2020-2021

namazu contest

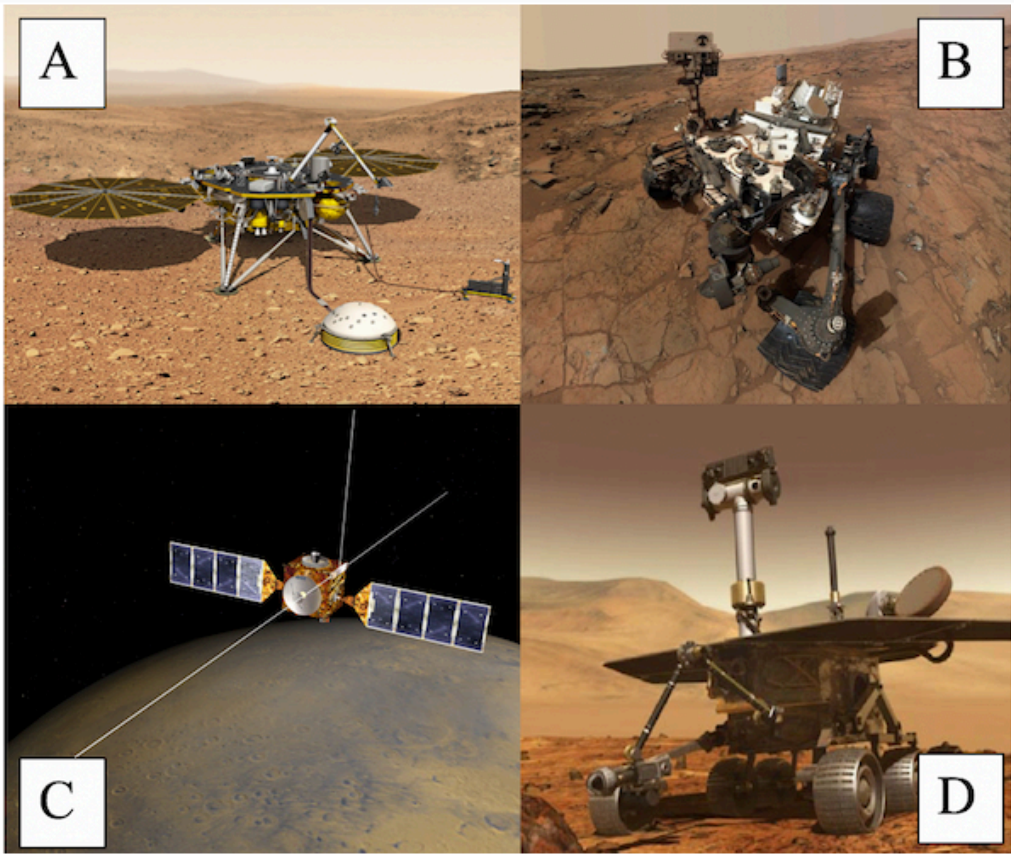
Episode 1 – Questions issued on 26/08/20 ; answers due on or before the 04/11/2020 to namazu@geoazur.unice.fr

Part I - Recalls on InSight.

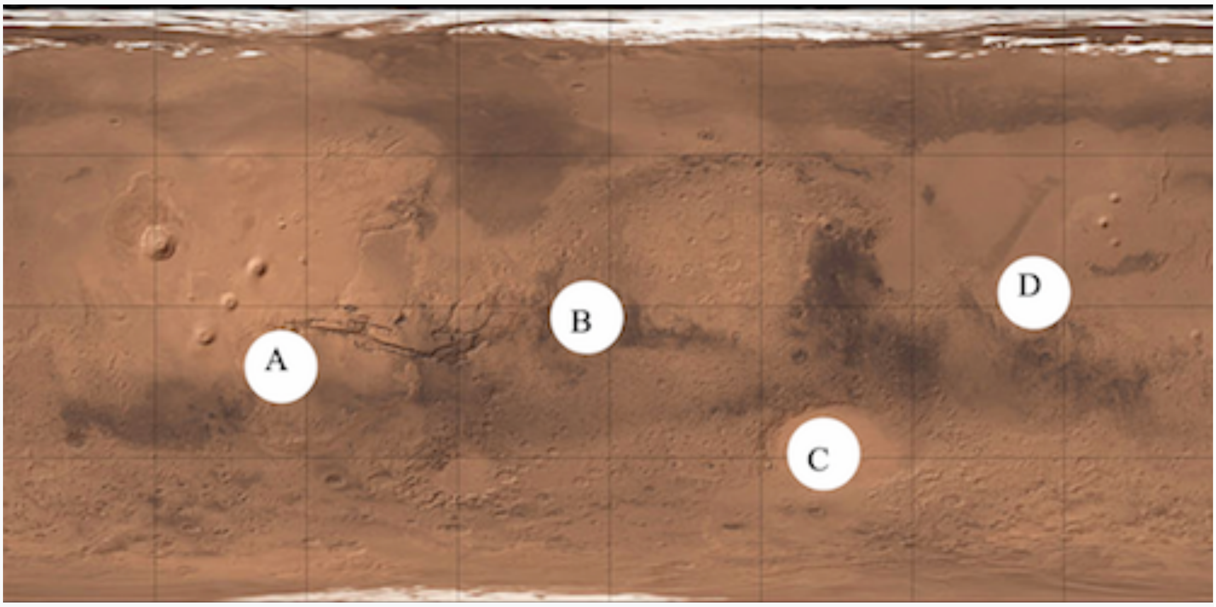
To start off this new Namazu season, the MCQs from part 1 will provide an update on the InSight mission so that the new participating establishments can familiarize themselves with this Martian mission.

