

WEBVTT

1

00:00:04.725 --> 00:00:09.435

Think back, if you will, to your very first review board,

2

00:00:09.435 --> 00:00:11.075

whether it was an ERB

3

00:00:11.095 --> 00:00:13.595

or an SRB, if this applies to you,

4

00:00:13.595 --> 00:00:15.795

that time when you had written your first test plan

5

00:00:16.535 --> 00:00:19.475

and you're at the table, hopefully you've got another pilot

6

00:00:19.535 --> 00:00:20.555

or an engineer next to you.

7

00:00:20.675 --> 00:00:23.715

'cause you're a team, and across the table there's a host

8

00:00:23.715 --> 00:00:25.915

of characters and one of them is the person

9

00:00:25.915 --> 00:00:27.395

that's gonna sign your test plan

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00:00:27.655 --> 00:00:29.835

so you can go execute your flight test.

11

00:00:30.125 --> 00:00:33.115

Right? I've got a story that I think you may be able

12

00:00:33.115 --> 00:00:35.315

to relate with if, if you've had this experience

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00:00:35.335 --> 00:00:37.195

or in your experience doing test

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00:00:37.435 --> 00:00:38.475  
planning and risk management.

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00:00:39.015 --> 00:00:41.995  
My first time doing this was at test pilot school, like many

16

00:00:41.995 --> 00:00:44.115  
of you, and it was our capstone exercise.

17

00:00:44.675 --> 00:00:46.355  
I was going to go down to, uh, Brazil

18

00:00:46.375 --> 00:00:47.635  
to fly this little aircraft.

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00:00:47.635 --> 00:00:50.515  
They have called the A MX air to ground, uh,

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00:00:50.515 --> 00:00:51.915  
closed air support kind of thing.

21

00:00:52.375 --> 00:00:53.675  
And I had a, a partner there

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00:00:53.675 --> 00:00:55.875  
and we, you know, we read all these books in, in Portuguese

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00:00:55.875 --> 00:00:58.595  
and tried to decipher how to fly this thing and what to do.

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00:00:59.015 --> 00:01:01.195  
And, uh, we, we were pretty well prepared.

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00:01:01.195 --> 00:01:02.835  
We thought after a year of academics

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00:01:03.045 --> 00:01:04.275  
stuff that was pretty straightforward.

27

00:01:04.295 --> 00:01:05.995

You know, there's calculus and statics

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00:01:05.995 --> 00:01:08.755

and dynamics that, that sort of get you going and, and first

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00:01:08.775 --> 00:01:10.875

and second order behavior, things

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00:01:10.875 --> 00:01:11.915

that are pretty black and white.

31

00:01:12.495 --> 00:01:14.715

And then there were test hazard analyses,

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00:01:14.935 --> 00:01:16.715

and that's where it got a little more subjective

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00:01:16.715 --> 00:01:18.435

and artistic and squishy, right?

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00:01:18.435 --> 00:01:19.595

But nevertheless, we're prepared

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00:01:19.815 --> 00:01:22.115

and we show up on a on game day for our review board,

36

00:01:22.175 --> 00:01:23.275

and we've got our test plan

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00:01:23.575 --> 00:01:25.035

and we go through this, this process.

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00:01:25.405 --> 00:01:27.355

There may have been some people in this room here that,

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00:01:27.355 --> 00:01:29.035

that were part of that, uh, looking back now,

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00:01:29.035 --> 00:01:30.315

maybe I don't remember.

41  
00:01:30.535 --> 00:01:32.235  
But nevertheless, you know, the first part goes pretty good.

42  
00:01:32.235 --> 00:01:33.515  
We're things are pretty straightforward.

43  
00:01:33.615 --> 00:01:36.435  
And then we get to the t HHAs, the test hazard analysis

44  
00:01:36.565 --> 00:01:38.595  
where we've documented our risk management process

45  
00:01:38.655 --> 00:01:39.835  
and the good thinking we've done.

46  
00:01:40.695 --> 00:01:42.235  
And we started getting comments like this.

47  
00:01:42.535 --> 00:01:44.875  
And I wonder if you've heard some of these? Yeah.

48  
00:01:45.015 --> 00:01:47.555  
You know, Oxy, you guys call this a hazard,

49  
00:01:47.775 --> 00:01:50.955  
but it might really be in effect or,

50  
00:01:51.015 --> 00:01:52.075  
or this comment, Hey,

51  
00:01:52.075 --> 00:01:53.595  
you've got some good information in here,

52  
00:01:53.735 --> 00:01:55.515  
but I don't think it belongs there.

53  
00:01:55.525 --> 00:01:57.435  
Maybe it should go somewhere else in your test plan.

54  
00:01:57.465 --> 00:02:00.355

Anybody have that experience? Right? Yeah.

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00:02:01.065 --> 00:02:02.395

Tpha can be like a dark art.

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00:02:02.425 --> 00:02:04.075

It's sort of black magic to some people.

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00:02:04.315 --> 00:02:05.355

I said it's subjective

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00:02:05.505 --> 00:02:07.075

because there are a lot of different ways

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00:02:07.075 --> 00:02:08.355

to skin that cat, right?

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00:02:08.695 --> 00:02:11.035

And it's artistic because there are,

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00:02:11.095 --> 00:02:12.475

you can use some license

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00:02:12.775 --> 00:02:13.835

and creativity in

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00:02:13.995 --> 00:02:15.795

how you communicate the risk

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00:02:15.795 --> 00:02:17.195

management planning you've done in there.

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00:02:17.615 --> 00:02:19.875

And like art, it's sort of beauty's in the eye

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00:02:19.875 --> 00:02:21.515

of the beholder, good and bad.

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00:02:21.735 --> 00:02:23.955

You know, I may think something's great and,

68

00:02:24.135 --> 00:02:25.155  
and where's Brick Wilson?

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00:02:25.255 --> 00:02:27.315  
He may think it's garbage. Right? There he is in the back.

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00:02:27.335 --> 00:02:29.435  
Of course. Right? Well, I got my eye on you,

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00:02:29.535 --> 00:02:31.475  
so the back row, we know why you're there.

72

00:02:32.455 --> 00:02:36.795  
Um, so what we're hoping to do this week,

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00:02:37.805 --> 00:02:38.995  
first I'll introduce myself.

74

00:02:39.015 --> 00:02:40.875  
I'm Pat Moran. I'm excited to be here

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00:02:41.335 --> 00:02:42.355  
to, uh, do a couple things.

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00:02:42.735 --> 00:02:46.915  
One is appreciate and acknowledge the great experience

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00:02:47.735 --> 00:02:50.755  
and, um, knowledge that your organizations have

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00:02:51.015 --> 00:02:53.035  
and that you each individually bring you.

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00:02:53.035 --> 00:02:56.235  
Look around here. This is a great, uh, group of folks we got

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00:02:56.255 --> 00:02:58.315  
and, and look forward to doing some information sharing.

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00:02:59.025 --> 00:03:00.925

But the converse to that is the,

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00:03:00.925 --> 00:03:03.325

another objective is I'd like to see if we can all

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00:03:04.185 --> 00:03:07.285

get a baseline understanding of the concepts and definitions

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00:03:08.105 --> 00:03:11.045

and the process that we're gonna use in the next couple days

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00:03:11.665 --> 00:03:13.085

as we do look at our ultimate objective

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00:03:13.085 --> 00:03:15.845

that Huffer talked about, which is to generate some awesome

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00:03:16.435 --> 00:03:19.725

tpha that might be worthy to share with the enterprise,

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00:03:19.955 --> 00:03:22.645

perhaps via the flight test safety database vehicle.

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00:03:23.115 --> 00:03:26.805

Okay, that's my hope. How am I sounding so far? Johnny?

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00:03:26.965 --> 00:03:29.525

O Okay, awesome. Got the thumbs up.

91

00:03:30.665 --> 00:03:31.725

So who the heck am I, and,

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00:03:31.725 --> 00:03:33.645

and how do I earn the right to, uh, talk to you

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00:03:33.645 --> 00:03:35.165

for the, this entire morning?

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00:03:35.165 --> 00:03:37.085

Right. Again, I'm Pat Moran.

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00:03:37.095 --> 00:03:40.285

Until three years ago today, May 1st, 2015,

96

00:03:40.645 --> 00:03:42.045

I was in uniform as a Marine.

97

00:03:42.245 --> 00:03:43.445

I stood up there in PAX and,

98

00:03:43.445 --> 00:03:45.045

and said my farewells three years ago.

99

00:03:45.665 --> 00:03:48.165

Um, and it been that time, 20 years in uniform.

100

00:03:48.285 --> 00:03:50.205

I spent, uh, I had a couple different perspectives in this

101

00:03:50.205 --> 00:03:52.125

whole THA in endeavor were doing.

102

00:03:52.445 --> 00:03:55.165

I started as a F 18 project officer.

103

00:03:56.295 --> 00:03:57.365

Turbo was my CEO

104

00:03:57.705 --> 00:04:00.525

and I, I had in that capacity the opportunity to write ths.

105

00:04:00.605 --> 00:04:02.165

I was a doer, the one creating them,

106

00:04:02.165 --> 00:04:03.285

doing the risk management process.

