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*A. Siebert, K. Baillié, M. Béthermin, F. Cantalloube, E. Josselin, N. Lagarde, J. Malzac, J. Richard, L. Selliez, O. Venot (eds)*

# PRODUCTION OF A STROCK 250 TELESCOPE BY IPSA VEGA

C. da Graca Baptista[1], F. Nollet[1], A. Saint-Paul[1], S. Candun[1], M. Cellier[1], M. Godart[1], B. Veillaud[1], M. Levy[1], D. Prevost[1], A. Lekic[1,2] and P. Pointier[1]

**Abstract.** As part of a collaboration with the Instrument Commission of the French Astronomical Society, IPSA Vega has begun polishing its mirror. The next goal is to build a telescope. The telescope is a Strock-type telescope with a diameter of 250 mm. This project is part of a scientific initiative aimed at raising awareness among association members about instrumental optics techniques.

Keywords: telescope, mirror, production, Strock

## 1 Introduction

The Stock-type telescope was designed by Pierre Strock and is used for straightforward use and portability. Its defining characteristic is a modular construction that allows the telescope to be assembled and disassembled with relative ease, enabling convenient transport, storage, and maintenance. One of its main advantage is that it is cheap to construct, which made it a perfect choice for IPSA Vega to build their first telescope. The association, after a vote, decided to name it the "Vegatron", thus directly referencing its name.

## 2 Research for the structure

### 2.1 Drawing up plans

In order to do the plans, the association used the Catia licence offered by the school to design every pieces. The first part designed was the secondary mirror cage, and then the primary mirror cage. Not to be overcharged by the quantity of pieces that would need to be created, the designers created sub-assemblies that corresponded to different parts of the structures (the cages, the spider, ...).

Finally, the final assembly was created using the different sub-assemblies, which allowed the association to create the first design of what would be the telescope. To help to visualize better the final structure, the association also created the structure in its closed position, with all the pieces in it, which can be seen on Fig. 1 (right).

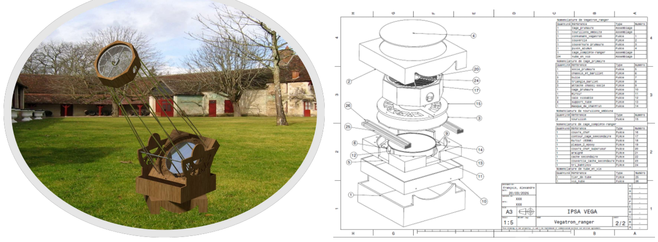

**Fig. 1. Left:** 3D-view of the structure opened **Right:** Drawing of the structure closed

[1] Institut Polytechnique des Sciences Avancées (IPSA), 63 bis Boulevard de Brandebourg - 94200 Ivry-sur-Seine
[2] Société Astronomique de France (SAF), 3 rue Beethoven - 75016 Paris

### 2.2 Differences with a Strock telescope

The drawings were mainly inspired from the Strock plans but ended up being different in many ways. The first big difference is on the secondary mirror cage: In the original drawing, the spider was supposed to be built using different pieces then assembled when the telescope was open. For IPSA Vega's version, the designers decided to go with a single piece, that would be later printed using one of the 3D-printer available in the school.

The second difference is the collimation system of the primary mirror: The association decided to go with a 9-points barrel, which will then be positioned on a plate that can be moved during the collimation, instead of a single pin, which was the case on the original version.

## 3 Construction of the telescope

### 3.1 Polishing the mirror

After the plans were designed, the association began the construction of the telescope by the mirror. For this step, members part of the project went to the Sorbonne. The process was the following: The first step was to make the mirror spherical. To accomplish that, carborundum is used, which allows to furrow the mirror. As time goes by, the size of the carborundum was reduced and the surface condition of the mirror improved.

Then, the next step was to polish it. The objective was to remove every single irregularity from the mirror surface. Once there is no more irregularity, the association started the parabolisation of the mirror. To do that, the aim is to do W-shaped movements to go from a spherical to a parabolic shape.

Finally, the mirror was coated with aluminum to make it reflective. This allowed the association to obtain a mirror of great quality, perfectly fit for this telescope.


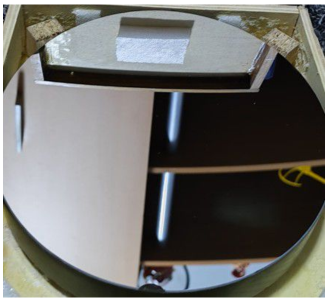

**Fig. 2. Left:** The mirror at the end of the first step **Right:** The mirror finished

### 3.2 Building the structure

Once the drawings and the mirror were finished, the construction of the structure began. It started off by cutting out the different wooden pieces. The members of this project started by the easiest ones, which allowed to correct some minor mistakes. This process is currently still in progress, but will then go on to the assembly.

Here are some specifications: First, the designers decided to buy the secondary mirror instead of polishing it, reducing the cost and difficulty of this project. Then, to support the primary mirror, it was decided to put carbon reinforcement instead of wood, in order to not have any problem of deformations. But after some considerations, the final option was to use aluminium, which is more robust and durable.

## 4 Conclusions

This year's work on the Strock-type telescope project has progressed successfully, with the completion of the primary mirror marking an important milestone. In parallel, members of the association participated in the RETA, a gathering dedicated to astronomical telescopes, where they had the opportunity to present the project and exchange ideas with other participants. These discussions proved highly valuable: based on constructive feedback and internal reflection, the association decided to modify the original plan and pursue the construction of a Serrurier-type telescope. IPSA Vega hope to be able to present the next step of this project during the next SF2A gathering in 2026.