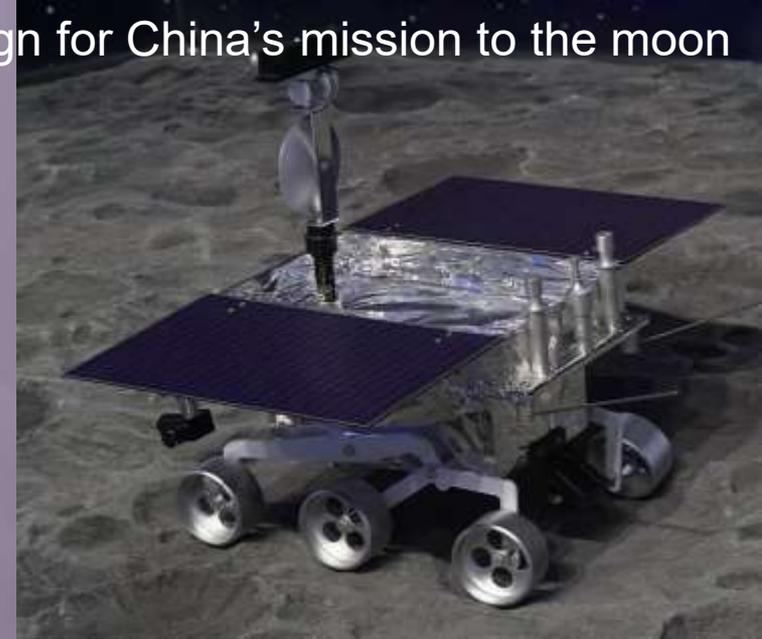


# Lunar Vehicles

Lunar rover design for China's mission to the moon

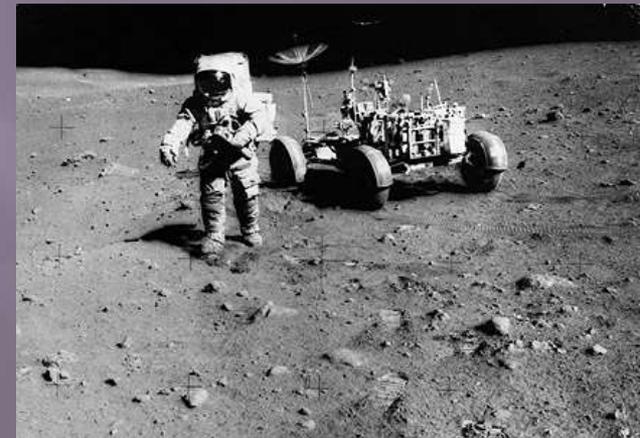
You may have recently seen on TV the NASA mission to the International Space Station using Space-X rocket technology. Nasa is aiming to get to Mars, as are other countries such as China, India and Japan.



Toyota's designs for Japan's lunar rover for their 2029 moon landing

# Space Buggy Facts

- Space Buggies are called Luna Rovers
- They were designed to help Astronauts explore further on the moon as they can not walk very far in their bulky spacesuits.
- Three Luna Rovers have been taken to the moon and left there—they are still there!
- The Luna Rover uses the sun to help it navigate where to go.
- Harrison Schmitt of Apollo 17 said, “....the Lunar Rover proved to be the reliable, safe and flexible lunar exploration vehicle we expected it to be. Without it, the major scientific discoveries of Apollo 15, 16, and 17 would not have been possible”

