



1
00:00:07,349 --> 00:00:05,590
we've invited you not just to hear the

2
00:00:09,669 --> 00:00:07,359
president speak but to

3
00:00:12,150 --> 00:00:09,679
to the next phase of the day so if i can

4
00:00:14,070 --> 00:00:12,160
get everybody to just calm down for a

5
00:00:16,310 --> 00:00:14,080
minute we're going to let you get on

6
00:00:19,029 --> 00:00:16,320
buses and go do what the other part of

7
00:00:20,950 --> 00:00:19,039
what we brought you here for

8
00:00:22,470 --> 00:00:20,960
space is critical to this nation and the

9
00:00:25,109 --> 00:00:22,480
men and women of nasa are working

10
00:00:26,070 --> 00:00:25,119
tirelessly to enable the new plans for

11
00:00:27,750 --> 00:00:26,080
nasa

12
00:00:29,589 --> 00:00:27,760
these new plans set the stage for

13
00:00:31,349 --> 00:00:29,599

transformative space achievements over

14

00:00:33,030 --> 00:00:31,359

the coming years

15

00:00:35,670 --> 00:00:33,040

there are a lot of peop smart people in

16

00:00:36,950 --> 00:00:35,680

the room today lots of smart people in

17

00:00:39,830 --> 00:00:36,960

the room today

18

00:00:41,990 --> 00:00:39,840

uh not the least of whom is my friend dr

19

00:00:45,350 --> 00:00:42,000

ed crawley who's sitting there going i

20

00:00:47,270 --> 00:00:45,360

wonder who he's talking about bo bemik

21

00:00:49,430 --> 00:00:47,280

and i should stop now because i'll run

22

00:00:50,869 --> 00:00:49,440

out of names and everything but there

23

00:00:52,549 --> 00:00:50,879

are lots of smart people here and we

24

00:00:54,229 --> 00:00:52,559

want to take advantage of having you all

25

00:00:55,910 --> 00:00:54,239

here

26

00:00:58,069 --> 00:00:55,920

i know that we can count on all of you

27

00:00:59,750 --> 00:00:58,079

to contribute your thoughts and your

28

00:01:01,349 --> 00:00:59,760

ideas and the sessions that follow and

29

00:01:02,150 --> 00:01:01,359

we really want you to do that this is

30

00:01:03,670 --> 00:01:02,160

not

31

00:01:05,670 --> 00:01:03,680

um

32

00:01:08,070 --> 00:01:05,680

this is not for show

33

00:01:10,310 --> 00:01:08,080

okay please understand

34

00:01:11,990 --> 00:01:10,320

we want your ideas we want your thoughts

35

00:01:14,070 --> 00:01:12,000

you're going to hear some panelists talk

36

00:01:16,789 --> 00:01:14,080

and give their ideas

37

00:01:20,390 --> 00:01:16,799

if you have competing ideas or ideas to

38

00:01:22,390 --> 00:01:20,400

the contrary uh it's okay

39

00:01:24,550 --> 00:01:22,400

if we come out of this day

40

00:01:27,270 --> 00:01:24,560

and uh and it's like we were all looking

41

00:01:30,390 --> 00:01:27,280

at the same hymnal and singing the same

42

00:01:32,630 --> 00:01:30,400

song then we have failed

43

00:01:35,910 --> 00:01:32,640

we really want people to discuss today

44

00:01:37,429 --> 00:01:35,920

because we want to learn from you

45

00:01:39,190 --> 00:01:37,439

before i begin i've asked two

46

00:01:41,749 --> 00:01:39,200

individuals to provide some initial

47

00:01:42,789 --> 00:01:41,759

comments as we head into our breakout

48

00:01:44,870 --> 00:01:42,799

sessions

49

00:01:46,870 --> 00:01:44,880

these comments will help provide context

50

00:01:48,310 --> 00:01:46,880

and foundation for the conversations to

51

00:01:50,230 --> 00:01:48,320

come

52

00:01:52,630 --> 00:01:50,240

i'd like to provide some short words of

53

00:01:56,149 --> 00:01:52,640

introduction for people who i consider

54

00:01:57,990 --> 00:01:56,159

to be national assets and real friends

55

00:01:59,510 --> 00:01:58,000

dr john holdren

56

00:02:01,190 --> 00:01:59,520

is the assistant to the president for

57

00:02:02,950 --> 00:02:01,200

science and technology and the director

58

00:02:05,510 --> 00:02:02,960

of the white house science office of

59

00:02:07,030 --> 00:02:05,520

science and technology policy

60

00:02:08,949 --> 00:02:07,040

john has a long and distinguished

61

00:02:10,710 --> 00:02:08,959

history in academia

62

00:02:12,550 --> 00:02:10,720

besides holding advanced degrees in

63

00:02:15,670 --> 00:02:12,560

aerospace engineering and theoretical

64

00:02:17,270 --> 00:02:15,680

plasma physics from mit and stanford he

65

00:02:19,510 --> 00:02:17,280

has taught at harvard

66

00:02:21,190 --> 00:02:19,520

and berkeley he was the director of the

67

00:02:22,630 --> 00:02:21,200

independent nonprofit woods hole

68

00:02:24,309 --> 00:02:22,640

research center

69

00:02:25,910 --> 00:02:24,319

he's a member of the national academy of

70

00:02:27,110 --> 00:02:25,920

sciences the national academy of

71

00:02:28,790 --> 00:02:27,120

engineering

72

00:02:29,910 --> 00:02:28,800

