When You Know Better…

You Do Better.

A Business Case For Data Recording Technology

Presented to: TSB Transportation Safety Summit

Ottawa, Ontario

Presented by:

Paul Spring

President, Phoenix Heli-Flight

April 21, 2016


PHOENIX HELI-FLIGHT


STOP
POLICE

Advocacy

- *I am not endorsing a particular product or manufacturer.*
- *I am promoting the use of modern technology to enhance safety.*

Not knowing can be fatal!

Tech solutions can provide knowledge that aids employees and managers with;

- ✓DECISION MAKING
- ✓TROUBLESHOOTING (Operational & Mechanical)
- ✓PROACTIVE RISK REDUCTION
- ✓ACCIDENT or INCIDENT ANALYSIS

Use of knowledge can prevent:

- ✓Loss of Life
- ✓Loss of Assets
- ✓Loss of Reputation
- ✓Unjustified Prosecution

All = Emotional or Financial Stress

THE ROGUE

Comfort Logic Before Data Recorders

'Our pilots wouldn't do anything stupid or illegal because'

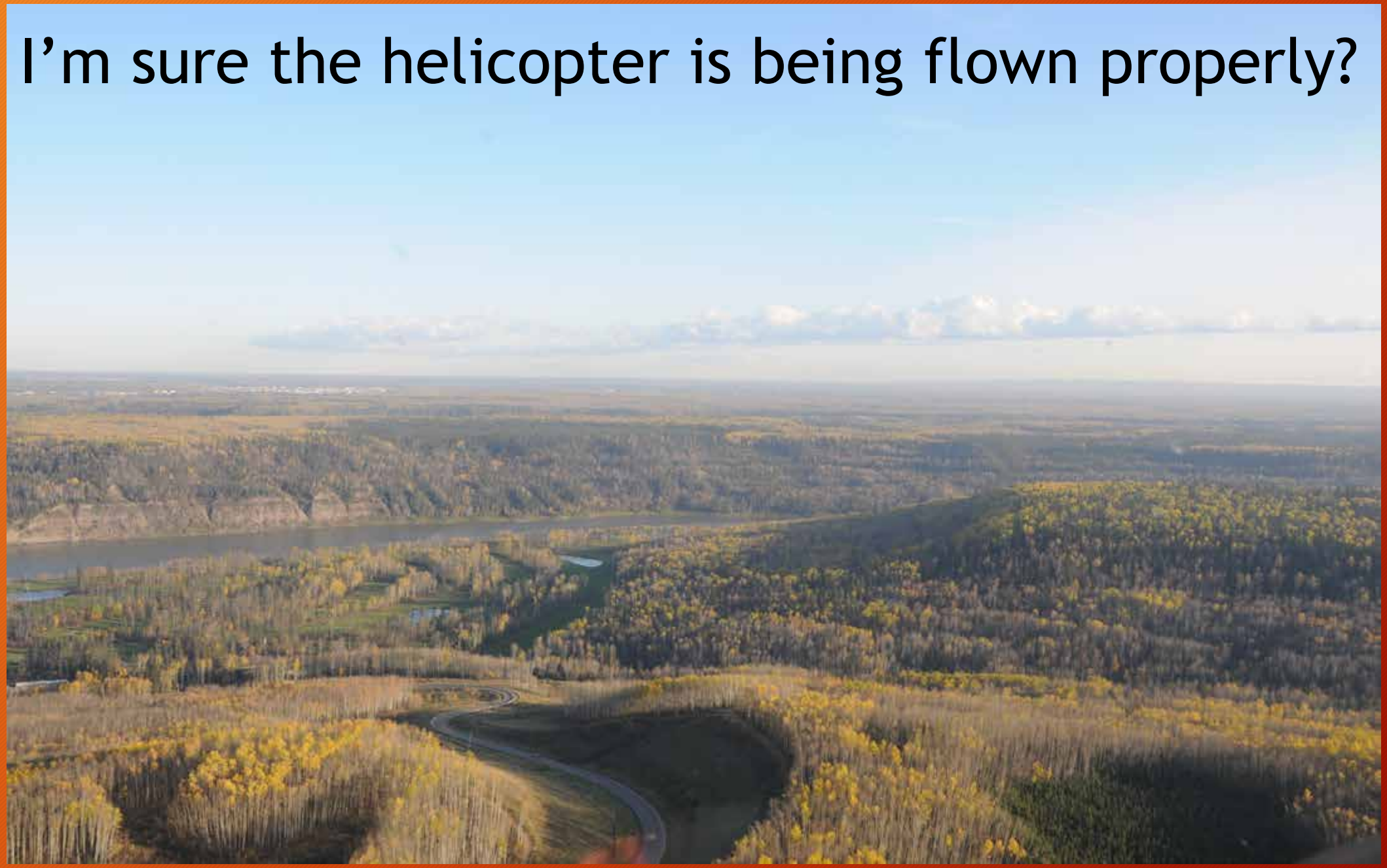
- Our pilots respect our clients and our helicopters
- We don't allow aggressive flying
- We only hire experienced crew
- We give them proper training
- We have a safety policy

Shocking Discoveries

I thought my company had it covered.

I was DEAD wrong!

I’m sure the helicopter is being flown properly?

