


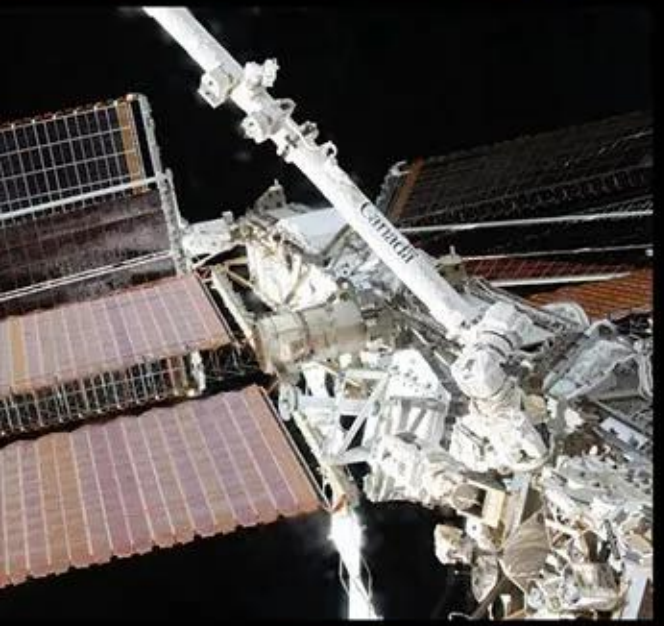

TY@N

THIS YEAR @ NASA

2021





1
00:00:04,150 --> 00:00:01,350
[Music]

