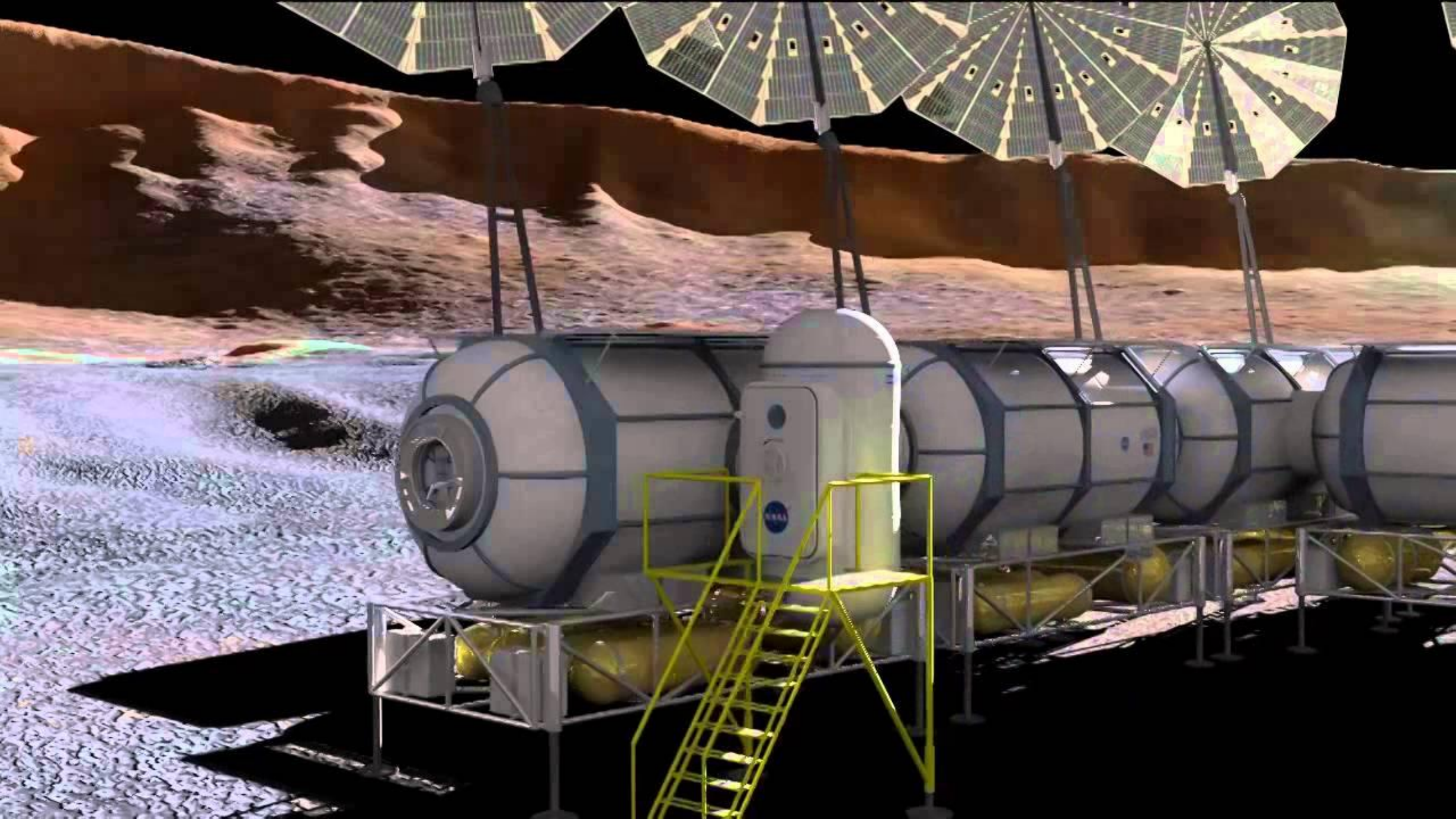

1
00:00:04,810 --> 00:00:02,729
the station hosts a collaborative

2
00:00:06,910 --> 00:00:04,820
experiment that has been operating on

3
00:00:08,770 --> 00:00:06,920
station for more than five years and

4
00:00:10,870 --> 00:00:08,780
while the French Space Agency is the

5
00:00:13,000 --> 00:00:10,880
lead for this experiment it involves

6
00:00:16,000 --> 00:00:13,010
American investigators and scientists

7
00:00:18,550 --> 00:00:16,010
from many other countries d click

8
00:00:20,470 --> 00:00:18,560
continues to send back data allowing us

9
00:00:23,259 --> 00:00:20,480
to learn how various materials change

10
00:00:26,050 --> 00:00:23,269
from solid to liquid to gas and then

11
00:00:28,300 --> 00:00:26,060
back again on the molecular level the

12
00:00:30,849 --> 00:00:28,310
microgravity environment in space allows

13
00:00:32,679 --> 00:00:30,859

investigators to study fluid processes

14
00:00:35,250 --> 00:00:32,689
that are difficult and sometimes

15
00:00:37,569 --> 00:00:35,260
impossible to observe here on earth

16
00:00:40,060 --> 00:00:37,579
Tracy McMann a public affairs officer

17
00:00:42,880 --> 00:00:40,070
with the station's payload operations

18
00:00:43,810 --> 00:00:42,890
integration Center there at the Marshall

19
00:00:46,930 --> 00:00:43,820
Space Flight Center in Huntsville

20
00:00:49,419 --> 00:00:46,940
Alabama spoke recently with D clicks

21
00:00:52,750 --> 00:00:49,429
mission manager from the French Space

22
00:00:55,540 --> 00:00:52,760
Agency the name of the experiment is D

23
00:00:58,770 --> 00:00:55,550
click it stands for device for the study

24
00:01:01,509 --> 00:00:58,780
of critical liquids and crystallization

25
00:01:04,000 --> 00:01:01,519
the click is a facility dedicated to the

26
00:01:08,200 --> 00:01:04,010
study of transparent media it's a kind

27
00:01:10,690 --> 00:01:08,210
of furnace in which one can put the

28
00:01:14,290 --> 00:01:10,700
media he wants to study for example we

29
00:01:17,020 --> 00:01:14,300
have studies on supercritical fluids or

30
00:01:19,540 --> 00:01:17,030
solidification of transparent media it

31
00:01:21,880 --> 00:01:19,550
is onboard the space station since 2009

32
00:01:24,010 --> 00:01:21,890
and working since then

33
00:01:26,650 --> 00:01:24,020
a typical simple material that is being

34
00:01:30,750 --> 00:01:26,660
studied and on own body click is the

35
00:01:34,030 --> 00:01:30,760
water and we are studying what are the

36
00:01:37,240 --> 00:01:34,040
critical fluid because when you heat

37
00:01:40,270 --> 00:01:37,250
water at very high temperature which is

