WEBVTT

1
00:00:03.335 --> 00:00:03.805
Thank you.

2
00:00:03.905 --> 00:00:05.645
We are hitting the end of our time limit,

3
00:00:05.665 --> 00:00:07.525
so I'll save the rest of the questions for the panel.

4
00:00:07.945 --> 00:00:09.765
Uh, coming up next, we have Mr.

5
00:00:10.145 --> 00:00:14.045
Uh, Tom Hill with a new rotational for addressing risk

6
00:00:14.045 --> 00:00:15.485
and complex circumstances.

7
00:00:16.625 --> 00:00:18.365
Tom is, uh, has an ms,

8
00:00:18.365 --> 00:00:20.725
aerospace engineering from Penn State Aviator

9
00:00:20.725 --> 00:00:23.285
with 40 years military and DOD civil experience

10
00:00:23.925 --> 00:00:26.565
attended both navigator and pilot training flying F fours

11
00:00:26.565 --> 00:00:31.485
and FFTs operationally graduated from the USAF TPS class 94

12
00:00:31.565 --> 00:00:33.725
B, which led to many test roles and US

13
00:00:33.725 --> 00:00:37.805
and Canada involving aircraft ranging from the Schweitzer

14
00:00:38.765 --> 00:00:42.405
r ru 38 motor glider to NASA's and F 15 B.

15
00:00:43.975 --> 00:00:46.205
Thank you. Thank you.

16
00:00:50.665 --> 00:00:52.245
So I have a confession right off the start,

17
00:00:52.945 --> 00:00:56.885
and what I learned out of this from, um, preparing

18
00:00:56.965 --> 00:00:59.525
for this is this particular bit of information.

19
00:01:00.545 --> 00:01:02.685
I'm an idiot and I've always been an idiot.

20
00:01:03.705 --> 00:01:05.605
So the reason why I bring that up is

21
00:01:05.725 --> 00:01:07.085
'cause it's fundamental to the reason why

22
00:01:07.135 --> 00:01:08.325
we're talking about this stuff.

23
00:01:08.745 --> 00:01:11.365
And the, the thing we're talking about is, um,

24
00:01:11.685 --> 00:01:14.125
a rationale for risk.

25
00:01:14.905 --> 00:01:16.685
And, um, and,

26
00:01:17.025 --> 00:01:20.005
and the reason why I'm throwing in I'm an idiot,

27
00:01:20.035 --> 00:01:22.005

I've always been an idiot, is like this stuff's

28
00:01:22.015 --> 00:01:25.245
after you read about it, is much more obvious than what we,

29
00:01:25.245 --> 00:01:26.605
than our circumstances are.

30
00:01:27.425 --> 00:01:31.925
So, um, I also wanna reinforce that the, um,

31
00:01:32.465 --> 00:01:34.645
it was really hard putting this together,

32
00:01:35.425 --> 00:01:38.325
but it sounds like there's a coalition of a, a bunch

33
00:01:38.385 --> 00:01:41.485
of ideas that are pointing in the same direction

34
00:01:41.485 --> 00:01:42.805
that something has to update.

35
00:01:43.305 --> 00:01:45.765
And the whole point of talking about these things is our

36
00:01:45.765 --> 00:01:49.005
current approaches for how we do risk analysis is,

37
00:01:49.145 --> 00:01:50.525
I'm gonna say, is unsatisfying.

38
00:01:50.785 --> 00:01:53.085
And we'll talk more about that here, here as we go along.

39
00:01:54.225 --> 00:01:56.005
So I love this, uh, quote,

40
00:01:56.925 --> 00:02:01.285
'cause it suggests that, um, we tend to appreciate people

41
00:02:01.345 --> 00:02:04.835
who are certain, and the people who are less certain

42
00:02:05.985 --> 00:02:08.475
tend not to be adopted by, um, by those people.

43
00:02:09.415 --> 00:02:12.345
Okay? And then, and I believe this is useful

44
00:02:12.375 --> 00:02:15.385
because it promotes to a cultural problem that goes into

45
00:02:15.415 --> 00:02:17.425
what the state that we are right now.

46
00:02:18.015 --> 00:02:20.745
Okay? So what I'm gonna do is go through a,

47
00:02:20.885 --> 00:02:21.945
um, bunch of topics.

48
00:02:22.565 --> 00:02:24.705
The, uh, first thing is a briefing ca, um, caveat,

49
00:02:24.925 --> 00:02:26.265
and that talks about what the problem is.

50
00:02:27.175 --> 00:02:30.105
Instead, I'm gonna talk about the, what the problem is

51
00:02:30.105 --> 00:02:31.265
that's motivating all this.

52
00:02:31.525 --> 00:02:33.705
I'm gonna talk more abstractly

53
00:02:33.805 --> 00:02:36.145
and then hopefully in some detail about

54
00:02:36.765 --> 00:02:38.425

why we're in the position that we're in

55
00:02:38.485 --> 00:02:40.745
and eventually get into the detail like,

56
00:02:40.975 --> 00:02:43.305
what is the technique that we, that we should employ.

57
00:02:43.975 --> 00:02:45.865
Okay? So

58
00:02:49.595 --> 00:02:51.165
fundamentally our, um,

59
00:02:51.435 --> 00:02:54.965
problem is whatever our risk analysis process is,

60
00:02:55.785 --> 00:02:57.845
as an aggregate, it's unsatisfying.

61
00:02:58.805 --> 00:02:59.885
Okay? Even,

62
00:02:59.985 --> 00:03:03.445
and I would go on to say that even if we're doing things

63
00:03:03.445 --> 00:03:06.445
that are updating that process, whether it's

64
00:03:06.445 --> 00:03:08.765
through better modeling in the end,

65
00:03:08.985 --> 00:03:11.845
it ultimately turns into it's unsatisfying.

66
00:03:12.235 --> 00:03:15.805
Okay? So the thought is that the data is, it's unsatisfying.

67
00:03:15.915 --> 00:03:18.605
What do you do? And that's what we're gonna go through.

68
00:03:19.035 --> 00:03:22.245
Okay? So the first thing is to do is like,

69
00:03:22.265 --> 00:03:24.525
how do we do analysis and why we're bound it?

