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A VERSATILE SPACE APPLICATION TOOL TO SUPPORT LIFE IN SPACE: INTRODUCTION TO ASTRAX U2U (Universal User Interface)

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Abstract

Around the world, space travel has become accessible to the general public, allowing more people to venture into space each year. Since 2005, ASTRAX has been developing and launching various services and products necessary for private space travelers. As of 2024, ASTRAX has established over 200 space-related services in anticipation of the era of commercial space travel. To provide these services more efficiently and enhance accessibility, ASTRAX has developed ASTRAX U2U (Universal User Interface), a versatile space application tool. Additionally, ASTRAX has established ASTRAX USP (Universal Service Platform) to support a wide range of space services and ASTRAX VALUE, a framework defining essential value standards for utilizing these services. This paper presents the functions and usage of ASTRAX U2U, which supports space travelers and residents in their preparation, education, training, spaceflight, and daily life in space. Furthermore, it explores how this tool enhances the convenience of the emerging space economy and living environments beyond Earth.

Keywords: Private space travel, space services, ASTRAX U2U (Universal User Interface), ASTRAX USP (Universal Service Platform), ASTRAX VALUE, space economy (living area)

Acronyms/Abbreviations

1. Introduction

Since 2021, private companies such as SpaceX, Virgin Galactic, and Blue Origin have fully launched human spaceflight services for the general public. This has ushered in an era in which diverse people, regardless of nationality, race, gender, age, occupation, or disability, can launch into space. This trend is expected to accelerate, transforming space into a realm accessible to everyone, not just limited experts.

ASTRAX has been one of the earliest companies to anticipate this era of private space travel and has developed and provided over 200 space-related services since 2005. At the same time, we have also focused on developing universal talent capable of thriving in the unique environment of space (see Reference [29]). As the number of people traveling to space continues to explode, the needs of life in space will become even more diverse and complex, and a wide range of areas, including education, health care, and lifestyle support, will become increasingly important.

Against this backdrop, ASTRAX has been building a system to efficiently match supply and demand in space. At its core are the ASTRAX USP (Universal Service Platform) (see references [6], [13], [15], and [25] for details) and the ASTRAX U2U (Universal User Interface), a general-purpose application tool that anyone can use intuitively. (See references [6], [22], [51], and [95] for details.)

The goal is to enable use in all situations, including civilian spaceflight and space stays, as well as ground support and preparation. As civilian space technology evolves and develops, the functions and roles of ASTRAX U2U will also evolve simultaneously.

2. Background and Challenges

At ASTRAX, we develop a variety of space products and services, but they are fragmented and inconvenient. We decided to create an application to centralize and manage these services. Originally, ASTRAX built a portal site for accessing various websites, but we concluded that an app would be more convenient from the user's perspective.

We also envision a single app that can handle everything from spaceflight preparation to the actual flight and subsequent deployment.

Furthermore, in the future, we plan to develop a platform that can handle not only ASTRAX products and services, but all products and services used in space. It would be like combining the e-commerce site Amazon and the portal site Yahoo, but for space use only. We also envision using it for education and training for human resource development. Initially, all products and services will be provided for a fee, but points will gradually be accumulated, and we envision these points becoming a form of currency in the space economy. As a result, we envision a future where a variety of services will be available using the same value standards and currency whether on Earth, the Moon, Mars, or in outer space.

The reason we are trying to create such a system is because space is an entirely new field that can be developed almost from scratch. Therefore, it would be better to create an ideal and efficient economic sphere (living sphere) from the start. We are still at the stage where we can create standards and create norms. And while on Earth, trying to do something new is bound by vested interests and past traditions, such things do not yet exist in space, so we are in a position to provide ideal services from the start. As with the SDGs, addressing problems after they have spread is difficult to solve. It is important to take action from the beginning, before that happens.

3. Role and benefits of U2U (image of usage)

3.1 Role

(1) Providing the environment necessary for survival (place to sleep, eat, feed, excrete, breathe, etc.)
(2) Access to all education and training systems necessary for humans from birth to death
(3) Access to all education and training systems necessary for humans to live in space
(4) Providing entertainment
(5) Providing a creative environment

3.2 Benefits

(1) Everything is free to use
(2) Everything necessary for survival is provided
(3) Everything is automated
(4) Simple and efficient

4. ASTRAX U2U Goals

4.1 Benefits ASTRAX Will Produce

U2U aims to enable humans to perform all activities necessary for living in space with a single app.

This is because humanity has acquired the means to go into space, and it is certain that many people will do so in the future. However, at this stage, there are currently no environments other than the International Space Station where humans can live (or stay) for long periods of time. Therefore, the most efficient way to do this is to create ideal and convenient tools and common platforms now, and then evolve them as humanity expands into space.

This is because if we were to produce everything needed for living and living in space separately, there would be a great deal of waste. Of course, at first, each company will probably provide products and services separately. However, if we could enable the ultimate sharing, reuse, and bartering of goods and services in space, we aim to eliminate unnecessary competition and battles for market share, and allow people to always focus on constructive activities.

While the principle of competition is necessary for evolution, this can be done on Earth. Ideally, we would like to be able to provide the best and most efficient of these in space.

U2U is the tool we use to ensure the provision and circulation of such ideal products and services for space life.

At ASTRAX, we envision life in space, on the Moon, or Mars as a world where humanity lives together as one family, with no need for concepts like ownership or buying and selling.

In order to efficiently circulate limited resources and create a sustainable living environment, we aim to create tools and platforms (similar to a smartphone OS or apps) that everyone can use, and to enable everyone to live using just those tools from the preparation stage (including education).

Our goal is to make the activities necessary for human survival as ultimately efficient as possible, so that all of humanity's wisdom can be creatively utilized for the constructive evolution of humanity.

As a result, we believe that destructive and violent conflict will be eliminated, and a brighter, more peaceful future will be built both in space and on Earth.

Humans living on Earth tend to think of Earth as their home and space as a new frontier, but ASTRAX's vision for the future may be the opposite, with a home in space and Earth as a frontier where various challenges await.

4.2 What kind of civilization should we build in space?

Life in space can be imagined as a luxury cruise ship like the Peace Boat, where all crew members are equal, living in one place and cooperating with each other. It can gradually expand as needed.

Or perhaps it's like nomads or Vikings, exploring uncharted territory in search of a better living environment.

Or perhaps we could imagine building an Earth Town in space, just as China has built Chinatowns all over the world.

Or, if freedom, novelty, and diversity are important, perhaps we could imagine building a United States of Space, just like the United States of America in space.

There are many different ideas about what kind of civilization should ideally evolve, but in any case, it is important to learn from Earth's history and evolve in a way that avoids repeating the same mistakes.

To achieve this, we aim to create universal apps for all humanity, so that humanity becomes like one family.

5. Future Outlook

First, we will create a habitable environment (simulation facility) on Earth based on this concept and conduct demonstration experiments on a small scale.

At the same time, we will provide our technology and experience in line with space exploration. We will provide repeated feedback and make improvements.
At the same time, we will return "space-specific" technologies to Earth.

