CAPTURING, RECORDING, REPORTING, AND MONITORING MAINTENANCE RESERVES

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Abstract

This study develops an MVP (Minimum Viable Product) for maintenance reserve to control and pay all aircraft components required in contract between operators and lessors. The calculation methodology was developed based on airline controls on information disclosed through investor relations portals available for public consultation. Maintenance reserves guarantee the lessor that there will be sufficient resources to carry out maintenance checks and tasks. The aircraft must be in perfect flying condition to another operator in case of insolvency of the current operator. The project aims to calculate and recognize Brazilian airlines' payments, which consist of 30% of their current assets. Furthermore, to avoid fraud and sanctions from financial market regulators.

Keywords: *Maintenance Reserve, Leasing, Aircraft Program, Finance, Calculation.*

Introduction

The airline industry is well-known for being a very capital-intensive business. High cash is required to run the business and maintain the value of assets. In this regard, operational leasing has advantages for airlines. Operationally, it provides more flexibility and assertiveness to fleet allocation if compared to direct purchase. When a leasing contract ends, the company renews or returns the aircraft to the lessor (ALC (Aircraft Leasing Company) - Aircraft Leasing Company). Thus, no long-term responsibilities are incurred, as if it was an acquisition (GOMES & FONSECA, 2014).

Financially, it improves cash flow monitoring and preserves working capital and the airline's creditworthiness. There is no asset investment (CAPEX) involved – which could be up to 30% of the aircraft's value, even before it starts operating. In certain countries, including Brazil, leasing can be excluded from the balance sheet, accounting only as lease expenses.

Finally, leasing gives the airline greater predictability of fleet expenses, avoiding unexpected costs. There are, however, potential disadvantages and challenges to aircraft leasing from an airline's perspective. For example, cost, as airlines have access to lower values when purchasing directly from the manufacturer.

This paper will address the challenge related to lessors' requirements for the airline maintenance reserves deposit. Those payments depend on the monthly utilization of the aircraft. And its objective is to guarantee resources to perform mandatory aircraft maintenance. Alternatives to deposits are hiring financial instruments.

Those requirements reflect credit risk and usually are in place when airlines have a weaker credit position. This somewhat limits the airline's cash management, as such

reserves are accounted for as revenue by lessors and create complexities for financial management. It is essential for airlines, having no other solution, to implement adequate controls surrounding such assets. The amounts involved are very substantial and the information to be obtained highly depends on the maintenance planning document. Ensuring that maintenance information is adequately captured considering validity, integrity, valuation, cutoff. Being recorded is vital to guarantee correct balance statement position and decision-making process, including the fleet's size versus capital expenditure.

Problem Statement

Not implementing the correct controls over assets like airframes and motors might lead to a reputational crisis for the airlines. Especially the ones listed on the American Securities Exchange Commission, which must comply with sections 302 and 404 of the Sabernes-Oxley Law. This sort of situation is not so unusual in the industry.

For instance, in 2015, GOL Airlines (GOL et al.) failed to keep adequate support for the maintenance reserve accounting balance, which its external auditors, Deloitte, concealed. The accounting firm was found guilty of violating American Federal Securities Laws and PCAOB Quality Control Standards. Senior leaders received a fine of US$8.5 million and being required to expel ten employees among partners, senior managers, and managers (Folha, 2016). Afterward, at the 2021 year-end, Azul S.A., another major Brazilian airline, was given a significant deficiency related to the matter.

This type of situation can lead to disastrous consequences for a company. It can be avoided if invested in improving the financial management of leasing contracts.

Gathering the correct information in an application or tool that allows agile and accurate access is fundamental to this approach.

Project Goals and Scope

This study aims to develop a technology system that allows the airlines to ensure the amounts related to reserve maintenance. Developing a technological system will provide proper disclosure in its financial statements. Technology will avoid losses due to fraud and improve the decision-making process.

Definition of Terms

LESSOR: someone who leases property or personal property to another lessor.

OPERATIONAL AIRCRAFT LEASING: a contract whereby the lessor or lessor (the company engaged in operating leasing) acquires an asset chosen by its customer (the lessee or lessee) and then leases it to the latter for a fixed term.

CASH FLOW: represents the value that a company contains at present, i.e., the amount of cash that remains in the company after all its expenses have been paid, such as rent, salaries, etc.

CAPEX: is a term that concerns the expenses or investments in capital goods of a company, so it is also called "capital expenditure."