2
00:00:06,309 --> 00:00:04,160
in 2021 we touched down on mars then

3
00:00:08,230 --> 00:00:06,319
reached new heights on the red planet we

4
00:00:10,629 --> 00:00:08,240
also made progress preparing for a

5
00:00:13,110 --> 00:00:10,639
flight test around the moon and we had a

6
00:00:15,589 --> 00:00:13,120
very busy year in low earth orbit

7
00:00:17,510 --> 00:00:15,599
exploring other deep space destinations

8
00:00:19,990 --> 00:00:17,520
addressing climate change here on our

9
00:00:22,550 --> 00:00:20,000
home planet testing technologies for

10
00:00:24,390 --> 00:00:22,560
next generation aircraft and much more

11
00:00:27,750 --> 00:00:24,400
here's a look back at those and other

12
00:00:29,429 --> 00:00:27,760
things we did this year at nasa

13
00:00:32,069 --> 00:00:29,439

there were plenty of developments in

14
00:00:34,470 --> 00:00:32,079
2021 with existing and future missions

15
00:00:35,990 --> 00:00:34,480
designed to explore our solar system and

16
00:00:39,830 --> 00:00:36,000
beyond

17
00:00:44,310 --> 00:00:41,990
the perseverance rover landed on mars in

18
00:00:46,470 --> 00:00:44,320
february and later collected its first

19
00:00:48,549 --> 00:00:46,480
rock core sample which could be

20
00:00:49,990 --> 00:00:48,559
retrieved and returned to earth by a

21
00:00:51,990 --> 00:00:50,000
future mission

22
00:00:54,069 --> 00:00:52,000
while the ingenuity helicopter a

23
00:00:56,069 --> 00:00:54,079
technology demonstration on that mission

24
00:00:57,990 --> 00:00:56,079
became the first aircraft to make a

25
00:00:59,029 --> 00:00:58,000
powered controlled flight on another

26
00:01:01,110 --> 00:00:59,039
planet

27
00:01:02,950 --> 00:01:01,120
we completed testing of the james webb

28
00:01:05,350 --> 00:01:02,960
space telescope and sent it to its

29
00:01:07,109 --> 00:01:05,360
launch site in french guiana the wide

30
00:01:09,109 --> 00:01:07,119
array of science missions we sent to

31
00:01:11,670 --> 00:01:09,119
space included the first mission to

32
00:01:13,990 --> 00:01:11,680
study the polarization of x-rays the

33
00:01:17,190 --> 00:01:14,000
first spacecraft to visit jupiter's

34
00:01:19,429 --> 00:01:17,200
trojan asteroids and our first planetary

35
00:01:21,830 --> 00:01:19,439
defense test mission

36
00:01:24,149 --> 00:01:21,840
our chandra x-ray observatory may have

37
00:01:26,310 --> 00:01:24,159
detected signs of a planet crossing in

38
00:01:28,230 --> 00:01:26,320

front of a star outside of our milky way

39
00:01:30,390 --> 00:01:28,240
galaxy for the first time

40
00:01:32,550 --> 00:01:30,400
while our parker solar probe provided

41
00:01:35,590 --> 00:01:32,560
surprising views of venus during a close

42
00:01:38,310 --> 00:01:35,600
flyby and became the first spacecraft in

43
00:01:40,230 --> 00:01:38,320
history to touch the sun flying through

44
00:01:42,469 --> 00:01:40,240
and sampling the environment in the

45
00:01:45,030 --> 00:01:42,479
sun's upper atmosphere and the

46
00:01:47,749 --> 00:01:45,040
transiting exoplanet survey satellite or

47
00:01:50,389 --> 00:01:47,759
tess helped discover a trio of hot

48
00:01:53,510 --> 00:01:50,399
worlds larger than earth orbiting a much

49
00:01:55,830 --> 00:01:53,520
younger version of our sun

50
00:01:58,310 --> 00:01:55,840
some new but familiar faces took on

51
00:02:00,469 --> 00:01:58,320
leadership roles at the agency

52
00:02:02,550 --> 00:02:00,479
the biden harris administration chose

53
00:02:04,870 --> 00:02:02,560
former senator and space shuttle payload

54
00:02:06,789 --> 00:02:04,880
specialist bill nelson and former

55
00:02:09,109 --> 00:02:06,799
astronaut and space shuttle commander

56
00:02:11,270 --> 00:02:09,119
pam melroy as nasa's newest

57
00:02:13,110 --> 00:02:11,280
administrator and deputy administrator

58
00:02:15,670 --> 00:02:13,120
respectively

59
00:02:17,670 --> 00:02:15,680
some of our work in 2021 reflected the

60
00:02:19,750 --> 00:02:17,680
biden-harris administration's commitment

61
00:02:22,470 --> 00:02:19,760
to addressing climate change and its

