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TITLE	AUTHOR	DATE
Install New Piksi Firmware	Stewart Aslan	9/30/2019

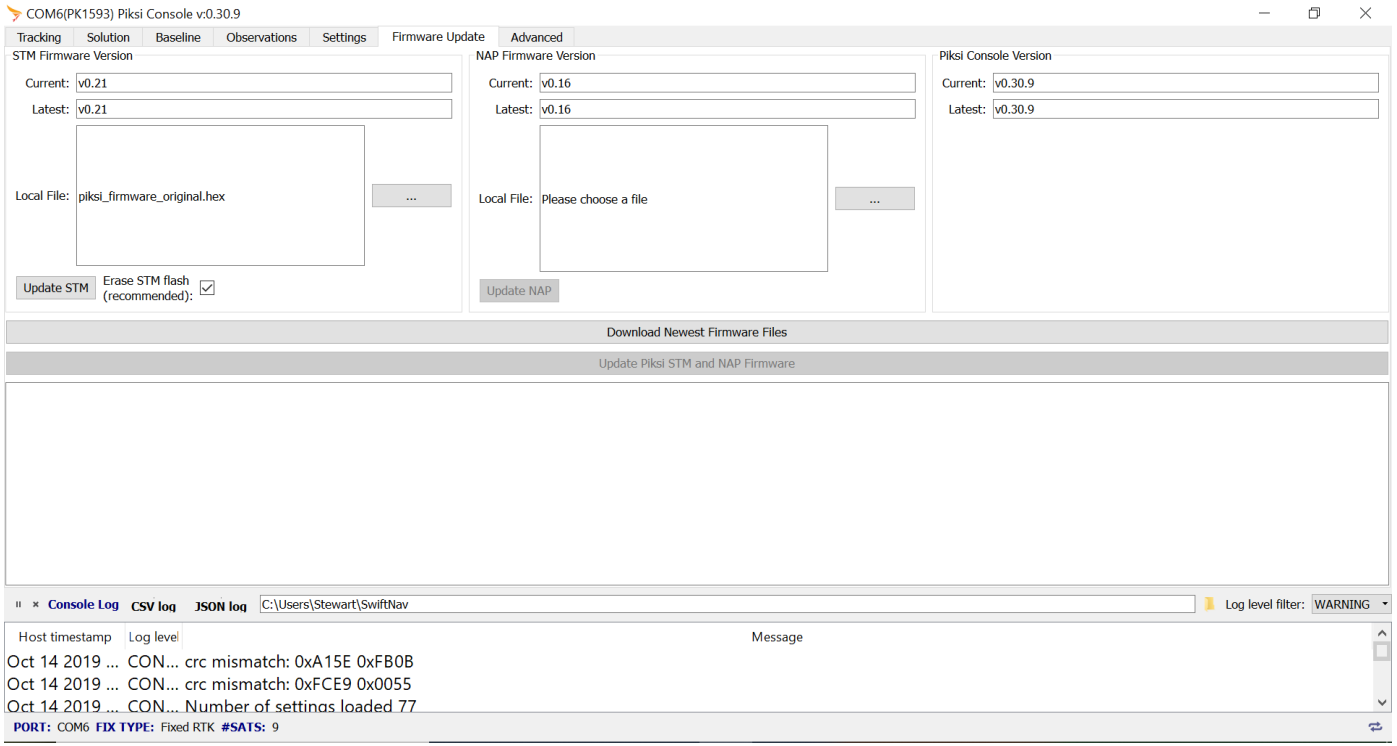
8. PURPOSE	APPROVALS (Printed or Typed and Signed)	
Install new Piksi firmware with the GPS COCOM limit removed.	11.	DATE
	12.	DATE
	13.	DATE

ITEM	PART NAME	PART NO. / DRAWING NO.	SERIALNO.	QTY	UNIT
1	PAN Satellite	N/A	N/A	1	FLIGHT
6	Phone or camera	N/A	N/A	1	
7	Computer with Arduino IDE, Teensy Duino and Piksi Console installed	N/A	N/A	1	GSE
8	Micro USB cable with power cut	N/A	N/A	1	GSE
9	Micro USB cable with power	N/A	N/A	1	GSE

SETUP

The test will need a clean phone to use as a camera. Phones must be cleaned thoroughly to bring them into the clean room, and phone cases must be removed, since they are hard to clean well. Use IPA but apparently IPA is not good for phone screens so unless your phone has a screen protector just wipe the screen off with a clean room wipe, removing all fingerprints.