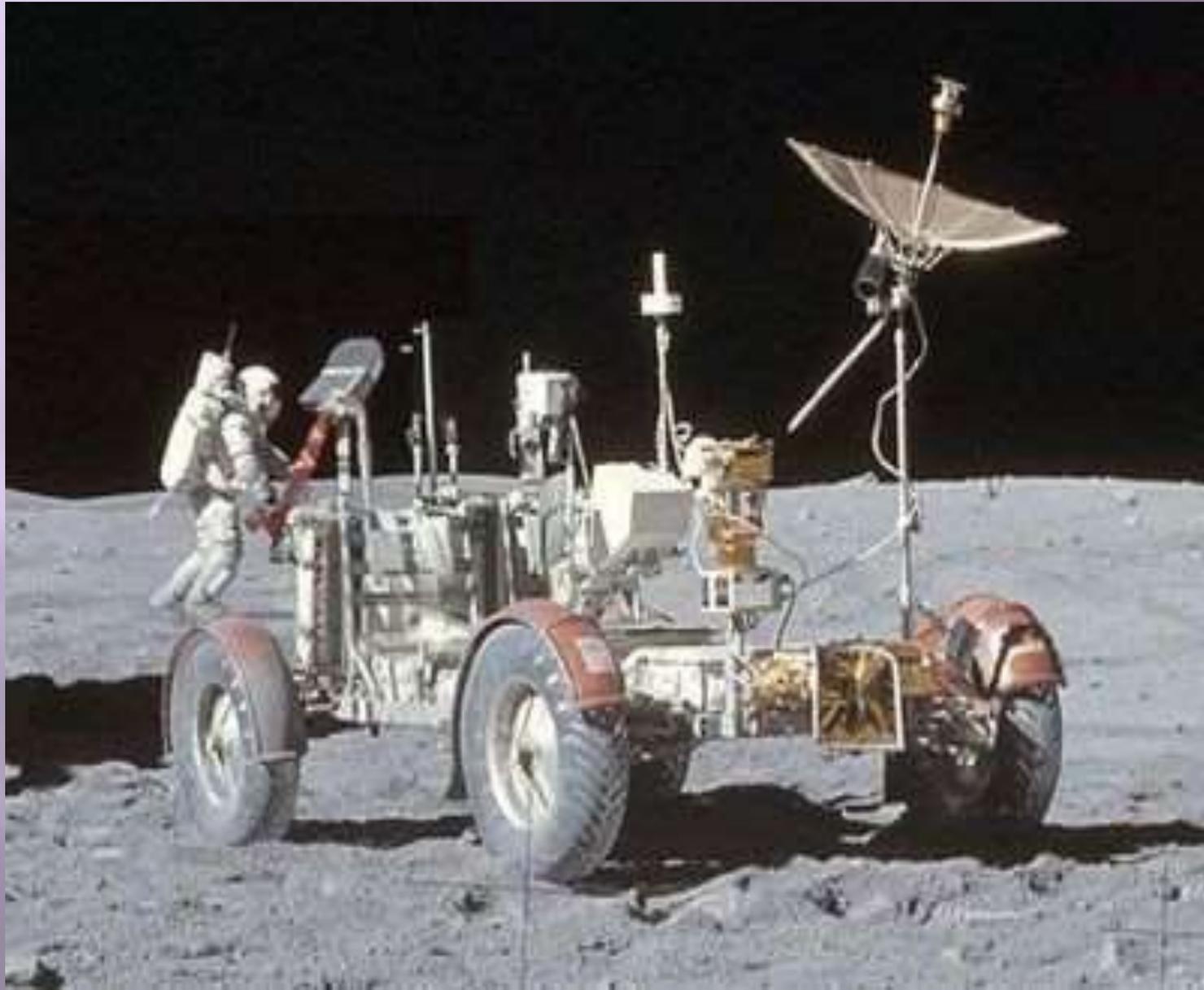


**Click on this link and watch the video**

Link to video footage filmed from a space buggy.

[http://starchild.gsfc.nasa.gov/docs/StarChild/space\\_level2/apollo15\\_rover.html](http://starchild.gsfc.nasa.gov/docs/StarChild/space_level2/apollo15_rover.html)

