MASI-AI Flight Data Monitoring Analysis Report

File Name: decoded_flight.csv
Analysis Date: 2026-09-04 17:11:28
Aircraft Type: GregCorp G919
Registration: N1234YZ, N5678AB
ARINC Format: 767
FRED-XML: 647A-1_767Example 051508.xml
Data Source: Pre-decoded CSV (ARINC 717, 12-bit words)

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ANALYSIS SUMMARY
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Total Frames Analyzed:     309
Time Range:                0.0000 – 19.2500 s
Sample Rate:               16.0 Hz
Parameters Analyzed:       ALT, CAS, HDG, VS
==================================================
Total Anomalies Found:     2214
  Critical:                906
  High:                    365
  Medium:                  931
  Low:                     12
==================================================
Anomalies by Category:
  Data Integrity: 6
  Exceedance: 563
  Plausibility Error: 446
  Rate-of-Change Violation: 1199
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Anomalies by Parameter:
  ALT: 459
  CAS: 784
  HDG: 303
  VS: 668
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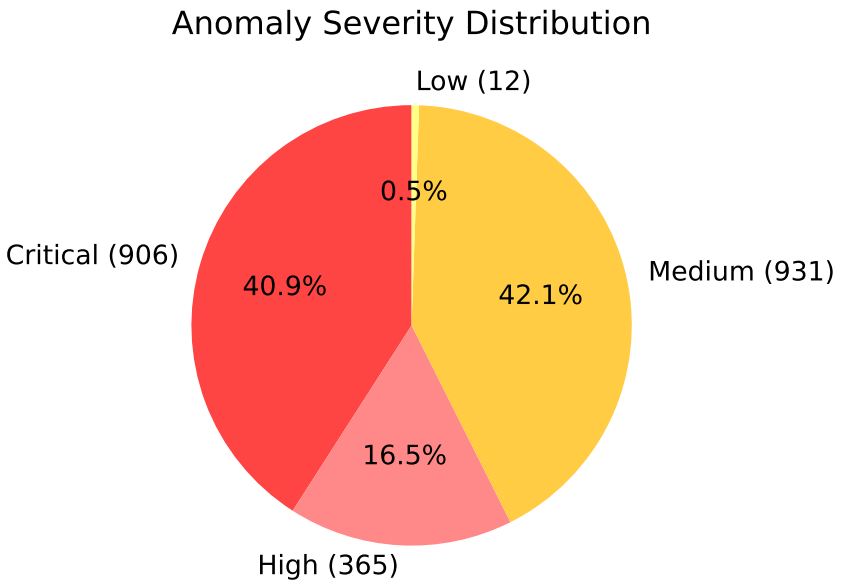
Parameter Statistics Table

