
NASA

1
00:00:15,829 --> 00:00:13,910
since its introduction three decades ago

2
00:00:19,510 --> 00:00:15,839
the helicopter has been a valuable

3
00:00:23,349 --> 00:00:21,670
more recently the tilt rotor aircraft

4
00:00:26,230 --> 00:00:23,359
has demonstrated it can do almost

5
00:00:28,790 --> 00:00:26,240
everything the helicopter does and more

6
00:00:32,229 --> 00:00:28,800
including flying like a fixed-wing plane

7
00:00:36,310 --> 00:00:34,229
as our airports and air space become

8
00:00:38,709 --> 00:00:36,320
more congested and the demand for

9
00:00:41,510 --> 00:00:38,719
short-range commuter flights grows the

10
00:00:43,990 --> 00:00:41,520
appeal of rotorcraft is becoming greater

11
00:00:46,310 --> 00:00:44,000
but current systems are too noisy burn

12
00:00:47,270 --> 00:00:46,320
too much fuel and require expensive

13
00:00:49,590 --> 00:00:47,280

maintenance

14
00:00:51,350 --> 00:00:49,600
it is problems like these which nasa's

15
00:00:53,830 --> 00:00:51,360
ames research center in mountain view

16
00:00:56,150 --> 00:00:53,840
california is studying

17
00:00:58,790 --> 00:00:56,160
here engineers use wind tunnels to carry

18
00:01:00,470 --> 00:00:58,800
out aerodynamic tests similar to those

19
00:01:01,910 --> 00:01:00,480
done on conventional planes and

20
00:01:03,830 --> 00:01:01,920
automobiles

21
00:01:05,590 --> 00:01:03,840
a rotor blade section is mounted in

22
00:01:09,510 --> 00:01:05,600
front of a sophisticated instrument

23
00:01:12,390 --> 00:01:09,520
called a laser velocimeter or lv

24
00:01:14,630 --> 00:01:12,400
once setup is complete air along with a

25
00:01:15,750 --> 00:01:14,640
fine oil mist is blown through the

26
00:01:18,070 --> 00:01:15,760
tunnel

27
00:01:19,270 --> 00:01:18,080
tiny oil particles reflect light back

28
00:01:21,350 --> 00:01:19,280
into the air

29
00:01:23,670 --> 00:01:21,360
allowing researchers to determine how

30
00:01:26,710 --> 00:01:23,680
fast air flows around any area of the

31
00:01:28,630 --> 00:01:26,720
blade being tested

32
00:01:31,429 --> 00:01:28,640
related work is underway at the ames

33
00:01:33,590 --> 00:01:31,439
outdoor aerodynamic research facility

34
00:01:35,910 --> 00:01:33,600
in this particular study engineers are

35
00:01:37,749 --> 00:01:35,920
investigating how certain aerodynamic

36
00:01:40,630 --> 00:01:37,759
characteristics of rotor systems

37
00:01:42,069 --> 00:01:40,640
influence overall performance according

38
00:01:44,950 --> 00:01:42,079

to the chief of the rotary wing

39
00:01:46,950 --> 00:01:44,960
aeromechanics branch at ames ten percent

40
00:01:49,749 --> 00:01:46,960
of a rotor system's total energy is

41
00:01:51,990 --> 00:01:49,759
wasted because downward forces generated

42
00:01:54,550 --> 00:01:52,000
by the spinning blades push other parts

43
00:01:55,670 --> 00:01:54,560
of the aircraft towards the ground bill

44
00:01:57,270 --> 00:01:55,680
warnbrook

45
00:01:59,030 --> 00:01:57,280
consequently the rotor system has to

46
00:01:59,990 --> 00:01:59,040
work 10

47
00:02:02,709 --> 00:02:00,000
harder

48
00:02:04,389 --> 00:02:02,719
to develop an equivalent amount of lift

49
00:02:07,510 --> 00:02:04,399
say to lift

50
00:02:09,589 --> 00:02:07,520
a crew and useful cargo complementing

51
00:02:12,229 --> 00:02:09,599
these experimental studies are computer

52
00:02:14,470 --> 00:02:12,239
simulations when a blade rotates it is

53
00:02:16,790 --> 00:02:14,480
constantly colliding with tornado-like

54
00:02:19,430 --> 00:02:16,800
pockets of turbulence created by other

55
00:02:21,589 --> 00:02:19,440
blades in front of it the result is less

56
00:02:24,390 --> 00:02:21,599
efficiency and greater noise

57
00:02:25,990 --> 00:02:24,400
simulations like these cut costs by

58
00:02:28,550 --> 00:02:26,000
allowing researchers to study

59
00:02:31,670 --> 00:02:28,560
aerodynamic problems before building the

60
00:02:36,470 --> 00:02:34,470
nasa's rotorcraft research an approach