HASP Payload Specification and Integration Plan

Payload Title: Stratospheric Bacteria and Microbe Accumulator (SIMBA)

Payload Class: Small Large (circle one)

Payload ID: 06

Institution: University of Colorado at Boulder

Contact Name: Haleigh Flaherty

Contact Phone: 719-660-9177

Contact E-mail: haleigh.flaherty@colorado.edu

Submit Date: April 24th, 2015

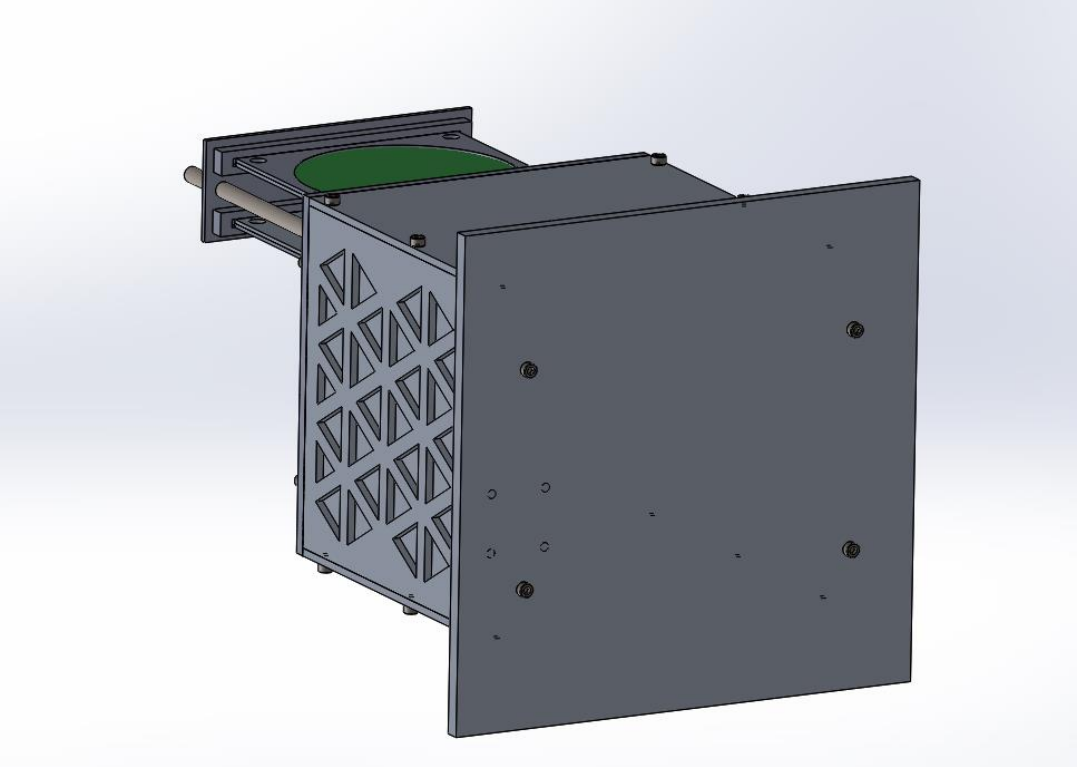
I. Mechanical Specifications:

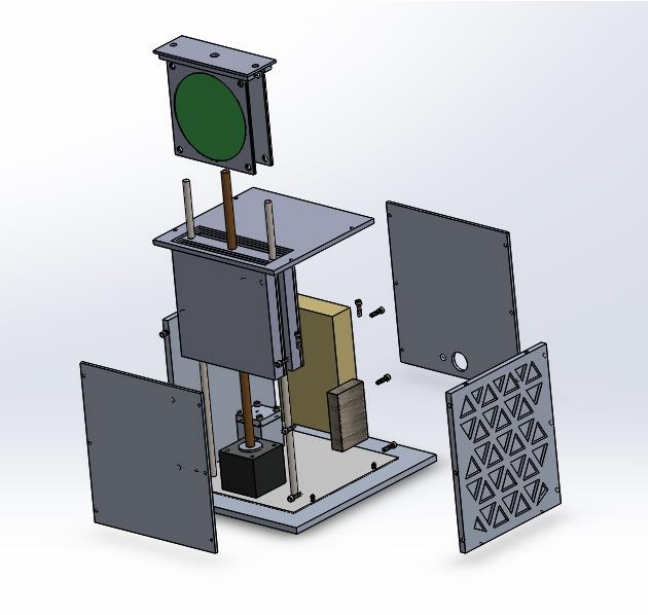
A. Measured weight of the payload (not including payload plate)

