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Game Design

Introduction:

The Game design page aims to focus on designing the game format, crucial contents and details related to background and client's requirements. There are three subsections:

Gameplay Page

This page discusses the main components and some of the preliminary design of the game by the development team.

Plot Page

This page discusses one of the main game elements, the plot. It lists some related components of the plot, characters, decisions, outcomes, and so on.

Characters Page

This page discusses the design of the game's characters. Furthermore, it describes details and the information about each character.

Decision Tree

This contains the decision tree, comprising the final version of the plot and game content

To learn more information about the subsections, please follow the links below:

- [Gameplay](#)
- [Plot \(draft\)](#)
- [Characters](#)
- [Decision Tree \(Final plot\)](#)

Gameplay

Game Principles

- A 5-player game, where each player assumes the role of a key 'player' at Boeing during the 737 MAX project. It is likely that the company, and project, will be re-appropriated to conceal any linkage to the 737 MAX, since much about the consequences of this project is relatively well-known among the public
- To maximise complexity of decisions, each 'player' will be given a set of personal goals that they are to fulfill before game end, throughout in intervals, players will be given vague updates on these goals to let them know whether they are going on the right track with their decision-making, these goals will necessarily conflict with the goals of others
- A primary focus is to generate conflict between players, where clashes of incentive cause players to rally behind different goals such as financial, time, environment, ethical etc. This conflict should serve to create a concept of 'diplomacy' where players feel support or dislike toward others based on their decisions
- Players are only to communicate with one another when prompted explicitly by the game

Two Approaches

- Round-based: The whole story is played out as a series of 'rounds', where in each round each player in turn makes a certain decision, possibly influenced by decisions made before, each of these decisions ultimately impact how the story plays out and thus the decisions that are presented in the next round.
- Fluid: There is little structure to the story, characters are weaved in and out as the story sees fit, such a method allows for maximum versatility of the decision-tree and thus complexity, but this is harder to design well

Game Objective

- To teach players about the value of ethics in decision-making in industry, where many factors and complexities are at play

Major Decision/Plot Points

Game Start

- Each player is randomly assigned a role, and is run through the context specific to each of their roles
- Each player is then run through a tutorial of the game, followed by being presented with a list of goals that the player must achieve in order to personally win the game

...

Plot (draft)

...

Game End

- The story plays out to completion, resulting in either a team victory (on-time and cost-effective deployment of a superior plane), or team defeat (crashes, too slow, plane not superior etc.)
- The player receives their personal result, which will likely, but not always, be failure with a team defeat, the idea is that some players will win and some players will lose unless decisions are near-flawless in terms of taking ethics into account in an appropriate and realistic manner

Roles in the game, Personas and Personal Goals

- Boeing Executive **BE**
- Software Developer **SD**
- Airline Pilot **AP**
- Aeronautical Engineer **AE**
- FAA Official **FAA**

Plot (draft)

This page mainly describes the key plots of game process.

Roles in the game, Personas and Personal Goals

- Boeing Executive **BE**
- Software Developer **SD**
- Airline Pilot **AP**
- Aeronautical Engineer **AE**
- FAA Official **FAA**

Key decision points and roles involved

Decision ID	Decision	Roles involved
1	Develop a new model or modify current model	BE AE
2	Using a larger but dangerous engine or a small safer engine	BE AE
3	Consider pilots' responses to MCAS function or not	BE AE SD AP
4	Ground new model aircrafts after the first crash	BE AE SD AP FAA
5	Investigate the cause & Disclose investigation result to the public	BE AE SD AP FAA
6	Using highly trained test pilots or different experience level pilots for new model aircraft training	BE AP FAA

Key Factors that impact outcomes

- Available money
- Company reputation (impact on the demand of the new model and the compensation)
- Time
- Possibility of Crash (implicit for the players)

Notes

- The 2nd crash is only related to the risk of crashing, however, the 1st crash will always happen no matter how low the possibility of crashing is.
- The investigation results have no impact on the 2nd crash.
- Some choices cannot be made if the available money or the reputation is 0.

Outcomes for Boeing

- **Outcome 1:** Boeing builds a successful model which is superior to Airbus's in payload and fuel efficiency, and launches it before Airbus release its model. That brings lots of orders for this model to Boeing. After new model aircrafts start their service, there is no incident happened thanks to the good design of the new model.
- **Outcome 2:** Boeing build a successful model which is superior to Airbus's in payload and fuel efficiency, but its launch is later than Airbus release its new model. Although that lowers Boeing's stock value and reduces orders for the new model, Boeing and Airbus still share the market evenly. Moreover, after new model aircrafts start their service, there is no incident happened thanks to the good design of the new model, and Boeing is still looking for another chance to beat Airbus.
- **Outcome 3:** Boeing builds a successful model which is superior to Airbus's in payload and fuel efficiency, and launches it before Airbus release its model. However, a new model aircraft crashes after a few months it enters service and more than 100 people die. Boeing immediately grounds all the aircrafts of this model, suspends all the production of this model, and investigate the causes of the crash. The investigation result shows that the crash happened due to the incorrect design of the new model. Because of that, Boeing lost billions dollar including victims litigation, client compensation and lowered stock value. However, Boeing is a big and long history company, and it can survive this and will be back one day.
- **Outcome 4:** Boeing builds a successful model which is superior to Airbus's in payload and fuel efficiency, and launches it before Airbus release its model. However, a new model aircraft crashes after a few months it enters service and more than 100 people die. Boeing insists there is no problem on the new model. Only two months after Boeing releases its innocent announcement, another new model aircraft crashes. The investigation reveals that the incorrect design of the new model causes these two crashes. FAA immediately grounds all the aircrafts of the new model. As a result, Boeing goes bankrupt soon due to the great loss in loss of sales and revenue, loss of reputation, victims litigation, client compensation and lowered stock value.

Main Story plot

1.Intro

Boeing, the most biggest aircraft producer in the world, now faces a serious challenge you ever have in the company's history. Your competitor, Airbus, had little market share back in 1990s, but it splits the market nearly evenly with you. Moreover, Airbus prepares to launch a new aircraft model, which they claim it can carry more payload but consume less fuel. It would cause that Boeing 737's demand decreases and more worst, lower stock price.

To turn the situation around, you, a group of people from different areas, are gathered and assigned a task: develop a new aircraft model which can beat Airbus.

2. Development

Based on the development lifecycle and the funds, **AE** tells **BE** there are 2 options ahead (**Decision 1**):

1. develop a brand new model, it is safer but takes more money and time (2.1);
2. update the current model to produce a new one, it saves money and time but more dangerous (2.2).

Then for a larger payload and high fuel efficient rate, **AE** tells **BE** there are 2 options (**Decision 2**):

1. develop a new small engine, it is safer but takes more money and time (2.3);
2. enlarge the current engine, it saves money and time but more dangerous (2.4).

To increase the safety of the aircraft, **AE** suggests a auto-pilot system that can help pilots to avoid making mistakes. So there would be 3 choices (**Decision 3**):

1. not build this system, it definitely saves money and time, but it will not increase risks nor safety (2.5);
2. building a system without considering pilots' operation, it takes money and time, and it will increase risks of crashes (2.6);
3. building a system that take pilots' actions into consideration, it takes the same money as choice 2.6 but longer time than choice 2.6, and it will reduce the chance of getting crashes thus increase safety (2.7).

3. Launch

Boeing's board is satisfied with the new model, and finally decides to launch it. The result would be (depending on the timeline and the possibility of the crash):

1. Outcome 1 (3.1);
2. the first crash happened (3.2).

For 3.2, Some people in the group realize there must be some flaws about the new model when they review their work (**AE** finds the engine has more chance causing the crash than he estimates, **SD** discovers that the auto-pilot system only takes one sensor's data as input which increases the risk of crashing, and **AP** finds that the auto-pilot system might lead to unintended behaviour when the pilot attempt to respond to it). Hence (**Decision 4**):

1. Ground all the new model aircrafts that are at services, suspend all the production of the current model, which will cost huge amount of money and a small amount of reputation(3.3);
2. Ignore the crash, insist Boeing is innocent for this, it will cost no money but a great amount of reputation (3.4).

