

WEBVTT

1

00:00:00.000 --> 00:00:02.890

Support Before we broke, I was getting into an introduction, which, uh,

2

00:00:02.890 --> 00:00:06.040

is a little bit personal for me. Uh, we're gonna introduce, uh,

3

00:00:06.150 --> 00:00:09.040

weel Co from the Korean Air Force. Uh,

4

00:00:09.040 --> 00:00:12.640

we worked together at National Test Pilot School when he went through the course

5

00:00:12.760 --> 00:00:14.160

a couple of, uh, years ago.

6

00:00:14.860 --> 00:00:18.440

And if you're a graduate of a test pilot school and you did it in your first

7

00:00:18.800 --> 00:00:19.633

language,

8

00:00:19.860 --> 00:00:24.600

you probably can't imagine how much challenge you have to face trying to go

9

00:00:24.600 --> 00:00:28.360

through that program in your second language, which is exactly what, uh,

10

00:00:28.360 --> 00:00:32.970

we soak did. But, uh, we soak is a Korean Air Force fighter pilot.

11

00:00:33.030 --> 00:00:35.050

He spent 20 over 20 years in the, uh,

12

00:00:35.110 --> 00:00:37.450

air Force flying numerous different aircraft.

13

00:00:37.450 --> 00:00:41.810

He's got over 3000 hours in aircraft such as the F 16,

14

00:00:42.090 --> 00:00:45.610

F five, A 37 i L 1 0 3,

15

00:00:45.870 --> 00:00:48.650

and the T 41 Bravo. Uh,

16

00:00:48.650 --> 00:00:52.810

he's currently working with Korea Aerospace Industries, uh,

17

00:00:52.830 --> 00:00:57.010

and he's in an experimental test pilot. He's done work on the FA 50,

18

00:00:57.630 --> 00:00:58.050

uh,

19

00:00:58.050 --> 00:01:02.130

external stores upgrade is continuing to do work on that program for external,

20

00:01:02.490 --> 00:01:04.370

external stores. Second upgrade,

21

00:01:05.110 --> 00:01:08.730

and is currently a developmental test pilot on the KF 21.

22

00:01:09.030 --> 00:01:12.850

If you haven't seen that aircraft, it's, uh, it's an impressive airplane.

And,

23

00:01:12.870 --> 00:01:13.260

uh,

24

00:01:13.260 --> 00:01:18.090

he'll be presenting on building a credible risk level for flight test

25

00:01:18.620 --> 00:01:19.453

result.

26

00:01:27.560 --> 00:01:30.760
Good morning, everyone. Um, uh,

27
00:01:32.330 --> 00:01:34.240
Hutch, uh, uh,

28
00:01:35.430 --> 00:01:39.120
very thank you Huk for introducing me twice. Um,

29
00:01:40.420 --> 00:01:45.160
he, he didn't mention though, um, he was a instructor,

30
00:01:45.780 --> 00:01:50.100
uh, especially he told us, uh, statistics for flight test.

31
00:01:50.840 --> 00:01:55.280
I will, uh, deal with some statistic materials. Uh,

32
00:01:56.300 --> 00:01:59.360
please forget statistic grade of me. Okay.

33
00:02:01.600 --> 00:02:06.580
Um, it's very great honor, uh, to become a, uh, presenter.

34
00:02:06.850 --> 00:02:11.780
Presenter, uh, in, in front of, uh, distinguished, uh, audiences.

35
00:02:12.000 --> 00:02:16.180
And at this, uh, prestigious, uh, workshop.

36
00:02:17.880 --> 00:02:22.740
I'm a career aerospace industry's, uh, test pilot as HU introduced.

37
00:02:23.600 --> 00:02:27.860
Um, uh, my company is developing a new, uh, fighter, jet KF 2021,

38
00:02:28.520 --> 00:02:32.060
uh, we call it, uh, for the Republic career offers,

39
00:02:32.060 --> 00:02:36.430
which is now in the test and evaluation phase. Uh,

40

00:02:36.440 --> 00:02:39.590
since it's maiden flight on, uh, July last year,

41

00:02:40.290 --> 00:02:44.390
the program has been going very smoothly and safely,

42

00:02:45.230 --> 00:02:48.970
not only because of my, our company's, uh, safety management system,

43

00:02:49.110 --> 00:02:53.170
but also because of all of your, uh, previous experience.

44

00:02:54.830 --> 00:02:56.770
Um, uh, the subject,

45

00:02:56.770 --> 00:03:01.560
subject that I speak of today is about the flight test risk assessment.