70
00:03:24.525 --> 00:03:25.565
That's the first question.

71
00:03:26.225 --> 00:03:28.405
So this is a simple functional control diagram

72
00:03:28.975 --> 00:03:32.005
about the analysis process where you have some agent,

73
00:03:32.005 --> 00:03:35.045
which could be a person or a team, they interacts

74
00:03:35.045 --> 00:03:36.205
with a technical problem.

75
00:03:36.665 --> 00:03:39.005
And that technical problem has some input from one

76
00:03:39.005 --> 00:03:40.205
side and has an output.

77
00:03:40.865 --> 00:03:43.525
The output is essentially what's gonna indicate whether

78
00:03:43.525 --> 00:03:45.325
you're gonna be satisfied with the output

79
00:03:45.325 --> 00:03:47.045
or not satisfied with the output.

80
00:03:47.435 --> 00:03:49.725
Okay? And it also suggests that something

81
00:03:49.725 --> 00:03:52.085

that's going on in there, if the output is constantly

82
00:03:52.445 --> 00:03:54.965
unsatisfying, is that something is going on there

83
00:03:54.965 --> 00:03:56.205
that's keeping that fixed.

84
00:03:57.825 --> 00:04:00.005
So when I'm talking about unsatisfying,

85
00:04:00.225 --> 00:04:01.885
I'm not just talking about mishaps,

86
00:04:01.945 --> 00:04:04.205
I'm talking about all the characteristics that come with it,

87
00:04:04.205 --> 00:04:08.205
whether it's costs, schedule, mission, the data,

88
00:04:09.025 --> 00:04:11.285
any of those things, exposure to risk, like

89
00:04:11.285 --> 00:04:15.125
how much did you have to expose yourself to risks to be able

90
00:04:15.125 --> 00:04:16.325
to accomplish what you did.

91
00:04:16.755 --> 00:04:17.925
Okay? So it's everything.

92
00:04:19.505 --> 00:04:20.925
So to get down into this,

93
00:04:20.925 --> 00:04:25.365
because I'm a simple caveman fighter pilot, test pilot is I,

94
00:04:25.705 --> 00:04:27.445
I'm using this, I'm not a psychologist

95
00:04:27.445 --> 00:04:30.005
or anything like that, but I do have want to communicate.

96
00:04:30.005 --> 00:04:32.965
There's, there's, um, things that we can control

97
00:04:33.345 --> 00:04:34.845
and things that we can't control.

98
00:04:35.545 --> 00:04:37.245
And ultimately all that we have

99
00:04:37.245 --> 00:04:40.285
to do is talk about the things that we can control,

100
00:04:40.575 --> 00:04:42.405
which is essentially the nurture part.

101
00:04:42.745 --> 00:04:45.365
So usually a functional, uh, diagram

102
00:04:45.585 --> 00:04:48.085
and presuming that this has a competent agent within the

103
00:04:48.085 --> 00:04:51.045
context that they know, is that the way to fix that is

104
00:04:51.045 --> 00:04:53.925
to put some new experiences from the outside.

105
00:04:54.635 --> 00:04:59.485
Okay? I also presume that, um, we're doing

106
00:04:59.485 --> 00:05:01.365
that right now, so

107
00:05:01.365 --> 00:05:03.885
that even though we're doing the experiences, education

108
00:05:03.885 --> 00:05:06.445

and training as we have right now, we're still having

109
00:05:06.965 --> 00:05:08.405
outcomes that are unsatisfying.

110
00:05:09.325 --> 00:05:14.105
Okay? So then you might think, well, these people are part

111
00:05:14.105 --> 00:05:17.065
of an organization, so the organization ought

112
00:05:17.065 --> 00:05:18.345
to be able to influence this.

113
00:05:18.645 --> 00:05:20.345
But if you take this model a little bit further,

114
00:05:20.565 --> 00:05:24.345
it is just call that one more entity, one gigantic entity.

115
00:05:24.805 --> 00:05:27.465
And that turns into, we still have imperatives information

116
00:05:27.495 --> 00:05:28.825
from, from the outside.

117
00:05:29.645 --> 00:05:32.305
And then that causes the output as it is,

118
00:05:32.305 --> 00:05:33.705
and it's still unsatisfying.

119
00:05:34.375 --> 00:05:36.785
Even though the input is change, changing

120
00:05:37.425 --> 00:05:38.425
whatever quantity about,

121
00:05:38.485 --> 00:05:41.385
or whatever quality about that input is,

122
00:05:41.445 --> 00:05:43.105
is not affecting the change that we want.

123
00:05:43.815 --> 00:05:47.265
Okay? So what my briefing is, is about is

124
00:05:47.265 --> 00:05:49.185
what input are we gonna put in there?

125
00:05:49.855 --> 00:05:54.345
Okay? So what we know, this is just like

126
00:05:54.565 --> 00:05:56.185
how do we, how do we know what we know?

127
00:05:57.465 --> 00:06:01.585
Um, fangs Opini,

128
00:06:01.585 --> 00:06:03.905
who's a commandant Air Force test possible, introduce me

129
00:06:03.905 --> 00:06:06.785
to this, uh, book by Cohen, uh,

130
00:06:07.065 --> 00:06:08.225
defining the engineering method.

131
00:06:08.965 --> 00:06:11.905
Uh, his assertion is, is that fundamentally

132
00:06:12.095 --> 00:06:14.905
what we do is engineering is deploy heuristics.

133
00:06:15.685 --> 00:06:19.985
And the obligation is eng as engineers is to deploy

134
00:06:20.255 --> 00:06:23.785
that heuristic that results in the best outcome.

135
00:06:24.495 --> 00:06:27.625

Okay? So you can, you can, we can debate about

136
00:06:27.625 --> 00:06:28.745
what the scope of a heuristic

137
00:06:28.745 --> 00:06:30.465
and what the details are about what heuristic,

138
00:06:30.465 --> 00:06:33.305
but it's essentially all the techniques, tactics, tools

139
00:06:33.305 --> 00:06:35.385
that we use to do what we do.

140
00:06:36.255 --> 00:06:40.145
Okay? So my hypothesis is,

141
00:06:40.245 --> 00:06:44.875
or is that our heuristics form

142
00:06:45.375 --> 00:06:46.515
how we look at problems.

