WEBVTT

1
00:00:00.065 --> 00:00:02.125
Try and try and wake everybody up, especially me.

2
00:00:03.225 --> 00:00:04.795
This was me this morning.

3
00:00:13.155 --> 00:00:13.835
I just gave up.

4
00:00:25.115 --> 00:00:25.915
Actually, that'd be a pretty good

5
00:00:25.915 --> 00:00:27.395
alarm clock for me sometimes.

6
00:00:28.995 --> 00:00:30.295
How many people left outside?

7
00:00:31.595 --> 00:00:33.815
Did anybody have fish last night? Raise of hands.

8
00:00:33.845 --> 00:00:36.855
Show of hands. We found where that fish came from.

9
00:00:37.125 --> 00:00:38.125
Roll the video

10
00:00:39.595 --> 00:00:40.595
At the river mouth.

11
00:00:40.835 --> 00:00:43.975
The bears catch only the tastiest, most tender salmon,

12
00:00:45.945 --> 00:00:48.575
which is exactly what we John West want.

13
00:01:00.195 --> 00:01:01.175
Oh, look, an eagle.

14
00:01:04.765 --> 00:01:07.495
John West endured the worst to bring you the best.

15
00:01:08.755 --> 00:01:10.255
So if you ever hear me say, look,

16
00:01:10.255 --> 00:01:13.855
an eagle ducking cover.

17
00:01:14.395 --> 00:01:17.535
So did, did anybody have fun last night?

18
00:01:17.695 --> 00:01:20.295
I had way too much, uh, uh, reunions.

19
00:01:20.795 --> 00:01:24.315
Is everybody having a good time at this? Get together.

20
00:01:24.935 --> 00:01:29.315
Are we learning lessons after hours too? I, I, I sure did.

21
00:01:31.045 --> 00:01:34.385
And I, like I said yesterday, I'm really, really fond

22
00:01:34.405 --> 00:01:37.465
of this particular venue, the Flight to Safety workshop.

23
00:01:38.185 --> 00:01:41.085
And welcome to Monday, uh, part three.

24
00:01:41.745 --> 00:01:44.005
Um, here's our disclaimer.

25
00:01:44.705 --> 00:01:47.205
Um, again, uh,

26
00:01:49.205 --> 00:01:50.225
please honor this.

27
00:01:50.725 --> 00:01:52.825

Please don't take pictures when you shouldn't.

28
00:01:53.445 --> 00:01:56.985
Uh, please get in touch with his presenters

29
00:01:57.565 --> 00:01:58.785
so you get the right story.

30
00:01:59.525 --> 00:02:00.785
You know, I've, I've worried

31
00:02:00.785 --> 00:02:03.145
that we would have somebody from the media here and,

32
00:02:03.205 --> 00:02:04.945
and tweeting or doing something like that.

33
00:02:05.815 --> 00:02:06.895
I really wanna make sure

34
00:02:06.895 --> 00:02:08.975
that we keep the flight test safety workshop,

35
00:02:08.975 --> 00:02:12.775
the safe haven, where we can convince our leadership, our,

36
00:02:13.545 --> 00:02:16.565
uh, corporate lawyers and folks like that to let us come

37
00:02:16.565 --> 00:02:21.335
and share the lessons learned so that if I have an incident

38
00:02:21.395 --> 00:02:25.095
or have him forbid an accident, um,

39
00:02:26.485 --> 00:02:27.745
we can share information and,

40
00:02:27.965 --> 00:02:29.625
and prevent that from happening to somebody else.

41
00:02:30.595 --> 00:02:33.655
Um, it, it's near and dear to my heart,

42
00:02:33.835 --> 00:02:35.815
and it, it's at somber.

43
00:02:35.875 --> 00:02:38.615
We had, uh, Trish talk on Tuesday.

44
00:02:39.345 --> 00:02:43.215
We're gonna start off with an a mishap that was fatal today.

45
00:02:43.865 --> 00:02:47.485
Um, I want to try and lighten it up a little bit

46
00:02:47.485 --> 00:02:50.845
because, uh, Han's money, uh, book Walter, um,

47
00:02:51.875 --> 00:02:54.165
there's something wrong with his risk assessment

48
00:02:54.165 --> 00:02:56.205
because in his spare time,

49
00:02:56.605 --> 00:02:59.965
'cause flight testing isn't, uh, exciting enough, he goes

50
00:02:59.985 --> 00:03:04.125
and does, uh, the Mexico 1000 where he takes one

51
00:03:04.125 --> 00:03:07.005
of those Polaris, uh, SUV vehicles.

52
00:03:07.265 --> 00:03:10.045
And, uh, I was told it broke down 40 miles

53
00:03:10.055 --> 00:03:11.125
short of the finish line.

54
00:03:11.145 --> 00:03:12.765

So he had to get towed out by a local.

55
00:03:13.585 --> 00:03:14.995
He's gonna give us a presentation.

56
00:03:15.375 --> 00:03:18.875
And again, in the spirit of the safety workshop,

57
00:03:20.325 --> 00:03:23.115
let's do things right, not take things outta context.

58
00:03:23.965 --> 00:03:26.345
If you need to get in touch with money and,

59
00:03:26.485 --> 00:03:28.185
and get the straight scoop

60
00:03:28.925 --> 00:03:32.225
and know what you can tell your teams and everybody else.

61
00:03:32.805 --> 00:03:37.265
And he just two nights ago, got permission to present this.

62
00:03:37.955 --> 00:03:39.145
Let's not jeopardize that.

63
00:03:39.145 --> 00:03:40.945
And let's thank him for coming here

64
00:03:41.085 --> 00:03:43.865
to talk about a tough subject, Hans stages your,

65
00:03:55.675 --> 00:03:56.675
Well, good morning.

66
00:03:56.695 --> 00:03:58.565
Thank you very much for the opportunity to, uh,

67
00:03:58.565 --> 00:03:59.605
let me speak to you this morning.

68
00:03:59.985 --> 00:04:01.445
I'm Hans Buckwalter. I'm the commander

69
00:04:01.445 --> 00:04:04.365
of the 5 86 Flight Test Squadron at Alman Air Force Base.

70
00:04:05.755 --> 00:04:07.335
And the longer that I'm in this business, the longer

71
00:04:07.335 --> 00:04:09.175
that I'm involved in aviation and flight test.

72
00:04:09.895 --> 00:04:11.975
I think one of the things I appreciate most is forms like

73
00:04:11.975 --> 00:04:14.725
this, where there's something that, that you don't, you,

74
00:04:14.725 --> 00:04:15.965
you may know that I don't know,

75
00:04:16.185 --> 00:04:17.245
but you're willing to share with me.

76
00:04:18.405 --> 00:04:20.025
And same here. So there's something that, uh,

77
00:04:20.025 --> 00:04:21.945
that we learned here, and hopefully I can share that

78
00:04:21.945 --> 00:04:24.025
with you and we can all be safer as a result.

79
00:04:24.205 --> 00:04:26.305
Uh, we're in this together as, uh, as test professionals.

80
00:04:26.645 --> 00:04:28.665
And so that's the spirit that I'm gonna present this, uh,

81
00:04:28.805 --> 00:04:31.885

in Today, I'll be presenting on an H one M mishap

82
00:04:31.885 --> 00:04:34.205
that we had last summer, uh, at Holman Air Force Base.

83
00:04:34.305 --> 00:04:36.165
Uh, we lost an airplane, we lost a, uh, pilot.

84
00:04:36.665 --> 00:04:40.495
And so what I'm gonna do is provide a little bit

85
00:04:40.495 --> 00:04:42.775
of background, you know, exactly, uh, the context

86
00:04:42.835 --> 00:04:44.255
of the situation, just enough so

87
00:04:44.255 --> 00:04:46.255
that you understand the programmatics that went into

88
00:04:46.445 --> 00:04:48.375
what we were doing that day, uh, in New Mexico.

89
00:04:50.295 --> 00:04:51.785
Give you a little bit of background. We'll talk about a

90
00:04:51.785 --> 00:04:53.345
couple definitions just to all get on the same page.

91
00:04:53.345 --> 00:04:54.345
And I'm gonna go through the sequence

92
00:04:54.605 --> 00:04:55.945
and just like we learned yesterday, I'm gonna do my

93
00:04:55.945 --> 00:04:56.985
best to, uh, just tell the story.

94
00:04:57.125 --> 00:04:58.625
I'm gonna ask you to kind of dive in with me,

95
00:04:58.645 --> 00:04:59.945
put yourself in that situation.

96
00:05:00.075 --> 00:05:02.465
We're gonna go through those 28 seconds, uh, from release

97
00:05:02.485 --> 00:05:03.585
to, uh, aircraft Impact.

98
00:05:03.675 --> 00:05:05.665
We'll talk through that. And then at the

99
00:05:05.665 --> 00:05:06.745
end, I'm gonna ask you to participate.

100
00:05:06.775 --> 00:05:08.785
This is a workshop. Uh, I'm not gonna ask you

101
00:05:08.785 --> 00:05:10.785
to say anything, but we're gonna talk about those human

102
00:05:10.785 --> 00:05:12.385
factors that were identified in the report.

103
00:05:12.565 --> 00:05:13.665
And I'm gonna ask you to think about how

104
00:05:13.665 --> 00:05:14.825
those apply maybe to your program.

