1
00:00:17,409 --> 00:00:14,440
medli is a set of instrumentation that

2
00:00:20,380 --> 00:00:17,419
we're installing on the Mars Science

3
00:00:24,519 --> 00:00:20,390
Laboratory spacecraft so we went to take

4
00:00:25,359 --> 00:00:24,529
data during the entry MSL through the

5
00:00:28,960 --> 00:00:25,369
Martian atmosphere

6
00:00:31,479 --> 00:00:28,970
medli data is really going to provide an

7
00:00:34,540 --> 00:00:31,489
order magnitude more information than

8
00:00:37,090 --> 00:00:34,550
engineers have had in the past we've

9
00:00:39,280 --> 00:00:37,100
never instrumented a Mars entry vehicle

10
00:00:41,650 --> 00:00:39,290
to this extent we make a lot of

11
00:00:45,280 --> 00:00:41,660
assumptions and our simulations and our

12
00:00:49,030 --> 00:00:45,290
vehicle models for instance since MSL is

13
00:00:50,980 --> 00:00:49,040

so big we expect the flow on the front

14
00:00:54,460 --> 00:00:50,990
of the vehicle during entry to

15
00:00:57,040 --> 00:00:54,470
transition to a turbulent state which

16
00:01:00,040 --> 00:00:57,050
will raise the heating on the front of

17
00:01:03,130 --> 00:01:00,050
the vehicle we're not sure where on the

18
00:01:06,069 --> 00:01:03,140
vehicle or when that will happen we're

19
00:01:07,899 --> 00:01:06,079
also not sure how the vehicle is

20
00:01:12,340 --> 00:01:07,909
aerodynamic characteristics will change

21
00:01:14,919 --> 00:01:12,350
as the TPS material burns away so these

22
00:01:18,039 --> 00:01:14,929
are all things that we can use our data

23
00:01:22,149 --> 00:01:18,049
for to improve our knowledge for the

24
00:01:25,660 --> 00:01:22,159
next Lander we also have a temperature

25
00:01:29,169 --> 00:01:25,670
subsystem and that was developed at the

26
00:01:31,840 --> 00:01:29,179
Ames Research Center and it's actually a

27
00:01:34,359 --> 00:01:31,850
plug of thermal protection system

28
00:01:37,059 --> 00:01:34,369
material that has contained in it for

29
00:01:40,029 --> 00:01:37,069
thermocouples at different depths in the

30
00:01:43,029 --> 00:01:40,039
heat shield and also a recession sensor

31
00:01:46,149 --> 00:01:43,039
that sticks up to the surface and will

32
00:01:48,940 --> 00:01:46,159
tell us how much the heat shield will

33
00:01:53,429 --> 00:01:48,950
burn away as it flies through the

34
00:01:58,120 --> 00:01:53,439
atmosphere this is an actual piece of

35
00:01:59,919 --> 00:01:58,130
simulated MSL aeroshell structure the

36
00:02:02,019 --> 00:01:59,929
thermal protection system would be down

37
00:02:05,139 --> 00:02:02,029
here as the vehicle enters the

38
00:02:08,320 --> 00:02:05,149

atmosphere and here is our pressure

39
00:02:10,759 --> 00:02:08,330
transducer connected via stainless steel

40
00:02:13,849 --> 00:02:10,769
tube through the structure and then

41
00:02:16,039 --> 00:02:13,859
that would extend through the thermal

42
00:02:18,830 --> 00:02:16,049
protection system where we would sense

43
00:02:21,949 --> 00:02:18,840
the pressure the Mars Science Laboratory

44
00:02:24,860 --> 00:02:21,959
has a heat shield that is the biggest

45
00:02:27,229 --> 00:02:24,870
one ever flown to Mars and it's about

46
00:02:30,410 --> 00:02:27,239
four and a half meters or about fifteen

47
00:02:33,500 --> 00:02:30,420
feet in diameter and across the vehicle

48
00:02:36,259 --> 00:02:33,510
we have seven pressure transducers and

49
00:02:39,819 --> 00:02:36,269
we also have seven thermal plugs and

50
00:02:43,399 --> 00:02:39,829
those were located very carefully by our

51
00:02:46,759 --> 00:02:43,409
scientist and principal investigators to

52
00:02:50,360 --> 00:02:46,769
look at some specific things for the

53
00:02:54,470 --> 00:02:50,370
pressure system the transducers are

54
00:02:56,420 --> 00:02:54,480
located in a cross configuration down

55
00:02:59,720 --> 00:02:56,430
the centerline of the vehicle and that

56
00:03:01,610 --> 00:02:59,730
allows us to then look at the different

57
00:03:03,860 --> 00:03:01,620
measurements and determine what the

58
00:03:06,500 --> 00:03:03,870
attitude of the vehicle was the angle of

59
00:03:09,379 --> 00:03:06,510
attack and also the angle of sideslip

60
00:03:11,899 --> 00:03:09,389
and this gives us an independent measure

61
00:03:14,629 --> 00:03:11,909
from the inertial measurement unit

62
00:03:17,089 --> 00:03:14,639
that's on the spacecraft for the thermal

63
00:03:21,110 --> 00:03:17,099

plugs the seven thermal plug located

64
00:03:23,539 --> 00:03:21,120
those in areas where we expected the

65
00:03:26,210 --> 00:03:23,549
flow to transition from laminar to

66
00:03:29,240 --> 00:03:26,220
turbulent so that we can predict where

67
00:03:31,009 --> 00:03:29,250
and when that transition would occur and

68
00:03:32,599 --> 00:03:31,019
where the heating might increase on the

69
00:03:34,399 --> 00:03:32,609
vehicle we're looking for additional

70
00:03:36,649 --> 00:03:34,409
information how the vehicle performs

71
00:03:39,199 --> 00:03:36,659
that we can use to apply to the design

72
00:03:40,849 --> 00:03:39,209
of the next generation of vehicles and

73
00:03:43,039 --> 00:03:40,859
maybe will help define what the

74
00:03:46,219 --> 00:03:43,049
technology should be as well as

75
00:03:48,710 --> 00:03:46,229
understand where the design assumptions

76
00:03:51,289 --> 00:03:48,720
that we've made for MSL are conservative

77
00:03:53,199 --> 00:03:51,299
or not conservative enough so it'll

78
00:03:56,210 --> 00:03:53,209
allow us to make designs that can land