

**From:** [LARIMORE Bryan \(SAFRAN HELICOPTER ENGINES USA\)](#)  
**To:** [Cornejo Tealeye](#)  
**Subject:** WPR20LA244 Safran HE USA Onsite Report  
**Date:** Tuesday, November 1, 2022 1:11:04 PM

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Hi Tealeye,

You have the permission of Safran HE USA to place this onsite examination report on the public docket.

Best regards,

Bryan



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# SafranHE On Site Examination Report

| Submitted By: |                 | Approved By: |       |
|---------------|-----------------|--------------|-------|
| D2S/TEA       | Date: 17AUG2020 |              | Date: |

|                        |                                 |
|------------------------|---------------------------------|
| NTSB Reference:        | <b>WPR20LA244</b>               |
| TM USA Reference:      | <b>(A-2020-010)</b>             |
| TM FR Reference:       | <b>(RA/2020/177)</b>            |
| Event Date/Time:       | <b>(29JUL2020) /(1700 UTC)</b>  |
| Event Location:        | <b>(Pioche, NV, USA)</b>        |
| Operator:              | <b>St Louis Helicopters LLC</b> |
| Aircraft Type:         | <b>Airbus H125</b>              |
| Aircraft S/N:          | <b>7763</b>                     |
| Aircraft Registration: | <b>N755AE</b>                   |
| Engine                 | <b>0292020030</b>               |
| Variant:               | <b>Arriel 2D</b>                |
| Engine S/N:            | <b>50572</b>                    |



## Accident Site

| Date(s) of On Site Investigation: |           |         |           |
|-----------------------------------|-----------|---------|-----------|
| Arrive:                           | 31JUL2020 | Depart: | 31JUL2020 |

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# SafranHE On Site Examination Report

## Participants

| Company / Agency        | Role | Comments |
|-------------------------|------|----------|
| 1. FAA                  | ASI  |          |
| 2. FAA                  | ASI  |          |
| 3. FAA                  | ASI  |          |
| 4. St Louis Helicopters | DOM  |          |
| 5. Airbus               | ASI  |          |
| 6. Safran HE USA        | ASI  |          |
| 7.                      |      |          |
| 8.                      |      |          |
| 9.                      |      |          |
| 10.                     |      |          |
| 11.                     |      |          |
| 12.                     |      |          |
| 13.                     |      |          |
| 14.                     |      |          |

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# SafranHE On Site Examination Report

## **Circumstances reported to SafranHE:**

During a flight, the aircraft crashed under undetermined circumstances.

## **Additional Circumstances reported by NTSB Preliminary Report:**

On July 29, 2020, about 1000 Pacific daylight time, an American Eurocopter Corp. AS350B3 helicopter, N755AE, was destroyed when it was involved in an accident near Pioche, Nevada. The pilot and passenger were fatally injured. The helicopter was operated as a Title 14 Code of Federal Regulations (CFR) Part 91 positioning flight. A witness reported dropping off the pilot and passenger at the helicopter and noticed that the long line was laid out and attached to the belly of the helicopter. According to Federal Aviation Administration (FAA) inspectors, who responded to the site, the helicopter was on its right side in mountainous densely forested desert terrain at an elevation of 6,741 ft mean sea level (MSL). (See Figure 1). The steel long line cable impacted the main rotor blades and was also entangled in the separated tail rotor. The tail rotor with one blade attached was 21 ft. from the main wreckage. Approximately 30 ft. of long line and one tail rotor blade were not located. The vertical stabilizer was 365 ft. from the main wreckage. The helicopter was recovered to a secure facility for further examination.

