1
00:00:00,000 --> 00:01:05,140
I

2
00:01:11,060 --> 00:01:08,360
hello and welcome to volume 6 of NASA

3
00:01:14,360 --> 00:01:11,070
report to education I'm Lynn Bondurant

4
00:01:17,210 --> 00:01:14,370
the crew aboard the STS 28 went about

5
00:01:20,270 --> 00:01:17,220
their business but unseen and unheard by

6
00:01:23,150 --> 00:01:20,280
all but ground controllers because the

7
00:01:26,180 --> 00:01:23,160
STS 28 flight was a classified military

8
00:01:29,780 --> 00:01:26,190
mission a virtual news blackout was in

9
00:01:32,750 --> 00:01:29,790
effect on launch day the five men all

10
00:01:35,330 --> 00:01:32,760
military crew mission commander Brewster

11
00:01:38,330 --> 00:01:35,340
Shah pilot dick Richards and mission

12
00:01:41,109 --> 00:01:38,340
specialist David Lisa James Adamson and

13
00:01:43,700 --> 00:01:41,119

Mark Brown were up well before dawn

14
00:01:45,950 --> 00:01:43,710
dressed in the bright orange pressurized

15
00:01:48,160 --> 00:01:45,960
flight suits they made their way to the

16
00:01:51,109 --> 00:01:48,170
astro van for the ride to the launch pad

17
00:01:53,270 --> 00:01:51,119
once onboard the orbiter they had to

18
00:01:55,880 --> 00:01:53,280
wait out a slightly hazy sky over the

19
00:01:58,910 --> 00:01:55,890
Kennedy Space Center for the orbiter

20
00:02:00,740 --> 00:01:58,920
Columbia NASA's oldest Space Shuttle it

21
00:02:04,760 --> 00:02:00,750
would mark its first flight since

22
00:02:06,550 --> 00:02:04,770
January 12 1986 during the three and a

23
00:02:09,620 --> 00:02:06,560
half years since its last flight

24
00:02:12,170 --> 00:02:09,630
Columbia underwent more than 250

25
00:02:14,840 --> 00:02:12,180
modifications to bring it up to par with

26
00:02:18,140 --> 00:02:14,850
the other two orbiters discovery and

27
00:02:21,830 --> 00:02:18,150
Atlantis finally at eight thirty seven

28
00:02:27,470 --> 00:02:21,840
a.m. it was time liftoff liftoff on

29
00:02:29,360 --> 00:02:27,480
Columbia and its return to flight the

30
00:02:31,760 --> 00:02:29,370
space shuttle Columbia completed its

31
00:02:34,400 --> 00:02:31,770
mission with a smooth landing at edwards

32
00:02:36,830 --> 00:02:34,410
air force base in california on August

33
00:02:39,290 --> 00:02:36,840
thirteenth but because it was a

34
00:02:41,839 --> 00:02:39,300
classified Department of Defense mission

35
00:02:44,480 --> 00:02:41,849
the public was not permitted on the base

36
00:02:46,880 --> 00:02:44,490
as Columbia glided in for a landing at

37
00:02:50,900 --> 00:02:46,890
nine thirty seven a.m. eastern daylight

38
00:02:53,330 --> 00:02:50,910

time after a five-day flight a super

39
00:02:56,000 --> 00:02:53,340
team and a great machine welcome home

40
00:02:58,250 --> 00:02:56,010
columbia capsule communicator Frank

41
00:03:01,760 --> 00:02:58,260
Culbertson radioed the crew from Houston

42
00:03:04,040 --> 00:03:01,770
as the orbiter rolled to a halt about an

43
00:03:06,290 --> 00:03:04,050
hour after touchdown the crew emerged

44
00:03:08,540 --> 00:03:06,300
from the orbiter greeted by NASA

45
00:03:10,910 --> 00:03:08,550
Administrator Admiral Richard truly and

46
00:03:13,420 --> 00:03:10,920
other NASA officials they made the

47
00:03:16,130 --> 00:03:13,430
traditional inspection of the spacecraft

48
00:03:16,550 --> 00:03:16,140
officials say it appears that only three

49
00:03:18,979 --> 00:03:16,560
of

50
00:03:21,680 --> 00:03:18,989
lumby as heat protection tiles will have

51
00:03:23,720 --> 00:03:21,690
to be replaced a thruster in the

52
00:03:25,910 --> 00:03:23,730
reaction control system was shut down in

53
00:03:28,520 --> 00:03:25,920
flight by the crew because of

54
00:03:31,010 --> 00:03:28,530
indications of a leak officials also

55
00:03:33,350 --> 00:03:31,020
report that pilot dick Richards seat

56
00:03:35,350 --> 00:03:33,360
jerked backwards about one inch when the

57
00:03:38,000 --> 00:03:35,360
shuttle lifted off the launch pad

58
00:03:39,770 --> 00:03:38,010
Richards used a motor control to move

59
00:03:43,850 --> 00:03:39,780
the seat forward to its normal position

60
00:03:46,640 --> 00:03:43,860
and Montgomery the orbiter flow director

61
00:03:48,800 --> 00:03:46,650
said that workers will examine about 20

62
00:03:54,110 --> 00:03:48,810
other minor problems that develop just

63
00:03:56,470 --> 00:03:54,120

before or during Columbia's flight 20

64
00:03:58,460 --> 00:03:56,480
years after the Apollo moon landing

65
00:04:01,039 --> 00:03:58,470
technologies which enabled manned

66
00:04:03,470 --> 00:04:01,049
spaceflight continued to improve our

67
00:04:07,100 --> 00:04:03,480
daily lives in the areas of health

68
00:04:09,500 --> 00:04:07,110
safety comfort and enjoyment some

69
00:04:12,229 --> 00:04:09,510
specific examples of technology

70
00:04:14,330 --> 00:04:12,239
spin-offs from the Apollo era include

71
00:04:16,370 --> 00:04:14,340
the lunar roving vehicle that allowed

72
00:04:19,400 --> 00:04:16,380
astronauts to travel miles away from

73
00:04:21,560 --> 00:04:19,410
their lunar base the rover was the

74
00:04:24,560 --> 00:04:21,570
source of a Eunice ticks controller now

75
00:04:28,130 --> 00:04:24,570
used by handicapped people to accelerate

76
00:04:30,860 --> 00:04:28,140
brake and steer automobiles scratch

77
00:04:33,670 --> 00:04:30,870
resistant sunglass lenses were derived

78
00:04:35,719 --> 00:04:33,680
from a highly abrasion resistant coating

79
00:04:38,240 --> 00:04:35,729
developed to protect from harsh

80
00:04:40,279 --> 00:04:38,250
environments further hundreds of lives

81
00:04:42,740 --> 00:04:40,289
