
NASA

1
00:00:01,166 --> 00:00:07,166
[music playing]

2
00:00:17,633 --> 00:00:19,166
- Good afternoon, everyone.

3
00:00:19,166 --> 00:00:20,466
[overlapping greetings]

4
00:00:20,466 --> 00:00:22,100
Welcome, welcome.

5
00:00:22,100 --> 00:00:26,600
Welcome to the NASA Ames
2016 Seminar Series.

6
00:00:26,600 --> 00:00:28,533
It's an incredible honor
and privilege

7
00:00:28,533 --> 00:00:31,500
for me to introduce
our guest speaker today.

8
00:00:31,500 --> 00:00:33,566
Today's presentation
is entitled,

9
00:00:33,566 --> 00:00:35,933
"Exploration and
the Journey to Mars."

10
00:00:35,933 --> 00:00:38,133
It'll be given
by NASA Administrator,

11
00:00:38,133 --> 00:00:40,000
Charles Bolden.

12
00:00:40,000 --> 00:00:41,666
I'm going to take
the opportunity here

13
00:00:41,666 --> 00:00:43,166
to give you a little bit
of his background,

14
00:00:43,166 --> 00:00:45,233
since I know many of you
here are students,

15
00:00:45,233 --> 00:00:48,266
and you may not know
as much as we do

16
00:00:48,266 --> 00:00:50,466
within the NASA workforce.

17
00:00:50,466 --> 00:00:54,633
But, Charlie was nominated
by President Barack Obama

18
00:00:54,633 --> 00:00:56,466
and confirmed
by the U.S. Senate

19
00:00:56,466 --> 00:00:59,233
as the 12th administrator
of the National Aeronautics

20
00:00:59,233 --> 00:01:02,100
and Space Administration
in 2009.

21
00:01:02,100 --> 00:01:03,633
He earned a Bachelor
of Science degree

22

00:01:03,633 --> 00:01:06,866
in Electrical Science in 1968,

23
00:01:06,866 --> 00:01:08,933
and was commissioned
as a Second Lieutenant

24
00:01:08,933 --> 00:01:11,233
in the U.S. Marine Corps.

25
00:01:11,233 --> 00:01:14,266
Charlie flew more
than 100 combat missions

26
00:01:14,266 --> 00:01:16,100
in North and South Vietnam,

27
00:01:16,100 --> 00:01:18,000
Laos, Cambodia,

28
00:01:18,000 --> 00:01:19,333
while stationed in Thailand

29
00:01:19,333 --> 00:01:22,866
between 1972 and 1973.

30
00:01:22,866 --> 00:01:25,200
Charlie earned
a Masters of Science degree

31
00:01:25,200 --> 00:01:26,466
in Systems Management

32
00:01:26,466 --> 00:01:30,400
from the University
of Southern California in 1977.

33
00:01:30,400 --> 00:01:31,800
And since I'm a Cal graduate,

34
00:01:31,800 --> 00:01:36,633
I often lose our annual bets
on football to USC.

35
00:01:36,633 --> 00:01:38,966
So, that just comes
with the territory.

36
00:01:38,966 --> 00:01:40,633
[laughs]

37
00:01:42,200 --> 00:01:46,266
Charlie has a 34-year career
with the Marine Corps,

38
00:01:46,266 --> 00:01:48,166
also including 14 years

39
00:01:48,166 --> 00:01:50,800
as a member
of the NASA Astronaut Office.

40
00:01:50,800 --> 00:01:53,466
After joining the office
in 1980,

41
00:01:53,466 --> 00:01:55,566
Charlie flew four times

42
00:01:55,566 --> 00:01:58,966
on space shuttle
between 1986 and 1994,

43
00:01:58,966 --> 00:02:02,266
commanding two of the missions
and piloting two others.

44
00:02:02,266 --> 00:02:05,800

His flights included deployment
of the Hubble Space Telescope,

45
00:02:05,800 --> 00:02:08,700
and the first joint
U.S./Russian shuttle mission,

46
00:02:08,700 --> 00:02:12,433
which featured a cosmonaut
as a member of his crew.

47
00:02:12,433 --> 00:02:15,866
Charlie was inducted into
the U.S. Astronaut Hall of Fame

48
00:02:15,866 --> 00:02:18,800
in May 2006.

49
00:02:18,800 --> 00:02:21,300
After his final shuttle flight
in 1994,

50
00:02:21,300 --> 00:02:22,600
he left NASA

51
00:02:22,600 --> 00:02:25,033
and returned to active duty
with the Marine Corps,

52
00:02:25,033 --> 00:02:27,966
operating forces
as the Deputy Commandant

53
00:02:27,966 --> 00:02:31,233
of Midshipmen
at the U.S. Naval Academy,

54
00:02:31,233 --> 00:02:33,900
and retired with the rank
of Major General.

55
00:02:33,900 --> 00:02:35,733
So please join me

56
00:02:35,733 --> 00:02:37,900
in welcoming my friend,
mentor,

57
00:02:37,900 --> 00:02:39,533
and most importantly,
my boss,

58
00:02:39,533 --> 00:02:41,300
Administrator Charles Bolden.

59
00:02:41,300 --> 00:02:44,300
[applause]

60
00:02:45,366 --> 00:02:46,566
- Thank you.

61
00:02:49,433 --> 00:02:52,366
Thank you, Eugene.
Thanks very much.

62
00:02:52,366 --> 00:02:56,033
And thanks to all of you for--
boy, for filling this place.

63
00:02:56,033 --> 00:02:57,766
The fire marshal's
not real happy,

64
00:02:57,766 --> 00:02:59,300
but, um...
[laughter]

65
00:02:59,300 --> 00:03:02,866
Is the fire marshal still here?

[laughter]

66
00:03:02,866 --> 00:03:05,866
No, it's always good
to come back out to Ames.

67
00:03:05,866 --> 00:03:09,266
This is a very special place
with very special people.

68
00:03:09,266 --> 00:03:11,466
And since--as I look
through the audience,

69
00:03:11,466 --> 00:03:13,800
I will tell most of you--

70
00:03:13,800 --> 00:03:15,800
since none of you were born

71
00:03:15,800 --> 00:03:17,166
when some of the stuff
was going on

72
00:03:17,166 --> 00:03:20,000
about which Eugene just talked,

73
00:03:20,000 --> 00:03:24,366
you've now had your
history lesson for the week.

74
00:03:24,366 --> 00:03:27,200
You probably still don't
know anything about Vietnam,

75
00:03:27,200 --> 00:03:29,266
or where it is, or what it is,
and all that stuff.

76

00:03:29,266 --> 00:03:31,200
But that's okay.

77
00:03:31,200 --> 00:03:33,300
You know, when I was
invited to join you here

78
00:03:33,300 --> 00:03:37,200
as a part of the Director's
Summer Colloquia Series,

79
00:03:37,200 --> 00:03:40,100
I was asked
to focus my presentation

80
00:03:40,100 --> 00:03:42,833
on exploration,

81
00:03:42,833 --> 00:03:45,800
research,
technology,

82
00:03:45,800 --> 00:03:48,233
technology development,

83
00:03:48,233 --> 00:03:51,933
inspiring future generations,
catalyzing scientific progress,

84
00:03:51,933 --> 00:03:53,300
sharing ideas,

85
00:03:53,300 --> 00:03:56,066
communicating new
and exciting concepts,

86
00:03:56,066 --> 00:03:57,900
and doing so in a way
that would appeal

87
00:03:57,900 --> 00:03:59,666
to a diverse audience
of researchers,

88
00:03:59,666 --> 00:04:01,766
students, scientists,

89
00:04:01,766 --> 00:04:03,800
engineers,
and managers.

90
00:04:03,800 --> 00:04:06,900
Oh, and try
to keep things brief.

91
00:04:06,900 --> 00:04:08,066
[laughter]

92
00:04:08,066 --> 00:04:10,166
So, sounds easy enough,

93
00:04:10,166 --> 00:04:13,266
but I tell you
what I'm gonna do.

94
00:04:13,266 --> 00:04:14,833
I'm really interested
in hearing from you all,

95
00:04:14,833 --> 00:04:16,766
more than anything else.

96
00:04:16,766 --> 00:04:20,000
So I thought I would
just kind of summarize

97
00:04:20,000 --> 00:04:22,366
some of those topics
for a few minutes,

98
00:04:22,366 --> 00:04:25,300
and then we'll go
right into a Q&A.

99
00:04:25,300 --> 00:04:27,800
So, I do have two rules,

100
00:04:27,800 --> 00:04:31,333
and they're the rules
I use everywhere I go.

101
00:04:31,333 --> 00:04:34,000
Rule number one is,
you can ask questions anytime.

102
00:04:34,000 --> 00:04:35,200
I know there's a formal

103
00:04:35,200 --> 00:04:37,000
question-and-answer
period afterwards,

104
00:04:37,000 --> 00:04:40,333
but if you're like me and you
don't trust your brain,

105
00:04:40,333 --> 00:04:41,833
you know, to hold the question

106
00:04:41,833 --> 00:04:44,300
until the speaker finishes,
just raise your hand

107
00:04:44,300 --> 00:04:46,900
and I will try
to answer the question.

108
00:04:46,900 --> 00:04:49,133

If you feel like it, you can
come to this mic up here,

109
00:04:49,133 --> 00:04:50,566
but if you want to--
I think they're trying

110
00:04:50,566 --> 00:04:53,366
to capture all this stuff,
so you may want to do that.

111
00:04:53,366 --> 00:04:56,200
But if you can, hold it
until we get to that part.

112
00:04:56,200 --> 00:04:58,766
But don't feel compelled
to have to hold it.

113
00:04:58,766 --> 00:05:01,400
Second rule is,
there are no dumb questions.

114
00:05:01,400 --> 00:05:03,066
If you're thinking about it,

115
00:05:03,066 --> 00:05:06,900
I can guarantee you
that there is at least

116
00:05:06,900 --> 00:05:09,166
one other person
sitting in the audience

117
00:05:09,166 --> 00:05:11,233
who's thinking about
the same question.

118
00:05:11,233 --> 00:05:13,033
And all of the people

thinking about that question

119
00:05:13,033 --> 00:05:14,433
may not be sitting
in the audience,

120
00:05:14,433 --> 00:05:17,300
because it may be one
that I've been asking myself,

121
00:05:17,300 --> 00:05:18,866
and I won't have
an answer for you.

122
00:05:18,866 --> 00:05:21,233
So I'm gonna get Steve Smith,
who is sitting out here.

123
00:05:21,233 --> 00:05:23,300
And he was my colleague
in the Astronaut Office

124
00:05:23,300 --> 00:05:25,966
for a while before he came
back home to the Bay Area,

125
00:05:25,966 --> 00:05:28,300
and now is working as

126
00:05:28,300 --> 00:05:31,133
the Associate Director
for ISS, yeah?

127
00:05:31,133 --> 00:05:33,933
So there are enough of us
in the room

128
00:05:33,933 --> 00:05:37,733
who can try to answer
your questions if you stump me.

129
00:05:37,733 --> 00:05:40,233
You know, one of the things is,

130
00:05:40,233 --> 00:05:41,866
as I've traveled
around the country,

131
00:05:41,866 --> 00:05:43,866
and in fact,
around the world,

132
00:05:43,866 --> 00:05:46,633
I've been telling
anyone who will listen

133
00:05:46,633 --> 00:05:50,066
that our NASA--
and I emphasize the term "our,"

134
00:05:50,066 --> 00:05:53,100
since all of you,
particularly the interns,

135
00:05:53,100 --> 00:05:55,566
you may not identify
as being a part of NASA yet,

136
00:05:55,566 --> 00:05:57,766
but you are.
You are already.

137
00:05:57,766 --> 00:05:59,466
By virtue of the fact
that you're here at Ames,

138
00:05:59,466 --> 00:06:02,266
and you're working as an intern,
it's your NASA.

139
00:06:02,266 --> 00:06:05,533
And so, what I would hope that
whenever this period of time

140
00:06:05,533 --> 00:06:07,933
is done that you finish
your internship,

141
00:06:07,933 --> 00:06:10,666
whenever anybody asks you
what you do or what you did,

142
00:06:10,666 --> 00:06:12,266
you'll stick your chest out
proudly and say,

143
00:06:12,266 --> 00:06:13,633
"I work for NASA."

144
00:06:13,633 --> 00:06:15,433
Because that's really,
really, really important.

145
00:06:15,433 --> 00:06:18,366
You are now official emissaries
and ambassadors

146
00:06:18,366 --> 00:06:19,933
for everything we do.

147
00:06:19,933 --> 00:06:21,833
And I think Eugene
will tell you,

148
00:06:21,833 --> 00:06:23,400
and his deputy, Tom,

149
00:06:23,400 --> 00:06:24,966
all we want you to do

is tell people

150
00:06:24,966 --> 00:06:27,133
about the experience you had
here this summer.

151
00:06:27,133 --> 00:06:30,733
If it was lousy,
tell one of them first.

152
00:06:30,733 --> 00:06:31,900
[laughter]

153
00:06:31,900 --> 00:06:33,266
And then you can
tell other people.

154
00:06:33,266 --> 00:06:36,100
But I--my guess is
you will find that

155
00:06:36,100 --> 00:06:38,300
you had a pretty good time here
this summer.

156
00:06:38,300 --> 00:06:40,466
And you are gonna have
an experience

157
00:06:40,466 --> 00:06:44,100
that many of your peers
will probably never have.

158
00:06:44,100 --> 00:06:46,966
And so, I would implore you
to share it with them

159
00:06:46,966 --> 00:06:48,633
because just in talking
about the things

160
00:06:48,633 --> 00:06:51,266
that you did this summer
you will--

161
00:06:51,266 --> 00:06:53,466
you know, you'll serve
to inspire some of them

162
00:06:53,466 --> 00:06:55,366
to want to do the same thing.

163
00:06:55,366 --> 00:06:58,000
I always emphasize
the word "our,"

164
00:06:58,000 --> 00:07:01,266
for the very reason
that I just explained to you,

165
00:07:01,266 --> 00:07:04,900
but I say that our NASA
is as strong as it's ever been.

166
00:07:04,900 --> 00:07:09,466
Back in Washington, where people
can tend to be pretty cynical,

167
00:07:09,466 --> 00:07:12,133
frequently when I say NASA's
as strong as it's ever been,

168
00:07:12,133 --> 00:07:14,366
they say, "Yeah,
but what about the Apollo era?"

