



1
00:00:06,890 --> 00:00:09,640
This Week at NASA...

2
00:00:09,640 --> 00:00:16,910
“How do you see the evolution of commercially sponsored research sort of taking place down

3
00:00:16,910 --> 00:00:17,910
the road?”

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00:00:17,910 --> 00:00:22,060
A discussion about the ground-breaking science research being conducted aboard the International

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00:00:22,060 --> 00:00:26,609
Space Station was part of a series of NASA briefings at the Kennedy Space Center.

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00:00:26,609 --> 00:00:31,060
“We really have, as you’ve heard, great capacity on the ISS to meet the needs of a

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00:00:31,060 --> 00:00:34,829
large number of users And it just provides the opportunity for real innovation and for

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00:00:34,829 --> 00:00:36,480
things to advance quite quickly.”

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00:00:36,480 --> 00:00:41,421
During another session, NASA officials talked about the agency’s human deep space exploration

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00:00:41,421 --> 00:00:45,769
efforts with a progress update from the Orion and Space Launch System programs.

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00:00:45,769 --> 00:00:53,929
“It is a very key element of our overall

plan to get humans back beyond Earth orbit

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00:00:53,929 --> 00:00:55,690

as quickly as we can.”

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00:00:55,690 --> 00:01:00,010

We are working very diligently to our first test flight which will come up in September

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00:01:00,010 --> 00:01:03,239

2014, called Exploration Flight Test-1.”

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00:01:03,239 --> 00:01:08,840

Orion and SLS will enable astronauts to travel beyond low Earth orbit, to the most distant

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00:01:08,840 --> 00:01:14,140

destinations ever.

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00:01:14,140 --> 00:01:19,110

Powering the upper stage of the SLS will be the J-2X engine.

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00:01:19,110 --> 00:01:23,600

Engineers at the Stennis Space Center continued the year’s second test of the J-2X.

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00:01:23,600 --> 00:01:29,040

The full duration 550-second test firing provided critical information on the combustion stability

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00:01:29,040 --> 00:01:33,130

of the engine and on its performance with the nozzle extension.

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00:01:33,130 --> 00:01:38,491

The exercise was also used to further evaluate the clamshell configuration of the A2 test

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00:01:38,491 --> 00:01:45,630

stand, as well as calibration of the facility's cryogenic flow meters.

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00:01:45,630 --> 00:01:49,970

Parts for the next-generation Space Launch System are being created here, at the National

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00:01:49,970 --> 00:01:54,430

Center for Advanced Manufacturing Rapid Prototyping Facility.

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00:01:54,430 --> 00:01:58,869

NASA Administrator Charlie Bolden was at the Marshall Space Flight Center to tour the high-tech

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00:01:58,869 --> 00:02:04,159

manufacturing facility that impacted America's manufacturing sector last year to the tune

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00:02:04,159 --> 00:02:06,930

of an estimated 5-billion dollars.

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00:02:06,930 --> 00:02:12,201

Bolden watched a type of additive manufacturing called "selective laser melting" create

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00:02:12,201 --> 00:02:16,550

complex parts for the J-2X and RS-25 rocket engines.

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00:02:16,550 --> 00:02:22,190

"Anything that we do in spaceflight, whether it's human spaceflight or otherwise, Marshall's

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00:02:22,190 --> 00:02:23,190

involved.

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00:02:23,190 --> 00:02:27,930

People who live here should know that Marshall

is an integral part of NASA – it's who

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00:02:27,930 --> 00:02:28,930

we are.”

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00:02:28,930 --> 00:02:34,720

Done without welding, “selective laser melting” also saves time and reduces the cost of creating

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00:02:34,720 --> 00:02:40,129

component parts for what will be the largest launch vehicle ever built.

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00:02:40,129 --> 00:02:46,860

NASA's Van Allen Probes have discovered a previously unknown third radiation belt

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00:02:46,860 --> 00:02:48,450

around Earth.

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00:02:48,450 --> 00:02:53,800

Traditional observations long showed the Van Allen belts as two distinct regions of trapped

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00:02:53,800 --> 00:02:55,110

radiation.

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00:02:55,110 --> 00:02:59,890

These new high-resolution observations by the first dual-spacecraft mission to fly through

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00:02:59,890 --> 00:03:05,610

them show that there can be three long-lasting belt structures with the emergence of a second

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00:03:05,610 --> 00:03:07,069

“slot” (or empty) region.

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00:03:07,069 --> 00:03:10,950

“The International Space Station is down below the inner belt.

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00:03:10,950 --> 00:03:17,870

This new ring is actually much further out than that, it's at about 12,000 miles above

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00:03:17,870 --> 00:03:18,870

the surface.”

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00:03:18,870 --> 00:03:24,459

These radiation belts, named for their discoverer, Dr. James Van Allen, are affected by solar

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00:03:24,459 --> 00:03:30,540

storms in the form of coronal mass ejections – space weather – and can swell dramatically.

