

Exploring the Solar System I – Robots on Mars

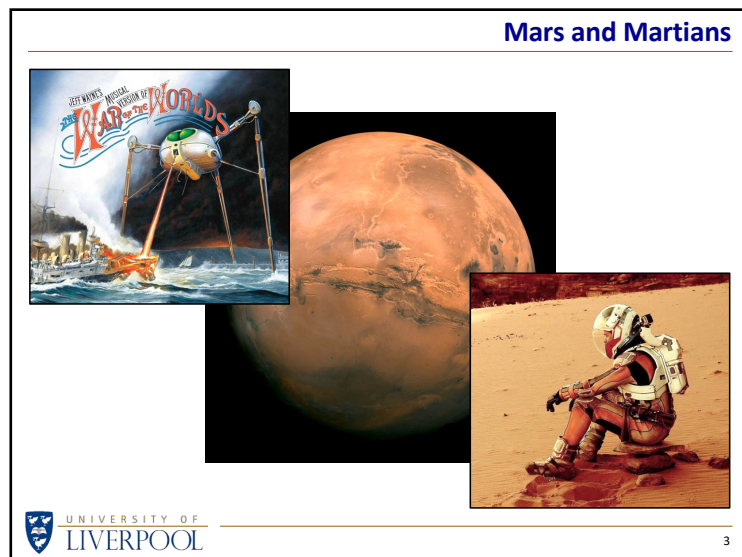


Mars and Martians

Landers and Rovers

What Have They Found?

What Next?



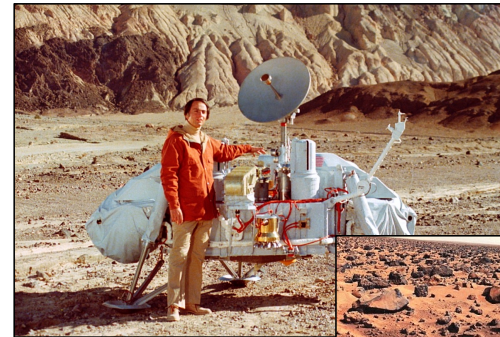
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Landers and Rovers

	Landers	Rovers
1976	Viking	
1997	Pathfinder	Sojourner
2004		Spirit
2004		Opportunity "Oppy"
2008	Phoenix	
2012		Curiosity
2018	Insight	
2020		Perseverance "Percy"



Viking 1976

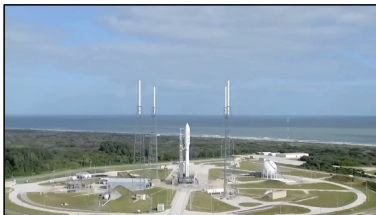


First colour images

Carl Sagan provides scale for a model of the Viking lander



Perseverance Launch



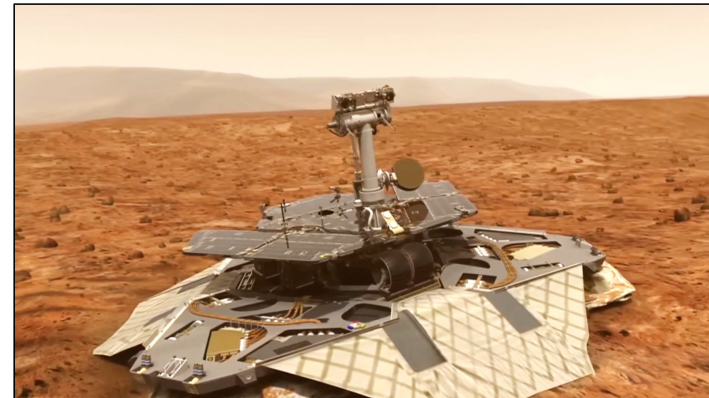
To get Perseverance to Mars needed a small Atlas rocket.

Apollo missions to the Moon in the 1960s needed the much larger Saturn V rocket.



