WEBVTT

1
00:00:00.145 --> 00:00:00.645
You bet.

2
00:00:05.065 --> 00:00:06.765
Hey, it's great to be back here.

3
00:00:07.075 --> 00:00:10.365
I've met lots of old colleagues and some new ones.

4
00:00:10.465 --> 00:00:14.765
So, Uh, I'm here to be an evangelist

5
00:00:14.945 --> 00:00:16.165
and to challenge you today.

6
00:00:16.545 --> 00:00:19.085
And so you can spread this wherever you want, if,

7
00:00:19.105 --> 00:00:20.165
if you feel like it.

8
00:00:20.585 --> 00:00:24.535
Um, our theme is brilliance and basics,

9
00:00:25.035 --> 00:00:29.735
and Mark, uh, owns in his April Safety fact.

10
00:00:29.755 --> 00:00:33.095
How many people read that? I've seen it a lot of you.

11
00:00:33.795 --> 00:00:37.375
He recounts a story of Vince Lombardi taking over

12
00:00:37.395 --> 00:00:40.255
as the head coach for the Green Bay Packers.

13
00:00:40.675 --> 00:00:44.445
And, and Lombardi is asked, are you gonna change anything?

14
00:00:44.445 --> 00:00:48.165
And he says, no, we're just gonna stick with the basics,

15
00:00:48.165 --> 00:00:50.765
the tried and true and the fundamentals.

16
00:00:52.425 --> 00:00:57.005
And the question I want to deal with today is, is

17
00:00:57.005 --> 00:00:58.325
that analogy, the tried

18
00:00:58.325 --> 00:01:01.125
and true, the traditional applicable

19
00:01:01.625 --> 00:01:03.365
for flight test and flight test safety.

20
00:01:04.395 --> 00:01:07.685
Yesterday, we heard some stories,

21
00:01:08.105 --> 00:01:09.925
and a lot of it I agree with,

22
00:01:10.825 --> 00:01:14.085
but I'm gonna take a stance today that the basics

23
00:01:14.545 --> 00:01:17.045
by themselves are insufficient

24
00:01:19.225 --> 00:01:20.445
And find this.

25
00:01:23.985 --> 00:01:27.405
All right, here's my depiction of three pillars

26
00:01:27.425 --> 00:01:29.725
for effective and safe flight testing.

27
00:01:30.965 --> 00:01:32.285

Relevant, relevant methods

28
00:01:32.465 --> 00:01:36.235
and tools, competent flight test professionals

29
00:01:36.895 --> 00:01:38.555
who have the appropriate skills

30
00:01:38.935 --> 00:01:42.075
and the mindset, uh, to excel.

31
00:01:43.215 --> 00:01:44.795
And a company safety culture

32
00:01:45.345 --> 00:01:47.035
that supports the other two pillars.

33
00:01:48.495 --> 00:01:50.715
I'm gonna suggest that the fundamental elements

34
00:01:51.545 --> 00:01:56.075
that make up methods and tools are evolving by necessity.

35
00:01:56.745 --> 00:01:58.115
They are neither simple

36
00:01:58.815 --> 00:02:01.475
nor traditional practices, at least not completely,

37
00:02:02.295 --> 00:02:05.995
and that's due to the complex nature of modern flight tests.

38
00:02:07.945 --> 00:02:12.035
Similarly, I'm gonna say that the traditional practices

39
00:02:12.095 --> 00:02:16.905
to educate flight test engineers are inadequate.

40
00:02:23.935 --> 00:02:27.595
We know this, the aerospace industry is giving flight

41
00:02:27.785 --> 00:02:31.555
testers and flight test safety, some new challenges.

42
00:02:32.375 --> 00:02:35.875
We have, you know, four fifth gen fighters.

43
00:02:35.935 --> 00:02:39.875
We have supersonic hypersonic, we have

44
00:02:40.415 --> 00:02:45.025
on crewed aircraft, we have autonomy in the loop, uh,

45
00:02:45.085 --> 00:02:47.065
and vertical takeoff and eval.

46
00:02:47.065 --> 00:02:51.105
The vertical flight societies has 400 lists, 430

47
00:02:51.655 --> 00:02:56.105
designs, and in 12 prototypes in, in,

48
00:02:56.645 --> 00:02:57.985
uh, in, in flight test

49
00:03:04.105 --> 00:03:06.515
systems are increasingly opaque.

50
00:03:07.135 --> 00:03:08.915
Architecture's non-standard

51
00:03:10.295 --> 00:03:13.675
and test points don't always derive neatly from

52
00:03:13.675 --> 00:03:15.315
historical baselines.

53
00:03:15.815 --> 00:03:18.835
And there are operational aspects

54
00:03:19.455 --> 00:03:22.955

and organizational aspects that are complex, what I term

55
00:03:24.775 --> 00:03:26.275
sociotechnical challenges.

56
00:03:28.545 --> 00:03:30.045
And then finally, in the middle of

57
00:03:30.045 --> 00:03:32.205
that is software growing exponentially.

