



1
00:00:24,540 --> 00:00:04,490
this special aeronautics and space

2
00:00:36,960 --> 00:00:28,990
aeronautics and space 1973 these were

3
00:00:42,220 --> 00:00:40,480
this was the gear of Skylab Skylab got

4
00:00:44,470 --> 00:00:42,230
off to a shaky start when a heat

5
00:00:46,600 --> 00:00:44,480
deflecting micrometeoroid shield was

6
00:00:48,880 --> 00:00:46,610
ripped off during launch causing the

7
00:00:51,729 --> 00:00:48,890
loss of one solar wing and jamming the

8
00:00:53,970 --> 00:00:51,739
other although in orbit the big space

9
00:00:56,500 --> 00:00:53,980
station was overheating at low on fire

10
00:00:58,689 --> 00:00:56,510
people on the ground however hastily

11
00:01:00,880 --> 00:00:58,699
designed a replacement an umbrella-like

12
00:01:04,090 --> 00:01:00,890
device that would protect the workshops

13
00:01:05,800 --> 00:01:04,100

thin skin from the hot Sun the first

14

00:01:08,380 --> 00:01:05,810

crew then used the newly designed

15

00:01:10,810 --> 00:01:08,390

sunshade to repair the overheating Space

16

00:01:13,330 --> 00:01:10,820

Station they also deployed the jam

17

00:01:15,820 --> 00:01:13,340

solder wing result an increase in

18

00:01:19,240 --> 00:01:15,830

electrical power and a cooler place to

19

00:01:21,550 --> 00:01:19,250

work and work they did three separate

20

00:01:23,830 --> 00:01:21,560

astronaut crews have lived in Skylab for

21

00:01:25,840 --> 00:01:23,840

extended periods of time proving that

22

00:01:29,020 --> 00:01:25,850

man can withstand prolonged

23

00:01:31,180 --> 00:01:29,030

weightlessness by training skylabs

24

00:01:33,730 --> 00:01:31,190

onboard telescopes in the direction of

25

00:01:35,740 --> 00:01:33,740

the Sun the science of solar astronomy

26
00:01:38,170 --> 00:01:35,750
has been extended beyond the limits of

27
00:01:40,469 --> 00:01:38,180
earth-based observations we're learning

28
00:01:43,359 --> 00:01:40,479
more about the Sun than ever before

29
00:01:45,490 --> 00:01:43,369
information that may one day help us use

30
00:01:47,680 --> 00:01:45,500
this giant furnace as a means of

31
00:01:51,130 --> 00:01:47,690
generating and controlling energy for

32
00:01:53,800 --> 00:01:51,140
use on Earth using cameras and remote

33
00:01:56,289 --> 00:01:53,810
sensors the crews have accumulated hours

34
00:01:58,750 --> 00:01:56,299
and hours of intense observations of the

35
00:02:00,789 --> 00:01:58,760
earth observations that have ranged from

36
00:02:03,130 --> 00:02:00,799
taking measurements of Hurricane Ellen

37
00:02:05,560 --> 00:02:03,140
over the Atlantic Ocean to photographing

38
00:02:09,180 --> 00:02:05,570

possible huge new mineral deposits in

39
00:02:11,289 --> 00:02:09,190
Nevada by the time Skylab ends more than

40
00:02:15,100 --> 00:02:11,299
42,000 pictures of the Earth's surface

41
00:02:17,949 --> 00:02:15,110
will have been taken they called her

42
00:02:19,990 --> 00:02:17,959
Arabella the space spider actually

43
00:02:22,569 --> 00:02:20,000
Arabella was one of several student

44
00:02:24,460 --> 00:02:22,579
experiments on Skylab the question

45
00:02:27,220 --> 00:02:24,470
raised by a young high school student

46
00:02:29,770 --> 00:02:27,230
from Massachusetts was can a spider spin

47
00:02:33,880 --> 00:02:29,780
a web in the absence of gravity the

48
00:02:36,900 --> 00:02:33,890
answer as you can see was yes tiny fish

49
00:02:40,020 --> 00:02:36,910
were another subject for study

50
00:02:42,270 --> 00:02:40,030
this buck Roger like backpack was also

51
00:02:47,450 --> 00:02:42,280