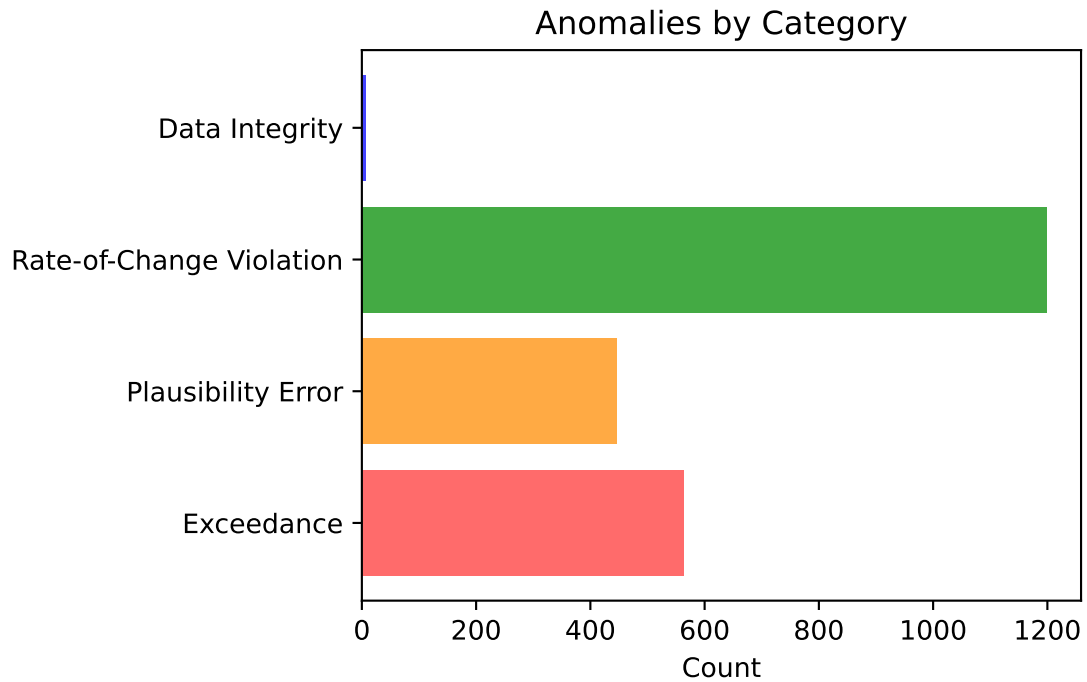
Parameter	Description	Units	Count	Raw Min	Raw Max	Raw Mean	Raw Std	Eng Min	Eng Max	Eng Mean	Eng Std	Op Min	Op Max	Limit Min	Limit Max
ALT	Pressure Altitude	ft	309	17.0	4095.0	2550.1	1312.4	-5087.50	5117.50	-153.11	2610.26	-1500	80000	-1500	43000
CAS	Calibrated Airspeed	kt	309	0.0	4094.0	2539.2	1263.1	0.00	2047.00	1269.58	631.57	0	1000	0	270
HDG	Heading (True)	deg	309	0.0	4095.0	2444.9	1319.5	0.00	359.91	214.89	115.98	0	360	0	360
VS	Vertical Speed	ft/min	309	18.0	4095.0	2566.0	1303.8	-32768.00	32752.00	758.78	16395.76	-6000	6000	-4000	6000