143
00:06:47.615 --> 00:06:49.555
So I've been at the test bible school multiple times,

144
00:06:49.615 --> 00:06:51.155
air force test, Bible School multiple times,

145
00:06:51.855 --> 00:06:54.115
and it has got a really rich history

146
00:06:54.115 --> 00:06:56.955
that starts from back in 1942 until present day.

147
00:06:57.775 --> 00:07:00.315
And, and if you look at the construct, construct

148
00:07:00.315 --> 00:07:03.195
of the curriculum, it's fundamentally based

149
00:07:03.195 --> 00:07:04.315
on physical sciences.

150
00:07:05.865 --> 00:07:07.165
So that, to go along

151
00:07:07.165 --> 00:07:10.645
with my hypothesis is the way we look at problems, I is,

152
00:07:11.405 --> 00:07:15.845
I believe, bias towards how we deal with physical sciences

153
00:07:16.425 --> 00:07:18.085
in a complexity environment,

154
00:07:18.085 --> 00:07:19.645
which Jeff was bringing up earlier.

155
00:07:20.105 --> 00:07:23.365
That's not sufficient. Okay?

156
00:07:24.305 --> 00:07:27.285
So, just so you know, 10 years ago we tried

157
00:07:27.285 --> 00:07:29.525
to update the Air force test ball school curriculum

158
00:07:29.785 --> 00:07:33.605
to capture all that secret sauce makes, um, uh,

159
00:07:33.805 --> 00:07:36.445
TPS grads awesome and call that test foundations.

160
00:07:36.505 --> 00:07:41.085
And the belief was if we put a really thorough sense

161
00:07:41.085 --> 00:07:44.165
of systems theory into that test foundations piece,

162
00:07:44.555 --> 00:07:46.045

that everything would work out great.

163
00:07:46.455 --> 00:07:48.365
Which in the end, it's turns out

164
00:07:48.365 --> 00:07:51.205
that we're still unsatisfied with what that result is.

165
00:07:53.415 --> 00:07:54.795
So to get more deep into it,

166
00:07:54.935 --> 00:07:56.755
and if you're considering things in scope of

167
00:07:56.755 --> 00:08:00.835
what heuristics we do, there's essentially a, a set

168
00:08:00.935 --> 00:08:03.355
of possibilities of all possible heuristics

169
00:08:03.495 --> 00:08:05.155
and the heuristics we already have.

170
00:08:05.625 --> 00:08:07.835
Okay? And remember I'm talking about heuristics, the tools,

171
00:08:07.895 --> 00:08:10.435
models, techniques, everything we use

172
00:08:10.575 --> 00:08:12.715
to do the mission that we do.

173
00:08:13.695 --> 00:08:15.075
And then along with that,

174
00:08:15.975 --> 00:08:18.115
to be almost totally obvious is these are the

175
00:08:18.115 --> 00:08:19.235
heuristics we don't have.

176
00:08:19.655 --> 00:08:20.995
But I wanna say

177
00:08:20.995 --> 00:08:23.555
that these are the heuristics we might have soon.

178
00:08:24.025 --> 00:08:26.755
What I mean is that if you just did a slightly different

179
00:08:27.115 --> 00:08:29.395
rationale or slightly different technique, is

180
00:08:29.395 --> 00:08:31.755
that we might be able to come up with a set of shortcuts

181
00:08:32.385 --> 00:08:35.435
that might be beyond what we do right now,

182
00:08:35.495 --> 00:08:37.275
but are useful, okay?

183
00:08:37.535 --> 00:08:38.875
An incremental change to the,

184
00:08:38.875 --> 00:08:40.515
basically the scope of the things that we do.

185
00:08:42.055 --> 00:08:44.555
So the question is, is

186
00:08:45.985 --> 00:08:47.995
what do we do when we don't have a heuristic?

187
00:08:49.495 --> 00:08:52.915
So what do we do today that when you encounter a problem

188
00:08:53.305 --> 00:08:55.365
that you haven't been trained with a technique

189
00:08:55.665 --> 00:08:57.605

or procedure, haven't gone to school for it,

190
00:08:57.605 --> 00:08:58.605
don't have an algorithm,

191
00:08:58.815 --> 00:09:01.445
don't have an anything, what do you do?

192
00:09:02.385 --> 00:09:04.365
And in some ways, some people could say, well,

193
00:09:04.365 --> 00:09:05.845
what you do is just simply guess.

194
00:09:06.675 --> 00:09:08.685
Okay? So if you look in behavioral economists

195
00:09:08.685 --> 00:09:11.565
or psychology point of view, that's literally a short story,

196
00:09:11.765 --> 00:09:14.525
a short story for that phenomenon, okay?

197
00:09:14.985 --> 00:09:17.565
And my belief is instead of guessing,

198
00:09:17.565 --> 00:09:18.805
there's a better way of doing it.

199
00:09:21.125 --> 00:09:23.465
So to get to the how, to understand what the better way of,

200
00:09:23.715 --> 00:09:26.705
let's do, uh, let's look at how complex systems work.

201
00:09:27.325 --> 00:09:31.545
And like I said, I'm a simple caman test pilot, so I tend

202
00:09:31.545 --> 00:09:33.945
to look at things and, you know, block diagrams

203
00:09:34.005 --> 00:09:37.665
and little, um, if I had a crayon, I would be using it.

204
00:09:39.045 --> 00:09:43.335
So to look at, um, complexity

205
00:09:45.315 --> 00:09:47.215
is the system starts with a set

206
00:09:47.215 --> 00:09:48.535
of attributes at the very beginning.

207
00:09:48.875 --> 00:09:51.175
So an unknown number one, to end to attributes

208
00:09:51.175 --> 00:09:52.535
that start at the very beginning.

209
00:09:53.675 --> 00:09:57.855
You cut that system loose time interval later, it has a set

210
00:09:57.855 --> 00:10:01.415
of new attributes at time interval later, one

211
00:10:01.415 --> 00:10:02.655
that won the capital M.

212
00:10:03.435 --> 00:10:07.375
So those initial system attributes have several qualities.