Literature Review

References Sources	Reference Summary

BUGAJ, Martin. (2020, January 10). Aircraft Maintenance Reserves – New Approach to Optimization. Aircraft maintenance reserves – new approach to optimization - ScienceDirect. Retrieved August 29, 2023, from https://www.sciencedirect.com/science/article/pii/S2352146519305836	The author conducted an empirical study that presents a new approach to analyzing and optimizing maintenance management reserves. Many commercial factors lead to protecting the aircraft's value and running the airline in a cost-productive condition, so it is necessary to review procedures and redesign some processes. Maintenance reserve rates and their essential purpose and importance are explored in the study, as well as the calculations and all factors that affect the contracts between lessors and lessees.
CHEMTOB, Danielle. WorldCom, Tyco, Enron - - R.I.P. Available at: https://www.forbes.com/2002/07/01/0701topnews.html?sh=74ca04865397. Accessed on: August 29, 2023.	The article refers to the accounting scandals that occurred at the beginning of 2000, which culminated with the enactment of the Sarbanes-Oxley Act.
FORMULÁRIO DE REFERÊNCIA Azul S.A. – 2022. 5.3 Descrição dos Controles Internos. Available at: https://api.mziq.com/mzfilemanager/v2/d/ed78542a-4e01-429a-8926-03d69ccfa307/b2157754-b701-b389-13a0-7b3fdb332853?origin=1. Accessed on: August 29, 2023.	The form for the fiscal year ended December 31, 2021, filled with the Brazilian Exchange Commission, presented that AZUL had a significant deficiency in its internal controls' environment related to the lack of establishing and timely executing controls related to maintenance reserves.
HANSON, Jay D. The PCAOB, Its Current Activities, and Impact on Preparers. Available at: https://pcaobus.org/news-events/speeches/speech-detail/the-pcaob-its-current-activities-and-impact-on-preparers_620#:~:text=The%20PCAOB%20was%20established%20in,governance%20over%20the%20auditing%20profession. Accessed on: August 29, 2023.	The speech refers to U.S. Government actions taken aiming to reestablish the trust level and have more governance in place, the American Government, through enacting the Sarbanes & Oxley Act (Sox Act), created the Public Company Accounting Oversight Board (PCAOB)

IATA. (2017, May). Guidance Material and Best Practices for Aircraft Leases. Retrieved August 29, 2023, from https://www.iata.org/contentassets/bf8ca67c8bcd4358b3d004b0d6d0916f/ac-leases-4th-edition.pdf	The guidance material released by IATA explains the mechanisms of maintenance reserves as well as its importance for airlines operating in South America and how it is used to ensure the existence of sufficient resources for future maintenance activities protecting assets values.
KWON, S. H., & DESHMUKH, A. (2022). Earnings management and instances of material weaknesses reported under Sections 302 and 404. Asia-Pacific Journal of Accounting & Economics, 29(6), 1540–1559. https://doi.org/10.1080/16081625.2019.1681282 . Accessed on August 29, 2023.	The author clarifies that Section 302 requires companies' management to assess the effectiveness of the company's internal controls and procedures, express opinions on the effectiveness of the internal controls, and certify annual or quarterly financial statements.
Langmann, C., & Turi, D. (2022). Robotic Process Automation (RPA) - Digitization and automation of processes. In Springer eBooks. https://doi.org/10.1007/978-3-658-38692-4	The author describes that there are three automation models: Robotic Desktop Automation (RDA), Robotic Process Automation (RPA), and Intelligent Process Automation (IPA). Robotic Process Automation (RPA) allows automation to be created that replaces manual inputs. He mentions that RPA can also be created and adapted to the systems and processes already implemented in organizations. In this way, there is no need to modify the already established flows. As it is a simple system to implement, the intellectual capital required to develop it is low, which makes its development and operating costs cheaper.
PCAOB. AS 2201: An Audit of Internal Control Over Financial Reporting That Is Integrated with An Audit of Financial Statements. Available at: https://pcaobus.org/oversight/standards/auditing-standards/details/AS2201 . Accessed on: August 29, 2023.	The regulation set up section 404 of the Sarbanes-Oxley Act seeks to enhance internal controls over financial reporting, including a requirement that the company's management assess and report on the effectiveness of the company's internal control and a requirement for the company's independent auditor to attest to management's disclosures regarding the effectiveness of its internal control. The

	regulation also establishes the definition of material weakness and significant deficiency.
PCAOB ORDER INSTITUTING DISCIPLINARY PROCEEDINGS, MAKING FINDINGS, AND IMPOSING SANCTIONS. Available at: https://assets.pcaobus.org/pcaob-dev/docs/default-source/enforcement/decisions/documents/105-2016-031-deloitte-brazil.pdf?sfvrsn=96e25af2_0. Accessed on: August 29, 2023.	The order issued by PCAOB is related to the fact that GOL Linhas Aereas, during the fiscal year ended December 31, 2011, was not able to put in place adequate controls related to maintenance reserve balances. The company's auditors, Deloitte, covered up such conditions and tried to embellish its working paper to deceive PCAOB investigators. As a consequence, Deloitte had to pay a penalty of US$8 million and had to expel 12 professionals from its activities.

