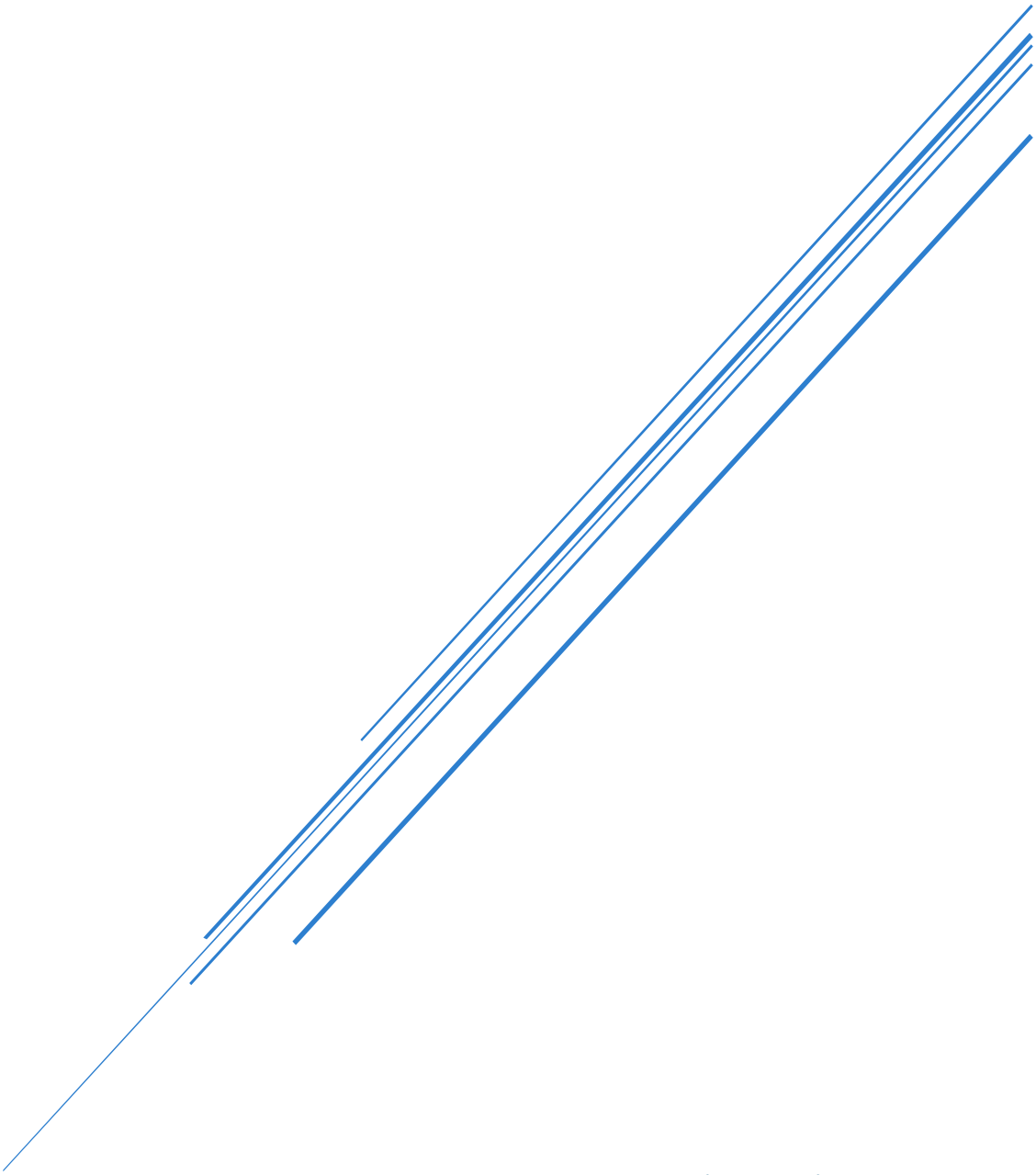
PRODUCTION TEST TOOL

Project Plan



Internship assignment
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1. Internship Company

WHO?

The Internship company is Tokheim Belgium. The group is a part of Dover Fueling Solutions (DFS) that offers a lot of assortments. Starting with fuel dispensers, fuel pumps, retail automation systems, media devices, support services and ending with payment terminals. The office in Turnhout is specifically responsible for EMEA systems and payment. It involves multiple departments: Product Management, Engineering, Operations and L3. My internship was inside of the Engineering sector. In the Engineering office in Turnhout the software systems and things related to payment are being developed and created. So, the DFS itself has about twenty-four thousand people collaborating with them in many different countries. In the office in Turnhout works around 60-70 people inside the "Systems and Payment Engineering". My assignment is connected to the new generation payment terminal, so I collaborate with people responsible for Crypto NOVA, more specifically it is called "Team Rocket," here it's about 4 developers working on it, alongside with 2 QA testers.