213
00:10:07.885 --> 00:10:10.495
Some portion of are, are attributes that we can control.

214
00:10:12.285 --> 00:10:16.195
Other attributes have, um, things that we know about

215
00:10:16.215 --> 00:10:17.235
but we can't control.

216
00:10:18.705 --> 00:10:21.645

And then other ones that we're euphemistically known

217
00:10:21.805 --> 00:10:24.995
unknowns, and then everything else.

218
00:10:25.955 --> 00:10:27.775
And in some cases you can consider these

219
00:10:27.835 --> 00:10:29.975
as at least in the time interval that we're worried about.

220
00:10:30.025 --> 00:10:32.775
These are unknowable, okay?

221
00:10:34.335 --> 00:10:37.715
So when you start from there, you do the time interval,

222
00:10:37.735 --> 00:10:39.155
you get to these new attributes.

223
00:10:39.895 --> 00:10:41.595
I'm just for convenience states just gonna

224
00:10:41.595 --> 00:10:42.715
change the title of this.

225
00:10:43.055 --> 00:10:45.475
Uh, second set as into the system states.

226
00:10:45.495 --> 00:10:49.635
So one end system states those system states have certain

227
00:10:49.665 --> 00:10:51.715
qualities and to follow system theory,

228
00:10:51.715 --> 00:10:53.155
they have emergent properties

229
00:10:53.775 --> 00:10:56.715
and a certain set of those emergent properties result in

230
00:10:57.275 --> 00:10:58.355
a quality about safety.

231
00:10:59.355 --> 00:11:02.155
A certain set have a certain quality about security.

232
00:11:02.665 --> 00:11:05.475
Another set have a certain quality about operations,

233
00:11:05.775 --> 00:11:06.915
and then include operations.

234
00:11:06.915 --> 00:11:09.755
Like what data, like did you collect the data you want?

235
00:11:10.785 --> 00:11:12.745
Ultimately, all those things add up

236
00:11:12.745 --> 00:11:14.585
to essentially your outcomes.

237
00:11:14.925 --> 00:11:16.665
The immersion property of outcomes.

238
00:11:17.525 --> 00:11:20.985
And our measure for those outcomes leads to,

239
00:11:22.285 --> 00:11:24.865
and we're doing this over time, is are we satisfied with

240
00:11:24.865 --> 00:11:27.825
what we're getting or not satisfied with what we're getting?

241
00:11:28.625 --> 00:11:31.235
Okay? And just to be complete here, outcomes,

242
00:11:31.985 --> 00:11:33.555
it's just another name for the mission.

243
00:11:35.055 --> 00:11:36.195

So when you're doing stuff,

244
00:11:36.195 --> 00:11:39.755
eventually the immersion property needs to be always related

245
00:11:39.775 --> 00:11:41.395
to the mission, whatever the mission

246
00:11:41.395 --> 00:11:42.675
of the thing that you're doing.

247
00:11:43.535 --> 00:11:47.115
And I'm truly saying that all this is obvious,

248
00:11:47.335 --> 00:11:49.395
but it's necessary to bring these things up.

249
00:11:50.035 --> 00:11:52.995
'cause it helps focus the mind into the particular areas

250
00:11:53.075 --> 00:11:54.245
that need to be worked on.

251
00:11:54.985 --> 00:11:57.125
And those areas are the things that we can control.

252
00:11:59.755 --> 00:12:04.155
So to get more simple into this, what the key attributes are

253
00:12:05.215 --> 00:12:08.595
is we have to have those things that we control,

254
00:12:09.345 --> 00:12:13.275
control in the right fashion so that the outcomes lead

255
00:12:13.375 --> 00:12:14.795
to satisfying outcomes.

256
00:12:15.495 --> 00:12:18.855
That's literally the mission. That's as simple as that.

257
00:12:19.155 --> 00:12:21.175
So every, we already do that right now.

258
00:12:21.675 --> 00:12:25.055
And what I'm proposing is, is that what we do in

259
00:12:25.055 --> 00:12:27.695
that context between the things that we do right now to do

260
00:12:27.715 --> 00:12:30.095
for the, um, things that we have control compared

261
00:12:30.095 --> 00:12:32.535
to the outcomes is not sufficient.

262
00:12:37.275 --> 00:12:40.335
So that goes, looking at these things from controllable

263
00:12:40.335 --> 00:12:45.145
system outcomes, What I

264
00:12:46.055 --> 00:12:47.585
propose is

265
00:12:47.585 --> 00:12:50.905
that the heuristics we already do are essentially all the

266
00:12:50.905 --> 00:12:53.545
legacy techniques that we have included in

267
00:12:53.545 --> 00:12:55.705
that list is everything we have to do to meet up

268
00:12:55.705 --> 00:12:59.105
with airworthiness requirements, whatever the physics, um,

269
00:13:00.165 --> 00:13:02.145
um, domain that you're an expert at.

270
00:13:02.365 --> 00:13:04.465

All those things we already know how to do.

271
00:13:05.835 --> 00:13:09.375
And then there's the other set of heuristics

272
00:13:09.805 --> 00:13:11.735
that are uniquely tiered to the scenario

273
00:13:12.715 --> 00:13:15.995
of whatever we're encountering, okay?

274
00:13:16.295 --> 00:13:19.195
So when we're talking about, hey, how do you navigate

275
00:13:19.195 --> 00:13:20.715
through these competing interests?

276
00:13:20.715 --> 00:13:24.765
And so on, the r rubric we're looking for to solve

277
00:13:24.765 --> 00:13:26.565
that problem is in this space.

278
00:13:28.485 --> 00:13:30.545
And, and specifically to get into how do we deal

279
00:13:30.545 --> 00:13:32.105
with the whole idea, I don't have enough money

280
00:13:32.105 --> 00:13:33.225
to do this analysis.

281
00:13:33.485 --> 00:13:36.305
How do you do that? The rubric to deal with

282
00:13:36.305 --> 00:13:37.305
that is in this space.

283
00:13:40.375 --> 00:13:42.155
So let's go through where we are right now.

284
00:13:46.125 --> 00:13:48.225
So we have a problem with reliably solving problem.

