



**spaceflight**

1

00:00:00,003 --> 00:00:03,440

>>Flashing across California desert skies, the airplanes you see

2

00:00:03,440 --> 00:00:07,544

here are writing new chapters in the story  
of man made flight....there she goes!

3

00:00:07,544 --> 00:00:12,082

>>This is my first opportunity  
to greet you as deputy administrator

4

00:00:12,082 --> 00:00:15,752

of the National Aeronautics  
and Space Administration.

5

00:00:16,086 --> 00:00:18,722

>>Together, you and I must make our new agency

6

00:00:18,722 --> 00:00:20,056

>>A most unusual place

7

00:00:20,090 --> 00:00:22,926

>>An organization that can challenge  
conventional wisdom.

8

00:00:22,926 --> 00:00:26,530

>>We can engineer anything we can write the requirements for.

9

00:00:26,530 --> 00:00:27,931

>>We're going to make your idea work.

10

00:00:27,931 --> 00:00:30,500

This particular idea is quite disruptive.

11

00:00:31,168 --> 00:00:35,439

>>A typical flight, of course, starts  
under the wing of the B-52 mothership.

12

00:00:35,605 --> 00:00:41,044  
>>This sleek, high speed machine  
would have made Rube Goldberg proud.

13  
00:00:41,178 --> 00:00:44,047  
>>The manner in which we fly  
reentry from space,

14  
00:00:44,047 --> 00:00:48,051  
on the space shuttle was  
pioneered on the X-15.

15  
00:00:48,051 --> 00:00:53,657  
>>The X-31 pretty much wrote the book on thrust vectoring, along with its sister program, the F-18 HARV.

16  
00:00:53,657 --> 00:00:55,826  
>>An observation of an occultation is

17  
00:00:55,826 --> 00:00:58,795  
one of the more challenging  
missions that SOFIA can do.

18  
00:00:59,596 --> 00:01:18,782  
[Music/Background sound]

19  
00:01:19,616 --> 00:01:23,987  
>>Right now, we are looking  
at the dawn of a new era of aviation.

20  
00:01:27,023 --> 00:01:31,361  
[Music/Background sound]

21  
00:01:37,133 --> 00:01:41,037  
[Music]

22  
00:01:41,371 --> 00:01:45,242  
>>Hic de ficit orbis...here ends  
the world.

23

00:01:46,109 --> 00:01:48,445

>>Do satellites have practical uses?

24

00:01:48,445 --> 00:01:51,281

>>You could maintain continuous transmission of telephone calls...

25

00:01:51,481 --> 00:01:55,685

>>A chain of sister satellites will closely link all parts of the globe...

26

00:01:56,086 --> 00:01:58,955

>>Several of them can report continuously on worldwide weather conditions...

27

00:01:59,823 --> 00:02:04,261

>>Here in outer space is a natural vacuum for scientific experiments...

28

00:02:04,261 --> 00:02:06,997

>>It is the mountaintop and the ridgeline of the future...

29

00:02:06,997 --> 00:02:09,900

>>The high ground of military capability now...

30

00:02:10,066 --> 00:02:13,737

>>We will at first timidly penetrate beyond the limits of the atmosphere

31

00:02:14,170 --> 00:02:16,806

and then we'll conquer all the space around the sun.

32

00:02:17,173 --> 00:02:20,544

>>Men have been dropped out of high-flying bombers and rocket aircraft

33

00:02:20,844 --> 00:02:23,246

to probe extremely high altitudes...

34

00:02:23,246 --> 00:02:26,917

>>Moving away from Earth  
into the borders of space...

35

00:02:26,917 --> 00:02:29,486

>>Beyond the aerodynamically effective atmosphere...

36

00:02:29,486 --> 00:02:33,323

>>At extremely high altitudes,  
the conventional aerodynamic control

37

00:02:33,323 --> 00:02:36,860

surfaces are not sufficiently responsive  
for complete flight control.

38

00:02:37,027 --> 00:02:38,094

>>The answer??

39

00:02:38,094 --> 00:02:39,396

>>Reaction jets...

40

00:02:39,763 --> 00:02:44,000

>>What it would be to fly a vehicle  
that didn't have atmosphere...

41

00:02:44,000 --> 00:02:47,571

Everything that anyone subsequently used for reaction  
control

42

00:02:47,571 --> 00:02:51,308

systems in space derives from the work  
they did out here.

