HASP 2023 Monthly Status Report

Report Month:	February 2023
Submitted by:	Dr. Nirmal Patel
Submit Date:	02 /24 / 2023
Institution:	University of North Florida University of North Dakota
Payload Number:	2023-07
Payload Name:	Measurements of Ozone in the Troposphere and Stratosphere
Payload Short Name:	Ozone Sensors Payload – OSPrey

I) Activities during Previous Month:

(i) The team reviewed the payload fabrication work done earlier, issues and failures of hardware and software and science reports of the last year HASP balloon flight 2022. Team reported the answers of all comments / questions asked by the reviewers.

II) Issues Encountered:

None

III) Milestones Achieved:

(i) Team made redesign of the payload body.
(ii) A separate file "UNF_Payload_Body_Design 2023_V1" is attached with this report for all new drawings of the payload body.
(iii) Cory made 3-D printed payload body for simulation and model purpose. The details are given in on page 3.
(iv) Miguel developed the new microcontroller circuit board design.

IV) Plans for Coming Month:

(i) Fabrication of new payload body based on new design and drawings.
(ii) Fabrication of new circuit board
(iii) Completing Preliminary Payload specifications and Integration Plan (PSIP) and NASA integration on-site security clearance documentation.

V) Other Comments:

None

VI) Team Composition and Organization:

University of North Florida								
Name	**Start Date**	**End Date**	**Role**	**Student Status**	**Race**	**Ethnicity**	**Gender**	**Disabled**
Miguel Bolante	01/09/2023	Present	Leader, EE, Communications Sensors	UG-EE	Caucasian /White	Hispanic	Male	No
Diego Fontan-Ulibarri	01/09/2023	Present	Payload design and body	UG-Civil/ ME	Caucasian /White	Hispanic	Male	No
David Medis	01/09/2023	Present	EE Microcontroller Circuits and Data Analysis	UG-EE	Caucasian /White	Non-Hispanic	Male	No
Lovely Ramos	01/09/2023	Present	EE Microcontroller Circuits and Data Analysis	UG-EE	Asian-Filipino	Non-Hispanic	Female	No
Dustin Leonard	02/01/2023	Present	EE-Circuit board and components work	UG-EE	Caucasian /White	Non-Hispanic	Male	ADHD
Colin Ott	02/01/2023	Present	EE-Circuits, sensors, and integration	UG-EE	Caucasian /White	Non-Hispanic	Male	No
Cory Pare	03/01/2023	Present	ME, Payload body design, Fabrication	UG-ME	Caucasian /White	Non-Hispanic	Male	No
Haris Smajic	01/09/2023	Present	EE Microcontroller Circuits and power budget	UG-EE	Caucasian /White	Non-Hispanic	Male	No
Aryan Patel	02/01/2023	Present	Software - Programming Payload design and weight budget	UG-Computer	Asian-America	Non-Hispanic	Male	No
Elric Burch	02/01/2023	Present	EE-Sensors and payload thermal budget	UG-EE	White-Cherokee	Non-Hispanic	Male	No
University of North Dakota								
Sam Reams	01/09/2023	Present	Space Studies	Master-Space Studies	Caucasian /White	Non-Hispanic	Male	No

Cory and other team members decided to make 3-D printing of the payload body. The 3-D printed body **will not use for the flight** but for the simulation purpose and will help to make the actual payload body using CNC machine. The brief information about 3-D printing is given below.

Preparing the 3-D Printer

The UNF HASP Payload – Design # 1 was prototyped using a 3-D printer (Make: Rostock Max V2 Delta Printer). A series of bed leveling strategies were used to get a usable first layer of a bigger size print of HASP payload body. The SeeMeCNC Delta Calibration wizard was utilized to help bump up the accuracy of the print as well as provide the usable first layer. Various parameters within the EEProm of the printer Software were entered in the program to complete the calibration Wizard. Once the data is entered the spread sheet creates a. gcode that runs a test (fig.1). This test utilizes the accelerometer probe within the hot end of the printer and touches 10 spots on the print bed. The 10 spots are measuring the offset height of the Z tower. Once the test is done the spread sheet updates with new values and creates a separate. gcode that is uploaded via MatterControl. This new. gcode essentially calibrates the printer to a higher level of precision which is essential for larger parts.