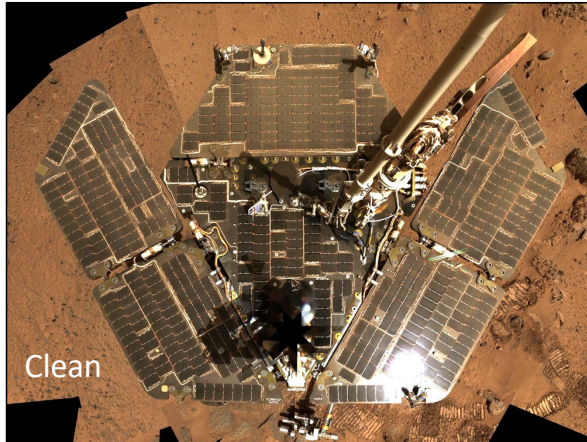
CGI

Spirit and Opportunity

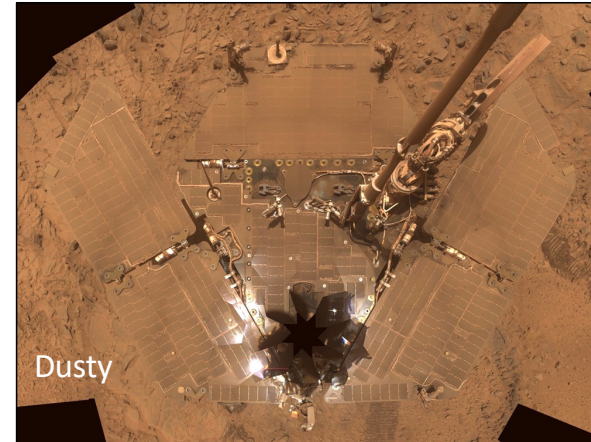


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Solar Panels



Solar Panels



Solar Panels



Rovers have to keep warm during the night

Day +20°C

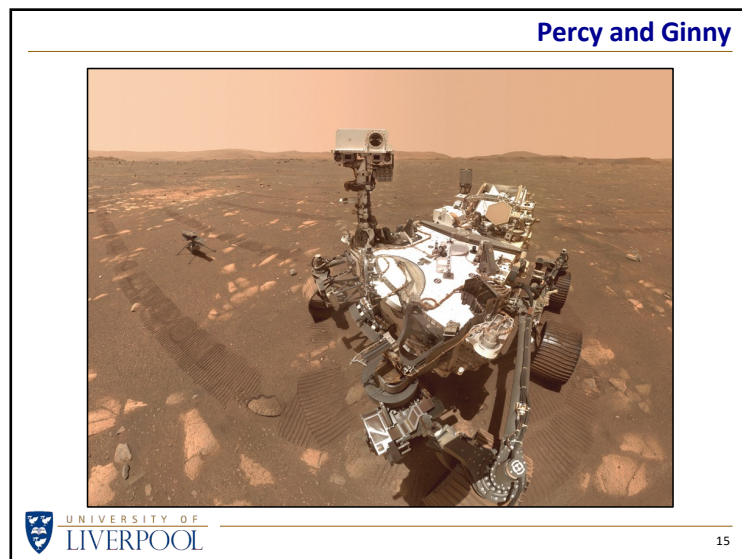
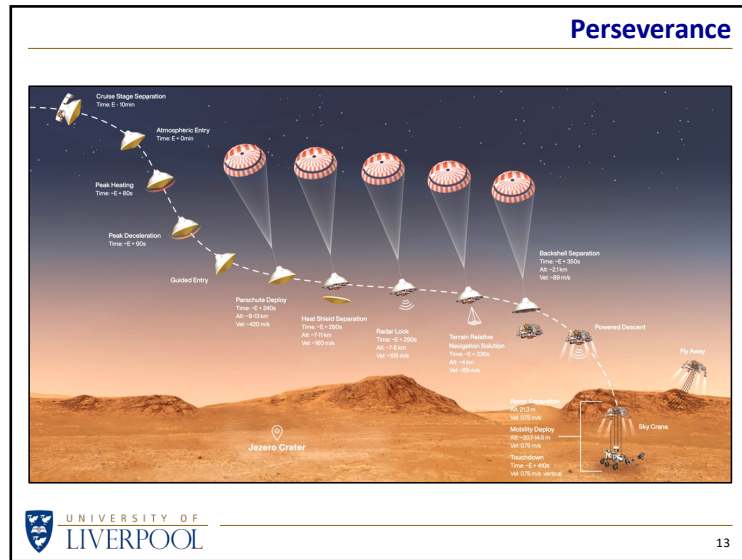
Night -100°C

Last Transmission

Opportunity 10 Jun 2018

battery low ...
getting dark ...

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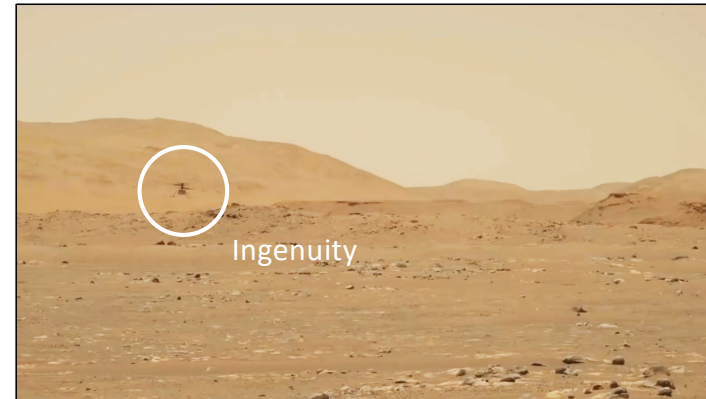


