



1
00:00:00,006 --> 00:00:01,106
[Sound Effects]

2
00:00:01,106 --> 00:00:02,576
Hi my name is Kaci Heins and I'm

3
00:00:02,576 --> 00:00:04,346
from Northland Preparatory
Academy

4
00:00:04,346 --> 00:00:07,976
in Flagstaff Arizona
and this is NASA Now.

5
00:00:08,516 --> 00:00:29,306
[Sound Effects]

6
00:00:29,806 --> 00:00:33,746
Hi I'm Rick and this
is NASA Now.

7
00:00:34,666 --> 00:00:38,356
NASA has taken an extraordinary
journey over the past 54 years.

8
00:00:39,046 --> 00:00:40,846
So what does the future
hold for space travel?

9
00:00:41,536 --> 00:00:43,916
Who better to ask than one
of NASA's own astronauts?

10
00:00:44,566 --> 00:00:47,926
That's ahead, but first here's
what's happening at NASA Now.

11
00:00:48,516 --> 00:00:51,856
[Sound Effects]

12

00:00:52,356 --> 00:00:56,266

Turning trash into gas...that's
what scientists are working

13

00:00:56,266 --> 00:00:56,976

on at NASA.

14

00:00:57,656 --> 00:01:00,486

In an effort to support future
long distance space missions,

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00:01:00,606 --> 00:01:03,786

NASA researchers built a
prototype reactor designed

16

00:01:03,786 --> 00:01:05,746

to convert trash into gas.

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00:01:06,506 --> 00:01:09,466

The device incinerates the
trash that astronauts accumulate

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00:01:09,466 --> 00:01:12,836

in space and creates
methane, oxygen, and water.

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00:01:13,626 --> 00:01:15,066

These elements can then be used

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00:01:15,066 --> 00:01:17,476

for rocket fuel,
and life support.

21

00:01:18,106 --> 00:01:19,976

The reactor could
fly for demonstration

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00:01:19,976 --> 00:01:23,606

on the International Space
Station as soon as 2018.

23

00:01:23,966 --> 00:01:26,926

This research also has potential
applications right here

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00:01:26,926 --> 00:01:27,326

on Earth.

25

00:01:27,796 --> 00:01:31,346

By converting trash into power,
these generators could be used

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00:01:31,346 --> 00:01:33,556

to generate electricity
in remote areas.

27

00:01:34,516 --> 00:01:36,916

[Sound Effects]

28

00:01:37,416 --> 00:01:39,956

Did you know that
NASA technology

29

00:01:39,956 --> 00:01:43,186

from the 1970's could be
used to develop future tires

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00:01:43,186 --> 00:01:45,146

for commercial and
passenger vehicles.

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00:01:45,686 --> 00:01:47,546

The same type of
tire that was used

32

00:01:47,546 --> 00:01:50,526

on the Lunar Rover during the
Apollo moon missions could be

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00:01:50,526 --> 00:01:52,966

incorporated into
future tires manufactured

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00:01:52,966 --> 00:01:54,706

by the Goodyear Tire
& Rubber company.

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00:01:55,056 --> 00:01:58,136

NASA and Goodyear have recently
completed a jointly funded

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00:01:58,186 --> 00:02:00,976

project to improve on the wire
mesh Moon tire technology.

37

00:02:02,076 --> 00:02:05,566

The new tires would save energy,
be more resistant to punctures

38

00:02:05,646 --> 00:02:08,056

and could also be used
on more massive lunar

39

00:02:08,056 --> 00:02:09,216

exploration vehicles.

40

00:02:09,736 --> 00:02:10,706

Now you know.

41

00:02:11,516 --> 00:02:13,616

[Sound Effects]

42

00:02:14,116 --> 00:02:17,526

In a previous program we talked
with retired Air Force Colonel

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00:02:17,526 --> 00:02:19,906

and astronaut Greg
Johnson about his path

44

00:02:19,906 --> 00:02:20,986
to becoming an astronaut.

45

00:02:21,546 --> 00:02:23,696
Today we are going to
continue that conversation

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00:02:23,946 --> 00:02:25,676
and see what Colonel
Johnson envisions

47

00:02:25,676 --> 00:02:27,086
for the future of space travel.

48

00:02:28,126 --> 00:02:30,126
[Music]

49

00:02:30,236 --> 00:02:31,796
We are an exploring people.

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00:02:32,016 --> 00:02:34,616
If you look back in the
history of our country

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00:02:34,936 --> 00:02:38,036
from the great explorers
many centuries ago,

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00:02:38,606 --> 00:02:44,056
they were exploring to find new
lands, new ideas, new places

53

00:02:44,636 --> 00:02:49,636
and time enables us to look
back at these great expeditions

54

00:02:50,106 --> 00:02:53,156
in our history where we learned
about the unknown unknowns

55
00:02:53,546 --> 00:02:55,786
and that's what space
offers for us.

56
00:02:56,516 --> 00:02:58,946
[Music]

57
00:02:59,446 --> 00:03:02,486
If you think of any of the
great frontiers in our world,

58
00:03:03,016 --> 00:03:04,936
it's going deeper
into the ocean, right?

59
00:03:04,936 --> 00:03:06,546
It's going up into
the atmosphere,

60
00:03:06,546 --> 00:03:08,826
away from the atmosphere,
out of the atmosphere,

61
00:03:09,286 --> 00:03:11,766
out among the planets
in the solar system,

62
00:03:11,876 --> 00:03:12,966
out of the solar system.

63
00:03:13,386 --> 00:03:15,216
There's places that
we just haven't gone.