# SafranHE On Site Examination Report

## Engine Information



**Engine as Found**

|                              |            |
|------------------------------|------------|
| Engine Variant               | Arriel 2D  |
| Part Number                  | 0292020030 |
| Serial Number                | 50572      |
| Time since new (TSN)         | 2775.6     |
| Time since overhaul (TSO)    | N/A        |
| NG Cycles since new (NGCC)   | 9351.0     |
| NTL Cycles since new (NTLCC) | 1940.0     |
| NG Cycles since overhaul     | N/A        |
| NTL Cycles since overhaul    | N/A        |

# SafranHE On Site Examination Report

## Engine Information

Engine

| Module   | Part Number | Serial Number |  |
|----------|-------------|---------------|--|
| Module 1 | 70BMO10020  | 19572         |  |
| Module 2 | 70BMO20010  | 20610         |  |
| Module 3 | 70BMO30070  | 26093         |  |
| Module 4 | 70BMO40020  | 24765         |  |
| Module 5 | 70BMO50010  | 22610         |  |
| HMU      | 0292862200  | 50643         |  |

# SafranHE On Site Examination Report

## DECU Information



**DECU**

### DECU

|                    |          |
|--------------------|----------|
| DECU Part Number   | Unknown  |
| DECU Serial Number | Unknown  |
| DECU NG Cycles     | 9353.436 |
| DECU NTL Cycles    | 1941.496 |

# SafranHE On Site Examination Report

## Arriel 2D Technical Information

### 1.1 GENERAL DESIGN

The ARRIEL 2D is a 700 kW class turboshaft engine, certified for powering single-engined helicopters.

The design of the ARRIEL 2D engine, together with its equipment, is such as to enable the aircraft in which it is to be installed to show compliance with JAR/FAR/CS-E 27 and 29.

The ARRIEL 2D is a modular engine, which is easy to install and which provides easy access to the main accessories.

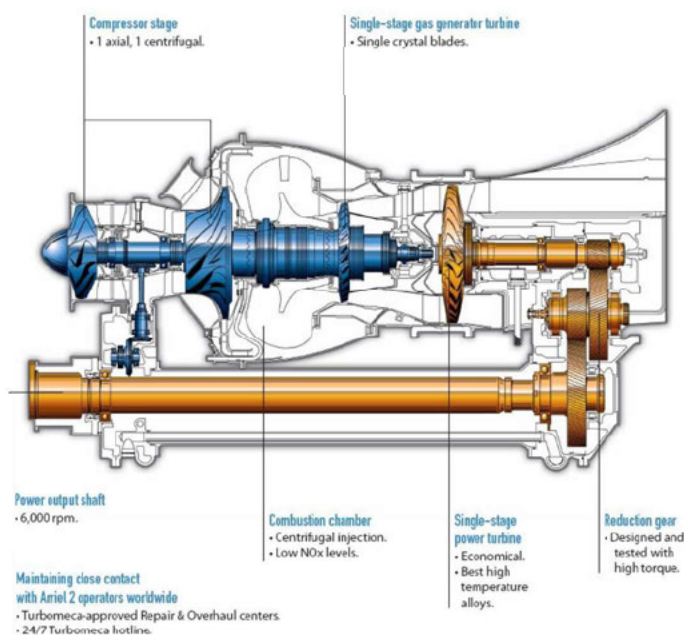
### 1.2 GENERAL CONSTRUCTION

The engine consists of an axial compressor and a centrifugal compressor driven by a single stage turbine, a combustion chamber, and a single stage power turbine driving a reduction gearbox located at the rear. An accessory drive gearbox, driven by the gas generator, is located at the front.

The transmission shaft main output is located at the front of the engine.