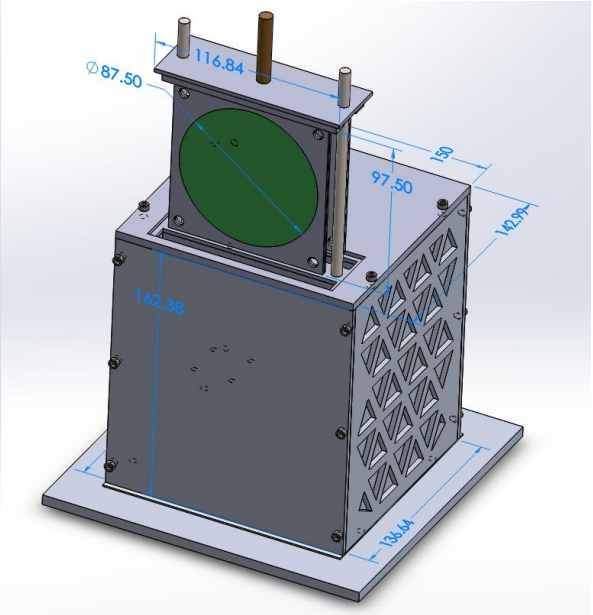
Specimen	Quantity	Estimated Mass (g)	Actual Mass (g)
1/8" T-6061Aluminum Wall	2	417	-
1/4" T-6061Aluminum Wall	2	634.2	-
0.09" T-6061Aluminum Top	4	234.15	-
Clean Zone Compartment	2	180.32	-
Steel Guide Rod	2	148.22	-
Microbeal Capture Unit	1	220.52	-
Stepper Motor w/ Threaded Rod	1	385	383
Control Filter Housing	1	67.9	-
Helicoils 6-32 Thread, .414" Length	20	8	8
Steel Alloy Socket Head Cap Screws	20	10	10
O rings	3	6	-
Filters	3	0.1	-
UV Sensor	1	1	2
Micro SD Card	1	1	1
Motor Driver	1	5	3

Raspberry Pi	1	45	44
Push Button	1	1	0.2
Humidity Sensor	1	1	1
Temperature Sensor	10	5	4
Driver Reciever	1	1	2
Buck Conveter	1	65	59
Wires	-	100	-
TOTAL		2536.41	517.2

B. Provide a mechanical drawing detailing the major components of your payload and specifically how your payload is attached to the payload mounting plate







C. If you are flying anything that is potentially hazardous to HASP or the ground crew before or after launch, please supply all documentation provided with the hazardous components (i.e. pressurized containers, radioactive material, projectiles, rockets…)

   i. N/A

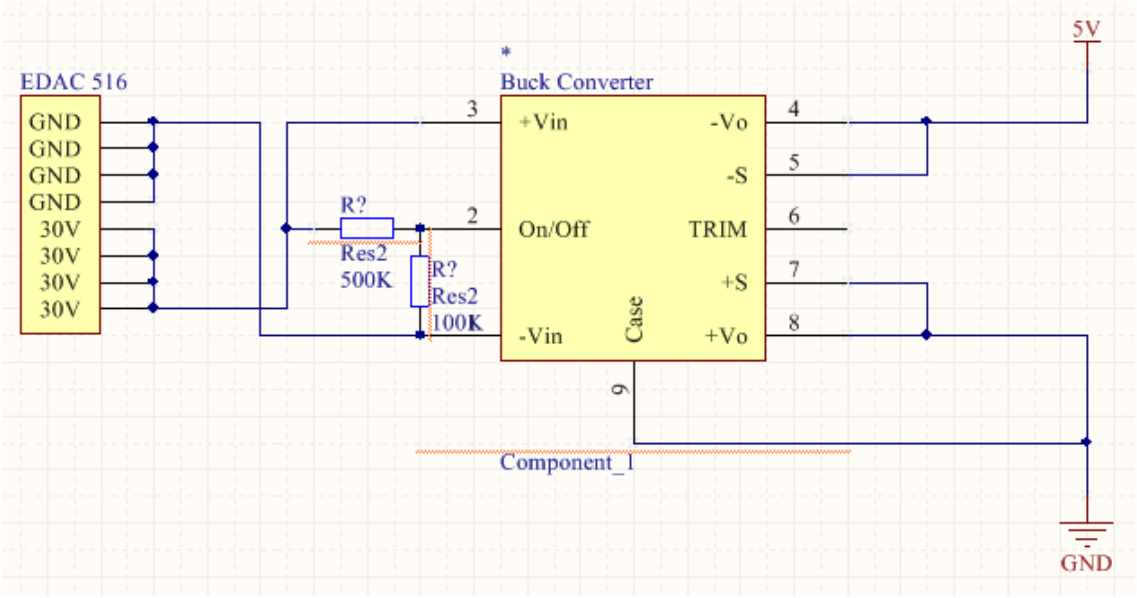
D. Other relevant mechanical information

II. Power Specifications:

A. Measured current draw at 30 VDC

   i. Without a physical payload to measure, the precise current draw is unknown. However, the anticipated power usage is 9.7 Watts, meaning the estimated current draw at 30VDC is 0.33 Amps.

