
MISSION CONTROL CENTER
PAO

1
00:00:01,530 --> 00:00:04,140
>> Well, I'd like to
welcome everybody inside

2
00:00:04,140 --> 00:00:05,160
Mission Control.

3
00:00:05,160 --> 00:00:09,760
We're pleased to be joined this
morning by Gennaro Caliendo.

4
00:00:09,760 --> 00:00:13,720
Gennaro is based at the
Kennedy Space Center in Florida.

5
00:00:13,720 --> 00:00:18,410
He is the partner manager for
the commercial crew program

6
00:00:18,410 --> 00:00:21,600
for Boeing, one of
the three partners

7
00:00:21,600 --> 00:00:25,160
in the Commercial Crew
Integrated Capability contract--

8
00:00:25,160 --> 00:00:27,580
or not really contract, but
space act agreements, I guess.

9
00:00:27,580 --> 00:00:27,720
>> Right.

10
00:00:27,720 --> 00:00:29,270
>> But continuing with that

11
00:00:29,270 --> 00:00:32,100
and that was just

awarded in early August.

12
00:00:32,100 --> 00:00:34,760
Gennaro, welcome
to Mission Control.

13
00:00:34,760 --> 00:00:35,730
We're glad to have you here.

14
00:00:35,730 --> 00:00:36,930
>> Thank you for
having me, Kyle.

15
00:00:36,930 --> 00:00:42,100
>> Gennaro comes to NASA
I guess from years of work

16
00:00:42,100 --> 00:00:44,910
in the aerospace business down
at the Kennedy Space Center.

17
00:00:44,910 --> 00:00:48,460
He started out-- hails from
Long Island area of New York.

18
00:00:48,460 --> 00:00:49,280
>> Right.

19
00:00:49,280 --> 00:00:53,600
>> And had a big interest in
aerospace and a friend suggested

20
00:00:53,600 --> 00:00:56,330
that there might be some
opening down in Florida

21
00:00:56,330 --> 00:00:58,400
and that's how you ended
up with NASA right?

22
00:00:58,400 --> 00:00:59,710
>> Yeah. That's good
memory, Kyle.

23
00:00:59,710 --> 00:01:02,380
That was a while back
we had this discussion.

24
00:01:02,380 --> 00:01:02,470
Yeah.

25
00:01:02,470 --> 00:01:05,780
>> Well yeah, Gennaro,
we talked back in March

26
00:01:05,780 --> 00:01:07,800
when there were seven partners--

27
00:01:07,800 --> 00:01:07,990
>> Right.

28
00:01:07,990 --> 00:01:12,120
>> -- under the previous
commercial crew development,

29
00:01:12,120 --> 00:01:13,460
space act agreements right?

30
00:01:13,460 --> 00:01:17,170
And of course now the programs
whittled that down to the three

31
00:01:17,170 --> 00:01:19,900
that we're working with now
and you retained the role

32
00:01:19,900 --> 00:01:22,570
of partner manager
with Boeing right?

33
00:01:22,570 --> 00:01:24,340
>> Oh, for Boeing, right.

34
00:01:24,340 --> 00:01:24,420
Yeah.

35
00:01:24,420 --> 00:01:28,210
>> Obviously, one of the
reasons that Gennaro's here

36
00:01:28,210 --> 00:01:29,850
and I'll let you
talk about this.

37
00:01:29,850 --> 00:01:32,640
This is your-- you're having
kick off meeting starting

38
00:01:32,640 --> 00:01:35,950
actually today with
Boeing here in Houston

39
00:01:35,950 --> 00:01:38,170
and the whole team has
assembled here, right?

40
00:01:38,170 --> 00:01:38,770
>> That's correct.

41
00:01:38,770 --> 00:01:39,520
We are all here.

42
00:01:39,520 --> 00:01:41,460
We got in here last night
and we're looking forward

43
00:01:41,460 --> 00:01:44,080
to a good review starting this

morning to the next three days.

