



1
00:00:00,500 --> 00:00:01,467



2
00:00:01,500 --> 00:00:02,835
Exploring Ocean Worlds with
Robots

3
00:00:02,868 --> 00:00:04,203
[Mechanical sounds]

4
00:00:04,236 --> 00:00:06,973
Robotics engineers have
prototyped new technology

5
00:00:07,006 --> 00:00:08,708
for icy ocean worlds.

6
00:00:08,741 --> 00:00:10,743
Several moons in the
outer solar system

7
00:00:10,776 --> 00:00:12,145
are believed to
have liquid oceans.

8
00:00:12,178 --> 00:00:15,114



9
00:00:15,147 --> 00:00:19,085
If they have liquid water, they
may be able to support life.

10
00:00:20,653 --> 00:00:25,458
But to acquire samples, robot
visitors will need new tools.

11
00:00:25,491 --> 00:00:26,459
[crunching sounds]

12

00:00:26,492 --> 00:00:28,227

Rovers would need special wheels

13

00:00:28,260 --> 00:00:29,596

to cross ice that
behaves like sand.

14

00:00:30,362 --> 00:00:32,432

A folding arm could reach up to
33 feet (10 meters)

15

00:00:32,465 --> 00:00:33,433

for distant samples.

16

00:00:33,466 --> 00:00:36,369

■

17

00:00:36,402 --> 00:00:37,537

For an even longer reach,

18

00:00:37,570 --> 00:00:39,038

a projectile launcher could
send a sampling mechanism

19

00:00:39,071 --> 00:00:39,705

[click]

20

00:00:39,738 --> 00:00:41,007

[slowed down roar]

21

00:00:41,040 --> 00:00:44,377

up to 164 feet
(50 meters) away.

22

00:00:44,410 --> 00:00:47,680

It would then be
reeled in on a tether.

23

00:00:47,713 --> 00:00:51,551
Both the arm and launcher could
use a claw to grab samples.

24
00:00:52,551 --> 00:00:55,321
Heated prongs would melt in
to secure a grip.

25
00:00:55,354 --> 00:00:56,722
[grinding]

26
00:00:56,755 --> 00:00:58,458
allowing a drill to penetrate
the ice.

27
00:00:58,491 --> 00:00:59,492
[drill sound]

28
00:01:00,392 --> 00:01:02,162
And that's just on the surface.

29
00:01:02,828 --> 00:01:04,363
A subsurface probe could contain

30
00:01:04,396 --> 00:01:07,600
a buzz saw to bore through the
icy crust

31
00:01:08,134 --> 00:01:09,769
and send samples of ice water
back to the surface

32
00:01:09,802 --> 00:01:10,770
through pneumatic tubes.

33
00:01:10,803 --> 00:01:12,371

34
00:01:12,404 --> 00:01:14,907

The probe could bore for miles.

35

00:01:14,940 --> 00:01:18,078

These prototypes are just
a starting point.

36

00:01:18,511 --> 00:01:20,947

Each prototype is now under
review by NASA.

37

00:01:20,980 --> 00:01:22,882

■

38

00:01:22,915 --> 00:01:25,051

If selected for future
development, these robotic tools

39

00:01:25,084 --> 00:01:27,687

could one day help us explore
the outer solar system.

40

00:01:28,287 --> 00:01:30,056

These robotic tools were
developed at JPL as part of

41

00:01:30,089 --> 00:01:32,391

the Ocean Worlds Mobility and
Sensing study,

42

00:01:32,424 --> 00:01:34,894

funded by NASA's Science
Technology Mission Directorate.

43

00:01:35,528 --> 00:01:37,063

NASA Jet Propulsion Laboratory