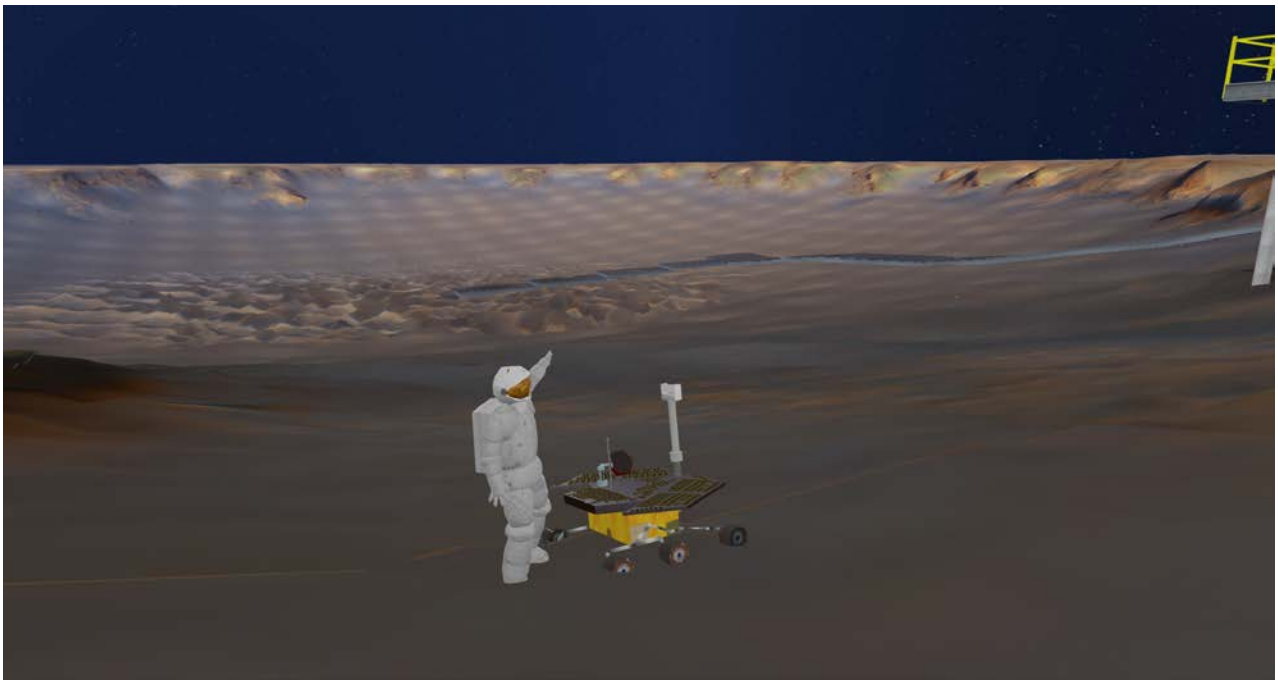
"Mars and Opportunity rover"



Date/ Time: 8th June (Sat), 2019 at 7 am PDT/ 14:00 GMT/ 23:00 Japan

Tour guide: Hajime Nishimura (JAMSTEC)/ Yan Lauria (Abyss Observatory and Education Portal)

Locations:
- Start from Mars field of Explorer Island
http://maps.secondlife.com/secondlife/Explorer%20Island/90/99/35
- TP to Mars Victoria Crater
http://maps.secondlife.com/secondlife/Explorer%20Island/26/140/636
- Bonus: Asteroid Ryugu and Hayabusa2, International spaceflight Museum
http://maps.secondlife.com/secondlife/Spaceport%20Alpha/88/203/651

Participants:
Ari (Arisia Vita), Dae Miami, Enno (enno36), Fumon Crystal, Jeanne Valois (JeanneValois), Joseph Bard (science24), Mike Shaw (Shawza Tunwarm), panni (upad), Radrun Rau, Scire

Organizer: Chantal Jager (Nymf Hathaway)

Abstract
On February, 2019, NASA announced the end of 15 years Mars exploration by the Opportunity rover at last.

At first, NASA thought Opportunity's life is only 3 months due to dust on the solar panels, but it is found Mars Dust Devils blow away the dust on the solar panel.
It is known Mars wind can be more than 120 km/h, so Sci-Fi novels and movies describe astronauts are blown even in recent movie "The Martian" (2015).
But there is a trick that Mars air density is only 0.75% of the Earth. Its thin air annoyed Mars landing.
At Explorer Island, you can ride on Opportunity, Landing airbags and even Dust Devil, and you can feel empathy with Opportunity when he/she entered in the Victoria crater.
As a bonus, I'll introduce new exhibit of the spacecraft "Hayabusa2" and sample return mission from asteroid "Ryugu" using markup language Markdown.

