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# Logbook

## Weekly Report

### 1st Week Report

#### Introduction and Integration

The first week of the program focused on organizational structure and team integration. We were officially divided into 6-person project teams. During the introductory sessions, the faculty presented the overall curriculum and outlined the specific objectives and learning outcomes for each course.

#### Team Building and Workshops

To foster collaboration, we participated in two key sessions:

1. Teambuilding: We engaged in integration exercises, including mutual introductions and a creative task where we designed our own future team-building activities.
2. Technical Workshop: We attended an introductory session on the ESP32 microcontroller, which provided the foundational technical knowledge necessary for our upcoming project work.

#### Project Ideation and Selection

The primary goal for this week was to integrate the group and define our project direction. We followed a two-step selection process:

1. Brainstorming (Feb 26): During our first meeting, we held an intensive brainstorming session, generating a wide variety of ideas.
2. Selection and Voting (Feb 27): During the second meeting, we reviewed all ideas and conducted a formal vote. As a result, we selected three main topics, ranked by preference:

1) Smartification of Everyday Objects - A smart, reusable water bottle connected to a mobile app to track hydration. 2) Smartification of Buildings - Integrating embedded intelligence into technical devices to extend their operational lifespan. 3) Aircraft Surface Treatment Robot - A specialized robot designed for de-icing, cleaning, or damage inspection of aircraft.

#### Summary and Next Steps

The first week was successful in establishing a strong group dynamic and narrowing down our technical focus. Our immediate next objective is awaiting feedback from our supervisors to evaluate the feasibility of our ideas and finalize the selection of a single project theme.

## 2nd Week Report

### Workshops and Training

The team participated in a series of interdisciplinary sessions designed to refine the product's market fit and technical execution. In the Marketing track, work focused on the Value Proposition using the Business Model Canvas and the development of a concise Elevator Pitch. Management classes introduced various project leadership styles, including Scrum, Agile, and Waterfall, providing a framework for organizing our workflow. Additionally, a Design Thinking workshop allowed the team to deeply analyze the target audience and identify potential buyers for the system.

On the technical side, a hands-on workshop was held using Ultrasonic (Sonar) sensors to practice distance detection and signal integration. To improve internal dynamics, team-building activities were conducted in the park, where each group prepared an exercise to strengthen communication and team spirit.

### Project Development

Significant progress was made in defining the brand identity and technical requirements for the product. The team officially named the device "Traqua," a combination of the words "Track" and "Aqua," and created the initial logo.

Formal documentation has also commenced, with the team drafting the Introduction section of the project report. During team meetings, we discussed the initial product concept and the specific technical challenges involved in selecting and integrating the right sensors to ensure accurate data. To optimize this research phase, the team divided into specialized subgroups, with each group focusing on examining sensors capable of measuring water quality, tracking water quantity, or implementing water filtering solutions.

### Summary and Future Actions

The week concluded with the finalization of the core concept and the preparation of materials for the upcoming project milestone. The team was informed of the requirement to produce a Black Box Diagram, a Schematic Draft, and a pitch progress presentation for the next meeting.

Moving forward, the primary focus will be on refining the Traqua pitch and finalizing the technical drawings to illustrate the system's data and energy flow. These deliverables will be essential for the next project review, where we will present our progress and the finalized hardware architecture.

## 3rd Week Report

### Workshops and Training

During the third week of the project, the team focused on transitioning from abstract concepts to structured business and technical documentation. A significant portion of the week was dedicated to

the Design Thinking Workshop, where the group developed a promotional video to visualize the Traqua user experience and communicate the core value of active sanitization. This creative exercise allowed the team to better define the product's market positioning and user interaction flow.

In parallel with the marketing sessions, the team refined the fundamental business architecture of the project. This included the formalization of the Problem Statement, the development of the Business Model Canvas, and a detailed breakdown of the Value Proposition. By focusing on these strategic elements, the team was able to clearly articulate how Traqua addresses the “invisible” hygiene gap in the reusable bottle market through a combination of hardware sterilization and software-driven hydration coaching.

## **Project Development**

The technical focus of the week was directed toward hardware research and system architecture. The team conducted extensive research into specific electronic components, prioritizing the selection of the UV-C LED, TDS sensors, and the ESP32 microcontroller. These research findings were integrated into the first iterations of the Structural Drafts and the Black Box Diagram. While these initial diagrams provided a foundational overview of the system's logic, the team identified the need to further standardize the functional blocks to meet professional engineering requirements in the upcoming week.