Methodology

Maintenance Reserves Definition and Importance to Airlines Industry

Risk is usually in place and inherent in most businesses. Therefore, companies are always aware and act to mitigate it. In aviation, maintenance reserves are commonly used in leasing models. The literature does not present any case about maintenance reserves being practiced in the US or Europe. Although, in regions with more volatile economies, such as South America, this is vastly performed as a risk reduction practice.

In the context of airline operations, aircraft are valuable assets that require regular maintenance to ensure their operability and safety. In this context, aircraft leasing contracts have emerged as a flexible tool, allowing airlines to acquire and operate aircraft without needing a substantial initial investment. Within the South American reality, this factor is even more critical.

One of the essential aspects of these contracts is the Maintenance Reserve. This mechanism refers to a financial fund accumulated over time to cover future aircraft

maintenance costs. The lessees (airlines) make regular payments to the lessor (owner or leasing company) to accumulate funds (credits) that will be used for maintenance in the future throughout the contract. This mechanism ensures that, at the end of the aircraft lease, the aircraft is returned to the lessor in pre-agreed condition. In short, it is a way to ensure that the resources needed for maintenance are available, thus protecting the lessor's investment and ensuring continued operability for the airline.

Maintenance reserve amounts are calculated based on flight hours, flight cycles, or calendar time consumed (whichever is the relevant factor for the specific item of equipment) and as a proportion of the estimated cost of specified (future) maintenance events. The objective of both parties when agreeing with provisions related to maintenance reserves is to adequately cover the anticipated cost of labor and material used for the specified maintenance event. (IATA, 2017) Maintenance reserve payments are generally structured around specific maintenance events, such as engine overhauls, cabin interior renovations, or major inspections. The leasing contract determines the amount to be paid and the frequency of these payments.

When evaluating advantages for the lessor, the main point is the guarantee that funds are available to keep the aircraft in good condition. This evaluation helps preserve the asset's value and ensure that the aircraft can be leased again or sold without excessive devaluation due to lack of maintenance. As for airlines, they benefit from having a structured financial mechanism to plan and pay for maintenance. This mechanism provides predictability in costs and helps avoid financial surprises or operational disruptions due to a lack of maintenance funds.

Martin Bugaj et al. (2019) conducted an empirical study that presents an innovative approach to analyzing and optimizing maintenance management reserves. Many commercial factors lead to protecting the aircraft's value and running the airline in a cost-productive condition, so it is necessary to review procedures and redesign some processes. Maintenance reserve rates, their essential purpose and importance are explored in the study, the calculations and all factors that affect the contracts between lessors and lessees.

Fleet Size, fleet age, Aircraft type, and operational environment are factors present in the study, and they all impact the negotiation for the Maintenance Reserve. That is why it is so essential for airlines to be cautious when negotiating. Costs can be high, and airlines constantly seek cost reductions.

Data Collection

Sarbanes-Oxley Requirements and Impacts Due to a Lack of Adequate Controls over Maintenance Reserves

At the beginning of 2000, the finance world was shaken by several accounting scandals involving companies like Enron, WorldCom, Xerox, Tyco, Global Crossing, etc. (Forbes, 2002). Consequently, the public and investors became suspicious of auditors and their role. At the time, these concerns contributed to much investor unease about the U.S. capital markets (PCAOB, 2016). Therefore, aiming to reestablish the trust level and have more governance in place, the American Government, through enacting the Sarbanes & Oxley Act (Sox Act), created the Public Company Accounting Oversight Board (PCAOB). The primary purpose of the newly created organism was to oversee the audits of public companies to protect investors and the public interest by promoting informative,

accurate, and independent audit reports. The PCAOB began operations in April 2003. (PCAOB, 2016).

Among several requirements introduced by the Sox act, it is of interest to this study to highlight sections 302 and 404. According to Kwon & Deshmukh, Section 302 requires companies' management to assess the effectiveness of the company's internal controls and procedures, express opinions on the effectiveness of the internal controls, and certify annual or quarterly financial statements. On the other hand, Section 404 of the Sarbanes-Oxley Act seeks to enhance internal controls over financial reporting, including a requirement that company management assess and report on the effectiveness of the company's internal control and a requirement for the company's independent auditor to attest to management's disclosures regarding the effectiveness of its internal control (PCAOB, 2016). In turn, the auditor's objective in an audit of internal control over financial reporting is to express an opinion on the company's internal control over financial reporting's effectiveness.