(Sound Setting)

[06:52] Radrun: I will have to relog, there are sound issues on my end
[06:52] Chantal: ok Radrun
[06:53] Mike: I will share the sound from my Firestorm window (as usual) at https://siue.zoom.us/j/681592843 in case people have difficulty with Voice
[06:53] Chantal: Thank you, Mike ツ
[06:53] Yan: We need trouble shooting panel for sound problem
[06:54] Chantal: Can you use text chat? Yan
[06:54] Chantal: seems to work again...your voice
[06:55] Yan: It is difficult to use text chat during moving
[06:55] Chantal: is yes
[06:58] Radrun: My problems is that the firefox browser reconfigures my audio settings on Ubuntu. I must not press that link for a wrong reason.

(Tornadoes & Flooding in RL and SL)

[06:51] Mike: Hello! I'm hoping that there will be no tornadoes this weekend near me!
[06:51] Chantal: well better hide than ツ
[06:57] Chantal: you alive, Mike???
[06:57] Mike: Yikes! Tornadoes!
[06:57] Chantal: ツ
[06:57] Ari: we call them dust devils :)
[06:57] Chantal: I like that, Arisia ツ
[06:57] Yan: In this tour, timing of sand devil is important.
[06:58] Mike: The more pressing problem locally is flooding along the Mississippi... there are communities underwater. I am OK, but I have friends who had to relocate
[06:58] Chantal: :(sorry to hear that, Mike
[06:58] Dae: yes I have been hearing about that on news

(Eclipse)

[06:57] Chantal: I like to share an event we have in July... for the real fans

https://www.sciencecircle.org/event/exploratoriumlivechile/

[06:58] Dae: We had 90% solar eclipse a year ago. That day was cloudy and we almost missed the whole event

(Start)

[07:00] Mike: I have turned on the recording on my Zoom window

[07:00] Chantal: Thank you, Mike ㋡

Yan: Here is Mars field of the Explorer Island, built by Jet Propulsion Laboratory of NASA. Here is next of International Spaceflight Museum.

(Mars Sky Color))

Yan: At first, please look up. Mars sky color is confusing on internet information. Orange?, pink? Yellow-brown or "butterscotch" color?

[07:02] Dae: mmm butterscotch good candy

Yan: Our image of Mars sky is orange for long time but it is caused by a scandal that NASA administrator, Dr. James Fletcher, ordered to increasing red channel of image from Viking 1 in 1976. I don't know why, but I suppose Dr. Fletcher concerned people thought the images were taken at Arizona.

Yan: Rover's camera has several color filters and it is optimized for scientific purpose, so we can't say it is suitable to know true color for human.

Yan: In anyway, Mars sky at noon is rather pink or yellow-brown, but may be more bluish than our image, and at sunset, Mars sky is bluish in opposition to the Earth sunset.

[07:03] Yan: https://en.wikipedia.org/wiki/Astronomy_on_Mars#The_color_of_the_sky

[07:03] Chantal: Thank you ㋡

(Mars Curse)

Yan: In the second, I'll talk that there were so many failures in Mars exploration history in comparing with other planets.

Two of the three have failed. Russia has challenged more than a dozen times over the past 50 years, but there has never been a complete success.

So someone said that there is a Bermuda Triangle between Earth and Mars, or there is the "Mars Curse" or "Martian Curse".

[07:05] Yan: https://en.wikipedia.org/wiki/Exploration_of_Mars#Probing_difficulties

Yan: Why? Time lag? Thin xtmosphrer? Mars Dust? Come on please.

(Landing Airbag)

Yan : I'll talk about difficulty caused from thin atmosphere of the Mars. Only 0.75% density of atmosphere of the Earth.

So it is difficult to brake by parachute when landing.

Well, there is something like a lump of balloons.

[07:07] Mike: This is the landing bubble

[07:07] Chantal: yes ㋡

[07:07] Mike: parachutes won't work

Yan: This is the airbag which was used for landing.

Then, someone, please sit on an airbag.

[07:08] Dae: It is not letting me sit

[07:08] Dae: nope

[07:08] Ari: I can't either

[07:08] Chantal: no, neither

Yan: Please look carefully. We can move the airbag by mouse.

Like this, the airbag is bouncing and rotating for long distance after landing

[07:09] Fumon: ((rolling rock))

[07:11] Yan: https://www.youtube.com/watch?v=KyktvC7w7Js

(Dust Devil and Dust Storm)

[07:12] Mike: Tornado!

[07:12] Dae: watch out for dust storm lol

Yan: Now a Dust Devil is happening

It looks like a tornado, but "Dust devil" occurs not on a storm day but on a sunny day.

This wind speed can be more than 120 km/hr, as fast as an express train. If it is on the Earth, it is about a fierce wind of typhoon (wind speed 33 m / s).

In addition, the gravity of Mars is about 40% of the Earth, so people thought that humans would be blown away.