and the american academy of arts and

73

00:02:31,830 --> 00:02:29,920

sciences

74

00:02:33,910 --> 00:02:31,840

as well as a foreign member of the royal

75

00:02:35,509 --> 00:02:33,920

society of london

76

00:02:37,110 --> 00:02:35,519

a former president

77

00:02:39,509 --> 00:02:37,120

of the american association for the

78

00:02:41,430 --> 00:02:39,519

advancement of science his awards

79

00:02:42,630 --> 00:02:41,440

include the macarthur foundation prize

80

00:02:46,150 --> 00:02:42,640

fellowship

81

00:02:47,990 --> 00:02:46,160

the john hines prize in public policy

82

00:02:49,670 --> 00:02:48,000

the tyler prize for environmental

83

00:02:50,869 --> 00:02:49,680

achievement and the volvo environment

84

00:02:52,710 --> 00:02:50,879

prize

85

00:02:54,790 --> 00:02:52,720

this is the man you want advising the

86

00:02:57,509 --> 00:02:54,800

president on science and technology and

87

00:02:59,190 --> 00:02:57,519

we're lucky to have him with us today

88

00:03:01,589 --> 00:02:59,200

shortly after president obama took

89

00:03:02,949 --> 00:03:01,599

office he turned to another leader to

90

00:03:04,470 --> 00:03:02,959

advise him

91

00:03:05,670 --> 00:03:04,480

on the direction of the u s space

92

00:03:07,670 --> 00:03:05,680

program

93

00:03:09,670 --> 00:03:07,680

that was norm augustine

94

00:03:11,509 --> 00:03:09,680

noam augustine has served as a leader of

95

00:03:12,630 --> 00:03:11,519

some of america's strongest aerospace

96

00:03:14,790 --> 00:03:12,640

companies

97

00:03:16,949 --> 00:03:14,800

he's he is quite possibly the most

98

00:03:18,710 --> 00:03:16,959

recognized member of our corporate

99

00:03:20,470 --> 00:03:18,720

aerospace community

100

00:03:22,470 --> 00:03:20,480

he served on the president's council of

101
00:03:24,630 --> 00:03:22,480
advisors on science and technology under

102
00:03:25,750 --> 00:03:24,640
both democratic and republican

103
00:03:27,670 --> 00:03:25,760
presidents

104
00:03:29,990 --> 00:03:27,680
in addition and in addition to last

105
00:03:31,910 --> 00:03:30,000
year's committee he led the 1990

106
00:03:35,030 --> 00:03:31,920
advisory committee on the future of u.s

107
00:03:37,030 --> 00:03:35,040
space programs and the 2005 national

108
00:03:39,190 --> 00:03:37,040
academies commission that produced the

109
00:03:41,750 --> 00:03:39,200
landmark report rising above the

110
00:03:44,869 --> 00:03:41,760
gathering storm energizing and employing

111
00:03:47,030 --> 00:03:44,879
america for a brighter economic future

112
00:03:49,030 --> 00:03:47,040
he is also the author of the well-known

113
00:03:52,070 --> 00:03:49,040

augustine laws books

114

00:03:53,910 --> 00:03:52,080
which feature his deep wisdom

115

00:04:06,710 --> 00:03:53,920
and wit

116

00:04:10,149 --> 00:04:08,390
charlie thank you very much and

117

00:04:11,830 --> 00:04:10,159
especially thank you for the plug for my

118

00:04:13,350 --> 00:04:11,840
book

119

00:04:15,110 --> 00:04:13,360
if any of you happen to have a copy

120

00:04:17,430 --> 00:04:15,120
you're a member of a very select small

121

00:04:24,310 --> 00:04:18,310
i

122

00:04:26,230 --> 00:04:24,320
general bolden

123

00:04:28,150 --> 00:04:26,240
this is a pivotal time

124

00:04:29,430 --> 00:04:28,160
and his impact is going to be so

125

00:04:31,270 --> 00:04:29,440
important

126

00:04:33,430 --> 00:04:31,280

uh i'd like to before i begin

127

00:04:36,469 --> 00:04:33,440

acknowledge that several members of my

128

00:04:39,030 --> 00:04:36,479

committee our committee are here today

129

00:04:41,110 --> 00:04:39,040

charlie mentioned several of them uh

130

00:04:43,270 --> 00:04:41,120

and i'd just like to thank them for all

131

00:04:44,710 --> 00:04:43,280

they had done to contribute to this

132

00:04:47,670 --> 00:04:44,720

effort

133

00:04:49,030 --> 00:04:47,680

i've been asked to offer the perspective

134

00:04:50,950 --> 00:04:49,040

of our

135

00:04:52,710 --> 00:04:50,960

group that conducted the study

136

00:04:54,310 --> 00:04:52,720

of future planning for the human space

137

00:04:55,350 --> 00:04:54,320

flight program

138

00:04:57,350 --> 00:04:55,360

and to

139

00:04:59,110 --> 00:04:57,360

share with you a few of the

140

00:05:01,350 --> 00:04:59,120

factors that have to be considered in

141

00:05:03,830 --> 00:05:01,360

putting together a space program that

142

00:05:05,670 --> 00:05:03,840

will be sustainable

143

00:05:07,990 --> 00:05:05,680

i i should mention that our committee

144

00:05:11,430 --> 00:05:08,000

had 10 members included astronauts

145

00:05:14,150 --> 00:05:11,440

scientists engineers

146

00:05:16,629 --> 00:05:14,160

