

Joint Symposium

33rd ISTS & 10th NSAT & 14th IAA LCPM



ISTS : International Symposium on Space Technology and Science

NSAT : Nano-Satellite Symposium

IAA LCPM: Low-Cost Planetary Missions Conference

Feb 26 - Mar 4, 2022

Beppu, Oita, Japan



*Beppu in Oita:
Beautiful Harmony of Earth
and Space for Sustainable Future.*

PROGRAM BOOK

Contact us:

<https://www.ists.or.jp/>



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Joint Symposium : 33rd ISTS & 10th NSAT & 14th IAA LCPM Main Theme “ Beautiful Harmony of Earth and Space for Sustainable Future.”

CONTENTS

Letters of Welcome

Message from the 33 rd ISTS General Chairperson	I
Message from the 10 th NSAT General Chairperson	II
Message from the President of JSASS	III

General Information

Symposium Site Floor Guide	IV
Contacts and Open Hours	VII

Timetable Overview

Time Table Overview/ Event Schedule	VIII
Final Program Session Schedule	IX
Special Sessions and Events	XX
Social Program	XXIV
Excursion	XXV
Session Details	XXVI

Program

Organized Session	1
Technical Session Oral	5
Finalist Student Session	76
Technical Session Poster	79

Authors' Index	a-1
----------------------	-----

Sponsors' List	i
----------------------	---

Committees	iii
------------------	-----

Letters of Welcome

Message from the 33rd ISTS General Chairperson



On behalf of the ISTS organizing committee, I am very pleased to welcome you to the 33rd ISTS Beppu in Oita, which is one of the most beautiful cities of Japan and very famous as “onsen (hot spa) town.”

ISTS stands for “International Symposium on Space Technology and Science,” which is one of top five largest international space related symposiums, covering almost all the disciplines related to space. It first met in 1959 in Tokyo and has been held in Japan almost every two years, and recent ISTS had more than 1,000 participants from all over the world. Initially, 33rd ISTS was planned to be held in June 2021, but due to COVID-19 problem, we decided to postpone it to February 2022 with a hope that face to face on-site meetings will become possible in 2022. One of the very important objectives of holding this kind of symposiums or conferences is to provide participants with excellent opportunities to discuss with other participants on technical issues, formulation of new collaboration plans and to find new friends who have common interests. Under this severe COVID-19 situations prevailing the world, it would be difficult for all the participants to attend the symposium on-site, so we organize the symposium program as “hybrid” so that participants can hear presentations and discuss with other participants online or onsite. And for the participants who can come to the symposium site, please enjoy face to face discussions with other participants to move forward your research or business, which we could not do for these years.

We, as an organizing committee of ISTS, have been recognizing the importance of collaboration and exchange with local government and community. Our success in past ISTS can be attributed not only to the combined endeavors of the participants and the organizing committees but also to the strong supports from the local communities. We are so proud to have assisted the local communities in increasing their involvement in space related activities, including space utilizations by local governments, space business and education to younger generations even before the symposiums. Also I am very grateful to Oita and Beppu local governments for their kindest provision of the main reception, special programs and cultural events, with which I would encourage you to enjoy the wonderful food, culture and “onsen” of Beppu in Oita.

“Beautiful Harmony of Earth and Space for Sustainable Future.”

We picked up the above words as the main theme of 33rd ISTS. This is a very important concept which we all should continually pursue into the future. Let us make this ISTS the first step towards realizing this goal, by exchanging ideas and stimulating discussions with new and old friends to brainstorm how space technology and science can contribute to it.

I hope all of you will enjoy the symposium as well as your stay in Beppu in Oita !!

A handwritten signature in black ink, appearing to read "Shinichi Nakasuka".

Prof. Shinichi Nakasuka,
General Chairperson of the 33rd ISTS

Message from the 10th Nano-Sat Symposium General Chairperson



We are witnessing a big game change of space development and utilization all over the world. Small/micro/nano-satellite “mega-constellations” have appeared on the stage in various areas such as communication, Earth observation and PNT (Position, Navigation and Time) service, etc. Constellations of large number of satellite can provide high time resolution which will be important for frequent observation of the Earth for disaster detection and monitoring missions, and communication service using low altitude satellites will mitigate power requirement and also reduce the communication latency. Such large number of satellites mostly weigh less than 250kg, and even CubeSats (such as 3U or 6U) are being employed. By utilizing such benefits of LEO constellation, many venture companies are now very actively proceeding with business, and large investment to those venture companies have been made by governmental and private funds. Not only in business fields, but also in the field of space science and exploration, micro/nano-satellites are becoming to be employed, such as NASA JPL's INSPIRE(3U), MarCO(6U) for interplanetary missions and ASTERIA (6U) for exoplanets observation mission. In Japan, too, PROCYON (65kg) was launched to interplanetary trajectory in 2014, and two 6U CubeSats EQUULEUS and OMOTENASHI are to be launched to cis-lunar trajectory by NASA's new SLS rocket in 2022. Utilizations of micro/nano/pico-satellites are now not only for educational or experimental use but for real business, space science and other practical applications.

Maybe we cannot perfectly predict the future ways of utilizing these satellites, just as initial computer developers could not predict today's so varied and profound utilizations of personal computers. Key factor of such “explosion of utilizations” is extremely low cost and large availability of PCs. The same phenomenon is now happening in space, by utilizing the similar features of micro/nano/pico-satellites. Let us see what will happen with these satellites in future!

Nano-satellite symposium (NSAT) which started in 2010 has been featuring the technologies, applications, legal matters, educational aspects and many other themes related to micro/nano/pico-satellites. Though the symposium's name is “Nanosatellite Symposium,” the scope has not been restricted to nano-satellites (around 10kg), but also includes micro and pico-satellites. Japanese “Hodoyoshi Project” lead by myself hosted the first five Nano-satellite Symposia during the project period (2010-2013) in Japan, among which 5th Symposium held in University of Tokyo in 2013 found 260 attendants from 47 countries. 6th Symposium was held as one session of 30th ISTS in Kobe in 2015, 7th was in Varna, Bulgaria in 2016, 8th was in 31st ISTS Matsuyama in 2017, and 9th was held in 32nd ISTS Fukui in 2019.

As I mentioned every time, one of the important objectives of continually holding Nano-satellite Symposia is to strengthen our community of micro/nano/pico-satellites. Through the previous nine symposiums, we have established firm community in this field, grew friendships, and several practical collaborations actually started within our community. The 10th NSAT, organized together with 33rd ISTS in Beppu, is to be held in hybrid fashion: the participants either online or on-site are encouraged to deepen old friendship, discuss technical matters and find new friends, and I would encourage on-site participants to enjoy beautiful nature, culture and excellent food and “onsen (hot spa)” of Beppu in Oita.

I welcome all of you to the 10th NSAT and let us share the current technologies and future visions of these evolving space systems. I am looking forward to seeing you in Beppu or online !

Prof. Shinichi Nakasuka,
General Chair of the 10th Nano-satellite Symposium

Message from the President of JSASS



On behalf of the Japan Society for Aeronautical and Space Sciences (JSASS), I would like to thank everyone who participated in the 33rd ISTS. Also, I am particularly pleased to be able to host the event in Beppu City, Oita Prefecture as the main venue because my hometown is Oita city next to Beppu city. The year I was born in 1961 was the year Yuri Gagarin became the first human to fly in space. And last years was the 60 years anniversary of human spaceflight and could be called “the first year of private spaceflight”, with spacecraft from private companies such as Blue Origin and SpaceX successfully flew into space with passengers on board. And there will be more opportunities for ordinary people who are not astronauts to fly in space.

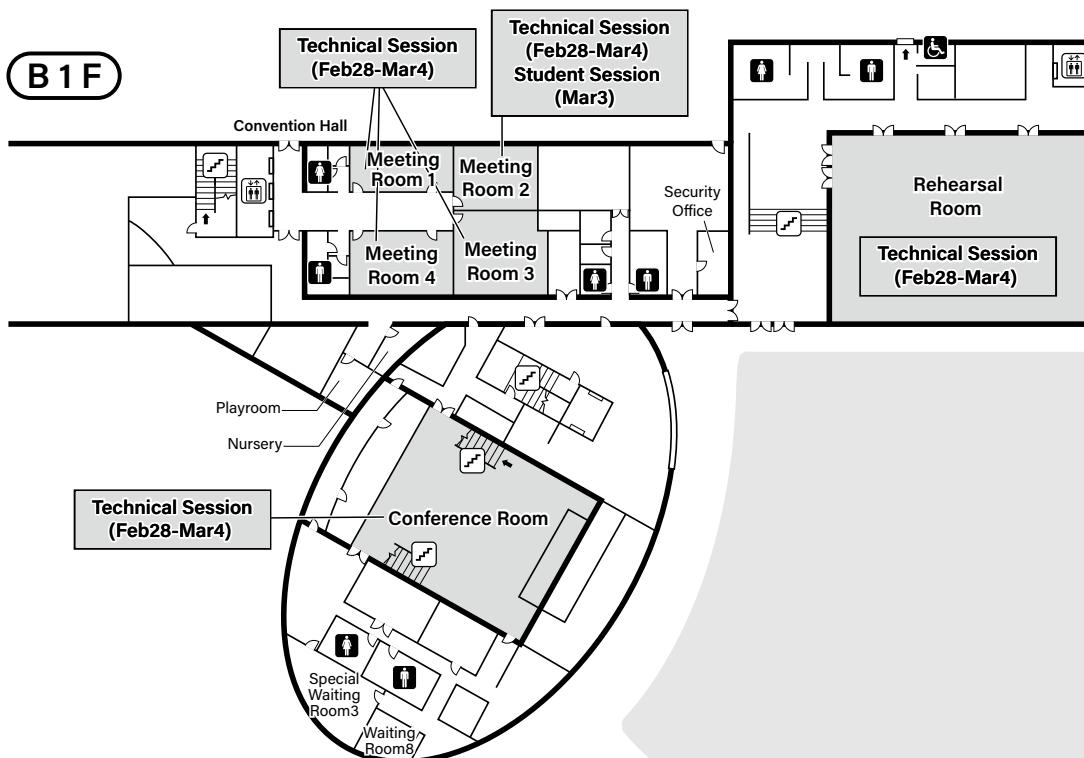
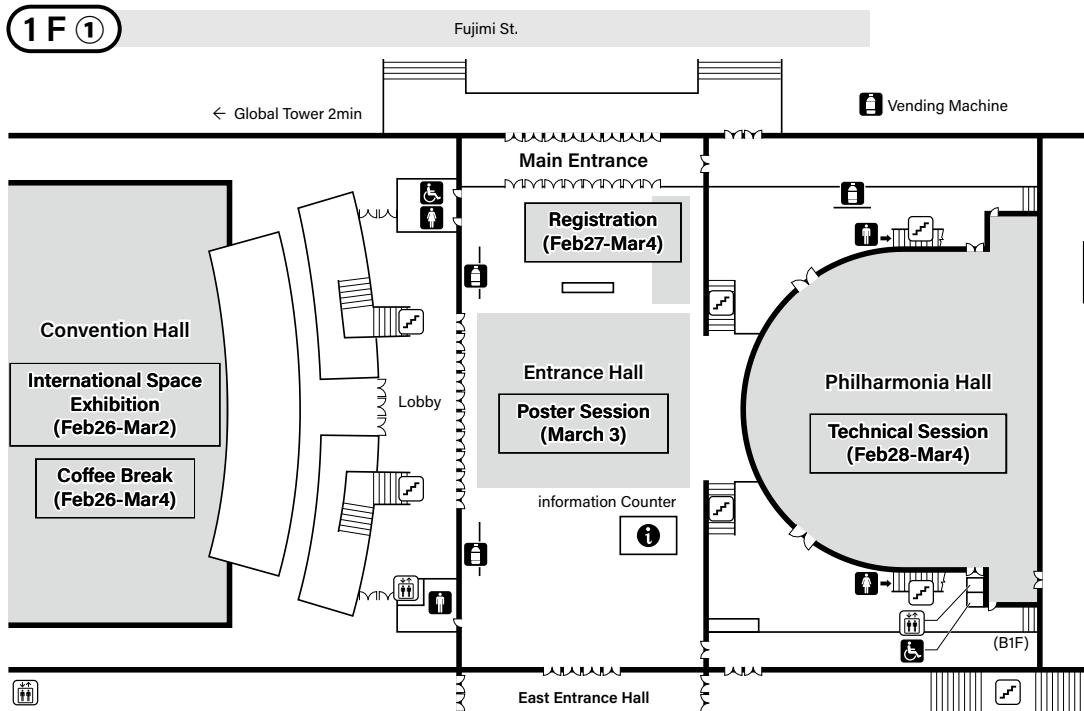
The COVID-19 pandemic since 2020 has taught us those global problems have no borders and that we must work together to solve them. The theme of the 33rd ISTS is “Beppu in Oita: Beautiful Harmony of Earth and Space for Sustainable Future.” And I believe that Space Technology and Science can provide an effective means of solving global problems, represented by the SDGs: Sustainable Development Goals, as well as problems common to all humankind, by providing a perspective from Earth to Space and from Space to Earth.

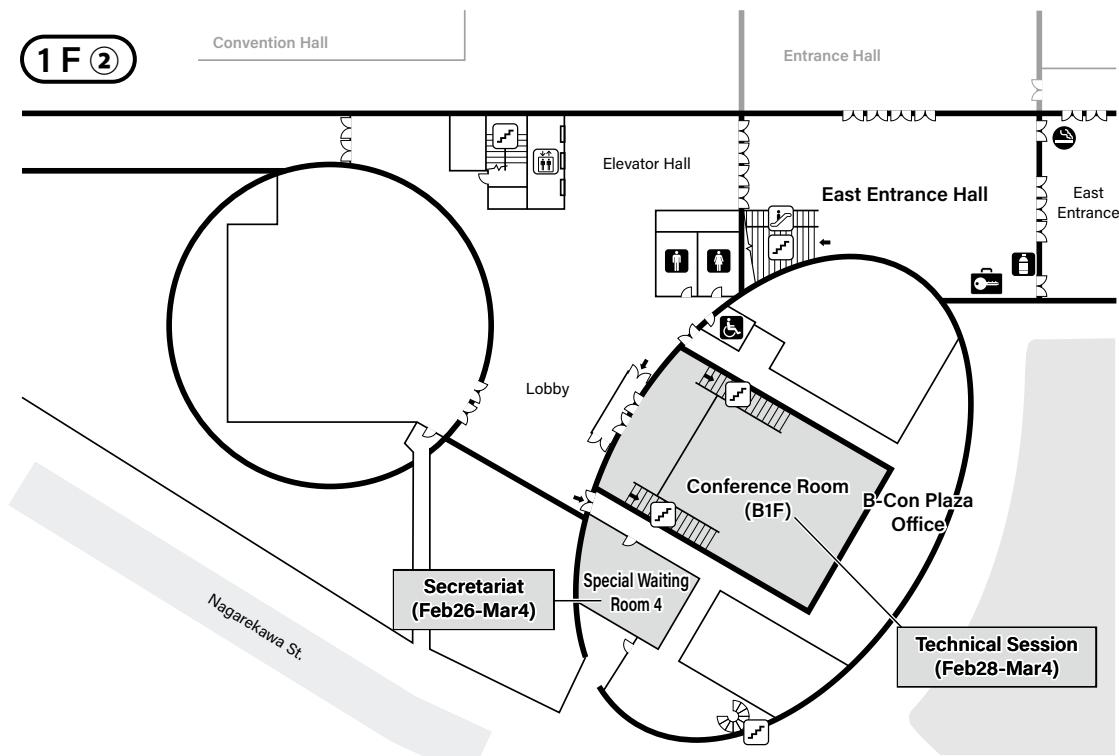
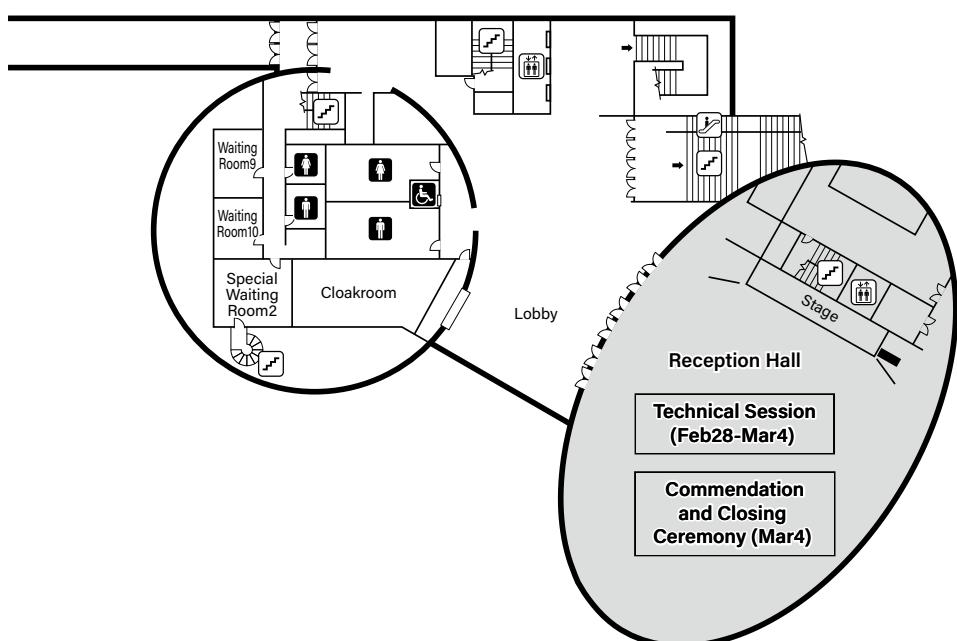
For example, Space Vision 2050 was established by JSASS as a 50-year anniversary project, since JSASS introduced “space” in addition to “aviation” to become the “Society for Aeronautical and Space Science” and advocates the construction of a lunar base in the underground cavity of the moon protected from space radiation. The Vertical Hall which is the entrance to this underground cavity was discovered by Japanese scientist from the observation data of the lunar probe KAGUYA (SELENE) and is the greatest achievement that our country’s space science can contribute to the advancement of mankind into space. We would like to provide a forum where researchers of space science and space technology such as space robotics, which is necessary for future space activities, come together to conduct meaningful research presentations and discussions that will lead to the sustainable development of humankind.

Beppu is the number one hot spring city in Japan in terms of the number of sources and the amount of spring water, and you could also enjoy sightseeing “Jigoku Meguri” in the feeling of “heaven” by soaking in hot springs. It is a beautiful place surrounded by the sea and mountains. Furthermore, Beppu is blessed with delicious seafood like Shiroshita Karei (flatfish), Seki Aji, and Seki Saba. I hope that this wonderful Beppu will be the base point for meaningful research presentations and discussions, and that it will be a useful symposium for the development of humankind.

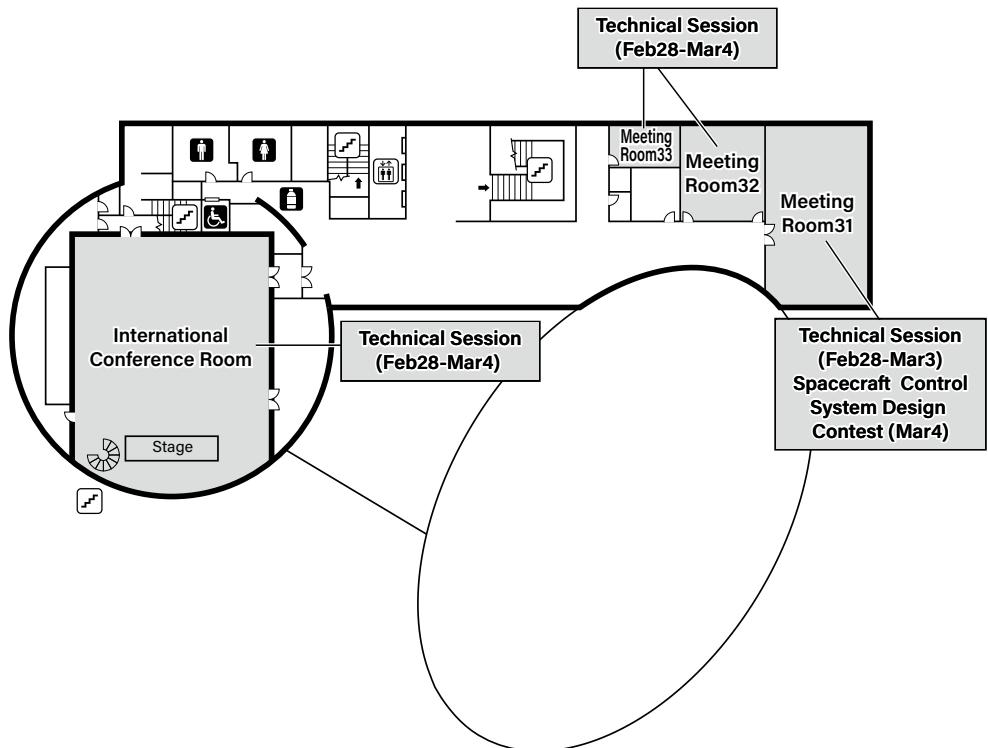
Isao KAWANO
President,
The Japan Society for Aeronautical and Space Sciences

Symposium Site Floor Guide



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3 F



Contacts and Open Hours

Secretariat

The 33rd ISTS Secretariat: Special Waiting Room4, 1F, B-Con Plaza

Opening Hours:

February 27 (Sun)	9:00 - 18:00
February 28 (Mon) - March 2 (Wed)	8:30 - 18:00
March 3 (Thu)	8:30 - 20:00
March 4 (Fri)	8:30 - 18:30

Reception, Registration & Information Desk

Entrance Hall, 1F, B-Con Plaza

Opening Hours:

February 27 (Sun)	14:00 - 17:00
February 28 (Mon) - March 3 (Thu)	8:30 - 18:00
March 4 (Fri)	8:30 - 16:30

International Space Exhibition

February 26 (Sat) – March 2 (Wed)

Convention Hall, B1F, B-Con Plaza

Opening Hours:

February 26 (Sat)	12:00 - 17:00
February 27 (Sun) - March 2 (Wed)	10:00 - 17:00

Wi-Fi Service

Free wireless internet access is available in the session rooms at B-Con Plaza.

B-CON_FREE

PW: bcon12341101

Program Application for PC, iPad and Mobile phones

PC: Access the symposium program site (<https://www.ists.or.jp/program/41/>).

iOS: Search by keyword “ists2021” at the App Store and download the application.

Android: Search by keyword “ists2021” at the Google Play and download the application.