107

00:04:03.875 --> 00:04:05.725

From there, I went on to be the operations officer

108

00:04:05.725 --> 00:04:08.565



of a squadron and an instructor at test pilot school,

109

00:04:08.615 --> 00:04:11.205

where now I had the, the role of being a reviewer

110

00:04:11.205 --> 00:04:13.125

where I could look at the doer's work

111

00:04:13.245 --> 00:04:14.965

and help polish it so that when it got

112

00:04:14.965 --> 00:04:17.045

to the approvers, it was ready to go.

113

00:04:17.585 --> 00:04:19.125

And in my final job in the Marine Corps,

114

00:04:19.245 --> 00:04:22.245

I was the government flight test director for F 35 at pax.

115

00:04:22.505 --> 00:04:23.725

And now I was the approver.

116

00:04:23.765 --> 00:04:25.205

I had test plan signing authority.

117

00:04:25.665 --> 00:04:27.405

So I had the opportunity

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00:04:27.405 --> 00:04:29.045

to look at a test plan from that perspective.

119

00:04:30.015 --> 00:04:32.125

Since then, after I retired, I went to work

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00:04:32.225 --> 00:04:35.525

for this company, avian, and a great company, great outfit.

121

00:04:35.525 --> 00:04:37.405

And, and they offered me the opportunity

122

00:04:37.405 --> 00:04:38.445  
to teach test planning

123

00:04:38.785 --> 00:04:40.685  
and test reporting to the Navy's newest

124

00:04:40.685 --> 00:04:41.805  
flight test engineers.

125

00:04:41.905 --> 00:04:43.085  
And what a great opportunity.

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00:04:43.085 --> 00:04:44.685  
You know, you think about being a college professor

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00:04:44.685 --> 00:04:46.365  
or something, that's great, but when you got college

128

00:04:46.725 --> 00:04:48.725  
graduates, engineers that are starting a new career

129

00:04:48.985 --> 00:04:50.685  
and they're fired up and motivated to learn,

130

00:04:50.995 --> 00:04:52.485  
it's a great, great audience.

131

00:04:52.905 --> 00:04:54.485  
Um, and some of you have probably been in there.

132

00:04:54.545 --> 00:04:56.605  
Pat, where's Pat out of, uh, point Magoo?

133

00:04:56.755 --> 00:04:59.045  
Yeah, you were, you went through the class, right?

134

00:04:59.305 --> 00:05:01.125  
Or some of this? No, you kicked it off.

135

00:05:01.585 --> 00:05:03.285

But, uh, maybe some of you have been through this training,

136

00:05:03.305 --> 00:05:04.325

if not with me, somebody else.

137

00:05:05.025 --> 00:05:08.925

Um, in that process though, with Avian, we also had a chance

138

00:05:09.085 --> 00:05:10.485

to work with some commercial companies.

139

00:05:10.485 --> 00:05:11.685

And this is where there's some

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00:05:11.685 --> 00:05:13.005

good relevance for you out there.

141

00:05:13.075 --> 00:05:15.925

Okay. This, this class derives from that,

142

00:05:15.925 --> 00:05:17.165

and that's why I'm sharing this with you.

143

00:05:17.425 --> 00:05:19.645

We had a chance to work with a little Silicon Valley company

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00:05:19.645 --> 00:05:22.285

that was making hot air balloons with heavy payloads.

145

00:05:22.555 --> 00:05:23.765

They were making UAVs

146

00:05:23.765 --> 00:05:25.445

that would deliver your Starbucks latte

147

00:05:25.585 --> 00:05:27.605

or your Chipotle chalupa to you.

148

00:05:28.025 --> 00:05:29.725

And, uh, and they even had self-driving cars.

149

00:05:29.865 --> 00:05:32.605

So they had this experimental test group,

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00:05:32.905 --> 00:05:33.925

but they didn't know what they were doing.

151

00:05:33.925 --> 00:05:35.045

They, the complexity

152

00:05:35.045 --> 00:05:36.165

and the risk was getting so great

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00:05:36.165 --> 00:05:37.205

that they asked for some guidance.

154

00:05:37.905 --> 00:05:39.325

And in preparing the training for them,

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00:05:39.325 --> 00:05:41.245

we had the opportunity to survey the industry.

156

00:05:41.745 --> 00:05:44.245

We went to the Air Force, um, instructions.

157

00:05:44.425 --> 00:05:46.925

We, I had experienced with JSF, we had the Navy of course,

158

00:05:47.225 --> 00:05:48.485

but we could also start looking

159

00:05:48.745 --> 00:05:50.525

or, uh, bringing in our experience with, uh,

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00:05:50.525 --> 00:05:51.925

the Brazilian Air Force, uh,

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00:05:51.995 --> 00:05:54.405

test pilot school empire Ebner, where we've been.

162

00:05:54.665 --> 00:05:57.125

And we could take the best of all those, the best practices

163

00:05:57.165 --> 00:05:58.885

and lesson learned and bake 'em into a course.

164

00:06:00.035 --> 00:06:04.325

Following that, we had a commercial aircraft, uh, developer,

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00:06:04.745 --> 00:06:06.285

um, that asked us to help them

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00:06:06.285 --> 00:06:08.005

with some specifically risk management

167

00:06:08.005 --> 00:06:11.285

and THA training, building better THA worksheets.

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00:06:11.705 --> 00:06:15.205

And now we opened up our aperture to look at the FAA,

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00:06:15.365 --> 00:06:18.405

the 40 40 26 B, the order that guides a lot of you

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00:06:18.405 --> 00:06:19.845

and your commercial development efforts.

171

00:06:20.265 --> 00:06:21.885

And we learned a lot from that bottom line.

172

00:06:21.885 --> 00:06:23.285

We pulled all those best things in there,

173

00:06:23.465 --> 00:06:24.685

and we had this class for them.

174

00:06:24.895 --> 00:06:26.885

About that time, Huffer was walking the halls

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00:06:26.885 --> 00:06:28.325

of test pilot school looking

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00:06:28.345 --> 00:06:29.645  
for Barb Gordon, the safety officer.

177

00:06:29.645 --> 00:06:31.485  
Is Barb here? No.

178

00:06:31.705 --> 00:06:35.085  
And Johnny o, chief academic, um, officer, instructor.

179

00:06:35.585 --> 00:06:36.765  
Um, and I heard it.

180

00:06:36.805 --> 00:06:38.965  
I said, Hey, we got this great project maybe to be

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00:06:38.965 --> 00:06:40.565  
of value, and I hope it is.

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00:06:40.565 --> 00:06:42.045  
And that's, this is a derivative of that.

183

00:06:42.115 --> 00:06:44.165  
Looking forward to sharing this information

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00:06:44.165 --> 00:06:47.005  
with you this week or this couple days.

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00:06:48.395 --> 00:06:49.765  
Here are our learning objectives.

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00:06:49.765 --> 00:06:51.605  
Like any great class, we've got these for you.

187

00:06:51.745 --> 00:06:53.445  
The first one, Huffer asked me

188

00:06:53.445 --> 00:06:56.485  
to put this in the top corner, apply critical thinking.

189

00:06:57.105 --> 00:06:59.485

Who in here has had critical thinking classes in college

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00:06:59.585 --> 00:07:00.605  
or school or somewhere else?

191

00:07:02.365 --> 00:07:04.565  
A handful, right? It's one of these cool hot words,

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00:07:04.665 --> 00:07:06.285  
you know, like TQI, we throw it around

193

00:07:06.545 --> 00:07:07.565  
and nobody really knows what it means.

194

00:07:07.595 --> 00:07:10.645  
Okay? Three things of critical thinking I want you

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00:07:10.645 --> 00:07:12.965  
to use in the next two and a half days, okay?

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00:07:13.985 --> 00:07:15.405  
One is intellectual humility.

197

00:07:16.035 --> 00:07:19.365  
Acknowledge that nobody in here knows everything, okay?

198

00:07:19.365 --> 00:07:21.125  
So for some of you, I'm looking you right in the eye

199

00:07:21.125 --> 00:07:22.365  
and I'm saying you don't know everything.

200

00:07:22.865 --> 00:07:24.485  
The other people around you have a lot of good stuff

201

00:07:24.485 --> 00:07:26.285  
to share, and we're gonna share that information.

202

00:07:27.025 --> 00:07:29.805  
The second thing, from critical thinking,

203

00:07:29.805 --> 00:07:31.125

I want establish fair mindedness.

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00:07:31.335 --> 00:07:33.085

We're gonna put you in groups with 10 other people

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00:07:33.385 --> 00:07:34.885

and you're gonna have information exchange.

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00:07:34.945 --> 00:07:36.205

Be open to their other opinions,

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00:07:36.205 --> 00:07:37.445

their ways of doing things, okay?

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00:07:37.825 --> 00:07:39.845

And the final element of, of critical thinking,

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00:07:40.245 --> 00:07:41.565

I encourage you to, um,

210

00:07:41.905 --> 00:07:44.165

to keep in this couple days is, is, um, focus.

211

00:07:44.165 --> 00:07:45.725

You know, we talked about there's a question at hand

212

00:07:45.725 --> 00:07:47.005

and we have a purpose in solving that.

213

00:07:47.465 --> 00:07:49.925

We wanna come out here with some awesome tpha

214

00:07:49.925 --> 00:07:51.725

that we can load to the flight test safety base.

215

00:07:52.025 --> 00:07:54.605

So all those things will help keep us focused in on timeline

216

00:07:54.605 --> 00:07:56.325



and being productive quickly.

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00:07:56.335 --> 00:07:58.485

These other ones, we're gonna talk about the different

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00:07:58.645 --> 00:07:59.725

approaches to risk management.

