1
00:00:39,910 --> 00:00:38,069
the first ae in nasa stands for

2
00:00:41,990 --> 00:00:39,920
aeronautics and a commitment to

3
00:00:44,790 --> 00:00:42,000
developing the world's most advanced

4
00:00:47,510 --> 00:00:44,800
efficient aircraft

5
00:00:50,310 --> 00:00:47,520
key to the success of this effort today

6
00:00:52,470 --> 00:00:50,320
is computer modeling the ability to

7
00:00:55,910 --> 00:00:52,480
evaluate a number of factors before

8
00:00:58,470 --> 00:00:55,920
committing to a particular configuration

9
00:01:00,229 --> 00:00:58,480
recently engineers at nasa's lewis

10
00:01:02,470 --> 00:01:00,239
research center have been using these

11
00:01:05,509 --> 00:01:02,480
same modeling techniques to improve the

12
00:01:06,950 --> 00:01:05,519
design and durability of artificial

13
00:01:09,109 --> 00:01:06,960

joints

14
00:01:11,030 --> 00:01:09,119
joint replacement surgery is performed

15
00:01:13,590 --> 00:01:11,040
almost every day at places like the

16
00:01:15,910 --> 00:01:13,600
university hospitals of cleveland

17
00:01:18,789 --> 00:01:15,920
here orthopedic surgeon dr bernard

18
00:01:19,749 --> 00:01:18,799
stolberg holds a widely used artificial

19
00:01:21,910 --> 00:01:19,759
knee

20
00:01:24,230 --> 00:01:21,920
the problem is that implants like these

21
00:01:27,510 --> 00:01:24,240
currently have to be replaced every 10

22
00:01:29,270 --> 00:01:27,520
to 15 years these parts can come loose

23
00:01:31,030 --> 00:01:29,280
they can wear

24
00:01:34,310 --> 00:01:31,040
and there's a very intimate relationship

25
00:01:37,109 --> 00:01:34,320
between the implant and the bone that

26
00:01:39,270 --> 00:01:37,119
is just beginning to be explored

27
00:01:41,670 --> 00:01:39,280
nasa researchers are using their

28
00:01:43,830 --> 00:01:41,680
computer codes to come up with a design

29
00:01:46,230 --> 00:01:43,840
that will stay securely in the bone for

30
00:01:48,149 --> 00:01:46,240
a longer period of time

31
00:01:50,550 --> 00:01:48,159
these techniques also make it possible

32
00:01:53,030 --> 00:01:50,560
to custom design artificial joints

33
00:01:55,270 --> 00:01:53,040
according to aerospace engineer dale

34
00:01:57,270 --> 00:01:55,280
hopkins rather than fitting the patient

35
00:01:58,469 --> 00:01:57,280
to the implant the implant is fitted to

36
00:02:00,950 --> 00:01:58,479
the patient

37
00:02:02,310 --> 00:02:00,960
another medical development involves

38
00:02:04,310 --> 00:02:02,320

ultrasound

39
00:02:06,389 --> 00:02:04,320
originally used to detect structural

40
00:02:09,430 --> 00:02:06,399
flaws in aircraft at nasa's langley

41
00:02:11,910 --> 00:02:09,440
research center this technology is now

42
00:02:13,190 --> 00:02:11,920
enhancing the treatment of fire related

43
00:02:15,910 --> 00:02:13,200
injuries

44
00:02:18,550 --> 00:02:15,920
each year 2 million americans suffer

45
00:02:20,309 --> 00:02:18,560
serious burns 200 000 need

46
00:02:22,470 --> 00:02:20,319
hospitalization

47
00:02:24,869 --> 00:02:22,480
assessing whether a burn is second or

48
00:02:27,270 --> 00:02:24,879
third degree is crucial in determining

49
00:02:29,190 --> 00:02:27,280
proper treatment according to dr anthony

50
00:02:30,390 --> 00:02:29,200
marmaru at the medical college of

51
00:02:32,869 --> 00:02:30,400
virginia

52
00:02:35,270 --> 00:02:32,879
the faster we can make that assessment

53
00:02:37,270 --> 00:02:35,280
the easier it is going to be in terms of

54
00:02:39,910 --> 00:02:37,280
the healing process

55
00:02:42,949 --> 00:02:39,920
ultrasound used in nasa aeronautics

56
00:02:45,910 --> 00:02:42,959
research has been modified to make rapid

57
00:02:47,990 --> 00:02:45,920
accurate assessments of burn thickness

58
00:02:50,390 --> 00:02:48,000
this procedure enables doctors to

59
00:02:52,790 --> 00:02:50,400
distinguish between a second-degree burn

60
00:02:55,830 --> 00:02:52,800
that can heal naturally and the third

61
00:02:57,910 --> 00:02:55,840
degree requiring surgical skin grafting

62
00:03:00,630 --> 00:02:57,920
so again front surface

63
00:03:02,949 --> 00:03:00,640

and a very diffuse back surface and

64
00:03:06,309 --> 00:03:02,959
that's what we see when we have a very

65
00:03:08,790 --> 00:03:06,319
deep burn once left a time in a doctor's

66
00:03:11,750 --> 00:03:08,800
eye and experience burn assessment can

67
00:03:13,750 --> 00:03:11,760
now be highly accurate and instantaneous

68
00:03:16,470 --> 00:03:13,760
comparing this ultrasound technique with

69
00:03:18,710 --> 00:03:16,480
other medical procedures langley's dr

70
00:03:22,390 --> 00:03:18,720
john cantrell we have been

71
00:03:24,949 --> 00:03:22,400
exactly on the money 100 of the time

72
00:03:27,509 --> 00:03:24,959
improving the assessment of burns and

73
00:03:30,550 --> 00:03:27,519
the design of artificial joints