105
00:05:15.565 --> 00:05:18.825
I'm confident that none of your most likely a 29 testers,

106
00:05:19.205 --> 00:05:20.745
but you still have programs that I think

107
00:05:20.745 --> 00:05:21.865
can learn from these human factors.

108
00:05:22.005 --> 00:05:23.065

So that's what we're going to, uh,

109
00:05:23.065 --> 00:05:24.065
do here over the next few minutes.

110
00:05:24.165 --> 00:05:27.865
Mm-hmm. Alright.

111
00:05:27.865 --> 00:05:29.225
Diving right into the, uh, background,

112
00:05:29.645 --> 00:05:31.025
the light attack experiment.

113
00:05:31.445 --> 00:05:33.345
Um, some of you may have heard of it, some may not.

114
00:05:33.865 --> 00:05:35.925
Uh, the start of this was in 2017,

115
00:05:36.265 --> 00:05:39.005
the Air Force Research Laboratory was tasked with looking at

116
00:05:39.525 --> 00:05:41.415
solutions that may exist in industry,

117
00:05:41.415 --> 00:05:43.775
commercial office shelf solutions,

118
00:05:44.315 --> 00:05:46.455
how we can take those non developmental platforms

119
00:05:46.595 --> 00:05:48.815
and potentially apply that to the light attack mission.

120
00:05:49.075 --> 00:05:50.375
Uh, think close air support.

121
00:05:50.815 --> 00:05:52.555
So how can we take what our existing industry

122
00:05:52.735 --> 00:05:54.715
and then leverage that for the benefit of the war fighter?

123
00:05:54.935 --> 00:05:59.305
Uh, in that light attack mission set, that first experiment,

124
00:05:59.305 --> 00:06:00.825
we just called it the lat attack experiment.

125
00:06:00.885 --> 00:06:03.025
We now call it phase one because there was a phase two,

126
00:06:03.165 --> 00:06:05.185
but it was just the lat attack experiment at the time.

127
00:06:05.575 --> 00:06:06.985
That was August of 2017,

128
00:06:07.605 --> 00:06:09.585
and there were four aircraft, the, uh, air tractor,

129
00:06:10.005 --> 00:06:12.345
the scorpion, the a T six and the A 29.

130
00:06:12.805 --> 00:06:14.695
So those four aircraft were brought

131
00:06:14.695 --> 00:06:15.695
to a Holman Air Force base

132
00:06:15.715 --> 00:06:18.215
and the executed at, uh, in August of 2017.

133
00:06:18.935 --> 00:06:20.955
And they were assessing the capability of those platforms

134
00:06:20.975 --> 00:06:23.635
as they existed in their current state to provide, uh,

135
00:06:23.755 --> 00:06:26.275

a closer air support, uh, advantage for our war fighters.

136
00:06:28.055 --> 00:06:29.425
That led to what, uh, became known

137
00:06:29.425 --> 00:06:30.985
as the lie attack experiment, phase two.

138
00:06:31.645 --> 00:06:33.505
So phase two is where I, uh, got involved.

139
00:06:34.275 --> 00:06:35.535
The decision was made to move forward,

140
00:06:35.565 --> 00:06:36.455
look at a few different things

141
00:06:36.455 --> 00:06:37.575
with that phase of the experiment.

142
00:06:37.715 --> 00:06:40.135
And so in the spring of 2018, I was the chief of safety

143
00:06:40.155 --> 00:06:42.295
for the seven oh fourth test group at Halman Air Force Base.

144
00:06:43.575 --> 00:06:44.595
Uh, and the decision was made.

145
00:06:44.595 --> 00:06:45.435
They were gonna bring the Li Tac

146
00:06:45.435 --> 00:06:46.755
experiment, phase two to Halman.

147
00:06:46.765 --> 00:06:48.395
There were discussions about taking it elsewhere,

148
00:06:48.395 --> 00:06:49.755
but ultimately the decision was to bring it

149
00:06:49.755 --> 00:06:50.755
to Halman Air Force base.

150
00:06:52.315 --> 00:06:53.415
Now, this was gonna be two aircraft,

151
00:06:53.435 --> 00:06:54.775
the a t six and the A 29.

152
00:06:55.275 --> 00:06:57.695
And the difference between the second phase was they we're

153
00:06:57.695 --> 00:07:00.135
gonna be, was thinking, uh, we're gonna bring in maintainers

154
00:07:00.135 --> 00:07:03.095
and we're gonna look at the maintainability, reliability,

155
00:07:03.095 --> 00:07:04.575
sustainability, logistics,

156
00:07:04.835 --> 00:07:07.575
all those factors then feed into an actual fielded platform.

157
00:07:07.575 --> 00:07:08.935
So that was really the focus of the second

158
00:07:09.185 --> 00:07:10.775
experiment, was to look at those factors.

159
00:07:12.725 --> 00:07:14.465
Two airplanes, uh, we'll be in flying on the, uh,

160
00:07:14.465 --> 00:07:15.625
7th of May, 2018.

161
00:07:16.575 --> 00:07:18.115
Uh, in middle of June, I took command

162
00:07:18.115 --> 00:07:19.435

of the five a six flight test squadron.

163
00:07:19.435 --> 00:07:21.715
So I moved from the chief of safety to the, uh, commander,

164
00:07:21.735 --> 00:07:23.515
uh, of that squadron that was executing this.

165
00:07:23.815 --> 00:07:25.915
And then on, uh, my 10th day of command, uh, I get

166
00:07:25.915 --> 00:07:26.995
that knock on the, uh, the door.

167
00:07:27.135 --> 00:07:28.875
And some of you have, uh, been in that position.

168
00:07:28.875 --> 00:07:30.355
You've gotten that knock on your door from your,

169
00:07:30.545 --> 00:07:32.235
your senior enlisted member, your superintendent,

170
00:07:32.235 --> 00:07:33.235
perhaps like it was from me.

171
00:07:33.585 --> 00:07:35.395
They said, Hey, boss, uh, we've got an airplane down.

172
00:07:35.715 --> 00:07:37.035
I think we only have one parachute.

173
00:07:38.845 --> 00:07:40.185
So immediately the, uh, things

174
00:07:40.185 --> 00:07:41.345
that we talked about on Tuesday, right?

175
00:07:41.345 --> 00:07:43.145
Emergency action plan, that was,

176
00:07:43.145 --> 00:07:44.345
that, that's exactly what we did.

177
00:07:44.445 --> 00:07:47.255
And so I grabbed my superintendent, grabbed my, uh,

178
00:07:47.335 --> 00:07:50.095
squadron, uh, safety officer, and we grabbed our checklist.

179
00:07:50.685 --> 00:07:53.505
And, and the checklist wasn't, it wasn't dust covered, uh,

180
00:07:53.505 --> 00:07:55.825
in the corner with pages, you know, stuck together.

181
00:07:56.125 --> 00:07:58.345
We, we were ready to go. We, we knew where it was.

182
00:07:58.365 --> 00:08:00.195
We know what to do. Uh,

183
00:08:00.195 --> 00:08:01.955
and despite the, uh, the tragedy of the situation,

184
00:08:01.995 --> 00:08:04.035
I couldn't be more proud to how my team responded that day.

185
00:08:04.255 --> 00:08:06.235
Uh, an excellent response from the, uh, the squadron.

186
00:08:08.415 --> 00:08:09.595
So in the, uh, minutes, uh,

187
00:08:09.595 --> 00:08:10.955
and hours that followed, we determined that yes,

188
00:08:10.955 --> 00:08:12.235
we hadn't fast lost an aircraft.

189
00:08:12.335 --> 00:08:13.795

Uh, there was one successful ejection,

190
00:08:13.795 --> 00:08:15.795
and we had lost, uh, a pilot, uh,

191
00:08:15.825 --> 00:08:17.395
fatally injured in that mishap.

192
00:08:20.195 --> 00:08:21.435
A little bit more about the, uh, the crew,

193
00:08:21.855 --> 00:08:22.915
uh, two place crew.

194
00:08:23.055 --> 00:08:25.035
You have a, uh, pilot and a WSO in that airplane.

195
00:08:25.215 --> 00:08:27.115
The, uh, front seat was a naval aviator, uh,

196
00:08:27.115 --> 00:08:28.515
primarily an F 18 background.

197
00:08:28.515 --> 00:08:30.475
He had over a thousand hours in that airplane, uh,

198
00:08:30.475 --> 00:08:33.275
1600 hours total, highly experienced, uh,

199
00:08:33.385 --> 00:08:35.225
yet relatively inexperienced in the HY nine.

200
00:08:35.875 --> 00:08:38.655
So he had 11 hours, uh, in the H 29.

201
00:08:38.655 --> 00:08:40.575
This was his seventh flight. It was his first

202
00:08:40.575 --> 00:08:41.655
flight without an instructor.

203
00:08:42.075 --> 00:08:43.655
So they'd gone through the approved training syllabus,

204
00:08:43.795 --> 00:08:45.015
they'd accomplished a check ride.

205
00:08:45.125 --> 00:08:48.205
This is their first flight after, uh, that check ride.

206
00:08:49.565 --> 00:08:50.895
Same for the, uh, weapon system officer.

207
00:08:51.155 --> 00:08:52.895
Uh, he's a highly experienced, uh, uh,

208
00:08:53.095 --> 00:08:55.525
aviator over 3000 hours in the special ops ops community.

209
00:08:55.675 --> 00:08:57.765
Primarily, U 28 was his platform.

