



1  
00:00:12,740 --> 00:00:10,610  
the L def structure was built at NASA

2  
00:00:15,440 --> 00:00:12,750  
Langley Research Center and shipped to

3  
00:00:17,000 --> 00:00:15,450  
Kennedy Space Center in 1983 where

4  
00:00:19,820 --> 00:00:17,010  
experiments were mounted to it in

5  
00:00:22,070 --> 00:00:19,830  
preparation for launch these experiments

6  
00:00:23,900 --> 00:00:22,080  
and the structure itself were designed

7  
00:00:25,849 --> 00:00:23,910  
to better define and determine the

8  
00:00:28,370 --> 00:00:25,859  
effects of the low Earth orbit

9  
00:00:30,380 --> 00:00:28,380  
environment where man may someday live

10  
00:00:39,580 --> 00:00:30,390  
as he extends his exploration of the

11  
00:00:44,680 --> 00:00:41,950  
quantum NFL death NASA's long-duration

12  
00:00:47,890 --> 00:00:44,690  
exposure facility took place in April of

13  
00:00:50,799 --> 00:00:47,900

1984 it would become one of NASA's most

14

00:00:52,780 --> 00:00:50,809

successful satellites the first

15

00:00:54,670 --> 00:00:52,790

spacecraft ever to take advantage of the

16

00:00:56,830 --> 00:00:54,680

space shuttles unique capability to

17

00:00:59,229 --> 00:00:56,840

deploy experiments in space for long

18

00:01:03,540 --> 00:00:59,239

exposure times and then return them

19

00:01:06,190 --> 00:01:03,550

safely to earth for laboratory analysis

20

00:01:08,020 --> 00:01:06,200

using a remote manipulator arm Terry

21

00:01:10,300 --> 00:01:08,030

Hart lifted the LD from the shuttle

22

00:01:14,230 --> 00:01:10,310

cargo bay and placed it in the proper

23

00:01:17,080 --> 00:01:14,240

position for free flight in space the L

24

00:01:19,090 --> 00:01:17,090

Deaf's initial orbit was 257 nautical

25

00:01:22,510 --> 00:01:19,100

miles above the earth and inclination at

26  
00:01:24,730 --> 00:01:22,520  
28 and 1/2 degrees as it orbited in free

27  
00:01:27,100 --> 00:01:24,740  
flight one end always pointed toward

28  
00:01:29,889 --> 00:01:27,110  
space the other always pointed toward

29  
00:01:33,160 --> 00:01:29,899  
the center of the earth for 5 and 1/2

30  
00:01:37,060 --> 00:01:33,170  
years I def would carry 57 experiments

31  
00:01:38,920 --> 00:01:37,070  
in 86 trays mounted on its exterior it

32  
00:01:40,749 --> 00:01:38,930  
would be the only source of data to

33  
00:01:43,090 --> 00:01:40,759  
measure the effects of prolonged space

34  
00:01:49,990 --> 00:01:43,100  
exposure on spacecraft materials and

35  
00:01:52,480 --> 00:01:50,000  
living organisms the retrieval of L def

36  
00:01:54,370 --> 00:01:52,490  
in January of 1990 marked the beginning

37  
00:01:57,040 --> 00:01:54,380  
of scientific investigation for the more

38  
00:01:59,109 --> 00:01:57,050

than 200 researchers and scientists who

39

00:02:09,150 --> 00:01:59,119

had launched their experiments 5 and 1/2

40

00:02:14,020 --> 00:02:11,860

this time astronaut Bonnie Dunbar

41

00:02:16,360 --> 00:02:14,030

operated the manipulator arm while

42

00:02:20,830 --> 00:02:16,370

astronaut Marsha Ivins took the first

43

00:02:22,930 --> 00:02:20,840

investigative photographs 10,000

44

00:02:24,790 --> 00:02:22,940

specimens and virtually every part of

45

00:02:27,310 --> 00:02:24,800

the facility will provide information

46

00:02:30,790 --> 00:02:27,320

about what happens when things stay in

47

00:02:32,770 --> 00:02:30,800

space for long periods of time the

48

00:02:35,260 --> 00:02:32,780

facility and experiments will provide

49

00:02:37,180 --> 00:02:35,270

unprecedented data on the magnitude of

50

00:02:40,600 --> 00:02:37,190

induced radioactivity in materials

51  
00:02:42,790 --> 00:02:40,610  
during prolonged exposure in space the

52  
00:02:44,680 --> 00:02:42,800  
interstellar gas experiment will provide

53  
00:02:47,350 --> 00:02:44,690  
insight into the formation of the

54  
00:02:50,500 --> 00:02:47,360  
galaxies as captured interstellar gas

55  
00:02:52,630 --> 00:02:50,510  
atoms are analyzed cosmic dust

56  
00:02:54,400 --> 00:02:52,640  
experiments will provide insight into

57  
00:02:56,560 --> 00:02:54,410  
the evolution of the solar system

58  
00:02:59,410 --> 00:02:56,570  
through studies of the unparalleled

59  
00:03:03,520 --> 00:02:59,420  
quantity of captured micrometeoroid

60  
00:03:05,920 --> 00:03:03,530  
