



Recovery team flight computer preparation procedure

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Subject to revision

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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 **"DISARM"** 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