A company's internal control cannot be considered adequate if one or more material weaknesses exist. To form a basis for expressing an opinion, the auditor must plan and perform the audit to obtain sufficient evidence. Also, they must obtain reasonable assurance about whether material weaknesses exist as of the date specified in management's assessment (PCAOB – AS 2201). A material weakness in internal control over financial reporting may exist even when financial statements are not materially misstated or even considering the existence of multiple significant deficiencies. PCAOB, AS nº5, defines material weakness and significant deficiency as set forth below:

In 2016 PCAOB states that "A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the company's annual or interim financial statements will not be prevented or detected on a timely basis." "A significant deficiency is a deficiency, or a combination of deficiencies, in internal control over financial reporting that is less severe than a material weakness, yet important enough to merit attention by those responsible for oversight of the company's financial reporting." As part of the audit process at GOL and AZUL, it was identified that both Companies, at a certain point in time, were not able to establish adequate controls over maintenance reserves, as detailed below.

Case: GOL

As part of its business model, GOL leases aircraft and engines and deposits monies with the lessors for future maintenance. In 2009 and 2010, Deloitte Brazil was responsible for the airline's accounting audit. The firm concluded that GOL did not adequately track the use of maintenance deposits on a contract-by-contract basis. According to the firm, these assets reported by the airline could have been overestimated by 6% to 5%. According to the PCAOB (Public et al.), Deloitte Brazil did not obtain sufficient audit evidence to support GOL's maintenance deposit accounting, among other violations. Opinions on the 2010 financial statements were issued without reservations, which resulted in sanctions against the firm and a fine of 8 million dollars.

Case: AZUL

With a lower severity level, AZUL also had difficulties establishing an adequate process surrounding the activities related to maintenance reserve controls. As mentioned

in the Formulário de Referência filed by the company with the Brazilian Security Exchange Commission, for the fiscal year ended December 31, 2021. The company's auditors identified a significant deficiency related to the control of circularization of the maintenance reserve balances, which, despite the confirmation of the presented balances of the balance sheet, the execution of the control was untimely.

Interventionist Research Definition

The study was developed based on interventionist research (IVR). According to The Global Health Network Organization, "research can be either observational or interventional. Interventional studies involve making a change – or intervening - to study the outcome of what has been changed." Additionally, Lukka (2006) stated that "IVR aims to narrow the gap between practice and academic theory. The interaction between practitioners and researchers, and their interchange of knowledge and ideas, is an essential part of the process. A key feature is that the researcher becomes more actively involved with problem-solving or change processes in one or more real organizations, while also having the chance to develop and contribute to academic theory."

Lukka goes further explaining that "The major differences from traditional case research are that interventionist researchers are directly involved with the case and do not try to avoid having an effect. They transform the inescapable feature of case studies that they become immersed in into a key research asset. The research takes place as part of the daily life of the host organization. This means that the researcher is viewed as a participant in the organization and is treated as "one of us", not as a "tourist". This observation as a participant, rather than as an outsider in non-interventionist case research, is essential to the collection of empirical materials in interventionist research."

Furthermore, the author clarifies that “host organizations potentially benefit from interventionist research because it puts managerial problems under critical scrutiny to resolve them. Most practitioners struggle to keep track of the theoretical literature that is relevant to their current problems. Past hosts have also highlighted the fact that academic researchers offer a more profound theoretical knowledge than, for example, consultants, and are free from bias towards specific solutions.”

