



1
00:00:00,010 --> 00:00:04,010
[Music] The universe appears

2
00:00:04,030 --> 00:00:08,050
to be infinite, but starting from his tiny

3
00:00:08,070 --> 00:00:12,070
dot in one corner of the Milky Way, man is beginning

4
00:00:12,090 --> 00:00:16,100
his conquest of it. [Music]

5
00:00:16,120 --> 00:00:20,120
[Music]

6
00:00:20,140 --> 00:00:24,140
After his first trial steps, he will one day walk

7
00:00:24,160 --> 00:00:28,170
the Moon. We can marvel at such exploits,

8
00:00:28,190 --> 00:00:32,180
even as we realize the chances are slight that man will venture

9
00:00:32,200 --> 00:00:36,210
personally beyond his own solar system. It is a long

10
00:00:36,230 --> 00:00:40,250
way to the stars.

11
00:00:40,270 --> 00:00:44,290
The sole source of knowledge of objects beyond our solar system

12
00:00:44,310 --> 00:00:48,310
is electromagnetic radiation. But despite the fact that

13
00:00:48,330 --> 00:00:52,340

we receive almost all our knowledge through our eyes, the visible

14

00:00:52,360 --> 00:00:56,350

spectrum is a narrow one. We might see many new

15

00:00:56,370 --> 00:01:00,380

colors if we could see into other wavelengths, and the light

16

00:01:00,400 --> 00:01:04,400

invisible to us can tell us much about the mysteries of space.

17

00:01:04,420 --> 00:01:08,420

Already, this invisible light has led us to a new

18

00:01:08,440 --> 00:01:12,450

understanding of the universe, and provided unsuspected puzzles

19

00:01:12,470 --> 00:01:16,480

for our solution.

20

00:01:16,500 --> 00:01:20,510

The envelope of air which protects life on Earth also

21

00:01:20,530 --> 00:01:24,530

screens out, or absorbs, the starlight in this portion

22

00:01:24,550 --> 00:01:28,550

of the spectrum, and it is these invisible radiations

23

00:01:28,570 --> 00:01:32,570

that could one day tell us how stars are born and die.

24

00:01:32,590 --> 00:01:36,590

And how the universe was created. For Earth-bound astronomers,

25

00:01:36,610 --> 00:01:40,620

the challenge is tantalizing. Yes, it is beyond the air

26

00:01:40,640 --> 00:01:44,660

that we must go if we seek a clearer image of the heavens.

27

00:01:44,680 --> 00:01:48,680

Above distortion that makes the stars twinkle,

28

00:01:48,700 --> 00:01:52,720

above the blotter of air that absorbs the ultraviolet,

29

00:01:52,740 --> 00:01:56,740

the X-rays, the gamma rays, on which

30

00:01:56,760 --> 00:02:00,480

much of the study of starlight depends.

31

00:02:00,480 --> 00:02:04,800

We need a solid platform, hundreds of miles out in space,

32

00:02:04,820 --> 00:02:08,820

from which to make our studies. Not a rocket, not a balloon,

33

00:02:08,840 --> 00:02:12,840

but an orbiting astronomical observatory, and that is what has

34

00:02:12,860 --> 00:02:16,660

been developed by scientists at the Goddard Space Flight Center,

35

00:02:16,660 --> 00:02:20,900

where Dr. James Kupperian headed a group of distinguished astronomers.

36

00:02:20,930 --> 00:02:24,930

[Music]

37

00:02:24,950 --> 00:02:28,950

To know the stars, we must capture starlight,

38

00:02:28,970 --> 00:02:32,980

light that is cut off forever from human eyes on Earth. For this,

39

00:02:33,000 --> 00:02:37,010

we need special telescopes. [Dr. Kupperian]: With the Goddard telescope in space,

40

00:02:37,030 --> 00:02:41,060

we can sample radiations emitted from within our own

41

00:02:41,080 --> 00:02:45,080

galaxy and compare them to emissions from

42

00:02:45,100 --> 00:02:49,100

galaxies tens of millions of light-years distant. It's an exciting

43

00:02:49,120 --> 00:02:53,120

prospect. With the OAO man will go a long way

44

00:02:53,140 --> 00:02:57,140

toward solving the mystery of the creation of matter.

45

00:02:57,160 --> 00:03:01,160

[Narrator]: Through our new window on the universe, we shall search

46

00:03:01,180 --> 00:03:05,170

the stars in many ways. An early project will be the mapping

47

00:03:05,190 --> 00:03:09,200

of the entire sky by ultraviolet light. In charge

48

00:03:09,220 --> 00:03:13,220

of making this unique celestial map is Dr. Fred Whipple.

49

00:03:13,240 --> 00:03:17,260

[Dr. Whipple]: The new map of the universe, which will be very different

50

00:03:17,280 --> 00:03:21,280

from these maps, will be made by a telescope.