62
00:02:24,630 --> 00:02:22,480
effect on our home planet something nasa

63
00:02:26,390 --> 00:02:24,640

is uniquely positioned to do

64
00:02:28,710 --> 00:02:26,400
we announced our earth system

65
00:02:31,190 --> 00:02:28,720
observatory a new set of missions to

66
00:02:33,589 --> 00:02:31,200
help guide efforts related to climate

67
00:02:35,990 --> 00:02:33,599
change disaster mitigation fighting

68
00:02:40,150 --> 00:02:36,000
forest fires and improving real-time

69
00:02:42,949 --> 00:02:40,160
agricultural processes and liftoff

70
00:02:45,430 --> 00:02:42,959
liftoff of an atlas 5 rocket and landsat

71
00:02:48,470 --> 00:02:45,440
9. we partnered with a u.s geological

72
00:02:50,869 --> 00:02:48,480
survey to launch the landsat 9 satellite

73
00:02:53,190 --> 00:02:50,879
built to continue the program's 50-year

74
00:02:55,030 --> 00:02:53,200
track record of monitoring the planet's

75
00:02:57,030 --> 00:02:55,040
changing landscapes

76
00:02:59,509 --> 00:02:57,040
several weeks later vice president

77
00:03:02,710 --> 00:02:59,519
kamala harris visited the agency as we

78
00:03:04,949 --> 00:03:02,720
unveiled the satellite's first images

79
00:03:07,430 --> 00:03:04,959
nasa conducted and participated in a

80
00:03:10,149 --> 00:03:07,440
series of climate change studies related

81
00:03:12,790 --> 00:03:10,159
to high tide floods and earth's energy

82
00:03:15,030 --> 00:03:12,800
imbalance and energy budget

83
00:03:16,949 --> 00:03:15,040
this animation as part of a global

84
00:03:19,110 --> 00:03:16,959
response to climate change we

85
00:03:21,270 --> 00:03:19,120
participated in the u.n climate change

86
00:03:23,030 --> 00:03:21,280
conference we captured data with a

87
00:03:25,110 --> 00:03:23,040
specialized instrument on the space

88
00:03:26,789 --> 00:03:25,120

station to help fight forest fires in

89
00:03:29,110 --> 00:03:26,799
the western u.s

90
00:03:31,270 --> 00:03:29,120
we also coordinated with researchers to

91
00:03:33,670 --> 00:03:31,280
develop dashboards on the spread and

92
00:03:35,750 --> 00:03:33,680
effects of the covet 19 pandemic

93
00:03:38,309 --> 00:03:35,760
including tracking any changes to

94
00:03:40,470 --> 00:03:38,319
worldwide air pollution

95
00:03:43,589 --> 00:03:40,480
and we launched an online platform

96
00:03:46,470 --> 00:03:43,599
called open et to help farmers and water

97
00:03:48,710 --> 00:03:46,480
managers in 17 western u.s states

98
00:03:51,509 --> 00:03:48,720
accelerate improvements and innovations

99
00:03:53,830 --> 00:03:51,519
in water management

100
00:03:55,670 --> 00:03:53,840
2021 was the busiest year for human

101
00:03:58,309 --> 00:03:55,680
space flight at the international space

102
00:04:00,309 --> 00:03:58,319
station in a decade it also marked the

103
00:04:02,869 --> 00:04:00,319
start of the 21st straight year of

104
00:04:05,190 --> 00:04:02,879
humans living and working in space

105
00:04:06,789 --> 00:04:05,200
the splashdown of our spacex crew one

106
00:04:09,030 --> 00:04:06,799
mission marked the completion of the

107
00:04:11,270 --> 00:04:09,040
first operational commercial crew flight

108
00:04:13,509 --> 00:04:11,280
to the station and the first nighttime

109
00:04:20,870 --> 00:04:13,519
splashdown of a u.s crude spacecraft

110
00:04:25,189 --> 00:04:23,510
our spacex crew 2 mission followed that

111
00:04:27,430 --> 00:04:25,199
it was the first commercial crew mission

112
00:04:31,270 --> 00:04:27,440
to fly two international partners and

113
00:04:33,990 --> 00:04:31,280

spent a record 199 days in space

114
00:04:35,830 --> 00:04:34,000
and in november nasa's spacex crew 3

115
00:04:38,070 --> 00:04:35,840
mission arrived at the space station for

116
00:04:39,270 --> 00:04:38,080
a planned six-month scientific research

117
00:04:41,670 --> 00:04:39,280
mission

118
00:04:43,909 --> 00:04:41,680
astronauts and cosmonauts completed 13

119
00:04:47,030 --> 00:04:43,919
spacewalks outside the space station the

120
00:04:49,189 --> 00:04:47,040
most in a year since 2010.