## **4th Week Report**

During this week, the team made progress across both technical and documentation aspects of the project. We worked on the selection and presentation of materials and components, ensuring that they align with the project requirements. At the same time, we continued developing and refining the system design, including updating the black box diagram and correcting previous errors.

A significant part of the work focused on addressing technical challenges related to the safe use of UV-C light. We explored different solutions, including bottle geometry modifications, the use of magnetic sensing systems, and alternative material choices to reduce reflectivity. Additionally, we considered the implementation of geometric barriers as a simple and effective safety feature. These concepts were discussed and further evaluated to determine their feasibility.

We also made progress on the written report. We started working on sections related to Marketing, Ethics, Sustainability, and Project Development. We also focused on our product's branding, developing a proposed color palette, logo, and fonts. Additionally, we created the first version of the TRAQUA flyer.

Furthermore, we continued improving the overall quality of the report by updating the material table and ensuring proper formatting of references using the required BibTeX standard. Overall, this week's work contributed to both the technical development of the project and the advancement of the accompanying documentation.

## **5th Week Report**

The team continued to advance both the design and documentation of the project. We created a cardboard model of the product, which allowed for better visualization of the overall concept. In

addition, the detailed schematics were reviewed and further refined based on feedback.

Work on promotional materials also progressed, as we developed and presented the second version of the flyer. After discussion and evaluation, we finalized the preferred version. We also continued working on the report chapters related to Marketing, Ethics, Sustainability, and Project Development, improving their content and structure.

During this week, we focused on clarifying the requirements for the project management chapter and began working on this part of the report. We also received feedback on the sustainability chapter, which allowed us to make further improvements. Overall, this week focused on refining designs, finalizing key concepts, and improving both documentation and project planning.

## 6th Week Report

The sixth week of the project was primarily dedicated to the finalization of the Interim Report and the strategic planning of the upcoming Interim Presentation. This involved a comprehensive review of the structural drafts, the Business Model Canvas, and the competitive analysis to ensure all sections met the required academic and professional standards.

In addition to finalizing the written documentation, the team focused on the development of the Interim Presentation. This process included defining the core narrative of the presentation to effectively communicate the Traqua value proposition to the evaluation panel. The team conducted a strategic planning session to divide the presentation responsibilities.

## 7th Week Report

During the seventh week of the project, the team concentrated heavily on the development of our packaging solution and the refinement of our visual assets. A significant portion of our efforts went into optimizing the 3D model video. To improve the user suggestion concept, we decided to incorporate a hand holding the bottle to clarify the intended interaction. Technical adjustments were also prioritized for the video, including the use of darker text and stronger background contrast to ensure readability, alongside the addition of surface textures and the Traqua logo to provide greater visual depth and brand identity.

Parallel to the visual design, we met with our teacher to discuss and refine our detailed schematic diagrams. This review ensured that the technical foundation of the project is sound as we move toward the physical assembly phase.

Regarding our promotional materials, both the leaflet and poster underwent a thorough review. We are currently correcting minor spelling errors and condensing the leaflet text for better impact.

## 8th Week Report

During the 8th week, the team finalized the packaging solution. Our work was focused on finishing the scientific paper and correcting minor spelling errors in our report file. We also received the ordered elements for our prototype, so we have been discussing and deciding how the work should be organized next week to focus on prototype building. During Thursday's weekly meeting, the video of our product was shown. We still have to record the voiceover for the video and standardize the

graphics of our final product that we are using in our advertising materials.

## 9th Week Report

We were still working on paper, it must be finished until end of May. During week we have been discussing the proposed material that we can use making our prototype. The voiceover for the video was recorded.

## 10th Week Report

During our last meeting, we finalized the next steps for the prototyping, testing, and documentation phases of the project.

We were working on completing the preparations for the 3D printing process. We must submit the final design files to production. To assist with the physical assembly of this prototype, we have been provided with new LEDs that need to be integrated into the build.

The usability testing for the mobile companion application was conducted to optimize its user experience. We decided to fix our packaging solution - we are going to put „blankets“ inside the bag to make it more safe for bottle during transportation. We worked on User Manual to eliminate any typos and grammatical errors.

Finally, we addressed the academic paper. The team was given instructions to carefully review all sources and references within the document, adding page numbers where they are currently missing. To complete the paper, all remaining chapters must be fully drafted and integrated as soon as possible

## 11th Week Report

We have done the functional test and uploaded it on Wiki. We are going to make impact/stress simulation (when for example kid will kick the bottle). We changed the picture in paper to this one that suits our final product. We also uploaded corrected packaging solution. The VoiceOver was putted into video, however we are going to change some graphics in it.

