

Copyright © 2014 by Miguel Cooper. Published by The Mars Society with permission

1492 - 2024

From Europe to the New World and From Earth to Mars A comparison of two expeditions

Miguel Cooper
Mars Society
17th international Conference
Houston Texas
August 2014



Dedication

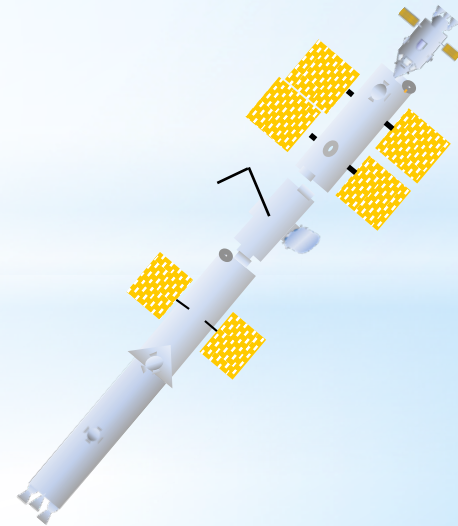
I would like to dedicate this paper to my wife, my daughters, to Mr. Charlie Bolden, and to all the explorers and scientists of the world, in the past, in our time and in the future, and of course to God that gives strength, knowledge and the will to explore.

May the spirit of exploration continues forever.



Abstract

The objective of this paper is to compare the environment in which the 1492 Journey took place to be able to do it with the available technological means and knowledge, and to compare it with the planning of a possible Mars Manned Mission within the next ten years



These Topics are addressed here for both endeavors



What is the objective?

What is known?

Previous Experience

What is against?

What is needed?

How can it be done?

Goals to achieve



For this purpose it is necessary to try to picture ourselves in that time to understand the environment that surrounded the planning and execution of the endeavor, and then look at our time. From 1492 to this date there have been amazing explorations with risks, failures and triumphs.



Calendario 1492

enero	febrero	marzo
lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
abril	mayo	junio
lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
julio	agosto	septiembre
lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
octubre	noviembre	diciembre
lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

2024

January	February	March	April
lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
May	June	July	August
lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
September	October	November	December
lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	lu ma mi ju vi sa do 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30





1400

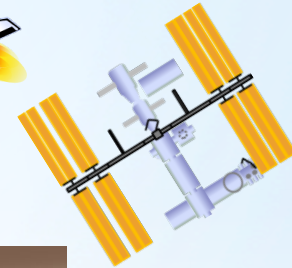
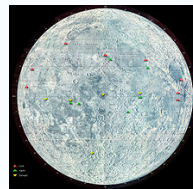
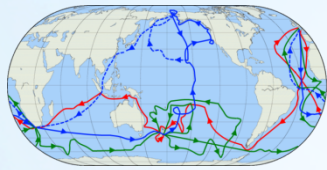
1700

1900

1960

2000

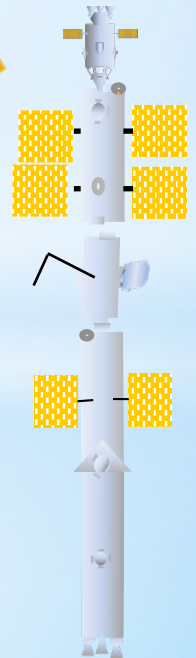
2024



AMERICA
XPO FERENS

Handwritten signatures of Columbus and da Gama

Handwritten signature of James Cook



Something to keep in mind:

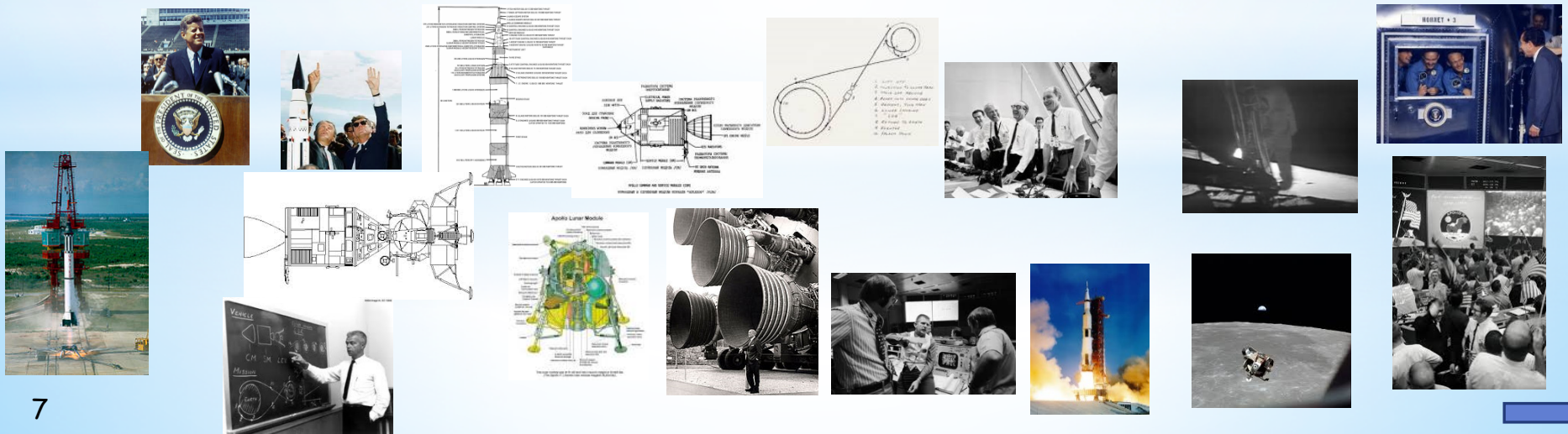
President Kennedy Speech at Rice University "We Choose to go to the Moon"
September 12, 1962

Previous Experience:

- Vostok 1 Yuri Gagarin April 12 1961: 108 minutes Orbital Flight
- Freedom 7 Alan Shepard May 5 1961: 15 Minutes 12 Seconds sub Orbital Flight (Apogee 115 Miles)

