

Tutorial Flight Test Crew Resource Management Part 1

1

00:00:01.420 --> 00:00:01.839

Thanks, sir.

2

00:00:04.380 --> 00:00:06.680

Morning. Oh, wow, I am on. Hi.

3

00:00:08.800 --> 00:00:09.100

All right.

4

00:00:10.320 --> 00:00:14.120

So first, thanks to Tom and the Flight Test Safety Committee for

5

00:00:14.220 --> 00:00:18.040

having me in this morning. I'll set the

6

00:00:18.100 --> 00:00:21.740

stage a little bit with how this morning's going to work and how I'm approaching

7

00:00:21.780 --> 00:00:22.000

this,

8

00:00:22.800 --> 00:00:24.160

and we'll go from there.

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00:00:25.160 --> 00:00:27.660

So the presentation that I'm going to give is

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00:00:28.560 --> 00:00:29.780

going to be in two parts.

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00:00:31.160 --> 00:00:35.080

The main subject line is going to be around flight test crew resource

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00:00:35.120 --> 00:00:38.520

management and how it is different from, say,

13

00:00:38.660 --> 00:00:41.880

CRM out on the line, flying for an airline type thing.

14

00:00:44.020 --> 00:00:46.220

We'll start with how we develop the course.

15

00:00:47.820 --> 00:00:48.080

So that

16

00:00:49.380 --> 00:00:53.140

presentation's going to run hopefully 30-ish minutes or so.

17

00:00:53.280 --> 00:00:55.960

We'll take a break, go through some questions.

18

00:00:56.740 --> 00:01:00.460

While they switch out to a second presentation that I have, you can get a

19

00:01:00.540 --> 00:01:04.041

drink at that point, and then we'll run to the 10:00 break

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00:01:04.100 --> 00:01:06.010

that Tom mentioned, and

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00:01:07.120 --> 00:01:09.630

take a break there, and then we'll finish out after that till lunchtime.

22

00:01:10.620 --> 00:01:10.900

So,

23

00:01:12.800 --> 00:01:15.280

a red screen is not a good way to start.

24

00:01:21.060 --> 00:01:22.280

And that was unplanned.

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00:01:29.120 --> 00:01:31.740

All right. This is the technical difficulty for the day, I think.

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00:01:38.500 --> 00:01:41.040

How about this? I'll start without it, and we'll catch up.

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00:01:42.840 --> 00:01:46.440

All right. So we're going to start off... Oh, here we go. I see it down here now.

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00:01:51.380 --> 00:01:54.700

Maybe. No, not quite. That's all right.

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00:01:55.860 --> 00:01:56.460

We'll get going.

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00:01:59.120 --> 00:02:03.080

All right. So like I said, we decided in earnest to develop a flight test

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00:02:03.120 --> 00:02:06.960

CRM course within the FAA, and this first part is going to be

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00:02:07.020 --> 00:02:10.660

about how we develop that. So we'll go through talking about

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00:02:11.200 --> 00:02:12.080

a foundation

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00:02:13.120 --> 00:02:16.080

of where the idea started, a little bit of background.

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00:02:16.140 --> 00:02:19.920

We'll hit some ground rules on things that we decided

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00:02:20.280 --> 00:02:23.870

to abide by throughout the development of the course, and then I'll take you

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00:02:23.870 --> 00:02:25.280

through a little bit more of the process.

38

00:02:26.280 --> 00:02:26.800

Ah, perfect.

39

00:02:28.160 --> 00:02:32.020

And it works. Outstanding. All right. Where's Addison? Raise your hand.

40

00:02:32.120 --> 00:02:35.500

There he is in the back. Addison's our national safety officer.

41

00:02:35.620 --> 00:02:39.360

I couldn't do a presentation at a flight test safety workshop without an SMS

42

00:02:39.400 --> 00:02:40.970

slide. So I got you covered, man.

43

00:02:43.220 --> 00:02:47.060

So I think the large majority of you in the room know and have

44

00:02:47.100 --> 00:02:49.859

experienced SMS and development of a system.

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00:02:50.800 --> 00:02:54.600

Training obviously lives down in the safety promotion portion, but I would argue

46

00:02:54.720 --> 00:02:58.260

that it is a direct tie into safety assurance as well.

47

00:02:58.820 --> 00:03:02.710

That feedback loop and learning those lessons, and actually learning

48

00:03:02.710 --> 00:03:06.540

the lessons and institutionalizing them, is a super important

49

00:03:06.580 --> 00:03:10.220

part of any SMS, and training is a key

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00:03:10.240 --> 00:03:12.000

component to that.

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00:03:13.720 --> 00:03:17.520

Internal to the FAA, at any given time within our flight test group, we have

52

00:03:17.600 --> 00:03:19.200

several strategic teams going.

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00:03:20.140 --> 00:03:24.000

Right now, Addison's running one, and I think a lot of you have

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00:03:24.040 --> 00:03:24.620

contributed

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00:03:25.640 --> 00:03:29.269

to the revision of Order 4040.26, the risk management order.

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00:03:29.960 --> 00:03:33.720

So that's happening, but one of the other teams that's kind of always

57

00:03:33.760 --> 00:03:37.269

running in our background is a team focused on our training,

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00:03:38.280 --> 00:03:41.820

and what process improvements we can make, what courses we can change,

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00:03:42.440 --> 00:03:45.700

and how we can affect our crew members from a training perspective to make sure

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00:03:45.740 --> 00:03:49.530

they're as ready as they can be to come work with you guys out in industry

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00:03:49.740 --> 00:03:51.160

on different flight test campaigns.

62

00:03:53.520 --> 00:03:57.360

Let's see. One of the decisions we made around our

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00:03:57.440 --> 00:03:58.320

training programs,

64

00:03:59.400 --> 00:04:02.800

most recently and probably over the last, I'd say, 10 years now,

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00:04:03.880 --> 00:04:07.680

is really looking at how we train. So breaking up our

66

00:04:07.720 --> 00:04:08.900  
training into components.

67

00:04:09.940 --> 00:04:10.300  
So

68

00:04:11.360 --> 00:04:15.250  
what I mean by that is we used to have some pretty large classes, three weeks

69

00:04:15.340 --> 00:04:18.500  
here, six weeks there, and we made a very deliberate

70

00:04:18.541 --> 00:04:22.300  
decision to break those up into components so that we could be

71

00:04:22.340 --> 00:04:25.800  
more focused and more deliberate about the items that we're trying to train to,

72

00:04:26.400 --> 00:04:29.560  
and CRM obviously was one of those tasks.

73

00:04:32.040 --> 00:04:35.940  
All right. So where did CRM and formal CRM training get its

74

00:04:36.060 --> 00:04:36.420  
start?

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00:04:38.140 --> 00:04:40.440  
It's a hint here on the right side of the screen.

76

00:04:40.840 --> 00:04:44.040  
NASA had a workshop in 1979,

77

00:04:45.100 --> 00:04:48.599  
and it was following an accident. Anybody remember what it was?

78

00:04:49.800 --> 00:04:50.540  
Shout it out. Come on.

79

00:04:53.120 --> 00:04:53.640  
Tenerife.

80

00:04:55.000 --> 00:04:56.860  
Tenerife. Tenerife is what it followed.

81

00:04:58.880 --> 00:04:59.840  
That first workshop,

82

00:05:01.020 --> 00:05:04.720  
yes, it was around CRM, but the primary focus was

83

00:05:04.820 --> 00:05:05.340  
around

84

00:05:07.100 --> 00:05:09.840  
the authority gradient and individual performance,

85

00:05:10.740 --> 00:05:13.260  
and obviously CRM has developed since then, right?

86

00:05:13.320 --> 00:05:17.110  
So we've gone much more to a look around team-based safety.

87

00:05:18.860 --> 00:05:22.760  
That said, all the primary components of CRM that are listed in

88

00:05:22.820 --> 00:05:26.560  
that report are still major components of CRM

89

00:05:26.640 --> 00:05:27.260  
training today.

90

00:05:28.640 --> 00:05:32.290  
So crew engagement is one, decision

91

00:05:32.360 --> 00:05:34.460  
making, problem solving, judgment.

92

00:05:34.500 --> 00:05:38.330

Those are all key components to any CRM course today, and they are

93

00:05:38.400 --> 00:05:40.610  
all in that report from 1979.

94

00:05:41.980 --> 00:05:42.320  
So

95

00:05:43.220 --> 00:05:47.160  
the basics, the ideas, the premise of it all is still the same, but it has

96

00:05:47.220 --> 00:05:49.340  
certainly evolved throughout the years. It has to.

97

00:05:51.540 --> 00:05:53.260  
So what makes flight test CRM different?

98

00:05:54.320 --> 00:05:57.720  
Well, when we fly the line, when we're flying from A to B, even when we're flying

99

00:05:57.740 --> 00:06:01.674  
our flight test aircraft just from one station to the otherIt's a

100

00:06:01.724 --> 00:06:05.584  
different setup, right? Because when we do a flight test mission,

101

00:06:06.144 --> 00:06:09.384  
we have the takeoff, the en route, and the landing like everybody else does, but

102

00:06:09.444 --> 00:06:13.094  
that funny little middle part, where we always seem to be really busy,

103

00:06:14.404 --> 00:06:17.564  
is what makes flight test CRM different.

104

00:06:17.644 --> 00:06:21.504  
It's the high risk, it's the any elevated risk, it's

105

00:06:21.514 --> 00:06:25.443  
the choreographed test techniques that we have that are developed by

106

00:06:25.524 --> 00:06:28.784  
one or more pilots, flight test engineers, TM,

107

00:06:29.344 --> 00:06:30.244  
ground station.

108

00:06:31.354 --> 00:06:31.604  
That

109

00:06:32.764 --> 00:06:36.724  
orchestra of people that's required to successfully execute

110

00:06:36.744 --> 00:06:39.604  
a flight test mission is what makes flight test CRM different.

111

00:06:43.704 --> 00:06:46.334  
There it goes. All right. So we set up some ground rules

112

00:06:47.264 --> 00:06:48.604  
when we were developing this class.

113

00:06:50.204 --> 00:06:54.094  
The first and most important of which that we found was that it had to be driven

114

00:06:54.124 --> 00:06:58.004  
by the people in the room. It couldn't be somebody standing up at the

115

00:06:58.044 --> 00:07:01.844  
front talking at you for two and a half

116

00:07:01.904 --> 00:07:04.244  
days, a day and a half, whatever the case may be.

117

00:07:04.964 --> 00:07:08.824  
It needed to be driven by the people in the room, and we're going to do our best

118

00:07:08.864 --> 00:07:09.624  
to do that

119  
00:07:10.464 --> 00:07:13.424  
a little bit later here as part of my presentation.

120  
00:07:13.724 --> 00:07:17.614  
But this scale is a little bit different than what we're used to in our  
classroom,

121  
00:07:18.124 --> 00:07:19.754  
and you'll see that more in a second here.

122  
00:07:20.514 --> 00:07:24.004  
But yeah, conversation versus lecture-based is super important.

123  
00:07:26.404 --> 00:07:30.354  
We really want to capitalize on the variety of backgrounds that we have  
in the

124  
00:07:30.384 --> 00:07:34.244  
room. So a lot of our flight test crew members that come in,

125  
00:07:34.324 --> 00:07:38.314  
yes, some are military test pilot school grads, but we have a lot of

126  
00:07:38.344 --> 00:07:41.324  
people with super varying backgrounds from all over

127  
00:07:41.364 --> 00:07:45.344  
industry. To not capitalize on those lessons, to

128  
00:07:45.384 --> 00:07:49.274  
not capitalize on that experience and what they bring into the flight  
deck, it

129  
00:07:49.304 --> 00:07:52.144  
would be a colossal mistake. So, that

130  
00:07:52.204 --> 00:07:55.864  
conversation-based, that participant-based class

131

00:07:56.064 --> 00:07:58.904  
is the cornerstone of our entire program.

132

00:08:00.724 --> 00:08:02.504  
The other big piece is making it realistic.

133

00:08:04.404 --> 00:08:07.334  
So we do full-on pre-flight briefings,

134

00:08:08.404 --> 00:08:09.864  
including risk management review.

135

00:08:11.124 --> 00:08:15.004  
There's no zooming in the sim. Right now, we're conducting all these

136

00:08:15.084 --> 00:08:16.124  
exercises in a sim,

137

00:08:17.044 --> 00:08:20.874  
but there's no zooming. The most that we will do is we will

138

00:08:20.964 --> 00:08:24.464  
have you on a ramp, engines running, ready to taxi.

139

00:08:25.004 --> 00:08:28.344  
But beyond that, it's taxi, takeoff, commute out to the test

140

00:08:28.424 --> 00:08:31.064  
area, run your test, commute back,

141

00:08:32.345 --> 00:08:33.744  
landing, and taxi in.

142

00:08:34.804 --> 00:08:37.225  
So it is a full-on flight test mission.

143

00:08:39.444 --> 00:08:43.004  
Buildup. If you haven't done the test techniques that are going to be on  
the cards

144

00:08:43.044 --> 00:08:46.784  
that day, you can do a buildup before you

145  
00:08:46.844 --> 00:08:48.544  
execute your first test condition.

146  
00:08:48.984 --> 00:08:52.104  
We run the scenario like you run a test.

147  
00:08:53.644 --> 00:08:57.464  
Defining the FTE and pilot different roles and responsibilities,

148  
00:08:57.504 --> 00:08:59.284  
who's pilot flying, pilot monitoring.

149  
00:08:59.404 --> 00:09:00.024  
Some tests,

150  
00:09:00.844 --> 00:09:04.393  
one of the scenarios that we run is engine operating characteristics.

151  
00:09:05.244 --> 00:09:08.444  
So for any of you that have done stuff like that with BOWTIES and excels  
and

152  
00:09:08.484 --> 00:09:12.224  
decel, you know that just keeping the aircraft on

153  
00:09:12.324 --> 00:09:12.764  
speed

154  
00:09:13.624 --> 00:09:17.284  
and in the direction it's pointed in the test area is a mission into

155  
00:09:17.304 --> 00:09:20.884  
itself. So then the other pilot's running the throttles or something  
along those

156  
00:09:20.904 --> 00:09:24.444  
lines. But defining all that in the briefing room before we get into the

157

00:09:24.484 --> 00:09:25.924  
aircraft is a key component.

158  
00:09:27.324 --> 00:09:30.624  
And then my favorite one that we worked really hard is no role-play.

159  
00:09:31.744 --> 00:09:35.484  
So how many people have been through a CRM course where you're told to play a

160  
00:09:35.504 --> 00:09:37.144  
role, where you're

161  
00:09:38.884 --> 00:09:42.224  
an instigator in the cockpit, or you become incapacitated?

162  
00:09:42.284 --> 00:09:44.904  
There's lots of room for that, right?

163  
00:09:45.604 --> 00:09:48.824  
And there's value to it, and I'm going to get to another piece of that a little

164  
00:09:48.884 --> 00:09:49.424  
later, but

165  
00:09:50.284 --> 00:09:53.784  
we made a very distinct decision in developing all of our

166  
00:09:53.804 --> 00:09:55.364  
scenarios that there's no role-play.

167  
00:09:56.184 --> 00:09:59.624  
That isn't to say there are no abnormalities or

168  
00:09:59.644 --> 00:10:00.804  
emergencies that happen.

169  
00:10:01.604 --> 00:10:05.484  
We have purposefully built up the scenarios that if you

170

00:10:05.544 --> 00:10:09.064  
are not working well together as a team, if you are not

171  
00:10:09.104 --> 00:10:12.964  
situationally aware of what's happening on the flight deck, you will

172  
00:10:13.204 --> 00:10:14.924  
walk yourself into a problem.

173  
00:10:16.544 --> 00:10:20.224  
And then it's incumbent on you as a team to get yourselves out of it.

174  
00:10:21.904 --> 00:10:25.744  
But that's a super important one, and that's one that I'm super proud of  
in how we

175  
00:10:25.764 --> 00:10:29.484  
developed this course, is the lack of role-playing.

176  
00:10:29.524 --> 00:10:32.604  
And then the last piece there, aircraft agnostic.

177  
00:10:32.664 --> 00:10:34.564  
This one's a lot harder than you would think.

178  
00:10:35.804 --> 00:10:39.664  
We can write some cards that are aircraft agnostic,

179  
00:10:39.764 --> 00:10:43.424  
but really for the cards to be effective, you have to get aircraft

180  
00:10:43.524 --> 00:10:47.264  
specific, right? When you start talking about V speeds

181  
00:10:47.484 --> 00:10:51.084  
and altitude capability and the systems that the

182  
00:10:51.104 --> 00:10:54.824  
aircraft has or doesn't have, there has to be some specifics

183  
00:10:55.144 --> 00:10:56.564

integrated into these cards.

184

00:10:57.524 --> 00:11:01.404

That said, we have built them where you can drop part of those cards

185

00:11:01.464 --> 00:11:04.964

off and attach another part depending on the aircraft that you're in.

186

00:11:05.024 --> 00:11:06.324

It's pretty easy to adapt.

187

00:11:11.164 --> 00:11:13.784

All right. Let's make sure I didn't forget anything. Yep, I'm good.

188

00:11:17.304 --> 00:11:20.104

All right. So where do we start? How do we develop this?

189

00:11:22.304 --> 00:11:26.164

The first piece is we can't really be taught like

190

00:11:26.204 --> 00:11:29.904

your typical TPS students, when you start talking about our FAA crew members.

191

00:11:31.124 --> 00:11:31.934

The reason being,

192

00:11:33.424 --> 00:11:37.264

very, very few of us, if any of us, are complete newbies to flight

193

00:11:37.304 --> 00:11:37.604

test.

194

00:11:38.784 --> 00:11:41.204

Like I said, many are test pilot school graduates.

195

00:11:41.264 --> 00:11:45.034

Many are coming to us with years and years of experience from industry.

196

00:11:45.824 --> 00:11:49.484

So approaching this like any other TPS student

197

00:11:49.744 --> 00:11:51.224  
doesn't necessarily work for us.

198

00:11:52.244 --> 00:11:55.984  
So we had to approach it and think about how we wanted to

199

00:11:56.264 --> 00:11:57.704  
teach this, where

200

00:11:58.684 --> 00:12:02.540  
the adaptability piece is the key.And

201

00:12:03.020 --> 00:12:06.449  
we have several people, almost all of our folks have been through the  
class at

202

00:12:06.500 --> 00:12:09.740  
least once now. And many of them will tell

203

00:12:09.840 --> 00:12:13.520  
you that the level of discomfort they feel in operating an

204

00:12:13.560 --> 00:12:17.440  
aircraft that's not familiar to them is high.

205

00:12:17.580 --> 00:12:21.420  
And the key to this is fly the plane,

206

00:12:22.620 --> 00:12:22.860  
right?

207

00:12:23.960 --> 00:12:24.220  
And that

208

00:12:25.140 --> 00:12:29.060  
statement rings true throughout any flight test mission,

209

00:12:29.520 --> 00:12:31.640  
throughout any operation that you have.

210

00:12:32.340 --> 00:12:35.640

When in doubt, when all things seem to be going wrong,

211

00:12:36.480 --> 00:12:37.380

fly the plane.

212

00:12:38.880 --> 00:12:42.340

So that is a key cornerstone here, and we repeat

213

00:12:42.349 --> 00:12:44.560

that a lot throughout the course.

214

00:12:45.480 --> 00:12:48.989

That said, as instructors/facilitators,

215

00:12:49.520 --> 00:12:53.340

we do our best to help guide people through with some of the aircraft-specific

216

00:12:53.350 --> 00:12:55.280

things and some of the

217

00:12:56.780 --> 00:12:59.540

knowledge-based items that they need just to operate the aircraft.

218

00:13:03.720 --> 00:13:04.160

All right.

219

00:13:05.180 --> 00:13:08.680

So because of the varied mission that we have, because of the different

220

00:13:08.720 --> 00:13:12.080

platforms that we operate, we see everything from light Part 23

221

00:13:12.140 --> 00:13:16.040

aircraft and light Part 27 helicopters, all the way

222

00:13:16.120 --> 00:13:18.800

up through the heavies operating with the new

223

00:13:18.980 --> 00:13:22.860  
777-9. And then don't forget about gliders,

224  
00:13:23.160 --> 00:13:26.280  
hot air balloons, powered lift. We get to see all of it.

225  
00:13:27.400 --> 00:13:30.920  
So having a "standardized training

226  
00:13:30.940 --> 00:13:33.140  
program" becomes quite a monster.

227  
00:13:34.400 --> 00:13:38.380  
So how do we design a hands-on day-of-flight

228  
00:13:38.460 --> 00:13:41.850  
exercise that covers all of that? Well,

229  
00:13:42.440 --> 00:13:42.840  
you can't,

230  
00:13:43.780 --> 00:13:47.460  
right? We do our best to adapt to the situations and involve some

231  
00:13:47.520 --> 00:13:48.450  
standard practices.