*In order to view paper PDF, personal ID and Password (sent by email after registration) are required

Time Table Overview/ Event Schedule

Date	Morning	Afternoon	Night	Other Activities
February 26 (Sat)	· Exhibition Opening (10:00, BIF Convention Hall)			· International Space Exhibition (10:00-17:00, BIF Convention Hall)
February 27 (Sun)		· Registration Start (14:00, 1F Entrance Hall)		· International Space Exhibition (10:00-17:00, BIF Convention Hall)
February 28 (Mon)	· Opening Ceremony (9:00-9:50, Philharmonia Hall) · Plenary Lecture (10:00-10:35, Philharmonia Hall) · Keynote Speech 1 (10:35-11:10, Philharmonia Hall) · Keynote Speech 2 (11:10-11:45, Philharmonia Hall)	· Highlight I : World Space Highlight (13:30-15:00, Philharmonia Hall)	· Welcome Reception (19:00-21:00, Hikari Hall, Suginoi Hotel)	· International Space Exhibition (10:00-17:00, BIF Convention Hall)
March 1 (Tue)	· Technical Sessions (B-Con Plaza)	· Highlight II : Creation of new spaceindustry and innovation from Kyushu (14:00-15:40, Philharmonia Hall) · Technical Sessions (B-Con Plaza)	· Cultural Night (17:00, Kannawa Jigoku Mushi) · Cultural Night (18:00, Kannawa Jigoku Mushi)	· International Space Exhibition (10:00-17:00, BIF Convention Hall) · Technical Tour: 1. Usa Jingu Shrine Morning Tour
March 2 (Wed)	· Technical Sessions (B-Con Plaza)	· Highlight III : Sustainable Energy (14:00-15:40, Philharmonia Hall) · Technical Sessions (B-Con Plaza)		· International Space Exhibition (10:00-17:00, BIF Convention Hall) · Technical Tour: 2. Yufuin and Beppu Half Day Tour
March 3 (Thu)	· Technical Sessions (B-Con Plaza)	· Highlight IV : Young Professionals Program, Sustainable Space Development Visions 2040 (14:00-15:40, Philharmonia Hall) · Technical Sessions (B-Con Plaza)	· Technical Session Poster (18:00-20:00 1F Entrance Hall)	· Technical Tour: 3. Usuki Stone Buddhas & Puffer-fish Lunch Tour
March 4 (Fri)	· Political and Strategic Discussions on Satellite Technologies (to be discussed in Japanese language) (9:00-10:40, Philharmonia Hall) · Political and Strategic Discussions on Future Space Transportation System (to be discussed in Japanese language) (11:00-12:40, Philharmonia Hall) · Spacecraft Control System Design Contest (9:00-12:40, Meeting Room31) · Technical Sessions (B-Con Plaza)	· Highlight V : Sustainable Habitation on Moon (14:00-15:40, Philharmonia Hall) · Technical Sessions (B-Con Plaza)	· Commendation & Closing Ceremony (18:00-19:30, 2F Reception Hall)	· Technical Tour: 4. Kunisaki Peninsula Temples & Shrines Hopping Tour

Final Program Session Schedule

February 26, Saturday 33rd ISTS Final Technical Program Overview

		Student Session											
Room	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	Other Events
1F Convention Hall													
B-Con Plaza	10:00												17:00

International Space Exhibition

February 27, Sunday 33rd ISTS Final Technical Program Overview

		Student Session											
Room	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	Other Events
1F Entrance Hall													
B-Con Plaza	10:00												17:00

Registration Start

International Space Exhibition

February 28, Monday 33rd ISTS Final Technical Program Overview

Room	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	Other Events
1F Philharmonia Hall	9:00 Opening Ceremony	9:50 Plenary Lecture	10:00 10:35	10:35 Keynote Speech 1	11:10 Keynote Speech 2	11:45 Highlight I : World Space Highlight	13:30 15:00						
2F Reception Hall													
3F International Conference Room													
3F Meeting Room31													
3F Meeting Room32													
B1F Conference Room													
B-Con Plaza													
Student Session Reception Place: Hikari Hall, Suginoi Hotel Time: 19:00-21:00													

March 1, Tuesday 33rd ISTS Final Technical Program Overview

Room	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	Other Events
B1F Rehearsal Room	9:20 Missions and Future Capabilities 1 Page 37	10:40 f-2 Missions and Future Capabilities 1 Page 37	11:00 f-3 Missions and Future Capabilities 2 Page 38	12:40									
B1F Meeting Room1	9:00 Microgravity Sciences Page 47	10:00 h-1 Microgravity Technology Page 47	11:00 h-2 Microgravity Technology Page 47										
B1F Meeting Room2	9:00 Structural Dynamics and Control Page 18	10:40 c-2 Structural Dynamics and Control Page 18	11:00 c-3 Deployable structures Page 19	12:20									
B1F Meeting Room3	9:00 Space Policy, Security and History Page 72	10:40 v-1 Space Policy, Security and History Page 72	11:00 v-2 Space Law Page 73	12:15									
B1F Meeting Room4	9:20 Exploration to Lunar Hole and Lava Tube Page 51	10:40 k-2 Exploration to Lunar Hole and Lava Tube Page 51	11:00 k-3 Robotics, abs Sampling Technologies Page 52	12:40									
1F Convention Hall													17:00 International Space Exhibition

March 2, Wednesday 33rd ISTS Final Technical Program Overview

Room	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	Other Events
1F Philharmonia Hall													Student Session
2F Reception Hall	9:00 9:40 b-5 Arcets / MPD Thrusters			11:00 b-6 Pulsed Plasma Thrusters / Vacuum Arc Thrusters	12:20								
3F International Conference Room	9:00 d-8 Mission Design 1			11:00 d-9 Mission Design 2									
3F Meeting Room31	9:00 a-5 Liquid Rocket 1			11:00 a-6 Liquid Rocket 2	12:20								
3F Meeting Room32	9:00 a-5 [A] (Low-Cost) Planetary Missions Conference 5			11:00 a-6 [A] (Low-Cost) Planetary Missions Conference 6	12:20								
3F Meeting Room33	9:00 n-1 Earth Environmental Observation by Optical Imager	10:40		11:00 n-2 Satellite Precipitation Measurement and Application	12:40								
B1F Conference Room	9:00 r-2 NEO Space Debris Observation	10:20		11:00 r-3 Collision Avoidance, Modelling, Space Traffic Management	12:40								

B-Con Plaza

Room	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	Other Events
B1F Rehearsal Room	9:20 f-5 Remote Sensing Missions and Technologies Page 39	10:40 f-6 NSAT&LCPM Joint Session: Lunar and Interplanetary Missions Page 40	11:00 f-6 NSAT&LCPM Joint Session: Lunar and Interplanetary Missions Page 40	12:20 Session: Lunar and Interplanetary Missions Page 40									
B1F Meeting Room1	9:00 m-2 Science Mission using Balloon and Rocket Page 57	10:00 m-2 Science Mission using Balloon and Rocket Page 57	11:00 m-3 Flight Demonstration of Detonation Engine Page 58	12:20 m-3 Flight Demonstration of Detonation Engine Page 58									
B1F Meeting Room2	9:00 c-5 Structural Analysis Page 20	10:40 c-5 Structural Analysis Page 20	11:00 c-6 Space Antennas Page 21	12:20 c-6 Space Antennas Page 21									
B1F Meeting Room3	9:00 e-1 Re-entry Aerodynamics Page 31	10:40 e-1 Re-entry Aerodynamics Page 31	11:00 e-2 Aerothermodynamics and Arcjet Page 32	12:00 e-2 Aerothermodynamics and Arcjet Page 32									
B1F Meeting Room4	9:00 k-5 Small Body Explorations - Hayabusa2 and MMX Page 53	10:40 k-5 Small Body Explorations - Hayabusa2 and MMX Page 53	11:00 k-6 Martian and Plasma Science and Missions Page 54	12:00 k-6 Martian and Plasma Science and Missions Page 54									
1F Convention Hall													17:00 International Space Exhibition

March 3, Thursday 33rd ISTS Final Technical Program Overview

Room	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	Other Events
1F Philharmonia Hall													Student Session
2F Reception Hall	9:00	10:00	b-8 RF Thrusters Page 14		11:00	b-9 RF Thrusters / Magnetic Nozzle Page 15							
3F International Conference Room	9:00	10:00	d-11 Formation Flying & Satellite Constellations 1 Page 28		11:00	d-12 Formation Flying & Satellite Constellations 2 Page 28							
3F Meeting Room31	9:00	10:00	a-8 Solid Rocket & Detonation Engine Page 9										
3F Meeting Room32	9:00	10:30	I-8 IAA Low-Cost Planetary Missions Conference 8 Page 56		11:00	I-9 IAA Low-Cost Planetary Missions Conference Page 56	12:30						
3F Meeting Room33	9:00	n-4	10:20 Land Optical Observation and Application Page 61		11:00	n-5 Synthetic Aperture Radar and Application Page 62	12:40						
B1F Conference Room	9:00	10:20			11:00	q-2 Space Power Systems 2 Page 64							
													Student Session
B-Con Plaza													

Room	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	Other Events
B1F Rehearsal Room	9:40 f-8 Formation/ Constellation Management Page 41	10:40 f-9 Attitude Determination and Control Page 41	11:00 f-9 Attitude Determination and Control Page 41	12:40 f-10 Operations Automation and Optimization Page 42	16:00 f-10 Operations Automation and Optimization Page 42	17:40 f-10 Operations Automation and Optimization Page 42							
B1F Meeting Room1	9:00 j-1 Satellite Communications, Broadcasting and Navigation 1 Page 49	10:00 j-2 Satellite Communications, Broadcasting and Navigation 2 Page 49	11:00 j-2 Satellite Communications, Broadcasting and Navigation 2 Page 50	12:00 j-3 Satellite Communications, Broadcasting and Navigation 3 Page 50	16:00 j-3 Satellite Communications, Broadcasting and Navigation 3 Page 50	17:20 j-3 Satellite Communications, Broadcasting and Navigation 3 Page 50							
B1F Meeting Room2	9:00 s-1 Finalist Student Session 1 Page 76	10:30 s-1 Finalist Student Session 1 Page 76	10:50 s-2 Finalist Student Session 2 Page 77	12:35 s-2 Finalist Student Session 2 Page 77	16:00 s-3 Finalist Student Session 3 Page 78	17:30 s-3 Finalist Student Session 3 Page 78							
B1F Meeting Room3	9:00 e-4 High-enthalpy and Hypersonic Flow II Page 33	10:40 e-4 High-enthalpy and Hypersonic Flow II Page 33	11:00 e-5 Plasma Flows Page 34	12:40 e-5 Plasma Flows Page 34	16:00 e-6 Advanced Fluid Dynamics and Multi-phase Flow Page 35	17:40 e-6 Advanced Fluid Dynamics and Multi-phase Flow Page 35							
B1F Meeting Room4					11:00 o-1-1 Development and experiment of engine 1 Page 1	12:20 o-1-1 Development and experiment of engine 1 Page 1	16:00 o-1-2 Numerical model and combustion instability Page 1	17:20 o-1-2 Numerical model and combustion instability Page 1					
F1 Entrance Hall							18:00 Poster Session Page 79	20:00 Poster Session Page 79					

March 4, Friday 33rd ISTS Final Technical Program Overview

Room	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	Other Events
1F Philharmonia Hall	9:00 SS-8 Political and Strategic Discussions on Satellite Technologies (to be discussed in Japanese language) Chaired by Shikasaka	10:40 11:00 Political and Strategic Discussions on Future Space Transportation System (to be discussed in Japanese language) Chaired by Shikasaka		12:40 ss-9 Political and Strategic Discussions on Future Space Transportation System (to be discussed in Japanese language)		14:00 Highlight V: Sustainable Habitation on Moon		15:40 Highlight V: Sustainable Habitation on Moon					
2F Reception Hall	9:00 b-11 Laser Propulsion			10:20 11:00 b-12 Microwave Rocket									
3F International Conference Room	9:00 d-14 Trajectory Design and Optimization 1			10:20 11:00 d-15 Trajectory Design and Optimization 2									
3F Meeting Room31	9:00 i-2 Thermal Control 2			10:00 Page 49									
3F Meeting Room32	9:00 t-2 Systems Engineering for Satellite Design			10:15 Page 68		11:00 ss-11 Spacecraft Control System Design Contest		12:40 Page 30					
B1F Conference Room	9:00 g-1 Reusable Launch Vehicles (RLVs) 1			10:20 Page 45		11:00 g-2 Reusable launch Vehicles (RLVs) 2		12:00 Page 45		16:00 g-3 Reusable Launch Vehicles (RLVs) 3		18:00 Page 46	
B-Con Plaza													
Commentation & Closing Ceremony Place: Reception Hall (2F) Time: 18:00-19:30													

Room	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	Other Events
B1F Rehearsal Room	9:00 10:40 f-11 Integrating Space and Ground Observations Page 43	10:00 10:40 f-11 Integrating Space and Ground Observations Page 43	11:00 12:40 f-12 Satellite Design and Development 1 Page 43										Satellite Design and Development 2 Page 44
B1F Meeting Room1	9:00 w-1 Safety & Reliability Page 74	10:20		11:00 12:20 w-2 EEE parts Page 74									
B1F Meeting Room3	9:00 e-7 Aerodynamics I Page 35	10:20		11:00 11:40 e-8 Acoustics Page 36									
B1F Meeting Room4	9:00 o-1-3 Development and experiment of engine 2 Page 2	10:40		11:00 12:40 o-1-4 Oxidizer flow and tank Page 2									Solid fuel combustion Page 3

Special Sessions and Events

Opening Ceremony

Opening

Kojiro Suzuki (Chairperson of General Affairs Committee)

Opening Address from 33rd ISTS

Shinichi Nakasuka (General Chairperson of the 33rd ISTS)

Congratulatory address from Beppu City

Yasuhiro Nagano (Mayor of Beppu City)

Congratulatory Address from JAXA

Hiroshi Yamakawa (President of Japan Aerospace Exploration Agency)

Congratulatory Address from COSPAR

Masaki Fujimoto (Representative of Committee on Space Research)

Address from NSAT

Shinichi Nakasuka (General Chairperson of the 10th Nano-Satellite Organizing Committee)

Address from IAA:LCPM

TBD (General Chairperson of the 14th IAA:LCPM Organizing Committee)

Address from JSASS

Isao Kawano (President of Japan Society for Aeronautical and Space Sciences)

Information of Program and Event Schedule

Toru Shimada (Chairperson of Program Committee)

Closing

Kojiro Suzuki (Chairperson of General Affairs Committee)

Special Programs (Plenary, Invited Speakers)

Special Session after the Opening Ceremony

Date : February 28 (Mon.) 10:00 - 12:40

Place : Philharmonia Hall (1F)

Plenary Lecture 10:00 - 10:35

Mr. Masayasu Ishida (CEO of Spacetide, President and CEO, SPACETIDE foundation / Director, A.T. Kearney) As co-founder, president and CEO of SPACETIDE foundation, Masayasu works on a variety of cross-industry activities with the aim of creating new waves in the space industry. Masayasu is also leading the global space group of A.T. Kearney where he has provided management consulting services to governmental agencies and space related companies in various countries. On top of that, Masayasu has been contributing to policymaking in the Japanese government through various governmental committees. He holds a degree in Mechanical Engineering from the University of Tokyo.

Keynote Speech 1 10:35 - 11:10

Mr. Mike Safyan (VP of Launch, Planet Labs PBC)

In 2011, Mike Safyan joined the eight-person founding team at Planet where the company was building the first iterations of its Dove satellite in a Cupertino garage. Mike is responsible for Planet's Launch strategy and has overseen the launch of over 350 Planet satellites across 22 launch attempts. Mike received his B.S. of Aerospace Engineering at UCLA, and an M.Sc. of Space Studies at the International Space University in Strasbourg, France. He started his career working on lunar rover designs for the Barcelona Moon Team competing for the Google Lunar X-Prize and then joined the PhoneSat team at NASA Ames where he worked as a Systems Engineer developing ultra-low-cost CubeSats utilizing smartphone technologies. In 2018, Mike received the SSPI Promise Award, which recognizes outstanding achievement by satellite industry professionals under the age of 35.

Keynote Speech 2 11:10 - 11:45

Mr. Sandy Tirtey (Commercial Launch service Director, Rocket Lab)

Highlight I : World Space Highlight

Date: February 28 (Mon.) 13:30 - 15:00

Place: Philharmonia Hall (1F)

Moderator : Yoshikazu Shoji (JAXA)

- Introduction
- National space policy and program
- Q&A and closing: Moderator

Speakers:

① USA

Mr. Garvey McIntosh , NASA

② Germany

Dr. Niklas Reinke, DLR

③ France

Mr. Mariez Julien CNES

④ Japan

Mr. Shoji Yoshikazu,JAXA

Highlight II : Creation of new space industry and innovation from Kyushu

Date : March 1 (Tue.) 14:00 - 15:40

Place: Philharmonia Hall (1F)

Coordinator: Yuta Kikuchi (JAXA Business Development and Industrial Relations Department)

This Highlight Session features the trends of space utilization and business creation in Kyushu that have been spreading over the past few years, with key person who are working on creating new businesses and solving social issues in Kyushu.

Speakers:

- Kyoko Dateki (Director, JAXA Business Development and Industrial Relations Department)
- Hidetaka Aoki (Space Evangelist / Director, Space Port Japan)
- Tadashi Morimitsu (Outreach coordinator, Advanced Technologies & Applications Division, Oita Prefecture)
- Ken Fujiwara (Co-founder / CEO, Umitron)
- Naohiko Kohtake (Professor, Graduate School of SDM, Keio University)

Panel Discussion follows with above speakers.

Moderator : Hidetaka Aoki

Highlight III : Sustainable Energy

Date: March 2 (Wed.) 14:00 - 15:40
Place: Philharmonia Hall (1F)
Coordinator : Oita Prefecture

Reducing greenhouse gas emissions is an urgent issue worldwide.

COP26 will be held from the end of October 2021.

The Government of Japan officially decided to reduce the greenhouse gas reduction target for 2030 by 46%, and the Cabinet decided on the basic energy plan on October 22.

Space is a part of the field that utilizes advanced technology.

How will energy be used in the future in the face of issues such as global warming, Announcement of the current status of carbon-neutral energy such as renewable energy and hydrogen, future utilization in space, including geothermal utilization in Oita Prefecture

Speakers:

- General story
Incorporated Administrative Agency Oil and Natural Gas and Metal Mineral Resources Organization (JOGMEC)
- Kyushu Electric Power
Kokonoe town geothermal power generation, etc.
- Shimizu Corporation (Katsu Ichikawa, Professor Emeritus, Hokkaido University)
Biomass gasification utilizing geothermal steam, etc.
- Obayashi Corporation (planned: Green Energy Headquarters Nagao)
Hydrogen generation (water electrolysis) using geothermal power generation

Highlight IV : Young Professionals Program, Sustainable Space Development Visions 2040

Date: March 3 (Thu.) 14:00 - 15:40
Place : Philharmonia Hall (1F)
Moderator : Naoya Ozaki (JAXA)

In the 2020s, space activities will reach a turning point due to the rapid growth of the commercial space sector and the development of new infrastructures such as lunar orbital gateways and space transportation systems. In the future, it will be necessary to think about space development visions involving not only national government organizations and academic institutions but also with private companies. In addition, "sustainability" is an indispensable keyword for future space development visions. Sustainability here includes not only environmental sustainability, such as debris management and planetary protection, but also economic sustainability, allowing space development without dependence on governmental budgets. Therefore, the ISTS will hold a program in which students and young professionals from the industry, the academia, and the government can work together on the building blocks of sustainable space development visions for 2040. Through this activity, we aim to create a team that can not only draw cross-sectional visions, but also break through the vertical divisions of occupations and fields, to solve problems as one.

Background and Purpose Activities

Six teams (about six members each) will be formed to discuss sustainable space visions. Each team will discuss "themes to be solved for 2040" and present and discuss their vision for solving the issues.

Highlight V : Sustainable Habitation on Moon

Date : March 4 (Fri.) 14:00 - 15:40

Place : Philharmonia Hall (1F)

Moderator : Yuko Inatomi (JAXA)

In recent years, space agencies and private companies have been aiming to land on and explore the Moon. A key theme is to expand human activities into space and ultimately build a sustainable society on the Moon and planets. To realize this major theme, it is necessary not only to solve the pressing issues in scientific research and technological development, but also to discuss how to dramatically expand human activities beyond the existing framework, achievements, and methods of space development. This session aims to discuss the issues and solutions for sustainable human habitation of the Moon, not limited to space science.

Speakers:

- Space Radiation Measurement and Protection toward International Space Exploration
Aiko Nagamatsu (Research and Development Directorate, JAXA)
- Sustainable Lunar Base Design by using Eco-Engineering
Masato Sakurai (Research and Development Directorate, JAXA)
- Core Biome Complex and its Space Exploration
Yosuke Alexandre Yamashiki (SIC Human Spaceology Center, GSAIS, Kyoto University)
- Relevance of Protein Nutrition on the Moon
Takeshi Nikawa (Institute of Space Nutrition, Tokushima University Graduate School)
- An Overview of the Industrial Activities on Moon and Cis-Lunar Development
Atsushi Uchida (Mitsubishi Research Institute, Inc.)

Corporate Presentation * luncheons

Date: March 1 (Tue.) 12:50 - 13:50 Mitsui Bussan Aerospace Co.Ltd.

March 2 (Wed.) 12:50 - 13:50 Space BD

Place : Meeting Room 31(3F)

The recruitment consultant corner will be set up on the 1st floor foyer, Please come if you are interested !

Social Program

Welcome Reception

Date : February 28 (Mon.) 19:00 - 21:00

Place : Hikari Hall, Suginoi Hotel

Fee : Free

On Monday evening, all ISTS/NSAT participants will be cordially invited to the Welcome Reception by the Governor of Oita Prefecture and the Mayer of Beppu City with Japanese hospitality.

Commendation & Closing Ceremony

Date : March 4 (Fri.) 18:00 - 19:30

Place : B-con Plaza, Reception Hall

The 33rd ISTS and 10th NSAT, 14th LCPM Organizing Committee intends to make this last evening of the joint symposium an unforgettable event.

Cultural Night: "Jigoku Mushi Kobo"

Date : March 1 (Tue.)

①17:00 - (Up to 30 people) ②18:00 - (Up to 30 people)

Place : Jigoku Mushi Kobo Kannawa

Fee : Free

(*)You can share the "Jigoku Mushi dish" with 3 people

At Kannawa-onsen Hot Spring in Beppu City, Oita Prefecture, "Jigoku Mushi Cuisine" using steam from hot springs, which is geothermal energy, has been popular since the Edo period.

The Jigoku Mushi Kobo is a facility where you can experience the traditional cooking method "Jigoku Mushi Cuisine" by steaming meat and vegetables in a steamer and eating them as they are after cooking. In addition, many people are surprised at its delicious taste. The 100% natural steam heat from the hot spring is used to steam the ingredients of the hot spring at a high temperature so the flavors of the ingredients are condensed and seasonal vegetables and local fresh ingredients can be cooked deliciously.

There is also a cooling equipment monument, a drinking fountain, and a corner where you can learn about the history of iron rings and hot springs. You can experience the history and culture unique to Beppu and iron rings. In addition, there is a foot-steam bath and a wheelchair accessible footbath in the next pocket park so you can enjoy delicious food and relieve your travel fatigue. "(Cre: Premium Stay Kyushu)"

Excursion

1. Usa Jingu Shrine Morning Tour

Date : March 1 (Tue.)

Tour fee : 1,100JPY

- Usa Jingu Shrine

The head shrine of over four thousands of shrines across Japan that are dedicated to Hachiman, the God of Archery and War, famous as economic fortune, victory, wishing power spot.

- Kitsuki castle town

Suyanosaka slope: Vinegar shop's slope from Edo-era, traditional and unique scenery. Ryukyu and Toriten the set of local lunch unique to Oita Prefecture

2. Yufuin and Beppu Half Day Tour

Date : March 2 (Wed.)

Tour fee : 2,600JPY

- Yufuin

A leisurely walk in a world of fairy tales, Yunotsubo Street and Kinrin-ko Lake.

- Umijigoku

The iconic Beppu hot-spring, "Umijigoku" and authentic local cuisine, "Jigoku-mushi" (hot-spring-steamed dish)

3. Usuki Stone Buddhas & Puffer-fish Lunch Tour

Date : March 3 (Thu.)

Tour fee : 4,950JPY

Usuki Buddhas: Visit the great Buddhas of Usuki.

Lunch: Taste the local specialty, puffer fish lunch set.

Usuki Castle Town: Take a walk through the traditional castle town and enjoy the history of Usuki.

4. Kunisaki Peninsula Temples & Shrines Hopping Tour

Date : March 4 (Fri.)

Tour fee : 4,000JPY

Monjusenji: Unique gomadaki ceremony

Lunch: Japanese Buddhist cuisine

Fukiji Temple: One of the oldest wooden buildings remaining in Japan.

Kumano Magaibutsu Buddha statue: The long ancient steps known to be built by ogres.

Session Details

Synopsis

The 33rd International Symposium on Space Technology and Science (ISTS) will be held at B-Con Plaza from Feb.26 (Sat) - Mar.4 (Fri), 2022.

The ISTS Organizing Committee and the Japan Society for Aeronautical and Space Sciences (JSASS) would like to invite individuals of all nations interested in space-related activities to participate in this event.

The 33rd ISTS will be held under the main theme of “Beppu in Oita: Beautiful Harmony of Earth and Space for Sustainable Future”

Beppu in Oita Prefecture is located in the Kyushu region of Japan, and boasts the number one source of hot springs and the largest amount of spring water in Japan. Beppu is considered a paradise hot springs famous for its high therapeutic effects, and it is a tourist city visited by more than 8 million tourists every year. In April 2020, Oita Airport (Kunisaki City) was selected for the first time in Asia as a space port for small satellite launch.

We will welcome you with a variety of programs, including keynote speeches, World-Space Highlights, special lectures, and poster sessions in plenary format and, in parallel format, general and organized technical sessions, student sessions, as well as a control contest, Gemstone project of young people and social programs to help you experience and enjoy Beppu.

We are looking forward to seeing you at the 33rd ISTS, 10th NSAT and 14th LCPM in the beautiful city of Beppu, with a lot of great Japanese Onsen (natural hot springs), many recreational facilities and local cuisine and crafts.

Venue

Beppu is the city of Oita Prefecture which is in the island of Kyushu, one of the four major islands of Japan, and about 100-minute flight from Tokyo. Beppu is the second largest city on Oita with a population of over 110,000 and is surrounded by Beppu Bay and the volcanic belt. Blessed with more than 2,000 hot springs, the climate of the city is mild with an average annual temperature of 15.8°C, and you can enjoy fresh farm and marine food from the nature around.

Beppu also possesses a unique culture and atmosphere. A city rich in nature and culture, overflowing with the energy of the Earth. The ISTS Conference in Beppu, to be held in 2022, will offer excellent opportunities to discuss the exploration in Beautiful Harmony of Earth and Space. People in Beppu will warmly welcome you all in hope of deepening our understanding about Space just like the hospitable waters of Beppu's abundant hot springs.

We sincerely hope that all those participating in ISTS will truly enjoy their time in the city of Beppu Oita.

Sessions

The Symposium will address various fields of space-related technology and science. It will include Special Programs, Organized Sessions, Panel Discussions, and 20 Technical Sessions of contributed papers and a Student Session.