Q1. On the construction of which instrument of the InSight mission did the French CNES participate?
- The SEIS seismometer
- The APSS weather station
- The HP3 heat flow sensor
- The RISE communication system

Q2. Which of these images corresponds to InSight?
- A
- B
- C
- D



Q3. Now it's up to you to find out where InSight has landed on Mars. What letter does the "landing" site correspond to?
- A
- B
- C
- D



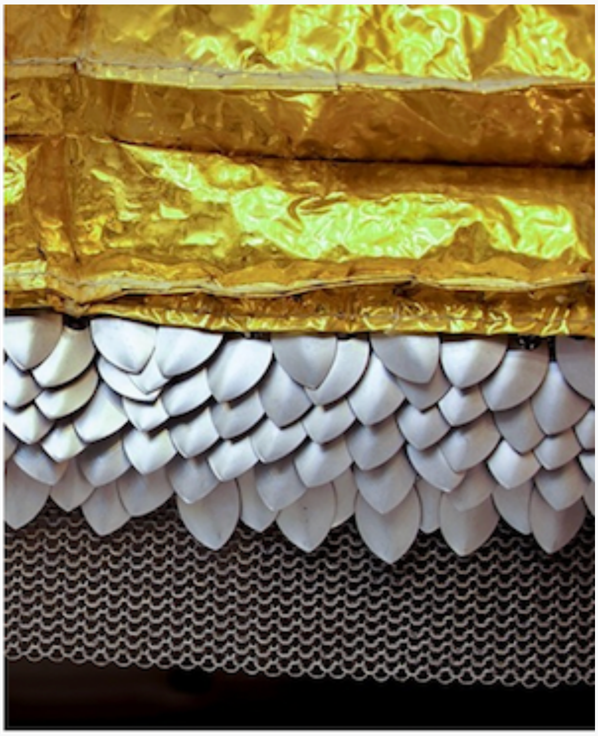
Planisphere of the planet Mars

Q4. How many earthquakes have been recorded by the SEIS seismometer of the InSight mission since it began recording?
- Around 10
- About 500
- About 3500
- Millions

Q5. However, the recording of these earthquakes does not allow scientists to know the deep structure of the planet. Why not ?
- The earthquakes recorded were not of sufficient magnitude
- Earthquakes are located too far from InSight
- There are not enough earthquakes
- The earthquakes only occurred at night

Q6. InSight has a magnetometer that measures the strength of the magnetic field. Interestingly, the measurements collected show an intensity 10 times greater than that which the scientists had assumed. To what is this due?
- The presence of a magnetic field on the surface of Mars
- The presence of underground rocks with traces of a past magnetic field
- Wind disturbances
- Energy sources from InSight solar panels distort magnetometer readings

Q7. Mystery photography.