232  
00:13:50.160 --> 00:13:53.200  
But with the variety of mission that we have, that becomes a lot harder.

233  
00:13:55.700 --> 00:13:59.550  
One thing I wanted to highlight is what we had going into

234  
00:13:59.600 --> 00:14:03.580  
this exercise. So our CRM lessons going into

235  
00:14:03.640 --> 00:14:07.320  
this were a web-based training course.

236  
00:14:08.340 --> 00:14:10.280  
Who here thinks that was super valuable?

237

00:14:12.160 --> 00:14:15.260

And largely coincidental CRM

238

00:14:15.300 --> 00:14:19.120

training. We're going to a type rating recurrent course and getting a

239

00:14:19.360 --> 00:14:22.989

61.58 check. We're going out to National Test Pilot

240

00:14:23.020 --> 00:14:25.760

School and taking one of their short courses.

241

00:14:27.200 --> 00:14:30.560

There was a lot of coincidental CRM learning, but very

242

00:14:31.000 --> 00:14:33.920

little purposeful CRM education.

243

00:14:34.660 --> 00:14:36.460

And that was a huge

244

00:14:37.340 --> 00:14:38.860

impetus to start this.

245

00:14:41.800 --> 00:14:45.080

So we started with a few questions, and what you're going to see now on all these

246

00:14:45.120 --> 00:14:48.940

slides are the questions we were asking ourselves as we went through the

247

00:14:48.980 --> 00:14:49.500

process.

248

00:14:52.940 --> 00:14:54.100

Come on, you can do it. There we go.

249

00:14:56.800 --> 00:14:59.960

So how do you make it realistic if you're only going to use a classroom and a sim?

250

00:15:00.020 --> 00:15:03.820

We already talked about this a little bit, but it's real test cards, production

251

00:15:03.860 --> 00:15:06.600

test procedures, cert test procedures from TIAs

252

00:15:07.500 --> 00:15:09.280

were all used as examples,

253

00:15:10.100 --> 00:15:13.300

varying the test techniques and identifying gaps.

254

00:15:13.960 --> 00:15:16.580

So we very purposefully

255

00:15:17.760 --> 00:15:21.620

designed our test cards to not be, we'll say,

256

00:15:21.720 --> 00:15:22.240

ideal.

257

00:15:24.460 --> 00:15:28.120

The test conditions, instead of being in a order that you would

258

00:15:28.160 --> 00:15:32.110

expect to execute, like let's do all of this configuration first,

259

00:15:32.140 --> 00:15:35.840

then that configuration, or all at low speed first, and then switch to high

260

00:15:35.920 --> 00:15:36.240

speed.

261

00:15:37.320 --> 00:15:41.080

We didn't organize them that way. They're kind of haphazardly

262

00:15:41.180 --> 00:15:45.049

organized, putting it on the crew members during the brief to take

263

00:15:45.100 --> 00:15:48.580

that part of the exercise on themselves and get organized.

264

00:15:50.420 --> 00:15:54.140

Part of that also includes other systems configurations throughout the

265

00:15:54.200 --> 00:15:58.060

test, and that's where you generate potential

266

00:15:58.120 --> 00:16:01.820

errors. That's where you generate your potential non-normals,

267

00:16:02.800 --> 00:16:05.280

is in those transitions. Right?

268

00:16:07.020 --> 00:16:10.720

How many people have read an accident investigation, have read a

269

00:16:10.760 --> 00:16:14.750

safety event report from your internal safety reports that starts

270

00:16:14.800 --> 00:16:18.460

with, "We were transitioning from this condition to that one.

271

00:16:19.280 --> 00:16:22.840

We were returning to base after all conditions were over.

272

00:16:23.060 --> 00:16:25.020

It was our last test of the day."

273

00:16:26.120 --> 00:16:26.320

Right?

274

00:16:27.300 --> 00:16:31.060

Those are all based on gaps. Those are all based

275

00:16:31.160 --> 00:16:34.860

on that mental step that you take throughout a flight test

276

00:16:35.020 --> 00:16:35.330  
mission,

277  
00:16:36.180 --> 00:16:36.330  
and

278  
00:16:37.260 --> 00:16:41.180  
it's harder than you'd think to design that into a set of cards.

279  
00:16:41.200 --> 00:16:44.080  
But I think we've managed to do that pretty successfully.

280  
00:16:47.280 --> 00:16:51.040  
One thing that has been an idea of ours that we haven't incorporated

281  
00:16:51.080 --> 00:16:53.530  
yet, that I'm excited to try,

282  
00:16:56.400 --> 00:16:59.860  
inconsistencies in the test cards between what the FTEs have in their

283  
00:16:59.900 --> 00:17:02.280  
hands and what the pilots have in their hands.

284  
00:17:03.680 --> 00:17:07.240  
So how many times have you sat in a pre-flight brief and an

285  
00:17:07.320 --> 00:17:10.980  
FTE that's walking you through a different set of test conditions says,

286  
00:17:11.421 --> 00:17:13.560  
"Well, I have a note of that on my card,"

287  
00:17:15.200 --> 00:17:16.181  
but it's not on mine.

288  
00:17:18.181 --> 00:17:18.460  
Right?

289  
00:17:19.381 --> 00:17:23.340  
Having those little steps, those little inconsistencies, can also be a

290

00:17:23.381 --> 00:17:25.350

really valuable tool in this training environment.

291

00:17:26.240 --> 00:17:29.620

So we haven't approached that one yet, but it's on our

292

00:17:29.640 --> 00:17:33.000

radar. So heads up for all the FAA guys in the back of the room.

293

00:17:36.000 --> 00:17:39.840

Real THAs. So we've pulled actual THAs in from different

294

00:17:39.900 --> 00:17:43.260

tests that we've done to be the THAs for the different test techniques that we're

295

00:17:43.300 --> 00:17:45.960

running in the sim, and they are part of the brief.

296

00:17:49.840 --> 00:17:51.400

I got to figure out where to point this thing.

297

00:17:53.400 --> 00:17:54.980

So who are the right people to be involved?

298

00:17:58.540 --> 00:18:02.460

So the role of the instructor, and I'm using big

299

00:18:02.500 --> 00:18:05.540

air quotes there because I really don't feel like we're instructors.

300

00:18:05.620 --> 00:18:09.400

We're more facilitators. We point and push in a certain

301

00:18:09.460 --> 00:18:13.348

direction, and then let you... flail and do

302

00:18:13.368 --> 00:18:14.218

what you're going to do,

303  
00:18:15.348 --> 00:18:19.068  
and learn as you go. So not really a teacher

304  
00:18:19.168 --> 00:18:22.008  
role, not really an instructor role.

305  
00:18:22.128 --> 00:18:25.708  
Anybody that's been in a sim session knows the

306  
00:18:25.768 --> 00:18:29.358  
failure injector role. Yeah, we're not that either.

307  
00:18:29.648 --> 00:18:33.428  
There is rare occasion that we will inject a

308  
00:18:33.488 --> 00:18:34.888  
failure from the back of the sim,

309  
00:18:35.908 --> 00:18:39.788  
but it's for one reason and one reason only, time.

310  
00:18:41.288 --> 00:18:45.148  
With this class, we only have a certain amount of time for each sim

311  
00:18:45.168 --> 00:18:47.508  
block. We're trying to get more people through.

312  
00:18:47.548 --> 00:18:51.268  
We're trying to be respectful of the

313  
00:18:51.328 --> 00:18:55.227  
time that the sim folks have given us, because we do get to operate them  
for free.

314  
00:18:57.788 --> 00:19:01.648  
So to be mindful of that, if a test mission's taking a

315  
00:19:01.668 --> 00:19:04.178  
little bit longer, if the efficiencies aren't quite there,

316

00:19:06.168 --> 00:19:10.148  
we will inject something that will drive them to make a decision to go

317  
00:19:10.168 --> 00:19:10.388  
home.

318  
00:19:11.298 --> 00:19:14.988  
If you're doing engine operating characteristics and your test engine starts to

319  
00:19:15.028 --> 00:19:17.588  
surge, are you going to keep testing that engine?

320  
00:19:18.248 --> 00:19:21.808  
Probably not. Let's go home. That sounds like a good idea.

321  
00:19:24.828 --> 00:19:27.788  
But beyond that, we're really more facilitating this.

322  
00:19:28.808 --> 00:19:29.628  
In particular,

323  
00:19:30.488 --> 00:19:34.328  
things like our Airbus simulator, where we don't

324  
00:19:34.388 --> 00:19:37.908  
have very much experience across the FAA flying large Airbus

325  
00:19:37.948 --> 00:19:41.328  
aircraft. So having the instructor kind of point and shoot,

326  
00:19:41.798 --> 00:19:45.208  
"Don't worry about that system. That's the button you want to push.

327  
00:19:45.648 --> 00:19:49.588  
Let me help you with that FMS programming so that you can figure out

328  
00:19:49.628 --> 00:19:50.648  
how to load an approach."

329  
00:19:51.728 --> 00:19:55.328

We help in those ways, but we're not in there

330

00:19:55.408 --> 00:19:58.948

full-on instructing. We're letting the test crew run the test

331

00:19:58.988 --> 00:20:00.828

mission.

332

00:20:02.988 --> 00:20:04.268

So how do we structure the class?

333

00:20:06.768 --> 00:20:10.608

The first piece of this is we wanted to figure out a way to

334

00:20:10.648 --> 00:20:13.828

integrate this class into our training program without a large impact

335

00:20:14.668 --> 00:20:17.208

to our crews. Our folks already travel a lot.

336

00:20:18.328 --> 00:20:22.228

We have a large population of our crews that are on travel at least

337

00:20:22.408 --> 00:20:26.098

50% of the year. So to add more travel to that for another

338

00:20:26.148 --> 00:20:29.388

class, is not desirable for any of us.

339

00:20:29.528 --> 00:20:33.098

So we already have a recurrency of

340

00:20:33.108 --> 00:20:36.808

physiological and survival training that we utilize at the Civil

341

00:20:36.868 --> 00:20:40.708

Aeromedical Institute in Oklahoma City, and that's where these sims

342

00:20:40.788 --> 00:20:44.548

happen to be based as well. So we coupled this course onto the tail

343  
00:20:44.628 --> 00:20:48.408  
end of that week of training so that it becomes a three-course kind of  
string all

344  
00:20:48.448 --> 00:20:48.828  
in a week.

345  
00:20:50.488 --> 00:20:53.508  
So that was the first piece. We have the location down.

346  
00:20:54.168 --> 00:20:57.868  
Now, how do we want to roll this in? So what we did is we decided to do a

347  
00:20:57.948 --> 00:20:59.628  
morning classroom session,

348  
00:21:00.588 --> 00:21:04.137  
ground school if you will, followed by an afternoon sim session,

349  
00:21:05.288 --> 00:21:08.608  
go back to the hotel, have a nice dinner, come back the next morning for  
one final

350  
00:21:08.648 --> 00:21:12.368  
sim session, then you return home. We've got the two sims.

351  
00:21:12.428 --> 00:21:16.417  
We have an Airbus A330 sim that's also convertible to a 340,

352  
00:21:17.488 --> 00:21:21.417  
and we've got a 737 sim. It was an 800NG, and it's

353  
00:21:21.448 --> 00:21:25.228  
most recently been reconfigured into a Max-8, which is really nice.

354  
00:21:26.968 --> 00:21:30.408  
So our class will be made up of eight crew members,

355  
00:21:31.028 --> 00:21:33.268  
so two pilots and two FTEs per crew.

356

00:21:34.408 --> 00:21:37.748

So one crew will be in the Airbus sim in the afternoon on Thursday.

357

00:21:37.788 --> 00:21:39.588

The other will be in the Boeing sim.

358

00:21:40.388 --> 00:21:43.948

Ideal world, depending on the scenarios, we'll have them executing the same

359

00:21:44.028 --> 00:21:47.788

scenario in the two different boxes, and they'll

360

00:21:48.508 --> 00:21:52.488

brief separately, debrief together, so we can all learn the lessons

361

00:21:52.508 --> 00:21:52.868

together.

362

00:21:53.888 --> 00:21:57.128

And then the next morning, the crews flip-flop sims,

363

00:21:58.268 --> 00:22:01.128

and the pilots and FTEs will also flip-flop roles.

364

00:22:01.748 --> 00:22:05.408

So if you were pilot flying in one, you'll become pilot monitoring in the next.

365

00:22:06.008 --> 00:22:09.868

And for the FTEs, we have a couple of options that I

366

00:22:09.928 --> 00:22:10.668

really enjoy,

367

00:22:12.068 --> 00:22:14.928

and that's part of the benefit of the setup we have here in Oak City.

368

00:22:15.448 --> 00:22:19.028

This is a research facility, and we're taking advantage of some of those

369

00:22:19.068 --> 00:22:20.908  
research capabilities that the

370

00:22:21.948 --> 00:22:25.648  
sims and the setup have. So we've actually got a

371

00:22:25.688 --> 00:22:26.248  
TM room.

372

00:22:27.468 --> 00:22:30.968  
It's not perfect. It's not the pretty little strip charts.

373

00:22:31.088 --> 00:22:33.428  
It's a lot of data and digits,

374

00:22:34.267 --> 00:22:37.588  
and some pretty pictures. But it is a makeshift TM

375

00:22:37.648 --> 00:22:41.368  
room with real-time open comms to the caps.

376

00:22:42.188 --> 00:22:46.168  
So, we put one FTE in the TM room and one as a test conductor,

377

00:22:46.218 --> 00:22:50.188  
an onboard FTE in the sim to run the test in the box, and then

378

00:22:50.228 --> 00:22:52.908  
they'll swap roles for their second session as well.

379

00:22:55.028 --> 00:22:58.978  
Instructor wise, we'll have one pilot instructor in each box just

380

00:22:58.988 --> 00:23:01.728  
to help with the logistics of running the different sims.

381

00:23:02.348 --> 00:23:06.288  
And then we'll have one of our FTEs down in the control room to

382

00:23:06.328 --> 00:23:10.308

help with the TM setup and answer any questions that happen down

383

00:23:10.348 --> 00:23:10.568  
there.

384

00:23:13.468 --> 00:23:14.347  
Let's see.

385

00:23:16.728 --> 00:23:20.288  
All right. So this is a little bit of insight into our setup.

386

00:23:20.808 --> 00:23:24.548  
In the lower right here is a picture of one of the

387

00:23:24.568 --> 00:23:28.348  
TM examples. You can see there's some good stuff on there, but it's a lot  
of moving

388

00:23:28.408 --> 00:23:31.688  
numbers. And what would you like to see in moving numbers?

389

00:23:31.848 --> 00:23:34.368  
That they turn colors when something goes bad, right?

390

00:23:34.428 --> 00:23:37.768  
Or they bold or underline or something. No, it doesn't do any of that.

391

00:23:40.628 --> 00:23:44.328  
Like I said, imperfections in the system drive part of

392

00:23:44.388 --> 00:23:45.988  
this course exercise.

393

00:23:47.168 --> 00:23:47.368  
The

394

00:23:48.188 --> 00:23:48.688  
cab in the

395

00:23:49.968 --> 00:23:53.448  
upper left there, I believe that's the Airbus set up.

396

00:23:53.548 --> 00:23:55.808

I'd have to come around and get a better view of it.

397

00:23:57.868 --> 00:24:00.148

But those are the two setups that we have.

398

00:24:00.188 --> 00:24:04.148

The biggest thing is we have to be adaptable, even day

399

00:24:04.268 --> 00:24:07.138

of, in giving this course. More than once,

400

00:24:07.948 --> 00:24:10.988

we've had comm issues with the TM room talking to the

401

00:24:11.028 --> 00:24:14.680

cab. So we do have some

402

00:24:14.720 --> 00:24:18.400

adaptability there. The data screens that you see

403

00:24:18.660 --> 00:24:21.440

in the TM room, we have the capability of putting those same

404

00:24:21.600 --> 00:24:25.180

screens on the instructor station screens in the sim.

405

00:24:26.220 --> 00:24:29.780

So in a case like that where comms go bad, we can actually move that

406

00:24:29.880 --> 00:24:33.740

person up into the sim to have both FTEs on board, and have

407

00:24:33.800 --> 00:24:37.700

one being data monitoring on board and the other being the test conductor

408

00:24:37.740 --> 00:24:40.280

running the test. And at that point, the

409

00:24:40.320 --> 00:24:43.880  
instructor/facilitator will actually take a back seat in the sim,

410  
00:24:44.760 --> 00:24:48.490  
only stepping up to punch the handful of buttons that we need to

411  
00:24:48.680 --> 00:24:50.240  
throughout the course.

412  
00:24:51.240 --> 00:24:52.900  
So we do have some good availability there.

413  
00:24:53.840 --> 00:24:57.690  
We can also move things around depending on the number of crew members  
that we have

414  
00:24:57.720 --> 00:25:01.320  
in a given course, like I said, whether we have TM or

415  
00:25:01.340 --> 00:25:01.740  
not.

416  
00:25:03.960 --> 00:25:07.400  
The biggest part of that, the reason around all of this, again, these  
tools were

417  
00:25:07.420 --> 00:25:10.400  
not designed for us. They weren't installed for us.

418  
00:25:11.240 --> 00:25:14.920  
This is a research facility that we are taking advantage of,

419  
00:25:15.500 --> 00:25:18.600  
and of the opportunity to run our course in.

420  
00:25:18.740 --> 00:25:22.220  
So it's on us to adapt to the facility.

421  
00:25:22.240 --> 00:25:26.030  
They have been great. They've installed and built some screens for us and

422

00:25:26.080 --> 00:25:30.040  
done a lot of things for us, but really it was on us to

423  
00:25:30.100 --> 00:25:33.160  
adapt to their facility to fit our needs.

424  
00:25:35.740 --> 00:25:39.720  
All right. So debrief tools. This is one of my favorite

425  
00:25:39.780 --> 00:25:42.560  
parts. Sometimes we use it in the courses, sometimes we don't.

426  
00:25:43.960 --> 00:25:46.260  
But it is a capability that every course has.

427  
00:25:47.740 --> 00:25:50.180  
This one is the Boeing sim,

428  
00:25:51.360 --> 00:25:53.740  
and I'll let this run in the background as I'm going.

429  
00:25:54.950 --> 00:25:57.780  
But you can see some of the things that we have at our disposal.

430  
00:25:57.900 --> 00:26:00.460  
You can actually see flight controls moving.

431  
00:26:00.800 --> 00:26:03.340  
You've got an exo view of the aircraft.

432  
00:26:03.400 --> 00:26:07.170  
You got a pilot's view, PFD, NDs. It'll

433  
00:26:07.220 --> 00:26:09.870  
show cast warnings as well,

434  
00:26:11.060 --> 00:26:15.040  
and then the camera of the crew. I want you to really pay attention to  
what

435  
00:26:15.080 --> 00:26:19.060

this screen looks like. I'm going to show you the other sim playback screen that we

436

00:26:19.160 --> 00:26:22.460

have so you can see a difference and see one of the

437

00:26:22.920 --> 00:26:26.620

challenges that we had to work with when developing this

438

00:26:26.660 --> 00:26:29.639

course and deciding how we wanted to use these tools.

439

00:26:32.300 --> 00:26:35.820

One of the great things that we have in this sim as

440

00:26:35.840 --> 00:26:39.500

capability is we can, as an instructor at the instructor stations,

441

00:26:39.720 --> 00:26:41.640

drop an event marker with the push of a button.

442

00:26:42.280 --> 00:26:45.940

If something happened from a CRM perspective that we want to talk about in the

443

00:26:45.980 --> 00:26:49.960

debrief, we can drop an event marker, I think there's five different

444

00:26:50.020 --> 00:26:53.920

colored markers that we have at our disposal, and make a little note to

445

00:26:53.930 --> 00:26:57.570

ourselves, "Blue marker was this person said this," or, "Red

446

00:26:57.640 --> 00:26:59.810

marker was this person didn't do this."

447

00:27:00.700 --> 00:27:03.480

And we can drop those markers to use as part of a playback,

448

00:27:04.780 --> 00:27:07.810

because how many times have you gone through and somebody's asked you a question,

449

00:27:07.840 --> 00:27:11.290

"Well, you said this." "No, I didn't." "Well, you pushed this button." "I didn't

450

00:27:11.300 --> 00:27:11.880

push that button."

451

00:27:13.220 --> 00:27:15.840

We can go back and we can actually look at it.

452

00:27:19.380 --> 00:27:22.540

So this is the Airbus sim. Anybody see a key difference?

453

00:27:23.800 --> 00:27:26.080

Something that we had a really hard time with when we first started?