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00:07:59.765 --> 00:08:01.845

I I'm gonna talk early on here about some general best

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00:08:02.085 --> 00:08:04.085

practices, some transcendent principles

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00:08:04.085 --> 00:08:06.405

that we all should know and embrace.

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00:08:07.515 --> 00:08:08.805

Then we're gonna turn the corner

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00:08:08.865 --> 00:08:10.885

and talk about concepts and definitions.

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00:08:11.065 --> 00:08:12.085

Huffer got right into it.

225

00:08:12.085 --> 00:08:13.845

We're gonna leverage a little bit of his discussion,

226

00:08:14.055 --> 00:08:15.645

going right to what is the definition

227

00:08:15.825 --> 00:08:17.245

of these key concepts we're using.

228

00:08:17.775 --> 00:08:19.285

We've all got different understanding of them,

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00:08:19.305 --> 00:08:20.525

but we're gonna agree on a couple

230

00:08:20.525 --> 00:08:22.085  
that are based on the 40 40 26.

231

00:08:22.705 --> 00:08:25.685  
And finally, we're gonna split up into working groups.

232

00:08:25.855 --> 00:08:27.205  
We're gonna get pen to paper,

233

00:08:27.585 --> 00:08:28.805  
and we're gonna work as a team

234

00:08:28.865 --> 00:08:30.925  
to develop some ths on your assigned things.

235

00:08:31.275 --> 00:08:34.525  
Okay? That is our objective for, uh, for this workshop.

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00:08:36.675 --> 00:08:39.085  
Some, uh, admin, just real quick, I wanna highlight.

237

00:08:39.085 --> 00:08:41.165  
You've got you, uh, you should have this

238

00:08:41.165 --> 00:08:42.245  
awesome smart pack here.

239

00:08:43.135 --> 00:08:45.405  
We're quite excited when this actually came together.

240

00:08:45.585 --> 00:08:47.845  
You've got the slides huffer put together for you.

241

00:08:47.945 --> 00:08:50.085  
You've got the slides from my presentation in here,

242

00:08:50.505 --> 00:08:54.245  
and it's intended to be, um, this brief.

243

00:08:54.245 --> 00:08:56.405

Isn't you ever had a, a class where you go in

244

00:08:56.405 --> 00:08:57.965

and the, the slides are full of bullets

245

00:08:58.185 --> 00:09:00.765

and it's like your textbook just put in a PowerPoint, right?

246

00:09:00.865 --> 00:09:03.325

That's not what this is. So the pictures guide our

247

00:09:03.325 --> 00:09:05.685

discussion, but in the back of that, the very back

248

00:09:05.685 --> 00:09:06.965

of your book, there's some notes

249

00:09:06.965 --> 00:09:08.285

that compliment some of the slides.

250

00:09:08.585 --> 00:09:09.765

So little more information.

251

00:09:10.665 --> 00:09:13.045

Um, so as you walk away from here, you'll have those there.

252

00:09:13.265 --> 00:09:15.005

One of the big things, I'll foot stop in there,

253

00:09:15.025 --> 00:09:16.405

is a list of definitions.

254

00:09:16.925 --> 00:09:18.885

I had fund survey in different organizations,

255

00:09:18.885 --> 00:09:21.125

different policies, and pull in their different

256

00:09:21.125 --> 00:09:22.485

definitions for the same term.

257  
00:09:22.865 --> 00:09:25.885  
And you'd be interested in some, some of the differences in

258  
00:09:25.945 --> 00:09:29.405  
how we define some basic things like hazard or risk.

259  
00:09:29.985 --> 00:09:33.285  
So that's your smart pack. Again, briefly

260  
00:09:33.345 --> 00:09:35.765  
before the break, I hit on the transcendent fundamentals

261  
00:09:35.765 --> 00:09:37.605  
of risk management that we all should be embracing.

262  
00:09:38.145 --> 00:09:39.845  
Now we're gonna turn the corner, go to concepts

263  
00:09:39.845 --> 00:09:41.405  
and definitions and talk about the process

264  
00:09:41.835 --> 00:09:44.485  
that we're gonna use as we do our working group efforts.

265  
00:09:45.225 --> 00:09:46.605  
Uh, this afternoon we have a panel.

266  
00:09:47.065 --> 00:09:48.965  
We got some all stars that are come up, come up here.

267  
00:09:49.225 --> 00:09:51.765  
And it's our opportunity to ask them the tough questions,

268  
00:09:52.545 --> 00:09:53.885  
ask them the tough questions.

269  
00:09:54.585 --> 00:09:57.765  
So not me. Uh, if we do have some things we drop anchor on

270  
00:09:57.765 --> 00:09:58.965

and we need to put 'em in the parking lot,

271

00:09:59.155 --> 00:10:00.365

just we will carry them over

272

00:10:00.365 --> 00:10:02.485

and maybe we can, uh, leverage that in the panel.

273

00:10:02.865 --> 00:10:06.205

Um, I, I say that in jest,

274

00:10:06.205 --> 00:10:07.365

you know, don't ask me tough questions.

275

00:10:07.475 --> 00:10:09.565

I've been talking for about five minutes now

276

00:10:09.905 --> 00:10:12.605

and this is the longest I wanna go without you guys

277

00:10:12.605 --> 00:10:13.685

talking to, okay?

278

00:10:13.685 --> 00:10:15.165

This is gonna be a two-way conversation.

279

00:10:15.165 --> 00:10:18.245

This isn't patran up here teaching.

280

00:10:18.355 --> 00:10:20.485

It's us, me facilitating a conversation with you.

281

00:10:20.605 --> 00:10:23.205

I wanna hear what you have to say and your perspectives.

282

00:10:23.505 --> 00:10:24.965

And, uh, I think we're gonna have fun with that.

283

00:10:24.965 --> 00:10:26.005

We're gonna have a lot of opportunity

284

00:10:26.275 --> 00:10:27.485  
even after this morning.

285

00:10:27.715 --> 00:10:31.405  
Okay? So your participation is key.

286

00:10:31.635 --> 00:10:35.045  
Risk management fundamentals. We have a lot in common.

287

00:10:35.665 --> 00:10:36.685  
We have a couple differences.

288

00:10:36.905 --> 00:10:38.245  
The differences are where the fun

289

00:10:38.265 --> 00:10:39.565  
and maybe the challenge is gonna be.

290

00:10:40.225 --> 00:10:42.165  
As I said, we look, you look across the industry

291

00:10:42.625 --> 00:10:44.005  
and within flight tests

292

00:10:44.945 --> 00:10:49.125  
we have 90% commonality in our approach to risk management.

293

00:10:49.185 --> 00:10:51.805  
We all sort of get it intuitively, and then we codify

294

00:10:51.805 --> 00:10:53.085  
and document in our policies

295

00:10:53.085 --> 00:10:56.605  
and processes that leaves that 10% out there

296

00:10:56.605 --> 00:10:57.805  
where we have some differences.

297

00:10:58.145 --> 00:10:59.805

And that may be where the friction is, okay?

298

00:10:59.805 --> 00:11:02.965

We need to overcome that. But the bottom line is we've got

299

00:11:02.965 --> 00:11:05.925

this huge body of knowledge that we're sharing today.

300

00:11:06.005 --> 00:11:08.485

I don't know, this is just an awesome group of people.

301

00:11:08.545 --> 00:11:10.765

How often do we get so many different people from different

302

00:11:10.765 --> 00:11:12.085

organizations together like this?

303

00:11:12.545 --> 00:11:13.805

So the crosstalk is great

304

00:11:14.505 --> 00:11:17.845

and we share even just back at our organizations as well.

305

00:11:18.105 --> 00:11:19.125

But we take the shared knowledge,

306

00:11:19.125 --> 00:11:20.645

we tailor it to our organization.

307

00:11:20.645 --> 00:11:25.005

It's gotta fit our risk posture, the machines testing the,

308

00:11:25.065 --> 00:11:27.125

our culture and our resources.

309

00:11:27.205 --> 00:11:29.005

I was talking to John er with the FAA

310

00:11:29.005 --> 00:11:30.365

and he sees a full specter.

311  
00:11:30.365 --> 00:11:32.885  
Where's John? He's, he's thing number two.

312  
00:11:32.945 --> 00:11:34.525  
I'm thing number one. And we'll swap.

313  
00:11:34.525 --> 00:11:36.725  
Today, we're often accused of being twins,

314  
00:11:36.905 --> 00:11:39.565  
but he sees he's, um, FAA safety officer.

315  
00:11:39.945 --> 00:11:42.085  
Did I get that right? He sees a full swath

316  
00:11:42.265 --> 00:11:45.285  
of large organization to small organizations, different, uh,

317  
00:11:45.395 --> 00:11:48.525  
different resources to do their, their flight tests

318  
00:11:48.585 --> 00:11:49.885  
and a different approach to doing it.

319  
00:11:49.885 --> 00:11:50.885  
Sort of shaped on that. Okay?

320  
00:11:51.505 --> 00:11:53.565  
But you, so we tailor these best practices

321  
00:11:53.585 --> 00:11:55.045  
and this, uh, these lessons learned

322  
00:11:55.045 --> 00:11:56.445  
to our, our organization.

323  
00:11:56.545 --> 00:11:59.365  
We have a lot in common. About 10% we're gonna talk about,

324  
00:11:59.715 --> 00:12:03.205



okay, Why flight test risk management.

