

**NATIONAL TRANSPORTATION SAFETY BOARD**  
Vehicle Recorder Division  
Washington, D.C. 20594

June 4, 2018

## **Engine Data Recorder (EDR)**

### **Group Chairman's Factual Report By Sean Payne**

#### **1. EVENT SUMMARY**

Location: Memphis, Tennessee  
Date: January 28, 2018  
Aircraft: Airbus Helicopters EC130T2  
Registration: N894GT  
Operator: Air Evac EMS Inc.  
NTSB Number: ERA18IA078

On January 28, 2018, about 1400 central standard time, an Airbus Helicopters EC 130 T2; N894GT, operated by Air Evac EMS Inc., incurred minor damage during a hard landing at Regional One Health Medical Center's Rooftop Helipad, Memphis, Tennessee. The commercial pilot, flight nurse, flight paramedic, and patient being transported, were not injured. The flight was operated under the provisions of Title 14 *Code of Federal Regulations* Part 135, as a helicopter air ambulance flight. Visual meteorological conditions (VMC) prevailed for the flight, and a company visual flight rules (VFR), flight plan was filed for the flight which departed from Humboldt, Tennessee about 1327.

#### **2. ENGINE DATA MONITOR GROUP**

An Engine Data Recorder (EDR) group was convened on April 26, 2018.

Group Chairman:	Sean Payne Mechanical Engineer NTSB
Member:	Todd Gunther Investigator-In-Charge (IIC) NTSB
Member:	Bob Hendrickson Senior Air Safety Investigator Federal Aviation Administration (FAA)

Member: Pascal Hérate  
Safety Investigator  
Bureau d'Enquêtes et d'Analyses (BEA)

Member: Seth Buttner  
Manager – Accident Investigation  
Airbus Helicopters

Member: Bryan Larimore  
Air Safety Investigator  
Safran HE

Member: Greg Houska  
Aviation Training Manager  
AirEvac

### **3. DETAILS OF INVESTIGATION**

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following EDR:

Recorder Manufacturer/Model: **EDR**  
Recorder Serial Number: **File Transfer**

#### **3.1. EDR Data Description**

The EDR (Engine Data Recorder) is a light recorder that exclusively records data sent by the FADEC in a non-volatile memory component for maintenance purposes. For both channels, engine parameters, logical words and failure flags are recorded. Engine parameters are recorded at a sample rate of 1 Hz in a continuous recording and at a sample rate of 5 Hz on a limited duration when a failure occurs (context recording).

##### **3.1.1. Data Description**

The EDR recording was converted from raw data by the BEA with assistance from the engine manufacturer. The raw data after being converted was 3818 seconds long and was associated with the event flight. The recording captured the event.

##### **3.1.2. Engineering Units Conversions**

The engineering unit conversions used for the data contained in this report are based on documentation from the manufacturer of the rotorcraft's engine, Turbomeca HE.

Appendix A lists the EDR parameters verified and provided in this report.

#### **3.2. Time Correlation**

Timing of the EDR data is expressed as Appareo Video Elapsed Time, which is time from the beginning of the Appareo recording. Timing was correlated between the video recording

and the EDR by aligning the discrete parameter showing the rotorcraft's transition from "flight" to "idle". For additional timing information, see the Onboard Image Recorder Group Chairman's Factual report, which can be found in the public docket for this accident.

Therefore, the time correlation exists as the following equation:

$$\text{Appareo Time} - 18 \text{ seconds} = \text{EDR Time}$$

### 3.3. Plots and Corresponding Tabular Data

The following three figures contain EDR data recorded during the January 28, 2018, event.

Figure 1 is a plot of basic engine parameters and collective position during the entire flight. Around 00:15:30, the rotorcraft landed at Humbolt General Hospital, Humbolt, Tennessee. Around 00:28:30, the rotorcraft departed Humbolt General Hospital. Around 01:00:00, the helicopter arrived at Regional One Medical Center (The Med), Memphis, Tennessee. The incident was recorded moments later. Data ended at 01:04:11 elapsed time.

Figure 2 is a plot of basic engine parameters and collective position during the rotorcraft's departure from Humbolt General Hospital. The oval around the area of the plot showing collective position showed a recorded transducer position profile of the collective being taken out of a locked position.