454

00:27:28.880 --> 00:27:29.280

Now look.

455

00:27:30.820 --> 00:27:34.800

How well can you see the people and the different instruments and

456

00:27:34.860 --> 00:27:38.300

things happening on the flight deck in the big picture? It's super dark.

457

00:27:39.480 --> 00:27:43.340

So that's one of the lessons that we had to learn, that we had to be very

458

00:27:43.360 --> 00:27:47.340

cognizant of as instructors and facilitators when we're setting up the sims

459

00:27:47.360 --> 00:27:48.080

for this course.

460

00:27:49.200 --> 00:27:53.080

As much as possible, as much as isn't intrusive, we dial up the lighting in

461  
00:27:53.140 --> 00:27:53.500  
the cab

462  
00:27:54.820 --> 00:27:58.790  
so that the playback can see the people, the TM room that

463  
00:27:58.900 --> 00:28:02.040  
has the same capability with the same camera can see the people and  
what's

464  
00:28:02.140 --> 00:28:03.200  
happening on the flight deck.

465  
00:28:04.030 --> 00:28:06.750  
The other one, and I have the sound turned off here purposefully,

466  
00:28:08.260 --> 00:28:10.160  
the other one is this does incorporate sound,

467  
00:28:11.200 --> 00:28:15.100  
but all of the sound, including the comms with the TM

468  
00:28:15.120 --> 00:28:17.700  
room, are all only via area mic.

469  
00:28:19.400 --> 00:28:22.060  
So what would have a big effect in a simulator on an area mic?

470  
00:28:22.650 --> 00:28:26.560  
The sound, the engine sound, the air rush sound that they

471  
00:28:26.600 --> 00:28:30.579  
pipe into the sims. If it's at a quote, unquote, "normal level" that

472  
00:28:30.600 --> 00:28:34.540  
you would normally hear in a sim event, the area mic is terrible.

473  
00:28:35.620 --> 00:28:37.390  
So we actually have to keep that dialed down.

474

00:28:38.660 --> 00:28:41.440

So those are just a couple of things that when we were developing the course, we

475

00:28:41.460 --> 00:28:44.440

ran into, to pay really close attention to.

476

00:28:50.260 --> 00:28:54.160

Yeah, it's a pretty neat setup. You can see it highlights things as they move.

477

00:28:54.780 --> 00:28:56.720

So it's a great tool.

478

00:28:57.560 --> 00:29:00.020

We probably underutilize it, to be frank,

479

00:29:00.900 --> 00:29:03.400

but we've got some really great capability.

480

00:29:08.200 --> 00:29:11.900

So other learning options. So down in that same room, where the TM

481

00:29:12.000 --> 00:29:15.780

setup is, the guy sitting over there on the left, he's sitting at one of the TM

482

00:29:15.860 --> 00:29:19.440

stations. We can run both sims at the same time.

483

00:29:19.480 --> 00:29:23.400

There's two identical desks to that picture that I showed you a couple of minutes

484

00:29:23.440 --> 00:29:26.540

ago that are right there on the left side of the room.

485

00:29:26.580 --> 00:29:30.140

Then there's a full conference room table, and there's eight screens,

486

00:29:30.980 --> 00:29:34.840

and we can display all the information from both sims at the same time as

487

00:29:34.900 --> 00:29:38.480

well. So if we have observers in the room, it's

488

00:29:38.780 --> 00:29:42.320

learning by watching as well. So if we have additional crew members,

489

00:29:42.340 --> 00:29:45.720

visitors, other people that want to participate, we can actually have them in the

490

00:29:45.780 --> 00:29:49.700

room hearing and participating and seeing what's going on in both

491

00:29:49.760 --> 00:29:50.860

sims all at the same time.

492

00:29:55.520 --> 00:29:55.820

All right.

493

00:29:56.920 --> 00:29:58.260

So how did we get this rolling?

494

00:30:00.560 --> 00:30:04.300

We did a lot of paperwork exercise with this, a lot of test card

495

00:30:04.320 --> 00:30:06.980

development, THAs, these look right, these don't.

496

00:30:08.080 --> 00:30:11.240

What can we build into this card that's not in that card?

497

00:30:11.260 --> 00:30:14.180

But it came to a point where we had to give this a

498

00:30:14.220 --> 00:30:17.512

run. So we convened for a week in person.

499

00:30:18.812 --> 00:30:21.771

We had a team of, I want to say it was eight people.

500  
00:30:22.632 --> 00:30:26.392  
There's only a couple of us left. Several have retired and moved on to

501  
00:30:26.452 --> 00:30:29.692  
other things, but there are a couple of us left in the room.

502  
00:30:29.772 --> 00:30:32.492  
Ray is in the back there. He was part of the original team.

503  
00:30:34.112 --> 00:30:37.752  
But we met for a week, and we just started running cards, and just started

504  
00:30:37.812 --> 00:30:41.512  
flying them. And I will tell you, more than once as we were running a

505  
00:30:41.552 --> 00:30:45.492  
card, we were surprised by something, but in a very pleasant

506  
00:30:45.532 --> 00:30:47.982  
way. It's, "Oh, wow. That's a good thing.

507  
00:30:48.192 --> 00:30:51.372  
Let's make sure that's in the cards, because that's going to cause a problem."

508  
00:30:53.092 --> 00:30:57.052  
But with no role-playing. This is all just how the test was set

509  
00:30:57.112 --> 00:30:57.272  
up.

510  
00:30:58.812 --> 00:31:01.932  
So we went through that. That was travel in on Monday, did a bunch

511  
00:31:02.052 --> 00:31:05.732  
of testing and planning on Tuesday and Wednesday, and

512  
00:31:05.772 --> 00:31:09.392  
then at that same week, we had a class of

513

00:31:09.432 --> 00:31:13.202

folks going through the physio survival recurrent track that I talked about,

514

00:31:14.012 --> 00:31:16.072

and we asked a group of them to stay.

515

00:31:17.172 --> 00:31:21.012

So they stayed a couple of days. They came in and they helped run these

516

00:31:21.032 --> 00:31:24.802

test cards for the first time. Super successful.

517

00:31:26.232 --> 00:31:29.342

We had a really great time. We learned a lot.

518

00:31:29.572 --> 00:31:32.362

Some of those pictures that I was talking about with lighting and sound, that's

519

00:31:32.372 --> 00:31:33.842

where a lot of that was discovered.

520

00:31:35.632 --> 00:31:35.872

And

521

00:31:36.952 --> 00:31:39.192

we did not run the full ground school with them.

522

00:31:39.232 --> 00:31:42.902

We thought that was something that we could work on and develop a little later.

523

00:31:43.652 --> 00:31:47.072

We were really focused on the sims and usage of the sims that first week.

524

00:31:47.652 --> 00:31:50.732

So they came in, they ran both of our two original

525

00:31:50.752 --> 00:31:53.732

scenarios. Of course, we had some great feedback.

526

00:31:56.212 --> 00:32:00.152

Some we didn't anticipate, a lot that we anticipated, a lot of comments around,

527

00:32:00.532 --> 00:32:01.612

"These test cards suck."

528

00:32:02.732 --> 00:32:06.692

Right? "You need to work on this. You're missing this speed.

529

00:32:06.792 --> 00:32:08.952

You're missing that configuration.

530

00:32:08.982 --> 00:32:10.912

This step and that step are out of order."

531

00:32:12.032 --> 00:32:14.412

Yes. Thank you. We noticed.

532

00:32:17.452 --> 00:32:20.622

We did make some changes. There were some really great comments that we hadn't

533

00:32:20.672 --> 00:32:24.512

anticipated, so we did make some changes, but a lot of those gaps that

534

00:32:24.552 --> 00:32:27.172

were found were there for a reason.

535

00:32:31.012 --> 00:32:34.752

So we went through that, and wildly successful, had some really great

536

00:32:34.792 --> 00:32:37.972

positive feedback, so at that point, we decided to start rolling it into our

537

00:32:37.992 --> 00:32:38.972

training model.

538

00:32:42.552 --> 00:32:43.002

Come on.

539

00:32:45.672 --> 00:32:46.852

Maybe. No.

540

00:32:48.512 --> 00:32:48.892

There we go.

541

00:32:51.952 --> 00:32:54.092

So what's next? So we worked it into our training cycle.

542

00:32:54.152 --> 00:32:57.492

It has become the primary CRM training for our crews.

543

00:32:57.912 --> 00:33:00.232

We've been doing that since roughly 2019.

544

00:33:01.352 --> 00:33:04.612

So we've had almost all of our crew members go through it.

545

00:33:04.732 --> 00:33:08.132

The only folks that haven't been through it at least once are our brand-new folks.

546

00:33:09.472 --> 00:33:10.232

But beyond that,

547

00:33:11.172 --> 00:33:12.732

everybody's been through it at least once.

548

00:33:12.812 --> 00:33:14.972

We've gone from two scenarios now

549

00:33:15.892 --> 00:33:17.732

up to, I think we're at five or six.

550

00:33:18.932 --> 00:33:22.792

So we keep building out that library as well, because what we also don't want is we

551

00:33:22.812 --> 00:33:23.992

don't want this to get stale.

552

00:33:24.932 --> 00:33:28.732

Right? Those gaps, those little things that we've built

553

00:33:28.772 --> 00:33:31.592

into each scenario, once you've seen them, you've seen them.

554

00:33:31.952 --> 00:33:32.592

You know they're there.

555

00:33:33.692 --> 00:33:36.962

So we want to develop more scenarios so that by the time you come back

556

00:33:36.992 --> 00:33:39.692

through, you're experiencing something else.

557

00:33:39.752 --> 00:33:43.172

So at best, you're going to see the same scenario once

558

00:33:44.152 --> 00:33:45.352

every 10 years or so.

559

00:33:46.612 --> 00:33:50.072

Odds are you're not going to remember all the details a decade after you did it for

560

00:33:50.092 --> 00:33:50.632

the first time.

561

00:33:53.712 --> 00:33:57.212

We've continued to develop those scenarios, and we're still on the hunt for

562

00:33:57.252 --> 00:33:58.832

more. So

563

00:34:00.512 --> 00:34:00.712

that's

564

00:34:02.112 --> 00:34:05.692

been an important step, is in keeping the course fresh.

565

00:34:06.772 --> 00:34:07.792

For a future state,

566

00:34:09.053 --> 00:34:12.772

we do want to continue to expand this, and we've done that very

567

00:34:12.832 --> 00:34:16.772

recently. Tom was super generous and had several of us down

568

00:34:16.852 --> 00:34:20.473

to the Bell Flight Research Center to use the 525

569

00:34:21.572 --> 00:34:24.252

RASL, they call it. It's their systems integration lab.

570

00:34:24.993 --> 00:34:28.953

And we actually ran one of their crew members and a couple of ours

571

00:34:29.712 --> 00:34:33.122

through a rotorcraft scenario in the 525 sim for the first time,

572

00:34:33.652 --> 00:34:37.201

and that worked out really well. So that's

573

00:34:37.732 --> 00:34:40.252

in our bag of tricks now as well, which is great.

574

00:34:41.572 --> 00:34:45.432

We also have other things available to us on campus up at the academy in

575

00:34:45.473 --> 00:34:49.152

Oak City. There's several non-motion training devices.

576

00:34:50.013 --> 00:34:53.312

There's a Citation Mustang, there's a Baron, there's an EC

577

00:34:53.432 --> 00:34:57.332

135 from a helicopter perspective, so we do have some ability

578

00:34:57.392 --> 00:34:59.372  
there. The trade-off

579

00:35:00.452 --> 00:35:04.392  
is it's in a different setup and a different situation than the two full-motion

580

00:35:04.452 --> 00:35:08.052  
sims, so we don't get the TM capability, we don't get those

581

00:35:08.092 --> 00:35:10.792  
comms, and we don't get some of the flight research stuff

582

00:35:12.292 --> 00:35:16.212  
and screens and computer capability that's in the two full-motion sims.

583

00:35:16.272 --> 00:35:19.992  
So we are still very focused on those sims just because of that capability.

584

00:35:24.132 --> 00:35:25.732  
Probably our biggest step

585

00:35:26.732 --> 00:35:30.572  
in really future state and next step of this course was

586

00:35:30.672 --> 00:35:34.452  
actually a couple of years ago. I think it was July of

587

00:35:34.462 --> 00:35:35.672  
'23.

588

00:35:36.992 --> 00:35:40.252  
Some of you are in the room, and you can correct me if I'm wrong, but we had

589

00:35:40.732 --> 00:35:44.112  
folks from Bombardier, Textron, Boeing.

590

00:35:45.952 --> 00:35:46.972  
Who else am I forgetting?

591

00:35:47.932 --> 00:35:48.552

Gulfstream.

592

00:35:49.672 --> 00:35:53.432

So we had several folks come in from the different OEMs and

593

00:35:53.512 --> 00:35:56.102

actually demo portions of this class with us.

594

00:35:56.952 --> 00:36:00.572

It was a great exercise. We had a great brainstorming session afterwards

595

00:36:00.652 --> 00:36:04.592

about directions we could take, different scenarios, and we've actually built out

596

00:36:04.602 --> 00:36:06.832

some scenarios based on those discussions.

597

00:36:07.592 --> 00:36:11.192

But really highlighting what we're trying to do with this

598

00:36:11.272 --> 00:36:11.692

course

599

00:36:12.492 --> 00:36:12.892

and

600

00:36:14.112 --> 00:36:18.016

trying to integrate our OEM partners into this exercise

601

00:36:18.056 --> 00:36:19.396

was super important to us,

602

00:36:20.256 --> 00:36:22.176

because having that influence and

603

00:36:22.976 --> 00:36:26.876

shining a little light behind the curtain of what we go through day-to-day

604

00:36:26.936 --> 00:36:30.836

test mission-wise, and being adaptable from one airframe to the

605

00:36:30.876 --> 00:36:34.176

next, was super important. And having those folks

606

00:36:34.256 --> 00:36:38.246

in, I think, was very valuable. So thanks for

607

00:36:38.276 --> 00:36:41.316

the people that came in and participated in that with us.

608

00:36:43.136 --> 00:36:45.106

Next on slate, and

609

00:36:46.456 --> 00:36:48.056

I'll try to find her in the room, but we

610

00:36:48.916 --> 00:36:51.936

have actually been in talks with Navy Test Pilot School.

611

00:36:52.736 --> 00:36:56.276

They're interested also in coming out and taking a look, and being a part of it.

612

00:36:56.376 --> 00:37:00.296

So we hope to continue that effort, and continue to expand

613

00:37:00.376 --> 00:37:03.916

out our reach with this course. And if we can

614

00:37:03.976 --> 00:37:04.556

influence

615

00:37:05.396 --> 00:37:07.156

courses that you all have internally,

616

00:37:08.516 --> 00:37:12.266

then we've met the mark, I think. So on top of that

617

00:37:12.296 --> 00:37:15.996

currency for us, if we can influence how you guys are

618

00:37:16.016 --> 00:37:19.706

thinking about and teaching CRM as well, then that's an end

619

00:37:19.776 --> 00:37:23.616

state and a super big success for this course and what we were trying to

620

00:37:23.696 --> 00:37:24.956

do.

621

00:37:25.916 --> 00:37:26.956

All right. So with that,

622

00:37:28.016 --> 00:37:31.936

we are a little bit in, and this is the end

623

00:37:32.076 --> 00:37:35.846

of how we developed the course, and we're going to change over and

624

00:37:36.176 --> 00:37:37.076

switch gears.

625

00:37:37.976 --> 00:37:39.896

And I'm actually going to give you guys

626

00:37:40.836 --> 00:37:43.776

a look into that ground

627

00:37:43.916 --> 00:37:47.806

portion of the course, and we're going to go through that for our rest of  
the

628

00:37:47.876 --> 00:37:48.576

time this morning.

629

00:37:49.536 --> 00:37:53.496

I will preface this by, yes, it's partly me talking, and when

630

00:37:53.556 --> 00:37:57.536

we give this course in the classroom, the facilitators do

631

00:37:57.616 --> 00:38:01.276

a fair amount of talking and spurring, but it's a lot of

632

00:38:01.336 --> 00:38:01.976

discussion,

633

00:38:02.976 --> 00:38:05.096

a lot of engagement with the class.

634

00:38:05.396 --> 00:38:09.256

So if you guys sit there and smile at me and nod your heads like you're all doing

635

00:38:09.316 --> 00:38:11.956

right now, this is going to be a really long three hours.

636

00:38:16.676 --> 00:38:20.176

So they're going to switch over. While they're doing that, does anybody have any

637

00:38:20.276 --> 00:38:23.756

questions about the development that we went through so far? Yeah.

638

00:38:25.096 --> 00:38:28.696

Is everybody in your organization an instructor, or do you have dedicated

639

00:38:28.756 --> 00:38:31.996

instructors? And if so, what training do they get?

640

00:38:32.856 --> 00:38:33.476

Great question.

641

00:38:34.936 --> 00:38:38.606

So for those, if you didn't hear it, is everybody in our organization instructors?

642

00:38:38.656 --> 00:38:42.536

And if not, the population that are instructors, what training do they get,

643

00:38:42.596 --> 00:38:46.436

was the question. So the first answer is no, not everybody is an

644

00:38:46.456 --> 00:38:50.316

instructor. We've got a pool of six of us across the

645

00:38:50.356 --> 00:38:53.996

country. Largely, it's folks that are within

646

00:38:54.056 --> 00:38:56.416

somewhat easy commuting distance to Oklahoma City.

647

00:38:57.816 --> 00:39:01.656

So that's part of it. As far as training, probably

648

00:39:01.716 --> 00:39:02.816

not as much as we should.

649

00:39:03.896 --> 00:39:05.476

There's some initial

650

00:39:06.336 --> 00:39:10.176

training on how to operate the sim, to give the proper safety briefings in the

651

00:39:10.236 --> 00:39:14.216

sim, what all the screens do, act, how they behave, and buttons

652

00:39:14.236 --> 00:39:15.576

to push and buttons not to push.

653

00:39:16.736 --> 00:39:20.236

So there's that aspect of it. As far as direct

654

00:39:20.296 --> 00:39:24.116

CRM instructor training, we have not gone that far

655

00:39:24.156 --> 00:39:24.376

yet.

656

00:39:25.656 --> 00:39:29.616

Like I said, we're very much facilitators, so it's not so much of

657

00:39:29.676 --> 00:39:33.656

us teaching, as much as us directing a conversation.

658

00:39:37.396 --> 00:39:38.876

Is there any particular way you manage,

659

00:39:40.336 --> 00:39:41.076

in the discussion,

660

00:39:42.196 --> 00:39:45.656

translating the in-class learning to

661

00:39:46.736 --> 00:39:50.636

the real environment? Because I could see, "Well, we had this engine

662

00:39:50.716 --> 00:39:53.646

surge. We're in a CRM course. We should probably go home." Right?

663

00:39:53.676 --> 00:39:57.456

Versus the drive to finish what your task is when you're actually on a test.

664

00:39:57.796 --> 00:39:58.836

Do you have that kind of discussion?

665

00:39:59.436 --> 00:40:01.516

Yeah. So absolutely. And

666

00:40:02.816 --> 00:40:06.216

hopefully everybody could hear the question. We do have those discussions.

667

00:40:07.076 --> 00:40:10.856

The big thing is when they're going through their

668

00:40:10.896 --> 00:40:11.706

pre-flight briefs,

669

00:40:14.136 --> 00:40:17.696

we again emphasize keeping it real as possible.

670

00:40:18.176 --> 00:40:22.096

So in doing that, if you see something that in the real aircraft

671

00:40:22.176 --> 00:40:26.056

on a test day would make you question whether you should continue or not,

672

00:40:27.176 --> 00:40:30.116

if your decision in the real aircraft would be to go home, then go home.

673

00:40:31.296 --> 00:40:34.996

Right? If your decision real time would be to continue, then

674

00:40:35.056 --> 00:40:35.556

continue.

675

00:40:36.736 --> 00:40:39.416

And as an instructor, if we don't want you to continue, we'll just give you

676

00:40:39.456 --> 00:40:40.136

something worse.

677

00:40:42.456 --> 00:40:44.916

There are times we reset too, right?

678

00:40:45.036 --> 00:40:45.236

Yeah.

679

00:40:47.676 --> 00:40:49.176

I saw another hand. Yeah.

680

00:40:49.236 --> 00:40:52.836

Yeah. Eric, why did you guys use production flight test procedures?

681

00:40:54.076 --> 00:40:54.726

Say that one more time. I'm sorry.

682

00:40:54.796 --> 00:40:56.006  
Why did you use production-

683  
00:40:56.276 --> 00:40:56.676  
When would we?

684  
00:40:56.736 --> 00:41:00.606  
... flight test. Why production? Why not experimental?