have been saved through a widely used

82
00:04:46,010 --> 00:04:42,750
commercial raft that will not capsized

83
00:04:48,320 --> 00:04:46,020
in heavy seas the raft employs a NASA

84
00:04:50,840 --> 00:04:48,330
patented water ballast stabilization

85
00:04:53,000 --> 00:04:50,850
system used in rafts developed for the

86
00:04:57,350 --> 00:04:53,010
returning Apollo astronauts after their

87
00:04:59,330 --> 00:04:57,360
splashdown a 3m designed meal heating

88
00:05:02,029 --> 00:04:59,340

unit developed for the Apollo spacecraft

89
00:05:04,279 --> 00:05:02,039
crews served as a basis for an

90
00:05:07,340 --> 00:05:04,289
electronic food warming system used in

91
00:05:09,080 --> 00:05:07,350
hospitals these are just a few of the

92
00:05:10,909 --> 00:05:09,090
hundreds of spin-offs which have

93
00:05:14,390 --> 00:05:10,919
resulted from the research carried out

94
00:05:16,550 --> 00:05:14,400
during the Apollo program American and

95
00:05:18,830 --> 00:05:16,560
Soviet physicians are just past the

96
00:05:22,219 --> 00:05:18,840
halfway point in a four-month-long

97
00:05:25,159 --> 00:05:22,229
telemedicine space bridge it's been set

98
00:05:26,330 --> 00:05:25,169
up to provide medical assistance to the

99
00:05:28,969 --> 00:05:26,340
victims of the earthquake that

100
00:05:29,900 --> 00:05:28,979
devastated parts of the Soviet republic

101
00:05:33,440 --> 00:05:29,910
of armenia

102
00:05:36,410 --> 00:05:33,450
last December linked by a satellite

103
00:05:38,300 --> 00:05:36,420
hookup physicians in Armenia have access

104
00:05:41,210 --> 00:05:38,310
to audio-visual communication

105
00:05:43,490 --> 00:05:41,220
capabilities with us doctors at NASA

106
00:05:46,760 --> 00:05:43,500
headquarters and medical facilities in

107
00:05:48,950 --> 00:05:46,770
Maryland Texas in Utah the satellite

108
00:05:51,860 --> 00:05:48,960
conferences are held for four hours each

109
00:05:53,360 --> 00:05:51,870
morning Monday through Friday this

110
00:05:55,610 --> 00:05:53,370
session dealt with different

111
00:05:57,920 --> 00:05:55,620
psychological problems suffered by some

112
00:06:00,380 --> 00:05:57,930
thirty seven thousand children who were

113
00:06:02,990 --> 00:06:00,390

victims of the earthquake more than

114
00:06:04,880 --> 00:06:03,000
1,000 the children were orphaned NASA

115
00:06:08,000 --> 00:06:04,890
announced that the space bridge with

116
00:06:10,340 --> 00:06:08,010
armenia has been so successful then it

117
00:06:12,920 --> 00:06:10,350
will be extended to Moscow in the Soviet

118
00:06:14,960 --> 00:06:12,930
city utha to assist the victims of two

119
00:06:19,160 --> 00:06:14,970
trains which were recently destroyed by

120
00:06:21,650 --> 00:06:19,170
a gas explosion scientists at Lois have

121
00:06:23,660 --> 00:06:21,660
produced the first high-speed electronic

122
00:06:26,900 --> 00:06:23,670
circuit using high-temperature

123
00:06:30,430 --> 00:06:26,910
superconductivity research the circuit

124
00:06:32,750 --> 00:06:30,440
can operate at 30 32 37 gigahertz a

125
00:06:35,350 --> 00:06:32,760
frequency range three times higher than

126
00:06:38,240 --> 00:06:35,360
that attainable with existing circuits

127
00:06:40,790 --> 00:06:38,250
according to cool bhasin a space

128
00:06:42,680 --> 00:06:40,800
electronics researcher at lewis the high

129
00:06:44,630 --> 00:06:42,690
speed circuit could become part of

130
00:06:47,450 --> 00:06:44,640
future generations of satellites that

131
00:06:50,630 --> 00:06:47,460
operate at ultra-high frequencies called

132
00:06:53,120 --> 00:06:50,640
k-band these frequencies would let

133
00:06:55,970 --> 00:06:53,130
satellites process data at much faster

134
00:06:59,180 --> 00:06:55,980
rates and handle many more customers

135
00:07:01,340 --> 00:06:59,190
than conventional satellites further the

136
00:07:03,620 --> 00:07:01,350
circuit might be used in radar imaging

137
00:07:07,190 --> 00:07:03,630
satellites to reduce the size of space

138
00:07:08,720 --> 00:07:07,200

antennas Dennis Connelly deputy chief of

139
00:07:11,360 --> 00:07:08,730
Applied Research of the space

140
00:07:13,040 --> 00:07:11,370
electronics division at Lewis said the

141
00:07:15,770 --> 00:07:13,050
circuits should eventually help in the

142
00:07:17,270 --> 00:07:15,780
development of faster computers because

143
00:07:20,770 --> 00:07:17,280
they would reduce the amount of waste

144
00:07:23,210 --> 00:07:20,780
heat generated by existing circuits

145
00:07:26,030 --> 00:07:23,220
superconductors conduct electricity with

146
00:07:29,180 --> 00:07:26,040
no resistance and therefore with no loss

147
00:07:31,400 --> 00:07:29,190
of power scientists at NASA's Marshall

148
00:07:33,470 --> 00:07:31,410
Space Flight Center believe they have

149
00:07:35,360 --> 00:07:33,480
solved a mystery that may help in the

150
00:07:38,330 --> 00:07:35,370
design of new and improved

151
00:07:41,330 --> 00:07:38,340
disease-fighting drugs using a technique

152
00:07:43,170 --> 00:07:41,340
known as x-ray crystallography a team of

153
00:07:44,990 --> 00:07:43,180
scientists and technicians

154
00:07:47,550 --> 00:07:45,000
from Marshall Space Science Laboratory

155
00:07:50,310 --> 00:07:47,560
have determined the three-dimensional

156
00:07:52,590 --> 00:07:50,320
structure of human serum albumin the

157
00:07:55,409 --> 00:07:52,600
most abundant plasma protein in the

158
00:07:57,150 --> 00:07:55,419
human circulatory system the scientists

159
00:07:59,070 --> 00:07:57,160
have mapped and confirmed the structure

160
00:08:01,469 --> 00:07:59,080
of the protein to a resolution which

