



1  
00:00:08,230 --> 00:00:04,870  
aeronautics

2  
00:00:10,790 --> 00:00:08,240  
space exploration research a look back

3  
00:00:17,670 --> 00:00:10,800  
at this year in aeronautics and space

4  
00:00:29,509 --> 00:00:17,680  
and a preview of things to come

5  
00:00:33,590 --> 00:00:31,910  
three mariner spacecraft have flown by

6  
00:00:35,430 --> 00:00:33,600  
mars in recent years

7  
00:00:37,110 --> 00:00:35,440  
they were fleeting glimpses and the

8  
00:00:38,790 --> 00:00:37,120  
craft did not fly close to the

9  
00:00:41,510 --> 00:00:38,800  
mysterious red planet

10  
00:00:42,869 --> 00:00:41,520  
two thousand miles was the closest on

11  
00:00:46,150 --> 00:00:42,879  
november 13th

12  
00:00:47,590 --> 00:00:46,160  
mariner 9 changed all that as its

13  
00:00:49,590 --> 00:00:47,600

braking rocket fired

14

00:00:50,950 --> 00:00:49,600

the picture-taking mariner swung into

15

00:00:53,110 --> 00:00:50,960

orbit around mars

16

00:00:56,869 --> 00:00:53,120

an orbit allowing the spacecraft to come

17

00:00:59,270 --> 00:00:56,879

within 850 miles of the surface

18

00:01:00,229 --> 00:00:59,280

as it circles the planet twice a day it

19

00:01:01,990 --> 00:01:00,239

will photograph

20

00:01:03,270 --> 00:01:02,000

and gather data for at least three

21

00:01:06,310 --> 00:01:03,280

months mapping

22

00:01:09,190 --> 00:01:06,320

seventy percent of the planet's surface

23

00:01:09,910 --> 00:01:09,200

the two small moons of mars phobos and

24

00:01:12,950 --> 00:01:09,920

deimos

25

00:01:15,109 --> 00:01:12,960

will also be closely scrutinized

26

00:01:18,070 --> 00:01:15,119

mars appears to have gone or is going

27

00:01:20,310 --> 00:01:18,080

through some type of planetary evolution

28

00:01:21,429 --> 00:01:20,320

the main question is whether it is an

29

00:01:24,550 --> 00:01:21,439

evolving planet

30

00:01:26,710 --> 00:01:24,560

or a decaying one mars is more

31

00:01:29,429 --> 00:01:26,720

earth-like than any other planet

32

00:01:31,910 --> 00:01:29,439

its clouds seasonal changes and polar

33

00:01:34,069 --> 00:01:31,920

ice caps are intriguing

34

00:01:36,310 --> 00:01:34,079

as the mariner 9 returns its vast

35

00:01:37,830 --> 00:01:36,320

accumulation of data and pictures

36

00:01:40,550 --> 00:01:37,840

scientists will have their first

37

00:01:42,550 --> 00:01:40,560

close-up view and hopefully clues to the

38

00:01:56,069 --> 00:01:42,560

history and evolution of mars

39

00:01:59,830 --> 00:01:58,870

the sun is roughly 10 000 times larger

40

00:02:01,990 --> 00:01:59,840

than earth

41

00:02:03,190 --> 00:02:02,000

its very presence affects our daily

42

00:02:05,350 --> 00:02:03,200

lives

43

00:02:07,109 --> 00:02:05,360

to learn more about this and about how

44

00:02:09,910 --> 00:02:07,119

it affects our environment

45

00:02:12,869 --> 00:02:09,920

nasa orbited three unmanned scientific

46

00:02:16,710 --> 00:02:15,510

imp interplanetary monitoring platform

47

00:02:19,350 --> 00:02:16,720

was the first

48

00:02:21,430 --> 00:02:19,360

the versatile imp eighth in a series is

49

00:02:23,110 --> 00:02:21,440

exploring interplanetary space

50

00:02:24,790 --> 00:02:23,120

and the outer fringes of the earth's

51

00:02:27,110 --> 00:02:24,800

magnetosphere

52