former presidential appointees

147

00:05:18,550 --> 00:05:16,639

air force general officer retired

148

00:05:20,870 --> 00:05:18,560

and and so on

149

00:05:21,830 --> 00:05:20,880

we were given 90 days to conduct our

150

00:05:24,790 --> 00:05:21,840

study

151
00:05:26,870 --> 00:05:24,800
the title of which was seeking a human

152
00:05:28,070 --> 00:05:26,880
space flight program

153
00:05:31,350 --> 00:05:28,080
worthy

154
00:05:35,430 --> 00:05:33,749
i should probably emphasize the role

155
00:05:37,510 --> 00:05:35,440
that we were asked to take

156
00:05:38,870 --> 00:05:37,520
we were specifically not asked to make a

157
00:05:41,830 --> 00:05:38,880
recommendation

158
00:05:42,790 --> 00:05:41,840
as to a particular human space flight

159
00:05:45,110 --> 00:05:42,800
program

160
00:05:46,710 --> 00:05:45,120
rather we would offer options

161
00:05:48,950 --> 00:05:46,720
and as i understand it the reason for

162
00:05:49,909 --> 00:05:48,960
that was to permit us

163
00:05:52,710 --> 00:05:49,919

to

164

00:05:54,710 --> 00:05:52,720

be very independent and dispassionate in

165

00:05:56,550 --> 00:05:54,720

trying to provide the pros and cons of

166

00:05:58,870 --> 00:05:56,560

various alternatives

167

00:06:02,790 --> 00:05:58,880

and not to be burdened with having to

168

00:06:04,790 --> 00:06:02,800

defend any particular recommendation

169

00:06:06,469 --> 00:06:04,800

furthermore the answer to what is an

170

00:06:08,309 --> 00:06:06,479

appropriate space program

171

00:06:10,629 --> 00:06:08,319

depends so heavily on what the nation

172

00:06:12,629 --> 00:06:10,639

can afford to pay for it

173

00:06:13,990 --> 00:06:12,639

and that of course is the role of the

174

00:06:17,590 --> 00:06:14,000

congress and the president and not

175

00:06:21,590 --> 00:06:19,350

in all candor i have to say that i've

176

00:06:23,749 --> 00:06:21,600

spent most of my adult life working in

177

00:06:26,870 --> 00:06:23,759

the space program

178

00:06:29,270 --> 00:06:26,880

i candidly i'm an advocate

179

00:06:31,430 --> 00:06:29,280

and i have many friends who are on all

180

00:06:33,510 --> 00:06:31,440

sides of the current debate about the

181

00:06:35,590 --> 00:06:33,520

space program

182

00:06:39,830 --> 00:06:35,600

this is a topic in which

183

00:06:42,230 --> 00:06:39,840

reasonable people can and do disagree

184

00:06:44,150 --> 00:06:42,240

let me quickly summarize the issues that

185

00:06:45,990 --> 00:06:44,160

needed to be taken into consideration

186

00:06:47,909 --> 00:06:46,000

and putting together a program

187

00:06:49,510 --> 00:06:47,919

such as the president is described to us

188

00:06:51,909 --> 00:06:49,520

today

189

00:06:54,070 --> 00:06:51,919

it has many moving parts interdependent

190

00:06:56,070 --> 00:06:54,080

moving parts

191

00:06:58,390 --> 00:06:56,080

first of all there is a space pro the

192

00:07:00,070 --> 00:06:58,400

space shuttle program

193

00:07:02,150 --> 00:07:00,080

a long time ago the space shuttle

194

00:07:04,950 --> 00:07:02,160

program was decided to be terminated at

195

00:07:07,350 --> 00:07:04,960

the end of the current fiscal year

196

00:07:09,110 --> 00:07:07,360

and that we would depend upon russia

197

00:07:11,350 --> 00:07:09,120

during the interim until we had an

198

00:07:13,670 --> 00:07:11,360

appropriate launch vehicle to launch our

199

00:07:15,510 --> 00:07:13,680

astronauts into low earth orbit

200

00:07:19,510 --> 00:07:15,520

that interim appears to be about five to

201
00:07:22,629 --> 00:07:21,430
we could of course restart the shuttle

202
00:07:24,790 --> 00:07:22,639
program

203
00:07:27,350 --> 00:07:24,800
the problem with doing that

204
00:07:30,230 --> 00:07:27,360
is that it consumes funds that are badly

205
00:07:32,710 --> 00:07:30,240
needed for the exploration program

206
00:07:36,230 --> 00:07:32,720
furthermore it confines us to low earth

207
00:07:38,309 --> 00:07:36,240
orbit for a prolonged period of time

208
00:07:39,270 --> 00:07:38,319
it does have the benefit that it helps

209
00:07:42,550 --> 00:07:39,280
to

210
00:07:45,189 --> 00:07:42,560
reduce the turbulence in the employment

211
00:07:46,550 --> 00:07:45,199
of a very talented group of people

212
00:07:47,909 --> 00:07:46,560
but once again

213
00:07:49,990 --> 00:07:47,919

one is faced

214

00:07:52,070 --> 00:07:50,000

with trying to maintain total continuity

215

00:07:54,150 --> 00:07:52,080

of employment on one hand

216

00:07:55,990 --> 00:07:54,160

and on the other having a program for

217

00:07:57,430 --> 00:07:56,000

the future

218

00:07:58,629 --> 00:07:57,440

turning to the international space

219

00:08:00,950 --> 00:07:58,639

