



1  
00:00:00,000 --> 00:00:07,808  
Music

2  
00:00:07,808 --> 00:00:09,376  
>>He was quiet.

3  
00:00:09,376 --> 00:00:12,846  
He was a man of many talents.

4  
00:00:12,846 --> 00:00:16,516  
Radio chatter

5  
00:00:16,516 --> 00:00:18,919  
He was also a good friend.

6  
00:00:18,919 --> 00:00:23,257  
>>He started flying when  
he was 16, and in his mid-20's

7  
00:00:23,257 --> 00:00:27,261  
he had already had more than 70  
combat flights, had bailed out.

8  
00:00:27,261 --> 00:00:29,229  
Prop plane flyby

9  
00:00:29,229 --> 00:00:31,698  
>>Willing to tackle anything.

10  
00:00:31,698 --> 00:00:34,701  
The best engineering test pilot  
I ever worked with.

11  
00:00:34,701 --> 00:00:38,372  
He flew absolutely impeccably.

12  
00:00:38,372 --> 00:00:41,375  
>>He took me on my

first supersonic ride in a 104.

13

00:00:41,375 --> 00:00:42,409

Jet engine

14

00:00:42,409 --> 00:00:44,678

It was the greatest flight I  
ever had.

15

00:00:44,678 --> 00:00:47,047

Radio chatter

16

00:00:47,047 --> 00:00:50,050

Music

17

00:00:50,050 --> 00:00:54,087

>>Every time an airplane flew  
over, he would look up at it.

18

00:00:54,087 --> 00:00:55,289

Music

19

00:00:55,289 --> 00:00:56,290

>>Pull!

20

00:00:56,290 --> 00:00:58,325

Applause

21

00:00:58,325 --> 00:00:59,726

>>While we are changing  
our name,

22

00:00:59,726 --> 00:01:01,695

the work we do remains  
consistent.

23

00:01:01,695 --> 00:01:06,300

We fly, we explore, we measure,  
we reveal, and we discover

24

00:01:06,300 --> 00:01:08,969  
the overlooked and unexpected  
for the benefit of the nation,

25

00:01:08,969 --> 00:01:11,071  
and for the benefit of human  
kind.

26

00:01:11,071 --> 00:01:13,073  
>>l'm going to ride off into  
the sunrise.

27

00:01:13,073 --> 00:01:18,578  
Jets taking off

28

00:01:18,578 --> 00:01:20,080  
>>836, left 3 degrees.

29

00:01:20,080 --> 00:01:21,081  
>>Copy.

30

00:01:21,081 --> 00:01:22,082  
>>Okay we have got lock.

31

00:01:22,082 --> 00:01:25,085  
>>Lock conditions.

32

00:01:25,085 --> 00:01:26,086  
Camera shutter

33

00:01:26,086 --> 00:01:28,088  
Jet engine

34

00:01:28,088 --> 00:01:30,123  
>>.95 run complete.

35

00:01:30,123 --> 00:01:32,259

>Copy .95 shown here,  
run complete.

36

00:01:32,259 --> 00:01:34,461

>>Mission controller, this is  
flight on data one,

37

00:01:34,461 --> 00:01:36,096

we are ready for the supersonic  
run.

38

00:01:36,096 --> 00:01:37,097

Sonic boom

39

00:01:37,097 --> 00:01:39,132

>>High speed research, is  
hopefully at one point

40

00:01:39,132 --> 00:01:42,302

in time, going to allow  
supersonic flight

41

00:01:42,302 --> 00:01:45,138

commercially over the U.S. and  
throughout the world.

42

00:01:45,138 --> 00:01:50,110

Jet plane flying

43

00:01:50,110 --> 00:01:53,113

Music

44

00:01:53,113 --> 00:01:58,585

Aircraft taking off

45

00:01:58,585 --> 00:02:02,389

>>Traffic, Traffic,  
Descend, Speed Up

46

00:02:02,389 --> 00:02:05,292  
>>12 o'clock, 5  
miles northbound, Navajo, 8,500

47  
00:02:05,292 --> 00:02:08,295  
November 02 Sierra, traffic  
2 o'clock

48  
00:02:08,295 --> 00:02:10,330  
Radio chatter

49  
00:02:10,330 --> 00:02:14,267  
>>Visual about 3.2 he's spot on  
perfect.