00:02:29,190 --> 00:02:27,120

it also provides warnings of possible

53

00:02:33,190 --> 00:02:29,200

solar flare radiation hazards to

54

00:02:36,949 --> 00:02:35,589

with the naval research laboratory nasa

55

00:02:39,509 --> 00:02:36,959

launched the solrad

56

00:02:41,830 --> 00:02:39,519

satellite it too studies the sun's

57

00:02:42,949 --> 00:02:41,840

radiation and records the disturbances

58

00:02:45,509 --> 00:02:42,959

which can disrupt

59

00:02:47,110 --> 00:02:45,519

long-range communications and navigation

60

00:02:49,190 --> 00:02:47,120

systems

61

00:02:50,229 --> 00:02:49,200

this computer-type picture shows the

62

00:02:54,470 --> 00:02:50,239

sun's disk and

63

00:02:56,150 --> 00:02:54,480

inner corona it was returned by oso 7

64

00:02:58,470 --> 00:02:56,160

the latest in the orbiting solar

65

00:03:00,710 --> 00:02:58,480

observatory series

66

00:03:02,630 --> 00:03:00,720

oso is trying to determine the direct

67

00:03:03,430 --> 00:03:02,640

effects solar flares have on the

68

00:03:06,149 --> 00:03:03,440

environment

69

00:03:08,229 --> 00:03:06,159

weather and communications earth is

70

00:03:10,390 --> 00:03:08,239

surrounded by the magnetosphere

71

00:03:12,149 --> 00:03:10,400

an enormous teardrop shaped region

72

00:03:14,710 --> 00:03:12,159

formed by the solar wind

73

00:03:17,350 --> 00:03:14,720

a supersonic stream of particles blowing

74

00:03:19,270 --> 00:03:17,360

on the earth's magnetic field

75

00:03:21,589 --> 00:03:19,280

it is in this region that a craft like

76

00:03:24,229 --> 00:03:21,599

the small scientific satellite does

77

00:03:26,309 --> 00:03:24,239

its job its mission is to investigate

78

00:03:27,509 --> 00:03:26,319

the causes of worldwide magnetic

79

00:03:30,070 --> 00:03:27,519

disturbances

80

00:03:32,149 --> 00:03:30,080

and map in detail the ways in which the

81

00:03:40,550 --> 00:03:32,159

motion of these particles changes with

82

00:03:44,830 --> 00:03:42,630

nearly 300 sounding rockets were

83

00:03:46,550 --> 00:03:44,840

launched from wallops island virginia in

84

00:03:48,630 --> 00:03:46,560

1971

85

00:03:50,630 --> 00:03:48,640

their payloads are used to explore the

86

00:03:51,910 --> 00:03:50,640

region through and just above the

87

00:03:54,070 --> 00:03:51,920

earth's atmosphere

88

00:03:55,270 --> 00:03:54,080

but below the area where satellites

89

00:03:57,110 --> 00:03:55,280

orbit

90

00:03:59,110 --> 00:03:57,120

sounding rocket probes return an

91

00:04:01,750 --> 00:03:59,120

enormous amount of information about

92

00:04:03,509 --> 00:04:01,760

earth and the atmosphere surrounding it

93

00:04:05,589 --> 00:04:03,519

interested scientists from all over the

94

00:04:13,429 --> 00:04:05,599

world bring their experiments to wallops

95

00:04:16,870 --> 00:04:16,150

stratoscope 2 a large astronomical

96

00:04:19,110 --> 00:04:16,880

telescope

97

00:04:21,030 --> 00:04:19,120

was hoisted into the sky by a giant

98

00:04:23,270 --> 00:04:21,040

balloon from the marshall space flight

99

00:04:26,550 --> 00:04:23,280

center in huntsville alabama

100

00:04:29,110 --> 00:04:26,560

this was the eighth stratoscope flight

101  
00:04:30,390 --> 00:04:29,120  
its goal obtained sharper pictures of

102  
00:04:32,950 --> 00:04:30,400  
