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# 1 List of Activities of SStS 2022 - 2024

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## May 2022 - December 2022: Project Planning for Project Stratos and the start of Stratos V

In May 2022, the team started to develop the plan for the future of Project Stratos. During this period, the team proposed multiple ideas for the future of Project Stratos and, thus, SStS. The team concluded the idea development and decided on the plan for Stratos V to develop a reusable liquid bi-propellant-sounding rocket. Various companies were visited during this period, too, improving relations and gathering resources.

## January 2023 - May 2023: Preliminary Design of Stratos V

During this period, the focus was on the initial research and development of the Stratos V rocket subsystems. This stage was crucial for laying the project's foundation as the team started the preliminary design of various components. Components from all subsystems were designed, including the engine, feed system and valves, tanks, intertank stages, avionic system, outer structure, primary and secondary decelerators, and the systems developed during the previous SStS project, Project Sparrow, were improved. Additionally, various companies were visited to get funds to support the project.

## May 2023 - November 2023: Detailed design, prototyping, testing of subsystems

The project transitioned into detailed design and prototyping following the preliminary design phase. This period was marked by progress in manufacturing and testing the rocket's subsystems. Key activities included:

- **Valve Manufacturing:** The team successfully manufactured critical valves essential for controlling the flow of propellants and other fluids within the rocket.
- **Thrust Structure Manufacturing:** The structural component designed to withstand the intense forces during launch generated by the engine was fabricated and tested.
- **Tanks Prototyping:** Prototypes of the propellant tanks were developed to ensure they met the required specifications and could withstand the operating conditions.
- **Engine Testing:** Rocket engine testing was conducted to validate its performance and reliability.
- **Feed System Components Testing:** The feed system, responsible for delivering propellants to the engine, underwent detailed testing to ensure its efficiency and safety.
- **Structural Testing:** Various structural elements of the rocket were subjected to testing to confirm their integrity under load conditions.

Additionally, the team actively participated in industry events and a year-closing event was organised:

- **Space Tech Expo Europe 2023:** The team attended this major industry event to network with experts, gather insights, and explore potential collaborations.



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- **Precisiebeurs:** Participation in this event allowed the team to engage with precision engineering professionals, which was invaluable for the intricate manufacturing aspects of the project.
- **Stratos V 1st Year Symposium:** A symposium was organised to showcase the progress made during the first year, fostering collaboration and discussion with stakeholders and the broader community.

## November 2023 - January 2024: Change in Project Direction & Preliminary Design of Stratos V Pathfinder 1

In November 2023, the project underwent a change with the decision to develop a pathfinder version of Stratos V. This pathfinder would serve as a testbed for critical technologies and subsystems before full-scale development of the final rocket. This change in direction de-risks the project and ensures the success of the ultimate mission.

Additionally, the team actively participated in various events and had the following important activities:

- **Airbus Visit:** The team visited Airbus' facilities to discuss potential partnerships and gain insights into advanced aerospace technologies.
- **Stand at "Discover Your Space" Event:** A presence at this event helped to raise awareness of the project and attract interest from the space industry and the public at the Delft University of Technology.
- **Stand at VSV Symposium:** Participation in the VSV Symposium provided an opportunity to showcase the pathfinder progress and engage with the academic and professional community, held at the Delft University of Technology.
- **Start of Pathfinder 1 Documentary:** The team began documenting the journey of Pathfinder 1, aiming to share their experiences and knowledge with a wider audience.

## January 2024 - July 2024: Detailed Design of Stratos V Pathfinder 1, Prototyping, and Testing of Subsystems

The first half of 2024 was dedicated to advancing the detailed design, prototyping, and testing of the Stratos V Pathfinder 1 subsystems. This period involved the following activities:

- **Continued development:** The team developed the aforementioned systems, adapting them for the Pathfinder. These include the tanks, feed system, engine, thrust structure, ground fire suppression system, etc.
- **Engine Test Campaign:** Engine tests were conducted to fine-tune performance and validate the design under real-world conditions.
- **Fin Manufacturing:** The fins were designed and manufactured for the rocket's stability during flight.
- **Recovery System Manufacturing:** The recovery system, designed to return the rocket or its components after launch safely, was manufactured.
- **Avionic system upgrades:** Detailed design of the rocket's electronic systems' newest iteration was done, covering navigation, communication, and control.
- **Simulation Development.** The team worked on defining uncertainties in their simulations to improve accuracy and predictability. Wind profile modelling was conducted to ensure that the



rocket's design could handle varying atmospheric conditions. Lastly, an analysis was carried out to predict how variations in launch conditions could affect the rocket's trajectory.

The team also engaged in several important visits and events to further the project:

- **SES Visit:** A visit to SES provided insights into satellite communications, which could be relevant to the rocket's payload capabilities.
- **NXP Visit:** This visit explored electronic components and systems that could enhance the rocket's functionality.
- **Ford Partnership:** A partnership was secured to provide transportation and logistical support for the project.
- **TU Delft Fast Fund Application:** An application was submitted to secure additional funding from TU Delft, aiming to accelerate the project's progress.
- **Moeder Delftsche Bedrijven Avond:** The team presented their work at this event, engaging with local businesses and potential sponsors.
- **GOSIM & RustNL:** Participation in GOSIM and RustNL allowed the team to connect with simulation experts and gather valuable feedback.