#### > Power rating (kW/shp):

|                   | EC130 T2  | AS350 B3e |
|-------------------|-----------|-----------|
| > Take-off        | 710 / 952 | 632 / 848 |
| > Max. continuous | 638 / 856 | 543 / 728 |
| > 30 min power    | 710 / 952 | 632 / 848 |



# **SafranHE On Site Examination Report**

## **Engine On Site Examination**

### **Narrative of On Site Engine Examination:**

**As found the engine was still retained in the helicopter by the front and rear supports. Visually, there was very little external damage to the engine. Oil spray was evident on the bottom of the bellmouth consistent with engine operation after inversion and oil being expelled from the bleed valve. All fuel, oil, air, and electrical connections were intact and appeared to be correctly saftied. The aircraft was recovered to a trailer for the remainder of the exam.**

**The gas generator and free turbine could both be turned freely by hand. There was minor FOD damage on the axial compressor. Oil was present inside the exhaust pipe a well, again consistent with the engine running while inverted.**

**Proper freewheel operation was confirmed. The rear tail rotor drive short shaft had separated from the drive flange on the freewheel shaft. The flector group connecting the two was torsionally splayed.**

**The module 5 reduction gearbox was removed to examine the input pinion slippage mark. It was found displaced in the tightening direction 1/2-1mm consistent with engine operation at the time of main rotor impact.**

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# **SafranHE On Site Examination Report**

## **Engine On Site Examination**

**Narrative of On Site Engine Examination continued:**

**The reduction gearbox and accessory gearbox chip detectors were found clean.**

**The EBCAU (Emergency Backup Control Ancillary Unit) was removed and the keyway was at the 12:00 position consistent with normal (non-emergency) operation.**

**The EDR was removed from the helicopter and downloaded at the factory. The final flight shows that during the accident the pilot placed the engine in idle then back to flight and then back to idle near the end of the recording. The EDR also shows that the during this sequence the NR drops below the necessary RPM to maintain lift.**

**No anomalies were found on the engine that would preclude normal flight.**

# SafranHE On Site Examination Report

## Engine On Site Examination

| Equipment         | Condition |
|-------------------|-----------|
| MO1 Magnetic Plug | Clean     |
| MO5 Magnetic Plug | Clean     |

**Module 1 magnetic plug**



**Module 2 magnetic plug**



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## Engine On Site Examination

| Equipment  | Condition   |
|------------|-------------|
| Oil Filter | Not removed |

| Equipment       | Condition   |
|-----------------|-------------|
| FCU Fuel Filter | Not removed |

**Oil Filter**



**FCU Fuel Filter no bypass**



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## Overall Engine



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## Fuel and Oil Connections



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## Electrical Connections



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## Axial Compressor



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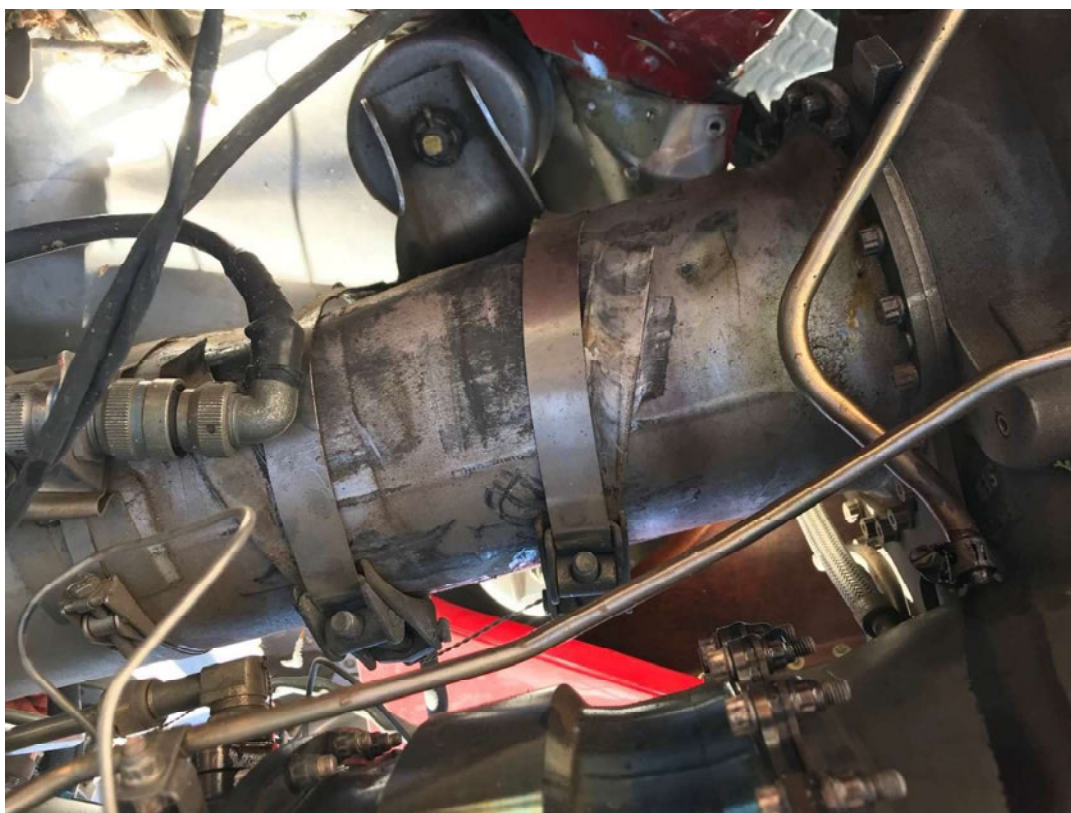
## Front Support