685  
00:41:01.556 --> 00:41:05.446  
Oh. So the large majority of what we're doing right now is all experimental

686  
00:41:05.556 --> 00:41:06.636  
stuff. Yeah.

687  
00:41:06.666 --> 00:41:09.416  
Oh, I thought you said in there you were following production flight tests.

688  
00:41:09.596 --> 00:41:13.196  
We do have that ability, and we've toyed around with that

689  
00:41:13.256 --> 00:41:16.556  
idea. The hiccup there is

690  
00:41:17.556 --> 00:41:21.196  
production procedures are very much aircraft specific.

691  
00:41:21.256 --> 00:41:24.946  
So that whole keeping test cards type agnostic and all the rest of that,

692  
00:41:25.016 --> 00:41:28.856  
becomes a lot harder when you start talking about production test procedures.

693  
00:41:31.076 --> 00:41:34.906  
We've toyed with the idea, because we do production oversight with a lot of the

694  
00:41:34.916 --> 00:41:37.156  
manufacturers, so there is value in it.

695

00:41:37.876 --> 00:41:41.736

But really adapting that to what we're trying to do becomes a lot

696

00:41:41.756 --> 00:41:45.196

more difficult. So it's doable, and we've talked about it.

697

00:41:45.296 --> 00:41:47.335

We haven't implemented that aspect of it yet.

698

00:41:50.176 --> 00:41:50.576

Thanks, Eric.

699

00:41:50.626 --> 00:41:50.626

Yeah.

700

00:41:50.676 --> 00:41:54.596

Thanks so much. When you're in a controlled environment like a simulator

701

00:41:54.616 --> 00:41:57.856

environment, is CRM measurable? Are there

702

00:41:57.936 --> 00:42:01.416

anything that you can do to measure CRM

703

00:42:01.436 --> 00:42:02.676

performance amongst the crew?

704

00:42:03.696 --> 00:42:07.076

That's a great question. I haven't thought about it like that actually,  
as far

705

00:42:07.156 --> 00:42:11.056

as actually measuring a performance indicator or something along those  
lines.

706

00:42:11.136 --> 00:42:13.316

We haven't gone down that path.

707

00:42:15.196 --> 00:42:18.596

I think largely because we don't want anybody to feel like they're being

708

00:42:18.656 --> 00:42:21.916

graded in this, because that's not the point of the exercise.

709

00:42:23.176 --> 00:42:26.834

IfAnybody here involved in the

710

00:42:27.344 --> 00:42:30.124

scouting organization? Girl Scouts, Boy Scouts, anything like that?

711

00:42:30.244 --> 00:42:32.664

You got kids in it? You've been in it in the past? Yeah.

712

00:42:33.344 --> 00:42:37.624

Sorry

713

00:42:37.704 --> 00:42:38.764

for the sidetrack.

714

00:42:39.664 --> 00:42:43.414

Hopefully, you've heard the phrase, "It's a safe place to fail." Fail is

715

00:42:43.504 --> 00:42:47.364

not a dirty word. We all learn from our mistakes and our failures.

716

00:42:48.404 --> 00:42:48.604

So

717

00:42:49.604 --> 00:42:53.544

the idea of performance indicators, while good, at

718

00:42:53.584 --> 00:42:57.364

the same time, we really want to make that environment a safe

719

00:42:57.484 --> 00:42:59.364

place to screw something up.

720

00:43:00.224 --> 00:43:03.624

Because that's what's going to drive the conversations in that post-flight brief.

721

00:43:04.184 --> 00:43:07.664

That's what's going to drive your train of thought the next time you're briefing a

722

00:43:07.704 --> 00:43:09.634

certain type of test or a certain environment,

723

00:43:10.484 --> 00:43:14.224

is, "Hey, I ran that in the sim, and I really botched that up last

724

00:43:14.233 --> 00:43:14.524

time,

725

00:43:15.324 --> 00:43:17.364

but I learned something from it, and here's what I learned.

726

00:43:17.454 --> 00:43:21.254

And I know these guys learned it with me, so we can have

727

00:43:21.304 --> 00:43:22.774

that conversation very openly."

728

00:43:24.824 --> 00:43:27.154

So Eric, to tag onto that.

729

00:43:27.304 --> 00:43:27.824

Yeah.

730

00:43:29.724 --> 00:43:33.554

The mission here is to help people bring their CRM skills up,

731

00:43:33.904 --> 00:43:37.784

and if you're going to measure those performance things, you need somebody to

732

00:43:37.824 --> 00:43:41.224

be really deeply involved in the airplane or the type.

733

00:43:41.504 --> 00:43:45.164

And because we're going across different manufacturers, different

734

00:43:45.224 --> 00:43:45.584  
types,

735

00:43:46.584 --> 00:43:50.344  
transport to general aviation and everything, and including

736

00:43:51.624 --> 00:43:52.344  
UAS stuff-

737

00:43:52.584 --> 00:43:52.684  
Yeah

738

00:43:52.944 --> 00:43:56.844  
... we're not trying to do that measurement stuff in this CRM

739

00:43:56.904 --> 00:43:59.024  
class. We're just trying to help people.

740

00:43:59.064 --> 00:44:02.954  
Okay, here's where my deficiencies are, and everybody learns to step up  
and

741

00:44:03.004 --> 00:44:05.704  
becomes aware of where they've got weak points.

742

00:44:06.344 --> 00:44:09.584  
And when we finish that course, we've got something to work on

743

00:44:09.644 --> 00:44:13.524  
for the next assignment that we've got with one of the OEMs or an

744

00:44:13.624 --> 00:44:14.784  
SDC applicant.

745

00:44:14.864 --> 00:44:18.704  
Yeah. No, very true. And a real important

746

00:44:18.744 --> 00:44:19.314  
point here,

747

00:44:20.684 --> 00:44:23.504  
when we get feedback from this course,

748  
00:44:25.104 --> 00:44:28.824  
the top one or two things are always about the quality of the test

749  
00:44:28.904 --> 00:44:30.064  
cards and the THAs.

750  
00:44:30.884 --> 00:44:34.824  
Right behind that is, in general, how uncomfortable

751  
00:44:34.834 --> 00:44:38.624  
they felt in one or both of the sims. I've never flown this.

752  
00:44:38.804 --> 00:44:42.744  
I haven't seen this in a decade. I haven't flown that test technique

753  
00:44:42.804 --> 00:44:45.044  
in two, three years. Right?

754  
00:44:46.144 --> 00:44:48.184  
That level of discomfort

755  
00:44:49.044 --> 00:44:52.253  
is actually what helps make this course even more valuable,

756  
00:44:53.124 --> 00:44:57.004  
because that level of discomfort forces

757  
00:44:57.044 --> 00:44:59.424  
the conversations on the flight deck. Right?

758  
00:45:00.164 --> 00:45:01.984  
"Hey, do you see what this thing is doing?"

759  
00:45:02.124 --> 00:45:05.714  
What's it doing now?" How many times has somebody heard that on a flight  
deck,

760  
00:45:06.644 --> 00:45:06.864

right?

761

00:45:07.704 --> 00:45:11.624

So having that level of discomfort is actually a really important

762

00:45:11.664 --> 00:45:13.504

component to the course,

763

00:45:14.444 --> 00:45:16.724

and we get that feedback all the time,

764

00:45:18.044 --> 00:45:20.763

to which we respond, "Just fly the plane."

765

00:45:22.464 --> 00:45:24.924

Right? The Airbus sim is a little bit different.

766

00:45:25.564 --> 00:45:29.404

It forces our hand in teaching some folks and pushing

767

00:45:30.104 --> 00:45:32.664

a little bit of systems management because it is so

768

00:45:33.564 --> 00:45:34.844

integrated, and

769

00:45:37.224 --> 00:45:38.844

you think a lot, what's it doing now?

770

00:45:41.544 --> 00:45:43.884

So we have to help along a little bit with that sim.

771

00:45:44.844 --> 00:45:48.524

We have a lot more familiarity from a pilot perspective across the Boeing sim,

772

00:45:48.724 --> 00:45:52.624

so there's a lot less of that in the 73 sim, but it still exists for

773

00:45:52.664 --> 00:45:56.624

some. But that level of discomfort is actually a great aid in the course.

774

00:45:58.844 --> 00:46:02.784

Continuing along that stream and what Pete was talking about, do

775

00:46:03.224 --> 00:46:05.064

any of the scenarios

776

00:46:05.624 --> 00:46:09.884

emphasize

777

00:46:09.924 --> 00:46:13.864

the uncomfortableness of when it's maybe time to have the

778

00:46:13.904 --> 00:46:17.664

maneuver flown and observed by a person that's accomplished the

779

00:46:17.684 --> 00:46:21.384

maneuver many times, versus attempt to fly the maneuver as the

780

00:46:21.424 --> 00:46:23.724

certification or evaluator themselves?

781

00:46:23.764 --> 00:46:26.164

Yeah, we actually come across that many times,

782

00:46:27.344 --> 00:46:29.224

where we'll have two pilots flying,

783

00:46:30.204 --> 00:46:30.624

and

784

00:46:32.084 --> 00:46:35.764

the one that's in the left seat that's supposed to be pilot flying for that mission

785

00:46:35.884 --> 00:46:38.664

hasn't flown that type of maneuver ever.

786

00:46:39.284 --> 00:46:42.793

One of our setups is around natural icing,

787

00:46:43.324 --> 00:46:44.663  
actually. So we'll

788

00:46:45.984 --> 00:46:49.784  
do a series of conditions. I'll use steady heading side slips as an

789

00:46:49.824 --> 00:46:53.804  
example, with a clean aircraft, and then we'll actually put them in

790

00:46:53.844 --> 00:46:54.264  
the ice,

791

00:46:55.164 --> 00:46:58.144  
and we'll do a nine-minute ice shape build.

792

00:46:58.944 --> 00:47:02.644  
You pop back out, and you're going to rerun those same steady heading  
side

793

00:47:02.704 --> 00:47:06.364  
slips. And we'll have several people that, "Well, I've never done

794

00:47:06.464 --> 00:47:09.264  
a true natural icing campaign before.

795

00:47:09.344 --> 00:47:10.624  
What should I be looking for?"

796

00:47:11.524 --> 00:47:14.884  
And that interaction between the two crew members is

797

00:47:16.004 --> 00:47:19.564  
fantastically valuable. And I'll sit in the back when

798

00:47:19.624 --> 00:47:22.944  
situations like that happen, and that's when I really just

799

00:47:23.704 --> 00:47:27.384  
cross the arms and keep my mouth shut because all the learning is  
happening up

800  
00:47:27.444 --> 00:47:29.494  
there, and I don't need to get in the way.

801  
00:47:30.504 --> 00:47:33.454  
So yes, it happens. It happens, and it's super valuable.

802  
00:47:35.804 --> 00:47:36.324  
Anybody else?

803  
00:47:37.924 --> 00:47:38.184  
All right.

804  
00:47:39.084 --> 00:47:40.744  
Thank you for the engagement and the questions.

805  
00:47:41.664 --> 00:47:44.964  
Keep it up. We're going to need more of it. All right.

806  
00:47:44.984 --> 00:47:47.964  
So there's a first few lead-in slides here

807  
00:47:48.984 --> 00:47:52.384  
that we're going to zip through a little quick because they're some of  
the

808  
00:47:52.404 --> 00:47:56.384  
background stuff that we just went over with the expanded explanation

809  
00:47:57.044 --> 00:47:57.404  
of how the

810  
00:47:58.244 --> 00:47:59.164  
course was developed.

811  
00:48:00.764 --> 00:48:04.004  
I want to do a little bit of a time check to see how I'm doing here, how  
fast I'm

812  
00:48:04.044 --> 00:48:04.404  
talking.

813

00:48:05.544 --> 00:48:06.084

I'm doing all right.

814

00:48:08.284 --> 00:48:08.604

All right.

815

00:48:10.324 --> 00:48:12.564

So yeah, this is our actual ground school material.

816

00:48:13.004 --> 00:48:16.964

There's a couple of my facilitators in the back of the room that are about to start

817

00:48:17.044 --> 00:48:20.994

squirring because they're actually going to teach one of these courses next week,

818

00:48:21.524 --> 00:48:23.274

and I've changed the material on

819

00:48:23.304 --> 00:48:28.284

them. So

820

00:48:28.344 --> 00:48:31.664

yes, it is recently revised, like two days ago.

821

00:48:34.864 --> 00:48:37.544

All right, so here's some of the logistics stuff. We go over this.

822

00:48:38.664 --> 00:48:41.744

You got to teach people where the bathrooms are and how to get out of the facility

823

00:48:41.764 --> 00:48:45.284

and all that good stuff. So we'll get to skip that.

824

00:48:45.404 --> 00:48:48.304

I do want to highlight some of these logistics, though.

825

00:48:50.704 --> 00:48:54.664

One thing that you don't have at your disposal today, that the crews do

826

00:48:54.704 --> 00:48:57.324

have when we bring them into the room, is a participant guide.

827

00:48:58.084 --> 00:48:58.844

Well, what's in the guide?

828

00:49:00.103 --> 00:49:04.094

So we have all the test cards. We have the THAs all printed out, ready

829

00:49:04.144 --> 00:49:06.504

to go. Some have some note sheets attached.

830

00:49:06.544 --> 00:49:08.424

Some are good, some aren't, as you can imagine.

831

00:49:10.024 --> 00:49:13.544

And then the back of the packet, we've probably got a dozen or so pages

832

00:49:14.324 --> 00:49:15.904

of some quick reference material.

833

00:49:16.344 --> 00:49:18.654

So you're doing a lot of configuration changes.

834

00:49:18.724 --> 00:49:20.834

It would help to know what the flap speeds are,

835

00:49:21.964 --> 00:49:22.924

what the gear speeds are,

836

00:49:24.004 --> 00:49:27.924

how to program something simple into the FMS, approach, a departure,

837

00:49:28.174 --> 00:49:28.554

something.

838

00:49:29.544 --> 00:49:32.764

So we do equip the crews with all of that.

839

00:49:32.863 --> 00:49:36.444

I do preface all of the crews that come to the class

840

00:49:36.504 --> 00:49:38.924

with no prep and no study is required.

841

00:49:40.064 --> 00:49:43.624

So if they haven't gone through that, if they don't know those numbers,

842

00:49:44.444 --> 00:49:47.404

that's one of the things the instructors in the sim are there for.

843

00:49:47.684 --> 00:49:51.644

We can help coach and point in that direction, in particular when

844

00:49:51.684 --> 00:49:55.364

it comes to managing the aircraft systems, like the FMS.

845

00:49:57.344 --> 00:50:00.704

We then do a tour of the facility just to show them where everything is, how to get

846

00:50:00.784 --> 00:50:01.324

around,

847

00:50:02.704 --> 00:50:04.764

and then lay out our expectations.

848

00:50:05.064 --> 00:50:08.584

So the open, honest discussion, the participation piece,

849

00:50:09.584 --> 00:50:13.364

and again, emphasizing over and over again, playing full

850

00:50:13.424 --> 00:50:17.264

out. The more realistic you make it, the more you put

851

00:50:17.344 --> 00:50:19.984

into it, the more the class is going to give back to you.

852

00:50:21.004 --> 00:50:23.774

If you think, "I'm here. I have to do this.

853

00:50:23.924 --> 00:50:27.674

I'm checking my training box for the week," the value you're going to get out of

854

00:50:27.704 --> 00:50:30.184

this class is going to be really poor.

855

00:50:30.644 --> 00:50:34.424

I will say we have really wonderful participation, and folks

856

00:50:34.464 --> 00:50:38.404

really get into this and own it, a lot of times, because there

857

00:50:38.424 --> 00:50:42.304

are certain test techniques that we have in these scenarios that are not the

858

00:50:42.344 --> 00:50:46.054

most common for us to go out and do. And

859

00:50:46.104 --> 00:50:48.064

again, that was done very purposefully.

860

00:50:48.144 --> 00:50:50.864

It's introducing that discomfort, that unfamiliarity.

861

00:50:56.044 --> 00:50:59.324

Okay. This is a super important one.

862

00:51:02.704 --> 00:51:05.544

One of the things that we really encourage throughout the,

863

00:51:06.624 --> 00:51:09.704

I'll keep calling it a ground school session, because I don't know what better to

864

00:51:09.764 --> 00:51:13.614

call it. But one of the things we keep emphasizing in that is the open, honest

865  
00:51:13.644 --> 00:51:17.624  
discussion and the storytelling. This happened to me, so there I was.

866  
00:51:20.104 --> 00:51:23.944  
If we don't make this a safe place for those stories to be told, where something

867  
00:51:24.004 --> 00:51:27.244  
isn't going to get held against you, isn't going to be talked about around the

868  
00:51:27.264 --> 00:51:30.504  
water cooler the next day, so on and so on.

869  
00:51:30.564 --> 00:51:32.544  
If we don't make that environment safe,

870  
00:51:33.604 --> 00:51:37.424  
then we're never going to have those conversations, and that's where a

871  
00:51:37.544 --> 00:51:39.904  
lot of value comes out in the classroom setting.

872  
00:51:40.664 --> 00:51:44.593  
So we put this up every time, just like we see at different

873  
00:51:44.644 --> 00:51:48.504  
SETP and SFTE events. When you give these presentations, it's meant for

874  
00:51:48.624 --> 00:51:52.504  
learning, not meant for any type of retribution or any type

875  
00:51:52.564 --> 00:51:55.084  
of, "I'm going to hold this against this person."

876  
00:51:57.504 --> 00:52:01.044  
We've been very mindful of that. Fortunately,

877  
00:52:01.324 --> 00:52:01.864  
we've had

878

00:52:03.064 --> 00:52:07.004

wonderful discussions as part of these classroom settings, and I know that's going

879

00:52:07.024 --> 00:52:10.664

to be a little bit challenging today because we're in and amongst lots of different

880

00:52:10.744 --> 00:52:14.264

OEMs, and there is proprietary data to be

881

00:52:14.304 --> 00:52:16.904

protected. I get all of that. But

882

00:52:16.964 --> 00:52:20.704

whatever level of comfort you guys have to

883

00:52:20.764 --> 00:52:21.144

share,

884

00:52:21.964 --> 00:52:25.504

even if it's in some way, shape, or form de-identified, it's very much

885

00:52:25.564 --> 00:52:29.044

appreciated because that's how we really learn the

886

00:52:29.084 --> 00:52:32.474

lessons. Tell them what SSE means. Oh, sorry.

887

00:52:33.024 --> 00:52:36.524

For the audience. Yeah. So SSEs are safety significant events.

888

00:52:37.744 --> 00:52:41.654

So the simple way to describe it, it doesn't have

889

00:52:41.684 --> 00:52:45.554

to be an accident or an incident. It's something didn't go the way

890

00:52:45.584 --> 00:52:46.604

we expected it to go.

891

00:52:48.284 --> 00:52:51.444

It's that basic, and I still have to drill that

892

00:52:51.504 --> 00:52:54.104

into all of our folks' heads sometimes, too.

893

00:52:54.884 --> 00:52:57.744

And it isn't always about something that happened.

894

00:52:58.364 --> 00:53:02.344

It could be something that didn't happen because a mitigation we put in place

895

00:53:02.504 --> 00:53:02.864

worked.

896

00:53:05.244 --> 00:53:09.204

So highlighting those events are almost, if not more important than

897

00:53:09.244 --> 00:53:13.104

when events actually happen. "Hey, this THA, we had

898

00:53:13.144 --> 00:53:16.384

these two mitigations listed. If we didn't do both of those,

899

00:53:17.084 --> 00:53:19.744

we would've been in big trouble. Something bad would've happened."

900

00:53:20.844 --> 00:53:24.164

So learning that lesson is super important. So yeah. Thanks, Pete.

901

00:53:28.664 --> 00:53:29.804

Okay, learning objectives.

902

00:53:31.224 --> 00:53:35.144

And this is one of the new slides. Here you go, guys.

903

00:53:35.224 --> 00:53:35.544

You ready?

904

00:53:39.004 --> 00:53:41.424

It's important to spell out what the goal of the class is.

905

00:53:43.144 --> 00:53:45.824

So we do want to do all the things listed here.

906

00:53:45.904 --> 00:53:49.204

We want to enhance the situational awareness, so having a good

907

00:53:49.224 --> 00:53:52.484

understanding and the meaning of the unfolding events,

908

00:53:52.744 --> 00:53:55.504

maintaining awareness of the aircraft state,

909

00:53:57.264 --> 00:54:00.424

developing leadership and team dynamics, that assertiveness, that shared

910

00:54:00.464 --> 00:54:02.254

responsibility across the flight deck.

911

00:54:02.664 --> 00:54:05.953

And that's really the important component here, is it's a shared responsibility.

912

00:54:06.364 --> 00:54:09.344

Despite who the PIC is, everybody's on board.

