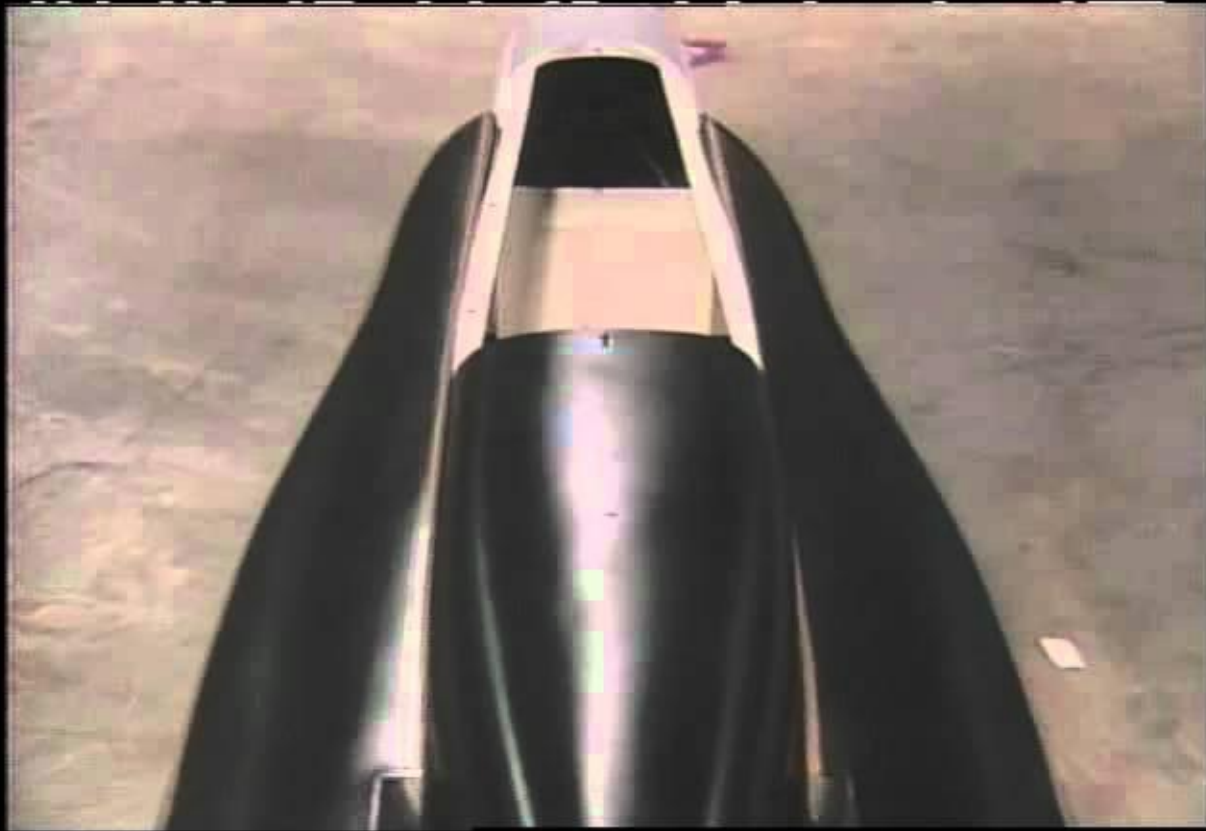

1
00:00:40,470 --> 00:00:37,910
radio-controlled model aircraft flying

2
00:00:42,229 --> 00:00:40,480
is one of america's most popular hobbies

3
00:00:43,750 --> 00:00:42,239
the people who fly these small-scale

4
00:00:46,069 --> 00:00:43,760
versions of their favorite planes have

5
00:00:48,389 --> 00:00:46,079
many reasons why they are interested

6
00:00:49,430 --> 00:00:48,399
some like the excitement of flying some

7
00:00:55,830 --> 00:00:49,440
like building them

8
00:00:59,270 --> 00:00:57,590
engineers at nasa's dryden flight

9
00:01:01,029 --> 00:00:59,280
research center in california

10
00:01:03,670 --> 00:01:01,039
use radio control aircraft for another

11
00:01:05,109 --> 00:01:03,680
reason research

12
00:01:08,630 --> 00:01:05,119
they know that meaningful data can be

13
00:01:10,630 --> 00:01:08,640

obtained from radio controlled aircraft

14
00:01:11,990 --> 00:01:10,640
they are using a 15 percent model of

15
00:01:13,910 --> 00:01:12,000
dry-in zone f-18

16
00:01:15,350 --> 00:01:13,920
high alpha research vehicle that has

17
00:01:19,830 --> 00:01:15,360
been built as a proof-of-concept

18
00:01:23,350 --> 00:01:21,350
the model was made at dryden almost

19
00:01:24,310 --> 00:01:23,360
exclusively from standard rc model

20
00:01:26,630 --> 00:01:24,320
industry equipment

21
00:01:28,469 --> 00:01:26,640
like this aeron servo but a number of

22
00:01:31,429 --> 00:01:28,479
modifications had to be made in order to

23
00:01:33,830 --> 00:01:31,439
meet research specifications

24
00:01:36,230 --> 00:01:33,840
the fuselage made of fiberglass comes

25
00:01:37,830 --> 00:01:36,240
from an off-the-shelf model kit

26
00:01:39,749 --> 00:01:37,840
the wings and tail surfaces are made out

27
00:01:42,469 --> 00:01:39,759
of a styrofoam core and sheeted with

28
00:01:45,910 --> 00:01:44,469
entirely new engine inlets and exhaust

29
00:01:47,109 --> 00:01:45,920
stucks were made in order to more

30
00:01:50,389 --> 00:01:47,119
accurately represent

31
00:01:52,830 --> 00:01:50,399
the true f-18 inlet configuration

32
00:01:54,149 --> 00:01:52,840
this included functional boundary layer

33
00:01:55,830 --> 00:01:54,159
diverters

34
00:01:57,990 --> 00:01:55,840
stress carrying bulkheads made of a

35
00:01:59,109 --> 00:01:58,000
special laminate of end grain balsa wood

36
00:02:00,469 --> 00:01:59,119
and fiberglass

37
00:02:01,910 --> 00:02:00,479
had to be installed to handle the

38
00:02:04,709 --> 00:02:01,920

stresses encountered by the model in

39
00:02:08,790 --> 00:02:06,709
some parts like the stabilator pivot

40
00:02:10,309 --> 00:02:08,800
mechanism were made by hand

41
00:02:14,309 --> 00:02:10,319
other types of material used were

42
00:02:15,910 --> 00:02:14,319
plywood carbon fiber and balsa wood

43
00:02:17,830 --> 00:02:15,920
the model's thrust comes from two

44
00:02:19,270 --> 00:02:17,840
commercially available ducted fan units

45
00:02:21,589 --> 00:02:19,280
that are 85 percent efficient in

46
00:02:23,510 --> 00:02:21,599
converting horsepower to thrust

47