certain galaxies

103  
00:04:36,469 --> 00:04:32,960  
nebulae and the planet saturn above the

104  
00:04:39,270 --> 00:04:36,479  
distortion of the earth's atmosphere

105  
00:04:40,469 --> 00:04:39,280  
the four-ton telescope is so accurate it

106  
00:04:42,870 --> 00:04:40,479  
can distinguish two

107  
00:04:45,830 --> 00:04:42,880  
objects thirty miles apart from one

108  
00:04:47,749 --> 00:04:45,840  
thousand miles away

109  
00:04:50,230 --> 00:04:47,759  
scientists will be working on the data

110  
00:05:05,029 --> 00:04:50,240  
returned by stratoscope two for the next

111  
00:05:09,749 --> 00:05:07,510  
nasa used planes like this in checking

112  
00:05:11,670 --> 00:05:09,759  
out cameras and sensing equipment to be

113  
00:05:12,469 --> 00:05:11,680

carried on future earth resources

114

00:05:14,629 --> 00:05:12,479

satellites

115

00:05:16,710 --> 00:05:14,639

and the manned orbiting skylab space

116

00:05:18,710 --> 00:05:16,720

station

117

00:05:20,870 --> 00:05:18,720

an interesting side benefit took place

118

00:05:23,189 --> 00:05:20,880

this summer as the specially equipped

119

00:05:26,870 --> 00:05:23,199

planes were used to detect southern corn

120

00:05:29,749 --> 00:05:26,880

blight during the 1971 growing season

121

00:05:32,150 --> 00:05:29,759

high altitude infrared photos were taken

122

00:05:34,390 --> 00:05:32,160

and then analyzed by purdue university

123

00:05:36,469 --> 00:05:34,400

and the department of agriculture

124

00:05:38,070 --> 00:05:36,479

these photographs were used to determine

125

00:05:41,990 --> 00:05:38,080

the extent and degree

126  
00:05:43,029 --> 00:05:42,000  
of corn blight at the request of the

127  
00:05:44,790 --> 00:05:43,039  
local government

128  
00:05:46,629 --> 00:05:44,800  
survey missions were flown over the

129  
00:05:48,950 --> 00:05:46,639  
island of jamaica

130  
00:05:50,230 --> 00:05:48,960  
much of the water from jamaica's 200

131  
00:05:52,710 --> 00:05:50,240  
inches of rainfall

132  
00:05:55,029 --> 00:05:52,720  
never reaches its cities it is believed

133  
00:05:56,390 --> 00:05:55,039  
that submarine springs carry a portion

134  
00:05:59,749 --> 00:05:56,400  
of the water offshore

135  
00:06:03,909 --> 00:05:59,759  
into the ocean this was indicated by the

136  
00:06:08,629 --> 00:06:06,469  
here is one of a pair of high-altitude

137  
00:06:09,189 --> 00:06:08,639  
aircraft converted for use in earth

138  
00:06:11,909 --> 00:06:09,199

resource

139

00:06:14,870 --> 00:06:11,919

surveys they are operating from nasa's

140

00:06:17,029 --> 00:06:14,880

ames research center near san francisco

141

00:06:18,550 --> 00:06:17,039

the data collected by these flights is

142

00:06:20,950 --> 00:06:18,560

being used to simulate

143

00:06:22,070 --> 00:06:20,960

future remote sensing earth resources

144

00:06:25,110 --> 00:06:22,080

satellites

145

00:06:32,830 --> 00:06:25,120

agriculture

146

00:06:32,840 --> 00:06:36,469

development

147

00:06:39,990 --> 00:06:38,629

test pilots at nasa's flight research

148

00:06:42,230 --> 00:06:40,000

center in california

149

00:06:43,189 --> 00:06:42,240

flew a plane with a new type wing this

150

00:06:45,430 --> 00:06:43,199

year

151  
00:06:46,950 --> 00:06:45,440  
called the supercritical wing it is