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## Rear Support



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## Tail Rotor Drive Coupling



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## Free Turbine



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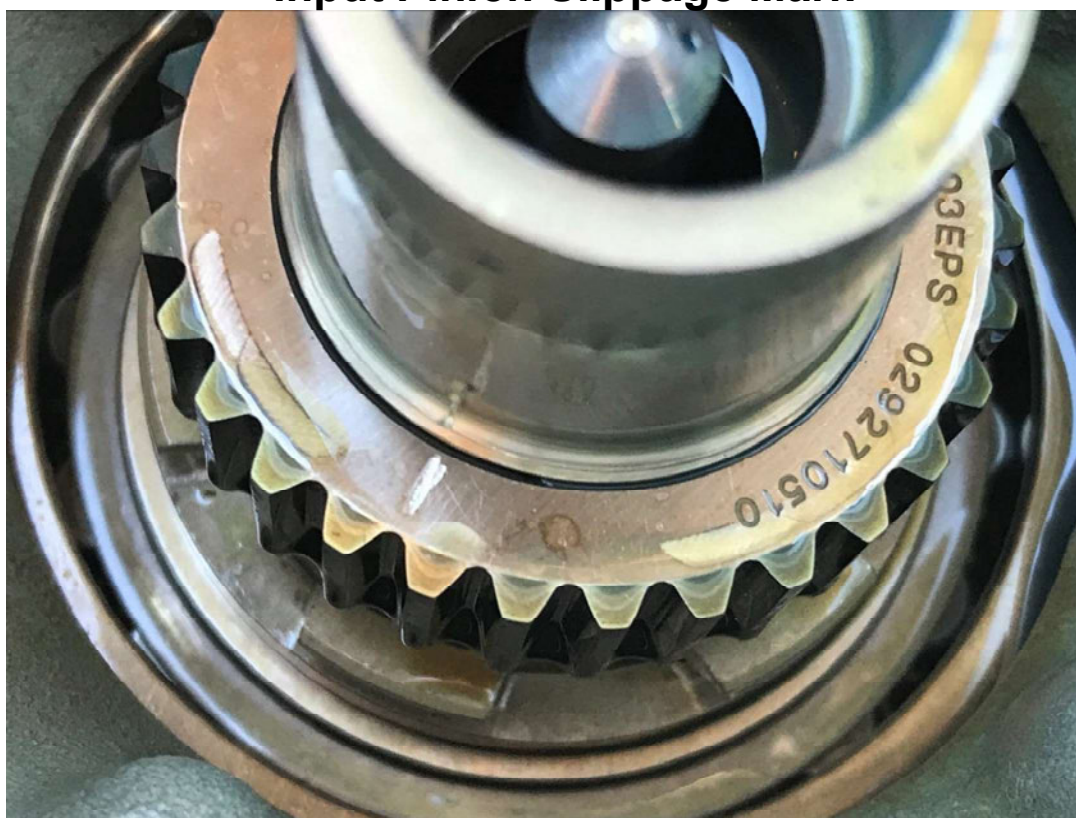
## Oil sprayed from bleed valve on bellmouth