Space buggy from the moon landing by the USA in July 1969



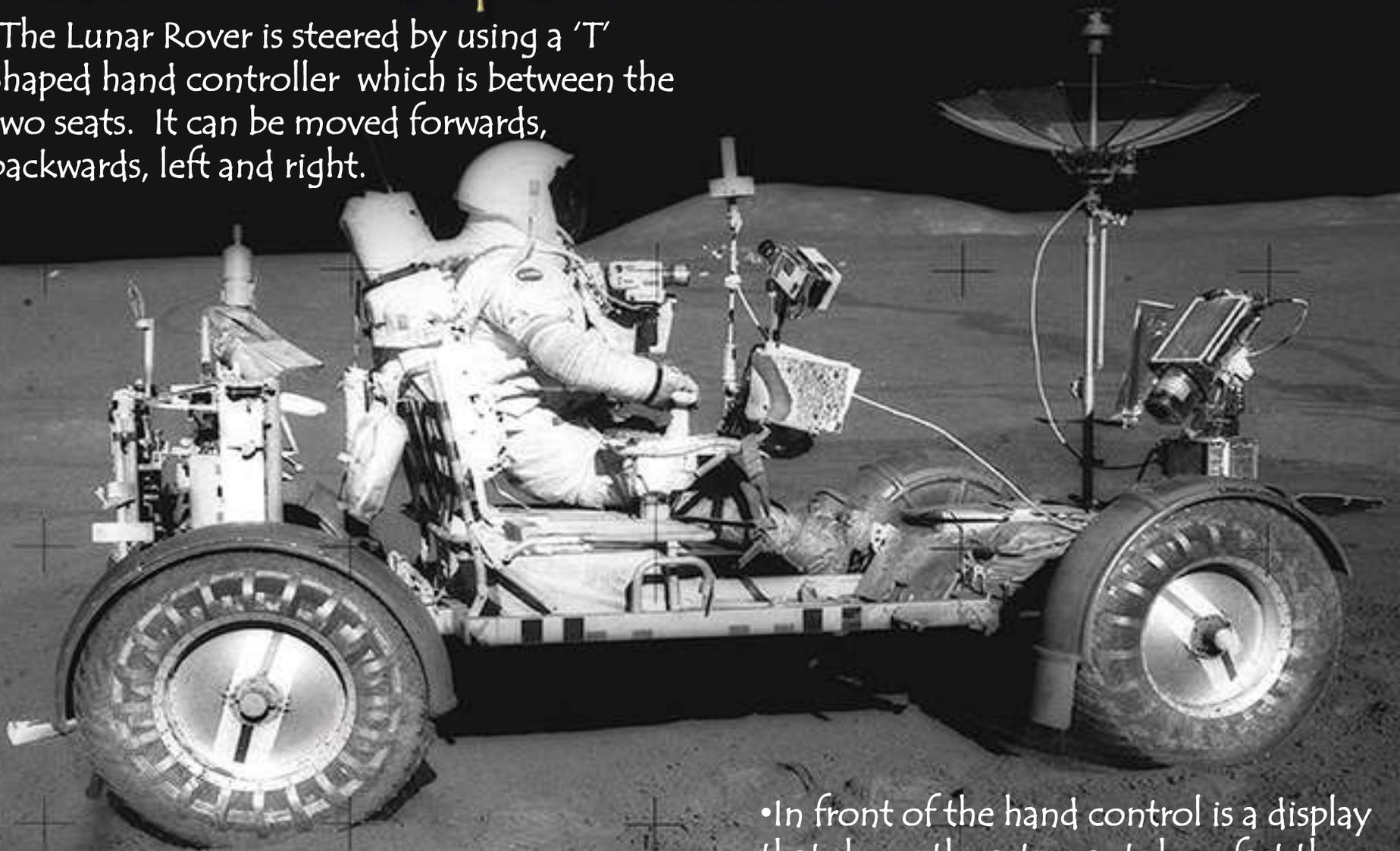
# Features of a Space Buggy

- The Lunar Rover was specially designed to travel in low gravity on the soft surface on the moon– it was tested on sand!
- It costs \$38 million.
- It was designed to carry two astronauts, equipment and moon rock samples.
- A Lunar Rover is 3.1m long and 1m high.
- It is powered by 2 36V batteries.
- The Lunar Rover can travel up to 8 miles per hour.
- There are two seats with an armrest in the middle and velcro seat belts.
- It has a colour video camera to record.
- It has a large dish antenna to send pictures back to earth. The buggy can also be controlled by NASA Mission Control.