Deadline to achieve the goal (December 31 1969): 87months 18 days

The goal was Achieved on July 24 1969. 82 Months 5 days After the Speech



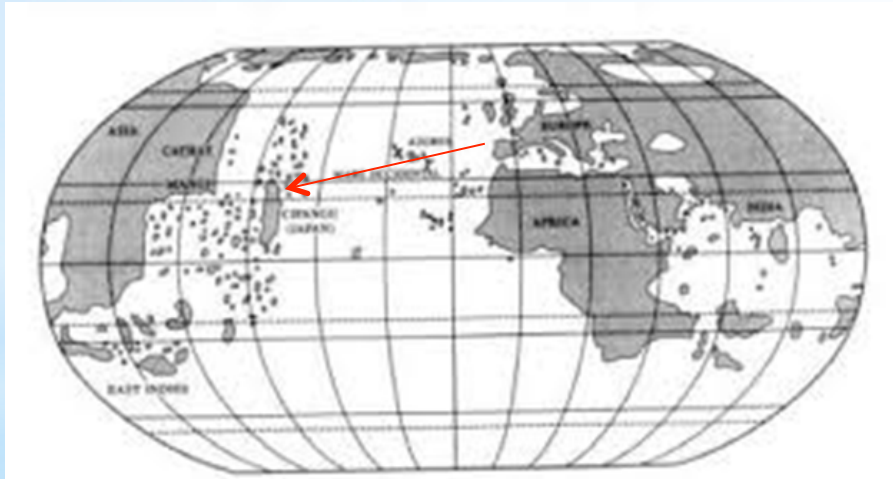
Planning the Journey

1492

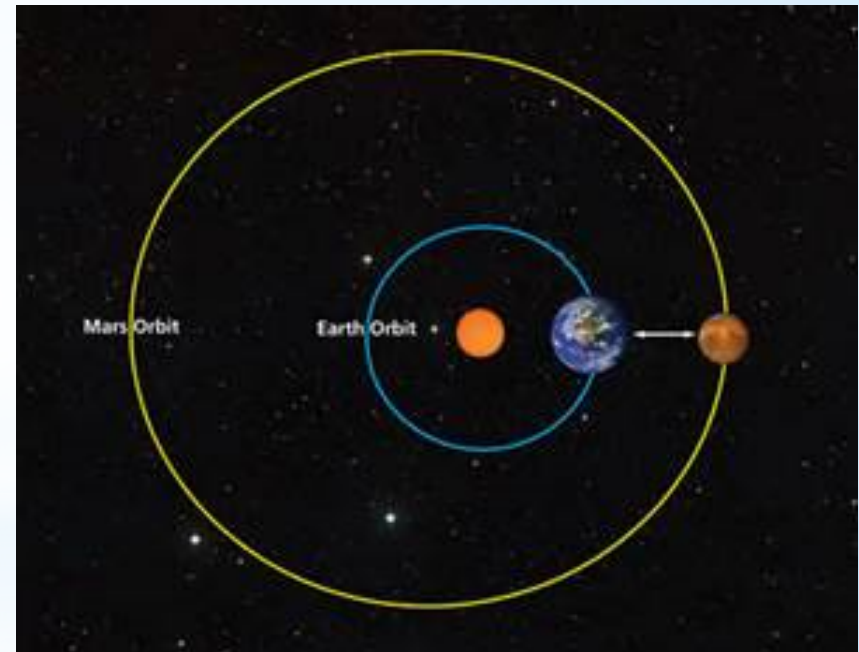
What is the objective?

2014

Reach the Indies through the Ocean-Sea, traveling west from Europe.



A Mars Manned Mission



Planning the Journey

1492

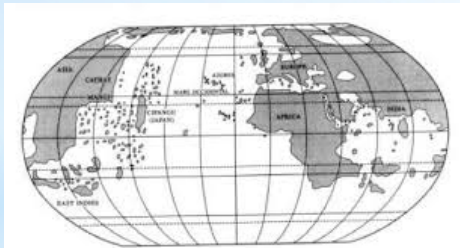
2014

What is known?

1.- The Earth is round With a circumference of 30,200 Kms. (real is 40,000)

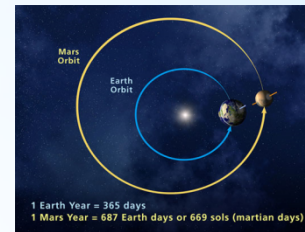


2.-The Distance from Canary Island to Japan is 2,300 mi

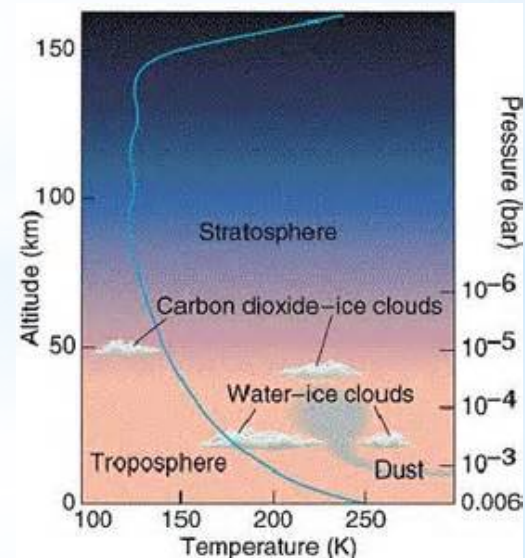


Real is 12,200 Miles

1.- Distance and Mars Orbit: From 33.9 to 249 Million Miles from Earth.



2.- Mars Atmosphere and weather



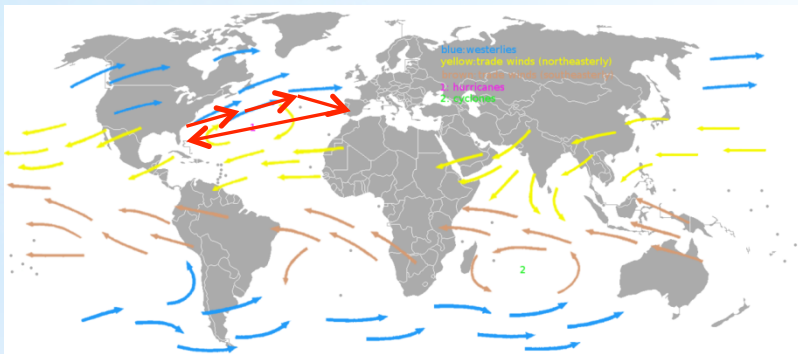
Planning the Journey

1492

2014

What it is known?

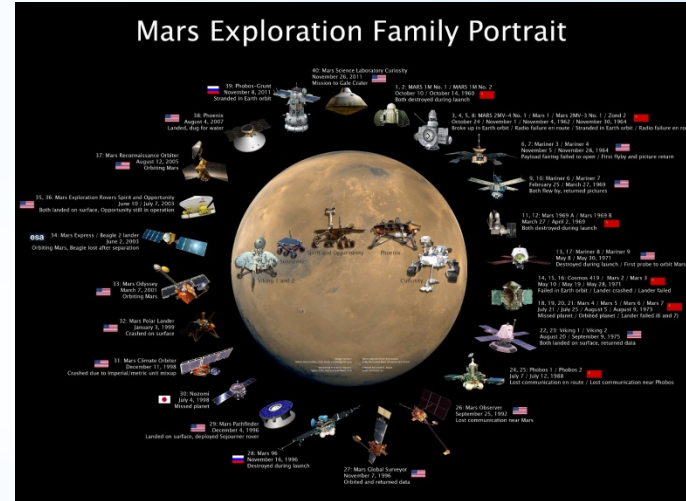
3.- The Winds: Knowledge of the Atlantic Winds.