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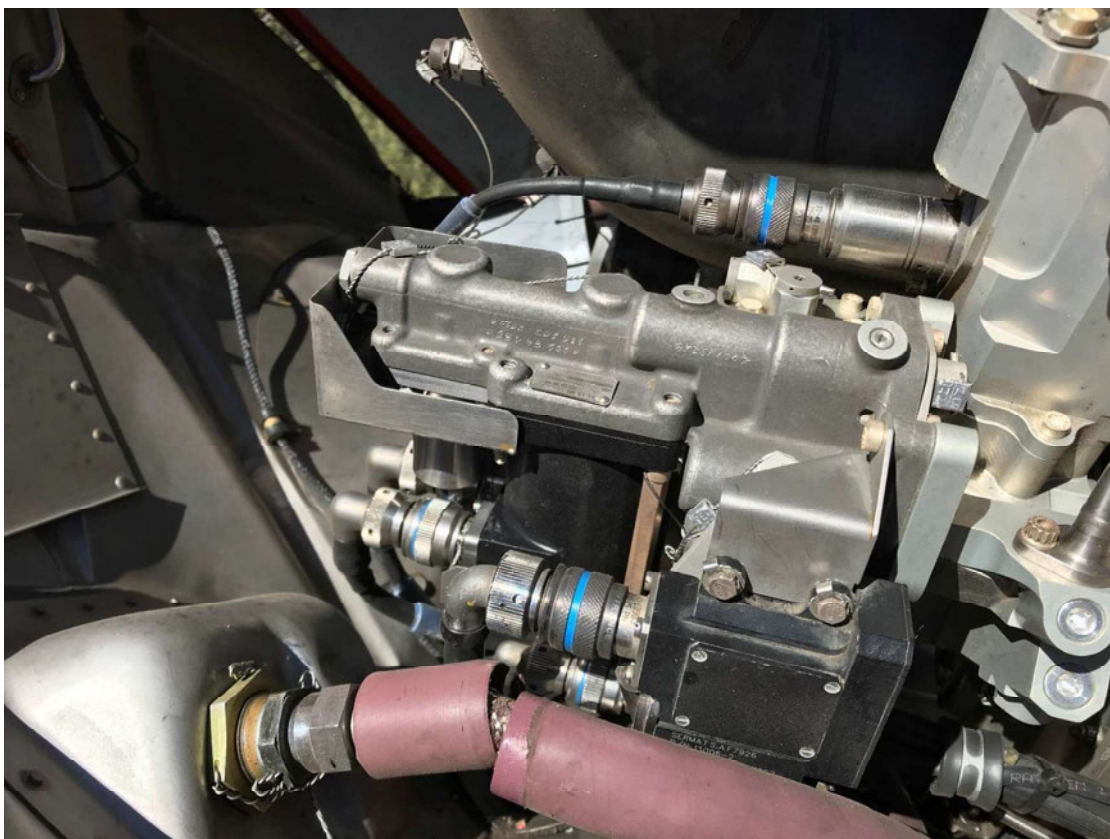
## Input Pinion Slippage Mark



