

A close-up photograph of a hand with a red ring on the ring finger, pressing a red button on a black control panel. The background is dark and out of focus, showing various mechanical components and lights.

Speed

1

00:00:00,734 --> 00:00:04,170

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

2

00:00:04,170 --> 00:00:08,274

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

3

00:00:08,274 --> 00:00:12,812

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

4

00:00:12,812 --> 00:00:16,483

of the National Aeronautics
and Space Administration.

5

00:00:16,816 --> 00:00:19,452

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

6

00:00:19,452 --> 00:00:20,787

>>A most unusual place

7

00:00:20,820 --> 00:00:23,656

>>An organization that can challenge
conventional wisdom.

8

00:00:23,656 --> 00:00:27,260

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

9

00:00:27,260 --> 00:00:28,661

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

10

00:00:28,661 --> 00:00:31,231

This particular idea is quite disruptive.

11

00:00:31,898 --> 00:00:36,169

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

12

00:00:36,336 --> 00:00:41,775
>>This sleek, high speed machine
would have made Rube Goldberg proud.

13
00:00:41,908 --> 00:00:44,778
>>The manner in which we fly
reentry from space,

14
00:00:44,778 --> 00:00:48,782
on the space shuttle was
pioneered on the X-15.

15
00:00:48,782 --> 00:00:54,387
>>The X-31 pretty much wrote the book on thrust vectoring, along with its sister program, the F-18 HARV.

16
00:00:54,387 --> 00:00:56,556
>>An observation of an occultation is

17
00:00:56,556 --> 00:00:59,526
one of the more challenging
missions that SOFIA can do.

18
00:01:00,326 --> 00:01:19,512
[Music/Background sound]

19
00:01:20,346 --> 00:01:24,717
>>Right now, we are looking
at the dawn of a new era of aviation.

20
00:01:27,754 --> 00:01:32,092
[Music/Background sound]

21
00:01:42,902 --> 00:01:47,607
[Music/Jet revving]

22
00:01:47,707 --> 00:01:49,142
[Jet flying over]

23
00:01:49,175 --> 00:01:53,179

>>Your Air Force is continually developing new and more astonishing aircraft.

24

00:01:53,179 --> 00:01:54,948

>>We have the air.

25

00:01:54,948 --> 00:01:55,915

We have the power.

26

00:01:55,915 --> 00:01:59,652

>>The development of new power in the air has brought about terrific speed,

27

00:02:00,587 --> 00:02:02,856

>>...diving of subsonic airplanes at speeds

28

00:02:02,856 --> 00:02:05,492

for which they were never designed could be a hazardous business.

29

00:02:05,859 --> 00:02:10,430

>>Knowledgeable men were seriously wondering whether man could ever fly faster

30

00:02:10,430 --> 00:02:12,599

than the speed of sound.

31

00:02:13,533 --> 00:02:16,870

>>It remained for the High-Speed Flight program to attack these problems

32

00:02:17,036 --> 00:02:19,539

with scientific facilities of a new kind.

33

00:02:21,508 --> 00:02:25,478

>>Rifle and artillery shells had been traveling supersonically for many years.

34

00:02:25,578 --> 00:02:30,717

The XS-1 was indeed
shaped like a .50 caliber bullet.

35

00:02:32,719 --> 00:02:34,721
>>...through the sound barrier-

36

00:02:34,721 --> 00:02:37,023
the first time ever in level flight!

37

00:02:38,558 --> 00:02:41,427
>>Blazing through sound barriers
and now heat barriers,

38

00:02:41,461 --> 00:02:46,166
the Bell X-2 reaches the unheard-of
speed of nineteen hundred miles per hour.

39

00:02:46,566 --> 00:02:49,435
>>The D-558 was the first American aircraft

40

00:02:49,435 --> 00:02:52,372
to use swept back wings and stall fences.

41

00:02:52,539 --> 00:02:56,743
The primary mission of the X-3
was thin wing research.

42

00:02:56,743 --> 00:02:58,878
...the X-4 was its lack of a horizontal tail.

43

00:02:58,878 --> 00:03:01,514
The X-5 could sweep its wings
in flight.

44

00:03:01,514 --> 00:03:04,384
>>Pilots achieved a 7-to-1 record over the MiGs...

45

00:03:04,384 --> 00:03:06,286
The United States Air Force played

46

00:03:06,286 --> 00:03:12,091

a vital role in holding the line
against Communist aggression.

47

00:03:13,026 --> 00:03:16,696

>>Step by step, these different aircraft
helped nibble away at the unknown

48

00:03:16,996 --> 00:03:19,966

until the frontiers of manned flight
had been advanced

49

00:03:19,966 --> 00:03:23,469

from speeds of 500 miles
an hour to Mach 3.

50

00:03:23,670 --> 00:03:27,006

>>It was long before Sputnik
that we decided to build the X-15.

51

00:03:27,173 --> 00:03:30,643

This was a logical step
in the research aircraft program...

52

00:03:31,177 --> 00:03:32,912

the first hypersonic aircraft...

53

00:03:32,912 --> 00:03:36,115

>>What is to be man's role in space travel?

54

00:03:36,149 --> 00:03:39,852

Can he pilot an aircraft
out of the earth's atmosphere, fly it in space,

55

00:03:40,186 --> 00:03:42,956

then reenter the atmosphere
and bring it back to a safe

56

00:03:42,956 --> 00:03:43,990
landing on earth?

57

00:03:43,990 --> 00:03:46,726
>>Designed to investigate the problems of manned flight

58

00:03:46,726 --> 00:03:48,328
in a near space environment.