Special Sessions after the Opening Ceremony (February 28 - March 4 2022)

- Plenary Lecture by Mr. Masayasu Ishida (CEO of Spacetide, President and CEO, SPACETIDE foundation / Director, A.T. Kearney)
- Keynote Speech 1 by Mr. Mike Safyan (VP of Launch, Planet Labs PBC)
- Keynote Speech 2 by Mr. Sandy Tirtey (Commercial Launch service Director, Rocket Lab)
- Highlight I : World Space Highlight
- Highlight II : Creation of new space industry and innovation from Kyushu
- Highlight III : Sustainable Energy
- Highlight IV : Young Professionals Program, Sustainable Space Development Visions 2040
- Highlight V : Sustainable Habitation on Moon

Organized Sessions

- os-1 : Hybrid Rocket ~ Essentially Non-Explosive Propulsion for Future Fail-Safe Space Transportation Systems ~

Technical Sessions

Technical Sessions will be categorized into the following 20 areas. The key words for each Technical Session are as follows:

a) Chemical Propulsion and Air-breathing Engines:

Solid, Liquid, Hybrid Rockets, Air-breathing Engines, Reusable Rockets

b) Electric and Advanced Propulsion:

Electric Propulsion, Laser/Microwave Propulsion, Solar-thermal/Sailing Propulsion, Electrodynamics Tether, Nuclear Propulsion, Magneto-hydrodynamics, Microthrusters, Thrust-er Plume and Spacecraft Interactions, Plasma Technologies, Non-propulsive Applications, Powered Flight Mission

c) Materials and Structures:

Structures of Spacecraft and Space Vehicles, Structural Dynamics and Control, Structural Analysis, Tests and Nondestructive Inspections, Material Characterizations, New-materials, Smart materials and structures, Composite materials, Space Environment Interactions, Composite Materials

d) Astrodynamics, Navigation Guidance and Control

Attitude Dynamics, Attitude Determination & Control, Attitude & Payload Sensor Calibration, Orbital Dynamics, Orbit Determination & Control, Trajectory Design and Optimization, Mission Design, Spacecraft Navigation, Entry/Landing/Ascent Guidance, Navigation & Control, Orbital Rendezvous & Proximity Operations, Formation Flying & Satellite Constellations, Space Robotics & Rover, Spacecraft Autonomy & Intelligence, Guidance, Navigation & Control Components, Recent Experiences & Lessons Learned

e) Fluid Dynamics and Aerothermodynamics

High Enthalpy Flow, Atmospheric-entry, Aero-thermodynamics, Aerodynamic Design, Rarefied Gas, Radiation, Thermal Protection System, Plasma, Magneto-gasdynamics, Low Speed Aerodynamics, Aerodynamics at Takeoff and Landing, Supersonic and Hypersonic Flow, Gas Dynamics, Wind Tunnel

f) Small Satellite : Joint session with NSAT

Innovative Small Satellite Mission, Small Satellite Utilization, Small Satellite Design and Development, Advanced Small Satellite Technology, Small Satellite Lessons Learned, Small Satellite Launch

Note : Same as the previous 32nd ISTS in 2019, papers presented at the session of f) Small Satellite are automatically registered as the technical papers of the Nano-Satellite Symposium at the same time.

g) Space Transportation

Reusable Launch Vehicles (RLVs), Expendable Launch Vehicles (ELVs), Reentry Vehicles, Orbital Transfer Vehicles (OTVs), Human Space Transportation, Sub-orbital Space Transportation

h) Micro-gravity Sciences and Technology

Micro-gravity Science, Physical Science, Fluid Physics, Combustion Science, Fundamental Physics, Material Science, Micro-gravity Experiments, Facilities for Micro-gravity Experiments, Opportunities for Micro-gravity Experiments, Operation and Utilization of the IS

i) Thermal Control

Thermal and Environmental Control, System and Instrument Thermal Design, Thermal Management, Heat Transfer, Thermophysical Property, Thermal Testing and Analysis, Passive and Active Thermal Control, Technologies, Two-phase Technology, Advanced Thermal Control Materials

j) Satellite Communications, Broadcasting and Navigation

Satellite System Architectures, Networks and Protocols, Experimental Projects and Results, Subsystems, Components and Devices, Propagation, Regulation, Financing and Marketing, Space Navigation Systems, Fixed and Broadcast Satellite Systems, Mobile Satellite Systems

k) Science and Technology for Human and Robotic Space Exploration

Scientific Objectives, Results, and Instruments for Exploration of the Moon, Planets and Solar System Small Bodies; Mission Analysis, Mission Design and Key Technologies of Human and Robotic Explorations; Commercial and Private Initiatives of Space Explorations; Road-map and Strategies for National and International Space Exploration Programs

L) IAA Low-Cost Planetary Missions: Joint session with The 14th IAA Low-Cost Planetary Mission Conference:

Agency Programs for Low-Cost Planetary Missions, Science and Engineering Results from Past and On-Going Missions, Low-Cost Planetary Missions Under Development, Science Instruments and Enabling Technologies for Future Low-Cost Planetary Exploration, Advanced Concepts for Future Low-Cost Planetary Missions by Small Sats, Cube-Sats, Nano-Sats, Rovers

m) Sounding Rocket, Balloon and Flight Experiment using Small Flight Vehicle

Promotion of Sounding Rocket or Balloon Programs , Suborbital, Scientific Results, Range Facility & Operation , Engineering Demonstration, Upper Atmosphere, Ionosphere, Flight Experiment using Small Flight Vehicle, Instrumentation, Parabolic Flights Test

n) Earth Observation

Earth Observation, Earth Environment, Remote Sensing, Remote Sensing Sensors, Application of Remote Sensing, Data and Signal Processing, Data Analysis, Ground System, Data Assimilation, Global Change Prediction, Earth System Science, Disaster Monitoring, Geographic Information Systems

p) Space Life Science

Space Medicine and Physiology, Countermeasures, Metabolism, Neurophysiology, Environmental Medicine, Behavior and Performance, Psycho-social Issue, Mental Health Care, Remote Medical Care and Tele-medicine, Biomedical Technology, Space Radiation (Measurement, Biological effect, Protection), Space Biology, Gravitational, Physiology and Biology, Artificial Gravity, Analogue Environments and Simulations, Public Outreach and Education in Life Science, Space Life Science for Human Exploration, Space Habitat

q) Space Power Systems

Solar Power Satellite, Solar Cells, Power Resources, Power Management and Distribution, Power Storage System, Wireless Power Transmission

r) Space Environment and Debris

Space Environment, Space Debris, Meteoroid, Space Situational Awareness, Debris Observation and Measurement, Debris Population and Evolution Model, Debris Risk Assessment and Management, Orbital Dynamics on Debris, Reentry Safety, Hypervelocity Impact, Protection Design, Debris Mitigation, Debris Removal, Debris Environment Remediation, Space Weather, Space Weather Forecast, Spacecraft Charging, Environment Model, Solar and Geomagnetic Activity, Environment Data Management, International Cooperation on Debris and Space Environment, Near Earth Objects, Space Traffic Management

t) Systems Engineering and Information Technology

Systems Engineering – Methodologies, Systems Engineering – System Design, Systems Engineering – Process and Tools, Model Based Systems Engineering, Verification and Validation, IT Application for Systems Engineering, Project Management and Systems Engineering, Risk Management, Software Engineering, Requirement Engineering, Knowledge Management

u) Space Education and Outreach for the Benefit of All People

Space Education, Public Outreach, Public Relations, Capacity Building, Citizen Science, International Collaborative Projects, Students Activity, Space Tourism, Effect of Space Activities on Culture and Humanity, Journalism, Art, Space Events, NanoSat and CanSat for Education, Model Rocket, Amateur Radio Satellite

v) Space Law, Policy and History

International Space Law, Domestic Law & Regulations over Space Activities, Foreign & Domestic Space Policy, Space History, Legal History, Policy History, History of Science & Technology, Industrial History, Humanities & Social Sciences, Space Business, Commercialization, Space Resource Exploitation, Environmental Protection, Space Debris, Space Diplomacy, Space Security, Disarmament & Arms Control, International Cooperation (Bilateral, Multilateral, Regional & Global), etc.

w) Safety and Mission Assurance

Safety, Reliability, Quality, Software Product Assurance, EEE & Mechanical Parts, Standardization



Organized Session

Technical Session Oral

Finalist Student Session

Technical Session Poster

Organized Session

Session o-1-1)

Mar 3 (Thu) 11:00 - 12:20 [Meeting Room4]

Development and experiment of engine 1

*Chairpersons: Harunori Nagata (Hokkaido University)
Koki Kitagawa (Kyushu Institute of Technology)*

2022-o-1-01 (11:00 - 11:20)

Control Methods for Electrically Driven Pump-Fed Hybrid Rocket Motor

*Tadayoshi Shoyama, Masaya Kimura, Shuichi Tanabe, Yutaka Wada, Takafumi Matsui
Chiba Institute of Technology, Planetary Exploration Research Center

2022-o-1-02 (11:20 - 11:40)

Hybrid Rocket Kick Motor Engineering Model Development

*Landon Thomas Kamps, Shota Hirai, Harunori Nagata
Hokkaido University

2022-o-1-03 (11:40 - 12:00)

A Study on Hybrid Rocket Engine with Multi-Section Swirl Injection Method and Aft Counter-Swirl Injection Method with Application to Fully Reusable Launch Vehicles

*Shigeru Aso, Ryutaro Sakamoto, Seiya Hodokami, Rikiya Mifune, Masayuki Katayama
Kurume Institute of Technology Department of Traffic & Mechanical Engineering

2022-o-1-05 (12:00 - 12:20)

Rocket Sled System Design for Various Missions

*Daisuke Nakata, Kazuki Yasuda, Akihiro Watanabe, Ang YiYong, Koki Yamagishi, Tatsuhiko Shiina, Takuya Tada, Iori Obara, Yuma Hashimoto, Hikaru Eguchi, Masaharu Uchiumi
Muroran Institute of Technology

Session o-1-2)

Mar 3 (Thu) 16:00 - 17:20 [Meeting Room4]

Numerical model and combustion instability

*Chairpersons: Ichiro Nakagawa (Tokai University)
Yo Kawabata (Fukuoka University)*

2022-o-1-07 (16:00 - 16:20)

Numerical Estimation of Discharge Coefficient of Nitrous Oxide Flow inside an Injector for Hybrid Rocket Engine

*Rikio Watanabe¹, Yoshiki Shimizu¹, Kazuki Yasuda², Daisuke Nakata²
¹Tokyo City University, Department of Mech. Sys. Engr., ²Muroran Institute of Technology, Aerospace Plane Research Center

2022-o-1-08 (16:20 - 16:40)

Vortex Shedding and Thermoacoustic Instability in Hybrid Rocket Combustion

*Wonjeong Hyun, Changjin Lee
Konkuk university, Department of Aerospace engineering

2022-o-1-09 (16:40 - 17:00)

Comprehensive Acoustic Modeling for Ballistic Data Reconstruction in Hybrid Rockets

*Maxime Marian Hadrien Sicat^{1,2}, Toru Shimada², Carmine Carmicino³

¹The University of Tokyo, department of Aeronautics and Astronautics, ²JAXA Institute of Space and Astronautical Science,

³Università di Napoli "Federico II"

2022-o-1-11 (17:00 - 17:20)

Modeling of Hybrid Rocket Combustion Using Variable Wall Temperature Model

*Takakazu Morita¹, Yansheng Yang², Jungpyo Lee³

¹Tokai Univ. Department of Aeronautics and Astronautics, ²Tokai Univ. Graduate School of Engineering, ³Univ. of Brasilia

Session o-1-3)

Mar 4 (Fri) 9:00 - 10:40 [Meeting Room4]

Development and experiment of engine 2

Chairpersons: Shigeru Aso (Kurume Institute of Technology)

Daisuke Nakata (Muroran Institute of Technology)

2022-o-1-12 (9:00 - 9:20)

Performance Evaluation of Swirling-Oxidizer-Flow-Type Hybrid Rocket Engine using Low Viscosity Low-Melting-Point Thermoplastic Fuel

*Tsuyoshi Oishi¹, Takashi Sakurai²

¹Graduate School of Systems Design, Tokyo Metropolitan University, ²Tokyo Metropolitan University

2022-o-1-13 (9:20 - 9:40)

Design of High-Expansion-Ratio Bell Nozzle for Vacuum Conditions

*Yamato Itoigawa¹, Shota Hirai², Landon Kamps², Harunori Nagata²

¹Hokkaido Univ. Department of Mechanical and Intelligent System Engineering, ²Hokkaido Univ. Faculty of Engineering

2022-o-1-14 (9:40 - 10:00)

Experimental Study on Effect of Swirling Oxidizer Flow on Average and Local Regression Rate of Low-Melting-Point Thermoplastic Fuel for Hybrid Rockets

*Yo Kawabata¹, Yutaka Wada², Nobuji Kato³, Keiichi Hori⁴

¹Fukuoka Univ. Department of Mechanical Engineering,

²Chiba Institute of Technology, Department of Innovative Mechanical and Electronic Engineering, ³Katazen Corporation, ⁴JAXA

2022-o-1-15 (10:00 - 10:20)

Combustion Characteristics of Rocket Reignition System Using Radiant Heat

*Shota Hirai, Shota Inoue, Mai Fukada, Landon Kamps, Harunori Nagata

Hokkaido University

2022-o-1-16 (10:20 - 10:40)

Experimental Study on Reaction Rate of Magnesium Wire in Water Vapor Flow

*Mariko Akiyama¹, Hiroyuki Koizumi², Kimiya Komurasaki¹

¹Department of Aeronautics and Astronautics, The University of Tokyo, ²Department of Advanced Energy, The University of Tokyo

Session o-1-4)**Mar 4 (Fri) 11:00 - 12:40 [Meeting Room4]****Oxidizer flow and tank***Chairpersons: Yutaka Wada (Chiba institute of technology)**Kenichi Takahashi (Nihon University)***2022-o-1-17 (11:00 - 11:20)****Unsteady Heat Transfer Analysis and Experimental Evaluation of LOX Regenerative-cooling Nozzle for SOFT Hybrid Rocket Engines****Hitomi Ozaki, Kodai Kurachi, Takashi Sakurai**Tokyo Metropolitan University***2022-o-1-18 (11:20 - 11:40)****Experimental Study on Filling and Discharging Characteristics of Nitrous Oxide to Spacecraft Tanks****Kazuki Yasuda, Tatsuhiko Shiina, Daisuke Nakata, Masaharu Uchiumi**Muroran institute of technology***2022-o-1-19 (11:40 - 12:00)****Development of a LOX Vaporizer for an Altering-Intensity Swirling Oxidizer Flow Type Hybrid Rocket****Kotoha Watanabe¹, Ichiro Nakagawa²**¹Tokai Univ. Department of Mechanical Engineering School of Engineering, ²Tokai Univ. Department of Aeronautics and Astronautics***2022-o-1-20 (12:00 - 12:20)****The VTVL Control Performance of HRE with Pressure Drop in Oxidizer Tank****Donghoon Chae, Changjin Lee**Department of Aerospace Engineering, Konkuk University***2022-o-1-21 (12:20 - 12:40)****Evaluation of Heat Transfer Characteristics of Liquid Oxygen Flow in a Thin Tube under High Heat Flux Conditions****Koki Kitagawa, Kohei Matsui**Kyushu Institute of Technology, Department of Space Systems Engineering***Session o-1-5)****Mar 4 (Fri) 16:00 - 17:15 [Meeting Room4]****Solid fuel combustion***Chairpersons: Toru Shimada (JAXA)**Landon Kamps (Hokkaido University)***2022-o-1-22 (16:00 - 16:15)****Visualization of Multiport PMMA Fuel Torch for Rocket Ignition****Shota Inoue, Shota Hirai, Mai Fukada, Yusuke Takada, Landon Kamps, Harunori Nagata**Hokkaido University*

2022-o-1-23 (16:15 - 16:30)

Experimental Observation of Condensed Combustion Products during Combustion of Magnesium in Water Vapor

*Keita Nishii, Hiroyuki Koizumi, Kimiya Komurasaki

The University of Tokyo

2022-o-1-24 (16:30 - 16:45)

Development of Rocket Reignition Device Using Electrically Conductive Plastic

*Shota Hirai, Yownin Albert M. Leung, Landon Kamps, Harunori Nagata

Hokkaido University

2022-o-1-25 (16:45 - 17:00)

Review of Alternative Sustainable Fuels for Hybrid Rocket Propulsion

*Francesco Barato

University of Padua, Department of Industrial Engineering

2022-o-1-26 (17:00 - 17:15)

Cellular Structures for Solid Fuel Grain Reinforcement: Mechanical and Combustion Performance in Conventional and Non-Conventional Hybrid Rocket Engines

*CHRISTIAN PARAVAN, Riccardo Bisin, Anwer Elsayed Hashish, Alberto Verga

POLITECNICO DI MILANO, Aerospace Science and Technology Department

Technical Session Oral

Session a-1)

Feb 28 (Mon) 15:40 - 16:20 [Meeting Room31]

Conceptual study & Systems study

Chairperson: TBD

2022-a-02 (15:40 - 16:00)

Concept Study on New Heavy Rocket with Ejector Rocket Engines (Including Study on Thrust Augmentation)

*Kenji Kobayashi, Sharma Gopal

Sohjo University Department of Aerospace Systems Engineering

2022-a-04 (16:00 - 16:20)

Current Environmental Concerns about Space and Suborbital Launch Activities

*Filippo Maggi, Stefania Carlotti

Politecnico di Milano, Dept. Aerospace Science and Technology

Session a-2)

Mar 1 (Tue) 9:00 - 10:00 [Meeting Room31]

Air-breathing Engine 1

Chairperson: TBD

2022-a-05 (9:00 - 9:20)

Temperature Measurement of Turbulent Exhaust Jet by Two-band Emission Method

*Genki Kawamura², Takumi Yamaguchi², Yoshinari Kobayashi¹, Shuhei Takahashi¹

¹*Gifu University Department of Engineering*

²*Gifu University Graduate School of Natural Science and Technology Department of Energy Engineering*

2022-a-07 (9:20 - 9:40)

Catalytic Effect on Thermal Decomposition of Hydrocarbon Fuel within a Tube Simulating Cooling Channel

*Sadatake Tomioka¹, Motoki Hattori², Takuo Onodera¹, Tatsushi Isono¹

¹*Japan Aerospace Exploration Agency, Kakuda Space Center, ²Tohoku University, Graduate School of Engineering*

2022-a-08 (9:40 - 10:00)

Oscillations of Hydrocarbon Fuel Flow in a Heated Tube Under Supercritical Pressure Conditions

*Takuo Onodera¹, Yosuke Kone², Tatsushi Isono¹, Sadatake Tomioka¹

¹*Japan Aerospace Exploration Agency, Research and Development Directorate, Research Unit IV,*

²*Tohoku University, Graduate School of Engineering, Department of Aerospace Engineering*

Session a-3)

Mar 1 (Tue) 11:00 - 12:40 [Meeting Room31]

Air-breathing Engine 2

Chairperson: TBD

2022-a-09 (11:00 - 11:20)

Design of a Scramjet Engine Supply System using Transient Analysis

*Kota Kubosaki¹, Sadatake Tomioka²

¹Tohoku University, ²JAXA, Kakuda Space Center

2022-a-10 (11:20 - 11:40)

Unsteady Numerical Analysis of a Dual-Mode Scramjet Combustor with Cavity

*Hironobu Nishiguchi¹, Masatoshi Kodera², Sadatake Tomioka²

¹Tohoku University, ²JAXA Kakuda Space Center

2022-a-11 (11:40 - 12:00)

RANS Simulations of a Supersonic Combustor with Methane/Ethylene Mixed Fuel

*Masatoshi Kodera, Sadatake Tomioka, Masahiro Takahashi

Japan Aerospace Exploration Agency

2022-a-12 (12:00 - 12:20)

Experimental Investigation on the Effect of the Intake Throat Height on the Buzz Characteristics in the Ramjet Engine for High-Mach Integrated Control Experiment (HIMICO)

*Manami Fujii¹, Yuki Fujimori¹, Yusuke Hoshiya¹, Yuki Kuwabara¹, Rintaro Tanaka¹, Tetsuya Sato¹, Hidemi Takahashi², Hideyuki Taguchi³

¹Department of Applied Mechanics and Aerospace Engineering, Waseda University, ²Aeronautical Technology Directorate, Japan Aerospace Exploration Agency, ³Research and Development Directorate, Japan Aerospace Exploration Agency

2022-a-13 (12:20 - 12:40)

A Streamline-traced Air Inlet for the Reusable Sounding Rocket with Airbreathing Engines

*Yusuke Maru¹, Haruaki Seta², Kazuma Matsumoto², Tetsuya Sato²

¹Japan Aerospace Exploration Agency, ²Department of Applied Mechanics and Aerospace Engineering, Waseda University

Session a-4)

Mar 1 (Tue) 16:00 - 17:40 [Meeting Room31]

Combustion

Chairperson: TBD

2022-a-14 (16:00 - 16:20)

Ground Test Evaluation of a Supersonic Combustor Model for JAXA Flight Experiment in Mach 6 Flight Condition

*Masahiro Takahashi, Sadatake Tomioka, Masao Takegoshi, Kan Kobayashi, Takuo Onodera, Toshihito Saito

Japan Aerospace Exploration Agency, Kakuda Space Center

2022-a-15 (16:20 - 16:40)**Study on Nonlinear Dynamics Using the State Space of Combustion Oscillation in a Rocket Combustor**

*Fumiya Arai, Kazuki Iemura, Masanori Saito, Mitsuaki Tanabe

College of Science and Technology, Nihon University

2022-a-16 (16:40 - 17:00)**Experimental Study on Combustion Efficiency of Water-Vapor and Aluminum-Powder Combustion Aiming for Micro-Chemical Propulsion**

*Masaya Murohara¹, Hiroyuki Koizumi², Kimiya Komurasaki¹

¹*the University of Tokyo, Department of Aeronautics and Astronautics, ²the University of Tokyo, Department of Advanced Energy*

2022-a-17 (17:00 - 17:20)**Combustion Characteristics of Ethanol-based Gel Fuel Droplet with Al Powder under Different Oxidant Concentration Convection**

*Junyu Zhu, Akiyo Takahashi, Kenichi Takahashi

Nihon Univ. College of Science and Technology

2022-a-18 (17:20 - 17:40)**Flame Characteristics of a High-Pressure LOX/CNG Rocket Combustor with Large Optical Access**

*Jan Martin¹, Wolfgang Armbruster¹, Dmitry Suslov¹, Robert Stützer¹, Justin Hardi¹, Michael Oschwald^{1,2}

¹*German Aerospace Center (DLR), Institute of Space Propulsion, ²RWTH Aachen University, Institute of Jet Propulsion and Turbomachinery*

Session a-5)**Mar 2 (Wed) 9:00 - 10:20 [Meeting Room31]****Liquid Rocket 1**

Chairperson: TBD

2022-a-19 (9:00 - 9:20)**Thermal Behavior of Eutectic Mixture of Ammonium Dinitramide and Hydrazide Compounds**

*Hiroki Matsunaga¹, Mamoru Hayata², Hiroto Habu³, Masaru Noda¹, Atsumi Miyake⁴

¹*Fukuoka Univ. Department of Chemical Engineering, ²Carlit Holdings Co., Ltd, ³JAXA/ISAS. Division of Space Flight Systems,*

⁴*Yokohama National Univ. Graduate School of Environment and Information Sciences*

2022-a-20 (9:20 - 9:40)**The Novel Ignition Method via Electrolysis for Ammonium Dinitramide based Energetic Ionic Liquid**

*Kiichiro Iguchi, Kento Shiota, Yu-ichiro Izato, Atsumi Miyake

Yokohama National University

2022-a-21 (9:40 - 10:00)**Fundamental Study on Pt/TiO₂ Catalyst to Aim Extension of Catalyst Life for Microsatellite-Friendly Multi-Purpose Propulsion System (MFMP-PROP)**

*Toshiaki Iizuka¹, Yuya Ikeda¹, Takeru Yuzawa¹, Takehito Kato¹, Ryusei Hayatomo², Kazuki Hirayama²,

Hiroyoshi Yasuhira², Haruki Sashida², Kohdai Ono², Takuto Iijima², Hironori Sahara²

¹*National Institute of Technology, Oyama College, ²Tokyo Metropolitan University*

2022-a-22 (10:00 - 10:20)

Design of an Electric-Chemical Dual-Mode thruster of Green Propellant

*Yumina Iwata, Akira Kakami

Department of Aeronautics and Astronautics, Tokyo Metropolitan University, Japan

Session a-6)

Mar 2 (Wed) 11:00 - 12:20 [Meeting Room31]

Liquid Rocket 2

Chairperson: TBD

2022-a-23 (11:00 - 11:20)

Research on Bi-propellant Mode Operation of Microsatellite-Friendly Multi-Purpose PROPUlision System (MFMP-PROP)

*Ryusei Hayatomo¹, Kazuki Hirayama¹, Hiroyoshi Yasuhira¹, Haruki Sashida¹, Kohdai Ono¹, Takuto Iijima¹, Hironori Sahara¹, Yuya Ikeda², Takeru Yuzawa², Toshiaki Iizuka², Suzuki Daisuke³

¹*Tokyo Metropolitan university*, ²*National Institute of Technology, Oyama College*, ³*ALE Co., Ltd*

2022-a-24 (11:20 - 11:40)

Advanced Performance Prediction Model Considering Losses in Spacecraft Engine Combustion Chamber

*Soma Tauchi, Chihiro Inoue

Kyushu Univ. Department of Aeronautics and Astronautics

2022-a-25 (11:40 - 12:00)

Pulse Performance Prediction of Bipropellant Thruster by Unsteady Stream Tube Model

*Yuki Oishi, Chihiro Inoue

Kyushu Univ. Department of Aeronautics and Astronautics

2022-a-26 (12:00 - 12:20)

Influence of L^* on Combustion Stability of N₂O/DME Thruster

*Yuki Furuya, Akira Kakami

Tokyo Metropolitan Univ. Department of System Design

Session a-7)

Mar 2 (Wed) 16:00 - 17:20 [Meeting Room31]

Liquid Rocket 3

Chairperson: TBD

2022-a-27 (16:00 - 16:20)

Inducer Cavitation Control via Inlet Swirl

*Christopher Groll^{1,2}, Tobias Traudt², Michael Oschwald², Stefan Schlechtriem², Armin Herbertz³

¹*University of Stuttgart, Institute of Space Systems, Germany*, ²*German Aerospace Center, Institute of Space Propulsion, Germany*,

³*European Space Agency, ESTEC, Netherlands*

2022-a-29 (16:20 - 16:40)

Liquid Upper Stage Demonstrator Engine (LUMEN): Component Test Results and Project Progress

*Tobias Traudt, Michael Börner, Dmitry Suslov, Robson dos Santos Hahn, Anirudh Mukund Saraf,
Jan Christian Deeken, Justin Hardi, Stefan Schlechtriem

German Aerospace Centre (DLR)

2022-a-30 (16:40 - 17:00)

A Parametric Blade Design Study in the Baljé-Diagram: Application to Supersonic Impulse Turbines

*Robson Hahn¹, Louis Souverein², Tobias Traudt¹

¹*German Aerospace Center, ²Ariane Group*

2022-a-31 (17:00 - 17:20)

Performance Analysis and Design Characterization of a Supersonic Impulse Turbine

*Robson Hahn¹, Tobias Traudt¹, Nima Fard Afshar², Stefan Henninger², Jan Deeken¹, Michael Oschwald¹,
Stefan Schlechtriem¹

¹*German Aerospace Center, ²RWTH Aachen University*

Session a-8)**Mar 3 (Thu) 9:00 - 10:00 [Meeting Room31]**

Solid Rocket & Detonation Engine

Chairperson: TBD

2022-a-32 (9:00 - 9:20)

Development and Flight Test of Small Solid Rocket Motor Using Glycidyl Azide Polymer/Ammonium Perchlorate Propellant

*Kazuki Nagao¹, Tamiaki Takasago¹, Masaya Fujita², Yutaka Wada², Kaiichi Baba³, Tatsuya Oda³, Katsuya Hasegawa⁴, Keiichi Hori⁴