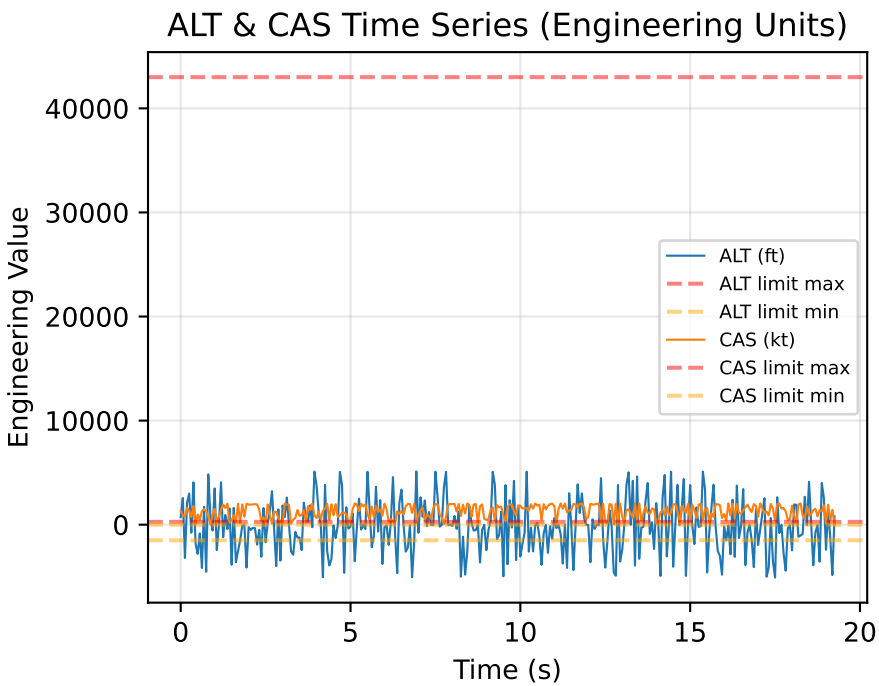
Detailed Anomaly List

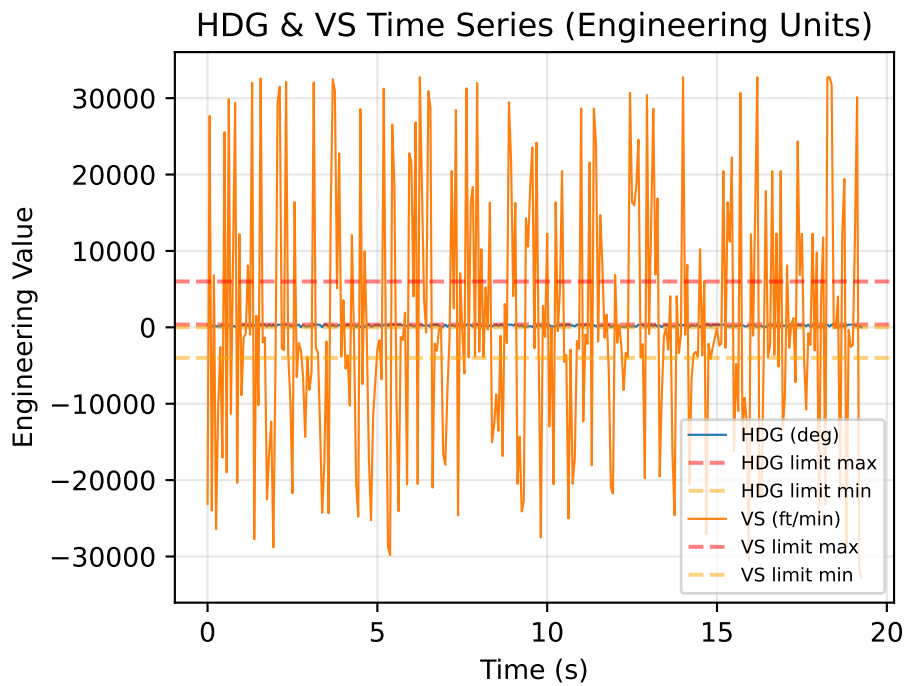
Time (s)	Parameter	Raw Val	Eng Value	Limit	Category	Severity	Description
0.0000	CAS	2661	1330.50	270	Exceedance	Critical	CAS = 1330.50 kt exceed
0.0000	CAS	2661	1330.50	0 to 1000	Plausibility Error	Critical	CAS = 1330.50 kt is phys
0.0000	VS	2652	-23104.00	-4000	Exceedance	Critical	VS = -23104.00 ft/min be
0.0000	VS	2652	-23104.00	-10000 to 10000	Plausibility Error	Critical	VS = -23104.00 ft/min is
0.0625	ALT	1025	2562.50	±5000 ft/s	Rate-of-Change Violati	Medium	ALT rate of change 29360
0.0625	CAS	1840	920.00	270	Exceedance	Critical	CAS = 920.00 kt exceeds
0.0625	CAS	1840	920.00	±100 kt/s	Rate-of-Change Violati	Medium	CAS rate of change -6568
0.0625	HDG	179	15.73	±30 deg/s	Rate-of-Change Violati	Medium	HDG rate of change -359
0.0625	VS	1730	27680.00	6000	Exceedance	Critical	VS = 27680.00 ft/min exc
0.0625	VS	1730	27680.00	-10000 to 10000	Plausibility Error	Critical	VS = 27680.00 ft/min is p
0.0625	VS	1730	27680.00	±20000 ft/min/min	Rate-of-Change Violati	High	VS rate of change 487526
0.1250	ALT	2816	-3200.00	-1500	Exceedance	Medium	ALT = -3200.00 ft below l
0.1250	ALT	2816	-3200.00	-1500 to 80000	Plausibility Error	Critical	ALT = -3200.00 ft is physi
0.1250	ALT	2816	-3200.00	±5000 ft/s	Rate-of-Change Violati	Medium	ALT rate of change -9220
0.1250	CAS	1507	753.50	270	Exceedance	Critical	CAS = 753.50 kt exceeds
0.1250	CAS	1507	753.50	±100 kt/s	Rate-of-Change Violati	Medium	CAS rate of change -2664
0.1250	HDG	818	71.89	±30 deg/s	Rate-of-Change Violati	Medium	HDG rate of change 898.5
0.1250	VS	2597	-23984.00	-4000	Exceedance	Critical	VS = -23984.00 ft/min be
0.1250	VS	2597	-23984.00	-10000 to 10000	Plausibility Error	Critical	VS = -23984.00 ft/min is
0.1250	VS	2597	-23984.00	±20000 ft/min/min	Rate-of-Change Violati	High	VS rate of change -49597
0.1875	ALT	848	2120.00	±5000 ft/s	Rate-of-Change Violati	Medium	ALT rate of change 85120
0.1875	CAS	3238	1619.00	270	Exceedance	Critical	CAS = 1619.00 kt exceed
0.1875	CAS	3238	1619.00	0 to 1000	Plausibility Error	Critical	CAS = 1619.00 kt is phys
0.1875	CAS	3238	1619.00	±100 kt/s	Rate-of-Change Violati	Medium	CAS rate of change 1384
0.1875	HDG	3532	310.43	±30 deg/s	Rate-of-Change Violati	Medium	HDG rate of change 3816
0.1875	VS	426	6816.00	6000	Exceedance	Medium	VS = 6816.00 ft/min exce
0.1875	VS	426	6816.00	±20000 ft/min/min	Rate-of-Change Violati	High	VS rate of change 29568
0.2500	ALT	1197	2992.50	±5000 ft/s	Rate-of-Change Violati	Medium	ALT rate of change 13960
0.2500	CAS	2709	1354.50	270	Exceedance	Critical	CAS = 1354.50 kt exceed