4.- Hurricane season (????)



3.- Mars Exploration with Robots



4.- Long duration Missions (Up to 437 days aboard the MIR)



Planning the Journey

1492

What is known

2014

5.- Manned landing on another "planet"



6.- Working and building structures in Space



7- International Participation



SPACEX



Planning the Journey

1492

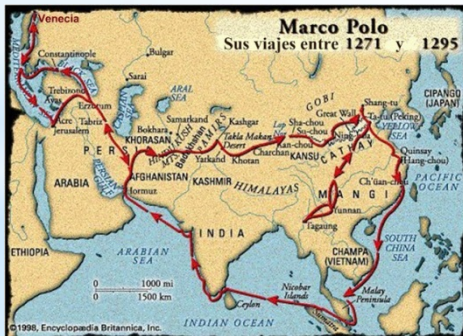
Previous experience

2014

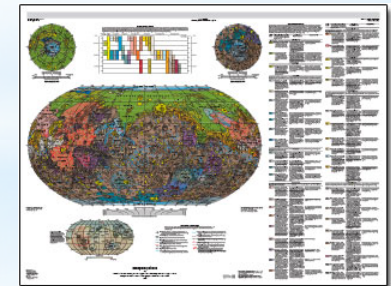
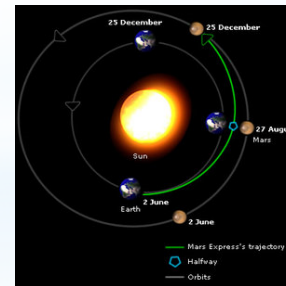
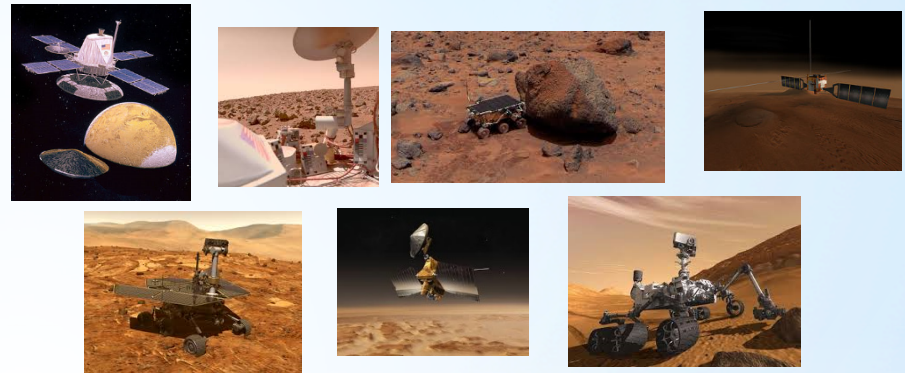
Vikings Exploration of Iceland and Greenland



Marco Polo's Travels to Cathay and Cipango



Unmanned Mars flyby, Mars orbiting and Landings



Planning the Journey

1492

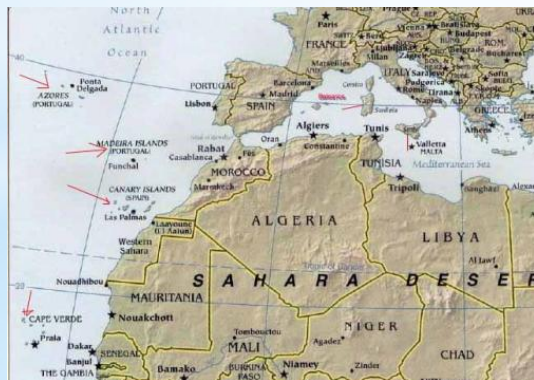
Previous experience

2014

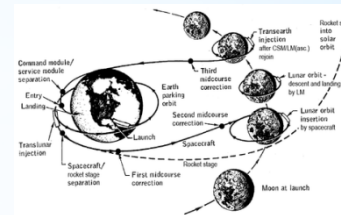
Bartolomeo Diaz Journey to the southern tip of Africa



Sea travels to Canary Islands and the Azores Islands

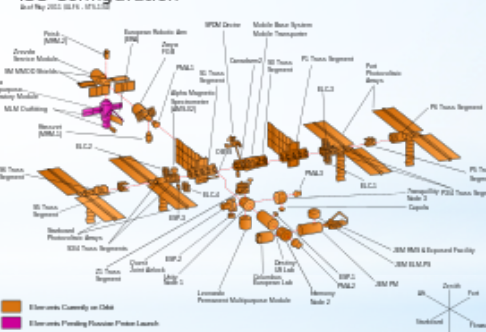


Moon Landings



Assembly of Complex Structures in Orbit

ISS Configuration



Working in Outer Space



Planning the Journey

1492

Previous experience

2014

Christopher Columbus Exploration of Iceland



Navigation and wind knowledge



Reference: <http://er.jsc.nasa.gov/seh/navigate.htm>

Map of what was believed at that time



Living, working and health In microgravity



Computers and sophisticated Guidance systems



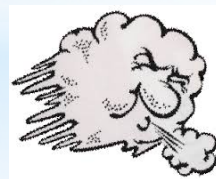
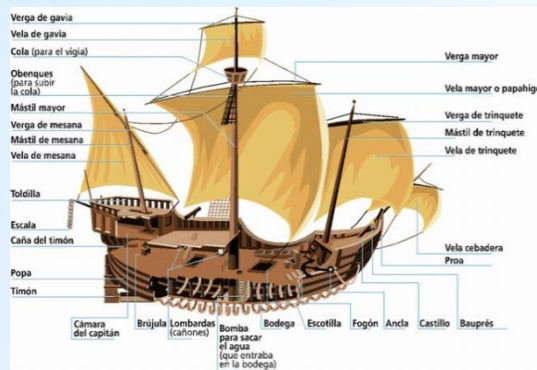
Planning the Journey

1492

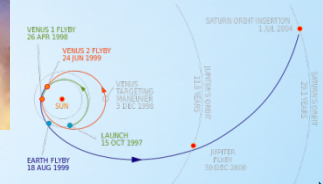
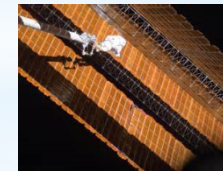
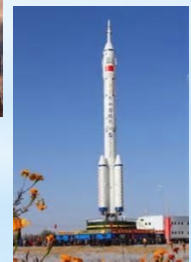
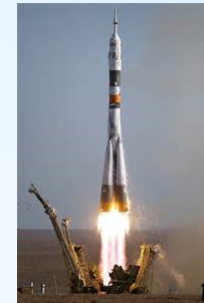
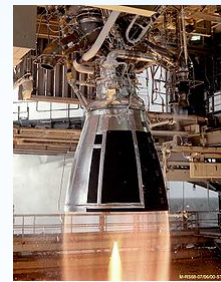
Previous experience

2014

Propulsion



Propulsion, rockets and energy management



Planning the Journey

1492

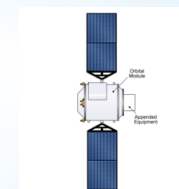
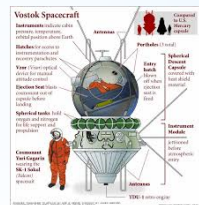
Previous experience

2014

Manned Sea Vehicles



Manned Space Vehicles



Planning the Journey

1492

Previous experience

2014

International cooperation



International Participation, Private Industries



Planning the Journey

1492

What is against?

