
NASA
DLR

1
00:00:00,699 --> 00:00:09,575
[Music]

2
00:00:20,186 --> 00:00:24,290
>> [Background music] When
we fly SOFIA to New Zealand,

3
00:00:24,290 --> 00:00:28,194
we are providing access
to astronomical objects

4
00:00:28,194 --> 00:00:32,231
that we don't have access to
here in the Northern Hemisphere,

5
00:00:32,231 --> 00:00:34,700
a different part of the sky,

6
00:00:34,700 --> 00:00:38,170
the Magellanic Clouds,
Southern Cross.

7
00:00:38,170 --> 00:00:41,540
>> One of my favorite objects in
the southern sky is the center

8
00:00:41,540 --> 00:00:43,476
of our own Milky Way Galaxy.

9
00:00:43,476 --> 00:00:45,678
There's a supermassive
black hole there,

10
00:00:45,678 --> 00:00:48,647
stars orbiting it,
gas clouds around it.

11
00:00:48,647 --> 00:00:50,116
SOFIA will be able

to observe these

12
00:00:50,116 --> 00:00:52,418
and study the center
of our galaxy.

13
00:00:52,418 --> 00:00:55,387
>> SOFIA stands for
stratospheric observatory

14
00:00:55,387 --> 00:00:57,356
for infrared astronomy.

15
00:00:57,356 --> 00:01:00,226
It is a jumbo jet
Boeing 747 aircraft

16
00:01:00,226 --> 00:01:04,463
that has been retrofitted with
a 2-1/2 meter infrared telescope

17
00:01:04,463 --> 00:01:09,735
that was built by our partner,
the German Aerospace Center.

18
00:01:09,735 --> 00:01:14,240
It flies above 99% of the water
vapor in the earth's atmosphere

19
00:01:14,240 --> 00:01:17,243
and that is the location
that is required

20
00:01:17,243 --> 00:01:20,646
to do infrared astronomy.

21
00:01:20,646 --> 00:01:22,615
>> SOFIA has unique
capabilities.

22
00:01:22,615 --> 00:01:25,518
It can detect light in a part
of the electromagnetic spectrum

23
00:01:25,518 --> 00:01:29,822
that can't be detected
by any other observatory.

24
00:01:29,822 --> 00:01:32,892
>> SOFIA does a lot
of unique science.

25
00:01:32,892 --> 00:01:36,228
We look at the formation
of stars.

26
00:01:36,228 --> 00:01:41,834
We also study the formation of
planetary systems around stars.

27
00:01:41,834 --> 00:01:43,903
We also will do planetary
science

28
00:01:43,903 --> 00:01:45,871
within our own solar system

29
00:01:45,871 --> 00:01:49,275
and the Pluto occultation is
a perfect example of that.

30
00:01:49,275 --> 00:01:52,978
Conducting an observation of
an occultation is probably one

31
00:01:52,978 --> 00:01:56,582
of the more challenging
missions that SOFIA can do.

32

00:01:56,582 --> 00:02:02,121
An occultation is essentially
a situation where a planet,

33
00:02:02,121 --> 00:02:06,025
in this case Pluto, is passing
in front of a background star,

34
00:02:06,025 --> 00:02:09,695
kind of like an eclipse,
and when Pluto does that,

35
00:02:09,695 --> 00:02:13,098
we will be able to see
the effects of the light

36
00:02:13,098 --> 00:02:15,134
as it passes through
Pluto's atmosphere.

37
00:02:15,134 --> 00:02:18,637
And we can use that light to
determine what is happening

38
00:02:18,637 --> 00:02:21,340
in Pluto's atmosphere,
how deep it is, whether

39
00:02:21,340 --> 00:02:26,812
or not there's winds, and help
characterize the situation.

40
00:02:26,812 --> 00:02:29,281
The shadow of this
occultation is going to occur

41
00:02:29,281 --> 00:02:30,683
in the middle of the ocean.

42
00:02:30,683 --> 00:02:31,951

There isn't another telescope

43
00:02:31,951 --> 00:02:35,888
that can take advantage
of this opportunity.

44
00:02:35,888 --> 00:02:40,292
The aircraft is moving at
about 500 miles an hour.

45
00:02:40,292 --> 00:02:43,329
The shadow that is being cast
on the surface of the Earth

46
00:02:43,329 --> 00:02:46,899
by Pluto is moving at
orbital velocities.

47
00:02:46,899 --> 00:02:49,668
We will really need a
teamwork effort in order

48
00:02:49,668 --> 00:02:54,807
to successfully observe
Pluto during its occultation.

49
00:02:54,807 --> 00:02:59,011
On the night of the observation,
while SOFIA is in flight,

50
00:02:59,011 --> 00:03:01,513
there will be a team
of observatories

51
00:03:01,513 --> 00:03:05,584
that will help SOFIA: The
Anglo-Australian Telescope,

52
00:03:05,584 --> 00:03:09,121
Lowell Observatory, the Naval

Observatory at Flagstaff,

53
00:03:09,121 --> 00:03:12,324
the Discovery Channel Telescope
will be making last-minute

54
00:03:12,324 --> 00:03:13,993
observations of Pluto.

55
00:03:13,993 --> 00:03:16,829
They will provide
observation data to MIT

56
00:03:16,829 --> 00:03:19,298
and MIT will update
their predictive model

57
00:03:19,298 --> 00:03:21,934
of where the shadow of the
Pluto occultation is going

58
00:03:21,934 --> 00:03:22,935
to be on the Earth.