210
00:08:58.955 --> 00:09:00.255
So experience, but it's worth noting

211
00:09:00.255 --> 00:09:01.415
that this is only his fifth flight

212
00:09:01.555 --> 00:09:02.735
in an ejection seat aircraft.

213
00:09:02.835 --> 00:09:05.015
Uh, U 20 eight's, not ejection seat equipped.

214
00:09:05.275 --> 00:09:07.015
So despite those hours, uh,

215
00:09:07.085 --> 00:09:09.255
he's not experienced in ejection seat operations.

216
00:09:09.255 --> 00:09:11.375

And that'll be a factor, uh, here at Lake, ultimately,

217
00:09:12.045 --> 00:09:13.395
again, first flight after his check ride,

218
00:09:13.395 --> 00:09:14.515
first flight without an ip.

219
00:09:17.645 --> 00:09:19.015
Alright, third game plan that day,

220
00:09:19.315 --> 00:09:21.775
it was a continuation training mission, uh, post check ride,

221
00:09:21.775 --> 00:09:22.895
as I mentioned, as they were going out

222
00:09:22.895 --> 00:09:25.135
to the Red Rio bombing range to execute,

223
00:09:25.135 --> 00:09:26.375
uh, practice weapon deliveries.

224
00:09:26.725 --> 00:09:29.495
They had two GB twelves, so inert 500 pound weapons.

225
00:09:29.495 --> 00:09:31.375
They had rockets, they had gun, uh,

226
00:09:31.375 --> 00:09:32.695
and they were going out the day to,

227
00:09:32.695 --> 00:09:34.135
they weren't being evaluated, the

228
00:09:34.295 --> 00:09:35.455
airplane wasn't being evaluated.

229
00:09:35.605 --> 00:09:37.975
They were just going out to execute, uh, practice deliveries

230
00:09:37.975 --> 00:09:39.815
to ultimately evaluate that airplane.

231
00:09:39.815 --> 00:09:43.375
On future sorties. First sort is gonna be a level release.

232
00:09:43.445 --> 00:09:44.775
It's gonna be a GB 12, uh,

233
00:09:44.825 --> 00:09:46.615
inert off the left wing of 500 pound weapon.

234
00:09:46.845 --> 00:09:49.295
They plan to do a one a right 180 degree turn,

235
00:09:49.595 --> 00:09:51.375
and then lays at their six o'clock.

236
00:09:51.395 --> 00:09:53.695
So turn away from the target and then use the, um,

237
00:09:53.925 --> 00:09:56.775
targeting sensor to provide laser energy on the target

238
00:09:57.195 --> 00:10:01.005
to guide the weapon into the, uh, in fact, impact, uh,

239
00:10:01.005 --> 00:10:02.165
wind is basically nominal that day.

240
00:10:02.165 --> 00:10:04.845
It's 35 degrees. Uh, winds are calm, sky's clear.

241
00:10:05.065 --> 00:10:06.605
Uh, really nothing to much note there.

242
00:10:10.375 --> 00:10:11.995
Now, an overview of the, uh, mishap sequence.

243
00:10:12.135 --> 00:10:13.195

Uh, and then I'm gonna take you

244
00:10:13.195 --> 00:10:14.355
through the story in a lot more detail

245
00:10:14.355 --> 00:10:15.515
here in a, in a few slides.

246
00:10:15.575 --> 00:10:18.275
But big picture, uh, eight days prior to the mishap,

247
00:10:18.415 --> 00:10:19.915
the a t six crew had gone out

248
00:10:19.915 --> 00:10:21.875
and done exactly what I just described, release a weapon,

249
00:10:21.875 --> 00:10:24.675
turn 180 degrees, uh, lays out the, uh, back of the aircraft

250
00:10:24.775 --> 00:10:26.275
to, uh, to guide a weapon to the target.

251
00:10:27.155 --> 00:10:29.415
Now, those 17 air crew that we had here were split

252
00:10:29.415 --> 00:10:30.855
between the a T six and a 29.

253
00:10:30.955 --> 00:10:33.055
So we assigned 'em to one or the other, uh,

254
00:10:33.055 --> 00:10:34.375
but they were working, uh, together,

255
00:10:34.375 --> 00:10:36.375
and that's where this idea originated.

256
00:10:38.165 --> 00:10:40.705
One day prior, the sort was changed from an evaluation sort

257
00:10:41.165 --> 00:10:43.225
to a continuation training sort.

258
00:10:43.365 --> 00:10:45.465
So originally this was gonna be an OT sort, kind

259
00:10:45.465 --> 00:10:47.785
of evaluating the airplane operational test.

260
00:10:48.325 --> 00:10:49.185
Uh, but it's changed to

261
00:10:49.185 --> 00:10:50.345
continuation training, as I mentioned.

262
00:10:50.365 --> 00:10:53.185
So, uh, nothing graded, uh, either aircrew or

263
00:10:53.525 --> 00:10:56.545
or aircraft on this mission at this point.

264
00:10:56.545 --> 00:10:57.545
The, uh, day prior, they plan

265
00:10:57.545 --> 00:10:59.745
to do this 180 degree maneuver for their first release.

266
00:10:59.745 --> 00:11:01.705
They're gonna drop the GB 12 off the left wing,

267
00:11:01.705 --> 00:11:03.845
and they're gonna turn right and

268
00:11:03.845 --> 00:11:04.925
then guide that weapon to the target.

269
00:11:06.415 --> 00:11:09.155
So prior to release, uh, generally nominal, so the,

270
00:11:09.255 --> 00:11:13.825

the briefing step, life support, start, taxi,

271
00:11:13.895 --> 00:11:16.665
takeoff, uh, all those things are generally nominal, uh,

272
00:11:16.665 --> 00:11:18.025
perhaps a little bit slower than they would've been

273
00:11:18.025 --> 00:11:19.025
with the more experienced crew.

274
00:11:19.325 --> 00:11:21.465
But, uh, but generally nominal up to, uh, to that point,

275
00:11:22.775 --> 00:11:24.345
they fly north from Holman Air Force Base.

276
00:11:24.345 --> 00:11:26.505
They go from Holman to the red re bombing range.

277
00:11:27.155 --> 00:11:28.805
They climb above their plan release altitude,

278
00:11:28.805 --> 00:11:30.045
then they bunt over to pick up speed.

279
00:11:30.265 --> 00:11:32.245
Uh, for this, this release, uh, at this point,

280
00:11:32.245 --> 00:11:36.275
everything is going generally as planned at release.

281
00:11:36.385 --> 00:11:37.715
They, uh, release the, uh, left weapon.

282
00:11:37.715 --> 00:11:39.755
They roll right into the, uh, heavy wing as I mentioned,

283
00:11:39.935 --> 00:11:41.835
and then one second later, they're gonna start their first

284
00:11:41.975 --> 00:11:43.155
of the four recovery attempts.

285
00:11:43.155 --> 00:11:45.375
They're gonna make, the airplane's gonna rotate, uh,

286
00:11:45.375 --> 00:11:46.495
to the right more than they expect.

287
00:11:46.755 --> 00:11:48.655
Uh, and I'll talk through that sequence along with, uh,

288
00:11:48.655 --> 00:11:49.655
some control service deflections.

289
00:11:50.035 --> 00:11:51.965
So they roll, right? They attempt to, uh,

290
00:11:51.965 --> 00:11:53.485
to recover six seconds after release.

291
00:11:53.485 --> 00:11:55.405
They're inverted. They're seven degrees nose low.

292
00:11:55.405 --> 00:11:57.605
They're established in a, uh, spiral dive.

293
00:11:58.385 --> 00:11:59.725
22 seconds after release.

294
00:11:59.725 --> 00:12:01.565
The, uh, WSO pulls his ejection handle.

295
00:12:01.875 --> 00:12:03.125
There's no bailout call.

296
00:12:03.465 --> 00:12:04.565
Uh, there's no coordination,

297
00:12:04.625 --> 00:12:06.565

and they're in the single mode of the ejection seat,

298
00:12:06.695 --> 00:12:08.005
which means each person has

299
00:12:08.005 --> 00:12:09.245
to individually pull their ejection handle.

300
00:12:09.665 --> 00:12:12.475
So he does that via wso, successfully,

301
00:12:12.655 --> 00:12:13.835
uh, ejects from the aircraft.

302
00:12:13.835 --> 00:12:14.915
He does have minor injuries,

303
00:12:15.055 --> 00:12:16.595
but that is a successful ejection.

304
00:12:17.525 --> 00:12:19.585
And then 28 seconds after that, uh, that release,

305
00:12:19.585 --> 00:12:21.185
the air packed, uh, aircraft,

306
00:12:21.185 --> 00:12:22.465
impacts the terrain interrupting

307
00:12:22.465 --> 00:12:23.545
the pilot's ejection sequence.

308
00:12:24.485 --> 00:12:25.865
Uh, he's failing injured at that point.

309
00:12:25.865 --> 00:12:26.985
And we'll talk through that in more detail.

310
00:12:27.995 --> 00:12:30.895
Alright, two definitions

311
00:12:30.895 --> 00:12:32.855
before we kinda tell the story of those 28 seconds.