325

00:12:03.205 --> 00:12:05.525

Huffer hit on it. We lose a lot of aircraft, we lose lives,

326

00:12:05.545 --> 00:12:08.445

we lose buddies, we lose friends, we lose valuable.

327

00:12:08.745 --> 00:12:12.565

We time because of buffoonery.

328

00:12:14.355 --> 00:12:16.285

It's the hallmark of flight test discipline, right?

329

00:12:16.705 --> 00:12:18.805

Is, uh, Eric Hildebrand in here?

330

00:12:20.835 --> 00:12:22.605

Okay, are you, you're a photographer?

331

00:12:23.185 --> 00:12:25.325

No, I thought we had a photographer. I misunderstood that.

332

00:12:25.325 --> 00:12:26.845

Okay, no photo in here.

333

00:12:26.845 --> 00:12:28.205

Well, here you guys to the general

334

00:12:28.205 --> 00:12:30.165

public who took this picture,

335

00:12:33.105 --> 00:12:34.105

Nobody knows.

336

00:12:34.385 --> 00:12:38.445

Was it their, uh, fisher? Say again. It was a fisherman.

337

00:12:38.565 --> 00:12:41.125

A fisherman. It wasn't their flight test engineer

338

00:12:41.145 --> 00:12:42.365  
or their, their data guy.

339

00:12:42.675 --> 00:12:44.565  
They didn't have a dedicated photo chase.

340

00:12:45.385 --> 00:12:47.245  
It was a, they called it a, it was a lifeguard.

341

00:12:47.245 --> 00:12:49.405  
They called them the station guy.

342

00:12:49.725 --> 00:12:51.445  
I just finished this book by David McCullough.

343

00:12:51.635 --> 00:12:53.205  
This is just the beginning of the story.

344

00:12:53.395 --> 00:12:55.565  
What happened after this is just so remarkable

345

00:12:55.675 --> 00:12:57.645  
that the Wright Brothers did and their experience.

346

00:12:58.265 --> 00:12:59.605  
So, uh, with the Wright brothers,

347

00:12:59.705 --> 00:13:00.885  
uh, okay, this is first flight.

348

00:13:00.885 --> 00:13:02.205  
Everybody we got that. Hopefully

349

00:13:02.265 --> 00:13:03.805  
that's 1903 Wright December.

350

00:13:03.805 --> 00:13:06.765  
Great things happened, um, with the Wright brothers,

351

00:13:06.985 --> 00:13:09.045

who were the engineers that designed their machine?

352

00:13:10.585 --> 00:13:12.325

The Wright brothers, who were the test

353

00:13:12.325 --> 00:13:13.525

pilots that flew their machine?

354

00:13:14.865 --> 00:13:16.205

Who was their safety officer?

355

00:13:17.185 --> 00:13:19.925

Who was their flight test engineer? You got it right?

356

00:13:20.195 --> 00:13:21.405

Okay, so that's first flight.

357

00:13:21.405 --> 00:13:23.165

You fast forward to World War I, right?

358

00:13:23.185 --> 00:13:25.605

Our, our air aircraft, uh, improve a little bit

359

00:13:25.605 --> 00:13:26.805

or they modernize a bit.

360

00:13:26.805 --> 00:13:31.645

What systems were on world One aircraft Gun.

361

00:13:31.645 --> 00:13:33.805

Yeah, we put a gun. Not much else, right?

362

00:13:33.805 --> 00:13:36.005

They're pretty simple. We still were evolving

363

00:13:36.065 --> 00:13:37.205

as an aviation industry.

364

00:13:37.665 --> 00:13:39.125

Um, and up to

365

00:13:39.125 --> 00:13:39.965  
that point it was really the people

366

00:13:40.205 --> 00:13:41.285  
building 'em were flying 'em.

367

00:13:41.285 --> 00:13:43.245  
They could go out there, they'd identify a characteristic

368

00:13:43.245 --> 00:13:44.845  
they didn't like and they could fix it.

369

00:13:44.845 --> 00:13:47.245  
Same guy flying, same guy fixing or gal.

370

00:13:47.785 --> 00:13:50.045  
We get to World War I and we mass produce these aircraft

371

00:13:50.045 --> 00:13:51.325  
and we put these young people in them

372

00:13:51.325 --> 00:13:53.165  
that don't have experience and they don't understand

373

00:13:53.165 --> 00:13:54.365  
what the aircraft's telling 'em.

374

00:13:54.505 --> 00:13:56.645  
And they crash and, and bad things happen, right?

375

00:13:57.595 --> 00:13:59.045  
Fast forward, it just gets worse.

376

00:13:59.145 --> 00:14:01.405  
As we go to World War ii, now it's systems are in our

377

00:14:01.685 --> 00:14:05.535  
aircraft more.

378

00:14:06.995 --> 00:14:10.295

We got cameras, antennas, radios, um,

379

00:14:10.755 --> 00:14:12.215

our propulsion is evolving, right?

380

00:14:12.215 --> 00:14:15.255

They get more complex, they get more expensive.

381

00:14:16.195 --> 00:14:17.695

The whole flight test industry

382

00:14:17.755 --> 00:14:19.295

or the, the flight industry evolves

383

00:14:19.515 --> 00:14:21.695

and now it gets more complicated.

384

00:14:21.805 --> 00:14:25.415

More risky. More expensive. So what happened 70 years ago?

385

00:14:26.215 --> 00:14:29.095

Somebody do the math for me. What year is that? Was it 48?

386

00:14:29.565 --> 00:14:31.655

What happened between World War II and 48

387

00:14:32.325 --> 00:14:33.325

Test pilot?

388

00:14:33.515 --> 00:14:35.695

Say it again. Test pilot. Test pilot school.

389

00:14:35.695 --> 00:14:39.415

We start formalizing this discipline of flight test, right?

390

00:14:39.795 --> 00:14:41.495

We start having flight test schools

391

00:14:42.315 --> 00:14:45.375

and now we have this flight test engineer discipline.

392

00:14:45.605 --> 00:14:46.815

Even, uh, academically,

393

00:14:46.815 --> 00:14:48.455

we start getting aerospace engineers,

394

00:14:48.735 --> 00:14:50.575

materials engineers, we start specializing.

395

00:14:52.335 --> 00:14:54.355

And that's why we say 70 years of lesson learned.

396

00:14:54.365 --> 00:14:57.355

We've gotten really rigorous in our approach

397

00:14:57.355 --> 00:14:58.675

to flight test risk management.

398

00:14:58.775 --> 00:15:00.355

And that's that body of knowledge we share.

399

00:15:01.255 --> 00:15:02.555

And that's why, part of why we're here

400

00:15:02.555 --> 00:15:03.755

today, and it continues to go.

401

00:15:03.755 --> 00:15:06.235

We don't just stop here, we keep growing. So it's the law.

402

00:15:06.235 --> 00:15:09.115

What do I mean by that? Believe it

403

00:15:09.115 --> 00:15:11.475

or not, US code, we took the time to define that.

404

00:15:11.475 --> 00:15:12.995

If you have a flight program, you need

405

00:15:12.995 --> 00:15:15.515

to have some safety programs that compliment it

406

00:15:16.135 --> 00:15:18.355

and it goes into some legalese.

407

00:15:18.375 --> 00:15:21.075

But bottom line, you gotta have risk

408

00:15:21.075 --> 00:15:22.435

management processes in place.

409

00:15:22.895 --> 00:15:25.155

If you're an, uh, if the FAA is your airworthiness

410

00:15:25.395 --> 00:15:28.715

certification authority, you need to follow the 40 40 26 B.

411

00:15:29.335 --> 00:15:32.075

If you have an approved risk management process at your

412

00:15:32.075 --> 00:15:33.435

organization, that's great,

413

00:15:33.575 --> 00:15:35.395

but at a minimum it has to meet the requirements

414

00:15:35.395 --> 00:15:36.755

of the 40 40 26 B.

415

00:15:37.175 --> 00:15:39.755

If your organization doesn't have an approved

416

00:15:39.755 --> 00:15:41.355

process, you use this one.

417

00:15:41.935 --> 00:15:43.595

So as Huffer said, this is our baseline.

418

00:15:44.145 --> 00:15:45.475

This is the sort of fountain head

419

00:15:45.475 --> 00:15:47.155  
for our conversation this, this week.

420

00:15:47.535 --> 00:15:49.995  
Uh, we got a lot of defense, uh, folks that are out there

421

00:15:49.995 --> 00:15:52.755  
and, and the Air Force and Navy have their own policies.

422

00:15:52.855 --> 00:15:54.235  
Um, and there's others out there too.

423

00:15:54.235 --> 00:15:55.835  
Do we have anybody from international?

424

00:15:55.875 --> 00:15:58.035  
I, I know there's some international folks, right?

425

00:15:58.055 --> 00:16:00.235  
So who's your governing or airworthiness? Royal

426

00:16:00.235 --> 00:16:01.235  
Air Force. Royal

427

00:16:01.235 --> 00:16:02.915  
Air Force. Awesome. Good to go. Anybody else?

428

00:16:08.975 --> 00:16:11.635  
Oh, Canadian. Canadian. Yeah. Excellent. Yeah, of course.

429

00:16:11.655 --> 00:16:16.075  
Yep. And who else over here? Oh yeah. Ia. Yep.

430

00:16:16.595 --> 00:16:19.425  
J Japanese. Japanese. Great.

431

00:16:19.485 --> 00:16:21.265  
So we've all got our different organizations.

