
IT'S NOT
ROCKET SCIENCE

1
00:00:00,000 --> 00:00:01,900
[fast paced music]

2
00:00:02,000 --> 00:00:05,000
>> STEPHEN: NASA's new rocket, the Space Launch System, is building on the-

3
00:00:05,100 --> 00:00:07,500
the foundation laid by the Saturn V and the Space Shuttle.

4
00:00:07,600 --> 00:00:10,000
In fact, its current design looks a little bit like a mash-up

5
00:00:10,100 --> 00:00:11,700
of the Saturn V and the Space Shuttle.

6
00:00:11,800 --> 00:00:14,100
That's because it's taking technology from both and combining them

7
00:00:14,200 --> 00:00:16,000
to go further than they ever could.

8
00:00:17,000 --> 00:00:18,900
That's one small step for man…

9
00:00:19,000 --> 00:00:20,000
[Fast paced music]

10
00:00:20,100 --> 00:00:21,900
Traveling through space is hard.

11
00:00:22,000 --> 00:00:24,000
That's why NASA's Space Launch System

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00:00:24,100 --> 00:00:26,000
will have to be the most powerful rocket in history.

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00:00:26,100 --> 00:00:29,500

How is SLS able to meet the challenges of exploring deep space?

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00:00:29,600 --> 00:00:32,500
Well, when it comes to our journey to Mars and beyond…

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00:00:32,600 --> 00:00:36,000
There are NO small steps.

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00:00:36,100 --> 00:00:39,000
Let’s talk about how the SLS is like the Saturn V.

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00:00:39,100 --> 00:00:42,000
The SLS is a staged rocket, like the Saturn V.

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00:00:42,100 --> 00:00:46,000
Once all of the fuel in a stage is used up, that stage is dropped to reduce weight.

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00:00:46,100 --> 00:00:48,000
The two are also similar heights.

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00:00:48,100 --> 00:00:53,100
The first version of the SLS will be 322 feet, compared to 360 feet for the Saturn V.

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00:00:53,200 --> 00:00:57,400
Now the Saturn V had 3 inline stages, where the SLS will only have 2.

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00:00:57,500 --> 00:01:00,100
But the SLS does have two boosters on either side…

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00:01:00,200 --> 00:01:01,500
And you know where those came from.

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00:01:01,600 --> 00:01:03,900
[Shuttle boosters rumbling]

25
00:01:04,000 --> 00:01:08,800
The Space Shuttle’s solid rocket boosters produced the most thrust of any rocket engine in history.

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00:01:08,900 --> 00:01:11,500
The SLS will use the same boosters, but they'll be even more powerful,

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00:01:11,600 --> 00:01:14,000
because they have an extra fifth segment containing propellant.

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00:01:14,100 --> 00:01:18,000
The SLS's two boosters combined will produce almost as much thrust

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00:01:18,100 --> 00:01:21,900
as all five of the Saturn V first stage engines.

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00:01:22,000 --> 00:01:25,000
The SLS is also using the Space Shuttle's main engines.

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00:01:25,100 --> 00:01:27,900
Four of them, at the bottom of the center of the rocket.

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00:01:28,000 --> 00:01:30,900
These engines have been used since 1981, although they've been upgraded,

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00:01:31,000 --> 00:01:32,900
improving performance and saving NASA money.

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00:01:33,000 --> 00:01:36,500
They're also hugely reliable. Between ground tests and Shuttle flights,

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00:01:36,600 --> 00:01:39,100
they've already clocked over 1 million seconds of "hot fire time,

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00:01:39,200 --> 00:01:41,800
and that's before SLS ever lifts off.

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00:01:41,900 --> 00:01:44,100
So, NASA has been some pretty incredible vehicles…

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00:01:44,200 --> 00:01:49,400

But the Space Shuttle couldn’t leave low-Earth orbit, and the Saturn V only went to the Moon.

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00:01:49,500 --> 00:01:53,500
How will the SLS combine their capabilities and get to Mars?

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00:01:53,600 --> 00:01:58,400
It’s because even though the SLS is built on previous technology, NASA’s improved it.

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00:01:58,500 --> 00:02:04,300
Think about your phone. This phone from 2007 looks like this new one, and they do the same basic job.

42
00:02:04,400 --> 00:02:07,100
However, this one has more power, is more efficient,

43
00:02:07,200 --> 00:02:10,800
and can plain just do more thanks to improvements in technology.

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00:02:10,900 --> 00:02:15,800
Similarly, the first version of the SLS will weigh 1 million pounds less than the Saturn V,

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00:02:15,900 --> 00:02:17,000
but it’ll get to the moon.

46
00:02:17,100 --> 00:02:19,800
The second version will weigh as much as the Saturn V,

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00:02:19,900 --> 00:02:23,000
it’ll carry the same amount of fuel, but it’s far more fuel efficient…

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00:02:23,100 --> 00:02:25,100
…and that’s the key to getting to Mars.

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00:02:25,200 --> 00:02:25,800
[cheers]

50
00:02:25,900 --> 00:02:29,900
Technology has changed a lot since the Shuttle program began back in 1972.

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00:02:30,000 --> 00:02:33,000
Back then… THIS was considered a smart phone.

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00:02:33,100 --> 00:02:36,600
To sum up, the physics of sending a rocket into space haven’t changed,

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00:02:36,700 --> 00:02:38,000
bur our engineering has.

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00:02:38,200 --> 00:02:42,100
NASA has figured out how to build on legacy technology while also improving it.

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00:02:42,200 --> 00:02:48,000
It’s like putting a roof on a house… When you do that, you don’t tear out the foundation.