46

00:03:02.670 --> 00:03:04.430
I will not give you, uh,

47

00:03:04.680 --> 00:03:09.590
fancy and rosy and new medical technique to assess the risk

48

00:03:09.600 --> 00:03:14.110
level, uh, such as TPA yesterday we discussed,

49

00:03:14.670 --> 00:03:18.570
but I can definitely probably help you,

50

00:03:19.470 --> 00:03:19.950
uh,

51

00:03:19.950 --> 00:03:24.840
remind of the past memory when you involved in,

52

00:03:25.620 --> 00:03:30.320
uh, the risk assessment process of your organization.

53

00:03:30.780 --> 00:03:34.070
Should I start? Yeah.

54
00:03:34.190 --> 00:03:38.750
I add this slide because my company paid, paid for my journey.

55
00:03:38.980 --> 00:03:43.630
They paid my trip. They wanted me to, they owe me.

56
00:03:47.360 --> 00:03:51.180
Yep. First, first of all, I want to introduce the document, uh,

57
00:03:51.180 --> 00:03:54.700
name the master plan for securing, uh, flight test safety.

58
00:03:55.480 --> 00:04:00.460
The purpose of this document was to define the general process related with

59
00:04:00.460 --> 00:04:05.140
the flight safety. In order to execute the flight test for the KF 21 program.

60
00:04:05.900 --> 00:04:10.660
I got rid of every KF 21 world, uh,

61
00:04:10.660 --> 00:04:15.580
because my government doesn't want me to do, uh, put the, uh,

62
00:04:15.680 --> 00:04:18.020
Tom in this slide. Uh,

63
00:04:20.660 --> 00:04:22.160
the, in this document,

64
00:04:22.500 --> 00:04:27.280
flight safety is defined as all activities to prevent flight misuse

65
00:04:28.320 --> 00:04:32.580
and CTT combined test team is composed of, uh,

66

00:04:33.020 --> 00:04:34.980
Republic of Korea Air Force, uh,

67
00:04:34.980 --> 00:04:39.860
defense of tradition program or administration and Korea aerospace

68
00:04:39.860 --> 00:04:44.500
industries, and, uh, agency for Defense Development.

69
00:04:45.310 --> 00:04:45.650
Uh,

70
00:04:45.650 --> 00:04:50.400
a d D is only responsible for the KF

71
00:04:50.400 --> 00:04:51.240
21 radar,

72
00:04:52.360 --> 00:04:56.500
but altogether CTT is responsible for the, uh,

73
00:04:56.570 --> 00:05:01.050
safe flight execution, uh,

74
00:05:01.050 --> 00:05:02.170
safety review board.

75
00:05:02.430 --> 00:05:07.170
And test TE analysis is a kind of a tool for making

76
00:05:07.270 --> 00:05:08.610
better safety plan.

77
00:05:09.470 --> 00:05:14.410
And Kai has a responsibility for building a T H A and supporting

78
00:05:14.870 --> 00:05:17.970
the reviewing process such as srb.

79
00:05:21.220 --> 00:05:25.440
Uh, this, the maas plan includes the whole process from, uh,

80

00:05:25.440 --> 00:05:29.730

flight test safety planning to compilation of flight test. Uh,

81

00:05:30.070 --> 00:05:34.730

Kai developed it own specific practices that satisfied the general

82

00:05:35.210 --> 00:05:39.170

standard, uh, which, uh, established,

83

00:05:39.170 --> 00:05:42.890

which is already established by the flight test organizations

84

00:05:43.890 --> 00:05:47.880

when it comes to the flight test. Uh, risk assessment.

85

00:05:48.700 --> 00:05:53.120

Kai tested team took charge of initial portion of risk assessment,

86

00:05:54.020 --> 00:05:55.960

and then ctt uh,

87

00:05:56.300 --> 00:06:01.040

com combined test team concludes the final assessment for executing

88

00:06:01.100 --> 00:06:05.690

the planned test. Uh,

89

00:06:05.880 --> 00:06:07.610

through the next few slides,

90

00:06:07.850 --> 00:06:12.650

I will elaborate more about the risk assessment process of Kai Test Team

91

00:06:13.030 --> 00:06:16.330

and combined test team and separately. Initially,

92

00:06:16.910 --> 00:06:20.250

Kai test team categorized the lines of test, in course,

93

00:06:20.250 --> 00:06:24.490

with the requirements of specification documents of K 20,

94

00:06:25.030 --> 00:06:28.410

KF 21, and wrote the test information sheet, uh,

95

00:06:28.430 --> 00:06:33.370

as a test plan for each test item in an integrated manner to provide

96

00:06:33.530 --> 00:06:37.170

a clear, uh, test progression description.