169
00:07:14,366 --> 00:07:16,966
And I said, "Yeah?"

170

00:07:16,966 --> 00:07:18,466
"Well what about
the height of Shuttle?"

171
00:07:18,466 --> 00:07:20,300
And I say, "Yeah?"

172
00:07:20,300 --> 00:07:22,800
And those were
all phenomenal times,

173
00:07:22,800 --> 00:07:24,100
but I don't think the agency

174
00:07:24,100 --> 00:07:26,366
has been as strong
as it is today

175
00:07:26,366 --> 00:07:27,833
for a variety of reasons.

176
00:07:27,833 --> 00:07:30,666
If you look at the portfolio
today, you know,

177
00:07:30,666 --> 00:07:33,866
NASA was established
way back in 1958,

178
00:07:33,866 --> 00:07:36,266
when we were--
we found out

179
00:07:36,266 --> 00:07:37,966
that there were other countries
in the world

180
00:07:37,966 --> 00:07:39,933
that were interested
in putting things in space,

181
00:07:39,933 --> 00:07:42,100
specifically Sputnik.

182
00:07:42,100 --> 00:07:45,100
Sputnik went overhead
and everybody panicked.

183
00:07:45,100 --> 00:07:47,333
And the President
and the Congress decided

184
00:07:47,333 --> 00:07:48,966
that we needed to do something,

185
00:07:48,966 --> 00:07:52,100
and so they founded NASA

186
00:07:52,100 --> 00:07:55,200
with the National Space Act
of 1958.

187
00:07:55,200 --> 00:07:58,366
And it was founded
to replace an organization

188
00:07:58,366 --> 00:08:00,400
that was called the NACA,

189
00:08:00,400 --> 00:08:04,000
the National Advisory
Committee on Aeronautics,

190
00:08:04,000 --> 00:08:05,733
which happened
to come into being

191
00:08:05,733 --> 00:08:07,933
a little bit more

than a hundred years ago,

192
00:08:07,933 --> 00:08:11,400
when--shortly after the Wright
brothers invented the airplane.

193
00:08:11,400 --> 00:08:14,000
And the Wright brothers
could not convince anybody

194
00:08:14,000 --> 00:08:16,433
in the U.S.,
particularly the Army Air Corps,

195
00:08:16,433 --> 00:08:20,400
that they should invest in this
new thing called "airplanes,"

196
00:08:20,400 --> 00:08:22,233
and while the Wright brothers
were failing

197
00:08:22,233 --> 00:08:23,566
and we weren't doing anything,

198
00:08:23,566 --> 00:08:25,400
the Europeans took
the Wright brothers' airplane

199
00:08:25,400 --> 00:08:26,766
and ran with it.

200
00:08:26,766 --> 00:08:29,833
And so, aviation
and aeronautics began

201
00:08:29,833 --> 00:08:31,233
to develop in Europe,

202

00:08:31,233 --> 00:08:32,933
and I mean, it bolted off.

203
00:08:32,933 --> 00:08:34,866
And the first thing--
the next thing you know,

204
00:08:34,866 --> 00:08:36,766
we looked up
and we were way behind.

205
00:08:36,766 --> 00:08:39,833
And again, the President
and the Congress said, "Wow.

206
00:08:39,833 --> 00:08:41,366
We need to do
something to catch up."

207
00:08:41,366 --> 00:08:42,933
And so they established then

208
00:08:42,933 --> 00:08:45,733
the National Advisory Committee
on Aeronautics,

209
00:08:45,733 --> 00:08:47,033
to help us get caught up.

210
00:08:47,033 --> 00:08:49,233
And it was through NACA,

211
00:08:49,233 --> 00:08:52,233
acting as
an expert advisory committee,

212
00:08:52,233 --> 00:08:53,766
if you will,
for the nation

213
00:08:53,766 --> 00:08:55,433
but mainly for companies

214
00:08:55,433 --> 00:08:57,333
that would become
aircraft manufacturers,

215
00:08:57,333 --> 00:08:58,833
answering critical questions

216
00:08:58,833 --> 00:09:01,566
that the companies
just didn't have the wherewithal

217
00:09:01,566 --> 00:09:02,733
to answer for themselves,

218
00:09:02,733 --> 00:09:04,500
or didn't have facilities
to answer.

219
00:09:04,500 --> 00:09:08,366
So they would typically be asked
to answer a probing question.

220
00:09:08,366 --> 00:09:12,133
And so they did that
until NASA was established.

221
00:09:12,133 --> 00:09:14,200
And then what happened was,
over time,

222
00:09:14,200 --> 00:09:17,133
we gradually began
to forget about our heritage.

223
00:09:17,133 --> 00:09:18,966
Our heritage is aeronautics.

224
00:09:18,966 --> 00:09:21,800
That is the strength of NASA.

225
00:09:21,800 --> 00:09:23,833
Everybody gets excited
about human spaceflight,

226
00:09:23,833 --> 00:09:26,000
because that's exciting stuff.

227
00:09:26,000 --> 00:09:30,400
But it is not the area
that leads the world--

228
00:09:30,400 --> 00:09:33,066
or causes the nation--

229
00:09:33,066 --> 00:09:35,133
it's not what brings about
the largest balance

230
00:09:35,133 --> 00:09:37,233
of trade item for this country.

231
00:09:37,233 --> 00:09:39,433
The largest balance
of trade item is airplanes

232
00:09:39,433 --> 00:09:41,766
and aircraft systems
and the like,

233
00:09:41,766 --> 00:09:44,733
and we dwarf everybody else
in the world in doing that.

234
00:09:44,733 --> 00:09:47,133
And so, NASA still

is called upon

235
00:09:47,133 --> 00:09:48,800
to play a critical role
in the development

236
00:09:48,800 --> 00:09:50,766
of new aeronautical systems

237
00:09:50,766 --> 00:09:53,100
and thus you'll
see that recently,

238
00:09:53,100 --> 00:09:55,433
we were fortunate enough
to get President Obama

239
00:09:55,433 --> 00:09:56,900
to support us in asking

240
00:09:56,900 --> 00:09:58,866
for increased
funding for aeronautics,

241
00:09:58,866 --> 00:10:00,833
so that we can work
our way back

242
00:10:00,833 --> 00:10:03,233
to building X-planes again--

243
00:10:03,233 --> 00:10:04,500
experimental airplanes.

244
00:10:04,500 --> 00:10:06,800
And then the work
that we do in science is just,

245
00:10:06,800 --> 00:10:08,200

I call it off-the-page.

246
00:10:08,200 --> 00:10:11,066
We have now visited
every single planet

247
00:10:11,066 --> 00:10:14,166
in what we call
the "classical" solar system.

248
00:10:14,166 --> 00:10:17,266
We have now found
thousands of other planets

249
00:10:17,266 --> 00:10:18,500
with an instrument

250
00:10:18,500 --> 00:10:21,466
out of here
that's called Kepler.

251
00:10:21,466 --> 00:10:23,466
Now we call it Kepler 2,

252
00:10:23,466 --> 00:10:24,566
because it died

253
00:10:24,566 --> 00:10:26,733
and we rebirthed it,
if you will.

254
00:10:26,733 --> 00:10:28,133
The smart people here at Ames,

255
00:10:28,133 --> 00:10:31,166
along with other scientists
and engineers around the agency,

256
00:10:31,166 --> 00:10:33,233

found a way to take
a crippled instrument

257
00:10:33,233 --> 00:10:34,800
and make it work.

258
00:10:34,800 --> 00:10:37,900
And so since it's
been repurposed,

259
00:10:37,900 --> 00:10:40,333
we've discovered
thousands more planets,

260
00:10:40,333 --> 00:10:41,966
orbiting other suns,

261
00:10:41,966 --> 00:10:44,733
in other solar systems,
and other galaxies.

262
00:10:44,733 --> 00:10:47,833
And it now has just
opened up our eyes to things

263
00:10:47,833 --> 00:10:49,933
that we didn't even
know existed before.

264
00:10:49,933 --> 00:10:53,066
And all this has happened
in your lifetime.

265
00:10:53,066 --> 00:10:55,966
You know, the reason
I talk about NASA though,

266
00:10:55,966 --> 00:10:57,900
and how good it is,
is because of all of you.

267
00:10:57,900 --> 00:11:00,200
Some of you will choose
to come back here

268
00:11:00,200 --> 00:11:02,133
and work with us.

269
00:11:02,133 --> 00:11:04,200
Some of you will go off
and do other things,

270
00:11:04,200 --> 00:11:06,333
but you'll still have
NASA in your blood.

271
00:11:06,333 --> 00:11:09,233
And the lessons
that you learned this summer

272
00:11:09,233 --> 00:11:12,100
I think will stay with you,
hopefully forever.

273
00:11:12,100 --> 00:11:13,733
And you'll use those lessons

274
00:11:13,733 --> 00:11:16,366
as you go off to be productive
in other places.

275
00:11:16,366 --> 00:11:18,366
You know, it's the employees

276
00:11:18,366 --> 00:11:20,800
and I count you as employees.

277
00:11:20,800 --> 00:11:22,266
It's all of you here at Ames

278
00:11:22,266 --> 00:11:24,900
and it's our colleagues
at other NASA centers

279
00:11:24,900 --> 00:11:27,866
and facilities
around the country,

280
00:11:27,866 --> 00:11:29,100
and actually
throughout the world.

281
00:11:29,100 --> 00:11:33,333
Because we have NASA
personnel in many nations

282
00:11:33,333 --> 00:11:35,333
around the world
that are doing our work.

283
00:11:35,333 --> 00:11:37,733
For example, we've got
a whole team of people,

284
00:11:37,733 --> 00:11:39,433
about 30 people in Moscow,

285
00:11:39,433 --> 00:11:41,100
day in and day out,

286
00:11:41,100 --> 00:11:42,966
who work in the
Mission Control Center there.

287
00:11:42,966 --> 00:11:44,733
They're called
the Houston Support Team.

288

00:11:44,733 --> 00:11:46,200
And they have a similar team

289
00:11:46,200 --> 00:11:48,333
that comes from Moscow
to Houston.

290
00:11:48,333 --> 00:11:49,733
And they're
the Moscow Support Team.

291
00:11:49,733 --> 00:11:51,733
And together they cooperate

292
00:11:51,733 --> 00:11:52,966
and run
the International Space Station,

293
00:11:52,966 --> 00:11:55,266
day in and day out.

294
00:11:55,266 --> 00:11:58,333
It's because of the work of
our NASA employees, contractors,

295
00:11:58,333 --> 00:12:02,000
and partners in classrooms,
boardrooms, laboratories,

296
00:12:02,000 --> 00:12:04,433
and even garages
across the country.

297
00:12:04,433 --> 00:12:06,766
That's why I say NASA
is better today

298
00:12:06,766 --> 00:12:09,100
than it's ever been before.

299
00:12:09,100 --> 00:12:11,033
Andrew Carnegie once said,
and I quote,

300
00:12:11,033 --> 00:12:14,033
"Take away my people
but leave my factories,

301
00:12:14,033 --> 00:12:16,866
and soon grass will grow
on the factory floors.

302
00:12:16,866 --> 00:12:19,433
But take away my factories
and leave my people,

303
00:12:19,433 --> 00:12:22,066
and soon we'll have
a new and better factory."

304
00:12:22,066 --> 00:12:23,733
It's you.

305
00:12:23,733 --> 00:12:26,900
It's not machines, it's you.

306
00:12:26,900 --> 00:12:28,766
And it's stuff that you do.

307
00:12:28,766 --> 00:12:31,933
And what is so exciting
about standing up here,

308
00:12:31,933 --> 00:12:35,000
and looking out at all of you
and all these young faces,

309
00:12:35,000 --> 00:12:38,100
is it says our future

is incredibly bright.

310
00:12:38,100 --> 00:12:41,200
You know, it's--I just
came back from Israel,

311
00:12:41,200 --> 00:12:42,866
and Jordan,
and the UAE,

312
00:12:42,866 --> 00:12:44,833
and where we--
we signed two agreements

313
00:12:44,833 --> 00:12:46,933
with the UAE Space Agency.

314
00:12:46,933 --> 00:12:48,933
It's been in existence
two years.

315
00:12:48,933 --> 00:12:52,966
The average age
in the UAE Space Agency is 28.

316
00:12:52,966 --> 00:12:55,033
Almost every single one
of their leaders

317
00:12:55,033 --> 00:12:56,733
has at least one degree

318
00:12:56,733 --> 00:12:58,400
from an American university.

319
00:12:58,400 --> 00:13:01,233
And one of the agreements
we signed with them

320

00:13:01,233 --> 00:13:03,000
is to work on an orbiter

321
00:13:03,000 --> 00:13:05,466
that they want to build
and launch in 2020,

322
00:13:05,466 --> 00:13:07,866
to get to Mars in 2021

323
00:13:07,866 --> 00:13:10,000
to celebrate
the 50th anniversary

324
00:13:10,000 --> 00:13:12,200
of the founding of the UAE.

325
00:13:12,200 --> 00:13:14,366
And that's because
they want to be like us.

326
00:13:14,366 --> 00:13:16,733
And so they want
to partner with us,

327
00:13:16,733 --> 00:13:19,200
and that's really important.

328
00:13:19,200 --> 00:13:20,466
What's the most important thing

329
00:13:20,466 --> 00:13:23,233
that we need to send
American astronauts

330
00:13:23,233 --> 00:13:25,466
to Mars in the 2030s?

331
00:13:25,466 --> 00:13:27,233

People.

332
00:13:27,233 --> 00:13:29,166
Simply put, people.

333
00:13:29,166 --> 00:13:31,233
What's the key to making
aviation greener,

334
00:13:31,233 --> 00:13:32,900
cleaner, safer,
and quieter?

335
00:13:32,900 --> 00:13:34,333
It's people.

336
00:13:34,333 --> 00:13:35,566
How will we succeed

337
00:13:35,566 --> 00:13:37,466
in unlocking more and more
secrets of the universe?

338
00:13:37,466 --> 00:13:39,466
It's our people.