2014

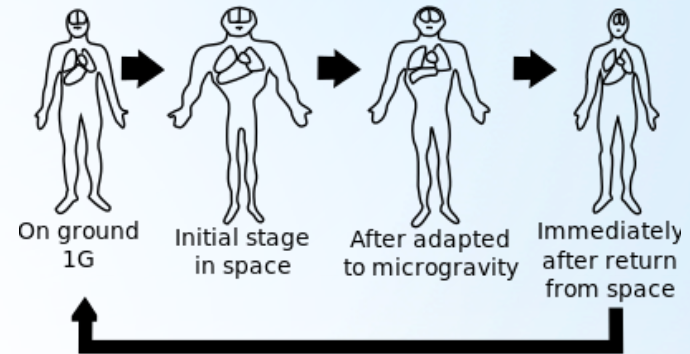
- uncertainty
If America had not been there their supplies would not have lasted to reach Cipango (Japan)



- Weather
from August to March 1493 Possibility of Hurricanes



- Long duration Space Mission
- Physical and Psychological health of the Crew



- Supplies storage capability (Food, water, oxygen and spare parts)



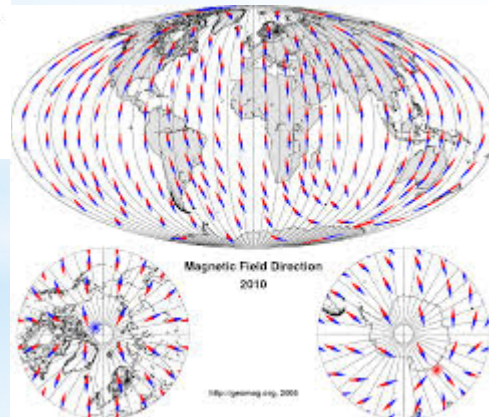
Planning the Journey

1492

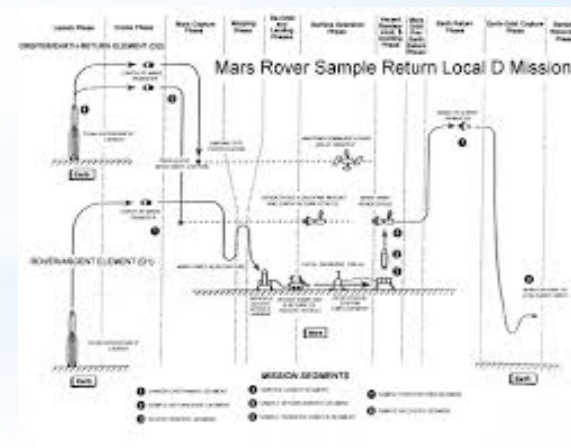
What is against?

2014

- Unknown factors Like
 - Magnetic Variation of the Compass for Navigation
 - Crew anxiety (homesick)
 - The sea to the west of the Azores Islands
 - Are the food and water enough for the Journey?



- Economic funds for:
 - New Rocket development
 - New Manned Space Vehicles
 - Energy and resources recycling
- No experience in a unmanned mission from Mars to Earth, a Mars Sample return Mission could demonstrate this.



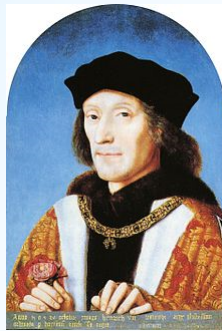
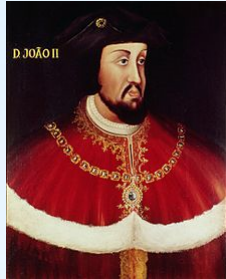
Planning the Journey

1492

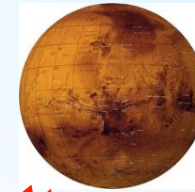
What is Needed?

2014

- Interest to support financially the endeavor
- Benefits



- Are the different Space Agencies considering this Journey in their Programs?



Planning the Journey

1492

What is Needed?

2014

- Economic funds
 - England Not Interested
 - France Not Interested
 - Portugal Not Interested
 - Spain Provided Funds

Justification: If new lands were to be found the country that finance the endeavor would extend its territory, and this journey may give to the it treasures and advantages.

- Benefits, find a shorter route for merchant traders in Europe, find some new lands as Marco Polo did.

- Mars Mission Programs
- Technology
 - Space vehicles for Beyond LEO Missions
 - Almost self sustained modular vehicle
 - Crew health for long duration Space Flights (36 months)
 - Mission Control Center, How to do it
 - A Mars sample Return Mission
- Financial funding to the program
- Justification: Explore another world, understand its environment, Study the grow of plants in that environment. A step toward s traveling far from Earth.
- Benefits, development of technology to be used on Earth, a common objective, understanding our planet and risks of damaging it.



Planning the Journey

1492

2014

Summary: The two Journeys

- Objective: New route to Indies
- Information Available
 - Maps
 - Navigation Instruments
 - Knowledge of the Winds
- Plans for new Technology: None
- Financial funding for the Expedition

- Objective: Explore Mars
- Information Available
 - Distance to Mars
 - Life in Microgravity
 - Mars Landings
 - Assembly of Structures in Orbit
 - Physical and Psychological aspects of Astronauts
 - Docking Vehicles
 - Energy generation
 - Computers
 - Ground Support
- Plans for new Technology:
 - New Launchers
 - New Manned Space Vehicles
 - New Propulsion Systems
- Financial fundings to the program
- Global participation