913

00:54:10.264 --> 00:54:13.324

Everybody's got to be there, be present, and

914

00:54:14.064 --> 00:54:15.704

execute in order for a safe flight.

915

00:54:17.284 --> 00:54:18.584

Managing stress and fatigue.

916

00:54:19.564 --> 00:54:22.544

So is there any stress and fatigue in the flight test world?

917

00:54:24.264 --> 00:54:25.044

Might be a little bit.

918

00:54:27.684 --> 00:54:31.540

Implementing threat error management. So understanding

919

00:54:31.550 --> 00:54:34.890

that model, being able to anticipate the risks that you

920

00:54:34.940 --> 00:54:38.760

can, identify and manage the ones that become present throughout a

921

00:54:38.780 --> 00:54:41.780

flight, and then fostering that safety culture.

922

00:54:42.460 --> 00:54:46.260

So the idea and the practice of a true

923

00:54:46.400 --> 00:54:47.090

just culture,

924

00:54:48.140 --> 00:54:51.780

where it's not punitive, you're

925

00:54:51.820 --> 00:54:53.190

prioritizing safety.

926

00:54:54.100 --> 00:54:57.680

So in order to prioritize safety truly, you have to prioritize the learning.

927

00:54:58.780 --> 00:55:02.100

And in order to do that, there has to be

928

00:55:02.110 --> 00:55:05.650

accountability, which is different than punishment,

929

00:55:06.060 --> 00:55:10.010

right? Holding each other accountable and prioritizing safety of

930

00:55:10.040 --> 00:55:10.540

the flight.

931

00:55:13.980 --> 00:55:14.300

All right.

932

00:55:15.320 --> 00:55:16.920

So what do we go over in the ground school?

933

00:55:20.180 --> 00:55:24.020

The biggest thing is going through what this course is and what this

934

00:55:24.060 --> 00:55:24.840

course is not.

935

00:55:26.010 --> 00:55:29.880

There are certain things that we just can't accomplish in a

936

00:55:29.920 --> 00:55:33.480

classroom environment, but there's a lot that we can. So highlighting that.

937

00:55:34.280 --> 00:55:36.740

What is flight test CRM? We're going to highlight that,

938

00:55:37.860 --> 00:55:41.400

and I'm not going to go through and read you the whole list, but you can see what's

939

00:55:41.440 --> 00:55:42.020

going on there.

940

00:55:46.360 --> 00:55:50.260

We want to really emphasize conducting flight tests safely,

941

00:55:50.600 --> 00:55:54.500

responding and recognizing emergencies or non-normals,

942

00:55:54.600 --> 00:55:57.060

or things that just weren't forecast to happen,

943

00:55:58.160 --> 00:55:59.980

and keeping our situational awareness up.

944

00:56:00.750 --> 00:56:03.540

There are several parts of scenarios that we run

945

00:56:04.500 --> 00:56:08.000

that things will be happening in the background in the

946

00:56:08.020 --> 00:56:11.810

aircraft, and it's very benign. And

947

00:56:11.840 --> 00:56:15.670

when a lot of the pilots in this room were going through

948

00:56:15.900 --> 00:56:19.820

instrument training as an example, it's beat into you, the scan.

949

00:56:20.800 --> 00:56:21.720

Keep your scan up.

950

00:56:23.360 --> 00:56:26.640

How many times have you heard that from an instructor?

951

00:56:26.700 --> 00:56:30.620

The same thing here. When you're in an unfamiliar aircraft, you

952

00:56:30.680 --> 00:56:34.040

have to keep that scan up in order to keep your situational awareness up,

953

00:56:34.460 --> 00:56:37.560

because there are certain things that are happening in a very benign way that all

954

00:56:37.620 --> 00:56:39.360

of a sudden won't be so benign.

955

00:56:40.879 --> 00:56:43.540

So keeping that scan up and keeping your awareness going.

956

00:56:44.520 --> 00:56:45.880

There's lots of distractions.

957

00:56:46.840 --> 00:56:50.580

As facilitators, we try not to be one of those distractions as part of this course,

958

00:56:51.420 --> 00:56:54.680

but other distractions happen. I talked about comm

959

00:56:54.740 --> 00:56:56.120

issues with the TM.

960

00:56:57.300 --> 00:56:59.100

That can be a huge distraction.

961

00:57:00.290 --> 00:57:04.120

"Did he hear me? Can you hear me? What did he say?"

962

00:57:05.100 --> 00:57:08.640

So it's just all those little things build on from a

963

00:57:08.660 --> 00:57:09.840

distraction perspective.

964

00:57:12.740 --> 00:57:15.800

Ultimately, one of the goals of the course is to raise the bar.

965

00:57:17.000 --> 00:57:20.830

We want to raise our CRM game so that when we come out into the field and

966

00:57:20.860 --> 00:57:22.140

we're flying with all of you,

967

00:57:22.980 --> 00:57:25.820

we're a valuable team member on the flight deck.

968

00:57:26.120 --> 00:57:30.060

We're not in any way, shape, or form holding anybody back, reducing

969

00:57:30.080 --> 00:57:33.750

efficiencies, or worse yet, reducing any type of safety

970

00:57:33.860 --> 00:57:36.359  
factors or safety buffers on the flight.

971  
00:57:36.400 --> 00:57:39.320  
We want to be those valued crew members as part of the test team.

972  
00:57:42.320 --> 00:57:44.040  
So we already talked about this a little bit.

973  
00:57:45.040 --> 00:57:48.229  
Call signs we don't care about. We hear all kinds of crazy call signs as part of

974  
00:57:48.240 --> 00:57:50.380  
the course. It's actually one of the little fun things.

975  
00:57:51.600 --> 00:57:55.120  
One of the limiting factors that we have, there's only a certain number of airports

976  
00:57:55.640 --> 00:57:58.500  
and areas that are accurately modeled in the sim.

977  
00:57:58.900 --> 00:58:00.360  
I'm sure many of you have dealt with that.

978  
00:58:01.740 --> 00:58:05.400  
So we do a lot of things based out of the Seattle Airport because it just

979  
00:58:05.500 --> 00:58:08.080  
happens to be modeled really well in the sims that we have.

980  
00:58:10.540 --> 00:58:12.080  
Talked about the crew setup already,

981  
00:58:13.000 --> 00:58:13.900  
and the briefings.

982  
00:58:15.260 --> 00:58:17.200  
The key really being to be adaptable.

983

00:58:19.760 --> 00:58:21.740  
We will guide folks through the procedures.

984  
00:58:21.900 --> 00:58:25.660  
Again, we emphasize asking questions and just flying the

985  
00:58:25.700 --> 00:58:26.080  
plane.

986  
00:58:27.870 --> 00:58:31.340  
We do have a lot available to us as far as markings throughout the

987  
00:58:31.360 --> 00:58:35.120  
aircraft. There's actually pretty clear indicators for flap

988  
00:58:35.160 --> 00:58:36.870  
speeds, gear speeds, all the rest of that.

989  
00:58:37.500 --> 00:58:40.810  
So, there's a lot that folks can

990  
00:58:41.320 --> 00:58:44.340  
find for themselves and adapt for themselves as part of the course.

991  
00:58:47.639 --> 00:58:48.579  
Let's see.

992  
00:58:49.600 --> 00:58:49.920  
There we go.

993  
00:58:51.340 --> 00:58:51.720  
Come on.

994  
00:58:56.000 --> 00:58:57.240  
So what this course is.

995  
00:58:58.080 --> 00:59:01.220  
So we really want to emphasize the team concept.

996  
00:59:04.300 --> 00:59:07.950  
Not sure the level of awareness in the room right now,

997

00:59:08.940 --> 00:59:12.320  
and I looked about a week ago,

998

00:59:12.440 --> 00:59:16.030  
across the entire flight test branch within the FAA, so it's roughly

999

00:59:16.300 --> 00:59:17.100  
70-ish people,

1000

00:59:18.340 --> 00:59:22.320  
25 pilots, about the same, a little bit more FTEs with some

1001

00:59:22.360 --> 00:59:25.640  
human factors folks, and then our admin staff.

1002

00:59:27.040 --> 00:59:28.440  
Across that staff,

1003

00:59:29.760 --> 00:59:33.320  
we're managing roughly around 1,100

1004

00:59:33.360 --> 00:59:36.120  
projects that flight test is involved in nationwide,

1005

00:59:38.340 --> 00:59:40.420  
across hundreds of applicants.

1006

00:59:42.000 --> 00:59:44.750  
So you guys all think you do things the same

1007

00:59:44.780 --> 00:59:48.700  
way? Same type of call-outs, same type of procedures and

1008

00:59:48.760 --> 00:59:49.600  
briefing guides?

1009

00:59:50.420 --> 00:59:51.320  
Not a chance.

1010

00:59:52.140 --> 00:59:52.660  
Yeah, Pete.

1011  
00:59:52.860 --> 00:59:55.560  
Point out that you mix up people from different parts-

1012  
00:59:55.720 --> 00:59:55.940  
Oh, yeah

1013  
00:59:56.040 --> 00:59:57.880  
... of the organization. So you're not

1014  
00:59:59.420 --> 01:00:03.000  
doing the course with somebody that you're already familiar with and  
already have

1015  
01:00:03.460 --> 01:00:05.400  
a built-in team CRM flow.

1016  
01:00:05.780 --> 01:00:08.120  
Yeah. Pete's a good setup man over there.

1017  
01:00:08.200 --> 01:00:12.080  
He stole a little bit of my thunder, but that's true.

1018  
01:00:12.380 --> 01:00:15.620  
The picture on the right here is one of our annual safety stand

1019  
01:00:15.640 --> 01:00:19.360  
downs, and that's also part of our CRM course

1020  
01:00:19.460 --> 01:00:23.320  
setup is when we... Depends on the number of

1021  
01:00:23.360 --> 01:00:27.320  
courses we run each year and who is in need of it from a currency  
perspective.

1022  
01:00:28.240 --> 01:00:32.200  
But we do our very best to not put people that fly

1023

01:00:32.240 --> 01:00:35.360  
together in the box together again.

1024  
01:00:35.960 --> 01:00:39.652  
We mix it up. We do a lot more national resource

1025  
01:00:39.712 --> 01:00:42.472  
sharing now. So for several projects,

1026  
01:00:43.292 --> 01:00:46.742  
you could have a pilot from Fort Worth and an FTE from New York,

1027  
01:00:47.602 --> 01:00:49.312  
and a human factors person from Seattle.

1028  
01:00:50.252 --> 01:00:50.992  
It happens.

1029  
01:00:52.132 --> 01:00:55.672  
We don't want the very first time these people have ever met each other  
to be in

1030  
01:00:55.712 --> 01:00:59.472  
your aircraft. So we try to integrate that in the training environment as

1031  
01:00:59.512 --> 01:00:59.752  
well.

1032  
01:01:00.872 --> 01:01:04.292  
So that's a very important component, which also goes to

1033  
01:01:04.352 --> 01:01:05.832  
emphasizing the team concept.

1034  
01:01:09.951 --> 01:01:13.872  
We use the word standardization, and that's a really big

1035  
01:01:13.912 --> 01:01:17.512  
word. When you start talking about all the

1036  
01:01:17.592 --> 01:01:21.392

applicants and the differing procedures and everything else that's out there in the

1037

01:01:21.412 --> 01:01:25.012  
environment right now, to say we are standardized,

1038

01:01:26.512 --> 01:01:28.932  
not sure that's even a reasonable expectation.

1039

01:01:29.792 --> 01:01:33.592  
So what we try to enforce and drive towards

1040

01:01:33.652 --> 01:01:35.592  
more than that is the adaptability piece.

1041

01:01:36.712 --> 01:01:36.892  
Right?

1042

01:01:37.712 --> 01:01:39.952  
We have a known bar

1043

01:01:41.252 --> 01:01:45.062  
in Order 4040.26 and mirrored in our flight test operations

1044

01:01:45.132 --> 01:01:48.612  
manual, the flight test briefing guides that are in there.

1045

01:01:49.252 --> 01:01:51.732  
That's a known bar. That's a known starting place.

1046

01:01:51.872 --> 01:01:55.572  
Now, a lot of you have your own briefing guides, but if you follow your briefing

1047

01:01:55.592 --> 01:01:59.202  
guide and ours at the same time, they're going to hit largely all the same points,

1048

01:02:00.332 --> 01:02:04.272  
with very few minor exceptions. But that's one

1049

01:02:04.312 --> 01:02:05.812  
thing that we emphasize with our

1050  
01:02:07.712 --> 01:02:10.492  
crews, to follow those guides as part of this class.

1051  
01:02:11.212 --> 01:02:14.532  
And when we're having that discussion in the classroom, we also

1052  
01:02:14.592 --> 01:02:18.262  
emphasize, "Hey, if you're flying with an OEM that has their own

1053  
01:02:18.272 --> 01:02:22.172  
briefing guide, that's great. You can still pull this one up and

1054  
01:02:22.192 --> 01:02:25.972  
follow along. And then if something is missed that you're not comfortable

1055  
01:02:26.192 --> 01:02:28.432  
not talking about, then you have

1056  
01:02:29.292 --> 01:02:32.112  
a way to mark that. You have a way to emphasize that."

1057  
01:02:37.352 --> 01:02:37.632  
Okay.

1058  
01:02:39.052 --> 01:02:43.012  
Who has been through a CRM course where you've seen a clip from that

1059  
01:02:43.052 --> 01:02:43.332  
movie?

1060  
01:02:45.432 --> 01:02:47.892  
Okay. I expected a lot more hands than that.

1061  
01:02:50.552 --> 01:02:52.332  
Yeah. We couldn't resist either.

1062  
01:02:57.512 --> 01:02:59.372  
Oh, no sound. It's all right.

1063

01:03:00.192 --> 01:03:00.612

It's okay.

1064

01:03:02.932 --> 01:03:06.792

You get the large majority in the room knew what was about to happen there, right?

1065

01:03:07.212 --> 01:03:08.352

Okay. Are we going to get it?

1066

01:03:13.412 --> 01:03:14.172

It's okay.

1067

01:03:17.992 --> 01:03:18.312

Robbie.

1068

01:03:18.841 --> 01:03:18.862

Oh, there we go.

1069

01:03:18.862 --> 01:03:20.732

Check your fuel composition. I'm going to take her down.

1070

01:03:20.892 --> 01:03:21.841

Wait a few more minutes, Captain.

1071

01:03:21.892 --> 01:03:22.632

Do as I say.

1072

01:03:22.732 --> 01:03:23.212

But it looks like-

1073

01:03:23.272 --> 01:03:24.012

Do as I say.

1074

01:03:24.052 --> 01:03:24.952

Give him a few more minutes.

1075

01:03:24.992 --> 01:03:27.192

I've already waited too long. Here we go.

1076

01:03:28.012 --> 01:03:28.702

No, we don't.

1077

01:03:29.572 --> 01:03:29.872

Get out.

1078

01:03:30.012 --> 01:03:31.852

Hold yourself, you yellow.

1079

01:03:34.632 --> 01:03:36.372

I only had to do that twice last week.

1080

01:03:41.212 --> 01:03:43.812

All right. So what this course isn't. It's not that.

1081

01:03:44.712 --> 01:03:48.652

It's also not the stereotypical four-hour sim session

1082

01:03:48.672 --> 01:03:52.312

that we've all been in, where an instructor is sitting in the back just

1083

01:03:52.352 --> 01:03:56.032

pitching failure after failure after failure at you, and

1084

01:03:56.072 --> 01:03:57.592

beating you to death for four hours.

1085

01:03:58.402 --> 01:04:02.332

We don't do that either. Like I said, the very rare occasion where we

1086

01:04:02.392 --> 01:04:06.032

inject some sort of failure, it's just because we're running out of time,  
and we

1087

01:04:06.072 --> 01:04:06.752

want you to go home.

1088

01:04:09.172 --> 01:04:12.922

Every now and again, we'll inject something to see how

1089

01:04:13.172 --> 01:04:15.552  
good your situational awareness really is.

1090  
01:04:16.972 --> 01:04:20.912  
We'll have several crews that go through the course that are really on it, and

1091  
01:04:20.972 --> 01:04:24.242  
they're zooming through these conditions, and they're hitting all the marks, and

1092  
01:04:24.252 --> 01:04:26.672  
they're saying all the right things and doing all the right things.

1093  
01:04:27.432 --> 01:04:30.452  
And then it occurs to us in the back, let's see how good they are.

1094  
01:04:32.492 --> 01:04:36.092  
So we'll throw a little something at them just to make them talk and make a

1095  
01:04:36.132 --> 01:04:36.552  
decision.

1096  
01:04:37.772 --> 01:04:39.841  
So let's see. How about

1097  
01:04:41.792 --> 01:04:45.732  
doing steady heading side slips? The APU happens to be running, and

1098  
01:04:45.772 --> 01:04:47.292  
we'll give them an APU generator fail.

1099  
01:04:49.252 --> 01:04:50.172  
Both engines are running,

1100  
01:04:51.112 --> 01:04:53.772  
everything else is fine, how much do we care?

1101  
01:04:55.752 --> 01:04:58.052  
Just having that discussion is the point.

1102

01:04:59.012 --> 01:05:02.282

I almost don't really care about what the decision is at that point, as long as

1103

01:05:02.292 --> 01:05:06.052

they're talking about it and coming to a decision as a crew that everybody's

1104

01:05:06.092 --> 01:05:06.772

comfortable with.

1105

01:05:12.612 --> 01:05:12.992

All right.

1106

01:05:13.932 --> 01:05:14.952

How many people knew

1107

01:05:15.872 --> 01:05:19.712

that there was an advisory circular that the entire topic was CRM?

1108

01:05:23.732 --> 01:05:25.492

Yeah, that's not very many hands.

1109

01:05:27.812 --> 01:05:31.632

Here's a self-disclosure. Until we started developing

1110

01:05:31.692 --> 01:05:33.022

this course, neither did I.

1111

01:05:37.892 --> 01:05:41.192

That said, there's a lot of good stuff in that AC, actually.

1112

01:05:41.292 --> 01:05:44.742

It's older. I think the last version of it was back from

1113

01:05:44.832 --> 01:05:45.792

2005.

1114

01:05:46.912 --> 01:05:47.192

So

1115

01:05:48.252 --> 01:05:48.332

it

1116

01:05:50.072 --> 01:05:53.092

could use some updating. Not going to argue that, but there is some good

1117

01:05:53.152 --> 01:05:57.052

information in it. So some of the topics that it talks about

1118

01:05:57.072 --> 01:05:58.932

that we also emphasize throughout the course,

1119

01:06:00.572 --> 01:06:03.952

optimization of the human machine interface with interpersonal

1120

01:06:04.052 --> 01:06:06.672

activities. It talks a lot about that. That's all good stuff.

1121

01:06:07.952 --> 01:06:09.292

How do we reinforce that, though?

1122

01:06:10.952 --> 01:06:13.192

We reinforce that with trying to develop awareness.

1123

01:06:14.372 --> 01:06:17.732

We reinforce it with practice, which is the point of this course,

1124

01:06:19.332 --> 01:06:23.152

and then continual reinforcement, so a recurrence to the course.

1125

01:06:25.672 --> 01:06:28.632

Do we deny people going more often than four years?

1126

01:06:29.712 --> 01:06:33.692

We haven't. In fact, a lot of times we'll pull people further forward to help fill

1127

01:06:33.752 --> 01:06:36.852

up spots in the course, whether they're due or not.

1128

01:06:37.632 --> 01:06:41.292  
So that recurrence and that practice is a

1129  
01:06:41.332 --> 01:06:43.392  
valuable component to any CRM

1130  
01:06:43.432 --> 01:06:46.794  
course. Are you ever going to

1131  
01:06:47.084 --> 01:06:48.484  
master CRM?

1132  
01:06:50.024 --> 01:06:50.184  
No.

1133  
01:06:51.444 --> 01:06:55.094  
You can get better at it. You can develop more skills, but

1134  
01:06:55.104 --> 01:06:58.734  
to say you're mastering CRM, and that

1135  
01:06:59.744 --> 01:07:01.724  
phrase comes up a lot in the AC.

1136  
01:07:03.664 --> 01:07:06.204  
You're not going to be a master of it. You can get better at it.

1137  
01:07:06.404 --> 01:07:09.824  
You can do a lot of practice. You can be a super valuable crew member  
that people

1138  
01:07:09.864 --> 01:07:13.464  
will want to fly with because, "Hey, that guy's always on it.

1139  
01:07:14.524 --> 01:07:16.904  
I always know I can count on that person to

1140  
01:07:17.944 --> 01:07:21.684  
be there, to run that checklist when I need it," to whatever the case may

1141  
01:07:21.724 --> 01:07:23.284

be, insert example here.