By efficiently carrying out this two-way process, we will create better living environments both in space and on Earth.

6. Conclusion

In previous papers, ASTRAX has considered the various functions and services that ASTRAX U2U could provide.

However, if such an ideal environment truly emerges, we must agree on a common vision and direction for the kind of civilization humanity needs to build. Otherwise, the new frontiers we explore in space, the Moon, Mars, and elsewhere will likely become places of perpetual inequality, competition, and war, just like Earth.

It is easy to imagine that discussion of this issue will lead to no solution. Therefore, we believe it is best to first conduct demonstrations on a small scale and gradually expand the scope.

At ASTRAX, we hope to continue pioneering humanity's expansion into space with the vision that all human beings are one family.

References

Reference to a conference/congress paper:

[1] T. Yamazaki, 民間商業宇宙飛行士と新規宇宙ビジネスの展開について, 3D18, 50th Space Science and Technology Conference, Kita Kyushu, Japan, 2006, 8- 10 November.
[2] T. Yamazaki, OVERVIEW OF ASTRAX SPACE SERVICES INCLUDING OVER 50 SPACE BUSINESSES, ISDC-2018-Many Roads to Space, International Space Development Conference 2018, Los Angeles, USA, 2018, 24-27 May.
[3] T. Yamazaki, ASTRAX ZERO GRAVITY FLIGHT SERVICES IN JAPAN, ISDC-2018-Many Roads to Space, International Space Development Conference 2018, Los Angeles, USA, 2018, 24-27 May.
[4] T. Yamazaki, ASTRAX LUNAR CITY DEVELOPMENT PROJECT, ISDC-2019-Many Roads to Space, International Space Development Conference 2019, Washington D.C., USA, 2019, 5-9 June.
[5] T. Yamazaki, ASTRAX SPACE SERVICES PLATFORM BY USING BLOCKCHAIN TECHNOLOGY, ISDC-2019-Many Roads to Space, International Space Development Conference 2019, Washington D.C., USA, 2019, 5-9 June.
[6] Taichi Yamazaki, Buhe Heshige, Yoshihide Nagase, ASTRAX UNIVERSAL SERVICE PLATFORM BY USING BLOCKCHAIN TECHNOLOGY, IAC-19- E6.5-GST.1.6, 70th International Astronautical Congress (IAC), Washington D.C., United States, 2019, 21-25 October.
[7] Taichi Yamazaki, MISSION CONTROL CENTER TO SUPPORT COMMERCIAL SPACE MISSIONS AND PASSENGER'S ACTIVITIES INSIDE OF THE CABIN, IAC-19-B3.2.3, 70th

International Astronautical Congress (IAC), Washington D.C., United States, 2019, 21-25 October.
[8] Taichi Yamazaki, ASTRAX ACADEMY AND SPACE BUSINESS AND SPACE FLIGHT SUPPORT EDUCATIONAL SYSTEM, Next-Generation Suborbital Researchers Conference (NSRC), Broomfield, CO, United States, 2020, 2-4 March.
[9] Taichi Yamazaki, MISSION SUPPORT CONTROL CENTER AND SUBORBITAL SPACECRAFT SIMULATOR TO SUPPORT COMMERCIAL SPACE MISSIONS AND CUSTOMER ACTIVITIES, Next-Generation Suborbital Researchers Conference (NSRC), Broomfield, CO, United States, 2020, 2-4 March.
[10] Taichi Yamazaki, ZEROG-NAUT AND MISSION COMMANDER TO SUPPORT COMMERCIAL SPACE MISSIONS AND CUSTOMER ACTIVITIES INSIDE CABIN, Next-Generation Suborbital Researchers Conference (NSRC), Broomfield, CO, United States, 2020, 2-4 March.
[11] Taichi Yamazaki, "SPACE SCOOTER": SPACE MOBILITY SYSTEM USED IN SPACE HOTELS AND SPACE STATIONS, IAC-20-B3.7.17, 71st International Astronautical Congress (IAC), The CyberSpace Edition, 2020, 12-14 October.
[12] Taichi Yamazaki, ASTRAX LUNAR CITY DEVELOPMENT PROJECT 2020, IAC-20-D4.2.11, 71st International Astronautical Congress (IAC), The CyberSpace Edition, 2020, 12-14 October.
[13] Taichi Yamazaki, ASTRAX LUNAR CITY ECONOMIC SYSTEM BY USING BLOCKCHAIN TECHNOLOGY, IAC-20-E6.2.9, 71st International Astronautical Congress (IAC), The CyberSpace Edition, 2020, 12-14 October.
[14] Taichi Yamazaki, ASTRAX SPACE SERVICE CATALOG SYSTEM FOR SPACE TOURISM, IAC- 20-B3.2.12, 71st International Astronautical Congress (IAC), The CyberSpace Edition, 2020, 12-14 October.
[15] Taichi Yamazaki, ASTRAX UNIVERSAL SERVICE PLATFORM BY USING BLOCKCHAIN TECHNOLOGY, IAC-20-D4.1.20, 71st International Astronautical Congress (IAC), The CyberSpace Edition, 2020, 12-14 October.
[16] Taichi Yamazaki, EXPERIENCE AND LESSONS LEANED FROM THE COVID-19 PROBLEM IN JAPAN AND APPLICATION TO SPACE TRAVEL, IAC-20-A1.3.15, 71st International Astronautical Congress (IAC), The CyberSpace Edition, 2020, 12-14 October.
[17] Taichi Yamazaki, ZERO-G-NAUT AND MISSION COMMANDER TO SUPPORT COMMERCIAL SPACE MISSION AND CUSTOMER ACTIVITIES INSIDE CABIN, IAC-20-B3.2.13, 71st International Astronautical Congress (IAC), The CyberSpace Edition, 2020, 12-14 October.
[18] Chieko Takahashi, Yuko Kirihara, Creating a new business of Space Flight Attendant service & SFA Academy, IAC-20-B3.2.10, 71st International Astronautical Congress (IAC), The CyberSpace Edition, 2020, 12-14 October.
[19] Taiko Kawakami, Taichi Yamazaki, THE IMPORTANCE OF KIMONO IN SPACE, IAC-20-E1.9.2, 71st International Astronautical Congress (IAC), The CyberSpace Edition, 2020, 12-14 October.
[20] Taiko Kawakami, Taichi Yamazaki, WHAT WOMEN NEED FOR SPACE TRAVEL, IAC-20-E3.2.9, 71st International Astronautical Congress (IAC), The CyberSpace Edition, 2020, 12-14 October.
[21] Hayaki Tsuji, Taichi Yamazaki, Satoshi Takamura, Yoichi Sugiura, PEACE THOUGHT AND SOCIO-ECONOMY FOR THE SPACE AGE USING SATELLITES, IAC-20-E5.5.5, 71st International Astronautical Congress (IAC) – The CyberSpace Edition, 2020, 12-14 October.
[22] Taichi Yamazaki, ADVANCED SPACE SERVICE ACCESS APPLICATION TOOL: ASTRAX UNIVERSAL USER INTERFACE (U2U), IAC-20-B3.1.11, 71st International Astronautical Congress (IAC) – The CyberSpace Edition, 2020, 12-14 October.
[23] Taichi Yamazaki, Taiko Kawakami, ASTRAX LUNAR CITY DEVELOPMENT PROJECT 2021, IAC-21-D3.1.6, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[24] Taichi Yamazaki, COMMERCIAL SPACE MISSION SUPPORT CONTROL CENTER AND SUBORBITAL SPACECRAFT SIMULATOR TO SUPPORT COMMERCIAL SPACE MISSIONS AND PASSENGERS ACTIVITIES IN SPACE, IAC-21-B6.2.12, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[25] Taichi Yamazaki, INITIATIVE OF DEVELOPMENT OF THE SOLAR SYSTEM ECONOMIC BLOC BY USING BLOCKCHAIN TECHNOLOGY, IAC-21-D4.1.11, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[26] Taichi Yamazaki, Mika Islam, SPACE FASHION AND SPACE CULTURE IN THE AGE OF SPACE