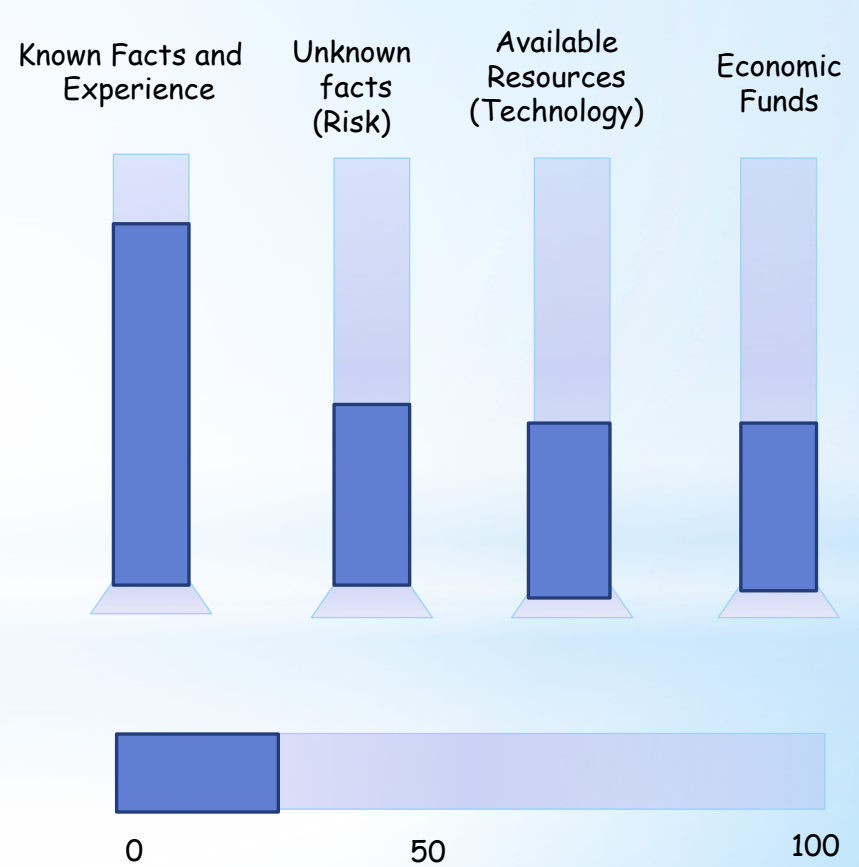
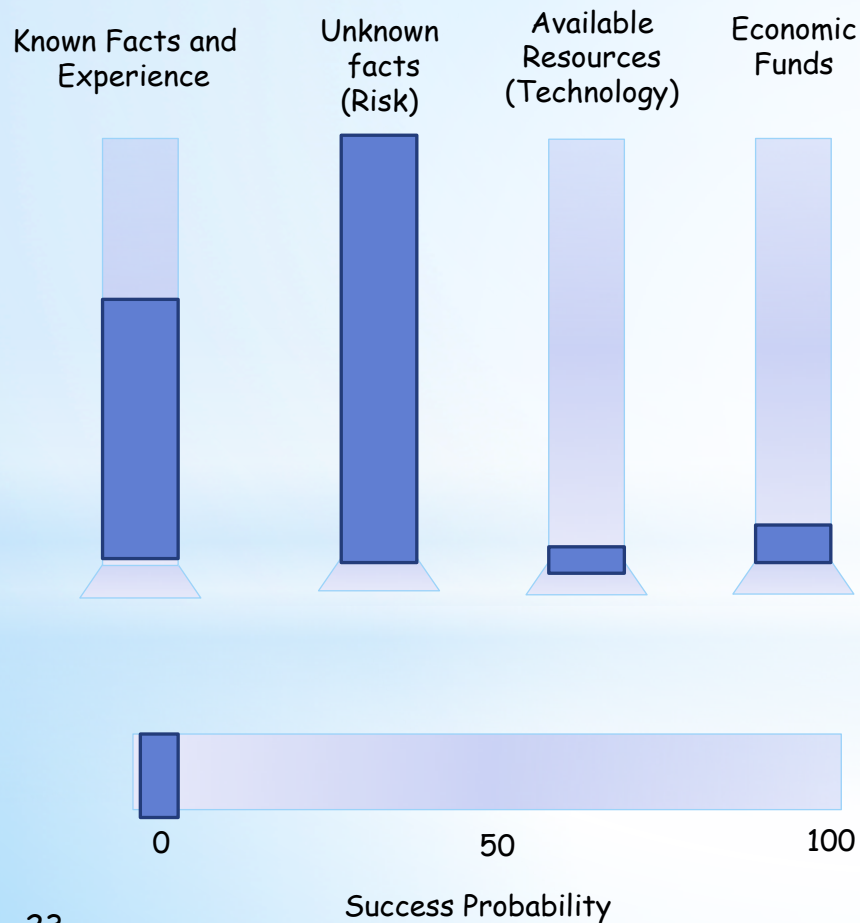


Planning the Journey

1492

What is the possibility of reaching the Goal in the proposed time frame as everything is today?

2014



Planning the Journey

1492

2014

How can it be done?

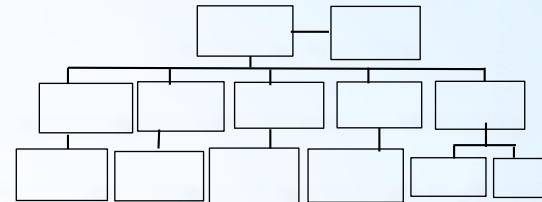
- Get the Funds



- Get the Vehicles , supplies and Crew



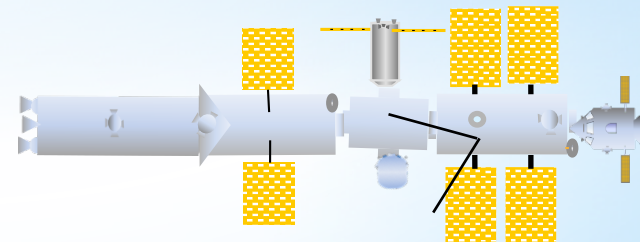
- Formalization of the endeavor:
Will it be multinational?
Period of time, goals definition



2024			
January	February	March	April
Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
May	June	July	August
Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
September	October	November	December
Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Sun Mon Tue Wed Thu Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



- Design a functional Space Vehicle that can sustain life for 36 months, with enough supplies and tools to make it almost independent from Earth. Mission Planning, Requirement definitions



Planning the Journey

1492

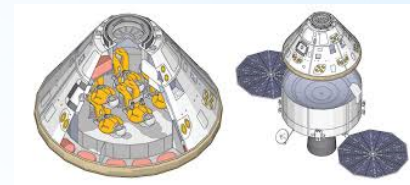
2014

How can it be done?

