



5-LAYER, KAPTON BASED SUNSHIELD  
18 METERS BY 12 METERS



5 TIMES DIAMETER OF HUBBLE'S  
PRIMARY MIRROR  
PRIMARY MIRROR SEGMENTS

3:07 AM 12/18/17  
0177-23-0100336.02A3 BR330 B.044  
CONDITIONS

1  
00:00:00,020 --> 00:00:10,190

[ music ]

2  
00:00:10,210 --> 00:00:14,540

Just looking forward to the future

3  
00:00:14,560 --> 00:00:20,730

focusing on Space Station and visiting vehicles and we still have a lot of work to do.

4  
00:00:20,750 --> 00:00:26,920

It's very enjoyable, challenging, and very rewarding.

5  
00:00:26,940 --> 00:00:30,000

I work with a very good of people.

6  
00:00:30,020 --> 00:00:36,190

I guess about two or three years ago when it was announced that this was going to be the last shuttle.

7  
00:00:36,210 --> 00:00:42,370

No one really believed it. They figured that something would come up and we're going to have another shuttle

8  
00:00:42,390 --> 00:00:45,520

But I guess all good things have to end at one point.

9  
00:00:45,540 --> 00:00:49,580

And lift-off of the Delta II with the NPP satellite.

10  
00:00:49,600 --> 00:00:55,680

Blazing the way at new technology for climate research and weather forecasting.

11  
00:00:55,700 --> 00:01:01,860

If you were to go looking for water on the moon, how would you find a good place to start digging?

12  
00:01:01,880 --> 00:01:04,970

NASA's Lunar Reconnaissance Orbiter has a pretty unique answer.

13  
00:01:04,990 --> 00:01:07,150

Count the neutrons coming from the moon.

14

00:01:07,170 --> 00:01:10,320

LRO's LEN instrument or Lunar Explorer Neutron Detector

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00:01:10,340 --> 00:01:12,500

is specifically designed to do just this.

16

00:01:12,520 --> 00:01:15,620

But how does counting neutrons help you find water?

17

00:01:15,640 --> 00:01:19,670

The answer lies in hydrogen, the smallest atom, and how those neutrons interact with it.

18

00:01:19,690 --> 00:01:22,840

So where do those neutrons come from and what do they do?

19

00:01:53,340 --> 00:01:33,020

[ music ]

20

00:01:58,550 --> 00:02:03,880

Two weeks ago we had another mission over Pine Island glacier.

21

00:02:03,900 --> 00:02:10,070

When looking out of the window of the aircraft we noticed a fairly large crack in the ice shelf.

22

00:02:10,090 --> 00:02:16,260

And I talked back to colleagues in the US that downloaded satellite images

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00:02:16,280 --> 00:02:22,430

and they reported that this crack has formed sometime between end of September or early October.

24

00:02:22,450 --> 00:02:28,540

At the moment the crack is about 80 meters wide. If the crack continues to propagate

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00:02:28,560 --> 00:02:34,680

It's about an iceberg that has area of about 800 square kilometer that will eventually break

26

00:02:34,700 --> 00:02:36,680

from the Pine Island glacier.

27

00:03:21,290 --> 00:02:46,760

[ music ]

28

00:03:21,310 --> 00:03:24,480

So this has implications for the origin of life on Earth.

29

00:03:24,500 --> 00:03:29,510

We know that meteorites contain amino acids which are the building blocks of proteins

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00:03:29,530 --> 00:03:35,700

and now from our research nucleobases which are the building blocks of genetic material,

31

00:03:35,720 --> 00:03:38,880

like DNA and RNA, are also found in meteorites.

32

00:03:38,900 --> 00:03:42,990

So these things together could have seeded an early Earth with these really important

33

00:03:43,010 --> 00:03:47,110

molecules that could have built up to the larger molecules that you see today

34

00:03:47,130 --> 00:03:51,110

that are essential for biology.

35

00:04:31,830 --> 00:04:01,110

[ music ]

36

00:04:33,030 --> 00:04:38,080

When we started working on the part there was a lot that was already in place before we began actually conce

37

00:04:38,100 --> 00:04:43,220

what it would look like. We really had take a created approach to come up with the geometer that we needed.

38

00:04:43,240 --> 00:04:48,410

And try to meet all of our requirements for interfaces and scientific requirements.

39

00:04:48,430 --> 00:04:51,540

When they start working on it they machine it out of a solid block of titanium.

40

00:04:51,560 --> 00:04:56,730

And what they do is they use a milling machine and actually mill away

41

00:04:56,750 --> 00:04:59,730

slight layers until they get the basic shape.

42

00:05:43,070 --> 00:05:09,730

[ music ]

43

00:05:43,090 --> 00:05:50,250

OSIRIS REx is the acronym for Origins Spectral Interpretation Resource Identification Security Regolith Explorer

44

00:05:50,270 --> 00:05:56,440

Scheduled for launch in 2016 the mission will collect the first sample from this special type of asteroid

45

00:05:56,460 --> 00:05:58,800

that holds clues to the origin of the solar system.

46

00:05:58,820 --> 00:06:03,870

And just possibly the kinds of organic molecules that may have planted the seeds of life on Earth.

47

00:06:03,890 --> 00:06:12,240

In 2023 the OSIRIS REx mission will return a sample to Earth where it will be studied by scientist for generations

48

00:06:12,260 --> 00:06:16,330

MAVEN is the Mars Atmosphere and Volatile Evolution mission.

49

00:06:16,350 --> 00:06:19,530

We're trying to understand basically why the climate changed on Mars,

50

00:06:19,550 --> 00:06:24,610

why Mars appears to have gone from an environment that was habitable, to microorganisms

51

00:06:24,630 --> 00:06:29,790

at least, to the one that is the cold, dry, uninhabitable environment we see today.

52

00:06:29,810 --> 00:06:33,930

By looking at the nature of the upper atmosphere today

53

00:06:33,950 --> 00:06:39,100

and how gases can be lost out of the atmosphere to space today.

54

00:06:39,120 --> 00:06:44,170

We learn about the processes that control the atmosphere and we are going to have a good understand of

55

00:06:44,190 --> 00:06:47,170

what the history of the atmosphere has been.

56

00:07:10,670 --> 00:06:47,340

[ music ]

57

00:07:10,690 --> 00:07:14,770

A next generation space telescope

58

00:07:14,790 --> 00:07:18,930

designed to cause yet another giant leap forward in our

59

00:07:18,950 --> 00:07:21,100

understanding of the cosmos.

60

00:07:21,120 --> 00:07:28,280

It will carry some of the most advanced technologies ever placed on an orbiting observatory.

61

00:07:28,300 --> 00:07:35,450

[ music ]

62

00:07:35,470 --> 00:07:37,600

18 articulating mirror segments

63

00:07:37,620 --> 00:07:41,740

2.75 times the diameter of Hubble's primary mirror.

64

00:07:41,760 --> 00:07:44,790

Microshuttles. Wave front sensing and control sub system

65

00:07:44,810 --> 00:07:48,840

12 x 18 meter, 5 layer Kaption based sunshield.

66

00:07:48,860 --> 00:07:51,980

The Webb Telescope

67

00:07:52,000 --> 00:07:59,050

a revolutionary tool, able to study every phase in the history of our universe.