59
00:03:22,935 --> 00:03:24,236
We will receive that update.

60
00:03:24,236 --> 00:03:27,406
We will modify our flight
plan and position SOFIA

61
00:03:27,406 --> 00:03:30,276
where it needs to be to
intercept the shadow.

62
00:03:30,276 --> 00:03:32,611
The data that SOFIA
is going to collect

63

00:03:32,611 --> 00:03:35,581
when we observe the Pluto
occultation will help

64
00:03:35,581 --> 00:03:39,018
characterize the
atmosphere on Pluto

65
00:03:39,018 --> 00:03:42,321
and it'll also provide data that
could be used for calibration,

66
00:03:42,321 --> 00:03:44,923
a ground truth source of data

67
00:03:44,923 --> 00:03:47,960
that will enhance the New
Horizon's mission

68
00:03:47,960 --> 00:03:49,728
in the following days.

69
00:03:49,728 --> 00:03:54,368
>> NASA New Horizons flyby July
14, 2015, is just two weeks

70
00:03:54,368 --> 00:03:57,348
after this stellar occultation
that SOFIA will observe.

71
00:03:57,348 --> 00:03:58,742
That is timely.

72
00:03:58,742 --> 00:04:02,110
It means that we can use the
data from SOFIA to correlate

73
00:04:02,110 --> 00:04:05,903
and corroborate the measurements
that are made by New Horizons

74
00:04:05,903 --> 00:04:08,603
when it goes up close and
personal two weeks later.

75
00:04:08,603 --> 00:04:13,472
We'll probe Pluto's atmosphere
to extreme low levels.

76
00:04:13,480 --> 00:04:17,617
SOFIA's infrared capability is
the only type of instrumentation

77
00:04:17,620 --> 00:04:19,088
that can equal that measurement.

78
00:04:19,088 --> 00:04:21,916
So by having a measurement
of Pluto's atmosphere

79
00:04:21,920 --> 00:04:24,423
from another platform
from SOFIA,

80
00:04:24,423 --> 00:04:28,124
taken with almost the
same type of sensitivity,

81
00:04:28,124 --> 00:04:30,222
can help us interpret
the results

82
00:04:30,222 --> 00:04:31,821
that the New Horizon
spacecraft is going

83
00:04:31,821 --> 00:04:33,188
to make two weeks later.

84

00:04:33,540 --> 00:04:40,040
[Music]

85
00:04:40,045 --> 00:04:41,380
>> [Background music] In order

86
00:04:41,380 --> 00:04:43,520
to successfully execute a
deployment requires a tremendous

87
00:04:43,520 --> 00:04:44,540
amount of planning.

88
00:04:44,540 --> 00:04:46,880
We've been planning for this
deployment for several months

89
00:04:46,880 --> 00:04:50,450
and in some cases
for almost a year.

90
00:04:50,450 --> 00:04:52,242
Essentially, what we're
doing is we're taking all

91
00:04:52,242 --> 00:04:53,541
of our home-base operations

92
00:04:53,541 --> 00:04:55,709
and we're transplanting
those operations

93
00:04:55,709 --> 00:04:57,369
to Christchurch, New Zealand.

94
00:04:58,000 --> 00:05:00,168
The last time we
were in New Zealand,

95

00:05:00,168 --> 00:05:01,862
we operated with a
single instrument

96
00:05:01,862 --> 00:05:03,862
and we were very
successful in doing so.

97
00:05:03,862 --> 00:05:04,995
This time around, we're going

98
00:05:05,000 --> 00:05:07,202
to increase our science
instrument complement

99
00:05:07,202 --> 00:05:08,635
by a factor of four.

100
00:05:08,640 --> 00:05:10,575
We're going to take four
different instruments.

101
00:05:10,580 --> 00:05:12,782
We're going to change
them out in location.

102
00:05:12,782 --> 00:05:14,983
We're going to support
all of those instruments

103
00:05:14,983 --> 00:05:19,017
and so the tremendous amount
of logistics, detail planning

104
00:05:19,020 --> 00:05:22,323
that is required to successfully
conduct those operations

105
00:05:22,323 --> 00:05:25,957
that we'd normally do at

home is quite challenging.

106
00:05:25,960 --> 00:05:30,598
>> Astronomy demands that we
develop very sensitive cameras,

107
00:05:30,600 --> 00:05:32,369
very sensitive optical systems,

108
00:05:32,369 --> 00:05:35,763
the ability to detect faint
sources amongst a noisy

109
00:05:35,763 --> 00:05:39,330
background and once we
have that capability,

110
00:05:39,330 --> 00:05:40,822
we can apply it in other areas.

111
00:05:40,822 --> 00:05:42,955
It's been used in
medical imaging.

112
00:05:42,960 --> 00:05:45,796
It's been used in
homeland security,

113
00:05:45,800 --> 00:05:49,070
but the most important reason we
study astronomy is to understand

114
00:05:49,070 --> 00:05:50,362
that place in the universe.

115
00:05:51,517 --> 00:05:56,157
[Music]

116
00:05:56,160 --> 00:05:57,295

>> I'm looking forward

117
00:05:57,300 --> 00:05:59,602
to a very successful Southern
Hemisphere deployment