material radiation experiments will

61  
00:03:09,699 --> 00:03:05,930  
provide data on radiation intensity and

62  
00:03:11,770 --> 00:03:09,709  
its effects on living organisms studies

63  
00:03:14,640 --> 00:03:11,780

of thousands of materials associated

64

00:03:19,110 --> 00:03:14,650

with design of spacecraft structures

65

00:03:24,220 --> 00:03:19,120

thermal control systems power systems

66

00:03:26,440 --> 00:03:24,230

optics electronic systems and propulsion

67

00:03:28,320 --> 00:03:26,450

systems will be analyzed for

68

00:03:31,330 --> 00:03:28,330

environmental effects of radiation

69

00:03:33,729 --> 00:03:31,340

vacuum extreme temperature variations

70

00:03:37,870 --> 00:03:33,739

atomic oxygen and collision with space

71

00:03:39,670 --> 00:03:37,880

materials eventually all spacecraft and

72

00:03:41,740 --> 00:03:39,680

spacecraft systems will be designed

73

00:03:45,490 --> 00:03:41,750

using materials that have been validated

74

00:03:47,320 --> 00:03:45,500

for long-duration space exposure for the

75

00:03:49,300 --> 00:03:47,330

remainder of the mission I def was

76  
00:03:52,150 --> 00:03:49,310  
safely tucked away in the space shuttles

77  
00:03:53,590 --> 00:03:52,160  
cargo bay it remained there through the

78  
00:03:55,690 --> 00:03:53,600  
shuttle landing at Edwards Air Force

79  
00:03:59,620 --> 00:03:55,700  
Base and the piggyback ride to the

80  
00:04:02,259 --> 00:03:59,630  
Kennedy Space Center in the orbiter

81  
00:04:04,870 --> 00:04:02,269  
processing facility investigators got

82  
00:04:06,400 --> 00:04:04,880  
their first glimpse of L dev initial

83  
00:04:08,650 --> 00:04:06,410  
examinations focused on the

84  
00:04:12,100 --> 00:04:08,660  
interrelationship of all experiments and

85  
00:04:14,309 --> 00:04:12,110  
the L def structure then the

86  
00:04:16,259 --> 00:04:14,319  
experimental trays were removed

87  
00:04:22,770 --> 00:04:16,269  
and distributed to investigators for

88  
00:04:24,960 --> 00:04:22,780

data analysis the science experiments

89

00:04:27,990 --> 00:04:24,970

hold exciting revelations regarding the

90

00:04:29,999 --> 00:04:28,000

evolution of the Kosmos and biological

91

00:04:32,460 --> 00:04:30,009

effects on long duration space exposure

92

00:04:36,540 --> 00:04:32,470

as they relate to the presence of humans

93

00:04:38,550 --> 00:04:36,550

in space I def technology experiments

94

00:04:40,830 --> 00:04:38,560

will establish a database for use in

95

00:04:45,600 --> 00:04:40,840

designing spacecraft such as Space

96

00:04:48,270 --> 00:04:45,610

Station the most publicized experiment

97

00:04:51,300 --> 00:04:48,280

is seeds which offers a wide variety of

98

00:04:53,460 --> 00:04:51,310

opportunities for student experiments 12

99

00:04:55,529 --> 00:04:53,470

and 1/2 million seed packages were

100

00:04:58,350 --> 00:04:55,539

distributed to upper elementary through

101  
00:05:00,360 --> 00:04:58,360  
University level students American

102  
00:05:02,249 --> 00:05:00,370  
students and students of foreign

103  
00:05:04,080 --> 00:05:02,259  
countries have become interested in

104  
00:05:06,689 --> 00:05:04,090  
science and the scientific method of

105  
00:05:08,640 --> 00:05:06,699  
Investigation by growing and comparing

106  
00:05:11,100 --> 00:05:08,650  
tomato plants from control seeds which

107  
00:05:13,320 --> 00:05:11,110  
are kept on earth and experimental seeds

108  
00:05:16,439 --> 00:05:13,330  
which are housed on L def as it orbited

109  
00:05:18,540 --> 00:05:16,449  
the earth L Daffy and his experiments

110  
00:05:20,279 --> 00:05:18,550  
are just beginning to define and

111  
00:05:24,300 --> 00:05:20,289  
determine the effects of the lower Earth

112  
00:05:26,129 --> 00:05:24,310  
orbit environment as investigators

113  
00:05:28,020 --> 00:05:26,139

interpret their data they grow

114

00:05:30,000 --> 00:05:28,030

confidence in the models they are using

115

00:05:32,730 --> 00:05:30,010

to accurately predict this environment

116

00:05:35,399 --> 00:05:32,740

all space vehicles that fly in low Earth

117

00:05:37,350 --> 00:05:35,409

orbit will benefit from L Dell Space

118

00:05:40,350 --> 00:05:37,360

Station freedom will be its first major

119

00:05:42,990 --> 00:05:40,360

benefactor the L dev structure designed