station

220

00:08:03,430 --> 00:08:00,960

it's taken us nearly 20 years to put

221

00:08:05,270 --> 00:08:03,440

that station in place and declare it

222

00:08:07,430 --> 00:08:05,280

operational

223

00:08:09,909 --> 00:08:07,440

the previous plan called for ending that

224

00:08:14,390 --> 00:08:09,919

program five years from now after only

225

00:08:18,790 --> 00:08:16,710

it would seem that the marginal benefit

226

00:08:21,029 --> 00:08:18,800

and cost i'm not referring to a sunk

227

00:08:22,869 --> 00:08:21,039

cost but a marginal cost

228

00:08:25,189 --> 00:08:22,879

of continuing to operate that program at

229

00:08:26,550 --> 00:08:25,199

least another five years

230

00:08:27,909 --> 00:08:26,560

is a very good

231

00:08:29,990 --> 00:08:27,919

investment

232

00:08:31,510 --> 00:08:30,000

furthermore our committee's visits with

233

00:08:33,509 --> 00:08:31,520

leaders of other countries and their

234

00:08:36,790 --> 00:08:33,519

space programs

235

00:08:39,269 --> 00:08:36,800

convinced us that to stop operating

236

00:08:41,029 --> 00:08:39,279

the the iss

237

00:08:42,709 --> 00:08:41,039

five years from now

238

00:08:46,949 --> 00:08:42,719

would be very damaging to our

239

00:08:49,829 --> 00:08:46,959

relationship with our partners in space

240

00:08:51,509 --> 00:08:49,839

let me turn to the constellation program

241

00:08:54,870 --> 00:08:51,519

at the time the constellation program

242

00:08:58,630 --> 00:08:54,880

was initiated in 2005

243

00:08:59,590 --> 00:08:58,640

it very very reasonably was a executable

244

00:09:01,110 --> 00:08:59,600

program

245

00:09:02,710 --> 00:09:01,120

it was one that could certainly be

246

00:09:05,910 --> 00:09:02,720

defended

247

00:09:07,750 --> 00:09:05,920

but for a large variety of reasons

248

00:09:09,190 --> 00:09:07,760

the actual funding that's been available

249

00:09:11,190 --> 00:09:09,200

to that program

250

00:09:12,870 --> 00:09:11,200

has been about a third less than the

251
00:09:15,430 --> 00:09:12,880
original plan

252
00:09:16,790 --> 00:09:15,440
that's been exacerbated by several other

253
00:09:17,990 --> 00:09:16,800
factors

254
00:09:23,110 --> 00:09:18,000
one

255
00:09:24,790 --> 00:09:23,120
iss beyond the first five years so if

256
00:09:27,670 --> 00:09:24,800
you continue it you have to take more

257
00:09:30,389 --> 00:09:27,680
money to make the old plan work more

258
00:09:32,070 --> 00:09:30,399
money away from the constellation

259
00:09:35,430 --> 00:09:32,080
there was no provision made in funding

260
00:09:39,190 --> 00:09:35,440
to deorbit the iss

261
00:09:40,710 --> 00:09:39,200
a now a 900 000 plus pound object

262
00:09:43,030 --> 00:09:40,720
which uh

263
00:09:46,070 --> 00:09:43,040

uh needs to be responsibly disposed of

264

00:09:48,230 --> 00:09:46,080

when its life does come to an end

265

00:09:51,190 --> 00:09:48,240

ares 1 encountered technical problems as

266

00:09:53,269 --> 00:09:51,200

we all know the kind one might expected

267

00:09:55,269 --> 00:09:53,279

a tough development program but it was

268

00:09:56,949 --> 00:09:55,279

required to shift funds to solve those

269

00:09:59,269 --> 00:09:56,959

problems

270

00:10:01,350 --> 00:09:59,279

the bottom line is that

271

00:10:03,350 --> 00:10:01,360

the view of our committee

272

00:10:05,509 --> 00:10:03,360

the consolation program

273

00:10:08,069 --> 00:10:05,519

as it then existed

274

00:10:10,230 --> 00:10:08,079

was not executable

275

00:10:11,110 --> 00:10:10,240

the main reason was a mismatch between

276

00:10:20,790 --> 00:10:11,120

the

277

00:10:22,470 --> 00:10:20,800

and that is that in essence what was

278

00:10:23,910 --> 00:10:22,480

being asked of the citizens of this

279

00:10:26,150 --> 00:10:23,920

country

280

00:10:28,949 --> 00:10:26,160

was to add another 60 billion dollars to

281

00:10:31,110 --> 00:10:28,959

the budget for the next two decades to

282

00:10:33,430 --> 00:10:31,120

what was already in the plan for the

283

00:10:36,790 --> 00:10:33,440

constellation

284

00:10:39,590 --> 00:10:36,800

and in late 2020 if all went well

285

00:10:41,269 --> 00:10:39,600

we would land on the moon

286

00:10:43,110 --> 00:10:41,279

but in talking to

287

00:10:44,310 --> 00:10:43,120

many many people and particularly young

288

00:10:46,630 --> 00:10:44,320

people

289

00:10:48,389 --> 00:10:46,640

the reaction tended to be

290

00:10:50,470 --> 00:10:48,399

well that was my grandfather's space

291

00:10:52,630 --> 00:10:50,480

program and i say that buzz with all

292

00:10:55,350 --> 00:10:52,640

apologies you and neal

293

00:10:59,269 --> 00:10:57,829

the uh

294

