

WEBVTT

1

00:00:05.745 --> 00:00:06.565

Uh, good morning.

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00:00:06.945 --> 00:00:10.045

Uh, this will not be as exciting as Turbos was yesterday.

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00:00:10.305 --> 00:00:12.525

Uh, we'll get, get into the papers quite quickly.

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00:00:12.685 --> 00:00:14.605

I did wanna share two observations from yesterday.

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00:00:15.185 --> 00:00:18.405

Uh, first one was often, uh, what I consider

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00:00:18.425 --> 00:00:20.165

to be the good and the bad.

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00:00:20.425 --> 00:00:21.925

So often when we do lessons learned,

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00:00:22.065 --> 00:00:23.965

we focus on don't do this.

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00:00:24.675 --> 00:00:26.765

Okay. We usually get that, okay, that didn't turn out

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00:00:26.765 --> 00:00:27.805

so well do something else.

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00:00:28.075 --> 00:00:31.285

However, often for many things, there's also lessons learned

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00:00:31.285 --> 00:00:33.005

of we did this and that turned out well.

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00:00:33.465 --> 00:00:34.485

For instance, we've talked about

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00:00:34.485 --> 00:00:35.765
simulations and things like that.

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00:00:36.185 --> 00:00:38.765
We need to stay focused on that as well as far as take

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00:00:38.765 --> 00:00:41.965
that lesson as far as this program, did this, do that again?

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00:00:42.945 --> 00:00:46.245
Uh, second piece is sort of a plug, if you will,

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00:00:46.345 --> 00:00:48.005
for sharing the knowledge.

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00:00:48.225 --> 00:00:50.885
Uh, what I mean by that is these papers generally here are

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00:00:50.885 --> 00:00:52.925
essentially given to the flight test community

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00:00:53.185 --> 00:00:54.525
and we are all part of the choir.

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00:00:54.625 --> 00:00:55.805
We all understand things.

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00:00:56.305 --> 00:00:59.245
Uh, what I would suggest is that what we've done at uh,

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00:00:59.245 --> 00:01:01.125
Northrop Grumman is take some of these papers

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00:01:01.265 --> 00:01:03.365
and share that with the other engineers

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00:01:03.545 --> 00:01:06.685
and the program management, obviously in the right kind

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00:01:06.685 --> 00:01:09.645

of context with the right intros and those sorts of things.

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00:01:10.145 --> 00:01:12.565

Um, we took one of Jerry White's papers earlier this year

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00:01:13.025 --> 00:01:14.805

and, uh, essentially opened the eyes

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00:01:14.805 --> 00:01:15.965

of our program management

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00:01:15.965 --> 00:01:18.485

and saw our engineers on a program to talk about some

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00:01:18.485 --> 00:01:20.325

of the things that have not gone well.

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00:01:20.465 --> 00:01:22.245

So it's quite the educational experience.

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00:01:22.705 --> 00:01:24.125

Now that can be a two-edged sword

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00:01:24.185 --> 00:01:25.605

and I'm actually gonna compliment program

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00:01:25.605 --> 00:01:27.085

management here, which is a surprise.

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00:01:27.615 --> 00:01:30.925

After that, our program manager, her comment, uh,

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00:01:30.935 --> 00:01:32.885

would generally be, what did my engineers

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00:01:32.945 --> 00:01:34.765

and what did my flight test people say?

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00:01:35.075 --> 00:01:37.125

They said this, well, there you have it.

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00:01:37.275 --> 00:01:38.525

That conversation is over.

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00:01:39.105 --> 00:01:41.685

So she had us, she had our back completely

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00:01:42.125 --> 00:01:43.205

'cause we brought them into the fold.

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00:01:44.065 --> 00:01:45.085

So enough of that,

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00:01:46.065 --> 00:01:48.725

our first speaker is Ben Luther from Gulfstream Aerospace.

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00:01:49.215 --> 00:01:51.645

Ben's the tested evaluation safety manager within the

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00:01:51.645 --> 00:01:53.965

aerospace safety office at Gulfstream Aerospace

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00:01:53.965 --> 00:01:55.245

Corporation in Savannah, Georgia.

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00:01:55.755 --> 00:01:58.645

He's a member of the Society of Flight Test Engineers.

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00:01:59.025 --> 00:02:02.445

Luther spent 22 years in the Australian Air Force

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00:02:02.445 --> 00:02:05.125

with more than 10 years in flight test with the Air Force.

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00:02:05.435 --> 00:02:07.525

Flew the a P three C operationally

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00:02:07.545 --> 00:02:11.085

and conducted flight tests on the FA 18, PC nine,

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00:02:11.285 --> 00:02:13.005

A three C, and C one 30 j.

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00:02:13.475 --> 00:02:14.925
He's a distinguished graduate

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00:02:15.105 --> 00:02:17.365
of national test pilot school in Mojave, California

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00:02:17.665 --> 00:02:20.045
and has studied management at Latrobe University in

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00:02:20.045 --> 00:02:21.285
Melbourne, Australia,

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00:02:22.265 --> 00:02:24.245
and Complex systems safety at the University

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00:02:24.245 --> 00:02:26.325
of South Australia and Adelaide South Australia.

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00:02:27.345 --> 00:02:28.445
Ben, the floor is yours.

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00:02:42.575 --> 00:02:43.625
Good morning and thank you for

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00:02:43.625 --> 00:02:44.705
the opportunity to speak to you this morning.

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00:02:44.925 --> 00:02:46.985
Uh, it really is a privilege to be pre selected

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00:02:47.125 --> 00:02:48.505
to present at an event like this

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00:02:49.325 --> 00:02:50.785
and to put an argument to my peers.

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00:02:50.965 --> 00:02:54.225
And for me, that's the definition from London 400 years ago

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00:02:54.335 --> 00:02:56.585

when they came up with the idea of to be professional is

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00:02:56.585 --> 00:02:57.625

to be judged by one's peers.

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00:02:57.725 --> 00:03:01.005

So for that thank you to the Flight Test Safety Committee,

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00:03:01.025 --> 00:03:03.485

and I think we really need to pursue events like this.

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00:03:04.935 --> 00:03:07.165

There was only one time slot when a presentation like this

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00:03:07.185 --> 00:03:08.925

was gonna work, and that's first up in the morning.

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00:03:10.185 --> 00:03:11.565

And the best piece of advice I've given

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00:03:11.565 --> 00:03:12.725

is don't compete with Turbo.

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00:03:13.585 --> 00:03:15.605

So I've gone completely other way.

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00:03:16.035 --> 00:03:18.805

This will be for the judging committee.

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00:03:18.835 --> 00:03:21.165

This is the most boring presentation you'll receive today.

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00:03:22.605 --> 00:03:24.685

I don't think I use the term fly by wire at all,

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00:03:24.985 --> 00:03:26.085

but it is something that I thought

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00:03:26.085 --> 00:03:27.245

was important to bring to the group.