432

00:16:21.285 --> 00:16:23.185



So just for today, because we need

433

00:16:23.185 --> 00:16:25.545

to be speaking the same language, um,

434

00:16:25.545 --> 00:16:26.985

we're gonna go 40, 40, 26.

435

00:16:27.155 --> 00:16:29.625

Brock, are you an, uh, a uh, physiologist?

436

00:16:30.325 --> 00:16:32.385

No, I'm a Wizo. You're a wizo? Okay.

437

00:16:32.985 --> 00:16:34.585

I was thinking about you. I know we met before,

438

00:16:34.645 --> 00:16:36.945

but that, you know, the, the the one answer about the

439

00:16:36.945 --> 00:16:38.105

surgeon getting, I remember,

440

00:16:38.545 --> 00:16:39.545

I remember you.

441

00:16:40.425 --> 00:16:45.065

I know it's, it's, I was feeling for our, uh,

442

00:16:45.065 --> 00:16:47.065

flight surgeon, if we have any flight surgeons in here.

443

00:16:47.725 --> 00:16:49.585

No. Alright. So we can say whatever we want about him.

444

00:16:49.585 --> 00:16:52.305

Huffer, you're good. Hey, so we're gonna,

445

00:16:52.425 --> 00:16:54.105

I got a couple slides that are just on, again,

446  
00:16:54.105 --> 00:16:56.305  
these general transcendent awesome things we do.

447  
00:16:56.575 --> 00:16:59.105  
Okay? And here's a head nod to the 40 40 26 B.

448  
00:16:59.105 --> 00:17:00.145  
It's a good document.

449  
00:17:00.925 --> 00:17:02.305  
If it's your governing authority,

450  
00:17:02.685 --> 00:17:03.785  
you should have it printed out

451  
00:17:04.005 --> 00:17:05.465  
and highlighted and on your desk.

452  
00:17:05.465 --> 00:17:07.065  
And every time you go to A SRB,

453  
00:17:07.125 --> 00:17:08.785  
you should probably have it handy.

454  
00:17:09.005 --> 00:17:10.785  
And that goes for if your Nair had

455  
00:17:10.785 --> 00:17:11.825  
the test planning instruction.

456  
00:17:12.215 --> 00:17:14.065  
Anybody that's, it's a good practice to have

457  
00:17:14.065 --> 00:17:15.065  
that governing document there.

458  
00:17:16.485 --> 00:17:19.945  
Here's one of the concepts it has is all flight tests

459  
00:17:20.595 --> 00:17:22.745

under this authority will follow these principles, right?

460

00:17:22.915 --> 00:17:25.105

First one except no unnecessary risks.

461

00:17:26.375 --> 00:17:28.505

Alright, trivia, what's the safest

462

00:17:28.505 --> 00:17:29.545

thing we can do in flight test?

463

00:17:29.845 --> 00:17:32.385

Not fly. Not fly. Alright, that's a non-starter, right?

464

00:17:32.765 --> 00:17:36.145

Um, but uh, we're gonna go fly anyway, right?

465

00:17:36.145 --> 00:17:37.705

So, but we need to identify

466

00:17:37.975 --> 00:17:40.025

what is necessary every time we go out

467

00:17:40.025 --> 00:17:43.425

and fly when we on our test cards, everything we do needs

468

00:17:43.425 --> 00:17:45.905

to be with the purpose of answering the question we've got

469

00:17:45.905 --> 00:17:47.545

for that flight test, getting the data for that.

470

00:17:48.065 --> 00:17:49.845

Anything else is extra risk

471

00:17:50.425 --> 00:17:55.045

and extra cost Reduce risk to an acceptable level.

472

00:17:55.355 --> 00:17:56.365

What does that imply?

473  
00:17:59.455 --> 00:18:01.875  
Say again, always be risks. Al be, always be risks.

474  
00:18:02.495 --> 00:18:03.555  
And that we understand.

475  
00:18:07.445 --> 00:18:09.475  
Can't eliminate, You can't eliminate 'em,

476  
00:18:09.475 --> 00:18:11.275  
but we know what's acceptable and what isn't.

477  
00:18:11.505 --> 00:18:12.715  
Okay? Yes. We

478  
00:18:12.715 --> 00:18:14.475  
Have to work at reducing the risk.

479  
00:18:14.865 --> 00:18:18.755  
Okay, good. Well do we, what if it's low risk? We can't

480  
00:18:18.755 --> 00:18:19.755  
Eliminate It. We

481  
00:18:19.755 --> 00:18:21.195  
do a cost benefit analysis, right?

482  
00:18:21.195 --> 00:18:23.515  
Maybe it's, we just accept it 'cause it's not a big deal.

483  
00:18:24.375 --> 00:18:27.395  
But if it is a big deal, we need to work at reducing it.

484  
00:18:29.555 --> 00:18:32.115  
I like this one. Manage risks in the

485  
00:18:32.115 --> 00:18:34.035  
concept and planning stages.

486  
00:18:35.195 --> 00:18:38.355

I like to say we bake risk management into the test plan.

487

00:18:38.615 --> 00:18:40.715

You don't wait to do risk management till you do your safety

488

00:18:40.715 --> 00:18:42.315

checklist or your tpha.

489

00:18:43.095 --> 00:18:45.635

You might start on the production line when you're putting

490

00:18:45.635 --> 00:18:47.075

in the instrumentation with a

491

00:18:47.875 --> 00:18:49.115

specifically designed test article.

492

00:18:49.975 --> 00:18:51.595

But for our I intents and purposes, you need

493

00:18:51.595 --> 00:18:52.875

to start, it's an iterative thing.

494

00:18:52.875 --> 00:18:54.075

You build it into your test plan

495

00:18:54.075 --> 00:18:55.155

and your scope, your method.

496

00:18:55.575 --> 00:18:58.515

So it risk management starts well

497

00:18:58.515 --> 00:19:01.595

before t HHAs Make a,

498

00:19:01.665 --> 00:19:05.015

make decisions at the appropriate level, right?

499

00:19:05.305 --> 00:19:07.855

Brick and I, we're gonna go do high, high risk test

500  
00:19:08.435 --> 00:19:09.535  
and uh, we're gonna geek out.

501  
00:19:09.535 --> 00:19:11.935  
The T ha's, I'll sign them, you fly 'em

502  
00:19:11.935 --> 00:19:13.735  
and, uh, we will take turns being chase.

503  
00:19:13.885 --> 00:19:15.815  
Does that sound good? What could go wrong?

504  
00:19:17.845 --> 00:19:19.465  
We we're not gonna do that, right? The higher the risk,

505  
00:19:19.465 --> 00:19:20.985  
the higher the approval level.

506  
00:19:24.325 --> 00:19:26.585  
Do, Do you guys see people deviate from this?

507  
00:19:26.585 --> 00:19:29.065  
Sometimes stay focused on flight test related risks.

508  
00:19:29.195 --> 00:19:30.505  
Who's, who's an approver in here

509  
00:19:30.505 --> 00:19:32.345  
or has been Who assigned test plans?

510  
00:19:33.135 --> 00:19:36.265  
Okay. And have you ever seen this for those

511  
00:19:36.265 --> 00:19:37.465  
that raise your hand where it's like

512  
00:19:38.645 --> 00:19:40.265  
we were talking about bird strike last night.

513  
00:19:40.265 --> 00:19:41.545

You're doing, you know, wind up turns

514

00:19:41.545 --> 00:19:43.025  
to 10,000 feet and you got bird strike.

515

00:19:43.025 --> 00:19:46.305  
That's, that's not a test related hazard, right?

516

00:19:48.005 --> 00:19:50.425  
Review all plans and use available resources.

517

00:19:52.265 --> 00:19:55.125  
Who actually uses the flight test safety database?

518

00:19:55.385 --> 00:19:56.885  
The NASA flight test safety database.

519

00:19:57.475 --> 00:20:02.445  
Okay, do you go there when you're doing tpha? Anybody?

520

00:20:02.445 --> 00:20:05.405  
You do head nod? Okay, good. So that's one outta 1 55.

521

00:20:06.745 --> 00:20:10.645  
We got another one. Two, our goal coming outta here is what

522

00:20:11.305 --> 00:20:14.525  
to crank out some awesome tpha that we can put there.

523

00:20:14.865 --> 00:20:15.885  
And we're gonna talk about how we're gonna

524

00:20:15.885 --> 00:20:17.005  
use them beyond that.

525

00:20:17.065 --> 00:20:21.365  
But that's a great clearinghouse for this

526

00:20:21.915 --> 00:20:23.005  
crosstalk that we're doing.

527

00:20:23.275 --> 00:20:24.725

Okay? So keep that in mind.

528

00:20:30.415 --> 00:20:32.665

Something we emphasize in nve,

529

00:20:32.665 --> 00:20:34.985

and I bet you do in your organization if you're not in nve,

530

00:20:34.985 --> 00:20:37.065

is, or I hope you do, it's a best practice

531

00:20:38.045 --> 00:20:39.825

to fully understand a system

532

00:20:39.845 --> 00:20:41.705

as you're evaluating it and the system under test.

533

00:20:41.885 --> 00:20:44.025

And to fully characterize risk in

534

00:20:44.025 --> 00:20:45.065

your risk management plans.

535

00:20:45.595 --> 00:20:47.600

Three things you gotta know. Three knowledge areas.

536

00:20:48.145 --> 00:20:50.805

And to do that, we want two perspectives.