339
00:13:39,466 --> 00:13:40,900
Our people are the keys,

340
00:13:40,900 --> 00:13:43,266
from entry systems
to wind tunnels,

341
00:13:43,266 --> 00:13:45,433
supercomputing to lunar science,

342
00:13:45,433 --> 00:13:47,200
NexGen, airborne science,

343
00:13:47,200 --> 00:13:51,233
low-cost missions,
biology, astrobiology,

344
00:13:51,233 --> 00:13:55,333
for the young lady
back there from Barcelona.

345
00:13:55,333 --> 00:13:57,033
It's people.

346
00:13:57,033 --> 00:13:59,800
Exponents, autonomy, robotics,

347
00:13:59,800 --> 00:14:02,733
human systems integration,
and human capital.

348
00:14:02,733 --> 00:14:04,300
These are all driven
by the creativity,

349
00:14:04,300 --> 00:14:07,833
imagination, innovation,
curiosity, drive,

350
00:14:07,833 --> 00:14:10,933
and ingenuity
of the women and men of Ames

351
00:14:10,933 --> 00:14:13,166
and of NASA as a whole.

352
00:14:13,166 --> 00:14:16,166
Just last week,
I saw a tremendous demonstration

353
00:14:16,166 --> 00:14:19,133
of the work of the folk here

at Ames in Aeronautics.

354
00:14:19,133 --> 00:14:22,466
I was at Charlotte Douglas
International Airport

355
00:14:22,466 --> 00:14:24,100
with U.S. Secretary
of Transportation,

356
00:14:24,100 --> 00:14:25,500
Anthony Foxx,

357
00:14:25,500 --> 00:14:27,266
and friends
from American Airlines

358
00:14:27,266 --> 00:14:29,066
and the FAA.

359
00:14:29,066 --> 00:14:31,266
And we were there to cut
the ribbon on a new lab

360
00:14:31,266 --> 00:14:34,733
that will host Airspace
Technology Demonstration 2,

361
00:14:34,733 --> 00:14:37,066
or ATD2.

362
00:14:37,066 --> 00:14:40,933
Anybody in here
happen to work on ATD2?

363
00:14:40,933 --> 00:14:43,100
It's full of interns
so there may not--oh!

364

00:14:43,100 --> 00:14:46,200
There are two people back there.

365
00:14:46,200 --> 00:14:48,900
I want you to give them,
representing their whole team,

366
00:14:48,900 --> 00:14:50,533
a round of applause
because they--

367
00:14:50,533 --> 00:14:53,533
[applause]

368
00:14:57,300 --> 00:14:59,966
Now you don't have
a clue probably,

369
00:14:59,966 --> 00:15:01,700
what ATD2 does,

370
00:15:01,700 --> 00:15:05,333
so let me try
very succinctly and quickly

371
00:15:05,333 --> 00:15:07,100
to give you an idea
of why it's important.

372
00:15:07,100 --> 00:15:10,500
How many of you
traveled here on an airplane?

373
00:15:10,500 --> 00:15:13,166
And sat on the ramp
after they backed away,

374
00:15:13,166 --> 00:15:16,066
and just sat there,
and sat there, and sat there,

375
00:15:16,066 --> 00:15:18,833
for sometimes hours
before you take off?

376
00:15:18,833 --> 00:15:21,433
Or you land, and you
sit out on the tarmac

377
00:15:21,433 --> 00:15:24,200
waiting to get to the ha--

378
00:15:24,200 --> 00:15:25,866
you know, to the terminal.

379
00:15:25,866 --> 00:15:29,033
The tool that was
developed here at Ames,

380
00:15:29,033 --> 00:15:33,033
that's called Airspace
Technology Demonstration 2,

381
00:15:33,033 --> 00:15:35,400
is intended to try
to avoid having people

382
00:15:35,400 --> 00:15:38,000
sit on the ramp
for hours and hours,

383
00:15:38,000 --> 00:15:40,466
or minutes and minutes,
waiting to take off.

384
00:15:40,466 --> 00:15:42,433
It allows, you know,

385
00:15:42,433 --> 00:15:44,433

it allows us to integrate data

386
00:15:44,433 --> 00:15:46,000
from over air-to-air traffic,

387
00:15:46,000 --> 00:15:48,000
from all around the region,

388
00:15:48,000 --> 00:15:50,200
from all the airplanes
on the airport,

389
00:15:50,200 --> 00:15:52,400
and everything, such that
a dispatcher or whoever it is

390
00:15:52,400 --> 00:15:53,866
that's gonna tell a pilot,

391
00:15:53,866 --> 00:15:57,000
"You're okay to start
your engines and back away."

392
00:15:57,000 --> 00:15:59,000
It doesn't tell them to do that

393
00:15:59,000 --> 00:16:01,033
until there's a slot overhead

394
00:16:01,033 --> 00:16:02,466
that they can back out,

395
00:16:02,466 --> 00:16:05,133
start engines,
taxi, takeoff,

396
00:16:05,133 --> 00:16:08,100
and fly up into that slot
and keep going.

397
00:16:08,100 --> 00:16:10,033
And so that's just
one of the many tools

398
00:16:10,033 --> 00:16:12,166
that have been developed
out here at Ames.

399
00:16:12,166 --> 00:16:14,333
Did I get it close?

400
00:16:14,333 --> 00:16:16,833
I got it close?
Okay.

401
00:16:16,833 --> 00:16:20,000
That's good enough for now?
All right.

402
00:16:20,000 --> 00:16:21,733
Any time you can develop
a technology

403
00:16:21,733 --> 00:16:23,766
that makes life better
for airline passengers

404
00:16:23,766 --> 00:16:24,966
and carriers,
air cargo,

405
00:16:24,966 --> 00:16:26,400
business pilots,

406
00:16:26,400 --> 00:16:28,900
air traffic controllers
and managers alike,

407

00:16:28,900 --> 00:16:30,633
all while reducing
the pollution

408
00:16:30,633 --> 00:16:32,500
that's omitted
into the environment,

409
00:16:32,500 --> 00:16:34,366
it's a really good day.

410
00:16:34,366 --> 00:16:36,366
ATD2 really has an opportunity

411
00:16:36,366 --> 00:16:38,033
to be a game changer

412
00:16:38,033 --> 00:16:40,366
in terms of reducing
airport congestion,

413
00:16:40,366 --> 00:16:42,733
by putting real-time information
into the hands

414
00:16:42,733 --> 00:16:44,366
of all the major players

415
00:16:44,366 --> 00:16:46,200
in air traffic control
and management,

416
00:16:46,200 --> 00:16:48,266
and it's being made possible

417
00:16:48,266 --> 00:16:50,266
by the hard work
of folk here at Ames.

418

00:16:50,266 --> 00:16:53,200
For those of you who are
working on aeronautics,

419
00:16:53,200 --> 00:16:56,933
it's really an exciting time
to be a part of the NASA family.

420
00:16:56,933 --> 00:16:59,500
As you may know,
President Obama is proposing

421
00:16:59,500 --> 00:17:02,333
a $3.7 billion investment

422
00:17:02,333 --> 00:17:03,933
in green aviation.

423
00:17:03,933 --> 00:17:05,866
Among the things
it's making possible is

424
00:17:05,866 --> 00:17:08,366
our New Aviation Horizons
Initiative,

425
00:17:08,366 --> 00:17:09,800
and with it,
the development

426
00:17:09,800 --> 00:17:11,333
of revolutionary,
new X-planes.

427
00:17:11,333 --> 00:17:13,200
We have five X-planes

428
00:17:13,200 --> 00:17:15,166
that we want to begin to build

429
00:17:15,166 --> 00:17:17,066
over the next ten years or so.

430
00:17:17,066 --> 00:17:20,200
One of them is already underway
at--we gave it a--

431
00:17:20,200 --> 00:17:22,800
the Air Force gave it
a designation, the X-57.

432
00:17:22,800 --> 00:17:25,366
And we call it Maxwell.

433
00:17:25,366 --> 00:17:27,633
And it's
a funky-looking airplane.

434
00:17:27,633 --> 00:17:29,133
It's about the size of a Cessna,

435
00:17:29,133 --> 00:17:31,333
but it's got a really long,
slender wing

436
00:17:31,333 --> 00:17:34,600
and 14 propellers on the wing.

437
00:17:34,600 --> 00:17:36,533
And it's an electric airplane,

438
00:17:36,533 --> 00:17:38,333
so it's
a hybrid electric airplane

439
00:17:38,333 --> 00:17:40,733
that we're looking at
to sort of revolutionize

440
00:17:40,733 --> 00:17:42,066
the way that we do air travel.

441
00:17:42,066 --> 00:17:43,933
It'll fly 175 knots.

442
00:17:43,933 --> 00:17:45,633
Now, for some of you,

443
00:17:45,633 --> 00:17:48,666
some of you who fly your jets
around, you know, now and then,

444
00:17:48,666 --> 00:17:50,566
that may not sound fast.

445
00:17:50,566 --> 00:17:52,866
But if you're getting
into the air traffic flow

446
00:17:52,866 --> 00:17:54,666
and you're going
where you want to go,

447
00:17:54,666 --> 00:17:56,066
that's pretty good speed.

448
00:17:56,066 --> 00:17:59,833
So--and the fact
that it's no pollution,

449
00:17:59,833 --> 00:18:02,100
no noise, other kinds of things,

450
00:18:02,100 --> 00:18:03,433
makes it really great.

451
00:18:03,433 --> 00:18:05,666

So we're excited about that.

452
00:18:05,666 --> 00:18:07,366
Sometimes as an organization,

453
00:18:07,366 --> 00:18:10,200
I think it's healthy
to just take a step back

454
00:18:10,200 --> 00:18:13,266
and think of what all this means
in terms of the impact

455
00:18:13,266 --> 00:18:15,900
it will have on our own families
and our neighbors.

456
00:18:15,900 --> 00:18:19,600
So let me invite you
all to close your eyes--

457
00:18:19,600 --> 00:18:22,333
just bear with me.
Play along, all right?

458
00:18:22,333 --> 00:18:23,766
Just close your eyes

459
00:18:23,766 --> 00:18:25,933
for a moment
and imagine with me.

460
00:18:25,933 --> 00:18:29,100
Got to close your eyes!
[scattered laughter]

461
00:18:29,100 --> 00:18:31,433
You know, it's like
when Mom looks around and--

462
00:18:31,433 --> 00:18:33,166
close your eyes!

463
00:18:33,166 --> 00:18:35,966
Okay, don't cheat over here.
All right.

464
00:18:35,966 --> 00:18:37,966
Now imagine,

465
00:18:37,966 --> 00:18:39,766
imagine being able to travel

466
00:18:39,766 --> 00:18:43,100
to most cities in the world
in six hours or less.

467
00:18:43,100 --> 00:18:45,166
Imagine the aircraft
you'll take there

468
00:18:45,166 --> 00:18:47,400
flies faster
than the speed of sound

469
00:18:47,400 --> 00:18:50,800
and it does so over land--
which it cannot do today--

470
00:18:50,800 --> 00:18:53,933
with hardly a hint
of a sonic boom.

471
00:18:53,933 --> 00:18:56,200
Imagine what it will mean
to our environment

472
00:18:56,200 --> 00:18:58,833
if our children and

grandchildren travel on planes

473
00:18:58,833 --> 00:19:01,566
that consume half as much fuel,

474
00:19:01,566 --> 00:19:05,133
that emit only about a quarter
of what aircraft emit today,

475
00:19:05,133 --> 00:19:07,900
that make use
of green energy sources.

476
00:19:07,900 --> 00:19:10,000
Imagine living near an airport

477
00:19:10,000 --> 00:19:12,600
and not being bothered by noise,

478
00:19:12,600 --> 00:19:16,400
because aircraft are operating
some 42 decibels quieter.

479
00:19:16,400 --> 00:19:18,200
Thus, allowing noise
to be contained

480
00:19:18,200 --> 00:19:20,366
within the airport's boundaries.

481
00:19:20,366 --> 00:19:22,500
Imagine what it will mean
to our economy

482
00:19:22,500 --> 00:19:25,200
if more of our neighbors
are working in good jobs,

483
00:19:25,200 --> 00:19:26,800

building those aircraft,

484
00:19:26,800 --> 00:19:29,266
and marketing them
across the world.

485
00:19:29,266 --> 00:19:30,766
It's okay to open
your eyes now.

486
00:19:30,766 --> 00:19:33,133
I appreciate you
all playing along.

487
00:19:33,133 --> 00:19:36,733
When I brag about you
and your fellow NASA employees,

488
00:19:36,733 --> 00:19:39,766
contractors, and partners,
I like to talk about the fact

489
00:19:39,766 --> 00:19:42,933
that you are making
the impossible possible,

490
00:19:42,933 --> 00:19:44,600
that you are turning
science fiction

491
00:19:44,600 --> 00:19:48,233
into science fact
with the work you do every day.

492
00:19:48,233 --> 00:19:50,600
You're not only searching
for life on other planets,

493
00:19:50,600 --> 00:19:52,200
you're improving

the quality of life

494
00:19:52,200 --> 00:19:55,800
for our fellow human beings
right here at home, on Earth.

495
00:19:55,800 --> 00:19:58,233
In this sense,
NASA's journey to Mars

496
00:19:58,233 --> 00:20:01,400
will not only send human beings
to the "Red Planet,"

497
00:20:01,400 --> 00:20:04,966
it will also put people to work
all across our country.

498
00:20:04,966 --> 00:20:07,833
And in fact,
it already is doing so.

499
00:20:07,833 --> 00:20:09,766
It will, and is already,

500
00:20:09,766 --> 00:20:12,500
producing spin-off benefits
that are revolutionizing

501
00:20:12,500 --> 00:20:14,433
the way we protect the health

502
00:20:14,433 --> 00:20:16,033
of both the people we love

503
00:20:16,033 --> 00:20:18,466
and the planet on which we live.

504
00:20:18,466 --> 00:20:20,166

With this in mind,
let's take a break

505
00:20:20,166 --> 00:20:22,133
from our regularly
scheduled programming

506
00:20:22,133 --> 00:20:25,366
and do
some audience participation.

507
00:20:25,366 --> 00:20:27,266
We're gonna play a little game,

508
00:20:27,266 --> 00:20:28,966
and some few of you
have probably

509
00:20:28,966 --> 00:20:30,566
played this game with me before,

510
00:20:30,566 --> 00:20:33,033
if you've seen me speak
other places.

511
00:20:33,033 --> 00:20:35,200
It's called "Mars Matters."