Yan: Everyone, please sit on the Dust Devils.

[07:13] Dae: oh cool

[07:17] panni: giggles

[07:17] panni: yeah

[07:18] Chantal: Harsh environment

Yan: Is it possible? You may remember the density of Mars air is only 0.75 % of the Earth, so the air resistance is also 0.75 %. So flying astronauts is only in fiction.

(Opportunity and Solar Panel)

Yan: Here is deflated airbag which wrapped the opportunity rover.

My question is how to avoid upset when the airbag stopped.

Yan: In anyway, someone, please sit on the Opportunity. Then, started.

(Time lag)

Yan: Next difficulty, between Mars and the Earth, radio waves takes 4 minutes one way, at the earliest, when Mars is closest to the Earth and 40 minutes when Mars is far away.
So Opportunity judges by himself with camera, and avoid risk by himself.

Yan: Third difficulty is sand dust. Opportunity was designed as one year life time, At first, it was thought that dust accumulated on the solar cell panel and power generation could not be performed.
But surprisingly, the dust devil blow off and the solar panel was kept clean for long time

Yan: On the other hand, because of low gravity (40% of the Earth), it is easy for sand dust to roll up like this, and the sandstorm blocks the light of the sun, solar cells can not generate much power,
So Opportunity could not move during the dust storm.

[07:19] Radrun: Why did NASA rely on dust-devils to do their work. Could they not have invented a cleaner. Windshield whiskers or a dust blower.

(Curiosity and Nuclear Battery)

Yan: Next Mars rover、Curiosity adopts nuclear battery cell like this so that he can move independently with weather.. Instead, Curiosity became heavy than Opportunity so he need to use sky crane with thrusters instead of airbags.

(15 years mission of Opportunity)

Yan: At last, NASA gave up Opportunity's operation last year.
https://mars.nasa.gov/mer/mission/rover-status/#recent

Then, let's experience how the Opportunity explorer on the Mars lonely.

Please teleport:

http://maps.secondlife.com/secondlife/Explorer%20Island/26/140/636

[07:19] Fumon: next

(Mars Victoria Crater)

[07:27] Chantal: Pity Jet Burns left sl

Yan : Here is the sky above of Explorer Island. This is a precise reproduction of the Martian Victoria Crater at a scale of 1/4. The true diameter is 750m.

Yan: The opportunity landed on Mars in 2004, 15 years ago. Two years and eight months later, Opportunity arrived at the edge of this Victoria Crater, where is that?

Yan: Here, Please use flying mode.

[07:29] Chantal: Stay in flying mode, please

[07:29] Chantal: you cannot walk here

Yan: Here is named Duck Bay. At that time, NASA's people concern once he entered this crater, he could not escape, but scientists really wanted to survey the old stratum of this cliff. Opportunity finally got into the crater in September 2007. And, after conducting a survey, he successfully escaped from the crater one year later. What kind of thing did you find out?

Yan: The main purpose is to look for evidence that water had once flowed on the surface of Mars. There was a time when there was a sea on Mars, and everyone thinks that there will still be some form of water underground.

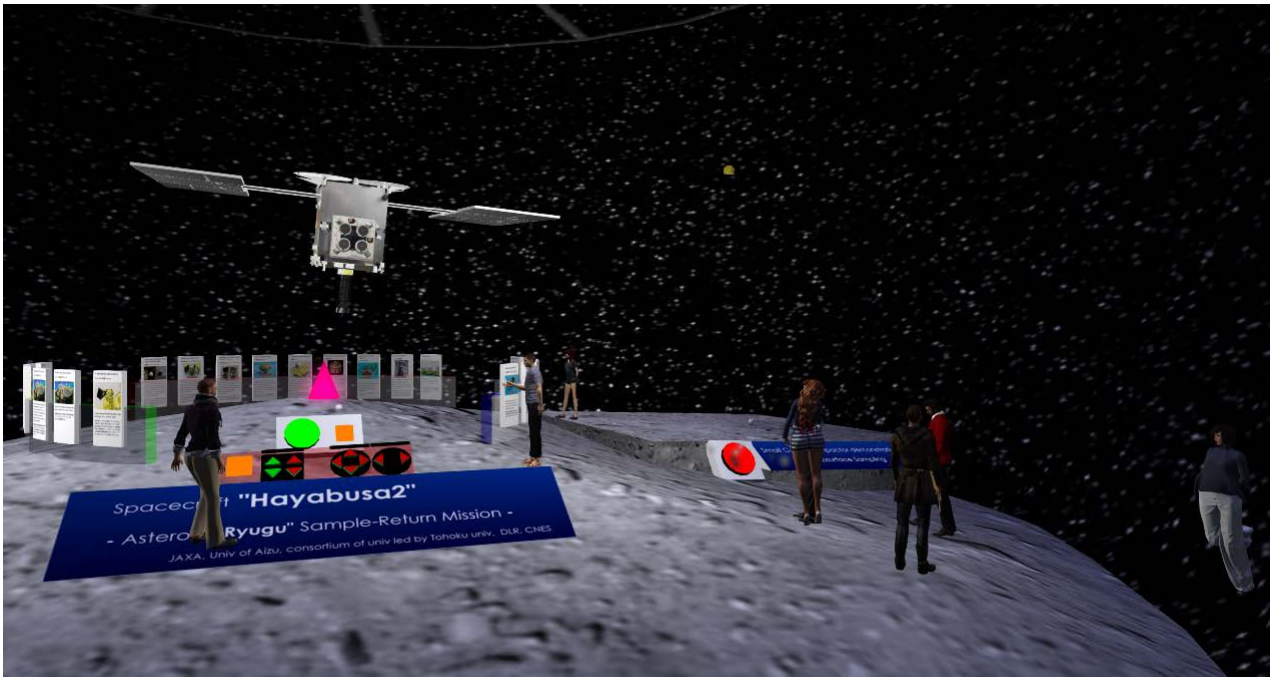
Yan: Total travel distance in 15 years is 45.16 kilometers