44
00:01:44,080 --> 00:01:47,750
>> We'll talk about what that
review is all about and I assume

45
00:01:47,750 --> 00:01:49,960
that all the partners are
going to do that, in fact,

46
00:01:49,960 --> 00:01:52,750
we are going to have
conversations

47
00:01:52,750 --> 00:01:54,730
with the three partner managers.

48
00:01:54,730 --> 00:01:57,280
Gennaro happens to be going
first 'cause he's got to get

49
00:01:57,280 --> 00:02:00,870
to the meetings and so we're
going to visit with you first

50
00:02:00,870 --> 00:02:03,820
but talk a little bit about
this whole project this week.

51
00:02:03,820 --> 00:02:05,600
>> Sure. So, we're not--

52
00:02:05,600 --> 00:02:08,770
Boeing doesn't really do
a kick off per se, Kyle.

53
00:02:08,770 --> 00:02:12,170
It's basically a continuation
of their program baseline plan.

54
00:02:12,170 --> 00:02:14,690
So up next for them is--

55
00:02:14,690 --> 00:02:17,490
[inaudible] called the
integrated system review

56
00:02:17,490 --> 00:02:21,520
and essentially what it
does is it sets the baseline

57
00:02:21,520 --> 00:02:22,930
that they're going to be using

58
00:02:22,930 --> 00:02:28,740
over the next 21 months
of this iCAP period.

59
00:02:28,740 --> 00:02:32,500
And what it's doing is it's
comparing how well their

60
00:02:32,500 --> 00:02:35,290
baseline design is meeting
up with their requirements

61
00:02:35,290 --> 00:02:39,260
and then any points of
departure that they need to have

62
00:02:39,260 --> 00:02:42,980
from this point forward that
the improvements to their design

63
00:02:42,980 --> 00:02:44,390
or things that they need to fix

64
00:02:44,390 --> 00:02:46,190
and that's essentially

what we're doing this week

65
00:02:46,190 --> 00:02:49,390
and hopefully we'll have a good
successful review with them.

66
00:02:49,390 --> 00:02:53,790
>> Talk a little bit about how
you were structured at least

67
00:02:53,790 --> 00:02:55,810
from the partner
manager standpoint

68
00:02:55,810 --> 00:03:01,590
under the CCDev 2 part of this
and now under the new program.

69
00:03:01,590 --> 00:03:04,470
>> Right. Under CCDev 2,
we were mostly focused

70
00:03:04,470 --> 00:03:10,270
on accomplishing the task of
providing insight and guidance

71
00:03:10,270 --> 00:03:15,180
against Boeing's design
and their requirements.

72
00:03:15,180 --> 00:03:17,700
For iCAP, what we're going
to do is we're going to kind

73
00:03:17,700 --> 00:03:21,890
of focus a little bit
more on that part of it

74
00:03:21,890 --> 00:03:25,240
as it becomes a more integrated

vehicle but also looking

75
00:03:25,240 --> 00:03:27,940
at certification requirements.

76
00:03:27,940 --> 00:03:28,940
And so what we've done

77
00:03:28,940 --> 00:03:32,960
in our partner integration team
is actually created two legs

78
00:03:32,960 --> 00:03:35,120
of that so we have a set of--

79
00:03:35,120 --> 00:03:38,470
it have deputy Bill
Lane that works for me.

80
00:03:38,470 --> 00:03:40,960
He will be handling
most of the iCAP work

81
00:03:40,960 --> 00:03:42,450
which is this space
act agreement

82
00:03:42,450 --> 00:03:46,850
and then John McKinney, who
also is working in the program

83
00:03:46,850 --> 00:03:48,850
as well before, he
will be handling more

84
00:03:48,850 --> 00:03:51,140
of the certification
issues as it pertains

85

00:03:51,140 --> 00:03:55,320
to NASA type requirements and
how well Boeing is achieving

86
00:03:55,320 --> 00:03:58,750
or accomplishing their goals
to meet our requirements.