512
00:20:35,200 --> 00:20:37,666
So even though

513
00:20:37,666 --> 00:20:39,666
we here recognize
why Mars matters--

514
00:20:39,666 --> 00:20:41,233
hopefully most of you do--

515
00:20:41,233 --> 00:20:42,733

it's important
every now and then

516
00:20:42,733 --> 00:20:44,300
to remind ourselves,

517
00:20:44,300 --> 00:20:46,766
so that we'll be more effective

518
00:20:46,766 --> 00:20:48,633
in reminding
our friends and neighbors.

519
00:20:48,633 --> 00:20:51,866
So what I want you to do is
I want you to repeat after me.

520
00:20:51,866 --> 00:20:53,700
When I point to the audience,

521
00:20:53,700 --> 00:20:56,200
I just want you all to yell out,
"Mars matters."

522
00:20:56,200 --> 00:20:57,833
Okay, you got it?
Try it one time.

523
00:20:57,833 --> 00:21:01,000
- Mars matters!
- All right, you're good.

524
00:21:01,000 --> 00:21:03,600
Because its formulation
and evolution

525
00:21:03,600 --> 00:21:05,666
are comparable to the Earth's...

526

00:21:05,666 --> 00:21:08,300
- Mars matters!
- Because the journey to Mars

527
00:21:08,300 --> 00:21:10,266
is already creating
and supporting jobs

528
00:21:10,266 --> 00:21:12,100
and economic growth
here at home...

529
00:21:12,100 --> 00:21:14,833
- Mars matters!
- Because it might just

530
00:21:14,833 --> 00:21:17,000
help unravel the age-old mystery

531
00:21:17,000 --> 00:21:19,266
about whether life exists
beyond Earth...

532
00:21:19,266 --> 00:21:21,700
- Mars matters!
- Great job, great job.

533
00:21:21,700 --> 00:21:23,233
You're all hired.

534
00:21:23,233 --> 00:21:26,700
I'd take you along with me
when I go speak places.

535
00:21:26,700 --> 00:21:29,333
Frankly, had you told me

536
00:21:29,333 --> 00:21:32,466
that we'd be this far along
on this journey to Mars

537
00:21:32,466 --> 00:21:33,633
when I first became

538
00:21:33,633 --> 00:21:35,266
the NASA Administrator
seven years ago,

539
00:21:35,266 --> 00:21:37,333
I would've been flabbergasted.

540
00:21:37,333 --> 00:21:39,966
You may recall--
you all won't,

541
00:21:39,966 --> 00:21:41,700
this was--
this is for Jack Boyd,

542
00:21:41,700 --> 00:21:44,700
and Eu--but most of you won't.

543
00:21:44,700 --> 00:21:48,366
Eugene and Tom,
some of you will recall,

544
00:21:48,366 --> 00:21:51,033
but, uh, they will recall

545
00:21:51,033 --> 00:21:54,366
that it was not too long ago

546
00:21:54,366 --> 00:21:56,833
when there was not even
real consensus around Mars

547
00:21:56,833 --> 00:21:58,633
as a destination.

548
00:21:58,633 --> 00:22:01,733
Sure, many of us in this room,

549
00:22:01,733 --> 00:22:03,666
and I do include
the students there,

550
00:22:03,666 --> 00:22:05,000
many of us in this room

551
00:22:05,000 --> 00:22:08,100
had long dreamed
of sending humans to Mars.

552
00:22:08,100 --> 00:22:09,900
But as an aerospace community,

553
00:22:09,900 --> 00:22:13,266
Mars was really just
a broad-horizon goal.

554
00:22:13,266 --> 00:22:15,966
There was no realistic
or sustainable plan in place

555
00:22:15,966 --> 00:22:18,900
for getting there,
there was no timetable.

556
00:22:18,900 --> 00:22:22,100
Today, there's a new consensus
forming around NASA's plan,

557
00:22:22,100 --> 00:22:23,933
timetable, and strategy

558
00:22:23,933 --> 00:22:27,600
for getting human beings
to Mars in the 2030s.

559
00:22:27,600 --> 00:22:29,333
Our plan is available online

560
00:22:29,333 --> 00:22:33,900
at www.Nasa.gov/JourneyToMars,

561
00:22:33,900 --> 00:22:36,233
for anyone and everyone to read.

562
00:22:36,233 --> 00:22:38,766
It's clear, it's affordable,
it's sustainable,

563
00:22:38,766 --> 00:22:40,533
and it's attainable.

564
00:22:40,533 --> 00:22:42,033
And it's dependent

565
00:22:42,033 --> 00:22:44,600
on the hard work of Team Ames.

566
00:22:44,600 --> 00:22:47,166
Today, we're closer to sending
human beings to Mars

567
00:22:47,166 --> 00:22:49,800
than ever before

568
00:22:49,800 --> 00:22:52,100
for anyone, anywhere,

569
00:22:52,100 --> 00:22:53,900
at any time.

570
00:22:53,900 --> 00:22:56,200
I'll tell you this:

One of the great indicators

571
00:22:56,200 --> 00:22:59,166
of progress is that--
that I see--

572
00:22:59,166 --> 00:23:02,033
is that when it comes
to the journey to Mars

573
00:23:02,033 --> 00:23:04,033
it's, quite frankly,

574
00:23:04,033 --> 00:23:06,300
that people don't smirk.

575
00:23:06,300 --> 00:23:09,133
Or they don't laugh
or look at me strange,

576
00:23:09,133 --> 00:23:11,633
like I'm from Mars

577
00:23:11,633 --> 00:23:12,800
when I tell them

578
00:23:12,800 --> 00:23:14,966
that we're headed
to the "Red Planet,"

579
00:23:14,966 --> 00:23:16,566
less often are folk asking,

580
00:23:16,566 --> 00:23:18,133
"Why aren't you doing this?"

581
00:23:18,133 --> 00:23:20,033
Or, "Why aren't you
doing things my way?"

582
00:23:20,033 --> 00:23:22,666
Or, "Is Mars
the right destination?"

583
00:23:22,666 --> 00:23:23,733
Rather, they're asking--

584
00:23:23,733 --> 00:23:25,933
and this is around the world--

585
00:23:25,933 --> 00:23:28,933
they're asking,
"How can we be a part of this?"

586
00:23:28,933 --> 00:23:32,633
And, "What are some areas
in which we can work together?"

587
00:23:32,633 --> 00:23:34,966
So as we open the floor
for discussion,

588
00:23:34,966 --> 00:23:38,866
I want to just ask you
once more to imagine.

589
00:23:38,866 --> 00:23:40,966
Imagine a future
where human beings are living

590
00:23:40,966 --> 00:23:42,633
and working together on Mars,

591
00:23:42,633 --> 00:23:45,166
and kids just view this
as a fact of life,

592
00:23:45,166 --> 00:23:47,700

much like the International
Space Station today.

593
00:23:47,700 --> 00:23:51,333
Anybody in here 15 years
or younger, 16 or younger?

594
00:23:51,333 --> 00:23:54,233
There's one over there,
one here.

595
00:23:54,233 --> 00:23:55,800
They are the Mars Gen--

596
00:23:55,800 --> 00:23:57,333
they are part of
the Mars Generation.

597
00:23:57,333 --> 00:24:00,166
President Obama calls
you all the Mars--

598
00:24:00,166 --> 00:24:02,366
you're part of
the Space Generation,

599
00:24:02,366 --> 00:24:05,033
and President Obama calls you
a part of the Mars Generation.

600
00:24:05,033 --> 00:24:06,833
And the reason
I say that is because

601
00:24:06,833 --> 00:24:09,033
there has not been
one second of your life,

602
00:24:09,033 --> 00:24:10,366
or one second of your life--

603
00:24:10,366 --> 00:24:12,866
you have not breathed one breath

604
00:24:12,866 --> 00:24:14,700
when human beings
have not been living

605
00:24:14,700 --> 00:24:16,700
and working off this planet,

606
00:24:16,700 --> 00:24:18,866
on the International
Space Station.

607
00:24:18,866 --> 00:24:20,300
In your lifetime.

608
00:24:20,300 --> 00:24:21,766
You're how old?

609
00:24:21,766 --> 00:24:24,300
- I'm 16.
- 16.

610
00:24:24,300 --> 00:24:26,800
- 16.

611
00:24:26,800 --> 00:24:28,066
And we're still going strong.

612
00:24:28,066 --> 00:24:30,500
And you think about it,
I mean, Steve Smith and I

613
00:24:30,500 --> 00:24:31,766
were talking about it
earlier this morning,

614
00:24:31,766 --> 00:24:33,266
I'm a big fan of recommending

615
00:24:33,266 --> 00:24:34,933
the International Space Station

616
00:24:34,933 --> 00:24:36,966
for the Nobel Peace Prize.

617
00:24:36,966 --> 00:24:39,633
Because the principal partners
are Russia and the U.S.

618
00:24:39,633 --> 00:24:41,933
We can't even talk
to each other down here.

619
00:24:41,933 --> 00:24:43,533
I mean, we have a hard time,
you know,

620
00:24:43,533 --> 00:24:46,533
with the Secretary of State
and the Foreign Minister

621
00:24:46,533 --> 00:24:48,033
sitting in the same room,

622
00:24:48,033 --> 00:24:50,033
and yet,
we work collaboratively on

623
00:24:50,033 --> 00:24:52,033
the International Space Station
day in and day out.

624
00:24:52,033 --> 00:24:54,166
Scott Kelly
and Mikhail Kornienko

625
00:24:54,166 --> 00:24:57,666
just came back from
a year in space as partners.

626
00:24:57,666 --> 00:24:58,966
We've got, you know,

627
00:24:58,966 --> 00:25:00,566
an American astronaut
getting ready to launch.

628
00:25:00,566 --> 00:25:01,966
Kate Rubin is getting
ready to launch

629
00:25:01,966 --> 00:25:03,300
with her Russian counterpart

630
00:25:03,300 --> 00:25:06,766
and a Japanese astronaut
in a week.

631
00:25:06,766 --> 00:25:08,366
It's just incredible,

632
00:25:08,366 --> 00:25:11,433
what we do 250 miles
above Earth.

633
00:25:11,433 --> 00:25:13,766
So it's really, really,
really important.

634
00:25:13,766 --> 00:25:15,366
But imagine a world
where NASA

635
00:25:15,366 --> 00:25:16,766

and our international partners

636
00:25:16,766 --> 00:25:19,333
are using Mars
as a stepping stone

637
00:25:19,333 --> 00:25:21,266
to the rest of the solar system.

638
00:25:21,266 --> 00:25:24,133
Imagine a world where
robust private space industry

639
00:25:24,133 --> 00:25:26,166
is launching human beings,
cargo,

640
00:25:26,166 --> 00:25:28,833
and satellites of all sizes
to space

641
00:25:28,833 --> 00:25:31,233
at a significantly
lower price point,

642
00:25:31,233 --> 00:25:34,333
a world where more Americans
are working in good jobs

643
00:25:34,333 --> 00:25:35,633
as a result of this,

644
00:25:35,633 --> 00:25:38,566
and all our efforts
on commercial crew and cargo,

645
00:25:38,566 --> 00:25:41,866
and the goal of building
a robust commercial market

646
00:25:41,866 --> 00:25:44,166
in low Earth
orbit have been attained.

647
00:25:44,166 --> 00:25:47,200
Imagine a future where
our grandchildren's children

648
00:25:47,200 --> 00:25:49,333
are drinking cleaner water,

649
00:25:49,333 --> 00:25:51,266
breathing cleaner air,

650
00:25:51,266 --> 00:25:55,133
and making use of cleaner energy
thanks to NASA technology.

651
00:25:55,133 --> 00:25:57,100
Imagine a world in which girls

652
00:25:57,100 --> 00:25:59,000
and young me--
young people of color

653
00:25:59,000 --> 00:26:01,133
are more excited
about pursuing education

654
00:26:01,133 --> 00:26:02,800
in science, technology,

655
00:26:02,800 --> 00:26:06,100
engineering, math, and the arts.

656
00:26:06,100 --> 00:26:07,633
And I'll just--

657

00:26:07,633 --> 00:26:10,900
I'll kind of stray here
for a second.

658
00:26:10,900 --> 00:26:12,833
I just came back
two weeks ago,

659
00:26:12,833 --> 00:26:15,666
from a backbreaking trip

660
00:26:15,666 --> 00:26:17,266
through four nations.

661
00:26:17,266 --> 00:26:19,300
We started out in Israel,

662
00:26:19,300 --> 00:26:20,866
we went to Jordan,

663
00:26:20,866 --> 00:26:22,000
then we went to UAE,

664
00:26:22,000 --> 00:26:24,033
and then we came back
to Paris, France.

665
00:26:24,033 --> 00:26:26,166
And I had lived in the--

666
00:26:26,166 --> 00:26:27,766
in the Middle East region

667
00:26:27,766 --> 00:26:30,366
back when I was still
an active duty Marine,

668
00:26:30,366 --> 00:26:32,966
from 1997 to 1998.

669
00:26:32,966 --> 00:26:34,766
And when I went back this time,

670
00:26:34,766 --> 00:26:37,200
I was just blown away
by the way--

671
00:26:37,200 --> 00:26:40,333
the cultural changes
that have taken place.

672
00:26:40,333 --> 00:26:43,333
In STEM-related courses
in colleges and universities

673
00:26:43,333 --> 00:26:46,600
across the region,
in Jordan and UAE,

674
00:26:46,600 --> 00:26:48,733
more than half the students
were women.

675
00:26:48,733 --> 00:26:51,600
[applause]
In, uh...

676
00:26:51,600 --> 00:26:53,300
And of the graduates

677
00:26:53,300 --> 00:26:56,933
and people taking jobs
in the region,

678
00:26:56,933 --> 00:26:59,033
more than half
of them were women.

679

00:26:59,033 --> 00:27:01,000
We met with King Abdullah
of Jordan,

680
00:27:01,000 --> 00:27:04,700
and his science advisor
is a young woman

681
00:27:04,700 --> 00:27:07,866
who happens to be
an engineer and scientist.