TRAVEL AND THE POSSIBILITIES OF "SPACE HAGOROMO", IAC-21-E5.3.6, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[27] Taichi Yamazaki, Taiko Kawakami, Keiichi Iwasaki, Akifumi Mimura, MAKING ASTRAX ACADEMY ONLINE AND MULTILINGUAL, IAC-21-E1.7.10, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[28] Taichi Yamazaki, POTENTIAL FUTURE PLAN OF SPACE IZAKAYA AS A PLACE TO CREATE NEW PRIVATE SPACE BUSINESS, IAC-21-E1.9.10, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[29] Taichi Yamazaki, FOSTERING UNIVERSAL HUMAN RESOURCES AND SUPER NEWTYPES FOR THE SPACE AGE, IAC-21-E1.9.8, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[30] Taichi Yamazaki, Shunsuke Chiba, DEMAND AND SUPPLY MATCHING BY THE ASTRAX LUNAR CITY BUSINESS COMMUNITY AND RESIDENCE CLUB, IAC-21-D3.3.3, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[31] Taichi Yamazaki, OUTLINE OF ASTRAX PRIVATE SPACE BUSINESS CREATION EDUCATION AND TRAINING CENTER, IAC-21-B3.2.5, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[32] Taichi Yamazaki, PROTOTYPE PLANS FOR VARIOUS COMMERCIAL SPACECRAFT TRAINING SIMULATORS, IAC-21-B3.2.2, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[33] Taichi Yamazaki, Yuki Yamazaki, EXPERIMENTS ON COLORING SOAP BUBBLES UNDER MICROGRAVITY, IAC-21-A2.6.5, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[34] Taichi Yamazaki, STUDY OF THE SELECTION OF LOCATION FOR COMMERCIAL SPACEPORTS IN JAPAN, IAC-21-D6.3.8, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[35] Taichi Yamazaki, SPACE RADIATION SHIELDING BY WATER DOME IN ASTRAX LUNAR CITY ON THE MOON, IAC-21-A1.5.10, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[36] Taichi Yamazaki, Hiroki Nakaegawa, INTRODUCTION OF A PRACTICAL EXAMPLE OF ASTRAX LUNAR CITY MAPPING WITH MINECRAFT AND ITS LINKAGE TO ECONOMIC ACTIVITIES ON EARTH, IAC-21-D4.2.6, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[37] Taichi Yamazaki, Hiroki Nakaegawa, DEVELOPMENT OF A CIVILIAN SPACECRAFT INTERIOR SIMULATOR USING MINECRAFT, IAC-21-B6.3.11, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[38] Taichi Yamazaki, PROPOSAL TO ADD A SPACE ECONOMICS SUBCOMMITTEE TO THE UN OFFICE FOR OUTER SPACE AFFAIRS' COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE (COPUOS IN UNOOSA), IAC-21-E3.4.7, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[39] Ayako Kurono, Haruto Kurono, Taichi Yamazaki, THE GENDER GAP AND ITS IMPACT IN MANGA, ANIME AND OTHER SPACE CREATIONS, IAC-21-E5.3.10, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[40] Ayako Kurono, Haruto Kurono, Taichi Yamazaki, CAREER DESIGN IN SPACE - FROM CHALLENGED TO CHALLENGING, IAC-21-B3.9-GTS.2.1, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[41] Haruto Kurono, Ayako Kurono, Taichi Yamazaki, THE EFFECTS OF USING MINECRAFT TO TEACH CHILDREN ABOUT SPACE, IAC-21-E1.8.2, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[42] Tomoko Imaizumi, Taichi Yamazaki, MAINTAINING THE HEALTH OF PILOTS AND CREW, IAC-21-D6.3.4, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[43] Taichi Yamazaki, Mami Oka, CONSIDERATION ON THE CREATION OF A CHICKEN EGG MARKET AT THE MOON VILLAGE, IAC-21-D4.2.10, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[44] Chieko Takahashi, Yuko Kirihara, Taichi Yamazaki, CONSIDERATION OF THE FUTURE PROSPECTS OF THE SPACE FLIGHT ATTENDANT(SFA) PROFESSION WITH THE EXPANSION OF SPACE TRAVEL MARKETING.IAC-21-B3.9-GTS.2.10, 72nd