Interviews

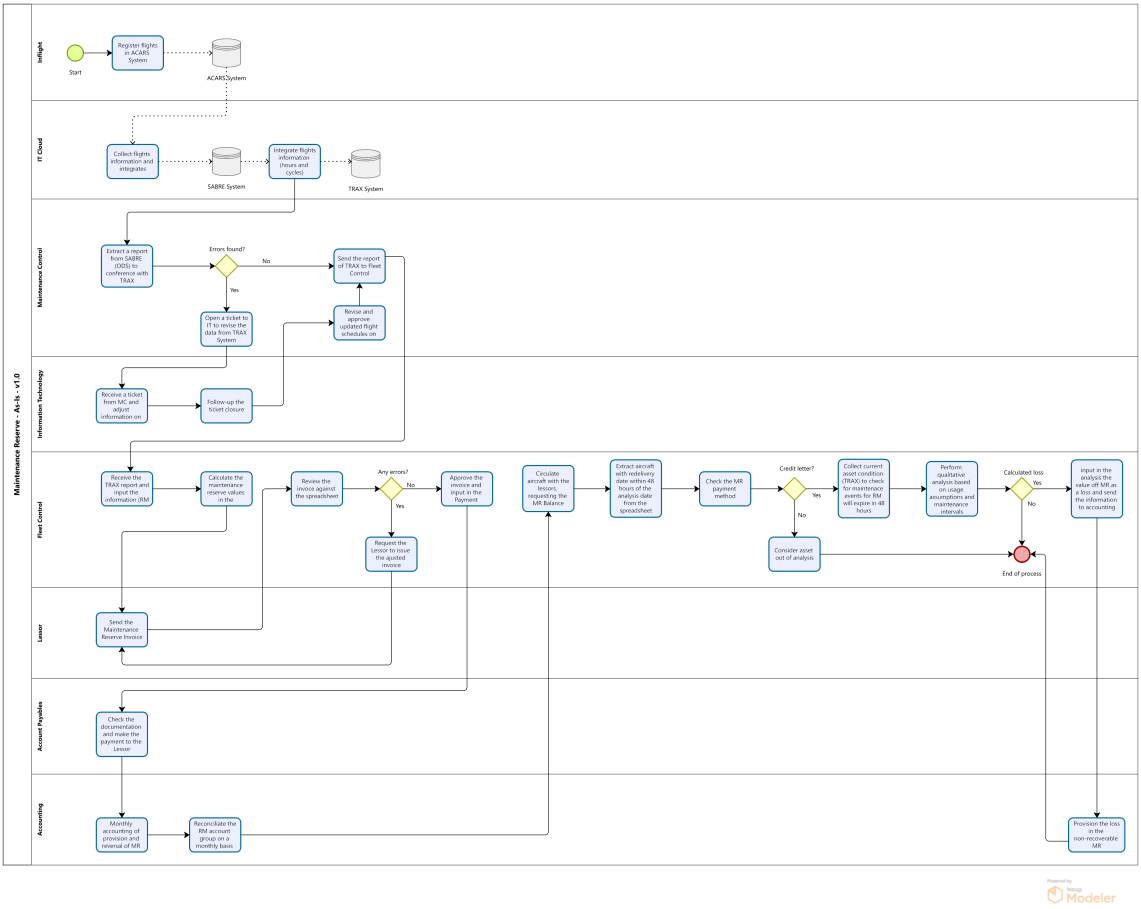
Interviews were conducted with the areas responsible for controlling the processes within Azul and Gol. The interviewees included managers, specialists and fleet and engine analysts from the companies. The current process was presented with all the step-by-step information extraction, consolidation, and calculation of the MR values, of an aircraft as an example. The process consists of extracting information from the companies' operational systems. This information is the number of cycles and flight hours flown by each aircraft in a month. This information is entered into an excel spreadsheet which contains all the calculation variables by factor and component for each aircraft. The components are engines, main landing gear (MLG), nose landing gear (NLG), airframe and auxiliary power unit (APU).

This spreadsheet records month by month how many cycles (CY) and flight hours (FH) have been carried out since the beginning of the aircraft's life. These two variables are necessary because depending on the component, a different variable will be used. It is also possible to check by month which variables, calculation memorandum and amount paid to the lessor have been used. Occasionally, there are credits in favor of the operator with the lessor which are also checked monthly in this spreadsheet.

According to the interviewees, there is a lot of effort involved in extracting and consolidating the files, as it is work totally manual. It also makes it difficult to enter the information into the control spreadsheet. As the fleet grows and new contracts are signed, it becomes necessary to create new spreadsheets. With the need to adjust the calculation factors based on the agreements signed with the lessor. These spreadsheets require recurring revisions to validate the amounts to be paid. It is necessary to adjust the factors every time there is a renegotiation with the lessor to adjust the amounts. Considering a fleet of 150 aircraft and dozens of different lessors, this work practically consumes an analyst for the entire month.

BPM Model - As Is Process

Based on the As Is process as it is operationalized today at Azul Linhas Areas, this study intends to use this process model as a starting point.



Data Analysis

As shown in the BPM – As Is process Design, the data is retrieved (within the scope of the company area selected for the study in question), and according to the mapped origins, making up the maintenance reserve database. Today this database is kept in an excel spreadsheet by the freight control department. The information contained in the excel file is discriminated with all content details in the Apendices.