161
00:08:04,219 --> 00:08:01,479
provides an image with enough detail to

162
00:08:06,689 --> 00:08:04,229
extract data about individual molecules

163
00:08:09,390 --> 00:08:06,699

the scientists next step will be to

164
00:08:12,600 --> 00:08:09,400
further refine the resolution using

165
00:08:14,820 --> 00:08:12,610
space grown crystals human serum albumin

166
00:08:17,370 --> 00:08:14,830
crystals have been grown twice in space

167
00:08:21,870 --> 00:08:17,380
most recently during shuttle mission

168
00:08:24,629 --> 00:08:21,880
sts-27 buraz part of a protein crystal

169
00:08:27,150 --> 00:08:24,639
growth experiment knowing the molecular

170
00:08:29,969 --> 00:08:27,160
structure may allow pharmaceutical

171
00:08:32,010 --> 00:08:29,979
companies to design new drugs or alter

172
00:08:33,990 --> 00:08:32,020
existing drugs to allow them to be more

173
00:08:37,019 --> 00:08:34,000
efficiently carried by the protein

174
00:08:39,839 --> 00:08:37,029
molecule through the body it's called

175
00:08:41,760 --> 00:08:39,849
NASA space link and people from all over

176
00:08:44,550 --> 00:08:41,770
the world are logging on to this special

177
00:08:45,949 --> 00:08:44,560
NASA computer system here's a report

178
00:08:48,840 --> 00:08:45,959
from the Marshall Space Flight Center

179
00:08:50,910 --> 00:08:48,850
who was the first American in space and

180
00:08:53,310 --> 00:08:50,920
see if you can tell me when raise your

181
00:08:57,630 --> 00:08:53,320
hand now I think it was Adam do Shepard

182
00:09:00,240 --> 00:08:57,640
and 1961 how many people have actually

183
00:09:02,790 --> 00:09:00,250
walked on the moon that's what people

184
00:09:04,560 --> 00:09:02,800
want them where was the first space

185
00:09:07,710 --> 00:09:04,570
shuttle launch and what was the name of

186
00:09:09,780 --> 00:09:07,720
it first space show was Columbia and it

187
00:09:11,940 --> 00:09:09,790
was launched in 1981 here's another

188
00:09:13,800 --> 00:09:11,950

question why did the students in this

189
00:09:16,560 --> 00:09:13,810
classroom know so much about the space

190
00:09:19,019 --> 00:09:16,570
program the answer because the space

191
00:09:21,930 --> 00:09:19,029
program has made its way into this

192
00:09:24,329 --> 00:09:21,940
classroom a computer system called NASA

193
00:09:26,490 --> 00:09:24,339
space link connects these students with

194
00:09:28,440 --> 00:09:26,500
such things as space agency background

195
00:09:30,720 --> 00:09:28,450
information daily updates and news

196
00:09:32,880 --> 00:09:30,730
releases even lesson plans and other

197
00:09:34,890 --> 00:09:32,890
resources for teachers like Margaret

198
00:09:36,960 --> 00:09:34,900
Milton unless you use newspapers or

199
00:09:39,180 --> 00:09:36,970
current periodicals or something like

200
00:09:41,639 --> 00:09:39,190
space link there's no way for kids to

201
00:09:43,110 --> 00:09:41,649
have the correct information science and

202
00:09:45,389 --> 00:09:43,120
technology of changing everything so

203
00:09:47,940 --> 00:09:45,399
quickly NASA hopes this program will

204
00:09:49,230 --> 00:09:47,950
address a growing national concern when

205
00:09:51,480 --> 00:09:49,240
these youngsters enter the workforce

206
00:09:53,910 --> 00:09:51,490
will there be enough trained scientists

207
00:09:55,090 --> 00:09:53,920
and engineers to meet an expanding need

208
00:09:57,280 --> 00:09:55,100
we are really faced

209
00:09:59,740 --> 00:09:57,290
crisis former teacher Bill Anderson

210
00:10:01,270 --> 00:09:59,750
manages the space link program which is

211
00:10:04,300 --> 00:10:01,280
based at NASA's Marshall Space Flight

212
00:10:06,130 --> 00:10:04,310
Center in Huntsville Alabama he believes

213
00:10:09,070 --> 00:10:06,140

that linking the space program with

214
00:10:11,470 --> 00:10:09,080
classrooms today will pay off big in the

215
00:10:13,060 --> 00:10:11,480
years ahead third fourth and fifth

216
00:10:15,610 --> 00:10:13,070
grades middle school high school

217
00:10:17,230 --> 00:10:15,620
encourage them to continue studying math

218
00:10:19,150 --> 00:10:17,240
and science to show them how important

219
00:10:21,550 --> 00:10:19,160
it is and really how exciting it is

220
00:10:24,850 --> 00:10:21,560
that's why we feel like with the program

221
00:10:26,560 --> 00:10:24,860
is exciting as the space program we we

222
00:10:28,210 --> 00:10:26,570
have an advantage and encouraging

223
00:10:30,460 --> 00:10:28,220
children to be interested in math and

224
00:10:33,220 --> 00:10:30,470
science and we feel like we need to do

225
00:10:35,380 --> 00:10:33,230
our part although primarily meant for

226
00:10:38,350 --> 00:10:35,390
schools the system is open to anyone

227
00:10:40,750 --> 00:10:38,360
interested in the space program all it

228
00:10:43,720 --> 00:10:40,760
takes is a personal computer a modem and

229
00:10:45,580 --> 00:10:43,730
a phone call to the marshall center when

230
00:10:47,650 --> 00:10:45,590
your computer connects with NASA's Space

231
00:10:49,300 --> 00:10:47,660
link user-friendly instructions will

232
00:10:52,390 --> 00:10:49,310
appear on your screen to help you

233
00:10:54,550 --> 00:10:52,400
register and use the system NASA space

234
00:10:56,080 --> 00:10:54,560
link is free but you'll owe your

235
00:10:59,500 --> 00:10:56,090
telephone company for any long distance

236
00:11:01,840 --> 00:10:59,510
calls recently President Bush traveled

237
00:11:06,250 --> 00:11:01,850
to the foothills of Virginia to address

238
00:11:08,710 --> 00:11:06,260

the 1989 national boy scout jamboree mr.