537

00:20:52.185 --> 00:20:55.485

So first, the knowledge areas, your system.

538

00:20:56.625 --> 00:20:58.165

How is the system supposed to work?

539

00:20:58.175 --> 00:21:00.845

How's it designed to work? How might it fail?

540

00:21:02.145 --> 00:21:03.885



And what behavior do you expect

541

00:21:04.435 --> 00:21:05.765

when you push the big red easy

542

00:21:05.765 --> 00:21:07.205

button and you start your test.

543

00:21:10.345 --> 00:21:13.405

Second is mission. Are you flying, uh, what is it like a,

544

00:21:13.445 --> 00:21:16.205

a rubber cargo plane outta Hong Kong

545

00:21:16.235 --> 00:21:17.405

full of dog poop or something?

546

00:21:17.405 --> 00:21:19.285

Or are you flying a fifth gen

547

00:21:19.445 --> 00:21:20.525

fighter off an aircraft carrier?

548

00:21:21.385 --> 00:21:25.005

You need to know what it takes to succeed or to be effective

549

00:21:25.005 --> 00:21:26.445

and suitable in that environment.

550

00:21:28.235 --> 00:21:29.495

And finally, the environment.

551

00:21:29.715 --> 00:21:30.895

So I used the wrong word there,

552

00:21:30.895 --> 00:21:32.695

but you, you get what I'm saying, your environment.

553

00:21:32.695 --> 00:21:35.815

This is, you know, are we doing, um, short field takeoff

554

00:21:35.815 --> 00:21:38.975  
and landings at Aspen in a business jet?

555

00:21:39.155 --> 00:21:40.655  
Or are we doing, uh,

556

00:21:41.225 --> 00:21:44.055  
brown out landings in a helicopter in Iraq?

557

00:21:44.325 --> 00:21:46.775  
Very different environment. We need to understand that so

558

00:21:46.775 --> 00:21:48.055  
that we can build our testing around it.

559

00:21:49.115 --> 00:21:51.135  
So what two perspectives do you think in SA we need

560

00:21:51.135 --> 00:21:53.295  
to understand these, these, these three things adequately.

561

00:21:57.635 --> 00:21:59.215  
So people you want on your team,

562

00:21:59.675 --> 00:22:01.095  
you need an engineering perspective

563

00:22:01.315 --> 00:22:02.575  
and an operator perspective.

564

00:22:02.835 --> 00:22:05.175  
And I'd even argue, I, I should have been more clear here,

565

00:22:06.415 --> 00:22:08.495  
a pilot perspective, if you're doing up and away things,

566

00:22:08.635 --> 00:22:10.815  
but often we neglect the suitability part,

567

00:22:10.815 --> 00:22:12.175

the ground part a maintainer.

568

00:22:12.175 --> 00:22:13.455

So if you're doing logistics, t

569

00:22:13.455 --> 00:22:15.415

and e, you wanna have that maintenance perspective.

570

00:22:15.475 --> 00:22:16.935

But for our intents and purposes here today,

571

00:22:17.365 --> 00:22:18.455

focused on up and away.

572

00:22:18.955 --> 00:22:21.175

So these two people who of these, your engineer

573

00:22:21.515 --> 00:22:23.135

and your pilot, if you have a team,

574

00:22:23.135 --> 00:22:24.935

they should be one is what we teach.

575

00:22:25.205 --> 00:22:26.975

They should be hip to hip as they go

576

00:22:26.975 --> 00:22:28.215

through planning and risk management.

577

00:22:28.875 --> 00:22:30.735

Who, which of these best understands?

578

00:22:30.875 --> 00:22:32.695

Um, the system

579

00:22:33.915 --> 00:22:37.375

stereotypically the engineer, right?

580

00:22:37.545 --> 00:22:38.935

Zeros and ones. They're great at that.

581  
00:22:39.095 --> 00:22:41.215  
I love it when they do the, the instrumentation list.

582  
00:22:41.575 --> 00:22:44.215  
I just tune out and the engineer, he's got it right?

583  
00:22:44.875 --> 00:22:49.655  
Who best understands the mission? Hopefully the pilot. Yeah.

584  
00:22:49.915 --> 00:22:51.495  
And who best understands the environment?

585  
00:22:54.145 --> 00:22:55.415  
Maybe both of them. Who said that?

586  
00:22:55.485 --> 00:22:57.655  
Yeah, like so you really need 'em both there.

587  
00:22:57.675 --> 00:22:59.295  
If in your organization or your team,

588  
00:22:59.635 --> 00:23:03.255  
you've got your junior flight test engineer doing your tpha

589  
00:23:03.275 --> 00:23:05.935  
or your test planning, you may be missing something.

590  
00:23:06.395 --> 00:23:09.535  
We highly recommend that you have involved project pilots

591  
00:23:09.535 --> 00:23:10.855  
and involved project engineers.

592  
00:23:11.045 --> 00:23:13.775  
Okay, anybody got a comment on that? Nothing.

593  
00:23:15.795 --> 00:23:19.415  
All right. More best practices.

594  
00:23:19.595 --> 00:23:20.935

Uh, tiered workflow.

595

00:23:22.175 --> 00:23:24.815

I talked about me and Brick doing our t ha's

596

00:23:24.815 --> 00:23:26.055

sign and going, flying in.

597

00:23:26.165 --> 00:23:28.775

What could go wrong? Seriously? What could go wrong?

598

00:23:28.915 --> 00:23:30.655

Why don't you want the test? Same test pilot

599

00:23:30.655 --> 00:23:31.775

that's doing a high risk test.

600

00:23:32.225 --> 00:23:35.495

Doing the test or the risk management signing off on it

601

00:23:35.495 --> 00:23:36.615

and executing anybody.

602

00:23:39.105 --> 00:23:41.975

Adult supervision. Okay, adult supervision.

603

00:23:42.725 --> 00:23:44.815

Different Perspective. Different perspective.

604

00:23:45.155 --> 00:23:47.045

Yeah, you step away from it, right?

605

00:23:47.345 --> 00:23:50.045

So we have the doers, we do have those brand new pilots

606

00:23:50.045 --> 00:23:51.085

and engineers doing the doing.

607

00:23:51.305 --> 00:23:52.325

What's a reviewer?

608  
00:23:52.945 --> 00:23:55.125  
What's the, what benefit do they bring to the whole process?

609  
00:23:55.265 --> 00:23:56.605  
Why don't we just go right up to the,

610  
00:23:56.745 --> 00:23:58.085  
the boss and have them sign it,

611  
00:24:01.015 --> 00:24:04.005  
Check and experience Check and experience and over here

612  
00:24:04.675 --> 00:24:07.045  
Control, Quality, control, all that.

613  
00:24:07.045 --> 00:24:09.405  
Exactly. Get a seasoned person, somebody's been

614  
00:24:09.405 --> 00:24:11.405  
around a while, they can maybe help stimulate some thought

615  
00:24:11.405 --> 00:24:13.285  
conversation with maybe the

616  
00:24:13.285 --> 00:24:14.525  
doers if they, if they need that.

617  
00:24:14.865 --> 00:24:17.845  
But it also polishes the product so that when it gets

618  
00:24:17.845 --> 00:24:21.765  
to the approver's desk, it's ready for signature content,

619  
00:24:22.545 --> 00:24:25.525  
format, thinking all that.

620  
00:24:25.825 --> 00:24:28.485  
If you have a good reviewer in your organization,

621  
00:24:28.635 --> 00:24:31.285

it's gonna save your team a lot of angst and a lot of time.

622

00:24:32.635 --> 00:24:34.365

What if you're flat organization?

623

00:24:34.365 --> 00:24:36.405

What if you don't have the resources for that doer

624

00:24:37.145 --> 00:24:40.565

or the reviewer rather, what's something you can do

625

00:24:40.825 --> 00:24:43.365

to get a review and inject a review in that process?

626

00:24:43.875 --> 00:24:45.485

Peer review. Peer review. Peer review. Exactly.

627

00:24:45.665 --> 00:24:47.365

That's right. It's big in software, right?

628

00:24:47.385 --> 00:24:48.445

Why don't we embrace it here?

629

00:24:48.635 --> 00:24:50.125

Just pitch it over to another test team.

630

00:24:50.125 --> 00:24:51.365

Say, Hey, check this out. What do you think?

631

00:24:52.815 --> 00:24:54.085

Email The flight test safety.

632

00:24:54.955 --> 00:24:57.565

Yeah. Really? Do you ever get that?

633

00:24:59.145 --> 00:25:00.165

Yes, we have in

634

00:25:00.165 --> 00:25:01.165

The past. Is that right?

635  
00:25:01.165 --> 00:25:03.245  
So you're offering up fresh

636  
00:25:03.245 --> 00:25:04.325  
eyes on a test plan.

637  
00:25:05.275 --> 00:25:06.445  
Okay, great.

638  
00:25:07.335 --> 00:25:08.645  
We're gonna get your email up here

639  
00:25:08.985 --> 00:25:11.245  
and uh, just for everybody's sake, can you tell us

640  
00:25:11.745 --> 00:25:13.645  
who you are and who you're with? Pete

641  
00:25:13.645 --> 00:25:15.285  
Donut, consultant.

642  
00:25:15.515 --> 00:25:19.565  
Retired Boeing Director Emeritus and the flight of safety.

643  
00:25:19.895 --> 00:25:21.285  
There you go. That's awesome.