58
00:03:32.695 --> 00:03:34.565
These platforms, these systems,

59
00:03:35.915 --> 00:03:37.525
they are radically different,

60
00:03:37.825 --> 00:03:40.205
but they share one common challenge,

61
00:03:40.345 --> 00:03:43.165
and that's unprecedented complexity.

62
00:03:44.065 --> 00:03:47.525
The complex domain possesses characteristics

63
00:03:47.585 --> 00:03:50.405
and behaviors that necessitate the employment

64
00:03:50.625 --> 00:03:51.845
of non-traditional tools

65
00:03:52.425 --> 00:03:56.685
and complex risk management strategies.

66
00:03:58.375 --> 00:04:00.115
Now, I asked the question yesterday,

67
00:04:00.215 --> 00:04:01.795
and I'm gonna ask, I how many

68
00:04:01.795 --> 00:04:04.075
of you have seen the Canne diagram?

69
00:04:06.105 --> 00:04:07.675
Good, a few more than yesterday.

70
00:04:08.575 --> 00:04:12.915
Um, the canen diagram portrays the difference

71
00:04:13.345 --> 00:04:17.075
between the complicated and the complex domains.

72
00:04:17.935 --> 00:04:20.915
And this was, and I will offer just a brief one.

73
00:04:21.015 --> 00:04:24.515
Ben Luther gave a great talk on this at the London Flight

74
00:04:24.515 --> 00:04:26.475
Test Safety workshop, and you can move back

75
00:04:26.475 --> 00:04:28.155
and listen to that in the upper.

76
00:04:28.455 --> 00:04:31.515
Um, right quadrant is the traditional approach.

77
00:04:32.215 --> 00:04:36.355
We have known unknowns, uh, statistics

78
00:04:36.355 --> 00:04:39.755
and history work in contrast,

79
00:04:39.975 --> 00:04:42.715
the upper left quadrant is the complex quadrant

80
00:04:42.845 --> 00:04:46.155
where non statistical methods are required.

81
00:04:46.905 --> 00:04:51.355

Complex systems, um, have things like emergence,

82
00:04:52.505 --> 00:04:56.515
nonlinear system behavior, small system sensitivity,

83
00:04:57.215 --> 00:05:00.395
and non, uh, non failure hazard analysis.

84
00:05:01.025 --> 00:05:02.995
Emergence is when all the components,

85
00:05:03.025 --> 00:05:05.755
when you look at their behavior do not predict

86
00:05:06.095 --> 00:05:07.115
the system's outcome.

87
00:05:08.455 --> 00:05:13.395
And non failure safety hazards are where things worked

88
00:05:13.535 --> 00:05:16.915
as designed, but the outcome isn't as intended.

89
00:05:16.935 --> 00:05:20.115
What's the poster child for that software?

90
00:05:20.555 --> 00:05:23.155
Software doesn't break. It does exactly what we,

91
00:05:23.155 --> 00:05:27.675
we had designed it In the complex domain.

92
00:05:28.025 --> 00:05:31.595
Traditional risk management methods are insufficient

93
00:05:32.335 --> 00:05:34.955
and in some cases inappropriate.

94
00:05:38.825 --> 00:05:42.315
There's the ubiquitous risk assessment matrix.

95
00:05:42.905 --> 00:05:46.315
Everybody uses that and there are places for it,

96
00:05:47.095 --> 00:05:49.435
but it relies on backwards looking data

97
00:05:49.895 --> 00:05:51.875
and it relies on probability.

98
00:05:53.195 --> 00:05:55.795
F-M-E-A-F-H ahas

99
00:05:56.415 --> 00:05:59.925
all have limitations in dealing with the complex domain.

100
00:06:07.445 --> 00:06:10.105
The limitations of the traditional methods has led

101
00:06:10.105 --> 00:06:11.345
to development of new tools.

102
00:06:12.005 --> 00:06:13.345
One of them is stamp

103
00:06:13.445 --> 00:06:15.145
and its tool SDPA,

104
00:06:15.305 --> 00:06:19.305
which the flight test safety workshop is looked at a lot,

105
00:06:19.365 --> 00:06:22.025
and you were gonna hear more about it later from Nome.

106
00:06:22.765 --> 00:06:26.145
So that has been a new tool

107
00:06:26.775 --> 00:06:29.825
that looks at different ways of risk

108
00:06:29.885 --> 00:06:31.105

and it's not backward looking.

109
00:06:33.375 --> 00:06:37.585
Several FTEs have used the FIN model,

110
00:06:37.775 --> 00:06:42.105
including Tony Lavera, winner, Ben Luther and Bob Barman

111
00:06:42.165 --> 00:06:44.465
and Star Hughes for the second one there,

112
00:06:44.465 --> 00:06:46.065
which is the FIN domains.

113
00:06:46.965 --> 00:06:48.785
And then we, we heard a lot from Marty

114
00:06:48.805 --> 00:06:51.305
and RJ about, um,

115
00:06:51.485 --> 00:06:53.985
beaker Wicker's risk awareness.