50  
00:02:14,267 --> 00:02:16,770  
>>Lift off initial climb  
mission phase.

51  
00:02:16,770 --> 00:02:18,138  
>>Pilot, monitor and verify  
guidance,

52  
00:02:18,138 --> 00:02:19,439  
advise when in normal flight.

53  
00:02:19,439 --> 00:02:21,441  
>>Passing through 10,000.

54  
00:02:21,441 --> 00:02:23,143  
Prop plane flying

55  
00:02:23,143 --> 00:02:25,345  
>>Phantom 02, gear is cycling.

56  
00:02:25,345 --> 00:02:27,147  
>>Yep, it looks good to me.

57  
00:02:27,147 --> 00:02:28,782

>>Perfect!

58

00:02:28,782 --> 00:02:31,084

>>Prandtl is the closest  
to bird flight

59

00:02:31,084 --> 00:02:34,221

that humans have ever gotten  
as far as aircraft goes.

60

00:02:34,221 --> 00:02:38,291

Not having a vertical tail would  
decrease the drag

61

00:02:38,291 --> 00:02:40,293

of an aircraft immensely.

62

00:02:40,293 --> 00:02:44,164

Wind

63

00:02:44,164 --> 00:02:46,500

Music

64

00:02:46,500 --> 00:02:48,502

Radio telemetry clicks

65

00:02:48,502 --> 00:02:50,303

>>You guys made history  
today.

66

00:02:50,303 --> 00:02:53,073

No one has ever proven that  
vortices go anywhere

67

00:02:53,073 --> 00:02:54,508

except at the wing tip.

68

00:02:54,508 --> 00:02:56,510

Music

69

00:02:56,510 --> 00:02:58,779

Prop plane

70

00:02:58,779 --> 00:03:00,380

>>We're at 50 knots.

71

00:03:00,380 --> 00:03:04,351

Rotor blades

72

00:03:04,351 --> 00:03:05,352

Clacking

73

00:03:05,352 --> 00:03:07,888

>>The fiber optic systems tells us how much the wing

74

00:03:07,888 --> 00:03:11,558

is bending in real time. This technology eventually should

75

00:03:11,558 --> 00:03:14,694

be applied to completely flexible wings,

76

00:03:14,694 --> 00:03:16,029

that's the future.

77

00:03:16,029 --> 00:03:19,366

Music

78

00:03:19,366 --> 00:03:22,836

>>The new flaps have promised to be lighter,

79

00:03:22,836 --> 00:03:27,507

more efficient, and also quieter. More like a bird,

80

00:03:27,507 --> 00:03:30,877

morph without any use of hinges  
and joints and things like that.

81

00:03:30,877 --> 00:03:35,882

Music

82

00:03:35,882 --> 00:03:37,884

Jet engine revving up

83

00:03:37,884 --> 00:03:41,488

Jet engine taxiing

84

00:03:41,488 --> 00:03:44,224

>>10 seconds...brakes, now.

85

00:03:44,224 --> 00:03:47,494

Jet plane taking off

86

00:03:47,494 --> 00:03:48,829

>>We are going to continue  
ahead here

87

00:03:48,829 --> 00:03:50,163

for about another couple  
of miles,

88

00:03:50,163 --> 00:03:52,099

just to check out the airplane,  
before we make a turn.

89

00:03:52,099 --> 00:03:54,234

Music

90

00:03:54,234 --> 00:03:57,571

Jet airplane flying

91

00:03:57,571 --> 00:03:59,706

>>Steady heading side  
slip to the left first,

92  
00:03:59,706 --> 00:04:02,542  
we will hold for 10 seconds  
and try to get about half over.

93  
00:04:02,542 --> 00:04:04,111  
Our pitch  
stability is good, roll and yaw.

94  
00:04:04,111 --> 00:04:06,046  
>>Runway is clear, you  
are go for takeoff.

95  
00:04:06,046 --> 00:04:08,281  
>>All of the airborne science  
aircraft; from the ER-2,

96  
00:04:08,281 --> 00:04:11,852  
to the C-20, to DC-8, to  
Global Hawk, they all play

97  
00:04:11,852 --> 00:04:12,986  
an important role.