International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[45] Taiko Kawakami, Taichi Yamazaki, PROBLEMS AND SOLUTIONS THAT ARE PREVENTING MORE WOMEN FROM BECOMING SPACE TOURISTS, IAC-21-B3.2.3, 72nd International Astronautical Congress (IAC), Dubai, United Arab Emirates, 2021, 25-29 October.
[46] Taichi Yamazaki, Taiko Kawakami, DEVELOPMENT OF A TERIPPER FOR INTRA-SPACECRAFT TRANSPORTATION, IAC-22-A1.3.17, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[47] Taichi Yamazaki, Taiko Kawakami, POSSIBILITY OF ZERO-GRAVITY FLIGHT SERVICE BY MRJ (MITSUBISHI REGIONAL JET), IAC-22-A2.IPB.1, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[48] Taichi Yamazaki, Taiko Kawakami, DEVELOPMENT OF ASTRAX COMMERCIAL SPACECRAFT EDUCATION AND TRAINING SIMULATOR, IAC-22-B3.IPB.4, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[49] Taichi Yamazaki, Taiko Kawakami, DEVELOPMENT OF SPACE SHOWER, IAC-22-B3.3.5, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[50] Taichi Yamazaki, Taiko Kawakami, PRODUCTION OF SPACE SUITS AND REPLICAS FOR SPACE TRAVEL, IAC-22-B3.9-GTS.2.1, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[51] Taichi Yamazaki, Taiko Kawakami, ADVANCED SPACE SERVICE ACCESS APPLICATION TOOL “ASTRAX UNIVERSAL USER INTERFACE (ASTRAX U2U)”, IAC-22-B5.IP.7, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[52] Taichi Yamazaki, Taiko Kawakami, ASTRAX SOLAR SYSTEM ECONOMIC BLOC CONCEPT USING NFT AND METAVERSE TECHNOLOGIES, IAC-22-D4.1.10, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[53] Taichi Yamazaki, Taiko Kawakami, DEVELOPMENT OF A REAL-LIFE (ANALOG) ASTRAX LUNAR CITY CONSTRUCTION PROJECT IN JAPAN, IAC-22-D4.2.6, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[54] Taichi Yamazaki, Taiko Kawakami, MULTILINGUALIZATION OF ASTRAX ACADEMY, IAC-22-E1.7.10, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[55] Taichi Yamazaki, Taiko Kawakami, POSSIBILITY OF ZERO-GRAVITY FLIGHT AND SPACE FLIGHT BY PEOPLE WITH DISABILITIES, IAC-22-E1.9.18, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[56] Taichi Yamazaki, Kentaro Chimura, Taiko Kawakami, DEVELOPMENT OF SPACE TOILET "SPACE BENKING" IN JAPAN, IAC-22-E5.IP.10, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[57] Taichi Yamazaki, Taiko Kawakami, DISASTER PREVENTION AND EVACUATION TECHNOLOGIES ON EARTH AND THEIR APPLICATION TO SPACE TRAVEL, IAC-22-E5.4.9, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[58] Mika Islam, Taichi Yamazaki, CLEANING METHODS FOR REUSING CLOTHES IN SPACE, IAC-22-B3.7.7, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[59] Mika Islam, Taichi Yamazaki, HOW TO GO TO SPACE WITH DIFFERENT HAIRSTYLES, IAC-22-E1.9.7, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[60] Yuko Kirihara, Airi Negisawa, Chieko Takahashi, Taichi Yamazaki, Cocoro Tamura, RESEARCH ON PSYCHOLOGICAL CHANGES AND GROWTH OF CHILDREN THROUGH EDUCATION RELATED TO COMMERCIAL SPACE BUSINESS, IAC-22-E1.IPB.9, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[61] Ayako Kurono, Taichi Yamazaki, WHAT DO THEY NEED FOR A SPACE MUSEUM?, IAC-22-E5.5.8, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[62] Haruto Kurono, Taichi Yamazaki, ESTABLISHMENT AND DEVELOPMENT OF A LUNAR COMMUNITY AND ACTIVITY SPACE BY CHILDREN FOR CHILDREN, IAC-22-D4.2.10, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[63] Akifumi Mimura, Taichi Yamazaki, VIDEO EDITING SERVICES FOR SPACE TRAVELLERS, IAC-22-B3.2.6, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.

[64] Akifumi Mimura, Taichi Yamazaki, TECHNOLOGIES ON A TRANSPARENT RESTROOM COULD BE USED FOR LUNAR HABITATS, IAC-22-E5.1.8, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[65] Taiko Kawakami, Taichi Yamazaki, ASTRAX LUNAR CITY PROJECT 2022, IAC-22-D3.1.12, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[66] Chikako Murayama, Taichi Yamazaki, THE NEED FOR A SPACE VERSION OF HAND SIGNALS, A COMMUNICATION TOOL FOR SPACE TRAVELERS, IAC-22-B3.2.1, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[67] Chikako Murayama, Taichi Yamazaki, Taiko Kawakami, PHOTOGRAPHY SERVICES AND TECHNIQUES REQUIRED FOR SPACE TRAVEL, IAC-22-D6.1.8, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[68] Chikako Murayama, Taichi Yamazaki, ON IMAGES OF THE UNIVERSE INFLUENCED BY MANGA AND ANIME, IAC-22-E1.9.3, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[69] Hikaru Otsuka, Taichi Yamazaki, A SPACE EDUCATION PROGRAM TO SOLVE THE SHORTAGE OF COMMERCIAL SPACE TEACHERS IN JAPANESE SCHOOLS, IAC-22-E1.7.8, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[70] Yasuko Fukushima, Taichi Yamazaki, HOW TO CAPTURE THE COSMIC DIVERSITY THAT IS COMING, IAC-22-E1.9.22, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[71] Chieko Takahashi, Taichi Yamazaki, THE ROLE OF SPACE FLIGHT ATTENDANTS IN LARGE, LONG-DURATION SPACE TRAVEL, IAC-22-B3.2.10, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[72] Kiyomi Shigematsu, Taichi Yamazaki, PROPOSAL FOR A BUSINESS MODEL THAT ENABLES AND ENCOURAGES OLDER ADULTS TO TRAVEL TO SPACE, IAC-22-E5.IP.22, 73rd International Astronautical Congress (IAC), Paris, France, 2022, 18-22 September.
[73] Taichi Yamazaki, Taiko Kawakami, Fumihiro Oiwa, DEVELOPMENT OF ASTRAX ZERO GRAVITY AIRCRAFT EDUCATION AND TRAINING SIMULATOR, IAC-23-A2.5.9, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[74] Taichi Yamazaki, Taiko Kawakami, DEVELOPING TECHNOLOGY FOR DRINKING CHILLED CARBONATED BEVERAGES IN SPACE, IAC-23-B5.1.11, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October."
[75] Taichi Yamazaki, Taiko Kawakami, Hiroki Nakaegawa, DEVELOPMENT OF COMMERCIAL SPACECRAFT EDUCATION AND TRAINING SIMULATOR USING THE METAVERSE, IAC-23-D1.1.6, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[76] Taichi Yamazaki, Taiko Kawakami, CONSTRUCTION PLAN OF ASTRAX LUNAR CITY SIMULATION FACILITY IN JAPAN, IAC-23-D4.2.9, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[77] Taichi Yamazaki, Taiko Kawakami, Kentaro Chimura, DEVELOPMENT OF THE SPACE TOILET CALLED "SPACE BENKING" 2023, IAC-23-E5.4.3, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[78] Taichi Yamazaki, Taiko Kawakami, INTRODUCTION OF COMMERCIAL SPACE R&D CENTER "ASTRAX LAB" IN JAPAN, IAC-23-B3.IPB.5, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[79] Taichi Yamazaki, Taiko Kawakami, ANALYSIS OF PASSENGERS' NEEDS AND DEMANDS OF ASTRAX ZERO GRAVITY SERVICES AND APPLICATION FOR SPACE TRAVEL SERVICES, IAC-23-B3.IP.1, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[80] Taiko Kawakami, Taichi Yamazaki, THE SENSES AND CREATIVITY THAT CAN BE ACHIEVED BY BRINGING ENTERTAINMENT IN SPACE, IAC-23-E1.IP.22, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[81] Taiko Kawakami, Taichi Yamazaki, TECHNOLOGY, PROBLEMS AND SOLUTIONS FOR DRINKING ALCOHOL IN SPACE, IAC-23-E1.9.2, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[82] Taiko Kawakami, Taichi Yamazaki, TECHNOLOGY, PROBLEMS, AND SOLUTIONS FOR SPACE TRAVEL MEALS AS REPRESENTED BY "YAKITORI", GRILLED CHICKEN, IAC-23-B5.IP.2, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October."