682
00:27:07,866 --> 00:27:09,366
When we went to the UAE,

683
00:27:09,366 --> 00:27:12,133
they have a member of
their House of Representatives,

684
00:27:12,133 --> 00:27:14,400
if you will,
the Speaker of the House

685
00:27:14,400 --> 00:27:17,100
is a woman.
Elected by popular vote

686
00:27:17,100 --> 00:27:20,633
and then further elected
to be the Speaker of the House,

687
00:27:20,633 --> 00:27:22,400
by the vote of her peers

688
00:27:22,400 --> 00:27:24,033
in that House.

689
00:27:24,033 --> 00:27:25,700
So, in many ways,

690
00:27:25,700 --> 00:27:27,700
I mean, they've got
a lot of work to do.

691
00:27:27,700 --> 00:27:29,633
There's no mistaking that.

692
00:27:29,633 --> 00:27:32,033
But in many ways,

693
00:27:32,033 --> 00:27:33,733
there are examples of things

694
00:27:33,733 --> 00:27:35,866
that we only wish we could do.

695
00:27:35,866 --> 00:27:37,733
You know, at NASA,
we pride ourselves

696
00:27:37,733 --> 00:27:40,233
in being
a very diverse workplace.

697
00:27:40,233 --> 00:27:41,933
I'd give my eyeteeth

698
00:27:41,933 --> 00:27:45,366
to have 50% of my engineers
be female.

699
00:27:45,366 --> 00:27:48,600
We are a long way
from doing that,

700
00:27:48,600 --> 00:27:50,333
and it's not because
we're not trying.

701
00:27:50,333 --> 00:27:52,166
So, I think there
are important lessons

702
00:27:52,166 --> 00:27:53,600
to be learned everywhere.

703
00:27:53,600 --> 00:27:56,600
Ames plays a critical role

704
00:27:56,600 --> 00:28:00,100
in having played a role
in helping to promote that

705
00:28:00,100 --> 00:28:03,200
because we've had international
interns for years now,

706
00:28:03,200 --> 00:28:04,433
who have been coming here

707
00:28:04,433 --> 00:28:06,866
to the Ames Research Center
in the summertime,

708
00:28:06,866 --> 00:28:09,766
just to get a look
at how we do things at NASA.

709
00:28:09,766 --> 00:28:12,766
And we met
with eight former st--

710
00:28:12,766 --> 00:28:14,100
international interns

711
00:28:14,100 --> 00:28:16,333
and two incoming students

712
00:28:16,333 --> 00:28:18,233
while we were in Jordan
with King Abdullah,

713
00:28:18,233 --> 00:28:19,633
who all had studied--

714
00:28:19,633 --> 00:28:21,966
had worked here
at the Ames Research Center,

715
00:28:21,966 --> 00:28:23,966
and they gave
glowing commentary

716
00:28:23,966 --> 00:28:26,633
about what an experience it was
for them to work here,

717
00:28:26,633 --> 00:28:28,933
alongside U.S. scientists
and engineers.

718
00:28:28,933 --> 00:28:31,666
Where they had a feeling
that they were trusted,

719
00:28:31,666 --> 00:28:33,666
that they were given open access

720
00:28:33,666 --> 00:28:35,166
to everything
that was going on,

721
00:28:35,166 --> 00:28:37,066
and they had an opportunity
to really learn.

722
00:28:37,066 --> 00:28:40,000

So, you know, think about
what's going on.

723
00:28:40,000 --> 00:28:42,233
Just imagine the way
the world can be.

724
00:28:42,233 --> 00:28:45,033
Imagine a future
in which maybe, just maybe,

725
00:28:45,033 --> 00:28:48,766
humanity finds the answer
to the age-old question,

726
00:28:48,766 --> 00:28:51,033
a question that
the ancient Greek philosopher,

727
00:28:51,033 --> 00:28:53,966
engineer, astronomer,

728
00:28:53,966 --> 00:28:56,933
Thales of Miletus,

729
00:28:56,933 --> 00:28:58,566
might have thought to himself

730
00:28:58,566 --> 00:29:00,700
as he stared up
at the night sky.

731
00:29:00,700 --> 00:29:03,933
Of whether we're alone
in the universe.

732
00:29:03,933 --> 00:29:05,400
When I imagine this future,

733

00:29:05,400 --> 00:29:08,133
I can't help but think
of all of you.

734
00:29:08,133 --> 00:29:11,366
The people who are making
that future possible.

735
00:29:11,366 --> 00:29:13,333
Who, as I said a moment ago,

736
00:29:13,333 --> 00:29:15,233
are making
the impossible possible

737
00:29:15,233 --> 00:29:19,066
by turning science fiction
into science fact.

738
00:29:19,066 --> 00:29:22,033
We are now embarked on an
absolutely incredible journey,

739
00:29:22,033 --> 00:29:23,633
unlike any that humanity

740
00:29:23,633 --> 00:29:26,500
has ever undertaken
in our lifetime.

741
00:29:26,500 --> 00:29:28,933
It's a journey that many
of our international partners

742
00:29:28,933 --> 00:29:30,633
are clamoring to join,

743
00:29:30,633 --> 00:29:33,133
and much of the credit
for where we are today

744
00:29:33,133 --> 00:29:36,533
goes to each
and every one of you

745
00:29:36,533 --> 00:29:37,900
who works here at Ames

746
00:29:37,900 --> 00:29:41,100
or who is now here as an intern.

747
00:29:41,100 --> 00:29:43,200
I want to thank all of you
for what you're doing

748
00:29:43,200 --> 00:29:46,266
to make our NASA
as strong as we have ever been.

749
00:29:46,266 --> 00:29:48,033
For the interns,

750
00:29:48,033 --> 00:29:51,366
thanks so much for picking us,
to spend your--

751
00:29:51,366 --> 00:29:53,700
with whom you are spending
your summer.

752
00:29:53,700 --> 00:29:56,000
And hopefully
you'll find us so attractive

753
00:29:56,000 --> 00:29:58,166
that you'll want to come back
and spend more time.

754
00:29:58,166 --> 00:30:00,766

So with that,
I think I'll move over here

755
00:30:00,766 --> 00:30:03,466
and we'll try to answer
some of your questions if I can.

756
00:30:03,466 --> 00:30:04,633
Thanks very much.

757
00:30:04,633 --> 00:30:07,133
[applause]

758
00:30:08,433 --> 00:30:10,433
- Thank you very much.

759
00:30:13,366 --> 00:30:14,766
So, if you have a question,

760
00:30:14,766 --> 00:30:17,033
please line up
in back of the mic

761
00:30:17,033 --> 00:30:18,600
and ask one question only.

762
00:30:18,600 --> 00:30:21,833
Thank you.

763
00:30:21,833 --> 00:30:23,100
- Thank you,
Administrator Bolden.

764
00:30:23,100 --> 00:30:25,700
When did you know
that you wanted to go to space?

765
00:30:25,700 --> 00:30:29,300
- Oh, late, late, late in life.

766
00:30:29,300 --> 00:30:31,333
Um, and what's your--

767
00:30:31,333 --> 00:30:32,933
Would you do me a favor,
when you come up,

768
00:30:32,933 --> 00:30:36,100
would you just give me your name
and where you go to school,

769
00:30:36,100 --> 00:30:39,000
if you're an intern,
or something like that?

770
00:30:39,000 --> 00:30:41,700
And--so if you could give us
your name and your school.

771
00:30:41,700 --> 00:30:43,866
Then I--I apologize.

772
00:30:43,866 --> 00:30:46,000
- My name is Jenny.
I go to Stanford.

773
00:30:46,000 --> 00:30:49,266
- Whoa.
Jenny at Stanford.

774
00:30:49,266 --> 00:30:50,933
Great.

775
00:30:50,933 --> 00:30:54,166
I am one who never dreamed
of going to space.

776
00:30:54,166 --> 00:30:55,833

I never dreamed of be--
growing up--

777
00:30:55,833 --> 00:30:57,266
I grew up
in Columbia, South Carolina,

778
00:30:57,266 --> 00:30:59,700
so there are a lot of reasons
why I never had that dream.

779
00:30:59,700 --> 00:31:01,233
I grew up
in the segregated South

780
00:31:01,233 --> 00:31:03,166
and so for me,

781
00:31:03,166 --> 00:31:05,633
becoming an astronaut
or going to fly an airplane

782
00:31:05,633 --> 00:31:08,066
or something else,
that was just inconceivable.

783
00:31:08,066 --> 00:31:10,100
You know,
my mom and dad were teachers,

784
00:31:10,100 --> 00:31:12,466
and they had told me
and my brother all our lives

785
00:31:12,466 --> 00:31:14,433
that we could do anything
we wanted to do,

786
00:31:14,433 --> 00:31:17,100
as long as we were willing to

study really hard and work hard.

787
00:31:17,100 --> 00:31:19,600
And I believe that
to a certain extent.

788
00:31:19,600 --> 00:31:21,633
But the thought
of being an astronaut,

789
00:31:21,633 --> 00:31:25,000
just--that didn't compute.

790
00:31:25,000 --> 00:31:26,366
What happened was, I--

791
00:31:26,366 --> 00:31:28,066
place that
I did want to go was

792
00:31:28,066 --> 00:31:30,800
the United States Naval Academy,
and I ended up,

793
00:31:30,800 --> 00:31:33,266
after a lot of difficulty
and struggle,

794
00:31:33,266 --> 00:31:34,366
I ended up getting
an appointment

795
00:31:34,366 --> 00:31:37,033
to the Naval Academy,
and I went there

796
00:31:37,033 --> 00:31:40,000
and graduated in 1968,

797

00:31:40,000 --> 00:31:41,533
but my first year there,

798
00:31:41,533 --> 00:31:43,366
I met a young man
who was a major

799
00:31:43,366 --> 00:31:44,800
in the United States
Marine Corps.

800
00:31:44,800 --> 00:31:47,433
So here I was, being influenced

801
00:31:47,433 --> 00:31:49,133
by a guy in the Marine Corps,

802
00:31:49,133 --> 00:31:50,633
and the only two things I knew

803
00:31:50,633 --> 00:31:52,066
when I left
C.A. Johnson High School

804
00:31:52,066 --> 00:31:53,200
in Columbia, South Carolina,

805
00:31:53,200 --> 00:31:55,700
was never,

806
00:31:55,700 --> 00:31:58,233
never, ever
would I be a Marine.

807
00:31:58,233 --> 00:32:00,200
They were absolutely crazy.

808
00:32:00,200 --> 00:32:01,666
[laughter]

809
00:32:01,666 --> 00:32:05,133
And under no circumstances
would I fly airplanes,

810
00:32:05,133 --> 00:32:06,700
because that was
inherently dangerous.

811
00:32:06,700 --> 00:32:09,033
So those were
the only two things I knew

812
00:32:09,033 --> 00:32:10,633
coming out of high school

813
00:32:10,633 --> 00:32:13,500
and my first company officer
was Major John Riley Love,

814
00:32:13,500 --> 00:32:15,600
a person who continued
to influence me

815
00:32:15,600 --> 00:32:18,866
until the day of his death
several years ago.

816
00:32:18,866 --> 00:32:21,533
But when it's time to graduate,
I looked back and I said,

817
00:32:21,533 --> 00:32:24,533
"I want to be like him.

818
00:32:24,533 --> 00:32:26,066
I want to be a Marine.

819
00:32:26,066 --> 00:32:27,766

And I want to be
an infantry Marine."

820
00:32:27,766 --> 00:32:30,333
That's really stupid.
[laughter]

821
00:32:30,333 --> 00:32:32,733
But I was so impressed
that I said,

822
00:32:32,733 --> 00:32:33,900
"I want to be like him."

823
00:32:33,900 --> 00:32:37,533
And some of you interns,
when your time is--

824
00:32:37,533 --> 00:32:39,366
when it's time for you
to make up your mind

825
00:32:39,366 --> 00:32:41,033
four years from now,
or two years from now,

826
00:32:41,033 --> 00:32:42,900
or three years from now,
you're gonna look back

827
00:32:42,900 --> 00:32:44,266
on your experience here
and you're gonna say,

828
00:32:44,266 --> 00:32:46,400
"Boy, I sure would like
to be like Tom,"

829
00:32:46,400 --> 00:32:49,100
or, "I'd like

to be like Dr. Tu,"

830
00:32:49,100 --> 00:32:50,366
or, "I'd like to be
like Jack Boyd,"

831
00:32:50,366 --> 00:32:53,200
or somebody
that you have worked with here

832
00:32:53,200 --> 00:32:54,633
and has really impressed you.

833
00:32:54,633 --> 00:32:57,500
And so--and similarly,

834
00:32:57,500 --> 00:33:00,200
young people
with whom you work today,

835
00:33:00,200 --> 00:33:01,900
whether you're a camp counselor

836
00:33:01,900 --> 00:33:04,300
or a Scout, you know, leader,

837
00:33:04,300 --> 00:33:06,333
or a--it doesn't
make any difference.

838
00:33:06,333 --> 00:33:08,200
Somebody's gonna look at you

839
00:33:08,200 --> 00:33:10,333
and say,
"I want to be like him."

840
00:33:10,333 --> 00:33:14,000
So you're a role model

whether you like it or not.

841
00:33:14,000 --> 00:33:16,800
So keep that
in the back of your mind also,

842
00:33:16,800 --> 00:33:18,800
as you're thinking about
what you want to do.

843
00:33:18,800 --> 00:33:22,833
So I became a Marine
and I married my wonderful wife.

844
00:33:22,833 --> 00:33:25,533
She did not like the idea
that I had become a Marine.

845
00:33:25,533 --> 00:33:27,566
And she did not like the idea

846
00:33:27,566 --> 00:33:29,166
at all that I wanted to be

847
00:33:29,166 --> 00:33:30,800
an infantry officer
and go to Vietnam,

848
00:33:30,800 --> 00:33:32,233
and try to defy

849
00:33:32,233 --> 00:33:34,200
the law of averages
on the life expectancy

850
00:33:34,200 --> 00:33:36,200
of a second lieutenant
infantry officer.

851

00:33:36,200 --> 00:33:38,100
And she kept saying,
"Why don't we go to Pensacola?"

852
00:33:38,100 --> 00:33:39,533
And I said,
"But that's flight school."

853
00:33:39,533 --> 00:33:41,333
She said, "I know,

854
00:33:41,333 --> 00:33:43,000
but we need to go to Pensacola."

855
00:33:43,000 --> 00:33:46,133
And during my time training
as a second lieutenant,

856
00:33:46,133 --> 00:33:49,533
I found I did not like
crawling around in the mud.