Meanwhile, **FAA** also face high pressure from the victims' family requesting the truth of the crash and starts to investigate the causes of the crash. Boeing need to decide (**Decision 5**):

1. Do nothing (3.5);
2. Cooperate with FAA and disclose the result to the public, it will increase the reputation but cost lots of money (3.6);
3. Bribe FAA with money so that the truth would not be known to the public but to Boeing, and the public will only know it is a normal accident, it will cost a small amount money but decrease the reputation(3.7).

4. Investigation

The investigation result depends on the possibility of crashing, and there will be 2 possible results:

1. the crash is caused by the incorrect design of the new model (4.1);
2. the crash is a normal accident (4.2).

For 3.5, if the result is 4.1, it will largely decrease the reputation; if the result is 4.2, nothing will be impacted.

For 3.6, if the result is 4.1, nothing will be impacted; if the crash is a normal accident, it will largely increase the reputation.

For 3.7, if **AE** chooses to blow the whistle, **AE** will be fired, and it will largely decrease the reputation (or Outcome 4?). If the result is 4.1, it will not only decrease the reputation but also the money (lower the stock value); if the result is 4.2, nothing will be impacted.

5. Retraining

No matter what reason causes this crash, Boeing decides to retrain pilots that operate the new model aircrafts so that they can respond to the auto-pilot system more quickly to prevent the plane from crashing. However, how to select the pilots from training is a big issue (**Decision 6**):

1. highly trained test pilots, it takes less money and shorter time because all the Boeing pilots are the best, however it increase the possibility of crashing (5.1);
2. pilots of all levels of experience, it takes more money and longer time to recruit them, but decrease the possibility of crashing(5.2).

After the retraining process, Boeing put the new model back to the service.

1. The 2nd plane crashes (Outcome 4);
2. The 2nd plane does not crash (Outcome 3, or Outcome 2 if the investigation result is 4.2)

Stage One: Introduction/Power Balance

- The **BE** will specify the overall direction of the development approach in terms of the 737 MAX, which will essentially relay the 'primary' desire of the **BE** to take into consideration for the decisions of other roles
- The **SD**, **AE** and **AP** are introduced as working on the same team, the **AE** chooses in private whether to use the existing vertical system where the **AE** calls the shots, and hence takes more credit for project success or failure, or a horizontal system where the **AE** relinquishes power to the **SD** and **AP** in return for superior communication
- The **SD** has the option to choose whether to spend his/her first week exploring existing code bases with Boeing to get a sense of standards /expectations and existing libraries and frameworks, or mingling with other (more senior) engineers to build some rapport
- The **AP** has the option to challenge the **AE** for leadership (and will have other opportunities to in future) of the project in vertical case, if not, has the option to seize leadership of the project by communicating with the manager, a common theme throughout the game will be the constant battle (or lack thereof in a pacifist run) for leadership and power between the **AE** and **AP**

Stage Two: First All-Hands Meeting Establish Project Focuses

- The discussion commences between all 5 players, the decisions of all players are outlined, the discussion is timed to keep the game moving forward and placing pressure on people
- First, balance of power disputes are resolved, first through attempted persuasion, followed then with a voting system, and failing that (one party still contests) the **BE** makes the final decision
- If time remains, the **BE** can communicate his/her goals to the group if he/she so desires, which will guide decision-making of those below

Stage Three: Project Commencement

Stage Four: Initial Designs + Sketches

Stage Five: Detailed Designs and PoC

Characters

Introduction:

This page mainly describes the relevant character characteristics of the five important characters related to the game being developed.

Character personas

To learn more information about each characters, please follow the links below:

- [Aeronautical engineer](#)
- [Airline pilot](#)
- [Boeing executive](#)
- [Federal Aviation Administration \(FAA\) official](#)
- [Software developer](#)

Summary

Roles of the game	Boeing executives	Software developer	Airport pilot	Aeronautical Engineer	Federal Aviation Administration
Responsibilities	<ul style="list-style-type: none"> • Maintain the company's reputation • Ensure the interest of the general board 	<ul style="list-style-type: none"> • Develop a pilot-assistant software that can improve the safetyself accomplishment? • Support the familymoney 	<ul style="list-style-type: none"> • Make sure the airplane landed safely 	<ul style="list-style-type: none"> • Make sure the design of airplane is safe enough • Support the family 	Administration work <ul style="list-style-type: none"> • Company functions as normal • Report looks nice
Reward	<ul style="list-style-type: none"> • Company reputation • More money • More market share • Stock price 	<ul style="list-style-type: none"> • More salary • Promotion (to manager level) 	<ul style="list-style-type: none"> • More salary • Promotion • Self safety and passengers safety 	<ul style="list-style-type: none"> • More salary • Promotion 	<ul style="list-style-type: none"> • More salary • Promotion
Punishment*	<ul style="list-style-type: none"> • Imprisonment • Lose of the executive position • Loss of company's reputation • Loss in stock price 	<ul style="list-style-type: none"> • Imprisonment • Loss of job • Loss of reputation in the software industry • Loss of money 	<ul style="list-style-type: none"> • Loss of life • Imprisonment • Grounding of aircraft • Loss of job • Loss of money 	<ul style="list-style-type: none"> • Imprisonment • Loss of job • Loss of reputation in the aircraft industry • Loss of money 	<ul style="list-style-type: none"> • Loss of reputation • Imprisonment (if inspector is found to be negligent) • Loss of job • Loss of money
Interact with others**					

*perhaps as a twist to the story-line one of these people can lose someone close to them as a result of a plane crash. (or this situation could be a reflection question after the game)

You can also put pictures if it helps.

** who can the role interact with and how

***bold part in reward may be regarded as the "attributes"

Aeronautical engineer

Name

Arthur McClenaghan

Role definition

Gives guidance on the feasibility of designs. Liaises with executive and with workers on the planes. Engineers have their own ethical code of practice. Consider the possibility of whistleblowing.

Background

Though still relatively inexperienced, the **AE** has worked with Boeing for 3 years now, and has for the most part found him/herself floundering with relatively insignificant maintenance tasks and trivial calculations. As a sole breadwinner for the family, with a spouse, and an infant child to take care of, his/her current income as a Boeing employee is insufficient. Whilst it is enough to survive, the **AE** hopes to work his/her way up the engineering ladder to a more senior position and salary grade; as the **AE** fears the guilt that may be faced in the event he/she is unable to support the family.

With the advent of the 737 MAX project, the **AE** has been given a managerial role in the technical/engineering sector of development, and will work closely with many types of engineers (mechatronics, mechanical, in particular software with the **SD**). The **AE** knows that this is the chance he/she has been seeking, and is eager to seize upon it.

Responsibilities

The **AE** acts as the project lead for the 737 MAX project, and is responsible for the continuous and stable operation of the 737 MAX in the future. For this reason, the **AE** will frequently report to the **BE** about their progress, obstacles and other such intrigues. The **AE** is also in a position to suggest the demotion, or promotion of other members in the team (**SD**, **AP**) based on his/her perception of their alignment to the project.

In addition to this, the **AE** will spearhead the hardware design and implementation of the 737 MAX, and take responsibility for any consequences of any damages caused by the project. The **AE** is also to gather reports from the **SD** and **AP** about plane software and risk management respectively, and use these to drive decision-making.

Motivations

Goals

- On-time completion of the project, with a superior plane as the output
 - PASS (1 month late ~ equal quality plane)
 - Bronze (On-time ~ 2% superior plane)
 - Silver (1 week ahead ~ 4% superior plane)
 - Gold (1 month ahead ~ 6% superior plane)
- Successfully bid for, or obtain naturally, a salary increase
 - PASS (constant)
 - Bronze (10% increase)
 - Silver (20% increase)
 - Gold (30% increase)
- Be granted a leadership role for the subsequent development project

Pressures

- The **AE**, in failing to achieve business objectives, is liable to be demoted (-10%) or dismissed (-25% + Game Over) from the project team, leading to differing pay cuts
- The **AE** will frequently face pressure from the **BE** to speed up development, and face opposite pressure from the **SD** and **AP** to minimise risk and maximise quality
- In the event of a crash, if Boeing holds the **AE** liable, the **AE** will lose the game

Airline pilot

Name

Peter Walker

Role definition

Peter is a pilot who flew one of the 737's that did not crash. He has flown for more than 22 years and now his work is more about testing. He was to work closely with the SD and AE and will work under the AE, as the SD will.