98  
00:04:12,986 --> 00:04:13,987  
>>Are you guys ready?

99  
00:04:13,987 --> 00:04:14,988  
>>Ready.

100  
00:04:14,988 --> 00:04:16,256  
>>Start Recording.

101  
00:04:16,256 --> 00:04:17,257  
>>OK, stop recording.

102  
00:04:17,257 --> 00:04:18,758

>>What are our temperatures?

103

00:04:18,758 --> 00:04:21,394

>>34, 33, 38...

104

00:04:21,394 --> 00:04:25,265

Jet plane taking off

105

00:04:25,265 --> 00:04:28,535

Music

106

00:04:28,535 --> 00:04:29,636

>>Hopefully we

will get some really good

107

00:04:29,636 --> 00:04:32,739

science data from this that

will help the community.

108

00:04:32,739 --> 00:04:36,309

>>I have got rising

terrain, 12o'clock, 7 miles from

109

00:04:36,309 --> 00:04:38,545

>>Tally-ho, and I am

going to start climbing here.

110

00:04:38,545 --> 00:04:39,546

>>Clear.

111

00:04:39,546 --> 00:04:40,747

>>We're clear.

112

00:04:40,747 --> 00:04:44,284

Music

113

00:04:44,284 --> 00:04:45,285

Airplane interior

114

00:04:45,285 --> 00:04:47,988

>>Alright it looks like it is at wings level and we're on course

115

00:04:47,988 --> 00:04:50,290

Music

116

00:04:50,290 --> 00:04:52,759

Jet plane flying

117

00:04:52,759 --> 00:04:54,594

>>Chief Scientist how is your flight?

118

00:04:54,594 --> 00:04:55,328

>>It was great.

119

00:04:55,328 --> 00:04:56,797

Music

120

00:04:56,797 --> 00:04:59,799

Jet flying low

121

00:04:59,799 --> 00:05:03,804

High altitude airplane gunning engine

122

00:05:03,804 --> 00:05:07,807

Cockpit ambience

123

00:05:07,807 --> 00:05:10,810

Music

124

00:05:10,810 --> 00:05:14,514

UAV taking off

125

00:05:14,514 --> 00:05:16,383

>>Woo-hoo!

126

00:05:16,383 --> 00:05:20,453

747 taking off

127

00:05:20,453 --> 00:05:24,324

>>I, myself, have learned so much just about the process

128

00:05:24,324 --> 00:05:27,227

of science, and that in itself is something

129

00:05:27,227 --> 00:05:28,895

you can bring back to the classroom.

130

00:05:28,895 --> 00:05:32,966

Music

131

00:05:32,966 --> 00:05:35,335

>>FIFI is an imaging spectrometer

132

00:05:35,335 --> 00:05:36,169

in the far infrared.

133

00:05:36,169 --> 00:05:39,873

We can reach wavelengths that other instruments cannot reach.

134

00:05:39,873 --> 00:05:45,245

Background hangar maintenance

135

00:05:45,245 --> 00:05:49,049

>>Inflatable systems allow us to build bigger heat shields

136

00:05:49,049 --> 00:05:52,385

that decelerate larger masses so

that we can support

137

00:05:52,385 --> 00:05:55,889

the systems that are required  
for human space exploration.

138

00:05:55,889 --> 00:06:00,894

Music

139

00:06:12,372 --> 00:06:14,541

Prop plane taking off

140

00:06:14,541 --> 00:06:17,477

>>Tower, NASA UAS airborne,  
UAS work area surface to

141

00:06:17,477 --> 00:06:19,479

2,000 feet.

142

00:06:19,479 --> 00:06:20,480

Radio chatter

143

00:06:20,480 --> 00:06:22,482

Prop plane flying

144

00:06:22,482 --> 00:06:23,817

>>Release!

145

00:06:23,817 --> 00:06:24,818

Music

146

00:06:24,818 --> 00:06:25,819

Prop plane flying

147

00:06:25,819 --> 00:06:30,824

Rocket launch

148

00:06:34,628 --> 00:06:37,530

>>Green light, green light,  
green light, nearest 1 0

149

00:06:37,530 --> 00:06:41,534

Music

150

00:06:41,534 --> 00:06:43,670

Prop plane flying