1
00:00:04,070 --> 00:00:01,750
hello jeff williams onboard the

2
00:00:06,389 --> 00:00:04,080
international space station i'd like to

3
00:00:10,070 --> 00:00:06,399
uh to address a couple of your questions

4
00:00:11,190 --> 00:00:10,080
here here's a question from miami

5
00:00:13,990 --> 00:00:11,200
from ernie

6
00:00:14,950 --> 00:00:14,000
he writes when how and why the iss

7
00:00:16,550 --> 00:00:14,960
pivots

8
00:00:18,950 --> 00:00:16,560
its orbit when the

9
00:00:22,310 --> 00:00:18,960
space shuttle is visiting the iss in

10
00:00:24,630 --> 00:00:22,320
other words uh why do the columbus and

11
00:00:26,710 --> 00:00:24,640
the japanese kibo modules

12
00:00:28,470 --> 00:00:26,720
are on there on the leading edge of the

13
00:00:30,310 --> 00:00:28,480

space station as it orbits during normal

14
00:00:32,470 --> 00:00:30,320
operations versus being in the trailing

15
00:00:34,150 --> 00:00:32,480
edge with the russian modules leading

16
00:00:36,630 --> 00:00:34,160
the station when the shuttle visits the

17
00:00:38,549 --> 00:00:36,640
station well the shuttle docks to the

18
00:00:40,069 --> 00:00:38,559
space station at the very forward end of

19
00:00:41,990 --> 00:00:40,079
the space station

20
00:00:44,229 --> 00:00:42,000
but because the forward end of the space

21
00:00:46,869 --> 00:00:44,239
station is more vulnerable to debris

22
00:00:48,869 --> 00:00:46,879
hits from micro meteorite

23
00:00:50,549 --> 00:00:48,879
and other debris

24
00:00:52,869 --> 00:00:50,559
that's that's up here in orbit that

25
00:00:55,270 --> 00:00:52,879
might possibly hit the station

26
00:00:57,029 --> 00:00:55,280
we after the docking takes place after

27
00:01:00,310 --> 00:00:57,039
the space shuttle is docked to the space

28
00:01:03,670 --> 00:01:00,320
station we actually rotate the space

29
00:01:05,509 --> 00:01:03,680
station shuttle stack around 180 degrees

30
00:01:07,830 --> 00:01:05,519
so that the space shuttle is at the back

31
00:01:09,350 --> 00:01:07,840
end and the russian segment or the back

32
00:01:10,870 --> 00:01:09,360
end of the space station is actually

33
00:01:13,350 --> 00:01:10,880
leading

34
00:01:16,230 --> 00:01:13,360
the in the velocity vector uh so that's

35
00:01:18,550 --> 00:01:16,240
to to add a little bit of protection for

36
00:01:21,190 --> 00:01:18,560
the space shuttle uh to protect its

37
00:01:29,030 --> 00:01:21,200
thermal control system uh for the return

38
00:01:32,870 --> 00:01:30,710

here are a couple of questions about the

39
00:01:35,270 --> 00:01:32,880
butterflies we had on board as as you

40
00:01:37,190 --> 00:01:35,280
know we had

41
00:01:40,950 --> 00:01:37,200
eggs that were brought up that hatched

42
00:01:42,870 --> 00:01:40,960
into uh caterpillars the caterpillars uh

43
00:01:44,550 --> 00:01:42,880
made their chrysalises

44
00:01:45,910 --> 00:01:44,560
and after they

45
00:01:47,990 --> 00:01:45,920
spent their time in the chrysalis they

46
00:01:49,510 --> 00:01:48,000
popped out and they were butterflies and

47
00:01:51,830 --> 00:01:49,520
we had them on board

48
00:01:53,350 --> 00:01:51,840
for a while uh the first question is do

49
00:01:55,749 --> 00:01:53,360
you think it was a good idea to bring

50
00:01:58,709 --> 00:01:55,759