¹*Graduate School of Chiba Institute of Technology, Japan, ²Chiba Institute of Technology, Japan, ³NOF CORPORATION, Japan, ⁴JAXA, Japan*

2022-a-33 (9:20 - 9:40)

Laser Ignition Characteristics of Low-temperature Boron/potassium Nitrate

*Kohei Matsui¹, Yoshiki Matsuura², Koki Kitagawa¹

¹*Kyushu Institute of Technology, Department of Space Systems Engineering, ²IHI Aerospace Co., Ltd.*

2022-a-35 (9:40 - 10:00)

Thrust Performance of Rotating Detonation Engines Using a Methane-Oxygen Mixture

*Kazuma Kawasaki¹, Haruhiro Kawana¹, Kanta Ohno¹, Kazuhiro Ishii¹, Makoto Kojima², Hideto Kawashima²

¹*Yokohama National Univ. Department of Mechanical Engineering, ²JAXA*

Session b-1)

Feb 28 (Mon) 15:40 - 17:20 [Reception Hall]

Ion Thrusters / Cathodes

Chairperson: TBD

2022-b-01 (15:40 - 16:00)

Investigation of Plasma Conditions in Ion Engine with Sublimable Propellants

*Ryo Shiraki¹, Naoji Yamamoto¹, Masakatsu Nakano², Yasushi Ohkawa³, Ikkoh Funaki³

¹Kyushu University. Interdisciplinary Graduate School of Engineering Sciences, ²Tokyo Metropolitan College of Industrial Technology, ³JAXA

2022-b-02 (16:00 - 16:20)

Research on Ion Engine Alternative Propellants Based on Numerical Simulation

*Zefeng Hu, Naruya Hiroike, Naoji Yamamoto, Morita Taichi, Yuji Koide

Kyushu Univ. Department of Advanced Energy Engineering Science Interdisciplinary Graduate School of Engineering Sciences

2022-b-03 (16:20 - 16:40)

Effect of Spacecraft Charging on Surface Erosion of Spacecraft due to Backflow of Ion Thruster

*Takanobu Muranaka¹, Kazuma Ueno¹, Mamoru Kato¹, Shunsuke Otsuka¹, Ayumu Nono², Yoshinori Nakayama³, Satoshi Hosoda⁴, Kazutaka Nishiyama⁴

¹Chukyo University, ²The University of Tokyo, ³National Defense Academy, ⁴Japan Aerospace Exploration Agency

2022-b-04 (16:40 - 17:00)

Scattering Behavior of Thermal Molecular Beams at Microstructured Surface for High Compression Intake System of Air Breathing Ion Engine

*Keisuke Ezaki¹, Kosuke Shoda¹, Kazuki Itatani¹, Yuki Jotaki², Yusaku Ashida², Koki Sugimoto², Takashi Ozawa³, Yusuke Yamashita⁴, Kazutaka Nishiyama⁵, Kumiko Yokota¹, Masahito Tagawa¹

¹Kobe Univ. Graduate School of Engineering, ²Kobe Univ. Department of Mechanical Engineering, ³Japan Aerospace Exploration Agency,

⁴The University of Tokyo, ⁵Institute of Space and Astronautical Science

2022-b-05 (17:00 - 17:20)

The Fluctuation Characteristics in the Hollow Cathode Plume

*Daisuke Imaguchi¹, Yuya Oshio², Hiroki Watanabe³, Shun Imai³, Ikkoh Funaki³, Yoshiki Yamagiwa¹

¹Shizuoka University, ²Ryukoku University, ³JAXA

Session b-2)

Mar 1 (Tue) 9:00 - 10:20 [Reception Hall]

Hall Thrusters 1

Chairperson: TBD

2022-b-06 (9:00 - 9:20)

Rotating Spoke Behaviour and Anomalous Electron Transport in Hall Thruster

*Masahiro Nonaka¹, Junko Yamasaki¹, Yutaro Murayama¹, Tetsuya Kobayashi¹, Emi Maruyama¹, Hiroki Ito¹, Tsubasa Kurihara¹, Toramu Morita¹, Kohei Shimamura², Shigeru Yokota²

¹Engineering Mechanics and Energy, University of Tsukuba, Tsukuba, Japan

²Faculty of Engineering, Information and Systems, University of Tsukuba, Tsukuba, Japan

2022-b-07 (9:20 - 9:40)**Investigation of Plume Interference Effects on Racetrack Anode-layer SBS System**

*Mitsuhiro Nagamine, Akane Kato, Takeshi Miyasaka, Makoto Asahara

Gifu University. Department of Natural Science and Technology

2022-b-09 (9:40 - 10:00)**Study of the Micro-turbulence Plasma Structure on a Hall-effect Thruster Using 2D Kinetic Simulation**

*Naoki Tsunezawa, Masayuki Takahashi, Naofumi Ohnishi

Tohoku Univ. Department of Aerospace Engineering

2022-b-10 (10:00 - 10:20)**Prediction of Discharge Current Using Reservoir Computing in Electric Propulsion**

*Kansei Ito, Naoji Yamamoto, Kai Morino

Kyushu Univ. Interdisciplinary Graduate School of Engineering Sciences.

Session b-3)**Mar 1 (Tue) 11:00 - 12:40 [Reception Hall]****Hall Thrusters 2**

Chairperson: TBD

2022-b-11 (11:00 - 11:20)**Performance Characteristics of Hall Thrusters for Transportation in the Solar System -Use of Carbon Dioxide, Methane, Ammonia, Hydrogen, Helium, Air and Water/Ice etc. in the Planets and Satellites to Propellants-**

*Takahiro Itsuki¹, Takuma Nagayoshi², Hirokazu Tahara², Tomoyuki Ikeda³, Yoshiyuki Takao⁴

¹*Osaka Sangyo University, Graduate School of Engineering, Division of Mechanical Engineering,*

²*Osaka Sangyo University, Department of Mechanical Engineering, ³Tokai University, ⁴Nishinippon Institute of Technology*

2022-b-12 (11:20 - 11:40)**The R&D Program of 6-kW-class Hall Thruster at JAXA**

*Ikkoh Funaki, Tadahiko Sano, Tsutomu Fukatsu

JAXA

2022-b-13 (11:40 - 12:00)**Magnetic-layer type hall thruster "ST-II"**

*Takayuki Asai, Tatsuki Matsuo, Satoru Shitara, Yuuto Matumoto, Hideyuki Horisawa, Tomoyuki Ikeda

Tokai University Department of Aeronautics and Astronautics

2022-b-14 (12:00 - 12:20)**Development of Hall Thruster for Small Satellites**

*Tetsuya Kobayashi, Junko Yamasaki, Masahiro Nonaka, Hiroki Ito, Emi Maruyama, Yutaro Murayama, Tsubasa Kurihara, Toramu Morita, Shigeru Yokota, Kohei Shimamura

Department of Engineering Mechanics and Energy. University of Tsukuba

2022-b-15 (12:20 - 12:40)

New Discharge Power Supply of 6-kW Hall Thruster using Voltage-Doubler-Type Rectifier

*Yoshiki Matsunaga¹, Hiroki Watanabe¹, Shun Imai¹, Hiroaki Kusawake¹, Toru Takahashi², Kazuhiro Kajiwara³, Fujio Kurokawa³, Ikkoh Funaki¹

¹*Japan Aerospace Exploration Agency*, ²*Takahashi Denki Seisakusho Corporation*, ³*Nagasaki Institute of Applied Science*

Session b-4)

Mar 1 (Tue) 16:00 - 17:40 [Reception Hall]

Hall Thrusters 3

Chairperson: TBD

2022-b-16 (16:00 - 16:20)

Hollow anode characterization for low-power Hall thrusters

*Satoru Shitara, Yuto Matsumoto, Rio Yabuki, Tatsuki Matsuo, Tomoyuki Ikeda, Hideyuki Horisawa

Tokai Univ. Department of Aeronautics and Astronautics

2022-b-17 (16:20 - 16:40)

Ionization Enhancement of Argon Propellant by Applying a Magnetic Field to Propellant Supply in a Hall thruster

*Emi Maruyama, Junko Yamasaki, Masahiro Nonaka, Yutaro Murayama, Tetsuya Kobayashi, Tsubasa Kurihara, Toramu Morita, Shigeru Yokota

Univ. of Tsukuba, Department of Engineering Mechanics and Energy

2022-b-18 (16:40 - 17:00)

The Effect of the Outer Coil Configuration on the Thrust Performance of the 6-kW-class Hall Thruster

*Shun Imai¹, Hiroki Watanabe¹, Yoshiki Matsunaga¹, Daisuke Imaguchi², Nobuhito Onishi³, Ikkoh Funaki¹

¹*Japan Aerospace Exploration Agency*, ²*Shizuoka Univ. Department of Engineering*, ³*Tokai Univ. Department of Mechanical Engineering*

2022-b-19 (17:00 - 17:20)

Effects of Electron Sources on Propulsion Performance in Hall Thrusters

*Yutaro Murayama, Junko Yamasaki, Emi Maruyama, Tetsuya Kobayashi, Hiroki Ito, Tsubasa Kurihara, Toramu Morita, Shigeru Yokota, Kohei Shimamura

University of Tsukuba

2022-b-20 (17:20 - 17:40)

Scaling Laws for the design of High - voltage Hall Thrusters

*Yuto Matsumoto¹, Ikkoh Funaki², Hiroki Watanabe², Yuya Oshio³, Hideyuki Horisawa¹

¹*Tokai Univ.*, ²*JAXA*, ³*Ryukoku Univ.*

Session b-5**Mar 2 (Wed) 9:00 - 9:40 [Reception Hall]****Arcjets / MPD Thrusters***Chairperson: TBD***2022-b-21 (9:00 - 9:20)****Performance Characteristics of DC Arcjet Thrusters -Use of Carbon Dioxide, Methane, Ammonia, Hydrogen, Helium, Air and Water/Ice etc. in Planets and Satellites in the Solar System to Propellants-**

*Kentaro Kaji¹, Kazuki Shibutani¹, Ryo Ikemoto¹, Ayano Yoshida¹, Hirokazu Tahara¹, Ai Momozawa², Daisuke Nakata³, Tomoyuki Ikeda⁴, Yoshiyuki Takao⁵, Yuichiro Nogawa⁶, Takashi Wakizono⁷, Masaya Toyama⁸

¹*Osaka Sangyo University, Department of Mechanical Engineering*, ²*Tokyo City University*, ³*Muroran Institute of Technology*, ⁴*Tokai University*, ⁵*Nishinippon Institute of Technology*, ⁶*Splije, Inc.*, ⁷*High Serve, Inc.*, ⁸*Pasett, Inc.*

2022-b-22 (9:20 - 9:40)**Performance Characteristics of High-Thrust High-specific-Impulse Steady-State Magneto-Plasma-Dynamic Thrusters for Transportation in the Solar System -Use of Carbon Dioxide, Methane, Ammonia, Hydrogen, Helium, Air and Water/Ice etc. in the Planets and Satellites to Propellants-**

*Ayano Yoshida¹, Ryo Ikemoto¹, Kazuki Shibutani¹, Kentaro Kaji¹, Hirokazu Tahara¹, Ai Momozawa², Daisuke Nakata³, Tomoyuki Ikeda⁴, Yoshiyuki Takao⁵, Takashi Wakizono⁶, Masaya Toyama⁷

¹*Osaka Sangyo University, Department of Mechanical Engineering*, ²*Tokyo City University*, ³*Muroran Institute of Technology*, ⁴*Tokai University*, ⁵*Nishinippon Institute of Technology*, ⁶*High Serve, Inc.*, ⁷*Pasett, Inc.*

Session b-6**Mar 2 (Wed) 11:00 - 12:20 [Reception Hall]****Pulsed Plasma Thrusters / Vacuum Arc Thrusters***Chairperson: TBD***2022-b-24 (11:00 - 11:20)****Research and Development of Commercially-Available High-Total-Impulse Electrothermal Pulsed Plasma Thruster Systems from Electric Energy/Power 1J/1W for 1U(1kg) Cubesats to 50J/50W for 50cm-Cube (50kg) Nano-Satellites in Osaka Sangyo University**

*Takuma Unegawa¹, Maika Uedahira¹, Kazuki Aoyagi¹, Tomoya Shimada¹, Ken-ichiro Oka², Tomonori Kimura², Takayuki Kuri², Kenshin Motoe², Hirokazu Tahara¹, Tomoyuki Ikeda³, Yoshiyuki Takao⁴, Takashi Wakizono⁵

¹*Osaka Sangyo University, Department of Mechanical Engineering*, ²*Osaka Sangyo University, Solar System Space Development Project*, ³*Tokai University*, ⁴*Nishinippon Institute of Technology*, ⁵*High Serve, Inc.*

2022-b-25 (11:20 - 11:40)**Temporal and Spatial Ion Velocity Distributions of a Short-pulse Coaxial Laser-assisted Pulsed Plasma Thruster**

*Satoru Shitara, Takuro Mikami, Maekawa Shuto, Hideyuki Horisawa

Tokai Univ. Department of Aeronautics and Astronautics

2022-b-26 (11:40 - 12:00)**Investigations on Plume Characteristics of Pulsed Electric ThRuster of the University of Stuttgart (PETRUS)**

*Zhe Zhang, Felix Schafer, Georg Herdrich

University of Stuttgart, Institute of Space Systems

2022-b-27 (12:00 - 12:20)

Propellant Development for Improving the Discharge Frequency of Vacuum Arc Thruster with Plasma Interaction Ignition

*Taiga Okamoto

Kyushu Institute of Technology Department of Space Major

Session b-7)

Mar 2 (Wed) 16:00 - 16:40 [Reception Hall]

Electrospray Thrusters / Advanced Micro Thrusters

Chairperson: TBD

2022-b-28 (16:00 - 16:20)

Design and Fabrication of Ionic Liquid Electrospray Thruster with Two-stage Electrodes

*Akane Nishimura¹, Yoshinori Takao², Toshiyuki Tsuchiya¹

¹*Kyoto University*, ²*Yokohama National University*

2022-b-29 (16:20 - 16:40)

Fabrication of SU-8 Based Emitter Arrays for Ionic Liquid Electrospray Thrusters

*Takumi Shingu^{1,2}, Masayoshi Nagao², Katsuhisa Murakami², Hiromasa Murata², Sommawan Khumpuang^{2,3}, Shiro Hara^{2,3}, Yoshinori Takao⁴

¹*Department of Mechanical Engineering, Materials Science, and Ocean Engineering, Yokohama National University*, ²*Device Technology Research Institute, National Institute of Advanced Industrial Science and Technology*, ³*Minimal Fab Promoting Organization*, ⁴*Division of Systems Research, Yokohama National University*

Session b-8)

Mar 3 (Thu) 9:00 - 10:00 [Reception Hall]

RF Thrusters

Chairperson: TBD

2022-b-31 (9:00 - 9:20)

Plasma Distribution Measurement of Miniature RF Plasma Thruster

*Yuya Oshio¹, Rin Hiwatashi¹, Hiroyuki Nishida², Hirotaka Ostu¹

¹*Ryukoku University*, ²*Tokyo University of Agriculture and Technology*

2022-b-33 (9:20 - 9:40)

Numerical Analysis on Effect of Magnetic Cusp on Discharge Characteristic in RF Plasma Thruster

*Xiang Ma, Takeru Furukawa, Hiroyuki Nishida

Tokyo University of Agriculture and Technology

2022-b-34 (9:40 - 10:00)

Dependence of Electromagnetic Force on Applied Current in Electrodeless Plasma Thruster Using $m = 0$ Half-cycle Acceleration Method

*Takeru Furukawa¹, Taisuke Torin¹, Daisuke Kuwahara², Hiroyuki Nishida¹, Shunjiro Shinohara¹

¹*Tokyo University of Agriculture and Technology*, ²*Chubu University*

Session b-9**Mar 3 (Thu) 11:00 - 12:20 [Reception Hall]****RF Thrusters / Magnetic Nozzle***Chairperson: TBD***2022-b-36 (11:00 - 11:20)****Multi-Objective Design Optimization of Microwave Electrothermal Thruster***Tsubasa Ozawa¹, Suk Hyun Yeo², Hideaki Ogawa¹, Milinda Suraweera³¹*Kyushu Univ. Department of Aeronautics and Astronautics*, ²*RMIT Univ. School of Engineering*, ³*Space Machines Company***2022-b-37 (11:20 - 11:40)****Experimental investigation on a magnetically-steered radiofrequency plasma thruster**

*Ryoji Imai, Kazunori Takahashi

*Tohoku Univ. Department of Electrical Engineering***2022-b-38 (11:40 - 12:00)****A Magnetic Nozzle rf Plasma Thruster - Performance Improvement and rf System Development-**

*Kazunori Takahashi, Ryoji Imai, Kengo Hanaoka

*Tohoku Univ. Department of Electrical Engineering***2022-b-39 (12:00 - 12:20)****Effects of Neutral Distributions on Plasma Flow Through a Magnetic Nozzle***Kazuma Emoto¹, Kazunori Takahashi², Yoshinori Takao³¹*Yokohama National Univ. Department of Mechanical Engineering, Materials Science, and Ocean Engineering*,²*Tohoku Univ. Department of Electrical Engineering*, ³*Yokohama National Univ. Division of Systems Research***Session b-10****Mar 3 (Thu) 16:00 - 17:20 [Reception Hall]****Fusion Rocket / Magneto Plasma Sail***Chairperson: TBD***2022-b-40 (16:00 - 16:20)****Quantitative Evaluation of the Impulse-bit Generated in a Magnetic Thrust Chamber***Taiki Inatomi¹, Taichi Morita², Naoji Yamamoto², Hideki Nakashima², Tomihiko Kojima¹, Eisuke Kuramoto¹, Masaki Ikebe¹, Atsushi Sunahara³, Shinichi Namba⁴, Toshiyuki Ise⁵, Kazuhiro Yagi⁵, Yoshitaka Mori⁶, Tomoyuki Johzaki⁴¹*Kyushu University Interdisciplinary graduate school of Engineering Sciences*, ²*Kyushu University Faculty of Engineering Sciences*, ³*Purdue University department of nuclear engineering*, ⁴*Hiroshima University department of advanced science and engineering*,⁵*IHI Aerospace Co., Ltd.*, ⁶*The Graduate School for the Creation of New Photonics Industries***2022-b-41 (16:20 - 16:40)****Thrust Performance of a Magnetic Thrust Chamber for Laser Fusion Rocket***Taichi Morita¹, Toshiyuki Ise², Eisuke Kuramoto¹, Masaki Ikebe¹, Taiki Inatomi¹, Takuto Kojima¹, Shinichi Namba³, Atsushi Sunahara⁴, Masafumi Edamoto⁵, Yoshitaka Mori⁶, Tomoyuki Johzaki³, Yoshihiro Kajimura⁷, Kazuhiro Yagi², Shinsuke Fujioka⁸, Yuki Abe⁸, Hideki Nakashima¹, Naoji Yamamoto¹¹*Kyushu University*, ²*IHI Aerospace Co. Ltd.*, ³*Hiroshima University*, ⁴*Purdue University*, ⁵*National Institute of Technology, Gifu College*, ⁶*The Graduate School for the Creation of New Photonics Industries*, ⁷*National Institute of Technology, Akashi College*, ⁸*Osaka University*

2022-b-42 (16:40 - 17:00)

Magnetohydrodynamic Analysis of Magnetoplasma Sail for Plasma Injection Angle considering Thermal Pressure and Dynamic Pressure

*Yuki murayama¹, Ryota Hara², Yoshiki Yamagiwa², Yuya Oshio³, Hiroyuki Nishida⁴, Ikkoh Funaki⁵

¹The Graduate University for Advanced Studies, Department of Space and Astronautical Science, ²Shizuoka University, ³Ryukoku University,

⁴Tokyo University of Agriculture and Technology, ⁵Japan Aerospace Exploration Agency

2022-b-43 (17:00 - 17:20)

Reinforcement Method of High Temperature Superconducting Coil for Magneto Plasma Sail

*Yoh Nagasaki¹, Masaki Maruyama¹, Makoto Tsuda¹, Ikkoh Funaki²

¹Tohoku University, ²JAXA

Session b-11

Mar 4 (Fri) 9:00 - 10:20 [Reception Hall]

Laser Propulsion

Chairperson: TBD

2022-b-44 (9:00 - 9:20)

Thrust Generation Mechanism through Interaction of Ultraviolet Light-emitting Diodes and Solid Polymers

*Kohei Watabe¹, Shunya Ogawa¹, Koki Inoue¹, Tomoyuki Ikeda¹, Hideyuki Horisawa¹, Shigeru Yamaguchi¹, Yoshinori Nakayama², Ikkoh Funaki³

¹Tokai Univ. Department of Aeronautics and Astronautics, ²Aerospace Engineering Department, The University of National Defense Academy,

³Institute of Space and Astronautical Science, JAXA

2022-b-45 (9:20 - 9:40)

Ignition of Xenon Diode Laser Sustained Plasma by Metal Rod

*Kota Okamoto, Kazuyoshi Ishikawa, Seiichiro Takano, Makoto Matsui

Shizuoka University

2022-b-46 (9:40 - 10:00)

Effect of f-number on Generation Conditions of Argon LSP using Diode Laser

*Seiichiro Takano, Kazuyoshi Ishikawa, Kota Okamoto, Makoto Matsui

Shizuoka Univ. Department of Mechanical Engineering

2022-b-47 (10:00 - 10:20)

Numerical Investigation of Sustainable Characteristics of Solid-State-Laser Sustained Plasma

*Hiroshi Katsurayama¹, Makoto Matsui²

¹Tottori Univ. Department of Mechanical and Aerospace Engineering, ²Shizuoka Univ. Department of Mechanical Engineering

Session b-12)**Mar 4 (Fri) 11:00 - 12:00 [Reception Hall]****Microwave Rocket***Chairperson: TBD***2022-b-48 (11:00 - 11:20)****A Study of a High-power RF System Configuration for a Power Station of Microwave Rocket****Yasuhisa Oda**Setsunan university***2022-b-49 (11:20 - 11:40)****Spectroscopic Study of Microwave Breakdown Induced by 28 GH gyrotron Beam****Tatsuki Hirano, Tomoya Suzuki, Maho Matsukura, Kohei Shimamura, Shigeru Yokota, Ryutaro Minami,**Tsuyoshi Kariya**University of Tsukuba***2022-b-50 (11:40 - 12:00)****Numerical Simulation of Millimeter-wave Discharge under Subcritical Beam Intensity****Soichiro Suzuki, Masayuki Takahashi, Naofumi Ohnishi**Tohoku Univ. Department of aerospace engineering***Session c-1)****Feb 28 (Mon) 15:40 - 17:20 [Meeting Room2]****Space Environment Interactions and Material Characterizations***Chairpersons: Koji Yugo Kimoto (JAXA)**Koji Matsumoto (JAXA)***2022-c-01 (15:40 - 16:00)****Application of Adsorbents to Space Use for Prevention of Molecular Contamination****Riyo Yamanaka¹, Anna Gubarevich², Katsumi Yoshida²**¹Japan Aerospace Exploration Agency, ²Tokyo Institute of Technology***2022-c-02 (16:00 - 16:20)****Research on Diamond Coating as Wear-Resistant Film for Mechanical Parts in Spacecraft****Koji Matsumoto, Satoshi Takada**JAXA***2022-c-03 (16:20 - 16:40)****Tentative Fluence Estimation of Ionizing Radiation Originated from Solar Flare****Minoru Iwata¹, Masahito Tagawa², Sumitaka Tachikawa³**¹Kyushu Institute of Technology, Department of Space Systems Engineering, ²Kobe University, ³JAXA***2022-c-04 (16:40 - 17:00)****Evaluation of Space Debris Impact on AO-protectant Materials for MLI****Yuko Kubo¹, Yugo Kimoto¹, Kaori Umeda², Sunao Hasegawa³**¹Research and Development Directorate, Japan Aerospace Exploration Agency., ²Fundamental Technology Division,**Advanced Engineering Services Co., Ltd., ³Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency.*

2022-c-05 (17:00 - 17:20)

Preparation of Protective SiO₂ Coating Film on Stainless Steel by Dip-coating Method and their H₂O₂ Compatibility

Ho-Chuan Lin¹, *Alfandy Tansyafri¹, Yao-Chung Hsu², Tien-Chuan Kuo²

¹*EWJET PRODUCTS CO., LTD.*, ²*National Space Organization*

Session c-2)

Mar 1 (Tue) 9:00 - 10:40 [Meeting Room2]

Structural Dynamics and Control

Chairpersons: Kosei Ishimura (Waseda University)

Atsuhiko Senba (Meijo University)

2022-c-06 (9:00 - 9:20)

Numerical Analysis on Optimal Deployment Configuration of Tightly-Folded Device-Laden Space Membrane

*Shuhei Yamada¹, Osamu Mori², Kiyoshi Ahmed Sugihara²

¹*The University of Tokyo*, ²*JAXA*

2022-c-07 (9:20 - 9:40)

Experimental Studies of Sloshing Dynamics for the Tank with Hemispheric Diaphragm

*Taro Kawano¹, Nobukatsu Okuzumi², Hikaru Eguchi³, Keisuke Michigami¹, Hitoshi Hamori¹, Susumu Yasuda¹, Rie Tagai¹, Shujiro Sawai²

¹*Japan Aerospace Exploration Agency, Research and Development Directorate*, ²*Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science*, ³*Muroran Institute of Technology, Aerospace Plane Research Center*

2022-c-08 (9:40 - 10:00)

Development of Multibody Dynamics Formulation Based on Canonical Theory

*Shuonan Dong¹, Keisuke Otsuka¹, Yinan Wang², Koji Fujita³, Hiroki Nagai³, Kanjuro Makihara¹

¹*Tohoku University, Department of Aerospace Engineering*, ²*University of Warwick*, ³*Tohoku University, Institute of Fluid Science*

2022-c-09 (10:00 - 10:20)

Joint Angle Control Considering Mutual Interference Friction of Transformable Spacecraft

*Kotaro Ikeda¹, Osamu Mori², Yosiki Sugawara¹

¹*Aoyama Gakuin university*, ²*JAXA*

2022-c-10 (10:20 - 10:40)

