

Interactive Presentations (IP)  
Topic 7 - Interactive Presentations (7)

Author: Mr. Karol Pelzner  
Blue Dot Solutions, Poland, karol.pelzner@gmail.com

OPTIMIZING THE DESIGN OF MICROBIOLOGICAL SAMPLING SYSTEM FOR HIGH ALTITUDE  
BALLOONS.

**Abstract**

Abstract—The stratosphere, which is part of the Earth's atmosphere, has been proven to host bio organism despite the harsh conditions of low temperatures and pressure along with high UV and cosmic radiation exposure. Missions have been carried out to catch the species in question and conclude bioanalysis on the ground. The apparatus needed to carry out such an experiment is often heavy and expensive to make, requiring even more expensive high altitude balloons able to accommodate the required weight. Optimising the weight of the experiment with the balloon size in mind would allow to drive down the overall cost of the experiment, and send out more missions within the same budget, while catching more biological material across all the missions. The students of the project Stardust at the Gdańsk University of Technology have compiled the knowledge from the previous missions, and set out to build an optimized version of the experiment. The use of lightweight materials, structurally equivalent elements and 3D printing allowed to drive down the mass of the final experiment, allowing the mission to be performed using smaller and cheaper balloon system. In the end the system weighs less than 1500 grams and can be carried by a relatively cheap helium or hydrogen filled balloon. The initial flight of the proposed system has concluded and the preliminary results show that the changes made do not compromise on the accuracy of the collected data. Further optimizations are taking place, allowing for driving the cost of the experiment down further and enabling more parties to carry out research in the same field.