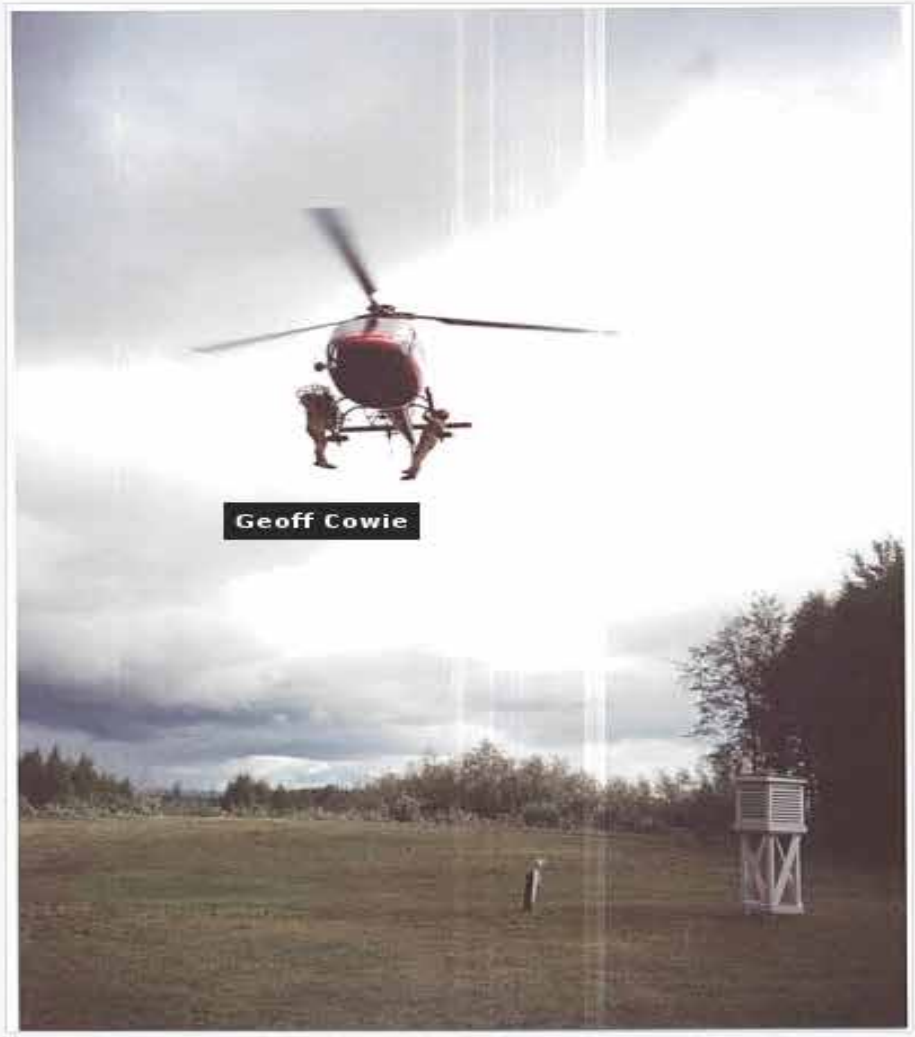



NX41860
15

Photo 2 of 23 | Back to Photos of Geoff | See Geoff's Profile Previous Next

fun.
In this photo: Geoff Cowie (photos), Gordon Wagstaff
Added January 18

From the album:
"Helitack 2007" by Geoff Cowie



Another view of where we are.
In this photo: Geoff Cowie (photos), Gordon Wagstaff
Added January 18

From the album:
"Helitack 2007" by Geoff Cowie

Alanda Skrzekowski (Edmonton, AB) wrote
at 9:09pm on January 18th, 2008

That's craziness!!

Message

Share +

Tag This Photo

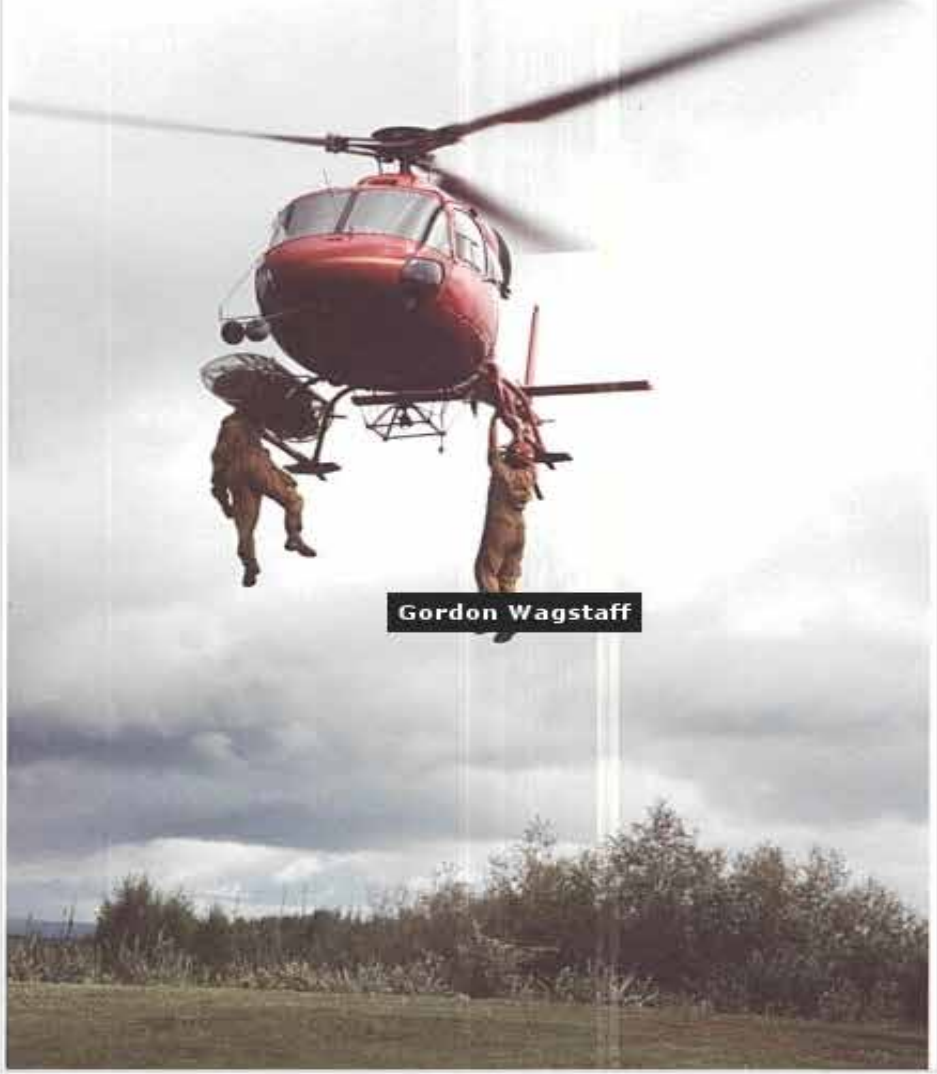
Report This Photo

Post a Reply

Gord and I preparing for the hover exit.
In this photo: Geoff Cowie (photos), Gordon Wagstaff

Added January 18

From the album:
"Helitack 2007" by Geoff Cowie



Hang time.....on the decent.
In this photo: Geoff Cowie (photos), Gordon Wagstaff

Added January 18

From the album:
"Helitack 2007" by Geoff Cowie

Suzan Nowaczynski (Vancouver, BC) wrote
at 9:22pm on January 18th, 2008

show off!!! ;)

Message

Share +

Tag This Photo

Report This Photo

The Cost of Not Knowing

The pilot with his crew of 4 woodland firefighters onboard had been in level cruise at 1000 feet AGL for 20 minutes when the helicopter descended abruptly…….