121
00:04:51,990 --> 00:04:49,199
with no slowdown to human space flight

122
00:04:54,310 --> 00:04:52,000
in sight we introduced 10 new astronaut

123
00:04:56,230 --> 00:04:54,320
candidates in early december

124
00:04:58,230 --> 00:04:56,240
we also accepted applications for the

125
00:05:00,870 --> 00:04:58,240
next class of flight directors and

126
00:05:02,870 --> 00:05:00,880
announced plans for the agency's first

127
00:05:05,909 --> 00:05:02,880
two private astronaut missions to the

128
00:05:07,670 --> 00:05:05,919
international space station

129
00:05:09,510 --> 00:05:07,680
cargo missions flown to the space

130
00:05:12,310 --> 00:05:09,520
station by our commercial partners

131
00:05:15,110 --> 00:05:12,320
delivered more than 33 000 pounds of

132
00:05:17,270 --> 00:05:15,120
science tools and critical supplies and

133
00:05:19,029 --> 00:05:17,280
returned thousands of pounds of research

134
00:05:20,710 --> 00:05:19,039
and equipment to earth

135
00:05:22,870 --> 00:05:20,720
and we signed agreements with three

136
00:05:25,510 --> 00:05:22,880
companies to develop early concepts of

137
00:05:28,150 --> 00:05:25,520
commercial destinations as part of our

138
00:05:32,790 --> 00:05:28,160

efforts to enable a robust american-led

139
00:05:37,430 --> 00:05:35,350
we made significant progress in 2021

140
00:05:40,150 --> 00:05:37,440
preparing for the artemis one integrated

141
00:05:42,070 --> 00:05:40,160
flight test around the moon next year

142
00:05:43,749 --> 00:05:42,080
engineers at our kennedy space center

143
00:05:45,990 --> 00:05:43,759
finished installing and testing

144
00:05:48,310 --> 00:05:46,000
components and systems for the orion

145
00:05:50,310 --> 00:05:48,320
spacecraft to make sure it is ready for

146
00:05:52,390 --> 00:05:50,320
artemis one

147
00:05:54,150 --> 00:05:52,400
meanwhile teams at our stennis space

148
00:05:56,629 --> 00:05:54,160
center completed the eight part green

149
00:06:00,070 --> 00:05:56,639
run test campaign with the space launch

150
00:06:02,469 --> 00:06:00,080
system or sls rockets core stage

151
00:06:04,629 --> 00:06:02,479
there was also work in 2021 toward

152
00:06:07,110 --> 00:06:04,639
future artemis missions to the moon with

153
00:06:09,749 --> 00:06:07,120
astronauts we delivered a key piece of

154
00:06:11,670 --> 00:06:09,759
artemis ii flight hardware to florida

155
00:06:13,990 --> 00:06:11,680
completed the welding of another major

156
00:06:16,309 --> 00:06:14,000
piece of hardware for the mission

157
00:06:19,189 --> 00:06:16,319
and conducted a series of water impact

158
00:06:21,270 --> 00:06:19,199
testing with a test version of orion we

159
00:06:22,950 --> 00:06:21,280
partnered with spacex to continue

160
00:06:25,350 --> 00:06:22,960
development of the first commercial

161
00:06:27,029 --> 00:06:25,360
human lunar lander through artemis we

162
00:06:29,350 --> 00:06:27,039
planned to land the first woman and

163
00:06:31,110 --> 00:06:29,360

first person of color on the moon

164
00:06:33,029 --> 00:06:31,120
working with commercial partners we

165
00:06:34,790 --> 00:06:33,039
completed the first propulsion system

166
00:06:37,350 --> 00:06:34,800
ground tests with the power and

167
00:06:40,070 --> 00:06:37,360
propulsion element for gateway also

