HASP Monthly Status Report

Report Month:	March 2023
Submitted by:	Andrew Snowdy & Wookwon Lee
Submit Date:	03/31/2023
Institution:	Gannon University
Payload Number:	2023-12
Payload Name:	UHF-Band Video-Streaming Payload

I) Activities During Previous Month:

a) Video Source (Raspberry Pi) --- Kalkidan, Zoey: A single Raspberry Pi 3B has been configured to use 3 webcams to simultaneously video stream via a wideband radio; in-lab test is in progress with a pair of M5 (5.8 GHz) radios to refine the PoE Power board is refined to output 15V to power up the M5; tested video streaming with: "R-pi -- M5 Tx – M5 Rx – VLC on laptop" with workbench power supplies; also tested with batteries to estimate video streaming duration; tested using 1, 2, and 3 cameras while keeping the R-Pi's CPU time to 30~40%.

b) I5 CPU for DTA2115B – Sara, Jack: Teste various modulation settings to find the most effective streaming configuration; concluded that the constellations and power draw were relatively unaffected by the changes in modulation. Likely to use 64 QAM or QPSK for baseband modulation, subject to further testing.

c) Front-end Power Amplifier – Andrew, Hannah, Sara: Tested a UHF power amplifier at 446 MHz and 906 MHz via a coax cable to a spectrum analyzer to verify the gain and transmit power. Max. 23 dBm is the target Tx power; unfortunately, during the testing, the amplifier stopped producing the output – debugging in progress to determine the cause of it and the next course of action (to procure another unit, if necessary).

d) Auto start for video streaming at boot-up – Jack, Sara: work has been in progress to make the i5 CPU auto-run DTA2115B at boot-up; a batch script was drafted and its testing is in progress.

e) Payload thermal control plan – Zack, N. Conklin: Ordered 1/8" Thick, 18" x 18" aluminum sheet for the inner layer of our payload enclosure; literature review is in progress for optimizing thermal condition; also configuration of the Raspberry Pi is in progress for temperature sensors on a few key electronics as well as writing a script for the R-Pi to collect and send temperature data to ground via HASP serial.

f) HAM Band Use Plans -- W. Lee, KC3GQE:

- On March 20th, contacted NM and AZ Amateur Radio Frequency Coordination Committees -- 440-450 MHz (Brian McCarthy AK7F) and 900 MHz (Dave Hall, N7ZPY) for central and northern AZ, and Neil Addis, W7FED, NMFCC Secretary and Database Manager and Central NM Frequency Coordinator; waiting to hear from them with a follow-up email sent on 3/28/23.
- Frequency to transmit (and no reception at the payload): either 442-450 MHz or 902-910 MHz. Our DTA2115B works over a wide range of frequencies from 32 MHz to 2,186 MHz using up to eight independent 8 MHz bandwidth channels; we will use only one 8 MHz channel to fit 6~8 MHz bandwidth for the video quality. As DTA2115B uses OFDM technology, a minimum of 6 MHz (and a maximum of 8 MHz) bandwidth is required.

II) Issues Encountered:

- The power amplifier was concluded not functional after testing and will get another one.

III) Milestones Achieved:

- No specific milestone in the month of March

IV) Plans for Coming Month:

- To complete PSIP by 4/28/23

V) Other Comments or Questions for HASP Management:

- None at the moment.

VI) Team Composition and Organization:

Fill in text as necessary plus update table below.

Name [i]	Start Date	End Date	Role	Student Status	Race[ii]	Ethnicity[iii]	Gender [i]	Disabled
Wookwon Lee	1/9/23	Present	Faculty Advisor	Faculty	Asian	Non-Hispanic	Male	No
Nicholas Conklin	1/9/23	Present	Faculty Co-Advisor	Faculty	White	Non-Hispanic	Male	No
Andrew Snowdy	1/9/23	Present	Project Lead	Undergraduate	White	Non-Hispanic	Male	No
Kalkidan Lakew	1/9/23	Present	Video source operation & integration	Undergraduate	Black	Non-Hispanic	Female	No
Hannah Jacobs	1/9/23	Present	UHF front-end electronics	Undergraduate	White	Non-Hispanic	Female	No
Zoey McClain	1/9/23	Present	Video source operation & integration	Undergraduate	White	Non-Hispanic	Female	No
Sara Jones	1/9/23	Present	UHF modulator operation & testing	Undergraduate	White	Non-Hispanic	Female	No
John (Jack) White	1/9/23	Present	i5 CPU integration	Undergraduate	White	Non-Hispanic	Male	No
Zachary Dickinson	2/8/23	Present	R-Pi & Thermal control	Undergraduate	White	Non-Hispanic	Male	No
Damien Chu	3/20/23	Present	R-Pi & Thermal control	Undergraduate	Asian	Non-Hispanic	Male	No

i. Current NASA guidance requires information from up to date legal documentation (for instance, Driver's License, Passport)

ii. Accepted options include African-American/Black, Asian, American Indian/Alaskan Native, Native Hawaiian, Pacific Islander, White