116
00:06:55.085 --> 00:06:58.545
Now, I will tell you, uh, if you haven't heard of the fin,

117
00:06:58.545 --> 00:07:02.345
and I like what Wicked does, it's a great paper,

118
00:07:02.685 --> 00:07:05.625
but when I gave him the paper, um,

119
00:07:06.085 --> 00:07:08.225
why flight test is distinctly different,

120
00:07:08.235 --> 00:07:12.065
which went over the ENT domains, Wicker's response is,

121
00:07:12.135 --> 00:07:13.665
this is better written in my paper.

122
00:07:14.285 --> 00:07:18.425
So I want you to think, why didn't I know about that paper?

123
00:07:18.685 --> 00:07:20.625
Why the people who brought it up?

124
00:07:20.885 --> 00:07:22.225
And, uh, I have an answer

125
00:07:22.285 --> 00:07:23.665
or at least a solution for

126
00:07:23.765 --> 00:07:25.105
how you might do that in the future.

127
00:07:28.085 --> 00:07:31.065
Now, we heard some of the, the approaches

128
00:07:31.085 --> 00:07:32.945
to employing knowledge awareness,

129
00:07:34.005 --> 00:07:38.505
but at, at, at one of the SFT symposiums, uh, Rado

130
00:07:38.505 --> 00:07:41.585
and McGee, and I think they also spoke at an SET symposium,

131
00:07:41.855 --> 00:07:45.705
gave us a real world example of that employment and,

132
00:07:45.925 --> 00:07:47.545
and how they transformed it.

133
00:07:47.565 --> 00:07:50.025
And they did it mostly in the classified world,

134
00:07:50.025 --> 00:07:52.185
but they gave us one real world example

135
00:07:52.975 --> 00:07:56.385

with the F 16 Vista and it works.

136
00:07:56.565 --> 00:08:00.585
But you know what? Read the paper. It's not simple.

137
00:08:01.455 --> 00:08:03.225
It's actually complex. It hurts my head,

138
00:08:03.445 --> 00:08:06.385
but that's the kind of thing that we need

139
00:08:07.325 --> 00:08:09.385
to move forward in this complex domain.

140
00:08:12.175 --> 00:08:15.195
Now, model-based test engineering is just

141
00:08:15.195 --> 00:08:16.235
coming in the flight test.

142
00:08:16.255 --> 00:08:17.715
At least I'm aware of it.

143
00:08:17.875 --> 00:08:21.995
I heard a, a talk at the 2023 SFTE

144
00:08:22.145 --> 00:08:24.315
symposium from the four 12.

145
00:08:24.745 --> 00:08:27.435
It's a derivative of model-based systems engineering,

146
00:08:28.175 --> 00:08:29.435
and there's a paper out there,

147
00:08:30.255 --> 00:08:32.835
and we're, we're taking this to

148
00:08:32.835 --> 00:08:34.795
where we're actually doing it in flight tests.

149
00:08:34.855 --> 00:08:37.395
And this was the first example that I knew about.

150
00:08:39.515 --> 00:08:43.495
And then the four 12 again, at a SFT conference,

151
00:08:44.435 --> 00:08:47.055
um, talked about their use of AI

152
00:08:47.635 --> 00:08:49.935
in the envelope expansion arena.

153
00:08:51.035 --> 00:08:54.375
And, and they are actually using it near real time,

154
00:08:54.985 --> 00:08:59.005
taking their data and using an AI machine learning algorithm

155
00:08:59.145 --> 00:09:01.805
to decide if they proceed or not with test plans.

156
00:09:02.355 --> 00:09:05.685
This is the kind of tools that have been evolving

157
00:09:05.825 --> 00:09:09.605
for the complex domain, and we can read about them all.

158
00:09:10.265 --> 00:09:14.365
Uh, and if, uh, one, uh, solicitation,

159
00:09:14.505 --> 00:09:16.005
if you wanna know about all these

160
00:09:16.105 --> 00:09:18.005
and you wanna know about SATP papers,

161
00:09:18.515 --> 00:09:21.405
join SFTE 55 bucks a year.

162
00:09:21.425 --> 00:09:24.405

You get a one stop shopping for all the presentations,

163
00:09:24.745 --> 00:09:26.285
all the databases for there.

164
00:09:27.345 --> 00:09:30.085
So what's next? Stu? Uh, talked about it.

165
00:09:30.115 --> 00:09:33.485
It's GPTs, which I'm gonna give you a couple demos on.

166
00:09:34.025 --> 00:09:38.205
Um, Mike Rado Zulu in the Wichita.

167
00:09:38.385 --> 00:09:42.695
How many people were at Wichita for his talk? Just a few.

168
00:09:43.115 --> 00:09:44.975
Uh, he talked about, uh,

169
00:09:45.115 --> 00:09:47.055
why we don't remember the lessons learned.

170
00:09:47.555 --> 00:09:51.055
And he used, uh, Oracle Chat,

171
00:09:51.295 --> 00:09:54.615
GPT calling it the Oracle of Delphi to try

172
00:09:54.615 --> 00:09:57.455
and explain that great talk

173
00:09:57.755 --> 00:10:00.655
and his talk to continuously learn

174
00:10:01.435 --> 00:10:03.655
and to use machine learning.