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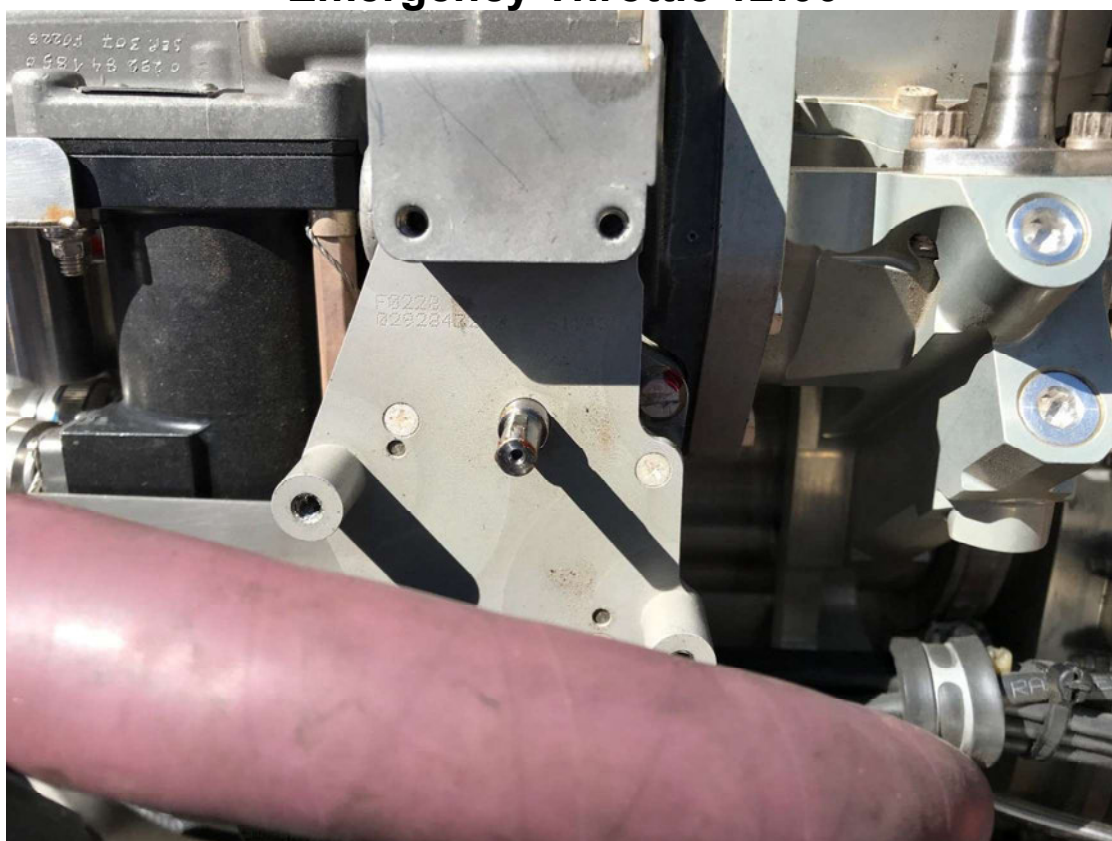
## HMU