monarchs to space and this comes from a

51
00:02:02,149 --> 00:01:58,719
fifth grader in indianapolis

52
00:02:04,389 --> 00:02:02,159
and of course uh i think it was a good

53
00:02:06,310 --> 00:02:04,399
idea to bring monarchs to space it's a

54
00:02:09,510 --> 00:02:06,320
good idea to bring lots of things

55
00:02:12,869 --> 00:02:09,520
to space to study them to understand

56
00:02:14,550 --> 00:02:12,879
why they work how they work

57
00:02:19,589 --> 00:02:14,560
to

58
00:02:22,309 --> 00:02:19,599
this case of life

59
00:02:24,390 --> 00:02:22,319
and how gravity impacts it and whatnot

60
00:02:25,990 --> 00:02:24,400
so that we can apply that to uh to other

61
00:02:27,910 --> 00:02:26,000
things whether it be

62
00:02:30,070 --> 00:02:27,920
astronauts going for a long-duration

63
00:02:33,589 --> 00:02:30,080

flight out to another planet or to the

64
00:02:36,550 --> 00:02:33,599
moon to mars etc or perhaps there'll be

65
00:02:38,150 --> 00:02:36,560
some indirect benefit from these kinds

66
00:02:40,630 --> 00:02:38,160
of studies

67
00:02:42,630 --> 00:02:40,640
for life on earth and there has been

68
00:02:44,470 --> 00:02:42,640
much of that in the past so it's

69
00:02:46,470 --> 00:02:44,480
certainly a good idea to study things

70
00:02:48,630 --> 00:02:46,480
now the monarchs were brought on board

71
00:02:50,949 --> 00:02:48,640
primarily as a school project to

72
00:02:53,350 --> 00:02:50,959
increase interest among students

73
00:02:55,350 --> 00:02:53,360
around the world on

74
00:02:57,589 --> 00:02:55,360
science and engineering and space

75
00:02:59,030 --> 00:02:57,599
technology and all of that

76
00:03:00,630 --> 00:02:59,040
because that interest needs to be

77
00:03:01,910 --> 00:03:00,640
fostered

78
00:03:04,070 --> 00:03:01,920
because

79
00:03:05,509 --> 00:03:04,080
the kids that are in school now are

80
00:03:08,470 --> 00:03:05,519
going to be the next generation of

81
00:03:10,149 --> 00:03:08,480
scientists and engineers and technicians

82
00:03:12,869 --> 00:03:10,159
and that will be very important for the

83
00:03:14,229 --> 00:03:12,879
future the people of all over the world

84
00:03:15,270 --> 00:03:14,239
there's a related question that comes

85
00:03:16,550 --> 00:03:15,280
from the same place about the

86
00:03:17,910 --> 00:03:16,560
butterflies

87
00:03:20,550 --> 00:03:17,920
asking if we were going to let the

88
00:03:22,869 --> 00:03:20,560

butterflies fly around the iss well we

89
00:03:24,949 --> 00:03:22,879
wanted to we and the crew

90
00:03:27,030 --> 00:03:24,959
actually but unfortunately we couldn't

91
00:03:28,869 --> 00:03:27,040
do that they stayed in their incubator

92
00:03:30,550 --> 00:03:28,879
in their controlled environment and

93
00:03:32,309 --> 00:03:30,560
lived out their lifetime their normal

94
00:03:33,990 --> 00:03:32,319
lifetime

95
00:03:35,110 --> 00:03:34,000
and died and they'll be returned to

96
00:03:37,430 --> 00:03:35,120
earth

97
00:03:39,190 --> 00:03:37,440
but we observed them

98
00:03:40,949 --> 00:03:39,200
through a video camera that was

99
00:03:43,270 --> 00:03:40,959
installed inside

100
00:03:45,509 --> 00:03:43,280
and watched as they went through their

101
00:03:47,910 --> 00:03:45,519
life cycle unfortunately they they never