1. Download the hacked Piksi firmware from here
2. Remove X+ wall
3. Plug in USB cable with power to Piksi, verify that Piksi lights are flashing
    a. None of the micro-USB cables fit, they were all obstructed by the MRO radio
    b. Gabe shaved down a USB cable
    c. Still didn't work, bending the USB connector to the proper angle breaks the RX or TX line and causes the cable to not work (device is powered by not recognized by the computer).
    d. We were able to take out 2 MRO screws and rotate the 3d part instead, allowing access to the Pikis's USB port
    e. We also had to unplug the Piksi to Umbilical harness from the Piksi
    f. Also undid the ziptie holding Piksi-GPS, Umbilical-to-ADCS and DCDC-to-ADCS harnesses, though this might not be necessary in the futuire.
4. Open Piksi Console
5. Set BAUD rate to 1000000
6. Select the COM port with Piksi connected from the dropdown menu and hit OK
    a. Piksi communication could not be established on the clean room computer. The Piksi's LED was solid green, indicating connection with a computer, but the clean room computer did not recognize that a Piksi was connected.
    b. We ran a USB cable outside the clean room to Stewart's laptop, which was able to successfully recognize the Piksi and re-program the firmware
7. Once console has started, navigate to the Firmware Update tab
    a. The Follower Piksi had STM firmware v0.13 and NAP firmware v0.10 installed, which is extremely outdated and incompatible with the current console version
    b. We first downloaded the newest Piksi firmware and flashed the Piksi with that
    c. After installing the newest firmware, we put the Piksi into simulation mode to check that it was receiving a simulated GPS solution in the Solutions tab
    d. After verifying that Piksi was working, we installed the hacked firmware as described below
    e. We cut the ziptie keeping the Deployment Switch 2a and 2b harnesses in place, but this was probably unnecessaary and shouldn't be done in the future
8. Under STM FIrmware Version, browse for file and choose the hacked firmware



9. Select "Update STM"
10. Wait for the firmware update to finish. If a dialog box appears asking to update firmware to the newest version, close it.
11. Verify that Piksi is still communicating with the console
12. In the "Settings" tab, scroll down to the "simulator" section and verify that "enabled" is set to "False"
13. Disconnect Piksi from USB
14. Verify that the flight computer can communicate with Piksi
    a. We plugged in the Piksi to Umbilical harness since we had unplugged it earlier
    b. Download Test Code Scripts from here
    c. Turn the satellite on by removing the RBF pin
    d. Unzip the test code scripts folder
    e. Unzip PiksiTest.zip
    f. Open the Piksi Ping Test arduino script
    g. Plug in the Teensy to the USB cable with power cut
    h. Upload the PIksi Ping Test script to the Teensy

i. Open the serial monitor and verify that it prints out a statement saying the PIksi is functional
j. Unplug the USB cable
k. Turn off the satellite by inserting the RBF pin and then pressing both deployment switches simultaneously

15. Re-integrated the MRO radio
    a. Unplugged the Piksi-to-Umbilical harness from Piksi again to access the MRO locknuts
    b. Used an M2 locknut (PAN-STR-665) for the screw (PAN-STR-644) that only secures the 3D-printed MRO mount (PAN-STR-033). We did not add epoxy since the locknut inself should be enough to hold the screw in place during vibe testing and launch.
    c. We torqued the screw to 4 in-lb as per the assembly procedure
    d. The locknut on the third MRO screw that secures the MRO to the 3D-printed base was still epoxied on with a lot of epoxy, so we used Loctite 222ms to attach a new M2 screw (PAN-STR-644) to it.
    e. We torqued the screw to 4 in-lb as per the assembly procedure
16. Replace the X+ Wall
    a. We replaced the Deployment Switch 2a and 2b harness ziptie
    b. We plugged the Piksi to Umbilical harness back into the Piksi
    c. Ziptied the Piksi GPS, Umbilical-to-ADCS and DCDC-to-ADCS harnesses to the X+ wall as before

COMPLETED 10/14 by Gabe and Stewart