Touchdown Experiments on Landing Gear with Electromagnetic Dampers for Planetary Landers

*Shota Iwabuchi, Kenji Minesugi

Japan Aerospace Exploration Agency

Session c-3)**Mar 1 (Tue) 11:00 - 12:20 [Meeting Room2]****Deployable structures**

*Chairpersons: Hiroaki Tanaka (National Defense Academy of Japan)
Keisuke Otsuka (Tohoku University)*

2022-c-11 (11:00 - 11:20)**Deployment Prediction of Micro Solar Sail Composed of Self-Extension Boom**

*Asuka Tatara¹, Riko Tachikawa², Yasuyuki Miyazaki³

¹The Graduate University for Advanced Studies, School of Physical Sciences, Department of Space and Astronautical Science,

²Nihon Univ., College of Science and Technology, Department of Aerospace Engineering, ³Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science

2022-c-12 (11:20 - 11:40)**Mechanical Properties of Retractable Self-Deployable Space Booms Consisting of Connected Shell Panels with Variable Geometry Truss**

*Tomonori Sotome, Hiroshi Furuya

Tokyo Institute of Technology, Department of Mechanical Engineering

2022-c-13 (11:40 - 12:00)**Feasibility Evaluation of Two-dimensional Self-deployable Corrugated Panels for Miura-fold**

*Makoto Yoshioka, Tetsuhiro Nakashima, Hiroshi Furuya

Tokyo Institute of Technology, Department of Mechanical Engineering

2022-c-14 (12:00 - 12:20)**Design of a Deployable Sandwich Panel using Shape Memory Polymers**

*Ziyue Lu¹, Kosei Ishimura¹, Atsuhiko Senba²

¹Waseda University, School of Creative Science and Engineering, Department of Modern Mechanical Engineering,

²Meijo University, Department of Vehicle and Mechanical Engineering

Session c-4)**Mar 1 (Tue) 16:00 - 17:20 [Meeting Room2]****Smart materials and structures**

*Chairpersons: Tomohiro Yokozeki (The University of Tokyo)
Taro Kawano (JAXA)*

2022-c-15 (16:00 - 16:20)**Self-Deployment Rate Control for Shape Memory Polymer Convex Shell**

*Atsuhiko Senba¹, Hiroshi Furuya²

¹Meijo University, ²Tokyo Institute of Technology

2022-c-16 (16:20 - 16:40)**Result of Exposure Experiment of Piezoelectric Actuators Using ExHAM**

*Nozomu KOGISO¹, Hiroaki Tanaka², Tadashige Ikeda³, Kosei Ishimura⁴, Masahito Tagawa⁵, Minoru Iwata⁶, Motoharu Fujigaki⁷

¹Osaka Prefecture University, ²National Defense Academy, ³Chubu University, ⁴Waseda University, ⁵Kobe University,

⁶Kyushu Institute of Technology, ⁷University of Fukui

2022-c-17 (16:40 - 17:00)

Resilient Operation of Smart Reflectors Considering Actuator Failure

*Koichi Yokota, Iida Kisumi, Nozomu Kogiso

Osaka Prefecture Univ. Department of Aerospace Engineering

2022-c-18 (17:00 - 17:20)

Proto-flight Model Development of a Lightweight Membrane Deployment Structure with Power Generation and Antenna Functions, HELIOS

*Masanori Matsushita¹, Yuki Takao¹, Kiyoshi Ahmed Sugihara¹, Osamu Mori¹, Akihito Watanabe², Kazuyuki Nakamura³, Tetsuya Kusumoto⁴, Genki Ohira⁵, Masahiro Fujita⁴, Keisuke Sugiura⁶, Kotaro Ikeda⁶, Ayaka Fujita⁷, Shuhei Yamada⁴, Maiko Yamakawa⁵, Yasutaka Satou¹, Yasuyuki Miyazaki¹, Nobukatsu Okuzumi¹, Hiraku Sakamoto⁸, Atsushi Shirane⁸, Kenichi Okada⁸

¹JAXA, ²Sakase Adtech Co., Ltd., ³Technosolver Corporation, ⁴The University of Tokyo, ⁵SOKENDAI, ⁶Aoyama Gakuin University,

⁷Tokai University, ⁸Tokyo Institute of Technology

Session c-5)

Mar 2 (Wed) 9:00 - 10:40 [Meeting Room2]

Structural Analysis

Chairpersons: Nozomu KOGISO (Osaka Prefecture University)

Yasutaka Satou (JAXA)

2022-c-19 (9:00 - 9:20)

Analysis of the Effect of Design Parameters on Deployment Repeatability of Two-dimensional Extensible Mast

*Takahiro Morita, Kosei Ishimura

Waseda University

2022-c-20 (9:20 - 9:40)

Vibration Characteristics of Ultra-lightweight with High-rigidity Solar Array Structure

*Sunao Nishimura, Rikiya Hayashi, Daiki Watanabe, Akihiro Miyasaka

Tokyo City University

2022-c-21 (9:40 - 10:00)

A Study on a Low-Dimensional Model of Membrane Space Structure with Flexibly Adapting to Change Design Parameters

*Daisuke Yanagihara, Masahiko Yamazaki

Nihon Univ. Graduate School of Science and Technology Department of Aerospace Engineering

2022-c-22 (10:00 - 10:20)

Numerical Analysis of Impact Properties of CFRP with CNF Dispersion Layer

*Haruna Yamaguchi¹, Naoko Kishimoto¹, Kazuaki Katagiri²

¹Setsunan University, ²Osaka Research Institute of Industrial Science and Technology

2022-c-23 (10:20 - 10:40)**Out-of-Plane Thermal Deformation of CFRP Laminated Curved Plates**

Takahiko Shibata¹, *Kosei Ishimura¹, Motoharu Fujigaki², Kazuyuki Nakamura³, Nobuko Nakamura³, Kenichi Miyazaki⁴

¹Waseda Univ. Department of Mechanical Engineering, ²Fukui Univ. Department of Human and Artificial Intelligent Systems,

³Technosolver Corporation, ⁴Sankyo Manufacturing Co. Ltd.

Session c-6)**Mar 2 (Wed) 11:00 - 12:20 [Meeting Room2]****Space Antennas**

Chairpersons: Naoko Kishimoto (Setsunan University)

Hiroaki Tanaka (National Defense Academy of Japan)

2022-c-24 (11:00 - 11:20)**Improvement of Estimation Accuracy on Uncertainty Propagation Analysis of Antenna Gain for Smart Antenna**

*Yuki Suzuki¹, Nozomu Kogiso¹, Takashi Yamawaki², Takashi Iwasa², Hiroaki Tanaka³

¹Osaka Prefecture Univ. Department of Aerospace Engineering, ²Tottori Univ. Department of Mechanical and Aerospace Engineering,

³National Defense Academy Department of Aerospace Engineering

2022-c-25 (11:20 - 11:40)**Cable-Mesh Surface Design for Large Antenna Including Mesh Deformation**

*Kenta Hoshii, Taisuke Sawahashi, Akihiro Miyasaka

Tokyo City University

2022-c-26 (11:40 - 12:00)**Scissors-Structure Antenna Design on Initial Deployment Force Generated by Strain Energy**

*Taisuke Sawahashi¹, Kenta Hoshii¹, Akihiro Miyasaka¹, Ken'ichi Kawaguchi²

¹Tokyo City University, ²The University of Tokyo

2022-c-27 (12:00 - 12:20)**Study on Surface Error Modes of Lightweight Deployable Reflector Antennas**

*Hiroaki Tanaka

National Defense Academy of Japan

Session d-1)**Feb 28 (Mon) 15:40 - 17:20 [International Conference Room]****Orbit Determination & Control 1**

Chairpersons: Toshihiro Chujo (Tokyo Institute of Technology)

Pablo Solano López (Universidad Rey Juan Carlos)

2022-d-01 (15:40 - 16:00)**Improving QZSS Precise Orbit Determination with Space-based and Ground-based Observations**

*Kyohei Akiyama, Isao Kawano, Koichi Inoue

JAXA

2022-d-02 (16:00 - 16:20)

Low-Cost Deep Space Navigation by One-way and Two-way Combined Orbit Determination

*Kentaro Enokida, Yosuke Kawabata, Keidai Iiyama, Shinichi Nakasuka

The University of Tokyo

2022-d-03 (16:20 - 16:40)

Flight Results of GPS Receiver for Geosynchronous Satellite

*Yu Nakajima¹, Toru Yamamoto¹, Naoki Miyashita¹, Kyoji Shintate¹, Takehiro Matsumoto¹, Takushi Sakamoto¹, Ryo Harada², Susumu Kumagai²

¹*Japan Aerospace Exploration Agency*, ²*NEC Space Technologies Ltd.*

2022-d-04 (16:40 - 17:00)

Estimation of the Spacecraft Position Based on Point Cloud by Applying Polar Hough Transform

*Shuya Kashioka¹, Genki Ohira¹, Yuki Takao², Yuichi Tsuda²

¹*The Graduate University for Advanced Studies, SOKENDAI*, ²*JAXA*

2022-d-05 (17:00 - 17:20)

Image-based Estimation of the Attitude and Orbital Motion of Hayabusa2's Deployable Camera (DCAM3) around Ryugu

*Shota Kikuchi¹, Kei Shirai², Ko Ishibashi¹, Koji Wada¹, Rie Honda³, Yasuhiro Yokota⁴, Toshihiko Kadono⁵, Yuri Shimaki⁴, Naoya Sakatani⁶, Kazunori Ogawa⁴, Hirotaka Sawada⁴, Masahiko Arakawa²

¹*Chiba Institute of Technology*, ²*Kobe University*, ³*Kochi University*, ⁴*Japan Aerospace Exploration Agency*,

⁵*University of Occupational and Environmental Health*, ⁶*Rikkyo University*

Session d-2)

Feb 28 (Mon) 15:40 - 17:20 [Conference Room]

Attitude Determination & Control 1

Chairpersons: Hirohisa Kojima (Tokyo Metropolitan University)

Rui Qi (Beijing Institute of Technology)

2022-d-06 (15:40 - 16:00)

Wave Based Control During Retrieval of Debris Using Tethered Space Tug

*Fuzhen Yao¹, Rui Qi¹, Rui Zhong²

¹*Beijing Institute of Technology*, ²*Beibang University*

2022-d-07 (16:00 - 16:20)

Development of a Novel Sliding Mode based Control Algorithm for a Satellite with Sloshing Dynamics

*Amila Sri Madhushanka Gilimalage, Shinichi Kimura

Tokyo University of Science

2022-d-08 (16:20 - 16:40)

Reinforcement Learning for Shape and Attitude Control of Origami-Inspired Spacecraft

*Kazutoshi Ito, Tomohiro Yanao

Waseda Univ. Department of Applied Mechanics and Aerospace Engineering

2022-d-09 (16:40 - 17:00)**Adaptive Thrust Vector Control for Deorbit of Space Debris Using Electric Propulsion System**

*Takahiro Sasaki, Hiroyuki Okamoto, Ryo Nakamura, Toru Yamamoto

*Japan Aerospace Exploration Agency***2022-d-10 (17:00 - 17:20)****Attitude Determination for Nanosatellites Using Only a Set of Analog Sun Sensors**Murat Gokce¹, *Numan Sozen¹, Farid Gulmammadov¹, Halil Ersin Soken²¹*TUBITAK Space Technologies Research Institute*, ²*Middle East Technical University***Session d-3)****Mar 1 (Tue) 9:00 - 10:40 [International Conference Room]****Orbit Determination & Control 2***Chairpersons: Shota Kikuchi (Chiba Institute of Technology)**Nicola Baresi (University of Surrey)***2022-d-11 (9:00 - 9:20)****Autonomous Proximity Operations at Small NEAs**

*Shota Takahashi, Daniel Scheeres

*University of Colorado Boulder, Department of Aerospace Engineering Sciences***2022-d-12 (9:20 - 9:40)****Dynamics and Control for Near-Earth Asteroid Orbiting Spacecraft using Solar Sails**

*Xinbo Gu, Kohei Yamaguchi, Takaya Inamori

*Nagoya University, Graduate School of Engineering, Department of Aerospace Engineering***2022-d-13 (9:40 - 10:00)****In-Orbit Change in Phase by Lagrange Points Stand-by Transfers***Roger Gutierrez-Ramon¹, Yuto Takei², Takanao Saiki², Yuichi Tsuda², Yasuhiro Kawakatsu²¹*The Graduate University for Advanced Studies, SOKENDAI, Department of Space and Astronautical Science*,²*Institute of Space and Astronautical Science / Japan Aerospace Exploration Agency (ISAS/JAXA)***2022-d-14 (10:00 - 10:20)****Covariance Control Approach for Stationkeeping of Halo Orbits in the Earth-Moon System***Takuya Chikazawa¹, Naoya Ozaki², Kota Kakihara³, Akihiro Ishikawa³, Yasuhiro Kawakatsu²¹*The University of Tokyo, Department of Advanced Energy*, ²*Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency*,³*The University of Tokyo, Department of Aeronautics and Astronautics***2022-d-15 (10:20 - 10:40)****Guidance, Navigation, and Control of Retrograde Relative Orbits Around Phobos***Nicola Baresi¹, Nicolo Bernardini¹, Edoardo Ciccarelli¹, Xiaoyu Fu¹, Harry Holt¹, Roberto Armellin²¹*Surrey Space Centre / University of Surrey*, ²*Auckland Space Institute / University of Auckland*

Session d-4)

Mar 1 (Tue) 11:00 - 12:20 [International Conference Room]

Orbital Dynamics 1

Chairpersons: Kohei Yamaguchi (Nagoya University)

Daniel J Scheeres (University of Colorado Boulder)

2022-d-16 (11:00 - 11:20)

Lunar Resonant Retrograde Periodic Orbit around the Earth

*Kenta Oshima

Hiroshima Institute of Technology

2022-d-17 (11:20 - 11:40)

Stability Analysis of Three-dimensional Distant Retrograde Orbits

*Kazuya Oishi, Satoshi Satoh, Katsuhiko Yamada

Osaka University, Department of Mechanical Engineering.

2022-d-18 (11:40 - 12:00)

Small-Amplitude Quasi-Periodic Orbit around Sun-Earth Libration Points Controlled by Solar Radiation Pressure

*Toshihiro Chujo¹, Yuki Kubo², Tetsuya Kusumoto²

¹*Tokyo Institute of Technology*, ²*The University of Tokyo*

2022-d-19 (12:00 - 12:20)

A Fast and Accurate Earth Radiation Pressure Model for Low-Drag Low Earth Orbit

*Maximilien BERTHET¹, Kojiro SUZUKI²

¹*Department of Aeronautics and Astronautics, The University of Tokyo, Japan*, ²*Department of Advanced Energy, The University of Tokyo, Japan*

Session d-5)

Mar 1 (Tue) 16:00 - 17:20 [International Conference Room]

Orbital Dynamics 2

Chairpersons: Yuki Takao (JAXA)

Ji Hyun Park (Nagoya University)

2022-d-21 (16:00 - 16:20)

A Dynamics-leveraging Guidance and Control Architecture for Autonomous Rendezvous and Docking in the Restricted Three-Body Problem

*Sergio Cuevas del Valle¹, Hodei Urrutxua Cereijo¹, Pablo Solano López¹

¹*Aerospace Systems and Transport Research Group (GISAT-ASTRG) | Universidad Rey Juan Carlos*

2022-d-22 (16:20 - 16:40)

A Fast Analytical Prediction Method for Orbit-Attitude Performance of Solar Sails in LEO Including Air Drag and Eclipses

*Maximilien BERTHET¹, Kojiro SUZUKI²

¹*Department of Aeronautics and Astronautics, The University of Tokyo, Japan*, ²*Department of Advanced Energy, The University of Tokyo, Japan*

2022-d-23 (16:40 - 17:00)**Design of Low Energy Transfer Trajectories from Earth to Europa with Ballistic Capture**

*Kanta Ikeda, Naoki Hiraiwa, Mai Bando, Shinji Hokamoto

*Kyushu Univ. Department of Aeronautics and Astronautics***2022-d-24 (17:00 - 17:20)****Preliminary Mission Analysis for the Hayabusa2 Extended Mission in the Vicinity of 1998 KY26***Shota Kikuchi¹, Yuya Mimasu², Takanao Saiki², Yuto Takei², Hitoshi Ikeda², Yuichi Tsuda²¹*Chiba Institute of Technology*, ²*Japan Aerospace Exploration Agency***Session d-6)****Mar 1 (Tue) 9:00 - 10:20 [Conference Room]****Attitude Determination & Control 2***Chairpersons: Kenji Uchiyama (Nihon University)**Xiaofeng Wu (Sydney University)***2022-d-25 (9:00 - 9:20)****Semi-Optimal Control Law for Minimum-Time Maneuver of Satellite with Pyramid-Type VSCMG***Kohei Oikawa¹, Takehiro Higuchi², Motoharu Fujii¹, Naoto Hoshika¹, So Kaieda³, Ohmi Fuchiwaki⁴¹*Yokohama National University Graduate School of Engineering Science*, ²*Yokohama National University Faculty of Environment and Information Science*, ³*Yokohama National University College of Engineering Science*, ⁴*Yokohama National University Faculty of Engineering***2022-d-26 (9:20 - 9:40)****Inverse-Kinematics Steering Law for Double Gimbal Scissored-Pair Control Moment Gyros**

*Ryo Kawamoto, Hirohisa Kojima, Sajjad Keshtkar

*Tokyo Metropolitan University***2022-d-27 (9:40 - 10:00)****Backstepping Controller Design for Satellite Using Spherical Control Moment Gyroscope**

*Reiji Kobayashi, Kenji Uchiyama, Kai Masuda

*Nihon Univ. Department of aerospace engineering***2022-d-28 (10:00 - 10:20)****Simultaneous Control of Sway and Torsional Vibrations in Suspended Systems with a Momentum Wheel and a Reaction Wheel**

*Toshihiko Nakano, Hina Takasaki

National Institute of Technology, Oita College

Session d-7)

Mar 1 (Tue) 11:00 - 12:00 [Conference Room]

Attitude Dynamics

Chairpersons: Yasuhiro Shoji (Kanazawa University)

Halil Ersin Soken (Middle East Technical University)

2022-d-29 (11:00 - 11:20)

Analyzing Defunct Satellite De-tumbling using a Finite Element Method

*Ryotaro Sakamoto, Daniel J Scheeres

University of Colorado Boulder

2022-d-30 (11:20 - 11:40)

Effects of Rotational Joint Directions of Variable Structure on Non-holonomic Features

*Saki Takeuchi, Kanta Ikeda, Mai Bando, Shinji Hokamoto

Kyushu Univ. Department of Aeronautics and Astronautics

2022-d-31 (11:40 - 12:00)

Attitude Control of Low Earth Orbit Satellites with Variable Shape Mechanisms utilizing Disturbance Torque and Magnetic Torque

*Kiyona Miyamoto, Toshihiro Chujo, Kei Watanabe, Saburo Matunaga

Tokyo Institute of Technology

Session d-8)

Mar 2 (Wed) 9:00 - 10:00 [International Conference Room]

Mission Design 1

Chairpersons: Yosuke Kawabata (The University of Tokyo)

Sajjad Keshtkar (Tokyo Metropolitan University)

2022-d-32 (9:00 - 9:20)

Rapid Filtering Method for Asteroid Exploration Candidate Searches

*Chloe Jeneva Long, Anivid Pedros-Faura, Jay McMahon

University of Colorado Boulder

2022-d-34 (9:20 - 9:40)

Trajectory and Attitude Planning during Deep Space Insertion from GTO for Microsatellite having High Thrust Propulsion System

*Tomotaka Yamamoto, Yosuke Kawabata, Ryu Funase, Shinichi Nakasuka

The University of Tokyo

2022-d-35 (9:40 - 10:00)

Study on Mission Design Software for Lunar Orbital Platform-Gateway Utilization Mission

*Naoya Ozaki¹, Kanta Yanagida², Takuya Chikazawa², Toshiro Shimizu³, Shun Kodama³, Ken Nishioka³, Yohei Kubo³, Kazuaki Someno³, Takashi Shimizu³

¹ISAS/JAXA, ²University of Tokyo, ³ISP

Session d-9**Mar 2 (Wed) 11:00 - 12:00 [International Conference Room]****Mission Design 2**

*Chairpersons: Satoshi Ikari (The University of Tokyo)
Xiaofeng Wu (Sydney University)*

2022-d-36 (11:00 - 11:20)**Proposal for a Formation Flight Interferometry Mission in an Artificial Halo Orbit Using a Solar Sail**

*Keisuke Sugiura¹, Yuki Takao², Kiyoshi Ahmed Sugihara², Yoshiki Sugawara³, Osamu Mori²

¹Graduate School of Aoyama Gakuin University, ²Japan Aerospace Exploration Agency, ³Aoyama Gakuin University

2022-d-37 (11:20 - 11:40)**Deep Space Exploration Missions by a Micro Solar Sail Using Hybrid Propulsion**

*Yuki Takao¹, Toshihiro Chujo²

¹Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency,

²Department of Mechanical Engineering, Tokyo Institute of Technology

2022-d-38 (11:40 - 12:00)**Super Proximity Asteroid Flyby of Hayabusa2 Extended Mission**

*Yuya Mimasu¹, Shota Kikuchi², Yuto Takei¹, Takanao Saiki¹, Hiroshi Takeuchi¹, Manabu Yamada², Yuichi Tsuda¹

¹Japan Aerospace Exploration Agency, ²Chiba Institute of Technology

Session d-10**Mar 2 (Wed) 16:00 - 17:00 [International Conference Room]****Navigation & Control**

Chairpersons: Stefania Soldini (The University of Liverpool)

Yunhua Wu (Nanjing University of Aeronautics and Astronautics)

2022-d-41 (16:00 - 16:20)**Attitude and Orbit Control System for a 6U CubeSat Mission in Low Altitude Lunar Orbit using Low-thrust Propulsion System**

*Jose Rodrigo Cordova Alarcon¹, Matteo Laterza², Necmi Cihan Orger¹, Tze King Lam², Kai Sheng Khoo², George-Christian Potrivity², Jian Wei Mark Lim², Sangkyun Kim¹, Mengu Cho¹

¹Kyushu Institute of Technology, ²ALIENA

2022-d-42 (16:20 - 16:40)**Development of a Truss Structure Grasping End-Effector for On-orbit servicing**

*Naoki Kawaguchi, Hiroki Nakanishi

Tokyo Institute of Technology. Department of Mechanical Engineering

2022-d-44 (16:40 - 17:00)**Theoretical and Measured Thrust Characteristics of Cold Gas Thruster Using Oxidizer of Hybrid Kick Motor**

*Ryo Onodera, Shota Hirai, Landon Kamps, Harunori Nagata

Hokkaido University, Department of Engineering

Session d-11)

Mar 3 (Thu) 9:00 - 10:00 [International Conference Room]

Formation Flying & Satellite Constellations 1

*Chairpersons: Kenji Fujimoto (Kyoto University)
Arun Misra (McGill University)*

2022-d-45 (9:00 - 9:20)

Propellant Balancing Considering the Propellant Remaining Difference Using a Virtual Chief

*Masaru Kambayashi¹, Takahiro Ito², Shin-Ichiro Sakai²

¹*The University of Tokyo, Department of Graduate School of Frontier Sciences, ²Japan Aerospace Exploration Agency*

2022-d-46 (9:20 - 9:40)

Formation Tracking Control Using Generalized Canonical Transformations and Sliding Mode Control of Port-Hamiltonian Systems

*Ichito Tabuchi, Satoshi Satoh, Katsuhiko Yamada

Osaka University

2022-d-47 (9:40 - 10:00)

Study on The Relative Position Control Method for Formation Flying Satellites Using Acousto-Optic Deflector

*Toshihiro Suzuki¹, Satoshi Ikari¹, Mitsuru Masha², Shinichi Nakasuka¹

¹*The University of Tokyo, ²The University of Electro-Communications*

Session d-12)

Mar 3 (Thu) 11:00 - 12:00 [International Conference Room]

Formation Flying & Satellite Constellations 2

*Chairpersons: Takanori Iwata (JAXA)
Takeya Shima (MITSUBISHI ELECTRIC Corporation)*

2022-d-49 (11:00 - 11:20)

Orbit Design for Earth-orbiting Formation Flying Satellites Aligned in a Straight Line toward an Inertial Target

*Kenta Suda, Satoshi Ikari, Ryu Funase, Shinichi Nakasuka

The University of Tokyo, Department of Aeronautics and Astronautics

2022-d-50 (11:20 - 11:40)

Optimal Constellation Design for Earth Observation Satellites

*Yuta Imoto¹, Satoshi Satoh¹, Toshihiro Obata², Katsuhiko Yamada¹

¹*Osaka University, ²Synspective Inc.*

2022-d-51 (11:40 - 12:00)

On Collision Detection for Satellite Constellations Based on Spatial Hashing

*Chikako Nakayama¹, Kenji Fujimoto¹, Ichiro Maruta¹, Kazuhiro Izui¹, Akihiko Honda², Yuta Asano², Takeya Shima², Shoji Yoshikawa², Akihiko Imag²

¹*Kyoto University, ²Mitsubishi Electric Corporation*

Session d-13)**Mar 3 (Thu) 16:00 - 17:40 [International Conference Room]****Entry/Landing/Ascent Guidance 1**

*Chairpersons: Takaya Inamori (Nagoya University)
Rui Zhong (Beihang University)*

2022-d-52 (16:00 - 16:20)**Real-time Hazard Detection for Planetary Landing using Spiking Neural Networks**

*Hideaki Kinoshita¹, Shinichi Kimura¹, Seisuke Fukuda²

¹Tokyo university of science. Department of Electrical Engineering, ²JAXA/ISAS

2022-d-53 (16:20 - 16:40)**The Evaluation of Mechanical Models of Lander with Sloshing Fluid Fuel Tank**

*Motoki Suzuki¹, Taro Kawano², Syujiro Sawai², Masahiro Nohmi¹

¹Shizuoka University, ²JAXA

2022-d-54 (16:40 - 17:00)**Deployable and Identifiable Markers for a Precise Landing on an Asteroid**