239
00:11:11,320 --> 00:11:08,720
Bush used the Jamboree theme of space

240
00:11:14,410 --> 00:11:11,330
exploration to talk about his goals for

241
00:11:16,480 --> 00:11:14,420
the space program for generation will

242
00:11:19,000 --> 00:11:16,490
have a broader greater opportunity to

243
00:11:21,190 --> 00:11:19,010
live in space to travel to establish an

244
00:11:23,680 --> 00:11:21,200
outpost on the moon and explore the

245
00:11:25,900 --> 00:11:23,690
mysteries of Mars and this is the

246
00:11:29,770 --> 00:11:25,910
challenge of the next century your

247
00:11:33,610 --> 00:11:29,780
century your challenge and today is

248
00:11:35,650 --> 00:11:33,620
before subtended and trying voices

249
00:11:38,290 --> 00:11:35,660
caution us against the danger of the

250
00:11:40,950 --> 00:11:38,300
hardship and expense and perhaps they

251
00:11:43,300 --> 00:11:40,960
shoulda seen didn't steal birds

252
00:11:45,730 --> 00:11:43,310
extravaganza or perhaps they should

253
00:11:48,580 --> 00:11:45,740
listen to Ray Bradbury a writer who once

254
00:11:52,390 --> 00:11:48,590
said that space will make children of us

255
00:11:55,210 --> 00:11:52,400
all amen that the strange beauty and

256
00:11:58,300 --> 00:11:55,220
mystery of space will teach even the

257
00:11:59,980 --> 00:11:58,310
most cynical and world-weary among us to

258
00:12:03,690 --> 00:11:59,990
rediscover the wonders of their first

259
00:12:06,790 --> 00:12:03,700
glimpse of the night sky and tonight

260
00:12:09,190 --> 00:12:06,800
when you're lying around the campfire

261
00:12:12,610 --> 00:12:09,200
surrounded by dark cars looking up at

262
00:12:15,610 --> 00:12:12,620
the stars of the night sky I want you to

263
00:12:17,560 --> 00:12:15,620

consider something perhaps you or your

264
00:12:20,730 --> 00:12:17,570
kids or as hard as it is for you to

265
00:12:23,620 --> 00:12:20,740
imagine your grandchildren well one day

266
00:12:27,900 --> 00:12:23,630
look up at the night sky before going to

267
00:12:32,200 --> 00:12:27,910
sleep and see the earth as a thang

268
00:12:37,570 --> 00:12:32,210
twinkling blue star it is this spirit a

269
00:12:40,540 --> 00:12:37,580
spirit of wonder of discovery adventure

270
00:12:44,530 --> 00:12:40,550
it is surely drawing us to a new destiny

271
00:12:48,430 --> 00:12:44,540
a new and far distant worlds you are

272
00:12:51,820 --> 00:12:48,440
privileged to be the generation the

273
00:12:55,210 --> 00:12:51,830
witness the first large movement of men

274
00:13:00,000 --> 00:12:55,220
and women in his face and is as this

275
00:13:04,810 --> 00:13:00,010
happens I know that the Boy Scouts of

276
00:13:06,540 --> 00:13:04,820
today will be in the lead over 50,000

277
00:13:09,490 --> 00:13:06,550
Boy Scouts attending the Jamboree

278
00:13:12,880 --> 00:13:09,500
learned about nasa and its many programs

279
00:13:15,010 --> 00:13:12,890
as we see in this report Quinn tens of

280
00:13:17,020 --> 00:13:15,020
thousands of Boy Scouts from all over

281
00:13:19,750 --> 00:13:17,030
the globe get together every four years

282
00:13:22,230 --> 00:13:19,760
for this Jamboree you'd expect them to

283
00:13:25,750 --> 00:13:22,240
get in plenty of boating fishing and

284
00:13:27,340 --> 00:13:25,760
other outdoor activities but this year

285
00:13:30,550 --> 00:13:27,350
there was something new added to the

286
00:13:33,610 --> 00:13:30,560
agenda space you could see it reflected

287
00:13:36,580 --> 00:13:33,620
in the Jamboree patch in the campsites

288
00:13:39,460 --> 00:13:36,590

name for us spacecraft and in a variety

289
00:13:41,560 --> 00:13:39,470
of activities brought here by NASA the

290
00:13:43,660 --> 00:13:41,570
NASA exhibits really cool i did a report

291
00:13:44,980 --> 00:13:43,670
on the all the Apollo programs in high

292
00:13:46,930 --> 00:13:44,990
school and there's a lot more

293
00:13:50,380 --> 00:13:46,940
information here than I ever got all

294
00:13:52,300 --> 00:13:50,390
dispersed I was great I like it it's

295
00:13:54,070 --> 00:13:52,310
really interesting it gives a kiss a

296
00:13:55,570 --> 00:13:54,080
chant the scouts and parents and

297
00:13:57,190 --> 00:13:55,580
visitors a chance to see really what's

298
00:13:58,990 --> 00:13:57,200
going on in addition to what you read

299
00:14:02,020 --> 00:13:59,000
the newspapers and magazines but to

300
00:14:03,820 --> 00:14:02,030
physically see things like the freedom

301
00:14:05,220 --> 00:14:03,830
Space Station freedom a slice of it what