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00:03:27.705 --> 00:03:30.965

Um, You should find this quite different from the

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00:03:30.965 --> 00:03:33.885

normal presentation style, and I'm happy to take questions

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00:03:33.885 --> 00:03:35.685

and make it quite conversational along the way.

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00:03:36.425 --> 00:03:38.165

Uh, I'm not a psychologist,

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00:03:38.165 --> 00:03:43.125

but over the last 1218 months, I was tasked by my boss to go

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00:03:43.125 --> 00:03:46.245

and apply generative safety culture

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00:03:46.345 --> 00:03:47.645

to the conduct of flight test.

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00:03:48.065 --> 00:03:50.805

Now that didn't mean just, uh, go out there

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00:03:50.805 --> 00:03:52.605

and grab what they do on the factory floor.

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00:03:52.675 --> 00:03:55.365

This was how do we apply the safety science

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00:03:55.365 --> 00:03:58.285

that they use on the factory floor with hazmat

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00:03:58.665 --> 00:04:02.405

and rivet guns and really obvious hazards,

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00:04:02.405 --> 00:04:05.045

and how do we apply that to the art of complex systems?

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00:04:06.305 --> 00:04:09.205

And that led me to, um, the idea of

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00:04:12.075 --> 00:04:13.245

generally safety culture.

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00:04:13.825 --> 00:04:15.765

And for that, I was looking for areas

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00:04:16.345 --> 00:04:19.245

to improve our thinking and the idea of critical thinking.

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00:04:20.825 --> 00:04:23.205

The material in today's presentation was originally inspired

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00:04:23.205 --> 00:04:25.285

by Steve Daniels, an ETPS instructor.

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00:04:25.625 --> 00:04:27.365

Uh, he mentioned the term critical thinking

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00:04:27.365 --> 00:04:31.405

and maybe that's in it for, for some of us, the work of

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00:04:32.025 --> 00:04:33.485

Nia Werner and Stidel,

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00:04:33.585 --> 00:04:35.165

two gentlemen from the US Navy College.

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00:04:35.395 --> 00:04:37.245

They pursued it for a bit on behalf of NASA

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00:04:37.415 --> 00:04:38.765

after one of the, uh,

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00:04:38.855 --> 00:04:40.805

after the most recent space shuttle accident.

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00:04:41.705 --> 00:04:43.605

And I refer you to also to Taylor

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00:04:43.745 --> 00:04:47.245

and Gowan, uh, two gentlemen who came from medicine

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00:04:47.385 --> 00:04:50.005

and the finance industry who are also looking at this idea

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00:04:50.005 --> 00:04:51.365

of complex safety.

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00:04:52.465 --> 00:04:55.165

And really this became an academic exercise.

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00:04:55.265 --> 00:04:57.165

Please take it in that, in that context.

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00:04:57.745 --> 00:05:00.365

Uh, this is to provide you some thought

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00:05:00.385 --> 00:05:01.845

and some thinking so

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00:05:01.845 --> 00:05:04.085

that in 25 minutes from now you leave here wanting

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00:05:04.085 --> 00:05:05.725

to be a better flight test professional than you were

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00:05:05.785 --> 00:05:06.925

25 minutes ago.

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00:05:07.725 --> 00:05:09.005

I don't have any lessons learned.

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00:05:09.005 --> 00:05:10.765

There's no stories of me inverted

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00:05:11.405 --> 00:05:13.445

negative two G doing some release on the hornet.

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00:05:15.065 --> 00:05:17.445

That's not where we are. Uh, not where I'm at the moment.

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00:05:17.505 --> 00:05:18.685

And it's not where we are now.

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00:05:18.755 --> 00:05:21.725

This is where we are looking more for our current industry

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00:05:21.725 --> 00:05:24.405

of how to put more avionics into an aircraft

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00:05:24.585 --> 00:05:25.765

and how do we find new

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00:05:25.765 --> 00:05:28.765

and interesting ways to kill ourselves with a TCAs box.

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00:05:29.345 --> 00:05:34.125

Uh, Looking at the agenda

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00:05:34.145 --> 00:05:35.565

for today, um,

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00:05:35.875 --> 00:05:37.485

this will give you a quick idea of where we're going.

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00:05:38.025 --> 00:05:39.565

Uh, I'll start with the definition so

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00:05:39.565 --> 00:05:40.765

that we've got a baseline.

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00:05:41.435 --> 00:05:43.645

Then I'll have a look at, uh, why we'd want

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00:05:43.645 --> 00:05:46.365

to employ critical thinking some of the benefits.

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00:05:46.595 --> 00:05:48.805

Then we'll go on to what's stopping us doing this?

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00:05:48.945 --> 00:05:51.445

Why isn't it automatic bias threats?

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00:05:51.945 --> 00:05:54.125

Uh, then make the follow me with the jump to checklist.

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00:05:54.435 --> 00:05:55.645

That was the key to it for me.

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00:05:55.645 --> 00:05:57.925

Once I've been reading on, on critical thinking,

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00:05:58.465 --> 00:05:59.485

the key then was, ah,

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00:05:59.485 --> 00:06:01.045

this is something that we can checklist.

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00:06:01.705 --> 00:06:04.165

And then finally look at some techniques on how to apply it.

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00:06:07.735 --> 00:06:10.165

First and foremost, critical thinking is purposeful.

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00:06:10.505 --> 00:06:13.325

It is absolutely not lucky and it does not happen by chance.

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00:06:13.865 --> 00:06:16.485

It is a deliberate application of thought to the subject.

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00:06:18.045 --> 00:06:19.525

Critical thinking applies reason judgment.

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00:06:19.945 --> 00:06:22.325

It considers the evidence, the context of the problem,

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00:06:22.625 --> 00:06:24.045

the many methods of resolution.

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00:06:25.705 --> 00:06:27.805

It is brought in its consideration to inputs

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00:06:27.805 --> 00:06:30.365

and weighs up all manner so that a reasoned

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00:06:30.925 --> 00:06:31.925

argument can be articulated.

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00:06:32.625 --> 00:06:34.645

And the last point that I read was very,

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00:06:34.795 --> 00:06:36.605

very important to articulate it.

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00:06:36.785 --> 00:06:38.765

And I put to you that if you cannot put your argument

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00:06:38.765 --> 00:06:41.365

to your peers from your own company, from another company,

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00:06:41.465 --> 00:06:44.165

if you can't call up an old test pilot schoolmate

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00:06:44.165 --> 00:06:46.605

and say, can I run this by you for five minutes?

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00:06:46.785 --> 00:06:49.605

If you can't put it to them in words, language

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00:06:49.605 --> 00:06:51.485

of your choice, I'm constrained to English.

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00:06:52.185 --> 00:06:55.885

Uh, if you can't put it to them in five minutes, 15 minutes,

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00:06:56.725 --> 00:06:58.405

I suggest you've got some more thinking to do.

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00:07:00.645 --> 00:07:01.645

Critical thinking is objective.