59

00:03:48,328 --> 00:03:50,263
There were many unknowns to be discovered.

60

00:03:50,296 --> 00:03:52,432
Many problems to be overcome.

61

00:03:52,432 --> 00:03:55,368
Hypersonic flow of air
would heat the leading edges of the plane

62

00:03:55,668 --> 00:03:57,904
to 1300 degrees Fahrenheit.

63

00:03:58,404 --> 00:04:01,040
How could the pilot
control the aircraft in air

64

00:04:01,040 --> 00:04:05,378
so thin that normal
aerodynamic control would be impossible?

65

00:04:06,546 --> 00:04:09,015
No engine like this
had ever existed before.

66

00:04:09,215 --> 00:04:12,018
>>The fifty thousand pounds of thrust
in a single chamber

67

00:04:12,018 --> 00:04:14,287

had to be controllable
at the pilot's discretion.

68

00:04:15,021 --> 00:04:18,057
>>The X-15 pilots flew to study
the physiological

69

00:04:18,057 --> 00:04:20,927
aspects of high speed and high
altitude flight.

70

00:04:21,094 --> 00:04:24,731
The data gathered proved to be invaluable
to follow on missions

71

00:04:25,031 --> 00:04:26,833
beyond the Earth's atmosphere.

72

00:04:26,833 --> 00:04:30,670
>>They have dramatized the potential
of piloted high performance aircraft

73

00:04:30,670 --> 00:04:33,706
in a space environment
at a time when much of the world's

74

00:04:33,706 --> 00:04:35,775
gaze was turned toward orbital flight.

75

00:04:38,044 --> 00:04:41,814
>>The airplane has become an important means
of commercial transportation

76

00:04:41,814 --> 00:04:43,716
and a decisive weapon of war

77

00:04:43,716 --> 00:04:45,885
...air transportation helps our economy...

78

00:04:45,885 --> 00:04:48,588

>>The United States is only about 5 hours wide.

79

00:04:48,588 --> 00:04:54,027

>>Research programs investigate flight at ever greater speeds as time and distance shrink.

80

00:04:54,727 --> 00:04:59,065

>>A supersonic transport must be durable
and it cannot itself cost too much.

81

00:05:00,733 --> 00:05:01,834

>>The controversial XB-70 gathers

82

00:05:01,834 --> 00:05:05,238

invaluable data on stability
and control characteristics.

83

00:05:05,672 --> 00:05:10,610

>>We were flying two YF-12s with a whole lot
of supersonic, high temperature types of research...

84

00:05:12,045 --> 00:05:14,881

...and the F-111 TACT airplane,

85

00:05:15,014 --> 00:05:18,885

which contributed greatly to the knowledge
of the transonic regime...

86

00:05:18,885 --> 00:05:22,355

>>...a cross-country flight that would take you minutes instead of hours...

87

00:05:22,889 --> 00:05:25,458

>>The X-43 is a revolutionary
new kind of airplane.

88

00:05:25,525 --> 00:05:28,661

What we want to do with this is prove
that hypersonic flight with an air

89

00:05:28,661 --> 00:05:30,063
breathing engine is possible.

90
00:05:30,063 --> 00:05:31,764
>>...through Mach 3...

91
00:05:31,831 --> 00:05:34,834
[Music]

92
00:05:35,134 --> 00:05:36,536
>>Though the technology exists

93
00:05:36,536 --> 00:05:39,539
for aircraft to fly at speeds faster
than the speed of sound,

94
00:05:39,906 --> 00:05:42,275
today's aircraft don't.

95
00:05:42,275 --> 00:05:43,843
[Sonic booms]

96
00:05:43,843 --> 00:05:46,112
>>If an aircraft is flying
from New York to Los Angeles,

97
00:05:46,212 --> 00:05:48,748
the sonic boom will be heard
consistently across the country.

98
00:05:48,748 --> 00:05:50,516
>>We're talking about commercial operations.

99
00:05:50,516 --> 00:05:52,785
...you having, you know, 40 in a day

100
00:05:52,785 --> 00:05:56,022
>>We'd be breaking windows
or at least annoying a lot of people.

101

00:05:56,389 --> 00:05:59,625

[Music/Background noise]

102

00:05:59,859 --> 00:06:01,994

>>We can, in fact, shape the airplane

103

00:06:01,994 --> 00:06:04,063

in such a way that we can
shape the sonic boom,

104

00:06:04,063 --> 00:06:05,164

and it sound different...

105

00:06:05,631 --> 00:06:07,934

>>This project is looking to put instrumentation

106

00:06:07,934 --> 00:06:11,804

for the air crew to see
where the airplane is booming the ground at.

107

00:06:12,238 --> 00:06:15,441

It's a real time
map display overlaid with the boom

108

00:06:15,875 --> 00:06:17,543

showing where it's
hitting the ground.

109

00:06:18,811 --> 00:06:21,314

>>Supersonic...

110

00:06:21,314 --> 00:06:26,586

>>It's that pull out that puts the quiet
boom out on the area of interest.

111

00:06:26,819 --> 00:06:30,223

>>...foxtrot heard thump thump...spike 3 thump thump...

112
00:06:30,223 --> 00:06:33,393
>>The end goal is to create a quiet supersonic aircraft.

113
00:06:33,393 --> 00:06:35,294
>>With the X-59 program,

114
00:06:35,294 --> 00:06:39,365
we're going to be gathering a series
of data from communities around the US

115
00:06:39,632 --> 00:06:43,369
relating people's response
to the noise, to the sonic thumps.

116
00:06:43,436 --> 00:06:47,473
We're hoping that the data
that we gather with X-59 will convince