The Aftermath

- 1 person dead, his family & friends devastated
- 4 persons injured
- 1 helicopter destroyed
- The company's reputation threatened

The TSB of Canada final report stated:

- *“the pilot had previously flown in a similar manner “*
- *“however, no complaints were submitted” to the management.*
- The helicopter involved had no HFDM.

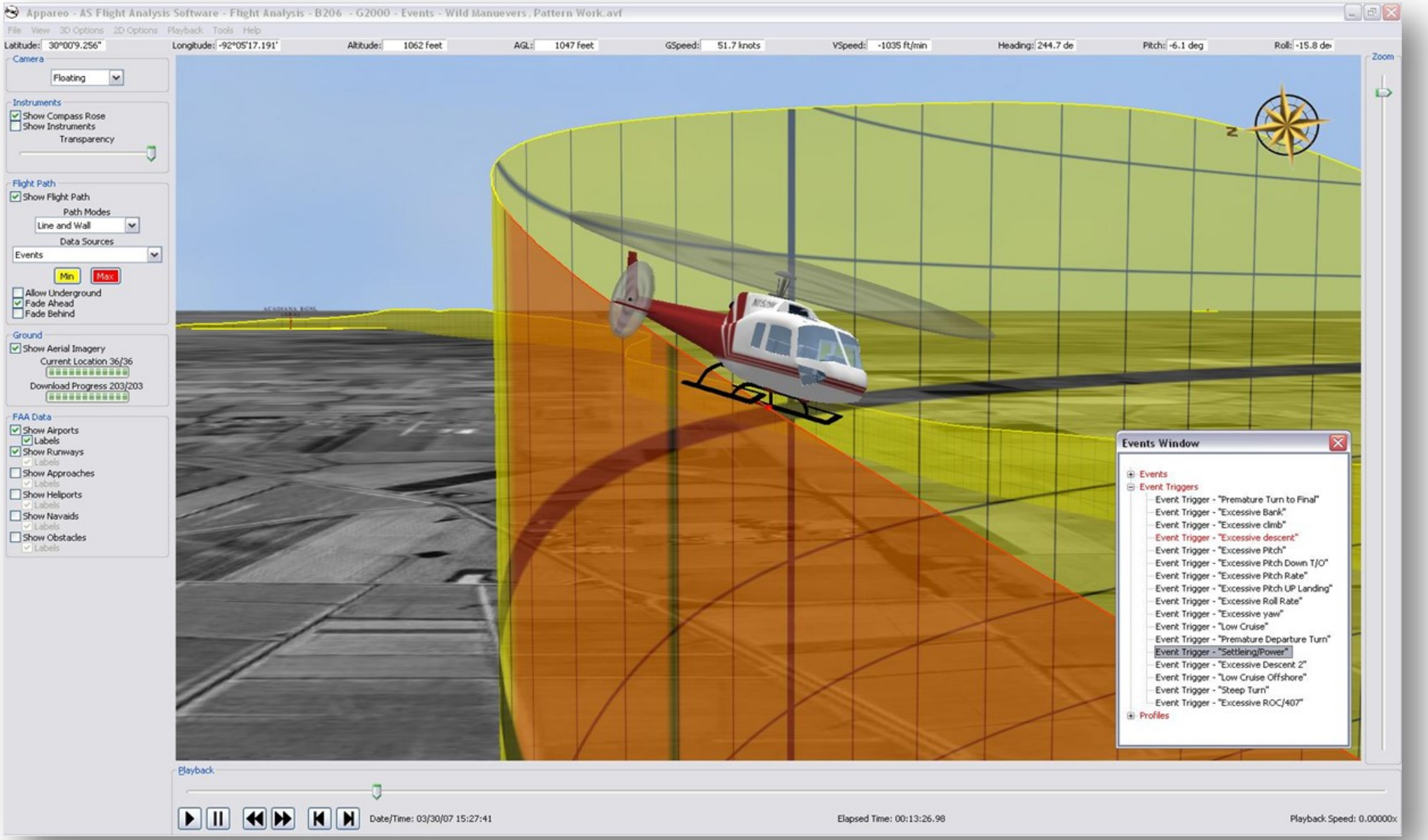
  many reports now include this observation

