
EXPLORE as ONE

1
00:00:00,506 --> 00:00:07,500
[Music]

2
00:00:11,096 --> 00:00:14,766
>> I'm CJ Bixby, I am the Chief
of the Systems Engineering

3
00:00:14,766 --> 00:00:16,036
and Integration Branch,

4
00:00:16,036 --> 00:00:17,896
at NASA's Armstrong
Flight Research Center.

5
00:00:25,426 --> 00:00:26,496
I think there's a good chance

6
00:00:26,496 --> 00:00:28,266
that Armstrong will still
be here in 60 years.

7
00:00:28,496 --> 00:00:30,156
I think we have a few
things going for us.

8
00:00:30,296 --> 00:00:34,976
We have access to restricted
air space and the lake beds,

9
00:00:35,566 --> 00:00:38,356
and about 345 days of
great flying weather.

10
00:00:38,356 --> 00:00:40,316
That gives us a lot of
flexibility to do the kind

11
00:00:40,316 --> 00:00:41,256
of missions that we do.

12
00:00:42,416 --> 00:00:47,686
We have world class capabilities
in flight research integration.

13
00:00:48,246 --> 00:00:52,116
Our mission here is to advance
knowledge through flight.

14
00:00:52,786 --> 00:00:55,656
So, basically what
we do is we look

15
00:00:55,656 --> 00:00:59,296
up to get knowledge
about the universe.

16
00:00:59,896 --> 00:01:02,546
We look down and sniff
around to get knowledge

17
00:01:02,546 --> 00:01:03,886
about the Earth and
the atmosphere.

18
00:01:04,416 --> 00:01:06,946
And we look at the
thing that we're flying

19
00:01:07,346 --> 00:01:08,916
to advance knowledge
about aeronautics.

20
00:01:09,876 --> 00:01:12,246
I don't think that
all the mysteries

21
00:01:12,246 --> 00:01:15,036
of those three things will
be solved in 60 years.

22
00:01:15,036 --> 00:01:18,566
I think we're actually kind of
adding to mystery at this point.

23
00:01:19,126 --> 00:01:23,406
So, I think there's a really
good chance that the kind

24
00:01:23,406 --> 00:01:26,116
of thing that we do here will
still be really relevant.

25
00:01:26,346 --> 00:01:29,476
And that we'll still
need to fly machines

26
00:01:29,476 --> 00:01:31,946
in relevant environments
to get that kind of data.

27
00:01:32,526 --> 00:01:35,496
So, I think we'll still be here,
and I think we'll be vibrant,

28
00:01:36,136 --> 00:01:38,976
robust contributors
to the knowledge base.

29
00:01:47,046 --> 00:01:50,356
So, I don't know what exactly
we'll be working on in 60 years,

30
00:01:51,226 --> 00:01:53,846
but I think there's
a good chance

31
00:01:54,116 --> 00:01:59,936
that we'll still be integrating,
simulating, modeling,

32
00:02:00,136 --> 00:02:03,756
and bringing new technologies to
flight in order to learn stuff

33
00:02:03,756 --> 00:02:07,206
about the universe, and the
planet, and the things that fly.

34
00:02:07,646 --> 00:02:09,756
We're in a really
interesting time right now

35
00:02:10,306 --> 00:02:14,186
where technologies are kind of
coming together and it looks

36
00:02:14,186 --> 00:02:20,486
like markets might open up to
increase accessibility, speed,

37
00:02:21,366 --> 00:02:25,046
and efficiency of air transport.

38
00:02:25,046 --> 00:02:29,856
And we don't know which of
those technologies is going

39
00:02:29,856 --> 00:02:31,206
to kind of win.

40
00:02:31,206 --> 00:02:33,056
You know, what -- which of
those technologies is going

41
00:02:33,116 --> 00:02:33,686
to pan out.

42
00:02:34,016 --> 00:02:34,806

Something will.

