

來一瓶魔法藥水-地球觀測史

A bottle of magic potion - Journey to the Earth Observatory history

High-Level Project Summary

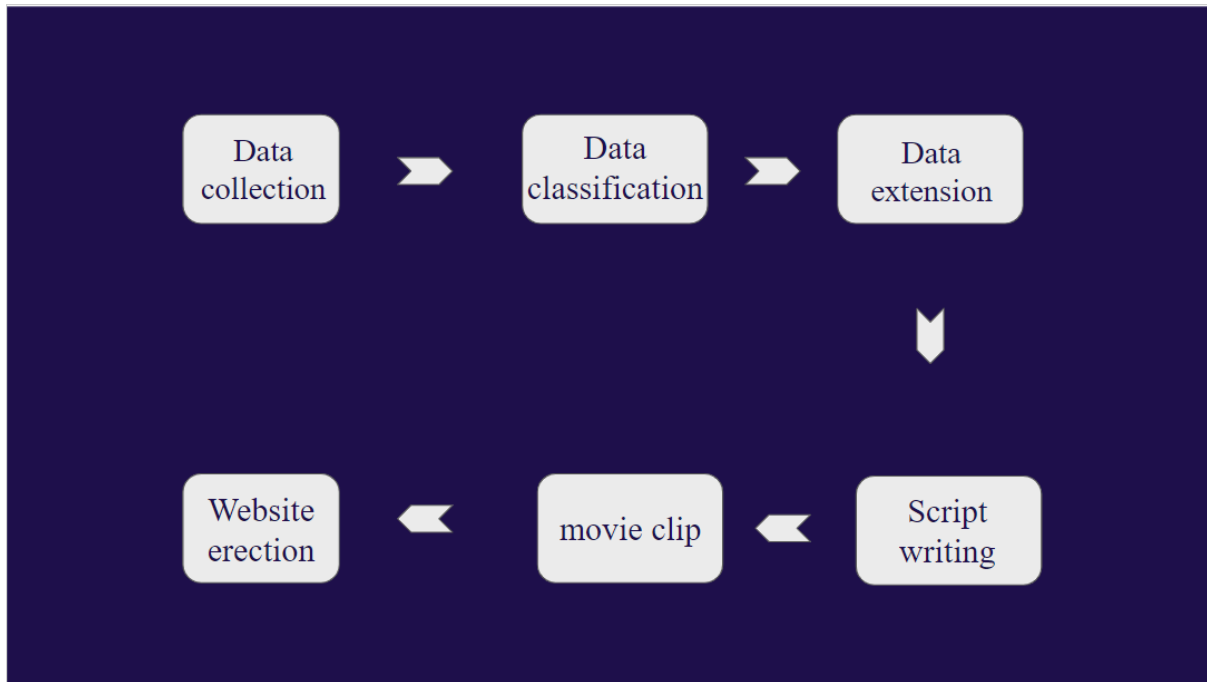
Satellites are the grand achievements of human beings. Modern life and civilization today benefited and prospered greatly from NASA's exploration into space and observations of the earth. However, the general public often shy away from the complexity of technology and sciences, and consider that is exclusively for professional people. To bridge the gap, we made six animated short films to introduce various satellites as a medium for reaching out to the general public. Two fictional characters of Gabee (an allion) and Monica (an earthline) are built to make story telling in a witty and comical way to promote NASA's history of scientific observation.

By utilizing Gather Town as a medium, we built the Magic potion town for all participants to have a satellite odyssey with Gabee and Monica. Using open source data provided, we categorize the satellites into the climate and solar energy; clouds and aerosol, biosphere, and global environment monitoring. In this design, the audiences can also understand the importance behind the observation and the concept of the earth system.

Detailed Project Description

The procedures for us when we conducted this project stimulated our interest in scientific thinking. We followed the steps shown in the figure below to try to come up with an effective solution to this challenge. Our main purpose is to contribute to the popularization of science. So we first set out to collect a large amount of information about satellites, their data: including satellite launch time, orbital altitude, scientific goals, etc. After our discussion, we found that the public doesn't care so much about satellite details. We changed to focus on their scientific goals, hoping that would arouse the audiences' attention and interest in the earth's environment. Next, we categorize satellites by their scientific topics. In the hope that viewers will not only understand the history of satellites, but also understand the interaction among Earth's spheres. The next step is to collect more visual data to facilitate the production materials into videos and create a virtual space for knowledge circulation.