Background

The **AP** is a pilot who has worked for Boeing for the last 22 years, immensely loyal to Boeing and what it stands for, the pilot was disturbed by the news of a new **BE** being appointed, worried that the upheaval of the company might change it for the worse. Having retired from commercial flight in 2008, the **AP** has stepped into a testing role as it reduced the stress of travel and seemed a natural transition into retirement, which was expected to be in around 8 years from then. A relatively uninspiring job, the **AP** was delighted to hear that he/she would work on the 737 MAX project, where the **AP** would get the opportunity to test new and innovative plane designs; and leverage his/her commercial flying experience to comment on designs and software models from a practical perspective.

The **AP** was to work closely with the **SD** and **AE**, and will work under the **AE**, as the **SD** will.

Because Boeing recently held an emergency board of directors and decided to use a group of newcomers to develop Boeing 737MAX series models and compete with Airbus A320 models for market share, Peter was worried that the results of this project could not reach the goal, because Peter did not understand these newcomers, so he wants to get involved as a pilot for many years to evaluate and test aircraft.

Responsibilities

The **AP**'s primary role will be to test and evaluate the aircraft model designs generated throughout the 737MAX project in the perspective of reality (more practical). As subordinate to the **AE**, the **AP** will frequently report his findings to him, which will primarily focus on risk management as well as some practical suggestions for airplane improvement (cockpit design, software functionality etc.). As the only experienced member of the team, the **BE** expects the **AP** to play an influential role in decision-making and where necessary challenge the **AE**'s leadership.

Motivations

Goals

- Retain current position in the company
 - PASS (salary constant)
- Improve reputation with the company
 - PASS (reputation constant)
 - Bronze (+5% reputation)
 - Silver (+10% reputation)
 - Gold (+20%+ reputation)
- See the Boeing 737 MAX outcompete the Airbus A380
 - PASS (30% share)
 - Bronze (45% share)
 - Silver (60% share)
 - Gold (75%+ share)

Whilst finances aren't as big a concern for the **AP** as for others, the **AP** as a loyal Boeing employee does seek recognition from the company of some form, and wishes to see the company succeed.

Pressures

- The **BE** has placed high pressure on the **AP** to be an influential member of the team, failing to take a leadership role at critical points will open up risks of demotion (-10% salary)
- The **AP** desires to become a critical part of Boeing's success, failure to be looked up favourably by Boeing leadership (**AE**, **BE**), or failing to produce good outcomes for Boeing will be seen as a failure.

Peter's pressure comes from Boeing's trust and recognition for himself for many years. If he can't complete the task in the 737MAX project or cause incalculable losses in the future, Peter will lose the company's trust in him. In serious cases, he may be investigated with legal liability.

Boeing executive

Name

Patrick Chang

Role Definition

Overseeing the plan to catch up to Airbus. Motivated, in part, by financial and reputational considerations. What are the duties of company executives? Who do they owe duties to? Shareholders? Corporation? Public? Environment? Etc.

Background

The game sets itself at the beginning of 2011. A month earlier, Airbus, the main competitor of Boeing launched the Airbus A320 family that delivered fuel burn and operating efficiency outcomes far superior to existing Boeing models in the market (that is, it uses less oil to run longer distances), the resultant orders for these new planes from many established Boeing partners such as American Airlines has led to substantial shareholder pressure and reduction in value of Boeing stock. The board of directors, dissatisfied with these results has taken the drastic action of firing the existing executive in hopes of finding a new one who can turn their dire situation around.

The new **BE** is introduced, with the assignment of leading a new development effort for a new airplane family, the Boeing 737 MAX. The board of directors, shareholders, and existing management have made it very clear what the **BE** is there to accomplish, a rapid deployment of a superior plane that would reclaim lost market share from Airbus.

Responsibilities

The **BE** is in charge of the whole 737 MAX project, as well as the other operations occurring within the Boeing industry. One of the primary challenges as **BE** will be to allocate focus appropriately, to ensure other existing plane models do not experience problems that interfere with, or place undue pressure on the 737 MAX. The **BE** will also receive reports from the **AE** about the progress of the project (these may or may not be falsified), which will influence executive decisions that will influence the project from above.

The **BE** will also be responsible for appropriate public relations (PR), handling any interviews or press releases.

Motivations

- Improve reputation with the board of directors
 - PASS (constant)
 - Bronze (+5% reputation)
 - Silver (+10% reputation)
 - Gold (+20% reputation)
- Improve reputation with corporate employees (**AE, AP, SD**)
 - PASS (constant)
 - Bronze (+5% reputation)
 - Silver (+10% reputation)
 - Gold (+20% reputation)
- Improve overall corporate reputation with public
 - PASS (constant)
 - Bronze (+5% reputation)
 - Silver (+10% reputation)
 - Gold (+20% reputation)

The main motivation for BE Pat comes from the trust of Boeing's board meeting and greater recognition of its potential for improvement. Because Pat was elected through the board meeting. Secondly, the motivation of BE Pat also comes from the return on value, that is, to obtain a higher salary.

Pressures

- The board of directors expects: on-time delivery of a superior plane, strong market share outcomes upon plane release, good financial management during the project
- The employees expect: fair treatment, a feeling of empowerment, a minimisation of pressure placed on the project from above
- The public expect: good ethical practice, a focus on safety and quality of the plane, good PR

A sufficiently low reputation with the public or board of directors will lead to being fired (game over), a sufficiently low reputation with the employees merely suggests dissatisfaction with executive decisions, but will almost certainly lead to eventual failure with the other two parties.

Federal Aviation Administration (FAA) official

Name

FAA Team

Role Definition

Federal Aviation Administration (FAA) official: In charge of liaising with Boeing. Responsible for the safety of planes in the USA.

Background

The Federal Aviation Administration always pays attention to the safety of civil aviation, and has enjoyed a high reputation domestically and internationally for many years. At the same time, he has also witnessed the development of a number of airlines, such as Airbus, American Airlines and Boeing. In recent years, with the development of aerospace companies and the introduction of new models by various companies' products, civil aviation aircraft crashes that have focused too much on economic benefits and neglected flight safety have occurred one after another. The department decided to conduct a close investigation of the crashed airliner and to conduct more detailed management in the field of civil aviation.

Responsibilities

1. In charge of liaising with Boeing
2. Standardize the distribution of air navigation facilities and aviation safety inspection standardsIf the aircraft crashes in the future, it is necessary to re-investigate the safety of the Boeing 737MAX model and take decisions to remove the aircraft or maintain flight.
3. The issue, suspend or revoke a flight licenself the aircraft crashes in the future and is found to be due to improper pilot operations or other related responsibilities, perform this step.

Goals

Ensure the stable order of civil aviation, reduce the possibility of aircraft crashes, and promote the development of civil aviation.

Motivations

Because the FAA team has a significant historical responsibility, the FAA team's motivation is the strong social responsibility and the passion for serving the people. At the same time, if the FAA team can guarantee the safety of people's lives and the well-being of aviation, the Federal Aviation Administration will also win the trust of more people.

Pressures

If FAA team cannot properly handle the civil aviation incident, it will lose people's trust in the Federal Aviation Administration and cause considerable public opinion pressure and also have a bad reputation (in severe cases, internal processing may be conducted)

Software developer

Name

Michelle Gerwen

Role Definition

Develop the MCAS software under directions from engineers and executive. Consider Codes of practice and ethics for computer programmers etc.

Background

The **SD** is a recent university graduate of the class of 2010, having completed an graduate degree in Software Engineering at a prestigious Ivy League university in the United States. For a long time, the **SD** has been very passionate about the complexities of air travel and how software plays a role. For the **SD**, Boeing is the dream job. In 2009, the **SD** completed a summer internship at the local Boeing office working relatively menial software tasks and group assignments, and in late 2010 the **SD** survived a rigorous and highly selective application process for a graduate role at Boeing headquarters in Chicago.