97

00:06:39.740 --> 00:06:44.320

In conjunction with test plan preparation. Test writers should prepare,

98

00:06:44.900 --> 00:06:49.720

uh, test hazard analysis th a that contains the, uh,

99

00:06:49.720 --> 00:06:53.720

company list of test specifics, cause effects, and so on.

100

00:06:54.780 --> 00:06:59.760

Around 15 test writers were assigned to the specific test

101

00:06:59.760 --> 00:07:01.320

items, respectively.

102

00:07:01.790 --> 00:07:06.480

Most of them had workeded on f a 50 modification and K 100 development

103

00:07:06.480 --> 00:07:10.120

program. So I can say they are well, uh, experienced.

104

00:07:11.060 --> 00:07:15.820

T test pilots were also assigned as an advisor to support setting up

105

00:07:15.980 --> 00:07:19.540

a test manual and, uh, building the t a

106

00:07:22.070 --> 00:07:26.970

and next t a writers tried hard to identify test related unique hazard

107

00:07:27.360 --> 00:07:30.290
associa associated with each type of test,

108

00:07:30.790 --> 00:07:34.410
as well as elevated normal operational hazard.

109

00:07:35.750 --> 00:07:40.370
Uh, for us, this space was a time of hardship because, uh,

110

00:07:41.010 --> 00:07:44.650
although we could identify well enough hazard, uh,

111

00:07:44.650 --> 00:07:48.770
based on previous experience and several databases, uh,

112

00:07:48.770 --> 00:07:53.530
the government wanted us to identify more hazards as if the number

113

00:07:53.790 --> 00:07:57.250
of hazards has been already set somewhere. So,

114

00:07:57.550 --> 00:08:01.610
TK writers and kit test pilots, uh, were beating our brains to the,

115

00:08:01.990 --> 00:08:03.930
to the very brink of madness,

116

00:08:04.030 --> 00:08:08.530
but the number of UHS does not increase dramat

117

00:08:08.530 --> 00:08:12.780
dramatically. Um,

118

00:08:13.120 --> 00:08:16.180
as with, as is the case with the general, uh,

119

00:08:16.380 --> 00:08:21.020
standard risk level is calculated by the combination combination of
severity

120

00:08:21.020 --> 00:08:24.140
level and misstep, uh, uh,

121

00:08:24.140 --> 00:08:26.670
probability for the severity level,

122

00:08:27.010 --> 00:08:31.550
we categorized it into four levels based on the expected

123

00:08:31.620 --> 00:08:34.870
financial loss and, uh, level of human injury,

124

00:08:37.840 --> 00:08:40.900
and the probability for the probability.

125

00:08:41.200 --> 00:08:46.100
In order to calculate the comprehensive probability of each hedge, uh,

126

00:08:46.100 --> 00:08:50.980
we had to figure out first how often each course of the hazard OC occur,

127

00:08:51.200 --> 00:08:56.080
and we brought them into one numeric or descriptive probability

128

00:08:56.220 --> 00:08:59.740
for the, which is not perfect. Uh, yeah,

129

00:09:00.910 --> 00:09:05.240
it's not new one. According to the comprehensive probability for the,

130

00:09:06.100 --> 00:09:08.840
uh, the overall probability level was determined by this table.

131

00:09:09.660 --> 00:09:13.240
One of the difficult parts when we made this table was to develop the

132

00:09:13.590 --> 00:09:17.120
descriptive probability definitions conclusively.

133

00:09:17.220 --> 00:09:21.400

We decide to focus not only on the program, but also on each test 30.

134

00:09:21.880 --> 00:09:25.760

I guess all of you already have, have this kind of experience

135

00:09:27.600 --> 00:09:28.660

and the risk.

136

00:09:28.660 --> 00:09:33.260

This risk assessment metrics was used to assess the risk level of test has

137

00:09:33.260 --> 00:09:36.060

result as identified in the test plan.

138

00:09:36.060 --> 00:09:40.580

Development risk categories are this critically divided into,

139

00:09:41.200 --> 00:09:45.980

uh, three colored regions to distinguish between low, medium, high.

140

00:09:48.170 --> 00:09:52.070

Uh, this table shows us what risk level was assigned to each test.

141

00:09:52.290 --> 00:09:57.070

The overall risk level for Ortiz was assigned by safety officer and

142

00:09:57.070 --> 00:10:01.030

reviewed by, uh, safety Review Board. Interestingly,

143

00:10:01.610 --> 00:10:06.230

all the risk level were the same as the most critical level

144

00:10:06.770 --> 00:10:11.230

of the hedges identified from test plan development. It is my opinion that,

145

00:10:11.930 --> 00:10:16.550

um, this, each of these levels seems to be quite underrated.