312
00:12:33.835 --> 00:12:38.435
So, spiral versus spin spiral live, um, is characters

313
00:12:38.435 --> 00:12:41.235
by nose low, uh, upset, uh, attitude there, according

314
00:12:41.235 --> 00:12:44.555
to the FA, A, it's a descending turn increasing g increasing

315
00:12:44.555 --> 00:12:46.915
airspeed increasing, uh, roll rate to, uh,

316
00:12:46.915 --> 00:12:50.725
to summarize there, quickly spin, uh, again, not

317
00:12:50.725 --> 00:12:52.165
to insult anyone's intelligence,

318
00:12:52.165 --> 00:12:55.405
but, uh, where installed conditions aggravated, the, uh,

319
00:12:55.405 --> 00:12:57.445
outside wing is less stall than the, uh, inside wing,

320
00:12:57.505 --> 00:12:59.445
but it's, uh, characterized by a descending turn

321
00:12:59.445 --> 00:13:00.565
around a vertical access.

322
00:13:00.705 --> 00:13:05.085
And again, it's a stall. Alright,

323
00:13:05.085 --> 00:13:07.085
just one more note on the ejection seat sequencing.

324
00:13:07.345 --> 00:13:10.085

Uh, this is an excerpt from the, uh, tech board guidance

325
00:13:10.085 --> 00:13:11.805
that was current at the time of the, uh, the mishap.

326
00:13:12.225 --> 00:13:15.695
So crews are directed both by instruction, you know,

327
00:13:15.895 --> 00:13:17.575
instruction through the training syllabus, as well

328
00:13:17.575 --> 00:13:21.315
as the tech order directs the crews to fly in single mode,

329
00:13:21.605 --> 00:13:23.155
which again, means each crew member has

330
00:13:23.155 --> 00:13:24.435
to individually pull their ejection handle.

331
00:13:24.435 --> 00:13:26.675
There's no automatic sequencing between the seats.

332
00:13:27.175 --> 00:13:28.035
And I'll talk about why.

333
00:13:33.295 --> 00:13:35.745
Alright, so the next few slides,

334
00:13:35.745 --> 00:13:37.745
what I'm gonna do is my best to, uh, to tell the story.

335
00:13:38.085 --> 00:13:40.185
And so I'd ask that you just try to do your best to kind

336
00:13:40.185 --> 00:13:41.185
of put yourself in the situation.

337
00:13:41.245 --> 00:13:44.145
You know, what, what's the air crew thinking, feeling,

338
00:13:44.295 --> 00:13:46.145
hearing, hearing, you know, what's

339
00:13:46.145 --> 00:13:47.545
that situation like for these 28 seconds?

340
00:13:47.705 --> 00:13:49.345
I want you to put yourself as best you can in

341
00:13:49.345 --> 00:13:50.545
that situation as we go through this.

342
00:13:50.805 --> 00:13:53.525
So here we go.

343
00:13:53.865 --> 00:13:55.525
GB 12, uh, released from the left wing,

344
00:13:55.525 --> 00:13:57.325
they're just under 16,000 feet.

345
00:13:57.525 --> 00:14:02.035
MSL just under 10,000 feet, A GL. They're at 166 knots.

346
00:14:02.035 --> 00:14:03.595
They're slower than the Plange 210,

347
00:14:03.935 --> 00:14:05.035
but they, uh, released the, uh,

348
00:14:05.135 --> 00:14:06.755
GB 12 off the, uh, the left hand side.

349
00:14:07.965 --> 00:14:09.185
At this point, there's a single GB

350
00:14:09.185 --> 00:14:10.265
12 remaining on the right side.

351
00:14:10.495 --> 00:14:11.665

It's a 500 pound bomb.

352
00:14:12.245 --> 00:14:15.465
Uh, and for those, uh, who have released these, probably out

353
00:14:15.465 --> 00:14:17.025
of a B 52, you can barely feel, feel it.

354
00:14:17.025 --> 00:14:19.665
I imagine I've never dropped a a 500 pounder out of a, out

355
00:14:19.665 --> 00:14:21.705
of a beef or two, but I bet you probably can't feel it,

356
00:14:21.925 --> 00:14:23.465
but you can feel it on one of these airplanes.

357
00:14:23.465 --> 00:14:24.545
It's a, it's a light airplane.

358
00:14:24.565 --> 00:14:27.945
So a 500 pound, uh, store is a significant, um,

359
00:14:28.455 --> 00:14:30.025
asymmetry that's created there instantly.

360
00:14:31.445 --> 00:14:33.415
This is that release. Um,

361
00:14:34.235 --> 00:14:35.695
and I'm sorry for the, uh, control surfaces,

362
00:14:35.695 --> 00:14:38.875
you can see on the left side sticks, basically neutral, uh,

363
00:14:38.875 --> 00:14:40.835
neutral elevator, neutral aileron, uh,

364
00:14:40.835 --> 00:14:41.875
slide 'em outta right rudder.

365
00:14:42.255 --> 00:14:43.595
On the right side, you can see the, uh,

366
00:14:43.595 --> 00:14:45.195
pilot's inputs after release.

367
00:14:45.495 --> 00:14:48.795
So right aileron, uh, back stick pressure to, uh, to start

368
00:14:48.795 --> 00:14:50.595
that turn and then increasing right rudder.

369
00:14:55.225 --> 00:14:57.605
One second. After release, the, uh, crew has just released,

370
00:14:57.605 --> 00:14:58.845
they've started that right hand turn.

371
00:14:59.265 --> 00:15:01.885
Uh, and immediately they, uh, command the first

372
00:15:01.945 --> 00:15:03.285
of four recovery attempts.

373
00:15:04.025 --> 00:15:05.125
So why is a crew attempting

374
00:15:05.125 --> 00:15:06.645
to recover one second after release?

375
00:15:06.905 --> 00:15:08.125
And, and there's really three reasons.

376
00:15:08.585 --> 00:15:10.815
So, first of all, we, uh, said

377
00:15:10.815 --> 00:15:11.735
that there was a 500 pound

378
00:15:11.735 --> 00:15:12.735

weapon released off the right side.

379
00:15:12.925 --> 00:15:15.375
That asymmetry is gonna cause the left wing to rise,

380
00:15:15.395 --> 00:15:16.575
and it's gonna cause that right rolling

381
00:15:16.855 --> 00:15:17.895
tendency, uh, right off the bat.

382
00:15:18.195 --> 00:15:20.255
So the airplane's naturally gonna want to roll, right,

383
00:15:20.255 --> 00:15:21.935
because it's now, it's, uh, right wing heavy.

384
00:15:23.085 --> 00:15:24.265
The pilot commanded a right roll.

385
00:15:24.265 --> 00:15:26.145
So we put in a right, a on you put in a right rudder,

386
00:15:26.145 --> 00:15:27.745
those are obviously gonna turn the airplane to the right.

387
00:15:28.205 --> 00:15:29.665
And then the third factor is as the,

388
00:15:29.665 --> 00:15:30.745
applies the back stake pressure.

389
00:15:31.005 --> 00:15:32.745
And now you have asymmetrically loaded aircraft.

390
00:15:32.805 --> 00:15:35.265
So you have a 500 pound, uh, store on the right wing

391
00:15:35.265 --> 00:15:36.265
that you don't have on the left wing.

392
00:15:36.265 --> 00:15:37.305
So as you pull back on the stick,

393
00:15:37.305 --> 00:15:38.745
the left wing is naturally gonna rise more.

394
00:15:38.885 --> 00:15:40.545
And that's gonna be the third factor that's gonna create

395
00:15:40.545 --> 00:15:42.345
that right rolling tendency.

396
00:15:43.875 --> 00:15:46.415
So these three factors result in, uh, more right roll, uh,

397
00:15:46.415 --> 00:15:48.175
and further nose load than the aircraft expected.

398
00:15:48.275 --> 00:15:50.575
And so they're immediately start, uh, a recovery attempt.

399
00:15:51.245 --> 00:15:54.465
And we do that here with the, uh, full left aileron input.

400
00:15:54.605 --> 00:15:56.665
You notice that the, uh, right rudder though is still in.

401
00:15:57.165 --> 00:15:59.145
And then you can, uh, notice just barely it's, you know,

402
00:15:59.145 --> 00:16:00.145
blue on a black background.

403
00:16:00.245 --> 00:16:02.825
But you can see that the elevator is apt of neutral.

404
00:16:03.205 --> 00:16:05.905
And the reason why is the aircraft is trimmed for 122 knots.

405
00:16:07.145 --> 00:16:08.525

So the release was 166.

406
00:16:08.525 --> 00:16:10.325
The aircraft is still trimmed for 122.

407
00:16:10.625 --> 00:16:12.005
And so when you, uh, if you were

408
00:16:12.005 --> 00:16:14.925
to release the stick in the situation, the neutral,

409
00:16:15.065 --> 00:16:16.085
if you will, uh,

410
00:16:16.085 --> 00:16:17.685
stick position is actually gonna be active neutral,

411
00:16:17.685 --> 00:16:19.685
because aircraft is trimmed for 122 knots.

412
00:16:20.345 --> 00:16:22.805
So, pilots, uh, perhaps had the, uh, stick centered with,

413
00:16:22.805 --> 00:16:25.485
uh, left aileron, but what that's doing is left aileron,

414
00:16:25.485 --> 00:16:26.845
but also it's pulling back on the stick

415
00:16:26.945 --> 00:16:29.805
as the airplane airplane, uh, searches for 122 knots.

416
00:16:30.885 --> 00:16:33.105
So you have one left, uh, rolling command with the aileron.