And we use Chinese and English subtitles to choose from, hoping to promote the popularization of science through the world's two major language systems, so that the public can break through the limitations of language to learn new scientific knowledge.



▲ Production process applied for this challenge

We take the virtual space of gather town to carry our goal of knowledge circulation space. In gather town, the audience can freely discuss information about satellite missions and watch our full series of popular science videos.

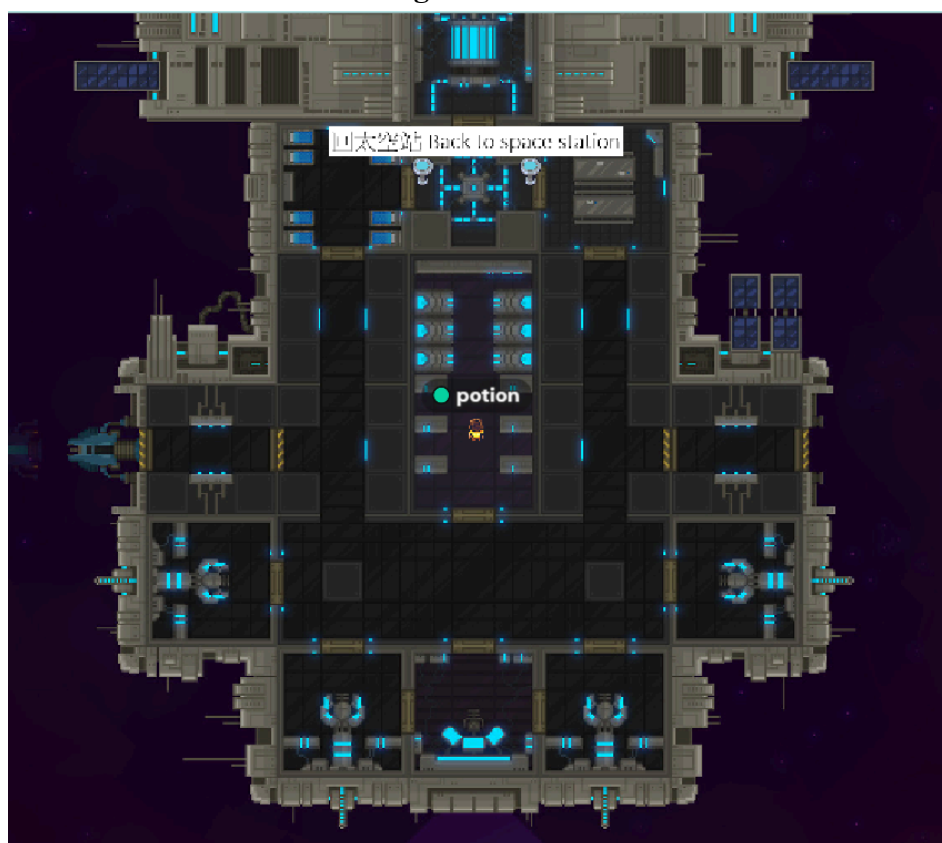
In particular, gather town is a place with unlimited opportunities for expansion. In the future, we will gradually update new series of films, and continue to extend more space for the public to cross the barriers of time and space to obtain new scientific knowledge in virtual space.

gather town :