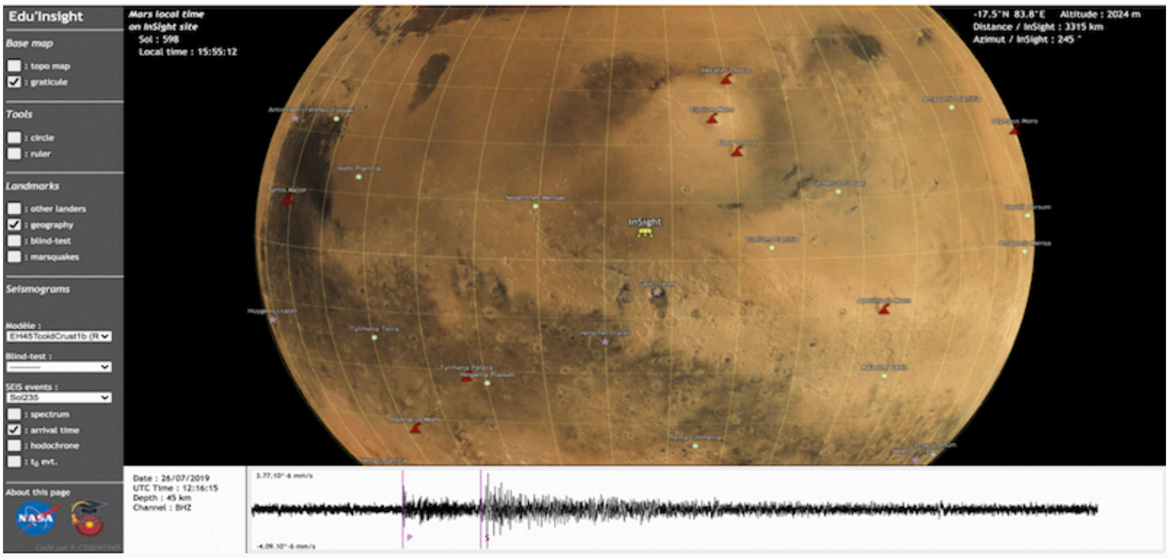
Credit: © NASA / JPL-Caltech / IPGP / Philippe Labrot

What part of InSight does this photograph correspond to?
- The protective shield of SEIS
- A cable from HP3
- The temperature sensor
- An element of the solar panel

Q8. What award has NASA never received?
- Webby
- Emmy Award
- Oscar
- AIAA Foundation Award

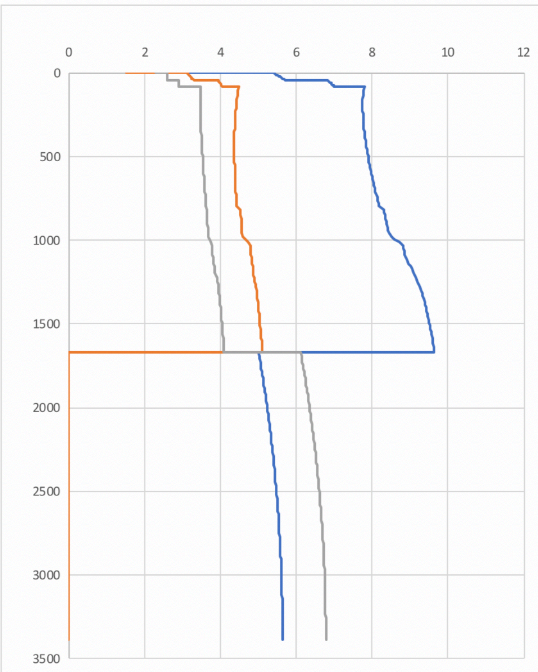
PART II - Things are moving on Mars!

Since the beginning of its recordings, InSight has recorded the first “marsquakes”, Martian ‘earthquakes’.
In this part, we will work on the data of these recordings using the "Marsview" software available online at this address: http://namazu.unice.fr/marsview/