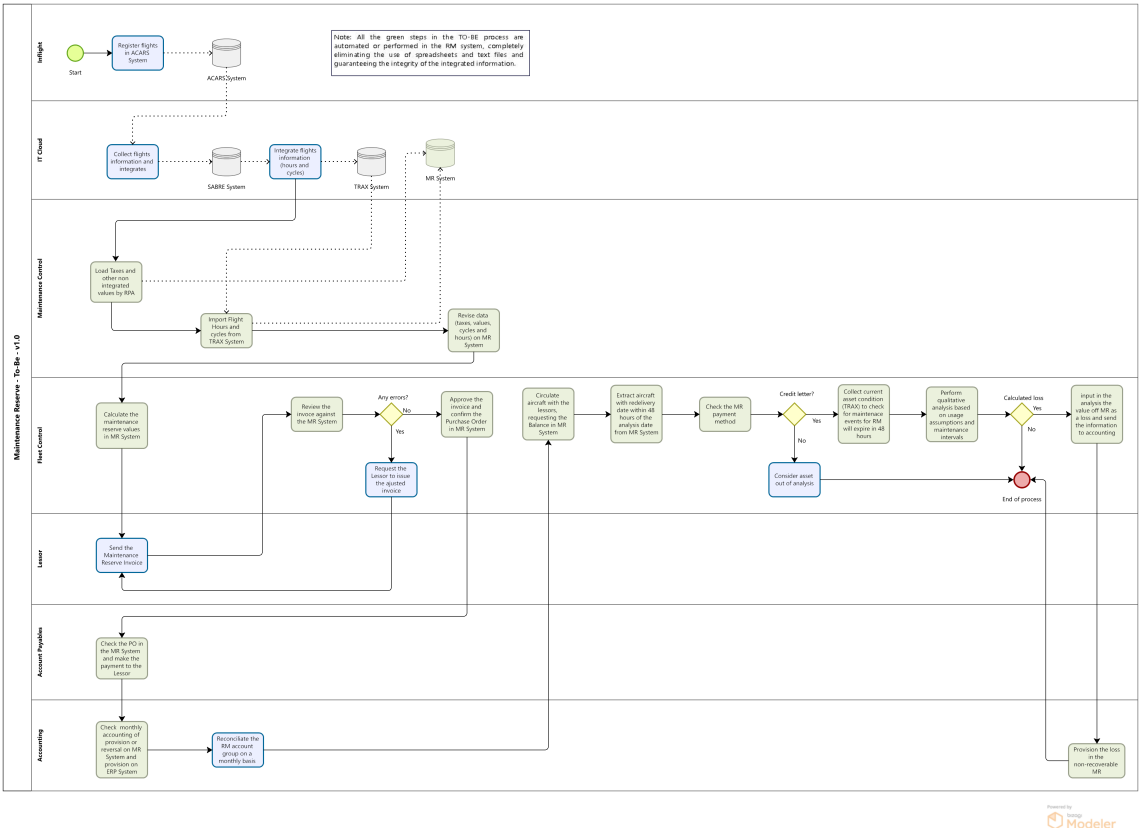
The main source of data for the maintenance booking process comes from the TRAX system (according to step 6 of BPM – As Is process Design). The data is extracted through the TRAX system's own data export functionality. In the AS-IS process, the way the data is shared is not considered 100% secure, as there is no data encryption to protect

the generated spreadsheet, which also exposes a major point of failure in the process, as the original data could easily be altered or manipulated.

The data is interpreted humanely by a user with a high level of knowledge of the process, the origin of the data and the systems that generated the information. The data analyzed was used from the airline's actual base and is considered reliable, accurate and factual as it has been duly validated by Lessor.