175
00:10:03.675 --> 00:10:06.295
And AI inspired me to look into this a little bit more.

176
00:10:06.715 --> 00:10:08.935
And, uh, I actually did that.

177
00:10:11.085 --> 00:10:13.255
Mike introduced me to Jordan Connor.

178
00:10:14.435 --> 00:10:17.655
And Jordan is a brilliant flight test engineer

179
00:10:17.965 --> 00:10:20.775
that had been doing tpha at Edwards and still doing it.

180
00:10:20.795 --> 00:10:24.935
But he came up with a chat g chat bot using chat GPT.

181
00:10:25.155 --> 00:10:26.855
That's garnered a great deal

182
00:10:26.855 --> 00:10:28.775
of attention from the Department of Defense

183
00:10:28.835 --> 00:10:30.095
and the Intel community.

184
00:10:30.635 --> 00:10:32.055
And this is a public domain.

185
00:10:32.715 --> 00:10:35.295
Uh, you can go out there and play with this yourself.

186
00:10:35.365 --> 00:10:39.095
Some of you have, and it is being used to create test plans,

187
00:10:39.185 --> 00:10:42.295
write a test hazard analysis, and generate test cards.

188
00:10:43.865 --> 00:10:46.895
Let's go through a quick demo.

189
00:10:48.815 --> 00:10:52.305

Okay, so we're gonna look at P 51 DIVE testing today.

190
00:10:52.565 --> 00:10:54.545
And, uh, for this chat, GPT,

191
00:10:54.805 --> 00:10:58.465
I'm gonna upload a PDF document from a pilot's manual

192
00:10:58.565 --> 00:10:59.825
on P 50 ones.

193
00:11:00.245 --> 00:11:01.385
And one thing to notice,

194
00:11:01.475 --> 00:11:03.465
we're gonna look at one particular test hazard.

195
00:11:04.245 --> 00:11:06.385
Uh, there's a note in there, I just circled it.

196
00:11:06.385 --> 00:11:08.985
That's in it, the elevator modifications

197
00:11:09.005 --> 00:11:11.185
to LA later model P 50 ones.

198
00:11:11.645 --> 00:11:12.905
So this will go out there

199
00:11:12.965 --> 00:11:15.265
and it'll be tailored by uploading this document.

200
00:11:19.595 --> 00:11:21.945
Let's see if I click it once more, it should work, right?

201
00:11:25.945 --> 00:11:27.485
All right, so I'm asking it,

202
00:11:27.985 --> 00:11:30.325
I'm gonna generate a test hazard analysis.

203
00:11:31.735 --> 00:11:33.275
I'm gonna add some additional content.

204
00:11:34.215 --> 00:11:36.035
Upload the P 51 document

205
00:11:36.655 --> 00:11:38.795
so you can upload your favorite documents,

206
00:11:42.085 --> 00:11:44.305
Ask it to generate a test hazard analysis.

207
00:11:51.185 --> 00:11:53.165
And there's some of 'em compressibility effects

208
00:11:53.165 --> 00:11:56.045
during high speed dive, uncontrolled purposing,

209
00:11:56.045 --> 00:11:59.005
high mach numbers, loss of control due

210
00:11:59.005 --> 00:12:00.525
to modification at high M numbers.

211
00:12:00.705 --> 00:12:03.765
I'm gonna pick that one and say, let's do a THA on that.

212
00:12:12.905 --> 00:12:14.555
Alright, so there's the causes.

213
00:12:14.555 --> 00:12:16.995
Insufficient forward stick pressure at mach numbers

214
00:12:17.315 --> 00:12:20.835
approaching 0.74, loss of directional stability at speed,

215
00:12:20.835 --> 00:12:22.315
exceeding the recommended mach, limit

216
00:12:22.895 --> 00:12:25.835

the minimizing procedures prior to high speed dives.

217
00:12:26.255 --> 00:12:29.115
Uh, set the elevator trim correctly,

218
00:12:30.385 --> 00:12:32.445
and the corrective actions

219
00:12:32.445 --> 00:12:35.125
and emergency procedures, the, the tool.

220
00:12:35.625 --> 00:12:38.045
And this is a basic tool that I, uh,

221
00:12:38.115 --> 00:12:40.805
this example is actually a few months old and is improved,

222
00:12:40.805 --> 00:12:42.925
but you can go in there and interact with any of it.

223
00:12:43.465 --> 00:12:46.565
Ask the GPT what to go back and change it

224
00:12:46.585 --> 00:12:47.805
and ask why it's doing that.

225
00:12:48.505 --> 00:12:49.765
And when you're done,

226
00:12:52.385 --> 00:12:55.125
you have a THA, uh, the background.

227
00:12:55.125 --> 00:12:57.085
There's a lot in the engine behind here.

228
00:12:57.515 --> 00:13:01.045
It's formatted for the four twelves. THA analysis.

229
00:13:02.165 --> 00:13:05.805
Let's see, we do it here. Oh, I guess I do.

