

Deep voltage sag on **3 flights** (fly122, fly125, fly143) with **pack voltage dipping <13.0 V** under load; on **fly143** the **lowest cell reached ~3.00 V** (dangerously low).

Propulsion/thrust problems: repeated **notEnoughForce** events (**144 total**; worst on **fly143** with **138** events). That points to props/motor/ESC being unable to deliver commanded thrust (common causes below).

Compass interference: heavy **compassError** activity (**668 total**), concentrated on **fly122 (274)** and **fly131 (196)**—expect mode drops, toilet-bowling, or restricted yaw until interference clears.

Batteries (health & performance)

- **High temperature events**

- **fly119.csv**: max batt temp **62.0 °C** (duration ~21m48s; min pack ~14.25 V).
- **fly120.csv**: max batt temp **61.0 °C** (~22m29s; min pack ~14.07 V).
- **Significance**: Sustained temps in the 60s °C stress the pack (capacity loss, swelling risk). Avoid long, high-current climbs or flying in hot, stagnant air.

- **Low pack voltage under load**

- **fly122.csv**: pack min **12.38 V**; current peak **~17.6 A**; temp **56 °C**.
- **fly125.csv**: pack min **12.19 V**; current peak **~26.7 A**; temp **55 °C**.
- **fly143.csv**: pack min **12.18 V**; **lowest cell ~3.00 V** (filtered, zeroes removed); current peak **~14.8 A**; temp **26 °C**.
- **Significance**: These dips indicate high load on a pack that's near the bottom of its usable range. Hitting ~3.0–3.2 V per cell is *too* low and shortens life; land earlier to leave headroom.

- **Current draw**

- Fleet-wide **max observed ~27.3 A** (fly125). Median heavy-load draw (95th percentile) across flights is **~13.7 A**.
- **Significance**: Spikes near ~25–27 A are expected in hard climbs or full-stick ascents, but combined with heat or old packs they drive voltage sag fast.

Recurring battery flags in the logs

- The explicit **osd_data:lowVoltage** bit never tripped, yet we still observed deep sag in the raw pack values—so don't rely solely on that flag; watch actual voltages and percentage.

Motors / ESC / Propulsion

- **notEnoughForce** (thrust insufficiency) totals **144**:
 - **fly143.csv** is the standout with **138** events; **fly125.csv** shows **6**; others ~0.
 - **What it means:** The controller demanded thrust but didn't get it. Typical causes:
 - Worn/chipped/incorrect props (e.g., wrong pitch, mixed pairs, or quick-release not fully locked).
 - High density altitude + wind (thin air), aggressive maneuvers.
 - Motor/ESC friction or partial obstruction (deformed bell, sand/dust, bearing wear).
 - **Action:** Replace all props as a set (balanced OEM), inspect motor bells/shafts for play and debris, spin by hand for roughness, and avoid heavy stick inputs when the pack is below ~30–35%.

Navigation / Sensors

- **compassError** totals **668** across the set:
 - Worst flights: **fly122 (274)**, **fly131 (196)**; smaller clusters on fly130, fly129, fly125.
 - **What it means:** Magnetic interference—common when powering up on reinforced concrete/metal, near vehicles/fences, or with magnetic accessories.
 - **Action:** Power on and set home point **away from metal**; keep phone/tablet magnets (cases, mounts) away from the compass area. Re-calibrate compass only in a clean environment if errors persist. Expect degraded or restricted control when this fires.

A few specific call-outs

- **Watch battery pack “143”** (fly143.csv): combo of **very low cell (~3.00 V)** and **massive thrust-insufficiency** suggests either a weak/imbalanced pack under load **and/or** prop/motor issues. Retire or capacity-test this pack, and refresh all props before the next flight.
- **Pack heating** (fly119, fly120): If ambient was hot or flights were long full-throttle sessions, build more cool-down time between flights and avoid sustained high-current climbs toward the end of a pack

Practical recommendations

1. Battery care

- Land earlier: target landing with **ample buffer** before you reach deep sag (don't push to the last minutes).
- If any pack is warm to the touch after landing, let it cool before charging; store ~40–60% when idle.
- Inspect for **swelling** or **cell imbalance**; if a pack repeatedly sags or runs hot vs. others, bench it.

2. Props & motors

- Replace all props (matched set), ensure locks fully seat; inspect for micro-chips.
- Spin each motor by hand—feel for gritty bearings or rubbing; clean out dust/sand.
- After prop refresh, do a short, low-altitude test hover; check for renewed **notEnoughForce** flags.

3. Compass discipline

- Power-up/takeoff on non-metal ground; step away from cars/rebar.
- Keep phone/tablet magnets/cases and metal tools away from the airframe during startup.

4. Flight style

- Avoid aggressive climbs late in the pack; reduce sport-mode bursts when pack <35%.
- In hot weather, shorten flights or give batteries longer cool-downs.