43

00:02:52,576 --> 00:02:55,245

>>From the flying laboratories of the X-2  
and X-3, there

44

00:02:55,245 --> 00:03:01,451  
evolved a new kind of aircraft  
capable of flying into space...the X-15.

45  
00:03:03,153 --> 00:03:04,588  
>>The epic mission for which

46  
00:03:04,588 --> 00:03:07,157  
it was designed: to skim  
the upper limits of the world's

47  
00:03:07,190 --> 00:03:08,558  
blanket of air,

48  
00:03:08,558 --> 00:03:10,694  
>>Higher  
than man has ever ventured before,

49  
00:03:10,694 --> 00:03:13,630  
>>and then to handle like a conventional plane  
in landing.

50  
00:03:13,630 --> 00:03:16,533  
>>A rocket, airplane, and spacecraft  
in one.

51  
00:03:16,533 --> 00:03:19,736  
>>Fundamental data applicable  
to the problems of manned hypersonic

52  
00:03:19,736 --> 00:03:23,373  
and space vehicles can be obtained  
in full-scale flight, providing

53  
00:03:23,373 --> 00:03:27,010  
basic information in advance of design  
needs for future space missions.

54  
00:03:27,210 --> 00:03:29,412  
>>The first thing had to do

was get the engine lit.

55

00:03:30,013 --> 00:03:33,116

And then all of a sudden here

I was sitting there with my head back

56

00:03:33,116 --> 00:03:34,050

and I couldn't move it.

57

00:03:34,050 --> 00:03:37,187

>>60,000

LBS of thrust in a 30,000 LB airplane.

58

00:03:37,287 --> 00:03:40,423

When you lit that engine, why

you could tell you were hauling the mail.

59

00:03:41,057 --> 00:03:44,761

>>Test pilots aren't supposed to say

they're afraid, but I was impressed.

60

00:03:45,095 --> 00:03:47,364

>>During the climb,

we were controlling the airplane

61

00:03:47,364 --> 00:03:51,267

with the right hand sidestick controller;

and as we exited the atmosphere,

62

00:03:51,267 --> 00:03:55,538

we transitioned to a left-hand controller

and flew the airplane

63

00:03:55,538 --> 00:03:57,340

with the reaction controls.

64

00:03:57,340 --> 00:04:01,411

>>What is being done to protect man

in this heretofore unknown environment?

65

00:04:01,611 --> 00:04:04,014

>>We were looking at  
what it would do to the pilot,

66

00:04:04,080 --> 00:04:07,751

what it would do to the airplane...all of  
those things were unknowns.

67

00:04:07,751 --> 00:04:10,453

>>This multi-layered suit is complete  
with air conditioning,

68

00:04:10,720 --> 00:04:14,758

pressurization, oxygen supply;  
it gives the comfort and mobility

69

00:04:14,758 --> 00:04:18,361

needed to control an airplane  
or a spacecraft.

70

00:04:18,495 --> 00:04:22,265

>>Reentry into the Earth's atmosphere  
poses another set of problems.

71

00:04:22,565 --> 00:04:24,834

>>Air  
friction will be heat parts of the plane

72

00:04:25,368 --> 00:04:27,904

to a red glow- 1200 degrees Fahrenheit.

73

00:04:28,271 --> 00:04:32,809

>>We coast the remaining 200 miles  
back to Edwards for a powerless landing

74

00:04:32,909 --> 00:04:34,744

at the dry lake.

75

00:04:34,744 --> 00:04:37,247

>>The X-15 pioneered reentry

76

00:04:37,247 --> 00:04:40,483

from space  
to an aerodynamically controlled landing.

77

00:04:40,517 --> 00:04:44,187

>>The flight program proved  
that winged earth exit and reentry

78

00:04:44,421 --> 00:04:46,890

are well within the control  
capabilities of man.

79

00:04:47,323 --> 00:04:51,828

>>The space program's workhorse,  
pilots will routinely fly into space,

80

00:04:51,828 --> 00:04:56,499

do research for the Gemini and Apollo  
programs, and fly back.

81

00:04:56,499 --> 00:05:00,403

>>Over the course of nine years  
and 199 flights the X-15

82

00:05:00,403 --> 00:05:04,007

laid the groundwork for every space  
exploration program that has followed.