417
00:16:33.105 --> 00:16:35.065
You have two right rolling commands with a right rudder

418
00:16:35.065 --> 00:16:36.305
as well as the, uh, the app stick.

419
00:16:36.645 --> 00:16:38.865
And as a result, the recovery attempt is unsuccessful

420
00:16:42.005 --> 00:16:43.115
three seconds after release.

421
00:16:43.175 --> 00:16:45.275
So we're now at, uh, 128 degrees angled bank,

422
00:16:45.275 --> 00:16:47.035
as depicted here, 30 degrees nose low.

423
00:16:47.335 --> 00:16:48.555
And the pilot reduced the throttle

424
00:16:48.555 --> 00:16:49.795
to the, uh, full forward setting.

425
00:16:49.795 --> 00:16:52.915
He reduces that to, uh, to midrange at the aircraft pitches,

426
00:16:52.915 --> 00:16:56.275
nose down six seconds

427
00:16:56.275 --> 00:16:58.915
after release, the aircraft is as pictured, it's inverted.

428
00:16:58.915 --> 00:17:00.355
They're 70 degrees, no low at this point.

429
00:17:00.355 --> 00:17:01.995
They're in an uncontrolled spiral dive.

430
00:17:02.375 --> 00:17:03.395
And so what we said was that

431
00:17:03.585 --> 00:17:05.675
that spiral dive is gonna be characters by characterized

432
00:17:05.675 --> 00:17:06.555

by increasing roll rates,

433
00:17:06.555 --> 00:17:08.155
increasing Gs, increasing air speeded.

434
00:17:08.155 --> 00:17:09.875
That's what we expect, uh, from a spiral dive.

435
00:17:12.315 --> 00:17:14.495
Now, eight seconds after release, they've accelerated

436
00:17:14.495 --> 00:17:15.495
to 181 knots.

437
00:17:15.495 --> 00:17:18.575
They're passing 9,200 feet A GL at this point.

438
00:17:18.595 --> 00:17:20.895
Uh, they hear the over G tone in their headsets.

439
00:17:20.895 --> 00:17:24.095
So passing three G's over G over G as the aircraft continues

440
00:17:24.095 --> 00:17:25.655
to increase in air speed and increase in G

441
00:17:25.835 --> 00:17:28.605
and increase in roll rate, at this point,

442
00:17:28.605 --> 00:17:30.325
the crew makes their second of four recovery attempts.

443
00:17:30.325 --> 00:17:31.605
It's a left aileron input.

444
00:17:31.865 --> 00:17:33.325
Uh, it does reduce the right role.

445
00:17:33.325 --> 00:17:34.445
It is effective in doing that,

446
00:17:34.665 --> 00:17:37.085
but it's not held for, uh, sufficient duration

447
00:17:37.345 --> 00:17:38.685
to actually affect a full recovery.

448
00:17:38.825 --> 00:17:40.605
So the airplane does start to recover,

449
00:17:40.665 --> 00:17:42.325
but those inputs are not held long enough

450
00:17:42.385 --> 00:17:44.285
to fully recover from the, uh, spiral dive.

451
00:17:44.665 --> 00:17:46.485
Uh, and therefore it's unsuccessful. Mm-hmm.

452
00:17:46.945 --> 00:17:49.405
Now, 10, 10 seconds

453
00:17:49.405 --> 00:17:51.045
after release, the crew identifies the motion

454
00:17:51.045 --> 00:17:52.205
of the aircraft as a spin.

455
00:17:52.585 --> 00:17:54.125
Uh, and for the remaining attempts, they're going

456
00:17:54.125 --> 00:17:55.725
to treat this as a spin recovery.

457
00:17:56.995 --> 00:17:58.575
The pilot reduces the throttle to idle.

458
00:17:58.575 --> 00:18:00.055
They're now passing 216 knots

459
00:18:00.055 --> 00:18:01.975

and 7,700 feet A GL

460
00:18:01.975 --> 00:18:06.975
approximately 13 seconds after release.

461
00:18:06.975 --> 00:18:09.895
The, uh, crew, uh, attempts their third of their fourth

462
00:18:10.275 --> 00:18:11.495
of their four recovery attempts.

463
00:18:12.025 --> 00:18:15.005
Uh, and we can see there is a left rudder attempt with, uh,

464
00:18:15.005 --> 00:18:16.325
generally neutral ailerons.

465
00:18:16.325 --> 00:18:18.925
And still that aft backtick pressure, uh, driven, uh,

466
00:18:19.165 --> 00:18:21.605
possibly by the fact the aircraft is trimmed for 122 knots.

467
00:18:23.105 --> 00:18:24.725
At this point, there were greater than five Gs.

468
00:18:24.945 --> 00:18:26.685
Uh, and again, this attempt is unsuccessful.

469
00:18:30.305 --> 00:18:32.445
Now, 18 seconds after release, the aircraft is,

470
00:18:33.155 --> 00:18:35.815
as you see there on the, uh, series of photos, it pits,

471
00:18:35.815 --> 00:18:36.935
it's, uh, pitched nose down.

472
00:18:37.045 --> 00:18:38.735
They're passing 5,000 feet agl,

473
00:18:38.735 --> 00:18:39.975
which is the uncontrolled ejection

474
00:18:40.095 --> 00:18:41.375
altitude directed by the tech order.

475
00:18:41.475 --> 00:18:43.575
So at 5,000 feet, uh, in the HY nine,

476
00:18:43.575 --> 00:18:45.255
if you're uncontrolled, the procedure is

477
00:18:45.255 --> 00:18:46.855
to eject from the aircraft.

478
00:18:48.165 --> 00:18:49.975
They're greater than 60 degrees nose, nose load.

479
00:18:49.975 --> 00:18:51.655
They're now at, uh, 263 knots.

480
00:18:51.795 --> 00:18:54.255
The G is at, is increasing based on the spiral dive.

481
00:18:54.255 --> 00:18:57.215
They're not, uh, 5.37 Gs and increasing.

482
00:19:00.025 --> 00:19:01.195
Alright, now, 22 seconds

483
00:19:01.195 --> 00:19:03.955
after, uh, release, the, uh, roll rate is 248 degrees.

484
00:19:03.975 --> 00:19:05.755
Ya rate is about 50 degrees per second.

485
00:19:06.105 --> 00:19:09.235
They're approaching seven Gs. They're at, uh, 6.67 gs.

486
00:19:09.335 --> 00:19:12.195

Uh, at this point, the, uh, vertical velocity is pegged.

487
00:19:12.195 --> 00:19:14.675
They're, uh, 30,000 feet per minute descent.

488
00:19:14.675 --> 00:19:15.915
That's about 500 feet per second.

489
00:19:16.255 --> 00:19:18.475
Uh, and that's situation that, uh, they found themselves in.

490
00:19:18.475 --> 00:19:20.035
Hopefully you can kinda picture yourself in that, in

491
00:19:20.035 --> 00:19:23.555
that same situation, uh, you know, you're almost seven GS is

492
00:19:23.555 --> 00:19:24.875
what you're feeling on your, uh, your body.

493
00:19:25.215 --> 00:19:26.235
Uh, air speed's increasing.

494
00:19:26.255 --> 00:19:28.275
So you're probably hearing some wind rush over the canopy.

495
00:19:28.655 --> 00:19:31.275
Uh, sun's high in the sky. This is just before noon. Local.

496
00:19:31.615 --> 00:19:33.275
Uh, so the sun's high in the sky.

497
00:19:33.275 --> 00:19:34.435
You've got reflection off the display.

498
00:19:34.435 --> 00:19:35.795
It's making it hard to see. Uh,

499
00:19:35.795 --> 00:19:37.035
and that's the situation that they're,

500
00:19:37.035 --> 00:19:39.945
that they're in at this point.

501
00:19:39.945 --> 00:19:42.025
They, uh, make the final four recovery attempts full Left

502
00:19:42.175 --> 00:19:43.585
Aron, uh, full left rudder.

503
00:19:43.605 --> 00:19:45.145
Uh, of note, that was the perception.

504
00:19:45.145 --> 00:19:47.145
The reality was about a 42% rudder deflection.

505
00:19:47.605 --> 00:19:49.385
Uh, this is a reversible flight control system.

506
00:19:49.385 --> 00:19:50.865
There's some, uh, significant loading

507
00:19:50.865 --> 00:19:51.945
on those control services.

508
00:19:52.085 --> 00:19:53.625
So, uh, the full, uh,

509
00:19:53.625 --> 00:19:55.745
rudder perception was actually only about 42%.

510
00:19:57.435 --> 00:19:58.535
Uh, and that, that, uh, fourth

511
00:19:58.555 --> 00:20:00.655
and final attempt, uh, is in fact unsuccessful.

512
00:20:01.965 --> 00:20:04.305
So at this point, you can picture yourself, uh, perhaps the,

513
00:20:04.305 --> 00:20:06.185

uh, Wizo is on his fifth sortie in his

514
00:20:06.185 --> 00:20:07.265
life, an ejection seat aircraft.

515
00:20:07.765 --> 00:20:10.065
Uh, he perceives the, uh, proximity

516
00:20:10.065 --> 00:20:11.265
of the aircraft to the ground.

517
00:20:11.525 --> 00:20:12.745
Uh, he grabs the ejection handle

518
00:20:12.745 --> 00:20:15.035
and he pulls, so he pulls the ejection handle.