87
00:03:58,750 --> 00:04:00,250
>> How big is your team--

88
00:04:00,250 --> 00:04:03,830
I mean obviously it's larger
now probably on the NASA side

89
00:04:03,830 --> 00:04:06,140
than it was under
CCDev to you right?

90
00:04:06,140 --> 00:04:06,720
>> Right. Right.

91
00:04:06,720 --> 00:04:11,570
It is. We've effectively
doubled the size of our team--

92
00:04:11,570 --> 00:04:13,530
our small partner
integration team.

93
00:04:13,530 --> 00:04:14,250
Of course we're pulling

94
00:04:14,250 --> 00:04:17,300
from resources throughout
engineering, safety,

95
00:04:17,300 --> 00:04:21,030
health and medical, and we
have reps on the team from all

96
00:04:21,030 --> 00:04:24,500
of those different categories
that I just described.

97
00:04:24,500 --> 00:04:26,870
And they're pulling from
a pool of resources here

98
00:04:26,870 --> 00:04:29,190
at the Johnson Space Center,
at the Kennedy Space Center,

99
00:04:29,190 --> 00:04:31,810
as well as the Marshall
Space Flight Center depending

100
00:04:31,810 --> 00:04:34,360
on the expertise that
we're looking for.

101
00:04:34,360 --> 00:04:38,700
>> Just to refresh, for
those that maybe new

102
00:04:38,700 --> 00:04:41,280
to commercial crew program
or at least following it.

103
00:04:41,280 --> 00:04:44,270
Talk a little bit about Boeing's
contribution that it's--

104
00:04:44,270 --> 00:04:48,610
obviously they have a capsule
design but it's very robust

105
00:04:48,610 --> 00:04:50,260
and they've made
a lot of progress

106
00:04:50,260 --> 00:04:52,590
through the early stages
and now we're here.

107
00:04:52,590 --> 00:04:53,440
>> Yeah sure.

108
00:04:53,440 --> 00:04:56,190
Boeing is producing the CST-100.

109
00:04:56,190 --> 00:04:58,550
It's a-- as you said
it's a capsule design.

110
00:04:58,550 --> 00:05:02,180
It will be launched on
an ATLAS 5 for right now,

111
00:05:02,180 --> 00:05:05,090
that's what they've
contracted for.

112
00:05:05,090 --> 00:05:09,870
It will fly up into low earth
orbit and then rendezvous--

113
00:05:09,870 --> 00:05:12,550
for us we hope, with the
International Space Station

114
00:05:12,550 --> 00:05:16,530
and then reenter similarly
to any other spacecraft

115
00:05:16,530 --> 00:05:18,950
but instead of-- as in the
shuttle instead of landing

116

00:05:18,950 --> 00:05:21,070
on wheels it's going to
actually use parachutes

117
00:05:21,070 --> 00:05:22,730
like the old Apollo style.

118
00:05:22,730 --> 00:05:24,610
The real interesting thing
about the way they're going

119
00:05:24,610 --> 00:05:26,230
to do it is they're
actually going to land

120
00:05:26,230 --> 00:05:27,970
on land using air bags.

121
00:05:27,970 --> 00:05:32,990
Some of the things within CCDev
2 that they did was to prove

122
00:05:32,990 --> 00:05:36,250
out some of these concepts, what
they considered high-risk areas,

123
00:05:36,250 --> 00:05:39,010
one of them being air bag
technology to make sure

124
00:05:39,010 --> 00:05:40,980
that they can actually
land safely on airbags.

125
00:05:40,980 --> 00:05:41,380
>> Right.

126
00:05:41,380 --> 00:05:42,620
>> The other one was parachutes

127
00:05:42,620 --> 00:05:44,520
to make sure the
parachutes work.

128
00:05:44,520 --> 00:05:46,420
They also had on this vehicle,

129
00:05:46,420 --> 00:05:49,100
just like all the other
partners, they're having

130
00:05:49,100 --> 00:05:51,640
to produce a launch
escape system.

131
00:05:51,640 --> 00:05:53,800
And so they tested out some
of those brand new motors

132
00:05:53,800 --> 00:05:55,630
with their sub contractors.

