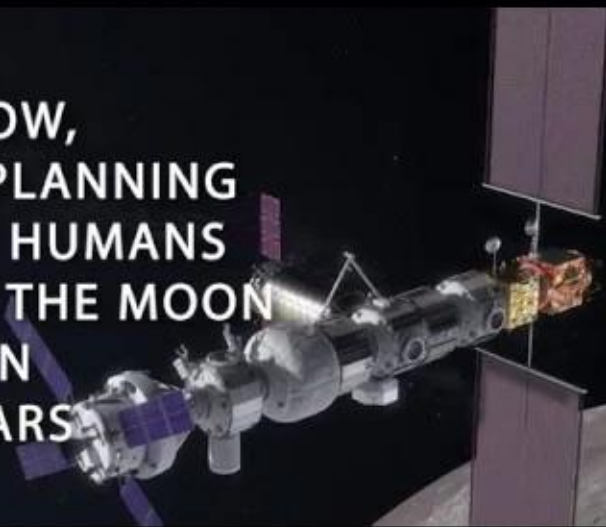


RIGHT NOW,  
WE ARE PLANNING  
TO SEND HUMANS  
FIRST TO THE MOON  
AND THEN  
ONTO MARS



1  
00:00:00,467 --> 00:00:01,234  
>> SO RIGHT NOW, WE ARE

2  
00:00:01,234 --> 00:00:02,802  
PLANNING TO SEND HUMANS

3  
00:00:02,802 --> 00:00:04,404  
FIRST TO THE MOON,

4  
00:00:04,404 --> 00:00:06,072  
AND THEN ON TO MARS.

5  
00:00:06,072 --> 00:00:06,940  
SO THERE'S A BIG DIFFERENCE

6  
00:00:06,940 --> 00:00:08,241  
IN THE KIND OF RADIATION

7  
00:00:08,241 --> 00:00:10,043  
THAT WE ENCOUNTER ON EARTH

8  
00:00:10,043 --> 00:00:10,977  
VERSUS WHAT WE ENCOUNTER

9  
00:00:10,977 --> 00:00:12,145  
IN SPACE.

10  
00:00:12,145 --> 00:00:12,846  
IT'S VERY IMPORTANT

11  
00:00:12,846 --> 00:00:14,814  
THAT WE PREPARE FOR THIS NOW.

12  
00:00:14,814 --> 00:00:16,883  
PROTECTING ASTRONAUTS

13  
00:00:16,883 --> 00:00:18,051

HAS ALWAYS BEEN

14

00:00:18,051 --> 00:00:19,386

NASA'S NUMBER ONE PRIORITY.

15

00:00:20,420 --> 00:00:23,556

[ MUSIC ]

16

00:00:23,556 --> 00:00:25,125

WHAT WE ENCOUNTER ON EARTH

17

00:00:25,125 --> 00:00:27,660

IS RADIATION THAT'S BASICALLY

18

00:00:27,660 --> 00:00:28,828

A FORM OF LIGHT--

19

00:00:28,828 --> 00:00:30,697

HIGH ENERGY LIGHT.

20

00:00:30,697 --> 00:00:32,098

IN SPACE, HOWEVER,

21

00:00:32,098 --> 00:00:33,867

WE HAVE ATOMS--

22

00:00:33,867 --> 00:00:35,168

NOT PARTICLES OF LIGHT,

23

00:00:35,168 --> 00:00:36,336

BUT ATOMS, STRIPPED OF

24

00:00:36,336 --> 00:00:38,071

THEIR ELECTRONS, MOVING AT

25

00:00:38,071 --> 00:00:40,173

FRACTIONS OF THE SPEED OF LIGHT.

26

00:00:40,173 --> 00:00:41,741

>> OUR SUN IS A VERY ACTIVE

27

00:00:41,741 --> 00:00:43,877

BODY, AND WE MONITOR OUR SUN

28

00:00:43,877 --> 00:00:46,546

FOR SOLAR FLARES.