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00:07:02.545 --> 00:07:05.125

Uh, critical thinking distances an individual from bias

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00:07:05.345 --> 00:07:06.565

and enables a reasonable judgment

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00:07:06.565 --> 00:07:08.365

to be conducted in an impartial manner

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00:07:08.915 --> 00:07:11.525

because it is methodical, it doesn't happen by chance.

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00:07:11.545 --> 00:07:13.005

And its techniques insulate the

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00:07:13.005 --> 00:07:14.325

practitioner from undue influence.

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00:07:14.825 --> 00:07:16.485

It allows 'em to make a balanced assessment.

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00:07:17.675 --> 00:07:18.805

It's also standardized.

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00:07:19.265 --> 00:07:21.405

And by being standardized, it's formulaic

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00:07:21.545 --> 00:07:23.765

and practitioners can provide assurance to themselves

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00:07:23.785 --> 00:07:24.805

and their organizations.

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00:07:25.305 --> 00:07:27.485

We can go back and we can tell our boss the

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00:07:27.485 --> 00:07:28.605

areas that we've thought about.

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00:07:30.715 --> 00:07:33.245

They are broad based, well reasoned and objective.

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00:07:33.545 --> 00:07:35.565

The standardization allows the practitioner

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00:07:35.565 --> 00:07:38.045

to focus on the creative rather than the mundane,

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00:07:38.415 --> 00:07:40.565

while ensuring that the mundane is not forgotten.

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00:07:41.015 --> 00:07:42.525

These are the still important elements

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00:07:42.525 --> 00:07:44.445

of flight test process that we all hate.

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00:07:44.675 --> 00:07:46.565

This is the process that you have to do

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00:07:46.745 --> 00:07:49.125

before you can go flying the paperwork.

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00:07:49.625 --> 00:07:51.685

And the critical thinking allows you to get

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00:07:51.685 --> 00:07:53.005

that done without a mission.

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00:07:53.705 --> 00:07:55.845

And that was the point that triggered me to checklists.

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00:07:59.545 --> 00:08:00.685

So why critical thinking?

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00:08:00.835 --> 00:08:03.125

Well, we spend a lot of our time thinking it's an attribute

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00:08:03.125 --> 00:08:05.405

of being human and it makes us, makes us human

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00:08:05.405 --> 00:08:07.245

and it's absolutely essential for flight test.

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00:08:07.705 --> 00:08:09.085

And if we're gonna do so much of it,

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00:08:09.315 --> 00:08:10.685

then we may as well be good at it.

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00:08:10.985 --> 00:08:13.205

And if we can get good at it, then we can become efficient.

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00:08:14.425 --> 00:08:15.485

It is an essential skill

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00:08:15.665 --> 00:08:17.365

and it keeps us alive in flight test.

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00:08:17.675 --> 00:08:19.725

It's a succinct way of getting to the heart of the matter.

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00:08:21.025 --> 00:08:22.045

Bad thought processes.

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00:08:22.045 --> 00:08:24.445

Those that are not critical thinking are the ones that fail

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00:08:24.445 --> 00:08:25.925

to identify the important points.

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00:08:26.315 --> 00:08:28.525

They place emphasis on elements that are not important

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00:08:28.705 --> 00:08:30.245

and fail to consider the broader context.

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00:08:32.325 --> 00:08:34.365

Critical thinking applies a construct of the thought process

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00:08:34.945 --> 00:08:37.605
and provides the assurance that thinking is complete.

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00:08:38.665 --> 00:08:40.805
In doing so, it ensures the quality of the decision

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00:08:40.955 --> 00:08:43.005
that arises from a critical thinking process.

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00:08:44.475 --> 00:08:46.205
Note that this is not ethical thinking.

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00:08:46.515 --> 00:08:48.125
This is not telling you what to think.

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00:08:48.635 --> 00:08:51.845
This is teaching you or ensuring how you think

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00:08:52.105 --> 00:08:53.925
and how you think becomes systematic.

210
00:08:54.065 --> 00:08:55.805
And it becomes an intellectual skill

211
00:08:56.225 --> 00:08:57.485
and you can assure yourself

212
00:08:57.545 --> 00:08:59.325
and your boss that you've thought about

213
00:08:59.325 --> 00:09:00.445
it in a complete manner.

214
00:09:01.435 --> 00:09:02.445
It's the feedback loop,

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00:09:02.755 --> 00:09:05.045
it's the quality process on your own thought process.

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00:09:08.625 --> 00:09:12.365

So what are the benefits? The benefits

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00:09:12.365 --> 00:09:14.685

of critical thinking have been demonstrated experimentally.

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00:09:14.745 --> 00:09:17.525

The universities here in the US principally, uh,

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00:09:17.635 --> 00:09:20.165

have demonstrated this only in the last 10 years or so,

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00:09:20.165 --> 00:09:22.765

and it's starting to be injected into the curriculum.

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00:09:23.465 --> 00:09:25.085

And I was pleased to see

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00:09:25.085 --> 00:09:27.205

and find it in my child's uh, school.

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00:09:27.205 --> 00:09:29.925

They actually teach this, which was something

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00:09:29.925 --> 00:09:31.165

that I discovered after the event.

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00:09:31.185 --> 00:09:32.645

I'm thinking, well, that, where's that?

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00:09:32.645 --> 00:09:34.725

Leave the rest of us. We we're staffed.

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00:09:34.855 --> 00:09:36.165

We're, we're not at school anymore.

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00:09:36.985 --> 00:09:39.045

So how do we go back now and loop back

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00:09:39.145 --> 00:09:43.365

and teach ourselves this Critical thinking will aid the

230
00:09:43.365 --> 00:09:44.525
person in determining the elements

231
00:09:44.525 --> 00:09:45.845
that are important and which are noise.

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00:09:46.635 --> 00:09:47.645
It's a structured process

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00:09:47.705 --> 00:09:49.605
to ensure the full breadth is considered.

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00:09:50.225 --> 00:09:52.965
And by applying a critical thinking, a person becomes aware

235
00:09:52.965 --> 00:09:54.165
of the limits to their knowledge

236
00:09:54.625 --> 00:09:56.725
and it's the rational process that is repeatable.

237
00:09:57.965 --> 00:09:59.925
Critical thinking is a particular benefit to flight test,

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00:10:00.025 --> 00:10:02.485
be it because it assures the breadth of consideration

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00:10:03.345 --> 00:10:05.805
and rather than ad hoc process, it becomes systematic

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00:10:05.805 --> 00:10:07.205
and provides an assurance of breadth.

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00:10:07.745 --> 00:10:10.165
It provides you with knowledge of the boundaries.

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00:10:10.905 --> 00:10:12.965
And again, this is where I made the jump to say, okay,

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00:10:12.965 --> 00:10:15.245

if I know where the boundaries of my thought process are,

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00:10:16.115 --> 00:10:18.285

that then becomes the envelope for my flight test.

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00:10:18.945 --> 00:10:21.205

So I can say to my boss, this is where I've thought to,

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00:10:21.275 --> 00:10:22.445

this is where I'll go to.

