WEBVTT

1
00:00:00.035 --> 00:00:02.125
ProTech, uh, I'll, I'll introduce him.

2
00:00:02.275 --> 00:00:06.105
He's got a similar, uh, problem with, uh, his, uh,

3
00:00:06.315 --> 00:00:07.385
management of risks,

4
00:00:07.385 --> 00:00:10.385
because when he is not flight testing, he likes to do rock

5
00:00:10.905 --> 00:00:12.265
climbing, mountain biking,

6
00:00:12.405 --> 00:00:14.945
and one of the most hazardous things I know in world,

7
00:00:14.965 --> 00:00:16.585
in the world is child rearing.

8
00:00:16.885 --> 00:00:17.985
Please welcome Reed.

9
00:00:28.705 --> 00:00:31.785
Hey, thank you, Pete. Um, in talking to Pete this morning,

10
00:00:31.845 --> 00:00:34.915
he was thanking me for doing this, preparing this.

11
00:00:35.335 --> 00:00:37.755
Um, what I wanted to say is that I, I find this rewarding

12
00:00:37.755 --> 00:00:40.435
because, um, this, this effectively serves

13
00:00:40.435 --> 00:00:41.555
as an introspective for us,

14
00:00:41.815 --> 00:00:43.075
and so we get something out

15
00:00:43.075 --> 00:00:44.155
of it directly as an organization.

16
00:00:44.905 --> 00:00:46.925
Um, in addition, it's always interesting to see

17
00:00:47.025 --> 00:00:50.005
how the message you prepared fits in with the, the course

18
00:00:50.005 --> 00:00:51.085
of the, uh, workshop.

19
00:00:51.505 --> 00:00:54.685
So yesterday, the conversation turned towards, uh, working

20
00:00:54.685 --> 00:00:56.805
with your program office and how to manage that pressure.

21
00:00:57.325 --> 00:00:59.625
Um, and it occurred to me that I, I think that some

22
00:00:59.625 --> 00:01:00.945
of this could be applicable to that.

23
00:01:00.945 --> 00:01:02.025
So hopefully I, um,

24
00:01:02.325 --> 00:01:04.025
can provide some ideas or solutions for that.

25
00:01:04.905 --> 00:01:07.485
Um, flight test safety to improve customer relationships.

26
00:01:08.155 --> 00:01:10.045
This is a collection of lessons learned by us

27
00:01:10.045 --> 00:01:11.205

as a flight test service provider.

28
00:01:11.725 --> 00:01:14.225
Um, rather than focus on one individual story

29
00:01:14.285 --> 00:01:17.225
and, uh, go into the technical detail, rather what spoke

30
00:01:17.225 --> 00:01:18.585
to us and looking at the different options

31
00:01:18.605 --> 00:01:21.945
and stories that came to mind is the common thread of

32
00:01:22.005 --> 00:01:24.145
how our, how working with our customer

33
00:01:24.145 --> 00:01:26.025
and how getting that relationship off on the right foot

34
00:01:26.765 --> 00:01:28.435
influences the safety picture of the program.

35
00:01:31.965 --> 00:01:33.585
So for background, what do we do?

36
00:01:34.125 --> 00:01:35.825
Uh, aerotech, TEC

37
00:01:35.825 --> 00:01:38.145
and AEROTECH stands for Test Engineering Certification.

38
00:01:38.645 --> 00:01:41.995
So at the core, we provide contract flight test services.

39
00:01:42.935 --> 00:01:46.475
Um, in addition, we provide services around that activity.

40
00:01:46.615 --> 00:01:48.915
So certification, uh, helping the customer with that.

41
00:01:49.375 --> 00:01:50.955
Uh, and sometimes engineering as well,

42
00:01:50.985 --> 00:01:52.515
that could be help with the design.

43
00:01:53.235 --> 00:01:54.695
Uh, it could just be design

44
00:01:54.695 --> 00:01:55.735
and build a flight test equipment.

45
00:01:56.405 --> 00:01:59.105
Um, and it truly spans the whole range in some cases.

46
00:01:59.885 --> 00:02:03.715
Um, our customers are maybe an established OEM

47
00:02:03.715 --> 00:02:05.035
that does have a flight test organization.

48
00:02:05.295 --> 00:02:07.275
Uh, and we have that common background

49
00:02:07.295 --> 00:02:09.555
and understanding of what flight test is, what it involves,

50
00:02:10.225 --> 00:02:11.645
and they just need surge labor

51
00:02:11.785 --> 00:02:13.405
or support in doing a small program

52
00:02:13.475 --> 00:02:15.085
that they don't have time to take on.

53
00:02:15.455 --> 00:02:17.925
Maybe we're helping a new OEMs set up their organization,

54
00:02:18.685 --> 00:02:20.585

uh, and there's some learning that goes on together.

55
00:02:21.505 --> 00:02:25.205
And maybe, uh, in honest, in all honesty, most

56
00:02:25.205 --> 00:02:27.845
of our programs by, in terms of number, uh,

57
00:02:27.945 --> 00:02:29.365
our customer doesn't have a flight test

58
00:02:29.365 --> 00:02:30.565
organization, they're not familiar.

59
00:02:30.865 --> 00:02:32.525
Um, maybe they've never done flight tests.

60
00:02:33.345 --> 00:02:34.945
Um, and so that's,

61
00:02:34.945 --> 00:02:36.625
that's the most interesting to look at, I think.

62
00:02:36.625 --> 00:02:39.565
So keep that in mind, uh, as they go

63
00:02:39.565 --> 00:02:40.805
through these, uh, slides.

64
00:02:44.215 --> 00:02:46.355
So to look at that a bit more, uh, this is,

65
00:02:47.095 --> 00:02:50.115
I'd say a high level, uh, of a program flow.

66
00:02:50.595 --> 00:02:53.175
Customer kicks off the project, begins their design work

67
00:02:53.175 --> 00:02:57.015
integration, and goes through the rest of the activity.

68
00:02:57.955 --> 00:03:01.285
And with all, all programs, there's a level of optimism.

69
00:03:01.775 --> 00:03:03.125
We're humans. This is what we do.

70
00:03:03.305 --> 00:03:05.805
Uh, and as we go through the program, that optimism starts

71
00:03:05.805 --> 00:03:09.365
to dip into reserves, um, schedule reserves,

72
00:03:09.465 --> 00:03:10.805
uh, monetary reserves.

73
00:03:11.415 --> 00:03:13.955
By the time we get to test, I think we all understand

74
00:03:13.955 --> 00:03:15.955
that there's more pressure on the program.

75
00:03:17.755 --> 00:03:20.135
In addition, maybe our customer didn't, uh,

76
00:03:20.645 --> 00:03:22.335
realize they needed test early on,

77
00:03:23.015 --> 00:03:25.115
or maybe it didn't seem particularly pressing at the time.

78
00:03:25.755 --> 00:03:26.915
Suffice it to say, we typically get

79
00:03:27.115 --> 00:03:28.275
involved later than we'd like.

80
00:03:28.895 --> 00:03:32.135
Um, so we'd rather be involved earlier. We get it.

81
00:03:32.355 --> 00:03:33.695

Um, we're typically involved later.

82
00:03:33.725 --> 00:03:35.295
It's the constraints we're stuck with.

83
00:03:35.295 --> 00:03:37.375
We can't help on the program that we're not involved in.

84
00:03:37.985 --> 00:03:39.645
Um, but I think it's useful to understand that.

85
00:03:40.815 --> 00:03:43.635
And then in, in addition, as a service provider, um,

86
00:03:44.175 --> 00:03:46.555
we have an interesting mix of responsibilities we have

87
00:03:46.555 --> 00:03:47.995
to provide value for, for the money,

88
00:03:47.995 --> 00:03:49.115
otherwise we're not in business.

