



Chevron
Aeronautics

5
YEARS
NASA

1
00:00:06,070 --> 00:00:03,590
the nation's airports are busier than

2
00:00:09,030 --> 00:00:06,080
ever with thousands of planes taking off

3
00:00:10,950 --> 00:00:09,040
and landing daily passengers and people

4
00:00:13,350 --> 00:00:10,960
living around airports are often

5
00:00:15,030 --> 00:00:13,360
reminded that air transport is not

6
00:00:17,830 --> 00:00:15,040
always the quietest mode of

7
00:00:20,710 --> 00:00:17,840
transportation nasa continues working

8
00:00:23,269 --> 00:00:20,720
with partners in industry and academia

9
00:00:26,390 --> 00:00:23,279
to help alleviate the problem of noisy

10
00:00:31,429 --> 00:00:28,710
flow protruding in

11
00:00:33,350 --> 00:00:31,439
aeronautics researcher james bridges of

12
00:00:35,990 --> 00:00:33,360
nasa's glenn research center in

13
00:00:37,590 --> 00:00:36,000

cleveland discusses chevron engine

14

00:00:40,310 --> 00:00:37,600

nozzle technology

15

00:00:43,270 --> 00:00:40,320

a nasa innovation to help airplanes fly

16

00:00:45,190 --> 00:00:43,280

quieter very good at reducing noise the

17

00:00:46,790 --> 00:00:45,200

chevrons are the sawtooth pattern that

18

00:00:47,750 --> 00:00:46,800

you can see me if i hold at this angle a

19

00:00:49,430 --> 00:00:47,760

little bit better you can see the

20

00:00:51,029 --> 00:00:49,440

sawtooth pattern that's what is called

21

00:00:53,750 --> 00:00:51,039

the chevron

22

00:00:57,670 --> 00:00:53,760

and that is a change from just a regular

23

00:01:01,349 --> 00:00:57,680

smooth round lip that most nozzles have

24

00:01:03,750 --> 00:01:01,359

that change modifies how the flow

25

00:01:05,270 --> 00:01:03,760

downstream of the engine makes noise

26
00:01:06,789 --> 00:01:05,280
makes it so that it doesn't make as much

27
00:01:09,109 --> 00:01:06,799
noise which is obviously what we will

28
00:01:11,429 --> 00:01:09,119
want the aircraft to be quieter these

29
00:01:13,109 --> 00:01:11,439
are being used in the aircraft that are

30
00:01:14,310 --> 00:01:13,119
being turned off the production line

31
00:01:15,590 --> 00:01:14,320
today are the ones that will soon be

32
00:01:17,429 --> 00:01:15,600
coming out production lines they've been

33
00:01:19,350 --> 00:01:17,439
in in the initial flight test the

34
00:01:21,830 --> 00:01:19,360
development of chevrons is the one a

35
00:01:24,630 --> 00:01:21,840
good example of the kind of work it

36
00:01:27,670 --> 00:01:24,640
requires in this country and

37
00:01:29,910 --> 00:01:27,680
to bring ideas from fundamental research

38
00:01:32,149 --> 00:01:29,920

all the way to a product there was

39

00:01:35,030 --> 00:01:32,159

people working in academia with nasa

40

00:01:36,710 --> 00:01:35,040

sponsorship for 20 30 years people doing

41

00:01:38,390 --> 00:01:36,720

a lot of work it very it's sometimes

42

00:01:40,390 --> 00:01:38,400

hard to recognize that this is going to

43

00:01:42,469 --> 00:01:40,400

ever turn into something really useful

44

00:01:43,670 --> 00:01:42,479

but it's it's in a scientific pursuit

45

00:01:45,429 --> 00:01:43,680

and then when you pull a lot of

46

00:01:47,270 --> 00:01:45,439

different ideas together but with

47

00:01:49,190 --> 00:01:47,280

engineers who have problems to solve

48

00:01:51,510 --> 00:01:49,200

then you start making progress on on the

49

00:01:54,230 --> 00:01:51,520

real problems right now we have several

50

00:01:57,429 --> 00:01:54,240

aeronautics programs that are working on

51
00:02:00,469 --> 00:01:57,439
reducing noise as part of our whole

52
00:02:02,870 --> 00:02:00,479
green aviation initiative some of them

53
00:02:05,190 --> 00:02:02,880
are worried about propulsion noise the

54
00:02:06,630 --> 00:02:05,200
noise that the fan makes and some of

55
00:02:08,150 --> 00:02:06,640
them are worried about the airframe

56
00:02:09,589 --> 00:02:08,160
noise the noise of the landing gear and

57
00:02:11,350 --> 00:02:09,599
flaps and slats and everything else

58
00:02:13,670 --> 00:02:11,360
makes that make the aircraft so noisy on

59
00:02:15,430 --> 00:02:13,680
approach there's a lot of fundamental

60
00:02:17,270 --> 00:02:15,440
science that still needs to be done to

61
00:02:19,990 --> 00:02:17,280
understand that to understand ways to

62
00:02:21,750 --> 00:02:20,000
reduce that so things like the serrated

63
00:02:24,070 --> 00:02:21,760

edges these chevrons on these nozzles

64

00:02:26,710 --> 00:02:24,080

here when applied to helicopter blades

65

00:02:29,270 --> 00:02:26,720

can potentially also be a reduction for

66

00:02:31,110 --> 00:02:29,280

helicopter blade noise and that is the

67

00:02:33,350 --> 00:02:31,120

that is at a very fundamental level

68

00:02:35,430 --> 00:02:33,360

understanding how that all works is what

69

00:02:37,670 --> 00:02:35,440

nasa is all about

70

00:02:39,670 --> 00:02:37,680

this nozzle we have some tabs which hang

71

00:02:41,350 --> 00:02:39,680

out some which are neutral some which

72

00:02:43,270 --> 00:02:41,360

protrude in

73

00:02:44,790 --> 00:02:43,280

and here we had a

74

00:02:46,949 --> 00:02:44,800

one lobe which was

75

00:02:48,470 --> 00:02:46,959

outwards compared to the way the norm a

76
00:02:51,030 --> 00:02:48,480
normal nozzle would look and then some

77
00:02:53,190 --> 00:02:51,040
which then protruded inwards we have all

78
00:02:55,110 --> 00:02:53,200
the all of these chevrons are the same

79
00:03:07,750 --> 00:02:55,120
amount of in and out they have just a

80
00:03:13,190 --> 00:03:11,270
the chevron which gives you the

81
00:03:14,550 --> 00:03:13,200
variation in the edge

82
00:03:16,710 --> 00:03:14,560
problem is that the air coming out the

83
00:03:18,710 --> 00:03:16,720
back of the engine makes a lot of noise

84
00:03:19,830 --> 00:03:18,720
as the turbulent

85
00:03:22,550 --> 00:03:19,840
produces

86
00:03:25,430 --> 00:03:22,560
these changes to the nozzle

87
00:03:27,110 --> 00:03:25,440
change the noi change the turbulence of

88
00:03:29,030 --> 00:03:27,120

the flow it comes out the back of the