133
00:05:55,630 --> 00:05:59,080
And then some maneuvering
engines for in space as well.

134
00:05:59,080 --> 00:06:01,210
So they were attempting
to retire a lot

135
00:06:01,210 --> 00:06:03,590
of high risk areas
under CCDev 2.

136
00:06:03,590 --> 00:06:05,520
And now under iCAP
they're going to push

137
00:06:05,520 --> 00:06:09,460

that technology a
little bit further along.

138
00:06:09,460 --> 00:06:10,070
>> All right.

139
00:06:10,070 --> 00:06:14,830
Talk a little bit about--
since you've worked so closely

140
00:06:14,830 --> 00:06:18,870
with Boeing through CCDev 2,
your also comfort factor I guess

141
00:06:18,870 --> 00:06:22,330
in working together, it
obviously gets better and better

142
00:06:22,330 --> 00:06:25,170
in terms of the integration
between the--

143
00:06:25,170 --> 00:06:28,070
I mean Boeing's no stranger to
working with NASA anyway, right?

144
00:06:28,070 --> 00:06:28,470
So.

145
00:06:28,470 --> 00:06:29,490
>> Right. Right.

146
00:06:29,490 --> 00:06:32,880
>> But obviously you all are
getting much more comfortable

147
00:06:32,880 --> 00:06:35,190
working closer together,
that's probably part

148
00:06:35,190 --> 00:06:38,310
of why you retained your
role working with Boeing

149
00:06:38,310 --> 00:06:40,130
as the partner manager.

150
00:06:40,130 --> 00:06:41,690
>> Yeah. We've had
a good relationship.

151
00:06:41,690 --> 00:06:44,210
I think for us it's
more an evolution

152
00:06:44,210 --> 00:06:46,230
of both sides actually.

153
00:06:46,230 --> 00:06:49,740
Boeing and NASA both are, as
we talked about last time,

154
00:06:49,740 --> 00:06:53,130
are in a new kind of environment
and we continue to evolve

155
00:06:53,130 --> 00:06:57,010
as we try and figure out
exactly what our roles are.

156
00:06:57,010 --> 00:07:00,230
This is a learning
process for both of us.

157
00:07:00,230 --> 00:07:03,340
We continue to kind of
maneuver or reshape our teams

158
00:07:03,340 --> 00:07:07,990

on both sides to try and get
the most effective results

159
00:07:07,990 --> 00:07:12,040
out of both sides and we provide
a little bit more guidance

160
00:07:12,040 --> 00:07:15,340
nowadays than we did
on the front end.

161
00:07:15,340 --> 00:07:18,980
And Boeing of course, they're
a very capable corporation,

162
00:07:18,980 --> 00:07:20,750
and they've got very
capable people.

163
00:07:20,750 --> 00:07:24,980
A lot of them are
shuttle heritage people.

164
00:07:24,980 --> 00:07:28,110
And so they know the
kinds of questions to ask

165
00:07:28,110 --> 00:07:31,060
and we also have the right
people on our side to kind

166
00:07:31,060 --> 00:07:33,670
of help the-- get them
the answers when we can.

167
00:07:33,670 --> 00:07:35,290
>> All right.

168
00:07:35,290 --> 00:07:37,120
We're talking with

Gennaro Caliendo,

169
00:07:37,120 --> 00:07:40,280
Gennaro is the partner
manager for NASA in terms

170
00:07:40,280 --> 00:07:44,660
of the commercial crew program
with Boeing and he's in here

171
00:07:44,660 --> 00:07:48,430
in town in Houston for
a series of meetings

172
00:07:48,430 --> 00:07:51,830
to basically get
started with the CCiCAP

173
00:07:51,830 --> 00:07:54,620
which is Commercial Crew
Integrated Capability.

174
00:07:54,620 --> 00:08:00,050
Boeing was awarded
460 million as part

175
00:08:00,050 --> 00:08:04,350
of this latest development as
part of the stepping stones

176
00:08:04,350 --> 00:08:06,570
to get to flight in
a few years and--

177
00:08:06,570 --> 00:08:08,350
you already talked a little bit

178
00:08:08,350 --> 00:08:10,860
about what was accomplished
in CCDev 2.