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00:10:22.605 --> 00:10:26.205

I won't go any further. Finally,

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00:10:26.205 --> 00:10:29.005

because it is systematic, it is repeatable.

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00:10:29.005 --> 00:10:30.405

And two people can be involved,

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00:10:30.625 --> 00:10:32.485

two teams can be involved in the same process

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00:10:32.705 --> 00:10:36.205

and not overlap, not conflict, not omit parts of it.

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00:10:36.605 --> 00:10:38.485

I can know what my partner has done

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00:10:38.785 --> 00:10:40.725

and he can be assured of what I have done.

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00:10:42.755 --> 00:10:44.205

High reliability organizations

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00:10:44.205 --> 00:10:46.285

with complex socio-technical systems.

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00:10:46.825 --> 00:10:49.445

Yes, a phrase I stole from my university textbook.

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00:10:50.105 --> 00:10:52.005

Uh, they need to advocate for critical thinking

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00:10:52.005 --> 00:10:53.285

and teach this to employees

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00:10:53.285 --> 00:10:55.365

because it protects them from the hazards of their work.

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00:10:56.295 --> 00:10:58.965

Since no one person can know it all in complex systems,

261

00:10:59.955 --> 00:11:02.045

this allows groups of people to work cohesively.

262

00:11:02.945 --> 00:11:04.285

The complexity can arise

263

00:11:04.285 --> 00:11:06.005

because the system changes over time.

264

00:11:06.585 --> 00:11:09.925

It can be compositionally complex or it can be non-linear.

265

00:11:10.185 --> 00:11:12.605

So box A doesn't do function A.

266

00:11:13.225 --> 00:11:16.605

So box A and B together might be needed to produce output C.

267

00:11:16.605 --> 00:11:19.165

And all these complex systems we get in our fly

268

00:11:19.165 --> 00:11:23.005

by wire systems, critical thinking removes bias from

269

00:11:23.165 --> 00:11:25.725

decisions and assist us in breaking down complex systems

270

00:11:25.755 --> 00:11:27.325

into blocks that can be understood.

271

00:11:27.945 --> 00:11:30.645

And decisions made on the basis of critical thinking

272

00:11:31.285 --> 00:11:33.765

represent a safer proposal, a better business proposition,

273

00:11:34.105 --> 00:11:35.725

and a more accurate engineering judgment.

274

00:11:39.865 --> 00:11:42.525

So we all want to do, we all wanna do critical thinking.

275

00:11:42.785 --> 00:11:44.245

That's an easy argument to put.

276

00:11:45.385 --> 00:11:46.925

But then bias, what is,

277

00:11:46.925 --> 00:11:49.085

what are the things working against critical thinking?

278

00:11:49.905 --> 00:11:51.525

One of those things is the bias

279

00:11:51.525 --> 00:11:53.045

that we have in us as human beings.

280

00:11:54.225 --> 00:11:56.925

And critical thinking can help you be self-aware of those.

281

00:11:57.665 --> 00:12:00.245

One of the most common is confirmation bias, also known

282

00:12:00.245 --> 00:12:01.365

as prior hypothesis.

283

00:12:02.275 --> 00:12:04.965

When influenced by this bias thinkers weight input material

284

00:12:04.965 --> 00:12:06.525
that confirms their prior ideas

285

00:12:07.025 --> 00:12:08.845
and ignore the things that contradict this,

286

00:12:09.395 --> 00:12:11.085
they see only what they want to see.

287

00:12:11.585 --> 00:12:14.365
And it's a problem when flight test practitioners have come

288

00:12:14.365 --> 00:12:16.245
from a task and they rely on

289

00:12:16.245 --> 00:12:19.325
that prior experience without confirming that the adage

290

00:12:19.325 --> 00:12:21.165
of a man with a hammer sees everything as a nail.

291

00:12:22.765 --> 00:12:24.325
A means of reducing complexity is

292

00:12:24.325 --> 00:12:27.645
to falsely eliminate alternatives either by exclusion

293

00:12:27.645 --> 00:12:28.645
or by grouping them together.

294

00:12:28.905 --> 00:12:30.405
And that gives you a loss of fidelity.

295

00:12:31.305 --> 00:12:33.645
The flight tester does this when they exclude alternative

296

00:12:33.645 --> 00:12:36.885
solutions to a problem and force everything into a scenario

297

00:12:36.915 --> 00:12:38.525

that they're familiar and comfortable with.

298

00:12:39.065 --> 00:12:41.565

No alternatives are sought and none are considered.

299

00:12:43.515 --> 00:12:46.045

Insensitivity to probabilities is classic flight test.

300

00:12:46.315 --> 00:12:49.085

This is the propensity for humans to focus on consequences

301

00:12:49.745 --> 00:12:51.765

and in flight tests we like big consequences

302

00:12:52.025 --> 00:12:53.285

and we are confident in ourselves

303

00:12:53.285 --> 00:12:55.445

because we have very, very small probabilities.

304

00:12:56.385 --> 00:12:57.565

We view our work as unique

305

00:12:57.665 --> 00:12:59.125

and we love to be seen with a scarf

306

00:12:59.125 --> 00:13:03.445

and spurs on Because we view our work as unique,

307

00:13:03.445 --> 00:13:04.685

we convince ourselves that

308

00:13:05.265 --> 00:13:07.725

we can't calculate the probabilities on what we do

309

00:13:08.145 --> 00:13:09.525

by the work that anyone else has done

310

00:13:09.525 --> 00:13:11.565

because by definition we are unique,

311
00:13:11.565 --> 00:13:13.805
therefore the probabilities are unknown and

312
00:13:13.805 --> 00:13:15.565
therefore we should crack on and get on with the job.

313
00:13:16.785 --> 00:13:19.445
We need to be harder on ourselves. That's absolute rubbish.

314
00:13:19.905 --> 00:13:22.125
And we need to be harder on ourselves to get it right

315
00:13:22.185 --> 00:13:23.605
and be careful in our risk analysis

316
00:13:23.705 --> 00:13:25.725
and not succumb to the bias

317
00:13:25.945 --> 00:13:27.805
of insensitivity to probabilities.

318
00:13:28.105 --> 00:13:29.165
We need to put the work in

319
00:13:29.165 --> 00:13:34.005
and do the critical thinking, the illusion of management.

320
00:13:34.415 --> 00:13:36.405
We've all worked for someone or a program office

321
00:13:36.665 --> 00:13:38.445
who thought they had a handle on what was going on.

322
00:13:40.145 --> 00:13:42.125
We as humans like to believe that we're in control

323
00:13:42.705 --> 00:13:45.525
and awareness of the difference between what we control

324
00:13:45.665 --> 00:13:49.805

and that which we do not is not a natural human uh, idea.

325

00:13:49.825 --> 00:13:53.925

And it is one of our bias earned dogmatism.

326

00:13:54.115 --> 00:13:55.965

This is the one I liked came out of uh,

327

00:13:56.845 --> 00:13:59.325

I believe it was a Seattle university, uh, only last year.

