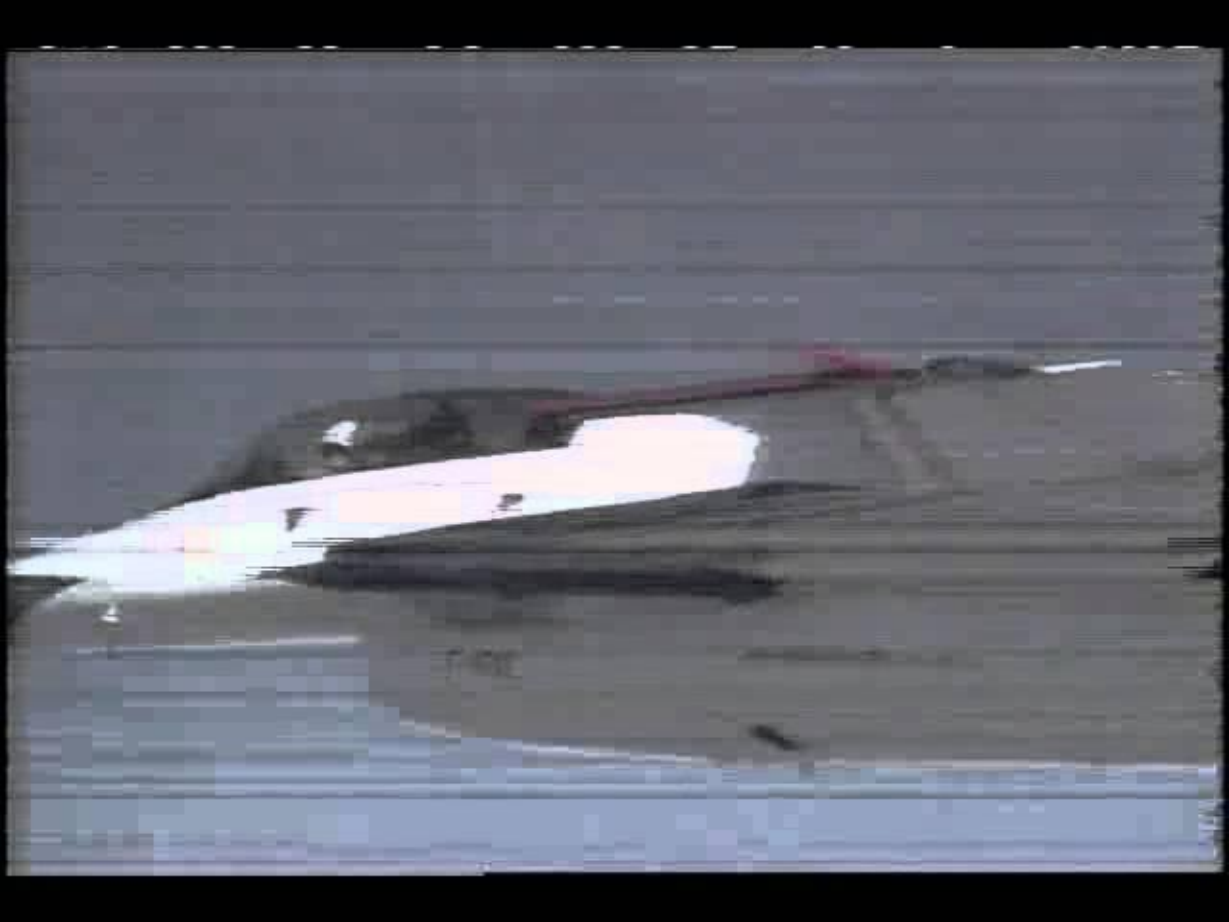

1
00:00:06,470 --> 00:00:04,630
a research excitation flight system was

2
00:00:08,070 --> 00:00:06,480
recently flight tested at nasa's dryden

3
00:00:10,709 --> 00:00:08,080
flight research facility

4
00:00:12,789 --> 00:00:10,719
a nasa f-16xl aircraft served as a test

5
00:00:14,709 --> 00:00:12,799
bed

6
00:00:16,230 --> 00:00:14,719
this exciter is unique because it is a

7
00:00:17,910 --> 00:00:16,240
self-contained lightweight

8
00:00:20,070 --> 00:00:17,920
excitation system which can easily be

9
00:00:21,510 --> 00:00:20,080
strapped onto a variety of aircraft

10
00:00:23,109 --> 00:00:21,520
it is intended to be used in flight

11
00:00:23,670 --> 00:00:23,119
flutter testing to help improve data

12
00:00:28,870 --> 00:00:23,680
quality

13
00:00:32,229 --> 00:00:30,630

the system consists of a fixed vein with

14
00:00:33,190 --> 00:00:32,239
a rotating slotted cylinder at the

15
00:00:34,790 --> 00:00:33,200
trailing edge

16
00:00:36,549 --> 00:00:34,800
the slotted cylinder rotates and the

17
00:00:37,590 --> 00:00:36,559
flow is ultimately deflected upward and

18
00:00:39,270 --> 00:00:37,600
downward

19
00:00:40,869 --> 00:00:39,280
this results in a periodic lift force

20
00:00:42,830 --> 00:00:40,879
which is imparted to the aircraft at

21
00:00:46,950 --> 00:00:42,840
twice the cylinder's rotational

22
00:00:50,310 --> 00:00:48,389
the exciter vane is controlled by the

23
00:00:52,229 --> 00:00:50,320
pilot in the backseat of the f-16xl

24
00:00:54,869 --> 00:00:52,239
aircraft who sets the parameters for the

25
00:00:58,069 --> 00:00:56,389
data is telemetered to the spectral

26
00:00:59,270 --> 00:00:58,079
analysis facility where it is monitored

27
00:01:00,709 --> 00:00:59,280
in real time

28
00:01:02,470 --> 00:01:00,719
here response from the wing tips are

29
00:01:03,029 --> 00:01:02,480
monitored to find frequency and damping

30
00:01:04,789 --> 00:01:03,039
trends

31
00:01:06,390 --> 00:01:04,799
as functions of mach number and dynamic

32
00:01:07,910 --> 00:01:06,400
pressure

33
00:01:10,149 --> 00:01:07,920
the wing can be seen responding to the

34
00:01:13,750 --> 00:01:10,159
exciter veins input sweeping from 5 to

35
00:01:15,670 --> 00:01:13,760
35 hertz

36
00:01:23,350 --> 00:01:15,680
data is analyzed in the computer showing

37
00:01:28,149 --> 00:01:25,670
test points were taken between mach 0.6

38
00:01:29,030 --> 00:01:28,159

and mach 1.7 at an altitude of 30 000

39
00:01:30,390 --> 00:01:29,040
feet

40
00:01:32,550 --> 00:01:30,400
the variables in the different frequency

41
00:01:34,310 --> 00:01:32,560
sweeps were linear or logarithmic sweeps

42
00:01:38,830 --> 00:01:34,320
brain time length varying force

43
00:01:38,840 --> 00:01:42,469
frequency

44
00:01:45,910 --> 00:01:43,990
this exciter system has shown it can

45
00:01:47,109 --> 00:01:45,920
provide high quality data and improve

46
00:01:48,550 --> 00:01:47,119
flight test efficiency

47
00:01:50,950 --> 00:01:48,560
with minimal interface to aircraft

48
00:01:52,950 --> 00:01:50,960
systems future testing will continue to

49
00:01:55,350 --> 00:01:52,960
provide insight into using this system

50
00:02:06,830 --> 00:01:55,360
as a safer more effective flight flutter