## 12th Week Report

We started building the prototype, and test the UVC-light. We also started preparing the final presentation and finalising last chapters in the report. The video was finally completed and accepted by everyone in team. We refined also the poster.

## 13th Week Report

We finalised our final presentation, now we are working on preparing speech. We are going to meet to practice it before the final presentation. The prototype sensors were tested. We must remember to submit all documents on Wiki.

# Meetings

## 1st Meeting (2026-02-26)

### Agenda:

1. Presentation
2. Modus operandi
3. Project proposals
4. Electronic logbook (Wiki)

### Minute:

The first team meeting was primarily focused on establishing our work framework and generating project concepts. Following the agenda, we covered the following:

- **Presentation & Modus Operandi:** We discussed our internal team structure, communication methods, and how we will collaborate effectively as a 6-person group.
- **Project Proposals & Brainstorming:** The core of the meeting was an intensive brainstorming session. We generated a wide range of potential project ideas, focusing on innovation and practical application.
- **Electronic Logbook:** We reviewed the requirements for maintaining our project documentation on the Wiki/Electronic Logbook to ensure consistent progress tracking.
- **Decision Making:** The group agreed to review the list of ideas overnight. It was decided that during the next meeting (Feb 27), we will conduct a formal vote to select our top three project proposals.

## 1.2 Meeting (2026-02-27)

### Agenda:

1. Review of brainstorming results
2. Project selection (Voting)
3. Action plan and communication with supervisors

### Minutes

The primary objective of the second meeting was to narrow down the wide range of ideas from the previous day into a concrete list of project proposals.

The team conducted a formal voting process to evaluate the ideas generated during the brainstorming session. Based on the group's expertise and interest, we finalized our Top 3 Project Topics:

- Smartification of Everyday Objects
- Smartification of Buildings
- Robot for Aircraft Surface Treatment Operations

Action Items: Bernardo was assigned the responsibility of drafting and sending the confirmation emails to our supervisors. These emails will outline our chosen topics and request official feedback and validation.

## 2nd Meeting (2026-03-05)

### Agenda:

1. Discuss introduction part of the report
2. Discuss the black box diagrams.
3. Present the core concept of our product.

### Minute:

During the meeting we have gone through Ideation phase showing our way of thinking and how we imagine our product. A key part of the discussion was defining the Black Box Diagram to map out the connections between our power source, sensors, and the ESP32 microcontroller. Key notes:

- Design & Ergonomics: The bottle will feature an ergonomic shape for a comfortable grip. We also prioritized easy cleaning—ensuring the interior has rounded edges and the base module is accessible for maintenance.
- After evaluating sensor limitations, we decided not to include a pH sensor. The large physical size and the requirement for frequent calibration make it impractical for a portable bottle. Instead, we agreed to use the Total Dissolved Solids (TDS) sensor, which effectively measures mineral levels to provide a clear water quality score.

Next Steps: The team is tasked with preparing Structural Drafts for the next meeting (Thursday 12.03) and Black Box Diagram.

## 3rd Meeting (2026-03-12)

### Agenda:

1. Review of Structural Drafts and Black Box Diagram
2. Discussion - Sensors, Filters, and UV-C Research
3. State of the Art Discussion, Background Research
4. Material Selection Proposal
5. Scrum Board Review
6. Bibliography & Citations

**Minute:**

-The project meeting focused on refining the TRAQUA structural drafts and the technical integration of the sensor array. It was determined that the current Black Box diagrams must be redrawn to follow professional engineering standards.

-The team analyzed the selection of TDS and temperature sensors, prioritizing a balance between accuracy, physical size, and unit cost to ensure the "Smart Base" remains compact. To support these hardware decisions, the team was asked to prepare a power budget table to calculate the maximum voltage and current requirements for the ESP32 and UV-C driver. The team should also think of the design of the filter and how and when it has to be changed. All components have to be water resistant and food-safe.

-During the early development phases, standard blue LEDs will be used as a safe visual proxy for the sterilization cycle to test the mechanical housing. We also have think about the safety issues of UV-C.

-There was a suggestion to replace placeholder images in the report with original models and to include a new "Smartness Features" table to better differentiate TRAQUA from current market alternatives.

**4th Meeting (2026-03-19)****Agenda:**

1. Present Selected Materials
2. Present Selected Components
3. Discussion about UV-C technical challenges
4. Updated Black Box Diagram
5. Present Chapter concerning Marketing, Ethics, Sustainability and Project Development
6. Present Branding

**Minutes:**

This week's meeting mainly focused on discussions regarding the technical protection of the UV-C light. First, we presented our ideas related to the bottle geometry and the use of magnetic sensors. The teachers complemented these ideas with additional approaches. One suggested solution was to integrate a magnetometer by placing a magnet in the bottle cap. However, a potential disadvantage of this concept is that the bottle could still be operated in a vertical position. Another option discussed was the use of a material with lower reflectivity in the upper part of the bottle. Additionally, implementing geometric barriers at the top of the bottle could protect both the filter and the user, while also representing one of the simplest technical solutions. To further evaluate this concept, we need to analyse the reflection angles and conduct additional background research.