- Follow the planned route



- Focus on new Technologies, as manned Vehicles, launchers, Propulsion, Water and Oxygen Recycle, Energy



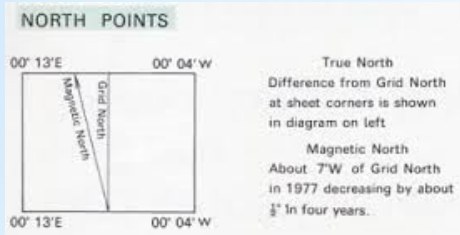
Planning the Journey

1492

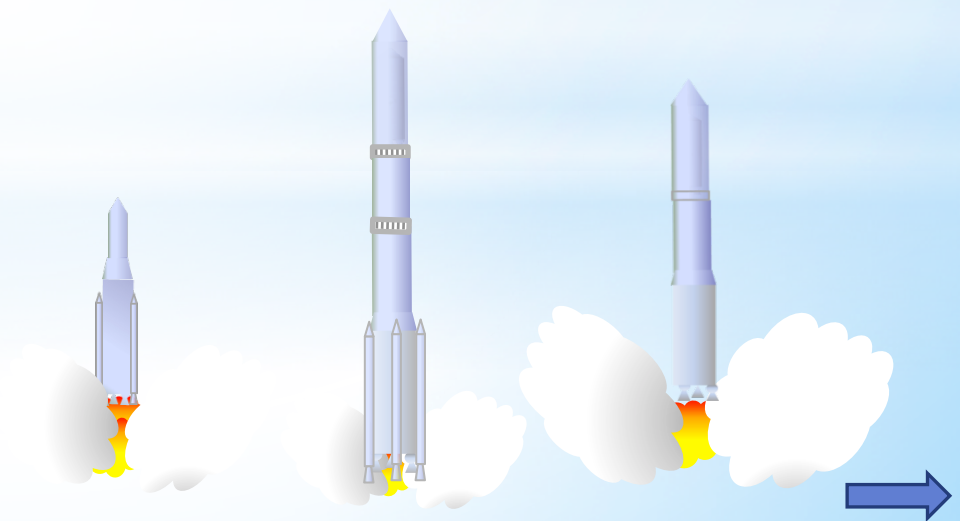
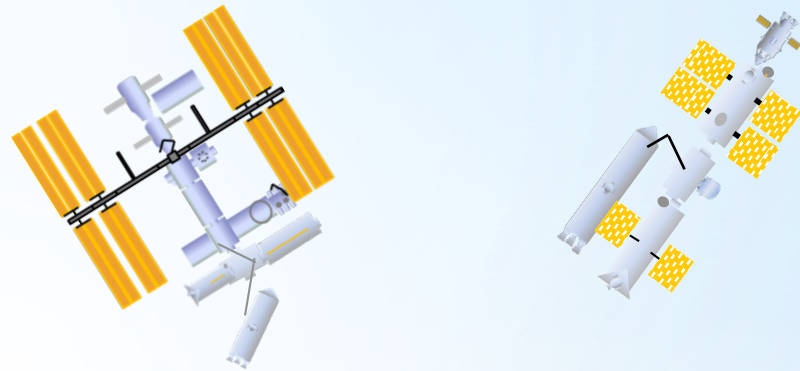
2014

How can it be done?

- Be prepared to overcome unexpected situations for example:
 - Navigational (North Star)
 - Crew believes (Sea Monsters)
 - Change of winds (period of no winds)



- Orbital assembly of the Vehicle, With or without de ISS



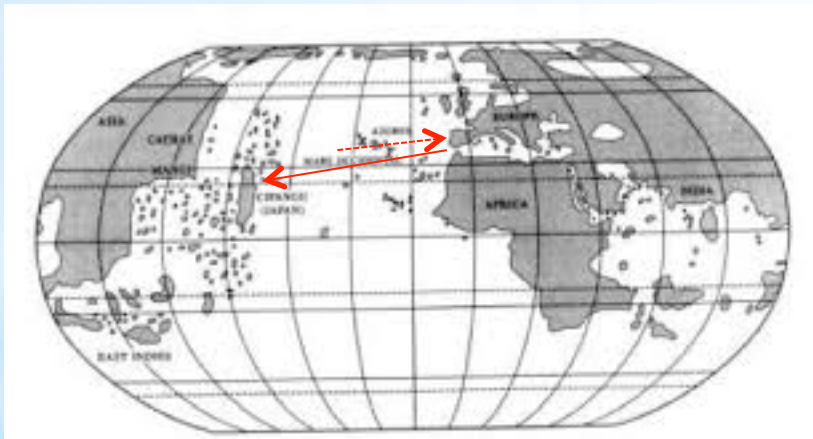
Planning the Journey

1492

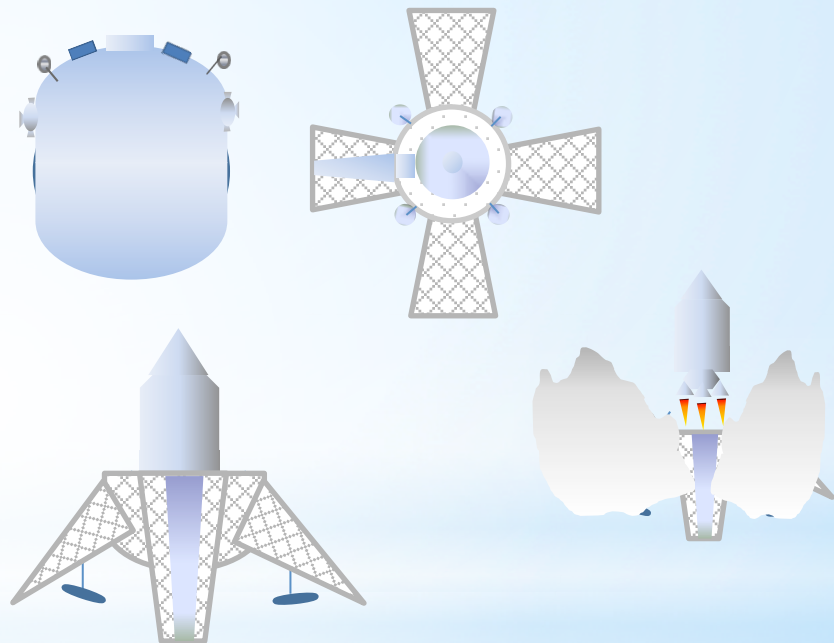
2014

How can it be done?

- Return Options
- Is there a way to return at any point of the exploration?