83

00:05:04,708 --> 00:05:08,278

>>I don't think there's ever been  
an experimental test program that has come

84

00:05:08,278 --> 00:05:12,449

close to providing as much information  
to the industry as the X-15

85

00:05:14,317 --> 00:05:23,393

[Music/Background noise]

86

00:05:32,502 --> 00:05:34,904

>>NASA's Parasev explored

87

00:05:34,904 --> 00:05:37,240

the possibility of using flexible wings.

88

00:05:37,240 --> 00:05:41,544

>>A potential recovery system  
for the Gemini spacecraft,

89

00:05:41,544 --> 00:05:44,447

it didn't work out quite the way  
we hoped it would.

90

00:05:46,816 --> 00:05:50,186

>>...train ourselves in coming down  
to a body without atmosphere...

91

00:05:50,186 --> 00:05:52,021

>>A program  
to develop the piloting techniques

92

00:05:52,021 --> 00:05:54,190

that were used  
during the final phase of the manned

93

00:05:54,190 --> 00:05:57,927

lunar landing was started  
at the Flight Research Center in 1964.

94

00:05:58,261 --> 00:06:02,198

To compensate for the gravitational and  
atmospheric differences between the earth

95

00:06:02,198 --> 00:06:05,869

and the moon, the LLRV was equipped  
with a gimbaled jet engine

96

00:06:06,302 --> 00:06:10,073  
that produced enough thrust  
to counterbalance 5/6 of its weight,

97

00:06:10,540 --> 00:06:12,842  
thereby simulating 1/6  
gravity of the moon.

98

00:06:13,143 --> 00:06:15,945  
>>It had more degrees of freedom  
than an octopus.

99

00:06:15,945 --> 00:06:17,981  
>>...30 seconds...

100

00:06:17,981 --> 00:06:23,419  
>>When Mission Control advised me  
that I had 30 seconds of fuel remaining,

101

00:06:23,419 --> 00:06:25,722  
I thought 'no problem,

102

00:06:25,722 --> 00:06:27,690  
it's just like the LLRV.'

103

00:06:27,824 --> 00:06:29,826  
>>Scheduled to fly in 1965,

104

00:06:29,826 --> 00:06:33,596  
the X-20 was a logical follow  
on to the X-15.

105

00:06:33,596 --> 00:06:36,032  
Under the control of a pilot-astronaut,  
fully

106

00:06:36,032 --> 00:06:39,002  
maneuverable  
and capable of orbital flight.

107

00:06:39,235 --> 00:06:43,006

>>Though never completed, made significant contributions to the problems

108

00:06:43,006 --> 00:06:47,644

of orbital mechanics, inertial navigation and reentry dynamics

109

00:06:49,412 --> 00:06:50,280

>>Up to the

110

00:06:50,280 --> 00:06:52,749

present, manned spacecraft have been cone-shaped.

111

00:06:52,916 --> 00:06:56,986

They lack maneuverability. But as more and more men leave their world, easier,

112

00:06:56,986 --> 00:07:00,990

more flexible, less costly ways to let them return must be found.

113

00:07:01,157 --> 00:07:05,728

>>If we were to eliminate the top half of the configuration

114

00:07:06,162 --> 00:07:09,933

and have more of a flat top on it as so,

115

00:07:10,900 --> 00:07:15,705

maintaining the expanding forebody on the aft end....then

116

00:07:15,705 --> 00:07:19,843

we would develop lift as shown due to the pressures acting on the bottom

117

00:07:19,843 --> 00:07:21,177

surface of the vehicle.

118

00:07:21,177 --> 00:07:24,981

>>Lifting bodies are wingless vehicles  
that obtain aerodynamic lift

119

00:07:24,981 --> 00:07:26,883

from the shape of their bodies.

120

00:07:26,883 --> 00:07:30,153

>>Capable both of high-speed  
reentry and low-speed landing.

121

00:07:30,753 --> 00:07:32,889

The lifting body is reusable.

122

00:07:32,889 --> 00:07:36,226

Its initial cost could be spread over  
hundreds of flights

123

00:07:37,861 --> 00:07:38,995

>>Speeds approaching

124

00:07:38,995 --> 00:07:42,232

Mach 2 and altitudes  
greater than 90,000 feet.

125

00:07:42,632 --> 00:07:43,933

The pilot stabilized

126

00:07:43,933 --> 00:07:47,570

and controlled the craft  
by using its fins and control surfaces.