43
00:02:35,576 --> 00:02:37,356
And so, I think that you know,

44
00:02:37,356 --> 00:02:40,036
our workforce will
still be doing

45
00:02:40,036 --> 00:02:44,756
that really interesting work of
bringing technologies together,

46
00:02:44,996 --> 00:02:48,796
and working out how to make
complex systems work together

47
00:02:49,456 --> 00:02:53,526
to open those markets
and refine the vehicles

48
00:02:53,526 --> 00:02:55,746
that will operate
in those markets.

49
00:03:02,396 --> 00:03:08,446
A visionary from 60 years
ago would be both amazed

50
00:03:08,826 --> 00:03:11,546
and a little bit disappointed.

51
00:03:11,546 --> 00:03:15,586
I think the compute
power that we have

52
00:03:15,586 --> 00:03:18,296
and the way we use
it would probably,

53
00:03:18,296 --> 00:03:20,626
even if they had been able
to anticipate some of that,

54
00:03:21,146 --> 00:03:23,466
just the fact of it would
probably be amazing.

55
00:03:24,036 --> 00:03:28,496
The way that we use computers
and airplanes, and the amount

56
00:03:28,496 --> 00:03:31,176
of calculations they do,
you know, in real time,

57
00:03:31,606 --> 00:03:33,316
I think that would
be pretty amazing

58
00:03:33,316 --> 00:03:34,886
to somebody from 60 years ago.

59
00:03:35,476 --> 00:03:37,596
The fidelity of our models

60
00:03:37,596 --> 00:03:40,996
and our simulations I think
would be pretty mind-blowing

61
00:03:40,996 --> 00:03:42,576
to somebody from 60 years ago.

62
00:03:43,096 --> 00:03:44,536
And you know, we all carry

63
00:03:44,536 --> 00:03:46,196
around in our pocket
this computer,

64
00:03:46,196 --> 00:03:50,286
and it's an encyclopedia,
and a phone, and a camera.

65
00:03:50,786 --> 00:03:55,676
And you know, I think -- and
the fidelity of that screen,

66
00:03:55,676 --> 00:04:01,136
just the way the color and
the resolution of that screen

67
00:04:01,136 --> 00:04:04,316
in that little, tiny package,
and the way we use it.

68
00:04:04,316 --> 00:04:07,866
Like, we -- I navigate
to the grocery store

69
00:04:08,266 --> 00:04:10,486
with a computer in
my pocket, right?

70
00:04:10,486 --> 00:04:13,186
If you try to explain
to somebody in 1958

71
00:04:13,186 --> 00:04:16,386
that I was doing that, and
they're thinking in 1958 terms

72
00:04:16,386 --> 00:04:18,756
about what a phone,
and a computer,

73
00:04:18,896 --> 00:04:20,396
and an encyclopedia look like,

74
00:04:21,006 --> 00:04:23,336
they would probably think
we were nuts, right?

75
00:04:23,826 --> 00:04:26,046
So, I think that part
would be amazing.

76
00:04:26,086 --> 00:04:29,786
I think the thing that would be
a little bit disappointing is

77
00:04:29,786 --> 00:04:33,856
that we don't have flying cars,
and we don't -- and there's --

78
00:04:33,856 --> 00:04:39,456
and alot of our technology maybe
hasn't accomplished what you

79
00:04:39,456 --> 00:04:41,056
might have hoped it
would accomplish.

80
00:04:41,056 --> 00:04:44,546
I think it's human to think
that technology is going

81
00:04:44,546 --> 00:04:45,846
to solve a lot of
human problems.

82
00:04:46,996 --> 00:04:49,876
And we still have a lot of
stuff that we're dealing

83
00:04:49,876 --> 00:04:53,236
with that our technology
hasn't solved.

84
00:04:53,236 --> 00:04:56,096
And sometimes our technology
exacerbates problems before it

85
00:04:56,096 --> 00:04:56,946
solves them, right?

86
00:04:56,946 --> 00:04:59,746
So, I think that would be
a little bit disappointing.

87
00:04:59,746 --> 00:05:01,246
We still do a lot of our work,

88
00:05:01,506 --> 00:05:03,706
we do it a little bit
by rote sometimes.

89
00:05:03,706 --> 00:05:07,586
We have rote process,
we have bureaucracy.