29

00:00:46,546 --> 00:00:47,747

COMPARING WHAT THE GENERAL

30

00:00:47,747 --> 00:00:49,682

POPULATION WOULD RECEIVE FROM

31

00:00:49,682 --> 00:00:51,751

NATURAL BACKGROUND RADIATION,

32

00:00:51,751 --> 00:00:52,952

IF YOU WERE A CREW MEMBER

33

00:00:52,952 --> 00:00:54,421

IN DEEP SPACE, YOU WOULD BE

34

00:00:54,421 --> 00:00:56,890

RECEIVING 50 TO 60 TIMES

35

00:00:56,890 --> 00:00:58,691

WHAT WE RECEIVE DAILY

36

00:00:58,691 --> 00:01:00,093

ON EARTH.

37

00:01:01,961 --> 00:01:03,229

OUR UNIVERSE IS VAST,

38

00:01:03,229 --> 00:01:04,597

AND GALACTIC COSMIC RADIATION

39

00:01:04,597 --> 00:01:05,832  
IS GENERATED OUTSIDE OF

40

00:01:05,832 --> 00:01:07,200  
OUR SOLAR SYSTEM.

41

00:01:07,200 --> 00:01:08,968  
PARTICLES ARE ACCELERATED IN

42

00:01:08,968 --> 00:01:09,903  
FROM ALL DIRECTIONS

43

00:01:09,903 --> 00:01:11,237  
INTO OUR SOLAR SYSTEM THAT

44

00:01:11,237 --> 00:01:12,972  
ARE MOVING VERY, VERY QUICKLY

45

00:01:12,972 --> 00:01:14,574  
UP TO THE SPEED OF LIGHT.

46

00:01:16,509 --> 00:01:17,610  
AT THE NASA SPACE RADIATION

47

00:01:17,610 --> 00:01:18,845  
RESEARCH LAB, WE'RE ABLE

48

00:01:18,845 --> 00:01:20,914  
TO SIMULATE THE PARTICLES

49

00:01:20,914 --> 00:01:21,714  
AND THE COMPONENTS OF

50

00:01:21,714 --> 00:01:24,150  
THE GALACTIC COSMIC RADIATION.

51  
00:01:24,150 --> 00:01:25,585  
THE PARTICLES ARE ACCELERATED

52  
00:01:25,585 --> 00:01:27,086  
TO HIGH ENERGIES.

53  
00:01:27,086 --> 00:01:29,289  
WE STUDY THE BIOLOGICAL EFFECTS.

54  
00:01:29,289 --> 00:01:30,457  
FOR EXAMPLE, THE RADIATION

55  
00:01:30,457 --> 00:01:32,158  
IN SPACE CAN CAUSE

56  
00:01:32,158 --> 00:01:34,027  
COMPLEX DOUBLE STRAND BREAKS

57  
00:01:34,027 --> 00:01:35,762  
TO OUR DNA.

58  
00:01:35,762 --> 00:01:36,996  
PHYSICALLY, WE'RE GOING TO

59  
00:01:36,996 --> 00:01:38,031  
PROTECT OUR CREW MEMBERS

60  
00:01:38,031 --> 00:01:39,232  
WITH SHIELDING.

61  
00:01:39,232 --> 00:01:41,167  
WE HAVE SHELTERS TO PROTECT

62  
00:01:41,167 --> 00:01:42,068  
THE CREW MEMBERS FROM

63  
00:01:42,068 --> 00:01:43,870

SOLAR PARTICLE FLARES,

64

00:01:43,870 --> 00:01:45,672

MEDICAL COUNTERMEASURES,

65

00:01:45,672 --> 00:01:47,574

WHICH CAN INCLUDE DIETARY

66

00:01:47,574 --> 00:01:49,108

COUNTERMEASURES

67

00:01:49,108 --> 00:01:51,544

AND EVEN SLEEP AND EXERCISE

68

00:01:51,544 --> 00:01:53,046

TO HELP MITIGATE THESE EFFECTS.

69

00:01:54,280 --> 00:01:55,014

>> SO THIS IS THE KIND OF

70

00:01:55,014 --> 00:01:56,449

RESEARCH WE NEED TO DO

71

00:01:56,449 --> 00:01:58,485

TO ENSURE THE SAFETY AND HEALTH

72

00:01:58,485 --> 00:02:00,587

AND THE WELL-BEING OF OUR CREWS

73

00:02:00,587 --> 00:02:02,021

AS WE GO TO THE MOON