230
00:13:05.915 --> 00:13:07.685
Well, I'll talk a little bit about that.

231
00:13:08.105 --> 00:13:11.245
Um, I did that analysis with chat GPT-4 oh,

232
00:13:11.335 --> 00:13:12.685
which is the old standard.

233
00:13:12.835 --> 00:13:13.965
It's six months old.

234
00:13:14.465 --> 00:13:18.005
The new chat GPT, which you can now select if you go out

235
00:13:18.005 --> 00:13:20.605
and try this, it, it won't chug the wrong,

236
00:13:20.635 --> 00:13:23.485
it's not 30 seconds, it'll be five minutes to 10 minutes,

237
00:13:23.825 --> 00:13:25.685
but it doesn't use statistical approaches.

238
00:13:25.705 --> 00:13:30.405
It does a much more, um, high, high, um, in-depth look.

239
00:13:30.865 --> 00:13:33.285
And the answers that are coming back are great.

240
00:13:33.665 --> 00:13:38.125
Now that AI digital assistant is not replacing a test team

241
00:13:38.505 --> 00:13:41.605
or hazard analysis, Jordan says that

242
00:13:42.255 --> 00:13:44.085
we're using the standard chat.

243
00:13:44.285 --> 00:13:47.725

GPT, which you can do is the 50% solution.

244
00:13:48.745 --> 00:13:52.605
And if you do the new one with chat GPT, uh, 4.03,

245
00:13:52.665 --> 00:13:57.165
he calls it the 80% solution team's gotta go in there.

246
00:13:57.165 --> 00:13:58.565
But it's a great starting point

247
00:13:58.625 --> 00:14:01.165
and it, it expands maybe what you thought about.

248
00:14:01.235 --> 00:14:04.245
It's not just the people in that meeting or on that team.

249
00:14:05.385 --> 00:14:08.005
Uh, one group from the X 32 looked at it

250
00:14:08.185 --> 00:14:09.725
and said, if they had had this,

251
00:14:10.055 --> 00:14:12.565
their productivity would've been enhanced greatly.

252
00:14:12.835 --> 00:14:14.325
What they had done in one month

253
00:14:14.335 --> 00:14:15.605
could have been done in one week.

254
00:14:16.035 --> 00:14:17.925
Alright, so I got excited doing this.

255
00:14:18.005 --> 00:14:20.165
I said, well, maybe I can do it.

256
00:14:20.245 --> 00:14:22.365
I don't know much about chat GPT,

257
00:14:22.385 --> 00:14:26.885
but I, I subscribe to chat, um, open AIS chat, GPT,

258
00:14:27.505 --> 00:14:30.805
and I made myself a chat bot for STPA.

259
00:14:30.815 --> 00:14:32.485
Marty said, where's Marty?

260
00:14:33.185 --> 00:14:35.125
He, he said, I don't even know about this. It's hard.

261
00:14:35.125 --> 00:14:37.165
You know what? It's intimidating to look at it.

262
00:14:37.355 --> 00:14:40.205
Well, here's a chat bot to help you get started, Marty.

263
00:14:40.825 --> 00:14:43.365
Um, and this is my chat bot,

264
00:14:43.785 --> 00:14:46.165
and I'm gonna do this demo again with 4.0.

265
00:14:46.325 --> 00:14:47.765
I did it before the accident.

266
00:14:47.945 --> 00:14:51.285
Uh, the, the helicopter, uh, Washington DC accident

267
00:14:51.985 --> 00:14:53.045
and it a few months ago.

268
00:14:53.425 --> 00:14:55.845
And you'll notice up there it's chat GPT-4 oh

269
00:14:56.435 --> 00:14:58.685
that the new ones are even better.

270
00:14:58.735 --> 00:15:02.085

Let's see if this works. And I'm gonna do, uh,

271
00:15:02.145 --> 00:15:03.485
do an STP analysis.

272
00:15:03.485 --> 00:15:08.085
Very simple, very basic of a collision between,

273
00:15:08.585 --> 00:15:11.285
so that's the name I gave it, uh, between a,

274
00:15:11.505 --> 00:15:12.605
uh, two aircraft.

275
00:15:17.545 --> 00:15:20.805
So I'm gonna upload an excerpt from the STPA

276
00:15:20.805 --> 00:15:22.855
manual chapter two.

277
00:15:23.315 --> 00:15:24.415
That's from MIT.

278
00:15:26.115 --> 00:15:28.535
You can go in there when you make your chat bot

279
00:15:28.555 --> 00:15:29.815
and give it instructions.

280
00:15:30.475 --> 00:15:32.695
And, uh, I'm gonna do that next.

281
00:15:32.905 --> 00:15:36.055
Those, those lists down below are me just running sample,

282
00:15:36.595 --> 00:15:38.695
uh, other previous queries.

283
00:15:38.695 --> 00:15:41.975
So there's my instructions. The five things to do for chat.

284
00:15:42.175 --> 00:15:44.335
GPT, identify lazar hazards

285
00:15:44.335 --> 00:15:46.495
and losses, identify system level constraints,

286
00:15:46.865 --> 00:15:50.855
model control structures, identify unsafe control actions

287
00:15:51.275 --> 00:15:53.415
and verify causal services.

