
Exploring A Crater

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00:00:03,770 --> 00:00:07,140
In the desert of southern New
Mexico lies Kilbourne Hole, a

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00:00:07,140 --> 00:00:10,577
nearly two-mile long maar crater
in the heart of the Potrillo

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00:00:10,577 --> 00:00:14,882
volcanic field. This crater
formed about twenty-four

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00:00:14,882 --> 00:00:17,417
thousand years ago when
underground magma came into

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00:00:17,417 --> 00:00:20,621
contact with ground water,
causing an explosion as the

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00:00:20,621 --> 00:00:24,324
water turned to steam. The blast
scattered ash and rocks from

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00:00:24,324 --> 00:00:27,060
deep within the Earth and
exposed many layers of crust,

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00:00:27,060 --> 00:00:31,732
making Kilbourne Hole a great
site for geological studies.

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00:00:31,732 --> 00:00:34,968
Today, scientists from NASA
Goddard, as a part of the RIS4E

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00:00:34,968 --> 00:00:37,905
project\hfrom Stony Brook
University, have come here to

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00:00:37,905 --> 00:00:40,507
test hand-held instruments that
could one day be used by

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00:00:40,507 --> 00:00:46,546
astronauts exploring the Moon,
Mars, or even an asteroid.

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00:00:46,546 --> 00:00:49,716
One such device is an x-ray
fluorescence spectrometer, or

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00:00:49,716 --> 00:00:53,020
XRF, which can determine the
chemical composition of rocks.

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00:00:53,020 --> 00:00:57,557
Another, known as LIBS, uses
laser pulses to detect what

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00:00:57,557 --> 00:01:00,360
elements are present in a
sample. Both instruments provide

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00:01:00,360 --> 00:01:04,698
information for small and
confined points on the surface.

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00:01:04,698 --> 00:01:07,401
For a broader field of view, the
team adds in the use of

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00:01:07,401 --> 00:01:11,104
hyperspectral and thermal
cameras. These instruments would

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00:01:11,104 --> 00:01:14,508
help astronauts understand the
geochemical context of the rocks

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00:01:14,508 --> 00:01:17,477
at the site they are exploring,
which would be beneficial in

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00:01:17,477 --> 00:01:21,348
deciding what samples to bring
back to Earth for further study.

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00:01:21,348 --> 00:01:25,352
The team also set up LiDAR and
GPS equipment to create

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00:01:25,352 --> 00:01:28,655
three-dimensional maps of the
terrain – useful information for

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00:01:28,655 --> 00:01:31,959
any human or robotic explorer.
Joining the Goddard Instrument

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00:01:31,959 --> 00:01:35,629
Field Team were members from
Johnson Space Center and the

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00:01:35,629 --> 00:01:39,099
University of Texas El Paso. And
the list of attendees included

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00:01:39,099 --> 00:01:42,369
some rather notable names as
well. Current astronaut Butch

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00:01:42,369 --> 00:01:45,439
Wilmore, who served as a
commander of the International

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00:01:45,439 --> 00:01:49,076
Space Station, played an active
role by simulating astronaut

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00:01:49,076 --> 00:01:51,979
EVAs, or extravehicular
activities, while hiking the

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00:01:51,979 --> 00:01:56,750
landscape with a geologist. It
was their job to evaluate and

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00:01:56,750 --> 00:02:00,520
choose spots for data collection
with the instruments. Also

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00:02:00,520 --> 00:02:03,423
making the trip was retired
Apollo 17 astronaut Jack

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00:02:03,423 --> 00:02:06,994
Schmitt. As a geologist who
eventually walked on the Moon,

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00:02:06,994 --> 00:02:10,897
Jack came to this very location
to train with other Apollo

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00:02:10,897 --> 00:02:13,600
astronauts and learn how to
explore and sample

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00:02:13,600 --> 00:02:15,302
diverse rock types.

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00:02:15,302 --> 00:02:18,705
"Well Kilbourne was primarily a
training site for understanding,

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00:02:18,705 --> 00:02:21,508
for getting, particularly the
pilot, the professional pilots

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00:02:21,508 --> 00:02:25,579
to understand how diverse
geological sampling can be.

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00:02:25,579 --> 00:02:27,581
And Kilbourne certainly is
diverse.

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00:02:27,581 --> 00:02:31,551
And - also just to give
them, get them thinking,

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00:02:31,551 --> 00:02:35,022
about what does it mean to see a
set of layered rocks.

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00:02:35,022 --> 00:02:37,858
That that is actually a history
of what was going on

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00:02:37,858 --> 00:02:41,528
on the Earth at a particular
time. All of that, I think,

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00:02:41,528 --> 00:02:44,031
was very important for people
who just never had been

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00:02:44,031 --> 00:02:46,900
exposed to geological thinking."

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00:02:46,900 --> 00:02:49,536
On this excursion, Jack shared
the lessons learned from

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00:02:49,536 --> 00:02:53,073
his career, while also being
shown some of the new techniques

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00:02:53,073 --> 00:02:56,410

and technologies being tested by
the current NASA scientists.

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00:02:56,410 --> 00:02:59,946
Journalism students from Stony
Brook University also came to

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00:02:59,946 --> 00:03:02,983
Kilbourne Hole to shadow the
scientists and learn about the

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00:03:02,983 --> 00:03:07,387
fieldwork process. By working in
this embedded capacity, this

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00:03:07,387 --> 00:03:09,990
next generation of science
journalists gained first-hand

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00:03:09,990 --> 00:03:14,961
knowledge about scientific
methods and equipment use.

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00:03:14,961 --> 00:03:18,031
The overall goal of the field
deployment to the Kilbourne Hole

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00:03:18,031 --> 00:03:20,834
crater was to simulate what data
collection might look like on

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00:03:20,834 --> 00:03:24,004
another planetary body. The
lessons that the Goddard

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00:03:24,004 --> 00:03:27,007
Instrument Field Team and the
RIS4E project learn here on

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00:03:27,007 --> 00:03:29,342

Earth will help ensure that
future astronauts are as