*Tetsuya Kusumoto¹, Osamu Mori²

¹The University of Tokyo, ²JAXA

2022-d-55 (17:00 - 17:20)**Real-Time Navigation Using Ultra-Wideband Ranging with Artificial Markers for Small Body Exploration**

*Genki Ohira¹, Yuki Takao², Makoto Yoshikawa², Yuichi Tsuda²

¹The Graduate University for Advanced Studies, SOKENDAI, ²Japan Aerospace Exploration Agency (JAXA)

2022-d-56 (17:20 - 17:40)**Reentry Terminal Guidance Operation of Hayabusa2**

*Yuichi Tsuda¹, Shota Kikuchi², Takanao Saiki¹, Hiroshi Takeuchi¹, Tetsuya Yamada¹, Yasunori Nagata¹, Satoru Nakazawa¹, Masatoshi Matsuoka³

¹Japan Aerospace Exploration Agency, ²Chiba Institute of Technology, ³NEC Corporation

Session d-14)**Mar 4 (Fri) 9:00 - 10:20 [International Conference Room]****Trajectory Design and Optimization 1**

*Chairpersons: Takehiro Higuchi (Yokohama National University)
Hongru Chen (Kyushu University)*

2022-d-57 (9:00 - 9:20)**Minimum-Time Transfer Trajectories from Low-Earth Orbit to NRHO**

*Yuta Hagiwara, Seiya Ueno, Takehiro Higuchi

Yokohama National University

2022-d-58 (9:20 - 9:40)

Halo-to-Halo Low-Thrust Transfer via Successive Convex Optimization with Intermediate Orbit Design

*Naoki Hiraiwa, Mai Bando, Shinji Hokamoto

Kyushu Univ. Department of Aeronautics and Astronautics

2022-d-59 (9:40 - 10:00)

Low-Thrust Trajectory Design Between Periodic Orbits in Bicircular Four Body Problem

*Yuki Okumura, Kenji Uchiyama, Kai Masuda

Nihon university

2022-d-60 (10:00 - 10:20)

Design of Multi-Lunar-Flyby Trajectories using Collision Orbits in a Bicircular Restricted Four-Body Model

*Ferran Gonzalez Franquesa¹, Diogene Alessandro Dei Tos², Yasuhiro Kawakatsu²

¹*The Graduate University for Advanced Studies, SOKENDAI*, ²*JAXA*

Session d-15)

Mar 4 (Fri) 11:00 - 12:00 [International Conference Room]

Trajectory Design and Optimization 2

Chairpersons: Yusuke Oki (JAXA)

Wang Jihe (Sun Yat-sen University)

2022-d-62 (11:00 - 11:20)

Study of an Orbital Transition Scenario for Medium-sized Lunar Cargo Lander Mission

*Yuki Matsumoto, Satoshi Ueda, Junji Kikuchi, Masaru Koga, Kota Tanabe, Naoki Satoh

Japan Aerospace Exploration Agency

2022-d-63 (11:20 - 11:40)

Multidisciplinary System Design Optimization on Precise Lunar Landing Trajectories and Spacecraft Systems

*Satoshi Ueda¹, Takahiro Ito¹, Shin-ichiro Sakai²

¹*Japan Aerospace Exploration Agency, Research and Development Directorate,*

²*Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science*

2022-d-64 (11:40 - 12:00)

Robust Trajectory Optimization for Low-Thrust Orbit Transfer under Uncertainty

*Rui Ohtaki, Kenji Uchiyama, Kai Masuda

Nihon Univ. Department of Aerospace Engineering

Session d-16)**Mar 4 (Fri) 16:00 - 17:20 [International Conference Room]****Trajectory Design and Optimization 3**

Chairpersons: *Takanao Saiki (JAXA)*
Mai Bando (Kyushu University)

2022-d-65 (16:00 - 16:20)**Operational Safety Analysis on Quasi-Satellite Orbits for Martian Moon eXploration Mission**

*Yusuke Oki¹, Hitoshi Ikeda¹, Kazuma Nishimura², Masaya Nakano²

¹JAXA, ²Fujitsu

2022-d-66 (16:20 - 16:40)**Trajectory Optimization of Mars Aerocapture with Electric Propulsion by NPC and Drag Modulation Techniques**

*Tomoki Nishikawa¹, Kojiro Suzuki²

¹Univ of Tokyo. Graduate School of Engineering. Department of Aeronautics and Astronautics,

²Univ of Tokyo. Graduate School of Frontier Sciences. Department of Advanced Energy

2022-d-67 (16:40 - 17:00)**Trajectory Design and Navigation Analysis for EQUULEUS mission**

*Yosuke Kawabata¹, Takuya Chikazawa¹, Kota Kakihara¹, Stefano Campagnola³, Ryu Funase^{1,2}

¹The University of Tokyo, ²ISAS/JAXA, ³NASA JPL

2022-d-68 (17:00 - 17:20)**Trajectory Design for the Hayabusa2 Extended Mission**

*Takanao Saiki¹, Yuya Mimasu¹, Yuto Takei¹, Hiroshi Takeuchi¹, Kazutaka Nishiyama¹, Takaaki Kato², Yuichi Tsuda¹

¹Japan Aerospace Exploration Agency, ²NEC Aerospace Systems, Ltd.

Session e-1)**Mar 2 (Wed) 9:00 - 10:40 [Meeting Room3]****Re-entry Aerodynamics**

Chairpersons: *Hirotaka OTSU (Ryukoku University)*
Hiroki TAKAYANAGI (JAXA)

2022-e-01 (9:00 - 9:20)**An All-in-One Unpowered Mars Rover integrated with EDL System**

*Daisuke Akita¹

¹Tokyo Institute of Technology

2022-e-02 (9:20 - 9:40)**Rotational Motions of Axisymmetric Blunt Body in Different Degrees of Freedom**

*Koju Hiraki¹, Masanori Sakai¹, Yu Handa¹, Harald Kleine²

¹Kyushu Institute of Technology, ²University of New South Wales

2022-e-03 (9:40 - 10:00)

Ablation Experiments of Porous Carbon-based Heat-resistant Materials in High-enthalpy Air Plasma Freejets

Yusuke Matsuoka¹, *Yuki Oya¹, Masato Funatsu²

¹*Department of Mechanical Science and Technology, School of Science and Technology, Gunma University,*

²*Division of Mechanical Science and Technology, Graduate School of Science and Technology, Gunma University*

2022-e-04 (10:00 - 10:20)

Trajectory Reconstruction and Localization of Hayabusa2 SRC in Recovery Operation

*Tetsuya Yamada, Kosuke Kawahara, Satoru Nakazawa

JAXA

2022-e-05 (10:20 - 10:40)

Post-flight Analysis of Recovered Components of Hayabusa2 Sample Return Capsule

*Tetsuya Yamada, Keisuke Yoshihara

JAXA

Session e-2)

Mar 2 (Wed) 11:00 - 12:00 [Meeting Room3]

Aerothermodynamics and Arc Jet

Chairpersons: Katsuyoshi FUKIBA (Shizuoka University)

Hiroyuki NISHIDA (Tokyo University of Agriculture and Technology)

2022-e-07 (11:00 - 11:20)

Assessment of a Centerline Enthalpy Determination Method of Arcjet Wind Tunnel Flow

*Kenichi Sakamoto¹, Yoichi Takagi¹, Kota Moriyama¹, Kaho Hayashi¹, Hiroshi Katsurayama¹, Toshiyuki Suzuki², Takeharu Sakai¹

¹*Tottori University, ²JAXA*

2022-e-08 (11:20 - 11:40)

Laser Thomson Scattering Measurement around Magnetized Body in Rarefied Arc-Heated Argon Plume

*Kota Moriyama¹, Hiroki Sakaguchi², Hiroshi Katsurayama¹, Kentaro Tomita³

¹*Tottori Univ. Department of Mechanical and Aerospace Engineering, ²Yamaguchi Univ. Department of Mechanical Engineering,*

³Hokkaido Univ. Division of Quantum Science and Engineering

2022-e-09 (11:40 - 12:00)

Ionization Seed Addition Experiment for Magnetohydrodynamic Shock Layer Enlargement in Arc-Heated Flow

*Shiori Kusu¹, Hayato Iizuka², Hiroshi Katsurayama¹, Kenichi Sakamoto¹, Takeharu Sakai¹, Toshiyuki Suzuki⁴, Makoto Matsui³

¹*Tottori Univ. Department of Mechanical and Aerospace Engineering, ²Yamaguchi Univ. Department of Mechanical Engineering, ³Sizuoka Univ. Department of Mechanical Engineering, ⁴JAXA*

Session e-3**Mar 2 (Wed) 16:00 - 17:00 [Meeting Room3]****High-enthalpy and Hypersonic Flow I**

*Chairpersons: Kojiro SUZUKI (The University of Tokyo)
Yasumasa WATANABE (The University of Tokyo)*

2022-e-11 (16:00 - 16:20)**Development of an Evaluation Method for Sample Return Capsule Parachute using Numerical Analysis and Wind Tunnel Tests**

*Ryota Samo¹, Hiroki Takayanagi², Riku Shinohara¹, Toshiyuki Suzuki², Shinjiro Umez¹

¹Waseda Univ. Faculty of Science and Engineering, ²Japan Aerospace Exploration Agency

2022-e-12 (16:20 - 16:40)**Attitude Motion of Deployable Aeroshell Capsule during Reentry Flight in Sounding Rocket Experiment**

*Yasunori Nagata¹, Tatsuro Nakao¹, Hideto Takasawa², Koshiro Hirata³, Kazuhiko Yamada¹

¹Japan Aerospace Exploration Agency, ²Hokkaido University, ³Tokyo University of Agriculture and Technology

2022-e-13 (16:40 - 17:00)**Assessment of Martian Real-Gas Aerodynamics by Free-Flight Test Facility**

*Kyosuke ITABASHI¹, Satoshi NOMURA², Masahito MIZUNO², Kazuhisa FUJITA²

¹The University of Tokyo, Department of Advanced Energy, ²Japan Aerospace Exploration Agency, Aeronautical Technology Directorate

Session e-4**Mar 3 (Thu) 9:00 - 10:40 [Meeting Room3]****High-enthalpy and Hypersonic Flow II**

*Chairpersons: Makoto MATSUI (Shizuoka University)
Hiroshi Katsurayama (Tottori University)*

2022-e-14 (9:00 - 9:20)**Three-dimensional Numerical Simulation of Hypersonic Flow over a Ramp : Effects of Angle of Attack on Shock Wave Structure**

*Kalash Dixit, Kohei ozawa, Nobuyuki Tsuboi

Kyushu Institute of Technology

2022-e-15 (9:20 - 9:40)**Numerical Study toward Verification of Analogy between Hypersonic Turbulent Transition and Directed Percolation**

*Yasuhiro Okano, Shintaro Sato, Naofumi Ohnishi

Department of Aerospace Engineering, Tohoku University

2022-e-16 (9:40 - 10:00)**Hypersonic Boundary Layer Development on Tube Wall in Long-Distance Propagation of Shock Wave**

*Hiroki Sakamoto, Shintaro Sato, Naofumi Ohnishi

Tohoku Univ. Department of Aerospace Engineering

2022-e-17 (10:00 - 10:20)

Study on the Interaction between Two Proximal Spherical Bodies in Hypersonic Flow

*Zipei Dong¹, Yasumasa Watanabe², Kojiro Suzuki¹

¹The University of Tokyo, Department of advanced energy, ²The University of Tokyo, Department of Aeronautics and Astronautics

2022-e-18 (10:20 - 10:40)

Fundamental Study on Icing and Phase Change of Water along Compression and Expansion Surfaces in Mach-7 Hypersonic Flow

*Yasumasa Watanabe¹, Kojiro Suzuki²

¹Department of Aeronautics and Astronautics, The University of Tokyo, ²Department of Advanced Energy, The University of Tokyo

Session e-5)

Mar 3 (Thu) 11:00 - 12:40 [Meeting Room3]

Plasma Flows

Chairpersons: Nobuyuki TSUBOI (Kyushu Institute of Technology)

Takashi MATSUNO (Tottori University)

2022-e-19 (11:00 - 11:20)

Aluminum Collection from Laser Ablated Al₂O₃ by Plume Cooling with Supersonic Nozzle

*Ryohei Oishi¹, Kazune Uesugi¹, Kanta Ishiguro², Makoto Matsui¹

¹Shizuoka University. Department of Engineering, ²Shizuoka University. Department of Mechanical Engineering

2022-e-20 (11:20 - 11:40)

Pressure Dependency on Carbothermal Reduction Efficiency of Al₂O₃ by Laser Ablation under Methane Environment

*Kanta Ishiguro¹, Kazune Uesugi², Ryohei Oishi², Makoto Matsui²

¹Shizuoka Univ. Department of Mechanical Engineering, ²Shizuoka Univ. Department of Engineering

2022-e-21 (11:40 - 12:00)

Experimental and Numerical Study on Plasma-assisted Rapid Control of Flowfield around Nose of Hypersonic Transport

*Yasumasa Watanabe¹, Kojiro Suzuki²

¹Department of Aeronautics and Astronautics, The University of Tokyo, ²Department of Advanced Energy, The University of Tokyo

2022-e-22 (12:00 - 12:20)

Effect of External Flow Velocity on the Thermal Characteristics of Dielectric Barrier Discharge Plasma Actuator

*Asami Hatamoto, Kenta Emori, Hiroyuki Nishida

Tokyo University of Agriculture and Technology

2022-e-23 (12:20 - 12:40)

Towards Development of a Plasma Actuator without External Power Supply for Electric Cars and Aircraft

*Shintaro Sato, Naofumi Ohnishi

Tohoku University

Session e-6)**Mar 3 (Thu) 16:00 - 17:40 [Meeting Room3]****Advanced Fluid Dynamics and Multi-phase Flow**

*Chairpersons: Keiichi Kitamura (Yokohama National University)
Naofumi OHNISHI (Tohoku University)*

2022-e-24 (16:00 - 16:20)**Experimental Study of a Flow Multimeter for Gas-Liquid Two-Phase Flow Using Bidirectional Long Short-Term Memory Network**

*Keigo Nakao¹, Mizuki Oinuma¹, Yukari Sakano¹, Takumi Miyase¹, Motohide Akutsu¹, Yuki Sakamoto², Tetsuya Sato¹

¹*Department of Applied Mechanics and Aerospace Engineering, Waseda University,*

²*Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency*

2022-e-25 (16:20 - 16:40)**Asymmetrical unsteady flow field due to a supersonic impinging jet controlled by fluidic injectors**

*Masahiro Kobayashi, Takahiro Ukai

Osaka Institute of Technology. Department of Mechanical Engineering

2022-e-26 (16:40 - 17:00)**The effects of time scale on the interaction between the pressure waveforms and turbulence**

*Honami Nakagawa, Takahiro Ukai

Osaka Institute of Technology. Department of mechanical engineering

2022-e-27 (17:00 - 17:20)**Numerical Study of Cryogenic Hydrogen Jet in Crossflow under Supercritical Pressure: Effects of the Number of Injector Holes**

*Tomohito Nakatsukasa¹, Amano Taishi¹, Takahide Araki¹, Hiroshi Terashima², Daiki Muto³, Nobuyuki Tsuboi¹, Kohei Ozawa¹

¹*Kyushu Institute of Technology, ²The University of Hokkaido, ³JAXA*

2022-e-28 (17:20 - 17:40)**Prediction of Fuel Injection Flowfield in Scramjet Engine via Machine Learning**

*Kento AKiyama, Hideaki Ogawa

Kyushu Univ. Department of Aeronautics and Astronautics

Session e-7)**Mar 4 (Fri) 9:00 - 10:20 [Meeting Room3]****Aerodynamics I**

*Chairpersons: Makoto SATO (Kogakuin University)
MASAYUKI ANYOJI (Kyushu University)*

2022-e-29 (9:00 - 9:20)**Modelling of Flight Dynamics of Wing-Tip-Chained Airplanes for Airborne Observation on Mars**

*Yoichi Suenaga, Kojiro Suzuki

Department of Advanced Energy, Graduate School of Frontier Sciences, The University of Tokyo

2022-e-30 (9:20 - 9:40)

Visual Explanation of Flow Separation Control Strategy over an Airfoil Obtained in Deep Reinforcement Learning

*Naoki Takada, Tatsumasa Ishikawa, Satoshi Shimomura, Satoshi Sekimoto, Hiroyuki Nishida

Tokyo University of Agriculture and Technology

2022-e-31 (9:40 - 10:00)

Experimental and Numerical Study on Aerodynamic Instability of Thin Shell Type Reentry Capsule at Subsonic Speed

*Hideto Takasawa¹, Tomoya Fujii², Yusuke Takahashi¹, Yasunori Nagata³, Kazuhiko Yamada³, Hiroki Takayanagi³

¹Hokkaido Univ. Faculty of engineering, ²Waseda Univ. Faculty of Science and Engineering, ³JAXA

2022-e-32 (10:00 - 10:20)

Basic Experiment on Calibration Method for Wind Tunnel Balance System at Cryogenic Temperature

*Masashi Kashitani¹, Masato Taguchi¹, Thai Duong Nguyen¹, Hiroaki Ono²

¹National Defense Academy, ²Formerly University of Tsukuba

Session e-8)

Mar 4 (Fri) 11:00 - 11:40 [Meeting Room3]

Aerodynamics II

Chairpersons: Masashi Kashitani (National Defense Academy)

Masato Taguchi (National Defense Academy)

2022-e-33 (11:00 - 11:20)

Study on Water Vapor Distribution in Supersonic Flow Using TDLAS

*Ryota Ito¹, Yamato Kashiwagi¹, Shinya Nagasawa¹, Sadatake Tomioka²

¹Tohoku University, ²JAXA

2022-e-34 (11:20 - 11:40)

Extension of Applicable Flow Velocity Range for High-Speed Impinging Jet by Optical Flow Analysis

*Masato Hijikuro, Masayuki Anyoji

Kyushu Univ.

Session f-1)

Feb 28 (Mon) 15:40 - 17:00 [Rehearsal Room]

Structures and Materials

Chairpersons: Hirokazu Masui (Kyushu Institute of Technology)

Yuji Sakamoto (Hokkaido University)

2022-f-01 (15:40 - 16:00)

Structural system of 6U satellite Ten-Koh 2 molded by 3D printing

*Taichi Murakami, Keiichi Okuyama, Rafael Rodriguez, Hideaki Hashimoto

College of Science and Technology, Nihon University

2022-f-02 (16:00 - 16:20)**Nanosatellite payload suite for in-orbit validation of spacecraft materials and systems**

*Isai Fajardo, Keiichi Okuyama, Rafael Rodríguez, Ten-Koh 2 team

Nihon University

2022-f-03 (16:20 - 16:40)**Lessons Learned on Structure Design and Vibration Test for 50-kg Microsatellites Deployed from the International Space Station**

*Yuji Sakamoto¹, Junichi Kurihara¹, Shinya Fujita², Yuji Sato², Toshinori Kuwahara²

¹*Hokkaido University*, ²*Tohoku University*

2022-f-04 (16:40 - 17:00)**Research on Vibration Control to Mitigate Mechanical Environment Inside Satellites**

*Kentaro Shirai, Hironori Sahara

Tokyo Metropolitan Univ. Department of Aeronautics and Astronautics

Session f-2)**Mar 1 (Tue) 9:20 - 10:40 [Rehearsal Room]****Missions and Future Capabilities 1**

Chairperson: Hirokazu Masui (Kyushu Institute of Technology)

2022-f-05 (9:20 - 9:40)**The Detailed Design of the SOURCE Satellite for Demise Investigation**

*Daniel Galla¹, Sabine Klinkner¹, Georg Herdrich¹, Clemens Kaiser¹, Hendrik Kuhm², Hendrik Fischer²

¹*Institute of Space Systems, University of Stuttgart*, ²*Small Satellite Student Society at the University of Stuttgart*

2022-f-06 (9:40 - 10:00)**Transparent S-band patch array antenna for a lunar mission CubeSat**

*Daisuke Nakayama, Mengu Cho

Kyushu Institute of Technology

2022-f-07 (10:00 - 10:20)**Development of Osaka Sangyo University 1U Cubesat OSU-1 with 1J/1W Pulsed Plasma Thruster Systems for Powered Flight, and R&D Project Features of Nano-Satellite & Probe OSU-2, 3 and 4**

*Kazuki Aoyagi¹, Tomoya Shimada¹, Takuma Unegawa¹, Maika Uedahira¹, Ken-ichiro Oka², Tomonori Kimura², Takayuki Kuri², Kenshin Motoe², Takahiro Itsuki³, Hirokazu Tahara¹, Tomoyuki Ikeda⁴, Yoshiyuki Takao⁵, Takashi Wakazono⁶

¹*Osaka Sangyo University, Department of Mechanical Engineering*, ²*Osaka Sangyo University, Solar System Space Development Project*,

³*Osaka Sangyo University, Graduate School of Engineering, Division of Mechanical Engineering*, ⁴*Tokai University*,

⁵*Nishinippon Institute of Technology*, ⁶*High Serve, Inc.*

2022-f-09 (10:20 - 10:40)**Development of 2U satellite "MITSUBA" for Orbit Demonstration of Commercial Components**

*Hirokazu Masui, Isami Kato, MITSUBA project, Mengu Cho

Kyushu Institute of Technology

Session f-3)

Mar 1 (Tue) 11:00 - 12:40 [Rehearsal Room]

Missions and Future Capabilities 2

Chairperson: Norihide Miyamura (Meisei University)

2022-f-10 (11:00 - 11:20)

Development of a Double Langmuir Probe that can be Mounted on a Nano-Satellite

*Kohei Kamitani, Hirokazu Masui, Mengu Cho

Kyushu Institute of Technology

2022-f-11 (11:20 - 11:40)

Alignment and Wavefront Correction for the Formation Flying Synthetic Aperture Telescope (FFSAT)

*Norihide Miyamura¹, Ryo Suzumoto², Satoshi Ikari², Shinichi Yokobori², Shinichi Nakasuka²

¹*Meisei University*, ²*The University of Tokyo*

2022-f-12 (11:40 - 12:00)

AlIV challenges under the WiPTherm project: Hybrid Power Harvesting System for a 3U CubeSat

Fernando Aguado Agelet¹, *Fermín Navarro Medina², Carlos Ulloa Sande², Pedro Orgeira Crespo², Guillermo Rey González², Alejandro Manuel Gómez San Juan², Uxia García Luis², Vlad Dragos Darau¹, Alejandro Camanizo Mariño¹

¹*University of Vigo, ETSE Telecomunicación, Spain*, ²*University of Vigo, Escuela de Ingeniería Aeronáutica y del Espacio, Spain*

2022-f-13 (12:00 - 12:20)

Ten-Koh 2 Spacecraft and Its Missions

*Keiichi Okuyama, Rafael Armando Rodriguez Leon, Isai Fajardo Tapia, Ten-Koh 2 Team

Nihon University, College of Science and Technology, Department of Aerospace Engineering

2022-f-14 (12:20 - 12:40)

Development of the Whisker Verification Experiment Satellite “FUTABA”

*Akihiro Oboshi, Mengu Cho, Hirokazu Masui

Kyushu Institute of Technology

Session f-4)

Mar 1 (Tue) 16:00 - 17:00 [Rehearsal Room]

Mission Results and Lessons Learned

Chairperson: Toshinori Kuwahara (Tohoku University)

2022-f-16 (16:00 - 16:20)

Advancing National Space Capabilities: From a CubeSat to a MicroSat. Small satellites for Sustainable Development

*Kasia Clatworthy, Alex Da Silva Curiel, Martin Sweeting, Emma Turnbull

Surrey Satellite Technology Ltd

2022-f-18 (16:20 - 16:40)**Revival and Successive Operation of 3U CubeSat OrigamiSat-1 with Multifunctional Deployable Membrane**

*Shuhei Koike¹, Motoki Moritani¹, Misato Ishiwata¹, Shinya Tamura¹, Kazuki Nagai¹, Hiraku Sakamoto¹, Hiroki Nakanishi¹, Takashi Tomura¹, Hiroshi Furuya¹, Akihito Watanabe²

¹Tokyo Institute of Technology, ²Sakase Adtech, Co., Ltd.