288
00:15:53.675 --> 00:15:54.775
And then I'm gonna go through

289
00:15:54.915 --> 00:15:56.295
and say, I like the tables

290
00:15:56.295 --> 00:15:57.775
to look like this or this or this.

291
00:15:57.875 --> 00:16:00.455
And I got it. Just I, maybe I even duplicated

292
00:16:00.485 --> 00:16:02.895
what was in the STPA handbook,

293
00:16:03.075 --> 00:16:07.215
but I wanted to do a few things for the layout to look like

294
00:16:07.215 --> 00:16:09.015
what you normally see in STPA.

295
00:16:10.175 --> 00:16:13.945
This, this was cut and paste for me. I'm not an STPA expert.

296
00:16:14.525 --> 00:16:16.585
I'm A-S-T-P-A neophyte.

297
00:16:16.585 --> 00:16:19.945

And like Marty, I can get a little intimidated by the tool.

298
00:16:22.125 --> 00:16:24.105
So I'm asking to create a table,

299
00:16:24.745 --> 00:16:27.265
identify unsafe control actions with a third table,

300
00:16:27.665 --> 00:16:29.705
a brief description of causal scenarios

301
00:16:29.845 --> 00:16:31.345
for each unsafe control action.

302
00:16:32.525 --> 00:16:35.865
So I'll type in my query having uploaded that

303
00:16:36.045 --> 00:16:39.105
and given it those instructions, which it retains.

304
00:16:41.205 --> 00:16:44.745
And if you can't read that, it says create an STPA analysis

305
00:16:45.085 --> 00:16:47.145
for the collision of two aircraft.

306
00:17:07.745 --> 00:17:11.565
So there it goes. Losses and hazards table

307
00:17:11.865 --> 00:17:15.525
and associated hazards, sort of in the framework

308
00:17:15.525 --> 00:17:16.925
that STPA likes to use.

309
00:17:18.485 --> 00:17:20.485
Aircraft violates minimum separation

310
00:17:20.725 --> 00:17:21.885
standards is one hazard.

311
00:17:22.505 --> 00:17:25.205
And, uh, losses are loss of human life, loss

312
00:17:25.205 --> 00:17:27.325
of the customer public trust.

313
00:17:28.185 --> 00:17:30.005
And, and so you can go play with this,

314
00:17:30.205 --> 00:17:32.885
I can show you afterwards and look at it more detail.

315
00:17:33.065 --> 00:17:37.545
The system level constraints, air

316
00:17:38.105 --> 00:17:39.105
aircraft must be maintained.

317
00:17:39.105 --> 00:17:41.465
Minimum safe separation from other aircraft.

318
00:17:41.695 --> 00:17:44.145
Collision avoidance systems must detect

319
00:17:44.325 --> 00:17:45.425
and prevent a collision.

320
00:17:45.845 --> 00:17:50.365
The control structure, which is a TC, the pilot,

321
00:17:50.465 --> 00:17:53.405
the flight management systems, collision avoidance,

322
00:17:54.785 --> 00:17:55.965
and the control actions.

323
00:18:04.065 --> 00:18:06.785
I asked to do a diagram. I'll tell you the diagrams, uh,

324
00:18:06.815 --> 00:18:08.625

changed each time I did it.

325
00:18:09.085 --> 00:18:12.465
And I am going to, I can upload some more instructions

326
00:18:12.805 --> 00:18:14.265
or go to the next generation

327
00:18:14.265 --> 00:18:15.785
of chat GPT and see what it does.

328
00:18:15.805 --> 00:18:16.905
But it will give you a diagram.

329
00:18:17.825 --> 00:18:19.585
I don't think it was STPA level,

330
00:18:20.125 --> 00:18:21.825
but if you wanted to play with it

331
00:18:21.825 --> 00:18:24.425
and upload more content, you can trade it more.

332
00:18:24.475 --> 00:18:27.105
Again, this is the basic ary, uh, cut

333
00:18:27.105 --> 00:18:31.105
and dried, not doing what, uh, uh, we're doing for the, uh,

334
00:18:31.125 --> 00:18:32.145
safety workshop.

335
00:18:32.495 --> 00:18:35.185
Alright, identify the unsafe control actions.

336
00:18:36.465 --> 00:18:40.065
A TC fails to issue a separation commands

337
00:18:41.425 --> 00:18:44.325
issues are incorrect or con conflicting commands.

338
00:18:44.605 --> 00:18:48.325
TC AF fails to ensure resolution, et cetera, et cetera.

339
00:18:48.665 --> 00:18:49.965
And the causal scenarios.

340
00:18:55.065 --> 00:18:57.245
So it's pretty cool there I am.

341
00:18:57.565 --> 00:18:59.125
I haven't made it public yet, but I will.

342
00:18:59.125 --> 00:19:00.205
Anybody once I went out there

343
00:19:00.205 --> 00:19:02.285
and looked since I did this six months ago.

