weekly patterns. Identifying trends over time enables proactive resource allocation and response planning (see fig. 4.9).

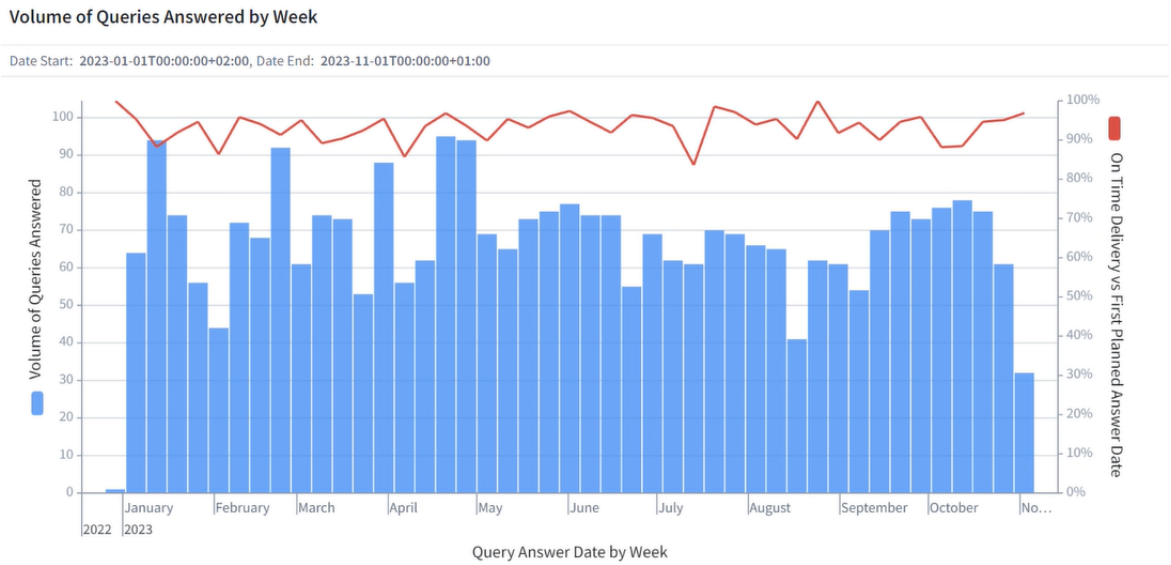

Figure 4.9: KPI for Queries vs Week and On Time Delivery for each week.

- **Queries urgency vs program**
  This KPI examines the urgency levels of queries in relation to the aircraft program. Understanding the urgency distribution across programs aids in prioritizing support

efforts (see fig. 4.10).

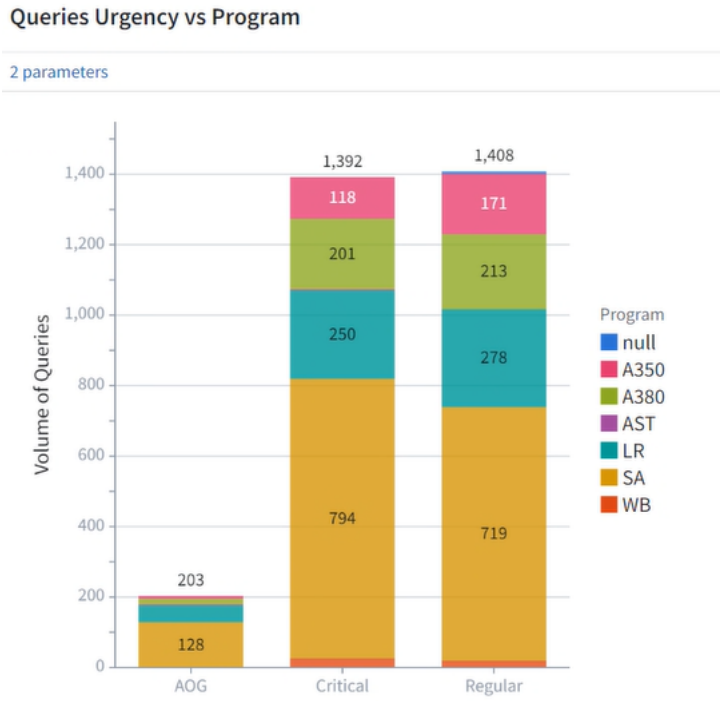

Figure 4.10: KPI Queries Urgency vs Program

- **RDAF**
  This KPI offers an overview of the total number of Repair and Design Approval Forms (RDAF) created by 1SYPF. Monitoring the volume of RDAF offers insights into the overall operators need Engineering/Repair solution beyond those published in the Airbus documentation.