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Percy Drops Ginny

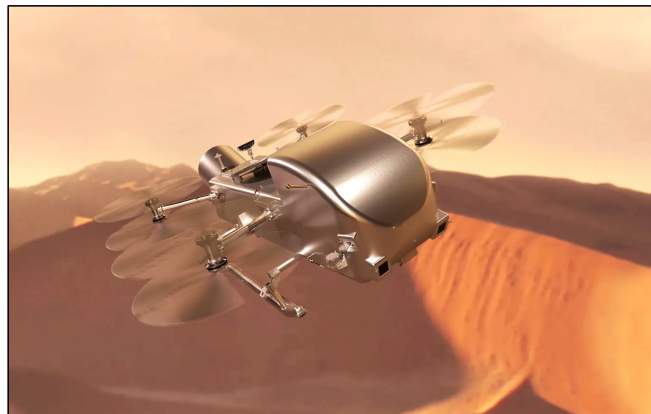


Flight of Ingenuity

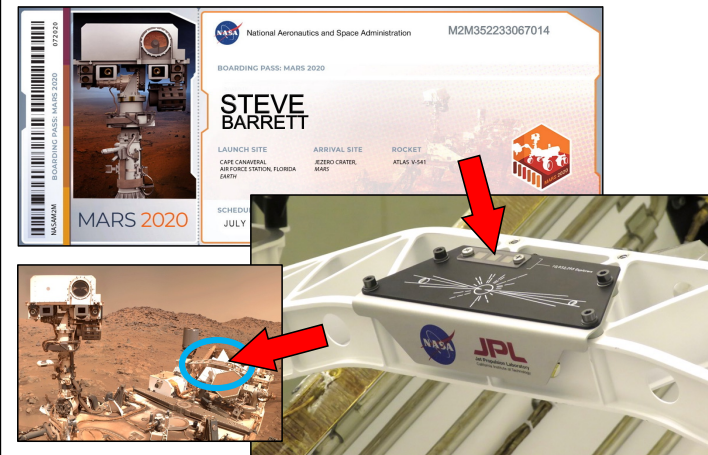


CGI

Dragonfly on Titan



Boarding Pass



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Exploring Mars

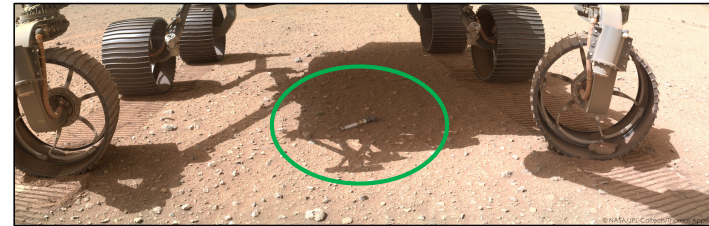
Why explore Mars?

To study its geology and climate

Does life exist, or did it ever exist?

To prepare for human exploration

Mars Sample Return

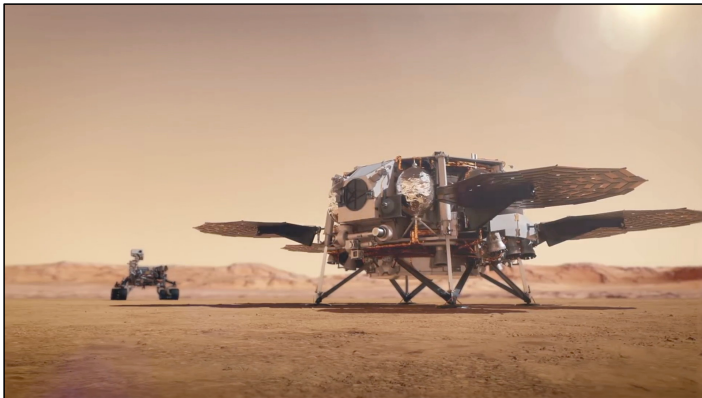


Perseverance is collecting rock and atmosphere samples and leaving a trail of sample tubes behind as it explores the Martian surface.

How will we get these samples back to Earth for more detailed study?

CGI

Mars Sample Return



CGI

Mars Sample Return



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What's Next



esa
2028

UNIVERSITY OF
LIVERPOOL

25

Airbus UK



UNIVERSITY OF
LIVERPOOL

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Want To Know More?



NASA.gov ESA.int CASC.cn

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Exploring the Solar System – I
www.liverpool.ac.uk/~sdb/Talks



ROBOTS
ON MARS

Dr Steve Barrett
M2M 23 Sep 2025