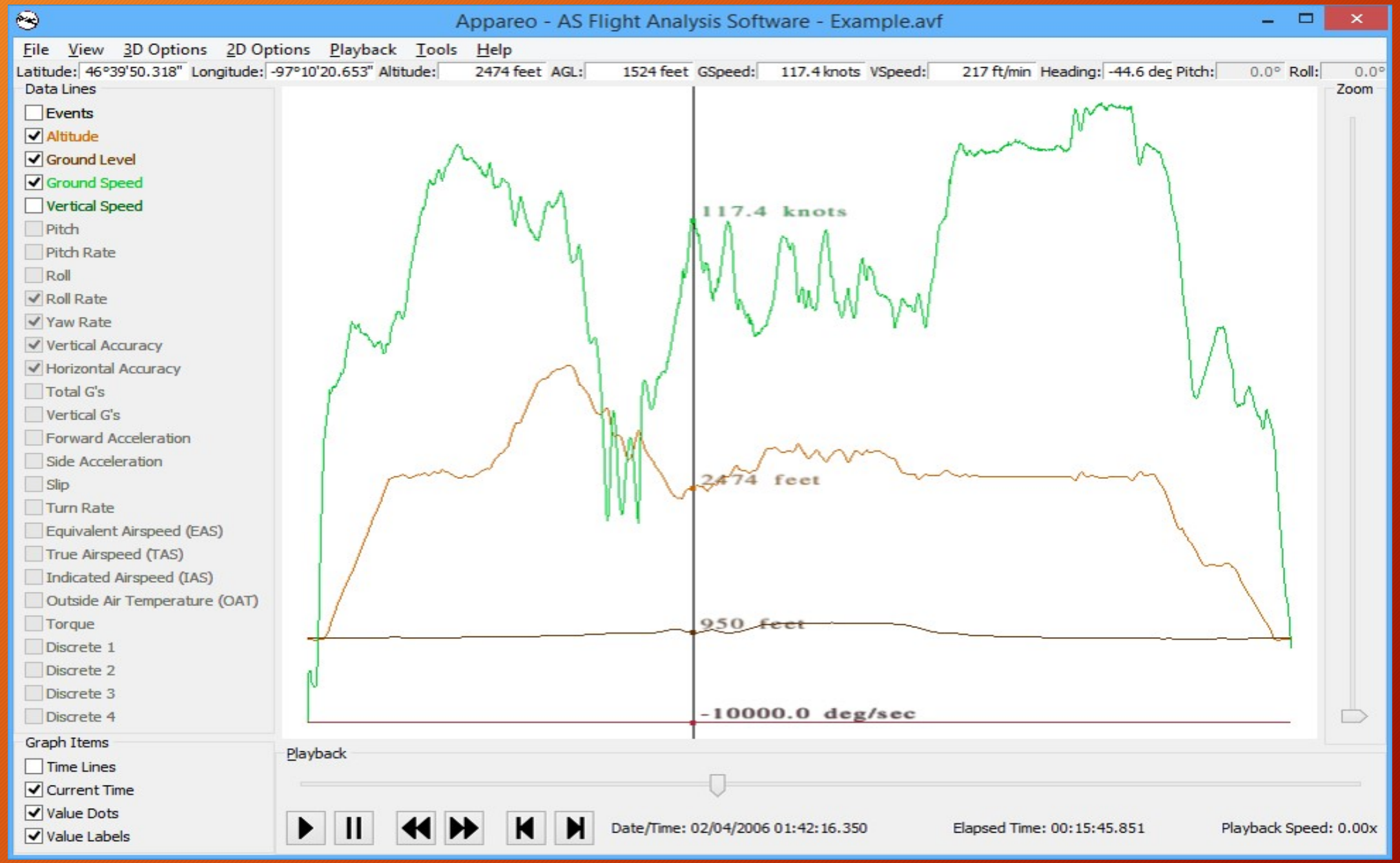
Unintentional Non-Compliance

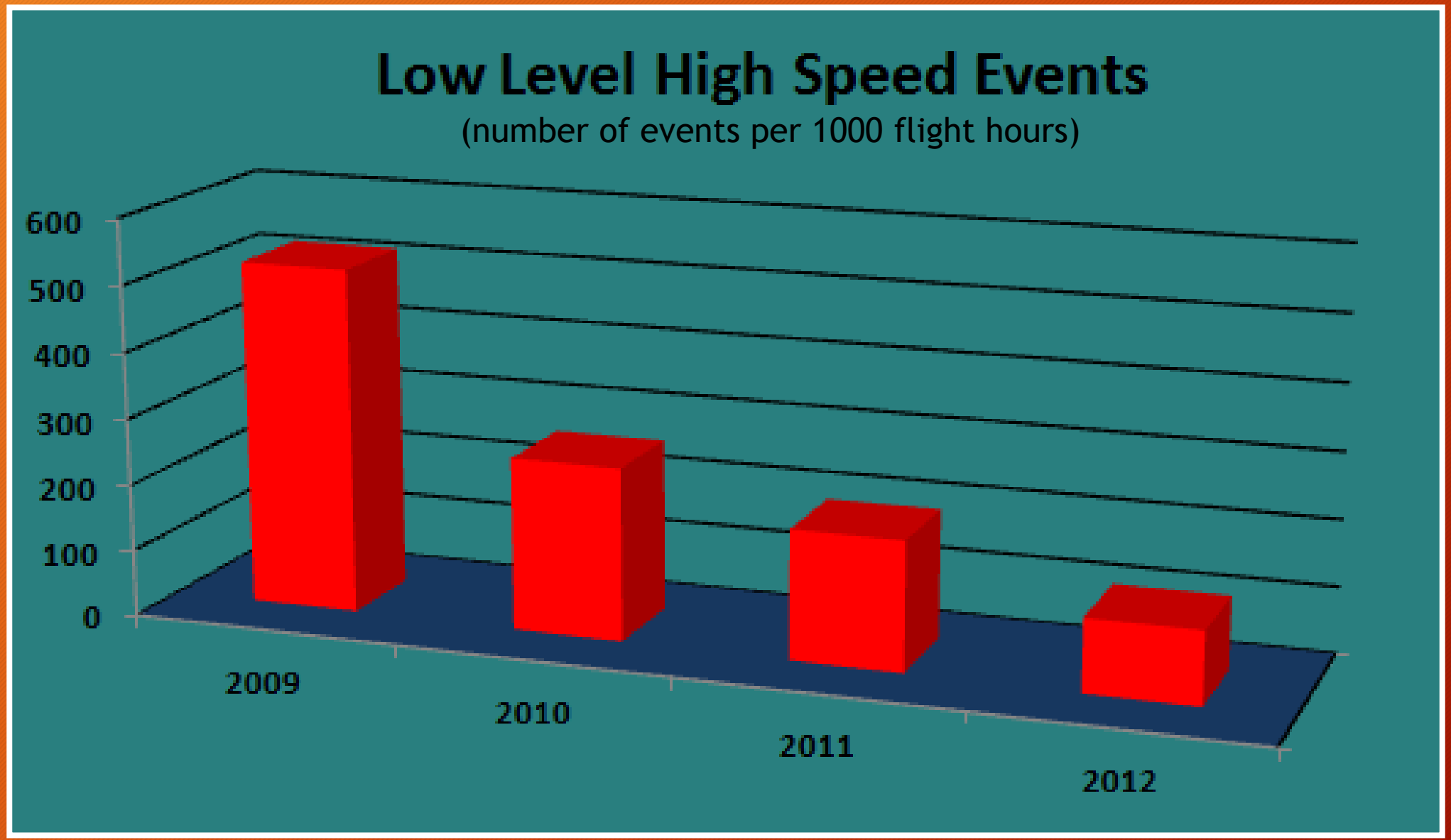
- Shortcuts
- Work arounds
- Procedural drift
- Bad norms
- Lack of training (initial or recurrent)
- Lack of supervision