51
00:03:21,300 --> 00:03:25,310
With four such ground-controlled

52
00:03:25,330 --> 00:03:29,330
telescopic cameras, we intend to make an all-sky

53
00:03:29,350 --> 00:03:33,360
map in four separate ultraviolet colors.

54
00:03:33,380 --> 00:03:37,370
In addition, we plan to catalog more than

55
00:03:37,390 --> 00:03:41,410
30,000 very hot stars

56
00:03:41,430 --> 00:03:45,440
much brighter than the Sun, many times more

57
00:03:45,460 --> 00:03:49,470
than astronomers have previously recorded in

58
00:03:49,490 --> 00:03:53,490
the ultraviolet. [Narrator]: This

59
00:03:53,510 --> 00:03:57,510
satellite, the OAO, is the biggest and most complex

60
00:03:57,530 --> 00:04:01,530
unmanned satellite in the NASA program. Built by the Grumman

61
00:04:01,550 --> 00:04:05,570
Aircraft Corporation, it basically a shell, into which

62
00:04:05,590 --> 00:04:09,600
various kinds of telescopes can be mounted. When it has been placed in an

63
00:04:09,620 --> 00:04:13,620

orbit 500 miles beyond the Earth, this space observatory will

64
00:04:13,640 --> 00:04:17,660
give us eyes to see into regions until now invisible

65
00:04:17,680 --> 00:04:21,690
to man. [Music]

66
00:04:33,770 --> 00:04:25,740
[Music]

67
00:04:41,820 --> 00:04:37,790
[Rocket launch sound]

68
00:04:41,840 --> 00:04:45,850
Launched by a Centaur rocket, the OAO sheds its protective fairings

69
00:04:45,870 --> 00:04:49,880
in space. [Music]

70
00:04:49,900 --> 00:04:53,900
The OAO powers itself

71
00:04:53,920 --> 00:04:57,910
through solar panels, storing electrical energy derived from

72
00:04:57,930 --> 00:05:01,920
sunlight. Once in orbit, it relies on

73
00:05:01,940 --> 00:05:05,950
solar sensors and star trackers to stabilize itself.

74
00:05:05,970 --> 00:05:09,970
Then, it opens its eyes to look through a new window in the

75
00:05:09,990 --> 00:05:14,010
universe. With each succeeding year, a new OAO

76

00:05:14,030 --> 00:05:18,020

will be orbited. The first one in space carries telescope packages

77

00:05:18,040 --> 00:05:22,040

in both ends. [Music]

78

00:05:22,060 --> 00:05:26,080

From a ground control station, men reach into space

79

00:05:26,100 --> 00:05:30,110

500 miles to point the OAO toward any part of the sky

80

00:05:30,120 --> 00:05:33,740

they wish to study.

81

00:05:33,740 --> 00:05:38,140

Precision is such that the OAO could fix on the eraser of a pencil

82

00:05:38,160 --> 00:05:42,140

100 miles away. Observations can be

83

00:05:42,140 --> 00:05:45,640

stored by magnetic memory,

84

00:05:45,640 --> 00:05:50,220

and all information flashed to Earth within seconds. Recorded as numerical

85

00:05:50,240 --> 00:05:54,260

data, starlight images can be translated into pictures

86

00:05:54,280 --> 00:05:58,300

by the trained scientists.

87

00:05:59,440 --> 00:06:02,320

The OAO will be another significant advance

88

00:06:02,350 --> 00:06:06,350

in astronomy since Galileo aimed the first telescope

89

00:06:06,360 --> 00:06:10,380

to prove the Earth was not the center of the universe.

90

00:06:13,160 --> 00:06:14,380

From the time when

91

00:06:14,410 --> 00:06:18,420

prehistoric man wondered at the bright pin points in the sky,

92

00:06:18,440 --> 00:06:20,860

astronomy has developed as a challenge.

93

00:06:22,460 --> 00:06:26,460

The OAO, the Orbiting Astronomical Observatory,

94

00:06:26,480 --> 00:06:30,500

will extend man's range of vision across the universe.

95

00:06:32,700 --> 00:06:34,520

Man, on his

96

00:06:34,540 --> 00:06:38,530

tiny planet -- a sand grain on the shoreline of the seas

97

00:06:38,550 --> 00:06:42,580

of infinity--longs to find out what the stars are,

98

00:06:42,600 --> 00:06:46,620

why they are there, how they came to be there,

99

00:06:46,640 --> 00:06:50,640

vast, in the immensities of space, that

100

00:06:50,660 --> 00:06:54,670

may, or may not, have a beginning,

101

00:06:54,680 --> 00:06:57,540

or an end.

102

00:06:57,540 --> 00:07:01,560

[Produced by Film Graphics, Inc.][Music]