519
00:20:15.375 --> 00:20:16.715
Uh, they're in single mode, so he's the

520
00:20:16.715 --> 00:20:17.755
only seat to, uh, to go.

521
00:20:17.895 --> 00:20:20.835
Uh, and he ejects from the aircraft successfully, uh,

522
00:20:20.835 --> 00:20:23.675
minor injuries, uh, but he does get a good shoot, uh,

523
00:20:23.675 --> 00:20:25.235
and does survive the, uh, the ejection

524
00:20:26.815 --> 00:20:28.235
at this point, 2,600 feet A GL.

525
00:20:28.235 --> 00:20:31.195
They're at, uh, 295 knot, 60 degrees nose low, uh,

526
00:20:31.215 --> 00:20:32.355
as I all alluded to earlier.

527
00:20:35.165 --> 00:20:36.385
Now, finally, just 28 seconds

528
00:20:36.395 --> 00:20:39.465
after, um, it was expected to be a continuation training,

529
00:20:39.815 --> 00:20:41.505
nominal release of a, uh, weapon.

530
00:20:42.045 --> 00:20:43.465
The, uh, pilot now does the same thing.

531
00:20:43.885 --> 00:20:44.985
So three to three and a half seconds

532
00:20:44.985 --> 00:20:46.465
after the WSO commanded the ejection.

533
00:20:46.465 --> 00:20:48.565
The pilot pilot, uh, pulls his ejection handle.

534
00:20:48.875 --> 00:20:50.605
He's at 700 feet, uh, a GL.

535
00:20:51.725 --> 00:20:52.825
Uh, he pulls the ejection handle,

536
00:20:52.825 --> 00:20:54.865
and that, uh, ejection sequence is interrupted.

537
00:20:54.865 --> 00:20:56.625
Uh, unfortunately by ground impact,

538
00:20:59.225 --> 00:21:01.605
he did eject about a second half prior to, uh, to impact.

539
00:21:01.825 --> 00:21:03.765
Uh, however, analysis showed that, uh, he would've needed

540
00:21:03.765 --> 00:21:05.765

to eject another second half prior to that.

541
00:21:05.985 --> 00:21:07.365
So a total of three seconds prior

542
00:21:07.365 --> 00:21:09.245
to ground impact have a reasonable chance of,

543
00:21:09.245 --> 00:21:10.525
of survival of that ejection.

544
00:21:14.185 --> 00:21:17.155
Alright, and, uh, 28 seconds, again from the, uh, picture

545
00:21:17.155 --> 00:21:19.355
that I showed you earlier of an H 29, uh, releasing weapon.

546
00:21:19.415 --> 00:21:20.555
28 seconds later.

547
00:21:20.695 --> 00:21:22.395
Uh, this is, this is what we had on the, uh,

548
00:21:22.395 --> 00:21:24.525
red re bombing range in New Mexico.

549
00:21:26.815 --> 00:21:30.975
So, In the remaining time, what I'd like to do is, uh,

550
00:21:30.975 --> 00:21:32.255
I'm gonna go through six human factors

551
00:21:32.255 --> 00:21:33.495
that were identified specifically

552
00:21:33.495 --> 00:21:34.935
by the Accident Investigation Board.

553
00:21:34.935 --> 00:21:36.295
So lemme go through those, talk

554
00:21:36.295 --> 00:21:37.495
through those in just a little bit more detail.

555
00:21:37.795 --> 00:21:39.255
Uh, and then as promised, I'm gonna come back.

556
00:21:39.275 --> 00:21:41.175
I'm gonna put up the list of all six of those human factors.

557
00:21:41.315 --> 00:21:42.895
I'm just gonna ask you, uh, in place

558
00:21:42.915 --> 00:21:44.735
to think about how those apply to you.

559
00:21:45.415 --> 00:21:46.855
I got it. You're not a 29 testers,

560
00:21:46.995 --> 00:21:48.655
but I'm pretty sure that some of these lessons learned will

561
00:21:48.655 --> 00:21:50.335
apply to, uh, to you and your programs,

562
00:21:50.355 --> 00:21:51.895
and keep you and your team safer.

563
00:21:53.575 --> 00:21:55.195
So, first, human factor number one,

564
00:21:55.195 --> 00:21:57.875
over control slash under control of the, uh, the aircraft.

565
00:21:58.365 --> 00:21:59.625
Uh, initially it was over control.

566
00:21:59.885 --> 00:22:02.225
So after the, uh, the release, there are those three factors

567
00:22:02.225 --> 00:22:04.905

that all combined, uh, with the asymmetric configuration

568
00:22:04.925 --> 00:22:06.945
to increase the right rolling rate, uh,

569
00:22:06.945 --> 00:22:08.065
beyond what the crew is expecting.

570
00:22:08.065 --> 00:22:10.265
So over control initially, and then under control.

571
00:22:10.925 --> 00:22:12.745
So each of those four recovery attempts,

572
00:22:12.965 --> 00:22:14.545
the aircraft responded as expected.

573
00:22:15.085 --> 00:22:16.945
So left aileron input, for example,

574
00:22:17.085 --> 00:22:18.385
did reduce the, uh, the right roll.

575
00:22:19.665 --> 00:22:21.915
However, uh, those control inputs were not

576
00:22:21.915 --> 00:22:23.635
of sufficient deflection in some cases,

577
00:22:24.175 --> 00:22:26.995
or duration in some cases, to fully affect the recovery.

578
00:22:27.055 --> 00:22:29.195
So under control of the aircraft, uh,

579
00:22:29.195 --> 00:22:30.555
once it had departed controlled flight,

580
00:22:30.555 --> 00:22:31.635
and it was in a spiral dive.

581
00:22:35.135 --> 00:22:36.395
Second human factor is delay

582
00:22:36.395 --> 00:22:37.595
of necessary action in this case,

583
00:22:37.875 --> 00:22:38.995
specifically the ejection sequence.

584
00:22:39.415 --> 00:22:41.155
So hopefully you can kinda picture that situation.

585
00:22:41.155 --> 00:22:42.835
You're passing 5,000 feet agl l

586
00:22:42.835 --> 00:22:44.355
but the sun's glaring off those displays.

587
00:22:44.355 --> 00:22:45.555
You have wind rush over the canopy,

588
00:22:45.555 --> 00:22:47.605
you're pinned back in your seat by the, uh,

589
00:22:47.665 --> 00:22:48.685
by the, uh, increase in G forces.

590
00:22:48.705 --> 00:22:50.365
You have high roll rates. Um,

591
00:22:51.775 --> 00:22:53.235
but the crude delayed that necessary action.

592
00:22:53.255 --> 00:22:55.315
So 5,000 feet was the time that they needed

593
00:22:55.315 --> 00:22:57.715
to eject from the aircraft, uh, in order to comply

594
00:22:57.715 --> 00:23:00.195

with the tech cord guidance and, uh, and have assurance, uh,

595
00:23:00.195 --> 00:23:02.435
or reasonable assurance of a good, uh, good parachute

596
00:23:04.265 --> 00:23:05.715
that was delayed by, uh, both crew members.

597
00:23:05.735 --> 00:23:07.755
The WSO delayed to about, uh, 2,600 feet.

598
00:23:07.815 --> 00:23:10.115
Agl l the pilot delayed to about 700 feet, uh, a GL,

599
00:23:11.455 --> 00:23:13.055
specifically with the, uh, pilot's ejection sequence.

600
00:23:13.855 --> 00:23:16.075
Uh, there was time for him to egress the aircraft.

601
00:23:16.175 --> 00:23:17.915
The, the, uh, the seat did leave the aircraft.

602
00:23:17.915 --> 00:23:19.875
There was time for a drove shoot. There was not time.

603
00:23:19.875 --> 00:23:21.275
However, for that main parachute,

604
00:23:24.995 --> 00:23:26.775
Our third human factor, wrong choice of action.

605
00:23:27.115 --> 00:23:29.875
And specifically what was called out was the, uh, decision

606
00:23:29.875 --> 00:23:32.675
to continue that right hand turn into the heavy wing

607
00:23:32.925 --> 00:23:34.955
asymmetric at a slower than planned air speed.

608
00:23:35.295 --> 00:23:36.915
So 210 knots was planned.

609
00:23:37.275 --> 00:23:39.635
166 was, is what, uh, was actually achieved.

610
00:23:40.395 --> 00:23:42.885
It's what the, uh, accident investigation board report calls

611
00:23:42.885 --> 00:23:45.245
out was the, uh, decision here to continue

612
00:23:45.245 --> 00:23:47.565
that maneuver at a slower than planned airspeed, uh,

613
00:23:47.565 --> 00:23:49.165
into the heavy wing without fully accounting

614
00:23:49.165 --> 00:23:50.445
for the, uh, symmetric stores.

615
00:23:51.265 --> 00:23:52.545
I, I think it's worth noting here. This is,

616
00:23:52.615 --> 00:23:53.905
this is in accordance with to limits.

617
00:23:53.905 --> 00:23:55.225
This is not a prohibited maneuver

618
00:23:55.225 --> 00:23:56.505
that's being done outside of that.

619
00:23:56.695 --> 00:23:58.465
This is within, uh, what's published.

620
00:23:58.885 --> 00:24:00.785
Uh, however, it's not, uh, uh,

621
00:24:00.785 --> 00:24:02.745

largely untested was the, uh, verbiage used.

622
00:24:03.005 --> 00:24:04.665
So there hadn't been a whole lot of test points done.

