



1

00:00:01,220 --> 00:00:06,350

HOST: Water on Earth that is in rivers, lakes and the oceans is easy for scientists to see

2

00:00:06,350 --> 00:00:07,910

and measure.

3

00:00:07,910 --> 00:00:12,440

But what about the water that is inside the dirt under our feet, or at the root of all

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00:00:12,440 --> 00:00:15,000

the crops grown on the planet?

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00:00:15,000 --> 00:00:18,960

It's not so easy to see, but we all know it's there.

6

00:00:18,960 --> 00:00:24,400

Thanks to a new NASA spacecraft called SMAP, researchers hope to find out much more about

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00:00:24,400 --> 00:00:29,509

the water inside the dirt and try to figure out why it stays in some places and leaves

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00:00:29,509 --> 00:00:31,449

others.

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00:00:31,449 --> 00:00:37,150

SMAP is short for soil moisture active passive, a name which refers to the set of instruments

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00:00:37,150 --> 00:00:42,720

the spacecraft will use to decipher the layers of water just beneath the surface.

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00:00:42,720 --> 00:00:46,460

It's information that could lead to better

forecasts of growing conditions,

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00:00:46,460 --> 00:00:47,880

floods and droughts.

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00:00:47,890 --> 00:00:54,190

KENT KELLOGG: The amount of water the Earth holds is constant, but some areas may receive

14

00:00:54,190 --> 00:01:02,030

more water, some areas may receive less water. SMAP will help us improve our ability to forecast where

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00:01:02,030 --> 00:01:08,990

those regions are and to perhaps take action to mitigate the effects of either too

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00:01:08,990 --> 00:01:11,820

much water or too little water.

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00:01:11,820 --> 00:01:17,710

HOST: Using a 20-foot diameter antenna, the SMAP observatory will take detailed readings

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00:01:17,710 --> 00:01:23,590

of the moisture in the first two inches of topsoil around the world in such detail that

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00:01:23,590 --> 00:01:28,950

scientists can establish global patterns for how the moisture evaporates and how it affects

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00:01:28,950 --> 00:01:30,890

weather conditions.

21

00:01:30,890 --> 00:01:36,310

Engineers have tested the spacecraft, fueled it and folded up its antenna and solar panels

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00:01:36,310 --> 00:01:39,409

to fit inside the nosecone of the Delta II
for launch in late January.

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00:01:39,409 --> 00:01:42,370

CHUONG NGUYEN:

This mission has been very smooth so far the

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00:01:42,380 --> 00:01:50,729

preparation of the rocket and the preparation of the satellite has gone very smoothly. There's been very

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00:01:50,729 --> 00:01:54,509

very little issue with the activities so far.

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00:01:54,509 --> 00:02:04,089

3, 2, Main engine start, 1, 0, and liftoff of the Delta II with the NPP satellite.

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00:02:04,160 --> 00:02:09,380

HOST: The Delta II, built and launched by
United Launch Alliance, has earned a reputation

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00:02:09,390 --> 00:02:15,260

for launching dozens of NASA missions to observe
elements of the Earth in detail, plus extend

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00:02:15,260 --> 00:02:18,240

NASA's research reach out into the solar system.

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00:02:19,180 --> 00:02:25,960

TIM DUNN: There's been 152 launches of the
Delta II since 1989. 51 of those have been

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00:02:25,970 --> 00:02:31,349

for NASA – all successes. It's been a great
rocket.

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00:02:31,349 --> 00:02:40,520

We sent two Mars rovers on Delta II back in
2003, Spirit and Opportunity and every time

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00:02:40,520 --> 00:02:46,740
you see a rover on Mars it's hard not to think
of the Delta II heritage. Delta II has done

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00:02:46,740 --> 00:02:47,920
it all for NASA.

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00:02:47,920 --> 00:02:53,290
HOST: SMAP is launching from California so
it can be placed in a polar orbit, meaning

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00:02:53,290 --> 00:02:58,330
its path over Earth will take it near or over
the North Pole and South Pole on each pass

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00:02:58,330 --> 00:03:00,290
around the planet.

38
00:03:00,290 --> 00:03:05,129
That way, the observatory will see and measure
the entire surface of the world to produce

39
00:03:05,129 --> 00:03:09,670
the most accurate picture possible of moisture
patterns in the dirt.

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00:03:09,670 --> 00:03:14,819
Once in space and flying free of the rocket,
SMAP must unfold the three solar panels that

41
00:03:14,819 --> 00:03:19,780
will provide electrical power to the spacecraft.
Then, the long boom with the all-important

42
00:03:19,780 --> 00:03:22,150
antenna on it has to unfold correctly.

43
00:03:22,150 --> 00:03:27,620
Finally, the antenna itself must open to the

proper tension so it can correctly steer the

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00:03:27,620 --> 00:03:32,069

radar signals for the SMAP instruments to perform their own intricate studies.

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00:03:32,069 --> 00:03:36,970

It will take days for the process to play out in orbit while controllers stand watch

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00:03:36,970 --> 00:03:38,470

in ground stations.

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00:03:38,470 --> 00:03:43,349

The work is worth the wait for scientists who say understanding more about the moisture

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00:03:43,349 --> 00:03:49,040

in the two inches of soil around the Earth is vital to completing our understanding of

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00:03:49,040 --> 00:03:50,190

our whole planet.

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00:03:50,190 --> 00:03:55,610

ENI NJOKU: One of the most important applications is improving our ability to predict weather

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00:03:55,610 --> 00:04:02,540

and climate. The soil moisture conditions at the surface are important for initializing

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00:04:02,540 --> 00:04:07,500

weather models that predict future rain and temperature.

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00:04:07,500 --> 00:04:13,870

The soil moisture is also very important in improving climate models that can help us