2. Reason and Background

WHAT?

The company in Turnhout is responsible for creating software for the devices. The department here is called system and payment engineering. The teams are working on PoS's (Points of Sale) and payment terminals. The company has a terminal called Crypto VGA. For this standalone terminal, both software and hardware were created within the company, from scratch. The software was developed in Tokheim Belgium in Turnhout, and the hardware was manufactured in Tokheim the Netherlands in Bladel. The manufacturers needed a way to check if everything is well with the device – if all the components are working properly. So, they produced a production test tool – application that lets you evaluate every part of the device separately, through a sequence of tests. This way, they had full grasp if the device they will be putting in field is appropriate to use.

Now the company is working on a new generation terminal – this time based on Android. The thing is this time the hardware is not being developed by the company. Tokheim is only developing software from scratch. The devices themselves are from the third-party company – PAX. The company already has a tool installed that was designed for testing, but the problem is that those are unit tests and that the tool is not easy to use at all. You must know everything beforehand if you want to use it efficiently, which is not the case here. The tool is also not user-friendly. There are also a lot of tests. They are mostly not needed for our use case, and it is not handy when it comes to checking the functionalities that are needed by the new generation terminal. So, that is why the company produced the internship assignment. To create a new Production Test Tool from the scratch – but this time for the Android device. An application that can be used by the manufacturers to see if the devices sent by PAX are fully functional. It must be as straightforward and easy to use as possible. By performing the maintenance and checks with the application, they will be able to ensure that the terminal they have on hand is fully functional and ready to be used in the field.

3. Objectives

Production Test Tool Application – this is a testing application designed to verify whether the device works as intended, checking if all components are functional.

The expected final product is a fully automated, working Production Test Tool, meaning:

- There is one fixed flow. Once the application starts, the test sequence follows a predefined order.
- The user cannot skip or rearrange tests.
- The system uses a pass/fail approach for each test.
- If a test fails, the user can either retry the test or exit the application.

This ensures that every critical component is rigorously evaluated before the device will be put into the field.

What should be realized by the end of the internship --> A complete and functional Production Test Tool Application to validate devices before shipment.

What must be finished → Full implementation of the entire testing process, covering all required tests, enforcing a non-skippable sequence, a pass/fail system for each test, and a results overview displayed and/or printed.

What it must contain:

- Touchscreen Test
- Display Test
- LED Test
- Beeping Test
- Magstripe reader Test
- Chip Card Reader Test
- Contactless Reader Test
- Camera Test
- Barcode Scanner Test
- Printer Test

What characteristics the result must meet:

- All tests must accurately detect failures.
- Each test run must follow the exact same process and behavior.
- Users must not be able to skip or change the test sequence.
- Tests should execute quickly and smoothly.
- The test results must be clear and easy to read and understand.
- The system should be designed to allow future updates, such as adding new tests.
- Clear feedback should be provided in case of failures, offering retry or exit options.
- It must not be possible to easily bypass or interfere with the test flow.

4. Business Case

Situation after the internship assignment (following benefits for the company):

A complete, automated, and reliable Production Test Tool will be available for manufacturing workers. The quality assurance process will become faster, more systematic, and less prone to human error. Fewer defective devices will be put into the field, reducing the need for costly returns and repairs. Device validation will be standardized across all production units, improving overall consistency and reliability.

Why the internship assignment is needed:

Currently, the manufacturing team lacks an automated and structured tool specifically designed for the Crypto NOVA terminal. Manual or incomplete testing increases the risk of faulty products reaching the market. The company needs to minimize the number of defects and ensure that only devices in perfect working condition will be put to the field. It is necessary to support the production process with a user-friendly, consistent, and enforceable testing system.

Added value for the company:

- Improved product quality and reliability
- Reduced costs associated with returns, repairs, and shipping faulty devices back to PAX.
- Faster and more efficient quality control, leading to shorter production and delivery times.
- Better documentation and traceability of device testing results, which is valuable for audits and customer support.

Link between the assignment and business objectives:

The result is intended for the manufacturing workers and quality control teams. They will benefit from:

- Having an efficient, easy-to-use tool to ensure each device meets all functional standards.
- Reducing the risk of human errors during testing.

5. Planning

The project was divided into four separate phases that got planned according to the sprint planning within the company. This way it is easier to participate in daily stand-up and use the

Jira structure to work on the project tasks. It is also easier to create the branches and commits and keep track of the work that was done/still needs to be done.