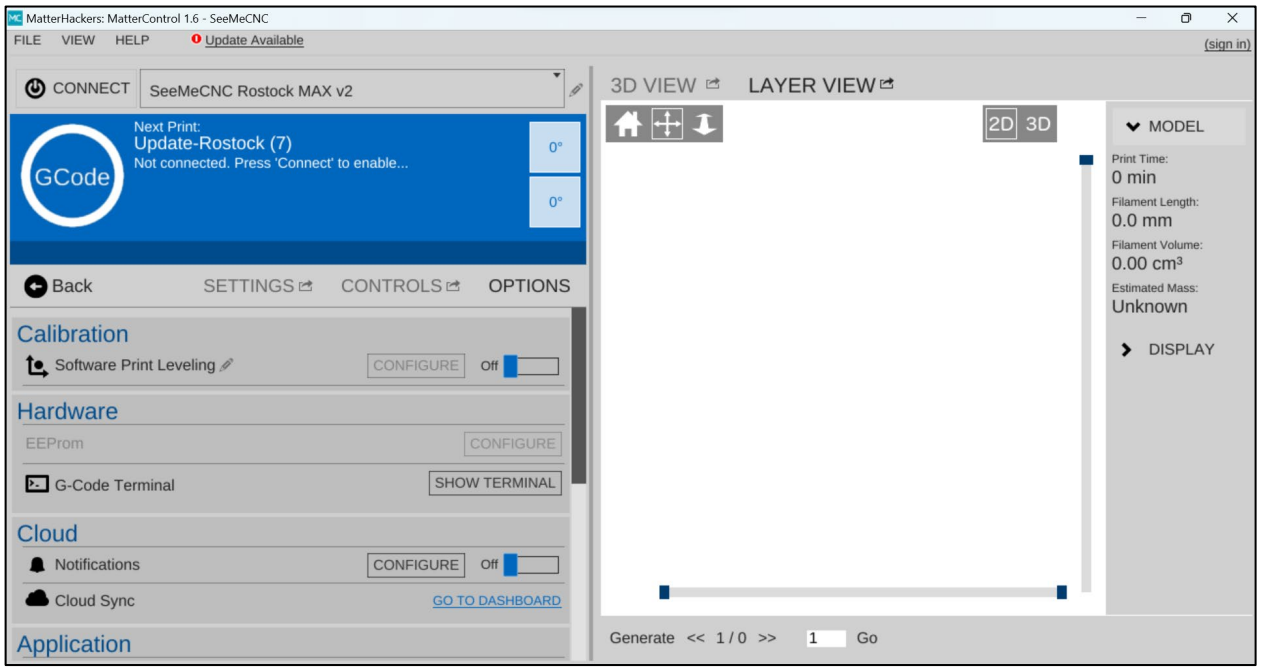

Fig. 1 GCode

Slicing and printing the HASP Payload

Once the printer was calibrated a .stl file was uploaded to the 3D slicing software- Ultimaker Cura. (Fig.2) The prototype payload was printed from a Carbon PLA made by Overture. Most of the default

PLA settings within Cura were kept default except the initial layer speed and retraction settings. An initial layer speed of 20 mm/s was set as well as retraction was enabled (Fig. 3).