127

00:07:48,004 --> 00:07:51,541

>>With a lifting body,  
you could fly back to a chosen

128

00:07:51,541 --> 00:07:55,345

landing site without any mode of thrust,  
just taking advantage of energy

129

00:07:55,345 --> 00:07:56,479  
management.

130

00:07:57,213 --> 00:08:03,620  
[Music/Background noise]

131

00:08:11,924 --> 00:08:12,625  
>>Information

132

00:08:12,625 --> 00:08:16,996  
obtained from flights of the YF-12  
will be used to further the development

133

00:08:16,996 --> 00:08:20,566  
and operation of the proposed space  
shuttle.

134

00:08:21,300 --> 00:08:24,937  
>>NASA's reusable shuttle orbiter-  
part of a new, less

135

00:08:24,937 --> 00:08:27,740  
expensive space transportation  
system...

136

00:08:27,740 --> 00:08:29,942  
>>With no air-breathing engines,

137

00:08:29,942 --> 00:08:33,045  
it will be flown to a powerless landing,  
like a glider.

138

00:08:33,045 --> 00:08:35,915  
>>Dryden Center undertook  
the first approach and landing tests

139

00:08:35,915 --> 00:08:39,852  
of the space shuttle, air launching it  
from the back of a Boeing 747.

140  
00:08:40,219 --> 00:08:42,655  
>>Okay  
we arm...two lights and the orbiters go...

141  
00:08:43,389 --> 00:08:46,192  
>>Houston is go for sep,  
have a great flight...

142  
00:08:46,492 --> 00:08:49,595  
>>...standby...that wasn't too bad...

143  
00:08:49,595 --> 00:08:52,798  
...ok she's flying good...

144  
00:08:53,199 --> 00:08:56,702  
>>During that series of flights  
we were able to gain experience

145  
00:08:56,702 --> 00:09:00,172  
on the hydraulic and communications  
and electrical systems;

146  
00:09:00,172 --> 00:09:02,608  
the handling qualities  
of the shuttle...And

147  
00:09:02,675 --> 00:09:04,210  
were able to make some minor adjustments

148  
00:09:04,210 --> 00:09:07,780  
to flight control system  
in the landing phase of the program.

149  
00:09:08,247 --> 00:09:12,285  
>>The tests demonstrated that the shuttle  
has acceptable landing performance.

150

00:09:12,685 --> 00:09:15,988

Another milestone  
in the space shuttle development program.

151

00:09:17,123 --> 00:09:24,864

[Music/Background noise]

152

00:09:25,731 --> 00:09:27,800

>>One of our F-15s

153

00:09:27,800 --> 00:09:31,103

was flight testing heat  
shield tiles for the space shuttle-

154

00:09:31,370 --> 00:09:33,906

We learned a great deal  
about thermal tiles

155

00:09:34,206 --> 00:09:36,542

and how to attach them for flight  
in the atmosphere.

156

00:09:37,310 --> 00:09:40,012

>>Never before has a winged vehicle  
been launched

157

00:09:40,012 --> 00:09:45,184

like a rocket, orbited the earth, returned  
through frictional heating and landed,

158

00:09:45,184 --> 00:09:49,221

still aerodynamically sound,  
to be launched again

159

00:09:49,388 --> 00:09:50,590

and again.

160

00:09:53,259 --> 00:09:55,461

>>Dryden has been providing  
landing support.

161

00:09:55,628 --> 00:09:57,496

We maintain the visual landing aids

162

00:09:57,496 --> 00:10:01,434

activate our control room and provide  
radar coverage for the landing itself.

163

00:10:01,467 --> 00:10:05,037

We also assist on the convoy operation  
that is used to safe the orbiter

164

00:10:05,471 --> 00:10:07,273

and help the crew to egress.

165

00:10:07,273 --> 00:10:11,177

This specially modified  
747 is towed underneath the shuttle

166

00:10:11,177 --> 00:10:14,246

here in the Mate-Demate Device  
and the two are bolted together with seven

167

00:10:14,246 --> 00:10:17,883

large bolts for its return to the Kennedy  
Space Center in Florida.

168

00:10:19,151 --> 00:10:26,692

[Music/Background sound]

169

00:10:28,227 --> 00:10:31,464

>>The JetStar test flies the microwave  
scanning beam landing

170

00:10:31,464 --> 00:10:35,434

system used by the space shuttle  
when it returns from orbit

171  
00:10:36,636 --> 00:10:38,304  
>>Do you wanna look at the tiles, NASA 1?