First phase:

Initialization and project setup 24/02 – 14/03:

- Basic framework of the product (android studio, environment set up, core UI, basic flow of the application and the tests)
- Functional and Technical documentation

Second phase:

Implementation of the tests 17/03 – 25/04

- Sprint 10.5 17/03 – 28/03
  - Touchscreen Test
  - Display Test
  - LED Test
- Sprint 10.6 31/03 – 11/04
  - Beep Test
  - Magstripe Reader Test
  - Chipcard Reader Test
- Sprint 11.1 14/04 – 25/04
  - Contactless Reader Test
  - Printer Test
  - Barcode Test
  - Camera Test
  - Test Results

Third phase

Unit Test Feature 24/04 – 09/05

- Unit Test Implementation
- Update the documentation.

Fourth phase

Finalization and Presentation Preparation 12/05 – 30/05

- Add nice-to-have features.
  - Ability to read multiple types of contactless cards.
  - Ability to scan QR codes.
- Prepare presentation.
- Optional: Animations or pretty visuals?

Ongoing feedback and milestones:

- Daily stand-up:
  - Every day, during stand-ups, I communicate what I am working on, what I have completed, and any challenges I am facing.

    - Tasks and progress are tracked through tickets in Jira, ensuring visibility and task management.
- Sprint reviews:
    - At the end of every sprint, a Sprint Review is held with all team members working within the Payments department.
    - During the review, I can present my work, demonstrate the current state of the project, and receive feedback from colleagues and supervisors.

6. Assignment After Internship (improvements)

Production Test Tool is a standalone application to be used by the manufacturing workers. Everything is already planned and documented – which specific tests are needed, etc. But after the internship it will be still possible to change the application, add some additional functionalities or tests that were not needed before. So, in general, the whole project should be finished before the end of the internship, BUT there is always an opportunity to make things bigger or better. But at this moment in time, there are no specific plans for changing the Production Test Tool in the future.

There is a list of tests that should be implemented, but it is not a problem to add something to that list. Everything that needs to be done is defined in the planning in the sections above. There are already some "nice-to-have" features that we thought of while creating the technical and functional documentation. But they are "additional" at this moment. If there is enough time, then they will be implemented on time with other main functionalities.

7. General Risks

There are some general risks that can be considered while talking about the Production Test Tool assignment:

1. Timing Risk – if the assignment is not completed within the given period, meaning that not all required tests are fully implemented, the Production Test Tool will not be functional.
   Impact → The tool would not be usable by the manufacturing workers, which would defeat the primary purpose of the project.
   Mitigation → Careful time management, consistent task tracking via Jira, daily stand-ups to monitor progress, and early identification of potential delays to allow for prompt corrective actions.
2. Incorrect Implementation Risk - If the hardware tests are not implemented properly according to the technical requirements, the application will not validate the device functionalities correctly.
   Impact → The tool would give false test results, leading to defective devices being approved and shipped, resulting in quality issues and potential customer dissatisfaction.
   Mitigation → Detailed testing of each module during development, internal code reviews where possible, and constant feedback loops via pull requests and QA testing to verify that the tool operates as expected.
3. Dependency Risk - The functionality of some tests (e.g., magstripe reader, chip card reader, contactless reader) depends on hardware availability or proper hardware simulation.
   Impact → Could delay or block testing and integration.
4. Score Creep Risk - There could be pressure to add "nice-to-have" features (e.g., visual improvements, extra functionalities) at the cost of core functionality.

Impact → Diverting resources from completing mandatory tasks might lead to an unfinished core product.
Mitigation → Prioritize critical functionalities first; only implement extras if time and resources allow, after core deliverables are confirmed completed.

Information Gathering and Reporting

Within the company there are a lot of tools used for communication, gathering and reporting. A lot of them are from office suite, like Teams, Outlook. For the reporting there is Jira that is implemented alongside with GitHub. The work is split into a sprint, so the agile way of working is present. And to be precise, a SAFe agile is being practiced here.

From within Jira, you have your user stories and story points (tickets) and from this interface it is easy to create a git branch for the specific feature or fix, which makes developing much easier. It is also extremely easy to keep an eye on your commits.

Within my team there are also daily stand-up that take up to 15 mins. The idea is that everybody just says the update on the work that they have been working on. This way it is easy to see if everything will proceed smoothly if something is stuck with something. Things like that. So, for the Production Test Tool a whole environment was created on Jira to keep track of everything happening around it. There are specific user stories that implement the functionalities of the device in the way that it was intended.