Light/Affordable HFDM Is Available

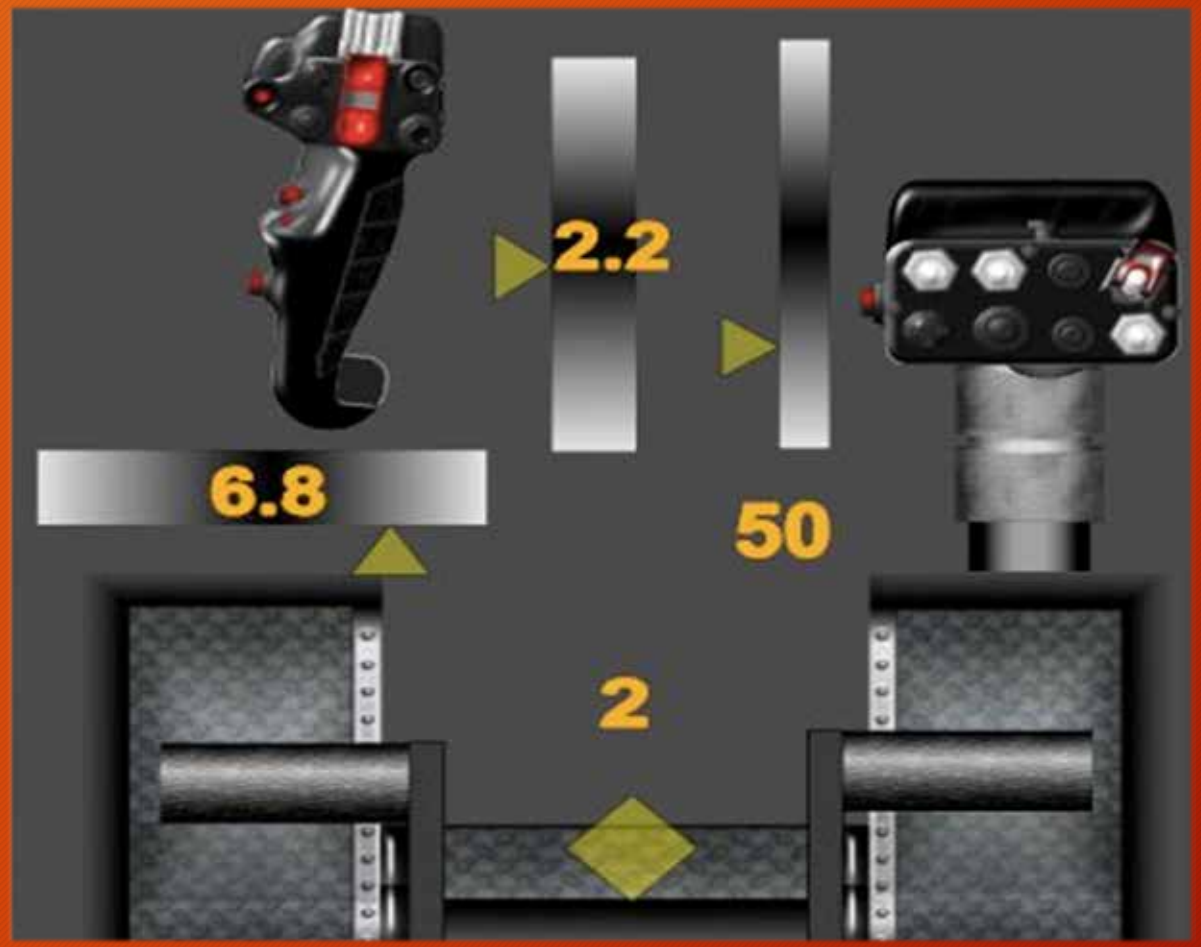
- HFDM provides *Operational Oversight*.
- HFDM is both Reactive and Proactive.
- Phoenix's HFDM initiative made a profit the first year.
- HFDM recorders work on any aircraft.