1142

01:07:25.204 --> 01:07:28.704

We can get to a high level of proficiency, but to call ourselves

1143

01:07:28.784 --> 01:07:29.524

masteries,

1144

01:07:30.704 --> 01:07:31.064

I don't know.

1145

01:07:32.384 --> 01:07:33.204

I'm not a believer there.

1146

01:07:36.024 --> 01:07:37.904

No matter how good you are at CRM,

1147

01:07:38.924 --> 01:07:42.834

it can never overcome a lack of proficiency or a lack of technical

1148

01:07:42.844 --> 01:07:45.124

ability, right? It has to be hand-in-hand.

1149

01:07:45.964 --> 01:07:49.524

And just like being the most technically savvy and best

1150

01:07:49.863 --> 01:07:53.604

stick and rudder pilot you've ever seen in your life isn't going to

1151

01:07:53.684 --> 01:07:57.614

counteract really poor CRM so that John Wayne doesn't have

1152

01:07:57.624 --> 01:07:59.104

to get up and smack you across the face.

1153

01:08:03.204 --> 01:08:04.684

CRM concepts, like I said,

1154

01:08:06.524 --> 01:08:10.404

prior to this course, were very coincidental with other pieces of training

1155

01:08:10.444 --> 01:08:11.134

that we were doing.

1156

01:08:12.214 --> 01:08:16.074

That's still very valuable. That's still increasing your CRM ability.

1157

01:08:17.504 --> 01:08:21.324

So integrating that type of training into all the training we do

1158

01:08:21.424 --> 01:08:24.344

is very valuable and necessary.

1159

01:08:25.824 --> 01:08:29.534

But it can't be solely the entire point of

1160

01:08:31.344 --> 01:08:32.504

any CRM course.

1161

01:08:35.684 --> 01:08:39.124

So the long and short of it is we want to reinforce good behaviors,

1162

01:08:39.724 --> 01:08:43.144

positive mindsets when it comes to CRM, and

1163

01:08:43.485 --> 01:08:44.405

setting good habits.

1164

01:08:46.605 --> 01:08:50.284

The AC actually makes a recommendation in developing CRM training.

1165

01:08:51.584 --> 01:08:53.105

It actually recommends role-playing.

1166

01:08:54.485 --> 01:08:55.804

I said very specifically,

1167

01:08:56.844 --> 01:08:59.445

we made that a ground rule of what not to do.

1168

01:09:00.644 --> 01:09:03.304  
So is there value in role-playing?

1169  
01:09:03.924 --> 01:09:06.905  
How many people here have been through a CRM course where you actually had to play

1170  
01:09:06.945 --> 01:09:10.784  
a role? Yeah, a lot. Is there value in

1171  
01:09:10.824 --> 01:09:10.945  
it?

1172  
01:09:13.284 --> 01:09:14.744  
In certain cases, I think there is.

1173  
01:09:16.204 --> 01:09:19.744  
We made the decision not to do that. Not right, not wrong.

1174  
01:09:19.924 --> 01:09:21.565  
It's just what we felt was right for us.

1175  
01:09:26.384 --> 01:09:30.244  
One thing that the AC does go over, and it states at

1176  
01:09:30.284 --> 01:09:31.214  
least three times,

1177  
01:09:32.124 --> 01:09:36.084  
is that any CRM course, any training course, must be customized

1178  
01:09:36.124 --> 01:09:37.594  
for the organization's needs.

1179  
01:09:38.565 --> 01:09:39.815  
That makes perfect sense to me.

1180  
01:09:41.065 --> 01:09:41.844  
So that's where

1181  
01:09:43.244 --> 01:09:44.105

we took the detour

1182

01:09:45.324 --> 01:09:48.324

of no role-playing. We customized for us.

1183

01:09:51.844 --> 01:09:55.494

All right. So when it comes to what makes flight test CRM different, and here comes

1184

01:09:55.524 --> 01:09:58.424

the interactive piece, so I hope everybody is ready.

1185

01:10:00.304 --> 01:10:02.004

Yes, I brought a board to write on.

1186

01:10:04.544 --> 01:10:07.504

What makes CRM different is the resources we have available to us

1187

01:10:08.444 --> 01:10:09.204

and how we use them.

1188

01:10:11.124 --> 01:10:11.924

So let's talk about them.

1189

01:10:15.144 --> 01:10:16.404

We'll see if my marker works now.

1190

01:10:19.404 --> 01:10:22.064

All right. I'm going to rearrange everybody's stuff up here.

1191

01:10:25.964 --> 01:10:27.363

Okay.

1192

01:10:29.264 --> 01:10:32.764

Human resources. What do we have at our disposal when it comes to flight test CRM

1193

01:10:32.804 --> 01:10:34.784

from a human resource perspective?

1194

01:10:39.304 --> 01:10:40.704

Technical experts. Technical experts. I like that.

1195

01:10:44.924 --> 01:10:45.244

Crew.

1196

01:10:53.924 --> 01:10:54.264

What else?

1197

01:10:56.144 --> 01:10:56.564

Maintenance.

1198

01:10:57.504 --> 01:10:57.924

Maintenance.

1199

01:10:59.724 --> 01:11:01.064

Traffic control.

1200

01:11:02.964 --> 01:11:03.604

ATC.

1201

01:11:07.423 --> 01:11:07.844

Chase aircraft. Chase.

1202

01:11:10.124 --> 01:11:12.364

All right. We're five in and nobody's mentioned the crew yet.

1203

01:11:20.384 --> 01:11:21.564

FTEs. Yeah. FTEs.

1204

01:11:23.284 --> 01:11:25.324

That's part of the crew, but I'll list it separate.

1205

01:11:27.304 --> 01:11:27.644

Ground.

1206

01:11:32.044 --> 01:11:35.484

Ground. Fire and water. Yeah. SMEs, tech experts.

1207

01:11:39.964 --> 01:11:40.444

TM.

1208

01:11:42.154 --> 01:11:42.154  
TM.

1209

01:11:44.084 --> 01:11:44.384  
Yeah.

1210

01:11:45.264 --> 01:11:46.944  
Who's been on an icing flight lately?

1211

01:11:48.824 --> 01:11:50.644  
Air traffic control. Yep, I got ATC.

1212

01:11:54.544 --> 01:11:54.904  
PMs. Who what?

1213

01:11:56.264 --> 01:11:58.664  
PMs. PMs. Who loves those people?

1214

01:12:00.524 --> 01:12:03.424  
Wow. A lot of energy in the room around PMs.

1215

01:12:05.084 --> 01:12:05.684  
Dang.

1216

01:12:09.724 --> 01:12:12.604  
Didn't mean to touch a subject there. Jeez, Louise.

1217

01:12:13.024 --> 01:12:13.454  
How about

1218

01:12:15.044 --> 01:12:16.664  
non-participating aircraft? Non-participating aircraft.

1219

01:12:20.644 --> 01:12:23.124  
Safety department.

1220

01:12:28.984 --> 01:12:29.644  
Ooh.

1221

01:12:30.764 --> 01:12:31.564

Thanks for the plug.

1222

01:12:36.184 --> 01:12:37.784

Writing like this is harder than you'd think.

1223

01:12:40.404 --> 01:12:40.804

What else?

1224

01:12:42.284 --> 01:12:43.344

Dispatch.

1225

01:12:44.604 --> 01:12:49.674

Dispatch.All

1226

01:12:49.704 --> 01:12:52.764

right, we're in a flight test organization. Nobody said instrumentation yet.

1227

01:12:53.964 --> 01:12:54.464

Hello.

1228

01:13:02.784 --> 01:13:03.964

What else? What are we forgetting?

1229

01:13:05.544 --> 01:13:05.964

Fire.

1230

01:13:08.904 --> 01:13:08.914

Fire.

1231

01:13:10.644 --> 01:13:11.484

Hopefully, we don't need them.

1232

01:13:14.604 --> 01:13:15.204

Safety. Safety's on there.

1233

01:13:16.784 --> 01:13:18.824

Crew chief. Maintenance crew chief.

1234

01:13:21.884 --> 01:13:23.544

Search and

1235

01:13:23.564 --> 01:13:26.994  
rescue. SAR.

1236

01:13:29.784 --> 01:13:31.544  
Gold star for the guy over here.

1237

01:13:37.584 --> 01:13:40.484  
All right. It's a long list, and if we went at it long enough, we could probably

1238

01:13:40.524 --> 01:13:41.664  
keep going. Right?

1239

01:13:42.844 --> 01:13:43.124  
All right.

1240

01:13:44.904 --> 01:13:45.804  
We're going to switch now.

1241

01:13:49.224 --> 01:13:50.084  
See if this works.

1242

01:13:52.204 --> 01:13:55.464  
Probably won't stick for me. If it falls, it falls. Nobody run.

1243

01:13:56.564 --> 01:13:56.764  
Okay.

1244

01:13:58.604 --> 01:13:59.064  
Hardware.

1245

01:14:01.824 --> 01:14:02.204  
The sim.

1246

01:14:03.114 --> 01:14:03.114  
The sim.

1247

01:14:08.604 --> 01:14:08.844  
Okay.

1248  
01:14:11.324 --> 01:14:11.684  
TM.

1249  
01:14:13.574 --> 01:14:13.574  
TM.

1250  
01:14:16.664 --> 01:14:17.224  
iPad.

1251  
01:14:19.154 --> 01:14:22.124  
iPad. You have

1252  
01:14:23.004 --> 01:14:24.144  
to

1253  
01:14:24.744 --> 01:14:27.934  
ask him. Safety equipment. Airfield

1254  
01:14:27.934 --> 01:14:33.144  
facilities.

1255  
01:14:33.464 --> 01:14:34.544  
How bad am I angled here?

1256  
01:14:35.624 --> 01:14:36.024  
Say that again.

1257  
01:14:37.244 --> 01:14:38.044  
Airfield facilities. Facilities.

1258  
01:14:42.304 --> 01:14:46.784  
Ops.

1259  
01:14:49.544 --> 01:14:49.904  
Comms. Say again.

1260  
01:14:51.504 --> 01:14:52.084  
Comms. Comms.

1261  
01:15:02.084 --> 01:15:05.344

The test article. The test article. Test asset. Got it.

1262

01:15:08.344 --> 01:15:08.664

What else?

1263

01:15:09.484 --> 01:15:11.344

Requirements and implementation. Intro.

1264

01:15:12.384 --> 01:15:15.224

Kind of got DAS down here already, but we'll add intro to that.

1265

01:15:21.284 --> 01:15:21.664

What else?

1266

01:15:23.324 --> 01:15:25.463

Ballast team.

1267

01:15:26.724 --> 01:15:29.284

Ground support equipment. Yeah.

1268

01:15:34.844 --> 01:15:35.144

Chase? Chase.

1269

01:15:41.164 --> 01:15:47.704

From

1270

01:15:47.744 --> 01:15:47.844

the

1271

01:15:51.284 --> 01:15:54.184

table in the far back here, you had self-loading ballast.

1272

01:15:54.664 --> 01:15:55.964

Self-loading ballast. Self-loading-

1273

01:15:59.744 --> 01:16:00.744

But ballast in general

1274

01:16:01.044 --> 01:16:03.764

... ballast. How about that? I'm not going to write all that.

1275  
01:16:05.224 --> 01:16:05.314  
What

1276  
01:16:05.364 --> 01:16:11.724  
else?

1277  
01:16:12.044 --> 01:16:13.884  
Starlink. Starlink.

1278  
01:16:15.204 --> 01:16:16.144  
You need your internet.

1279  
01:16:17.994 --> 01:16:19.264  
We see some repeats already.

1280  
01:16:20.964 --> 01:16:21.144  
Right?

1281  
01:16:22.004 --> 01:16:22.384  
Okay.

1282  
01:16:28.084 --> 01:16:28.994  
See if I can do this.

1283  
01:16:31.184 --> 01:16:33.804  
Challenge number one is not falling off the stage.

1284  
01:16:36.024 --> 01:16:36.324  
Okay.

1285  
01:16:38.064 --> 01:16:38.604  
Information.

1286  
01:16:42.104 --> 01:16:42.844  
Test procedures.

1287  
01:16:44.694 --> 01:16:44.814  
Test procedures.

1288  
01:16:49.964 --> 01:16:53.644

Test plan.

1289

01:16:54.744 --> 01:16:56.104

Test procedures, test plan.

1290

01:16:57.664 --> 01:16:58.564

Flight manuals.

1291

01:17:00.154 --> 01:17:01.083

Flight manuals. THA. THA, I got.

1292

01:17:02.564 --> 01:17:02.824

Weather.

1293

01:17:04.374 --> 01:17:04.374

Weather.

1294

01:17:06.304 --> 01:17:08.424

Cards.

1295

01:17:09.593 --> 01:17:09.593

Cards.

1296

01:17:12.124 --> 01:17:14.234

Course rules, airfield procedures.

1297

01:17:20.864 --> 01:17:22.784

Okay, I write fast, but not that fast.

1298

01:17:25.454 --> 01:17:28.794

You're doing a

1299

01:17:28.794 --> 01:17:30.704

roll. All right.

1300

01:17:39.724 --> 01:17:40.524

How about foreflight?

1301

01:17:43.164 --> 01:17:44.663

Or JEP or whatever you want to call them.

1302  
01:17:52.204 --> 01:17:54.494  
Regs. Test

1303  
01:17:55.444 --> 01:17:56.644  
predictions. AC.

1304  
01:17:57.884 --> 01:17:58.524  
Dev data.

1305  
01:18:01.804 --> 01:18:02.304  
Flight third.

1306  
01:18:04.584 --> 01:18:06.184  
Clearance. Clearance.

1307  
01:18:08.824 --> 01:18:11.304  
Briefs. Briefs.

1308  
01:18:15.104 --> 01:18:16.004  
How about those SMEs?

1309  
01:18:18.124 --> 01:18:19.904  
Every now and again, they have a golden nugget.

1310  
01:18:24.744 --> 01:18:26.344  
Sorry, I was shielding you guys.

1311  
01:18:28.124 --> 01:18:28.544  
Range.

1312  
01:18:31.484 --> 01:18:32.084  
Range.

1313  
01:18:32.924 --> 01:18:33.604  
Oh, good one.

1314  
01:18:35.104 --> 01:18:38.864  
Flight controls. Squawks.

1315  
01:18:40.464 --> 01:18:43.304

Did somebody say FCS? Is that what I heard?

1316

01:18:49.184 --> 01:18:51.764

Air-to-gate conformity. Ooh.

1317

01:18:52.684 --> 01:18:53.904

Are we testing what we think we're

1318

01:18:53.944 --> 01:18:59.534

testing?All

1319

01:18:59.554 --> 01:19:00.734

right. So the point of this,

1320

01:19:02.814 --> 01:19:03.794

there's a lot of repeats.

1321

01:19:05.454 --> 01:19:08.814

But in the realm of what makes flight test CRM different,

1322

01:19:10.614 --> 01:19:14.254

do we think the average line pilot, your 172

1323

01:19:14.314 --> 01:19:15.494

private pilot,

1324

01:19:16.314 --> 01:19:19.634

is considering this level of

1325

01:19:19.674 --> 01:19:21.754

integration on a day-to-day flight?

1326

01:19:23.274 --> 01:19:26.494

Not even close. Exactly. Not even close.

1327

01:19:28.294 --> 01:19:32.054

Is this an expectation for you on an everyday flight?

1328

01:19:32.994 --> 01:19:34.914

Yes. That's the difference.

1329

01:19:36.294 --> 01:19:40.264

When it comes to crew resource management, cockpit resource management,

1330

01:19:40.334 --> 01:19:41.854

whatever you want to call it,

1331

01:19:42.754 --> 01:19:46.534

it's really a management of your communication skills on the

1332

01:19:46.574 --> 01:19:50.294

flight deck, and how you're processing all of this

1333

01:19:51.714 --> 01:19:54.214

as a crew, not as an individual.

1334

01:19:56.294 --> 01:19:59.754

Processing all of this, bringing this into your everyday flying

1335

01:19:59.894 --> 01:20:00.514

environment,

1336

01:20:01.654 --> 01:20:01.854

and

1337

01:20:03.034 --> 01:20:04.954

really being able to utilize it.

1338

01:20:06.454 --> 01:20:07.694

That's a crew.

1339

01:20:08.794 --> 01:20:11.014

Try to do that by yourself on an everyday basis.

1340

01:20:11.134 --> 01:20:13.394

You want to talk about adding up your fatigue and stress?

1341

01:20:15.394 --> 01:20:16.174

That'll ramp it up.

1342

01:20:17.554 --> 01:20:20.314

Process this as a crew, work together as a team,

1343

01:20:21.954 --> 01:20:23.034

now you're on the right track.

1344

01:20:29.974 --> 01:20:33.874

All right, how am I doing with break? Is that what my timer is here towards break?

1345

01:20:34.514 --> 01:20:35.454

Yes? Thank you.

1346

01:20:37.094 --> 01:20:38.634

Beautiful. All right. We're doing good.

1347

01:20:40.254 --> 01:20:41.694

If anything, we're moving a little quick.

1348

01:20:47.994 --> 01:20:51.794

All right. So this is a really important piece for us, and I'd

1349

01:20:51.834 --> 01:20:55.314

love to hear some discussion for people in the audience that

1350

01:20:56.054 --> 01:21:00.014

have worked with multiple companies, been with different outfits, even

1351

01:21:00.034 --> 01:21:01.174

within the government.

1352

01:21:04.254 --> 01:21:08.034

Should we, do we interact differently with different types of people,

1353

01:21:08.154 --> 01:21:11.774

large OEM flight test groups versus small

1354

01:21:11.874 --> 01:21:12.714

STC shops?

1355

01:21:13.534 --> 01:21:17.374

I can tell you, I have shown up as an FAA test pilot to do a

1356

01:21:17.734 --> 01:21:18.674

TIA cert flight

1357

01:21:19.694 --> 01:21:20.694

at an STC shop,

1358

01:21:21.654 --> 01:21:25.154

and the company development pilot that I was flying with

1359

01:21:26.034 --> 01:21:27.454

was a 135 line pilot,

1360

01:21:28.634 --> 01:21:32.614

and if you use the words phugoid or anything

1361

01:21:32.694 --> 01:21:35.024

even remotely like that, you just got this

1362

01:21:37.354 --> 01:21:40.274

total stare to a thousand miles.

1363

01:21:42.174 --> 01:21:45.074

So we get to see and interact with all of that.

1364

01:21:46.334 --> 01:21:47.494

So how do we prepare for that?

1365

01:21:49.194 --> 01:21:52.963

Is there any way to prepare for that in a standardized way?

1366

01:21:53.014 --> 01:21:55.634

Remember I said standardization is a big word?

1367

01:21:55.694 --> 01:21:58.894

It's a really big word when you start looking at that spectrum.

1368

01:22:00.554 --> 01:22:03.794

Experience differences between pilots and engineers,

1369

01:22:05.014 --> 01:22:08.794  
whether it's FAA to FAA, FAA to OEM,

1370  
01:22:09.094 --> 01:22:10.174  
whatever the case may be.

1371  
01:22:11.254 --> 01:22:12.274  
Process differences,

1372  
01:22:13.234 --> 01:22:17.094  
how you run your pre-flight briefings, how you set up

1373  
01:22:17.134 --> 01:22:17.894  
your test cards.

1374  
01:22:18.914 --> 01:22:22.734  
There are certain manufacturers that you show up, and the test card you get

1375  
01:22:23.114 --> 01:22:26.794  
is what I would call a dance card. It's just a list of your

1376  
01:22:26.934 --> 01:22:28.694  
25 things you're going to do on that flight,

1377  
01:22:29.674 --> 01:22:30.874  
not how you do them.

1378  
01:22:31.994 --> 01:22:34.794  
It doesn't walk you through how to do a steady heading side slip.

1379  
01:22:34.814 --> 01:22:37.414  
It doesn't walk you through how to do

1380  
01:22:38.394 --> 01:22:39.014  
stall speed.

1381  
01:22:39.834 --> 01:22:42.734  
It doesn't walk you through how to do all these different things.

1382  
01:22:42.914 --> 01:22:44.534

It just says, "These are the things you're going to do."

1383

01:22:45.634 --> 01:22:48.554

There are some that I've seen that you show up, and that list is like that, but

1384

01:22:48.594 --> 01:22:49.254

it's in code.

1385

01:22:50.334 --> 01:22:50.954

That's a fun one.

1386

01:22:52.794 --> 01:22:54.014

When you show up and it says

1387

01:22:54.134 --> 01:22:58.444

SHSS/F20/GRDN,

1388

01:22:59.314 --> 01:23:01.144

steady heading side slip flaps 20 to gear down.