Furthermore, we were advised to verify whether our logo and brand name already exist. If the brand name is used in a completely different field, it may still be possible to use it, but we should ensure sufficient differentiation. This should also be part of the ethics chapter.

In addition, we need to update the material table and continue working on the report. For the

bibliography, we are required to use the BibTeX format provided in the Wiki portal. The black box diagram also needs to be updated, including correcting spelling mistakes.

Regarding the background research section, the material chapter should be revised to present a more general overview rather than focusing specifically on the prototype.

## **5th Meeting (2026-03-26)**

### **Agenda:**

1. Presentation of the cardboard model
2. Review of detailed schematics
3. Presentation of the flyer
4. Clarification of differences between sprint overviews, sprint outcomes, and evaluations
5. Discussion of the Gantt chart and backlog
6. Discussion regarding the 3-piece concept

### **Minutes:**

Firstly, the teachers provided information about the interim presentation. The presentation should consist of approximately 10 slides and last around 10 minutes. Each team member is expected to present. The following topics should be covered: the problem, project development, state of the art, marketing, sustainability, ethics, and the solution design, including structural drawings and the smart system, followed by a final conclusion.

Regarding the schematics, some mistakes and potential improvements were identified. For example, issues were noted in the connection of the UV-C lights.

The flyer could be improved by using consistent font sizes and by adding a QR-code linking to the website or the wiki. Additionally, the perspective of the bottle was criticized.

For the report, it was suggested to describe the Gantt chart, backlog and the project development in general in more detail in written form.

Finally, we presented the idea of using a three-piece bottle, which was well received.

## **6th Meeting (2026-04-01)**

### **Agenda:**

1. Code Submission Requirements
2. Product Budget Presentation
3. Detailed Schematics Review
4. Interim Report Confirmation

## Minutes

During this meeting, we presented our revised budget plan, which now includes more expensive components such as batteries, wires, and other materials. We also discussed the battery configuration and presented the corresponding schematics.

The teachers pointed out that 16 V batteries are not standard and recommended creating a table to verify that the battery consumption requirements are met. They advised us to consider using 12 V batteries instead, while ensuring that they provide sufficient power for the UV-C lights and sensors. Afl changes should be sent to Louis.

In addition, we presented renderings of the water bottle, showing both the interior and exterior views, as well as its three main components.

Finally, we reviewed the requirements for the interim deliverables. We will upload the interim report as a PDF and share the website and app code via GitHub.

For the report, the website and the app the SI have to be corrected.

## 7th Meeting (2026-04-23)

### Agenda:

- 3D Model video
- Review revised detailed schematics
- Presentation of leaflet and poster
- Discuss when we are going to receive pieces for the prototype.

### Minutes

During the meeting, feedback on the visual design was discussed. It was noted that adding a hand holding the bottle could be beneficial, as this would strengthen the user suggestion concept and make the intended interaction clearer.

In the context of the video, it was recommended to use darker text in order to improve readability. Furthermore, a stronger contrast between the foreground and background should be established. Adding a surface texture was also suggested to enhance the visual depth of the video. In addition, the integration of the Traqua symbol or logo was proposed.

Regarding the leaflet, it was pointed out that several minor spelling errors need to be corrected. Moreover, parts of the text could be shortened and phrased more concisely to improve clarity and overall impact.

For the poster, it was mentioned that the text fields need to be aligned with the outer layout lines. The headings should be emphasized more clearly to improve visual hierarchy. Additionally, the use of the word "we" should be replaced with "people" to ensure a more appropriate and neutral tone.

Finally, the team was introduced to the task of preparing a scientific paper. This paper is intended to explain the background and context of the project in detail and will be submitted to TEEM'26.

## 8th Meeting (2026-04-30)

### Agenda:

-3D Model video -Final List of Materials & Components -Final List of Providers

### Minutes:

The meeting began with a review of technical requirements, specifically the need to add audio to the 3D model video. Regarding component sourcing, it was determined that the website for the battery holder and buck converter must be changed, the team must ensure that all components are sourced from the approved and suggested stores.