302
00:14:08,040 --> 00:14:05,230
it's like inside type of

303
00:14:10,260 --> 00:14:08,050
vironment things like that NASA and the

304
00:14:12,630 --> 00:14:10,270
Boy Scouts organization say they have

305
00:14:14,520 --> 00:14:12,640
some important things in common both

306
00:14:16,680 --> 00:14:14,530
think it's vital that young people in

307
00:14:19,710 --> 00:14:16,690
this country get early exposure to

308
00:14:22,620 --> 00:14:19,720
American technology solar wings here

309
00:14:24,390 --> 00:14:22,630
roll out in orbit their flimsy real

310
00:14:26,400 --> 00:14:24,400
flimsy they won't even hold their own

311
00:14:28,640 --> 00:14:26,410
weight up here on earth it's hope that

312
00:14:31,380 --> 00:14:28,650
by meeting NASA scientists and engineers

313
00:14:33,480 --> 00:14:31,390

plus astronauts like Bruce McCandless

314
00:14:35,160 --> 00:14:33,490
these Scouts will take a greater

315
00:14:38,340 --> 00:14:35,170
interest in school subjects like science

316
00:14:40,430 --> 00:14:38,350
and math these scouts brought a world of

317
00:14:42,570 --> 00:14:40,440
questions about space to this Jamboree

318
00:14:45,150 --> 00:14:42,580
NASA brought some of its brightest

319
00:14:47,640 --> 00:14:45,160
people to provide some answers to talk

320
00:14:49,080 --> 00:14:47,650
about the potential of space and to help

321
00:14:52,170 --> 00:14:49,090
Scouts earn a space and Aeronautics

322
00:14:53,880 --> 00:14:52,180
merit badge or two NASA officials here

323
00:14:56,490 --> 00:14:53,890
say this was a learning experience for

324
00:14:59,310 --> 00:14:56,500
them as well they got a glimpse into the

325
00:15:01,020 --> 00:14:59,320
future and a chance to meet perhaps the

326
00:15:06,330 --> 00:15:01,030
next generation of American space

327
00:15:08,550 --> 00:15:06,340
explorers by the way two-thirds of the

328
00:15:11,210 --> 00:15:08,560
United States astronauts were once

329
00:15:13,680 --> 00:15:11,220
members of the Boy Scouts of America

330
00:15:15,870 --> 00:15:13,690
technicians at the Cape recently erected

331
00:15:18,510 --> 00:15:15,880
the first stage of an atlas centaur

332
00:15:19,860 --> 00:15:18,520
launch vehicle in preparation for the

333
00:15:22,320 --> 00:15:19,870
launch of a fleet satellite

334
00:15:24,390 --> 00:15:22,330
communication spacecraft the spacecraft

335
00:15:27,300 --> 00:15:24,400
will be the final expendable launch

336
00:15:29,820 --> 00:15:27,310
vehicle under NASA responsibility for

337
00:15:34,110 --> 00:15:29,830
other Atlas Delta and tighten launches

338
00:15:38,550 --> 00:15:34,120

and NASA's Ames Dryden Flight Research

339
00:15:41,160 --> 00:15:38,560
Facility a new x29 forward swept wing

340
00:15:44,060 --> 00:15:41,170
airplane has started flying in a new

341
00:15:47,190 --> 00:15:44,070
high angle of attack research program

342
00:15:49,920 --> 00:15:47,200
high angle of attack refers to the nose

343
00:15:53,160 --> 00:15:49,930
high altitude of an airplane relative to

344
00:15:55,770 --> 00:15:53,170
its flight path the higher the angle of

345
00:15:58,950 --> 00:15:55,780
attack a plane is capable of the more

346
00:16:00,240 --> 00:15:58,960
maneuverable an airplane can be exceed

347
00:16:03,180 --> 00:16:00,250
the aircraft's angle of attack

348
00:16:06,120 --> 00:16:03,190
capability and the plane can spin and

349
00:16:08,760 --> 00:16:06,130
crash this video shows NASA research

350
00:16:10,350 --> 00:16:08,770
pilot Steve Ishmael deploying a spin

351
00:16:12,690 --> 00:16:10,360
shoot which can help recover the

352
00:16:16,230 --> 00:16:12,700
aircraft if it goes into a spin during

353
00:16:18,540 --> 00:16:16,240
test flights researchers expect the x29

354
00:16:19,030 --> 00:16:18,550
s forward swept wings will be more

355
00:16:21,040 --> 00:16:19,040
capable

356
00:16:23,560 --> 00:16:21,050
of high angle of attack flight than

357
00:16:25,540 --> 00:16:23,570
conventional wings the voyager 2

358
00:16:28,569 --> 00:16:25,550
spacecraft reached its closest encounter

359
00:16:30,999 --> 00:16:28,579
with neptune 3,000 miles above the

360
00:16:33,430 --> 00:16:31,009
planet's surface on August twenty-fourth

361
00:16:34,889 --> 00:16:33,440
the report you're about to see was

362
00:16:44,430 --> 00:16:34,899
released by NASA's Jet Propulsion

363
00:16:50,139 --> 00:16:47,319

it's been traveling for nearly 12 years

364
00:16:59,980 --> 00:16:50,149
it has already logged more than 4

365
00:17:02,019 --> 00:16:59,990