[83] Taiko Kawakami, Taichi Yamazaki, THE POSSIBILITY OF DEVELOPING JAPANESE CULTURE THROUGH “NATTO” IN SPACE, IAC-23-E5.IP.17, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[84] Hikaru Otsuka, Taichi Yamazaki, LOCAL REVITALIZATION PROJECT TO TURN MY HOMETOWN, KOMONO TOWN, INTO "SPACE TOWN", IAC-23-E1.9.3, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[85] Hikaru Otsuka, Taichi Yamazaki, METHODS AND PRACTICES FOR INTRODUCING PRIVATE SPACE EDUCATION PROGRAMS INTO JAPANESE SCHOOLS, IAC-23-E1.2.8, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[86] Masahiko Takehara, Taichi Yamazaki, ASTROLOGY IN THE SPACE AGE: WHAT WILL HAPPEN TO THE HOROSCOPES OF THOSE BORN ON THE MOON?, IAC-23-E1.9.8, 74th International Astronautical Congress (IAC), Baku, Azerbaijan, 2023, 2-6 October.
[87] Taichi Yamazaki, Taiko Kawakami, COMMERCIAL SPACE SUIT R&D CENTER ”ASTRAX WAER LAB” 2024, IAC-24-E5,IP,26, 75th International Astronautical Congress (IAC), Milan, Italy, 2024, 14-18 October.
[88] Taichi Yamazaki, Taiko Kawakami, DEVELOPMENT OF ASTRAX COMMERCIAL SPACECRAFT MISSION SUPPORT CONTROL CENTER IN JAPAN 2024, IAC-24-B6,1,8, 75th International Astronautical Congress (IAC), Milan, Italy, 2024, 14-18 October.
[89] Taichi Yamazaki, Taiko Kawakami, ASTRAX LUNAR CITY SIMULATION FACILITY CONSTRUCTION PLAN IN JAPAN 2024, IAC-24-D4,2,9, 75th International Astronautical Congress (IAC), Milan, Italy, 2024, 14-18 October.
[90] Ayako Kurono, Taichi Yamazaki, EXPLORING THE CONCEPT AND POTENTIAL OF SPACE MUSEUMS FOR PRESERVATION, EDUCATION, AND TOURISM, IAC-24-E5,5,10, 75th International Astronautical Congress (IAC), Milan, Italy, 2024, 14-18 October.
[91] Taichi Yamazaki, Taiko Kawakami, DEVELOPMENT OF RAMEN EATEN IN SPACE, IAC-25-B3,IP,21,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[92] Taichi Yamazaki, Taiko Kawakami, THE POTENTIAL OF SPACE NFTS, IAC-25-E3,IP,15,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[93] Taichi Yamazaki, Taiko Kawakami, UNIFORMS FOR PRIVATE SPACEFLIGHT MISSION COMMANDERS AND SPACE FLIGHT ATTENDANTS, IAC-25-B3,IP,22,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[94] Taichi Yamazaki, Taiko Kawakami, DEVELOPMENT AND EXPANSION OF NEW BEVERAGES FOR THE COMMERCIAL SPACE TRAVEL ERA, IAC-25-E6,IP,39,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[95] Taichi Yamazaki, Taiko Kawakami, A VERSATILE SPACE APPLICATION TOOL TO SUPPORT LIFE IN SPACE: INTRODUCTION TO ASTRAX U2U, IAC-25-D2,IP,25,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[96] Taichi Yamazaki, Taiko Kawakami, A SPACE VALUE STANDARD TO SUPPORT LIFE IN SPACE: INTRODUCTION TO ASTRAX VALUE, IAC-25-IP,6,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[97] Taichi Yamazaki, Taiko Kawakami, DEVELOPMENT OF ASTRAX SPACE MISSION SUPPORT CONTROL CENTER 2025, IAC-25-B3,4-B6.4,15,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[98] Taiko Kawakami, Taichi Yamazaki, ASTRAX LUNAR CITY PROJECT 2025, IAC-25-D4,2,12,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[99] Taiko Kawakami, Taichi Yamazaki, CONSTRUCTION PLAN OF ASTRAX LUNAR CITY SIMULATION FACILITY IN JAPAN 2025, IAC-25-E5,IP,21,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[100] Hikaru Otsuka, Taichi Yamazaki , IMPLEMENTING A RURAL REVITALIZATION PROJECT TO TURN MY HOMETOWN, KOMONO TOWN, INTO A 'SPACE TOWN', IAC-25-E1,9,12,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[101] Ayako Kurono, Haruto Kurono,Taichi Yamazaki, WHO GOVERNS SPACE MUSEUMS? LEGAL AND POLICY CHALLENGES IN THE NEW SPACE ERA, IAC-25-E5,5,9,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.
[102] Taiko Kawakami, Taichi Yamazaki, ESTABLISHING A CULTURE OF DRINKING IN SPACE: REALIZING A BEER EXPERIENCE IN

SPACE EQUIVALENT TO THAT ON EARTH, IAC-25-E1,9,18,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.

[103] Taichi Yamazaki, Taiko Kawakami, SPACE BUSINESS DEVELOPMENT EDUCATION AND TRAINING ACADEMY: ASTRAX ACADEMY 2025, IAC-25-E1,LBA,9,76th International Astronautical Congress (IAC 2025), Sydney, Australia, 29 Sep-3 Oct 2025.

IAC-25-D2.IP.25

宇宙での生活をサポートするための万能宇宙アプリケーションツール:
ASTRAX U2U（Universal User Interface)の紹介

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Abstract

Around the world, space travel has become accessible to the general public, allowing more people to venture into space each year. Since 2005, ASTRAX has been developing and launching various services and products necessary for private space travelers. As of 2024, ASTRAX has established over 200 space-related services in anticipation of the era of commercial space travel. To provide these services more efficiently and enhance accessibility, ASTRAX has developed ASTRAX U2U (Universal User Interface), a versatile space application tool. Additionally, ASTRAX has established ASTRAX USP (Universal Service Platform) to support a wide range of space services and ASTRAX VALUE, a framework defining essential value standards for utilizing these services.

This paper presents the functions and usage of ASTRAX U2U, which supports space travelers and residents in their preparation, education, training, spaceflight, and daily life in space. Furthermore, it explores how this tool enhances the convenience of the emerging space economy and living environments beyond Earth.

