
NASA
HOW DO
SPACECRAFT
SLOW
DOWN?

1
00:00:00,158 --> 00:00:04,260
How do spacecraft slow down?

2
00:00:08,616 --> 00:00:07,583
NASA

3
00:00:08,616 --> 00:00:12,241
Well, there are primarily two methods of thought\h
for how spacecraft slow down

4
00:00:12,241 --> 00:00:16,428
and you really have\hto ask yourself, "Are we landing in an area that\hhas an atmosphere?"

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00:00:16,428 --> 00:00:23,400
If not, you definitely want to\hgo with retropropulsion, where you use retro\hthrusters pointed down at the surfa

6
00:00:23,400 --> 00:00:28,630
planet to slow yourself down as you're coming in.\h
If you do have an atmosphere, that makes it a lot\heasier,\h

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00:00:28,630 --> 00:00:33,556
as the atmosphere acts as kind of a giant\h
break as you slow down. So you have your missions\h\h

8
00:00:33,556 --> 00:00:38,962
like Apollo that used retropropulsion when we\h
went to the Moon. When you're able to use the\hatmosphere,

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00:00:38,962 --> 00:00:43,260
you have your heat shield on the blunt\hend of your spacecraft coming into the atmosphere.

10
00:00:43,260 --> 00:00:47,940
And then the parachutes will come out and slow you down the rest of the way to provide that safe landing.

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00:00:48,900 --> 00:00:54,868
Here at NASA, we're constantly developing\hnew technologies to help with that entry,\hdescent and landing, o

12
00:00:54,868 --> 00:00:58,979

Some of the trick in\hentering atmosphere is when you do have it but\hit's really thin.

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00:00:58,979 --> 00:01:02,640
One of the technologies NASA\his developing to handle those is called HIAD,

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00:01:02,640 --> 00:01:09,300
Hypersonic Inflatable Aerodynamic Decelerator.\h
The HIAD can come as a heat shield much like\h\h

15
00:01:09,300 --> 00:01:14,891
the blunt body heat shields of those older\hmissions that were made out of ceramics or\hmetals, but were very

16
00:01:14,891 --> 00:01:20,000
However, HIAD is a flexible\hwoven system that compacts really, really small.\h

17
00:01:20,000 --> 00:01:24,000
So you're able to actually get a very small heat\h
shield inside your rocket diameter.

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00:01:24,000 --> 00:01:30,386
With HIAD,\hwhen the fairing comes off, the heat shield\hcan then inflate and expand to a diameter\hmuch larg

19
00:01:30,386 --> 00:01:34,244
Therefore you're\hable to bring in a much larger payload than\hyou were before.

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00:01:34,814 --> 00:01:36,234
So how do spacecraft slow\hdown?

21
00:01:36,745 --> 00:01:40,426
We have retropropulsion, you've got your\hrigid aeroshells and parachutes,

22
00:01:40,426 --> 00:01:42,933
and coming soon,\hwe've got these inflatable heat shields.