1389

01:23:02.064 --> 01:23:05.944

I shouldn't have to think that hard about what I'm going to be doing

1390

01:23:05.974 --> 01:23:09.554

on my next test condition. And then there's

1391

01:23:09.654 --> 01:23:12.194

others that even go the opposite direction.

1392

01:23:13.774 --> 01:23:17.534

I am going to give you a stack of cards yay thick or so that is going to walk you

1393

01:23:17.574 --> 01:23:21.514

through today's flight step, by step, by step, by

1394

01:23:21.594 --> 01:23:25.334

step. I'm on line number 376 doing

1395

01:23:25.474 --> 01:23:25.814

this.

1396

01:23:27.654 --> 01:23:30.274

We've seen every end of the spectrum.

1397

01:23:31.494 --> 01:23:34.294

Is one right versus one wrong? No, it's just different.

1398

01:23:35.274 --> 01:23:39.034

So how do we approach that as a crew? The briefings are key.

1399

01:23:41.934 --> 01:23:45.394

Flight test technique differences, people, hardware, and information differences,

1400

01:23:45.454 --> 01:23:47.134

what's being utilized on a given flight.

1401

01:23:49.174 --> 01:23:53.094

You think we interact differently with DERs and UMs than we do

1402

01:23:53.354 --> 01:23:56.154

your 135 line guy that I was referencing? Probably.

1403

01:23:58.054 --> 01:24:00.834

All right. Now I'm knocking stuff around.

1404

01:24:03.354 --> 01:24:04.774

So how do we level the playing field?

1405

01:24:07.234 --> 01:24:10.734

How do we get ready for things like that from a crew perspective?

1406

01:24:11.194 --> 01:24:14.154

How do you get ready for things like that when you're starting with a new company?

1407

01:24:14.234 --> 01:24:15.924

Hey, I worked for 25 years

1408

01:24:18.954 --> 01:24:19.694

flying in the Navy.

1409

01:24:20.854 --> 01:24:24.754

Did two tours in a test squadron, and now I'm leaving the Navy, and I'm going to

1410

01:24:24.794 --> 01:24:26.894

go work for Joby.

1411

01:24:28.314 --> 01:24:31.594

I'm going to go work for Textron. I'm going to go work for Bell.

1412

01:24:33.594 --> 01:24:35.554

How do you prepare yourself to adapt?

1413

01:24:36.334 --> 01:24:40.014

How do you prepare yourself to walk into that new situation?

1414

01:24:45.494 --> 01:24:45.994

Humility.

1415

01:24:47.734 --> 01:24:48.794

Humility. Yeah.

1416

01:24:50.014 --> 01:24:53.474

What you are and are not comfortable with, what you do and don't have experience

1417

01:24:53.534 --> 01:24:53.894

with.

1418

01:24:53.954 --> 01:25:05.050

Yeah.Move

1419

01:25:05.150 --> 01:25:05.330

on.

1420

01:25:11.450 --> 01:25:12.640

All right. Threat error management.

1421

01:25:14.690 --> 01:25:16.290

So let's talk about this a little bit.

1422

01:25:18.570 --> 01:25:20.790

Really, the bottom line up front is the stuff at the bottom.

1423

01:25:21.930 --> 01:25:22.129

Right?

1424

01:25:23.150 --> 01:25:26.710

We have to be able to prevent/anticipate certain threats.

1425

01:25:28.300 --> 01:25:29.180

We have to detect them

1426

01:25:30.070 --> 01:25:32.750

when things have happened, and we have to plan that recovery.

1427

01:25:33.490 --> 01:25:33.670

So

1428

01:25:35.170 --> 01:25:37.330

it isn't about achieving perfection.

1429

01:25:38.230 --> 01:25:40.030

It's about building up that safety buffer.

1430

01:25:41.730 --> 01:25:41.910

Right?

1431

01:25:43.280 --> 01:25:44.270

Threats will exist.

1432

01:25:46.250 --> 01:25:48.050

People are human, errors will happen.

1433

01:25:49.350 --> 01:25:49.670

Fact.

1434

01:25:50.490 --> 01:25:50.670

Right?

1435

01:25:51.710 --> 01:25:52.499

So what is a threat?

1436

01:25:54.430 --> 01:25:55.410

Think of it bigger scale,

1437

01:25:56.230 --> 01:25:58.530

but somebody define a threat for me.

1438

01:25:58.970 --> 01:26:00.890

So on a flight test mission, what would be a threat?

1439

01:26:01.770 --> 01:26:03.530

Big definition, top level.

1440

01:26:07.950 --> 01:26:10.170

Weather. Weather. Weather's a great example of a threat.

1441

01:26:13.230 --> 01:26:14.070

Yeah. Okay.

1442

01:26:15.030 --> 01:26:18.500

So think of threats as inputs from the environment,

1443

01:26:18.830 --> 01:26:22.380

environment being literal environment like weather, but

1444

01:26:22.470 --> 01:26:24.470

overall, the environment that you're operating in.

1445

01:26:27.330 --> 01:26:30.970

The only way to protect ourselves against threats in that manner from the

1446

01:26:31.010 --> 01:26:31.570

environment

1447

01:26:32.450 --> 01:26:34.610

is the anticipation piece, right?

1448

01:26:35.710 --> 01:26:38.510

"Hey, let's check the weather before we go.

1449

01:26:39.470 --> 01:26:43.390

We're going to be out on an eight-hour test mission.

1450

01:26:43.430 --> 01:26:47.150

Is the weather going to be the same when we get back as when we

1451

01:26:47.190 --> 01:26:47.550

left?"

1452

01:26:49.290 --> 01:26:50.250

Seems simple enough.

1453

01:26:53.010 --> 01:26:53.930

How about heavy traffic?

1454

01:26:55.190 --> 01:26:58.650

Anybody here operating out of major airfields that have a lot of traffic in

1455

01:26:58.690 --> 01:27:02.630

them? Do you try to not launch a test mission when the

1456

01:27:02.670 --> 01:27:05.190

airlines are launching 45 flights in 30 minutes?

1457

01:27:06.050 --> 01:27:07.430

Yeah, that'd be probably pretty smart.

1458

01:27:10.310 --> 01:27:13.129

Can you plan ahead for technical glitches?

1459

01:27:15.110 --> 01:27:18.890

"Hey, we've had five flights in a row where the TM system has taken a

1460

01:27:18.930 --> 01:27:19.190

dump.

1461

01:27:20.230 --> 01:27:20.970

What's our plan

1462

01:27:21.930 --> 01:27:25.370

if we lose TM at this point in the flight, at that point in the flight?"

1463

01:27:27.290 --> 01:27:30.170

That's stuff you can plan for. That's being proactive.

1464

01:27:31.810 --> 01:27:34.090

Error management, so the human response.

1465

01:27:35.510 --> 01:27:39.490

So the priority there is detection, right? And then recovery.

1466

01:27:41.190 --> 01:27:43.350

Do we have some countermeasures we can put in place?

1467

01:27:45.590 --> 01:27:46.590

How about checklists?

1468

01:27:47.490 --> 01:27:48.530

Right? Briefing guides.

1469

01:27:50.190 --> 01:27:51.810

Training. Training. Absolutely.

1470

01:27:54.490 --> 01:27:55.370

How about SOPs?

1471

01:27:57.070 --> 01:27:59.670

What company has a stack of SOPs that you're supposed to be following,

1472

01:28:01.410 --> 01:28:04.110

right? Those are countermeasures to error management.

1473

01:28:04.910 --> 01:28:08.530

All right. So if all that goes wrong, we end up in, we'll call it an

1474

01:28:08.570 --> 01:28:09.530

undesired state.

1475

01:28:10.470 --> 01:28:10.670

Okay?

1476

01:28:12.630 --> 01:28:14.780

So if we don't manage the threat completely,

1477

01:28:15.810 --> 01:28:19.310

if every error isn't caught, we could end up in an undesired state.

1478

01:28:19.370 --> 01:28:23.270

What's the focus? What should be the focus when you end up in that

1479

01:28:23.310 --> 01:28:24.150

undesired state?

1480

01:28:25.910 --> 01:28:26.190

Yes.

1481

01:28:27.030 --> 01:28:29.090

Are you trying to fix the error that you did?

1482

01:28:30.690 --> 01:28:32.730

Just recover. Fly the airplane, right?

1483

01:28:33.970 --> 01:28:36.570

Get back to a safe space, then worry about the error.

1484

01:28:38.250 --> 01:28:40.170

Recovery is the key. Great.

1485

01:28:45.530 --> 01:28:46.810

All right. We went through that.

1486

01:28:51.550 --> 01:28:51.870

All right.

1487

01:28:53.790 --> 01:28:57.190

Here's an area where I'd love to hear some stories and some insight from the

1488

01:28:57.230 --> 01:28:58.150

group.

1489

01:29:00.670 --> 01:29:01.550

Cultural effects.

1490

01:29:03.550 --> 01:29:06.940

Anybody think we're going through any cultural effects over the last year and

1491

01:29:06.970 --> 01:29:07.310

change,

1492

01:29:08.270 --> 01:29:10.960

in particular at the, say, national and governmental levels?

1493

01:29:12.910 --> 01:29:16.360

Anybody think that has an influence on, say, your FAA partners in the back of the

1494

01:29:16.410 --> 01:29:16.740

room there?

1495

01:29:18.010 --> 01:29:19.010

A little bit.

1496

01:29:21.930 --> 01:29:25.730

So there's a few different type of cultural effects that we're dealing with here in

1497

01:29:25.750 --> 01:29:27.970

flight test, and I'd love for

1498

01:29:29.450 --> 01:29:32.130

you guys to pipe up, and I'd love to hear some stories.

1499

01:29:32.830 --> 01:29:33.020

But

1500

01:29:34.590 --> 01:29:35.470

we'll start with

1501

01:29:37.910 --> 01:29:39.290  
the last one first. How about that?

1502  
01:29:40.070 --> 01:29:43.730  
So national culture surrounding the individuals in an organization,

1503  
01:29:44.250 --> 01:29:45.690  
whether you're talking governmental,

1504  
01:29:46.750 --> 01:29:48.570  
or just talk big picture. Right?

1505  
01:29:49.590 --> 01:29:50.529  
So

1506  
01:29:52.570 --> 01:29:52.970  
let's

1507  
01:29:53.890 --> 01:29:57.030  
use the Asiana crash out in San Francisco as an example.

1508  
01:29:57.630 --> 01:29:59.150  
Do we think there was a culture

1509  
01:30:00.450 --> 01:30:01.790  
issue on that flight deck?

1510  
01:30:03.230 --> 01:30:04.550  
Everybody know the one I'm talking about?

1511  
01:30:05.420 --> 01:30:07.030  
The 777 that flew into the sea wall.

1512  
01:30:08.170 --> 01:30:11.230  
You had three senior captains on that flight deck.

1513  
01:30:11.290 --> 01:30:12.990  
I think the lowest time dude had

1514  
01:30:13.810 --> 01:30:15.830  
14,000 hours or something like that.

1515

01:30:16.650 --> 01:30:16.750

So

1516

01:30:17.830 --> 01:30:21.630

not knuckleheads, people that have flown, have a minute in the flight deck,

1517

01:30:22.050 --> 01:30:22.800

know what they're doing,

1518

01:30:23.770 --> 01:30:24.070

yet

1519

01:30:24.930 --> 01:30:27.930

they're slow, low speed, low altitude,

1520

01:30:28.750 --> 01:30:32.690

and they're literally flying a passenger jet full of people into a sea wall in

1521

01:30:32.710 --> 01:30:35.330

San Francisco. How does that happen?

1522

01:30:35.450 --> 01:30:38.490

How does nobody stand up and say,

1523

01:30:39.380 --> 01:30:42.110

"Captain, watch your speed. Go

1524

01:30:42.230 --> 01:30:43.920

around." Something.

1525

01:30:45.870 --> 01:30:49.090

That had culture written all over it, right?

1526

01:30:50.050 --> 01:30:53.150

That was rewinding the CRM clock 40 years.

1527

01:30:55.870 --> 01:30:58.330

How do we prevent that? How can we help prevent that?

1528

01:30:59.010 --> 01:31:02.190

Do we prevent that in the flight test realm?

1529

01:31:03.190 --> 01:31:06.740

I think from a CRM perspective, we are

1530

01:31:06.790 --> 01:31:10.720

advanced on our CRM clock. The fact that we are having conversations like

1531

01:31:10.790 --> 01:31:14.130

this, the fact that I was asked to come up and talk

1532

01:31:14.170 --> 01:31:17.370

today about flight test CRM, I think that

1533

01:31:17.430 --> 01:31:19.670

means that we are that step ahead.

1534

01:31:20.590 --> 01:31:24.382

How do we continue to advance that?So

1535

01:31:24.422 --> 01:31:28.362

baking it into the culture of our organizations, baking

1536

01:31:28.422 --> 01:31:29.302

that into the,

1537

01:31:30.102 --> 01:31:33.142

we'll call it the foundational or national culture

1538

01:31:34.062 --> 01:31:37.902

of being able to step up and question when we don't like what we

1539

01:31:37.982 --> 01:31:38.922

see, what's happening.

1540

01:31:39.722 --> 01:31:41.302

Rod, what you got, man?

1541

01:31:41.382 --> 01:31:42.402  
safety culture.

1542  
01:31:43.622 --> 01:31:43.802  
Yeah.

1543  
01:31:44.042 --> 01:31:46.902  
Different than organizational culture, but

1544  
01:31:47.142 --> 01:31:48.842  
it's a culture.

1545  
01:31:49.122 --> 01:31:51.622  
Absolutely, it is. Wholeheartedly agree.

1546  
01:31:54.102 --> 01:31:57.202  
And I think it's a key component, to your point, Rod.

1547  
01:31:57.282 --> 01:32:01.022  
I think it's really key that from a safety culture perspective,

1548  
01:32:02.742 --> 01:32:06.322  
as an organization, we shouldn't have an organization

1549  
01:32:06.402 --> 01:32:08.362  
culture and a safety culture.

1550  
01:32:09.222 --> 01:32:10.662  
It should just be what we do.

1551  
01:32:11.622 --> 01:32:14.342  
Right? It should be baked into everything.

1552  
01:32:14.962 --> 01:32:17.522  
Is it important to have our safety systems? Of course it is.

1553  
01:32:17.622 --> 01:32:19.242  
I don't want to discount that in the least.

1554  
01:32:20.262 --> 01:32:23.402  
Right? But how we approach these things should

1555

01:32:23.562 --> 01:32:25.542

100% just be baked in.

1556

01:32:27.022 --> 01:32:30.482

Right? There should be no question about using a briefing guide.

1557

01:32:31.562 --> 01:32:35.122

There should be no question about, "Hey, Cap,

1558

01:32:35.742 --> 01:32:39.622

watch your airspeed there, man. You're creeping up really fast on MMO."

1559

01:32:41.562 --> 01:32:44.342

There should be no question about being able to do things like that.

1560

01:32:46.682 --> 01:32:47.862

I see the mic coming to you, Pete.

1561

01:32:48.562 --> 01:32:49.162

Yeah. Well,

1562

01:32:50.022 --> 01:32:53.522

one thing I'm going to throw counter to this is we've got the cultural pressures

1563

01:32:53.562 --> 01:32:54.702

from outside, from-

1564

01:32:54.902 --> 01:32:55.222

Sure we do

1565

01:32:55.322 --> 01:32:57.042

... project management and things like that.

1566

01:32:57.262 --> 01:32:59.152

And so our safety culture,

1567

01:33:00.042 --> 01:33:03.721

and I want to distill it down to the most basic element, is the no vote,

1568

01:33:03.802 --> 01:33:04.102  
say.

1569

01:33:04.382 --> 01:33:04.622  
Yeah.

1570

01:33:04.652 --> 01:33:08.302  
And our safety culture gets built around that, but organizations

1571

01:33:08.362 --> 01:33:12.112  
outside us don't adopt that. And I think the beautiful

1572

01:33:12.202 --> 01:33:15.862  
thing is that we, as a profession, continue to

1573

01:33:15.902 --> 01:33:19.762  
embody pushing back on congressional pressure or

1574

01:33:19.822 --> 01:33:23.442  
management pressure to keep doing the safety culture

1575

01:33:23.522 --> 01:33:23.822  
part.

1576

01:33:24.502 --> 01:33:28.222  
Yeah, and hopefully this slide isn't too antagonistic

1577

01:33:28.262 --> 01:33:30.602  
where we feel like we're discounting things like that.

1578

01:33:30.962 --> 01:33:34.482  
Really, those things fall into one of these categories at all times.

1579

01:33:35.182 --> 01:33:36.342  
So yeah.

1580

01:33:37.782 --> 01:33:39.722  
I'll use a personal story. So

1581

01:33:41.082 --> 01:33:42.892

one of the manufacturers I was at before

1582

01:33:44.142 --> 01:33:45.822  
coming to the FAA, not Cessna,

1583

01:33:47.062 --> 01:33:48.042  
different organization.

1584

01:33:49.702 --> 01:33:53.622  
I was in line to do the first flight on our second-ever test aircraft.

1585

01:33:54.612 --> 01:33:55.202  
And

1586

01:33:56.042 --> 01:33:59.742  
I was sitting at my desk, crew chief comes over, and he says,

1587

01:33:59.942 --> 01:34:00.382  
"Hey, Eric,

1588

01:34:01.802 --> 01:34:05.682  
thing's going to be ready tomorrow morning." I said, "Great." He goes,  
"In fact,

1589

01:34:05.882 --> 01:34:08.342  
it's probably going to be ready tonight by the end of second shift."

1590

01:34:09.182 --> 01:34:09.562  
"Awesome.

1591

01:34:10.402 --> 01:34:11.142  
I'll come in early.

1592

01:34:12.782 --> 01:34:16.702  
We'll get the brief done, we'll sit down, we'll have our discussions,  
we'll really

1593

01:34:16.742 --> 01:34:20.572  
walk through it. We'll get through the aircraft really thoroughly." I  
said,

1594

01:34:20.592 --> 01:34:22.231

"I'd love to be pushing the start buttons

1595

01:34:23.142 --> 01:34:26.402

when the engineer crews and everybody rolls in at 8:00."

1596

01:34:27.222 --> 01:34:31.202

"Sounds great. Let's plan for it." So I roll in the next morning, 0 dark 30.

1597

01:34:32.402 --> 01:34:34.642

Guess what? Can anybody imagine what happened?

1598

01:34:36.182 --> 01:34:39.582

The airplane's not ready. Right? Woo, surprise.

1599

01:34:43.042 --> 01:34:43.982

So we sit there all day.

1600

01:34:46.142 --> 01:34:49.112

3:30 rolls around. I've been there since roughly 5:00.

1601

01:34:50.382 --> 01:34:53.202

3:30 rolls around, crew chief walks in, guess what he tells me?

1602

01:34:54.222 --> 01:34:54.862

The airplane's ready.

1603

01:34:56.642 --> 01:34:57.602

"Airplane's ready." Who thinks I went flying?

1604

01:34:59.402 --> 01:35:00.482

Good. I didn't.

1605

01:35:02.942 --> 01:35:06.602

I said, "Perfect. Glad it's ready. Rope it off, lock the door.

1606

01:35:08.482 --> 01:35:11.002

Same plan from today, we'll execute tomorrow morning."

1607

01:35:12.202 --> 01:35:13.502

Crew chief says, "Great. Sounds good."

1608

01:35:14.682 --> 01:35:16.742

It took all of 10 minutes

1609

01:35:17.862 --> 01:35:20.802

for the vice president of engineering to come marching down to my desk.

1610

01:35:21.212 --> 01:35:24.262

"Eric, why aren't you flying? I heard the airplane's ready.

1611

01:35:24.372 --> 01:35:26.062

I see the release flag in the window."

1612

01:35:28.422 --> 01:35:28.922

I said, "Sir,

1613

01:35:30.262 --> 01:35:33.242

I've been here for nine hours already.

1614

01:35:33.262 --> 01:35:37.002

By the time we pre-flight, get out there, launch, you're talking

1615

01:35:37.122 --> 01:35:38.622

maybe a trip around the pattern.

1616

01:35:39.942 --> 01:35:43.822

That'd be all I'd be comfortable with." So I said, "I'm not going to do that.

1617

01:35:44.451 --> 01:35:47.542

We're not going to rush into this. We're going to launch first thing tomorrow

1618

01:35:47.582 --> 01:35:47.782

morning."

1619

01:35:48.651 --> 01:35:50.462

"No, I really need you to go." And I said, "No."

1620

01:35:51.842 --> 01:35:55.822

And then he kept emphasizing, and a little bit of background, and this is me

1621

01:35:55.862 --> 01:35:58.842

being a little bit obstinate, but we'll go there anyway.

1622

01:36:00.742 --> 01:36:04.032

His pet peeve, he hated walking around the engineering floor, and even during

1623

01:36:04.082 --> 01:36:06.182

lunch, seeing an engineer with his feet up on his desk.