Keywords: (maximum 6 keywords)

アブストラクト

世界では、一般人による宇宙旅行が可能となり、毎年たくさんの人たちが宇宙に飛び立つことができるようになってきました。ASTRAXでは、2005年より、約20年にわたり、民間宇宙旅行時代の到来に向けて、一般人が宇宙に行く際に必要となる様々なサービスを立ち上げ、商品の開発を行い、2024年現在、200以上の宇宙サービスを展開しています。さらに、それらを効率よく提供し、利用できるようにするためのアプリケーションツール（ASTRAX U2U: Universal User Interface)や様々なプラットフォーム(ASTARX USP: Universal Service Platform)、それらを利用する際に必要となる価値基準（ASTRAX VALUE）を整備してきました。
本論文では、宇宙旅行者や宇宙滞在者のための準備、教育、訓練、実際の宇宙飛行や宇宙生活をサポートするための万能宇宙アプリケーションツールASTRAX U2Uの機能や利用方法、それらがもたらす新たな宇宙経済圏（生活圏）の利便性について発表を行います。

キーワード: 民間宇宙旅行、宇宙サービス、ASTRAX U2U（Universal User Interface）、ASTRAX USP（Universal Service Platform）、ASTRAX VALUE、宇宙経済圏（生活圏）

Acronyms/Abbreviations

U2U: Universal User Interface
USP: Universal Service Platform

1. はじめに

2021 年以降、SpaceX、Virgin Galactic、Blue Origin といった民間企業によって、一般市民向けの有人宇宙飛行サービスが本格的に開始されました。これにより、国籍、人種、性別、年齢、職業、そして障害の有無といったあらゆる垣根を越え、多様な人々が宇宙へと飛び立つ時代が到来しました。この流れは今後さらに加速し、

宇宙は限られた専門家だけでなく、誰もがアクセスできる領域へと変貌していくと予想されます。

ASTRAX は、このような民間宇宙旅行時代の到来をいち早く見据え、2005 年から 200 以上の宇宙関連サービスを開発・提供してきました。同時に、宇宙という特殊な環境で活躍できるユニバーサル人材の育成にも力を入れてきました（参考文献【29】参照）。今後、宇宙に行く人々が爆発的に増加するにつれて、宇宙での生活におけるニーズは一層多様化・複雑化し、教育、健康管理、生活支援といった多岐にわたる領域の重要性が増すことは明らかです。

このような背景のもと、ASTRAX は宇宙における需要と供給を効率的にマッチングさせるためのシステム構築を進めてきました。その中核となるのが、ASTRAX USP (Universal Service Platform)（詳細は参考文献【6】【13】【15】【25】を参照）と、それを誰もが直感的に利用できる汎用アプリケーションツール ASTRAX U2U (Universal User Interface)です。（詳細は参考文献【6】【22】【51】【95】参照）

民間人による宇宙飛行や宇宙滞在、さらには地上からのサポートや準備など、あらゆる立場、あらゆる場面で利用できるようにすることを目的としており、民間宇宙技術の進化と発展とともに、ASTRAX U2U の機能や役割も同時に進化して行くことを目指しています。

2. 背景と課題

ASTRAX では、さまざまな宇宙商品や宇宙サービスの開発を行っていますが、それぞれが断片化されており、利便性が低くなっています。そこでなんとかこれらを一元管理できないかという発想から、アプリケーション化を行うことにしました。ASTRAX ではもともと、さまざまな Web サイトにアクセスするためのポータルサイトを構築していましたが、ユーザーの視点から考えるとアプリ化した方が便利であるという結論に行き着きました。

また、宇宙飛行の準備段階から、実際の宇宙飛行、そしてその後の展開にいたるまで、すべてを一つのアプリで対応できるようにすることを想定しています。

さらに、将来的には、ASTRAX の商品やサービスだけでなく、宇宙で利用されるすべての商品やサービスを扱えるようにプラットフォーム化することを考えています。例えるなら EC サイトのアマゾンとポータルサイトの Yahoo を足して、宇宙専用にしたようなイメージです。それ以外にも、人材育成のための教育や訓練などにも使用することを想定しています。しばらくはあらゆる商品やサービスが有料で提供されますが、徐々にポイントが加算されていき、いずれはそのポイントが宇宙経済の流通通貨のように利用できるようにすることを考えています。その結果、地球でも、月でも、火星でも、宇宙空間でも、同じ価値基準や通貨でさまざまなサービスが利用できるようになるという未来を描いています。

なぜそのような仕組みをつくろうとしているかというと、宇宙という領域が、ほぼゼロから開拓していける全く新しい領域だからです。ならば、最初から理想的で効率のいい経済圏（生活圏）を作った方がよいからです。いまならまだ基準作りや標準化ができる段階にあります。そして、地球では新しいことをやろうとすると利権や過去の伝統などの縛りがありますが、宇宙にはそのようなものがまだ存在しないため、最初から理想的なものを提供することができる状況だからです。SDGs もそうですが、問題が広がってから対処してもなかなか解決しません。そうなる前に最初から手を打っておくことが重要だからです。

3. U2U の役割やメリット（利用イメージ）

3.1 役割

(1) 生きていくために必要な環境（寝るところ、食べるところ、食べ物、排泄、呼吸など）の提供
(2) 人が生まれてから亡くなるまでに必要となるあらゆる教育や訓練にかかわるシステムへのアクセス
(3) 人が宇宙で生活するために必要となるあらゆる教育や訓練にかかわるシステムへのアクセス
(4) エンターテインメントの提供
(5) クリエイティブな環境の提供

3.2 メリット

(1) すべてのものが無料で使える
(2) 生きていく上で必要なものがすべて提供される
(3) あらゆることが自動化されている
(4) 無駄がなくてシンプル

4. ASTRAX U2U が目指すもの

4.1 ASTRAX が生み出す効果

U2U は、人間が宇宙で生活する上で必要となるすべての活動について、アプリ 1 つでなんでもできるようにすることを目指しています。

これは、人類が宇宙に行くための手段を手に入れ、これからたくさんの人々が宇宙に行くようになることが確実な

状況にありますが、今の段階では国際宇宙ステーション以外に、人類が長期に滞在（生活）する環境がまだ何も存在していない状況であるからこそ、今の段階から理想的かつ便利なツールや共通プラットフォームを作っておいて、人類の宇宙進出に合わせて進化させていくことが一番効率的だからです。

もし、宇宙での滞在や生活において、宇宙で必要になるものをバラバラに作っていくとなると非常に無駄が多くなるからです。もちろん初めのうちは各社バラバラに商品やサービスを提供するようになるでしょう。しかし、宇宙にある商品やサービスを究極のシェアリングと再利用と物々交換ができるようにすれば、余計な競争やマーケットの取り合いのような争いはなくなり、常に建設的な活動に専念できるようになることを目指しています。

進化のためには競争原理を働かせる必要がありますが、それは地球上で行えばよく、そのなかで最も優れており、もっとも効率的なものを宇宙で提供できるようにすることが理想だと考えています。

そのように選ばれた宇宙生活における理想的な商品やサービスを確実に提供し、確実に循環させるために利用するツールが U2U です。

ASTRAX としては、宇宙や月や火星での生活は、人類がひとつの家族のような共同生活を行うことを考えており、所有や売買といった概念は必要ないと考えています。

限られた資源を効率よく循環させて、持続可能な生活環境を作っていくために、すべての人が共通で使えるツールやプラットフォーム（スマホの OS やアプリのようなもの）を作り、準備段階から（教育も含む）そのツール 1 つで生活できるようにしていくことを目指しています。

人類が生きていくことで必要となる活動は究極的に効率化され、その結果、人類の叡智をすべて、人類の建設的進化のためにクリエイティブに活用していけるようにしていくことが目標です。