(Asteroid Belt and Hayabusa2)

Yan: At last, bonus tour, Come after me. Fly for northward of the crater.

This is ”Hayabusa2" and ”Ryugu”

http://maps.secondlife.com/secondlife/Spaceport%20Alpha/74/202/651



Yan: Ryugu means “Dragon Palace”.

You can see explanation of each equipment by touch these panels around the Hayabusa2, then pink cone points the equipment, but today, scripts doesn’t work well. We need to improve.

Click this green button, Hayabusa2 will touchdown like this.

And this side, click this red button. Then, impactor demo is started.

[07:43] Mike: I love the detail on all of the models... and the scripting... this is an impressive body of work!

Yan: Todays tour is ended. Thank you!

[07:43] Dae: Thank you Yan for the tour
[07:43] Chantal: Impressed by the Hayabusa model, Yan!
[07:43] Ari: great job Yan
[07:43] panni: ♥ Thank Youuuuuuuuuu!! ♥
[07:43] Mike: Yes, thanks for a great tour!
Yan: We are trying explanation using LSL-Markdown language but not working well yet.
[07:43] Fumon: にゃ～にゃ～♪
[07:43] Jeanne: thank you :)
[07:43] Fumon: .•*❤¨`•Applause•´¨`❤*•.
[07:43] panni: yes very good
[07:44] Chantal: Thank you, grateful you make use of the Nasa regions, Yan!
[07:44] Enno: thank you very much yan
[07:44] Mike: Applause!!
Yan: Do you have any question.
[07:44] Radrun: Is there a new planned mission by Japan to asteroids ?
Yan: Next mission is to return the sample to the Earth,
[07:47] Dae: It was nice seeing all of you. I have to log have a good day all
[07:47] Chantal: Have a nice weekend, Dae ツ
[07:48] Fumon: my question ヤンさん、はやぶさ２は、はやぶさ１みたいに、大気圏？ぐらいで分離されて、オーストラリアの砂漠にいち部分だけ帰還させる予定なのでしょうか。
Yan: Here is the re-entry capcel. Only this capcel will return to the Earth.
[07:49] Ari: thank you again Yan, great job
[07:49] Joseph: thank you Yan
[07:49] Fumon: .•*❤¨`•Applause•´¨`❤*•.
[07:49] Mike: Thanks very much for your time! Have a good night!
[07:49] Chantal: You too, Yan, thank you again!
[07:49] Radrun: Thank ou
[07:50] Enno: thank you ... bye
[07:50] Chantal: Thanks everyone for enjoying this with us!
[07:50] Chantal: Have a great weekend ツ
[07:51] Yan: Thank you all, have a nice weekend!
[07:56] Mike: It was nice to see everyone today... I have to go, but thanks again!
[07:56] Yan: yw, Mike
[07:56] Fumon: yay
[07:56] Jeanne: good bye mike :)
[07:58] Joseph: was a nice trip Yan, we have to leave , take care everyone
[07:58] Fumon: にゃ～にゃ～♪
[07:58] Yan: Thanks Joseph

[07:58] Jeanne: take care, thank you :)
[07:58] Jeanne: bye
[07:59] Fumon: ❤
[07:59] Fumon: see you soon, Jeanne Joseph
[07:59] Joseph: :)
[07:59] Fumon: :)
[08:00] Yan: You can continue solar system tour using pink cone, tp to upper floor,
[08:00] Yan: then there is Teleporter to the Jupiter
[08:01] Yan: Jupiter model is very detail
[08:01] Fumon: yep
[08:01] Fumon: aww great
[08:02] Yan: Pls visit Jupiter and far away when you have time.