146

00:10:20.020 --> 00:10:24.520

Uh, next I will elaborate about ctt this assessment and application.

147

00:10:25.590 --> 00:10:30.570

Um, I will briefly introduce it because actually, uh,

148

00:10:31.160 --> 00:10:34.890

ctts, so p uh, send operator approacher has limited,

149

00:10:35.950 --> 00:10:37.410

uh, information.

150

00:10:38.510 --> 00:10:42.530

CTT assessed the ultimate risk level for each flight test comprehensively

151

00:10:43.090 --> 00:10:47.570

considering these four items, uh, th hha risk by kit,

152

00:10:47.800 --> 00:10:49.130

made by kite test team,

153

00:10:49.150 --> 00:10:53.530

and delivered by and maturity of prototype,

154

00:10:54.030 --> 00:10:58.570

the degree of, of expansion and the another, uh,

155

00:10:58.720 --> 00:11:02.730

another risk level given by C T T itself.

156

00:11:05.780 --> 00:11:07.160

So this risk level,

157

00:11:07.260 --> 00:11:11.440

so which flight test item categorized in ctts o p are shown in this slide.

158

00:11:11.860 --> 00:11:16.520

At first glance, this is much different from the THS risk level,

159

00:11:17.020 --> 00:11:19.800

but this ratings seem to me very, um,

160

00:11:20.190 --> 00:11:22.880
similar to the general categorization,

161

00:11:27.290 --> 00:11:30.310
uh, ne next, um, according to the, so,

162

00:11:30.350 --> 00:11:34.430
p ultimate risk level mandates civil requirements, uh, like this,

163

00:11:36.980 --> 00:11:41.440
uh, this was something that drew my attention initially,

164

00:11:41.820 --> 00:11:46.560
the discrepancy between the risk levels of t H A and

165

00:11:46.760 --> 00:11:48.920
C T T. As we can see,

166

00:11:49.100 --> 00:11:52.080
the degree of difference is not trivial.

167

00:11:53.310 --> 00:11:57.070
I wanted to know what brought this, what brought this big difference.

168

00:11:59.440 --> 00:12:01.340
Uh, based on my initial assumption,

169

00:12:01.890 --> 00:12:06.500
this discrepancy might come out because of different pre

170

00:12:07.090 --> 00:12:10.930
application, application of engineering judgment. As you know,

171

00:12:11.170 --> 00:12:14.850
engineering judgment is the decision making method in a situation with

172

00:12:14.880 --> 00:12:19.330
uncertainty. Engineering judgment essentially include, uh,

173

00:12:19.530 --> 00:12:24.410
a subjective judgment set through our background and

174
00:12:24.410 --> 00:12:28.530
experience. Uh, both risk levels seem to be,

175
00:12:29.230 --> 00:12:34.170
uh, assessed by engineering judgment. But from what I've checked, uh,

176
00:12:34.670 --> 00:12:39.490
THS risk level was assessed more by limited probabilistic approach.

177
00:12:40.150 --> 00:12:44.570
And C is more, uh, heuristic approach. Uh,

178
00:12:44.580 --> 00:12:49.250
heuristics is a simple decision rule that allows one to make a judgment
without

179
00:12:49.250 --> 00:12:53.210
integrating all the information, uh, available. Yeah, you know,

180
00:12:53.270 --> 00:12:58.170
better than me because I didn't know which approach, uh,

181
00:12:58.170 --> 00:13:01.290
would be more appropriate to assess the rere,

182
00:13:03.030 --> 00:13:04.700
especially flight test rere,

183
00:13:05.300 --> 00:13:10.060
I decide to focus on how other test members, uh,

184
00:13:10.260 --> 00:13:15.060
such as, uh, test pilots and the military test pilots,

185
00:13:15.950 --> 00:13:20.090
uh, and the Kai engineers other than th writers,

186
00:13:20.590 --> 00:13:23.470

are thinking about the risk levels. In other words,

187

00:13:23.590 --> 00:13:28.070

I assume different people may judge the risk level differently

188

00:13:28.570 --> 00:13:32.030

and may thus arrive at, arrive at different conclusion.