0.2500	CAS	2709	1354.50	0 to 1000	Plausibility Error	Critical	CAS = 1354.50 kt is phys
0.2500	CAS	2709	1354.50	±100 kt/s	Rate-of-Change Violati	Medium	CAS rate of change -4232
0.2500	HDG	1330	116.89	±30 deg/s	Rate-of-Change Violati	Medium	HDG rate of change -309
0.2500	VS	2444	-26432.00	-4000	Exceedance	Critical	VS = -26432.00 ft/min be
0.2500	VS	2444	-26432.00	-10000 to 10000	Plausibility Error	Critical	VS = -26432.00 ft/min is
0.2500	VS	2444	-26432.00	±20000 ft/min/min	Rate-of-Change Violati	High	VS rate of change -31918
0.3125	ALT	3789	-767.50	±5000 ft/s	Rate-of-Change Violati	Medium	ALT rate of change -6016
0.3125	CAS	1485	742.50	270	Exceedance	Critical	CAS = 742.50 kt exceeds
0.3125	CAS	1485	742.50	±100 kt/s	Rate-of-Change Violati	Medium	CAS rate of change -9792
0.3125	HDG	1511	132.80	±30 deg/s	Rate-of-Change Violati	Medium	HDG rate of change 254.5
0.3125	VS	3434	-10592.00	-4000	Exceedance	Critical	VS = -10592.00 ft/min be
0.3125	VS	3434	-10592.00	-10000 to 10000	Plausibility Error	Critical	VS = -10592.00 ft/min is
0.3125	VS	3434	-10592.00	±20000 ft/min/min	Rate-of-Change Violati	High	VS rate of change 152064
0.3750	ALT	1629	4072.50	±5000 ft/s	Rate-of-Change Violati	Medium	ALT rate of change 77440
0.3750	CAS	3613	1806.50	270	Exceedance	Critical	CAS = 1806.50 kt exceed
0.3750	CAS	3613	1806.50	0 to 1000	Plausibility Error	Critical	CAS = 1806.50 kt is phys
0.3750	CAS	3613	1806.50	±100 kt/s	Rate-of-Change Violati	Medium	CAS rate of change 1702
0.3750	HDG	582	51.15	±30 deg/s	Rate-of-Change Violati	Medium	HDG rate of change -130
0.3750	VS	3935	-2576.00	±20000 ft/min/min	Rate-of-Change Violati	High	VS rate of change 769536
0.4375	ALT	3369	-1817.50	-1500	Exceedance	Low	ALT = -1817.50 ft below l
0.4375	ALT	3369	-1817.50	-1500 to 80000	Plausibility Error	Critical	ALT = -1817.50 ft is physi
0.4375	ALT	3369	-1817.50	±5000 ft/s	Rate-of-Change Violati	Medium	ALT rate of change -9424
0.4375	CAS	148	74.00	±100 kt/s	Rate-of-Change Violati	Medium	CAS rate of change -2772
0.4375	HDG	3466	304.63	±30 deg/s	Rate-of-Change Violati	Medium	HDG rate of change 4055
0.4375	VS	3030	-17056.00	-4000	Exceedance	Critical	VS = -17056.00 ft/min be
0.4375	VS	3030	-17056.00	-10000 to 10000	Plausibility Error	Critical	VS = -17056.00 ft/min is
0.4375	VS	3030	-17056.00	±20000 ft/min/min	Rate-of-Change Violati	High	VS rate of change -13900
0.5000	ALT	2974	-2805.00	-1500	Exceedance	Medium	ALT = -2805.00 ft below l
0.5000	ALT	2974	-2805.00	-1500 to 80000	Plausibility Error	Critical	ALT = -2805.00 ft is physi
0.5000	ALT	2974	-2805.00	±5000 ft/s	Rate-of-Change Violati	Medium	ALT rate of change -1580
0.5000	CAS	1948	974.00	270	Exceedance	Critical	CAS = 974.00 kt exceeds