328

00:14:00.315 --> 00:14:02.765

This is the idea that when you label someone an expert,

329

00:14:03.065 --> 00:14:04.445

you actually make them dumber.

330

00:14:04.745 --> 00:14:06.765

And these guys and these guys proved it.

331

00:14:08.865 --> 00:14:11.245

And that was my response. I I read this paper.

332

00:14:12.225 --> 00:14:13.605

The effect is doubly damaging.

333

00:14:13.955 --> 00:14:15.925

They prove that when you label someone an expert,

334

00:14:15.945 --> 00:14:20.005

you actually close off their acceptance of other ideas.

335

00:14:20.115 --> 00:14:22.525

They feel an entitlement to dump to a conclusion.

336

00:14:22.835 --> 00:14:25.365

Because I'm an expert, of course I can go straight

337

00:14:25.365 --> 00:14:29.005

to the answer, but doubly damaging the other.

338

00:14:29.105 --> 00:14:31.645

The other side of the sword is we place

339

00:14:31.645 --> 00:14:32.685

an expectation on them.

340

00:14:32.985 --> 00:14:35.645

Not only do they feel it, we expect that of them.

341

00:14:36.225 --> 00:14:37.525

So when you label someone an expert,

342

00:14:37.585 --> 00:14:39.045

you actually make them dumber.

343

00:14:40.785 --> 00:14:43.005

Be aware of your own bias since these are damaging

344

00:14:43.005 --> 00:14:44.885

to your ability to conduct critical thinking.

345

00:14:49.185 --> 00:14:51.085

So what are the attributes of a critical thinker?

346

00:14:51.295 --> 00:14:53.085

Given that I can't go to school with my son,

347

00:14:53.185 --> 00:14:54.645

my role is to simply send cash.

348

00:14:55.745 --> 00:14:59.565

Um, we need to find another way to learn critical thinking.

349

00:14:59.985 --> 00:15:02.365

And to that end, I spent some time applying my critical

350

00:15:02.365 --> 00:15:03.925

thinking skills to the idea of

351

00:15:03.955 --> 00:15:06.485

what would critical thinking look like within flight test.

352

00:15:08.185 --> 00:15:10.005

And it was the gentleman from the US Navy College

353

00:15:10.005 --> 00:15:11.765

that put together their list of attributes.

354

00:15:12.155 --> 00:15:14.725

This is their list and I applied it to flight test.

355

00:15:15.465 --> 00:15:16.525

The first one was humility.

356

00:15:16.905 --> 00:15:19.365

The idea of a self-awareness of shortcomings and bias.

357

00:15:20.125 --> 00:15:22.405

A flight tester would exhibit humility when they seek out

358

00:15:22.405 --> 00:15:24.285

system knowledge despite their prior experience.

359

00:15:25.145 --> 00:15:27.005

And the classic, I came from classic hornets,

360

00:15:27.005 --> 00:15:28.565

therefore I should know super hornets.

361

00:15:29.305 --> 00:15:31.645

No, take the time. Go back, read the flight.

362

00:15:31.645 --> 00:15:36.405

Manual Flight test practitioners exhibit courage when they

363

00:15:36.405 --> 00:15:37.765

seek ideas that challenge them,

364

00:15:37.765 --> 00:15:40.525

particularly when they question wire test is being conducted

365

00:15:40.525 --> 00:15:42.045
in the same manner that it was last time.

366

00:15:42.715 --> 00:15:45.445
This is when I encounter, when I change organizations.

367

00:15:45.865 --> 00:15:49.205
Oh no, no, we always do that here. No, don't accept that.

368

00:15:49.385 --> 00:15:51.405
Go back and challenge. Why are we doing it this way?

369

00:15:53.885 --> 00:15:55.575
Empathy. This would enable a person

370

00:15:55.595 --> 00:15:57.855
to think constructively about an idea from the perspective

371

00:15:57.855 --> 00:16:00.935
of another even when it conflicts with your personal ideals

372

00:16:00.955 --> 00:16:02.255
or your personal requirements.

373

00:16:03.325 --> 00:16:05.855
Empathy would enable a flight tester to think

374

00:16:05.855 --> 00:16:07.455
of the perspective from the supplier.

375

00:16:07.955 --> 00:16:09.255
The supplier's delivered late.

376

00:16:09.525 --> 00:16:11.255
There's nothing they can do about that here.

377

00:16:11.255 --> 00:16:12.575
Think about it from their perspective.

378

00:16:13.045 --> 00:16:14.455

What have they done to get it

379

00:16:14.455 --> 00:16:16.095

to you a week earlier than they should have?

380

00:16:16.425 --> 00:16:18.295

Where have they put their compromises in?

381

00:16:18.795 --> 00:16:20.895

So empathy, thinking of it from their perspective.

382

00:16:23.285 --> 00:16:26.575

Integrity. This is the ability to apply standards

383

00:16:26.575 --> 00:16:27.815

of critical thinking to yourself.

384

00:16:28.475 --> 00:16:30.215

Flight testers maintain their integrity

385

00:16:30.395 --> 00:16:33.055

and when they stand by their personal standards in the face

386

00:16:33.055 --> 00:16:35.535

of time pressure or apparently boring or simple testing.

387

00:16:36.435 --> 00:16:38.455

So VHF testing at 35,000 feet

388

00:16:38.455 --> 00:16:41.735

and 160 miles is done the same way for test 0.1

389

00:16:41.915 --> 00:16:43.055

and test point 100.

390

00:16:45.035 --> 00:16:48.055

Flight tests demonstrate perseverance when they seek answers

391

00:16:48.055 --> 00:16:49.655

to risk assessments to technical

392

00:16:49.995 --> 00:16:53.095

to technical questions despite the effort required to do so.

393

00:16:54.325 --> 00:16:56.895

It's a general dissatisfaction with an incomplete answer.

394

00:16:58.075 --> 00:17:00.215

The idea that when I don't have enough information,

395

00:17:00.215 --> 00:17:03.255

when I'm not comfortable that I really know what's going on,

396

00:17:03.435 --> 00:17:06.215

I'm gonna stay on the ground, I'm gonna persevere

397

00:17:06.215 --> 00:17:08.615

with the work to actually get the information I require.

398

00:17:11.135 --> 00:17:14.695

Autonomy. This is the one that's great for a forum like this

399

00:17:14.905 --> 00:17:17.415

where we all work as a team but we challenge each other.

400

00:17:19.275 --> 00:17:21.495

So the application of critical thinking towards personal

401

00:17:21.495 --> 00:17:23.215

knowledge rather than uncritically

402

00:17:23.215 --> 00:17:24.575

accepting the opinions of others.

403

00:17:25.115 --> 00:17:27.455

We work with the team but we challenge each other.

404

00:17:29.925 --> 00:17:33.255

Curiosity flight test is exhibit curiosity when they apply

405

00:17:33.255 --> 00:17:35.495

what they have learned from one area to another

406

00:17:37.715 --> 00:17:40.495

and confidence in reason is not confidence in James reason

407

00:17:40.495 --> 00:17:41.535

though that would be well founded.