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## Emergency Throttle 12:00



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## Helicopter tail rotor



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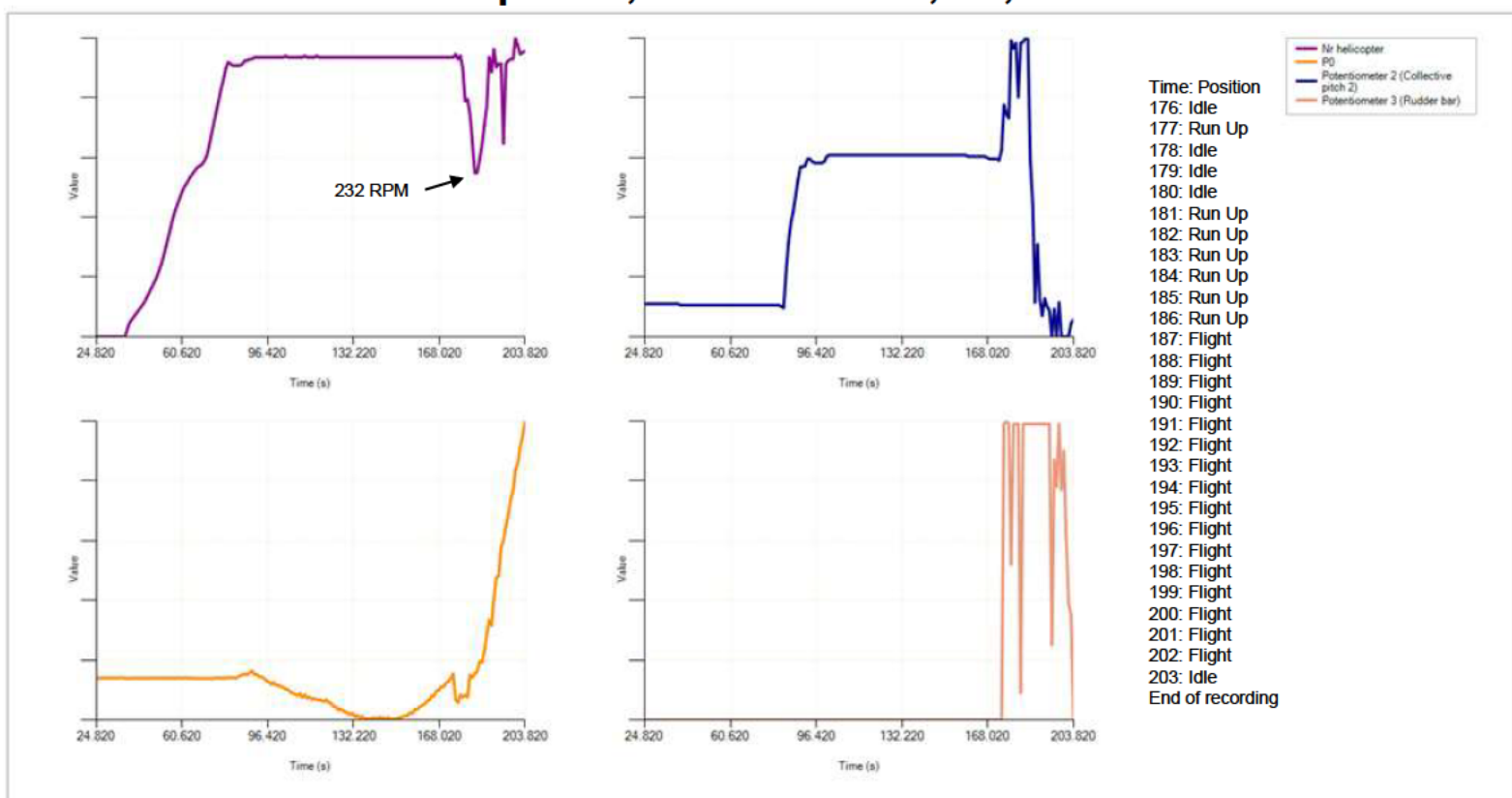
## Engine Data Recorder



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## EDR Graph NR, Collective Pot, PO, Pedal Pot



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## Additional Information Flight

|                                  |                                     |
|----------------------------------|-------------------------------------|
| Flight Originated From:          | Landing site chosen by pilot        |
| Departure Time:                  | ≈ 1000 PDT                          |
| Flight Time Prior to Occurrence: | Approximately 3 minutes             |
| Purpose of Flight:               | Relocation prior to beginning lifts |
| Flight Plan Filed:               | no                                  |
| Part 91 or 135:                  | 135                                 |
| VFR or IFR:                      | VFR                                 |
| NVG:                             | no                                  |
| Last Refueling Point:            | Unknown                             |
| Amount Of Fuel Received:         | Unknown                             |
| Gross Weight at Takeoff:         | Unknown                             |
| Terrain at Accident Site:        | Heavily treed mountainous terrain   |

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