89
00:03:49.715 --> 00:03:52.185
Um, and then with customers

90
00:03:52.185 --> 00:03:53.225
that may not understand flight tests

91
00:03:53.225 --> 00:03:54.305
or be experienced in flight test.

92
00:03:54.565 --> 00:03:56.785
And in a lot of cases, we find ourselves providing sort

93
00:03:56.785 --> 00:03:58.585
of an educational role and explaining

94
00:03:58.845 --> 00:04:00.385
or needing to explain the activities

95
00:04:00.385 --> 00:04:01.585
that we're doing as we do them.

96
00:04:02.525 --> 00:04:05.825
Um, finally, we have employees on a test aircraft.

97
00:04:05.825 --> 00:04:07.585
We need to protect our team. We need to adhere

98
00:04:07.585 --> 00:04:08.825
to flight test processes

99
00:04:08.825 --> 00:04:10.265
and make it as safe as practically possible.

100
00:04:12.245 --> 00:04:14.705
Um, and and the last thing to mention that, um, consider

101
00:04:14.705 --> 00:04:15.985
that in, in some of these programs,

102
00:04:15.985 --> 00:04:18.585
the only thing we're providing may be flight test.

103
00:04:19.355 --> 00:04:21.775
So by the very virtue of that, there's little installation

104
00:04:21.775 --> 00:04:24.055
between our flight test team and the customer's influence,

105
00:04:24.205 --> 00:04:26.055
because that is the team

106
00:04:26.335 --> 00:04:27.855
provided to the customer are the flight testers.

107
00:04:29.825 --> 00:04:31.805
So with that in mind, uh, maybe

108
00:04:31.805 --> 00:04:33.245

that doesn't describe the sort of work you do.

109
00:04:33.465 --> 00:04:35.125
Uh, who's this for? I think there's

110
00:04:35.125 --> 00:04:36.205
still something for everyone.

111
00:04:36.765 --> 00:04:38.185
Um, like I said,

112
00:04:38.185 --> 00:04:40.585
this could be pretty directly applicable if you're thinking

113
00:04:40.585 --> 00:04:42.025
about how to deal with your program office.

114
00:04:43.385 --> 00:04:44.715
Otherwise, uh, if,

115
00:04:44.775 --> 00:04:46.035
if this doesn't seem like something

116
00:04:46.035 --> 00:04:47.115
you experience, that's great.

117
00:04:47.415 --> 00:04:50.585
Um, but I think there's value in acknowledging

118
00:04:50.585 --> 00:04:52.025
and preserving a good relationship like that.

119
00:04:52.025 --> 00:04:52.945
That's certainly been my

120
00:04:52.945 --> 00:04:55.025
experience, uh, over the many years.

121
00:04:55.365 --> 00:04:58.385
EC is that that practiced positive relationship

122
00:04:58.385 --> 00:04:59.825
with the customer is really invaluable,

123
00:05:01.995 --> 00:05:03.445
most importantly, because that can change.

124
00:05:03.785 --> 00:05:06.765
Um, so if that does change, if you do find yourself working

125
00:05:06.765 --> 00:05:09.565
with a different entity in your programs, considered a risk,

126
00:05:10.145 --> 00:05:11.685
um, and treat it, uh, appropriately.

127
00:05:15.855 --> 00:05:17.035
So we broke this down into,

128
00:05:17.175 --> 00:05:19.035
and quite honestly, we had three examples to share.

129
00:05:19.335 --> 00:05:21.315
So we broke it down into three buckets.

130
00:05:21.315 --> 00:05:25.445
Three challenges, uh, that generally captures the, the realm

131
00:05:25.445 --> 00:05:27.125
of challenges we face in working with a customer.

132
00:05:27.675 --> 00:05:30.015
Number one, we don't have the entire program.

133
00:05:30.395 --> 00:05:31.495
Uh, we have limited scope.

134
00:05:31.705 --> 00:05:34.035
Furthermore, we don't always know the capabilities

135
00:05:34.095 --> 00:05:36.035

or the backgrounds of the other entities involved.

136
00:05:36.165 --> 00:05:37.155
We're getting to know them,

137
00:05:37.155 --> 00:05:38.355
especially if it's a new customer.

138
00:05:38.915 --> 00:05:39.975
And not just the customer,

139
00:05:39.995 --> 00:05:42.015
but perhaps the customer to other suppliers as well.

140
00:05:43.975 --> 00:05:47.555
Number two, limited resources. Um, time and money. Yes.

141
00:05:47.735 --> 00:05:48.875
Uh, sometimes data as well.

142
00:05:48.905 --> 00:05:50.355
Working in the aftermarket field.

143
00:05:51.045 --> 00:05:53.385
Um, not to say that we're the only ones experiencing this,

144
00:05:53.525 --> 00:05:56.625
but that a small program has less capacity to

145
00:05:57.185 --> 00:05:58.245
absorb the unexpected.

146
00:05:59.835 --> 00:06:01.135
And finally, politics and culture.

147
00:06:01.675 --> 00:06:03.535
Um, particularly very far reaching.

148
00:06:03.555 --> 00:06:06.775
But, um, provide one example to, uh, to illustrate that.

149
00:06:07.395 --> 00:06:11.055
And for each, um, have an example, a story to tell to, uh,

150
00:06:11.055 --> 00:06:12.415
paint a picture and provide some, uh,

151
00:06:12.415 --> 00:06:14.095
strategies for success there.

152
00:06:16.365 --> 00:06:18.845
So first up, um, limited scope

153
00:06:18.845 --> 00:06:20.085
and incomplete knowledge of other parties.

154
00:06:21.005 --> 00:06:22.555
First and foremost, like I alluded to,

155
00:06:23.015 --> 00:06:25.115
if it's a new customer, if it's a new entity,

156
00:06:25.495 --> 00:06:26.795
always expect a learning curve

157
00:06:26.815 --> 00:06:27.955
and, and treat that as a risk.

158
00:06:29.145 --> 00:06:30.225
'cause it does take time to

159
00:06:30.865 --> 00:06:31.985
identify people's strengths and weaknesses.

160
00:06:32.285 --> 00:06:34.675
Um, and there's really no way around that.

161
00:06:35.055 --> 00:06:39.215
Um, but if you are dealing with that, uh, a new entity,

162
00:06:39.395 --> 00:06:40.695

set expectations early and clearly

163
00:06:41.395 --> 00:06:42.735
and remain process oriented.

164
00:06:42.875 --> 00:06:46.685
Um, sort of take a page from, uh, the flight test mentality

165
00:06:47.105 --> 00:06:49.405
and apply that towards the way you work with your customer.

166
00:06:49.895 --> 00:06:51.075
And I'll illustrate

167
00:06:51.075 --> 00:06:52.315
that in more detail as we built the example.

168
00:06:53.215 --> 00:06:57.265
So the example story here, uh, we had a customer,

169
00:06:58.085 --> 00:07:00.065
uh, which was a new customer to us, obviously.

170
00:07:00.645 --> 00:07:03.375
Um, they had a modification ongoing

171
00:07:03.845 --> 00:07:06.615
that required relocating a static port on the aircraft, uh,

172
00:07:06.825 --> 00:07:09.095
flush mounted side of body static port.

173
00:07:10.225 --> 00:07:12.165
And without going into too much detail about the tech

174
00:07:12.165 --> 00:07:13.845
technical aspects of it, the,

175
00:07:14.145 --> 00:07:16.765
the most difficult aspect is retaining the RVSM

176
00:07:16.765 --> 00:07:17.885
capability of the airplane.

177
00:07:18.455 --> 00:07:20.275
The most technical cha technically challenging.