1624

01:36:06.822 --> 01:36:10.682

So when he kept pressing, I sat down in my chair, and I threw my feet

1625

01:36:10.742 --> 01:36:11.442

up on my desk.

1626

01:36:16.072 --> 01:36:17.082

That

1627

01:36:17.962 --> 01:36:19.202

didn't score me any points.

1628

01:36:20.302 --> 01:36:22.302

That probably wasn't a great culture example.

1629

01:36:24.622 --> 01:36:25.012

Bacteria.

1630

01:36:26.922 --> 01:36:30.222

That said, he left my desk and went into my boss's office.

1631

01:36:30.762 --> 01:36:31.682

What do you think my boss said?

1632

01:36:34.642 --> 01:36:35.112

Whatever Eric said.

1633

01:36:35.112 --> 01:36:35.482

"Whatever Eric said."

1634

01:36:38.782 --> 01:36:40.082  
That's a positive safety culture,

1635

01:36:41.182 --> 01:36:41.382  
right?

1636

01:36:42.322 --> 01:36:44.552  
Not what the vice president was exuding,

1637

01:36:45.582 --> 01:36:49.262  
but what my leadership did. I think that was a very positive safety culture.

1638

01:36:49.672 --> 01:36:52.662  
"Whatever Eric said. If he said no, the answer's no."

1639

01:36:53.902 --> 01:36:57.842  
We showed up the next morning, executed the plan as planned. It was awesome.

1640

01:36:58.422 --> 01:37:00.602  
The engineering group was super thrilled.

1641

01:37:01.102 --> 01:37:03.502  
They all were out on the ramp watching us taxi off.

1642

01:37:03.622 --> 01:37:07.442  
It was a great day, beautiful flight. Aircraft performed wonderfully.

1643

01:37:08.642 --> 01:37:10.522  
So everything went the way it should have,

1644

01:37:11.782 --> 01:37:15.742  
but that just shows a huge culture difference, even within

1645

01:37:15.782 --> 01:37:19.682  
the same company. And I know you all have experienced that in different outfits

1646

01:37:19.722 --> 01:37:20.542  
that you've been a part of.

1647  
01:37:22.162 --> 01:37:23.082  
So

1648  
01:37:23.982 --> 01:37:27.252  
know the atmosphere, know the culture of the environment

1649  
01:37:27.762 --> 01:37:31.752  
or the culture of the organization you're a part of and who you can count  
on,

1650  
01:37:31.762 --> 01:37:35.572  
and build those alliances And try to help grow that

1651  
01:37:35.612 --> 01:37:39.422  
culture beyond that. That's what we can do as

1652  
01:37:39.452 --> 01:37:40.082  
individuals,

1653  
01:37:40.932 --> 01:37:44.032  
is help perpetuate that type of culture throughout our organizations.

1654  
01:37:49.512 --> 01:37:50.492  
Okay. So

1655  
01:37:52.472 --> 01:37:53.792  
here's where we get a little bit tricky.

1656  
01:37:56.232 --> 01:37:57.872  
I know this is going to be harder today.

1657  
01:37:57.912 --> 01:38:00.932  
Again, the SSEs, everybody remember what I was talking about there?

1658  
01:38:00.972 --> 01:38:03.872  
Things didn't quite go the way I thought.

1659  
01:38:04.012 --> 01:38:07.932

I will tell you, when we run this course, we normally spend well over an

1660

01:38:07.992 --> 01:38:11.772

hour, probably 90 minutes, just on this slide, where we

1661

01:38:11.832 --> 01:38:15.752

sit there and we're exchanging stories around the room. You guys can't let me down.

1662

01:38:15.812 --> 01:38:16.752

You have to come up with something.

1663

01:38:17.892 --> 01:38:18.132

Okay?

1664

01:38:19.672 --> 01:38:21.572

I will kick one off,

1665

01:38:22.912 --> 01:38:26.612

and then I'll turn it over to you guys. Does that sound fair?

1666

01:38:27.532 --> 01:38:29.412

So I'll try to set a good example.

1667

01:38:31.752 --> 01:38:35.272

So I had an event. It was a single-engine turboprop

1668

01:38:35.312 --> 01:38:35.792

aircraft.

1669

01:38:36.902 --> 01:38:40.862

There was several external mods on the aircraft, so we were

1670

01:38:40.952 --> 01:38:44.352

out doing a handling qualities and series of stalls.

1671

01:38:45.512 --> 01:38:47.212

So, stall characteristics.

1672

01:38:48.552 --> 01:38:51.812

You ready? It was the last test condition of the day.

1673

01:38:52.632 --> 01:38:53.192

Sound familiar?

1674

01:38:54.312 --> 01:38:55.572

It was a power on,

1675

01:38:56.552 --> 01:38:57.832

turning, accelerated.

1676

01:38:59.132 --> 01:38:59.332

Right?

1677

01:39:00.472 --> 01:39:01.492

We had flaps extended.

1678

01:39:03.852 --> 01:39:07.692

I roll in. It was a right-hand turning stall. I pull into the stall.

1679

01:39:07.892 --> 01:39:09.282

The aircraft's tendency

1680

01:39:10.332 --> 01:39:12.212

was to roll back towards wings level.

1681

01:39:13.152 --> 01:39:14.052

Okay? That's good.

1682

01:39:16.292 --> 01:39:16.812

I was a little,

1683

01:39:18.172 --> 01:39:20.362

I'll call it lazy, casual on the controls.

1684

01:39:20.492 --> 01:39:23.712

So it rolled past wings level, and where are we allowed to go in the other

1685

01:39:23.732 --> 01:39:24.112

direction?

1686

01:39:25.092 --> 01:39:26.092  
30 degrees, right?

1687

01:39:27.552 --> 01:39:29.692  
I got right to that line.

1688

01:39:30.752 --> 01:39:31.972  
Recovered. Everything's fine.

1689

01:39:33.312 --> 01:39:35.412  
So what do I say to the company pilot I was flying with?

1690

01:39:36.802 --> 01:39:37.112  
"Eh,

1691

01:39:38.032 --> 01:39:39.692  
I didn't do that one quite as well as I should.

1692

01:39:40.612 --> 01:39:41.492  
Let's do that one again."

1693

01:39:44.231 --> 01:39:47.232  
Was what I did compliant the first time? Yes, it was.

1694

01:39:48.052 --> 01:39:50.872  
Did I need to do it again? I did not.

1695

01:39:52.152 --> 01:39:54.432  
Did my ego tell me to do it again?

1696

01:39:55.272 --> 01:39:55.832  
Yes, it did.

1697

01:39:57.672 --> 01:39:57.872  
Right?

1698

01:39:58.752 --> 01:40:01.312  
So now I'm going to hit pause right there for a second. I'm going to  
rewind.

1699

01:40:02.452 --> 01:40:04.692

In the pre-flight brief, I got our briefing guide out.

1700

01:40:04.812 --> 01:40:06.952

We're going down the whole thing. We hit our THAs.

1701

01:40:07.112 --> 01:40:09.872

One of the THAs was spin recovery

1702

01:40:10.712 --> 01:40:14.132

in case of an inadvertent departure. Great. We're going through it.

1703

01:40:15.272 --> 01:40:16.432

This is a tandem aircraft.

1704

01:40:17.361 --> 01:40:18.892

The company pilot was going to sit in the back.

1705

01:40:20.632 --> 01:40:21.252

And I said,

1706

01:40:22.162 --> 01:40:22.892

"If we depart,

1707

01:40:23.792 --> 01:40:25.672

I am going to continue to fly the aircraft

1708

01:40:27.372 --> 01:40:29.452

unless you want it. You're the PIC.

1709

01:40:29.672 --> 01:40:33.092

If you want it, it's yours." But I said, "I am not going to stop flying the

1710

01:40:33.132 --> 01:40:37.112

aircraft. I am not going to remove my hands from the controls until

1711

01:40:37.332 --> 01:40:41.032

I hear you call for the aircraft, and I feel you give me a stick shake.

1712

01:40:42.412 --> 01:40:45.232

If those two things don't happen, I am going to continue."

1713

01:40:45.672 --> 01:40:47.572

Fine. And we went through the rest of that.

1714

01:40:48.412 --> 01:40:50.272

Okay, now, so let's fast-forward again.

1715

01:40:50.352 --> 01:40:53.512

Now we're in the middle of it. I go to repeat.

1716

01:40:54.192 --> 01:40:57.542

Now, man, I am all over it. I'm going to be golden arm test pilot here, and I'm

1717

01:40:57.552 --> 01:40:58.952

going to get this thing really right.

1718

01:40:59.952 --> 01:41:02.792

And I was so all over it that we ended up departing.

1719

01:41:04.572 --> 01:41:07.892

So the aircraft stalls, starts to roll towards wings level.

1720

01:41:08.572 --> 01:41:11.792

I try to cram in some aileron and some rudder, and I'm going to

1721

01:41:12.672 --> 01:41:14.832

prevent this thing from going 30 the other way.

1722

01:41:15.532 --> 01:41:18.652

And it gives me a little pause at wings level and says, "Oh, you want all that?"

1723

01:41:18.752 --> 01:41:19.992

That's fine, and here we go."

1724

01:41:23.152 --> 01:41:24.572

So what do I hear from the backseat?

1725

01:41:29.712 --> 01:41:30.232

And then,

1726

01:41:31.872 --> 01:41:35.832

"Eric, you're at 9,600 feet and your airspeed is pegged on

1727

01:41:35.872 --> 01:41:36.392

the low end."

1728

01:41:37.652 --> 01:41:41.372

And it was that rhythm and that tone of airspeed and

1729

01:41:41.412 --> 01:41:43.752

altitude calls as I executed the recovery.

1730

01:41:44.952 --> 01:41:46.012

He didn't call for the airplane.

1731

01:41:47.352 --> 01:41:50.262

He didn't give me the stick shake. I kept flying. We recovered.

1732

01:41:50.812 --> 01:41:51.972

Minimal altitude loss.

1733

01:41:53.491 --> 01:41:57.441

No over-G, nothing abnormal, but throughout the whole thing, it was

1734

01:41:57.532 --> 01:42:01.272

a calm airspeed and altitude calls throughout the whole

1735

01:42:01.352 --> 01:42:01.812

recovery.

1736

01:42:03.832 --> 01:42:04.472

I thought that was great.

1737

01:42:05.612 --> 01:42:07.132

I thought that was a good CRM story.

1738

01:42:08.132 --> 01:42:11.252

I thought that was a good execution of what we had briefed.

1739

01:42:13.112 --> 01:42:15.352

I told him what my expectations were.

1740

01:42:15.372 --> 01:42:19.032

He executed what he thought was needed from an information perspective,

1741

01:42:19.532 --> 01:42:20.812

and we recovered successfully.

1742

01:42:22.732 --> 01:42:24.552

So I use that story because

1743

01:42:25.652 --> 01:42:27.332

it could have been very different. Right?

1744

01:42:27.552 --> 01:42:29.752

We could have not done the second condition.

1745

01:42:30.172 --> 01:42:33.752

He could've questioned me at that point, said, "Eric, do you really need to redo

1746

01:42:33.822 --> 01:42:37.712

that? That was compliant." He could've said that, and I could've said, "You know

1747

01:42:37.752 --> 01:42:39.872

what? You're right. Let's go home.

1748

01:42:40.192 --> 01:42:40.612

We're done."

1749

01:42:42.972 --> 01:42:45.192

So couple things went not my way.

1750

01:42:46.512 --> 01:42:47.632

Couple decisions made

1751

01:42:48.652 --> 01:42:50.452

probably could have made differently.

1752

01:42:51.472 --> 01:42:54.232

But the end result I thought was good comms,

1753

01:42:55.132 --> 01:42:56.612

good execution of procedures,

1754

01:42:57.752 --> 01:43:01.172

and we returned home safely with a healthy aircraft, no damage.

1755

01:43:02.452 --> 01:43:05.352

All's well at the end of the day, and a good story to tell to you guys.

1756

01:43:07.332 --> 01:43:11.232

So how about you guys? Do you guys have any CRM stories,

1757

01:43:11.632 --> 01:43:14.192

positives, negatives? Not expecting details,

1758

01:43:15.152 --> 01:43:16.612

but would love to hear. Yeah.

1759

01:43:18.652 --> 01:43:21.262

Okay, probably the other end of the spectrum from your good story-

1760

01:43:21.512 --> 01:43:21.562

Yeah

1761

01:43:21.592 --> 01:43:25.432

... Eric. I guess I start out with, and a little bit tying it

1762

01:43:25.472 --> 01:43:28.982

back to previous slides, I would say that I am really

1763

01:43:29.092 --> 01:43:32.912

bad at flying a lot of different aircraft. And what does that mean?

1764

01:43:33.052 --> 01:43:37.001

Often, I'll get, let's say, I think of a specific situation where I'll get

1765

01:43:37.012 --> 01:43:39.902  
in a manufacturer's aircraft, and I've seen some of the most professional  
crews,

1766  
01:43:39.922 --> 01:43:43.256  
and I'm thinking to myself, "I wish I could be like them." And then maybe  
I'll go to

1767  
01:43:43.266 --> 01:43:46.776  
a small STC shop, and I'm like going, "Is that other person a pilot?"

1768  
01:43:48.436 --> 01:43:50.115  
So there I was.

1769  
01:43:51.376 --> 01:43:53.656  
I'll set the stage a little bit. We had done the brief.

1770  
01:43:53.856 --> 01:43:57.596  
It's the first flight of this part of the campaign,

1771  
01:43:57.856 --> 01:44:00.676  
and I am the first pilot in this aircraft.

1772  
01:44:01.976 --> 01:44:05.936  
And we've gone through it, and the test point is going to be for an auto  
throttle

1773  
01:44:05.976 --> 01:44:09.156  
takeoff, and we're out there, and we're at the hole short, and I have not  
flown

1774  
01:44:09.176 --> 01:44:11.236  
this aircraft before, and there was no sim.

1775  
01:44:11.876 --> 01:44:15.845  
And I'm getting some coaching from the pilot in the right seat, who's

1776  
01:44:15.876 --> 01:44:18.826  
the PIC for the aircraft, and I'm pushing

1777  
01:44:18.876 --> 01:44:22.616  
through to get the auto throttle to engage, and for

1778

01:44:22.636 --> 01:44:25.736

whatever reason, I don't like the feel in the auto throttle, and next thing you

1779

01:44:25.776 --> 01:44:29.456

know, it disconnects, and it stick jumps, and we get an overtorque.

1780

01:44:29.896 --> 01:44:32.936

And I'm thinking to myself, "Did I just break this aircraft?"

1781

01:44:33.876 --> 01:44:37.126

And then that bothered me, right? You can imagine suddenly what's going through

1782

01:44:37.156 --> 01:44:41.096

your head in terms of the amount of pressure that a single test asset

1783

01:44:41.536 --> 01:44:45.316

and the FAA pilot shows up, and next thing you know is the

1784

01:44:45.356 --> 01:44:47.976

aircraft down for the rest of the campaign, which has got to be at least another

1785

01:44:48.056 --> 01:44:48.616

100 hours.

1786

01:44:50.876 --> 01:44:54.806

So we decide it's time to taxi off. He's looking at me, and

1787

01:44:54.856 --> 01:44:58.656

I'm looking at him. He's not quite sure, and I can see that

1788

01:44:58.756 --> 01:45:02.496

on his face, and I'm just a little embarrassed on my face.

1789

01:45:02.536 --> 01:45:06.376

We taxi off, we go in, we break out the maintenance pubs, and the

1790

01:45:06.416 --> 01:45:09.296

learning there is maybe I should have asked more questions about how this auto

1791

01:45:09.356 --> 01:45:12.696

throttle was going to engage. But we did find some other problems in the

1792

01:45:12.736 --> 01:45:14.016

maintenance pubs in that

1793

01:45:14.836 --> 01:45:18.796

it had a very low torque limit where they had artificially set

1794

01:45:18.836 --> 01:45:19.256

it low,

1795

01:45:20.556 --> 01:45:22.496

rather than a maintenance inspection required.

1796

01:45:23.096 --> 01:45:26.796

But then thanks to maybe JJ McHugh and my Naval Test Pilot

1797

01:45:26.876 --> 01:45:30.016

School background, I'm looking at the graph and I'm going, "There's no end to

1798

01:45:30.076 --> 01:45:33.796

this." I could have kept it at that sustained torque forever according to this

1799

01:45:33.836 --> 01:45:37.756

maintenance chart. So was it really an overtorque, or how

1800

01:45:37.796 --> 01:45:41.116

do you know? So if I had read the pubs maybe more closely initially,

1801

01:45:41.756 --> 01:45:45.526

I would know that situation, and we would've been able to make a decision

1802

01:45:46.136 --> 01:45:47.816

on the runway to keep the aircraft going.

1803

01:45:47.876 --> 01:45:51.566

At the same time, the other thing I've walked away with from

1804

01:45:51.695 --> 01:45:55.596

25 plus years of flying now is an aircraft safe on deck is a

1805

01:45:55.636 --> 01:45:57.916

hard fact to argue. So thank you.

1806

01:46:01.656 --> 01:46:03.436

I'm going to stay seated unlike Rory.

1807

01:46:03.485 --> 01:46:06.496

So I was part of the 53K test program.

1808

01:46:07.376 --> 01:46:11.316

We had a problem with the aircraft where the number two engine had a backflow issue

1809

01:46:11.336 --> 01:46:15.276

when you got to higher speed. So you'd always see temperatures rising in the engine

1810

01:46:15.316 --> 01:46:17.276

bay. Imagine

1811

01:46:18.296 --> 01:46:21.776

a 88,000-pound combined gross weight aircraft with

1812

01:46:21.836 --> 01:46:25.536

an external underneath it in the range and seeing temperatures

1813

01:46:25.596 --> 01:46:26.576

starting to rise.

1814

01:46:27.456 --> 01:46:27.696

So

1815

01:46:28.516 --> 01:46:32.196

they saw the temperatures rise. They had kind of a group think mindset where the

1816  
01:46:32.236 --> 01:46:35.796  
telemetry room and the crew both believed, "Ah, it's just backflow.

1817  
01:46:35.856 --> 01:46:37.336  
Let's bring it back to the airfield.

1818  
01:46:37.436 --> 01:46:38.096  
We'll reset."

1819  
01:46:39.996 --> 01:46:43.636  
I think the load at the time was a 36,000-pound load.

1820  
01:46:43.696 --> 01:46:47.436  
They brought it over the airfield, set it down, and when they landed the aircraft,

1821  
01:46:47.496 --> 01:46:49.636  
the number two engine gave up on them.

1822  
01:46:50.116 --> 01:46:53.956  
It turned out it wasn't just a backflow issue, it was a bleed air leak that

1823  
01:46:53.996 --> 01:46:56.376  
was cooking everything inside the engine bay.

1824  
01:46:56.816 --> 01:47:00.736  
So they were just lucky that that happened once they had landed on

1825  
01:47:00.776 --> 01:47:04.736  
the deck instead of in the air or over the range or over some place in

1826  
01:47:04.776 --> 01:47:08.736  
the field. But it was kind of a good study for the team on kind of the group

1827  
01:47:08.796 --> 01:47:12.196  
think mindset. Everybody thought that it was just

1828  
01:47:12.236 --> 01:47:16.156  
something that they'd seen a million times before, but when in fact,

1829

01:47:16.196 --> 01:47:17.036

it was a real issue.

1830

01:47:18.376 --> 01:47:19.036

Appreciate that.

1831

01:47:22.616 --> 01:47:25.376

All right. Here's what we're going to do. I'm a couple minutes early.

1832

01:47:25.406 --> 01:47:28.116

I'm going to ask you to save it, and I want to come back to it.

1833

01:47:28.596 --> 01:47:32.536

I think this is a decent spot to stop for our

1834

01:47:32.556 --> 01:47:32.856

break.

1835

01:47:33.716 --> 01:47:36.716

We'll let everybody grab some coffee, re-energize.

1836

01:47:37.476 --> 01:47:39.936

I think there should be snacks or something back there here in a minute.

1837

01:47:40.716 --> 01:47:44.516

And think of some more stories. We'll come back, and we'll continue this before we

1838

01:47:44.556 --> 01:47:45.996

move on. Is that fair?

1839

01:47:47.596 --> 01:47:47.836

All right.

1840

01:47:48.656 --> 01:47:50.116

What's the break, bottom of the hour?

1841

01:47:51.196 --> 01:47:53.996

Bottom of the hour for a return. All right. Thank you.

1842

01:48:02.476 --> 01:48:06.216

I stretch my hands out to the sky. We dance with monsters

1843

01:48:06.256 --> 01:48:07.046

through the night