90
00:05:07,756 --> 00:05:10,906
Our technology didn't
solve out that for us.

91
00:05:10,906 --> 00:05:13,486
And I think that would
probably be disappointing.

92
00:05:13,486 --> 00:05:16,406
But, I think what would be
super satisfying for somebody

93
00:05:16,446 --> 00:05:20,126
from 60 years ago is
to see our workforce,

94
00:05:20,126 --> 00:05:23,766

and the way our workforce
works with the kind of courage,

95
00:05:23,766 --> 00:05:27,876
and integrity, and persistence
that they worked with.

96
00:05:28,576 --> 00:05:30,576
And I think that would
be extremely satisfying

97
00:05:30,576 --> 00:05:31,816
to somebody from 60 years ago.

98
00:05:40,056 --> 00:05:41,876
I think Armstrong's workforce

99
00:05:41,876 --> 00:05:44,866
in the next 60 years will
look a lot like they do today.

100
00:05:44,866 --> 00:05:48,066
They'll be generalists,
they'll be innovators,

101
00:05:48,466 --> 00:05:49,566
they'll be integrators.

102
00:05:50,786 --> 00:05:52,116
I hope they're more diverse.

103
00:05:52,496 --> 00:05:55,036
I hope they look more like
the general population

104
00:05:55,036 --> 00:05:55,696
than we do today.

105
00:05:55,696 --> 00:05:57,386

We're not bad, but
we could be better.

106
00:05:58,206 --> 00:06:02,446
And I hope for that diversity,
because that's strength, right?

107
00:06:02,446 --> 00:06:05,646
I mean, my team fills
in my blind spots.

108
00:06:05,646 --> 00:06:07,706
So, the better, more
diverse my team is,

109
00:06:07,756 --> 00:06:09,756
the fewer blind spots
I'm going to end up with.

110
00:06:10,416 --> 00:06:13,376
I also am interested
in that diversity,

111
00:06:13,376 --> 00:06:16,976
because one of the easiest paths
to inspiration is to be able

112
00:06:16,976 --> 00:06:19,826
to see somebody that
you recognize as being

113
00:06:19,826 --> 00:06:22,476
like you doing something
really challenging.

114
00:06:23,026 --> 00:06:25,036
So, if we have a really
diverse workforce,

115
00:06:25,546 --> 00:06:29,576

we have the opportunity
to inspire a diverse group

116
00:06:29,576 --> 00:06:31,826
of people to come work with us

117
00:06:32,036 --> 00:06:34,916
and solve these really
challenging problems

118
00:06:34,916 --> 00:06:38,626
that are going to need a
really wide perspective

119
00:06:38,706 --> 00:06:39,496
in order to solve.

120
00:06:40,686 --> 00:06:45,026
I think that our future
workforce will be really

121
00:06:45,026 --> 00:06:47,816
comfortable with a lot of tools
that we can just dream of today.

122
00:06:47,816 --> 00:06:51,276
I think there will probably be
some language translation tools

123
00:06:51,316 --> 00:06:52,266
that are kind of seamless.

124
00:06:52,266 --> 00:06:55,276
There'll be some really
seamless collaboration tools.

125
00:06:55,906 --> 00:06:59,246
They'll just be -- and maybe
even some digital coworkers,

126
00:06:59,246 --> 00:06:59,546
right?

127
00:06:59,546 --> 00:07:03,966
And they'll be able to
interface with these machines,

128
00:07:03,966 --> 00:07:08,326
and these algorithms in a
way that we can't do today.

129
00:07:08,326 --> 00:07:11,016
We don't do a good
job of parsing

130
00:07:11,016 --> 00:07:15,026
up human/machine tasks right
now, in 60 years I hope

131
00:07:15,026 --> 00:07:16,576
that we make some
progress there.

132
00:07:16,576 --> 00:07:20,026
So, that their digital coworkers
will actually be pretty

133
00:07:20,026 --> 00:07:21,556
productive in that relationship,

134
00:07:22,456 --> 00:07:24,996
so called relationship would
pretty productive as well.