179
00:08:10,860 --> 00:08:14,520
Obviously there's a whole
series of new milestones or--

180
00:08:14,520 --> 00:08:14,960
>> Correct.

181
00:08:14,960 --> 00:08:18,520
>> -- maybe not new, but a
set of different milestones

182
00:08:18,520 --> 00:08:20,420
that have to be worked out
and it talked a little bit

183
00:08:20,420 --> 00:08:23,080
about how it's structured
in terms of getting to that,

184
00:08:23,080 --> 00:08:24,290
you said 21 months right?

185
00:08:24,290 --> 00:08:24,900
>> 21 months.

186
00:08:24,900 --> 00:08:26,150
Yeah. The base period,
21 months.

187
00:08:26,150 --> 00:08:31,680
So we had-- within our
request for proposals I guess--

188
00:08:31,680 --> 00:08:35,200
I'm probably not using the
right term but we had a request

189
00:08:35,200 --> 00:08:36,620

that they-- all these
partners get

190
00:08:36,620 --> 00:08:39,920
to a critical design review
level within their design.

191
00:08:39,920 --> 00:08:44,150
So in this area here, Boeing
is taking stepping stones

192
00:08:44,150 --> 00:08:45,100
to get to that point.

193
00:08:45,100 --> 00:08:47,020
There's 19 milestones.

194
00:08:47,020 --> 00:08:50,560
The next couple coming up
here are the production design

195
00:08:50,560 --> 00:08:53,590
review, this is where they're
taking and looking at the design

196
00:08:53,590 --> 00:08:57,670
on paper and then seeing how--
if they can actually produce it.

197
00:08:57,670 --> 00:09:00,070
And all of this-- the equipment
and things that are needed

198
00:09:00,070 --> 00:09:02,590
to produce this design
and then after that,

199
00:09:02,590 --> 00:09:06,260
we'll step onto a phase one
safety review and that's

200
00:09:06,260 --> 00:09:08,030
where they're looking at.

201
00:09:08,030 --> 00:09:11,020
The preliminary design review
products that were produced

202
00:09:11,020 --> 00:09:15,240
under CCDev 2 and then doing
the initial hazards and causes

203
00:09:15,240 --> 00:09:17,590
and then the controls
that they have in place

204
00:09:17,590 --> 00:09:20,510
to see how adequate they are
and then see if there's anything

205
00:09:20,510 --> 00:09:22,970
that they needed to do
to improve the design

206
00:09:22,970 --> 00:09:24,850
to prevent these
hazards from occurring.

207
00:09:24,850 --> 00:09:26,920
Now there's a bunch
of other milestones

208
00:09:26,920 --> 00:09:28,110
over the next 21 months--

209
00:09:28,110 --> 00:09:28,350
>> Right.

210
00:09:28,350 --> 00:09:29,980

>> And I guess we'll have
a chance to talk more

211
00:09:29,980 --> 00:09:31,060
about them in the future.

212
00:09:31,060 --> 00:09:32,510
>> Yeah. I hope so.

213
00:09:32,510 --> 00:09:34,280
I know you already
kind of touched on this

214
00:09:34,280 --> 00:09:36,740
but you said back in March
that this was a new world

215
00:09:36,740 --> 00:09:40,040
for both NASA and Boeing even
though they work closer together

216
00:09:40,040 --> 00:09:41,280
on other contracts.

217
00:09:41,280 --> 00:09:43,360
Do you think it's
still a new world

218
00:09:43,360 --> 00:09:45,800
or have we gotten a
little bit past that?

219
00:09:45,800 --> 00:09:47,520
Or we still got ways to go?

220
00:09:47,520 --> 00:09:50,440
>> I think we talked about
it a little bit ago there.

221

00:09:50,440 --> 00:09:53,090
It's a-- it is still new.