189

00:13:34.300 --> 00:13:38.200

So, I made a quick survey. Initially,

190

00:13:38.680 --> 00:13:42.880

I was supposed to do the survey only once because I had a,

191

00:13:43.280 --> 00:13:44.800

I had already had an assumption,

192

00:13:45.700 --> 00:13:50.280

but I conducted actually two quick surveys because I could not find the nemo,

193

00:13:50.620 --> 00:13:55.470

uh, through this first survey. Um, so in the first survey,

194

00:13:55.670 --> 00:14:00.430

I made two high hypothesis. First one is that Kai fly test engineers,

195

00:14:00.430 --> 00:14:04.790

other than th writers assess the severity and probability

196

00:14:05.370 --> 00:14:10.230

of which similarly with th writers important thing. Uh,

197

00:14:10.910 --> 00:14:15.470

I survey this one, uh, with the similarity with the T hha,

198

00:14:16.170 --> 00:14:18.270

uh, risk assessment process.

199

00:14:19.130 --> 00:14:23.550

The second one is that military pilots of CTT assess the severity and

200
00:14:23.660 --> 00:14:28.230
probability of which flight test more conservatively than writers.

201
00:14:28.850 --> 00:14:29.630
In other words,

202
00:14:29.630 --> 00:14:34.630
I assume that military pilots who transplanted their military

203
00:14:34.690 --> 00:14:39.550
own risk level into C T T S O P would assess the risk

204
00:14:39.550 --> 00:14:44.190
level more seriously than Kai flight test engineers, even if they, uh,

205
00:14:44.450 --> 00:14:48.310
try to assess them, uh, by th process.

206
00:14:51.000 --> 00:14:54.060
Uh, as we can see from the graph in this slide,

207
00:14:54.660 --> 00:14:58.140
engineers assess the severity level of each hazard, almost,

208
00:14:58.560 --> 00:15:01.820
almost identically, uh, with th writers.

209
00:15:04.250 --> 00:15:08.870
And they also assess the prob probability level, uh,

210
00:15:09.610 --> 00:15:11.750
uh, almost identically with t h e writers.

211
00:15:14.410 --> 00:15:15.590
Uh, this,

212
00:15:15.890 --> 00:15:20.790
the highest lists was selected as an overall list level for the test

213

00:15:20.940 --> 00:15:25.710
item, which appears exactly same, uh, as ths.

214
00:15:26.190 --> 00:15:28.610
This result, uh, I guess,

215
00:15:28.730 --> 00:15:31.530
supports my first high SIS perfectly.

216
00:15:33.490 --> 00:15:37.750
And next, um, let's check out how the military pilots responded.

217
00:15:38.290 --> 00:15:38.530
Uh,

218
00:15:38.530 --> 00:15:43.510
as I expected the sever level severity and also probability

219
00:15:43.580 --> 00:15:45.750
will assess differently from the ths,

220
00:15:46.170 --> 00:15:48.830
but the amount of difference is not so high,

221
00:15:52.050 --> 00:15:56.940
especially I expected the extent of extent of difference between

222
00:15:57.000 --> 00:16:01.840
the probability of THS and military pilots will be

223
00:16:01.840 --> 00:16:05.800
higher than the difference of severity level because, uh,

224
00:16:05.800 --> 00:16:10.240
judging probability normally tends to include more subjective, uh,

225
00:16:10.440 --> 00:16:14.270
judgment if the expectation or assumption,

226
00:16:14.870 --> 00:16:17.390
original assumption, would they have been proven true. Now,

227

00:16:17.390 --> 00:16:22.110

how do I would have been spoken about the probabilistic

228

00:16:22.180 --> 00:16:26.990

risk assessments such as human reliability analysis or performance shaping

229

00:16:26.990 --> 00:16:27.870

factors? However,

230

00:16:28.530 --> 00:16:32.950

the extent of difference was not so high that I had to change my

231

00:16:33.410 --> 00:16:38.220

course abruptly. So, uh,

232

00:16:38.250 --> 00:16:41.050

yeah, this table, uh,

233

00:16:41.330 --> 00:16:44.690

although the military pilot assessed the probability, uh,

234

00:16:44.990 --> 00:16:46.490

and civility level differently,

235

00:16:47.070 --> 00:16:51.130

the overall risk level for each test item was not changed Meaningfully,

236

00:16:51.880 --> 00:16:54.210

only three events, uh,

237

00:16:54.210 --> 00:16:57.130

were assessed just one never higher than ths.

238

00:17:00.340 --> 00:17:04.840

Um, this finding is prominently featured when we, uh,

239

00:17:04.840 --> 00:17:07.760

compare it with the ctts o p discover.

240

00:17:11.280 --> 00:17:15.900

Uh, from this kick survey, I found that military pilots as well as engineers,

241

00:17:16.440 --> 00:17:20.340

uh, assess the risk level as much similarly as the T HHA writers.