- **Volume of Design Office Contributions**
  Design Office Contributions represent inputs from the design office in resolving queries. Monitoring their volume provides insights into the collaboration between customer support and the design office (see fig. 4.11).

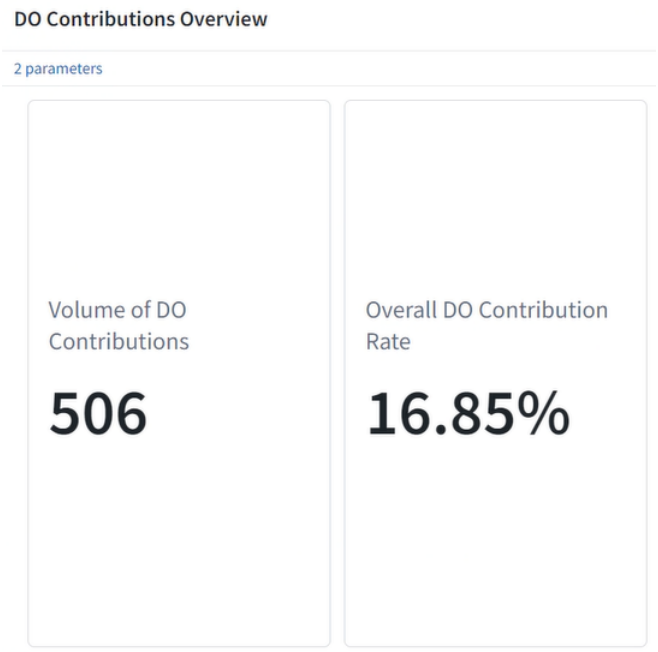

Figure 4.11: KPIs: Volume of DO Contributions and Overall DO Contributio Rate

- **Design Office Contribution Rate**
  The contribution rate assesses the proportion of queries that involve contributions from the design office. This KPI reflects the design office's involvement in query resolutions (see fig. 4.12).

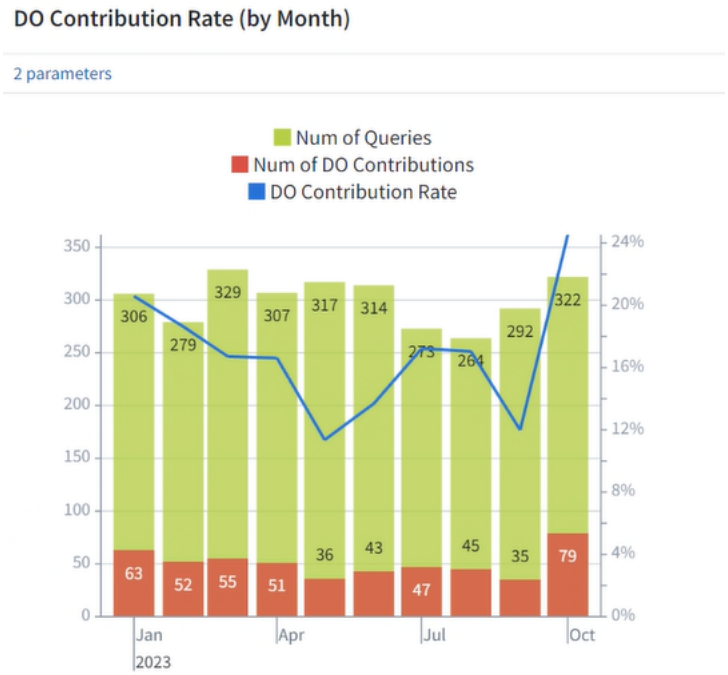

Figure 4.12: KPI DO Contribution Rate

Chapter 5

Conclusions and Future Work

5.1 Conclusions

The careful selection of key performance indicators (KPIs) and a user-centric design approach have established this dashboard as a pivotal tool for monitoring and analysing the performance of the team.

The chosen KPIs, spanning from query volume to the Design Office Contribution Rate, provide a comprehensive understanding of customer queries, enabling targeted interventions and data-driven decision-making across various facets of customer support.

The iterative design process, driven by a commitment to user-friendliness and visual clarity, ensures that the dashboard meets user expectations.

Acknowledgment is extended to my colleagues at Alten and Airbus team leaders whose collaboration and insights were instrumental in the success of this project. Their contributions and commitment to excellence have played a vital role in achieving the outlined objectives.

As we reflect on the success of this dashboard project, the future holds promising opportunities. The iterative development approach and the identified areas for future work lay the foundation for further enhancements, ensuring that the tool remains at the forefront of supporting evolving customer support dynamics.

In conclusion, the dashboard successfully fulfilled its intended purpose and met expectations. Feedback received from both Airbus and Alten representatives was overwhelmingly positive.

