



1
00:00:00,560 --> 00:00:04,280

[Music]

2
00:00:04,640 --> 00:00:07,240

[Volcano Rumbling]

3
00:00:13,680 --> 00:00:25,600

[Airplane landing]

4
00:00:27,800 --> 00:00:30,599

>>My day starts when the plane lands.

5
00:00:30,599 --> 00:00:34,360

Once the plane is brought back into the hangar and the data is removed from the plane, that's

6
00:00:34,360 --> 00:00:38,150

when I start looking at it to see if there's any problems that we can address prior to

7
00:00:38,160 --> 00:00:43,840

the next flight so that we don't waste flight hours and fuel.

8
00:00:44,440 --> 00:00:53,120

[Background noise]

9
00:00:54,840 --> 00:01:01,840

I've got some thermal infrared imagery here, and you can see the hot spot at the lava lake,

10
00:01:01,850 --> 00:01:06,369

you can see the lava tubes a little bit, through there.

11
00:01:06,369 --> 00:01:10,810

Prior to launching a satellite, or even after launching it, the airborne instrument is used

12
00:01:10,810 --> 00:01:16,140
to calibrate that satellite or to develop
new algorithms for the satellite that is being

13
00:01:16,140 --> 00:01:17,140
proposed.

14
00:01:17,140 --> 00:01:21,229
The MASTER instrument is a MODIS-Airborne
ASTER Simulator.

15
00:01:21,229 --> 00:01:24,720
We have four major areas of the electromagnetic
spectrum that we look at, from visible to

16
00:01:24,720 --> 00:01:25,720
thermal.

17
00:01:25,720 --> 00:01:29,770
As the plane is flying straight ahead, the
instrument is scanning the ground underneath,

18
00:01:29,770 --> 00:01:32,149
in a full 360 degree rotation.

19
00:01:32,149 --> 00:01:38,240
At 20 kilometers of altitude, we can capture
about 37 kilometers of the ground in this

20
00:01:38,240 --> 00:01:40,040
airplane.

21
00:01:40,040 --> 00:01:44,189
Everything in this world has a spectral signature,
and so by combining different wavelengths

22
00:01:44,189 --> 00:01:50,659
of light, you can ascertain the presence of
a certain compound, element, or aerosol, based

23

00:01:50,659 --> 00:01:52,899
on their spectral signature.

24

00:01:52,899 --> 00:01:58,090
There are different particles in the atmosphere,
water vapor, ozone, pollutants, sulfuric acid

25

00:01:58,090 --> 00:02:01,219
from the volcanoes, a lot of things in the
air column.

26

00:02:01,219 --> 00:02:05,430
By getting above the entire air column, you
can then predict what the satellite's going

27

00:02:05,440 --> 00:02:09,840
to see and make certain assumptions based
on that.

28

00:02:11,000 --> 00:02:16,360
[Music]

29

00:02:17,000 --> 00:02:21,520
Here we have the MASTER Instrument, the MODIS
Airborne ASTER Simulator.

30

00:02:21,520 --> 00:02:26,640
We have a spinning mirror down here, that's
allowing light to be collected and folded

31

00:02:26,650 --> 00:02:31,490
up into the system where it passes through
beam-splitting dichroics, folding mirrors,

32

00:02:31,490 --> 00:02:36,650
and it gets passed into different detector
arrays within the spectrometer that collects

33

00:02:36,650 --> 00:02:39,710

the visible through the thermal infrared.

34

00:02:39,710 --> 00:02:44,510

We have to keep the detectors very cold because the short-wave, mid-wave, and long-wave infrared

35

00:02:44,520 --> 00:02:46,760

detectors are sensitive to heat.

36

00:02:46,760 --> 00:02:49,800

[Background noise]

37

00:02:49,800 --> 00:02:53,959

I really enjoy working for NASA because of all the interesting people that I get to meet and

38

00:02:53,959 --> 00:02:55,170

places I get to go.

39

00:02:55,170 --> 00:02:57,099

We're on cutting edge technology.

40

00:02:57,099 --> 00:03:00,280

There are so many things on the Earth that we still don't understand.

41

00:03:00,280 --> 00:03:05,930

We need the data to input into our models to understand things like weather or extreme

42

00:03:05,930 --> 00:03:10,720

events, climate change for instance, and just basically document our changing world.