The discussion then moved to packaging, where the team confirmed the use of recycled fabrics to maintain sustainability goals. While the current packaging concept is solid, the team needs to establish a specific color palette for the retail versions of the product. Looking ahead to the next meeting, the priority will be to finalize the packaging drawings so that prototype production can begin. Additionally, sample papers from the previous year will be provided to the team shortly to serve as a reference for the required standards.

## 9th Meeting (2026-05-14)

### Agenda:

- packaging solution
- paper
- video
- report
- materials for the prototype

### Minutes:

paper: add personal outcomes (collusion) -do not force float (table, figure) location - use SI -deadline end of May packaging solution including space between 100 and % not 100% image of a bottle itself packaging solution adding for example foam between layers to make it shock absorbing

video: we have different design in terms of video, packaging and poster. we must choose one.

## 10th Meeting (2026-05-21)

### Agenda:

- 3D printing
- code

- app
- user manual
- packaging solution

During our last meeting, we finalized the next steps for the prototyping, testing, and documentation phases of the project.

Regarding manufacturing, the team must immediately complete the preparations for the 3D printing process and submit the final design files to production. To assist with the physical assembly of this prototype, we have been provided with new LEDs that need to be integrated into the build.

In terms of testing and quality assurance, two major evaluations are required. First, the water bottle must undergo a theoretical load and stress test to ensure its structural integrity. Second, we need to conduct usability testing for the mobile companion application to optimize its user experience.

Significant progress was also mapped out for our documentation and packaging materials. We decided that the text for the packaging solution needs to be shortened and streamlined. Furthermore, the user manual must be thoroughly proofread to eliminate any typos and grammatical errors, while also being revised to make the content more concise and precise.

Finally, we addressed the academic paper. The team was given instructions to carefully review all sources and references within the document, adding page numbers where they are currently missing. To complete the paper, all remaining chapters must be fully drafted and integrated as soon as possible.

## 11th Meeting (2026-05-28)

### Agenda:

- App presentation
- Paper
- Functional Tests & Results
- UV-C light testing

### Minutes:

The submission of paper postponed to 5th June. Put results of the functional test on Wiki. Think about making simulation if impact/stress test when for example kid will kick the bottle. UV-C light may be tested in special Lab, and the test will be conducted and we will be notified if it's working. In paper the picture of bottle should be change to the latest one. In paper fig 2. App deigned instead of TRAQUA design. The illustration of packaging solution may be connected with picture of the bottle to not have that many picture in the paper. Put two imagine, and put picture of load stress. Change Erasmus Project Semester to European Project Semester.

## 12th Meeting (2026-06-03)

**Agenda:**

- Protection glasses
- Battery issues
- Summary of paper
- Scheme of final presentation

**Minutes:**

There were suggestions regarding placement of subtitles regarding the video. But the video was accepted. Protection glasses were provided and we have already solved battery issues before the meeting. The scheme of final presentation is provided on Teams.

**13th Meeting (2026-06-11)****Agenda:**

- Mount sensors for the prototype
- Testing the UV-C light
- Start final presentation
- Summary and conclusions chapters in the report

**Minutes:**

We are going to have rehearsal of our final presentation. We have to finish the presentation and polish some headlines of report. It's recommended to print the poster (A3), leaflet. We are going to receive some kind of vessel where we can test our solution, as it's difficult to do it in our bottles because its irregular shape. After presentation at 18th we have to available for the rest of the day. We have to fill S&P assessment and individual perspective file. The prototype is needed for 25th June.

**Activities**

*Please register here all accomplished project activities*

| Start      | End        | Task                  | Description   | Who      |
|------------|------------|-----------------------|---|----------|
| 27.02.2026 | 27.02.2026 | E-mail sending        | Drafting and sending the confirmation emails to our supervisors | Bernardo |
| 27.02.2026 | 27.02.2026 | Write 1st Week Report | Write 1st Week Report   | Maria    |
| 27.02.2026 | 27.02.2026 | Write Minutes         | Write Minutes after 2nd meeting                                 | Maria    |
| 26.02.2026 | 26.02.2026 | Write Minutes         | Write Minutes after 1st meeting                                 | Maria    |
| 02.03.2026 | 11.03.2026 | Motivataion Part      | write the motivation part of the report's introduction          | Rieke    |
| 02.03.2026 | 11.03.2026 | Objective Part        | write the objective part of the report's introduction           | Max      |

| Start      | End        | Task              | Description  | Who      |
|------------|------------|-------------------|--|----------|
| 02.03.2026 | 11.03.2026 | Requirements Part | write the requirements part of the report's introduction | Bernardo |
| 02.03.2026 | 11.03.2026 | Problem Part      | write the problem part of the report's introduction      | Guillem  |

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