B. If HASP is providing power to your payload, provide a power system wiring diagram starting from pins on the student payload interface plate EDAC 516 connector through your power conversion to the voltages required by your subsystems.



C. Other relevant power information

III. Downlink Telemetry Specifications:

A. Serial data downlink format: Stream Packetized (circle one)

B. Approximate serial downlink rate (in bits per second)

   i. Approximately 900-1000 bps

C. Specify your serial data record including record length and information contained in each record byte.

Byte	Description
1	Sender Type Indicator
2	Record Type Indicator
3-7	Unix Time Stamp
8-10	Length of Data
10-12	Checksum of Data (adler32 method)
13+	Data
n	End Transit Hex Message

D. Number of analog channels being used:
   i. Zero
E. If analog channels are being used, what are they being used for?
   i. N/A
F. Number of discrete lines being used:
   i. Zero
G. If discrete lines are being used what are they being used for?
   i. N/A
H. Are there any on-board transmitters? If so, list the frequencies being used and the transmitted power.
   i. No
I. Other relevant downlink telemetry information.

IV. Uplink Commanding Specifications:

A. Command uplink capability required: Yes No (circle one)
B. If so, will commands be uplinked in regular intervals: Yes No (circle one)
C. How many commands do you expect to uplink during the flight (can be an absolute number or a rate, i.e. *n commands per hour*)
   i. No more than 10 commands are expected to be uplinked during the entire flight.
D. Provide a table of all of the commands that you will be uplinking to your payload

Byte	Description
1	Payload ID
2	• "AAFF" - Shutdown the threads • "AAAA" - Acknowledges ping from ground • "BB00" - Tell stepper motor driver to move forward • "BB11" - Tell stepper motor driver to move backward

E. Are there any on-board receivers? If so, list the frequencies being used.
   i. No
F. Other relevant uplink commanding information.

V. Integration and Logistics

A. Date and Time of your arrival for integration:
   i. Sunday August 2nd in the evening

B. Approximate amount of time required for integration:
   i. 2 hours

C. Name of the integration team leader: David St. Clair

D. Email address of the integration team leader: david.stclair@colorado.edu

E. List **ALL** integration participants (first and last names) who will be present for integration with their email addresses:

Name	Email
David St Clair	david.stclair@colorado.edu
Haleigh Flaherty	haleigh.flaherty@colorado.edu
Melody Blackis	melody.blackis@colorado.edu
Jack Dinkel	john.dinkel@colorado.edu
Allison Howard	allison.howard@colorado.edu
Gage Froelich	gage.froelich@colorado.edu

F. Define a successful integration of your payload:
   i. SIMBA's integration will be deemed successful if and only if the payload is able to complete all of its mission objectives stated in the RFP.

G. List all expected integration steps:
   i. Mass and measure SIMBA.
   ii. Connect all electrical components to HASP e.g., power, serial communication, etc.
   iii. Attach SIMBA to the small student payload mechanical interface plate
   iv. Decontaminate SIMBA's Clean Zone then place it in SIMBA.
   v. Run all required tests e.g., thermal, vacuum, and communication.

H. List all checks that will determine a successful integration:
   i. SIMBA adheres to the mechanical constraints of a small class payload.

ii. SIMBA has been attached to the small student payload mechanical interface plate and is properly secured, including all electrical connections.
iii. SIMBA powers on and all onboard electronics are operational at the minimum power of 14.5 watts.
iv. The current draw at the flight minimum of 29 VDC does not exceed 0.5 amps.
v. All the steps in the decontamination procedure have been properly executed.
vi. The serial downlink and uplink is functional and has the desired speed.
vii. SIMBA is able to run through a complete mission simulation with all of the above requirements.

I. List any additional LSU personnel support needed for a successful integration other than directly related to the HASP integration (i.e. lifting, moving equipment, hotel information/arrangements, any special delivery needs…):
   i. No additional personnel needed

J. List any LSU supplied equipment that may be needed for a successful integration:
   i. No additional equipment needed