tested the well-dressed space man of the

52
00:02:51,810 --> 00:02:49,770
American astronauts and Soviet

53
00:02:55,440 --> 00:02:51,820
cosmonauts trained this year to prepare

54
00:02:57,210 --> 00:02:55,450
for a joint space mission in 1975 the

55
00:02:59,070 --> 00:02:57,220
two crews will meet and join their

56
00:03:01,830 --> 00:02:59,080
spacecraft while in orbit around the

57
00:03:04,080 --> 00:03:01,840
earth beyond the rescue capability they

58
00:03:05,610 --> 00:03:04,090
will demonstrate it is hoped the complex

59
00:03:11,250 --> 00:03:05,620
project will lead to future

60
00:03:13,920 --> 00:03:11,260
international cooperative programs it's

61
00:03:15,870 --> 00:03:13,930
called the reusable space shuttle taking

62
00:03:18,120 --> 00:03:15,880
off like a rocket and landing like an

63
00:03:19,800 --> 00:03:18,130

airplane it will virtually replace the

64

00:03:23,060 --> 00:03:19,810

way we transport manned and unmanned

65

00:03:26,040 --> 00:03:23,070

spacecraft into orbit by the early 1980s

66

00:03:27,990 --> 00:03:26,050

to prepare for the shuttle research and

67

00:03:30,390 --> 00:03:28,000

development programs continued to move

68

00:03:32,250 --> 00:03:30,400

ahead as high-speed wind tunnels were

69

00:03:36,480 --> 00:03:32,260

used to help solve the problems of

70

00:03:38,820 --> 00:03:36,490

reentry here undergoing tests are

71

00:03:41,730 --> 00:03:38,830

special recoverable booster rockets that

72

00:03:43,620 --> 00:03:41,740

will be retrieved after launch other

73

00:03:45,810 --> 00:03:43,630

engineers prepare to make shuttle

74

00:03:49,860 --> 00:03:45,820

vibration studies finding out where the

75

00:03:52,680 --> 00:03:49,870

stress areas are at NASA's Flight

76

00:03:54,480 --> 00:03:52,690

Research Center in California the x24 be

77

00:03:57,750 --> 00:03:54,490

lifting body was air dropped several

78

00:03:59,730 --> 00:03:57,760

times the X 24 is developing maneuvering

79

00:04:01,830 --> 00:03:59,740

and landing capabilities for future

80

00:04:06,599 --> 00:04:01,840

aerospace vehicles like the space

81

00:04:11,890 --> 00:04:09,130

this is an artist concept of the

82

00:04:14,979 --> 00:04:11,900

asteroid belt a scientific spacecraft

83

00:04:17,289 --> 00:04:14,989

pioneer 10 spent 210 days passing

84

00:04:19,629 --> 00:04:17,299

through the thousands of rocks sand and

85

00:04:23,650 --> 00:04:19,639

dust that make up the asteroid belt on

86

00:04:25,719 --> 00:04:23,660

its way to this planet Jupiter on

87

00:04:27,850 --> 00:04:25,729

December third after traveling half a

88

00:04:29,620 --> 00:04:27,860

billion miles from Earth pioneer 10

89

00:04:32,070 --> 00:04:29,630

returned close-up pictures and

90

00:04:35,230 --> 00:04:32,080

scientific data as it passed within

91

00:04:37,420 --> 00:04:35,240

81,000 miles of the giant planet data

92

00:04:45,189 --> 00:04:37,430

about its temperature and the makeup of

93

00:04:47,409 --> 00:04:45,199

its atmosphere mercury smallest planet

94

00:04:49,390 --> 00:04:47,419

in the solar system and closest planet

95

00:04:52,390 --> 00:04:49,400

to the Sun so close that it's difficult

96

00:04:56,650 --> 00:04:52,400

to observe from Earth this Mariner

97

00:04:58,659 --> 00:04:56,660

spacecraft is on its way there now after

98

00:05:00,430 --> 00:04:58,669

swinging around Venus next February

99

00:05:02,620 --> 00:05:00,440

picking up speed from that planet's

100

00:05:06,640 --> 00:05:02,630

gravity it will be propelled on toward

101