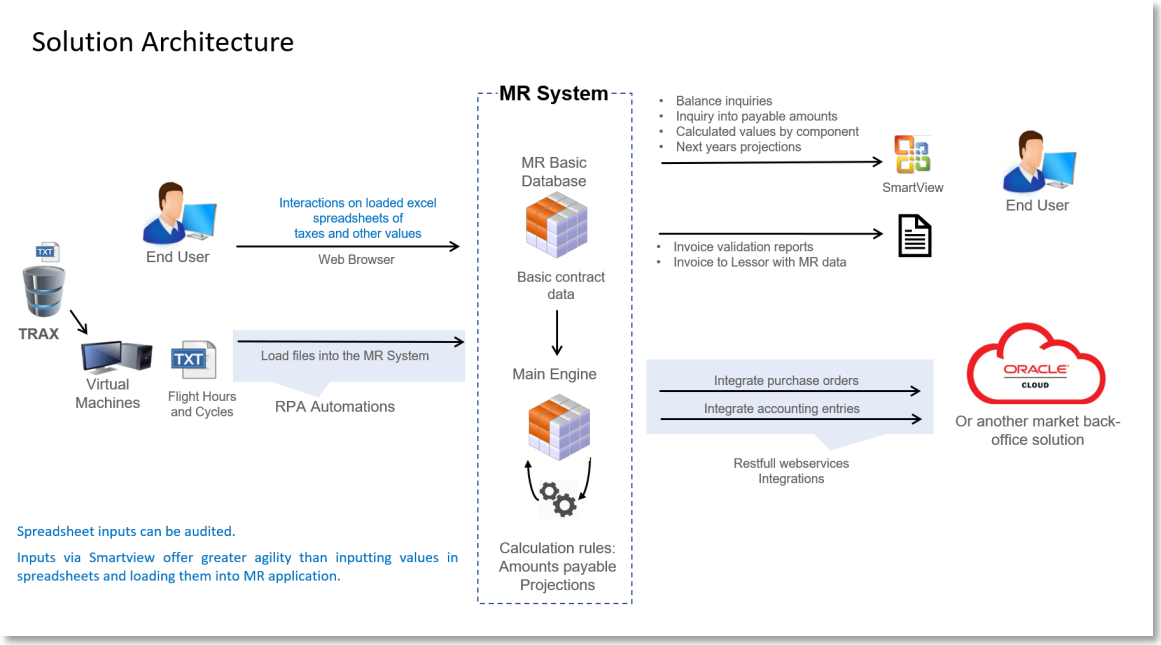
Project outcomes

The design of the To Be process provides a clear vision of the optimizations of the current process. It eliminates interaction with areas that are not necessary for the flow of information, as well as highlighting the automated steps. It gives more reliability and security in the integrations with the departments involved.



System outcomes (Solution Architecture)

This figure illustrates the solution architecture context of the Maintenance Reserve system would look like after implementation.



Business outcomes

The construction of the MVP of a computer system to control maintenance reserve proved viable in generating significant and long-term results, transforming how aircraft leasing operations are managed and optimized. This capstone project addressed the specific challenges faced by automating tasks and minimizing manual interactions with information. It also provided a basis for future advances in the maintenance booking management process. Here are the main results of that study:

Simplified maintenance maintenance reserve management: The computer system, in line with the To Be process, set out to successfully simplify maintenance reserve management, making it more efficient and user-friendly. It replaces manual processes

based on spreadsheets or files with automated workflows. It also reduces the likelihood of errors and delays in booking calculations.

Improved decision-making: The system's data analysis capabilities enable maintenance and fleet control teams to make more assertive decisions. It provides real-time information on each control stage. It also improves the ability to allocate resources in each area more effectively, and reduces the time spent on the process.

Cost savings: More significant cost savings will be achieved by better-managing maintenance reserve. The system will support the optimization of payment schedules and minimize the risk of financial penalties associated with non-conformities.

Improved reporting and transparency: The system also features automated integration with back-office systems to enhance reporting. It provides clear visibility of the results of maintenance bookings in the finance and accounting departments. This transparency makes it possible to improve communication and accountability within each department involved in the process.

Scalability: The system's architecture and design are scalable. It allows expansion and future integrations with other airline systems and processes. This adaptability positions it well for future growth and technological advances in the aviation sector.

Conclusions and Recommendations

This paper proposes an automated solution for managing aircraft lease maintenance reserve for airlines. It highlights the benefits of this solution for enhancing the efficiency, security, and accuracy of this process. Moreover, this solution can serve as a basis for further implementations in improving and automating a vital airline process using a similar approach.

The system is designed to be scalable for future integration with other airline back-office systems and adaptable to different airlines' situations. In addition, the project can be improved after the system has been deployed in an airline, following the next steps outlined below.

Conclusions

Aircraft leasing is widely used in aviation worldwide as a fleet management solution. Despite its many benefits for airlines, significant challenges require attention from company management. The main one is maintenance reserves, which are addressed in this paper. Poor control of such requirements can lead to severe consequences: both reputational and substantial financial penalties. The sheer size of the financial resources, the calculation complexity, and the volume of information mean that managing maintenance reserves is risky for the administration.

Once no complete solution is available to automate maintenance reserve management activities, there is an opportunity to develop a tool for this purpose. The MVP proved feasible, capable of generating results and being applied long-term. The system's potential benefits, aligned with process redesign (To Be), are diverse. Automating processes reduces the probability of miscalculations and late payments. The system provides real-time information on each control step, reducing the overall process time. Decision-making by the maintenance and fleet management teams becomes more assertive with the new process and improves resource allocation to each area involved. It also increases transparency and enhances communication and the division of responsibilities between departments.

Recommendations

This paper meets the objective by redesigning the processes and developing an MVP. To conclude the project, there are still stages to be performed in addition to the delivery of the system by Azul Airlines' systems development team. The course of activities is defined below:

1. Finalize the system development from the MVP.
2. Pre-implementation testing phases.
3. Implementing the system at Azul Airlines and calibrating the system.