# Features of a Space Vehicle

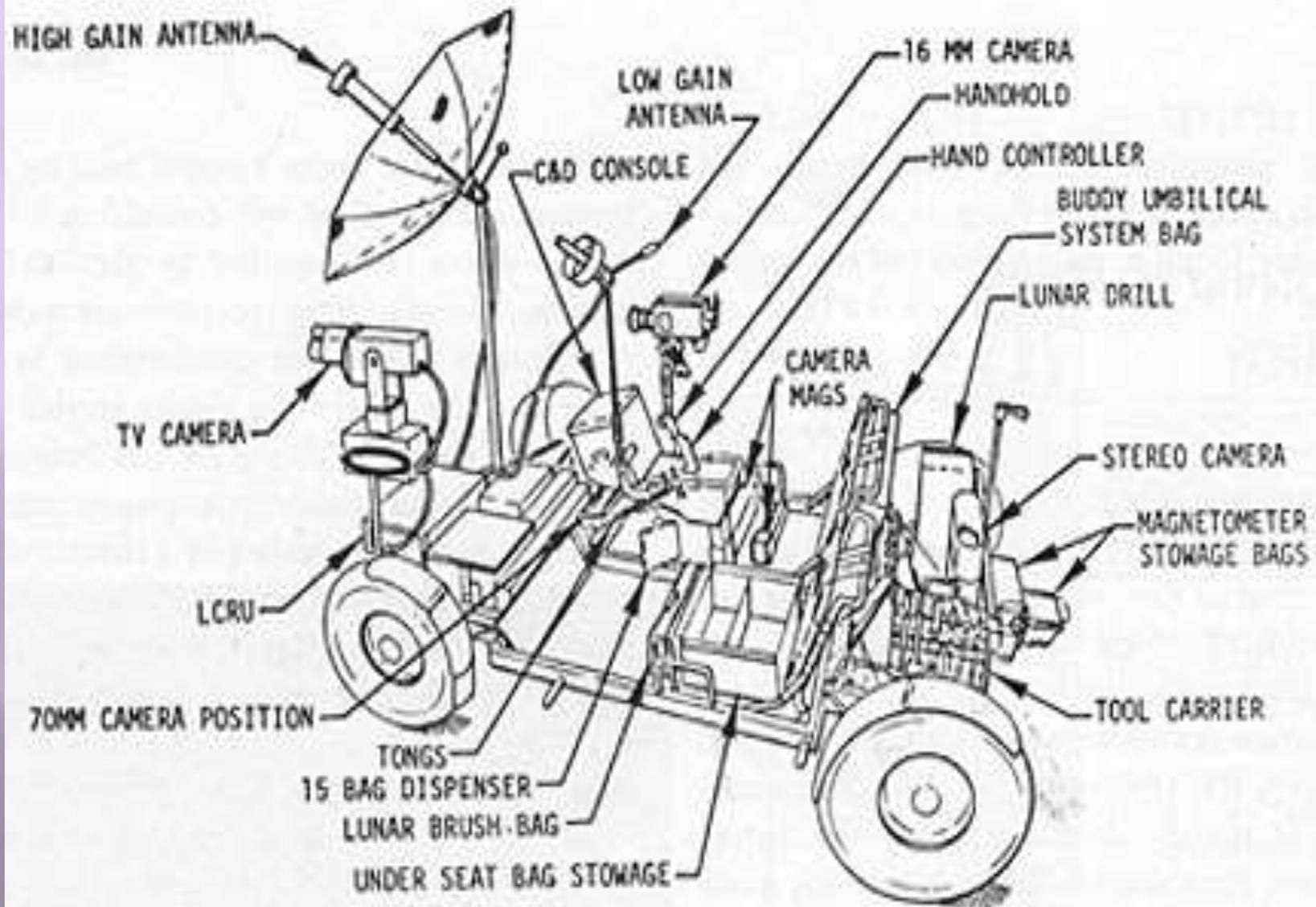
- The Lunar Rover is steered by using a 'T' Shaped hand controller which is between the two seats. It can be moved forwards, backwards, left and right.



- Pulling the hand lever back makes the buggy reverse and pulling it all the way back puts on the parking brakes.

- In front of the hand control is a display that shows the astronauts how fast they are going, the direction they are going in and what the temperature is.

# There is a lot to think about when designing a lunar vehicle!



# Moon Buggies in the Future

NASA are planning to send a team of astronauts to the moon again and Mars! They are currently testing a new Lunar Rover in the desert.

It is the size of a pick-up truck (with 12 wheels).

It is designed for two astronauts to spend 14 days on board and has sleeping and toilet facilities.

It can travel thousands of miles. Its wheels will move in any direction so it can even move sideways and can climb over rocks.

It has been designed to be reusable and last at least 10 years.

It is battery powered and NASA hopes if it is successful the design will be used to make energy efficient cars on earth!