その結果、破壊的で暴力的な争いは淘汰されていき、宇宙も地球上も平和で明るい未来が構築できると考えています。

地球上で生活する人類は、地球が HOME、宇宙が新しいフロンティアと考えがちですが、ASTRAX が考える未来はもしかしたら逆で、宇宙に HOME を作り、地球がさまざまな挑戦ができるフロンティアなのかもしれません。

4.2 宇宙にどのような文明を構築するべきか

宇宙での生活は、ピースボートのような格差のない豪華客船のようなイメージです。すべての乗組員が平等で、1 か所で生活し、協力し合って生活している状態です。必要に応じて徐々に拡大していきます。

あるいは、遊牧民やバイキングのようなイメージかもしれません。より良い生活環境を目指して未開の地を開拓していくイメージです。

あるいは、中国が全世界にチャイナタウンを作っているように、宇宙にも地球タウンを作るイメージかもしれません。あるいは、自由と新規性と多様性を重要とするならば、宇宙にアメリカ合衆国を作るように、宇宙合衆国を作るイメージになるかもしれません。

どのような文明の進化が理想的かは、さまざまな考え方があるでしょうが、いずれにしても、地球のこれまでの歴史を参考に、同じ過ちを繰り返さないように進化していくことが重要でしょう。

そのために必要となる全人類共通のユニバーサルアプリをつくることで、人類が一つの家族のようになることを目指しています。

5. 今後の展望

まずは、地球上に、このようなコンセプトで生活できる環境（模擬施設）を作り、小さい範囲の中で実証実験を行っていきます。

同時に、宇宙開拓に合わせて、その技術や経験を提供していきます。フィードバックを繰り返し、改善していきます。同時に、「宇宙ならでは」の技術を地球に還元していきます。

この双方向を効率的に行っていくことで、宇宙も地球もより良い生活環境が整っていくでしょう。

6. 結論

ASTRAX では、これまでの論文の中で ASTRAX U2U が提供できるさまざまな機能やサービスを考えてきました。しかし、もし本当にそのような理想的な環境が整った時、人類はどのような文明を構築していく必要があるかについて、共通のビジョンや方向性を決めておかないと、宇宙や月や火星などのこれから開拓していく新天地も地球と

同じような格差や競争や戦争の絶えない場所になってしまうでしょう。

この問題は、議論をしても、平行線の議論のまま答えは出ないことが容易に想像できます。そこで、まずは小さな範囲において実証を行い、徐々に拡大していくことが望ましいと考えています。

ASTRAX では、これからも、宇宙への人類の進出においては、人類皆家族というビジョンを持って開拓を行っていきたいと考えています。

参考文献

学会/国際会議論文

【1】民間商業宇宙飛行士と新規宇宙ビジネスの展開について

【2】Overview Of ASTRAX Space Services Including Over 50 Space Businesses,
50 以上の宇宙事業を含む ASTRAX の宇宙事業の概要

【3】ASTRAX Zero Gravity Flight Services In Japan,
日本における ASTRAX 無重力飛行サービス

【4】ASTRAX Lunar City Development Project,
ASTRAX 月面都市開発プロジェクト

【5】ASTRAX Space Services Platform By Using Blockchain Technology,
ブロックチェーン技術を活用したアストラックス宇宙サービスプラットフォーム

【6】ASTRAX Universal Service Platform By Using Blockchain Technology,
ブロックチェーン技術を活用した ASTRAX のユニバーサルサービスプラットフォーム

【7】Mission Control Center To Support Commercial Space Missions And Passenger'S Activities Inside Of The Cabin,
商業宇宙ミッションと乗客の機内活動を支援するミッションコントロールセンター

【8】ASTRAX Academy And Space Business And Space Flight Support Educational System,
ASTRAX ACADEMY と宇宙ビジネス・宇宙飛行支援教育システム

【9】Mission Support Control Center And Suborbital Spacecraft Simulator To Support Commercial Space Missions And Customer Activities,
商業宇宙ミッションと顧客活動を支援するミッション支援管制センターとサブオービタル宇宙船シミュレータ

【10】Zero G-Naut And Mission Commander To Support Commercial Space Missions And Customer Activities Inside Cabin,
Zero G-Naut と商業宇宙ミッションと顧客活動を支援するミッションコマンダー（船内）

【11】"Space Scooter": Space Mobility System Used In Space Hotels And Space Stations,
「スペーススクーター」宇宙ホテルや宇宙ステーションで使用される宇宙移動システム

【12】ASTRAX Lunar City Development Project 2020,
ASTRAX 月面都市開発プロジェクト 2020

【13】ASTRAX Lunar City Economic System By Using Blockchain Technology,
ブロックチェーン技術を活用した ASTRAX 月面都市経済システム

【14】ASTRAX Space Service Catalog System For Space Tourism,
宇宙旅行のための ASTRAX 宇宙サービスカタログシステム

【15】ASTRAX Universal Service Platform By Using Blockchain Technology,
ブロックチェーン技術を活用した ASTRAX ユニバーサルサービスプラットフォーム

【16】Experience And Lessons Leaned From The Covid-19 Problem In Japan And Application To Space Travel,
日本の COVID-19 問題から得た経験と教訓、そして宇宙旅行への適用

【17】Zero-G-Naut And Mission Commander To Support Commercial Space Mission And Customer Activities Inside Cabin,
ゼロ G 飛行士とミッションコマンダーが、商業宇宙ミッションと顧客活動を機内でサポートする

【18】Creating A New Business Of Space Flight Attendant Service & SFA Academy,
スペースフライトアテンダントと SFA アカデミーという新しいビジネスの創出

【19】 The Importance Of Kimono In Space, 宇宙での着物の重要性

【20】 What Women Need For Space Travel, 女性が宇宙へ行くために必要なこと

【21】 人工衛星を使用した宇宙時代の平和思考と社会経済学（ワンスマイルファンデーションシステム）

【22】 最新型宇宙サービスアクセスアプリケーションツール「ASTRAX U2U (Universal User Interface)」

【23】ASTRAX Lunar City Development Project 2021
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【24】Commercial Space Mission Support Control Center and Suborbital Spacecraft Simulator to Support Commercial Space Missions and Passengers Activities in Space
商業宇宙ミッションと宇宙での搭乗者の活動をサポートするための商業宇宙運用支援管制センターとサブオービタル宇宙船シミュレーター

【25】Initiative of development of the Solar System Economic Bloc by Using Blockchain Technology
ブロックチェーン技術を活用した太陽系経済圏構築構想

【26】Space Fashion and Space Culture in the Age of Space Travel and the Possibilities of “Space Hagoromo”
宇宙旅行時代の宇宙ファッションと宇宙カルチャー及び“宇宙羽衣”の可能性

【27】Making ASTRAX ACADEMY Online and Multilingual
「ASTRAX ACADEMY」のオンライン化と多言語化

【28】Potential Future Plan of Space Izakaya as a Place to Create New Private Space Business
新たな民間宇宙ビジネス創出の場としての宇宙居酒屋の将来性

【29】Fostering Universal Human Resources and Super Newtypes for the Space Age
ユニバーサル人材の育成と宇宙時代のスーパーニュータイプの養成