285
00:13:48.225 --> 00:13:50.385
It's a better word to saying is being satisfied

286
00:13:50.385 --> 00:13:51.425
with how we solve problems.

287
00:13:52.125 --> 00:13:55.705
Um, inputs to the individuals

288
00:13:55.705 --> 00:13:59.145
and organizations directly lead to the, um, outputs.

289
00:13:59.485 --> 00:14:02.865
So what I'm hypothesizing is if we do a particular input

290
00:14:02.865 --> 00:14:04.705
to the organization and so on,

291
00:14:04.705 --> 00:14:05.945
that'll lead to better outcomes.

292
00:14:07.935 --> 00:14:11.515
We do things in consideration or in context of heuristics.

293
00:14:12.135 --> 00:14:14.395
And a core question is, is

294
00:14:14.665 --> 00:14:16.795
what do you do when you don't have a heuristic?

295
00:14:19.095 --> 00:14:21.255
Outcomes are a product, are a product of

296
00:14:21.255 --> 00:14:23.695
what controllable system attributes we have at the very

297
00:14:23.695 --> 00:14:26.355

start, uh,

298
00:14:27.725 --> 00:14:28.785
and how we control things.

299
00:14:28.785 --> 00:14:30.545
There's just a mystery heuristics

300
00:14:30.545 --> 00:14:32.865
that we already use or don't use.

301
00:14:33.965 --> 00:14:36.355
And the ultimate thing is figure out

302
00:14:36.355 --> 00:14:38.875
how do we control attributes when we don't know

303
00:14:38.995 --> 00:14:40.315
what heuristic to use.

304
00:14:42.505 --> 00:14:44.725
So it's useful to get into, um,

305
00:14:46.655 --> 00:14:49.595
Discussion about complexity

306
00:14:49.775 --> 00:14:51.685
and how that relates to cognition.

307
00:14:53.755 --> 00:14:58.575
So complexity is a, a non-objective,

308
00:14:59.155 --> 00:15:01.575
um, reference system relative thing

309
00:15:01.605 --> 00:15:04.335
that goes from essentially simple intuitive,

310
00:15:04.835 --> 00:15:06.215
all the way to wicked complex.

311
00:15:08.275 --> 00:15:12.495
The in there in the middle, uh, some people have listed the,

312
00:15:12.555 --> 00:15:15.735
um, one point that transition from complicated to complex

313
00:15:16.115 --> 00:15:20.455
as being some sort of line imp implying certain conditions.

314
00:15:21.155 --> 00:15:23.895
So to take that theme is, I'm,

315
00:15:24.635 --> 00:15:29.055
I'm proposing laying on top that the cognitive capacity

316
00:15:29.055 --> 00:15:31.095
of the agent assessing the system

317
00:15:32.165 --> 00:15:34.255
defines the level of complexity.

318
00:15:36.425 --> 00:15:39.845
So, so in other words, related to the heuristics we use

319
00:15:40.585 --> 00:15:44.805
or the resources we have, basically the capability

320
00:15:44.825 --> 00:15:47.005
of doing the analysis is related to

321
00:15:47.005 --> 00:15:48.765
how complex the problem is.

322
00:15:50.205 --> 00:15:53.465
Okay? So what that implies is

323
00:15:53.465 --> 00:15:57.385
that if you have both the tools, the shortcuts,

324
00:15:57.965 --> 00:16:02.285

the analysis, and you have the resources, that's

325
00:16:02.345 --> 00:16:05.335
by this definition in this space from

326
00:16:05.335 --> 00:16:06.415
simple to complicated it.

327
00:16:07.645 --> 00:16:09.185
And what that further implies is

328
00:16:09.425 --> 00:16:11.305
that there's an optimum answer that exists.

329
00:16:13.145 --> 00:16:16.315
Okay? So the rational agent when you're in those conditions

330
00:16:16.315 --> 00:16:20.605
would just go do that, do the optimum, um, answer.

331
00:16:22.005 --> 00:16:23.345
So the opposite of that is

332
00:16:23.345 --> 00:16:26.145
that when you don't have either one of those, the

333
00:16:27.905 --> 00:16:29.635
optimum answer does not exist.

334
00:16:31.285 --> 00:16:35.065
So then the, and I'm proposing that

335
00:16:35.065 --> 00:16:37.345
that condition is a complex problem,

336
00:16:38.765 --> 00:16:40.985
and then when it's a complex problem

337
00:16:41.805 --> 00:16:43.985
and the optimum answer does not exist,

338
00:16:44.165 --> 00:16:46.425
as in the single answer does not exist,

339
00:16:47.145 --> 00:16:50.065
a different rationality strategy needs to be employed it.

340
00:16:53.465 --> 00:16:57.725
So most of the time, I think right now we implicitly deal

341
00:16:57.725 --> 00:16:58.885
with this every single day.

342
00:16:59.985 --> 00:17:03.525
And we ultimately use, uh,

343
00:17:03.715 --> 00:17:05.005
some structured process

344
00:17:05.515 --> 00:17:07.485
that fundamentally depends on experts.

345
00:17:08.425 --> 00:17:11.165
And I think Jeff brought this up earlier about the limit

346
00:17:11.185 --> 00:17:12.645
of the utility of experts.

347
00:17:13.465 --> 00:17:16.005
And then I appreciate bringing in extra people from

348
00:17:16.005 --> 00:17:18.245
outside your organization to look at things where you do.

349
00:17:18.245 --> 00:17:22.125
But fundamentally, those experts only bring the expertise

350
00:17:22.125 --> 00:17:24.005
and experiences that they already have.

351
00:17:24.585 --> 00:17:27.685

And if, and if the system is more complex than

352
00:17:27.685 --> 00:17:31.045
what there's area of expertise, um, applies

353
00:17:31.105 --> 00:17:32.405
to, that's a problem.

354
00:17:34.755 --> 00:17:38.135
So if you get into, um,

355
00:17:40.305 --> 00:17:42.525
uh, look at behavioral economists, like

356
00:17:42.555 --> 00:17:44.645
what Daniel Conman's work is

357
00:17:44.645 --> 00:17:47.765
that there's a very specific definition for expertise,

358
00:17:48.795 --> 00:17:52.365
and it needs to have these particular, um, qualities

359
00:17:53.415 --> 00:17:55.105
doesn't learn in a valid environment.

