

Cronos Sounding Rocket

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Cronos is the first hybrid rocket designed by our team and the first attempt to create such a rocket inside the Greek student community. We decided to build Cronos, in order to test our knowledge, skills and eventually improve them through the process of making each and every part in house.

By choosing to do so, a wide variety of engineering challenges became obvious after the first weeks of design and eventually manufacturing.

The lack of previous experience with such engines and lack of usage knowledge upon a wide variety of tools (mills, lathes, CNC's etc) capable of cutting such large pieces were the two major issues we encountered. Thus, we had to find ways to bypass the tool-related technical difficulties in order to manufacture our parts. However, after countless hours of learning, modifying our designs to fit the available tools, practicing our machining skills and (admittedly so) a lot of failures, we are currently at the point of being able to use the tools we have in our advantage, and cut every piece of the rocket by ourselves.

The MK2 engine, the run tank, the test stand structure, the control box as well as every other part of the rocket that is tested now and will fly at Cronos' first launch attempt, is a "product" designed and manufactured by the team, with the tools we have, available to every person around the globe, regardless of age or previous experience, to see, ask questions about, and get educated further. Through our open source repositories (<https://gitlab.com/librespacefoundation/cronos-rocket>), one can view every step we took from the start, engage with us directly through comments and given the experience and certificates, even build and fly themselves. Now, after almost 2 years into the development of Cronos, we have reached a level where we can predict the outcome of various tests, use the available tools in order to rapidly prototype and test parts and of course, use our acquired knowledge to review our mistakes and learn from them. We are really satisfied with the progress we've made so far, (considering that we started from scratch without any previous experience) and the fact that we have already passed so many tests (e.g. hydros, successful recovery firings, various avionics tests) makes us extremely happy.

It is important to say that the team has embraced the open source philosophy from the start.

Due to the difficulty of manufacturing this type of rocket (especially in the student community) our team members considered that Cronos deserves to be easily accessible to the community. In this way, anyone who wishes to learn and advance their knowledge upon such subjects is able to get information about our research and tests, come in close contact with our team and ask questions about what concerns them.

Moreover, the open source philosophy can motivate and encourage people who want to engage with this sector but they have no previous experience or knowledge as happened to us. Space technologies should be accessible to the community, and by sharing our work, we hope to contribute to this cause.

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