857
00:33:49,533 --> 00:33:51,066
And she said,
"That's why I said

858
00:33:51,066 --> 00:33:53,333
We ought to go to Pensacola."
So I said, "Okay."

859
00:33:53,333 --> 00:33:56,700
As I learned over the course
of my 48 years of marriage,

860
00:33:56,700 --> 00:33:58,733
when my wife says,
"We ought to,"

861
00:33:58,733 --> 00:34:02,166
I now generally say,

"Yes, dear."

862
00:34:02,166 --> 00:34:03,966
Because she is probably right.

863
00:34:03,966 --> 00:34:06,800
And so, we struck it off
for Pensacola.

864
00:34:06,800 --> 00:34:08,066
First time I got in an airplane

865
00:34:08,066 --> 00:34:09,666
and lifted off,
I could not believe it.

866
00:34:09,666 --> 00:34:11,566
I mean, I just fell in love
with it right away.

867
00:34:11,566 --> 00:34:12,800
First flight.

868
00:34:12,800 --> 00:34:15,900
And then things happened,
one thing after another.

869
00:34:15,900 --> 00:34:18,533
I had an instructor pilot
who was a test pilot

870
00:34:18,533 --> 00:34:20,666
and he talked about
how difficult it was,

871
00:34:20,666 --> 00:34:21,833
how challenging it was,

872
00:34:21,833 --> 00:34:24,133

not about no scarf
hanging out of the--

873
00:34:24,133 --> 00:34:25,633
you know, out of the cockpit
or any of that stuff,

874
00:34:25,633 --> 00:34:26,800
but how demanding it was.

875
00:34:26,800 --> 00:34:28,266
And that really intrigued me

876
00:34:28,266 --> 00:34:30,133
and so I said,
"You know, one of these days,

877
00:34:30,133 --> 00:34:31,933
I think I'd like to be
a test pilot."

878
00:34:31,933 --> 00:34:34,333
And so I started trying
as soon as I got my wings.

879
00:34:34,333 --> 00:34:36,033
I started applying
to be a test pilot.

880
00:34:36,033 --> 00:34:38,400
Took me about
six or seven years of applying,

881
00:34:38,400 --> 00:34:41,400
and I finally got accepted
to the Navy's test pilot school.

882
00:34:41,400 --> 00:34:43,533
And while I was serving
as a test pilot

883
00:34:43,533 --> 00:34:45,566
in a place called
Patuxent River, Maryland,

884
00:34:45,566 --> 00:34:47,033
NASA had selected
the first group

885
00:34:47,033 --> 00:34:50,166
of space shuttle astronauts,
and among that group was--

886
00:34:50,166 --> 00:34:53,500
they had, two--

887
00:34:53,500 --> 00:34:55,266
three African-Americans
were selected.

888
00:34:55,266 --> 00:34:58,233
Ron McNair, Guy Bluford,
and Fred Gregory.

889
00:34:58,233 --> 00:35:01,300
First people of color ever
in the space program.

890
00:35:01,300 --> 00:35:03,133
And one of them,
Ron McNair,

891
00:35:03,133 --> 00:35:05,266
had grown up just like I had.

892
00:35:05,266 --> 00:35:06,633
He grew up 42 miles from me,

893
00:35:06,633 --> 00:35:10,133

in a little bitty town
named Lake City, South Carolina.

894
00:35:10,133 --> 00:35:11,766
He was a little bit younger
than I was,

895
00:35:11,766 --> 00:35:13,900
but unlike me,
Ron had determined

896
00:35:13,900 --> 00:35:16,066
he was gonna be an astronaut
from the moment--

897
00:35:16,066 --> 00:35:18,600
he doesn't ever remember
not wanting to be an astronaut.

898
00:35:18,600 --> 00:35:20,633
And we sat and talked
for a weekend.

899
00:35:20,633 --> 00:35:21,900
When he got ready
to go back to Houston,

900
00:35:21,900 --> 00:35:23,300
he said, "Are you gonna apply
for the program?"

901
00:35:23,300 --> 00:35:25,033
I said, "Not on your life."

902
00:35:25,033 --> 00:35:26,300
And he said,
"Okay, I don't get it.

903
00:35:26,300 --> 00:35:28,566
Why are you not gonna apply?"

He said, "They--"

904
00:35:28,566 --> 00:35:30,100
I said, "They'd never pick me."

905
00:35:30,100 --> 00:35:31,533
And he looked at me and he said,

906
00:35:31,533 --> 00:35:34,200
"You know, that is
the dumbest thing I ever heard.

907
00:35:34,200 --> 00:35:36,633
How do you know
if you don't apply?"

908
00:35:36,633 --> 00:35:39,433
And he made me feel
about that big.

909
00:35:39,433 --> 00:35:41,333
Because I had forgotten

910
00:35:41,333 --> 00:35:44,233
what my mom and dad
taught me growing up.

911
00:35:44,233 --> 00:35:47,066
And I--Ron left,
and I got my pen and paper,

912
00:35:47,066 --> 00:35:48,133
and I applied.

913
00:35:48,133 --> 00:35:50,133
I was 33 years old.

914
00:35:50,133 --> 00:35:53,166
I was about to be

a major in the Marine Corps,

915
00:35:53,166 --> 00:35:56,066
and I decided I'd do something
that I said I would never do.

916
00:35:56,066 --> 00:35:58,066
I decided I'd apply
for the space program.

917
00:35:58,066 --> 00:36:00,600
And sure enough, I got nominated
by the Marine Corps,

918
00:36:00,600 --> 00:36:02,933
got selected by NASA
to come interview.

919
00:36:02,933 --> 00:36:04,966
And I remember going
from Patuxent River

920
00:36:04,966 --> 00:36:06,366
to Houston
and I told my wife,

921
00:36:06,366 --> 00:36:08,666
"I don't stand
a snowball's chance in hell

922
00:36:08,666 --> 00:36:10,266
of being selected,
but I just want to go down there

923
00:36:10,266 --> 00:36:11,733
and meet astronauts."

924
00:36:11,733 --> 00:36:14,133
And I said, "I'm gonna have
a good time when I go down,"

925
00:36:14,133 --> 00:36:15,833
and I did.
Steve'll tell you.

926
00:36:15,833 --> 00:36:17,900
You can either go down there
and decide to enjoy yourself

927
00:36:17,900 --> 00:36:20,166
and take advantage
of the opportunity,

928
00:36:20,166 --> 00:36:21,500
or you can go down
and get all uptight

929
00:36:21,500 --> 00:36:23,633
and probably just
mess yourself up.

930
00:36:23,633 --> 00:36:25,733
I decided I was gonna have
a good time, and I did.

931
00:36:25,733 --> 00:36:27,833
And I ended up being selected

932
00:36:27,833 --> 00:36:29,933
in the second group
of space shuttle astronauts.

933
00:36:29,933 --> 00:36:32,533
So, very long answer
to your very short question.

934
00:36:32,533 --> 00:36:35,066
But the lesson,
hopefully, for you all is

935
00:36:35,066 --> 00:36:38,166
if there's something you
want to do, ask for it.

936
00:36:38,166 --> 00:36:41,566
You know,
don't let anybody tell you

937
00:36:41,566 --> 00:36:43,566
that you can't do anything.

938
00:36:43,566 --> 00:36:45,166
But, particularly,

939
00:36:45,166 --> 00:36:48,766
don't let yourself
limit yourself.

940
00:36:48,766 --> 00:36:51,866
Three things
I tell students all the time.

941
00:36:51,866 --> 00:36:53,333
Study really hard,

942
00:36:53,333 --> 00:36:55,566
you all know that;
work really hard,

943
00:36:55,566 --> 00:36:57,800
I mean, focus on whatever it is
you're doing in the class,

944
00:36:57,800 --> 00:37:01,066
and the most important thing is
don't ever be afraid of failure.

945
00:37:01,066 --> 00:37:02,900
You know,

I put the limitation on myself.

946
00:37:02,900 --> 00:37:04,966
I was afraid that
I would not be selected.

947
00:37:04,966 --> 00:37:06,933
I just didn't want
to be embarrassed

948
00:37:06,933 --> 00:37:09,033
by applying for the program
and not being selected.

949
00:37:09,033 --> 00:37:12,100
Don't do that.
Particularly women.

950
00:37:12,100 --> 00:37:15,366
Whatever you want to do,
go do it.

951
00:37:15,366 --> 00:37:17,333
When you get into a job,

952
00:37:17,333 --> 00:37:19,800
or you're in an a cl--
you're in a--in an office,

953
00:37:19,800 --> 00:37:24,133
and people are trying to inquire
as to "why are you there,"

954
00:37:24,133 --> 00:37:26,200
don't waste your time

955
00:37:26,200 --> 00:37:28,600
trying to explain your presence.

956

00:37:28,600 --> 00:37:31,066
Just do your job and do it well,

957
00:37:31,066 --> 00:37:33,133
and if they don't understand,

958
00:37:33,133 --> 00:37:35,300
pretty soon
you'll be their boss.

959
00:37:35,300 --> 00:37:38,666
And then you can get rid of 'em
or help them understand,

960
00:37:38,666 --> 00:37:40,900
I don't know.
Question.

961
00:37:40,900 --> 00:37:42,266
- Thank you for your talk.

962
00:37:42,266 --> 00:37:44,833
It's always very inspiring
to hear you.

963
00:37:44,833 --> 00:37:46,866
- Name, name, name.
- My name is Ann-Sophie.

964
00:37:46,866 --> 00:37:48,933
I work in
the Space Bioscience Branch.

965
00:37:48,933 --> 00:37:52,033
So, you know, men were
the first on the moon.

966
00:37:52,033 --> 00:37:56,066
So, you think it's time
and turn for women

967
00:37:56,066 --> 00:37:58,166
to maybe be the first on Mars?
- On Mars?

968
00:37:58,166 --> 00:38:00,833
- Uh-huh.
- What's wrong with that?

969
00:38:00,833 --> 00:38:02,800
And I--and seriously,

970
00:38:02,800 --> 00:38:04,900
you know, we selected--

971
00:38:04,900 --> 00:38:06,933
out of 6800 applicants,

972
00:38:06,933 --> 00:38:09,933
the class of 2013
of NASA astronauts,

973
00:38:09,933 --> 00:38:12,233
we had a first ever,

974
00:38:12,233 --> 00:38:14,166
in anything I've ever
been associated with --

975
00:38:14,166 --> 00:38:16,400
we selected eight--

976
00:38:16,400 --> 00:38:18,966
eight people
in the class of 2013,

977
00:38:18,966 --> 00:38:20,333
out of 6800 applicants,

978
00:38:20,333 --> 00:38:24,266
and the top eight
were 50% men and 50% women.

979
00:38:24,266 --> 00:38:26,033
And I'll tell you,

980
00:38:26,033 --> 00:38:28,800
every single one
of those eight is just--

981
00:38:28,800 --> 00:38:30,633
they blow your socks off.

982
00:38:30,633 --> 00:38:32,000
They're absolutely incredible.

983
00:38:32,000 --> 00:38:35,733
And I am hoping that
out of the 18,000 applicants

984
00:38:35,733 --> 00:38:38,033
that we got
for the class of 2017,

985
00:38:38,033 --> 00:38:40,000
we will be so fortunate.

986
00:38:40,000 --> 00:38:43,000
But I think one of the reasons
I told you the story

987
00:38:43,000 --> 00:38:45,266
about traveling
through the Middle East

988
00:38:45,266 --> 00:38:47,300
is that we cannot afford,

989
00:38:47,300 --> 00:38:49,533
this nation cannot afford

990
00:38:49,533 --> 00:38:52,166
to shirk half of its population.

991
00:38:52,166 --> 00:38:54,200
We just won't--
we won't survive.

992
00:38:54,200 --> 00:38:57,666
We won't win
if we choose to do that.

993
00:38:57,666 --> 00:38:59,200
So I don't see
anything wrong with that.

994
00:38:59,200 --> 00:39:00,566
Besides, I have
three granddaughters

995
00:39:00,566 --> 00:39:01,933
and I've already
promised them one of 'em

996
00:39:01,933 --> 00:39:04,000
one of them is gonna be on--
[laughter]

997
00:39:04,000 --> 00:39:05,533
On the first crew to Mars.

998
00:39:05,533 --> 00:39:06,800
So I'm in trouble
if they don't make it.

999
00:39:06,800 --> 00:39:08,066
Yeah.

1000
00:39:08,066 --> 00:39:10,600
- Hello, I'm Roberto Carlino.

1001
00:39:10,600 --> 00:39:13,633
I work for test flown mission
of Kepler,

1002
00:39:13,633 --> 00:39:15,600
and I'm also one of
the organizers of

1003
00:39:15,600 --> 00:39:17,900
the Early Career Network
here at Ames.

1004
00:39:17,900 --> 00:39:20,800
So one question that arose

1005
00:39:20,800 --> 00:39:23,800
some time ago was--

1006
00:39:23,800 --> 00:39:27,766
considering all the people
retiring at Ames--

1007
00:39:27,766 --> 00:39:29,200
at NASA in general,

1008
00:39:29,200 --> 00:39:30,800
how we going,

1009
00:39:30,800 --> 00:39:32,866
like, pass down old knowledge

1010
00:39:32,866 --> 00:39:35,133
and experience
to the early careers?

1011
00:39:35,133 --> 00:39:38,066
- Great, great, great,
great question.

1012
00:39:38,066 --> 00:39:41,200
Not enough people
are retiring fast enough,

1013
00:39:41,200 --> 00:39:43,833
to be quite honest.
[laughter]

1014
00:39:43,833 --> 00:39:45,600
Beca--well,
and I--let--

1015
00:39:45,600 --> 00:39:49,266
now let me explain that, okay?

1016
00:39:49,266 --> 00:39:52,066
We ar--because of the way

1017
00:39:52,066 --> 00:39:53,800
that budgets operate,

1018
00:39:53,800 --> 00:39:55,133
you know, we're really--

1019
00:39:55,133 --> 00:39:57,633
Eugene has a lot of you

1020
00:39:57,633 --> 00:39:59,433
he would like to hire.

1021
00:39:59,433 --> 00:40:02,266
But his ability
to hire is very limited

1022

00:40:02,266 --> 00:40:03,766
because, you know,

1023
00:40:03,766 --> 00:40:06,366
he's got a ceiling
that he can't exceed.