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00:03:30,540 --> 00:03:36,620

When this occurs, they can pose dangers to communications and GPS satellites, as well

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00:03:36,620 --> 00:03:38,580

as human spaceflight activities.

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00:03:38,580 --> 00:03:44,010

“This is going to teach us a lot about how effectively the magnetosphere can store and

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00:03:44,010 --> 00:03:47,879

maintain an electron population for extended periods of time.”

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00:03:47,879 --> 00:03:54,090

Scientists using particle detection instruments flying on board the twin spacecraft also found

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00:03:54,090 --> 00:03:59,739

unexpected structures and processes within these hazardous regions of near space.

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00:03:59,739 --> 00:04:05,640

The new discovery shows the dynamic and variable nature of the radiation belts and will improve

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00:04:05,640 --> 00:04:10,340

our understanding of how they respond to solar activity.

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00:04:10,340 --> 00:04:17,209

The spin rate of a supermassive black hole has been measured definitively for the first

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00:04:17,209 --> 00:04:18,209

time.

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00:04:18,209 --> 00:04:24,350

NASA's X-ray observatory, Nuclear Spectroscopic Telescope Array, or NuSTAR, teamed with the

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00:04:24,350 --> 00:04:28,250

European Space Agency's XMM-Newton for the findings.

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00:04:28,250 --> 00:04:33,660

They solve a long-standing debate about similar measurements in other black holes and will

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00:04:33,660 --> 00:04:37,950

lead to a better understanding of how black holes and galaxies evolve.

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00:04:37,950 --> 00:04:43,730

The observations are also a powerful test of Einstein's theory of general relativity,

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00:04:43,730 --> 00:04:47,670

which holds that gravity can bend light and space-time.

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00:04:47,670 --> 00:04:52,710
The X-ray telescopes detected these warping effects in the most extreme environments,

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00:04:52,710 --> 00:05:00,460
where the immense gravity field of a black hole is severely altering space-time.

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00:05:00,460 --> 00:05:05,240
The annual Aerospace @ Annapolis Day, organized by Goddard Space Flight Center, attracted

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00:05:05,240 --> 00:05:10,860
about 400 people, including state lawmakers and midshipmen from the Naval Academy.

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00:05:10,860 --> 00:05:16,480
NASA exhibits on hand included a full-size model of the Mars Curiosity rover.

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00:05:16,480 --> 00:05:22,300
Attendees spoke with scientists who work with "Sample Analysis at Mars" one of Curiosity's

70
00:05:22,300 --> 00:05:23,830
main instruments –that was built at Goddard.

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00:05:23,830 --> 00:05:29,580
Goddard Center Director Chris Scolese talked about the significance of events like this

72
00:05:29,580 --> 00:05:31,260
to NASA and the local community.

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00:05:31,260 --> 00:05:37,930
"The purpose is to go off and inspire students and educators to pursue and teach the science

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00:05:37,930 --> 00:05:38,930

technology engineering and mathematics fields,
so that we can inspire the next generation

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00:05:38,930 --> 00:05:46,170
to move on, so people can see that they can
work here in Maryland and accomplish some

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00:05:46,170 --> 00:05:47,450
really great things.”

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00:05:47,450 --> 00:05:49,610

\h
Other missions showcased included the Landsat

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00:05:49,610 --> 00:05:55,160
Data Continuity Mission and the recent successful
on-orbit demonstration of the Robotic Refueling

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00:05:55,160 --> 00:05:56,160
Mission.

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00:05:56,160 --> 00:06:01,190
The event, hosted by the Maryland General
Assembly, was also an opportunity for NASA

81
00:06:01,190 --> 00:06:04,220
to get valued feedback – and Scolese liked
what he heard.

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00:06:04,220 --> 00:06:05,220
“Yes I did.

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00:06:05,220 --> 00:06:08,000
We met with the governor today and he was
very interested in what NASA's doing and

84
00:06:08,000 --> 00:06:15,520
looking forward to greater things from the
Goddard Space Flight Center.”

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00:06:15,520 --> 00:06:20,270
The Kennedy Space Center Visitor Complex unveiled
a new logo for the Space Shuttle Atlantis

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00:06:20,270 --> 00:06:24,330
exhibit still under construction at the Florida
spaceport.

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00:06:24,330 --> 00:06:28,960
Atlantis, the shuttle that flew the final
mission of the 30-year-long shuttle program,

88
00:06:28,960 --> 00:06:33,370
has been positioned inside the exhibit hall
as it will be displayed: wheels up, tilted

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00:06:33,370 --> 00:06:39,800
43 degrees to give it the same look it had
when leaving the International Space Station.

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00:06:39,800 --> 00:06:44,960
By the time the Atlantis exhibit opens June
29, Atlantis will have its cargo bay doors

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00:06:44,960 --> 00:06:47,840
open and its robotic arm extended.