64
00:03:15,216 --> 00:03:16,626
We've been to the moon.

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00:03:16,986 --> 00:03:19,126

We've been to low
Earth orbit with humans

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00:03:19,326 --> 00:03:21,936

and we've got probes going all

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00:03:21,936 --> 00:03:24,216

over the solar system right
now learning about Jupiter,

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00:03:24,216 --> 00:03:27,666

learning about Pluto and
we're learning new things

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00:03:27,666 --> 00:03:28,796

with every single mission

70

00:03:29,016 --> 00:03:31,016

[Music]

71

00:03:31,016 --> 00:03:33,456

We've always sent many probes

72

00:03:33,706 --> 00:03:37,126

to the distant places before
we actually send people.

73

00:03:37,636 --> 00:03:40,166

It's partly because
the unknown unknowns...

74

00:03:40,196 --> 00:03:42,316

We don't know what's out
there and we don't want

75

00:03:42,316 --> 00:03:45,536

to risk people's lives until we

better understand the problem,

76

00:03:45,536 --> 00:03:48,016

we have some expectation
of success.

77

00:03:48,616 --> 00:03:50,276

We have ideas.

78

00:03:50,996 --> 00:03:52,146

We have passions.

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00:03:52,456 --> 00:03:54,586

We do have limitations
with budget

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00:03:54,586 --> 00:03:55,656

so that's what we're
doing right now.

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00:03:55,656 --> 00:03:58,496

We're taking the first steps to
figure out what we need to do,

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00:03:58,496 --> 00:04:00,476

what kind of vehicle we have to
have, what's the mission going

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00:04:00,476 --> 00:04:02,276

to be, and then how are
we going to get there.

84

00:04:03,016 --> 00:04:04,966

[Music]

85

00:04:04,966 --> 00:04:10,036

The Mars Rovers have taught
us so much about that planet

86

00:04:10,036 --> 00:04:12,606
that we just can't learn
from just looking at it.

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00:04:12,926 --> 00:04:16,526
And so we obviously haven't
sent any humans and as soon

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00:04:16,526 --> 00:04:18,126
as we do send humans to Mars,

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00:04:18,406 --> 00:04:19,956
we're going to learn
all kinds of new things.

90

00:04:20,516 --> 00:04:22,926
[Music]

91

00:04:23,426 --> 00:04:26,466
I personally believe that
we're going to have a couple

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00:04:26,466 --> 00:04:29,696
of short missions to the moon
and then we're actually going

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00:04:29,696 --> 00:04:31,996
to set something up on
a more permanent basis,

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00:04:31,996 --> 00:04:33,146
kind of like the space station.

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00:04:33,146 --> 00:04:34,896
An outpost on the moon.

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00:04:34,896 --> 00:04:37,906
I'm not sure how
it would be funded.

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00:04:37,906 --> 00:04:40,786

Maybe we could have some sort
of commercial application

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00:04:40,786 --> 00:04:42,596

so we could get private
companies involved.

99

00:04:43,306 --> 00:04:46,796

We haven't been to the
moon in 40 years and many

100

00:04:46,796 --> 00:04:47,576

of the smart people

101

00:04:47,576 --> 00:04:49,616

that designed those
vehicles are retired.

102

00:04:49,736 --> 00:04:53,576

And so we've got a new brand
of engineers and scientists

103

00:04:53,996 --> 00:04:57,316

and astronauts and I think
if we want to go to Mars,

104

00:04:57,316 --> 00:05:01,576

I think it makes sense to first
go to the moon and relearn

105

00:05:01,936 --> 00:05:05,546

and improve on those missions
that we did about 40 years ago.

106

00:05:06,176 --> 00:05:08,596

Now eventually we're
hoping to go to Mars.

107

00:05:08,786 --> 00:05:11,556

I'm hoping that the kids in
the audience, when they get

108

00:05:11,556 --> 00:05:13,856

to be my age, we
will have looked back

109

00:05:13,856 --> 00:05:15,796

on several manned Mars missions.

110

00:05:16,216 --> 00:05:19,316

But for now I think it's
important for us to figure

111

00:05:19,316 --> 00:05:21,416

out how to get to a planet
that's only you know,

112

00:05:21,646 --> 00:05:24,486

250,000 miles away
instead of millions

113

00:05:24,486 --> 00:05:25,586

and millions of miles away.

114

00:05:26,311 --> 00:05:28,311

[Sound Effects]

115

00:05:28,606 --> 00:05:31,006

Seems like there is a world
of possibilities when it comes

116

00:05:31,006 --> 00:05:32,046

to future space travel.

117

00:05:32,616 --> 00:05:34,996

Now it's time to turn
your imagination loose.

118

00:05:36,186 --> 00:05:38,516

Teachers, here's a
great activity for you

119

00:05:38,516 --> 00:05:41,406

and your students to design
a future mission to the moon.

120

00:05:41,956 --> 00:05:44,376

Look for Newton's Laws
of Motion: Lunar Nautics.

121

00:05:44,806 --> 00:05:47,786

You'll find it on the NASA
Explorer School Virtual Campus.

122

00:05:49,166 --> 00:05:50,496

Well that's it for NASA NOW.

123

00:05:50,906 --> 00:05:53,416

Be sure to visit our facebook
page and leave a comment.

124

00:05:53,826 --> 00:05:56,206

We want to hear your ideas
for future space travel.

125

00:05:56,686 --> 00:05:58,836

We'll see you next
time on NASA NOW!

126

00:05:59,516 --> 00:06:05,706

[Sound Effects]