168
00:06:42,469 --> 00:06:40,080
japan became the third nation to support

169
00:06:44,870 --> 00:06:42,479
development of the lunar outpost

170
00:06:47,510 --> 00:06:44,880
and the lunar landing site for our viper

171
00:06:49,510 --> 00:06:47,520
robotic rover was selected a region just

172
00:06:51,909 --> 00:06:49,520
outside the western edge of nobile

173
00:06:53,670 --> 00:06:51,919
crater at the moon's south pole

174
00:06:56,150 --> 00:06:53,680
viper will be delivered to the moon in

175
00:06:58,710 --> 00:06:56,160
2023 through our commercial lunar

176
00:07:01,990 --> 00:06:58,720
payload services initiative or eclipse

177
00:07:04,710 --> 00:07:02,000
part of artemis

178
00:07:07,029 --> 00:07:04,720
we advanced space technology in 2021

179
00:07:11,029 --> 00:07:07,039
with new concepts to help drive space

180
00:07:12,870 --> 00:07:11,039
exploration and benefit life on earth

181
00:07:15,029 --> 00:07:12,880
our laser communications relay

182
00:07:17,990 --> 00:07:15,039
demonstration was launched to highlight

183
00:07:19,749 --> 00:07:18,000
the next era of space communications we

184
00:07:22,070 --> 00:07:19,759
teamed with the department of energy to

185
00:07:24,390 --> 00:07:22,080
advance nuclear spacecraft propulsion

186
00:07:26,309 --> 00:07:24,400
technologies and fission surface power

187
00:07:28,710 --> 00:07:26,319
concepts to boost future space

188
00:07:30,469 --> 00:07:28,720

exploration an onboard suite of

189
00:07:33,270 --> 00:07:30,479
cutting-edge technology helped the

190
00:07:35,589 --> 00:07:33,280
perseverance rover land safely on mars

191
00:07:37,670 --> 00:07:35,599
provide its first weather report and

192
00:07:38,950 --> 00:07:37,680
produce oxygen on the red planet for the

193
00:07:41,189 --> 00:07:38,960
first time

194
00:07:43,270 --> 00:07:41,199
and our deep space atomic clock

195
00:07:47,830 --> 00:07:43,280
concluded a successful two-year mission

196
00:07:49,909 --> 00:07:47,840
to advance precise time keeping in space

197
00:07:52,070 --> 00:07:49,919
we continued our aeronautics research

198
00:07:54,550 --> 00:07:52,080
efforts this year to validate unique

199
00:07:57,029 --> 00:07:54,560
airframe design technologies for more

200
00:07:59,189 --> 00:07:57,039
quiet safe and efficient flight on next

201
00:08:01,110 --> 00:07:59,199
generation aircraft

202
00:08:03,909 --> 00:08:01,120
we reached several milestones in

203
00:08:06,309 --> 00:08:03,919
assembly of our x-59 quiet supersonic

204
00:08:08,390 --> 00:08:06,319
technology aircraft and removed the

205
00:08:10,469 --> 00:08:08,400
experimental airplane from its external

206
00:08:12,550 --> 00:08:10,479
construction supports

207
00:08:15,670 --> 00:08:12,560
meanwhile we completed high voltage

208
00:08:17,189 --> 00:08:15,680
testing on our all-electric x-57 maxwell

209
00:08:19,270 --> 00:08:17,199
aircraft

210
00:08:21,430 --> 00:08:19,280
we conducted wind tunnel testing with a

211
00:08:23,430 --> 00:08:21,440
full-scale concept x-plane the

212
00:08:25,589 --> 00:08:23,440
centerpiece of a national partnership

213
00:08:28,390 --> 00:08:25,599

with industry academia and other

214
00:08:31,110 --> 00:08:28,400
agencies to achieve net zero emissions

215
00:08:33,350 --> 00:08:31,120
in aviation by 2050.