178
00:07:21.265 --> 00:07:23.045
Uh, our engineering was asked

179
00:07:23.045 --> 00:07:25.045
to assist in determining potentially a

180
00:07:25.045 --> 00:07:26.085
new static port location.

181
00:07:26.825 --> 00:07:30.285
And again, without too much detail, just understand that,

182
00:07:30.955 --> 00:07:33.575
uh, modifying the avionics, modifying the electronics

183
00:07:33.575 --> 00:07:37.175
that can correct the position error due to the placement

184
00:07:37.215 --> 00:07:39.925
of the static port was not presented as an option

185
00:07:39.925 --> 00:07:41.125
because of financial constraints.

186
00:07:41.535 --> 00:07:42.995
Uh, approaching a company like Honeywell

187
00:07:42.995 --> 00:07:46.015
or Rockwell for that sort of work is, uh, it's expensive.

188
00:07:46.635 --> 00:07:51.235
So the idea was to find a new location that was outside

189
00:07:51.235 --> 00:07:52.755

of the realm of the modification

190
00:07:53.455 --> 00:07:56.115
and induce less than 80 feet of error

191
00:07:56.255 --> 00:07:58.275
to meet those RVSM requirements.

192
00:07:58.415 --> 00:07:59.915
Uh, 80 feet of Altimetry air.

193
00:08:01.695 --> 00:08:04.355
So we helped out, uh, we participated in a CFD analysis,

194
00:08:05.735 --> 00:08:07.195
and here's an excerpt of that.

195
00:08:07.735 --> 00:08:10.675
Um, just to describe what's going on here.

196
00:08:10.855 --> 00:08:12.675
Uh, the, the upper image there, we're looking at

197
00:08:13.235 --> 00:08:15.115
140 inch wide section

198
00:08:15.655 --> 00:08:19.355
and a 80 inch tall section of the side of body.

199
00:08:20.315 --> 00:08:22.235
Anything in red is over 200 feet of induced air.

200
00:08:22.775 --> 00:08:27.095
No way, not a chance. Um, when we get to the blue shading,

201
00:08:27.095 --> 00:08:29.135
that's starting to be what we're looking for.

202
00:08:29.555 --> 00:08:31.295
And you might be saying, I don't see much blue.

203
00:08:31.915 --> 00:08:34.695
Um, that was our thought too.

204
00:08:34.955 --> 00:08:37.135
Uh, to put it, to put it in more direct terms.

205
00:08:37.165 --> 00:08:40.175
That lower plot is that, that's looking at that same error,

206
00:08:40.795 --> 00:08:42.935
but, uh, plotted as a function of, of

207
00:08:42.935 --> 00:08:44.695
that exposition across the side of body.

208
00:08:45.195 --> 00:08:48.795
Um, and each line is a specific water line on the aircraft,

209
00:08:49.525 --> 00:08:51.465
and there's one spot that's less than 80 feet.

210
00:08:51.885 --> 00:08:53.945
Um, it is in fact one inch wide.

211
00:08:54.725 --> 00:08:57.405
Um, so we will need some luck to do that.

212
00:08:57.585 --> 00:09:00.205
Uh, it occurred to us that this is essentially a game

213
00:09:00.205 --> 00:09:01.845
of CFD pin, the tail on the donkey.

214
00:09:02.065 --> 00:09:03.445
We have an idea, um,

215
00:09:03.825 --> 00:09:06.725
but we're really, we're really gonna be walking into it

216
00:09:06.725 --> 00:09:07.885

blindfolded with just this data.

217
00:09:09.345 --> 00:09:12.445
Our recommendation. Uh, we need to do a pressure survey, uh,

218
00:09:12.445 --> 00:09:14.765
flight test to validate this data, refine it,

219
00:09:14.765 --> 00:09:17.805
really hone in on, on what, what are our chances of success

220
00:09:17.985 --> 00:09:19.965
and what is the specific location?

221
00:09:20.205 --> 00:09:21.205
'cause that prediction could be off.

222
00:09:22.485 --> 00:09:23.515
Again, it's a new customer.

223
00:09:23.515 --> 00:09:25.195
We're still trying to figure out their business cadence

224
00:09:25.215 --> 00:09:27.395
and how to work with them, um, how to communicate.

225
00:09:28.135 --> 00:09:29.475
Um, couple months go by.

226
00:09:29.475 --> 00:09:30.675
They're, they're working through some other stuff.

227
00:09:31.145 --> 00:09:33.595
Come to find out the modification's complete,

228
00:09:35.165 --> 00:09:36.715
which leaves us a bit confused.

229
00:09:37.535 --> 00:09:40.515
Um, we're not contractually signed up

230
00:09:40.515 --> 00:09:41.795
to be the design authority in this area,

231
00:09:42.785 --> 00:09:44.125
but, uh, we were asked to help.

232
00:09:44.585 --> 00:09:46.795
Um, but it's okay. It's their program.

233
00:09:47.215 --> 00:09:48.395
Um, we're confused as

234
00:09:48.395 --> 00:09:50.715
to why we're accepting such a large technical risk.

235
00:09:51.255 --> 00:09:53.275
But we were able to work through the safety

236
00:09:53.275 --> 00:09:54.875
of flight process and get to first flight

237
00:09:55.135 --> 00:09:58.585
and perform flight test, um, which in fact,

238
00:09:58.585 --> 00:09:59.745
we did not meet the requirements.

239
00:09:59.805 --> 00:10:04.175
We were noncompliant. Um, so there was much angst over that.

240
00:10:04.675 --> 00:10:07.095
And furthermore, our help then asked in, in terms of

241
00:10:07.615 --> 00:10:10.455
defining a path forward, so we've really got

242
00:10:10.565 --> 00:10:12.375
what I'll call responsibility churn.

243
00:10:12.755 --> 00:10:14.575

Um, it's not clear what our role is.

244
00:10:14.575 --> 00:10:15.935
It shifts and moves over time,

245
00:10:16.835 --> 00:10:18.575
and this is just one small piece

246
00:10:18.675 --> 00:10:20.815
of the overall modification to the aircraft.

247
00:10:21.675 --> 00:10:22.775
And so, as we get ready

248
00:10:22.775 --> 00:10:24.335
to perform flight test on the aircraft,

249
00:10:24.685 --> 00:10:26.055
this is the key thought in our mind.

250
00:10:26.165 --> 00:10:28.895
What else is going on across the other aspects

251
00:10:28.895 --> 00:10:32.295
of the modification where this behavior is, is going on.

252
00:10:33.245 --> 00:10:37.025
Um, so when we get to a safety of flight process, we can't,

253
00:10:37.025 --> 00:10:38.945
we can't afford ambiguity as we get ready to fly.

254
00:10:41.255 --> 00:10:44.315
So getting to that idea of remain process oriented, uh,

255
00:10:44.315 --> 00:10:45.555
this safety of flight review process,

256
00:10:45.745 --> 00:10:47.315
it's potentially unfamiliar to the customer,

257
00:10:47.615 --> 00:10:50.275
but it, as I allude to, it's especially critical

258
00:10:50.275 --> 00:10:52.095
because, uh, this is

259
00:10:52.095 --> 00:10:53.575
where our program involvement goes from.

260
00:10:53.625 --> 00:10:55.575
We're, we're maybe involved in this one small aspect

261
00:10:55.575 --> 00:10:56.695
of the design, uh, effort,

262
00:10:57.115 --> 00:10:58.375
but now we're gonna start flight testing.

263
00:10:59.135 --> 00:11:02.305
Um, what we found though is that it's a,

264
00:11:02.305 --> 00:11:03.585
it's an extra valuable tool,

265
00:11:03.645 --> 00:11:04.665
and it's especially important

266
00:11:04.665 --> 00:11:06.345
to remain process oriented and stick to it.