38
00:01:41,410 --> 00:01:40,280

close to 400 degree C it it becomes

39
00:01:44,380 --> 00:01:41,420
supercritical

40
00:01:48,880 --> 00:01:44,390
which is a kind of mix between the fluid

41
00:01:52,480 --> 00:01:48,890
and in gas state it's a kind of gas that

42
00:01:54,880 --> 00:01:52,490
waits like a fluid and when you perform

43
00:01:57,700 --> 00:01:54,890
that kind of study on the ground it is

44
00:02:00,160 --> 00:01:57,710
very difficult because as it is a gas

45
00:02:03,100 --> 00:02:00,170
that weight recovery

46
00:02:06,430 --> 00:02:03,110
it is highly compressive and you cannot

47
00:02:08,310 --> 00:02:06,440
have a whole cell which is in a

48
00:02:11,050 --> 00:02:08,320
supercritical State for example and

49
00:02:11,870 --> 00:02:11,060
under microgravity as there is no weight

50
00:02:18,200 --> 00:02:11,880
you

51
00:02:20,930 --> 00:02:18,210
can study it very precisely and for

52
00:02:23,060 --> 00:02:20,940
example the the measurement of the

53
00:02:25,160 --> 00:02:23,070
critical temperature of water that we

54
00:02:27,910 --> 00:02:25,170
perform on board a click is the most

55
00:02:30,920 --> 00:02:27,920
precise ever measurement of this

56
00:02:34,250 --> 00:02:30,930
temperature when you are above the

57
00:02:37,700 --> 00:02:34,260
critical temperature the water is able

58
00:02:42,070 --> 00:02:37,710
to break the hydrocarbon ik chains of

59
00:02:45,890 --> 00:02:42,080
materials and so you see that you can

60
00:02:47,690 --> 00:02:45,900
recycle material by injecting material

61
00:02:50,360 --> 00:02:47,700
into supercritical water

62
00:02:52,910 --> 00:02:50,370
the main application for this is to to

63
00:02:56,270 --> 00:02:52,920

help recycling organic media which is a

64
00:02:59,930 --> 00:02:56,280
basically waste during long-duration

65
00:03:02,060 --> 00:02:59,940
manned mission so this is one of the

66
00:03:04,610 --> 00:03:02,070
application of the click but there are

67
00:03:07,120 --> 00:03:04,620
several daughters like solidification

68
00:03:09,590 --> 00:03:07,130
studies for example the objectives of

69
00:03:13,190 --> 00:03:09,600
performing that kind of experiment in

70
00:03:15,500 --> 00:03:13,200
microgravity is to get rid of gravity of

71
00:03:18,590 --> 00:03:15,510
course because when you have gravity you

72
00:03:21,080 --> 00:03:18,600
have induced phenomenons like convection

73
00:03:23,630 --> 00:03:21,090
for example that can hide some of the

74
00:03:26,630 --> 00:03:23,640
phenomenons that occur in education for

75
00:03:29,540 --> 00:03:26,640
example the ISS is the is the right

76