<https://app.gather.town/invite?token=3Nr1aEIBJFoO3Gq-6yjdQ5H74gAac5Fu>



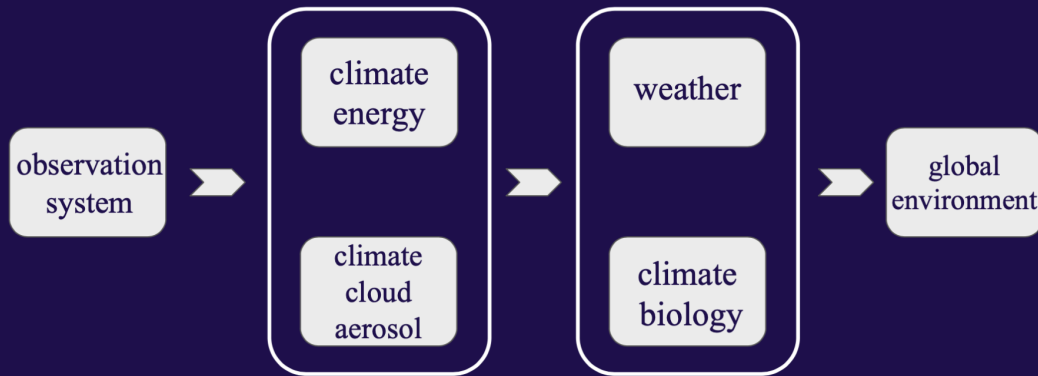
▲gather town



▲gather town

We have created six animated videos, which can be divided into three parts. Namely the observation plan as an introduction. The films about climate and solar energy , clouds and aerosols, and climate and biosphere satellites represent the main contents. Whereas the weather monitor and the global environment monitor sums up the grand conclusion of our satellite odyssey.

THE SCRIPTED ROUTE OF THE STORY



▲ Film structure

The six stories revolve around aliens and earthlings to discuss the observation and importance of the earth system. At the beginning, it tells that the alien GABEE chose to visit the earth because of the magnificent view of the earth from space. He met the heroine Monica TSENG and asked questions about the earth's environment. Taking Stratospheric Aerosol and Gas Experiment III (ISS) as an example to explain the importance of space telemetry and the concept of Earth system. 2-1 Climate and Energy mainly introduces the solar incident energy and the impact of the ozone layer on the earth's energy budget. Important tasks such as ACRIMSAT, SORCE, Aura, etc. are all introduced in this section, and 2-2 introduces clouds and aerosols. In order to let the public understand that clouds not only cause weather phenomena on the earth in precipitation, but also affect the climate in terms of energy budget, and aerosols, which are increasingly concerned in modern times, also have a profound impact on the earth's environment. This article introduces CloudSat, Cloud-Aerosol Transport System and other important tasks. The 3-1 weather that the audience can choose freely introduces the important tasks of TRMM, GPM, Lightning Imaging Sensor, etc. in the observation of precipitation, lightning, and hurricane. It is hoped that when the public sees the surrounding weather phenomena, they can also understand the scientific observation process and the task of weather forecasting. 3-2 In the climate and biosphere, the theme is also the impact of climate on organisms that resonates with the audience, and the tasks of Soil Moisture Active-Passive, ECOSTRESS, and ICESat-2 are introduced. The distribution of soil, ice cap, forest, and carbon dioxide affects the earth. The importance of systems science. In the final video, we conclude with the global environment, citing satellites such as Landsat 7, Aqua, Landsat-9, etc. to let the audience understand that large-scale observations of the earth allow us to integrate various types of data and