Having recently arrived at Chicago, with little to name, the **SD** was informed by a manager that he/she was to work with a team of other, relatively senior developers on a new, highly confidential Boeing 737 MAX project; an extremely lucrative project that placed large responsibility on the **SD**, which in turn gave a once-in-a-lifetime opportunity for a rapid rise through the company ranks.

Responsibilities

The **SD** is responsible for the creation of software that handles the following processes: functionality of the engine, responses to certain situations the plane finds itself in, auto-pilot etc. As subordinate to the **AE**, the **SD** is to report to the **AE** on behalf of the software team and accurately reflect the sentiments of the team. These reports will feature progress reports on developed software, any testing requirements, as well as discussing the segregation of priorities (documentation, coding, design etc.).

The **SD** will take responsibility for the quality of software on the 737 MAX, and is expected to frequently liaise with the **AP** to ensure software is of the highest standard, which will likely lead to delays due to the **AP's** demands.

Motivations

- Earn a promotion
 - PASS (base salary)
 - Bronze (+10% salary)
 - Silver (+20% salary)
 - Gold (+30% salary + promotion)
- Improve reputation with the **AE**
 - PASS (constant)
 - Bronze (+5% reputation)
 - Silver (+10% reputation)
 - Gold (+20% reputation)
- On-time delivery of software
 - PASS (1 month late)
 - Bronze (on-time)
 - Silver (1 week early)
 - Gold (1 month early)

The main motivation of SD Michelle is the promotion of personal positions and experience in participating in major development projects. Based on the perfect completion of the development project and improving the company's ranking, it also improved its own position competitiveness.

Pressures

- The **SD** is under pressure from the **AE** to reach time goals, so that software and hardware development operates in sync, failure to do so will incur negative consequences
- The **SD** will need to balance the wishes of the software team with those of the **AE**, **AP**, failure to do so will lead to loss of motivation of the software team, or loss of cohesion within the team, both likely leading to project failure

Decision Tree (Final plot)

Context: The five of you have been selected as influential members of a project team working on an innovative new plane design, dubbed the 'Vision 777'. Each of you have joined the project with a unique backstory, and more importantly, a unique set of goals that each of you must ensure are fulfilled by game's end. These goals will sometimes be fairly clear, and other times will not be known until the very end of the project. The executive board have allocated \$10 billion toward the project, and has stipulated a hard deadline of two years from today to complete it. Together, and sometimes apart, you will all make decisions that ultimately determine the fate of the project, as well as yourselves. It is up to you to work together as well as apart, using the information and goals you have been given, to win.

BE: You have assumed a leadership role for this project.

AE: You are responsible for the physical plane design, ensuring the plane delivers on performance objectives.

SD: You are responsible for the software utilized in the plane, which must work effectively in conjunction with the plane design.

FAA: You are responsible for ensuring the adherence of the company to FAA regulations, however, you are employed by the company.

TP: You are responsible for testing the plane's design and software, to ensure things are intuitive and effective for the pilot.

Initial Conditions

Company

- Financials
 - Company contracts with airlines: 50 (F1)
 - Competitor contracts with airlines: 50 (F2)
 - Share value: 40 (F3)
- Reputation
 - Public reputation: 50 (R1)
 - FAA reputation: 50 (R2)
 - Internal reputation: 50 (R3)
 - Executive reputation: 50 (R4)
 - Environment reputation: 50 (R5)
- Project projectInfo
 - Expected progress: 0 (P1)
 - Actual progress: 0 (P2)
 - Expected cost: 0 (P3)
 - Actual cost: 0 (P4)

BE: Your priority is to deliver the project on-budget and on-time, otherwise you will likely lose your job

AE: Your priority is to deliver a good quality product on-time.

SD: Your priority is to deliver a good quality product on-time.

FAA: Your priority is to deliver a good quality product.

TP: Your priority is to deliver a good quality product on-time.

1: The five of you are currently in a meeting to discuss the project and the focus of the team. Which area will the team prioritize:

Weights: 20% All

A- Quality, priority will be placed upon the quality of the plane, with the cost of time. 2 (P1+5, P2+4, P3+5, P4+5)

B- Cost, priority will be placed upon minimizing costs, with some possible costs to quality. 2 (P1+5, P2+5, P3+5, P4+4)

C- Time, priority will be placed upon minimizing time, with possibly increased costs and/or reduced quality 2 (P1+5, P2+6, P3+5, P4+5)

D- Reputation, ensuring the happiness of all stakeholders 2 ((P1+5, P2+5, P3+5, P4+5, R1+5, R2+5, R3+5, R4->+5)

E- All, vying for a balanced approach with equal focus in all key areas 2 (P1+5, P2+5, P3+5, P4+5, R1+2, R2+2, R3+2, R4->+2)

Context: With the focus of the project team set, development of some initial concept designs has begun. Things are currently proceeding smoothly though this is to be expected this early on.

BE: A 1-point difference between your expected and actual progress/costs represents one week.

AE: If competitor airline contracts with airlines exceeds 60, the company will fail.

SD: It is important to maintain a close relationship with the FAA

FAA: You are employed by the company, but your responsibility is to carry out the intents of the FAA.

TP: Reputation isn't important until the plane is actually released, all values of the company are out of a possible 100.

2: As a test pilot, your responsibility is to take a practical perspective on the development of the plane. You however, have been given the decision to make as to the extent of initial involvement you and other test pilots will have in the software component of the plane. As test pilots, you all will naturally spend significant time with cockpit and interface design, so this would be an extra overhead.

Weights: 20% All

A- Commit substantial pilot time, pilots will spend equal time giving software feedback as on cockpit and user interface design, this will lead to reduced time spent on cockpit/user interface 3 (P1+1, P2+1, P3+1, P4+1)

B- Commit a little pilot time, pilots will spend a small amount of time giving software feedback, this will consider only the main aspects of the software 3 (P1+1, P2+1, P3+1, P4+1)

C- Commit no time, pilots will spend no time giving software feedback, this is what has been done in the past since software expertise lies outside the scope of pilot training, this will lead to increased time spent on cockpit/user interface 3 (P1+1, P2+1, P3+1, P4+1)

Context: With the project set to begin in earnest soon, the FAA has obliged the company to perform inspections of the plane throughout the project.

BE: No new information for this round.

AE: No new information for this round.

SD: No new information for this round.

FAA: No new information for this round.

TP: No new information for this round.

3: As an FAA official, you are tasked with scheduling inspections to ensure the plane is developed up to a high quality standard. You have worked with the company for many years, and know that they have a history of reliability and high performance. You are to decide on a suitable number of inspections, each inspection incurs additional time and financial costs for the company, so choose wisely.

Weights: 20% All

A- Make one inspection at the end of plane development, minimizes costs and shows trust 5 (P1+4, P2+4, P3+4, P4+4, R2-3, R4+6)

B- Make two inspections, one mid-way through development and one at the end of development, more balanced, and what has been done in the past 5 (P1+4, P2+4, P3+4, P4+4, R4+3)

C- Make three inspections, one at the start, one mid-way through, and one at the end of development, more thorough but conveys less trust 5 (P1+4, P2+3, P3+4, P4+5)

Round Outcome: The FAA official has deemed it prudent to commence an official inspection of the project now. An official inspection takes one week long, and incurs time and financial costs for the company, essentially delaying the project.

Context: Development has continued, and now concept designs are beginning to be converted into prototype designs and software development has now also begun in earnest. Quite a few intriguing issues have popped up that require attention however.

BE: Expected Progress: P1, Actual Progress: P2, Expected Cost: P3, Actual Cost: P4

AE: All reputations: 50

SD: Share value: 40

FAA: Company contracts: F1, Competitor contracts: F2

TP: The next few rounds can potentially cause big differences.

5: You have recently performed tests on initial concept software for the plane, you were overall very satisfied with the software of the plane, but you found some of the user interfaces slightly awkward, and some of the autopilot mechanisms were a bit confusing, but once you understood them there was no issue. What do you report back?

Weights: 20% All

A- Report all issues and concerns, fixes to address both these issues will delay the project by three weeks, one week for the UI, two weeks for the autopilot 6

B- Report the user interface problems, fixes will delay the project by one week 7 (P1+5, P2+4, P3+5, P4->+5)

C- Report the autopilot mechanism concerns, these may be ignored, but if fixed will delay the project by two weeks 6

D- Report no issues, the project will continue unhindered 7 (P1+5, P2+5, P3+5, P4+5)

Context: The test pilot has pointed an issue with the initial concept software with regards to the autopilot mechanisms, which the test pilot found confusing at times, but once understood wasn't an issue. You are now to decide on what to do.