360
00:17:55.335 --> 00:17:58.065
They have repeated measurable experiences, timely feedback,

361
00:17:58.645 --> 00:18:01.425
um, deliberate practice in unfamiliar areas.

362
00:18:03.735 --> 00:18:06.195
So, so the question is how does

363
00:18:06.195 --> 00:18:08.515
that work in emerging tech environment?

364
00:18:09.695 --> 00:18:11.355
And my belief that most of

365
00:18:11.355 --> 00:18:14.675
what we do right now is in the emerging tech environment.

366
00:18:15.835 --> 00:18:19.695
So by definition, we have no experts in this space.

367
00:18:23.565 --> 00:18:24.775
Alright, so how do you deal

368
00:18:24.775 --> 00:18:28.745
with this herb Simon?

369
00:18:29.175 --> 00:18:30.465
This is a quote from her Simon.

370
00:18:31.415 --> 00:18:34.265
Basically what this quote implies is

371
00:18:34.265 --> 00:18:37.545
to replace the economic man who's fully rational in all

372
00:18:37.545 --> 00:18:40.545
circumstances, and instead apply a rationality

373
00:18:40.565 --> 00:18:44.365
that's appropriate to the real person, okay?

374
00:18:45.565 --> 00:18:48.105
And what that implies is that there's limits

375
00:18:48.245 --> 00:18:52.535
to human rationality, hence I'm an idiot.

376
00:18:53.725 --> 00:18:56.645
Okay? And then when not under the limits,

377
00:18:57.345 --> 00:18:59.845
the most rational answer is the optimum answer.

378
00:19:02.045 --> 00:19:06.485

And then, and I assert that that's just a surrogate

379
00:19:06.485 --> 00:19:11.095
for the legacy heuristics when under limit

380
00:19:11.835 --> 00:19:14.695
in dealing with a problem that's complex, the

381
00:19:15.325 --> 00:19:17.695
most rational answer is by definition

382
00:19:17.845 --> 00:19:21.775
that which is most satisfying and sufficient,

383
00:19:22.665 --> 00:19:26.615
and he conned the term of satisficing, okay?

384
00:19:26.875 --> 00:19:28.655
And we're gonna get into how we use

385
00:19:28.655 --> 00:19:30.895
that particular term in our context.

386
00:19:31.275 --> 00:19:33.655
And I wanna promote that when somebody says, well,

387
00:19:33.815 --> 00:19:35.295
how do you know that's good enough?

388
00:19:35.805 --> 00:19:37.615
Well, it wouldn't be minimally satisfying

389
00:19:37.615 --> 00:19:40.335
and minimally sufficient if it wasn't minimally satisfying

390
00:19:40.335 --> 00:19:41.455
and it wasn't sufficient.

391
00:19:44.775 --> 00:19:46.755
It also suggests that there are multiple answers

392
00:19:46.815 --> 00:19:50.435
to the same problem might be, um, available.

393
00:19:55.705 --> 00:19:57.325
So using modern safety theory

394
00:19:57.345 --> 00:19:59.485
and modern safety theory takes the idea

395
00:19:59.675 --> 00:20:02.325
that emergent properties are a control problem.

396
00:20:03.745 --> 00:20:05.925
And what that suggests that when we're,

397
00:20:05.925 --> 00:20:07.725
as the agent looking at a system

398
00:20:08.265 --> 00:20:12.885
and we consider, um, the complex problem with outcomes

399
00:20:13.465 --> 00:20:16.895
is that we have emergent properties,

400
00:20:16.915 --> 00:20:18.135
we have assistant states

401
00:20:18.395 --> 00:20:21.495
and system attributes that fundamentally it's about

402
00:20:22.735 --> 00:20:26.555
how we modify our control policies, those things

403
00:20:26.555 --> 00:20:30.315
that we can control to ensure the outcomes we want.

404
00:20:31.495 --> 00:20:36.055
Okay? And I already pointed this out

405
00:20:36.055 --> 00:20:38.815

that my assertion is, is that le there's a combination

406
00:20:38.815 --> 00:20:41.095
of legacy propo, um, control policies

407
00:20:41.875 --> 00:20:44.335
and control policies tailored to the scenario.

408
00:20:45.765 --> 00:20:50.615
Okay? So the next step is figuring out

409
00:20:50.635 --> 00:20:53.095
how do we figure out what those control policies are.

410
00:20:54.665 --> 00:20:57.445
So this is my complex, um, system model.

411
00:20:58.995 --> 00:21:00.725
Step number one is to find the mission.

412
00:21:02.615 --> 00:21:04.115
So the utility here is

413
00:21:04.115 --> 00:21:06.835
that even though you may be in encountering a problem,

414
00:21:08.095 --> 00:21:11.115
unless it's very carefully articulated,

415
00:21:11.935 --> 00:21:13.435
the mission defines everything.

416
00:21:13.775 --> 00:21:16.315
And if you don't have that information specifically on

417
00:21:16.315 --> 00:21:18.995
what the mission is that you're doing your analysis within,

418
00:21:20.865 --> 00:21:24.525
you'll never get to a, um, um, a reliable answer.

419
00:21:25.655 --> 00:21:30.425
Okay? And this is just top level to show you how this works.

420
00:21:30.425 --> 00:21:32.825
There's definitely techniques to get into, you know,

421
00:21:32.925 --> 00:21:34.465
how you define what the mission is.

422
00:21:35.445 --> 00:21:38.425
And the second part is, is that what leads to a mission is

423
00:21:38.455 --> 00:21:40.825
what are the emergent properties that you need to have?

424
00:21:40.885 --> 00:21:43.585
So I just have a surrogate for operation security safety.

425
00:21:44.045 --> 00:21:47.265
You can put costs up there, you can put things

426
00:21:47.265 --> 00:21:49.465
that are important based on what the circumstances

427
00:21:49.485 --> 00:21:52.355
of the scenario are, right?

428
00:21:53.255 --> 00:21:55.635
So you start with mission, you get

429
00:21:55.635 --> 00:21:56.795
to the emergent properties.

