UAV Flight #1 – Hot Report

Date/Conditions:

- Sat. Dec 20th
- Temperature: **–6 °C**
- Operator wearing gloves
- Launch method: **Hand-thrown**
- Number of flights: **2 (short-duration)**

Key Operational Note:

When hand-launching, the launcher must **actively guide the nose during the throw** to avoid premature pitch excursions.

Executive Summary

Both flights ended in stall-induced loss of control shortly after launch. The dominant contributing factors were **insufficient airspeed at takeoff** and **high variability inherent to hand-launching**, compounded by **cold-weather effects on materials and operator dexterity**. Flight 1 suggests that **self-stabilizing (auto-correct) mode is likely not the root cause**, while Flight 2 resulted in total airframe loss due to a nose-first impact.

Flight Overview

Flight 1

Observations

- Launch was hand-thrown
- Moderate upward pitch commanded via transmitter at launch
- Throttle likely below required level
- Onboard video available

Post-Flight Analysis

- Video review shows **flaps responding correctly** during descent recovery attempts
- During initial ascent, flaps were **actively attempting to return the aircraft to neutral pitch**
- This behavior is consistent with **self-stabilizing mode counteracting manual pitch-up commands**
- Regardless of flap behavior, **insufficient throttle likely caused an aerodynamic stall**

Conclusion (Flight 1)

- The aircraft did not reach sufficient airspeed during takeoff

- Stall and loss of control would have occurred **even with perfect flap response**
- **Self-stabilizing mode appears acceptable**, but **takeoff power and airspeed are insufficient**

Flight 2

Observations

- Steep initial climb immediately followed by stall
- Operator applied **maximum upward pitch** at launch
- Throttle set to approximately **75%**, but:
  - Gloves + muscle memory introduce an estimated **±25% uncertainty**
- Aircraft entered an **unrecoverable dive**

Impact & Damage

- Nose-first crash
- Nose structure fully collapsed; foam warped beyond repair
- Wings separated at the **front structural rod**
- Electronics survived structurally but:
  - All connectors were forcibly disconnected
  - Several pins appear **mechanically deformed** due to horizontal pull forces

Conclusion (Flight 2)

- Aggressive pitch input combined with uncertain throttle caused **immediate stall**
- Recovery was impossible due to low altitude and insufficient airspeed
- Airframe is a **total loss**, electronics potentially salvageable

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What Went Wrong (Likely Contributors)

1. **Insufficient throttle**
   - Possibly well below assumed 75% due to glove use
2. **Hand-launch variability**
   - Inconsistent release angle, speed, and nose alignment
3. **Cold-weather effects**
   - Hardened ground increased impact severity
   - Foam airframe more brittle at sub-freezing temperatures
   - Reduced operator dexterity and tactile feedback

Lessons Learned

- **Airspeed, not pitch, must be prioritized at launch**
- Throttle uncertainty is unacceptable during takeoff
- Hand-launching introduces a risky level of variance for early test flights
- Cold-weather testing significantly raises risk to foam airframes

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Recommendations for Next Flight

Operational Changes

- **Full throttle at launch (100%)**, no exceptions
- **Neutral or minimal pitch input** during initial acceleration
- Strongly consider:
  - Assisted launch
  - Bungee launch
  - Wheeled takeoff (if feasible)

Data Collection Improvements

- Mount **one iPhone on a tripod** covering launch and climb-out
- If three people are present:
  - One dedicated camera operator tracking the aircraft
- Capture **video of transmitter inputs** during launch
  - Especially throttle and pitch positions

Status

- **Airframe:** Body destroyed, wings fixable
- **Electronics:** Likely recoverable, requires connector and pin inspection
- **Flight readiness:** Pending airframe replacement and revised launch protocol