BE: No new information for this round.

AE: No new information for this round.

SD: No new information for this round.

FAA: No new information for this round.

TP: No new information for this round.

6: What is to be done?

Weights: 20% All

A- Ignore the autopilot mechanism issues, since they cause no problems once understood, project continues unhindered save the one week delay 7 (P1+5, P2+4, P3+5, P4+5)

B- Act on the concerns and re-structure the mechanisms, this will delay the project by three weeks total 7(P1+5, P2+2, P3+5, P4+5) **Major Bug Fixed**

Context: Some minor concerns have arisen in the software department about the utilization of version redundancy, which is an expensive, but potentially useful safety tool.

BE: No new information for this round.

AE: No new information for this round.

SD: No new information for this round.

FAA: No new information for this round.

TP: No new information for this round.

7: The executive team has proposed the implementation of software version redundancy procedures to ensure protection from any bugging of plane software. The software team are confident that plane software will not bug, and have written comprehensive test cases to make sure of this. Any redundancy schemes would have to rely upon outsourcing, which is expensive.

Weights: 20% All

A- Implement a comprehensive version redundancy scheme, this will greatly increase the cost of the project 8 (P1+5, P2+5, P3+5, P4+9)

B- Implement a single program redundancy scheme, this will slightly increase the cost of the project, but isn't as thorough a solution (P1+5, P2+5, P3+5, P4+7)

C- Do not implement, trust in the reliability of the software team. (P1+5, P2+5, P3+5, P4+5)

Context: With these decisions put in place, development is beginning to mature, and a full-fledged plane design is now coming to fruition. It is still a long way until the project will be completed, but things are looking relatively smooth. Most discussion this round will focus on developing the relationships of the company,

BE: It is of utmost importance that company reputation is high in all areas, current reputations are all at 50.

AE: Designing a plane to reduce the environmental footprint will not improve the performance of the plane from a commercial context.

SD: Internal reputation represents the feelings of teams under the guidance of the five of you, towards you, if this drops too low, project efficiency will lower.

FAA: Your job is to ensure that FAA reputation is maximized.

TP: Make sure any promises that the company makes are realistic.

8: The media have got in contact with the project team to discuss the new plane design, and has asked the team for a statement regarding the quality of the plane in comparison to its competitors. The company has historically outperformed its competitors but a recent competitor model has put some pressure on the company to deliver a new, high-quality model. Most experts that have reviewed initial concept sketches have been optimistic about the performance of the new plane.

Weights: 20% All

A- Be optimistic, state that the new plane design will outperform any competitor in the market, this will lead to good PR and reputation 9 (R1+10, R2+5, R3+10, R4+10, R5+5)

B- Be neutral, state that the new plane design will match the competitor, this is a weaker statement than ones in the past, and will slightly affect reputation 9 (R1->-3, R2->-3, R3->-5, R4->-5, R5->-3)

C- Be pessimistic, state that it is difficult to know how well the plane design will go compared to competitors, this will set public expectations very low, but will greatly affect reputation 9 (R1->-5, R2->-5, R3->-10, R4->-10, R5->-5)

Context: Environmental lobbies have not come into contact with the company. Traditionally, an environmental focus has been quite insignificant in the industry and will not lead to much difference against competitors, but appealing to these lobbies can be good for reputation.

BE: No new information for this round.

AE: No new information for this round.

SD: No new information for this round.

FAA: No new information for this round.

TP: No new information for this round.

9: Environmental lobbies have asked the project team to make a commitment to reduce the environmental footprint of the new plane. Current designs seek to match previous iterations for environmental efficiency, so such a commitment will lead to some overhead in terms of plane re-design, but anything less will be perceived as insufficient by the public and will lead to some reputation hits.

Weights: 20% All

A- Commit to reducing plane emissions, this will greatly enhance public reputation since no competitor has done this, but this will lead to a 3 week delay due to having to re-design IF (5B|D OR 6A) 10 ELSE (10B AND (P1+5, P2+5, P3+5, P4+5)) (P1+5, P2+2, P3+5, P4+5, R1+10, R5+20)

B- Commit to match emissions of any competitor, this is the anticipated outcome, but may be inadvertently broken by a new competitor model IF (5B|D OR 6A) 10 ELSE (10B AND (P1+5, P2+5, P3+5, P4+5)) (P1+5, P2+5, P3+5, P4+5, R1-3, R5->-5)

C- State that emissions targets are not the focus of the company, this will greatly upset environmental lobbyists, but at the same time takes away any pressure to hit targets, and will put the project 2 weeks ahead of time IF (5B|D OR 6A) 10 ELSE (10B AND (P1+5, P2+5, P3+5, P4+5)) (P1+5, P2+7, P3+5, P4+5, R1-3, R5->-5)

Context: Development continues, and the plane design has now been subject to rigorous testing from all different departments within the company. This has given rise to several concerns from these departments, since each department wants to ensure an extremely high quality of their respective part of the plane design. It is noted that departments have frequently noticed issues that testing processes failed to identify, but have been effective in fixing them. The analytics department have got back to you, and have stated that the 'conditions required for the auto-pilot malfunction to occur are very unlikely to occur, if the malfunction occurs we are unsure of the possible consequences'.

BE: Public Reputation: R1, Expected Progress: P1, Actual Progress: P2

AE: Things have gone quite smoothly in your department thus far.

SD: Internal Reputation: R3

FAA: FAA Reputation: R2

TP: The auto-pilot flaw that you missed wasn't your fault, but it does compromise your position in the eyes of the company slightly.

10: A pilot has brought up a minor auto-pilot malfunction, where the auto-pilot sometimes seizes control from the pilot when not intended to.

Weights: 20% All

A- Ignore the issue, the project will continue unhindered. 14 (P1+5, P2+5, P3+5, P4+5)

B- Commit fully to fixing the auto-pilot malfunction, this will delay the project by two weeks, and incur extra costs 14 (P1+5, P2+3, P3+5, P4+7) **Major Bug Fixed**

C- Send the issue to the FAA for a comprehensive risk review, this will not commit the company to fixing the issue, but will incur extra costs 13 (P4+1)

Context: The issue has been sent to the FAA, and the review has come in.

BE: No new information for this round.

AE: No new information for this round.

SD: No new information for this round.

FAA: No new information for this round.

TP: No new information for this round.

13: The FAA has investigated the issue and has deemed it a minor safety concern, thanks the company for identifying the issue, but will now not certify the plane as safe until it is resolved.

Weights: 20% All

A- Fix the issue, and inform the FAA of the change, this will delay the project by two weeks. 14 (P1+5, P2+3, P3+5, P4+7, R2->+5) **Major Bug Fixed**

B- Do not fix the issue, and inform the FAA of the change, the project will remain on-time. 14 (P1+5, P2+5, P3+5, P4+5, R2->+5)

Context: The aeronautical team has discovered an exciting new development that has been brought to the attention of leadership.

BE: No new information for this round.

AE: No new information for this round.

SD: No new information for this round.

FAA: No new information for this round.

TP: No new information for this round.

14: The aeronautical team has come to you with a proposal to request additional funding for the aeronautical sector of the plane, this is in response to a few late design changes that have been made to the plane, this funding would be utilized to perform some further performance tests. These design changes are not significant, and have been deemed inconsequential by experts, and initial testing was successful.

Weights: 20% All

A- Grant these additional funds, this will incur some additional project costs. 15 (P1+5, P2+5, P3+5, P4->+7)

B- Do not grant the funds, the project will continue unhindered. 15 (P1+5, P2+5, P3+5, P4+5)

Context: The employee union, dissatisfied with their compensations thus far for the intensity of the project, has come to the project team with a proposal.

BE: No new information for this round.

AE: No new information for this round.

SD: No new information for this round.

FAA: No new information for this round.

TP: No new information for this round.

15: The employee union has come to the executive team with a proposal. Owing to the highly intense nature of project work, the software and aeronautical teams have requested substantial raises to their pay to compensate. The board provided a small figure of money to provide a 5% raise to all project employees in anticipation, however, the union has demanded a 15% raise.