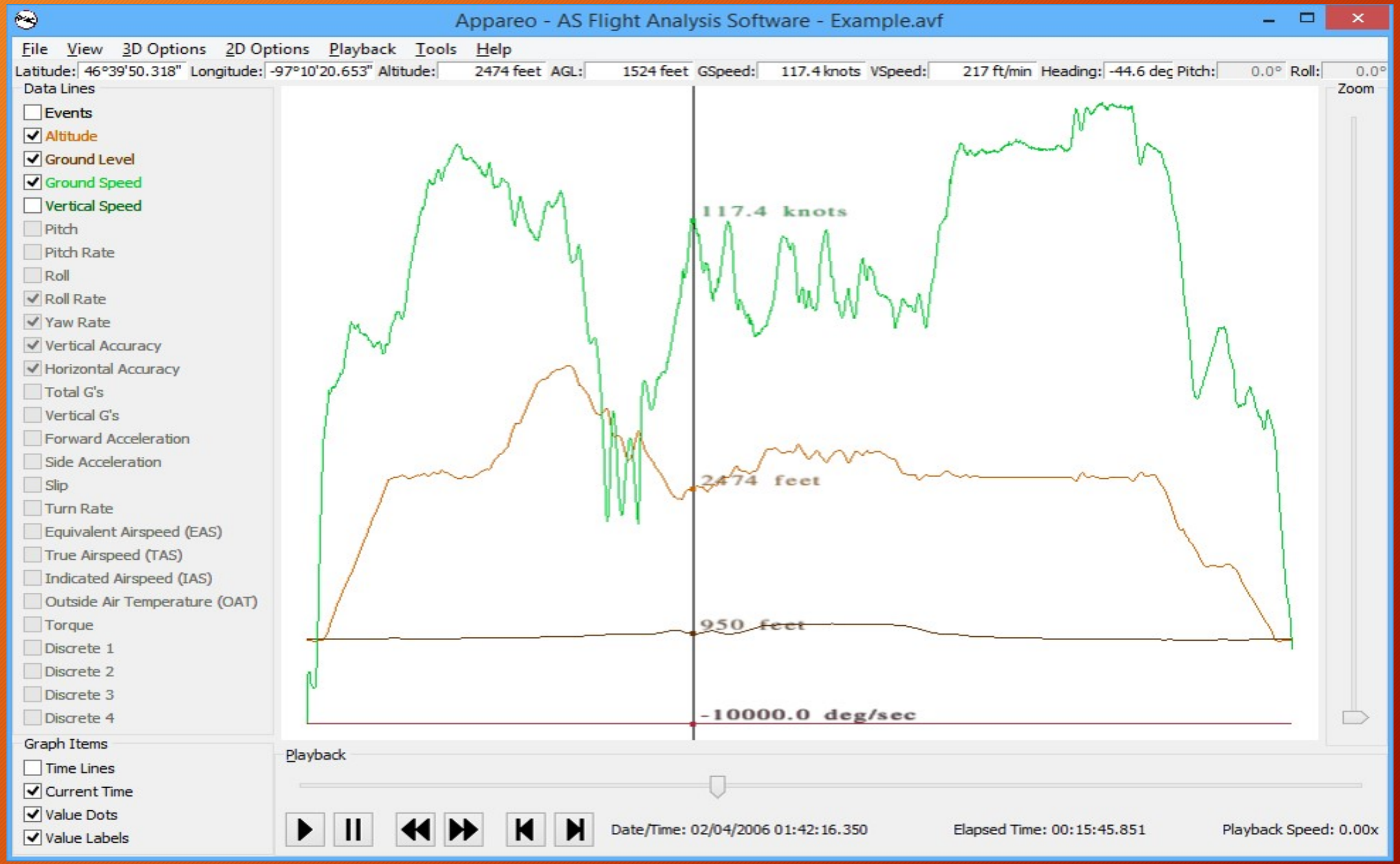

Appareo - AS Flight Analysis Software - Flight Analysis - B206 - G2000 - Events - Wild Manuevers, Pattern Work.avf
File View 3D Options 2D Options Playback Tools Help
Latitude: 30°00'9.256"
Longitude: -92°05'17.191"
Altitude: 1062 feet
AGL: 1047 feet
GSpeed: 51.7 knots
VSpeed: -1035 ft/min
Heading: 244.7 de
Pitch: -6.1 deg
Roll: -15.8 de
Camera
Floating
Instruments
Show Compass Rose
Show Instruments
Transparency
Flight Path
Show Flight Path
Path Modes
Line and Wall
Data Sources
Events
Min
Max
Allow Underground
Fade Ahead
Fade Behind
Ground
Show Aerial Imagery
Current Location 36/36
Download Progress 203/203
FAA Data
Show Airports
Labels
Show Runways
Show Approaches
Show Heliports
Show Navaids
Show Obstacles
Zoom
N
Events Window
Events
Event Triggers
Event Trigger - "Premature Turn to Final"
Event Trigger - "Excessive Bank"
Event Trigger - "Excessive climb"
Event Trigger - "Excessive descent"
Event Trigger - "Excessive Pitch"
Event Trigger - "Excessive Pitch Down T/O"
Event Trigger - "Excessive Pitch Rate"
Event Trigger - "Excessive Pitch UP Landing"
Event Trigger - "Excessive Roll Rate"
Event Trigger - "Excessive yaw"
Event Trigger - "Low Cruise"
Event Trigger - "Premature Departure Turn"
Event Trigger - "Settleing/Power"
Event Trigger - "Excessive Descent 2"
Event Trigger - "Low Cruise Offshore"
Event Trigger - "Steep Turn"
Event Trigger - "Excessive ROC/407"
Profiles
Playback
Date/Time: 03/30/07 15:27:41
Elapsed Time: 00:13:26.98
Playback Speed: 0.00000x


Appareo - AS Flight Analysis Software - Example.avf
File View 3D Options 2D Options Playback Tools Help
Latitude: 46°39'50.318" Longitude: -97°10'20.653" Altitude: 2474 feet AGL: 1524 feet GSpeed: 117.4 knots VSpeed: 217 ft/min Heading: -44.6 deg Pitch: 0.0° Roll: 0.0°
Data Lines
Events
Altitude
Ground Level
Ground Speed
Vertical Speed
Pitch
Pitch Rate
Roll
Roll Rate
Yaw Rate
Vertical Accuracy
Horizontal Accuracy
Total G's
Vertical G's
Forward Acceleration
Side Acceleration
Slip
Turn Rate
Equivalent Airspeed (EAS)
True Airspeed (TAS)
Indicated Airspeed (IAS)
Outside Air Temperature (OAT)
Torque
Discrete 1
Discrete 2
Discrete 3
Discrete 4
Graph Items
Time Lines
Current Time
Value Dots
Value Labels
117.4 knots
2474 feet
950 feet
-10000.0 deg/sec
Zoom
Playback
Date/Time: 02/04/2006 01:42:16.350
Elapsed Time: 00:15:45.851
Playback Speed: 0.00x


Low Level High Speed Events
(number of events per 1000 flight hours)
600
500
400
300
200
100
0
2009
2010
2011
2012

Integrated HFDM Control Image




Appareo - AS Flight Analysis Software - Example.avf
File View 3D Options 2D Options Playback Tools Help
Latitude: 46°39'50.318" Longitude: -97°10'20.653" Altitude: 2474 feet AGL: 1524 feet GSpeed: 117.4 knots VSpeed: 217 ft/min Heading: -44.6 deg Pitch: 0.0° Roll: 0.0°
Data Lines
Events
Altitude
Ground Level
Ground Speed
Vertical Speed
Pitch
Pitch Rate
Roll
Roll Rate
Yaw Rate
Vertical Accuracy
Horizontal Accuracy
Total G's
Vertical G's
Forward Acceleration
Side Acceleration
Slip
Turn Rate
Equivalent Airspeed (EAS)
True Airspeed (TAS)
Indicated Airspeed (IAS)
Outside Air Temperature (OAT)
Torque
Discrete 1
Discrete 2
Discrete 3
Discrete 4
Graph Items
Time Lines
Current Time
Value Dots
Value Labels
117.4 knots
2474 feet
950 feet
-10000.0 deg/sec
Zoom
Playback
Date/Time: 02/04/2006 01:42:16.350
Elapsed Time: 00:15:45.851
Playback Speed: 0.00x

April 21, 2016

Post Maintenance Run-up Incident

Following routine maintenance including a turbine gas path wash the engines of Phoenix's AS355N required a ground run. During the acceleration of one engine the helicopter began an uncontrolled rotation that ended in a collision with a ground power unit.