267
00:11:06.345 --> 00:11:09.575
It's very tempting, uh, to throw stones and try

268
00:11:09.575 --> 00:11:11.735
and, you know, tell the customer that that's not ready.

269
00:11:11.875 --> 00:11:16.085
Um, but that really just elicits an emotional response

270
00:11:16.085 --> 00:11:17.565

and damages the race relationship.

271
00:11:18.255 --> 00:11:20.835
Um, and it's akin to you make a flight test plan.

272
00:11:20.835 --> 00:11:22.595
You wouldn't go out then and just, uh,

273
00:11:22.595 --> 00:11:25.235
go pick at the most pressing aspect as you perceive it.

274
00:11:25.695 --> 00:11:27.195
Uh, the plan is a, you know,

275
00:11:27.235 --> 00:11:28.715
a systematic approach to get there.

276
00:11:29.095 --> 00:11:30.395
So you get a superior result.

277
00:11:30.735 --> 00:11:32.235
You preserve the relationship with the customer

278
00:11:32.255 --> 00:11:33.475
if you stick to your processes.

279
00:11:34.535 --> 00:11:37.315
Um, a little bit other detail there.

280
00:11:37.655 --> 00:11:39.515
We don't know the organization we're working with.

281
00:11:39.735 --> 00:11:43.165
Um, and they may not understand what's involved in operating

282
00:11:43.165 --> 00:11:44.325
an experimental test vehicle.

283
00:11:45.345 --> 00:11:47.645
So we structure a safety flight process

284
00:11:47.865 --> 00:11:49.885
to require digging one level deeper.

285
00:11:49.975 --> 00:11:51.845
We're not gonna accept just an executive signature.

286
00:11:51.845 --> 00:11:53.365
We want the cognizant engineer to,

287
00:11:53.805 --> 00:11:56.465
and in our experience, this has always brought out, um,

288
00:11:57.345 --> 00:11:59.465
a wealth of other limitations against

289
00:11:59.465 --> 00:12:00.745
the aircraft when we go through that process.

290
00:12:02.535 --> 00:12:04.905
Also, putting this, putting these requirements in the

291
00:12:04.905 --> 00:12:07.025
initial scope of work documents up front with the customer.

292
00:12:07.605 --> 00:12:09.025
Uh, it communicates it earlier.

293
00:12:09.095 --> 00:12:10.425
It's not a surprise when we get there.

294
00:12:10.685 --> 00:12:13.025
Um, and there's no excuse when, um,

295
00:12:13.295 --> 00:12:15.225
there's no excuse if it's not prepared in time.

296
00:12:15.815 --> 00:12:18.435
Um, and that, that we found that to be important.

297
00:12:20.525 --> 00:12:24.345

So moving on to, uh, limited resources, uh, in,

298
00:12:24.345 --> 00:12:26.945
in this case, um, remain solution oriented.

299
00:12:27.255 --> 00:12:29.225
I'll, uh, point this out in more detail in my example.

300
00:12:29.685 --> 00:12:31.945
Uh, shameless plug use resources

301
00:12:32.085 --> 00:12:35.585
and these sorts of venues are, um, great for that.

302
00:12:36.215 --> 00:12:38.155
Um, in fact, the technique I'm gonna

303
00:12:38.805 --> 00:12:39.815
talk about is something we,

304
00:12:39.835 --> 00:12:41.615
we wanna share in more detail at some, uh,

305
00:12:41.635 --> 00:12:42.895
future, uh, symposium.

306
00:12:44.045 --> 00:12:46.505
Uh, comparative techniques like baseline testing is really

307
00:12:46.505 --> 00:12:47.425
invaluable if you've got an

308
00:12:47.425 --> 00:12:48.425
incomplete data set to start with.

309
00:12:49.415 --> 00:12:52.915
Uh, and finally, as I'll illustrate in the example, uh, lack

310
00:12:52.915 --> 00:12:54.755
of other barriers enable success here.

311
00:12:54.895 --> 00:12:57.435
If you're facing limited resources, a very tight budget,

312
00:12:57.465 --> 00:12:59.795
very tight schedule, and you're working

313
00:12:59.795 --> 00:13:00.795
with unfamiliar entities

314
00:13:00.815 --> 00:13:02.555
or there's other issues going on, um,

315
00:13:02.655 --> 00:13:04.395
you're ultimately gonna be set up for disappointment.

316
00:13:04.975 --> 00:13:06.765
Quite honestly. Uh, fortunately,

317
00:13:06.765 --> 00:13:07.805
it's typically just financial.

318
00:13:09.615 --> 00:13:13.165
So in this example, uh, longtime customer of ours, uh,

319
00:13:13.205 --> 00:13:16.805
designing aftermarket winglets, um, they had OEM support.

320
00:13:17.145 --> 00:13:19.205
So we've got the original data set of the aircraft at our,

321
00:13:19.345 --> 00:13:22.245
uh, disposal, which is great, uh, can knock down a lot

322
00:13:22.245 --> 00:13:24.045
of risk, understand a lot of things we wouldn't

323
00:13:24.195 --> 00:13:26.125
otherwise know about the basic aircraft.

324
00:13:26.945 --> 00:13:30.445

Uh, specific to this example, uh, dry air ice shape testing,

325
00:13:30.985 --> 00:13:33.485
uh, ice shape flight testing was required for certification.

326
00:13:34.835 --> 00:13:36.945
Uh, airplanes were 10

327
00:13:36.945 --> 00:13:38.745
to 15 years since their type certification efforts.

328
00:13:38.805 --> 00:13:39.945
So a little bit of age on 'em,

329
00:13:39.945 --> 00:13:41.825
but fairly modern in the grand scheme of things.

330
00:13:42.165 --> 00:13:44.305
And obviously with access to that data,

331
00:13:44.325 --> 00:13:47.865
we requested the OEM data for those ice shapes, uh,

332
00:13:47.865 --> 00:13:50.025
including flight test reports and the drawing

333
00:13:50.045 --> 00:13:52.465
and analysis of the, the derivation of those ice shapes.

334
00:13:53.045 --> 00:13:54.495
That way we can recreate those

335
00:13:55.115 --> 00:13:56.935
and understand what the basic, uh,

336
00:13:57.375 --> 00:13:58.495
airplane behavior is going to be.

337
00:13:59.075 --> 00:14:01.215
Uh, the winglets are expected to be a small change, so

338
00:14:01.215 --> 00:14:02.735
that gets us 95% of the answer.

339
00:14:04.595 --> 00:14:07.295
So my, uh, dramatic reenactment, this isn't the actual data,

340
00:14:07.355 --> 00:14:08.415
but my recollection of it.

341
00:14:08.875 --> 00:14:11.025
Um, so we've got the

342
00:14:11.025 --> 00:14:12.625
horizontal stabilizer cross section here.

343
00:14:12.685 --> 00:14:14.585
Uh, that's the mo that's the area of most concern

344
00:14:14.585 --> 00:14:16.305
because it's an unprotected tail, uh,

345
00:14:16.375 --> 00:14:18.625
tail stalls the most severe, uh,

346
00:14:18.625 --> 00:14:20.985
of the consequences we can imagine in the flight test, um,

347
00:14:21.295 --> 00:14:22.435
of these ice shapes.

348
00:14:24.235 --> 00:14:27.485
So we did have to do the analysis reive our own ice

349
00:14:27.485 --> 00:14:28.725
shape for certification.

350
00:14:29.145 --> 00:14:31.005
And this is what we came up with, uh,

351
00:14:31.005 --> 00:14:32.125

using modern techniques.

