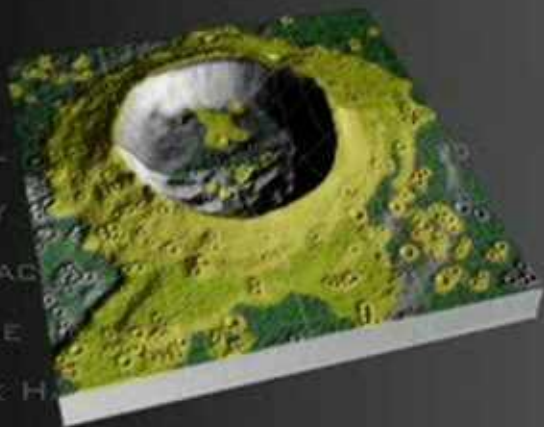


- 1 GRID CELL
- TOPOGRAPHY
- LEVEL SURFACE
- TEMPERATURE
- SMALL ROCK H
- SURFACE IMAGING



1
00:00:08,139 --> 00:00:05,620
one of the Lunar Reconnaissance orbiters

2
00:00:10,090 --> 00:00:08,149
primary objectives is to scout safe

3
00:00:13,750 --> 00:00:10,100
landing sites for future manned and

4
00:00:16,089 --> 00:00:13,760
robotic missions to the moon to do so

5
00:00:18,819 --> 00:00:16,099
LRO's suite of instruments work

6
00:00:21,999 --> 00:00:18,829
collectively to build a detailed picture

7
00:00:26,529 --> 00:00:22,009
of the surface let's take a look at how

8
00:00:28,630 --> 00:00:26,539
this is done the first thing we want to

9
00:00:31,839 --> 00:00:28,640
assess is the topography of the lunar

10
00:00:34,750 --> 00:00:31,849
terrain LRO uses an instrument called

11
00:00:37,299 --> 00:00:34,760
Lola that bounces laser pulses off of

12
00:00:40,000 --> 00:00:37,309
the surface when the pulse has returned

13
00:00:43,660 --> 00:00:40,010

to Lola their timing intensity and

14

00:00:46,840 --> 00:00:43,670

spread reveal the lunar landscape the

15

00:00:49,720 --> 00:00:46,850

resulting map shows steep slopes rough

16

00:00:51,880 --> 00:00:49,730

terrain and gives a general idea of what

17

00:00:55,200 --> 00:00:51,890

areas might be level enough to provide

18

00:00:58,239 --> 00:00:55,210

safe landing sites shown here in green

19

00:01:00,669 --> 00:00:58,249

LRO's next step is to create a

20

00:01:03,340 --> 00:01:00,679

temperature map of the surface using an

21

00:01:05,770 --> 00:01:03,350

instrument called diviner temperatures

22

00:01:08,590 --> 00:01:05,780

change more slowly in areas with lots of

23

00:01:11,170 --> 00:01:08,600

loose materials so by looking at thermal

24

00:01:13,210 --> 00:01:11,180

maps we can eliminate areas for landing

25

00:01:17,020 --> 00:01:13,220

that may have a dangerous abundance of

26

00:01:18,880 --> 00:01:17,030

rocks the regions in yellow represent

27

00:01:22,590 --> 00:01:18,890

places where the thermal signatures

28

00:01:25,360 --> 00:01:22,600

indicate they are unsafe landing sites

29

00:01:28,810 --> 00:01:25,370

lastly we want to double-check and

30

00:01:31,090 --> 00:01:28,820

refine our map even further LRO does

31

00:01:33,730 --> 00:01:31,100

this with a set of cameras that make

32

00:01:35,890 --> 00:01:33,740

detailed pictures of the surface looking

33

00:01:38,610 --> 00:01:35,900

closely at these images we can actually

34

00:01:41,500 --> 00:01:38,620

pick out individual boulders and craters

35

00:01:44,080 --> 00:01:41,510

these will clearly be hazardous places

36

00:01:47,030 --> 00:01:44,090

to land so we've labeled them red and

37

00:01:50,280 --> 00:01:47,040

remove them from our safe areas

38

00:01:53,400 --> 00:01:50,290

at this point any sites that are left

39
00:01:55,950 --> 00:01:53,410
green have been checked and rechecked to

40
00:01:59,580 --> 00:01:55,960
be Louisville smooth and free from

41
00:02:02,840 --> 00:01:59,590
hazards based on LRO scouting we would

42
00:02:16,130 --> 00:02:02,850
consider these safe locations to land

43
00:02:21,150 --> 00:02:18,870
it should be noted that while it is

44
00:02:24,240 --> 00:02:21,160
absolutely essential to find safe

45
00:02:27,120 --> 00:02:24,250
landing sites a safe place to land is

46
00:02:30,150 --> 00:02:27,130
not necessarily an interesting place to

47
00:02:32,910 --> 00:02:30,160
land when it comes time to pick the best

48
00:02:37,370 --> 00:02:32,920
landing site many other factors and

49
00:02:42,240 --> 00:02:40,470
as astronauts make their descent toward

50
00:02:45,180 --> 00:02:42,250
the lunar surface late in the next

51
00:02:48,449 --> 00:02:45,190
decade they can thank NASA's small robot