408

00:17:42.275 --> 00:17:43.975

Uh, critical thinkers believe in a

409

00:17:43.975 --> 00:17:45.175

universal standard of logic.

410

00:17:45.475 --> 00:17:48.175

So a confidence in a common basis of reasoning.

411

00:17:49.265 --> 00:17:52.205

Uh, they judge their decisions and personal beliefs on this

412

00:17:52.265 --> 00:17:54.325

and they're confident that others will do the same.

413

00:17:54.545 --> 00:17:56.685

So this is the sharing of a common baseline.

414

00:17:59.115 --> 00:18:02.085

Finally, fairness allows a critical thinker

415

00:18:02.145 --> 00:18:04.605

to treat all points of view with respect to be open

416

00:18:04.605 --> 00:18:06.765

and honest and be accepting of the newcomer.

417

00:18:07.185 --> 00:18:09.445

The new person to the team might just have the insight

418

00:18:09.445 --> 00:18:10.925

through the culture and the detritus

419

00:18:10.925 --> 00:18:12.725
of your test program to get to the answer.

420

00:18:16.545 --> 00:18:18.365
So if they're the behaviors that we can try

421

00:18:18.365 --> 00:18:20.085
and emulate within our test programs

422

00:18:20.105 --> 00:18:23.845
to be better at critical thinking, uh, what are the threats?

423

00:18:24.075 --> 00:18:26.445
It's not enough to try and be a good critical thinker.

424

00:18:26.445 --> 00:18:28.925
You actually have to avoid being a bad critical thinker.

425

00:18:30.065 --> 00:18:32.365
Of all the threats to critical thinking, the most potent

426

00:18:32.365 --> 00:18:34.565
and prevalent in flight test is the time constraint.

427

00:18:35.095 --> 00:18:37.285
There are volumes of research on the performance

428

00:18:37.285 --> 00:18:38.645
of humans under time pressure.

429

00:18:38.745 --> 00:18:40.325
And let's just say none of it's complimentary.

430

00:18:40.345 --> 00:18:44.165
As a general broad brush Pe beyond a certain threshold,

431

00:18:44.165 --> 00:18:46.205
people don't get better under time pressure.

432

00:18:46.585 --> 00:18:48.485

But flight tests don't go bad instantly.

433

00:18:48.755 --> 00:18:50.485

This is not a a binary equation.

434

00:18:50.745 --> 00:18:54.365

You actually decay over time as the time pressure increases.

435

00:18:55.235 --> 00:18:57.365

Initially people accelerate their processing

436

00:18:57.365 --> 00:18:58.405

to accommodate the pressure.

437

00:18:59.035 --> 00:19:00.525

This truncates the normal trial

438

00:19:00.525 --> 00:19:02.285

and error sub-process in human problem

439

00:19:02.285 --> 00:19:03.565

solving and decision making.

440

00:19:04.145 --> 00:19:05.165

It reduces the quality

441

00:19:05.185 --> 00:19:07.285

of the decisions under moderate time pressure.

442

00:19:08.465 --> 00:19:10.645

The second stage of the human reaction is

443

00:19:10.645 --> 00:19:13.405

to constrain the inputs exactly analogous

444

00:19:13.405 --> 00:19:14.805

to the limited alternatives bias.

445

00:19:14.945 --> 00:19:16.245

And it has the same impact.

446
00:19:17.085 --> 00:19:19.565
A flight test is subjected to time pressure beyond the point

447
00:19:19.565 --> 00:19:20.605
where they can accelerate

448
00:19:20.605 --> 00:19:23.605
to accommodate the inputs simply starts to ignore them.

449
00:19:24.355 --> 00:19:27.045
This is where a person doesn't see the right answer even

450
00:19:27.045 --> 00:19:28.805
when you hold it right up in front of their face.

451
00:19:31.595 --> 00:19:34.525
Finally, they change their strategy to avoid the problem

452
00:19:34.985 --> 00:19:36.405
and just proceed with the status quo.

453
00:19:36.755 --> 00:19:39.125
They throw in the tail and rely on probability,

454
00:19:39.275 --> 00:19:40.725
well maybe it won't go bad.

455
00:19:41.915 --> 00:19:44.125
This is what's occurring. When the individual in the TM room

456
00:19:44.345 --> 00:19:46.405
has an answer in front of them, they see it on the trace.

457
00:19:46.635 --> 00:19:48.205
This was the USAP video they made

458
00:19:48.205 --> 00:19:50.405
that we've probably all seen the guy in the TM room,

459
00:19:50.425 --> 00:19:52.045

he has the information and says nothing.

460

00:19:52.315 --> 00:19:54.565

There's enough time pressure that he has just shut down

461

00:19:54.625 --> 00:19:55.965

and he's gonna go with probability

462

00:19:55.965 --> 00:19:57.485

and maybe the bad things won't happen.

463

00:19:59.385 --> 00:20:00.885

The crucial element to critical thinking

464

00:20:00.885 --> 00:20:02.765

and flight test is to provide adequate time.

465

00:20:03.545 --> 00:20:05.325

The art of leading the flight test team is

466

00:20:05.325 --> 00:20:08.765

to permit your team to do the job not infinite time.

467

00:20:08.765 --> 00:20:10.165

Since commercial pressure is real

468

00:20:10.265 --> 00:20:12.205

and we all have a job, if our companies go

469

00:20:12.205 --> 00:20:13.445

broke, we don't have that job.

470

00:20:14.385 --> 00:20:17.965

We Pre-planned responses will enable the thinking time

471

00:20:17.985 --> 00:20:19.805

to be dislocated from the conduct phase.

472

00:20:20.765 --> 00:20:23.085

I suggest a data review cannot be done coincidentally

473

00:20:23.085 --> 00:20:25.245

with the conduct of testing, you have to pause

474

00:20:25.305 --> 00:20:26.725

for long enough to allow the right

475

00:20:26.725 --> 00:20:28.045

answer to come to the fore.

476

00:20:30.505 --> 00:20:31.765

So how to checklist come into this

477

00:20:32.665 --> 00:20:35.645

or checklist of a tool that enables the dislocation

478

00:20:35.645 --> 00:20:37.605

of the thinking from the time pressure

479

00:20:38.275 --> 00:20:41.285

they encapsulate the the pre-planned responses

480

00:20:41.545 --> 00:20:43.325

and they're the outcome of critical thinking

481

00:20:43.325 --> 00:20:45.765

that was conducted at zero feet and zero knots.

482

00:20:47.335 --> 00:20:49.085

Human error comes in one of two flavors.

483

00:20:49.175 --> 00:20:52.685

Ineptitude or ignorance ineptitude we can train to overcome.

484

00:20:53.665 --> 00:20:56.285

So we all have the skills and the experience to do our jobs,

485

00:20:56.945 --> 00:20:58.445

but ignorance that's a bit harder.

486

00:20:59.185 --> 00:21:01.165

Now we have to remember to use the skills

487

00:21:01.165 --> 00:21:03.845

and experience to do our jobs and we are just human.