billion miles in its lifetime it's been

366
00:17:05,799 --> 00:17:02,029
to places humans had once only dreamed

367
00:17:08,520 --> 00:17:05,809
about and on August twenty-fourth 1989

368
00:17:19,280 --> 00:17:08,530
at nine p.m. pacific daylight time

369
00:17:25,230 --> 00:17:22,230
it will become the first spacecraft to

370
00:17:30,110 --> 00:17:25,240
fly by Neptune a planet that orbits the

371
00:17:38,580 --> 00:17:34,410
launched in 1977 Voyager 1 and 2 have

372
00:17:41,490 --> 00:17:38,590
taken us to Jupiter and Saturn when

373
00:17:44,010 --> 00:17:41,500
Voyager 1 flew past the large moon Titan

374
00:17:45,990 --> 00:17:44,020
and behind Saturn's rings its flight

375
00:17:47,760 --> 00:17:46,000
path was bent northwood and the

376
00:17:50,720 --> 00:17:47,770
spacecraft was sent out of the ecliptic

377
00:17:53,400 --> 00:17:50,730
plane and on toward interstellar space

378
00:17:55,110 --> 00:17:53,410
Voyager 2 is on a flight path it takes

379
00:17:57,480 --> 00:17:55,120
advantage of a rare geometric

380
00:18:00,090 --> 00:17:57,490
positioning of the outer planets this

381
00:18:02,370 --> 00:18:00,100
allows Voyager 2 to use the gravity of

382
00:18:04,500 --> 00:18:02,380
the planets it's encountered to boost it

383
00:18:09,930 --> 00:18:04,510
from one to another without onboard

384
00:18:12,510 --> 00:18:09,940
propulsion Neptune is invisible to the

385
00:18:14,370 --> 00:18:12,520
naked eye even our biggest telescopes

386
00:18:17,610 --> 00:18:14,380
can see only broad features of the

387
00:18:20,370 --> 00:18:17,620
planet early pictures sent back from

388
00:18:22,590 --> 00:18:20,380

Voyager already show cloud features and

389
00:18:26,940 --> 00:18:22,600
a dark band of clouds and circling the

390
00:18:29,640 --> 00:18:26,950
southern pole Neptune's diameter is

391
00:18:31,890 --> 00:18:29,650
about four times the size of Earth it's

392
00:18:35,610 --> 00:18:31,900
blue green color comes from atmospheric

393
00:18:38,160 --> 00:18:35,620
methane which absorbs red light in orbit

394
00:18:40,350 --> 00:18:38,170
around Neptune our ring arcs and one of

395
00:18:45,540 --> 00:18:40,360
the larger and most interesting moons in

396
00:18:48,810 --> 00:18:45,550
the solar system Triton at Voyager tues

397
00:18:51,690 --> 00:18:48,820
closest approach it will pass just 3,000

398
00:18:54,000 --> 00:18:51,700
miles from Neptune's cloud tops that's

399
00:18:57,390 --> 00:18:54,010
closer than Voyager 2 has come to any

400
00:18:59,940 --> 00:18:57,400
other planet a few days before the

401
00:19:02,430 --> 00:18:59,950
spacecraft arrives at Neptune engineers

402
00:19:05,880 --> 00:19:02,440
will fine-tune voyagers flight path over

403
00:19:08,160 --> 00:19:05,890
Neptune's North Pole Voyager will be

404
00:19:10,020 --> 00:19:08,170
able to detect any Neptunian magnetic

405
00:19:13,820 --> 00:19:10,030
field and is likely to pass through the

406
00:19:16,350 --> 00:19:13,830
region where the Northern Lights form

407
00:19:18,690 --> 00:19:16,360
despite Neptune's greater distance from

408
00:19:21,750 --> 00:19:18,700
the Sun its temperature is the same as

409
00:19:24,570 --> 00:19:21,760
that of Uranus for it to be so warm and

410
00:19:28,799 --> 00:19:24,580
yet so far away lept you must generate

411
00:19:34,350 --> 00:19:31,379
another of Neptune's mysteries is it's

412
00:19:37,019 --> 00:19:34,360
moon Triton with a presumed atmosphere

413
00:19:38,489 --> 00:19:37,029

of methane and possibly nitrogen Triton

414
00:19:40,560 --> 00:19:38,499
is expected to be one of the most

415
00:19:44,129 --> 00:19:40,570
fascinating objects and counted in

416
00:19:47,190 --> 00:19:44,139
Voyager tues entire journey because

417
00:19:48,960 --> 00:19:47,200
Neptune is so far away radio data from

418
00:19:51,749 --> 00:19:48,970
Voyager traveling at the speed of light

419
00:19:55,110 --> 00:19:51,759
will take four hours and six minutes to

420
00:19:58,169 --> 00:19:55,120
reach Earth the signals are received

421
00:20:00,269 --> 00:19:58,179
through the Deep Space Network a global

422
00:20:02,100 --> 00:20:00,279
spacecraft tracking and communication

423
00:20:06,060 --> 00:20:02,110
system operated by the Jet Propulsion

424
00:20:07,919 --> 00:20:06,070
Laboratory for NASA to provide

425
00:20:11,100 --> 00:20:07,929
continuous two-way contact with the

426
00:20:13,230 --> 00:20:11,110
spacecraft DSN antenna stations are

427
00:20:17,879 --> 00:20:13,240
strategically located in California's

