Functional Design

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**Preface**

**General**

This Functional Design is to explain the functional requirements in our project, to make wireless internet available in the airplanes of Corendon. At this moment, there is no internet connection available in the airplanes and Corendon would like to offer this as a service.

**Background**

Corendon has asked us to develop a project that would offer a wireless internet connection to their customers on their airplanes. Corendon wants to do this to offer an extra service to their customers, and to keep up with the competition. Some are already offering wireless internet in their airplanes, Corendon would like to do the same.  
  
How we are going to do this will be explained further in this document. This will be done at a functional level. For the technical specifications and further explanation, please refer to our Technical Design.

**Our task**

The current world is a digital world, pretty much every customer of Corendon nowadays has devices that connect to the internet. Customers often take these devices with them when they travel to their destination and they would like to use these devices in the airplane already. This has created a need for internet availability on the airplane.

## Content

The functional design consists of the following sections:

1. Preface
2. Current situation
3. Desired situation
4. Consequences
5. Managementsummary

**Current situation**

Momentarily there is no Wi-Fi access on board of the Boeing 777’s that Corendon flies with. This causes discomfort for passengers who want to do internet activities, like checking their e-mails, update their social media accounts et cetera. The customers would greatly appreciate an internet connection on board, surveys have proven.   
  
Currently, there is no wireless internet connection on board. Customers cannot use their devices to connect to the internet, and there for cannot use internet services on their devices.

**Desired situation**

**Description of the new system**

*The input*

We will use several minicomputers spread throughout the airplane for continuous and stable reception. These minicomputers will all run software for connections, security and logging of data, which will all be discussed in technical detail in the Technical Design. The customers can connect to a wireless network and need to log in for security and identification purposes.

*The output*

A stable wireless network that will handle a wireless connection in a constant manner, without interrupts or delays. Also, the network will be fast and will be able to handle internet-requests without waiting time. The wireless network will be servicing one device per customer.

**The Network infrastructure**

*Hardware & additional systems*

As described earlier, we will use several minicomputers (Raspberry Pi) that will be connected to each other to operate as one wireless hotspot. The devices will be spread around the airplane to ensure the entire airplane will have good reception of the wireless signal. The minicomputers will use wireless hardware to transmit the networking-signal to and from the devices.   
  
The network infrastructure will be a complex and technical set-up, which will be further discussed in our Technical Design. For additional details, please refer to this document.   
  
*Services we will deliver:*   
in the desired situation, the following functionalities have to be offered:  
1. Fast and stable internet connectivity to customers’ devices  
2. Data-logging abilities  
3. Secure environment, with management capabilities  
4. Reliable infrastructure that will remain working, even if some components fail.

**Consequences**

**Organizational consequences**The consequences of such a system will bring extra maintenance. The extra hardware and software will have to be maintained, which would mean extra maintenance time and extra costs to keep the airplane on the ground. There should also be a technician on the ground that can perform those necessary maintenance-tasks. If Corendon does not have such a person available, this could mean someone has to be hired to do the job. This would bring additional costs on a regular basis.  
  
**Technical consequences**As previously mentioned, Corendon might not have the necessary know-how to make sure the entire system will be properly configured. This could mean the hiring of other staff or make sure the existing staff will have proper know-how of the new software and hardware that will be used.   
  
The airplanes will have to be installed with the necessary components, this will take quite some time to setup on all of the airplanes.

**Management summary**

In this chapter the functional specifications of the system are presented to the management staff of Corendon. In this chapter we will explain all our choices and why we have made these choices.

Corendon asked us to provide their airplanes with Wi-Fi that will be used by the customers of Corendon. In this way they can provide their customers with an extra service.

We were also asked to provide the internet connection with a captive portal, this is a site where you have to log in first, before you can use the internet. In this way the people that use the internet connection can be monitored and they will have to accept the terms of agreement.

- First, four tiny computers are needed, the Raspberry Pi’s. This Raspberry Pi will be the access point for all customer-devices that are connected to the internet. It will be used as an access point. The reason we have chosen the Raspberry Pi is because it's a cheap and easy to manage device.

- Second, two satellites are needed to provide the Raspberry Pi’s with an internet connection. We have chosen to use satellites because this system provides the most reliable service for the airplane, so it won’t be very common that the connectivity will be lost.

- Third, a load balancer is needed. The load balancer makes sure that when one of the two satellites malfunctions, the other one provides as backup. This will make sure that the internet-connection will remain functional when errors arise, to make sure the customers will keep their service at any cost.

- Last, an external battery is needed to charge the Raspberry Pi’s. With the external battery, the Raspberry Pi is able to be charged without a connection to a power socket. This makes sure the setup is very flexible, portable and easy to maintain.