152  
00:06:49,749 --> 00:06:46,960  
shaped quite differently from

153  
00:06:52,230 --> 00:06:49,759  
conventional wings the new design alters

154  
00:06:54,629 --> 00:06:52,240  
the flow of air over the top of the wing

155  
00:06:55,270 --> 00:06:54,639  
allowing an aircraft to fly faster

156  
00:06:58,790 --> 00:06:55,280  
farther

157  
00:07:01,749 --> 00:06:58,800  
and at a lower operating cost

158  
00:07:04,230 --> 00:07:01,759  
this sleek black plane the yf-12 capable

159  
00:07:07,749 --> 00:07:04,240  
of flying 2000 miles per hour

160  
00:07:10,150 --> 00:07:07,759  
made 25 test flights

161  
00:07:12,150 --> 00:07:10,160  
the joint nasa air force program is

162  
00:07:13,110 --> 00:07:12,160  
studying problems associated with

163  
00:07:15,110 --> 00:07:13,120

propulsion

164

00:07:16,309 --> 00:07:15,120

in-flight stopping and restarting of

165

00:07:19,110 --> 00:07:16,319

engines heating

166

00:07:20,950 --> 00:07:19,120

and structural dynamics the research is

167

00:07:22,309 --> 00:07:20,960

aimed at furthering the development and

168

00:07:32,469 --> 00:07:22,319

operations of future

169

00:07:36,950 --> 00:07:34,870

eight times the m2 lifting body was

170

00:07:39,430 --> 00:07:36,960

carried aloft and dropped over the dry

171

00:07:41,990 --> 00:07:39,440

lake desert in central california

172

00:07:42,629 --> 00:07:42,000

the wingless m2 and other lifting body

173

00:07:44,710 --> 00:07:42,639

types

174

00:07:46,230 --> 00:07:44,720

are the research forerunners of craft

175

00:07:48,390 --> 00:07:46,240

like the proposed shuttle

176  
00:07:50,309 --> 00:07:48,400  
that could fly a space mission and then

177  
00:07:54,309 --> 00:07:50,319  
return through the earth's atmosphere

178  
00:07:59,510 --> 00:07:56,629  
a new flight program began at nasa's

179  
00:08:02,150 --> 00:07:59,520  
ames research center with the x-14b

180  
00:08:02,950 --> 00:08:02,160  
vertical take-off and landing plane

181  
00:08:05,909 --> 00:08:02,960  
equipped with an

182  
00:08:08,309 --> 00:08:05,919  
on-board digital computer the x-14

183  
00:08:10,790 --> 00:08:08,319  
serves as a flying flight simulator

184  
00:08:12,070 --> 00:08:10,800  
by duplicating in advance the piloting

185  
00:08:15,270 --> 00:08:12,080  
qualities of proposed

186  
00:08:19,589 --> 00:08:17,589  
the aim center is also responsible for

187  
00:08:21,189 --> 00:08:19,599  
doing research on short takeoff and

188  
00:08:23,270 --> 00:08:21,199

landing aircraft

189

00:08:24,550 --> 00:08:23,280

this is one of the planes used to test

190

00:08:28,070 --> 00:08:24,560

new concepts

191

00:08:29,990 --> 00:08:28,080

the ov-10a bronco the united states is

192

00:08:31,749 --> 00:08:30,000

very interested in developing a short

193

00:08:33,909 --> 00:08:31,759

takeoff and landing plane

194

00:08:38,829 --> 00:08:33,919

for use as an inter-city transport in

195

00:08:38,839 --> 00:08:44,710

corridors

196

00:08:48,630 --> 00:08:46,870

in an effort to reduce the noise of jet

197

00:08:51,110 --> 00:08:48,640

aircraft as they land

198

00:08:52,949 --> 00:08:51,120

nasa with american airlines spent 50

199

00:08:54,630 --> 00:08:52,959

hours investigating the problems

200

00:08:55,990 --> 00:08:54,640

connected with steeper landing

201  