352
00:14:32.355 --> 00:14:34.325
It's pretty nasty looking double horned ice

353
00:14:34.325 --> 00:14:35.725
shape, but not a surprise.

354
00:14:35.865 --> 00:14:37.125
That's, that's what we expect.

355
00:14:38.145 --> 00:14:42.355
What was a surprise is when we received the OEM data, it

356
00:14:43.165 --> 00:14:44.465
did not reflect what we expected.

357
00:14:44.725 --> 00:14:48.305
Uh, it's not what the program assumed either we're stuck

358
00:14:48.305 --> 00:14:51.035
with, uh, basically that assumption

359
00:14:51.310 --> 00:14:52.230
that we would understand the

360
00:14:52.235 --> 00:14:53.395
baseline characteristics of the airplane.

361
00:14:53.705 --> 00:14:56.495
It's not true. Um, we, we don't know

362
00:14:56.495 --> 00:14:57.495
how this airplane's gonna behave

363
00:14:57.495 --> 00:14:58.615
with the ice shape we have to fly.

364
00:14:59.895 --> 00:15:03.505
So we basically have previously inflowing ice shapes,

365
00:15:03.505 --> 00:15:04.585
which wasn't our going in assumption.

366
00:15:05.125 --> 00:15:07.905
And we still have this flight test risk to, to work with.

367
00:15:08.525 --> 00:15:09.545
Is there a safe way to fly?

368
00:15:09.805 --> 00:15:12.505
Can we get through this without essentially killing the

369
00:15:12.505 --> 00:15:14.785
program with the added cost that might be associated with,

370
00:15:15.125 --> 00:15:18.985
uh, wind tunnel investigation or a rigorous analysis, um,

371
00:15:19.795 --> 00:15:21.365
otherwise of those ice shapes?

372
00:15:22.405 --> 00:15:24.345
And we were able to find a path forward.

373
00:15:25.265 --> 00:15:27.605
Um, and it was a

374
00:15:28.045 --> 00:15:29.205
creative technique, but it worked quite well.

375
00:15:29.705 --> 00:15:32.245
And essentially all we did was we added two days

376
00:15:32.245 --> 00:15:33.525
of flight testing to get this done.

377
00:15:34.525 --> 00:15:37.945
And we did high speed taxi test, we did ground runs,

378
00:15:38.705 --> 00:15:41.045

and I've got the chart down there to illustrate what we did.

379
00:15:41.345 --> 00:15:43.205
We did full nose up stabilizer

380
00:15:43.465 --> 00:15:45.245
and full nose up elevator at break release.

381
00:15:45.385 --> 00:15:46.965
So you're, you're well outside of the green band

382
00:15:47.305 --> 00:15:48.805
and you've got full nose up elevator,

383
00:15:49.065 --> 00:15:52.065
and which you get is you get nose wheel lift off at a quite

384
00:15:52.065 --> 00:15:54.405
low air speed using the basic physics of that.

385
00:15:54.585 --> 00:15:58.325
We can derive tail cl go back to neutral elevator,

386
00:15:58.715 --> 00:15:59.845
nose wheels back on the ground,

387
00:16:00.285 --> 00:16:01.725
airplane auto rotates shortly thereafter.

388
00:16:02.105 --> 00:16:04.245
Now we have tail CL without elevator.

389
00:16:05.485 --> 00:16:08.465
And then, um, reject take off, come to a stop, cool.

390
00:16:08.465 --> 00:16:11.255
Breaks and tires, um, all done on a very long runway

391
00:16:11.355 --> 00:16:13.655
to avoid, uh, most of the issues associated

392
00:16:13.655 --> 00:16:14.775
that you'd expect with that type of testing.

393
00:16:15.815 --> 00:16:18.235
And then we repeat that two degrees more stabilizer,

394
00:16:18.295 --> 00:16:20.155
two degrees more and effectively,

395
00:16:20.155 --> 00:16:22.355
we're building a tail cl curve with

396
00:16:22.355 --> 00:16:24.555
and without elevator on a comparative basis.

397
00:16:25.385 --> 00:16:28.325
And this tells us that the two things, uh, the onset

398
00:16:28.325 --> 00:16:30.845
of degradation with the ice is, it, it's mild in nature.

399
00:16:31.185 --> 00:16:32.645
Um, it's gradual onset,

400
00:16:33.025 --> 00:16:34.965
and more importantly, the elevator's always effective.

401
00:16:35.105 --> 00:16:38.445
So whatever characteristics we encounter, uh, we know

402
00:16:38.445 --> 00:16:40.045
that we can create a buildup technique

403
00:16:40.045 --> 00:16:42.845
that gets us there in a controlled, um, safe manner.

404
00:16:43.795 --> 00:16:48.295
So non-standard. Um, but, uh, it let us move forward.

405
00:16:48.755 --> 00:16:51.095

And the most important thing I wanna highlight here is

406
00:16:51.095 --> 00:16:52.215
that this, this is something

407
00:16:52.215 --> 00:16:53.375
we were able to keep in our camp.

408
00:16:53.395 --> 00:16:55.975
We were able to present to the customer, Hey,

409
00:16:55.975 --> 00:16:59.155
we've got a problem and we think we have a way forward, uh,

410
00:16:59.155 --> 00:17:02.075
that let us keep, uh, I guess, control of our own destiny,

411
00:17:02.575 --> 00:17:04.355
um, which was valuable in this case.

412
00:17:04.415 --> 00:17:06.595
And that long standing relationship

413
00:17:06.595 --> 00:17:09.395
with the customer really enabled that, uh, the,

414
00:17:09.415 --> 00:17:11.675
the understanding of where the capabilities lie within the

415
00:17:11.675 --> 00:17:13.875
team and the trust to move forward on those,

416
00:17:14.175 --> 00:17:15.225
uh, was key here.

417
00:17:19.225 --> 00:17:21.755
Okay. Politics and culture, um, like I say,

418
00:17:21.755 --> 00:17:23.075
potentially a huge topic.

419
00:17:23.675 --> 00:17:25.175
Uh, and I'm, I'm, I'm not gonna say

420
00:17:25.175 --> 00:17:26.775
that this is gonna touch on all pieces of it,

421
00:17:26.775 --> 00:17:29.215
but it's gonna illustrate some of the problems you can face

422
00:17:29.355 --> 00:17:33.635
and, and present some strategies of those, uh,

423
00:17:33.635 --> 00:17:34.715
that I'll get to here in the example.

424
00:17:35.275 --> 00:17:36.715
Communicate early, communicate clearly.

425
00:17:36.825 --> 00:17:38.795
I've touched these before, but, uh,

426
00:17:39.005 --> 00:17:40.195
these will come out in the example.

427
00:17:41.035 --> 00:17:43.195
Um, early means as soon as possible.

428
00:17:43.715 --> 00:17:45.885
Anytime you go through a program like I illustrated,

429
00:17:46.225 --> 00:17:48.215
things get more difficult as you go on.

430
00:17:48.215 --> 00:17:50.925
There's less time, time and less money available as far

431
00:17:50.925 --> 00:17:52.525
as the program management's concerned.

432
00:17:52.925 --> 00:17:54.425

So by putting off that conversation,

433
00:17:54.445 --> 00:17:56.905
you just make the conversation more tough as time goes on.

434
00:17:57.995 --> 00:18:00.355
Communicate clearly. Sometimes for customers, this means,

435
00:18:00.935 --> 00:18:02.715
uh, contractual documentation.

436
00:18:03.025 --> 00:18:04.315
It's the gatekeeper. Start the program

437
00:18:04.695 --> 00:18:06.795
as should be common agreement on safety.

438
00:18:07.795 --> 00:18:09.575
And sometimes it's the only documentation

439
00:18:09.575 --> 00:18:11.255
that you know is gonna get read by the customer.

