



NASA Ames Research Center
presents

2013

A Year in Space

1
00:00:00,000 --> 00:00:03,870
(Music)

2
00:00:03,890 --> 00:00:06,600
Narrator: 2013 was a big year for Ames Research

3
00:00:06,620 --> 00:00:09,390
Center's space exploration programs, including

4
00:00:09,410 --> 00:00:11,870
several new launches, and continuing a long

5
00:00:11,890 --> 00:00:14,310
history of cutting-edge innovations.

6
00:00:14,330 --> 00:00:21,970
(Music)

7
00:00:21,990 --> 00:00:24,430
Designed and built at Ames, the Lunar Atmosphere

8
00:00:24,450 --> 00:00:27,300
and Dust Environment Explorer or LADEE Mission was

9
00:00:27,320 --> 00:00:29,590
successfully launched and sent to orbit the Moon

10
00:00:29,610 --> 00:00:32,160
to conduct science operations.

11
00:00:32,180 --> 00:00:34,410
The spacecraft is studying the extremely thin

12
00:00:34,430 --> 00:00:37,260
atmosphere or exosphere of the Moon and measuring

13
00:00:37,280 --> 00:00:40,370

the amount of dust found in this region of space.

14
00:00:40,390 --> 00:00:42,600
Ames is managing the science operations for the

15
00:00:42,620 --> 00:00:44,740
LADEE Mission, as well as commanding and

16
00:00:44,760 --> 00:00:46,670
controlling the spacecraft using the

17
00:00:46,690 --> 00:00:49,510
Multi-Mission Operations Center.

18
00:00:49,530 --> 00:00:52,370
This facility is also being used by controllers

19
00:00:52,390 --> 00:00:54,880
for the Interface Region Imaging Spectrograph

20
00:00:54,900 --> 00:00:56,680
or IRIS Mission.

21
00:00:56,700 --> 00:00:59,170
The IRIS spacecraft successfully launched this

22
00:00:59,190 --> 00:01:01,770
year on its mission to study the region of space

23
00:01:01,790 --> 00:01:04,860
around the surface of the sun.

24
00:01:04,880 --> 00:01:07,860
Using state of the art imaging technologies, IRIS

25
00:01:07,880 --> 00:01:10,980
is gathering extremely high-resolution data about

26
00:01:11,000 --> 00:01:13,680
the energy release from the sun that creates what

27
00:01:13,700 --> 00:01:18,400
is commonly referred to as space weather.

28
00:01:18,420 --> 00:01:20,470
The Kepler Mission continues to make

29
00:01:20,490 --> 00:01:23,100
groundbreaking discoveries and redefine our

30
00:01:23,120 --> 00:01:26,390
understanding of planetary systems and stars in

31
00:01:26,410 --> 00:01:27,990
the galaxy.

32
00:01:28,010 --> 00:01:29,870
The team has found hundreds of new planet

33
00:01:29,890 --> 00:01:32,490
candidates this year and continues to discover

34
00:01:32,510 --> 00:01:35,030
smaller, Earth-sized planets orbiting in the

35
00:01:35,050 --> 00:01:39,570
habitable zone of their sun-like stars.

36
00:01:39,590 --> 00:01:42,900
For Ames researchers, 2013 could be called the

37
00:01:42,920 --> 00:01:45,070
"Year of the Nanosatellite!"

38
00:01:45,090 --> 00:01:47,190

Several of these tiny satellites were built and

39

00:01:47,210 --> 00:01:49,670

sent into space, including the innovative

40

00:01:49,690 --> 00:01:51,760

PhoneSat cubesat.

41

00:01:51,780 --> 00:01:54,680

PhoneSat was created as a technology demonstration

42

00:01:54,700 --> 00:01:56,850

mission to prove that a satellite based on a

43

00:01:56,870 --> 00:01:59,940

smartphone could function in space.

44

00:01:59,960 --> 00:02:02,550

This year, the team successfully flew 4 of the

45

00:02:02,570 --> 00:02:05,520

tiny satellites in space and future versions are

46

00:02:05,540 --> 00:02:08,110

already in development.

47

00:02:08,130 --> 00:02:11,390

The TechEdSat cubesat was also built at Ames as a

48

00:02:11,410 --> 00:02:13,270

technology demonstration.

49

00:02:13,290 --> 00:02:16,160

It tested a new "exo-braking" parachute system

50

00:02:16,180 --> 00:02:18,400

that could allow satellite payloads to safely

51
00:02:18,420 --> 00:02:21,370
re-enter the Earth's atmosphere.

52
00:02:21,390 --> 00:02:23,370
In collaboration with the Air Force,

53
00:02:23,390 --> 00:02:25,070
a team at Ames built the first

54
00:02:25,090 --> 00:02:27,850
Nanosatellite Launch Adapter System.

55
00:02:27,870 --> 00:02:30,880
NLAS is designed to launch multiple cubesats from

56
00:02:30,900 --> 00:02:33,110
rockets that could previously only carry

57
00:02:33,130 --> 00:02:36,400
two or three at a time.

58
00:02:36,420 --> 00:02:39,030
The Intelligent Robotics Group at NASA Ames is

59
00:02:39,050 --> 00:02:41,770
working to improve the capability, functionality

60
00:02:41,790 --> 00:02:44,840
and reliability of robotic systems that are key to

61
00:02:44,860 --> 00:02:47,820
the future of space exploration.

62
00:02:47,840 --> 00:02:50,450
On three different occasions this year, astronauts

63
00:02:50,470 --> 00:02:52,660

on the International Space Station remotely

64
00:02:52,680 --> 00:02:56,100
operated the Ames-developed K10 planetary rover

65
00:02:56,120 --> 00:02:58,830
located at the Center's Marscape.