Besides the practical application of this paper in the real life of an airline, it is essential to note that the system's architecture and design are scalable, which allows expansion and future integration with other company systems. Given the system's adaptability, another possible next step would be to implement the system in other airlines. GOL Airlines is recommended here since a gap in automating these processes was identified in this other Brazilian airline.

APPENDICES

Components

Airframes

LLP - Limited Life Parts (for each engine)

EPR - Engine Performance Restoration - Every 7 years

Nose LG - Nose landing Gear

Main LG LH - Main Landing Gear (Left)

Main LG RH - Main Landing Gear (Left)

APU - Auxiliary Power Unit

Maintenance Reserve Control Structure:

Source of information: TRAX system

Column A (PERIOD) - Aircraft History (since arrival)

Column B (FH) - Flight Hours - Hours flown

Column C (FH Dec) - Conversion of hours to decimals

Column D (FC) - Flight Cycles

Column E (APU H) - APU hours (in decimals)

Column F (APU FC) - APU cycles

Column G (TSN) - Time Since New (in decimals)

Column H (CSN) - Cycles Since New

Column I (APU TSN) - APU Time Since New (in decimals)

Column J (APU CSN) - APU Cycles Since New

Invoices information (from Lessor) - Performance restoration (EPR #1)

Column K - Invoice value

Column L - Current value (rate table value for the corresponding year)

Column M - Variation

Engine #1 Information

Column N - Location (Which engine)

Column O - ED - Contract Variation

Column P - RATIO - Engine power (from the manufacturer's website, collected every month) - (FH Dec / FC) - How to get this information from the manufacturer's website

Column Q - FH - Flight Hours

Column R - FH Dec - Flight Hours (in decimals)

Column S - FC - Flight Cycles

Column T - TSN - Time Since New

Column U - CSN - Cycles Since New

Invoice Information (from Lessor) - LLP #1

Column V - Invoice value

Column W - Current value (rate table value for the corresponding year)

Column X - Variation

Invoice information (from Lessor) - Performance restoration (EPR #2)

Column Y - Invoice value

Column Z - Current value (value from the rate table for the corresponding year)

Column AA - Variation

Engine Information #2

Column AB - Location (Which engine)

Column AC - ED - Contract Variation

Column AD - RATIO - Engine power (from the manufacturer's website, collected every month) - (FH Dec / FC)

Column AE - FH - Flight Hours

Column AF - FH Dec - Flight Hours (in decimals)

Column AG - FC - Flight Cycles

Column AH - TSN - Time Since New

Column AI - CSN - Cycles Since New

Invoices Information (from Lessor) - LLP #2

Column AJ - Invoice value

Column AK - Current value (rate table value for the corresponding year)

Column AL - Variation

Airframe (6Y) #1 - Maintenance 6 years

Column AM - Invoice value

Column AN - Current value (rate table value for corresponding year)

Column AO - Variation

Airframe (12Y) #1 - Maintenance 12 years

Column AP - Invoice value

Column AQ - Current value (rate table value for corresponding year)

Column AR - Variation

Nose LG (Nose Landing Gear)

Column AS - TSN - Time Since New

Column AT - CSN - Cycles Since New

Column AU - Invoice Value

Column AV - Current value (rate table value for the corresponding year)

Column AW - Variation

MAIN LG LH (Main Landing Gear Left - Hours)

Column AX - TSN - Time Since New

Column AY - CSN - Cycles Since New

Column AZ - Invoice value

Column BA - Current value (value from the rate table for the corresponding year)

Column BB - Variation

MAIN LG RH Main Landing Gear Right - Hours)

Column BC - TSN - Time Since New

Column BD - CSN - Cycles Since New

Column BE - Invoice value

Column BF - Current value (value from the rate table for the corresponding year)

Column BG - Variation

APU

Column BH - TSN - Time Since New

Column BI - CSN - Cycles Since New

Column BJ - Invoice value

Column BK - Current value (rate table value for the corresponding year)

Column BL - Variation

Totals

Column BM - Invoice value

Column BN - Current value (rate table value for corresponding year)

Column BO - Variation

Extra Information

Column BP - Credit or True Up History

Column BQ - Notes

Column BR - Invoice Number (BLUE)

Column BS - Description

Column BT - Due Date

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Appendix A: Definitions. (n.d.). Default. https://pcaobus.org/oversight/standards/archived-standards/pre-reorganized-auditing-standards-interpretations/details/Auditing_Standard_5_Appendix_A

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