00:11:00,710 --> 00:10:59,279

next thing that should be mentioned is

295

00:11:02,389 --> 00:11:00,720

the aries one

296

00:11:04,310 --> 00:11:02,399

the launch vehicle

297

00:11:05,670 --> 00:11:04,320

the ares one of course

298

00:11:08,630 --> 00:11:05,680

suffered from the problems of the

299

00:11:10,389 --> 00:11:08,640

constellation program as a whole

300

00:11:12,870 --> 00:11:10,399

four years into its life when we

301
00:11:14,630 --> 00:11:12,880
conducted our study last summer

302
00:11:16,310 --> 00:11:14,640
it's schedule it slipped between three

303
00:11:18,069 --> 00:11:16,320
and five years

304
00:11:20,389 --> 00:11:18,079
so that it tended to be too late to

305
00:11:23,350 --> 00:11:20,399
support the international space station

306
00:11:25,910 --> 00:11:23,360
and really too early to support the any

307
00:11:26,949 --> 00:11:25,920
exploration program or a return to the

308
00:11:28,870 --> 00:11:26,959
moon

309
00:11:30,389 --> 00:11:28,880
meanwhile it was consuming money that

310
00:11:31,990 --> 00:11:30,399
was much needed

311
00:11:34,550 --> 00:11:32,000
for a heavy lift launch vehicle and

312
00:11:38,069 --> 00:11:34,560
other purposes

313
00:11:39,670 --> 00:11:38,079

ares 5 the heavy lift launch vehicle

314

00:11:42,230 --> 00:11:39,680

it's very clear this nation needs a

315

00:11:43,910 --> 00:11:42,240

heavy lift launch vehicle and soon that

316

00:11:47,030 --> 00:11:43,920

was a conclusion of the study i was

317

00:11:49,350 --> 00:11:47,040

involved in 20 years ago as well

318

00:11:51,990 --> 00:11:49,360

it's a capability though that in terms

319

00:11:53,590 --> 00:11:52,000

of aries 5 had barely started because

320

00:11:56,550 --> 00:11:53,600

much of the money had had to be diverted

321

00:11:59,750 --> 00:11:56,560

away from it

322

00:12:01,750 --> 00:11:59,760

by turning to the orion capsule

323

00:12:03,269 --> 00:12:01,760

the orion capsule once again is the sort

324

00:12:04,550 --> 00:12:03,279

of a thing that will be needed in our

325

00:12:07,110 --> 00:12:04,560

space program

326

00:12:10,230 --> 00:12:07,120

more or less any direction it takes

327

00:12:11,590 --> 00:12:10,240

and a less costly version of it would

328

00:12:13,910 --> 00:12:11,600

provide for us

329

00:12:16,069 --> 00:12:13,920

a very good crew rescue vehicle

330

00:12:17,670 --> 00:12:16,079

that could be used

331

00:12:19,350 --> 00:12:17,680

if indeed

332

00:12:22,389 --> 00:12:19,360

we shut the shuttle down which as you've

333

00:12:24,389 --> 00:12:22,399

heard the president intends to do

334

00:12:27,430 --> 00:12:24,399

finally there's the issue of carrying

335

00:12:29,590 --> 00:12:27,440

cargo and crude to low earth orbit

336

00:12:32,949 --> 00:12:29,600

today nasa is essentially trapped in low

337

00:12:38,069 --> 00:12:32,959

earth orbit by the cost of hauling cargo

338

00:12:42,550 --> 00:12:40,069

using commercial firms to provide that

339

00:12:44,069 --> 00:12:42,560

capability there should be substantial

340

00:12:46,150 --> 00:12:44,079

savings possible

341

00:12:47,110 --> 00:12:46,160

that will let nasa focus its immense

342

00:12:49,670 --> 00:12:47,120

talents

343

00:12:51,030 --> 00:12:49,680

on the more exciting things of exploring

344

00:12:52,389 --> 00:12:51,040

outer space

345

00:12:55,110 --> 00:12:52,399

as opposed

346

00:12:59,110 --> 00:12:55,120

to hauling cargo and people between here

347

00:13:02,550 --> 00:13:00,470

you may recall that the commercial

348

00:13:04,310 --> 00:13:02,560

airlines were created

349

00:13:07,110 --> 00:13:04,320

when the u.s government

350

00:13:08,870 --> 00:13:07,120

awarded contracts to carry the mail

351
00:13:09,670 --> 00:13:08,880
we have the same kind of an opportunity

352
00:13:11,829 --> 00:13:09,680
here

353
00:13:15,430 --> 00:13:11,839
for nasa to ward contracts to carry

354
00:13:17,430 --> 00:13:15,440
people cargo fuel to orbit

355
00:13:21,269 --> 00:13:17,440
and to save money such that nasa could

356
00:13:22,870 --> 00:13:21,279
focus on the more exciting things

357
00:13:25,910 --> 00:13:22,880
now i would never suggest that we

358
00:13:27,910 --> 00:13:25,920
confuse airline operations with space

359
00:13:29,509 --> 00:13:27,920
operations

360
00:13:31,190 --> 00:13:29,519
on the other hand the question does

361
00:13:33,269 --> 00:13:31,200
arise

362
00:13:35,110 --> 00:13:33,279
do we have less faith in the u.s

363
00:13:37,430 --> 00:13:35,120

aerospace industry

364

00:13:39,670 --> 00:13:37,440

to carry our astronauts to orbit that we

365

00:13:49,509 --> 00:13:39,680

have to the russian industry to carry

366

00:13:54,550 --> 00:13:52,389