344
00:19:02.285 --> 00:19:05.365
And there's other two other STPA chatbots available.

345
00:19:05.425 --> 00:19:07.965
If you subscribe, you can only see this if you

346
00:19:08.165 --> 00:19:09.285
subscribe to chat GPT.

347
00:19:09.285 --> 00:19:11.725
It's not gonna, you can make it onto a web link,

348
00:19:11.745 --> 00:19:12.765
but I haven't done that yet.

349
00:19:13.275 --> 00:19:15.885
Alright, so what's coming next?

350
00:19:16.595 --> 00:19:18.045
This is large language models.

351
00:19:18.455 --> 00:19:20.805

Large behavioral models are starting to make their way in.

352
00:19:20.805 --> 00:19:22.045
This is interesting article,

353
00:19:22.465 --> 00:19:25.925
but a leading AI researcher who, uh,

354
00:19:26.105 --> 00:19:29.845
is teaching a robot the way we learn by observing

355
00:19:29.845 --> 00:19:32.965
and asking questions to, to make, uh, culinary dishes.

356
00:19:33.695 --> 00:19:37.285
Could this kind of large behavioral model be useful in a

357
00:19:37.285 --> 00:19:40.085
control room observing everybody's interactions,

358
00:19:40.575 --> 00:19:45.405
maybe like an X 31 action and hearing all the data

359
00:19:45.545 --> 00:19:48.725
and offering inputs to a test conductor.

360
00:19:51.495 --> 00:19:55.345
Alright, I gotta real quickly go to the second pillar, which

361
00:19:55.565 --> 00:19:56.705
for me is the elephant in the room.

362
00:19:56.985 --> 00:19:58.705
FTE competency.

363
00:20:02.605 --> 00:20:04.105
We can only do so much with tools.

364
00:20:04.285 --> 00:20:07.305
We still need really qualified flight test professionals.

365
00:20:07.525 --> 00:20:10.985
And the number of FTEs is continuing to grow, projected

366
00:20:10.985 --> 00:20:14.145
to grow 6% a year, uh, through 2032.

367
00:20:14.965 --> 00:20:18.545
Flight Society of Flight Test Engineers has seen a 42%

368
00:20:18.905 --> 00:20:21.025
increase in our membership over the last five years.

369
00:20:21.365 --> 00:20:23.945
People hungry to get that expertise.

370
00:20:26.825 --> 00:20:27.885
What's the problem though?

371
00:20:28.985 --> 00:20:31.245
Few receive TPS level training

372
00:20:31.825 --> 00:20:34.365
and the internal training of our companies

373
00:20:34.365 --> 00:20:35.405
and organizations varies.

374
00:20:35.555 --> 00:20:39.125
Some is good, but often it's not. It's inadequate.

375
00:20:40.075 --> 00:20:42.245
What do you need? And FTE needs

376
00:20:42.545 --> 00:20:44.205
to excel everything in that pie.

377
00:20:44.385 --> 00:20:45.805
Yes, you need the academics.

378
00:20:46.105 --> 00:20:48.805

Yes, you need the on the job training, which is traditional.

379
00:20:49.905 --> 00:20:52.565
You need mentoring. Sometimes you get that,

380
00:20:53.305 --> 00:20:55.365
but you also need airmanship acumen.

381
00:20:55.545 --> 00:20:58.885
You need to have been tested in that arena as well.

382
00:20:59.585 --> 00:21:00.925
And you need standal.

383
00:21:01.145 --> 00:21:03.085
You need to be evaluated, you need

384
00:21:03.085 --> 00:21:04.605
to have currency requirements,

385
00:21:05.305 --> 00:21:07.445
and you need ongoing professional development.

386
00:21:07.785 --> 00:21:09.765
And this is where we could do better.

387
00:21:11.395 --> 00:21:13.975
Uh, and what's the outcome that you want?

388
00:21:14.435 --> 00:21:17.455
The outcome you want is someone who has the expertise

389
00:21:17.455 --> 00:21:19.655
to identify things that you, if you're flying

390
00:21:19.655 --> 00:21:21.095
as the pilot may have missed.

391
00:21:21.755 --> 00:21:25.535
And the confidence, as Turbo has said to say no.

392
00:21:27.155 --> 00:21:29.495
My own my own experience doing that.

393
00:21:29.495 --> 00:21:34.135
When I was flying in ww uh, 86 at test pilot school,

394
00:21:34.485 --> 00:21:38.095
when a test pilot was starting to do some, um, maneuvers

395
00:21:38.095 --> 00:21:39.575
and he was starting to exit the boundary,

396
00:21:39.695 --> 00:21:40.855
A TC was calling from him.

397
00:21:41.375 --> 00:21:42.535
I said, we're a Borden.

398
00:21:42.535 --> 00:21:43.975
And, and he said, well, I need to finish.

399
00:21:44.215 --> 00:21:45.495
I said, I got the airplane.

400
00:21:45.955 --> 00:21:49.575
So you take over, you know, you gotta have that confidence

401
00:21:55.235 --> 00:21:56.295
And keep you with our mission.