428
00:20:21,180 --> 00:20:17,889
Mojave Desert near Madrid Spain and near

429
00:20:23,310 --> 00:20:21,190
Canberra Australia the father away

430
00:20:26,279 --> 00:20:23,320
Voyager goes the more difficult it is to

431
00:20:29,279 --> 00:20:26,289
pick up its weak signal to make up for

432
00:20:31,470 --> 00:20:29,289
this the DSN antennas have been enlarged

433
00:20:33,379 --> 00:20:31,480
and are now able to collect more and

434
00:20:36,060 --> 00:20:33,389
higher quality data from the spacecraft

435
00:20:37,889 --> 00:20:36,070
the Parkes radio Observatory in

436
00:20:40,259 --> 00:20:37,899
Australia and the National Radio

437
00:20:43,649 --> 00:20:40,269
Astronomy Observatory's Very Large Array

438
00:20:45,840 --> 00:20:43,659

in New Mexico will join the DSN antennas

439
00:20:48,989 --> 00:20:45,850
to provide for additional receiving

440
00:20:51,090 --> 00:20:48,999
power the asudar tracking station in

441
00:20:54,239 --> 00:20:51,100
japan will help conduct radio science

442
00:20:56,580 --> 00:20:54,249
experiments with the encounter of

443
00:20:58,739 --> 00:20:56,590
Neptune Voyager 2 will complete its

444
00:21:07,150 --> 00:20:58,749
grand tour of the four giant outer

445
00:21:12,850 --> 00:21:09,880
the spacecraft is expected to continue

446
00:21:15,910 --> 00:21:12,860
to send back valuable data well into the

447
00:21:18,460 --> 00:21:15,920
21st century as voyager 2 reaches for

448
00:21:22,840 --> 00:21:18,470
the edge of our solar system and enters

449
00:21:25,990 --> 00:21:22,850
interstellar space once there Voyager

450
00:21:28,860 --> 00:21:26,000
will again stretch our imagination as it

451
00:21:37,129 --> 00:21:28,870
discovers for us things we haven't even

452
00:21:42,739 --> 00:21:39,899
voyager 2 has nel sail beyond neptune

453
00:21:45,450 --> 00:21:42,749
leaving behind a wealth of information

454
00:21:48,720 --> 00:21:45,460
first review of the data indicates that

455
00:21:53,190 --> 00:21:48,730
a day on neptune lasts about 16 hours

456
00:21:58,409 --> 00:21:53,200
and three minutes atmospheric winds

457
00:22:00,869 --> 00:21:58,419
travel up to 700 miles per hour up to

458
00:22:04,680 --> 00:22:00,879
five rings and a sheet of dust circle

459
00:22:07,889 --> 00:22:04,690
above Neptune's equator there are at

460
00:22:12,269 --> 00:22:07,899
least six icy objects 6 to 12 miles wide

461
00:22:15,269 --> 00:22:12,279
hidden in one of the Rings Triton

462
00:22:19,379 --> 00:22:15,279
Neptune's largest moon has a thin

463
00:22:22,409 --> 00:22:19,389

atmosphere of nitrogen Triton is smaller

464
00:22:27,419 --> 00:22:22,419
than expected about 1,700 miles in

465
00:22:29,730 --> 00:22:27,429
diameter Triton also appears to have

466
00:22:32,070 --> 00:22:29,740
active volcano spewing nitrogen ice

467
00:22:36,919 --> 00:22:32,080
particles and gas up to 20 miles high

468
00:22:39,810 --> 00:22:36,929
and six new moons have been discovered

469
00:22:42,359 --> 00:22:39,820
launch processing work on the over to

470
00:22:45,060 --> 00:22:42,369
Atlantis continues to proceed smoothly

471
00:22:47,460 --> 00:22:45,070
and officials have said October twelfth

472
00:22:52,190 --> 00:22:47,470
as the date for this year's fourth

473
00:22:54,629 --> 00:22:52,200
shuttle launch on mission st s 34

474
00:22:56,399 --> 00:22:54,639
atlantis was moved from the Vehicle

475
00:23:00,509 --> 00:22:56,409
Assembly Building at Kennedy Space

476
00:23:02,549 --> 00:23:00,519
Center to launch pad 39b the primary

477
00:23:05,430 --> 00:23:02,559
goal of the mission is the deployment of

478
00:23:07,649 --> 00:23:05,440
the Galileo probe to Jupiter the most

479
00:23:11,340 --> 00:23:07,659
sophisticated interplanetary spacecraft

480
00:23:14,039 --> 00:23:11,350
ever built Galileo was already on the

481
00:23:16,109 --> 00:23:14,049
launch pad waiting for Atlantis and has

482
00:23:19,919 --> 00:23:16,119
now been transferred into the orbiters

483
00:23:22,489 --> 00:23:19,929
cargo bay once deployed the spacecraft

484
00:23:25,919 --> 00:23:22,499
will take six years to reach Jupiter

485
00:23:28,649 --> 00:23:25,929
using gravity assist it will fly once

486
00:23:31,169 --> 00:23:28,659
past Venus and twice past earth before

487
00:23:35,580 --> 00:23:31,179
reaching the huge planet on december

488
00:23:38,369 --> 00:23:35,590

seven 1995 equipped with a variety of

489
00:23:40,739 --> 00:23:38,379
high-tech sensors Galileo will drop a

490
00:23:43,409 --> 00:23:40,749
probe into Jupiter's atmosphere before