this is a decision that entails risk

367

00:13:55,750 --> 00:13:54,560

there is no question about it

368

00:13:56,790 --> 00:13:55,760

but with the

369

00:13:59,590 --> 00:13:56,800

strong

370

00:14:02,870 --> 00:13:59,600

active oversight of nasa

371

00:14:04,470 --> 00:14:02,880

i believe our industry is up to the job

372

00:14:06,550 --> 00:14:04,480

finally

373

00:14:08,710 --> 00:14:06,560

the question arises

374

00:14:10,470 --> 00:14:08,720

the president really addressed this

375

00:14:12,550 --> 00:14:10,480

why conduct space

376

00:14:14,710 --> 00:14:12,560

exploration at all

377

00:14:19,509 --> 00:14:14,720

certainly there are benefits to

378

00:14:22,790 --> 00:14:21,030

to science

379

00:14:24,230 --> 00:14:22,800

but the real benefit of the view of our

380

00:14:26,550 --> 00:14:24,240

panel

381

00:14:29,189 --> 00:14:26,560

is that it gives us a way

382

00:14:32,550 --> 00:14:29,199

to chart the way for humankind to expand

383

00:14:34,470 --> 00:14:32,560

its presence out into the solar system

384

00:14:36,150 --> 00:14:34,480

it doesn't seem that we have a need for

385

00:14:39,269 --> 00:14:36,160

a second moon race

386

00:14:41,430 --> 00:14:39,279

we need to set more demanded goals and

387

00:14:42,949 --> 00:14:41,440

in our mind that goal is landing humans

388

00:14:44,389 --> 00:14:42,959

on mars

389

00:14:45,750 --> 00:14:44,399

the problem is that we're not ready to

390

00:14:50,150 --> 00:14:45,760

do that today

391

00:14:56,629 --> 00:14:52,790

undoubtedly we

392

00:14:59,829 --> 00:14:56,639

will be able to land humans on mars

393

00:15:02,230 --> 00:14:59,839

they're not too distant future decades

394

00:15:03,829 --> 00:15:02,240

on the other hand i we do have the

395

00:15:05,670 --> 00:15:03,839

opportunity to do a lot of exciting

396

00:15:07,670 --> 00:15:05,680

things in the meantime

397

00:15:09,750 --> 00:15:07,680

and our committee defer referred to that

398

00:15:12,710 --> 00:15:09,760

as a flexible path

399

00:15:16,150 --> 00:15:12,720

it was a concept for space exploration

400

00:15:18,790 --> 00:15:16,160

where one takes steps every few years to

401
00:15:20,550 --> 00:15:18,800
something ever more exciting including

402
00:15:23,990 --> 00:15:20,560
things like

403
00:15:26,470 --> 00:15:24,000
circumnavigating mars orbiting mars

404
00:15:29,829 --> 00:15:26,480
landing on a

405
00:15:33,110 --> 00:15:31,509
it probably will include at some point

406
00:15:35,509 --> 00:15:33,120
returning to the moon

407
00:15:38,829 --> 00:15:35,519
going to lagrangian point landing on

408
00:15:41,910 --> 00:15:38,839
phobos or deimos the mar the moons of

409
00:15:44,870 --> 00:15:41,920
mars that is a highly simplified version

410
00:15:46,389 --> 00:15:44,880
of our 150 page report

411
00:15:47,590 --> 00:15:46,399
for those of you who like to read that

412
00:15:49,110 --> 00:15:47,600
kind of things

413
00:15:50,069 --> 00:15:49,120

you will recognize the president's

414

00:15:53,509 --> 00:15:50,079

program

415

00:15:55,910 --> 00:15:53,519

as being very close to the option 5b

416

00:15:59,269 --> 00:15:55,920

that we had proposed

417

00:16:01,910 --> 00:15:59,279

it would seem that if adequately funded

418

00:16:03,590 --> 00:16:01,920

and if timely decisions are made

419

00:16:05,110 --> 00:16:03,600

the president's program

420

00:16:07,990 --> 00:16:05,120

does give us a way

421

00:16:09,990 --> 00:16:08,000

to have a human space flight program

422

00:16:11,910 --> 00:16:10,000

worthy of a great nation

423

00:16:14,550 --> 00:16:11,920

and as others have said

424

00:16:25,030 --> 00:16:14,560

to transform us from transportation

425

00:16:29,269 --> 00:16:26,710

thanks very much norm and your words

426

00:16:31,030 --> 00:16:29,279

were very illuminating to me

427

00:16:32,710 --> 00:16:31,040

next i'm going to ask dr john holdren to

428

00:16:39,670 --> 00:16:32,720

come forward and give you some thoughts

429

00:16:43,670 --> 00:16:41,670

well i want to start by thanking charlie

430

00:16:45,910 --> 00:16:43,680

bolden for that very gracious

431

00:16:47,269 --> 00:16:45,920

introduction but even more i want to

432

00:16:49,749 --> 00:16:47,279

thank charlie bolden for his

433

00:16:51,749 --> 00:16:49,759

extraordinary service to this nation

434

00:16:54,629 --> 00:16:51,759

in a career that senator nelson

435

00:16:57,829 --> 00:16:54,639

summarized briefly that included being a

436

00:16:58,949 --> 00:16:57,839

marine an aviator a test pilot

437

00:17:01,189 --> 00:16:58,959

and now

438

00:17:02,949 --> 00:17:01,199

after a number of other kinds of service

439

00:17:05,189 --> 00:17:02,959

the extraordinarily far-sighted

