

## THE S-VISION CONCEPT



SSVOBB Lambach Aircraft's new ambition

***For every student society in Delft the beginning of each academic year is something special. New boards are inaugurated and the plans for the coming year are announced. The start of this academic year was a very important milestone for the student society SSVOBB Lambach Aircraft. After one year of hard work behind the scenes they were able to announce that the society is now working on a new project called the S-Vision.***

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Let's start by taking a closer look at this relatively small society at the faculty of Aerospace Engineering at Delft University of Technology. It was at the end of the eighties that some of the students had the idea to build their own aircraft. To realise this dream they founded SSVOBB Lambach Aircraft on January 19, 1991. SSVOBB is the acronym for "Stichting Studenten VliegtuigOntwikkeling, -Bouw en -Beheer" or translated in English: Foundation for Student Aircraft Development, Manufacturing and Operation. Because they were initially more interested in the actual building rather than the designing, the society chose to build a replica of the Lambach HL-II because of its history. The original HL-II was designed and built by a team led by the Delft alumnus Hugo

Lambach. Unfortunately this marvellous piece of Dutch aircraft engineering was lost in the Second World War with the bombing of Ypenburg. Since the original was designed and built within six months, the initial idea was that students should be able to complete the task within one year. Reality turned out to be quite different. It would take until September 8, 1995 before the HL-II would be airborne once again.

In 1993, SSVOBB members realised that the HL-II was nearly completed and that it would be a shame not to use the knowledge gained during the project. Encouraged by the success of the HL-II, the idea to build an aircraft based on an own design started to grow within the society.

This brought the members of SSVOBB to found the Stratego commission, a group in which most skilled builders were represented. The purpose of this group was to determine whether building an own design was a feasible option. Eventually, they gave their approval but it would take a DSE exercise in 1994 to actually start with the new project. The Impuls was born. Work on this project continued over the years and, piece by piece, the Impuls was designed and built by the concurrent engineering principle. From 1995 until 2009 the fuselage structure, the landing gear, the fuel system and some parts of the wing were designed and built.

The Impuls however, had to deal with a large amount of set-backs. First of all



Figure 1. A render of the S-Vision based on the current design

Table 1. Main parameters of the S-Vision	
PARAMETER	VALUE
Wing Area	11.16m
Wingspan	9.45m
Fuselage length	7.93m
Cabin width	1.2m
MTOW	645kg
EOW	370kg
Useful load	200kg
Range	900km
Cruise speed	270km/h
Stall speed (landing configuration)	75km/h
Engine	UL350iS
Engine Power	130hp



Figure 2. The previous ambitious design and build project of SSVOB, the Impuls, was frozen in 2009



Figure 3. The replica of the Lambach HL-II in front of the replica of the original Schiphol building in Lelystad

the amount of volunteers in the society dropped on a yearly basis, which caused significant delays. Because of these delays a lot of the techniques used in the Impuls had become outdated. Also, after the aerodynamic tests it became apparent that the aerodynamic properties were not as good as expected, but sadly, no adaptations to the design were made. Furthermore, large mistakes were made considering the certification. These facts combined forced the board to freeze the project in 2009. Although this eventually meant the end of the Impuls, the project is definitely not considered a complete failure. The Impuls did fulfil the main goal of the SSVOB of developing and building an aircraft and proved to be an excellent learning experience for many of the volunteers within the society.

The Stra2go commission was founded to see what should be done next. In the summer of 2009 they decided that SSVOB should carry on with its ambition to design and build an aircraft. In order to prevent a repetition of the Impuls project, the lessons learned from the project were put together. With these lessons the

basic requirements for the new project were determined. It was decided to go for a somewhat more conventional design than the Impuls. Also, instead of using CS-23 certification (Normal, Utility, Aerobatic and Commuter Aeroplanes), the new aircraft would be certified according to CS-VLA (Very Light Aeroplanes), which is considerably more simple than CS-23. Additionally, the SSVOB wanted to excel in one specific parameter in this category. Eventually it was opted to design one of the fastest aircraft in the VLA class. Furthermore, SSVOB wanted to reserve 25kg of payload for research equipment, which could be used by the university or other institutes for measurements and observations.

Having done all this, one specific problem hadn't been solved yet; what would be a proper name for the new aircraft? Many suggestions were made but none were approved to become the new name and the aircraft was to be called Lambach Aircraft One until a better name was found. Eventually the project was named the S-Vision, as it represents SSVOB's vision on how to build an aircraft. All this should

result in an aircraft designed and built by students for students.

Together with these requirements, a planning for the entire project has been set up. SSVOB plans to have finished the S-Vision design within five years and to have built the aircraft within another five years. The design phase has been divided in many more sub-phases, of which the project set-up and the conceptual design were finished last year. Based on the work performed last year, a long list of main parameters has been created of which the most interesting are put together in table 1.

This year the preliminary designing phase of the S-Vision has started. During this phase work has to be performed on the lay-out design of cockpit, fuselage, wing, empennage and landing gear. Besides designing the lay-out of the aircraft, the first aerodynamic calculations together with the thrust and power characteristics should be performed. This means quite a lot of work for the coming months, but SSVOB is confident that the deadline will be made. ✈