- Design and build de Manned Mars Lander



Planning the Journey

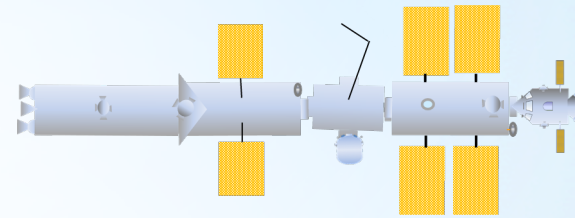
1492

- Knowledge of political rivals
Domain of Portugal of the "Ocean Sea"

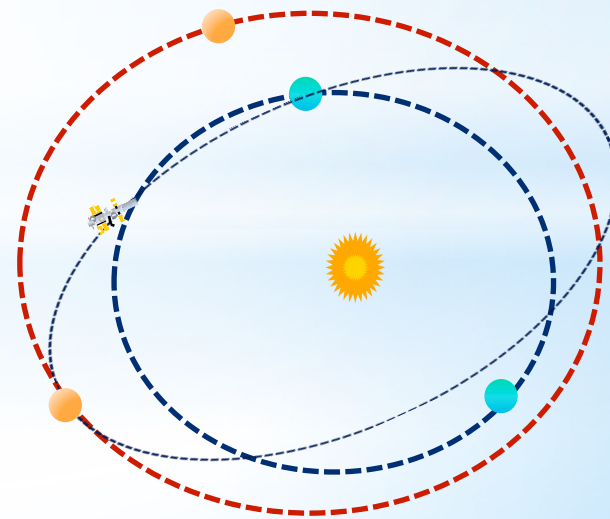
How can it be done?

2014

- Complete Tests and Integration of All Elements



- Final Mission Planning Revision Date definition



Planning the Journey

1492

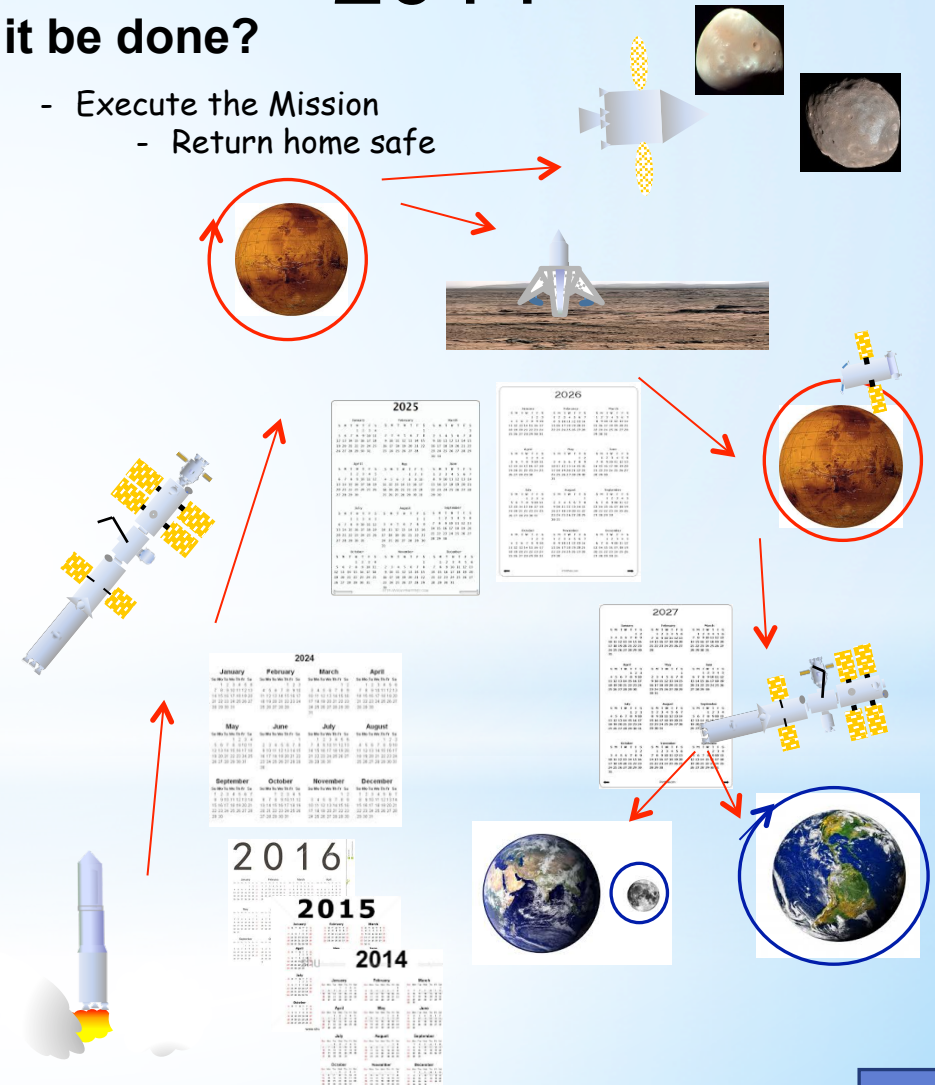
2014

How can it be done?

- Execute the Expedition
- Return home safe



- Execute the Mission
- Return home safe



Planning the Journey

1492

2014

How can it be done?

Travel Time (Facts)

Departure: August 3, 1492 Three Ships
Arrived to Canary Islands: August 9
Arrived in Indies (Bahamas): October 12
Departure January 15, 1493
Return Portugal: March 4
Return to Spain: March 15

total Travel Time: 7 months 12 days

Resupply in America

1 Ship lost 39 men left in La Navidad Fort (Haiti)

Travel Time (Estimated)

Departure from Earth Orbit
November-December 2024
Mars Orbit Arrival: August 2025

Departure from Mars Orbit December
2026-January 2027
Earth Orbit Arrival: July-August 2027