242

00:17:20.650 --> 00:17:25.460

When they have a chance to analyze, uh, them using the t a process,

243

00:17:27.420 --> 00:17:31.090

which means the risk level assessed the sort of t a process was acceptable.

244

00:17:31.470 --> 00:17:35.650

But my assumption that milit military pilots could assess the risk level more

245

00:17:36.000 --> 00:17:40.530

civilly than T HHA writers, uh, even if they are following the T HHA process,

246

00:17:40.620 --> 00:17:44.620

turns out to be rejected. So,

247

00:17:45.600 --> 00:17:49.400

uh, when the first survey didn't gimme a practical result,

248

00:17:49.560 --> 00:17:52.520

I had to quickly develop second survey, um,

249

00:17:53.610 --> 00:17:58.380

exactly abruptly. Uh, in this survey, I asked the military pilot,

250

00:17:59.040 --> 00:18:03.420

uh, and engineers to assess the overall risk level for each test items.

251

00:18:03.920 --> 00:18:05.860

Uh, heuristically, uh, I,

252

00:18:06.180 --> 00:18:11.040

I had the also two high processes for first one is that military pilots of

253

00:18:11.380 --> 00:18:15.360

CTT assess the overall risk level of which test item,

254

00:18:15.430 --> 00:18:17.240

similarly with the CTT SOPs.

255

00:18:17.920 --> 00:18:20.900

And second one is that Kai Appli test engineers,

256

00:18:20.900 --> 00:18:25.380

other than th writers assess the overall risk level of each test item.

257

00:18:25.530 --> 00:18:28.800

Similarly, with the th a writers, in other words,

258

00:18:29.040 --> 00:18:33.680

I assume that they assess them differently if they are using, uh, istic method.

259

00:18:35.340 --> 00:18:39.440

Uh, this table shows us the data obtained from 10 military pilots.

260

00:18:41.600 --> 00:18:46.060

Uh, I found that the risk levels are becoming similar to the cities.

261

00:18:46.440 --> 00:18:50.940

So I wanna say the first Thai hypothesis can be partially accepted,

262

00:18:53.150 --> 00:18:57.890

and this table shows us the result from 10 Kai engineers other than th

263

00:18:57.890 --> 00:19:01.000

writers, um,

264

00:19:01.320 --> 00:19:06.320

I cannot say strongly that engineers assess the risk level as similar as ths.

265

00:19:08.930 --> 00:19:13.750

Uh, rather the risk level have come close to the level of CTT

266

00:19:14.170 --> 00:19:16.190

in a certain extent.

267

00:19:19.010 --> 00:19:20.070

So from this result,

268

00:19:20.230 --> 00:19:24.630

I can say there were no big difference between evaluators when they assess the

269

00:19:24.630 --> 00:19:27.510

overall risk level of which test item in a risk way.

270

00:19:29.610 --> 00:19:33.590

Uh, which means my second assumption also turns out to be rejected.

271

00:19:35.220 --> 00:19:39.560

Yep. Although my every expectations had been proven wrong,

272

00:19:40.600 --> 00:19:45.280

I believe it wasn't completely meaningless because of this byproduct.

273

00:19:46.420 --> 00:19:51.120

The risk level could be assessed differently depending on the

274

00:19:51.430 --> 00:19:56.080

type of assessment masters rather than the person who assessed the risk travel.

275

00:19:57.380 --> 00:19:57.610

Uh,

276

00:19:57.610 --> 00:20:02.480

given that risk assessment is a combination of risk analysis and

277

00:20:02.480 --> 00:20:07.240

risk evaluation. Probabilistic approach used in t h a process,

278

00:20:07.940 --> 00:20:12.680

uh, can be considered as an analysis of known risks only.

279

00:20:13.410 --> 00:20:18.120

While heuristic approach used by CTT can be

280

00:20:18.880 --> 00:20:23.280

considered as an evaluation of both known and unknown risks

281

00:20:23.570 --> 00:20:28.040

based on evaluator's background and experience and knowledge

282

00:20:28.620 --> 00:20:33.050

for the flight test. Well, the uncertainties are prevalent.

283

00:20:34.140 --> 00:20:34.690

Um,

284

00:20:34.690 --> 00:20:39.430

addressing unknown risks is necessary to achieve more credible,

285

00:20:40.050 --> 00:20:44.710

uh, risk levels. So I wanna emphasize that we must keep, uh,

286

00:20:44.710 --> 00:20:48.840

heuristically assessed risk levels in mind when, uh,

287

00:20:49.850 --> 00:20:54.330

mind and never ignore them when assessing the risk drivers. Uh,

288

00:20:54.890 --> 00:20:57.490

additionally, assuming that we cannot identify every hazard,

289

00:20:57.910 --> 00:21:02.410

we can change the risk assessment method for hazard identification

290

00:21:02.870 --> 00:21:04.570

or overall risk level calculation.