Weights: 20% All

A- Grant the 15% raise to both departments, morale within both departments will skyrocket as both departments will feel fairly compensated, but this will incur an extremely large, and possibly crippling, additional cost 16 (P1+5, P2+9, P3+5, P4+13, R1+10, R3+20, R4->-10)

B- Grant the 15% raise only to aeronautical, costs will be halved compared to A, but benefits will be exclusive to the aeronautical team IF (3B|C) 16 ELSE 17 (P1+5, P2+6, P3+5, P4+9, R1+10, R3+5, R4->-10)

C- Grant the 15% raise only to software, costs will be halved compared to A, but benefits will be exclusive to the software team IF (3B|C) 16 ELSE 17 (P1+5, P2+6, P3+5, P4+9, R1+10, R3+5, R4->-10)

D- Grant a 10% raise to both departments, this is less than what was asked for, and more than what the budget allows IF (3B|C) 16 ELSE 17 (P1+5, P2+8, P3+5, P4+9, R3+5, R4->-5)

E- Grant a 5% raise to both departments, this is what was originally planned IF (3B|C) 16 ELSE 17 (P1+5, P2+5, P3+5, P4+5, R4+10)

F- Grant no raise to both departments, this will cut project costs substantially since a portion of budget is freed up, but this will upset the teams IF (3B|C) 16 ELSE 17 (P1+5, P2-1, P3+5, P4+1, R3->-20, R4+5)

Context: The FAA has deemed it necessary to conduct an inspection of the plane, based on an earlier decision made.

BE: No new information for this round.

AE: No new information for this round.

SD: No new information for this round.

FAA: No new information for this round.

TP: No new information for this round.

16: It is time for the mid-project FAA inspection of the plane design. You are in charge of the thoroughness of this review in terms of cost and time, it is important to keep in mind the current position of the company, as well as your obligations as an FAA official. Which type of inspection will you arrange?

Weights: 20% All

A- Skip the inspection, this will save two weeks worth of time and costs and thus will be very beneficial to the company 18 (P1+5, P2+7, P3->+5, P4+3)

B- Perform a shorter one-week inspection, this will cover the 'big picture' of the plane design, but won't go into the same depth as a two-week inspection 18 (P1+5, P2+6, P3->+5, P4+4)

C- Perform the two-week inspection, this is a standard-issue inspection that will consider details, but won't go into thorough cross-testing 18 (P1+5, P2+5, P3->+5, P4+5)

D- Perform a four-week inspection, this is a comprehensive inspection that will guarantee the quality of the plane is up to standard, and also consider business but it will delay the project 17 (P1+5, P2+3, P3->+5, P4+7) **Critical Bug Fixed**

Context: The FAA inspection has concluded, and results are in...

BE: No new information for this round.

AE: No new information for this round.

SD: No new information for this round.

FAA: No new information for this round.

TP: No new information for this round.

17: The comprehensive FAA inspection discovered a potentially fatal bug in the autopilot crash recovery software, it was found that testing processes put in place to detect these bugs in software were outdated and poorly executed. Fixing the bug will delay the project by a further week, but has prevented a potentially disastrous outcome. But what changes to software testing will be made?

Weights: 20% All

A- Comprehensive test reform, to guarantee that maximum lessons are learnt from the mistakes of the past, but this will delay the project by three weeks, keep in mind that these reforms can also be performed after the project. IF (10B|11A|12A|13B) 18 ELSE 19 (P4+5)

B- Qualitative test reform, reforms will happen in an informal manner, which will cause no delay but incur some training costs IF (!MajorBugFixed) 18 ELSE (20 AND (P1+5, P2+5, P3+5, P4+6))

C- No changes, reform will occur after the project, which will allow the project to proceed as usual, save the bug fixes IF (!MajorBugFixed) 18 ELSE (20 AND (P1+5, P2+5, P3+5, P4+5))

Context: Development of the plane is now beginning to reach its conclusion, final plane designs have now been proposed and are being tested by the test pilot team. As a designated 'half-way' point, the executive team have deemed it prudent to have a serious discussion regarding the focuses of the group going into future development.

BE: Make sure that the project does not fall too far behind schedule.

AE: Your department is vastly outperforming the others.

SD: The development team are beginning to feel the pressure.

FAA: Executive Reputation: R4, Environmental Reputation: R5

TP: This is a very dangerous time for you, proceed with caution.

18: You have just discovered that the autopilot issues that you thought earlier were of relatively minor consequence turned out to be substantially worse than previously thought. You now understand that the issues can potentially seize control from the pilot and act unexpectedly during critical take-off/landing periods. However, you have discovered this extremely late, and reporting it will delay the project by two months. You will also almost certainly lose your job, and thus fail your objectives if you report it now.

Weights: 100% TP

A- Report the issue, the development team will act on it, causing delays to the project by two months 20 (P1+5, P2-8, P3+5, P4+5) **Major Bug Fixed (TP loss)**

B- Do not report the issue 20 (P1+5, P2+5, P3+5, P4+5)

Context: An intrigue has come up in the aeronautical department.

BE: No new information for this round.

AE: No new information for this round.

SD: No new information for this round.

FAA: No new information for this round.

TP: No new information for this round.

20: The aeronautical team has discovered a new aerodynamics system that could potentially lead to substantial quality improvements in the plane, in short, the plane would be a guaranteed market leader for fuel efficiency as well as maximum speed. As development is in a mature stage however, re-designing the plane to accommodate this will delay the project by a month and incur some additional cost.

Weights: 20% All

A- Do not implement the re-design, this will save costs and time 21 (P1+5, P2+5, P3+5, P4+5)

B- Implement the re-design, this will displease the executive team due to the delay in spite of performance benefits 21 (P1+5, P2+9 P3+5, P4+9)

Context: Development of the initial plane has completed, and manufacturing has begun.

BE: Expected Progress: P1, Actual Progress: P2, Expected Cost: P3, Actual Cost: P4.

AE: Your department will work very closely with the manufacturing department.

SD: Development of plane software will continue, since this is done independently of the planes themselves.

FAA: FAA Reputation: R2, thus far, the FAA is satisfied with your performance.

TP: The cheaper manufacturer has a solid track record with smaller airlines.

21: It is now time to roll out the plane design to small-batch manufacturers, so commercial readiness testing can begin. As a group, it is time to decide what kind of manufacturer the company will align with.

Weights: 20% All

A- Choose a cheaper, less established, manufacturer, this will cut costs substantially, but this is not a manufacturer used before by the company 22 (P1+5, P2+5, P3+5, P4+0)

B- Remain with the same manufacturer as before, minimal risk, and minor loyalty discounts 22 (P1+5, P2+5 P3+5, P4+4)

C- Choose a premium manufacturer, quite risky since again not used before, but an extremely good track record and has shown initiative with manufacturing, also more expensive 23 (P1+10, P2+10, P3+10, P4+13) **Major Bug Fixed**

Round Outcome:

IF A- Your manufacturer has identified a major issue with the auto-pilot mechanisms of the plane through its own testing streams, they will refuse to manufacture the plane until it is fixed to protect their reputation. This will incur extra costs.

IF B- A manufacturer has now been chosen and the transition has been smooth, plane manufacturing has now begun.

Context: Manufacturing is now well and truly underway, with real-life testing anticipated in a few weeks time.

BE: Expected Cost: P3, Actual Cost: P4.

AE: It is important to strike a balance between quality and time/cost.

SD: Bug fixing and code development is occurring smoothly.

FAA: Public Reputation: R1

TP: A critical stage for your role is coming up in a few weeks.

22: Your manufacturer has identified a way to cut costs substantially in manufacturing, with a small performance loss to the aerodynamic performance of the plane, do you decide to do it?

Weights: 20% All

A- Yes, costs are cut, but reputation of the company will take a hit 23 (P1+5, P2+5, P3+5, P4+2, R1-5, R2-5)

B- No, costs will remain the same, but the company's commitment to quality is noted 22 (P1+5, P2+5, P3+5, P4+5, R1+5, R2+5)

Context: Real-life pilot testing has commenced. The results are as follows: 28% of pilots find the plane to be extremely good to control, 65% find the plane to be good/satisfactory to control, 5% pointed out a few minor issues that have since been easily fixed, and 2% had one or more moments where they felt the plane to be awkward to use, none found the plane to be difficult to control however.