00:02:25,270 --> 00:02:23,520
two model airplane engines power the fan

48
00:02:28,790 --> 00:02:25,280
units producing 11 pounds of static

49
00:02:32,550 --> 00:02:30,390
the plane has been tracked on radar at

50
00:02:33,910 --> 00:02:32,560
160 knots a speed which should be

51
00:02:37,910 --> 00:02:33,920
increased with the installation of

52
00:02:39,430 --> 00:02:37,920
liquid propane fuel mini turbo jets

53
00:02:40,949 --> 00:02:39,440
thrust vectoring vanes have been added

54
00:02:43,270 --> 00:02:40,959
to the model to make it true to the real

55
00:02:45,030 --> 00:02:43,280
aircraft but are not operational

56
00:02:48,309 --> 00:02:45,040
however an operational system has been

57
00:02:49,910 --> 00:02:48,319
designed for a future project

58
00:02:52,470 --> 00:02:49,920
the plane is fully instrumented to

59
00:02:55,190 --> 00:02:52,480
measure air speed angle of attack

60
00:02:57,270 --> 00:02:55,200
side slip and control surface positions

61
00:02:58,149 --> 00:02:57,280
three axis rate gyros measure the rate

62
00:02:59,750 --> 00:02:58,159
of rotation

63
00:03:01,509 --> 00:02:59,760

and three accelerometers measure the

64
00:03:02,869 --> 00:03:01,519
g-forces experienced by the model in

65
00:03:04,710 --> 00:03:02,879
flight

66
00:03:06,229 --> 00:03:04,720
it took six months to build at a cost of

67
00:03:07,670 --> 00:03:06,239
approximately twenty five thousand

68
00:03:09,430 --> 00:03:07,680
dollars

69
00:03:11,350 --> 00:03:09,440
these modifications make it truly

70
00:03:11,990 --> 00:03:11,360
capable performing as a flight research

71
00:03:14,949 --> 00:03:12,000
vehicle

72
00:03:16,949 --> 00:03:14,959
like its full-scale big brother rc

73
00:03:18,470 --> 00:03:16,959
subscale models like this have a unique

74
00:03:20,070 --> 00:03:18,480
quality that allows researchers to

75
00:03:21,589 --> 00:03:20,080
gather aerodynamic data

76
00:03:23,350 --> 00:03:21,599
which is difficult and expensive to

77
00:03:24,949 --> 00:03:23,360
obtain in wind tunnels

78
00:03:26,710 --> 00:03:24,959
models like this are especially suited

79
00:03:28,710 --> 00:03:26,720
for getting aerodynamic data

80
00:03:30,869 --> 00:03:28,720
like performing parameter identification

81
00:03:31,990 --> 00:03:30,879
studies and for confirming the basic

82
00:03:34,710 --> 00:03:32,000
airworthiness of unique

83
00:03:36,470 --> 00:03:34,720
aircraft configurations research and

84
00:03:38,789 --> 00:03:36,480
advanced control theory can also be done

85
00:03:40,309 --> 00:03:38,799
by using existing technology

86
00:03:41,830 --> 00:03:40,319
a flight control computer can be

87
00:03:43,350 --> 00:03:41,840
installed that would allow the aircraft

88
00:03:45,430 --> 00:03:43,360

to gather data at specific flight

89
00:03:47,110 --> 00:03:45,440
conditions

90
00:03:49,350 --> 00:03:47,120
radio-controlled model aircraft flying

91
00:03:50,550 --> 00:03:49,360
is a great hobby but for nasa's dryden

92
00:03:52,229 --> 00:03:50,560
flight research center

93
00:03:58,830 --> 00:03:52,239
they are just another innovative tool in