402
00:21:56.615 --> 00:21:59.535
SFT is supporting the flight test training education

403
00:21:59.565 --> 00:22:01.695
council, pat Hutchinson and

404
00:22:01.695 --> 00:22:03.455
after him, Doug, have done a great job.

405
00:22:03.985 --> 00:22:06.375

We're working with the schools to advocate

406
00:22:06.395 --> 00:22:09.135
for more integrated hybrid solutions

407
00:22:09.135 --> 00:22:11.495
that are more cost effective, but we need to do more.

408
00:22:12.275 --> 00:22:14.695
Uh, we're launching a standards based program.

409
00:22:17.875 --> 00:22:19.735
Its purpose is to recognize organizations

410
00:22:19.895 --> 00:22:23.295
that invest in structured FTE training, qualification,

411
00:22:23.575 --> 00:22:25.295
progression, and professional development.

412
00:22:26.035 --> 00:22:29.375
The objective is ensuring all FTEs are equipped

413
00:22:29.375 --> 00:22:30.375
with the knowledge, skills,

414
00:22:30.635 --> 00:22:32.975
and support systems necessary to excel.

415
00:22:33.435 --> 00:22:37.095
The strategic goal is to incentivize FTE training

416
00:22:37.955 --> 00:22:39.375
and development at all.

417
00:22:39.375 --> 00:22:43.975
Flight test organizations has two

418
00:22:43.975 --> 00:22:46.175
components on, uh,

419
00:22:46.175 --> 00:22:48.655
first qualification progression from novice

420
00:22:48.655 --> 00:22:52.895
to mentor based on evaluations and certification.

421
00:22:53.595 --> 00:22:56.535
Second proficiency development, ongoing training,

422
00:22:57.035 --> 00:22:58.375
credit for experience.

423
00:22:58.515 --> 00:23:00.695
Yes. And currency requirements.

424
00:23:01.675 --> 00:23:04.295
And I think maybe crew rest requirements.

425
00:23:04.915 --> 00:23:07.495
All these applications that are gonna, is gonna roll out,

426
00:23:07.635 --> 00:23:10.135
uh, in the end of this month are gonna be reviewed

427
00:23:10.155 --> 00:23:11.855
by highly experienced FTEs.

428
00:23:12.155 --> 00:23:15.375
You can view more information on the SFT website.

429
00:23:17.755 --> 00:23:21.215
So if your organization asks why, here's a list of reasons.

430
00:23:21.485 --> 00:23:23.455
It's not just safer, it's smarter.

431
00:23:23.755 --> 00:23:26.055
You're gonna attract talent, retain talent,

432
00:23:26.355 --> 00:23:28.335

and have a more effective test program.

433
00:23:30.815 --> 00:23:34.145
Alright, returning to the theme brilliance

434
00:23:34.145 --> 00:23:37.105
and basics, today's basics must expand

435
00:23:37.245 --> 00:23:39.185
to include new methods tailored

436
00:23:39.245 --> 00:23:41.785
to manage the risks associated in a complex domain.

437
00:23:42.485 --> 00:23:45.960
It must include a deeper organizational commitment

438
00:23:46.025 --> 00:23:47.645
to FTE training and development.

439
00:23:48.475 --> 00:23:52.205
It's gonna take all of us advocating for this evolution

440
00:23:52.465 --> 00:23:54.605
to realize the necessary cultural change.

441
00:23:55.505 --> 00:23:57.885
And perhaps that change means moving out

442
00:23:57.885 --> 00:24:00.125
of our separate societies and joining the other one.

443
00:24:00.155 --> 00:24:04.725
Like many test pilots have joined SFTE, uh,

444
00:24:05.185 --> 00:24:08.485
and i, I will name like Rick Simmons, pat Hutchinson,

445
00:24:08.585 --> 00:24:10.005
and others in here who have done that.

446
00:24:10.945 --> 00:24:15.725
So I say brothers and sisters, let's move forward together.

447
00:24:17.025 --> 00:24:18.645
Pilots become an SFTE member.

448
00:24:19.185 --> 00:24:21.485
Be part of the evolution to the Society

449
00:24:21.485 --> 00:24:23.365
of Flight Test Engineering.

450
00:24:24.265 --> 00:24:28.085
Double your knowledge aperture by going to the SFT

451
00:24:28.975 --> 00:24:31.805
symposiums and getting access to a database

452
00:24:31.805 --> 00:24:35.245
that has everything from S-F-T-S-E-T-P to SFT

453
00:24:36.715 --> 00:24:38.725
help us elevate the standards.

454
00:24:39.425 --> 00:24:41.525
So together, thank you

455
00:24:53.665 --> 00:24:54.665
Outta Time.

456
00:24:55.025 --> 00:24:56.855
We're running a little bit ahead if anybody has any

457
00:24:57.055 --> 00:24:59.615
questions or one question, maybe anybody

458
00:25:00.235 --> 00:25:01.895
or you can wait till the panel discussion.

459
00:25:06.675 --> 00:25:10.155

I don't see any. Thank you, Jeff. Yeah, nice job.