2022-f-19 (16:40 - 17:00)**Lessons Learned of International Scientific Micro-satellite RISESAT**

*Toshinori Kuwahara¹, Shinya Fujita¹, Yuji Sato¹, Yuji Sakamoto², Junichi Kurihara²

¹Tohoku University, ²Hokkaido University

Session f-5)

Mar 2 (Wed) 9:20 - 10:40 [Rehearsal Room]

Remote Sensing Missions and Technologies

Chairperson: Kazumasa Imai (National Institute of Technology, Kochi College)

2022-f-20 (9:20 - 9:40)**Mission introduction of ONGLAISAT (ONboard Globe-Looking AI Satellite)**

*Chen-Yu Chan¹, Nuan-Ya Huang¹, Jie-Rou Shang¹, Albert Lin¹, Jer Ling¹, Akihiro Ishikawa², Toshihiro Shibukawa^{2,3}, Ryo Suzumoto^{2,3}, Masahiro Fujiwara², Hirotaka Kondo², Toshio Imamura², Taiki Karakawa², Kenta Suda², Tomotaka Yamamoto², Yoshinari Gyu², Ryuichi Hirayama², Yosuke Kawabata², Satoshi Ikari², Ryu Funase², Shinichi Nakasuka²

¹National Space Organization (NSPO), ²The University of Tokyo, ³ArkEdge Space Inc., Japan

2022-f-21 (9:40 - 10:00)**Development of KITSUNE: A 6U CubeSat for 5-m Class Imaging, C-band Radio Service, Ionospheric Research and IoT**

*NECMI CIHAN ORGER¹, Jose Rodrigo Cordova-Alarcon¹, Victor Hugo Schulz¹, Tharindu Dayaratna^{1,2}, Takashi Yamauchi¹, Hirokazu Masui¹, Joseph Ampadu Ofosu¹, Sangkyun Kim¹, Mariko Teramoto¹, Pooja Leepcha¹, Daisuke Nakayama¹, Marloun Pelayo Sejera¹, Muhammad Hasif Bin Azami¹, Makiko Kishimoto¹, Chee Lap Chow³, King Ho Li Holden³, Hirotoshi Harada⁴, Yoshiya Fukuda⁴, Kaname Kojima⁵, Mengu Cho¹

¹Laboratory of Lean Satellite Enterprises and In-Orbit Experiments, Kyushu Institute of Technology,

²ACCIMT, ³Nanyang Technological University, ⁴Harada Seiki Co. Ltd, ⁵ADDNICS Corp

2022-f-22 (10:00 - 10:20)**Statistical Evaluation of Seismic Precursors by Artificial VLF radio waves using on-orbit Data**

*Tomoyuki Iida¹, Masahiko Yamazaki¹, Masashi Kamogawa²

¹Nihon Univ. Graduate School of Science and Technology Department of Aerospace Engineering,

²Division for Earthquake Prediction Research, Global Center for Asian and Regional Research, University of Shizuoka

2022-f-23 (10:20 - 10:40)

Technology Demonstration CubeSat KOSEN-1 for Jupiter Radio Observations

*Kazumasa Imai¹, Nobuto Hirakoso², Masanori Nishio³, Taku Takada⁴, Kentaro Kitamura⁵, Jun Nakaya⁶, Yukikazu Murakami⁷, Masahiro Tokumitsu⁸, Masafumi Imai⁹, Kan Fukai¹⁰

¹National Institute of Technology, Kochi College, ²National Institute of Technology, Gunma College, ³Aichi Univ. of Technology,

⁴Tokyo Metropolitan College of Industrial Technology, ⁵Kyushu Institute of Technology, ⁶National Institute of Technology, Gifu College,

⁷National Institute of Technology, Kagaoka College, ⁸National Institute of Technology, Yonago College,

⁹National Institute of Technology, Niigata College, ¹⁰Microwave Factory

Session f-6)

Mar 2 (Wed) 11:00 - 12:20 [Rehearsal Room]

NSAT&LCPM Joint Session: Lunar and Interplanetary Missions

Chairpersons: Shintaro Nakajima (Institute of Space and Astronautical Science JAXA)

Toshinori Kuwahara (Tohoku University)

2022-f-25 (11:00 - 11:20)

SEIMEI: Mission to search for life on Enceladus via small satellite with solar power sail

*Maximilien BERTHET, Jorge Alberto GARCIA PEREZ, Kentaro ENOKIDA, Luciana TENORIO, Rashmi RAJ

Department of Aeronautics and Astronautics, The University of Tokyo, Japan

2022-f-26 (11:20 - 11:40)

Folding, Deploying and Controlling the Payankeu Solar Sailcraft

*Guy Pignolet¹, Pierre Munoz¹, Varinka Ponamale¹, Alain Perret², Junichiro Kawaguchi³, Kenji Ogimoto⁴

¹Reunion Island Space Initiative, ²U3Solar Sail Association, ³Kawaguchi Lab, ⁴Souki Research Institute

2022-f-27 (11:40 - 12:00)

System Design of Interplanetary Microsatellite with High Thrust Propulsion System

*Shintaro Nakajima¹, Yosuke Kawabata², Tomotaka Yamamoto², Kazuma Fujimoto², Akihiro Ishikawa², Ryu Funase^{1,2}

¹Institute of Space and Astronautical Science, JAXA, ²The University of Tokyo

2022-f-28 (12:00 - 12:20)

A Micro/Nano Satellite Mission Idea Contest for Deep Space Science and Exploration - Results and Future perspectives

*Rei Kawashima¹, Naoya Ozaki², Herman Steyn³, Munetaka Ueno^{2,4}, Ryu Funase⁵, Rainer Sandau⁶, Rene Laufer⁷, Martin Sweeting⁸, Shinichi Nakasuka⁵, Nate Taylor¹

¹UNISEC-Global, ²ISAS/JAXA, ³Stellenbosch University, ⁴Kobe University, ⁵University of Tokyo, ⁶International Academy of Astronautics (IAA),

⁷Lulea University of Technology, ⁸Surrey Satellite Technology Limited (SSTL)

Session f-7)

Mar 2 (Wed) 16:00 - 17:00 [Rehearsal Room]

Flight Dynamics and Navigation

Chairperson: Yuji Sakamoto (Hokkaido University)

2022-f-29 (16:00 - 16:20)

Magnetic Plasma Drag Demonstration Mission for Nanosatellite Orbit Control

*Ji Hyun Park¹, Takaya Inamori¹, Hiroaki Masuda¹, Kiyoshi Kinoshita¹, Rei Kawashima², Kohei Yamaguchi¹

¹Nagoya University, Department of Aerospace Engineering, ²The University of Tokyo, Department of Aeronautics and Astronautics

2022-f-31 (16:20 - 16:40)**Development of an Autonomous Soft Docking of Small Spacecraft using Visual Guidance Saving Computational Cost and Hardware Resources**

*Asumi Nishimura, Katsuyoshi Tsujita

Osaka Institute of Technology, Dept. of Electrical and Electronic Systems Engineering

2022-f-32 (16:40 - 17:00)**Systematization of Microsatellite-Friendly Multi-Purpose Propulsion System**

*Hiroyoshi Yasuhira¹, Ryusei Hayatomo¹, Kazuki Hirayama¹, Haruki Sashida¹, Kohdai Ono¹, Takuto Iijima¹, Hironori Sahara¹, Takeru Yuzawa², Yuya Ikeda², Toshiaki Iizuka², Daisuke Suzuki³

¹*Tokyo Metropolitan University*, ²*National Institute of Technology, Oyama College*, ³*ALE Co., Ltd*

Session f-8)**Mar 3 (Thu) 9:40 - 10:40 [Rehearsal Room]****Formation/Constellation Management**

Chairperson: Satoshi Ikari (The University of Tokyo)

2022-f-34 (9:40 - 10:00)**Initial Result of High-precision Control Experiments with Optical System for Synthetic Aperture Telescope Using Formation Flying Micro-satellites**

*Ryo Suzumoto¹, Norihide Miyamura², Satoshi Ikari¹, Shinichi Yokobori¹, Shinichi Nakasuka¹

¹*The University of Tokyo*, ²*Meisei University*

2022-f-35 (10:00 - 10:20)**A Geolocation Technique Based on TOA and FOA in LEO Satellite-based Wireless Positioning**

*Ko-Yen Hsu, Jyh-Ching Juang

Department of Electrical Engineering, National Cheng Kung University, Taiwan. Rm. 92875., 8F, EE building, No.1Daxue Rd., East Dist., Tainan City 70101 Taiwan.

2022-f-36 (10:20 - 10:40)**Propellant-less formation flight with momentum exchange of jointed multiple Cubesats in the MAGNARO mission**

*Takaya Inamori, JiHyun Park, Yuki Yamada, Truong An Hoang Xuan, Xinbo Gu, Keita Nagai

Nagoya University, Department of Aerospace Engineering

Session f-9)**Mar 3 (Thu) 11:00 - 12:40 [Rehearsal Room]****Attitude Determination and Control**

Chairperson: Satoshi Ikari (The University of Tokyo)

2022-f-37 (11:00 - 11:20)**Experiment/Simulation-Based Assessment of Microvibration-Induced Pointing Error in 6U Class CubeSat Missions**

*Takayuki Hosonuma¹, Satoshi Ikari¹, Toshihiro Suzuki¹, Toshio Imamura¹, Masahiro Fujiwara¹, Hirotaka Sekine¹, Naoto Usami¹, Ryohei Takahashi¹, Yoshihide Shimada², Hirokazu Nakamura², Shinichi Yokobori¹, Ryuichi Hirayama¹, Tatsuya Arai¹, Kazuki Toma¹, Akihiro Ishikawa¹, Shuhei Matsushita¹, Ryu Funase¹, Shinichi Nakasuka¹

¹*The University of Tokyo*, ²*Seiren Co., Ltd*

2022-f-38 (11:20 - 11:40)

Analysis of Dzhanibekov Effect and Inertia Morphing in CubeSat Attitude Control

*Jyh-Ching Juang, Arvin Tan

National Cheng Kung University

2022-f-39 (11:40 - 12:00)

Flight Model Development and Ground Tests of Variable-Shape Attitude Control Demonstration MicroSatellite HIBARI

*Kei Watanabe, Hiroyuki Kobayashi, Yuki Amaki, Naoki Kawaguchi, Soichi Sato, Kenichiro Takahashi, Fumitaka Sagawa, Shogo Nerome, Kiyona Miyamoto, Yuta Sasagawa, Yoichi Yatsu, Toshihiro Chujo, Saburo Matunaga, HIBARI Development Team

Tokyo Institute of Technology

2022-f-40 (12:00 - 12:20)

Attitude determination and control system for the 6U CubeSat KITSUNE

*Jose Rodrigo Cordova Alarcon, Adolfo Javier Jara-Cespedes, Dulani Chamika Withanage, Victor Hugo Schultz, Necmi Cihan Orger, Sangkyun Kim, Mengu Cho

Kyushu Institute of Technology

2022-f-41 (12:20 - 12:40)

Development of Compact and Highly Capable Integrated AOCS Module for CubeSats

*Satoshi Ikari^{1,4}, Takayuki Hosonuma¹, Toshio Imamura¹, Toshihiro Suzuki¹, Masahiro Fujiwara¹, Hirotaka Sekine¹, Naoto Usami¹, Ryohei Takahashi^{1,4}, Hajime Arai², Yoshihide Shimada², Hirokazu Nakamura², Ryo Suzumoto^{1,4}, Toshihiro Shibukawa^{1,4}, Shuhei Matsushita^{1,4}, Akihiro Ishikawa¹, Takayoshi Fukuyo⁴, Ryu Funase^{1,3}, Shinichi Nakasuka¹

¹*The University of Tokyo*, ²*Seiren Co., Ltd.*, ³*ISAS, JAXA*, ⁴*ArkEdge Space Inc.*

Session f-10

Mar 3 (Thu) 16:00 - 17:40 [Rehearsal Room]

Operations Automation and Optimization

Chairperson: Junichi Kurihara (Hokkaido University)

2022-f-42 (16:00 - 16:20)

Space-camera Artificial Intelligence Mission for Image Data Prioritization

*Ji Hyun Park¹, Takaya Inamori¹, Takatomo Osaki¹, Ryuhei Hamaguchi², Kensuke Otsuki³

¹*Nagoya University, Department of Aerospace Engineering*, ²*PASCO CORPORATION*, ³*NTT DATA Mathematical Systems Inc.*

2022-f-43 (16:20 - 16:40)

Construction of Hazard Analysis for Resilient Operation of Nano-Satellite

*Masafumi Yamada, Nozomu Kogiso

Osaka Prefecture Univ. Department of Aerospace Engineering

2022-f-44 (16:40 - 17:00)

Comparison Study of Machine Learning Methods for CubeSat Anomaly Detection

*Adolfo Jara, Bramandika Holy Bagas Pangestu, Akitoshi Hanazawa, Mengu Cho

Kyushu Institute of Technology, Department of Engineering

2022-f-45 (17:00 - 17:20)**Anomaly Detection for Multiple Satellite System using Machine Learning**

*XINYU YANG, Shun Katube, Hironori Sahara

Tokyo Metropolitan University, Department of Aeronautics and Astronautics

2022-f-46 (17:20 - 17:40)**Satellite Data Manager for Data Management of Earth Observation Microsatellites**

*Junichi Kurihara¹, Yuji Sakamoto², Yuji Sato³, Shinya Fujita³, Toshinori Kuwahara³

¹Hokkaido University, Faculty of Science, ²Hokkaido University, Faculty of Engineering,

³Tohoku University, Department of Aerospace Engineering

Session f-11)**Mar 4 (Fri) 10:00 - 10:40 [Rehearsal Room]****Integrating Space and Ground Observations**

Chairpersons: Kikuko Miyata (Meijo University)

Junichi Kurihara (Hokkaido University)

2022-f-47 (10:00 - 10:20)**Design of Low Power Wide Area-network via Small Flying Objects Constellation**

*Kikuko Miyata¹, Takeshi Matsumoto^{2,3}, Shinichi Nakasuka³

¹Meijo University, ²ArkEdge Space, ³The University of Tokyo

2022-f-49 (10:20 - 10:40)**Conceptual Design of Telemetry & Command system enhanced by LPWA for 6U “ONGLAISAT”**

Takeshi Matsumoto^{1,3}, *Tomotaka Yamamoto¹, Naoto Usami^{1,2}, Kota Kakihara^{1,3}, Yosuke Kawabata¹, Do Xuan Phong¹, Kentaro Enokida¹, Tomoki Mochizuki¹, Charleston Dale M. Ambatali¹, Kanta Yanagida^{1,3}, Takayoshi Fukuyo^{1,3}, Akihiro Ishikawa¹, Ryu Funase¹, Shinichi Nakasuka¹

¹The University of Tokyo. Department of Aeronautics and Astronautics., ²JAXA, Japan, ³ArkEdge Space inc., Japan

Session f-12)**Mar 4 (Fri) 11:00 - 12:40 [Rehearsal Room]****Satellite Design and Development 1**

Chairperson: Kikuko Miyata (Meijo University)

2022-f-50 (11:00 - 11:20)**Flexible 6U CubeSat Bus System and its Efficient Production and Operation System for Various Constellation Missions**

*Shuhei Matsushita, Akihiro Ishikawa, Kota Kakihara, Toshihiro Shibukawa, Ryo Suzumoto, Ryohei Takahashi, Masanobu Tsuji, Nobuhiro Funabiki, Takeshi Matsumoto, Kanta Yanagida, Quentin Verspieren, Satoshi Ikari, Takayoshi Fukuyo

ArkEdge Space Inc.

2022-f-51 (11:20 - 11:40)**Development of Flexible 3U CubeSat Structural Platform for Mass Production Applications**

*Eyoas Ergetu Arede^{1,2}, Takashi Yamauchi¹, Cordova Rodrigo¹, Masui Hirokazu¹, Mengu Cho¹

¹Kyushu Institute of Technology, Department of Electrical and Space Engineering, ²Ethiopian Space Science and Technology Institute

2022-f-52 (11:40 - 12:00)

Adaptability and Scalability of Configurable Interface Board for Different CubeSat Platforms and Missions

*Marloun Sejera, Takahashi Yamauchi, Yukihisa Otani, Mengu Cho

Kyushu Institute of Technology

2022-f-53 (12:00 - 12:20)

Scalability of Kyutech Standardized Electrical Power System for Lean satellites

*Pooja Lepcha, Tharindu Dayarathna, Victor Hugo Schulz, Necmi Cihan Orger, Jose Rodrigo Cordova-Alarcon, Hari Ram Shrestha, Sangkyun Kim, Takashi Yamauchi, Hirokazu Masui, Mengu Cho

Laboratory of Lean Satellite Enterprises and In-Orbit Experiments, Kyushu Institute of Technology

2022-f-54 (12:20 - 12:40)

To Develop a Standardized Back Plane Board Based on the BIRDS Satellites

*Yukihisa Otani, Mengu Cho, Sangkyun Kim, Takashi Yamauchi, Marloun Pelayo Sejera

Kyushu Institute of Technology

Session f-13)

Mar 4 (Fri) 16:00 - 17:20 [Rehearsal Room]

Satellite Design and Development 2

Chairperson: Yuji Sakamoto (Hokkaido University)

2022-f-55 (16:00 - 16:20)

Comprehensive Power Balance Analysis under Various Operational Conditions for CubeSats

*Kazuma Fujimoto¹, Nobuhiro Funabiki¹, Kenta Suda¹, Morito Katsuyama¹, Kazuki Takashima¹, Keidai Iiyama¹, Akihiro Ishikawa¹, Shuhei Matsushita¹, Satoshi Ikari¹, Ryu Funase^{1,2}, Shinichi Nakasuka¹

¹*The University of Tokyo*, ²*Institute of Space and Astronautical Science (ISAS), JAXA*

2022-f-56 (16:20 - 16:40)

Development of a Function-Oriented Flight Software Framework for CubeSats

*Yun-Rong Yang, Jyh-Ching Juang

Department of Electrical Engineering, National Cheng Kung University, Tainan, Taiwan

2022-f-57 (16:40 - 17:00)

Strategy of CubeSat Electrical Interface Design for Comprehensive Management and Efficient Verification

*Taiki Karakawa, Nobuhiro Funabiki, Kota Kakihara, Akihiro Ishikawa, Kenta Suda, Kazuma Fujimoto, Ryuichi Hirayama, Kazuki Toma, Shuhei Matsushita, Ryu Funase, Shinichi Nakasuka

The University of Tokyo

2022-f-58 (17:00 - 17:20)

Improvement of C2A (Command-Centric Architecture) Reusability for Multiple Types of OBCs and Development of Continuous Integration Environment for Reliability of Flight Software

*Ryo Suzumoto, Kanta Yanagida, Taiki Karakawa, Yoshinari Gyu, Yutaro Ito, Akihiro Ishikawa, Satoshi Ikari, Ryu Funase, Shinichi Nakasuka

The University of Tokyo

Session g-1)**Mar 4 (Fri) 9:00 - 10:20 [Conference Room]****Reusable Launch Vehicles (RLVs) 1**

*Chairpersons: Kazuhiro Yagi (IHI Aerospace Co.,Ltd)
Takahiro Fujikawa (Tokyo University of Science)*

2022-g-01 (9:00 - 9:20)**Numerical Analysis on Axial Force Characteristics of Reusable Launch Vehicle during Return Phase**

*Tomohiro Mamashita¹, Tomotaro Muto², Keiichi Kitamura¹, Satoshi Nonaka³

¹*Yokohama National University*, ²*The University of Tokyo*, ³*JAXA (Japan Aerospace Exploration Agency)*

2022-g-03 (9:20 - 9:40)**Flowfield visualization and mechanism of dynamic derivatives of a small-scale supersonic flight experiment vehicle being developed at Muroran Institute of Technology**

*Shuuta Haraguchi¹, Shun Sasaki², Atsuya Honda¹, Ryuto Kawanabe², Haruka Nikado², Kazuhide Mizobata³

¹*Graduate student, Muroran-IT*, ²*Undergraduate student, Muroran-IT*, ³*Aerospace Plane Research Center, Muroran-IT*

2022-g-04 (9:40 - 10:00)**Drag Reduction of the Small-scale Supersonic Flight Experiment Vehicle Being Developed at Muroran Institute of Technology (Third Report)**

*Tomohiro Shigekiyo¹, Nana Hasegawa², Katsuya Miyamoto¹, Kazuhide Mizobata³

¹*Graduate student, Muroran-IT*, ²*Undergraduate student, Muroran-IT*, ³*Aerospace Plane Research Center, Muroran-IT*

2022-g-05 (10:00 - 10:20)**Mach 5 Flight Experiment Plan of High-Mach Integrated Control Experimental Aircraft (HIMICO)**

*Hideyuki Taguchi¹, Tetsuya Sato², Mitsuhiro Tsue³, Takeshi Tsuchiya³, Akiko Matsuo⁴, Asei Tezuka², Shinji Nakaya³, Takahiro Fujikawa⁵, Naoto Morita³, Tomonari Hirotani¹, Shunsuke Imamura¹, Hidemi Takahashi¹, Junichi Oki¹

¹*Japan Aerospace Exploration Agency*, ²*Waseda University*, ³*The University of Tokyo*, ⁴*Keio University*, ⁵*Tokyo University of Science*

Session g-2)**Mar 4 (Fri) 11:00 - 12:00 [Conference Room]****Reusable Launch Vehicles (RLVs) 2**

*Chairpersons: Kazuhide Mizobata (Muroran Institute of Technology)
Shinji Ishimoto (JAXA)*

2022-g-07 (11:00 - 11:20)**A Study on Increase of Down Range and Cross Range of Small Scale Fully Reusable Launch Vehicle with Morphing Technology**

*Shigeru Aso¹, Masayuki Katayama¹, Yasuhiro Tani²

¹*Kurume Institute of Technology*, ²*Sohjo University*

2022-g-09 (11:20 - 11:40)**Attitude Control Design for Launch Vehicle with Time-Varying Characteristics**

*Emi Sakaoka

The Graduate University for Advanced Studies

2022-g-10 (11:40 - 12:00)

Particle Motion due to a Surface Shape in Jet-particle Interaction

*Rika Hata, Takahiro Ukai

Osaka institute of technology Department of Mechanical Engineering

Session g-3)

Mar 4 (Fri) 16:00 - 18:00 [Conference Room]

Reusable Launch Vehicles (RLVs) 3

*Chairpersons: Koki Kitagawa (Kyushu Institute of Technology)
Wataru Sarae (JAXA)*

2022-g-12 (16:00 - 16:20)

Development Status of CALLISTO

*Shinji Ishimoto¹, Michel Illig², Etienne Dumont³

¹JAXA, ²CNES, ³DLR

2022-g-13 (16:20 - 16:40)

CALLISTO: towards Reusability of a Rocket Stage: Current Status

*Etienne Dumont¹, Shinji Ishimoto², Michel Illig³, Marco Sagliano¹, Marco Solari¹, Tobias Ecker⁴, Hauke Martens¹, Sven Krummen¹, Jean Desmariaux³, Yasuhiro Saito², Moritz Ertl⁴, Josef Klevanski⁵, Bodo Reimann⁶, Svenja Woicke¹, Rene Schwarz¹, David Seelbinder¹, Markus Markgraf⁷, Johannes Riehmer⁵, Benjamin Braun⁷, Moritz Aicher⁷

¹Institute of Space Systems, DLR, Bremen, Germany, ²Research and Development Directorate, JAXA, Tsukuba, Japan,

³Launcher directorate, CNES, Paris, France, ⁴Institute of Aerodynamics and Flow Technology, DLR, Gottingen, Germany,

⁵Institute of Aerodynamics and Flow Technology, DLR, Cologne, Germany, ⁶Institute of Aerodynamics and Flow Technology, DLR, Brunswick, Germany, ⁷Space Operations and Astronaut Training, DLR, Oberpfaffenhofen, Germany

2022-g-14 (16:40 - 17:00)

Development of Reusable Structures and Mechanisms for CALLISTO

*Sofia Giagkozoglou Vincenzino¹, Silas Eichel¹, Waldemar Rotarmel¹, Felix Krziwanie¹, Ivaylo Petkov¹, Etienne Dumont², Anton Schneider², Silvio Schroder², Jens Windelberg³, Tobias Ecker⁴, Moritz Ertl⁴

¹Institute of Structures and Design, DLR Stuttgart, Germany, ²Institute of Space Systems, DLR Bremen, Germany,

³Institute of Flight Systems, DLR Braunschweig, Germany, ⁴Institute of Aerodynamics and Flow Technology, DLR Gottingen, Germany

2022-g-15 (17:00 - 17:20)

CALLISTO Avionics Development and Avionics Validation Facility

*Pascal TATIOSSIAN¹, Laurent MILLET-LACOMBE², Nobuyuki IIIZUKA³, Janis Sebastian HASEKER⁴, Rene SCHWARZ⁴, Christian GRIMM⁴

¹Space Transportation Directorate, CNES, France, ²ArianeGroup SAS, Les Mureaux, France, ³Tsukuba Space Center, JAXA, Japan,

⁴Institute of Space Systems, German Aerospace Center (DLR), Bremen, Germany

2022-g-16 (17:20 - 17:40)

Design and Development Status of Experiment Winged Rocket WIRES#015

*Daiki Fukushima¹, Koichi Yonemoto¹, Takahiro Fujikawa¹, Takahiro Matsukami¹, Tsuyoshi Otsuki¹, Yuto Kitazono¹, Yasuhiro Koshida¹, Masaaki Murakami¹, Tomotaka Watanabe¹, Hina Atarashi¹, Hideyoshi Takeyama¹, Shintaro Tejika¹, Yuito Fujii¹, Raizo Matsuda¹, Yusuke Mine¹, Ayaka Yamazaki¹, Sho Yoshida¹, Toshiaki Morito²

¹Space System Laboratory at Tokyo University of Science. Department of Mechanical Engineering. Faculty of Science and Technology.,

²Japan Aerospace Exploration Agency (JAXA), Japan

2022-g-17 (17:40 - 18:00)**Application of Multidisciplinary Design Optimization to Preliminary Design of Suborbital Spaceplane***Takahiro Fujikawa¹, Koichi Yonemoto^{1,2}¹Tokyo University of Science, Department of Mechanical Engineering, ²SPACE WALKER Inc.**Session h-1)****Mar 1 (Tue) 9:00 - 10:00 [Meeting Room1]****Microgravity Sciences***Chairperson: TBD***2022-h-01 (9:00 - 9:20)****Numerical Investigation on the Effect of Droplet Interaction on Cool-flame Characteristics of n-Decane Droplet Pairs**

*Shion Ando, Kenshin Koyama, Osamu Morie

*Kyusbu Univ. Faculty of Engineering***2022-h-02 (9:20 - 9:40)****Extinction Limit of Opposed Flow Flame Propagating on PMMA Rods**

*Hirotomo Toda, Shinji Nakaya, Mitsuhiro Tsue

*Department of Aeronautics and Astronautics, The University of Tokyo***2022-h-03 (9:40 - 10:00)****Thermophysical property measurements of high temperature melts using the Electrostatic Levitation Furnace in the International Space Station (ISS-ELF)**

*Rina Shimonishi, Takehiko Ishikawa, Chihiro Koyama, Chihiro Kurosawa, Hirokazu Takeuchi, Shinsuke Kuroda, Hirohisa Oda, Tsuyoshi Ito

*JAXA***Session h-2)****Mar 1 (Tue) 11:00 - 11:40 [Meeting Room1]****Microgravity Technology***Chairperson: TBD***2022-h-05 (11:00 - 11:20)****Scattering Tendency of a Surface Object during Thrusting in the Vicinity of a Celestial Body***Maiko Yamakawa¹, Yusuke Maru², Mitsuhsisa Baba², Yu Daimon², Kazuhisa Fujita², Shujiro Sawai^{1,2}, Osamu Mori², Yuichi Tsuda²¹SOKENDAI, the Graduate University for Advanced Studies, ²Japan Aerospace Exploration Agency**2022-h-07 (11:20 - 11:40)****WICOnet: An Ultra-Wideband Wireless Sensor Network for the ISS Columbus Laboratory**