1024
00:40:06,366 --> 00:40:08,300
And so, the other thing
I mentioned,

1025
00:40:08,300 --> 00:40:12,166
the fact that while you need
an experienced workforce,

1026
00:40:12,166 --> 00:40:14,866
but you also need fresh blood

1027
00:40:14,866 --> 00:40:16,366
that's coming in

1028
00:40:16,366 --> 00:40:18,466
to replace
that experienced workforce.

1029
00:40:18,466 --> 00:40:21,066
The reason we need
the experienced workforce

1030
00:40:21,066 --> 00:40:23,366
is because they are the wisdom

1031
00:40:23,366 --> 00:40:27,633
that passes down to some of you
sitting around here.

1032
00:40:27,633 --> 00:40:29,500
Let me tell you,
I can ima--

1033
00:40:29,500 --> 00:40:31,766
any of you ever sit down
and talk to Jack Boyd?

1034
00:40:31,766 --> 00:40:33,100
While you've been here?
Anybody?

1035
00:40:33,100 --> 00:40:34,966
Everybody know who Jack Boyd is?

1036
00:40:34,966 --> 00:40:37,333
You sit and talk him

1037
00:40:37,333 --> 00:40:40,533
for five minutes

1038
00:40:40,533 --> 00:40:41,900
and you're drooling.

1039
00:40:41,900 --> 00:40:45,333
You're just--I mean,
the richness of the experiences

1040
00:40:45,333 --> 00:40:48,900
that he has had in his time
in this agency--

1041
00:40:48,900 --> 00:40:51,666
you could talk to Tom or Eugene,
they're not--

1042
00:40:51,666 --> 00:40:54,033
you know,
they're not young chickens,

1043
00:40:54,033 --> 00:40:56,266
and they've had
a lot of experiences.

1044
00:40:56,266 --> 00:40:57,500
I know they look like
they're new,

1045
00:40:57,500 --> 00:40:59,666
but that's the way

1046
00:40:59,666 --> 00:41:01,766
that we do exactly
what you're talking about,

1047
00:41:01,766 --> 00:41:05,700
that we pass down the wealth
of knowledge that we have.

1048
00:41:05,700 --> 00:41:07,700
One of the things
that we're trying to do

1049
00:41:07,700 --> 00:41:11,333
is trying to do what we call
"knowledge capture."

1050
00:41:11,333 --> 00:41:13,800
Usually when we have
an accident in NASA,

1051
00:41:13,800 --> 00:41:15,533
it's because
we forgot something.

1052
00:41:15,533 --> 00:41:18,666
We forgot a lesson
we learned years ago.

1053
00:41:18,666 --> 00:41:20,766
And so we repeat it.

1054

00:41:20,766 --> 00:41:22,400
I tell students
a lot of times--they ask me,

1055
00:41:22,400 --> 00:41:24,566
"What do I need to study
to be an astronaut?"

1056
00:41:24,566 --> 00:41:26,366
Math and science,
that's a no-brainer.

1057
00:41:26,366 --> 00:41:27,733
You know you got to do that.

1058
00:41:27,733 --> 00:41:29,000
Language skills.

1059
00:41:29,000 --> 00:41:31,633
Being able to read,
write, communicate,

1060
00:41:31,633 --> 00:41:33,566
so that you can
let people know

1061
00:41:33,566 --> 00:41:35,700
that you're competent
and you want to do something.

1062
00:41:35,700 --> 00:41:37,166
The other thing is history.

1063
00:41:37,166 --> 00:41:39,466
Because if we do
not study history,

1064
00:41:39,466 --> 00:41:40,933
we are destined to repeat it.

1065
00:41:40,933 --> 00:41:43,800
Nowhere is that as important

1066
00:41:43,800 --> 00:41:45,900
as in the work that we do

1067
00:41:45,900 --> 00:41:49,233
in Space and Aeronautics
Research and Exploration.

1068
00:41:49,233 --> 00:41:51,566
If we don't know our history,

1069
00:41:51,566 --> 00:41:54,200
if we don't remember
when we had a bad day,

1070
00:41:54,200 --> 00:41:56,366
we will repeat that bad day.

1071
00:41:56,366 --> 00:41:59,466
And, you know, we don't
have accidents very often,

1072
00:41:59,466 --> 00:42:01,000
thank goodness...
[knocking on podium]

1073
00:42:01,000 --> 00:42:03,333
But, boy, when we do,
we look back and we go,

1074
00:42:03,333 --> 00:42:06,866
"Man, how did we forget that?"

1075
00:42:06,866 --> 00:42:08,666
You know, we've--
we almost never have

1076
00:42:08,666 --> 00:42:10,866
a brand-new type of accident.

1077
00:42:10,866 --> 00:42:12,333
We just forgot something.

1078
00:42:12,333 --> 00:42:15,033
And that's the value
of having the turnover.

1079
00:42:15,033 --> 00:42:18,000
The experienced,
the wise persons

1080
00:42:18,000 --> 00:42:20,333
talking to the young people
and passing it on.

1081
00:42:20,333 --> 00:42:22,866
They can't pass on
any more to you, though,

1082
00:42:22,866 --> 00:42:24,966
than you're willing to ask for.

1083
00:42:24,966 --> 00:42:27,933
So that's where
the onus is on you.

1084
00:42:27,933 --> 00:42:30,700
Eugene can teach you
all kinds of stuff,

1085
00:42:30,700 --> 00:42:32,400
if you're willing to listen.

1086
00:42:32,400 --> 00:42:34,066
But you've got
to go up and say,

1087
00:42:34,066 --> 00:42:37,266
"Dr. Tu, what--
when did you come to NASA?"

1088
00:42:37,266 --> 00:42:39,166
You know,
"How did you happen to decide

1089
00:42:39,166 --> 00:42:40,766
that you wanted
to do what you do,

1090
00:42:40,766 --> 00:42:42,300
instead of going off

1091
00:42:42,300 --> 00:42:45,966
and being a planetary scientist
or something?"

1092
00:42:45,966 --> 00:42:47,066
You've got to ask.

1093
00:42:47,066 --> 00:42:49,666
So that's on you
while you're here.

1094
00:42:49,666 --> 00:42:51,900
That's one of the reasons
that you come here--

1095
00:42:51,900 --> 00:42:54,166
that we bring you here
for an internship.

1096
00:42:54,166 --> 00:42:56,700
It is to give you an opportunity
to be around people

1097

00:42:56,700 --> 00:42:58,266
that we think are
some of the brightest

1098
00:42:58,266 --> 00:42:59,766
and best in the world,

1099
00:42:59,766 --> 00:43:01,633
not in the country,
in the world,

1100
00:43:01,633 --> 00:43:03,700
and have an opportunity
to rub shoulders with 'em,

1101
00:43:03,700 --> 00:43:05,666
and ask them questions,

1102
00:43:05,666 --> 00:43:08,033
and make sure that
you're smarter than we were.

1103
00:43:08,033 --> 00:43:11,633
So that's important.
Question there.

1104
00:43:11,633 --> 00:43:13,066
- My name's Matthew.

1105
00:43:13,066 --> 00:43:15,166
I'm from the University of Utah,

1106
00:43:15,166 --> 00:43:18,600
and I'm in
the Aero Mechanics Branch.

1107
00:43:18,600 --> 00:43:20,000
I guess you sort of
already answered this,

1108
00:43:20,000 --> 00:43:23,433
but what do you look for

1109
00:43:23,433 --> 00:43:25,133
in astronaut candidates?
- Ah.

1110
00:43:25,133 --> 00:43:26,800
- And what can I do...
- Yeah.

1111
00:43:26,800 --> 00:43:29,133
- To make my resume
a little better?

1112
00:43:29,133 --> 00:43:31,366
[laughter]

1113
00:43:31,366 --> 00:43:35,133
And I'm, you know, considering
joining the military and stuff,

1114
00:43:35,133 --> 00:43:36,566
for other reasons but--

1115
00:43:36,566 --> 00:43:39,766
- Steve actually probably has
a lot better idea than I do,

1116
00:43:39,766 --> 00:43:42,833
because he left the office
much later than I did.

1117
00:43:42,833 --> 00:43:45,133
You want to try it?
What are we looking for today?

1118
00:43:45,133 --> 00:43:47,733
- Yeah, I've had several people

ask me this summer already,

1119
00:43:47,733 --> 00:43:49,266
the same question,

1120
00:43:49,266 --> 00:43:52,666
and what I usually tell them is
to pursue something you love.

1121
00:43:52,666 --> 00:43:54,466
If it happens to help you
in your journey

1122
00:43:54,466 --> 00:43:56,133
to become an astronaut,
that's great,

1123
00:43:56,133 --> 00:43:58,633
but there's a lot of obstacles
to becoming an astronaut,

1124
00:43:58,633 --> 00:44:00,633
so you really want to enjoy
what you're pursuing.

1125
00:44:00,633 --> 00:44:03,433
So that's the--
kind of the number one rule.

1126
00:44:03,433 --> 00:44:05,800
Be diverse, do different things,
try different things,

1127
00:44:05,800 --> 00:44:08,433
don't be afraid to fail,
as General Bolden said.

1128
00:44:08,433 --> 00:44:10,866
But the most important thing
is to enjoy what you're doing.

1129
00:44:10,866 --> 00:44:14,600
So if you have multiple choices
among what you want to pursue,

1130
00:44:14,600 --> 00:44:16,066
you're tempted to choose

1131
00:44:16,066 --> 00:44:17,666
the one you think
improves your chances the best.

1132
00:44:17,666 --> 00:44:18,900
Don't take that one.

1133
00:44:18,900 --> 00:44:21,033
Take the one
that you really love, so...

1134
00:44:21,033 --> 00:44:22,800
- I, you know, kind of echoing
what Steve said,

1135
00:44:22,800 --> 00:44:25,766
I am frequently accused
of being too passionate.

1136
00:44:25,766 --> 00:44:28,766
I cry a lot.
[laughter]

1137
00:44:28,766 --> 00:44:31,133
But I have loved life.

1138
00:44:31,133 --> 00:44:34,800
I, you know--I don't have a--
what's considered to be

1139
00:44:34,800 --> 00:44:37,733

a conventional career
for a Marine,

1140
00:44:37,733 --> 00:44:40,366
and it's just because
I did things that I wanted to do

1141
00:44:40,366 --> 00:44:42,633
and I thought I would enjoy.

1142
00:44:42,633 --> 00:44:44,800
And people would frequently,
at every step they'd say,

1143
00:44:44,800 --> 00:44:46,166
"You know, if you do that,
then that's it.

1144
00:44:46,166 --> 00:44:47,866
Your career is done."

1145
00:44:47,866 --> 00:44:50,600
I said, "That's okay."
You know?

1146
00:44:50,600 --> 00:44:53,366
This is what I want to do
because I--and so I would say,

1147
00:44:53,366 --> 00:44:54,766
like Steve did,
follow your passion.

1148
00:44:54,766 --> 00:44:57,366
That's the number one thing.

1149
00:44:57,366 --> 00:44:58,866
If you don't get it,

1150

00:44:58,866 --> 00:45:01,900
you've had fun.

1151
00:45:01,900 --> 00:45:03,266
- Hi, my name's Jason.

1152
00:45:03,266 --> 00:45:05,400
I go to a school at UC Irvine.

1153
00:45:05,400 --> 00:45:08,900
You talked a little bit
about Mars during your talk,

1154
00:45:08,900 --> 00:45:12,100
but you didn't mention
SpaceX at all,

1155
00:45:12,100 --> 00:45:14,233
and SpaceX wants to be on Mars

1156
00:45:14,233 --> 00:45:15,733
about a decade earlier
than NASA.

1157
00:45:15,733 --> 00:45:18,600
I was wondering, what do you see
NASA's role working with SpaceX?

1158
00:45:18,600 --> 00:45:19,766
And if they beat us to it?

1159
00:45:19,766 --> 00:45:22,366
- Yeah, what we're doing
right now

1160
00:45:22,366 --> 00:45:25,066
is we're a partner with SpaceX.

1161
00:45:25,066 --> 00:45:27,366

You know, we recently signed
an agreement with them

1162
00:45:27,366 --> 00:45:29,633
to work on something
called Red Dragon.

1163
00:45:29,633 --> 00:45:32,900
And we think Red Dragon
is critically important,

1164
00:45:32,900 --> 00:45:36,100
because it's--
while it's not a human mission,

1165
00:45:36,100 --> 00:45:37,866
it'll be the first mission

1166
00:45:37,866 --> 00:45:40,233
that uses supersonic
retropropulsion

1167
00:45:40,233 --> 00:45:42,200
to get on the surface of Mars.

1168
00:45:42,200 --> 00:45:44,566
There are two giant challenges

1169
00:45:44,566 --> 00:45:46,566
right now
to putting humans on Mars.

1170
00:45:46,566 --> 00:45:49,133
One is just
understanding better

1171
00:45:49,133 --> 00:45:50,600
radiation and its impact--

1172

00:45:50,600 --> 00:45:52,066
long-term impact on the body.

1173
00:45:52,066 --> 00:45:54,200
We think we're okay,
but we need to know more.

1174
00:45:54,200 --> 00:45:57,466
The second big challenge is what
we call Entry, Descent, Landing.

1175
00:45:57,466 --> 00:46:00,700
How do you get 20 metric tons
on the surface of Mars?

1176
00:46:00,700 --> 00:46:02,633
Curiosity weighed a ton.

1177
00:46:02,633 --> 00:46:05,700
And we really sweat

1178
00:46:05,700 --> 00:46:07,800
Curiosity's entry and landing,

1179
00:46:07,800 --> 00:46:09,833
but you're talking about
ten times that much,

1180
00:46:09,833 --> 00:46:11,600
20 metric tons--

1181
00:46:11,600 --> 00:46:14,466
or more,
to sustain a human.

1182
00:46:14,466 --> 00:46:15,666
So we're looking at everything.

1183
00:46:15,666 --> 00:46:18,333

We're looking at parachutes,
ballutes,

1184
00:46:18,333 --> 00:46:19,733
just plain old barn do--

1185
00:46:19,733 --> 00:46:21,233
you name it,
and we're doing it.

1186
00:46:21,233 --> 00:46:23,066
But we are not doing any work

1187
00:46:23,066 --> 00:46:25,400
on supersonic retropropulsion.