440

00:17:08,309 --> 00:17:05,199

administrator of nasa

441

00:17:10,870 --> 00:17:08,319

i also want to thank norm augustine and

442

00:17:12,630 --> 00:17:10,880

his panel for the extraordinary service

443

00:17:16,309 --> 00:17:12,640

that they did i know how hard they

444

00:17:19,350 --> 00:17:16,319

worked and i also know the high value

445

00:17:22,630 --> 00:17:19,360

that their painstaking findings

446

00:17:24,949 --> 00:17:22,640

held for me for the nasa administrator

447

00:17:26,230 --> 00:17:24,959

for the president as we grappled with

448

00:17:29,990 --> 00:17:26,240

the challenge

449

00:17:32,549 --> 00:17:30,000

of formulating a plan that would in fact

450

00:17:35,350 --> 00:17:32,559

be worthy of a great nation

451

00:17:38,150 --> 00:17:35,360

i also want to recognize the astronauts

452

00:17:39,669 --> 00:17:38,160

who have been good enough to come here

453

00:17:41,750 --> 00:17:39,679

uh today

454

00:17:43,750 --> 00:17:41,760

the current astronauts and the former

455

00:17:45,590 --> 00:17:43,760

astronauts buzz aldrin has already been

456

00:17:47,430 --> 00:17:45,600

mentioned one of the first two human

457

00:17:49,590 --> 00:17:47,440

beings to set foot on the moon charlie

458

00:17:50,630 --> 00:17:49,600

bolden our nasa administrator

459

00:17:53,990 --> 00:17:50,640

twice

460

00:17:56,230 --> 00:17:54,000

commander

461

00:17:58,630 --> 00:17:56,240

but i also want to mention i think

462

00:18:00,549 --> 00:17:58,640

i've counted at least another eight who

463

00:18:03,270 --> 00:18:00,559

are here mae jemison

464

00:18:05,029 --> 00:18:03,280

john grunsfeld

465

00:18:06,950 --> 00:18:05,039

ed lew

466

00:18:08,470 --> 00:18:06,960

bob cabana

467

00:18:10,390 --> 00:18:08,480

leland melvin

468

00:18:11,669 --> 00:18:10,400

andy thomas

469

00:18:13,830 --> 00:18:11,679

mike fola

470

00:18:15,510 --> 00:18:13,840

brewster shaw i don't know if i've

471

00:18:17,350 --> 00:18:15,520

missed any

472

00:18:19,350 --> 00:18:17,360

i do need to say

473

00:18:21,270 --> 00:18:19,360

that the courage that it takes to allow

474

00:18:23,110 --> 00:18:21,280

yourself to be strapped on to five

475

00:18:25,590 --> 00:18:23,120

million pounds of thrust

476
00:18:27,510 --> 00:18:25,600
and rocket it into space never mind the

477
00:18:29,029 --> 00:18:27,520
courage it takes then to step outside

478
00:18:30,070 --> 00:18:29,039
the capsule

479
00:18:34,789 --> 00:18:30,080
out there

480
00:18:37,270 --> 00:18:34,799
is something i can only imagine barely

481
00:18:48,710 --> 00:18:37,280
i think we owe these heroes an enormous

482
00:18:52,549 --> 00:18:50,549
i'm not going to take a lot of your time

483
00:18:56,470 --> 00:18:52,559
in a moment we're going to break out

484
00:18:58,630 --> 00:18:56,480
into our four parallel panel sessions

485
00:19:01,669 --> 00:18:58,640
i just want to say very briefly

486
00:19:03,590 --> 00:19:01,679
if i had to encapsulate

487
00:19:05,830 --> 00:19:03,600
in just a few words

488
00:19:07,590 --> 00:19:05,840

what i think the president's new plan

489

00:19:09,190 --> 00:19:07,600

for nasa and human space flight

490

00:19:12,950 --> 00:19:09,200

represent

491

00:19:15,830 --> 00:19:12,960

i would say it's a faster pace in space

492

00:19:18,549 --> 00:19:15,840

more missions to more destinations

493

00:19:20,230 --> 00:19:18,559

sooner at lower cost

494

00:19:23,190 --> 00:19:20,240

i think the plan

495

00:19:25,909 --> 00:19:23,200

offers a more flexible more practical

496

00:19:29,029 --> 00:19:25,919

more productive and more affordable but

497

00:19:31,750 --> 00:19:29,039

also more visionary approach to us

498

00:19:33,750 --> 00:19:31,760

leadership in human space exploration

499

00:19:36,070 --> 00:19:33,760

than the plan that it replaces by

500

00:19:38,549 --> 00:19:36,080

stimulating an expanded commercial

501
00:19:40,230 --> 00:19:38,559
capability for carrying cargo and

502
00:19:42,789 --> 00:19:40,240
astronauts to low earth orbit and

503
00:19:45,270 --> 00:19:42,799
allowing nasa to devote more resources

504
00:19:46,630 --> 00:19:45,280
to advanced technologies for exploring

505
00:19:48,549 --> 00:19:46,640
deep space

506
00:19:50,710 --> 00:19:48,559
the president's plan will greatly

507
00:19:52,870 --> 00:19:50,720
increase the number of missions to the

508
00:19:55,990 --> 00:19:52,880
international space station between now

509
00:19:58,230 --> 00:19:56,000
and 2020 by u.s astronauts

510
00:20:01,029 --> 00:19:58,240
expanding the u.s use of the station for

511
00:20:03,350 --> 00:20:01,039
path-breaking science and as a platform

512
00:20:05,270 --> 00:20:03,360