440
00:18:12.615 --> 00:18:13.755
It has teeth essentially.

441
00:18:15.025 --> 00:18:17.825
Uh, the other thing that I'll get to in the example here,

442
00:18:17.965 --> 00:18:20.945
uh, another take a page from flight test conduct is

443
00:18:20.945 --> 00:18:23.185
to pre-brief the program like you would a test flight

444
00:18:23.185 --> 00:18:24.545
with your customer, uh,

445
00:18:24.615 --> 00:18:26.625
talking about emergency procedures and stuff like that.

446
00:18:26.625 --> 00:18:28.585
What, what, what's the plan? What's the general

447
00:18:28.585 --> 00:18:29.625
roles and responsibilities?

448
00:18:29.625 --> 00:18:30.985
When something doesn't go as expected,

449
00:18:31.045 --> 00:18:34.715
how do we move forward and finally ensure, uh, clear

450
00:18:34.715 --> 00:18:36.715
and singular authority for the test operation

451
00:18:36.715 --> 00:18:39.715
to make sure you can act on those unexpected

452
00:18:39.715 --> 00:18:40.955
events the way you know you need to.

453
00:18:43.345 --> 00:18:46.845
So for this example, uh, customer,

454
00:18:47.595 --> 00:18:48.975
and I guess it's worth mentioning, again,

455
00:18:48.975 --> 00:18:50.015
it's a new customer to us.

456
00:18:50.615 --> 00:18:53.835
Uh, they designed a large OML modification for a special,

457
00:18:54.335 --> 00:18:55.555
uh, missions aircraft.

458
00:18:55.855 --> 00:18:59.085
Um, base aircraft was a large part 25 transport, uh,

459
00:18:59.235 --> 00:19:02.345

that was quite old, um, 25-year-old airframe,

460
00:19:02.485 --> 00:19:04.865
and probably even a little bit more date, uh, age on it.

461
00:19:04.865 --> 00:19:06.345
Since the, uh, type certification effort,

462
00:19:07.685 --> 00:19:09.165
OM data is not available, um,

463
00:19:10.185 --> 00:19:11.525
in fact the airplane's outta production.

464
00:19:11.525 --> 00:19:12.605
So there's really no way for us

465
00:19:12.625 --> 00:19:15.165
to get good data on the baseline aircraft characteristic.

466
00:19:16.085 --> 00:19:17.205
Uh, a couple side notes here.

467
00:19:17.785 --> 00:19:20.045
Um, there's a lot that could be talked about here.

468
00:19:20.265 --> 00:19:23.285
Um, for us internally, the baseline test aspect

469
00:19:23.285 --> 00:19:24.685
of this was a key lesson learned,

470
00:19:24.755 --> 00:19:25.915
but not the one I'm gonna focus on today.

471
00:19:26.825 --> 00:19:30.525
And the, uh, the customer was a, uh,

472
00:19:31.655 --> 00:19:34.865
capable, uh, operator of the part, uh, of the, uh,

473
00:19:34.865 --> 00:19:35.945
special emissions platform.

474
00:19:37.635 --> 00:19:39.895
So with this OML modification, uh,

475
00:19:40.175 --> 00:19:42.015
handling qualities including stability and control

476
00:19:42.115 --> 00:19:43.295
and stall characteristics

477
00:19:43.355 --> 00:19:45.455
and, um, performance stalls were all part of the program.

478
00:19:47.115 --> 00:19:49.375
And we had a lost control event during one

479
00:19:49.375 --> 00:19:50.855
of our stall characteristics, demonstration,

480
00:19:51.255 --> 00:19:55.625
turning flight stall for, um, to meet FAA regulations

481
00:19:55.625 --> 00:19:58.825
or demonstrate compliance with the FAA regulations flown

482
00:19:58.825 --> 00:20:01.425
by a qualified crew per a procedure

483
00:20:01.425 --> 00:20:02.585
that matched the FAA guidance.

484
00:20:03.595 --> 00:20:04.615
It was not our first stall.

485
00:20:05.035 --> 00:20:06.375
Uh, it came as a surprise to us,

486
00:20:07.405 --> 00:20:11.015

and, um, it came as a surprise to us both in the flight

487
00:20:11.275 --> 00:20:13.215
and through the course of the program.

488
00:20:13.245 --> 00:20:15.605
It's not something we identified as a risk to the customer.

489
00:20:17.715 --> 00:20:22.045
Um, obviously with an event like that, uh, it's all stop.

490
00:20:22.185 --> 00:20:24.645
Uh, our recommendation was we need to fix the problem.

491
00:20:24.945 --> 00:20:26.805
Uh, aerodynamic systems fix something

492
00:20:27.145 --> 00:20:28.805
to correct the problem prior to further testing.

493
00:20:29.265 --> 00:20:32.445
Um, pretty simple to make that recommendation.

494
00:20:32.905 --> 00:20:34.995
Um, like I say, it's,

495
00:20:34.995 --> 00:20:36.715
it's not something we identified as a risk in the program.

496
00:20:36.815 --> 00:20:38.755
It was a surprise to us as a surprise to the customer.

497
00:20:40.265 --> 00:20:42.365
And the customer disagreed ultimately, um,

498
00:20:42.875 --> 00:20:45.005
they were under extreme internal schedule pressure,

499
00:20:45.465 --> 00:20:48.835
and, um, they were insistent on a,

500
00:20:49.245 --> 00:20:50.505
on a technique that differed.

501
00:20:50.655 --> 00:20:54.265
It's true. Uh, but to us it was, it was an unnecessary risk.

502
00:20:54.365 --> 00:20:56.695
Yes, you can do a different type of test,

503
00:20:56.715 --> 00:20:58.095
you can make it a less severe stall,

504
00:20:58.475 --> 00:21:00.135
but if that's not gonna get you to the finish line

505
00:21:00.135 --> 00:21:01.535
of certification, which was our belief

506
00:21:01.535 --> 00:21:03.615
that it wouldn't get there, it's an unnecessary risk.

507
00:21:03.675 --> 00:21:05.055
We, we shouldn't be doing this.

508
00:21:05.935 --> 00:21:07.995
Um, and they proceeded to, uh,

509
00:21:08.185 --> 00:21:10.275
attempt their own test program without us.

510
00:21:10.745 --> 00:21:14.485
Um, what happens next?

511
00:21:15.325 --> 00:21:18.005
I don't have a video. Um, they, they were doing this solo,

512
00:21:18.585 --> 00:21:20.645
um, suffice it to say they had the same event we did.

513
00:21:21.025 --> 00:21:23.045

And fortunately, no damage to the aircraft.

514
00:21:23.045 --> 00:21:24.605
Nobody's hurt, but it's not the event.

515
00:21:24.635 --> 00:21:26.045
It's not the situation you want.

516
00:21:27.305 --> 00:21:28.765
We were there to provide flight test services

517
00:21:28.785 --> 00:21:31.525
to the customer, and they felt compelled

518
00:21:31.525 --> 00:21:32.765
to take things into their own hand.

519
00:21:34.715 --> 00:21:37.725
It's easy to think, in some cases, more easy than others.

520
00:21:38.025 --> 00:21:41.085
Uh, this customer is insert your choice words and move on.

521
00:21:41.805 --> 00:21:43.465
Um, unfortunately you haven't really moved on

522
00:21:43.465 --> 00:21:44.865
because they still need to finish their program,

523
00:21:44.865 --> 00:21:45.905
and you're probably still involved.

524
00:21:46.045 --> 00:21:48.985
So it's really not productive, uh, thinking

525
00:21:50.595 --> 00:21:54.565
on some level, their, at least their distress is justified,

526
00:21:54.565 --> 00:21:55.605
maybe not their behavior.

