

# Exploring the Solar System I – Robots on Mars



## Exploring the Solar System I

## Robots on Mars

Mars and Martians

Landers and Rovers

What Have They Found?

What Next?



2

## Mars and Martians



3

## Surface of Mars



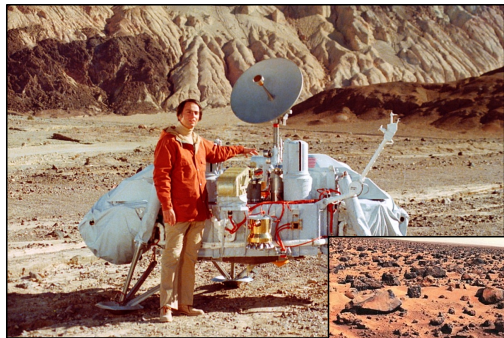
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# Exploring the Solar System I – Robots on Mars


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

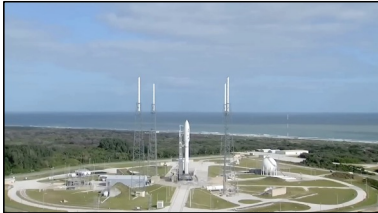



First colour images



Carl Sagan provides scale for a model of the Viking lander

## Perseverance Launch

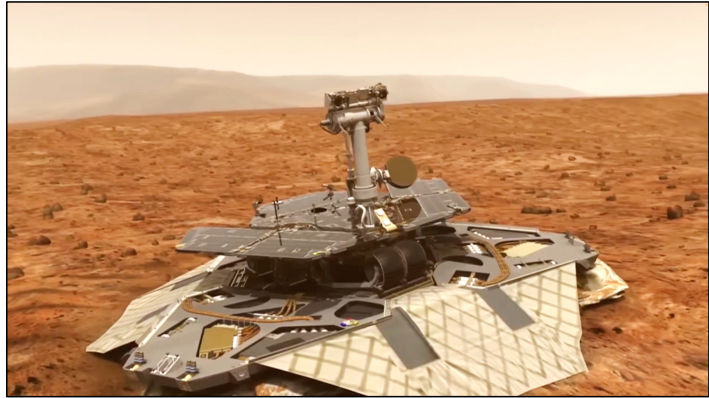
To get Perseverance to Mars needed a small Atlas rocket.

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



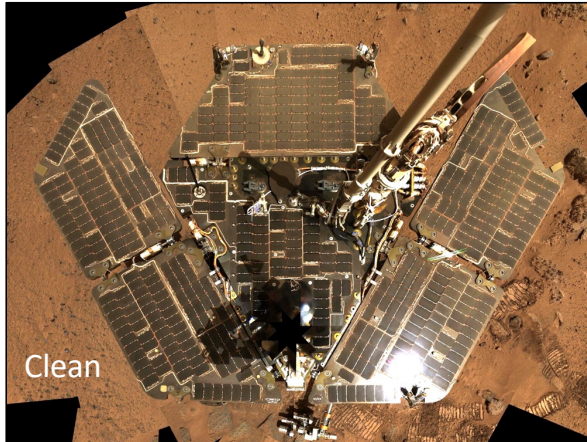
## Spirit and Opportunity

CGI

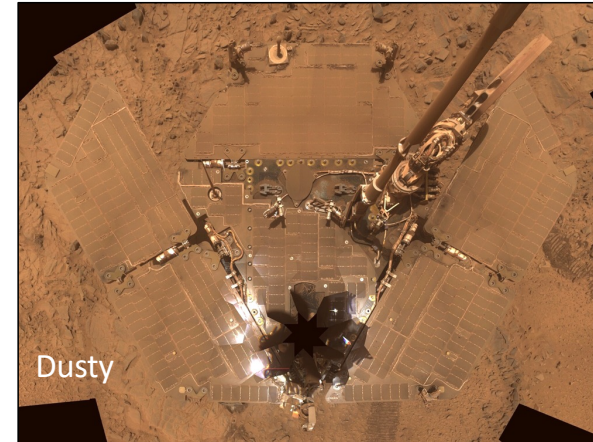


# Exploring the Solar System I – Robots on Mars

Solar Panels



Solar Panels



Solar Panels



Rovers have to keep warm during the night

Day +20°C

Night -100°C

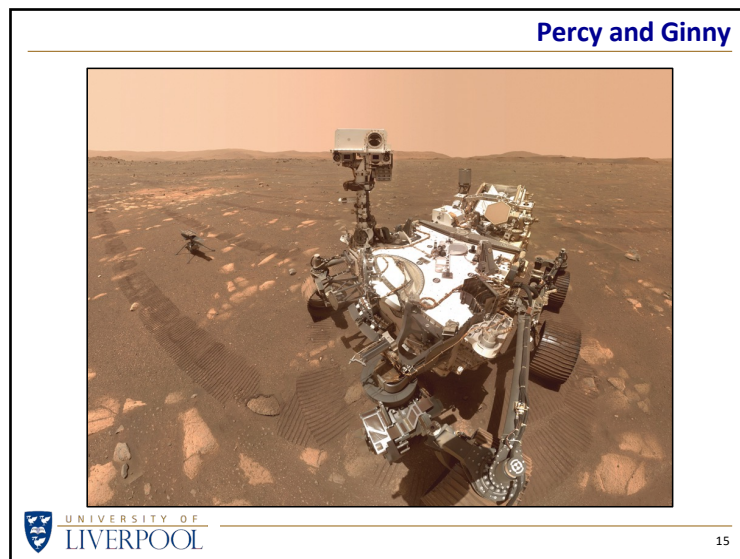
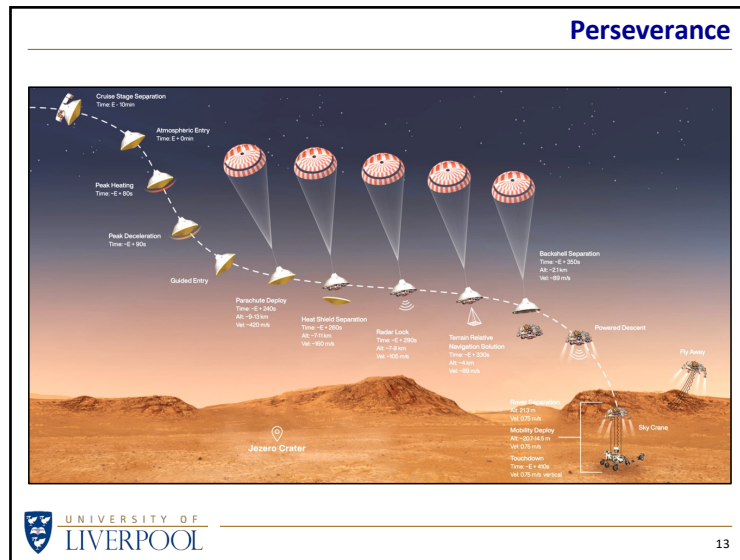
Last Transmission