BE: A re-design of anything at this point will set-back the project by a substantial amount, most likely by too much to recover from.

AE: No issues were found with your aspects of the plane.

SD: Most minor issues identified concerned the software, but were fairly routine fixes.

FAA: The FFA obliges you to investigate in-depth, any possible issues with the plane.

TP: If issues have been acted on in the past, perhaps the awkward moments aren't dangerous.

23: Based on this information, what will the team do prior to the second wave of manufacturing?

Weights: 20% All

A- A thorough investigation into the 2% issues, fixes to issues identified here will substantially delay the project and incur big costs, since it involves complete re-design, but will fix any issues no matter how significant or otherwise 24 (P1+5, P2-3, P3+5, P4+13) **Major & Critical Bugs Fixed**

B- A brief investigation into the 2% issues, this will consider the issues found here, but will delay the project quite a bit less, since there is no re-design, and should still fix most issues prevalent in the plane 24 (P1+5, P2+2, P3+5, P4+8) **Major Bug Fixed**

C- Do not pursue any fixes, if the issues are trivial, which experts consider to be likely, this will save substantial time and costs 24 (P1+5, P2+8, P3+5, P4+2)

Context: The 2nd and final stage of manufacturing is in progress, and it is thus now time for the final (and possibly, only) FAA inspection of the plane. Similar to the mid-point inspection, it is up to the team to decide on the thoroughness of this inspection.

BE: A re-design of anything at this point will set-back the project by a substantial amount, most likely by too much to recover from.

AE: This final inspection will not identify anything new that was missed in the middle inspection for your department, if you had one.

SD: Most minor issues identified concerned the software, but were fairly routine fixes.

FAA: The FFA obliges you to perform a two-week inspection.

TP: The results of this inspection are independent of your testing done a few weeks ago.

24: How should the company approach the upcoming inspection?

Weights: 20% All

A- Skip the inspection, this will save two weeks worth of time and costs and thus will be very beneficial to the company 25 (P1+5, P2+7, P3->+5, P4+3)

B- Perform a shorter one-week inspection, this will cover the 'big picture' of the plane design, but won't go into the same depth as a two-week inspection 25 (P1+5 P2+6, P3->+5, P4+4)

C- Perform the two-week inspection, this is a standard-issue inspection that will consider details, but won't go into thorough cross-testing 25 (P1+5, P2+5, P3->+5, P4+5)

D- Perform a six-week inspection, this is a comprehensive inspection that will guarantee the quality of the plane is up to standard, and also consider business but it will delay the project by a huge amount 25 (P1+5, P2-1, P3->+5, P4+11) **Major & Critical Bug Fixed**

Context: It is time for the commercial release and distribution of the plane, the company, being as big as it is, has very deep networks in the industry and can leverage them to garner a competitive market advantage, but to what extent?

BE: It is industry-standard to work 'under the table', and this is perfectly legal, though morally objectionable.

AE: Executive Reputation: R4, Environmental Reputation: R5.

SD: Public Reputation: R1

FAA: FAA Reputation: R2

TP: Internal Reputation: R3

25: To what extent should the company leverage it's networks to achieve a competitive advantage?

Weights: 20% All

A- Utilize to its full extent, this method involves some bribery and under-the-table dealings to develop a competitive advantage over rivals, but will greatly affect the company's reputation since word will get out 26 (P1+5, P2+5, P3+5, P4+7, F1+15, F2-15, F3+15, R1-20, R2->-20, R3-10, R4->-10)

B- Utilize to a legal extent, this is an aggressive method that is similar to A, but does not enter illegal territory, but because of this will be far less effective, yet still useful 26 (P1+5, P2+5, P3+5, P4+7, F1+3, F2-3, F3+5, R1->-10, R4+5)

C- Utilize to a reasonable extent, this is a standard method where competitors and the public will see as 'fair', still incurs costs, but can be eclipsed by competitors methods if they decide to be aggressive 26 (P1+5, P2+5, P3+5, P4+6, F1->-5, F2->+5, F3-5, R1+5, R2+5, R3+5, R4->-5)

D- Do not utilize, this will save two weeks of costs, and will be great for reputation, but will hinder the competitive effort 26 (P1+5, P2+5, P3+5, P4+3, F1->-20, F2+20, F3-10, R1+15, R2+15, R3-5, R4->-15)

Context: Deals have now been struck with certain airlines, and the planes are ready to take-off on their maiden voyages. However, there are many contracts still in close contention, that if acquired will greatly improve the competitive situation of the company. There is an option to utilize third-parties, that can perform corporate espionage on behalf of the company. There is almost zero chance of this being traced back to the company, and the executive team has encouraged it.

BE: As the executive team has stipulated this, they will approve, plus it helps your project out-compete competitors.

AE: Executive Reputation: R4

SD: Public Reputation: R1

FAA: You are obliged as FAA to object, but they will not know if you do not.

TP: Internal Reputation: R2

26: Will the company employ these tactics?

Weights: 20% All

A- Yes, this will incur costs, but will almost certainly lead to a competitive victory IF (16D|23A|24D) 30 ELSE 27 (P1+5, P2+5, P3+5, P4+8, F1+25, F2->-25, F3+20, R4+20)

B- No, this will upset the executive board and reduce competitive advantage, but will save some costs IF (16D|23A|24D) 30 ELSE 27 (P1+5, P2+5, P3+5, P4+2, F1->-5, F2+5, F3->-3, R4->-10)

Context: A serious event has come to the attention of the company. Two days ago, one of the new planes flying commercial tragically crashed, resulting in the deaths of all onboard. An investigative team has come to the following conclusions:

- The pilots appear to have lost control of the plane at some point, but this was unlikely to have been the cause behind the crash
- Issues appear to have been due to some fault of the pilots, where they didn't follow guidelines in a manner extremely unlikely to be replicated
- All pieces of the plane were in fine working order until the crash

This, of course, has affected corporate reputation in a negative way, but the executive team believes it can be salvaged since it appears that the accident was a freak one, there was even a mention of the possibility of foul play onboard the plane.

BE: Whilst a bad outcome, most airlines have belief from their experiences that the plane is perfectly fine and have pledged to remain in contract

AE: The aero of the plane was fine, so your department was not the cause of this accident.

SD: Plane software bug logs show some minor warnings, but none of these are attributable to the crash

FAA: The FAA has deemed the crash as an 'accident', but has also suggested a thorough investigation regardless

TP: During testing, you did notice some awkward features of the plane, but you never felt threatened of a crash

27: How will the team react?

Weights: 20% All

A- Commit to a full investigation into the issue, this is considered by most experts to be a waste since the pilots appear to be the cause of the crash, this will incur substantial, possibly crippling, costs, but will please the FAA 28 (P1+15, P2+15, P3+15, P4+25, R1->-15, R2+10, R3->-10, R4->-10, R5->-10, R1->-5, R2+5, R3->-5, F1->-10, F2+10, F3->-10) **Critical Bug Fixed**

B- Perform a standard investigation into the issue, this is expected by the FAA, and will help identify any fundamental issue with the plane, without leading to large cost overheads 29 (P1+15, P2+15, P3+15, P4+18, R1->-35, R2->-20, R3->-30, R4->-30, R5->-30, R1->-25, R2-15, R3->-25, R4->-20, R5->-20, F1->-60, F2+60, F3->-30)

C- Perform no investigation, relying on the comprehensive investigations performed by others, this leads to no costs, and operations will continue, in fact, this will prevent loss of contracts as clients will be more confident 29 (P1+15, P2+15, P3+15, P4+15, R1->-35, R2->-30, R3->-30, R4->-30, R5->-30, F1->-50, F2+50, F3->-20)

Round Outcome:

IF A- The comprehensive investigation into the issue brought about some unexpected results. In particular, there was a substantial behavioural issue with the auto-pilot of the plane, that took control of the plane from pilots in crisis situations and worked against the actions of the pilot. Therefore, whilst there was no explicit bug with the software, there was a dissonance between the software and typical pilot behaviour. The software has since been fixed and thankfully, the remainder of the project has occurred without any further incident. The FAA and general public are happy that the company was proactive in addressing the problem.