430
00:21:57.855 --> 00:22:01.775
The second step is, is instead of

431
00:22:02.685 --> 00:22:07.255
looking at system states that ensure the emergent properties

432
00:22:07.955 --> 00:22:09.615

is we're looking at system states

433
00:22:09.965 --> 00:22:12.135
that cause the emergent properties to fail.

434
00:22:13.975 --> 00:22:15.785
Does that make sense? So the goal is not

435
00:22:15.785 --> 00:22:17.585
to optimize the emergent properties.

436
00:22:17.685 --> 00:22:20.425
The goal is to define those system states

437
00:22:20.775 --> 00:22:22.665
that if those system states occur

438
00:22:23.775 --> 00:22:28.725
and they will lead to, um, an emergent property failure,

439
00:22:30.035 --> 00:22:32.485
that by definition is satisfying.

440
00:22:33.155 --> 00:22:35.605
That if you avoid the, with states

441
00:22:38.495 --> 00:22:41.225
that in theory supposes

442
00:22:41.225 --> 00:22:43.825
that the emergent properties will succeed,

443
00:22:44.735 --> 00:22:46.185
thus enabling your mission.

444
00:22:48.015 --> 00:22:50.515
Okay? And,

445
00:22:50.615 --> 00:22:53.515
and the reason why I put it up this way is that routinely,

446
00:22:53.515 --> 00:22:55.835
like whether it's safety, whether it's security,

447
00:22:56.305 --> 00:22:59.395
they'll ask you, Hey, bring me another rock to make sure.

448
00:22:59.455 --> 00:23:00.715
So I feel better about it.

449
00:23:00.865 --> 00:23:02.835
Even though you have satisfying condition

450
00:23:02.835 --> 00:23:06.545
that you're not failing any of the safety attributes is

451
00:23:06.545 --> 00:23:09.425
that you can trace it, that hey, X, Y

452
00:23:09.425 --> 00:23:11.985
and Z will show me that these are the assistant states

453
00:23:12.005 --> 00:23:13.865
and I've got them fully, um, covered,

454
00:23:14.645 --> 00:23:16.665
and that ensures that my immersion,

455
00:23:16.885 --> 00:23:18.545
my emerge properties will not fail.

456
00:23:22.275 --> 00:23:23.955
Ultimately, step number X, there's a server.

457
00:23:24.135 --> 00:23:27.155
The steps that are later on, if you're doing STPA,

458
00:23:27.655 --> 00:23:29.355
the the interim step there is

459
00:23:29.355 --> 00:23:32.115

to get into the scenario space, like

460
00:23:32.115 --> 00:23:35.995
what scenarios might lead to, um, system states and so on.

461
00:23:36.215 --> 00:23:37.435
But ultimately it leads down

462
00:23:37.435 --> 00:23:39.515
to X state is here are the mitigations,

463
00:23:42.115 --> 00:23:44.855
and those mitigations are specifically the control policies.

464
00:23:46.505 --> 00:23:48.885
And by definition, they're minimally satisfying

465
00:23:49.345 --> 00:23:50.765
and they're minimally sufficient.

466
00:23:51.665 --> 00:23:53.965
And note I already mentioned this is not test safety

467
00:23:54.865 --> 00:23:58.125
and the whole reason why it's not test safety is we do run a

468
00:23:58.325 --> 00:24:00.605
structured process, but it doesn't run

469
00:24:00.675 --> 00:24:01.765
this from top to down.

470
00:24:01.765 --> 00:24:03.405
From a system theoretic point of view,

471
00:24:04.265 --> 00:24:07.845
we might understand a mission, we might perceive

472
00:24:07.845 --> 00:24:10.285
through our expertise about, um,

473
00:24:10.795 --> 00:24:12.525
what emergent properties wanna insure,

474
00:24:12.985 --> 00:24:17.285
but they're all, um, let's say implicit versus explicit.

475
00:24:18.185 --> 00:24:19.185
Okay?

476
00:24:19.695 --> 00:24:24.175
And The punchline,

477
00:24:25.045 --> 00:24:27.375
depending on the experts, which I already defined

478
00:24:27.375 --> 00:24:29.135
as insufficient in immersion tech space,

479
00:24:29.995 --> 00:24:32.575
um, is test safety.

480
00:24:37.125 --> 00:24:39.945
So what we did with this barista, basically, um,

481
00:24:41.635 --> 00:24:44.515
I considered that the lack of the right rationale has led

482
00:24:44.515 --> 00:24:46.275
to intractable problem.

483
00:24:47.955 --> 00:24:50.295
And what I proposed is having a better rationale,

484
00:24:50.375 --> 00:24:51.775
a new rationality strategy

485
00:24:52.555 --> 00:24:55.175
and a structured process will lead to better outcomes.

486
00:24:58.385 --> 00:25:01.425

I, I also communicated that you can bend

487
00:25:01.485 --> 00:25:04.185
how we look at problems between those problems we know how

488
00:25:04.185 --> 00:25:06.265
to solve versus problems we don't know how to solve.

489
00:25:07.655 --> 00:25:10.475
And that in the space of the problems we don't have.

490
00:25:10.735 --> 00:25:13.355
So, um, know how to solve, uh,

491
00:25:13.675 --> 00:25:16.355
requires a unique, uh, rationale.

492
00:25:18.455 --> 00:25:20.175
I talked about cognition and complexity

493
00:25:20.175 --> 00:25:21.255
and I laid that on top.

494
00:25:21.475 --> 00:25:23.095
That's probably the most innovative

495
00:25:23.115 --> 00:25:25.415
or novel thing about, uh, in this brief,

496
00:25:25.415 --> 00:25:27.775
about putting those two things on top of each other.

497
00:25:28.355 --> 00:25:30.495
And a reason why I did that specifically is

498
00:25:30.695 --> 00:25:32.775
'cause it leads directly to prescriptions

499
00:25:32.775 --> 00:25:35.055
of whether you're in one state or another,

500
00:25:35.275 --> 00:25:37.015
or treatments, whether you're in one state

501
00:25:37.035 --> 00:25:40.935
or another, introduced satisficing

502
00:25:40.935 --> 00:25:42.615
and also talked about the risk framework.