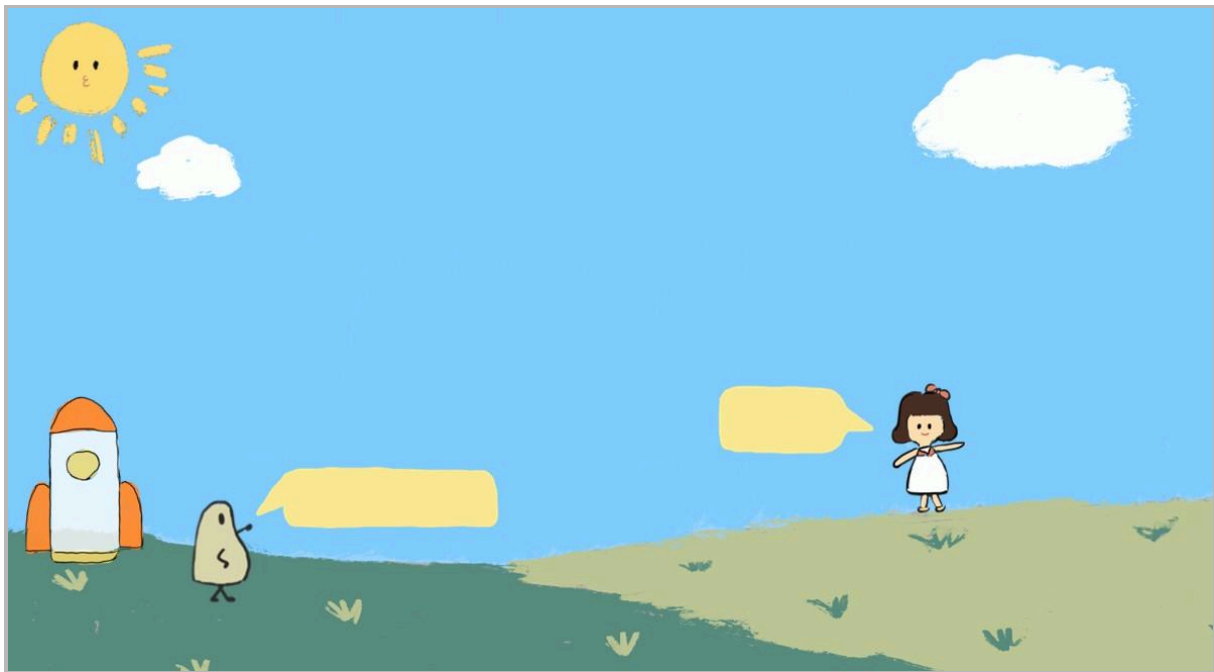
analyze them to better View the current state of the earth's environment from a macro perspective.

here is our youtube link:

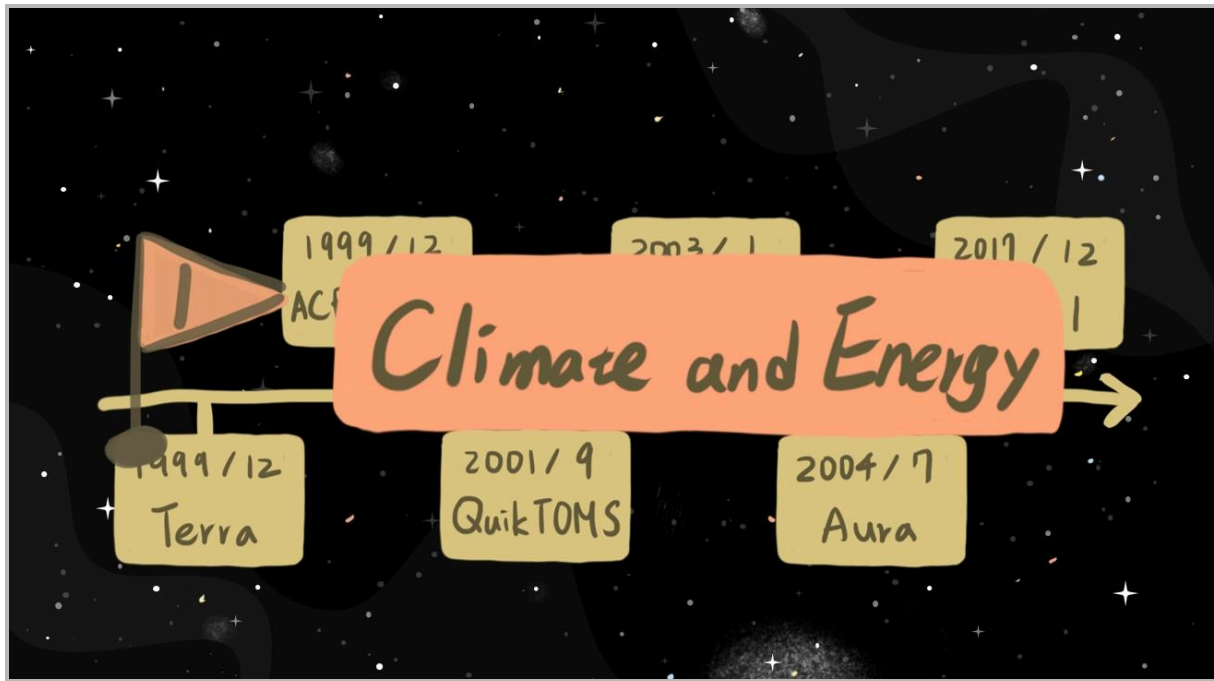
https://www.youtube.com/watch?v=z44VCNx_cqE&ab_channel=NASA_magicpotion