IF B OR C- It has been two further months since the first crash, and unfortunately, tragedy has struck again with another plane crash leading to a further set of deaths. Upon FAA investigation, of a far more thorough nature due to the 2nd occurrence, it was found that the plane had some major issues that had led to the pilots making incorrect decisions in crisis situations. Unfortunately, this has destroyed the company's reputation, as well as its competitive advantage.

Context: The remainder of the project has gone on without a hitch, well done!

BE: Congratulations, you have reached the end of the game!

AE: Congratulations, you have reached the end of the game!

SD: Congratulations, you have reached the end of the game!

FAA: Congratulations, you have reached the end of the game!

TP: Congratulations, you have reached the end of the game!

30: Continue to the final outcome!

Weights: 20% All

A- Ok! (P1+10, P2+10, P3+10, P4+10, R1+10, R2+10, R3+10, R4+10, F1+10, F2+10, F3->+10)

Work down the following list, top-to-bottom, to get the team outcome for the game.

Team Outcomes

CONDITIONS: 27B|C

Outcome 1: Critical Failure

Description: Whilst the plane was initially successfully, some undiscovered issues caused some catastrophic outcomes. Three months after the first commercial flight of the plane, there was a crash, resulting in the deaths of all onboard. Two months after that, due to the inaction of the company, a second crash occurred, resulting again in the deaths of all onboard.

The legal investigation was thorough, and found that the company was extremely negligent in its design of the plane, often cutting corners and prioritizing profits and efficiency over the wellbeing and safety of its customers. Though the investigation was unable to assign responsibility to any single party, the company has felt obliged to make cuts in response to the fierce public backlash, resulting in the loss of job of all staff involved in the project. It is doubtful that any of these employees will find work in their respective areas again.

CONDITIONS: 27A

Outcome 2: Minor Failure

Description: Whilst the plane was initially successfully, some undiscovered issues caused some catastrophic outcomes. Three months after the first commercial flight of the plane, there was a crash, resulting in the deaths of all onboard. Thankfully, the investigation was thorough enough to uncover an unexpected issue, which prevented any further potential crashes that may have happened.

Unfortunately, the project has still been deemed to be a failure, since the crash hurt the company's reputation as a market leader. However, there is a possibility that some of the employees may be able to find work in the future, in spite of all being let go.

CONDITIONS: F1<40 OR F3<30

Outcome 3: Outcompeted

Description: The development of the plane was of good quality, since the plane was found to be extremely reliable. However, various mistakes made caused the plane to be outcompeted by its competitors, making it a substantial loss for the company. It is of critical importance for any project that it delivers upon its investment, and unfortunately this time it did not do so, which has resulted in the loss of job for the Business Executive, and possibly others.

CONDITIONS: P2>125

Outcome 4: Too Slow

Description: Whatever the successes or otherwise the plane may have had, unfortunately the speed of development was far too slow, which has allowed competitors to build advantages outside the scope of the project. Decisions needed to take consideration of the need to deliver the project on-time.

CONDITIONS: P4>125

Outcome 5: Too Expensive

Description: Whatever the successes or otherwise the plane may have had, unfortunately the cost of development was far too high, which has allowed competitors to build advantages outside the scope of the project. Decisions needed to take consideration of the need to deliver the project on-budget, as well as within a reasonable timeframe.

CONDITIONS: Any R < 20

Outcome 6: Crippled Reputation

Description: Whatever the successes or otherwise the plane may have had, the reputation of the company in some respect has been crippled beyond repair. It is important in a project to consider all of the different stakeholders in a project and how internal project decisions may affect them.

CONDITIONS: F1>65 AND F3>50

Outcome 7: Market Leadership

Description: The plane was overall a great success and whilst potentially lacking in terms of time and money efficiency, the overall performance of the plane greatly outweighed competitors and a competitive advantage was able to be drawn. Reputations were also kept in control so the company's image remains in a good position in the eyes of all stakeholders.

CONDITIONS: P1>110 OR P2>110

Outcome 8: Not Bad

Description: The plane was relatively successful and was competitive in the market, and thus the project has been labelled a modest success by the executive team. Whilst a few employees may have lost their jobs due to their own individual failures, the project did hold up against competition, though there was either an issue with time or budget which prevented the plane from taking a more dominant market position.

CONDITIONS: P1>100 OR P2>100

Outcome 9: Good

Description: The plane was relatively successful and was competitive in the market, and thus the project has been labelled a success by the executive team. Whilst there were minor issues with timing or budget, overall the performance of the plane counter-acted these problems to the point of satisfaction. Good work!

CONDITIONS: Any R<35 OR F1<50 OR F3<50

Outcome 10: Excellent

Description: The project was delivered both on-time and on-budget, and was also of a great standard, so good work! Unfortunately, some issues, whether it was the competitiveness of the plane relative to competitors, or a reputation hit somewhere, meant that there was some minor repair work for the company to do to offset the otherwise perfect execution of the project.

ELSE

Outcome 11: Perfect

Description: Congratulations! This is a critical victory outcome, the company has shot past its competitors in every metric and all members of the project team have been granted substantial promotions and accolades by the company. Well done you have won!

Results in Perfect for ALL individuals.

Individual Outcomes

Outcome 1: Critical Failure

CONDITIONS: If Team Outcome 1

Business Executive/FAA/Software Developer/Aeronautical Engineer/Test Pilot

Description: As a result of the public backlash after the two crashes, the company have felt the need to replace you with immediate effect. Your employment prospects look grim after such a failure.

Outcome 2: Failure

CONDITIONS: If Team Outcomes 2 or 3 OR P2>115 OR P4>115

Business Executive

CONDITIONS: If Team Outcome 2 OR R2 < 30

FAA

CONDITIONS: If Team Outcome 2 OR P2>115

Software Developer

CONDITIONS: If Team Outcome 2 OR P4>115

Aeronautical Engineer

CONDITIONS: If Team Outcome 2 OR 18A

Test Pilot

Description: Your decisions throughout the game have caused you to lose your job, but there is at least some hope of re-employment by another company in the future.

Outcome 3: Poor

CONDITIONS: If Team Outcome 4|5|6

Business Executive

CONDITIONS: If Team Outcome 6

FAA

CONDITIONS: If Team Outcome 4|5 OR P2>110

Software Developer

CONDITIONS: If Team Outcome 4|5 OR P4>110

Aeronautical Engineer

CONDITIONS: If Team Outcome 4|5 OR P4>110

Test Pilot

Description: Whilst you have been able to retain your job, higher-ups in the company are unhappy with your performance and are unlikely to assign you to major projects for the foreseeable future.

Outcome 4: Average

CONDITIONS: If Team Outcome 7|8

Business Executive

CONDITIONS: If Team Outcome 3|7|8

FAA

CONDITIONS: If Team Outcome 3|7 OR P2>105

Software Developer

CONDITIONS: If Team Outcome 3|7 OR P4>105

Aeronautical Engineer

CONDITIONS: If Team Outcome 3|7 OR P4>105

Test Pilot

Description: You have been able to retain your job, and higher-ups in the company are satisfied with your performance, and have even given you a small raise to commemorate your efforts in the project.

Outcome 5: Good

CONDITIONS: If Team Outcome 9

Business Executive

CONDITIONS: If Team Outcome 9

FAA

CONDITIONS: If P2>98

Software Developer

CONDITIONS: If P4>98

Aeronautical Engineer

CONDITIONS: If P4>98

Test Pilot

Description: You have performed your personal role in the project admirably, resulting in a strong project result, and a promotion that has resulted in a substantial salary increase. Well done!

Outcome 6: Perfect

CONDITIONS: If Team Outcome 10

Business Executive

CONDITIONS: If Team Outcome 10|11

FAA

CONDITIONS: If P2>95

Software Developer

CONDITIONS: If P4>95

Aeronautical Engineer

CONDITIONS: If P4>95

Test Pilot

Description: You have performed your personal role in the project to a top level, the executive team has taken the time to personally commend your efforts, and you have been offered a top leadership position at the company (or an executive role as the Business Executive). Well done!