172  
00:10:38,304 --> 00:10:39,238  
Or have you seen what you want?

173  
00:10:39,238 --> 00:10:41,173  
>>This is the heaviest concentration right here.

174  
00:10:41,173 --> 00:10:42,208  
>>We concur,

175  
00:10:42,208 --> 00:10:45,444  
we're seeing some damage  
show up on tile number 2 and 3...

176  
00:10:46,078 --> 00:10:51,917  
[Music/Background sound]

177  
00:10:52,284 --> 00:10:56,856  
>>The initial test will involve  
orbiter landing gears.

178  
00:10:56,856 --> 00:11:00,259  
In the extreme tests, we actually plan  
to go enough beyond the design conditions

179  
00:11:00,259 --> 00:11:03,963  
to cause failure of the brakes  
and actually blowing the tires

180  
00:11:04,530 --> 00:11:07,099  
[Music/Background sound]

181  
00:11:07,700 --> 00:11:08,167  
>>The unique

182

00:11:08,167 --> 00:11:12,304  
feature of Pegasus is that rather  
than starting from sea level

183  
00:11:12,505 --> 00:11:17,009  
and launching vertically from a launchpad,  
we use this B-52 mothership

184  
00:11:17,376 --> 00:11:20,179  
to carry it to high altitude.

185  
00:11:20,179 --> 00:11:21,781  
>>Today's  
initial launch of the Pegasus Air

186  
00:11:21,781 --> 00:11:25,317  
Launch Space Booster marks  
the first time that a privately developed

187  
00:11:25,317 --> 00:11:28,621  
space launch vehicle has carried a  
satellite payload into orbit.

188  
00:11:28,954 --> 00:11:36,996  
[Music/Background sound]

189  
00:11:38,097 --> 00:11:38,864  
>>Able to

190  
00:11:38,864 --> 00:11:40,566  
fly from airport runways-

191  
00:11:40,566 --> 00:11:44,070  
>>Ramjets, scramjets, and finally rocket propulsion-

192  
00:11:44,070 --> 00:11:45,771  
>>Directly into Earth's orbit.

193  
00:11:45,771 --> 00:11:48,474

>>The rocket engine they are testing  
on the back of this exotic

194

00:11:48,474 --> 00:11:53,079

Mach 3 spy  
plane is part of the X-33 experimental

195

00:11:53,079 --> 00:11:56,882

aircraft designers hope will lead  
to a replacement for the space shuttle.

196

00:11:56,982 --> 00:11:59,819

>>NASA some researchers are looking for  
alternate means to reach orbit.

197

00:12:00,352 --> 00:12:01,587

One possible solution

198

00:12:01,587 --> 00:12:05,357

currently on the table would use air  
breathing scramjet technology.

199

00:12:05,591 --> 00:12:09,028

>>This flight was a key milestone and  
a major step forward in producing boosters

200

00:12:09,161 --> 00:12:12,398

that may send large and vital payloads  
into space in a reliable, safe

201

00:12:12,398 --> 00:12:14,500

and inexpensive manner.

202

00:12:15,234 --> 00:12:21,941

[Music/Background sound]

203

00:12:23,743 --> 00:12:25,678

>>The development of the Space Station

204

00:12:25,678 --> 00:12:29,749

has also created a need for a second kind of space vehicle, one

205

00:12:29,749 --> 00:12:33,819

that could bring astronauts back to Earth safely in the event of an emergency.

206

00:12:34,420 --> 00:12:39,091

>>The shape provides a large amount of cross range relative to a capsule.

207

00:12:39,458 --> 00:12:41,727

Instead of pulling the trigger and going exactly where it's aimed,

208

00:12:41,727 --> 00:12:44,897

I can pull the trigger on a lifting body, and I have 700 miles to either

209

00:12:44,897 --> 00:12:47,833

side of that initial path that I can maneuver.

210

00:12:47,867 --> 00:12:52,338

>>The X-38 is equipped with a parafoil-a giant steerable parachute-

211

00:12:52,338 --> 00:12:55,508

that allows it to fly to a pinpoint low speed

212

00:12:55,508 --> 00:12:58,511

landing on simple, reliable skids.

213

00:13:01,947 --> 00:13:04,683

>>We can't tell you all the activities that people will do in space,

214

00:13:04,717 --> 00:13:08,020

but we are certain the number of people  
and activities will increase greatly

215

00:13:08,287 --> 00:13:10,523

as the cost comes down and safety  
improves.