Figure 3 is a plot of basic engine parameters and collective position during the incident portion of flight at the Med. The recorded transducer position for the collective showed a profile of the collective rising from an unlocked position around 01:01:49, when the rotorcraft's engine transitioned from "Idle" to "Flight." The time for transition from "Flight" to "Idle" was recoded by a discrete contextual parameter from the EDR and was plotted at the appropriate position on the recording.

The corresponding tabular data used to create these three plots are provided in electronic (\*.csv<sup>1</sup>) format as Attachment 1 to this report.

---

<sup>1</sup> Comma Separated Value format.

Figure 1. Plot of basic engine parameters and collective position during the entire flight.

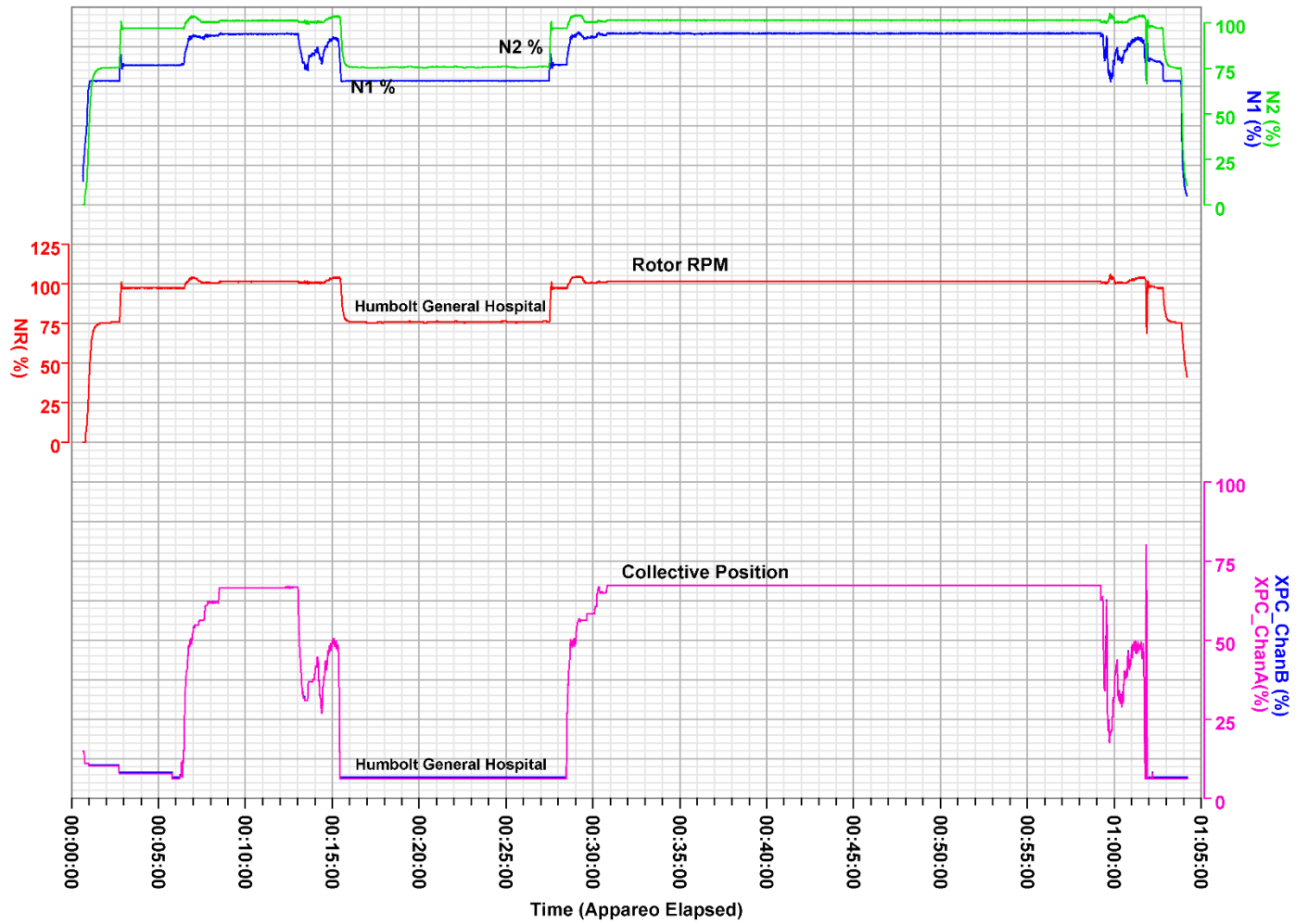


Figure 2. Plot of basic engine parameters and collective position during the departure from Humbolt General Hospital. An oval surrounds the profile of the collective being unlocked from a locked position.