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00:06:47,840 --> 00:06:53,100
The Space Shuttle Atlantis attraction will
feature dozens of interactive displays highlighting

93
00:06:53,100 --> 00:06:57,630
different aspects of the space shuttle and
Atlantis itself.

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00:06:57,630 --> 00:07:02,060
The exhibit will be on Kennedy property only
a few miles from the runway Atlantis touched

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00:07:02,060 --> 00:07:09,310
down on July 21, 2011, to close out NASA's longest human spaceflight program.

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00:07:09,310 --> 00:07:16,500
John Palguta, vice-president for policy with the Partnership for Public Service, and Jeri

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00:07:16,500 --> 00:07:21,320
Buchholz, assistant administrator for NASA Human Capital Management, visited the Stennis

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00:07:21,320 --> 00:07:26,590
Space Center to officially recognize the center's high ranking in the U.S. Office of Personnel

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00:07:26,590 --> 00:07:34,860
Management's Employee Viewpoint Survey.

100
00:07:34,860 --> 00:07:39,880
NASA was named the best place to work in the federal government among large agencies – with

101
00:07:39,880 --> 00:07:45,210
Stennis ranking second among 292 agency subcomponents.

102
00:07:45,210 --> 00:07:48,510
"He would come up to ya and spit water at you.

103
00:07:48,510 --> 00:07:51,190
So that was a neat part of the job.

104
00:07:51,190 --> 00:07:52,190
Dolphins are pretty smart."

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00:07:52,190 --> 00:07:56,190
The Wallops second annual job shadow day provided an opportunity for NASA employees to help

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00:07:56,190 --> 00:07:58,900

students experience STEM careers firsthand.

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00:07:58,900 --> 00:08:00,550

"I'm a huge science nerd.

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00:08:00,550 --> 00:08:05,160

I'll admit that and I like the organisms
in marine biology."

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00:08:05,160 --> 00:08:11,300

"I didn't know there was so much going
on here, like weather satellites, I didn't

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00:08:11,300 --> 00:08:13,480

know any of that happened here."

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00:08:13,480 --> 00:08:19,290

"I think this opportunity really gives me
a chance to understand which area means and

112

00:08:19,290 --> 00:08:21,950

which one I would be more happy going into."

113

00:08:21,950 --> 00:08:25,960

The experience can also provide students with
a pretty compelling reason to stay in school

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00:08:25,960 --> 00:08:29,560

by helping them make the connection between
education and success.

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00:08:29,560 --> 00:08:33,830

"I like to tell them about my background
a little bit so that they can try and understand

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00:08:33,830 --> 00:08:39,940

where I'm coming from, see sort of the steps
that I took to get to the position I'm in."

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00:08:39,940 --> 00:08:44,950

“More students should apply for this program because it is a great experience.”

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00:08:44,950 --> 00:08:55,670

“And liftoff of space shuttle Columbia to broaden our view of the universe through the

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00:08:55,670 --> 00:08:57,050

Hubble Space Telescope.”

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00:08:57,050 --> 00:09:03,220

On March first, 2002, space shuttle Columbia launched on STS-109 – also known as “Hubble

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00:09:03,220 --> 00:09:07,870

Servicing Mission 3-B” – the fourth servicing mission to the Hubble Space Telescope.

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00:09:07,870 --> 00:09:12,530

During the 11-day mission Columbia’s crew of seven installed new equipment that, among

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00:09:12,530 --> 00:09:18,140

other improvements, dispensed the telescope’s newly-increased power, and doubled the camera’s

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00:09:18,140 --> 00:09:20,740

coverage area with more speed and clarity.

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00:09:20,740 --> 00:09:25,880

In 2009, work was performed during a final servicing mission that is expected to keep

126

00:09:25,880 --> 00:09:29,440

HST in operation through 2014.

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00:09:29,440 --> 00:09:39,031

And, 41 years ago, on March 2, 1972, Pioneer 10 launched on what would prove to be a mission

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00:09:39,031 --> 00:09:41,360

lasting more than three decades!

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00:09:41,360 --> 00:09:47,010

Pioneer 10 was the first spacecraft to travel through the Asteroid belt, and the first spacecraft

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00:09:47,010 --> 00:09:52,420

to make direct observations and obtain close-up images of Jupiter and its moons.

131

00:09:52,420 --> 00:09:57,710

This historic event marked humans' first approach to the gas giant and opened the way for exploration

132

00:09:57,710 --> 00:10:05,310

of the outer solar system by future spacecraft like Voyager, Ulysses, Galileo and Cassini.

133

00:10:05,310 --> 00:10:11,210

After more than 8 billion miles traveled over more than 30 years, Pioneer 10 sent its last

134

00:10:11,210 --> 00:10:15,010

signal to Earth on January 23, 2003.

135

00:10:15,010 --> 00:10:18,310

And that's This Week @NASA.

136

00:10:18,310 --> 00:10:24,310

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