222
00:09:53,090 --> 00:09:54,550
We are getting a lot
more comfortable,

223
00:09:54,550 --> 00:09:56,230
working in this environment
both sides.

224
00:09:56,230 --> 00:09:59,270
There are still a few
growing pains to go,

225
00:09:59,270 --> 00:10:03,110
sharing data is really
important when it comes

226
00:10:03,110 --> 00:10:05,130
to this type of business.

227
00:10:05,130 --> 00:10:09,930
We have a lot of expertise on
the NASA side that we can share

228
00:10:09,930 --> 00:10:12,650
from other program shuttle.

229
00:10:12,650 --> 00:10:15,660
ORION is one where this
particular partner benefits

230
00:10:15,660 --> 00:10:17,530
quite a bit from.

231
00:10:17,530 --> 00:10:20,530
The problem we have sometimes
is how to do that exactly

232
00:10:20,530 --> 00:10:22,340
and we're still learning
that process.

233
00:10:22,340 --> 00:10:25,850
We've been working pretty
closely with the folks at ORION

234
00:10:25,850 --> 00:10:28,990
and then try and get
them to work with us

235
00:10:28,990 --> 00:10:31,600
and they've been pretty good
about helping when they can.

236
00:10:31,600 --> 00:10:34,610
Of course there are certain
rules and regulations

237
00:10:34,610 --> 00:10:37,250
and restrictions about how
that data can go back and forth

238
00:10:37,250 --> 00:10:40,770
from not just NASA
to Boeing but NASA

239
00:10:40,770 --> 00:10:42,960
to all these commercial partners
or with any commercial entity.

240
00:10:42,960 --> 00:10:45,410
So we're learning there.

241
00:10:45,410 --> 00:10:49,100
Boeing is really eager
to get some of that data.

242

00:10:49,100 --> 00:10:51,730
We are eager to help
them with that data.

243
00:10:51,730 --> 00:10:54,060
We don't certainly want
to go reinvent the wheel

244
00:10:54,060 --> 00:10:57,840
if we've already produced
it for other programs.

245
00:10:57,840 --> 00:11:01,000
And so that's where, I think,
we continue to learn how

246
00:11:01,000 --> 00:11:02,190
to work in that environment.

247
00:11:02,190 --> 00:11:03,600
>> Well all of that
previous knowledge

248
00:11:03,600 --> 00:11:07,190
from all those other programs,
a shuttle station even,

249
00:11:07,190 --> 00:11:07,880
>> Right.

250
00:11:07,880 --> 00:11:10,780
>> -- certainly helps and, with
regard to all of that activity.

251
00:11:10,780 --> 00:11:11,310
>> Yeah.

252
00:11:11,310 --> 00:11:14,210
>> And of course that's one of
the reasons that Gennaro is here

253
00:11:14,210 --> 00:11:17,880
with the whole team is to
get all that work started

254
00:11:17,880 --> 00:11:20,090
and get more and more
comfortable working together

255
00:11:20,090 --> 00:11:22,200
and get started with
all these milestones.

256
00:11:22,200 --> 00:11:26,530
And so we'll let you go and
get started with all that

257
00:11:26,530 --> 00:11:29,700
and we really appreciate you
coming by and joining us here

258
00:11:29,700 --> 00:11:33,990
in the station flight control
room 'cause obviously one

259
00:11:33,990 --> 00:11:39,040
of the goals is for Boeing to
hopefully send that capsule

260
00:11:39,040 --> 00:11:42,400
with crew members from US soil

261
00:11:42,400 --> 00:11:44,060
to the International
Space Station

262
00:11:44,060 --> 00:11:47,510
to make it even more robust
in terms of crew transport.

263
00:11:47,510 --> 00:11:50,190
So Gennaro we really
appreciate you stopping by.

264
00:11:50,190 --> 00:11:50,650
>> Thank you Kyle.

265
00:11:50,650 --> 00:11:51,470
Thank you for having me.

266
00:11:51,470 --> 00:11:55,220
>> Sure. Gennaro Caliendo, he is
the partner manager for Boeing