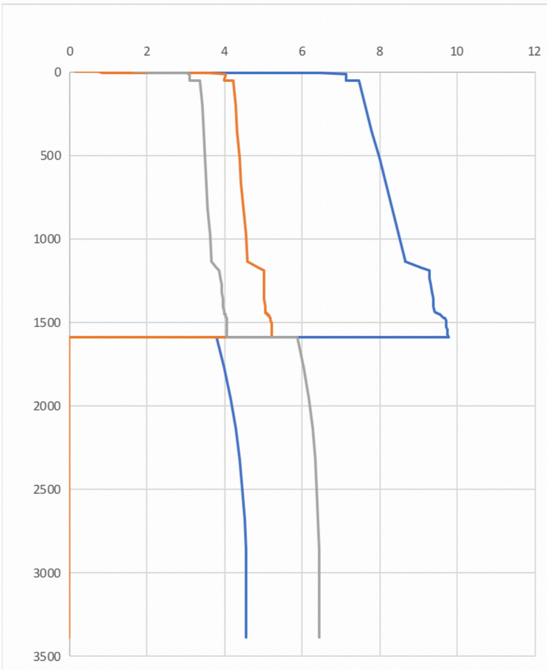


Screenshot of 'Marsview' software

Using this software, note the delay in arrival of S waves relative to P waves ... and using the hodochrone, estimate the distance from the epicenter of the ‘marsquake’ to the SEIS sensor of InSight.
For the calculation of the epicentral distance, two values are to be found because you will have to use successively the hodochrone of the model EH45TcoldCrust1b and that of the Gudkova model.



Speed (in km / s) of the P waves (in blue) and S (in red), and density (in gray) as a function of depth, according to the EH45-1b model



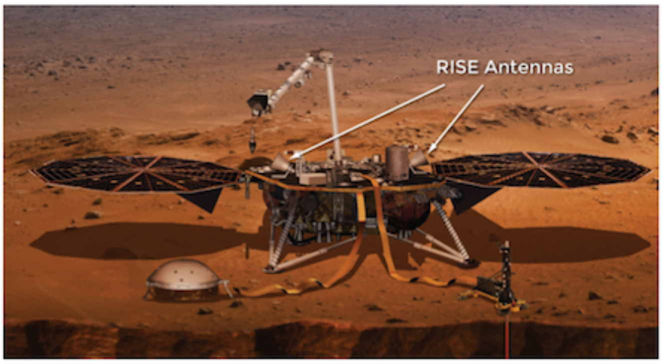
Speed (in km / s) of the P waves (in blue) and S (in red) and density (in gray) as a function of the depth, according to the Gudkova model

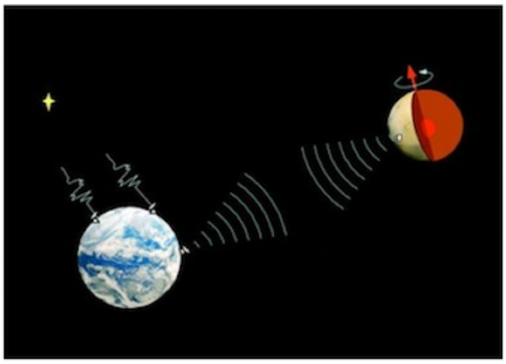
Then fill in the information on earthquakes for sol 173, 235 and 290 in the form of a table:
o The earthquake's earth time (to)> hours / minutes / seconds
o The delay between the arrival of S and P waves (ts-tp)> seconds

o The epicentral distances estimated by the hodochrones of each of the models> kilometers

Indicate which epicentral distance is not calculable and explain why.

Part III - And yet it turns.





You certainly know the seismometer named SEIS from the InSight mission, but do you know RISE?
It is an on-board system that measures the location of InSight every day with centimeter accuracy.
From Earth, signals are sent to RISE which works like a mirror. The difference between the start signal and the return signal allows scientists to determine the position of InSight and at the same time the oscillations of the planet Mars.
The purpose of these measurements is to determine the structure of the nucleus.
The measurement of the oscillation tells us in fact about the distribution of mass and materials inside the planet, of the external forces acting on the planet, such as the gravitational pull of the moons and if there is a "Sloshing" of the core. This movement of the nucleus can be demonstrated by spinning an egg ...

Rotate a raw egg and a cooked egg of the same size on the same table.
Describe the differences you observe.
Do the experiment again but this time place a finger momentarily on top of the eggs to stop the spinning, then release. It is important to only touch the egg to stop it for a moment, not to leave your finger on the egg for too long.

Based on the model used, and if future RISE measurements would show only weak oscillation of Mars, what hypothesis could be made by scientists.

The experience and the answers to the questions in this part should be captured as a short video.
It must be placed on a file transfer site for which you provide the link.

Part IV - Mars2020 has taken off!

NASA's Mars2020 mission took off at the end of July 2020 towards the Red Planet.
This mission will aim to learn more about Mars and more specifically on the search for traces of past life.

You can relive its take-off on the internet: https://www.youtube.com/watch?v=VWD-nx9gA0o

And to mark the launch of Mars2020 and the launch of this new year with Namazu, **you will have to take a selfie in front of an image of the takeoff of the Mars2020 mission.**