216
00:08:35,909 --> 00:08:33,360
we wrapped up our airspace technology

217
00:08:38,149 --> 00:08:35,919
demonstration 2 project after six years

218
00:08:40,230 --> 00:08:38,159
of successful research into reducing

219
00:08:43,110 --> 00:08:40,240
flight delays streamlining airport

220
00:08:44,870 --> 00:08:43,120
operations and curbing emissions

221
00:08:46,710 --> 00:08:44,880
we conducted flight tests with an

222
00:08:48,630 --> 00:08:46,720
all-electric vertical takeoff and

223
00:08:51,030 --> 00:08:48,640
landing aircraft to collect data

224
00:08:53,430 --> 00:08:51,040
critical to our advanced air mobility

225
00:08:56,150 --> 00:08:53,440
national campaign

226
00:08:58,150 --> 00:08:56,160
and a wildfire management workshop nasa

227
00:09:00,470 --> 00:08:58,160
hosted demonstrated how emergency

228
00:09:04,550 --> 00:09:00,480
responders can fight fires more safely

229
00:09:06,230 --> 00:09:04,560
and effectively using nasa technology

230
00:09:08,790 --> 00:09:06,240
we launched our mission equity

231
00:09:10,230 --> 00:09:08,800
initiative in 2021 as part of a federal

232
00:09:11,750 --> 00:09:10,240
government effort to support

233
00:09:14,470 --> 00:09:11,760
historically underserved and

234
00:09:16,470 --> 00:09:14,480
underrepresented communities

235
00:09:19,430 --> 00:09:16,480
our headquarters building in washington

236
00:09:22,389 --> 00:09:19,440
was named after mary w jackson the first

237
00:09:24,230 --> 00:09:22,399
african-american female engineer at nasa

238
00:09:26,310 --> 00:09:24,240

she was part of a group of women whose

239
00:09:28,230 --> 00:09:26,320
work was critical to sending the first

240
00:09:30,630 --> 00:09:28,240
americans to space

241
00:09:32,870 --> 00:09:30,640
and students who are deaf blind hearing

242
00:09:34,870 --> 00:09:32,880
and visually impaired connected with

243
00:09:36,870 --> 00:09:34,880
astronauts aboard the space station

244
00:09:40,389 --> 00:09:36,880
during an in-flight event to promote

245
00:09:45,509 --> 00:09:42,310
there were plenty of opportunities in

246
00:09:47,750 --> 00:09:45,519
2021 for students to engage in nasa stem

247
00:09:50,070 --> 00:09:47,760
related activities

248
00:09:52,310 --> 00:09:50,080
nasa collaborated with future engineers

249
00:09:55,269 --> 00:09:52,320
to create the artemis moonpod essay

250
00:09:56,870 --> 00:09:55,279
contest in which nearly 14 000 students

251
00:09:58,550 --> 00:09:56,880
from every state in the country

252
00:10:00,710 --> 00:09:58,560
participated

253
00:10:02,949 --> 00:10:00,720
our mission to mars student challenge

254
00:10:05,990 --> 00:10:02,959
demonstrated how science math and

255
00:10:08,389 --> 00:10:06,000
creativity are used to design build

256
00:10:10,870 --> 00:10:08,399
launch and land a mars mission we

257
00:10:13,110 --> 00:10:10,880
published first woman the agency's first

258
00:10:15,030 --> 00:10:13,120
digital interactive graphic novel in

259
00:10:17,110 --> 00:10:15,040
english and spanish

260
00:10:19,110 --> 00:10:17,120
student teams designed and launched

261
00:10:21,430 --> 00:10:19,120
climate remote sensing and space

262
00:10:24,389 --> 00:10:21,440
exploration experiments on suborbital

263
00:10:26,310 --> 00:10:24,399

rockets and high altitude balloons

264
00:10:28,710 --> 00:10:26,320
and the agency awarded funding to

265
00:10:31,670 --> 00:10:28,720
minority serving institutions to study

266
00:10:34,069 --> 00:10:31,680
our home planet develop space technology

267
00:10:36,730 --> 00:10:34,079
and expand participation in science

268
00:10:38,069 --> 00:10:36,740
technology engineering and math fields

269
00:10:40,310 --> 00:10:38,079
[Music]

270
00:10:42,870 --> 00:10:40,320
when all is said and done the underlying

271
00:10:44,710 --> 00:10:42,880
reason we do what we do from advancing

272
00:10:46,790 --> 00:10:44,720
space exploration to making

273
00:10:49,110 --> 00:10:46,800
groundbreaking scientific and technical

274
00:10:51,350 --> 00:10:49,120
discoveries to monitoring the health of

275
00:10:54,230 --> 00:10:51,360
our planet to developing innovative

276
00:10:55,990 --> 00:10:54,240
modes of transportation is to benefit

277
00:10:57,590 --> 00:10:56,000
you

278
00:11:01,030 --> 00:10:57,600
those are some of the highlights from

279
00:11:04,310 --> 00:11:01,040
what nasa did in 2021 for more details

280
00:11:06,389 --> 00:11:04,320
visit nasa.gov 2021

281
00:11:08,949 --> 00:11:06,399
thanks for watching please have a safe

282
00:11:10,710 --> 00:11:08,959
healthy and happy holiday season and we