527
00:21:56.365 --> 00:21:58.865
Um, but their behavior is somewhat understandable.

528
00:21:59.045 --> 00:22:00.505
We, we were entirely off script.

529
00:22:00.685 --> 00:22:03.185
Um, we, we didn't talk about what the plan was.

530
00:22:03.605 --> 00:22:06.685
If we had such an event, we didn't identify as a risk.

531
00:22:06.865 --> 00:22:08.805
It was late in the program. They're under a lot of pressure.

532
00:22:09.305 --> 00:22:11.485
Um, so I'm not, I'm not saying

533
00:22:11.485 --> 00:22:13.485
that we could have prevented this

534
00:22:13.765 --> 00:22:14.885
situation, but we certainly could have done more.

535
00:22:15.225 --> 00:22:17.725
And I think about the, uh, fireside partner's message of,

536
00:22:18.065 --> 00:22:19.845
the best thing you can do is do the right thing.

537
00:22:20.535 --> 00:22:22.635
And the second best thing you can do is, is try and,

538
00:22:22.655 --> 00:22:23.715
and not quite do the right thing.

539
00:22:24.015 --> 00:22:25.315
The worst thing you can do is nothing.

540
00:22:25.655 --> 00:22:28.235

Um, so the lesson from, for us here was to not wait

541
00:22:28.235 --> 00:22:29.635
for an unexpected event and do something

542
00:22:29.635 --> 00:22:30.755
to brief this with the customer.

543
00:22:31.025 --> 00:22:32.555
Establish an expectation of

544
00:22:32.555 --> 00:22:34.635
how we behave when the program goes,

545
00:22:34.655 --> 00:22:35.795
uh, goes sideways like this.

546
00:22:37.435 --> 00:22:40.135
So establish upfront

547
00:22:40.155 --> 00:22:42.855
and that that could be contractually, um, if appropriate.

548
00:22:43.155 --> 00:22:45.575
And in fact, that's, that's the way we do with a number of,

549
00:22:45.575 --> 00:22:46.815
uh, expectations around safety.

550
00:22:48.445 --> 00:22:52.665
Um, so this is the takeaway for us, uh, that

551
00:22:53.685 --> 00:22:56.775
the, to take a page from flight test practice,

552
00:22:56.995 --> 00:22:58.935
we could pre-brief a program with the customer.

553
00:22:59.625 --> 00:23:01.805
Um, and we can think of this as, uh,

554
00:23:01.895 --> 00:23:05.405
would you rather have your customer working off a procedure

555
00:23:05.405 --> 00:23:07.205
that was established in a one G environment

556
00:23:07.205 --> 00:23:09.805
and we all agreed on, uh, or do you want to try

557
00:23:09.805 --> 00:23:11.845
and establish that when you're looking

558
00:23:11.845 --> 00:23:13.005
at their emotional response?

559
00:23:13.475 --> 00:23:15.295
Um, same thing. Would you rather have your pilot working off

560
00:23:15.335 --> 00:23:17.335
a QRH has been thought out in the offices

561
00:23:17.845 --> 00:23:20.015
when people had time to figure it all out, uh,

562
00:23:20.015 --> 00:23:21.135
or flying by the seat of their pants?

563
00:23:21.315 --> 00:23:23.195
Uh, and I definitely know what I prefer.

564
00:23:25.925 --> 00:23:27.625
So that, that's the lesson

565
00:23:27.625 --> 00:23:29.265
that we took from this is something we can do different.

566
00:23:29.285 --> 00:23:31.345
Uh, in addition, it highlighted to us the value of some

567
00:23:31.345 --> 00:23:33.505

of the stuff that we do already, uh,

568
00:23:33.505 --> 00:23:36.705
and continue to do, uh, contractual understanding of

569
00:23:37.255 --> 00:23:38.865
what are some of those unique flight test

570
00:23:38.865 --> 00:23:40.025
concepts that need to be agreed on.

571
00:23:40.125 --> 00:23:42.025
Uh, crew rest policies is a great one.

572
00:23:42.165 --> 00:23:45.265
Uh, and risk mitigation activity, uh, stuff

573
00:23:45.265 --> 00:23:47.265
that we have in our, uh, general terms

574
00:23:47.265 --> 00:23:50.585
and agreement, uh, that we, this highlights the value of it.

575
00:23:52.565 --> 00:23:54.575
Also budget explicitly for safety activity.

576
00:23:55.315 --> 00:23:57.805
This sort of detail goes to the customer in,

577
00:23:58.145 --> 00:23:59.285
uh, a statement of work.

578
00:23:59.545 --> 00:24:01.285
So upfront they know we're gonna do it,

579
00:24:01.395 --> 00:24:03.005
it's gonna take time, it's gonna take money.

580
00:24:03.585 --> 00:24:05.525
Um, but it's part of the program.

581
00:24:06.325 --> 00:24:09.345
Uh, it also, it also keeps us honest so that we, um,

582
00:24:09.805 --> 00:24:11.745
we appropriately account for the time so

583
00:24:11.745 --> 00:24:12.865
that we're not pressed

584
00:24:12.865 --> 00:24:14.545
for time when it comes time to do these activities.

585
00:24:19.465 --> 00:24:22.005
Uh, so to put it all kind of on one page, um,

586
00:24:22.705 --> 00:24:24.855
and sort of, sort of reorganize those thoughts.

587
00:24:26.415 --> 00:24:27.635
That's, that's my first message.

588
00:24:27.875 --> 00:24:29.915
A positive and practice relationship is irreplaceable.

589
00:24:30.175 --> 00:24:33.485
Uh, that's been my experience over the variety

590
00:24:33.485 --> 00:24:35.245
of customers we've had in my work at Aerotech.

591
00:24:35.715 --> 00:24:37.895
Um, and I think it's worth realizing if, if you have

592
00:24:37.895 --> 00:24:39.535
that situation, uh, it's valuable.

593
00:24:40.065 --> 00:24:41.805
And if you, if you don't have that situation,

594
00:24:41.905 --> 00:24:44.205

if you do have a new entity, uh, treated as a risk,

595
00:24:46.365 --> 00:24:49.115
the the first thing to act on there, if you do have

596
00:24:49.115 --> 00:24:51.995
that situation, and really if you have a already have a

597
00:24:52.195 --> 00:24:53.875
positive and practice relationship, is make sure there's

598
00:24:53.875 --> 00:24:54.875
clear and singular authority for

599
00:24:54.875 --> 00:24:55.795
the test operation up front.

600
00:24:56.405 --> 00:24:58.145
It lets you take the action you, you know,

601
00:24:58.145 --> 00:24:59.345
you need to take to protect your team.

602
00:25:00.155 --> 00:25:02.775
Um, things can get quite muddy if, um,

603
00:25:03.435 --> 00:25:05.655
and fortunately, we, we typically have a common

604
00:25:05.655 --> 00:25:08.495
understanding with our customer when they come from a large

605
00:25:08.975 --> 00:25:10.425
established flight test organization.

606
00:25:10.685 --> 00:25:12.865
And we have that common background, common understanding.

607
00:25:13.405 --> 00:25:15.865
Uh, but things can get muddy if you, if you,

608
00:25:16.515 --> 00:25:18.775
if you have a customer who has flight test experience,

609
00:25:19.255 --> 00:25:21.915
but you share responsibility on the, uh, test operation.

610
00:25:22.955 --> 00:25:24.905
Um, so clear

611
00:25:24.985 --> 00:25:26.145
and singular authority, so you can

612
00:25:26.145 --> 00:25:27.225
act the way you know you need to.