644  
00:25:21.465 --> 00:25:23.645  
If you need fresh eyes, I'd take advantage of it.

645  
00:25:28.435 --> 00:25:29.965  
Anybody familiar with system safety?

646  
00:25:31.825 --> 00:25:32.925  
See what is system safety?

647  
00:25:32.925 --> 00:25:34.925  
Gentlemen in the back loud so we can hear you.

648  
00:25:36.035 --> 00:25:39.045



Basically it's that you have a problem with engineer out.

649

00:25:39.515 --> 00:25:43.005

Yeah. System safety. Okay, I like it. Fair enough.

650

00:25:43.625 --> 00:25:45.045

So this is an acknowledgement

651

00:25:45.045 --> 00:25:47.645

to our Air Force brethren outta the Air Force test.

652

00:25:47.885 --> 00:25:49.245

I think safety supplement instruction.

653

00:25:49.245 --> 00:25:50.885

I might be butchering the name, it's in your reference list

654

00:25:50.885 --> 00:25:54.045

in the back, but they have some great, uh, concepts too.

655

00:25:54.165 --> 00:25:56.725

Here. I, I'll, I'll put up the list

656

00:25:56.725 --> 00:25:58.445

and then I'll bring it back to system safety.

657

00:25:59.065 --> 00:26:00.965

You wanna design the test to eliminate the risk

658

00:26:01.345 --> 00:26:03.405

or change the methodology, okay?

659

00:26:03.405 --> 00:26:04.965

Just make the risk go away.

660

00:26:05.945 --> 00:26:09.445

Put in safety devices, put in warning and caution.

661

00:26:10.145 --> 00:26:13.685

Let 'em know what's going on. Or my least favorite

662

00:26:14.125 --> 00:26:15.605

procedures and training and we'll come back to that.

663

00:26:15.835 --> 00:26:18.125

This is the order you want to address those risk things.

664

00:26:18.435 --> 00:26:21.605

Okay? So as an F 18 pilot operationally in the fleet,

665

00:26:21.885 --> 00:26:24.365

f eighteens had this mode of failure is our, one

666

00:26:24.365 --> 00:26:27.405

of our biggest hornet killers

667

00:26:28.985 --> 00:26:31.365

up till we, the time we fixed it, it was a outta control,

668

00:26:33.065 --> 00:26:37.365

uh, uh, falling leaf outta control behavior

669

00:26:37.535 --> 00:26:39.765

where the aircraft would, as the name implies,

670

00:26:39.785 --> 00:26:40.845

it would just get in this

671

00:26:40.845 --> 00:26:42.405

unrecoverable outta control condition.

672

00:26:43.105 --> 00:26:45.885

So you know how we fixed it? Went to the top of the list.

673

00:26:46.535 --> 00:26:47.805

Who's familiar with it? What do we do?

674

00:26:50.275 --> 00:26:51.765

Beta feedback, flight controls.

675

00:26:51.765 --> 00:26:53.325

We went in there and we used software.

676

00:26:53.385 --> 00:26:55.885

We designed out that behavior in the aircraft.

677

00:26:55.945 --> 00:26:58.925

We just took it out. Who flew harriers in here?

678

00:26:59.245 --> 00:27:03.845

I know we got one and one in the bow. Hey, how you doing?

679

00:27:03.955 --> 00:27:06.205

Good. So you guys can qa my math here.

680

00:27:06.325 --> 00:27:09.565

I heard we lost something like 44 marine pilots in

681

00:27:09.565 --> 00:27:11.565

harrier, in hover state.

682

00:27:11.565 --> 00:27:13.885

There were mishaps, something like that.

683

00:27:13.945 --> 00:27:15.125

It was a lot of guys we lost.

684

00:27:15.465 --> 00:27:20.215

So what did we do with the F 35 B and I? We got two.

685

00:27:20.255 --> 00:27:24.055

Well, at least one F 35 pilot here. What do we do? Turbo

686

00:27:24.925 --> 00:27:25.925

Protections.

687

00:27:26.045 --> 00:27:27.335

Okay, auto eject.

688

00:27:27.915 --> 00:27:31.495

So when F 35 B is hovering, if it senses, you know,

689  
00:27:31.495 --> 00:27:33.695  
getting outta parameters, it'll automatically eject the

690  
00:27:33.695 --> 00:27:36.935  
pilot we designed in incorporated safety devices.

691  
00:27:40.715 --> 00:27:45.215  
We are we chuckling? Um, you guys ready for a break?

692  
00:27:45.215 --> 00:27:46.335  
We're not there yet. We're getting there,

693  
00:27:46.715 --> 00:27:48.655  
but, uh, did you guys have something in the back?

694  
00:27:49.755 --> 00:27:53.215  
No. Um, warning caution devices.

695  
00:27:53.355 --> 00:27:55.535  
If you fly a modern fighter,

696  
00:27:56.245 --> 00:27:59.295  
your community probably has some issues with hypoxia

697  
00:27:59.355 --> 00:28:00.695  
or physiological episodes.

698  
00:28:00.695 --> 00:28:01.735  
Anybody experiencing that?

699  
00:28:03.445 --> 00:28:06.175  
Yeah, Brock, I got the nod, right? So what did we do?

700  
00:28:06.805 --> 00:28:08.575  
What, what caution and warning device did we

701  
00:28:08.575 --> 00:28:09.695  
put in the F 18?

702  
00:28:10.615 --> 00:28:12.455

'cause our cabin pressure wasn't regulating properly.

703

00:28:13.835 --> 00:28:15.735

I'm putting you on the spot. It's down by your right.

704

00:28:15.735 --> 00:28:16.735

No, you're okay.

705

00:28:17.605 --> 00:28:18.695

Hearing little stick.

706

00:28:20.565 --> 00:28:22.895

They put a little yellow caution light down by your knee.

707

00:28:23.035 --> 00:28:24.535

So when the cabin pressure is not working

708

00:28:24.595 --> 00:28:26.655

and you're 45, well, 40,000 feet,

709

00:28:27.035 --> 00:28:28.255

uh, it'll, it'll illuminate.

710

00:28:28.635 --> 00:28:31.335

That's not a great way to address that problem, but

711

00:28:31.565 --> 00:28:32.975

because we couldn't do the other things,

712

00:28:32.975 --> 00:28:34.015

that's, that's what they went with.

713

00:28:34.395 --> 00:28:36.295

And finally, their, uh, procedures and training.

714

00:28:36.375 --> 00:28:39.215

I said that was my least favorite thing. Here's irony too.

715

00:28:39.455 --> 00:28:41.935

F 18, if you get hypoxic in an F 18,

716  
00:28:42.275 --> 00:28:44.775  
you've got these emergency pre procedures you're supposed

717  
00:28:44.775 --> 00:28:45.895  
to implement.

718  
00:28:46.115 --> 00:28:47.215  
But what's, yeah, right?

719  
00:28:47.215 --> 00:28:48.775  
What's the, what's the paradox there?

720  
00:28:50.395 --> 00:28:52.095  
You can't think when you're hypoxic.

721  
00:28:52.275 --> 00:28:54.735  
So remember these thing? Yeah, it's just horrible.

722  
00:28:54.795 --> 00:28:56.775  
We wanna avoid that kind of approach, okay?

723  
00:28:57.035 --> 00:29:00.775  
That's why it's in this order of, of, uh, precedents.

724  
00:29:01.195 --> 00:29:03.775  
So these are general fundamental best

725  
00:29:04.055 --> 00:29:05.175  
practices across the industry.

726  
00:29:05.415 --> 00:29:06.855  
I, because nobody's throwing spears at me,

727  
00:29:06.855 --> 00:29:09.895  
I get the impression that you guys violently agree.

728  
00:29:10.205 --> 00:29:10.495  
Okay?

729  
00:29:14.895 --> 00:29:15.415

Anything to add on that?

730

00:29:18.085 --> 00:29:22.645

Anybody? A uh, big historian? Who's that?

731

00:29:23.665 --> 00:29:26.485

Dwight Eisenhower. Anybody familiar with Dwight Eisenhower?

732

00:29:27.425 --> 00:29:29.165

It It's really a shame

733

00:29:29.365 --> 00:29:30.885

'cause my talent is gonna be lost on you

734

00:29:30.885 --> 00:29:32.965

because I have a spot on impersonation

735

00:29:32.965 --> 00:29:34.045

of Dwight di Eisenhower

736

00:29:34.265 --> 00:29:35.845

and none of you are gonna appreciate it.

737

00:29:40.065 --> 00:29:43.045

He had this quote, some of you may recognize it, he said,

738

00:29:43.425 --> 00:29:46.965

in preparing for battle, I find that plans are useless,

739

00:29:48.585 --> 00:29:50.085

but planning is essential.

740

00:29:52.035 --> 00:29:55.265

Plans are useless, but planning is essential. Okay?

741

00:29:55.265 --> 00:29:58.265

Think about that. Um, let me pick on somebody new.

742

00:29:58.605 --> 00:30:01.945

Uh, I need, uh, where's, uh,

743  
00:30:02.055 --> 00:30:03.425  
well, I can't think anybody did.

744  
00:30:03.435 --> 00:30:05.225  
Who's, I'll go back to Brick.

745  
00:30:05.275 --> 00:30:07.305  
Brick if I, well, you guys can play along here.

746  
00:30:07.305 --> 00:30:09.305  
If I told brick, brick, I want you

747  
00:30:09.305 --> 00:30:11.705  
to go write a THA for this test you're doing.