00:05:08,920 --> 00:05:06,650
mercury on March 29th 1974 as mariner

102
00:05:10,960 --> 00:05:08,930
flies by the tiny planet it's two

103
00:05:13,060 --> 00:05:10,970
television cameras will return pictures

104
00:05:19,270 --> 00:05:13,070
while other instruments probe in an

105
00:05:23,689 --> 00:05:21,469
technicians work around the radio

106
00:05:26,059 --> 00:05:23,699
astronomy Explorer satellite at the

107
00:05:27,890 --> 00:05:26,069
Kennedy Space Center its job is to

108
00:05:31,149 --> 00:05:27,900
explore the sources of low-frequency

109
00:05:33,950 --> 00:05:31,159
radio noise in our galaxy and beyond

110
00:05:36,050 --> 00:05:33,960
launched into orbit around the moon it

111
00:05:38,089 --> 00:05:36,060
is expected to provide astronomers with

112
00:05:45,619 --> 00:05:38,099
a better picture of extraterrestrial

113
00:05:47,420 --> 00:05:45,629

radio signals work continued in the

114

00:05:52,519 --> 00:05:47,430

preparation of Viking the spacecraft

115

00:05:54,050 --> 00:05:52,529

scheduled to land on Mars in 1976 trying

116

00:05:56,110 --> 00:05:54,060

to answer as many questions as possible

117

00:05:57,890 --> 00:05:56,120

before landing on the red planet

118

00:06:00,679 --> 00:05:57,900

scientists have been attempting to

119

00:06:02,510 --> 00:06:00,689

simulate the Martian atmosphere progress

120

00:06:05,149 --> 00:06:02,520

is also being made in preparing

121

00:06:10,560 --> 00:06:05,159

biological sensing devices to determine

122

00:06:15,460 --> 00:06:14,020

for years nASA has used sounding rockets

123

00:06:17,920 --> 00:06:15,470

to probe the region of the Earth's

124

00:06:19,690 --> 00:06:17,930

atmosphere just below satellite level

125

00:06:22,570 --> 00:06:19,700

but above the area where balloons

126
00:06:25,420 --> 00:06:22,580
returned 80 this year was no exception

127
00:06:27,580 --> 00:06:25,430
with some 80 launches both here and

128
00:06:34,110 --> 00:06:27,590
abroad several of the launches were in

129
00:06:39,730 --> 00:06:37,360
comet kohoutek is on its way visible

130
00:06:41,800 --> 00:06:39,740
between mid-november and late January it

131
00:06:44,400 --> 00:06:41,810
will eventually be as bright or brighter

132
00:06:47,320 --> 00:06:44,410
than the famous Halley's Comet of 1910

133
00:06:49,930 --> 00:06:47,330
when kohoutek reaches its closest point

134
00:06:51,850 --> 00:06:49,940
to the Sun on December 28 it will have

135
00:06:55,120 --> 00:06:51,860
completed a journey that began about two

136
00:06:57,610 --> 00:06:55,130
million years ago for NASA's spacecraft

137
00:07:00,340 --> 00:06:57,620
sounding rockets balloons Skylab

138
00:07:02,680 --> 00:07:00,350

ground-based observatories and telescope

139

00:07:04,870 --> 00:07:02,690

carrying aircraft like this will team up

140

00:07:07,870 --> 00:07:04,880

to form the most comprehensive comet

141

00:07:09,640 --> 00:07:07,880

watch ever planned astronomers are eager

142

00:07:12,100 --> 00:07:09,650

to determine the elements that make up

143

00:07:14,230 --> 00:07:12,110

kohoutek elements that should tell us

144

00:07:21,550 --> 00:07:14,240

more about the nature and origin of the

145

00:07:24,840 --> 00:07:21,560

Sun and other planets Santa Barbara

146

00:07:28,240 --> 00:07:24,850

California Louisiana and Mississippi

147

00:07:29,740 --> 00:07:28,250

Cleveland Ohio all these places like

148

00:07:32,140 --> 00:07:29,750

many others have one thing in common

149

00:07:34,950 --> 00:07:32,150

each was photographed by the earth's

150

00:07:38,770 --> 00:07:34,960