488

00:21:05.515 --> 00:21:07.045

This is where the checklists come into it.

489

00:21:07.045 --> 00:21:10.405

Since checklists prevent acts of omission, the point

490

00:21:10.405 --> 00:21:12.365

of this presentation is to encourage flight testers

491

00:21:12.365 --> 00:21:14.685

to incorporate critical thinking into checklists

492

00:21:14.685 --> 00:21:16.325

that they can use for their flight test process.

493

00:21:17.105 --> 00:21:20.605

Not just their checklist to to go flying designed.

494

00:21:20.605 --> 00:21:22.165

Well checklists are not onerous.

495

00:21:22.295 --> 00:21:25.125

Quite the reverse A tool go on writes.

496

00:21:25.125 --> 00:21:26.485

So the good checklist enables humans

497

00:21:26.545 --> 00:21:29.085

to ditch the mundane onto the checklist to leave them

498

00:21:29.085 --> 00:21:30.205

with higher order thinking.

499

00:21:30.945 --> 00:21:32.525

The checklist provides the assurance

500

00:21:32.525 --> 00:21:33.925
that the critical thinking has been

501

00:21:33.925 --> 00:21:35.205
broad enough to do the job.

502

00:21:36.025 --> 00:21:37.765
It ensures that routine inputs to the

503

00:21:38.065 --> 00:21:39.565
to the decision are considered.

504

00:21:40.295 --> 00:21:42.285
Checklists deal well with routine and

505

00:21:42.745 --> 00:21:44.005
and administrative nature.

506

00:21:44.745 --> 00:21:45.885
So flight test tasks

507

00:21:46.785 --> 00:21:49.005
and protecting the test team from acts of emission,

508

00:21:49.725 --> 00:21:51.405
challenging their biases and freeing them

509

00:21:51.505 --> 00:21:53.245
to consider the novel parts of the question.

510

00:21:54.245 --> 00:21:56.125
Critical thinking can be built into checklists

511

00:21:58.985 --> 00:22:01.685
as examples of this on our put up, uh, three checklists.

512

00:22:01.685 --> 00:22:04.365
The idea is that uh, not that we study them here so much

513

00:22:04.365 --> 00:22:06.605

as they are in the slide pack and you'll have them later.

514

00:22:07.825 --> 00:22:09.645

The first one here is the test plan review.

515

00:22:09.675 --> 00:22:12.245

This was the checklist that I used when reviewing uh,

516

00:22:12.265 --> 00:22:14.725

the test plans from the broader flight test organization

517

00:22:14.725 --> 00:22:16.445

before giving the safety office endorsement.

518

00:22:17.865 --> 00:22:19.605

I'm looking basically for those seven items,

519

00:22:20.685 --> 00:22:22.885

I stand back from the spelling mistakes and the grammar

520

00:22:23.145 --> 00:22:25.045

and I think the people who author the

521

00:22:25.045 --> 00:22:26.285

plans actually appreciate this.

522

00:22:26.315 --> 00:22:27.605

This is my rules of engagement.

523

00:22:27.905 --> 00:22:29.245

If you don't give me these seven things,

524

00:22:29.245 --> 00:22:31.005

you're not gonna get the safety office endorsement.

525

00:22:31.305 --> 00:22:32.645

The spelling and the grammar is on you.

526

00:22:34.265 --> 00:22:37.525

The objective obviously needs to be uh, unambiguous.

527

00:22:38.345 --> 00:22:40.365

The configuration was an interesting one in

528

00:22:40.365 --> 00:22:41.525

that we are flight test.

529

00:22:41.655 --> 00:22:43.205

We're about changing the configuration.

530

00:22:43.625 --> 00:22:45.725

If you cannot define the configuration for me,

531

00:22:45.875 --> 00:22:47.245

tell me how you're gonna control it.

532

00:22:48.505 --> 00:22:49.925

The instrumentation, I look to see

533

00:22:49.925 --> 00:22:51.645

that it's got no adverse influence on the system.

534

00:22:52.435 --> 00:22:53.765

Test conditions and techniques,

535

00:22:53.895 --> 00:22:55.925

these are quite closely related to the endpoints.

536

00:22:56.595 --> 00:22:58.605

Tell me what's a valid condition and

537

00:22:58.605 --> 00:22:59.885

therefore tell me what's not.

538

00:23:00.475 --> 00:23:02.765

What are the end points? How far are we gonna go with this?

539

00:23:03.585 --> 00:23:04.885

And then finally, the risk assessment.

540

00:23:04.985 --> 00:23:06.645

That's the broad summary of your argument

541

00:23:06.745 --> 00:23:08.565

and should be based on the preceding material.

542

00:23:09.545 --> 00:23:10.805

The graphic here is a freebie.

543

00:23:10.865 --> 00:23:13.365

That's the five checklist points I use for my own

544

00:23:14.065 --> 00:23:15.765

safety brief when I'm getting on board.

545

00:23:15.765 --> 00:23:18.725

Qantas delta, a gulf stream for flight test.

546

00:23:19.085 --> 00:23:21.365

I wanna see my seat, my exit, my oxy, my life, right?

547

00:23:21.465 --> 00:23:23.405

My life vest and my fire extinguisher.

548

00:23:24.115 --> 00:23:25.485

It's common to all aircraft.

549

00:23:27.715 --> 00:23:31.725

This one was uh, closely linked to the implementation

550

00:23:31.725 --> 00:23:32.725

of an incremental approach

551

00:23:32.955 --> 00:23:36.245

that we had some questions within Gulfstream to define

552

00:23:36.595 --> 00:23:38.205

what it was to be an incremental approach.

553

00:23:38.525 --> 00:23:40.805

I became intolerant of the idea that uh,

554

00:23:40.805 --> 00:23:42.005
we're just gonna have an incremental

555

00:23:42.005 --> 00:23:43.405
buildup and therefore we are good.

556

00:23:44.065 --> 00:23:46.645
And that entitled people to receive no more questions

557

00:23:46.875 --> 00:23:49.045
because we're just gonna do an incremental approach, right?

558

00:23:49.345 --> 00:23:50.885
And we're all happy And walk outta here it

559

00:23:50.885 --> 00:23:52.285
was, no, not good enough.

560

00:23:53.195 --> 00:23:55.045
Tell me how big the increment is gonna be

561

00:23:55.045 --> 00:23:56.485
and tell me what is the trigger

562

00:23:56.485 --> 00:23:57.965
that allows you to take that step.

563

00:23:58.835 --> 00:24:00.085
This then became my checklist.

564

00:24:00.225 --> 00:24:02.725
In assessing that step first

565

00:24:02.745 --> 00:24:04.685
and foremost, do we still have the requirement?

566

00:24:05.105 --> 00:24:07.525
So the exposure question, do we need to take the next step?

567

00:24:07.625 --> 00:24:10.365

Yes or no? Have a look at the data that we have.

568

00:24:10.425 --> 00:24:12.285

Is there enough quality and is there enough quantity?