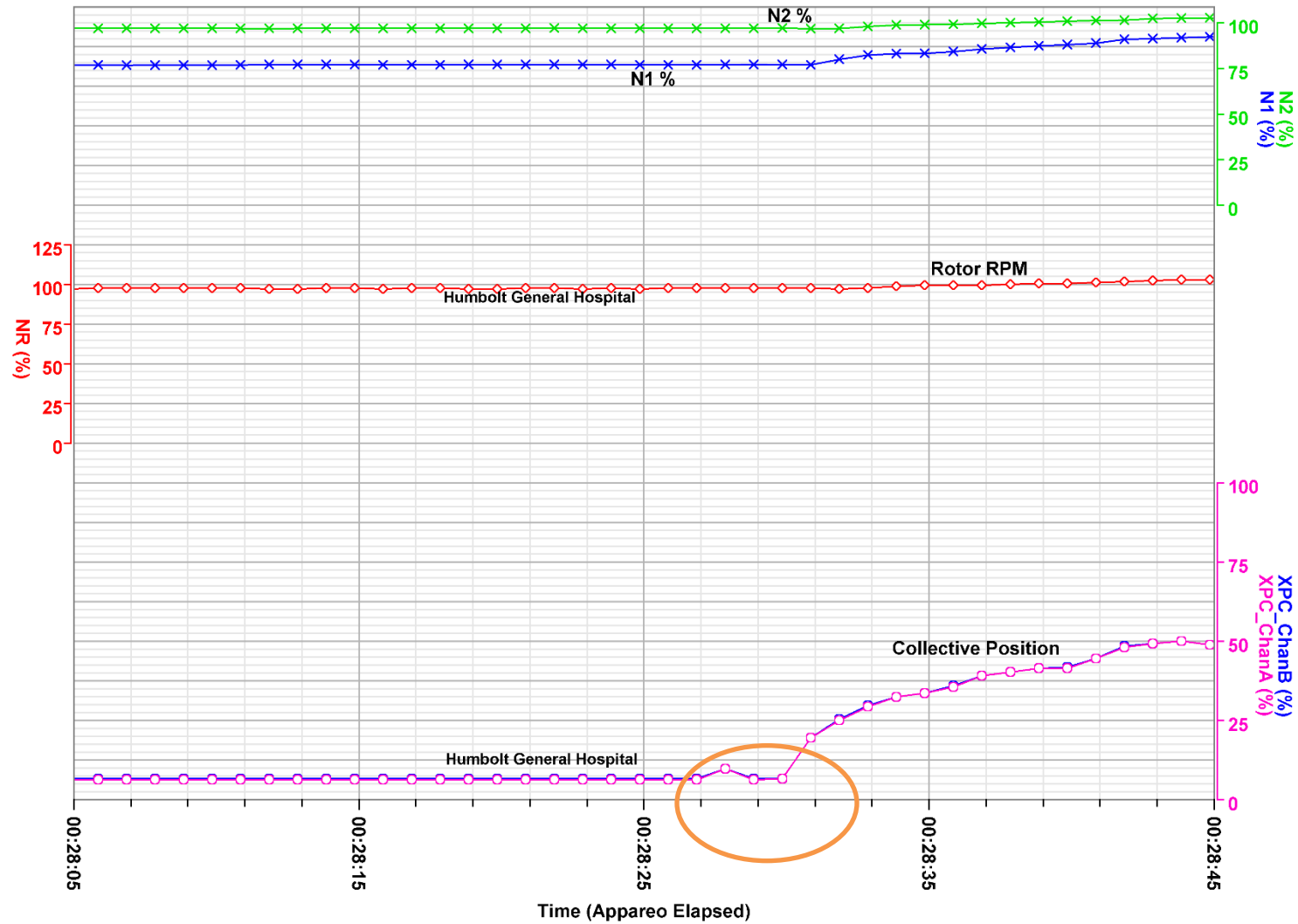
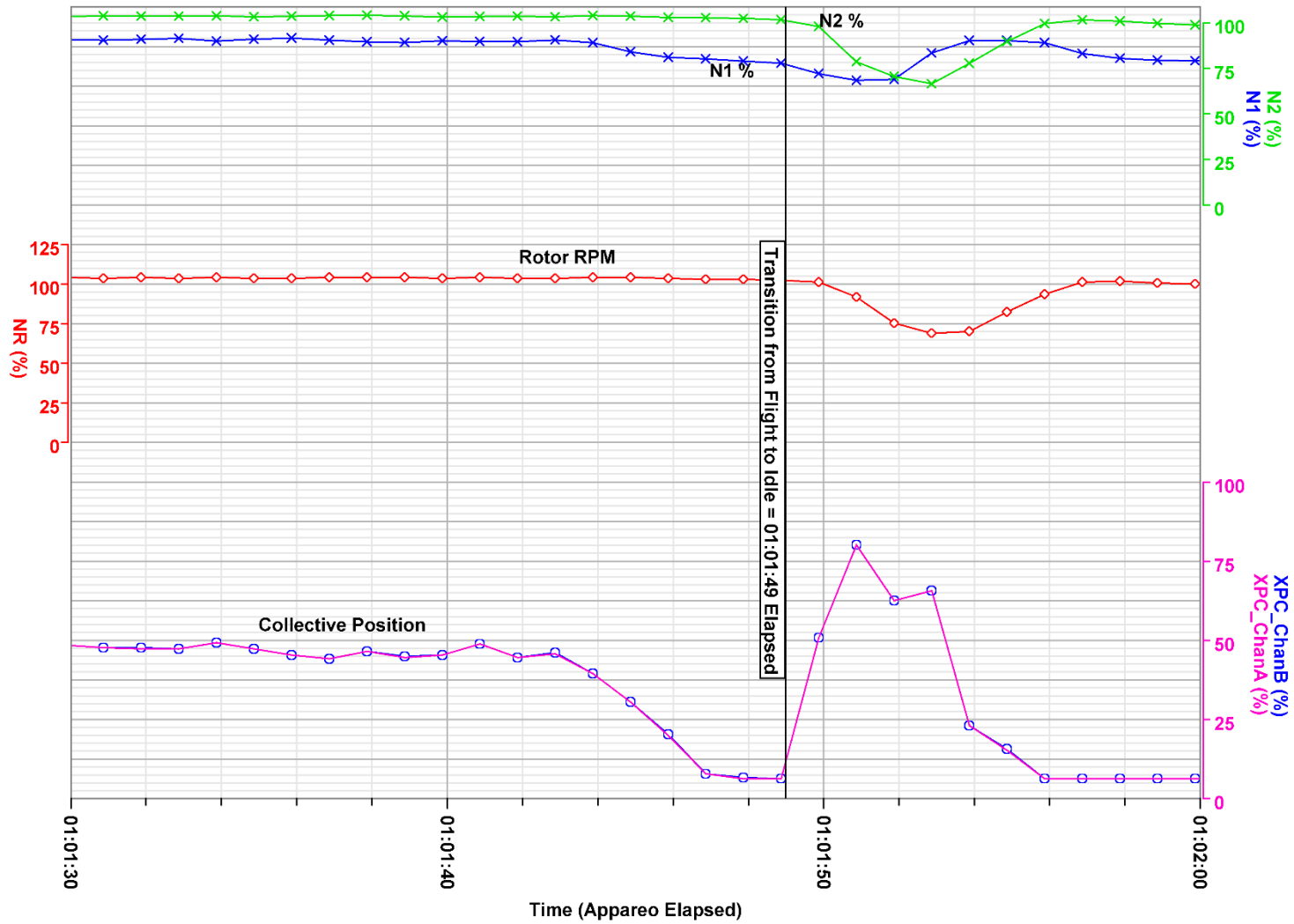


Figure 3. Plot of basic engine parameters and collective position during the incident portion of flight.



## APPENDIX A

This appendix describes the parameters provided and verified in this report. Table A-1 lists the parameters and table A-2 describes the unit abbreviations used in this report.

**Table A-1. Verified and provided parameters.**

<b>Parameter Name</b>	<b>Parameter Description</b>
1. N1 (%)	Percent N1 RPM
2. N2 (%)	Percent N2 RPM
3. NR (%)	Percent Rotor RPM
4. XPC_ChanA (%)	Percent Collective Position – Stoke Pot A
5. XPC_ChanB (%)	Percent Collective Position – Stoke Pot B

**Table A-2. Unit abbreviations.**

<b>Units Abbreviation</b>	<b>Description</b>
%	percent

NOTE: For parameters with a unit description of discrete, a discrete is typically a 1-bit parameter that is either a 0 state or a 1 state where each state is uniquely defined for each parameter.