66
00:02:58,850 --> 00:03:01,080
These tests were the first time an astronaut in

67
00:03:01,100 --> 00:03:06,240
space controlled a rover on a planetary surface.

68
00:03:06,260 --> 00:03:09,810
2013 was also a year that Ames researchers

69
00:03:09,830 --> 00:03:11,410
conducted experiments on the

70
00:03:11,430 --> 00:03:13,500
International Space Station to better

71
00:03:13,520 --> 00:03:16,400
understand the effects of microgravity.

72
00:03:16,420 --> 00:03:18,510
Seedling Growth-1 was designed to study

73
00:03:18,530 --> 00:03:20,900
how plants respond and adapt to a range

74
00:03:20,920 --> 00:03:23,500
of low gravity environments.

75
00:03:23,520 --> 00:03:25,730
The results of these studies could be key to

76

00:03:25,750 --> 00:03:27,010

supporting astronauts for

77

00:03:27,030 --> 00:03:29,710

long-duration space missions.

78

00:03:29,730 --> 00:03:31,480

Ames also developed the Cell Biology

79

00:03:31,500 --> 00:03:33,500

Technology Demonstration.

80

00:03:33,520 --> 00:03:35,630

The system is a simple, yet highly effective

81

00:03:35,650 --> 00:03:37,830

method, for conducting cell biology tests

82

00:03:37,850 --> 00:03:40,370

while in space.

83

00:03:40,390 --> 00:03:42,960

A team at Ames tested an innovative and compact

84

00:03:42,980 --> 00:03:45,730

heat shield that could expand like an umbrella to

85

00:03:45,750 --> 00:03:48,440

enable much larger payloads for planetary entry

86

00:03:48,460 --> 00:03:51,310

than are currently possible.

87

00:03:51,330 --> 00:03:53,550

Wind tunnel tests on models of the NASA Space

88

00:03:53,570 --> 00:03:56,200

Launch System were conducted at Ames to help

89
00:03:56,220 --> 00:03:58,890
improve the design and stability of NASA's next

90
00:03:58,910 --> 00:04:02,240
heavy-launch vehicle.

91
00:04:02,260 --> 00:04:04,620
This summer NASA launched Spaceloft-7 and

92
00:04:04,640 --> 00:04:07,930
Spaceloft-8, two sub-orbital rockets, from

93
00:04:07,950 --> 00:04:11,400
Spaceport America near Las Cruces, New Mexico.

94
00:04:11,420 --> 00:04:14,610
They achieved a record altitude of 73.9 miles,

95
00:04:14,630 --> 00:04:16,730
while carrying a variety of experiments

96
00:04:16,750 --> 00:04:18,440
in microgravity.

97
00:04:18,460 --> 00:04:21,110
Ames manages the selection and development of

98
00:04:21,130 --> 00:04:25,330
payloads for the suborbital flights program.

99
00:04:25,350 --> 00:04:27,880
The Curiosity rover continues to explore the

100
00:04:27,900 --> 00:04:30,760
surface of Mars and a team from Ames is using

101
00:04:30,780 --> 00:04:33,270
their X-ray diffraction instrument called CheMin

102
00:04:33,290 --> 00:04:36,030
to analyze the soil and find out exactly what

103
00:04:36,050 --> 00:04:38,470
minerals it contains.

104
00:04:38,490 --> 00:04:40,900
Ames researcher David Blake developed the CheMin

105
00:04:40,920 --> 00:04:43,640
instrument that is one of the key tools being used

106
00:04:43,660 --> 00:04:46,470
to identify whether the conditions for life could

107
00:04:46,490 --> 00:04:51,130
have existed at one time on the surface of Mars.

108
00:04:51,150 --> 00:04:52,800
Using instruments on the Mars Reconnaissance

109
00:04:52,820 --> 00:04:56,640
Orbiter, researchers from Ames and JPL are working

110
00:04:56,660 --> 00:04:59,810
to see if a form of salty water is responsible for

111
00:04:59,830 --> 00:05:01,790
the seasonal slopes that appear on the sides of

112
00:05:01,810 --> 00:05:04,340
Martian hills and mountains, an area where

113
00:05:04,360 --> 00:05:09,200

scientists generally believe conditions to be dry.

114

00:05:09,220 --> 00:05:11,510

Researchers at Ames worked in partnership with the

115

00:05:11,530 --> 00:05:13,940

Russian Space Agency on a life science experiment

116

00:05:13,960 --> 00:05:16,200

called Bion-1.

117

00:05:16,220 --> 00:05:18,310

The mission was to study how life adapts to

118

00:05:18,330 --> 00:05:20,700

microgravity in space and then re-adapts to

119

00:05:20,720 --> 00:05:23,440

gravity on Earth.

120

00:05:23,460 --> 00:05:26,110

The Ames-developed Pioneer 11 spacecraft reached

121

00:05:26,130 --> 00:05:29,130

its 40th anniversary in space.

122

00:05:29,150 --> 00:05:33,100

Launched in April of 1973, Pioneer 11 flew past

123

00:05:33,120 --> 00:05:35,740

Jupiter and Saturn and collected tremendous

124

00:05:35,760 --> 00:05:38,350

amounts of data about both before communication

125

00:05:38,370 --> 00:05:42,710

with the spacecraft ended in 1995.

126

00:05:42,730 --> 00:05:47,240

As they did in 2013, scientists, researchers and

127

00:05:47,260 --> 00:05:50,240

staff are hard at work to continue their mission

128

00:05:50,260 --> 00:05:54,860

to make new discoveries in 2014 and beyond!

129

00:05:54,880 --> 00:05:59,280

(Music)