Anomaly Distribution & Parameter Time Series









Recommendations Summary

1. ALT (Pressure Altitude): 85 CRITICAL anomaly/anomalies detected. Engineering range: -5087.50–5117.50 ft, limits: -1500–43000 ft. Immediate investigation required — possible sensor failure or safety-critical exceedance.
2. CAS (Calibrated Airspeed): 477 CRITICAL anomaly/anomalies detected. Engineering range: 0.00–2047.00 kt, limits: 0–270 kt. Immediate investigation required — possible sensor failure or safety-critical exceedance.
3. HDG (Heading (True)): 1 HIGH severity anomaly/anomalies. Engineering range: 0.00–359.91 deg. Review operational procedures and sensor calibration.
4. VS (Vertical Speed): 344 CRITICAL anomaly/anomalies detected. Engineering range: -32768.00–32752.00 ft/min, limits: -4000–6000 ft/min. Immediate investigation required — possible sensor failure or safety-critical exceedance.

5. Data Quality: The data appears to contain 12-bit unsigned raw values sampled at 16.0 Hz. Verify that the FRED-XML conversion coefficients match the actual aircraft data frame configuration.
6. Conversion Notes: ALT uses signed 12-bit × 2.5 ft/count (FRED 717 ALTPRL). CAS uses unsigned 12-bit × 0.5 kt/count (FRED 717 Airspeed). HDG uses standard 12-bit × (360/4096) deg/count. VS uses signed 12-bit × 16 ft/min/count (EASA resolution).
7. Sampling Rate: All parameters sampled at 16.0 Hz, exceeding EASA recommended rates (ALT/CAS/HDG: 1 Hz, VS: 4 Hz). Higher resolution is beneficial for FDM analysis.
8. CRITICAL ALERT: 906 critical anomalies require immediate review by flight safety personnel.

Parameter Conversion Sources:

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ALT: signed_12bit, coeff=2.5, source: FRED 717 ALTPRL coeff 2.5; HondaJet MAX_ALT 43000 ft
CAS: unsigned_12bit, coeff=0.5, source: FRED 717 Airspeed coeff 0.5; HondaJet VMO 270 KIAS
HDG: unsigned_12bit_linear, coeff=0.087890625, source: Standard 12-bit ARINC heading conversion; EASA resolution 0.09 deg
VS: signed_12bit, coeff=16, source: EASA resolution 16 ft/min; task defaults ±6000/-4000 ft/min
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