▲ video cover



▲ video content



▲ video content

Space Agency Data

Earth Science Mission Profile: https://eosps.nasa.gov/files/mission_profile.pdf

Through NASA's historical task list, we have learned about the profound history of Earth observation, and in the process of sorting out, we found that these historical information is not just a record of individual satellite information, it carries human's desire for knowledge and the earth's Understanding and breakthroughs in different stages of the environment. We found that satellite classifications of observation programs in different fields can be summarized in these information, which inspired us to think of interactive audio-visual and topical satellites. We hope that when the audience comes into contact with the information of these satellites, they will not only see them as A page in the prehistoric history, but also to understand the contribution of various satellites to the understanding of the earth's environment, they are not only eyes in space, but also an important part of the development of human civilization.

Hackathon Journey

We believe that while NASA has significant contributions to both space and Earth sciences, not everyone has a deep and holistic understanding of the Earth's environment. In Taiwan, where we live, the popularization of science has always been an

important issue. We believe that it is not that the public is incapable of receiving scientific knowledge, but that there is no channel or a people-friendly way to explore. Therefore, we chose the history of earth observation among the many challenges. We hope to promote science to the public through our own strength, and we hope to provide science with Chinese and English subtitles and make it easier for the public in Taiwan to understand.

At the beginning, we didn't know where to start with the vast history of observations, we didn't know how to organize the data in an interesting way and make a movie, but after we started to organize the data, we found that we could use the observation target to classify, And introduce them in chronological order in videos from different fields, so that the public can not only understand the important global environmental issues behind satellite observations, but also understand our interaction with the environment, and can see the progress of science and us in the progress of time series To understand the degree of the earth, we decided to classify the various data of satellites in order according to the topic category, and complete this project step by step.



▲ All NTNU participating teams inspiring ideas together

The completion of this topic must be thanked to all the companions who came for a bottle of magic potion. Without everyone's efforts to stay up late, there would not be such a rich video production. No matter how far away or how tired, it doesn't matter. I hope everyone has our magic potion. Can go to space together. I would also like to thank

Prof. Yeh Mengwan from the Department of Earth Sciences of National Taiwan Normal University for her supervisio and guidance. She continued to supervise our progress for weeks before the competition, and also provided us with assistance in English, scientife supervision, and meals over the two days competition. Thanks to professors in the Earth Sciences department of the National Taiwan Normal University for their care and assistance. I would also like to thank the staff of NASA space app of Taipei city, who not only did their best in planning of the event, but also prepared helpful courses and resources for us to participate.



▲ Great help from NTNU professors

Finally, we would like to thank all the fellow students who provided us with assistance and advice. We would also like to thank our team members who kept sacrificing their time this week. The division of labor is shown in the figure below, and everyone has made a key contribution to this project.



References

<https://spaceplace.nasa.gov/gallery-earth/en/>
<https://apod.nasa.gov/apod/ap080305.html>
https://youtube.com/clip/Ugkx6PX_ZhWEdv8tgiVHj4HArBcZpVL9y3g6
<https://www.youtube.com/watch?v=Uu2wB2cya1s>
<https://www.youtube.com/watch?v=93fr-C3R0ys>
<https://svs.gsfc.nasa.gov/2917>
https://www.youtube.com/watch?v=quhrfppN_Ag
<https://www.eoportal.org/satellite-missions/aura#group-award>
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<https://www.youtube.com/watch?v=0ITBte3QbeQ>
<https://www.youtube.com/watch?v=UeDY--mEYMA&t=28s>
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