The Resulting Damage

- An uncontrolled 95 degree ground twist to the right

- Damaging contact with a ground power unit resulting in a broken window and bent mirror bracket

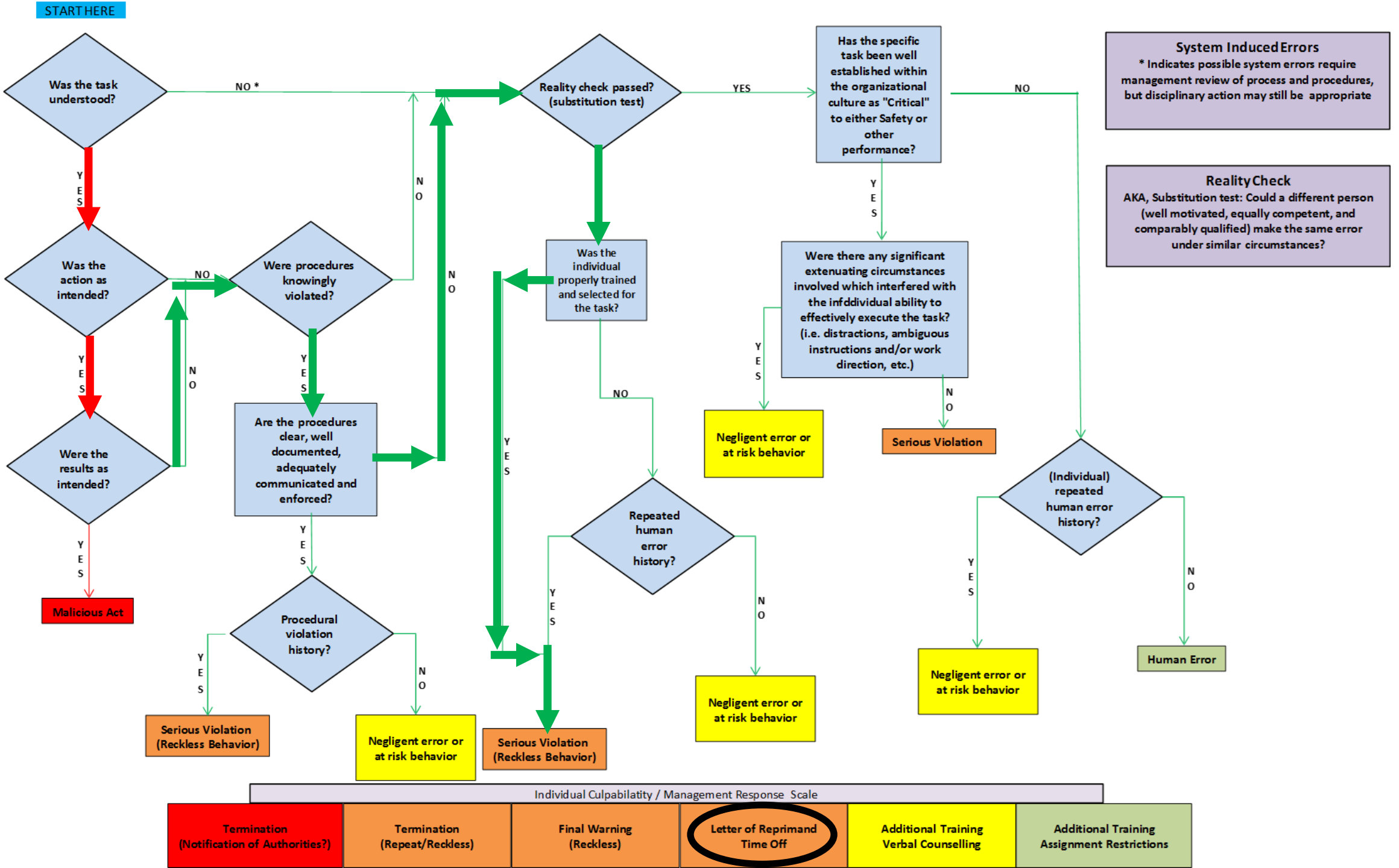
Recollections & Recordings

The pilot's recollection of the incident supported an assertion that he had no control over the incident and that the engine must have a mechanical problem.

The Cockpit Voice Video Reorder (CVVR) showed how the pilot's situational non-compliance introduced the factors that caused the incident.

Post Investigation Knowledge / Results

- 5 SOPS were not followed.
- Fatigue may have been a factor.
- Personal distraction was a factor.
- The pilot learned how he caused the incident.


START HERE
Was the task understood?
NO *
Reality check passed? (substitution test)
YES
Has the specific task been well established within the organizational culture as "Critical" to either Safety or other performance?
NO
System Induced Errors
* Indicates possible system errors require management review of process and procedures, but disciplinary action may still be appropriate
Reality Check
AKA, Substitution test: Could a different person (well motivated, equally competent, and comparably qualified) make the same error under similar circumstances?
Was the action as intended?
NO
Were procedures knowingly violated?
Was the individual properly trained and selected for the task?
Were there any significant extenuating circumstances involved which interfered with the infddividual ability to effectively execute the task? (i.e. distractions, ambiguous instructions and/or work direction, etc.)
Were the results as intended?
Are the procedures clear, well documented, adequately communicated and enforced?
Repeated human error history?
(Individual) repeated human error history?
Procedural violation history?
Malicious Act
Negligent error or at risk behavior
Serious Violation
Serious Violation (Reckless Behavior)
Negligent error or at risk behavior
Negligent error or at risk behavior
Negligent error or at risk behavior
Human Error
Serious Violation (Reckless Behavior)
Individual Culpabilatity / Management Response Scale
Termination (Notification of Authorities?)
Termination (Repeat/Reckless)
Final Warning (Reckless)
Letter of Reprimand Time Off
Additional Training Verbal Counselling
Additional Training Assignment Restrictions

Post Investigation Actions

- No punitive action was taken.
- The pilot was given time off to settle personal affairs.
- Fatigue awareness was improved.
- A post-maintenance ‘speed bump’ was put in place.