1188
00:46:25,400 --> 00:46:27,600
SpaceX is,
and so we've supported them

1189
00:46:27,600 --> 00:46:29,466
on every one of their attempts

1190
00:46:29,466 --> 00:46:31,866
to return their
first stage vehicle,

1191
00:46:31,866 --> 00:46:35,133
not because I think it's
important about reusability,

1192
00:46:35,133 --> 00:46:37,766
I mean, I--the, you know--
the court's still out

1193
00:46:37,766 --> 00:46:39,166
on whether or not

1194
00:46:39,166 --> 00:46:41,266

reusable systems
are any cheaper,

1195
00:46:41,266 --> 00:46:43,366
but, boy, the data
that we're getting.

1196
00:46:43,366 --> 00:46:46,633
When they come back
and go through this period of

1197
00:46:46,633 --> 00:46:49,300
from supersonic down to stop,

1198
00:46:49,300 --> 00:46:52,100
that's valuable data.

1199
00:46:52,100 --> 00:46:55,666
I don't look at it
being a contest,

1200
00:46:55,666 --> 00:46:58,633
you know,
if they can get humans on--

1201
00:46:58,633 --> 00:47:00,566
you got to remember
what Elon said.

1202
00:47:00,566 --> 00:47:02,633
He's not coming back.

1203
00:47:02,633 --> 00:47:05,200
That is not our plan.

1204
00:47:05,200 --> 00:47:07,366
So we may take ten years longer,

1205
00:47:07,366 --> 00:47:09,666

if he's able to get there
when he says,

1206
00:47:09,666 --> 00:47:11,933
but ours is gonna be
a round-trip.

1207
00:47:11,933 --> 00:47:14,200
So I just promise people that.

1208
00:47:14,200 --> 00:47:16,200
And I think that's not trivial.

1209
00:47:16,200 --> 00:47:19,833
You know, if you're willing
to go and not come back,

1210
00:47:19,833 --> 00:47:21,333
maybe you want to run that risk.

1211
00:47:21,333 --> 00:47:23,833
We just think it's gonna take us
a little bit longer

1212
00:47:23,833 --> 00:47:26,000
to make sure that we've got,

1213
00:47:26,000 --> 00:47:28,733
you know, robust systems
that we think we need,

1214
00:47:28,733 --> 00:47:31,233
and that's not just
the spacecraft itself,

1215
00:47:31,233 --> 00:47:34,700
but it's the systems that
give us clean drinking water,

1216

00:47:34,700 --> 00:47:37,166
bathrooms that work,
all those kinds of things that

1217
00:47:37,166 --> 00:47:39,733
--we have stuff that breaks on
the International Space Station.

1218
00:47:39,733 --> 00:47:41,833
It's eight months
one-way to Mars.

1219
00:47:41,833 --> 00:47:43,666
So you've got to have
much more robust systems

1220
00:47:43,666 --> 00:47:45,133
than we have today.

1221
00:47:45,133 --> 00:47:48,133
I'm not sure everybody's
thinking about that part.

1222
00:47:48,133 --> 00:47:49,400
Yeah.
Yeah?

1223
00:47:49,400 --> 00:47:53,366
- Okay, I am Miguel.
I am from Mexico City.

1224
00:47:53,366 --> 00:47:56,666
I came here as an international
student on behalf of my school,

1225
00:47:56,666 --> 00:47:58,766
the Metropolitan
Autonomous University,

1226
00:47:58,766 --> 00:48:00,866

and the Mexican Space Agency.

1227
00:48:00,866 --> 00:48:04,833
And we,
at our project here at Ames,

1228
00:48:04,833 --> 00:48:08,166
we are actually working
with these two Jordan students

1229
00:48:08,166 --> 00:48:11,000
that you talked about
a bit earlier.

1230
00:48:11,000 --> 00:48:13,633
And I just wanted to ask
if there's some possibility of,

1231
00:48:13,633 --> 00:48:16,833
I don't know,
making their paperwork easier

1232
00:48:16,833 --> 00:48:18,833
to get their visa here.
- Yeah, yeah.

1233
00:48:18,833 --> 00:48:21,066
- So we are real eager
to have them on our team.

1234
00:48:21,066 --> 00:48:22,500
They've been doing great work,

1235
00:48:22,500 --> 00:48:25,233
I think they even showed you
the things that we--

1236
00:48:25,233 --> 00:48:26,800
they were doing.

1237
00:48:26,800 --> 00:48:29,766
- We--just so--
I don't want to bore everybody,

1238
00:48:29,766 --> 00:48:31,900
but essentially
what he's talking about is,

1239
00:48:31,900 --> 00:48:33,566
you know, everybody--
most people--

1240
00:48:33,566 --> 00:48:35,433
have to have a visa
when they come here.

1241
00:48:35,433 --> 00:48:37,566
And we have two organizations

1242
00:48:37,566 --> 00:48:40,400
that work to enable the
International Intern Program.

1243
00:48:40,400 --> 00:48:43,400
It took years to get clearance

1244
00:48:43,400 --> 00:48:45,233
to conduct the
International Intern Program,

1245
00:48:45,233 --> 00:48:46,866
because post 9/11,

1246
00:48:46,866 --> 00:48:48,400
it's just hard

1247
00:48:48,400 --> 00:48:51,166
to get international peop--

1248
00:48:51,166 --> 00:48:53,566
you know, anyone--
any foreign national,

1249
00:48:53,566 --> 00:48:55,266
aboard a NASA installation,

1250
00:48:55,266 --> 00:48:57,633
and so we've got all kinds
of things we have to do.

1251
00:48:57,633 --> 00:48:59,366
We're looking--
Eugene is working

1252
00:48:59,366 --> 00:49:01,333
with our folk back
at NASA headquarters.

1253
00:49:01,333 --> 00:49:03,566
We've actually got the Office
of International Relations--

1254
00:49:03,566 --> 00:49:06,133
the Office of International
and Interagency Relations,

1255
00:49:06,133 --> 00:49:07,600
and then the Education Office.

1256
00:49:07,600 --> 00:49:09,866
And so, the two of them
put together--

1257
00:49:09,866 --> 00:49:11,200
the International Intern Program

1258
00:49:11,200 --> 00:49:13,333
and we're looking at

a more effective way

1259
00:49:13,333 --> 00:49:16,100
to handle the paperwork part,
the visas,

1260
00:49:16,100 --> 00:49:17,566
so that when they get here,

1261
00:49:17,566 --> 00:49:19,033
the Office of Education
can just,

1262
00:49:19,033 --> 00:49:21,066
boom, work with Ames or Johnson

1263
00:49:21,066 --> 00:49:22,566
or whatever Center
they happen to be on

1264
00:49:22,566 --> 00:49:23,566
and get 'em right to work.

1265
00:49:23,566 --> 00:49:24,900
So that--we just hadn't--

1266
00:49:24,900 --> 00:49:25,966
I guess we hadn't
thought about it.

1267
00:49:25,966 --> 00:49:27,700
We're working on it.

1268
00:49:27,700 --> 00:49:29,833
Thanks for the question.
Anybody else?

1269
00:49:29,833 --> 00:49:31,766
I think we've got time for one

before I have to leave.

1270
00:49:31,766 --> 00:49:33,333
- Me.
One more question.

1271
00:49:33,333 --> 00:49:35,000
- One more question.
- Thank you.

1272
00:49:35,000 --> 00:49:37,033
- They're worried,
'cause I got a plane to catch.

1273
00:49:37,033 --> 00:49:38,233
- I'm Jay Escoke,

1274
00:49:38,233 --> 00:49:40,000
a contractor
from the SETI Institute,

1275
00:49:40,000 --> 00:49:41,966
and you made--
you talked about your plan,

1276
00:49:41,966 --> 00:49:45,033
a long ti--a decade-long plan
for a trip to Mars,

1277
00:49:45,033 --> 00:49:47,300
and we've heard long-term plans
from NASA before,

1278
00:49:47,300 --> 00:49:48,966
and you can make them
as Administration.

1279
00:49:48,966 --> 00:49:50,600
How can we brace against changes

1280
00:49:50,600 --> 00:49:52,833
in government Administrations
and Congresses,

1281
00:49:52,833 --> 00:49:55,100
to be able to keep some of
those plans going forward

1282
00:49:55,100 --> 00:49:57,333
in the multi-decade time span?

1283
00:49:57,333 --> 00:49:59,233
- I would say there are
a couple of things we have done

1284
00:49:59,233 --> 00:50:00,766
and are doing.

1285
00:50:00,766 --> 00:50:04,133
I think we have a viable--

1286
00:50:04,133 --> 00:50:06,400
remember I told you before,
when I became the NASA--

1287
00:50:06,400 --> 00:50:07,966
or before I became
the NASA administrator,

1288
00:50:07,966 --> 00:50:09,533
my--in my confirmation hearing

1289
00:50:09,533 --> 00:50:11,233
I made a promise
to the Congress,

1290
00:50:11,233 --> 00:50:12,766
same promise I had made
to the President.

1291
00:50:12,766 --> 00:50:14,966
I would never bring in
a proposal to them

1292
00:50:14,966 --> 00:50:16,933
that wasn't reasonable,
something that we didn't think

1293
00:50:16,933 --> 00:50:18,100
we could really achieve;

1294
00:50:18,100 --> 00:50:19,566
that it wasn't sustainable,

1295
00:50:19,566 --> 00:50:21,366
it could last over
multiple Administrations

1296
00:50:21,366 --> 00:50:24,033
and multiple Congresses;
and that it was affordable.

1297
00:50:24,033 --> 00:50:26,733
The affordable part is
what kills stuff a lot of times.

1298
00:50:26,733 --> 00:50:29,533
So we recognize, you know,

1299
00:50:29,533 --> 00:50:31,633
about where our budgets
are gonna be.

1300
00:50:31,633 --> 00:50:33,533
We made a decision
several years ago

1301
00:50:33,533 --> 00:50:36,333

that would--
we'd build a strategic plan

1302
00:50:36,333 --> 00:50:38,100
and then price it.

1303
00:50:38,100 --> 00:50:40,033
Tell people what it was
gonna take to do that.

1304
00:50:40,033 --> 00:50:43,366
So the budgets that
we are getting here of late,

1305
00:50:43,366 --> 00:50:45,333
will sustain us

1306
00:50:45,333 --> 00:50:46,733
and will allow us

1307
00:50:46,733 --> 00:50:49,466
to afford sending humans to Mars
in the 2030s.

1308
00:50:49,466 --> 00:50:51,366
So that takes care
of those three things.

1309
00:50:51,366 --> 00:50:53,600
The other thing we've got to do,
the onus is on us,

1310
00:50:53,600 --> 00:50:55,866
is to constantly

1311
00:50:55,866 --> 00:50:57,700
tell people in Congress,

1312
00:50:57,700 --> 00:50:59,166

in the White House,

1313
00:50:59,166 --> 00:51:02,600
in OMB, and everywhere,
what it is we're doing.

1314
00:51:02,600 --> 00:51:03,966
And we've got to give 'em

1315
00:51:03,966 --> 00:51:06,800
little progress markings
all along the way.

1316
00:51:06,800 --> 00:51:09,533
We fired --we did
the last test firing

1317
00:51:09,533 --> 00:51:11,666
of a solid rock--a five-segment
solid rocket booster

1318
00:51:11,666 --> 00:51:13,166
at Utah this morning.

1319
00:51:13,166 --> 00:51:16,633
It went, I think, flawlessly
as far as what I've heard.

1320
00:51:16,633 --> 00:51:19,466
We flew Orion
on its first test flight

1321
00:51:19,466 --> 00:51:21,600
back in December of 2014.

1322
00:51:21,600 --> 00:51:25,366
We're gonna fly SLS
and Orion together in 2018.

1323

00:51:25,366 --> 00:51:27,966
So, I mean, unlike programs

1324
00:51:27,966 --> 00:51:29,600
that were designed
to carry people

1325
00:51:29,600 --> 00:51:32,200
to distant places in the past,

1326
00:51:32,200 --> 00:51:34,400
we're a good little bit
farther along.

1327
00:51:34,400 --> 00:51:37,800
We are--we really kind of
pared down the program.

1328
00:51:37,800 --> 00:51:40,233
We decided we would use--
where we had to--

1329
00:51:40,233 --> 00:51:42,200
we'd use existing technology.

1330
00:51:42,200 --> 00:51:44,300
And as new technologies
come along,

1331
00:51:44,300 --> 00:51:46,100
we'll fold them into the program

1332
00:51:46,100 --> 00:51:49,366
so that it's an evolvable
Mars program.

1333
00:51:49,366 --> 00:51:52,000
Some of the stuff
that we will fly to Mars,

1334
00:51:52,000 --> 00:51:54,233
if you're a first crew member,

1335
00:51:54,233 --> 00:51:56,000
the--hasn't even
been invented yet.

1336
00:51:56,000 --> 00:51:58,500
So that's kind of the way
we're doing it.

1337
00:51:58,500 --> 00:51:59,733
And you all have been great

1338
00:51:59,733 --> 00:52:01,500
and I apologize
for having to run,

1339
00:52:01,500 --> 00:52:04,466
but you know,
if you're an intern,

1340
00:52:04,466 --> 00:52:07,133
really just kind of
suck it up this summer.

1341
00:52:07,133 --> 00:52:10,800
Take advantage.
Ask for the world.

1342
00:52:10,800 --> 00:52:12,633
All they can do
is tell you "no,"

1343
00:52:12,633 --> 00:52:15,366
but if there's something
you want to see here,

1344
00:52:15,366 --> 00:52:18,500

say,
"I heard that you all have...

1345
00:52:18,500 --> 00:52:20,100
and I'd like to see it."

1346
00:52:20,100 --> 00:52:23,266
And if we got it,
you'll probably see it.

1347
00:52:23,266 --> 00:52:26,866
And the other thing is,
just set your goals really high,

1348
00:52:26,866 --> 00:52:30,066
and try not to give up on 'em.

1349
00:52:30,066 --> 00:52:31,666
And you'll
get there eventually,

1350
00:52:31,666 --> 00:52:33,500
but thanks so much
and good luck to all of you.

1351
00:52:33,500 --> 00:52:34,666
Thank you.

1352
00:52:34,666 --> 00:52:36,666
[applause]