resources technology satellite orbiting

151
00:07:41,050 --> 00:07:38,780
570 miles overhead since being launched

152
00:07:43,590 --> 00:07:41,060
in mid nineteen seventy-two the earth

153
00:07:50,629 --> 00:07:43,600
resources spacecraft has returned nearly

154
00:07:55,679 --> 00:07:53,249
more specifically it is proving

155
00:07:58,409 --> 00:07:55,689
extremely useful in such applications as

156
00:08:00,510 --> 00:07:58,419
land use and timber inventory crop

157
00:08:04,889 --> 00:08:00,520
identification water pollution and

158
00:08:06,869 --> 00:08:04,899
improved maps to geologists this area of

159
00:08:08,820 --> 00:08:06,879
California looks like this when the

160
00:08:11,730 --> 00:08:08,830
appropriate geologic information is

161
00:08:13,920 --> 00:08:11,740
superimposed investigators look forward

162
00:08:17,609 --> 00:08:13,930
to even more exciting possibilities for

163
00:08:20,189 --> 00:08:17,619

operational use in the future for

164

00:08:22,409 --> 00:08:20,199

example during this past summer a remote

165

00:08:24,929 --> 00:08:22,419

sensing station was tested that can tell

166

00:08:28,199 --> 00:08:24,939

when conditions exist for a forest fire

167

00:08:30,510 --> 00:08:28,209

to occur in less than an hour valuable

168

00:08:32,309 --> 00:08:30,520

fire index data was relayed via the

169

00:08:33,809 --> 00:08:32,319

earth's resources satellite to the

170

00:08:37,050 --> 00:08:33,819

California Division of Forestry

171

00:08:39,149 --> 00:08:37,060

headquarters in Sacramento the highly

172

00:08:41,339 --> 00:08:39,159

successful experiment has important

173

00:08:46,559 --> 00:08:41,349

implications for those areas troubled by

174

00:08:48,809 --> 00:08:46,569

forest fires helping verify images from

175

00:08:51,750 --> 00:08:48,819

spacecraft are the you to high-altitude

176

00:08:54,930 --> 00:08:51,760

Earth's survey planes flying at

177

00:08:56,910 --> 00:08:54,940

altitudes of 65,000 feet the u2 has

178

00:09:01,319 --> 00:08:56,920

evolved into a sophisticated research

179

00:09:03,000 --> 00:09:01,329

tool in its own right these are just a

180

00:09:05,189 --> 00:09:03,010

few of the high quality pictures

181

00:09:06,870 --> 00:09:05,199

returned pictures that have spotted

182

00:09:09,329 --> 00:09:06,880

smoke from forest fires in California

183

00:09:12,000 --> 00:09:09,339

and help survey the extent of damage

184

00:09:16,410 --> 00:09:12,010

done by tree killing tussock malls in

185

00:09:18,240 --> 00:09:16,420

Washington and Oregon the Lewis Research

186

00:09:20,519 --> 00:09:18,250

Center in Cleveland is scene of a

187

00:09:22,500 --> 00:09:20,529

program to explore and demonstrate how

188

00:09:26,100 --> 00:09:22,510

navigation of the Great Lakes may be

189

00:09:27,990 --> 00:09:26,110

extended year-round ice maps are made

190

00:09:30,780 --> 00:09:28,000

with the help of a reconnaissance plane

191

00:09:33,179 --> 00:09:30,790

on loan from the US Army it's special

192

00:09:35,699 --> 00:09:33,189

radar provides detailed images similar

193

00:09:38,780 --> 00:09:35,709

to black-and-white photographs another

194

00:09:41,970 --> 00:09:38,790

plane records ice surface temperatures

195

00:09:43,769 --> 00:09:41,980

NASA scientists also regularly fly in

196

00:09:45,540 --> 00:09:43,779

Coast Guard helicopters equipped to the

197

00:09:49,170 --> 00:09:45,550

type of radar that measures ice

198

00:09:51,150 --> 00:09:49,180

thickness to verify these instrument

199

00:09:53,670 --> 00:09:51,160