491
00:23:46,649 --> 00:23:43,419
going into orbit for a 20 month tour of

492
00:23:47,850 --> 00:23:46,659
the planet in its larger moons because

493
00:23:51,090 --> 00:23:47,860
Jupiter is about

494
00:23:54,090 --> 00:23:51,100
480 million miles from the Sun huge

495
00:23:56,280 --> 00:23:54,100
solar panels measuring 2,000 square feet

496
00:23:58,470 --> 00:23:56,290
would be needed to provide enough

497
00:24:02,520 --> 00:23:58,480
electricity for Galileo's instruments

498
00:24:04,520 --> 00:24:02,530
and that is not feasible instead the

499
00:24:07,470 --> 00:24:04,530
spacecraft is equipped with a pair of

500
00:24:10,470 --> 00:24:07,480
radioisotope thermoelectric generators

501
00:24:14,280 --> 00:24:10,480
each loaded with about 24 pounds of

502
00:24:17,039 --> 00:24:14,290
plutonium the launch of Atlantis with

503
00:24:19,049 --> 00:24:17,049
the Galileo Jupiter probe marks the

504
00:24:23,610 --> 00:24:19,059
beginning of a new effort by NASA to

505
00:24:26,159 --> 00:24:23,620
explore the solar system and planets dr.

506
00:24:28,440 --> 00:24:26,169
Leonard Fisk associate administrator for

507
00:24:31,500 --> 00:24:28,450
Space Science and applications said

508
00:24:34,230 --> 00:24:31,510
recently this is now the second Golden

509
00:24:37,340 --> 00:24:34,240
Age of space science and if we have our

510
00:24:40,440 --> 00:24:37,350
way it's an age that's not going to end

511
00:24:43,260 --> 00:24:40,450
at NASA's Goddard Space Flight Center in

512
00:24:45,720 --> 00:24:43,270
Greenbelt Maryland a new program is

513
00:24:47,760 --> 00:24:45,730

being developed to use technology such

514
00:24:50,130 --> 00:24:47,770
as robotics to help in the on-orbit

515
00:24:53,280 --> 00:24:50,140
assembly of NASA's Space Station freedom

516
00:24:55,620 --> 00:24:53,290
here's the report it's indicated by this

517
00:24:57,600 --> 00:24:55,630
graphic simulation Goddard is

518
00:24:59,580 --> 00:24:57,610
methodically developing the engineering

519
00:25:02,970 --> 00:24:59,590
requirements for freedoms flight tal

520
00:25:04,770 --> 00:25:02,980
robotic servicer the fts this device

521
00:25:07,080 --> 00:25:04,780
will be capable of the precise

522
00:25:09,780 --> 00:25:07,090
manipulations needed in space for the

523
00:25:12,360 --> 00:25:09,790
assembly and servicing of freedom what

524
00:25:18,510 --> 00:25:12,370
some have likened to a giant erector set

525
00:25:20,940 --> 00:25:18,520
in the sky inside Goddard robotics

526
00:25:22,860 --> 00:25:20,950
facility an operator runs a simulated

527
00:25:26,100 --> 00:25:22,870
robot through its paces to demonstrate

528
00:25:30,810 --> 00:25:26,110
how the fts will do its job once in

529
00:25:35,810 --> 00:25:30,820
space but the real action is in the

530
00:25:44,760 --> 00:25:42,110
gantry robot and so called dextrous

531
00:25:47,610 --> 00:25:44,770
manipulators each has seven

532
00:25:50,070 --> 00:25:47,620
independently operated joints each can

533
00:25:52,860 --> 00:25:50,080
function much as a human arm under

534
00:25:55,740 --> 00:25:52,870
operator control this device is reaching

535
00:25:58,980 --> 00:25:55,750
up and behind a camera which it could

536
00:26:01,210 --> 00:25:58,990
reposition or refocus if needed in fact

537
00:26:06,909 --> 00:26:01,220
with an operator controlling this robe

538
00:26:08,799 --> 00:26:06,919

can even maintain itself for actual

539
00:26:11,200 --> 00:26:08,809
Space Station freedom assembly and

540
00:26:14,080 --> 00:26:11,210
operations the FDS will be attached to

541
00:26:16,000 --> 00:26:14,090
freedoms remote manipulator arm and be

542
00:26:18,220 --> 00:26:16,010
controlled by the space shuttle crew

543
00:26:21,039 --> 00:26:18,230
from the aft flight deck of the orbiter

544
00:26:23,740 --> 00:26:21,049
in the meantime backed by human thought

545
00:26:25,899 --> 00:26:23,750
and imagination the mechanical members

546
00:26:27,850 --> 00:26:25,909
so to speak of Goddard's robotics

547
00:26:31,659 --> 00:26:27,860
facility have been cast in leading roles

548
00:26:33,549 --> 00:26:31,669
for mankind's exploration of space this

549
00:26:36,330 --> 00:26:33,559
is Carter Tov reporting from Goddard

550
00:26:38,919 --> 00:26:36,340
Space Flight Center Greenbelt Maryland

551
00:26:41,740 --> 00:26:38,929
that's all we have for this edition of

552
00:26:43,600 --> 00:26:41,750
NASA report to education I'm Lynn

553
00:26:46,090 --> 00:26:43,610
Bondurant at the NASA Lewis Research