623
00:24:04.665 --> 00:24:07.185
Kinda these slow speeds turns, uh, in a, in an

624
00:24:07.185 --> 00:24:08.665
as asymmetric, uh, configuration.

625
00:24:10.885 --> 00:24:12.185
The other thing I would highlight here is, um,

626
00:24:12.335 --> 00:24:14.065
both wrong choice of action from the crew.

627
00:24:14.325 --> 00:24:15.505
But then what about supervision?

628
00:24:15.525 --> 00:24:17.385
What's, uh, you know, who, who else is involved

629
00:24:17.385 --> 00:24:19.725
that might be able to, uh, to, you know, maybe,

630
00:24:19.725 --> 00:24:21.765
maybe step in and help, uh, give, give the folks

631
00:24:21.765 --> 00:24:23.725
that are executing this, the, the tools

632
00:24:23.865 --> 00:24:25.325
to make the best decision possible.

633
00:24:28.855 --> 00:24:31.065
Alright, uh, another human factor is inadequate

634
00:24:31.225 --> 00:24:32.625
procedural guidance or publications.

635
00:24:33.555 --> 00:24:36.805
So the crew is flying in a single

636
00:24:36.805 --> 00:24:37.965
mode, and we talked about that earlier.

637
00:24:38.265 --> 00:24:40.685
So why were they flying a sequenced

638
00:24:40.925 --> 00:24:42.045
ejection seed combination?

639
00:24:42.045 --> 00:24:43.325
Why were they flying that in a single mode,

640
00:24:43.375 --> 00:24:44.965
which basically took away that protection

641
00:24:44.965 --> 00:24:46.165
of the automatic sequencing?

642
00:24:47.305 --> 00:24:49.445
And the reason why is because in, uh, 2014

643
00:24:49.465 --> 00:24:50.965
and earlier, there was an issue

644
00:24:50.965 --> 00:24:52.765
with the automatic sequencing in between seats.

645
00:24:52.865 --> 00:24:55.285
And so the guidance from the manufacturer at that point was

646
00:24:55.285 --> 00:24:56.365
to fly in single mode.

647
00:24:56.705 --> 00:24:57.645
So each crier was gonna have

648
00:24:57.645 --> 00:24:58.605

to pull their own injection handle.

649
00:24:58.755 --> 00:25:00.125
They were gonna have to manually sequence

650
00:25:00.125 --> 00:25:01.605
themselves, uh, one at a time.

651
00:25:02.035 --> 00:25:03.765
That was the, uh, the guidance at the time.

652
00:25:04.265 --> 00:25:05.925
But these seats were made in 2015.

653
00:25:06.265 --> 00:25:08.325
So the problem with the sequencing had been resolved.

654
00:25:08.785 --> 00:25:11.285
And so, uh, this crew flying on seats

655
00:25:11.285 --> 00:25:13.405
that were manufactured in 2015 should

656
00:25:13.405 --> 00:25:14.565
have been in a sequenced mode.

657
00:25:15.155 --> 00:25:16.805
What that would've allowed is either crew member

658
00:25:16.805 --> 00:25:18.485
to pull the ejection handle at that point,

659
00:25:18.485 --> 00:25:19.565
the back seat is gonna go first,

660
00:25:19.585 --> 00:25:21.725
and then 0.4 seconds later, the front seater, uh,

661
00:25:21.725 --> 00:25:24.355
would have ejected the, uh, conclusion of the, uh,

662
00:25:24.475 --> 00:25:26.395
accident investigation board was that, uh, in fact would've,

663
00:25:27.255 --> 00:25:29.635
uh, given the crew, uh, a reasonable chance of survival.

664
00:25:29.735 --> 00:25:31.035
So both crew members, uh,

665
00:25:31.035 --> 00:25:32.955
would've survived most likely in that scenario.

666
00:25:33.015 --> 00:25:35.075
And I'd be telling you about a aircraft mishap, uh,

667
00:25:35.075 --> 00:25:35.875
with zero fatalities

668
00:25:35.945 --> 00:25:37.355
instead of what I'm telling you about today.

669
00:25:41.015 --> 00:25:43.115
So the, uh, the situation at the time, uh,

670
00:25:43.115 --> 00:25:44.355
was the 8 29 fleet was divided.

671
00:25:44.355 --> 00:25:46.675
Some seats were the 2014 earlier version.

672
00:25:46.675 --> 00:25:49.315
Some seats were the 2015, uh, and earlier version.

673
00:25:49.445 --> 00:25:51.395
There was no operational bulletin that had been released

674
00:25:51.665 --> 00:25:53.835
that, uh, that basically, you know, kind of cleared the,

675
00:25:53.855 --> 00:25:55.675

the fleet for split ops, if you will, you know, some

676
00:25:55.675 --> 00:25:57.995
to fly in single, some to fly in that, uh, that dual mode,

677
00:25:58.175 --> 00:25:59.275
uh, that had not happened.

678
00:25:59.575 --> 00:26:01.595
So the fact was the entire fleet, uh,

679
00:26:01.605 --> 00:26:03.205
was directed to fly in the single mode.

680
00:26:03.205 --> 00:26:05.045
And the crews, they were executing

681
00:26:05.045 --> 00:26:06.085
in accordance with what they've been taught.

682
00:26:06.225 --> 00:26:08.005
So they were applying, complying with tech orders.

683
00:26:08.005 --> 00:26:09.885
They were complying with the, what they had been taught

684
00:26:09.885 --> 00:26:11.165
by their instructors, uh,

685
00:26:11.165 --> 00:26:14.125
however, that, uh, in hindsight was not necessary.

686
00:26:16.865 --> 00:26:18.675
There's a few more human factors here, fixation.

687
00:26:18.775 --> 00:26:20.475
So the, uh, crew focused on the recovery

688
00:26:20.735 --> 00:26:22.235
as they're in the situation I described,

689
00:26:22.235 --> 00:26:24.315
pointed downhill wind rush over the canopy,

690
00:26:24.315 --> 00:26:27.395
increasing G sun glaring off the, uh, the displays.

691
00:26:27.495 --> 00:26:29.035
Uh, they were fixated. They were focused on

692
00:26:29.035 --> 00:26:30.115
the recovery of the aircraft.

693
00:26:30.735 --> 00:26:32.865
Instead, they were not focused on things like passing their

694
00:26:32.865 --> 00:26:34.505
5,000 foot altitude, uh,

695
00:26:34.525 --> 00:26:36.145
for the uncontrolled injection minimum,

696
00:26:36.445 --> 00:26:37.625
as well as some crew coordination.

697
00:26:40.735 --> 00:26:42.705
Alright, then last human factor I, uh,

698
00:26:43.205 --> 00:26:45.005
identified here was critical information, not communicated

699
00:26:45.605 --> 00:26:47.205
specifically the bailout call.

700
00:26:47.385 --> 00:26:48.845
And so for those of us

701
00:26:48.845 --> 00:26:51.085
who have flown multi-play ejection seat aircraft, uh,

702
00:26:51.085 --> 00:26:52.735

the call that I've always, uh,

703
00:26:52.735 --> 00:26:55.095
coordinated within my aircraft is bailout, bailout, bailout.

704
00:26:55.115 --> 00:26:56.935
Uh, that was the crew coordination contract here.

705
00:26:57.315 --> 00:26:59.015
Uh, so that's what we would've expected as a bailout,

706
00:26:59.015 --> 00:27:00.695
bailout, bailout call as the, uh,

707
00:27:00.735 --> 00:27:01.855
w wso pulls ejection handle.

708
00:27:02.675 --> 00:27:03.855
Uh, that didn't happen. There was no

709
00:27:03.855 --> 00:27:05.015
crew coordination at that point.

710
00:27:05.755 --> 00:27:08.135
But I would encourage you, um, you know,

711
00:27:08.135 --> 00:27:09.175
think about the context here.

712
00:27:09.745 --> 00:27:12.015
Don't, uh, maybe don't be so quick to throw spears.

713
00:27:12.015 --> 00:27:14.375
This is the W's fifth flight in injection seat aircraft.

714
00:27:14.605 --> 00:27:16.655
He's got 3000 hours, but this is only his fifth

715
00:27:16.655 --> 00:27:17.775
flight on injection seat aircraft.

716
00:27:17.775 --> 00:27:20.255
So I'll just kind of offer that as context maybe as we're,

717
00:27:20.355 --> 00:27:22.255
as we're thinking about this one, uh, the fact

718
00:27:22.255 --> 00:27:23.335
that that was not communicated.

719
00:27:28.575 --> 00:27:30.425
Alright, so I promise there's no math involved.

720
00:27:30.565 --> 00:27:32.425
Uh, but I do want, uh, want, want you

721
00:27:32.425 --> 00:27:33.785
to reflect on this here just a little bit this

722
00:27:33.785 --> 00:27:34.865
morning at this, uh, early hour.

723
00:27:36.085 --> 00:27:37.075
These are the, uh, six

724
00:27:37.075 --> 00:27:38.275
human factors that we just went through.

725
00:27:38.895 --> 00:27:40.475
And so what I want to do, uh, as I said,

726
00:27:40.475 --> 00:27:42.755
is we're not all a 29 testers, but we are all testers.

727
00:27:42.755 --> 00:27:45.995
So how can we be safer as individuals and as test teams?