291

00:21:05.510 --> 00:21:10.270

I think rebuilding the risk assessment metrics with consideration of heuristic

292

00:21:10.270 --> 00:21:11.470
assessment is,

293

00:21:11.770 --> 00:21:16.350
is one of the simplest way to build more credible risk levers.

294

00:21:18.470 --> 00:21:21.500
Uh, yeah. When we use this, uh,

295

00:21:22.090 --> 00:21:26.020
risk assessment metrics, we got this overall, uh,

296

00:21:26.180 --> 00:21:31.100
risk levels Yeah. We already discussed. And when we use, uh,

297

00:21:31.730 --> 00:21:35.300
when we, uh, change the risk metrics slightly,

298

00:21:36.400 --> 00:21:40.020
and we can, the risk level could change a lot.

299

00:21:42.600 --> 00:21:47.370
Yeah. Compared to ctts, um, the change is, uh,

300

00:21:47.370 --> 00:21:52.160
highlighted. Yep. That's all for I prepared.

301

00:21:52.660 --> 00:21:57.200
Um, this picture was taken when I finished,

302

00:21:57.700 --> 00:22:02.240
uh, my first KF 21 flight early this year. Uh, I was,

303

00:22:03.150 --> 00:22:06.480
yeah, one, one of my colleague told me that I,

304

00:22:07.560 --> 00:22:11.960
I looked like a, a defective North Korean pilot, so

305

00:22:13.630 --> 00:22:16.800

yeah, finally he found out the freedom. Yeah. So

306

00:22:19.180 --> 00:22:21.360

anyway, uh, I was,

307

00:22:21.800 --> 00:22:24.960

I was standing on top of the ladder, the,

308

00:22:24.970 --> 00:22:27.000

which had very narrow foothold.

309

00:22:27.500 --> 00:22:31.560

You may notice the pilot got killed. Actually, I,

310

00:22:31.960 --> 00:22:35.960

I got killed at, at the moment before flight.

311

00:22:35.960 --> 00:22:40.120

Nobody identified this kind of, uh, after doing this,

312

00:22:40.240 --> 00:22:45.120

I have known this was a high risk gesture because I

313

00:22:45.120 --> 00:22:49.450

got experienced, fortunately without any harm on this. I will,

314

00:22:50.270 --> 00:22:53.090

uh, give a credible risk level for this gesture,

315

00:22:53.930 --> 00:22:58.410

although pilots may do this again until one of them get injured. Okay.

316

00:22:58.660 --> 00:22:59.493

Thank you.

317

00:23:16.370 --> 00:23:19.010

Question. Uh, very good presentation. Thank you. Uh,

318

00:23:19.250 --> 00:23:23.010
I noticed that you didn't mention the, uh, flight test safety database,

319

00:23:23.390 --> 00:23:27.230
the use of it. Uh, or did you,

320

00:23:27.410 --> 00:23:30.870
did you use it or are, are you aware that,

321

00:23:31.060 --> 00:23:35.910
that it exists and, um, because it, it does have industry standards,

322

00:23:36.100 --> 00:23:40.750
suggested industry standards for risk levels for particular maneuvers?

323

00:23:41.540 --> 00:23:45.960
Yeah. Yeah. We used the database, uh, in, uh,

324

00:23:46.010 --> 00:23:49.880
pride test, safety committee database, and we, uh,

325

00:23:49.910 --> 00:23:51.120
analyze them a lot.

326

00:23:51.780 --> 00:23:56.720
But actually the data was not enough to,

327

00:23:57.100 --> 00:24:01.520
uh, analyze our situation. Yeah, we, but we, um,

328

00:24:01.820 --> 00:24:05.960
we got a lot of information from the database. Uh,

329

00:24:07.190 --> 00:24:10.490
but I want to say, uh,

330

00:24:12.980 --> 00:24:17.870
yeah, that's the, that's good, good, uh, information that we used. But,
uh,

331

00:24:18.070 --> 00:24:23.040

actually the, we separated, we, um, yeah,

332

00:24:23.100 --> 00:24:27.640

we separate the test, uh, hazard from the test item,

333

00:24:27.640 --> 00:24:28.640

each test item.

334

00:24:29.220 --> 00:24:34.020

So every test events does not

335

00:24:34.360 --> 00:24:38.740

relate, relate with the, um, the fast experience,

336

00:24:38.770 --> 00:24:43.220

past information. So yeah, it's, it's, it was useful,

337

00:24:43.640 --> 00:24:44.540

but not perfect.