569

00:24:12.805 --> 00:24:14.525

I don't need to analyze it at this point,

570

00:24:14.555 --> 00:24:16.765

it's just do I have enough yes or no?

571

00:24:17.475 --> 00:24:18.685

Have a look at the extent model.

572

00:24:19.545 --> 00:24:21.245

Is the data that we have supporting the model,

573

00:24:21.425 --> 00:24:22.885

are there any unexplained errors?

574

00:24:22.885 --> 00:24:24.285

Things that might be the first hint

575

00:24:24.555 --> 00:24:26.205

that our model is starting to break down.

576

00:24:27.065 --> 00:24:28.165

Do we still trust our model?

577

00:24:29.115 --> 00:24:31.445

Then the risk, look at the consequences and the probability.

578

00:24:31.785 --> 00:24:34.405

In all likelihood we can probably wind back the probability

579

00:24:34.495 --> 00:24:36.565

we've now got some empirical experience to base it upon.

580

00:24:37.305 --> 00:24:39.885

And then the final question, are we happy with the increment

581

00:24:39.885 --> 00:24:40.845
that we're about to consider

582

00:24:41.145 --> 00:24:42.325
and is it still within the model?

583

00:24:44.785 --> 00:24:47.645
The last checklist I've been using on myself is the idea

584

00:24:47.645 --> 00:24:48.685
of a safety review board.

585

00:24:49.195 --> 00:24:50.205
When I sit on the board,

586

00:24:50.325 --> 00:24:52.805
I wanna see declarations from the test team for those items.

587

00:24:53.425 --> 00:24:55.245
If you don't have those items, don't come to the board.

588

00:24:56.105 --> 00:24:58.205
So that was a case of the test team needs to be able

589

00:24:58.205 --> 00:25:00.685
to prepare and present an argument based on those items.

590

00:25:01.885 --> 00:25:04.485
I wanna hear lessons learned that come from third parties,

591

00:25:04.965 --> 00:25:06.805
previous testing, other manufacturers you

592

00:25:06.805 --> 00:25:07.845
make from flight test school.

593

00:25:08.875 --> 00:25:10.245
What have we got to base this upon?

594

00:25:10.825 --> 00:25:14.245

And then that leads to a well thought out risk management

595

00:25:14.405 --> 00:25:17.045

argument that is logical and based in critical thinking.

596

00:25:19.145 --> 00:25:20.525

The checklist enabled me to make sure

597

00:25:20.525 --> 00:25:21.605

that I had all the inputs.

598

00:25:25.385 --> 00:25:27.725

The technique when making a checklist ensure

599

00:25:27.725 --> 00:25:29.205

that the items are pitched at the right level.

600

00:25:29.455 --> 00:25:30.525

Checklists are just that.

601

00:25:30.525 --> 00:25:31.925

They're list of items to check off.

602

00:25:32.155 --> 00:25:33.725

They need to be short and sharp.

603

00:25:34.155 --> 00:25:35.485

They're not intended for use

604

00:25:35.485 --> 00:25:37.005

by people who dunno what they're doing.

605

00:25:37.035 --> 00:25:38.365

This is for people to apply

606

00:25:38.385 --> 00:25:40.165

to their own jobs when they do know what to do.

607

00:25:41.115 --> 00:25:43.165

They don't need to be instructive about the technique.

608

00:25:43.215 --> 00:25:44.565

There should be no long pros

609

00:25:44.705 --> 00:25:47.085

and we need to consider the point at which the checklist is

610

00:25:47.085 --> 00:25:49.525

implemented and who is going to implement the checklist.

611

00:25:50.595 --> 00:25:52.725

When is, uh, I recommend that in many cases

612

00:25:53.465 --> 00:25:54.965

and these ones I've shown you today

613

00:25:54.985 --> 00:25:56.205

are my personal checklists.

614

00:25:56.205 --> 00:25:57.445

So I apply them on myself

615

00:25:57.705 --> 00:25:59.045

and they are just singular words

616

00:25:59.105 --> 00:26:01.005

to prompt me to what I need.

617

00:26:02.255 --> 00:26:04.165

Checklists do well when they ensure the breadth

618

00:26:04.165 --> 00:26:05.845

of consideration for critical thinkers.

619

00:26:06.155 --> 00:26:07.485

They direct the flight test team

620

00:26:07.485 --> 00:26:08.645

to consider the particular items

621

00:26:08.865 --> 00:26:10.405

and then rely upon the expertise

622

00:26:10.405 --> 00:26:11.925
of the individuals to make it happen.

623

00:26:16.445 --> 00:26:18.485
Critical thinking is difficult. It requires discipline

624

00:26:18.485 --> 00:26:20.765
and skill as a feedback on thinking.

625

00:26:20.765 --> 00:26:23.405
It is an additional task and it does require time

626

00:26:23.425 --> 00:26:24.725
and resources to implement.

627

00:26:25.025 --> 00:26:28.045
It isn't free, but it does provide the quality assurance

628

00:26:28.045 --> 00:26:30.485
of the thought process and is essential to the safe

629

00:26:30.485 --> 00:26:33.605
and successful outcome of complex tasks like flight test.

630

00:26:34.905 --> 00:26:36.925
The use of checklists in aviation is ubiquitous.

631

00:26:37.305 --> 00:26:39.005
We all use checklists when we go flying.

632

00:26:39.465 --> 00:26:41.405
So why don't we do it for our flight test process?

633

00:26:42.405 --> 00:26:45.365
I think we should. They're directed and concise

634

00:26:45.945 --> 00:26:48.445
and checklists are a great defense against acts of omission

635
00:26:49.145 --> 00:26:50.925
and allow flight testers to progress quickly

636
00:26:50.925 --> 00:26:54.485
through the mundane items assuring that they're done so

637
00:26:54.485 --> 00:26:56.925
that we can then move on to the novel work where we like

638
00:26:56.925 --> 00:27:00.605
to do our best checklists, support the application

639
00:27:00.605 --> 00:27:02.285
of critical thinking to the flight test process.

640
00:27:03.945 --> 00:27:05.725
So the application of think critical thinking

641
00:27:05.725 --> 00:27:07.285
to flight test is an easy argument

642
00:27:07.285 --> 00:27:09.285
to make since it enables flight testers

643
00:27:09.625 --> 00:27:13.245
to assure the quality of their decisions by casting widely

644
00:27:13.245 --> 00:27:15.525
for available options, being conscious of bias

645
00:27:15.945 --> 00:27:17.725
and applying a universal standard of logic,

646
00:27:18.105 --> 00:27:20.005
the test team can get to the right answer

647
00:27:20.145 --> 00:27:23.325
and conduct flight test safety, conduct flight test safely.

648
00:27:23.985 --> 00:27:27.645

And I suggest that they use checklist to do it. Thank you.

649

00:27:40.395 --> 00:27:41.765

Your exactly has a pen inside.

650

00:27:48.005 --> 00:27:49.005

Excellent presentation. The one thing to.