**Watch this video!**

<http://www.youtube.com/watch?v=d1OacTW2J1E>

**Your task** is to design and draw an electric powered space vehicle. You will draw it in 2 dimensions, in colour, use a ruler when required, if it has wheels use a compass or draw round something that is the correct size.

It will be best to draw the vehicle from a side view looking on the longest side. You can also draw the vehicle from the front or rear as an extra drawing. There is an example of a side view drawing on the next slide

Firstly you will need to think about the features that your vehicle will need to have

How many astronauts? How big will it be?

Will it need to carry a load such as moon/mars rocks for scientific research?

Will it have 4 wheels? 6 wheels? More than 6? Or tank tracks to help it get over rough terrain?

Will it need tanks for air/water? Will it need a toilet or shower?

Will it have sleeping facilities?

Will it have a cabin or be an open cockpit like the first space buggy?

Will it have food storage?

Will it have solar panels?

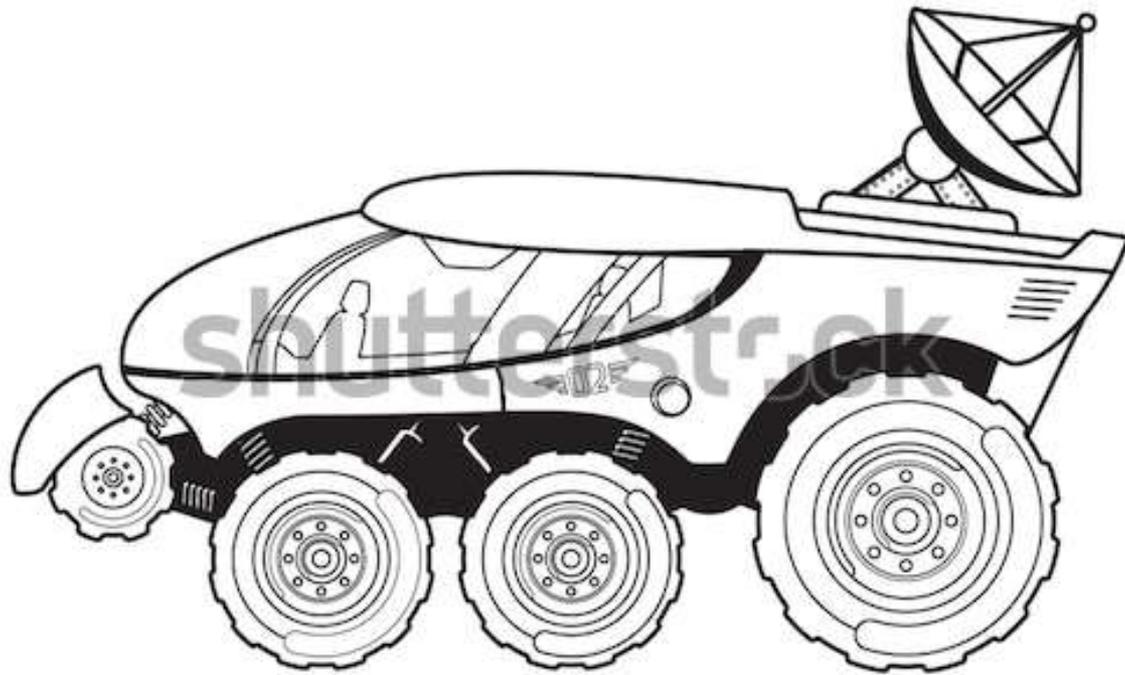
Will it have a satellite dish for communication?

Will it have cameras?

Any special features?

**What else can you think of that will be needed by the astronauts?**

Example side view drawing of a lunar vehicle



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# Task – answer these questions

- 1, What country was the first into space?
- 2, What country was the first to land on the moon?
- 3, what year was the moon landing?
- 4, Name the first man into space?
- 5, Name the first men on the moon?
- 6, When does Japan intend to land on the moon?
- 7, What does a solar cell do for a space buggy?
- 8, How much did the first space buggy cost to make?
- 9, How many wheels are used by the new nasa space buggy?
- 10, How many years will the new nasa space buggy be used for?

I hope you enjoyed finding all about lunar vehicles and designing your own lunar vehicle. The DT dept looks forward to seeing you in September!