Recovery team flight computer preparation procedure

28-11-24

Subject to revision

Contents

1. Pre-flight checks

The following checks will be followed during recovery team preparation for launch:

I. The flight computer's TEST/RUN toggle pin shall be set to RUN, as listed on the N4 Flight software documentation. Check here (https://nakujaproject.com/N4-Flight-Software)

II. The flight computer shall be OFF before flight. To power it ON, pull the RBF (Remove Before Flight) pin located on the side of the rocket

III. The flight computer shall beep twice in rapid succession to notify that the hardware is powered ON. In this state, the following shall be the state of the hardware:

ESP MCU: ON
MPU6050: ON
BMP180: ON
GPS: ON
FLASH MEMORY: ON
DROGUE CHUTE EJECTION SYSTEM: OFF
MAIN CHUTE EJECTION SYSTEM: OFF

In this state, the flight computer shall be considered **SAFE**.

IV. Base station checks:
   i) The flight computer shall immediately start transmitting telemetry to base station.
   ii) The flight computer MUST transmit **SAFE MODE** and **PRE-FLIGHT** state to base station

V. Solid team preparation
   i) To prevent harming the team due to possible misfires from the pyro charges, the flight computer shall remain in **SAFE_MODE** until the solid team is about to begin ignition countdown.

VI. Flight computer ARMING: The following shall be the steps to arm the flight computer and the pyro charges (see Appendix)
   i) A command "**ARM**" shall be sent from the base station to the flight computer
   ii) The flight computer shall respond with an acknowledge message

"**FC->BASE:ARM COMMAND RECEIVED**"

iii) At this stage the flight computer software shall perform the pyro arming procedure and respond with an acknowledge message "**FC->BASE:PYRO ARM SUCCESS**"

iv) The flight computer shall transmit a new state as **FLIGHT_MODE** and **PRE_FLIGHT** state to base station. In this mode, the flight computer shall be considered armed and necessary caution shall be taken to prevent injury from misfires, though highly unlikely.

VII. GPS and telemetry confirmation: Required telemetry transmission to the base station shall be confirmed as the last check

VIII. If all passed, recovery team shall notify the launch coordinator that **RECOVERY TEAM IS A GO.**

IX. Flight computer disarming: In case there is need for disarming the flight computer, the flight software shall provide a disarming method as follows:

i) A command "DIS**ARM**" shall be sent from the base station to the flight computer

ii) The flight computer shall respond with an acknowledge message "**FC->BASE:DISARM COMMAND RECEIVED**"

iii) At this stage the flight computer software shall perform the pyro disarming procedure and respond with an acknowledge message "**FC->BASE:PYRO DISARM SUCCESS**"

iv) The flight computer shall transmit a new state as **SAFE_MODE** and **PRE_FLIGHT** state to base station. In this mode, the flight computer shall be considered safe

X. Flight computer arming fallback: In case remote arming from the base station fails, the flight software shall automatically perform the arming procedure based on two conditions:

LAUNCH IS DETECTED and ROCKET_ALTITUDE > LAUNCH_ALTITUDE_THRESHOLD,

which will be determined by a value set in software.

2. Post-flight avionics recovery procedure

[To Be Determined]

3. Appendix

Fig 1: Arming procedure flow