measurements with actual conditions on

200

00:09:57,030 --> 00:09:53,680

the ice surface samples are taken along

201
00:09:59,069 --> 00:09:57,040
the flight path the system is expected

202
00:10:00,660 --> 00:09:59,079
to be in use this winter making it

203
00:10:03,030 --> 00:10:00,670
possible to extend the ship

204
00:10:11,760 --> 00:10:03,040
season and potentially saving millions

205
00:10:13,530 --> 00:10:11,770
of dollars NASA's Aeronautics program is

206
00:10:15,690 --> 00:10:13,540
geared toward improving civil and

207
00:10:18,480 --> 00:10:15,700
military aviation noise abatement

208
00:10:20,730 --> 00:10:18,490
airport congestion visibility tests

209
00:10:24,480 --> 00:10:20,740
short and vertical takeoff planes and

210
00:10:26,670 --> 00:10:24,490
all aspects of aircraft safety in great

211
00:10:29,400 --> 00:10:26,680
demand or the many simulators that help

212
00:10:31,770 --> 00:10:29,410
man work better with his machines some

213
00:10:34,710 --> 00:10:31,780

simulators use motion to make the pilots

214

00:10:36,780 --> 00:10:34,720

senses believe he is flying this

215

00:10:39,240 --> 00:10:36,790

man-machine integration as it's called

216

00:10:41,040 --> 00:10:39,250

tries among other things to determine

217

00:10:46,630 --> 00:10:41,050

the proper roles for humans and

218

00:10:51,710 --> 00:10:49,040

emphasis continues on the rapidly growing

219

00:10:54,769 --> 00:10:51,720

class of planes used by individuals or

220

00:10:57,050 --> 00:10:54,779

as executive aircraft consider the

221

00:10:59,540 --> 00:10:57,060

problem of wake turbulence tornado-like

222

00:11:02,210 --> 00:10:59,550

patterns of air the trail behind large

223

00:11:04,430 --> 00:11:02,220

jets these vortices as they are called

224

00:11:06,730 --> 00:11:04,440

pose a hazard for smaller lighter weight

225

00:11:09,800 --> 00:11:06,740

aircraft following in their weight

226
00:11:12,650 --> 00:11:09,810
through laboratory and wind tunnel tests

227
00:11:14,780 --> 00:11:12,660
and actual in-flight analysis NASA is

228
00:11:16,790 --> 00:11:14,790
studying ways to break up the whirling

229
00:11:20,120 --> 00:11:16,800
air masses eliminating the danger to

230
00:11:22,819 --> 00:11:20,130
smaller planes a research program is

231
00:11:26,449 --> 00:11:22,829
underway to identify acceptable airplane

232
00:11:28,759 --> 00:11:26,459
ride qualities these passengers respond

233
00:11:31,490 --> 00:11:28,769
to a variety of vibrations and motions

234
00:11:32,930 --> 00:11:31,500
without actually flying simulators like

235
00:11:35,329 --> 00:11:32,940
this one at the Langley Research Center

236
00:11:38,090 --> 00:11:35,339
are used to study passenger response

237
00:11:40,460 --> 00:11:38,100
under controlled conditions the

238
00:11:42,430 --> 00:11:40,470

simulator work is correlated with flight

239

00:11:45,650 --> 00:11:42,440

tests at the Flight Research Center

240

00:11:47,750 --> 00:11:45,660

volunteer passengers read write eat and

241

00:11:50,240 --> 00:11:47,760

drink typical passenger activities

242

00:11:52,160 --> 00:11:50,250

during the flight they evaluate the

243

00:11:56,269 --> 00:11:52,170

degree of motion and electronically

244

00:11:58,370 --> 00:11:56,279

record their rating the US Army flying

245

00:12:01,040 --> 00:11:58,380

crane helicopter is a unique machine

246

00:12:02,870 --> 00:12:01,050

when the helicopter developed excessive

247

00:12:05,389 --> 00:12:02,880

vibrations under certain payload

248

00:12:07,910 --> 00:12:05,399