00:08:58,230 --> 00:08:56,000  
approaches

202  
00:08:59,750 --> 00:08:58,240  
it appears that by keeping aircraft

203  
00:09:01,670 --> 00:08:59,760  
higher above the ground

204  
00:09:02,949 --> 00:09:01,680  
and reducing engine power during the

205  
00:09:05,750 --> 00:09:02,959  
landing approach

206  
00:09:07,910 --> 00:09:05,760  
noise near airports can be lessened

207  
00:09:08,870 --> 00:09:07,920  
operational procedures for this type of

208  
00:09:13,110 --> 00:09:08,880  
noise abatement

209  
00:09:17,269 --> 00:09:14,949  
attacking the jet noise problem at its

210  
00:09:19,269 --> 00:09:17,279  
source engineers at the lewis research

211  
00:09:22,550 --> 00:09:19,279  
center in cleveland are supervising

212  
00:09:24,870 --> 00:09:22,560  
tests of a quieter jet engine the goal

213  
00:09:27,350 --> 00:09:24,880

is to develop an engine that will be 15

214

00:09:39,910 --> 00:09:27,360

to 20 decibels quieter than present

215

00:09:43,030 --> 00:09:41,990

how long does it take jet aircraft to

216

00:09:46,230 --> 00:09:43,040

come to a stop

217

00:09:48,230 --> 00:09:46,240

on a wet runway to find out aeronautics

218

00:09:49,430 --> 00:09:48,240

experts from nasa's langley research

219

00:09:51,829 --> 00:09:49,440

center in virginia

220

00:09:52,710 --> 00:09:51,839

cooperating with air force and faa

221

00:09:55,269 --> 00:09:52,720

officials

222

00:09:57,910 --> 00:09:55,279

conducted a series of landing studies at

223

00:10:00,389 --> 00:09:57,920

several airports around the country

224

00:10:01,430 --> 00:10:00,399

time after time runways were flooded

225

00:10:03,670 --> 00:10:01,440

with water

226  
00:10:05,670 --> 00:10:03,680  
then ground vehicles and the test

227  
00:10:06,790 --> 00:10:05,680  
aircraft tried stopping on the wet

228  
00:10:08,470 --> 00:10:06,800  
pavements

229  
00:10:10,389 --> 00:10:08,480  
the increased knowledge of runway

230  
00:10:12,470 --> 00:10:10,399  
friction gained from these tests

231  
00:10:14,550 --> 00:10:12,480  
should result in improved safety for

232  
00:10:24,150 --> 00:10:14,560  
both aircraft and airport ground

233  
00:10:27,949 --> 00:10:27,190  
the scene is cape canaveral friday may

234  
00:10:31,750 --> 00:10:27,959  
5th

235  
00:10:32,310 --> 00:10:31,760  
1961 it was on this date that astronaut

236  
00:10:34,630 --> 00:10:32,320  
alan b

237  
00:10:51,030 --> 00:10:34,640  
shepherd became the first american to be

238  
00:10:57,269 --> 00:10:55,030

ten years later january 31st 1971

239

00:10:58,069 --> 00:10:57,279

alan b shepard made his second space

240

00:11:00,949 --> 00:10:58,079

flight

241

00:11:01,910 --> 00:11:00,959

this time as commander of apollo 14 the

242

00:11:04,870 --> 00:11:01,920

country's third

243

00:11:06,790 --> 00:11:04,880

moon landing with astronauts mitchell

244

00:11:09,110 --> 00:11:06,800

and rusa accompanying shepherd

245

00:11:10,949 --> 00:11:09,120

apollo 14 marked the beginning of

246

00:11:15,509 --> 00:11:10,959

large-scale use of the moon

247

00:11:17,670 --> 00:11:15,519

for science these are some of the 94

248

00:11:20,150 --> 00:11:17,680

pounds of lunar rocks returned from the

249

00:11:21,829 --> 00:11:20,160

moon's ancient hills of from morrow by

250

00:11:23,670 --> 00:11:21,839

apollo 14.