for advanced technology development it

513
00:20:08,310 --> 00:20:05,280

will greatly increase the total number

514

00:20:10,870 --> 00:20:08,320

of missions human and robotic launched

515

00:20:12,149 --> 00:20:10,880

from this space center between now and

516

00:20:14,390 --> 00:20:12,159

2020

517

00:20:16,630 --> 00:20:14,400

it will shorten the duration of

518

00:20:18,710 --> 00:20:16,640

dependence on russian rockets for

519

00:20:20,950 --> 00:20:18,720

carrying u.s astronauts to low earth

520

00:20:21,830 --> 00:20:20,960

orbit following retirement of the

521

00:20:23,510 --> 00:20:21,840

shuttle

522

00:20:25,110 --> 00:20:23,520

it will accelerate

523

00:20:26,710 --> 00:20:25,120

the development of the advanced

524

00:20:29,590 --> 00:20:26,720

technologies needed to take our

525

00:20:32,390 --> 00:20:29,600

astronauts beyond low earth orbit with

526
00:20:34,789 --> 00:20:32,400
greater safety shorter trip times

527
00:20:38,070 --> 00:20:34,799
greater capabilities at destination and

528
00:20:40,390 --> 00:20:38,080
lower costs than with current technology

529
00:20:43,350 --> 00:20:40,400
and it will expand the roster of deep

530
00:20:46,230 --> 00:20:43,360
space destinations that u.s astronauts

531
00:20:48,390 --> 00:20:46,240
will be able to visit after 2020 so that

532
00:20:50,549 --> 00:20:48,400
that roster includes not only the moon

533
00:20:53,350 --> 00:20:50,559
but also near-earth asteroids the moons

534
00:20:55,669 --> 00:20:53,360
of mars and of course ultimately

535
00:20:56,710 --> 00:20:55,679
the martian surface

536
00:20:59,590 --> 00:20:56,720
i think

537
00:21:02,149 --> 00:20:59,600
that as people come to understand

538
00:21:03,270 --> 00:21:02,159

the flesh and bones of this plan in

539

00:21:06,070 --> 00:21:03,280

detail

540

00:21:08,710 --> 00:21:06,080

they will recognize its vision

541

00:21:10,149 --> 00:21:08,720

for what it is which is far-reaching

542

00:21:11,990 --> 00:21:10,159

inspirational

543

00:21:14,870 --> 00:21:12,000

a way that the united states can move

544

00:21:16,789 --> 00:21:14,880

forward in space in the 21st century in

545

00:21:20,149 --> 00:21:16,799

a manner as norm augustine has

546

00:21:23,350 --> 00:21:20,159

emphasized worthy of a great nation

547

00:21:24,630 --> 00:21:23,360

with that i would like to invite folks

548

00:21:27,110 --> 00:21:24,640

to

549

00:21:29,590 --> 00:21:27,120

depart for the various breakout sessions

550

00:21:31,830 --> 00:21:29,600

i understand the logistics of that have

551
00:21:34,549 --> 00:21:31,840
already been made known to people so

552
00:21:35,590 --> 00:21:34,559
that if i'm correctly informed you know

553
00:21:37,990 --> 00:21:35,600
how to get

554
00:21:39,750 --> 00:21:38,000
to the panels there are four panels uh

555
00:21:41,430 --> 00:21:39,760
as you should know

556
00:21:43,350 --> 00:21:41,440
a panel on expanding the use of the

557
00:21:46,149 --> 00:21:43,360
international space station as we extend

558
00:21:48,470 --> 00:21:46,159
its life a panel on advanced

559
00:21:51,270 --> 00:21:48,480
technologies for moving deeper

560
00:21:53,270 --> 00:21:51,280
into space a panel on the destinations

561
00:21:54,470 --> 00:21:53,280
on the flexible path

562
00:21:56,230 --> 00:21:54,480
forward

563
00:21:57,669 --> 00:21:56,240

and a panel on the economic

564

00:22:00,230 --> 00:21:57,679

opportunities

565

00:22:01,590 --> 00:22:00,240

associated with the new plan so i'm

566

00:22:02,710 --> 00:22:01,600

hoping that you all know where you're

567

00:22:04,070 --> 00:22:02,720

going

568

00:22:05,750 --> 00:22:04,080

if you don't you'll have to rely on

569

00:22:10,310 --> 00:22:05,760

somebody besides me to tell you thank

570

00:22:15,510 --> 00:22:11,750

thanks

571

00:22:17,110 --> 00:22:15,520

coming i know some will not be staying

572

00:22:20,149 --> 00:22:17,120

but for those of you who are

573

00:22:21,750 --> 00:22:20,159

the three panels all but one panel are

574

00:22:22,870 --> 00:22:21,760

going to go from here by bus to the

575

00:22:23,750 --> 00:22:22,880

divas

576

00:22:25,909 --> 00:22:23,760

center

577

00:22:28,710 --> 00:22:25,919

uh the panel on international space

578

00:22:30,789 --> 00:22:28,720

station with miles o'brien just stay put

579

00:22:32,470 --> 00:22:30,799

until people start moving and then we're

580

00:22:34,870 --> 00:22:32,480

moving you into a conference room here

581

00:22:36,950 --> 00:22:34,880

let me re-emphasize what i said this is

582

00:22:38,950 --> 00:22:36,960

not for show

583

00:22:41,590 --> 00:22:38,960

we want to hear from you and we hope to

584

00:22:43,190 --> 00:22:41,600

have some vigorous discussion uh in the