conditions the army was assisted by NASA

249

00:12:10,250 --> 00:12:07,920

in solving the problem the solution

250

00:12:12,920 --> 00:12:10,260

developed involved bonding stiff

251
00:12:14,990 --> 00:12:12,930
lightweight Borana proxy materials to

252
00:12:17,300 --> 00:12:15,000
the aluminum frame the process

253
00:12:21,620 --> 00:12:17,310
eliminated the problem and provided a

254
00:12:23,930 --> 00:12:21,630
weight saving of 60 pounds besides so

255
00:12:26,360 --> 00:12:23,940
successful has the composite materials

256
00:12:28,490 --> 00:12:26,370
program bin that test applications are

257
00:12:31,000 --> 00:12:28,500
planned for the wing rudder and aileron

258
00:12:33,980 --> 00:12:31,010
components of large transport aircraft

259
00:12:35,990 --> 00:12:33,990
at the flight research center test

260
00:12:38,420 --> 00:12:36,000
pilots are flying a plane without having

261
00:12:40,160 --> 00:12:38,430
to leave the ground actually it's a new

262
00:12:42,860 --> 00:12:40,170
way of flight testing advanced aircraft

263
00:12:46,819 --> 00:12:42,870

that's both more economical and less

264

00:12:48,710 --> 00:12:46,829

hazardous a typical flight involves air

265

00:12:51,259 --> 00:12:48,720

launching a large scale model from high

266

00:12:53,449 --> 00:12:51,269

altitude the research pilot in a

267

00:12:55,250 --> 00:12:53,459

realistically recreated cockpit on the

268

00:12:57,790 --> 00:12:55,260

ground complete with flight controls

269

00:13:00,610 --> 00:12:57,800

flies the remotely piloted craft

270

00:13:02,620 --> 00:13:00,620

using computers and television the

271

00:13:04,540 --> 00:13:02,630

television camera is installed in the

272

00:13:07,150 --> 00:13:04,550

model where the pilot would normally sit

273

00:13:10,150 --> 00:13:07,160

this view is then transmitted to the

274

00:13:11,980 --> 00:13:10,160

test pilot since the research pilot on

275

00:13:14,500 --> 00:13:11,990

the ground has direct control over the

276

00:13:16,569 --> 00:13:14,510

model he is able to perform high-risk

277

00:13:19,540 --> 00:13:16,579

flight maneuvers such as stalls and

278

00:13:21,400 --> 00:13:19,550

rolling at the end of a typical nine

279

00:13:24,340 --> 00:13:21,410

minute test flight the model is lowered

280

00:13:26,500 --> 00:13:24,350

by parachute in the final stages it is

281

00:13:30,690 --> 00:13:26,510

recovered in midair by a helicopter and

282

00:13:33,910 --> 00:13:30,700

brought gently to the ground for reuse

283

00:13:36,100 --> 00:13:33,920

speed and fuel consumption these factors

284

00:13:39,040 --> 00:13:36,110

have great impact on the design and

285

00:13:41,800 --> 00:13:39,050

performance of future aircraft this Air

286

00:13:44,800 --> 00:13:41,810

Force plane the why f12 is being test

287

00:13:46,780 --> 00:13:44,810

flown to study such things other areas

288

00:13:48,940 --> 00:13:46,790

of research include heating flight

289

00:13:51,850 --> 00:13:48,950

stability and control structural

290

00:13:53,980 --> 00:13:51,860

dynamics gust response and since the

291

00:13:57,069 --> 00:13:53,990

plane cruises at three times the speed

292

00:14:00,470 --> 00:13:57,079

of sound at 75,000 feet the physics of

293

00:14:00,480 --> 00:14:06,730

you

294

00:14:13,490 --> 00:14:10,280

manned space flight space science and

295

00:14:17,720 --> 00:14:13,500

applications Aeronautics and research

296

00:14:27,100 --> 00:14:17,730

and development 1973 a year of

297

00:14:31,699 --> 00:14:29,660

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