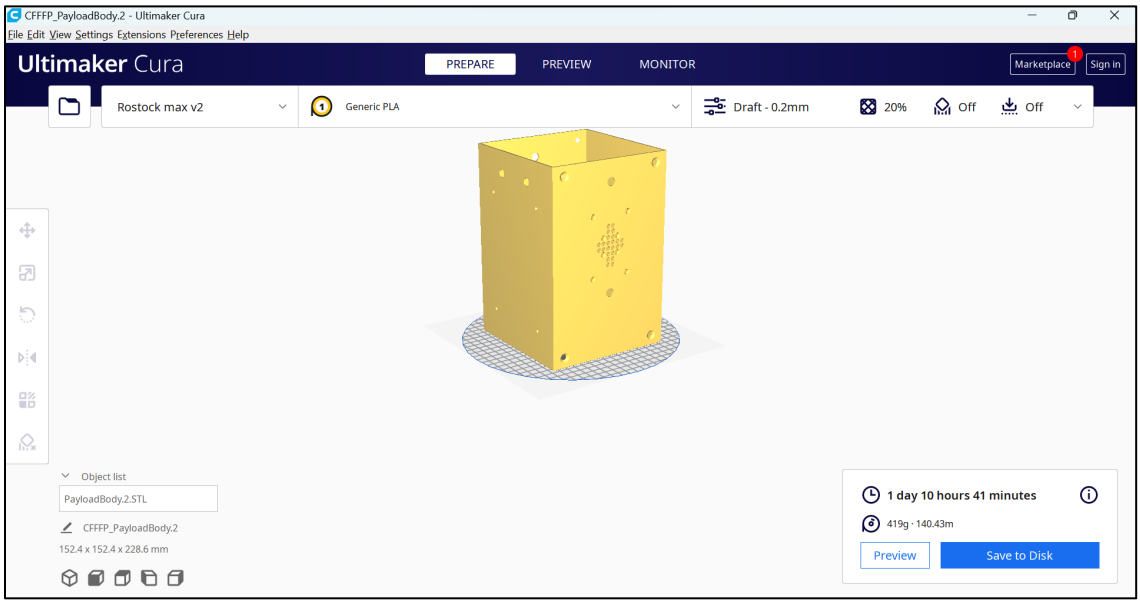

Fig. 2 Ultimaker Cura

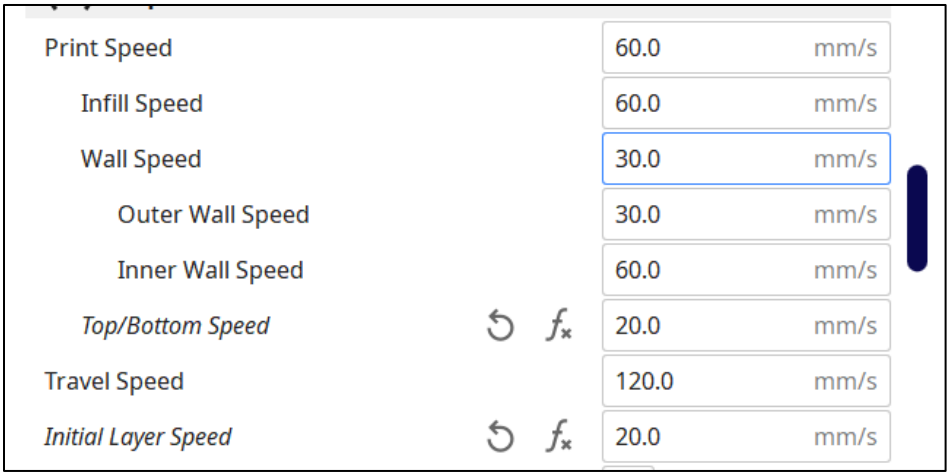

Fig. 3 Setting parameters

Once all the print settings were finished the part was sliced and printed. (Fig.4 and 5).

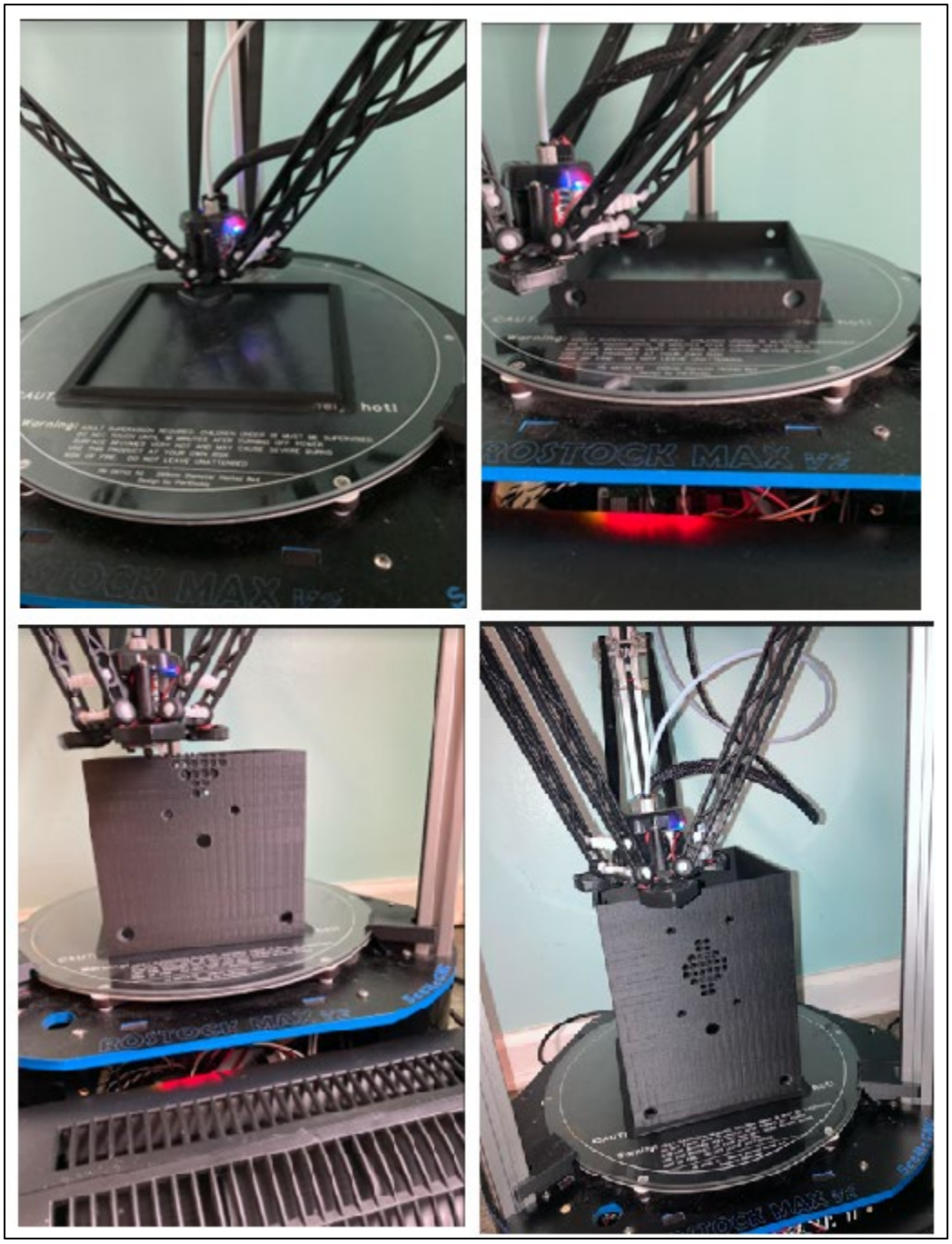

Fig.4 Different stages of printing.

Fig.5 Final 3-D print of the payload body