Travel Time (Estimated) 31 months

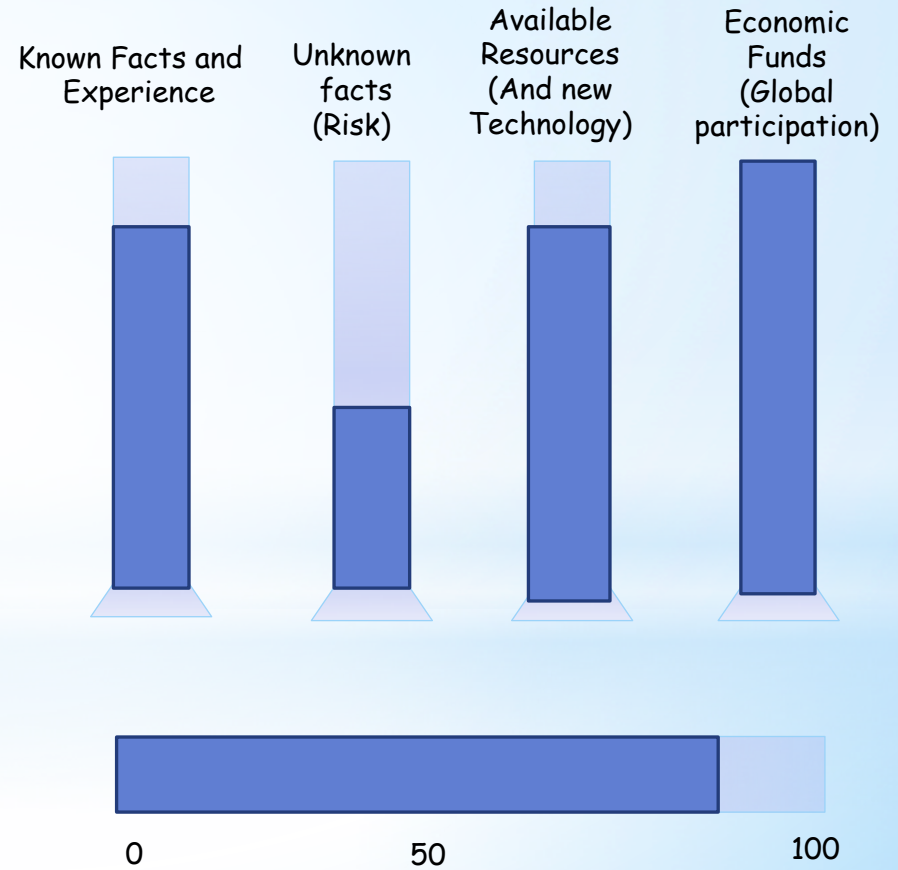
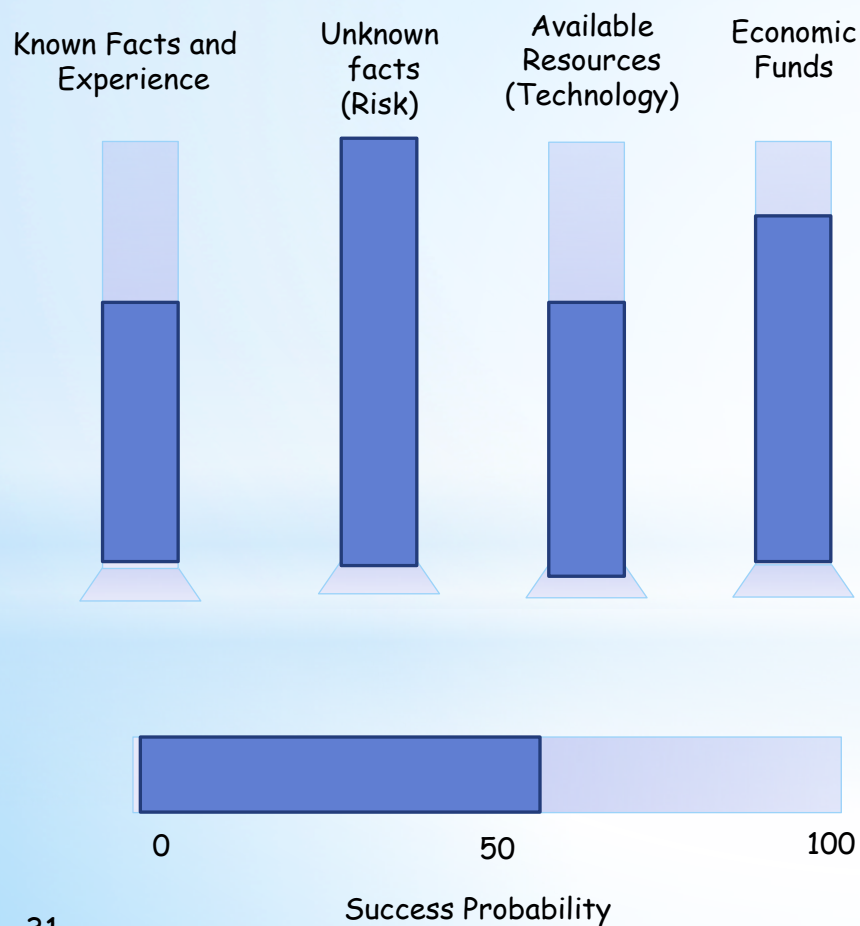


Planning the Journey

1492

What is the possibility of reaching the Goal in the proposed time frame adding resources and technology?

2014



Planning the Journey

1492

Goals to achieve

2014

- Arrive to Indies
- Found land (a continent) in between opened the way for a new world

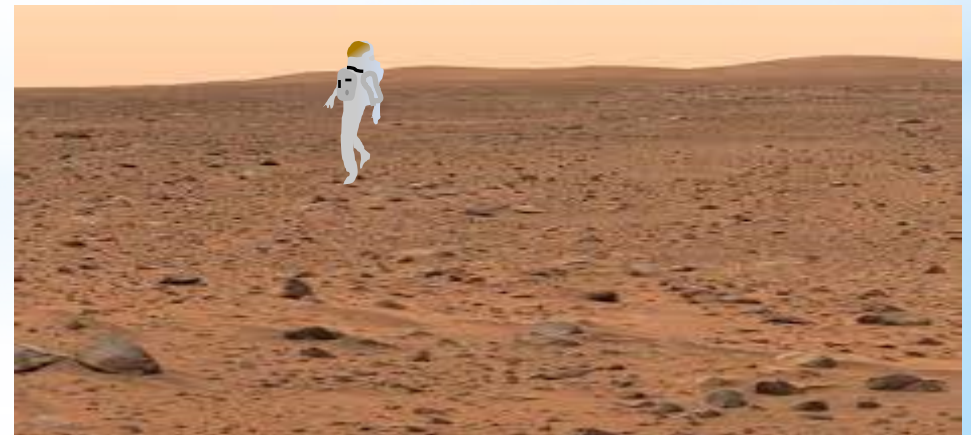


If Christopher Columbus would have known the correct dimensions of Earth and the distance between Europe and Japan traveling west, probably he would not have done the Journey with the available Ships, He would have needed a bigger ones.

If he had known about the Hurricane Season perhaps he would have changed the date for his expedition.

When done (2024 - 2027?) These Goals could be achieved:

- First Manned Exploration to the Orbit Of Mars
- First Manned Mars Landing
- First Phobos and Deimos Manned Flyby
- First Mars Space Station for future explorers
- Open the way for interplanetary exploration



Closing Thoughts

Why the 1492 endeavor could be done?

Why the 1969 Moon Landing was achieved in a relatively short time?

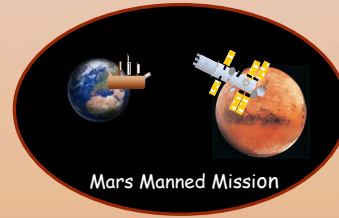
What is needed today to impulse this Mars Mission and get a commitment?



When President Kennedy asked Dr. Wernher Von Braun what it would take to build a rocket that could carry a man to the moon and bring him back safely to the Earth, Von Braun answered him in five words, "The will to do it."



Thank you



EXPLORE
MARS
AND
CARRY
ON