728
00:27:48.215 --> 00:27:50.835
So first of all, for the, uh, control of the aircraft,

729
00:27:51.605 --> 00:27:53.305

are the operators ready

730
00:27:53.885 --> 00:27:55.585
to control their aircraft in a situation

731
00:27:55.585 --> 00:27:56.785
that's off of nominal?

732
00:27:56.895 --> 00:27:58.625
When the airplane does something you don't expect?

733
00:27:59.085 --> 00:28:00.145
Are you, are your teams,

734
00:28:00.165 --> 00:28:01.425
are you ready to control the aircraft?

735
00:28:01.845 --> 00:28:03.935
And then for the situation, when you're outta control,

736
00:28:03.995 --> 00:28:05.175
are you ready to recover from that?

737
00:28:05.315 --> 00:28:07.095
Do you know what to do? Are you gonna put in

738
00:28:07.095 --> 00:28:08.175
the appropriate control inputs?

739
00:28:08.175 --> 00:28:10.095
And are you gonna hold that for significant duration in

740
00:28:10.095 --> 00:28:11.335
order to recover your asset

741
00:28:15.625 --> 00:28:16.795
delayed A necessary action.

742
00:28:16.935 --> 00:28:18.475
So in our case, that was a, uh,

743
00:28:18.475 --> 00:28:21.075
delaying the ejection decision below 5,000 feet, a GL

744
00:28:21.175 --> 00:28:22.795
as the tech order called for.

745
00:28:23.535 --> 00:28:25.455
A lot of, a lot of you fly in ejection seat aircraft,

746
00:28:25.555 --> 00:28:27.335
but, uh, whether you do

747
00:28:27.335 --> 00:28:29.055
or not, there's many actions that needs to take place

748
00:28:29.115 --> 00:28:30.375
and they have to take place on time.

749
00:28:30.515 --> 00:28:32.895
And so I'd ask, are the, uh, members of your test team,

750
00:28:32.995 --> 00:28:35.455
you know, is that junior recorder back in the, uh,

751
00:28:35.455 --> 00:28:36.535
dark corner of control room?

752
00:28:37.185 --> 00:28:40.365
Uh, is that person empowered? Do they know what to look for?

753
00:28:40.425 --> 00:28:41.485
Are they empowered to, uh,

754
00:28:41.485 --> 00:28:43.845
to make the call at the appropriate time to knock it off,

755
00:28:44.265 --> 00:28:45.725
not continue a test point, et cetera?

756
00:28:45.785 --> 00:28:47.165

Uh, have you empowered your test teams?

757
00:28:47.165 --> 00:28:50.685
And are they ready to take, uh, decisive action,

758
00:28:50.875 --> 00:28:53.005
assertive action, uh, when it's called for,

759
00:28:56.345 --> 00:28:58.245
for the wrong choice of action, we talked about the, uh,

760
00:28:58.725 --> 00:28:59.725
decision to make that what right,

761
00:28:59.725 --> 00:29:01.525
180 degree turn into the heavy wing at

762
00:29:01.525 --> 00:29:02.605
a slower than planned air speed?

763
00:29:03.535 --> 00:29:04.615
I also allude to, uh, you know,

764
00:29:04.615 --> 00:29:05.615
what kinda tools do you have in place?

765
00:29:05.995 --> 00:29:08.425
So do your operators have the,

766
00:29:08.485 --> 00:29:10.105
the tools they need to make the appropriate decision?

767
00:29:10.645 --> 00:29:13.045
And then for those who are inexperienced, uh,

768
00:29:13.045 --> 00:29:14.365
what about the supervision you have in place?

769
00:29:14.465 --> 00:29:17.705
You know, what kind of, uh, mentorship, what kind of, uh,

770
00:29:17.705 --> 00:29:19.305
checks and balances do you have in place to make sure

771
00:29:19.305 --> 00:29:20.305
that your folks have the tools

772
00:29:20.445 --> 00:29:22.225
to give them the best chance to make the right decision?

773
00:29:22.355 --> 00:29:24.545
We're not gonna make the right to call every time, but, uh,

774
00:29:24.545 --> 00:29:25.985
but what are we doing to make sure that our folks have the

775
00:29:25.985 --> 00:29:27.145
best chance of doing so?

776
00:29:30.815 --> 00:29:32.105
Alright, fourth there. Inadequate,

777
00:29:32.105 --> 00:29:33.905
inadequate procedural guidance or publications.

778
00:29:34.585 --> 00:29:37.565
So in your test program, what do you have in your tos?

779
00:29:37.715 --> 00:29:39.645
What do you have maybe in your, your tribal knowledge

780
00:29:40.035 --> 00:29:42.445
that just doesn't make sense, but you've always done it.

781
00:29:43.005 --> 00:29:44.305
You know, what, what out there

782
00:29:44.555 --> 00:29:45.785
would you like to see changed?

783
00:29:45.785 --> 00:29:47.665

But it's, it's written down. The instructor told me.

784
00:29:48.315 --> 00:29:49.375
Uh, so it must be right.

785
00:29:50.195 --> 00:29:51.775
Uh, I think one of the things that was mentioned yesterday

786
00:29:51.775 --> 00:29:53.255
was asking the, asking the why's.

787
00:29:53.475 --> 00:29:55.135
So I'd just encourage all of us to,

788
00:29:55.155 --> 00:29:57.415
to ask why, why are we doing it this way?

789
00:29:57.625 --> 00:29:59.415
Maybe there's a good answer. But in this case,

790
00:29:59.505 --> 00:30:00.655
there, there wasn't.

791
00:30:00.825 --> 00:30:02.855
Those seats could have been in a different ejection mode

792
00:30:02.855 --> 00:30:07.315
that should have changed the, uh, the outcome, uh, fixation.

793
00:30:07.555 --> 00:30:09.395
I liked, uh, one of the charts yesterday was the F

794
00:30:09.395 --> 00:30:10.635
22 control room display.

795
00:30:10.775 --> 00:30:13.515
So should the predictive, uh, aircraft performance, uh,

796
00:30:13.515 --> 00:30:15.235
overlaid by the actual aircraft performance,

797
00:30:15.615 --> 00:30:17.515
and those tools are great, but it's important for all of us,

798
00:30:17.515 --> 00:30:18.675
whether you're sitting in that control room

799
00:30:18.675 --> 00:30:21.155
or sitting in that airplane to, you know,

800
00:30:21.155 --> 00:30:22.315
what exactly are you looking at?

801
00:30:22.495 --> 00:30:24.635
And how's your crosscheck? How, how's your scan?

802
00:30:25.015 --> 00:30:27.475
You know, sure, we're monitoring a certain parameter in this

803
00:30:27.475 --> 00:30:28.635
case, trying to recover an aircraft.

804
00:30:29.015 --> 00:30:30.795
Uh, but what is our scan doing for us?

805
00:30:30.795 --> 00:30:32.475
What's our overall situational awareness

806
00:30:32.475 --> 00:30:34.635
that's gonna let us catch these situations

807
00:30:34.635 --> 00:30:36.195
where we're an unsafe situation?

808
00:30:36.255 --> 00:30:37.275
We may be on parameters,

809
00:30:37.275 --> 00:30:38.435
but, uh, we're approaching an

810
00:30:38.435 --> 00:30:39.595

unsafe situation in a different area.

811
00:30:39.815 --> 00:30:40.955
Uh, what are we doing to make

812
00:30:40.955 --> 00:30:41.995
sure that we are, we're ready for that?

813
00:30:44.615 --> 00:30:46.595
And then finally, uh, critical information not communicated.

814
00:30:46.775 --> 00:30:48.275
Uh, in this case it was a bailout call,

815
00:30:48.835 --> 00:30:50.055
but, uh, what are we doing to make sure

816
00:30:50.075 --> 00:30:51.095
all of our folks are empowered?

817
00:30:51.095 --> 00:30:52.615
Again, I always like to think of that, you know,

818
00:30:52.615 --> 00:30:54.455
brand new engineer stuck in the dark

819
00:30:54.455 --> 00:30:55.575
corner of the, uh, control room.

820
00:30:55.575 --> 00:30:56.815
You know, he's surrounded by experienced folks.

821
00:30:57.395 --> 00:30:58.655
Uh, but what is he doing?

822
00:30:59.115 --> 00:31:01.455
Uh, has he been empowered to know what to look for?

823
00:31:01.835 --> 00:31:04.825
And does he have the confidence, the assertiveness to uh,

824
00:31:04.825 --> 00:31:06.385
to step up and say, Hey, this is not right

825
00:31:06.385 --> 00:31:08.225
and we need to, uh, we need to do something about it.

826
00:31:08.605 --> 00:31:11.575
So are your test team is ready for that? Certainly. Hope so.

827
00:31:15.965 --> 00:31:17.535
Alright. And with that, uh, what I've

828
00:31:17.615 --> 00:31:19.575
provided here at the, uh, the bottom is the, uh, links, uh,

829
00:31:19.575 --> 00:31:20.815
this entire brief, uh,

830
00:31:20.815 --> 00:31:23.015
is based on the accident investigation board report

831
00:31:23.435 --> 00:31:24.535
that's publicly releasable.

832
00:31:24.535 --> 00:31:26.375
So I'd encourage you to, uh, feel free to dive in further,

833
00:31:26.835 --> 00:31:28.055
uh, pull some lessons learned

834
00:31:28.055 --> 00:31:29.415
and see how that, uh, that may apply to your,

835
00:31:29.415 --> 00:31:30.135
your organization.