251  
00:11:25,190 --> 00:11:23,680  
they are beginning to tell scientists a

252  
00:11:28,389 --> 00:11:25,200  
story a story

253  
00:11:30,069 --> 00:11:28,399  
three and one half billion years old

254  
00:11:32,389 --> 00:11:30,079  
from them we are learning about the

255  
00:11:35,430 --> 00:11:32,399  
early history of not only the moon

256  
00:11:44,949 --> 00:11:35,440  
but other planets as well the earth

257  
00:11:48,230 --> 00:11:47,509  
this is the view seen by apollo 15

258  
00:11:50,230 --> 00:11:48,240  
astronauts

259  
00:11:52,710 --> 00:11:50,240  
scott and irwin as their spacecraft

260  
00:11:54,790 --> 00:11:52,720  
falcon arched over the hadley rail

261  
00:11:56,310 --> 00:11:54,800  
located in the foothills of the moon's

262  
00:12:00,069 --> 00:11:56,320  
aponine mountains

263  
00:12:04,310 --> 00:12:00,079

eight feet minus one contact

264

00:12:05,829 --> 00:12:04,320

man okay the falcon is on the plane at

265

00:12:09,829 --> 00:12:05,839

hadley

266

00:12:13,350 --> 00:12:11,910

theirs was to be the most extensive

267

00:12:17,110 --> 00:12:13,360

exploration of the moon

268

00:12:21,590 --> 00:12:19,509

to prepare for the july mission scott

269

00:12:23,750 --> 00:12:21,600

and irwin practiced on similar earth

270

00:12:24,790 --> 00:12:23,760

terrain at the rio grande gorge in new

271

00:12:26,949 --> 00:12:24,800

mexico

272

00:12:34,230 --> 00:12:26,959

they also spent many hours getting used

273

00:12:37,670 --> 00:12:35,910

here's what it actually looked like to

274

00:12:38,389 --> 00:12:37,680

the moon riders as they drove their

275

00:12:46,550 --> 00:12:38,399

four-wheel

276

00:12:51,509 --> 00:12:48,710

as a result of their increased mobility

277

00:12:55,350 --> 00:12:51,519

the pair returned 180 pounds of lunar

278

00:12:57,829 --> 00:12:55,360

rocks and deep core samples

279

00:12:59,430 --> 00:12:57,839

after liftoff and while in lunar orbit

280

00:13:01,269 --> 00:12:59,440

the trio launched a small

281

00:13:03,910 --> 00:13:01,279

scientific satellite called the

282

00:13:05,509 --> 00:13:03,920

sub-satellite to study the area around

283

00:13:07,829 --> 00:13:05,519

the moon

284

00:13:10,150 --> 00:13:07,839

as they headed earthward astronaut al

285

00:13:12,150 --> 00:13:10,160

worden climbed outside the spacecraft

286

00:13:15,670 --> 00:13:12,160

and retrieved film from a pair of

287

00:13:19,910 --> 00:13:17,670

the scientific instruments left by

288

00:13:21,430 --> 00:13:19,920

apollo 15 and the photographs and

289

00:13:23,670 --> 00:13:21,440

samples they returned

290

00:13:25,829 --> 00:13:23,680

are giving us a real understanding of

291

00:13:35,590 --> 00:13:25,839

the moon in relationship to the earth

292

00:13:37,670 --> 00:13:35,600

and the sun we asked mr dale myers

293

00:13:40,470 --> 00:13:37,680

nasa's director of manned space flight

294

00:13:43,750 --> 00:13:40,480

to give us a status report on skylab

295

00:13:46,389 --> 00:13:43,760

the united states first space station

296

00:13:48,150 --> 00:13:46,399

this year has been a big year for skylab

297

00:13:50,790 --> 00:13:48,160

all of the hardware for the program

298

00:13:53,030 --> 00:13:50,800

is coming into focus our qualification

299

00:13:56,310 --> 00:13:53,040

programs are underway the

300

00:13:59,430 --> 00:13:56,320

major elements of the skylab system are

301

00:14:00,389 --> 00:13:59,440

in the final positions of manufacturing

302

00:14:02,310 --> 00:14:00,399

and checkout

303

00:14:04,230 --> 00:14:02,320

now one of the more important things to

304

00:14:05,269 --> 00:14:04,240

me about skylab is it gives us an

305

00:14:07,430 --> 00:14:05,279

opportunity to

306

00:14:14,829 --> 00:14:07,440

learn more about man's capability to

307

00:14:20,389 --> 00:14:18,230

1971 a year of significant achievement

308

00:14:27,590 --> 00:14:20,399

in aeronautics and space