Opportunity 10 Jun 2018

battery low ...  
getting dark ...



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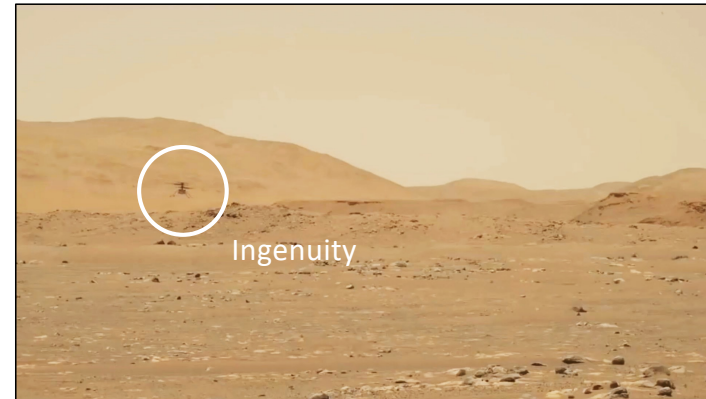


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Percy Drops Ginny

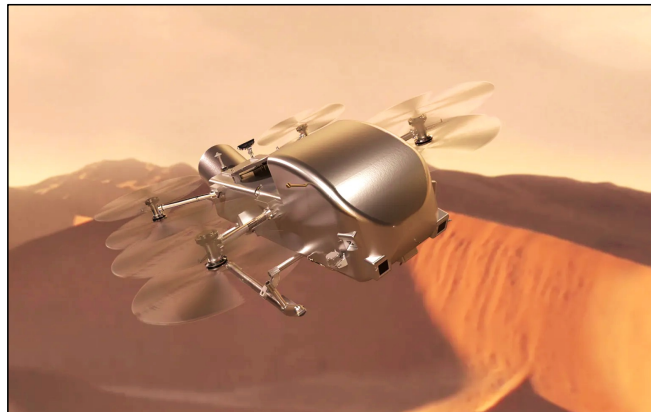


Flight of Ingenuity



CGI

Dragonfly on Titan



Boarding Pass



# Exploring the Solar System I – Robots on Mars

## Exploring Mars

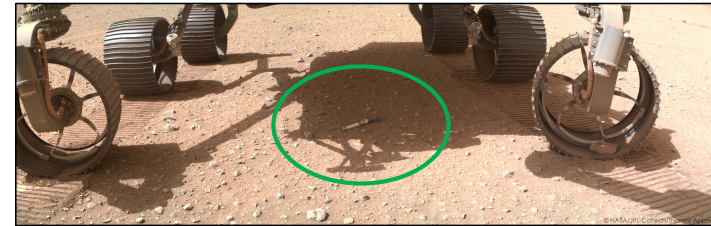
Why explore Mars?

To study its geology and climate

Does life exist, or did it ever exist?

To prepare for human exploration

## Mars Sample Return

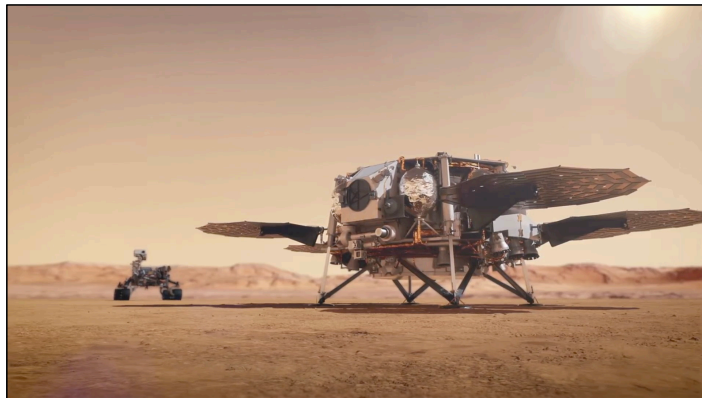


Perseverance is collecting rock and atmosphere samples and leaving a trail of sample tubes behind as it explores the Martian surface.

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

CGI

## Mars Sample Return



CGI

## Mars Sample Return





# Exploring the Solar System I – Robots on Mars

What's Next



esa  
2028

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LIVERPOOL

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Airbus UK



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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](http://www.liverpool.ac.uk/~sdb/Talks)



ROBOTS  
ON MARS

Dr Steve Barrett  
GSRC 9 Apr 2025