503
00:25:42.675 --> 00:25:45.095
And just so you know, risk framework is a student, uh, use

504
00:25:45.615 --> 00:25:48.615
euphemism for this basically arc to go from top to bottom,

505
00:25:48.905 --> 00:25:51.255
which many other rubrics already use.

506
00:25:53.875 --> 00:25:55.735
That's it. Questions.

507
00:26:09.875 --> 00:26:14.015
Hey Tom, uh, you, you mentioned crayons early on

508
00:26:14.565 --> 00:26:16.495
with the introduction on just being a knuckle dragging

509
00:26:17.255 --> 00:26:18.695
fighter test pile, which I am also,

510
00:26:19.635 --> 00:26:22.015
and, uh, you probably made all the marines mouth water

511
00:26:22.165 --> 00:26:23.335
with the mention of crayons,

512
00:26:23.335 --> 00:26:27.575
but I like colors on risk matrices.

513
00:26:28.445 --> 00:26:32.975

Yeah. So I, I wanna know, you know, red, yellow, green.

514
00:26:33.795 --> 00:26:37.255
And so, um, I, I made a note here that you said we just need

515
00:26:37.255 --> 00:26:38.535
to identify the states

516
00:26:40.045 --> 00:26:41.975
that cause the emergent properties to fail.

517
00:26:42.595 --> 00:26:46.565
Yep. So, um,

518
00:26:46.765 --> 00:26:48.205
I guess two questions.

519
00:26:49.745 --> 00:26:52.405
How do we know those emergent properties, those states

520
00:26:52.405 --> 00:26:54.205
that cause the emergent properties to fail?

521
00:26:54.585 --> 00:26:56.605
How do we know that those are deterministic?

522
00:26:57.945 --> 00:27:01.245
Do they always cause the emergent properties to fail?

523
00:27:01.985 --> 00:27:04.885
Is there a probability and severity relationship there?

524
00:27:05.665 --> 00:27:07.245
So there's two questions there,

525
00:27:07.785 --> 00:27:11.485
and I think the best utility to say is that, um,

526
00:27:12.225 --> 00:27:15.085
the probability severity matrix has no role in this

527
00:27:15.085 --> 00:27:16.205
particular pro process.

528
00:27:17.035 --> 00:27:21.805
Okay? So ultimately what we do

529
00:27:21.805 --> 00:27:24.165
through this process, especially in immersion tech space,

530
00:27:24.225 --> 00:27:25.765
is look for black swans.

531
00:27:27.195 --> 00:27:29.975
So by definition, there are no probabilities associated

532
00:27:29.975 --> 00:27:32.365
with identifying the black swans, okay?

533
00:27:33.145 --> 00:27:35.245
So when you go through this process

534
00:27:35.585 --> 00:27:37.485
and you look like, like for, what's the likelihood

535
00:27:37.485 --> 00:27:39.485
that the state's gonna lead to a particular loss,

536
00:27:39.745 --> 00:27:42.525
or I'm sorry, assert an emergent property and so on.

537
00:27:42.635 --> 00:27:45.645
There's no probabilities associated with it, okay?

538
00:27:46.115 --> 00:27:49.005
It's, it is, you assume through this process

539
00:27:49.875 --> 00:27:51.085
that it's gonna happen.

540
00:27:52.165 --> 00:27:55.625

That's the only way to consider, um, that,

541
00:27:57.085 --> 00:27:58.345
and the best way to consider

542
00:27:58.345 --> 00:27:59.825
that is consider about you're trying

543
00:27:59.825 --> 00:28:01.425
to prevent black swans from occurring.

544
00:28:01.975 --> 00:28:03.905
Okay? Now, break break.

545
00:28:05.215 --> 00:28:07.705
Does the probability severity matrix have a process

546
00:28:08.285 --> 00:28:11.185
or have a role to play in our whole gigantic process?

547
00:28:12.245 --> 00:28:15.905
So my personal opinion is to think of this risk management

548
00:28:16.165 --> 00:28:20.105
and two and two pillars, the modeling pillar

549
00:28:20.365 --> 00:28:21.665
and the decision making pillar.

550
00:28:22.505 --> 00:28:27.115
Okay? So all this is, is fundamentally modeling, modeling of

551
00:28:27.115 --> 00:28:28.475
what you understand about the system.

552
00:28:29.055 --> 00:28:31.835
And everything about it has to include, um,

553
00:28:32.465 --> 00:28:34.675
whether you've mitigated things or not.

554
00:28:35.815 --> 00:28:39.435
And then part of that is if you didn't mitigate something

555
00:28:39.615 --> 00:28:42.635
as fessing up that I did not mitigate here,

556
00:28:43.305 --> 00:28:46.035
this is a system state that I could not mitigate

557
00:28:46.105 --> 00:28:48.235
because of the circumstances of the sys

558
00:28:48.235 --> 00:28:49.795
of the, um, scenario.

559
00:28:50.535 --> 00:28:54.205
So I did a Tesla while ago that involved,

560
00:28:54.345 --> 00:28:55.565
um, a helmet system.

561
00:28:55.785 --> 00:28:57.805
The helmet system is completely uncertified

562
00:28:57.805 --> 00:28:58.805
with the ejection seat.

563
00:28:59.305 --> 00:29:02.765
So one of the unmitigated risks is in the event of a miss,

564
00:29:02.945 --> 00:29:07.005
uh, ejection is what would happen to the, um, aircrew

565
00:29:07.115 --> 00:29:10.765
with this un eject, unqualified ejection system

566
00:29:11.225 --> 00:29:12.765
or a helmet system on their nugget.

567
00:29:13.615 --> 00:29:15.705

Okay? So that was an unmitigated risk

568
00:29:16.005 --> 00:29:17.025
and that was presented

569
00:29:17.025 --> 00:29:19.225
to the appropriate authorities that way.

570
00:29:19.925 --> 00:29:23.065
So the way I look at it from this point of view is consider

571
00:29:23.615 --> 00:29:27.665
your, um, all of this as whether you've mitigated it or not,

572
00:29:28.605 --> 00:29:31.425
and then that information feeds into the decision

573
00:29:31.425 --> 00:29:33.585
process, whatever that might be.

574
00:29:38.475 --> 00:29:41.835
Anything else? Thank you.