748  
00:30:12.045 --> 00:30:14.025  
Go crank that thing out. Show me your risk management

749  
00:30:14.025 --> 00:30:15.265  
plan, okay?

750  
00:30:15.265 --> 00:30:17.225  
In his mind's eye, he's got this,

751  
00:30:18.215 --> 00:30:19.865  
this sheet he's gonna go fill out.

752  
00:30:20.665 --> 00:30:21.665  
Oxy wants me to fill out a sheet.

753  
00:30:21.685 --> 00:30:24.145  
I'm gonna fill out the sheet. Now, what if I said this?

754  
00:30:24.215 --> 00:30:26.905  
What if I said, Hey Brock, I need you

755  
00:30:26.965 --> 00:30:28.665  
to get your team together and go

756  
00:30:28.665 --> 00:30:32.425



through the risk management process for this upcoming test.

757

00:30:33.525 --> 00:30:34.575

Totally different, right?

758

00:30:35.165 --> 00:30:36.215

He's in his mind, he's like,

759

00:30:36.215 --> 00:30:37.415

he's gonna get his team in a room.

760

00:30:37.515 --> 00:30:39.615

You're gonna go to a whiteboard and they're gonna talk

761

00:30:39.615 --> 00:30:40.655

and they're gonna write stuff down.

762

00:30:40.955 --> 00:30:42.295

And the product of that process,

763

00:30:42.715 --> 00:30:45.775

the planning process might be a THA or a test plan,

764

00:30:45.955 --> 00:30:48.255

but it's not all about that piece of paper, okay?

765

00:30:48.555 --> 00:30:50.695

So it's all about the planning, not just the plan.

766

00:30:53.215 --> 00:30:54.415

I know you all know who this is,

767

00:30:54.875 --> 00:30:56.575

and I know you've heard him speak.

768

00:30:57.235 --> 00:30:59.175

My Mike Tyson impression is not quite as good

769

00:30:59.175 --> 00:31:00.735

as my DwightT the Eisenhower impression,

770  
00:31:01.755 --> 00:31:03.135  
but Mike's got some words of wisdom

771  
00:31:03.235 --> 00:31:04.495  
for us here today too, right?

772  
00:31:05.015 --> 00:31:06.095  
I I, I might get this right,

773  
00:31:06.095 --> 00:31:07.175  
maybe I'll get it wrong, I don't know.

774  
00:31:07.355 --> 00:31:09.135  
But he, uh, he's getting ready for a big fight.

775  
00:31:09.135 --> 00:31:12.775  
This is a while ago. And uh, one of the TV announcers,

776  
00:31:12.775 --> 00:31:14.775  
they're interviewing him and they say,

777  
00:31:14.775 --> 00:31:16.935  
Hey Mike, this guy's been training.

778  
00:31:18.325 --> 00:31:20.495  
He's got a plan to beat you, man. He's got a plan.

779  
00:31:21.435 --> 00:31:25.655  
And Mike Tyson says, everybody's got a plan

780  
00:31:27.025 --> 00:31:28.255  
until they get punched in the mouth.

781  
00:31:34.875 --> 00:31:37.335  
Do we get punched in the mouth in flight tests? Sometimes?

782  
00:31:38.645 --> 00:31:42.255  
Yeah. How Unexpected failure.

783  
00:31:42.545 --> 00:31:45.255

Unexpected failure, bad stuff happens.

784

00:31:46.475 --> 00:31:47.575

But if you did good planning,

785

00:31:48.235 --> 00:31:49.295

you may have thought about that stuff.

786

00:31:49.355 --> 00:31:51.055

You may not have kept it from happening,

787

00:31:51.435 --> 00:31:54.455

but maybe you're a little more agile in addressing it

788

00:31:54.715 --> 00:31:56.855

and minimizing the impact of it, right?

789

00:31:58.485 --> 00:32:01.615

Okay, we'll wrap it up real quickly here.

790

00:32:01.615 --> 00:32:03.495

Anybody recognize this gentleman?

791

00:32:04.675 --> 00:32:08.535

Say it again Wade. Welcome. I do have a friendly face.

792

00:32:08.965 --> 00:32:10.535

It's a helmet Von Mulkey. Did you?

793

00:32:10.735 --> 00:32:12.695

That's what you said, right? That's what you said. I gotcha.

794

00:32:13.955 --> 00:32:16.135

But the elder or junior? There are two of 'em.

795

00:32:16.885 --> 00:32:18.855

He's the elder. He's the elder. Exactly. Good job.

796

00:32:18.865 --> 00:32:20.895

Thank you. Um, he's got another quote.

797

00:32:20.975 --> 00:32:22.575

I can't remember it exactly. Maybe one of you do.

798

00:32:22.575 --> 00:32:24.975

Anybody remember what he said? What's the gist of it?

799

00:32:25.685 --> 00:32:29.335

What No plan survives first

800

00:32:29.415 --> 00:32:30.695

contact with the enemy, right?

801

00:32:30.845 --> 00:32:32.055

Okay, so your plan's great,

802

00:32:32.435 --> 00:32:34.295

but you don't just turbo doesn't just

803

00:32:34.295 --> 00:32:36.015

sign Oxy and bricks test plan.

804

00:32:36.015 --> 00:32:38.095

And then we go and, and it collects dust while we

805

00:32:38.095 --> 00:32:39.220

do a six month test program.

806

00:32:39.545 --> 00:32:41.045

We gotta keep it alive. We're gonna

807

00:32:41.045 --> 00:32:42.205

learn stuff with every flight.

808

00:32:42.205 --> 00:32:44.325

Just like Huffer said, we have discovery.

809

00:32:44.775 --> 00:32:46.725

Maybe the risk goes down from what we learn

810

00:32:47.165 --> 00:32:48.245

'cause we validated our models.

811

00:32:48.415 --> 00:32:51.405

Maybe something bites us and we need to take a pause

812

00:32:51.545 --> 00:32:53.525

and go refresh our risk management plan.

813

00:32:53.525 --> 00:32:57.325

Look at risk, but it needs to be alive. Okay?

814

00:32:57.505 --> 00:32:58.885

It, it's, we first contact

815

00:32:58.885 --> 00:33:00.645

with the enemy is first flight wheels up.

816

00:33:00.665 --> 00:33:05.285

And we're learning, planning is better than plans.

817

00:33:08.245 --> 00:33:09.645

I think I've got a couple questions for you.

818

00:33:09.665 --> 00:33:10.725

Do you have any questions for me?

819

00:33:11.335 --> 00:33:12.685

We're getting ready for our first pause.

820

00:33:13.105 --> 00:33:14.365

And if you're like me with age,

821

00:33:14.635 --> 00:33:16.045

I've got the one hour bladder,

822

00:33:16.185 --> 00:33:17.565

I'm all cuffed up and we need a break.

823

00:33:17.625 --> 00:33:19.885

So we're almost there, but get out your clickers

824

00:33:20.265 --> 00:33:21.885

and uh, I got a couple questions for you.

825

00:33:22.775 --> 00:33:25.725

These are slow ground balls, gang. Okay? So make me proud.

826

00:33:28.645 --> 00:33:30.605

Engineering and operational perspectives are important

827

00:33:30.625 --> 00:33:34.085

for insight and, uh, on all of these knowledge areas except

828

00:33:34.645 --> 00:33:38.805

a system under test B, operational environment, C, mission

829

00:33:39.505 --> 00:33:41.125

and D market factors.

830

00:33:55.865 --> 00:33:57.805

Yep. Good. There's always one in the bunch.

831

00:34:01.535 --> 00:34:04.125

We've got your information and I know who you are.

832

00:34:07.235 --> 00:34:10.685

Okay, good. One more. Flight test.

833

00:34:10.685 --> 00:34:12.685

Risk management fundamentals include all

834

00:34:12.685 --> 00:34:15.445

of the following except manage risks

835

00:34:15.465 --> 00:34:17.125

during concept and planning stages.

836

00:34:20.325 --> 00:34:22.085

Mitigate risks after they become an issue.

837

00:34:23.175 --> 00:34:24.645

Focus on test related risks.

838

00:34:25.725 --> 00:34:28.485

D, make risk management decisions at the appropriate level.

839

00:34:49.425 --> 00:34:54.085

All right. I told Huffer coming in,

840

00:34:54.285 --> 00:34:57.605

I was like, man, we're gonna be behind timeline at 8 0 1.

841

00:34:58.565 --> 00:35:00.085

I said this crowd's gonna be hard to manage.

842

00:35:00.085 --> 00:35:03.165

There are a lot of folks and I've been wrong on both counts.

843

00:35:03.625 --> 00:35:06.805

So I don't know if we we need more caffeine

844

00:35:06.865 --> 00:35:10.605

or if we're just awesome in execution regardless.

845

00:35:11.485 --> 00:35:13.325

I wanna stop here. This is a great break point.

846

00:35:13.675 --> 00:35:15.685

Okay, here's the deal though gang.

847

00:35:15.975 --> 00:35:18.445

We're gonna break early, but let's be ready to go

848

00:35:19.585 --> 00:35:20.805

at quarter till, okay?

849

00:35:20.825 --> 00:35:21.685

You know, you always got the

850

00:35:21.685 --> 00:35:22.845

stragglers doors open and closing.

851

00:35:22.975 --> 00:35:25.765

We're gonna kick it off at quarter till. Okay.

852

00:35:27.485 --> 00:35:29.605

Anything to add? Ready break.