5.2 Future Work

The use of a KPI based dashboard is indeed a tool for improving the performance and optimising the use of resources, but there is always room for improvement. In this dashboard, some of the potential areas for improvement include:

- Expanded KPIs: Consider adding new key performance indicators (KPIs) to the dashboard to provide a more comprehensive view of customer support operations.
- Predictive Analytics: Explore the integration of predictive analytics to anticipate customer query trends and proactively address potential issues.

- Expanding the scope of the dashboard by integrating additional parameters. Currently, the dashboard exclusively covers queries from the 1SYPF team, the fuel team. A significant area for improvement involves extending the dashboard's coverage to cover other customer support parameters such as structures, cabin, and more.

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Appendix A

TechRequest Daily Queries

A.1 In-Service Query Example

Figure A.1: In-Service Query Example

A.2 Answering Techrequest Daily Queries Detailed Flowchart

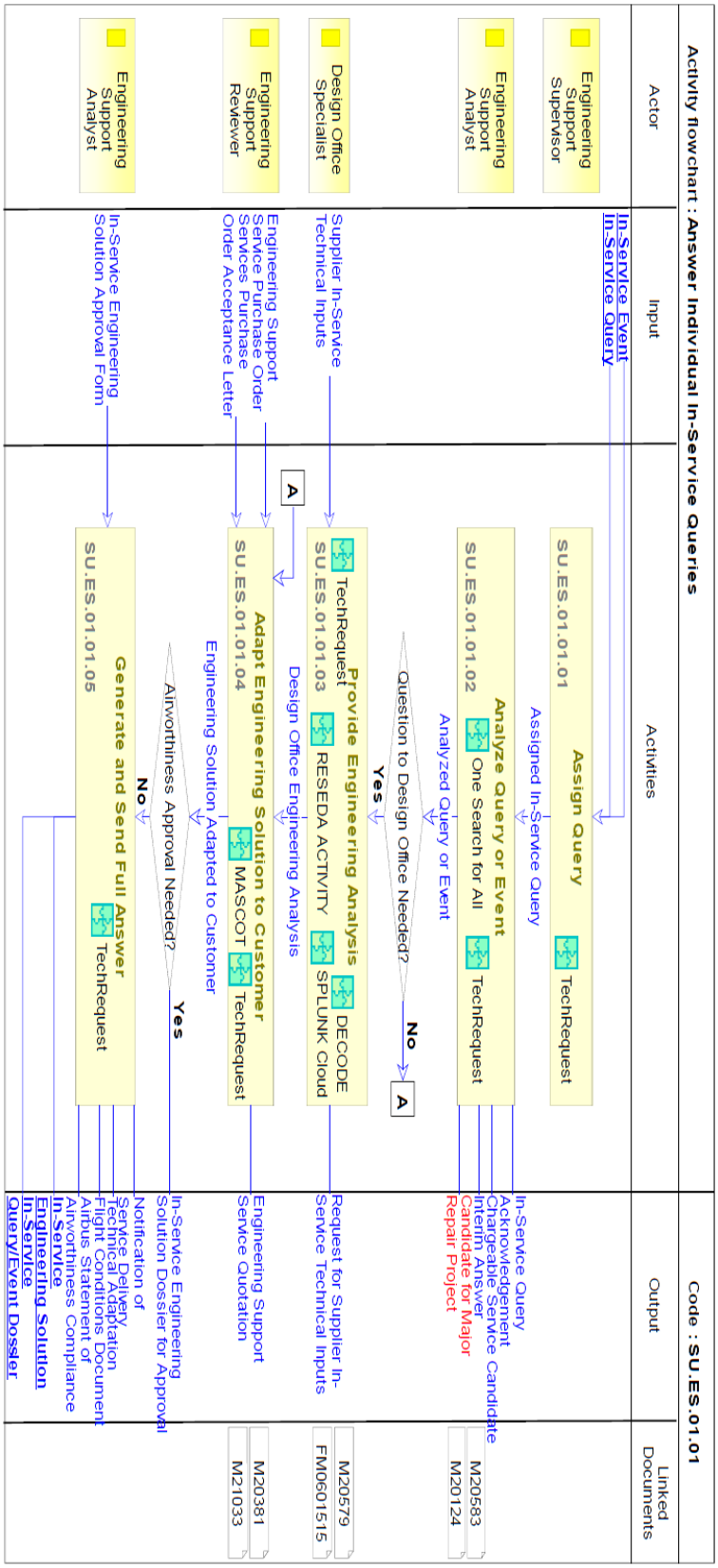

Figure A.2: Answering Techrequest Daily Queries Detailed Flowchart