216

00:13:10,523 --> 00:13:11,257

>>The next great

217

00:13:11,257 --> 00:13:15,194

American led trillion dollar enterprise-  
the commercial space enterprise.

218

00:13:15,561 --> 00:13:18,731

>>And we think that the technology  
to support the commercial

219

00:13:18,731 --> 00:13:21,867

exploitation of space is an appropriate  
task for NASA

220

00:13:21,867 --> 00:13:23,135

in the years ahead.

221

00:13:23,502 --> 00:13:25,704

[Music/Background sound]

222

00:13:26,005 --> 00:13:27,640

>>There

it is...standy for final recovey chute...

223

00:13:27,640 --> 00:13:31,610

>>Pad Abort Number One crew module is here  
for mass properties testing.

224

00:13:31,710 --> 00:13:34,380

>>We were tasked

to install the instrumentation,

225

00:13:34,780 --> 00:13:39,185

all the instrumentation sensors and the  
avionics systems to make this vehicle fly.

226

00:13:40,553 --> 00:13:42,254

>>The abort flight test provides

227

00:13:42,254 --> 00:13:45,791

important data that is used to validate

228

00:13:46,192 --> 00:13:49,161

the safety predictions  
for the overall Orion

229

00:13:49,161 --> 00:13:50,796

spacecraft.

230

00:13:51,096 --> 00:13:52,765

>>SPC jettison...

231

00:13:52,765 --> 00:13:56,202

>>Pilot deploy...mains are out...

232

00:13:56,602 --> 00:14:04,677

[Music/Background sound]

233

00:14:12,818 --> 00:14:14,420

>>So I'm released...

234

00:14:15,621 --> 00:14:16,121

>>We took our

235

00:14:16,121 --> 00:14:19,391

exact same code that's going to fly SLS

236

00:14:19,391 --> 00:14:22,595

and we put it on the F-18.

237

00:14:23,362 --> 00:14:25,998

And then we had the F-18 fly trajectories

238

00:14:25,998 --> 00:14:28,767

that matched what we would see with SLS.

239

00:14:29,201 --> 00:14:32,571

>>We don't land successfully  
without this radar that y'all tested.

240

00:14:33,038 --> 00:14:34,006

>>The radar has to hit

241

00:14:34,006 --> 00:14:37,509

just the right altitude and velocity  
measurements at just the right time

242

00:14:37,977 --> 00:14:40,145

or the rest of the landing sequence  
won't work.

243

00:14:40,379 --> 00:14:42,648

>>If you're not sure of the atmosphere  
on Mars,

244

00:14:42,848 --> 00:14:45,384

this will compensate  
for those type of design errors.

245

00:14:45,517 --> 00:14:47,419

>>And  
this is an idea to try and fly a small

246

00:14:47,419 --> 00:14:51,557

UAV on Mars, get some reconnaissance  
photos of potential landing sites.

247

00:14:51,590 --> 00:14:55,961

>>The next step for the fiber optic

sensing system is gonna be to design

248

00:14:55,961 --> 00:14:59,231

a ruggedized system that will be able  
to survive space application.

249

00:15:05,404 --> 00:15:09,074

>>3...2...1...mark!

250

00:15:09,408 --> 00:15:14,780

[Music/Background sound]

251

00:15:15,281 --> 00:15:15,614

>>The Flight

252

00:15:15,614 --> 00:15:18,617

Opportunities program purchases  
commercial suborbital

253

00:15:18,617 --> 00:15:22,821

reusable launch vehicle services  
to quickly fly technology payloads.

254

00:15:22,855 --> 00:15:26,992

>>It's a wonderful example  
of how government and private business

255

00:15:26,992 --> 00:15:29,495

and academia can all work together  
very well.

256

00:15:30,329 --> 00:15:35,901

[Music/Background sound]

257

00:15:36,335 --> 00:15:38,003

>>We're supporting

258

00:15:38,003 --> 00:15:41,040

NASA's Flight Opportunities by testing

different technologies here in the desert

259

00:15:41,040 --> 00:15:43,709

that'll hopefully land on another planet  
one day.

260

00:15:46,045 --> 00:15:46,745

>>You

261

00:15:46,745 --> 00:15:49,348

can do space tourism,  
you can do research education missions.