613
00:25:28.145 --> 00:25:30.075
Some of the other tools you can use under that, uh,

614
00:25:30.315 --> 00:25:31.515
umbrella, then, uh, engage

615
00:25:31.615 --> 00:25:33.395
as on safety as early as possible.

616
00:25:34.215 --> 00:25:36.235
Um, like I said, there's more time and money available.

617
00:25:36.425 --> 00:25:38.155
That conversation only gets more difficult

618
00:25:38.265 --> 00:25:39.795
because safety does take time and money.

619
00:25:40.295 --> 00:25:41.905
You also avoid emotional reactions.

620
00:25:41.905 --> 00:25:45.105
You get agreement before people are under, uh, duress.

621
00:25:47.285 --> 00:25:48.825

Set clear expectations for us.

622
00:25:48.825 --> 00:25:51.065
This takes the shape of contractual agreements in a lot

623
00:25:51.065 --> 00:25:54.975
of cases with some of these topics that I talked about.

624
00:25:54.975 --> 00:25:56.055
There certainly could be others

625
00:25:56.235 --> 00:25:57.615
and could be tailored to

626
00:25:57.615 --> 00:25:59.575
what ex specific challenges you face.

627
00:26:02.355 --> 00:26:04.375
Um, and those documents can't be ignored.

628
00:26:04.475 --> 00:26:08.175
It gives, it gives 'em teeth, it sets an agreement up front.

629
00:26:10.385 --> 00:26:13.605
Uh, also infuse a flight test mind, mind, uh, set

630
00:26:13.605 --> 00:26:16.545
to the customer relationship, staying process oriented,

631
00:26:16.765 --> 00:26:17.945
uh, and sticking to it.

632
00:26:18.805 --> 00:26:20.865
And, uh, pre-briefing a program

633
00:26:20.865 --> 00:26:21.945
in the same way you might a flight test.

634
00:26:22.125 --> 00:26:26.735
Set expectations upfront, remain solution oriented.

635
00:26:26.805 --> 00:26:29.055
This, uh, this lets you keep, uh, control

636
00:26:29.055 --> 00:26:30.975
of your own destiny in a lot of cases, uh,

637
00:26:31.115 --> 00:26:32.495
and preserve that customer relationship.

638
00:26:32.835 --> 00:26:36.345
It also prevents that, um, in situations

639
00:26:36.345 --> 00:26:37.745
where you wouldn't want it, the customer trying

640
00:26:37.745 --> 00:26:38.745
to take things into their own hands.

641
00:26:38.925 --> 00:26:41.345
Uh, so lets you keep the right expertise involved.

642
00:26:42.475 --> 00:26:45.585
Um, that does mean using good use of your resources and,

643
00:26:45.585 --> 00:26:47.585
and knowing what you're doing and having the right team.

644
00:26:50.245 --> 00:26:53.345
So thank you. And with that, I take a few questions.

645
00:26:53.345 --> 00:26:54.025
I think I got a few minutes

646
00:27:00.955 --> 00:27:01.075
question.

647
00:27:08.025 --> 00:27:09.685
Wow. Oh, there's one. Please go.

648
00:27:11.725 --> 00:27:14.225

Uh, did you end up solving the pedostatic issue

649
00:27:14.225 --> 00:27:15.425
or VSM question?

650
00:27:16.445 --> 00:27:21.345
Um, not yet. Those are, uh, hard.

651
00:27:22.155 --> 00:27:26.265
Yeah. Any other questions?

652
00:27:29.705 --> 00:27:33.585
One over there? Uh,

653
00:27:34.585 --> 00:27:35.585
a little bit less of a question

654
00:27:35.585 --> 00:27:37.385
and more of a, just a general comment.

655
00:27:37.525 --> 00:27:40.385
So, uh, you basically, uh, you know,

656
00:27:40.385 --> 00:27:43.105
presented on the stuff coming from a third party test

657
00:27:43.105 --> 00:27:44.585
organization to various

658
00:27:44.585 --> 00:27:46.065
different customers around the world.

659
00:27:46.645 --> 00:27:48.825
And I think this is absolutely applicable

660
00:27:48.825 --> 00:27:51.545
to every single one of us because, um, even if you work

661
00:27:51.545 --> 00:27:52.585
for the military or,

662
00:27:52.605 --> 00:27:56.545
or the OEM, we really are a third party test,

663
00:27:56.555 --> 00:27:59.265
organ test part of our organization.

664
00:27:59.325 --> 00:28:01.585
And we have customers that are the program office,

665
00:28:01.645 --> 00:28:04.375
and some of 'em are customers that we've worked with for,

666
00:28:04.515 --> 00:28:05.495
for a long time, and some

667
00:28:05.495 --> 00:28:06.655
of 'em are basically brand new people.

668
00:28:06.715 --> 00:28:09.375
So this stuff is, I see as directly applicable to the things

669
00:28:09.375 --> 00:28:12.055
that I do on a, on a daily basis with my, within my,

670
00:28:12.395 --> 00:28:13.815
my own organization.

671
00:28:14.685 --> 00:28:16.895
Yeah. And going into this, we realized that the, you know,

672
00:28:16.895 --> 00:28:19.465
the concept of internal customers is going

673
00:28:19.465 --> 00:28:22.305
to be generally applicable to the same concept of external.

674
00:28:23.225 --> 00:28:25.885
Um, in talking to folks last night, uh, around dinner,

675
00:28:26.225 --> 00:28:27.485

we were talking about the idea of dealing

676
00:28:27.485 --> 00:28:29.445
with the program office as being very similar.

677
00:28:30.185 --> 00:28:34.005
And also that, um, we were talking to one gentleman from,

678
00:28:34.005 --> 00:28:35.005
from the military background,

679
00:28:35.465 --> 00:28:39.505
and they don't get to experience that

680
00:28:40.095 --> 00:28:43.005
rehearsed, uh, repeat customer

681
00:28:43.535 --> 00:28:44.625
because the,

682
00:28:44.685 --> 00:28:47.225
the program office is continually promoting those people

683
00:28:47.225 --> 00:28:48.545
to hire, uh, positions.

684
00:28:48.725 --> 00:28:50.025
So you're always dealing with a new

685
00:28:50.625 --> 00:28:51.995
program manager essentially.

686
00:28:52.415 --> 00:28:54.675
Um, so that creates extra challenge that you're,

687
00:28:54.675 --> 00:28:55.955
you're kind of starting fresh on each program.

688
00:28:57.745 --> 00:28:59.415
Thank you for sharing. Yeah, thank you.

689
00:29:01.705 --> 00:29:02.885
Any other questions? One more,

690
00:29:07.835 --> 00:29:11.815
Um, one, one note on the, uh, um, singular point of, uh,

691
00:29:11.845 --> 00:29:14.135
authority for continued test operations.

692
00:29:14.595 --> 00:29:16.455
Uh, absolutely excellent point.

693
00:29:16.555 --> 00:29:19.815
We, we had to come up with more structure

694
00:29:19.955 --> 00:29:21.855
around our flight suspension process

695
00:29:22.035 --> 00:29:24.855
and how to get back into continued flight operations

696
00:29:25.395 --> 00:29:28.135
is very much a process that's questioned by your customer.

697
00:29:28.715 --> 00:29:30.255
Uh, it ever happens.

698
00:29:30.555 --> 00:29:32.855
And it's great to discuss the details of that

699
00:29:32.855 --> 00:29:33.895
with them ahead of time.

700
00:29:34.315 --> 00:29:36.015
So, yeah. Great point. Thank

701
00:29:36.015 --> 00:29:37.015
You.

702
00:29:37.485 --> 00:29:38.715

Thank you. See you at the break.

703
00:29:39.415 --> 00:29:43.745
And re here's my business card. Oh, Amy.