135
00:07:26,396 --> 00:07:28,356
But, I think if we
do our job right

136
00:07:29,396 --> 00:07:35,106

that we'll recognize
Team Armstrong 2078.

137
00:07:35,106 --> 00:07:37,406
Because the youngest
among us here

138
00:07:37,406 --> 00:07:44,756
in Team Armstrong 2018 will have
taught the oldest among Team

139
00:07:44,756 --> 00:07:49,756
Armstrong 2078 about the
persistence, the courage,

140
00:07:50,586 --> 00:07:55,256
and the innovation that
is needed to challenge --

141
00:07:55,256 --> 00:07:56,976
to tackle these really
challenging problems.

142
00:08:05,206 --> 00:08:07,456
Sometimes the facilities I
think, they'll look a lot

143
00:08:07,456 --> 00:08:10,576
like they do now on the outside,
but they'll be more powerful

144
00:08:10,666 --> 00:08:11,916
on the inside, I hope.

145
00:08:12,666 --> 00:08:15,526
I think -- I hope that
we'll have some --

146
00:08:16,116 --> 00:08:17,146
the ability to sort of,

147
00:08:17,146 --> 00:08:19,286
reconfigure our office
space really easily,

148
00:08:19,426 --> 00:08:22,896
so that it will accommodate
teamwork and individual work,

149
00:08:23,136 --> 00:08:25,036
maybe some kind of
lab work as well.

150
00:08:25,726 --> 00:08:29,236
I hope that we have really
seamless collaboration tools.

151
00:08:29,796 --> 00:08:33,536
I imagine that a lot of us
will continue to show up here,

152
00:08:34,106 --> 00:08:36,216
but our work has always
been about partnerships,

153
00:08:36,216 --> 00:08:40,666
and we'll need really seamless
tools to collaborate widely.

154
00:08:41,416 --> 00:08:44,726
I think that there's some really
interesting things happening

155
00:08:44,726 --> 00:08:46,206
right now We're kind
of on the cusp

156
00:08:46,206 --> 00:08:50,986
of some really interesting
data storage and retrieval.

157
00:08:51,806 --> 00:08:55,866
And I hope that that enables
us to get rid of paper.

158
00:08:55,866 --> 00:08:58,616
So, I hope that in 2078, some

159
00:08:58,616 --> 00:09:01,996
of our younger coworkers
have not seen a piece

160
00:09:01,996 --> 00:09:03,306
of paper in the workplace.

161
00:09:04,616 --> 00:09:06,686
I also hope that
we've figured out how

162
00:09:06,686 --> 00:09:09,006
to configure personal devices

163
00:09:09,206 --> 00:09:11,186
and professional
devices really easily,

164
00:09:11,186 --> 00:09:15,716
so that we can protect
our personal information

165
00:09:15,716 --> 00:09:16,976
and the government's
information.

166
00:09:17,856 --> 00:09:19,946
And I hope that, you know,

167
00:09:19,946 --> 00:09:23,036
we continue to expand

our capability to care

168
00:09:23,036 --> 00:09:24,216
for each other when we're here.

169
00:09:25,056 --> 00:09:27,256
So, that we have, you know,

170
00:09:27,256 --> 00:09:31,166
sort of world class medical
facilities, and gyms,

171
00:09:31,166 --> 00:09:33,946
and opportunities to
rest and recreate,

172
00:09:33,946 --> 00:09:37,546
and healthy eating options
for our world class workforce.

173
00:09:45,556 --> 00:09:46,636
That's up to us.

174
00:09:47,516 --> 00:09:49,686
A lot of people from my
generation wanted to work

175
00:09:49,686 --> 00:09:51,996
at NASA because we saw
moon landings on TV.

176
00:09:52,356 --> 00:09:54,996
We saw people really pushing
the envelope in every sense

177
00:09:55,466 --> 00:09:56,736
to do something really
difficult.

178

00:09:57,326 --> 00:10:02,366
And if we approach our
challenges the way the Apollo

179
00:10:02,366 --> 00:10:07,856
generation approached theirs,
if we choose to explore boldly

180
00:10:07,916 --> 00:10:13,186
as one, then people now and
in the future will be inspired