【30】Demand and Supply Matching by the ASTRAX LUNAR CITY Business Community and Residence Club
ASTRAX 月面シティのビジネスコミュニティとレジデンスクラブによる需要と供給のマッチング

【31】Outline of ASTRAX Private Space Business Creation Education and Training Center
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【32】Prototype plans for various commercial spacecraft training simulators
さまざまな民間商用宇宙船訓練用シミュレータの試作計画

【33】Experiments on Coloring Soap Bubbles under Microgravity
微小重力下でのシャボン玉の着色に関する実験

【34】Study of the selection of location for commercial spaceports in Japan
日本における商業宇宙港の立地選定に関する研究

【35】Space Radiation Shielding by Water Dome in ASTRAX Lunar City on the Moon
ASTRAX 月面シティのウォータードームによる宇宙放射線の遮蔽

【36】Introduction of a practical example of ASTRAX Lunar City mapping with Minecraft and its linkage to Economic Activities on Earth
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【37】Development of a Civilian Spacecraft Interior Simulator Using Minecraft
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【38】Proposal to Add a Space Economics Subcommittee to the UN Office for Outer Space Affairs' Committee on the Peaceful Uses of Outer Space(COPUOS in UNOOSA)
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【39】The Gender Gap and Its Impact in Manga, Anime and Other Space Creations
マンガ・アニメなどの空間演出におけるジェンダー・ギャップとその影響

【40】Career Design in Space - From Challenged to Challenging

宇宙でのキャリアデザイン - 挑戦者から挑戦者へ

【41】The Effects of Using Minecraft to Teach Children about Space
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【42】Maintaining the Health of Pilots and Crew
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【43】Consideration on the Creation of a Chicken Egg Market at the Moon Village
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【44】Consideration of the future prospects of the Space Flight Attendant (SFA) profession with the expansion of space travel marketing
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【45】Problems and Solutions that are Preventing More Women from Becoming Space Tourists
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【47】Possibility of Zero-Gravity Flight Service by MRJ (Mitsubishi Regional Jet),
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【48】Development of ASTRAX commercial spacecraft education and training simulator,
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【49】Development of Space Shower,
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【54】Multilingualization of ASTRAX ACADEMY,
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【55】Possibility of zero-gravity flight and space flight by people with disabilities,
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【56】Development of Space Toilet "Space BENKING" in Japan,
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【57】Disaster prevention and evacuation technologies on Earth and their application to space travel,
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【58】Cleaning Methods for Reusing Clothes in Space,
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【59】How to Go to Space with Different Hairstyles,
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【60】Research on Psychological Changes and Growth of Children through Education Related to Commercial Space Business,
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【61】What do they need for a space museum?,
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【63】video editing services for space travellers,
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【70】How to capture the cosmic diversity that is coming,
これからやってくる宇宙の多様性をどう捉えるか

【71】The Role of Space Flight Attendants in Large, Long-duration Space Travel,
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【74】Developing technology for drinking chilled carbonated beverages in space
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【76】Construction plan of ASTRAX LUNAR CITY Simulation Facility in Japan 日本における ASTRAX 月面シティシミュレーション施設の構築計画

【77】Development of the space toilet called "Space Benking" 2023
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【78】Introduction of commercial space R&D center "ASTRAX LAB" in Japan
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【79】Analysis of passengers' needs and demands of ASTRAX Zero Gravity Services and application for space travel services
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【80】The senses and creativity that can be achieved by bringing entertainment in space
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【81】Technology, problems and solutions for drinking alcohol in space
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【82】Technology, problems, and solutions for space travel meals as represented by "yakitori", grilled chicken
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【83】The Possibility of Developing Japanese Culture through “NATTO” in Space
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【84】Local revitalization project to turn my hometown, Komono Town, into "space town"
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【85】Methods and Practices for Introducing Private Space Education Programs into Japanese Schools
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【86】Astrology in the Space Age: What will happen to the horoscopes of those born on the Moon?
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【87】COMMERCIAL SPACE SUIT R&D CENTER ”ASTRAX WAER LAB” 2024
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【88】DEVELOPMENT OF ASTRAX COMMERCIAL SPACECRAFT MISSION SUPPORT CONTROL CENTER IN JAPAN 2024
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【89】ASTRAX LUNAR CITY SIMULATION FACILITY CONSTRUCTION PLAN IN JAPAN 2024
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【90】EXPLORING THE CONCEPT AND POTENTIAL OF SPACE MUSEUMS FOR PRESERVATION, EDUCATION, AND TOURISM
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【92】THE POTENTIAL OF SPACE NFTS 宇宙 NFT の可能性

【93】UNIFORMS FOR PRIVATE SPACEFLIGHT MISSION COMMANDERS AND SPACE FLIGHT ATTENDANTS 民間宇宙飛行士ミッションコマンダーや宇宙フライトアテンダントの制服

【94】DEVELOPMENT AND EXPANSION OF NEW BEVERAGES FOR THE COMMERCIAL SPACE TRAVEL ERA 民間宇宙旅行時代の新たな飲料開発と展開

【95】A VERSATILE SPACE APPLICATION TOOL TO SUPPORT LIFE IN SPACE: INTRODUCTION TO ASTRAX U2U 宇宙での生活をサポートするための万能宇宙アプリケーションツール：ASTRAX U2U（Universal User Interface)の紹介

【96】A SPACE VALUE STANDARD TO SUPPORT LIFE IN SPACE: INTRODUCTION TO ASTRAX VALUE 宇宙での生活をサポートするための宇宙価値基準: ASTRAX VALUE の紹介

【97】DEVELOPMENT OF ASTRAX SPACE MISSION SUPPORT CONTROL CENTER 2025ASTRAX 民間宇宙船運用支援管制センターの開発 2025

【98】ASTRAX LUNAR CITY PROJECT 2025ASTRAX 月面シティプロジェクト 2025

【99】CONSTRUCTION PLAN OF ASTRAX LUNAR CITY SIMULATION FACILITY IN JAPAN 2025 日本における ASTRAX 月面シティシミュレーション施設の構築 2025

【100】IMPLEMENTING A RURAL REVITALIZATION PROJECT TO TURN MY HOMETOWN, KOMONO TOWN, INTO A 'SPACE TOWN'故郷・菰野町を「宇宙のまち」に変える地域活性化プロジェクトの実施

【101】WHO GOVERNS SPACE MUSEUMS? LEGAL AND POLICY CHALLENGES IN THE NEW SPACE ERA 宇宙ミュージアムは誰が管理するのか？新たな宇宙時代における法的・政策的課題

【102】ESTABLISHING A CULTURE OF DRINKING IN SPACE: REALIZING A BEER EXPERIENCE IN SPACE EQUIVALENT TO THAT ON EARTH 宇宙での飲酒文化の確立：地上と変わらないビール体験を宇宙で実現する

【103】SPACE BUSINESS DEVELOPMENT EDUCATION AND TRAINING ACADEMY: ASTRAX ACADEMY 2025 民間宇宙事業創造教育訓練機関 ASTRAX ACADEMY について 2025