Spent vs. Saved

HFDM / CVVR costs

- HFDM recorder - 7,500
- OVVR unit - 2,400
- Camera - 1,900
- Avionics install - 1,920
- Hardware install - 400

14,120

+ annual software support

+ HFDM analyst (.5% per rev $)

+ repairs & maintenance

Incident savings

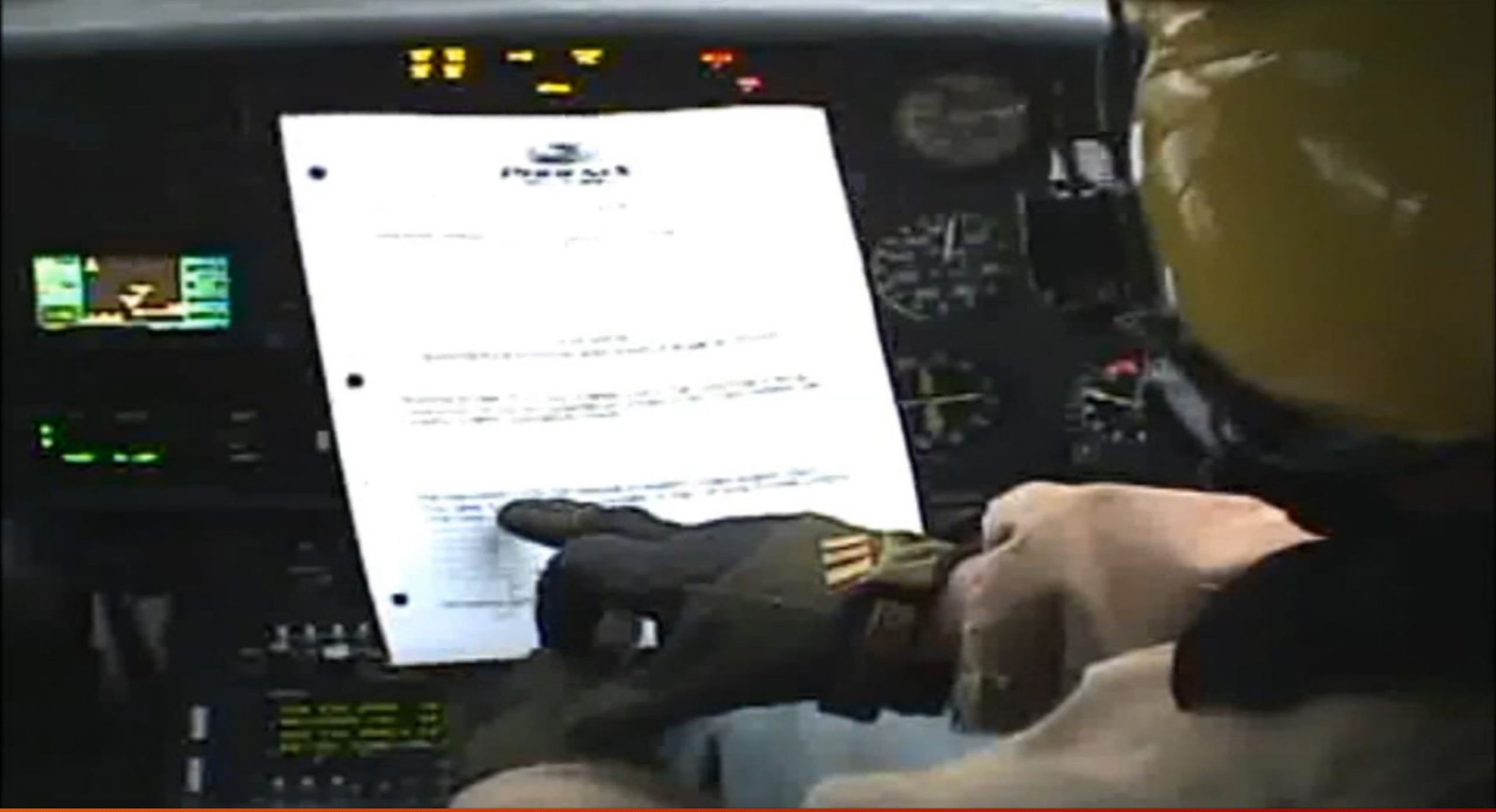
- 2 day grounding – 30,000
- AME labour - 2,600
- Pilot labour - 1,080
- Test DECU - 20,000
- Test HMU - 3,600

57,280

+ the elimination of doubt

+ cause determined

+ procedures adjusted



Learnings In Action

- 16 months later the same helicopter had a post maintenance failure of a newly installed $600K engine.

- The CVVR clearly showed the crew followed all company procedures as well as the instrument readings at the point of failure. The engine OEM provided full cooperation and warranty.

Financial Advantage$

- Recognition as proactive in quality assurance monitoring.
- Builds trust and a productive relationship with OEMs.
- Attractive to quality employees, **WHEN USED RESPONSIBLY!**

RFP Accountability Requirement

4.0 Safety

1. How does your company **measure and record** its safety history?
2. Are you enrolled in a **Service by Hour** or a **Power by Hour** program for any of your aircraft? If so, please describe by aircraft.
3. Are your aircraft equipped with **satellite tracking** capabilities? Do you monitor and use this?
4. Are your aircraft equipped with a **Cockpit Voice Video Recorder**? If so, what operational benefits do you realize?
5. Do you utilize a **Helicopter Flight Data Monitor**? If so, how often is the **data** downloaded and/or reviewed? What do you do with previously downloaded, historical **data**?
6. Are your aircraft equipped with Multi-Function **Digital Acquisition Units**? If so, what specific **data** collected are you currently tracking and why?
7. What communication equipment is in place for your pilot should he require direction or have an issue in flight?
8. Do all aircraft have a **Traffic Avoidance System**? Do you have a system in place to ensure it's turned on? Please describe.
9. Do all aircraft have **Helicopter Terrain Awareness System**? If not, which aircraft have this capability? Do you have a system in place to ensure it's turned on? Please describe.
10. Do you have **Synthetic Vision** installed in all aircraft? If so, please describe how this is used.

The Biggest Pay-Offs

1. For R/W aviation: reduction of injuries, fatalities and financial losses. Increased consumer confidence.

2. For crash investigations: a reduction in *'No Cause Determined'* findings.

3. For Owners & Accountable Executives: Peace of Mind.

HFDM.ORG

Without Data -

You Don’t Know What You Don’t Know