338

00:24:50.970 --> 00:24:53.170

I have a question outside of the scope, really of,

339

00:24:53.230 --> 00:24:54.970

of the main topic of the presentation,

340

00:24:55.390 --> 00:25:00.330

but how did the risk acceptance process work between KA I and,

341

00:25:00.430 --> 00:25:01.410

uh, the Air Force

342

00:25:02.430 --> 00:25:04.000

Risk acceptance? Acceptance, uh, the

343

00:25:04.000 --> 00:25:08.680

Risk acceptance? So who, who eventually overall accepted the risk? Was it joint?

344

00:25:09.020 --> 00:25:10.800

Was it k i or was it the Air Force?

345

00:25:11.230 --> 00:25:16.080

Yeah, I, that's the key point that I wanna wanted brought up,

346

00:25:16.180 --> 00:25:20.120

but bring up. But, uh, yeah, that's a good question.

347

00:25:20.740 --> 00:25:25.640

We in document, in documentation, uh, we don't have that kind of,

348

00:25:26.220 --> 00:25:30.680

um, risk acceptance, accept acceptance authority, you know, it's,

349

00:25:30.860 --> 00:25:35.480

is quite surprising. But, um, the risk level already,

350

00:25:35.620 --> 00:25:36.480

we can get,

351

00:25:36.620 --> 00:25:41.400

we can accept every risk level because this pro program is kind of a

352

00:25:41.640 --> 00:25:46.360

national project. So if you have a high risk, but you,

353

00:25:46.540 --> 00:25:50.560

you, the Kai or test pilot or, uh, CTT should,

354

00:25:51.020 --> 00:25:55.960

should solve every risk before executing

355

00:25:55.960 --> 00:26:00.880

this, uh, program because this, uh, this is a, a major event for our country.

356

00:26:09.410 --> 00:26:10.243

Thank you.

357

00:26:12.850 --> 00:26:13.683

Is it on our,

358

00:26:15.170 --> 00:26:19.230

so was your risk pre or post mitigation for the paper?

359

00:26:19.850 --> 00:26:23.230

Uh, yeah, good question. I chose the, uh,

360

00:26:23.490 --> 00:26:26.110

pre mitigating risk.

361

00:26:27.300 --> 00:26:28.570

Thank you. I mean,

362

00:26:29.410 --> 00:26:32.530

could that have added to some of the discrepancy between the people, or did it,

363

00:26:32.530 --> 00:26:34.370

was everybody really clear on pre

364

00:26:35.610 --> 00:26:36.443

Say that again?

365

00:26:36.530 --> 00:26:41.430

Was, was everybody that did the surveys very clear that it was pred risk?

366

00:26:42.020 --> 00:26:46.690

Yeah, yeah, yeah, absolutely. Okay. Yeah. Yeah. They, they don't have the,

367

00:26:47.320 --> 00:26:52.090

yeah, if they, they have, uh, information about, about the, uh,

368

00:26:52.090 --> 00:26:56.370

mitigating something, but absolutely, when I survey them,

369

00:26:56.640 --> 00:26:59.890

they didn't provide any, uh,

370

00:27:01.420 --> 00:27:05.920

any mitigating or residual risk thing, uh, before they survey,

371
00:27:06.460 --> 00:27:09.690
before they answer the questions. Thank you.

372
00:27:17.790 --> 00:27:19.360
Okay. Thank you.

373
00:27:27.690 --> 00:27:30.350
All right, great. Uh, presentation. We, so the, uh,

374
00:27:31.980 --> 00:27:34.990
last paper that we're gonna do this morning, I do not believe is here,

375
00:27:34.990 --> 00:27:37.790
unless he magically repels from the ceiling at this time.

376
00:27:38.260 --> 00:27:40.830
I'll give him a couple seconds to do that. Uh,

377
00:27:40.830 --> 00:27:44.430
so we are gonna break early and we're getting closer being on schedule.
Uh,

378
00:27:44.430 --> 00:27:49.310
there will be a tutorial on binomial statistical analysis of survey
results

379
00:27:49.540 --> 00:27:52.190
this evening by the bar after I've had a couple drinks.

380
00:27:52.570 --> 00:27:56.790
If you're really interested in, uh, in how, uh, we still come up with
those,

381
00:27:56.840 --> 00:28:01.710
those, uh, statistical lyes, uh, that's all we have for session one.

382
00:28:01.710 --> 00:28:06.570
Oh, we've got the board members now. All right. Okay. So if I can invite
the,

383
00:28:06.630 --> 00:28:08.850

uh, discussion panel members up and.