00:03:33,020 --> 00:03:29,550
place for for our experiments for three

77
00:03:35,350 --> 00:03:33,030
main reasons the first is that it gives

78
00:03:37,910 --> 00:03:35,360
us access to long-duration microgravity

79
00:03:40,100 --> 00:03:37,920
which is really needed for our

80
00:03:43,400 --> 00:03:40,110
applications the second reason is that

81
00:03:46,940 --> 00:03:43,410
we are able to launch and return

82
00:03:49,220 --> 00:03:46,950
Hardware from and to the International

83
00:03:52,930 --> 00:03:49,230
Space Station and to refurbish this at

84
00:03:56,890 --> 00:03:52,940
wire and so we have access to multiple

85
00:04:01,220 --> 00:03:56,900
experiments with only one payload and

86
00:04:03,740 --> 00:04:01,230
and the third reason is that onboard the

87
00:04:07,340 --> 00:04:03,750
ISS we can store several up several

88
00:04:10,070 --> 00:04:07,350

experiments several insert that exchange

89
00:04:12,590 --> 00:04:10,080
it inside the cake for the time being we

90
00:04:15,530 --> 00:04:12,600
have three inserts that have been

91
00:04:18,909 --> 00:04:15,540
developed to with the click for each

92
00:04:22,130 --> 00:04:18,919
insert we have a team of scientists and

93
00:04:25,469 --> 00:04:22,140
in each team we have both american and

94
00:04:27,420 --> 00:04:25,479
french scientists so for example for the

95
00:04:30,390 --> 00:04:27,430
high-temperature insert the dedicated to

96
00:04:33,240 --> 00:04:30,400
a supercritical water studies we have

97
00:04:37,680 --> 00:04:33,250
scientists from Green Research Center in

98
00:04:39,450 --> 00:04:37,690
in Cleveland Ohio and when the French

99
00:04:44,089 --> 00:04:39,460
scientists are located in Bordeaux

100
00:04:46,680 --> 00:04:44,099
France we have developed some tools that

101
00:04:49,050 --> 00:04:46,690
give the scientists the opportunity to

102
00:04:52,649 --> 00:04:49,060
follow in real time the experiments from

103
00:04:56,100 --> 00:04:52,659
the Arabs they only need an internet

104
00:04:58,379 --> 00:04:56,110
browser and they connect to the web

105
00:05:00,270 --> 00:04:58,389
server and they see in real time the

106
00:05:04,330 --> 00:05:00,280
evolution of the experiments the

107
00:05:06,970 --> 00:05:04,340
parameters and the images and so on

108
00:05:08,980 --> 00:05:06,980
more information on D click can be found

109
00:05:14,290 --> 00:05:08,990
on the French Space Agency website at

110
00:05:17,980 --> 00:05:14,300
Caen s dot fr and search for D click the

111
00:05:19,659 --> 00:05:17,990
ECL I see if you're not fluent in French

112
00:05:21,190 --> 00:05:19,669
you can click on the British flag in the