Christian Strowik, *Andre Luebken, Martin Drobczyk, Niklas Aksteiner

German Aerospace Center (DLR)

Session i-1)

Mar 3 (Thu) 16:00 - 17:40 [Meeting Room32]

Thermal Control 1

*Chairpersons: Hosei Nagano (Nagoya University)
Tsuyoshi Totani (Hokkaido Univ)*

2022-i-01 (16:00 - 16:20)

Thermal Control System to easily cool GAPS Balloon-borne Instrument on the Ground

*Hideyuki Fuke¹, Shun Okazaki¹, Akiko Kawachi², Shohei Kobayashi², Masayoshi Kozai³, Hiroyuki Ogawa¹,
Masaru Saito¹, Shuto Takeuchi⁴, Kakeru Tokunaga¹
¹JAXA, ²Tokai University, ³ROIS, ⁴Aoyama Gakuin University

2022-i-02 (16:20 - 16:40)

Effect on Startup Characteristics for Evaporator Preheating of Capillary Pumped Loop

*Masaru Hirata¹, Kimihide Odagiri², Hiroyuki Ogawa²
¹The University of Tokyo, ²Japan Aerospace Exploration Agency

2022-i-03 (16:40 - 17:00)

Thermal Effects of Aluminum-Copper-Aluminum Clad Material for the Utilization of the Entire Heat Capacity of Microsatellites

Kei Yoshii, *Tsuyoshi Totani
Hokkaido University

2022-i-04 (17:00 - 17:20)

Thermal Design Approach for CubeSats Utilizing a Standard Versatile Bus System

*Toshihiro Shibukawa, Shingo Nishimoto, Shuhei Matsushita, Shinichi Yokobori, Kazuki Takashima,
Akihiro Ishikawa, Ryu Funase, Shinichi Nakasuka
The University of Tokyo

2022-i-05 (17:20 - 17:40)

Performance Evaluation of Thermoelectric Device for Thermal Vacuum Testing of Nanosatellites

*Joseph Ampadu Ofosu^{1,2}, Hirokazu Masui^{1,2}, Mengu Cho¹
¹Kyushu Institute of Technology, ²Center for Nanosatellite Testing

Session i-2)

Mar 4 (Fri) 9:00 - 10:00 [Meeting Room32]

Thermal Control 2

*Chairpersons: Tsuyoshi Totani (Hokkaido Univ)
Hosei Nagano (Nagoya University)*

2022-i-06 (9:00 - 9:20)

Feasibility Study on Thermal Design of Optical System for Synthetic Aperture Telescope Using Formation Flying Micro-satellites

*Shinichi Yokobori¹, Ryo Suzumoto¹, Norihide Miyamura², Satoshi Ikari¹, Shinichi Nakasuka¹
¹The University of Tokyo, ²Meisei University

2022-i-07 (9:20 - 9:40)**Thermal Design of 6U Satellite KITSUNE Equipped with a High-Resolution Camera**

*Takashi Oshiro¹, Mengu Cho¹, Hirokazu Masui¹, Takashi Yamauchi¹, Muhammad Hasif Bin Azami¹, Necmi Cihan Orger¹, Kazuhiro Nakayama²

¹Kyushu Institute of Technology, ²Harada Seiki

2022-i-08 (9:40 - 10:00)**Thermal Control of Array Antenna Transmitters Attached on Space Membrane Structures**

*Yuki Takeda¹, Shinji Takeda¹, Shuhei Koike¹, Masahiro Fujita², Yuta Takahashi¹, Motoki Moritani¹, Haruki Hagiwara¹, Dongwon You¹, Atsushi Shirane¹, Hiraku Sakamoto¹

¹Tokyo Institute of Technology, ²The University of Tokyo

Session j-1)**Mar 3 (Thu) 9:00 - 10:00 [Meeting Room1]****Satellite Communications, Broadcasting and Navigation 1**

Chairpersons: Tomoshige Kan (NICT)

Tetsushi Ikegami (Meiji University)

2022-j-02 (9:00 - 9:20)**A Study on Estimation Methodology of Signal Intensity Distribution for Space VLBI**

*Masahiro Fujita¹, Yuichiro Nada¹, Yuki Takao², Ahmed Kiyoshi Sugihara², Junichiro Kawaguchi³

¹The University of Tokyo Department of Aeronautics and Astronautics, ²Japan Aerospace Exploration Agency,

³Tohoku University Department of Mechanical and Aerospace Engineering

2022-j-03 (9:20 - 9:40)**A Study of RF Feeder Link System for Data Relay Satellites Supporting Multiple Access**

*Mitsuhiro Nakadai, Chihaya Kato, Masanobu Yajima

Japan Aerospace Exploration Agency, Research and Development Directorate, Research Unit

2022-j-04 (9:40 - 10:00)**X-band Signal Observing Experiment from Hayabusa-2 by 2m-class Parabola Antenna**

*Yoshihiro Tsuruda, Masaaki Kawamura, Masaki Nakamiya

Teikyo University

Session j-2)**Mar 3 (Thu) 11:00 - 12:00 [Meeting Room1]****Satellite Communications, Broadcasting and Navigation 2**

Chairpersons: Masaaki Kojima (NHK)

Tetsushi Ikegami (Meiji University)

2022-j-06 (11:00 - 11:20)**Flight Demonstration Results of Information Theoretically Secure Wireless Communication on a Sounding Rocket MOMO**

*Sumio Morioka¹, Satoshi Obana², Maki Yoshida³

¹Interstellar Technologies Inc., R&D division, ²Hosei University, Faculty of computer and information sciences,

³NICT, Cybersecurity research institute

2022-j-07 (11:20 - 11:40)

On-orbit Demonstration of VCM Technology Based on DVB-S2X by the Rapid Innovative Payload Demonstration Satellite-2

*Chihaya Kato¹, Mitsuhiro Nakadai¹, Masanobu Yajima¹, Jin Miyazawa², Michiya Hayama³, Tsuyoshi Sasaki², Futaba Ejima²

¹*Japan Aerospace Exploration Agency (JAXA)*, ²*Mitsubishi Electric Corporation Kamakura Works*,

³*Mitsubishi Electric Corporation Information Technology R&D Center*

2022-j-08 (11:40 - 12:00)

Development of 3 Dimensional Phased Array Antenna for the Satellite Ground Stations

*Nobuyuki Kaya

WaveArrays, inc.

Session j-3)

Mar 3 (Thu) 16:00 - 17:20 [Meeting Room1]

Satellite Communications, Broadcasting and Navigation 3

Chairpersons: Yoshihisa Takayama (Tokai University)

Mitsuhiro Nakadai (JAXA)

2022-j-09 (16:00 - 16:20)

Development of Stepless Attenuator to Emulate a Mobile Satellite Communications System

*Byeongpyo Jeong, Tomoshige Kan, Takashi Takahashi

National Institute of Information and Communications Technology

2022-j-10 (16:20 - 16:40)

A Wide Area Propagation Measurement for Mobile Satellite Communications using Ka band satellite

*Tomoshige Kan, Byeongpyo Jeong, Hajime Susukita, Takashi Takahashi

National Institute of Information and Communications Technology. Space Communication Systems Laboratory

2022-j-11 (16:40 - 17:00)

DPD Performance for 12-GHz-band Satellite Transponder with APD Linearized TWTA

*Masaaki Kojima, Masashi Kamei, Hisashi Sujikai

NHK Science & Technology Research Laboratories

2022-j-12 (17:00 - 17:20)

Study on onboard antenna pointing deviation and control error for wireless relay system using fixed wing UAV

*Koki Hamajima¹, Masazumi Ueba¹, Munehiro Matsui², Hisayoshi Kanou², Kiyohiko Itokawa², Fumihiro Yamashita²

¹*Muroran Institute of Technology*, ²*NTT Access Service System Laboratories, NTT Corporation*

Session k-1)**Feb 28 (Mon) 15:40 - 16:20 [Meeting Room4]****ISS and Near Future Lunar Mission***Chairperson: TBD***2022-k-01 (15:40 - 16:00)****Engineering facilities and tools aboard the ISS Russian Segment over testing of key exploration technologies**

*Igor V. Sorokin, Alexander V. Markov, Victor P. Konoshenko

*S.P. Korolev Rocket and Space Corporation Energia***2022-k-04 (16:00 - 16:20)****Obstacles at candidate landing sites with long-term illuminated areas of lunar south pole region***Junichi Haruyama¹, Kazuki Kariya¹, Yuji Katsumata¹, Masaru Koga¹, Naoki Sato¹, Seiichi Hara²¹*JAXA*, ²*NTT DATA CCS***Session k-2)****Mar 1 (Tue) 9:20 - 10:40 [Meeting Room4]****Exploration to Lunar Hole and Lava Tube***Chairperson: TBD***2022-k-05 (9:20 - 9:40)****Unprecedented Zipangu Underworld of the Moon/Mars Exploration (UZUME) : Great resource-based exploration benefits**

*Junichi Haruyama

*JAXA***2022-k-06 (9:40 - 10:00)****Science mission of UZUME-1***Daigo Shoji¹, Junichi Haruyama¹, Tomokatsu Morota², Nobuo Geshi³, Goro Komatsu⁴, Motomaro Shirao⁵, Tsutomu Honda⁶, Tatsuhiko Michikami⁷, Hisayoshi Shimizu²¹*JAXA*, ²*The University of Tokyo*, ³*AIST*, ⁴*Universita d'Annunzio*, ⁵*Planetary Geological Society of Japan*, ⁶*NPO Volcano-Speleological Society*, ⁷*Kindai University***2022-k-07 (10:00 - 10:20)****Development of a Detection Method of Intact Lava Tubes on the Moon Using the FDTD Simulation***Hitoshi Nozawa¹, Junichi Haruyama^{2,1}, Atsushi Kumamoto³, Takahiro Iwata^{2,1}¹*The Graduate University for Advanced Studies (SOKENDAI)*, ²*Japan Aerospace Exploration Agency (JAXA)*, ³*Tohoku University***2022-k-08 (10:20 - 10:40)****Robotic Exoskeletons for Payload Transportation in Lunar Caves***Stephane Bonardi¹, Lucas Froissart², Toshihisa Nikaido¹, Auke Ijspeert², Takashi Kubota¹¹*Japan Aerospace Exploration Agency (JAXA)*, ²*Ecole Polytechnique Federale de Lausanne (EPFL)*

Session k-3)

Mar 1 (Tue) 11:00 - 12:40 [Meeting Room4]

Robotics abs Sampling Technologies

Chairperson: TBD

2022-k-09 (11:00 - 11:20)

Lunar Skylight Exploration by a Limbed Climbing Robot Using a Hand-Eye System

*Taku Okawara, Kentaro Uno, Kazuya Yoshida

Tohoku University

2022-k-10 (11:20 - 11:40)

Walking Control for a Bipedal Robot Used in the Moon Base Considering an Optimal Stride

*Takafumi Kanda, Jyun Satou, Tadashi Komatsu

Kanto Gakuin University

2022-k-11 (11:40 - 12:00)

Path and Gait Planning of Limbed Climbing Robots for Planetary Cliff Exploration

*Keigo Haji, Kentaro Uno, Warley F. R. Ribeiro, Kazuya Yoshida

Tohoku Univ. Department of Aerospace Engineering

2022-k-12 (12:00 - 12:20)

Long-Range Vertical Transport of Lunar Regolith and Ice Particles Using Electrodynamic Force and Mechanical Vibration

*Hiroyuki Kawamoto

Waseda University

2022-k-13 (12:20 - 12:40)

Numerical Simulation of Regolith Sampling Corer by Irreversible Compression Fluid Model

*Kojiro Suzuki

Graduate School of Frontier Sciences, The University of Tokyo

Session k-4)

Mar 1 (Tue) 16:00 - 17:00 [Meeting Room4]

Lunar Materials and Utilization

Chairperson: TBD

2022-k-14 (16:00 - 16:20)

The Investigation of Spatial Distribution of Volatiles on the Moon Using the Spectrum Data by SELENE

*Kosei Toyokawa^{1,2}, Junichi Haruyama^{2,1}, Takahiro Iwata^{2,1}

¹*The Graduate University of Advanced Studies, ²Institute of Space and Astronautical Science*

2022-k-15 (16:20 - 16:40)**Dynamical Properties of Granular Vibration Pumping for ISRU***Masato Adachi^{1,2}, Patricia Sophie Schneider^{2,3}, Matthias Sperl^{2,3}¹*Kyoto University, Graduate School of Engineering, Department of Mechanical Engineering and Science,*²*Deutsches Zentrum für Luft- und Raumfahrt (DLR), Institut für Materialphysik im Weltraum,*³*Universität zu Köln, Institut für Theoretische Physik***2022-k-16 (16:40 - 17:00)****Studies on Astronomical Observatory utilizing the Lunar Holes and Lava Tubes***Takahiro Iwata¹, Junichi Haruyama¹, Hideo Hanada²¹*Institute of Space and Astronautical Science, JAXA*, ²*National Astronomical Observatory of Japan***Session k-5)****Mar 2 (Wed) 9:00 - 10:40 [Meeting Room4]****Small Body Explorations - Hayabusa2 and MMX***Chairperson: TBD***2022-k-18 (9:00 - 9:20)****The Deep Space Orbital Transfer Vehicle Inspired by the Hayabusa2 Technology***Yuto Takei¹, Takanao Saiki¹, Roger Gutierrez Ramon², Naoko Ogawa¹, Yuya Mimasu¹, Maiko Yamakawa², Yusuke Maru¹, Yuichi Tsuda¹¹*Japan Aerospace Exploration Agency*, ²*The Graduate University for Advanced Studies***2022-k-19 (9:20 - 9:40)****In-Situ Trajectory Reconstruction and Telescopic Tracking of HAYABUSA2 Sample Return Capsule by Ground and Airborne Observations**

*Kazuhisa Fujita, Satoshi Nomura, Toshiyuki Suzuki, Takashi Ozawa, Hiroki Takayanagi, Mari Nishiyama, Shunsuke Noguchi, Tomoko Iijima, Junichi Oki, Hideyuki Tanno, Tetsuya Yamada, Satoru Nakazawa

*Japan Aerospace Exploration Agency***2022-k-20 (9:40 - 10:00)****Crack Orientation of Boulders on Ryugu: Meridional Preference and Exfoliation***Sho Sasaki¹, Shiho Kanda¹, Hiroshi Kikuchi², Tatsuhiro Michikami³, Tomokatsu Morota⁴, Chikatoshi Honda⁵, Hideaki Miyamoto⁴, Ryodo Henmi⁴, Seiji Suguta⁴, Eri Tatsumi⁴, Masanori Kanamaru², Seiichiro Watanabe⁶, Noriyuki Namiki⁷, Patrik Michel⁸, Masatoshi Hirabayashi⁹, Naru Hirata⁵, Tomoki Nakamura¹⁰, Takaaki Noguchi¹¹, Takahiro Hiroi¹², Naoya Sakatani¹³¹*Osaka University, Department of Earth and Space Science*, ²*JAXA, ISAS*, ³*Kindai University*, ⁴*University of Tokyo*, ⁵*University of Aizu*,⁶*Nagoya University*, ⁷*National Astronomical Observatory of Japan*, ⁸*Observatoire de la Côte d'Azur*, ⁹*Auburn University*, ¹⁰*Tohoku University*,¹¹*Kyoto University*, ¹²*Brown University*, ¹³*Rikkyo University***2022-k-21 (10:00 - 10:20)****Martian Moons eXploration (MMX) Mission Description**

*Yasuhiro Kawakatsu, Kiyoshi Kuramoto, Hisashi Otake, Takane Imada, Hajime Baba

JAXA MMX Project Team

2022-k-22 (10:20 - 10:40)

Technological Development of Dust Sensor for CMDM to be aboard MMX

*Masanori Kobayashi¹, Osamu Okudara¹, Ryo Ishimaru¹, Sho Sasaki², Masayuki Fujii³

¹*Planetary Exploration Research Center, Chiba Institute of Technology*

²*Department of Earth and Space Science, Osaka University*, ³*EAM science Co., Ltd.*

Session k-6)

Mar 2 (Wed) 11:00 - 12:00 [Meeting Room4]

Martian and Plasma Science and Missions

Chairperson: TBD

2022-k-25 (11:00 - 11:20)

A New Way to Explore Mars with a Micro-size Airplane in the Sky -Mars Shot PLUS-

*Hiroki Nagai

Institute of Fluid Science, Tohoku University

2022-k-26 (11:20 - 11:40)

Super-Alfvénic Collision of Extremely High-beta Plasmoids for Collisionless Shock Experiments

*Taichi Seki¹, Tomohiko Asai¹, Daichi Kobayashi¹, Tsutomu Takahashi¹, Takamasa Kikuchi¹, Hiroshi Hasebe¹, Koichi Iwamoto¹, Shinichiro Ohnuki¹, Seiya Kishimoto¹, Jordan Morelli²

¹*Nihon Univ. College of Science and Technology*, ²*Queen's University at Kingston*

2022-k-27 (11:40 - 12:00)

A Laboratory Astrophysical Project Toward Understanding Mysterious Fast Radio Bursts

*Yosuke Sumitomo¹, Tomohiko Asai¹, Shota Kisaka², Haruhisa Koguchi³, Kazuhiro Kusaka¹, Ryotaro Yanagi¹, Yuma Onishi¹, Yasushi Hayakawa¹, Daichi Kobayashi¹, Shiomi Kumagai¹, Takeshi Sakai¹, Taichi Seki¹

¹*Nihon University, College of Science and Technology*, ²*Hiroshima University*,

³*National Institute of Advanced Industrial Science and Technology (AIST)*

Session I-1)

Feb 28 (Mon) 15:40 - 17:10 [Meeting Room32]

IAA Low-Cost Planetary Missions Conference 1

Chairperson: TBD

Session I-2)

Mar 1 (Tue) 9:00 - 10:00 [Meeting Room32]

IAA Low-Cost Planetary Missions Conference 2

*Chairpersons: Hajime Yano (Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency)
Baker John (JPL)*

2022-I-04 (9:00 - 9:30)

Ready for launch: CubeSat Moon Lander OMOTENASHI

*Tatsuaki Hashimoto, Junji Kikuchi, Ryo Hirasawa, Shintaro Nakajima, Naoki Morishita, Atsushi Tomiki, Wataru Torii, Masatsugu Otsuki, Tetsuo Yoshimitsu, Yasuo Ishige, Kota Miyoshi, Nobutaka Bando, Chikako Hirose, Hiroshi Takeuchi, Hiroyuki Toyota, Keiichi Hori, Kakeru Tokunaga, Aiko Nagamatsu, Hitoshi Morimoto, Toshinori Ikenaga

JAXA

2022-I-05 (9:30 - 10:00)**Janus: A NASA SIMPLEx mission to explore two NEO Binary Asteroids**

*Daniel J Scheeres¹, Jay McMahon¹, E. B. Bierhaus², J. Wood², L. A.M. Benner³, C. M. Hartzell⁴, P. Hayne¹, R. Jedicke⁵, L. Le Corre⁶, A. Meyer¹, S. Naidu³, P. Pravec⁷, M. Ravine⁸, K. Sorli¹

¹*University of Colorado Boulder*, ²*Lockheed Martin Space, USA*, ³*Jet Propulsion Laboratory, USA*, ⁴*University of Maryland, USA*,

⁵*University of Hawaii, USA*, ⁶*Planetary Science Institute, USA*, ⁷*Astronomical Institute of the Academy of Sciences, Czech Republic*,

⁸*Malin Space Science Systems Inc, USA*

Session I-3)**Mar 1 (Tue) 11:00 - 11:30 [Meeting Room32]****IAA Low-Cost Planetary Missions Conference 3***Chairperson: TBD***2022-I-07 (11:00 - 11:30)****Deep Space Exploration Technology Demonstrator DESTINY+**

*Hiroyuki Toyota¹, Takeshi Takashima¹, Hiroshi Imamura¹, Kazutaka Nishiyama¹, Takayuki Yamamoto¹, Takeshi Miyabara¹, Masayuki Ohta¹, Yoshitaka Mochihara¹, Naoya Ozaki¹, Hiroyuki Nagamatsu¹, Takakazu Okahashi¹, Junko Takahashi¹, Toshiaki Okudaira¹, Tomoko Arai², DESTINY+ Project Team¹

¹*JAXA/ISAS*, ²*Chiba Institute of Technology/PERC*

Session I-4)**Mar 1 (Tue) 16:00 - 16:20 [Meeting Room32]****IAA Low-Cost Planetary Missions Conference 4**

*Chairpersons: Ryu Funase (Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency)
Bousquet Pierre (CNES)*

2022-I-10 (16:00 - 16:20)**CubeSat Complemented Radioscience for the Geodesy of Non-heliocentric Small Bodies**

*Hongru Chen¹, Nicolas Rambaux², Valery Lainey², Daniel Hestroffer²

¹*Department of Aeronautics and Astronautics, Kyushu University*,

²*IMCCE, Observatoire de Paris, Université PSL, Sorbonne Université, Université de Lille, CNRS*

Session I-5)**Mar 2 (Wed) 9:00 - 9:20 [Meeting Room32]****IAA Low- Cost Planetary Missions Conference 5**

*Chairpersons: Baker John (JPL)
Ryu Funase (Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency)*

Session I-6)

Mar 2 (Wed) 11:00 - 11:20 [Meeting Room32]

IAA Low-Cost Planetary Missions Conference 6

Chairperson: TBD

2022-I-17 (11:00 - 11:20)

Deployable Micro-Mars Airplane Stowed in 1U Cubesat

*Hiroti Tanaka¹, Tsubasa Ikami¹, Kohe Sone¹, Yudai Hamashima¹, Kohe Takeda¹, Kento Kaneko², Kazuma Yomo¹, Tatsuya Kobayashi¹, Maki Okawa¹, Koji Fujita¹, Hiroki Nagai¹

¹*Tohoku University*, ²*The University of Tokyo*

Session I-7)

Mar 2 (Wed) 16:00 - 16:15 [Meeting Room32]

IAA Low-Cost Planetary Missions Conference 7

Chairpersons: Bousquet Pierre (CNES)

Hajime Yano (Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency)

2022-I-21 (16:00 - 16:15)

Asynchronous One-Way Ranging Method Applied to Lunar and Interplanetary Probes

*Junichiro Kawaguchi¹, Yuichiro Nada², Yuka Ishigooka¹, Toshinori Kuwahara¹, Kazuya Yoshida¹

¹*Tohoku University*, ²*University of Tokyo*

Session I-8)

Mar 3 (Thu) 9:00 - 10:30 [Meeting Room32]

IAA Low-Cost Planetary Missions Conference 8

Chairpersons: Hajime Yano (Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency)

Baker John (JPL)

Session I-9)

Mar 3 (Thu) 11:00 - 12:30 [Meeting Room32]

IAA Low-Cost Planetary Missions Conference

Chairperson: Ryu Funase (Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency)

Session m-1)

Mar 1 (Tue) 16:00 - 17:40 [Meeting Room1]

Operation and Engineering of Balloon

Chairpersons: Yoshitaka Saito (Japan Aerospace Exploration Agency)

Kosei Ishimura (Waseda University)

2022-m-01 (16:00 - 16:20)

Balloon operations at Esrange Space Center since the last ISTS

*Mattias Abrahamsson, Henrik Pettersson

SSC - Swedish Space Corporation

2022-m-02 (16:20 - 16:40)

Flight Prediction and Control System for JAXA Scientific Balloon Operation

*Yoshitaka Mizumura, Hideyuki Fuke, Tetsuya Yoshida

Japan Aerospace Exploration Agency

2022-m-03 (16:40 - 17:00)**Development of an Automated Test System for On-board Balloon-Borne Bus Equipment***Hideyuki Mori¹, Hideyuki Fuke¹, Makoto Tamura¹, Tetsuya Yoshida²¹*Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science, Scientific Ballooning Research and Operation Group,*²*Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science, Department of Interdisciplinary Space Science***2022-m-04 (17:00 - 17:20)****Study on Attitude Motion of Balloon Flight Trains based on Distributed Attitude Measurements***Yasuhiro Shoji¹, Issei Iijima²¹*Kanazawa University, ²JAXA***2022-m-05 (17:20 - 17:40)****Flight Tests of Perovskite Solar Cell toward Applications to Balloon Envelope***Hideyuki Fuke¹, Shusaku Kanaya¹, Yu Miyazawa¹, Hiroyuki Toyota¹, Kazuyuki Hirose¹, Ryoto Funayama², Masashi Ikegami³¹*JAXA, ²Kishu Giken Kogyo Co., Ltd., ³Toin University of Yokohama***Session m-2)****Mar 2 (Wed) 9:00 - 10:00 [Meeting Room1]****Science Mission using Balloon and Rocket***Chairpersons: Yoshitaka Mizumura (Japan Aerospace Exploration Agency)**Keigo Ishizaka (Toyama Prefectural University)***2022-m-07 (9:00 - 9:20)****LODEWAVE (LOng-Duration balloon Experiment of gravity WAVE over Antarctica)***Yoshihiro Tomikawa^{1,2}, Kaoru Sato³, Yoshitaka Saito⁴, Isao Murata⁵, Naohiko Hirasawa^{1,2}, Masashi Kohma³, Kyoichi Nakashino⁶, Daisuke Akita⁷, Takuma Matsuo⁸, Masatomo Fujiwara⁹, Lihito Yoshida²¹*National Institute of Polar Research, ²School of Multidisciplinary Sciences, The Graduate University for Advanced Studies, SOKENDAI,*³*Graduate School of Science, The University of Tokyo, ⁴Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency,*⁵*Graduate school of Environmental Studies, Tohoku University, ⁶School of Engineering, Tokai University,*⁷*School of Environment and Society, Tokyo Institute of Technology, ⁸School of Science and Technology, Meiji University,*⁹*Faculty of Environmental Earth Science, Hokkaido University***2022-m-08 (9:20 - 9:40)****New Particle Identification Approach with Convolutional Neural Network in GAPS**Yusuke Nakagami¹, *Masahiro Yamatani², Hideyuki Fuke², Akiko Kawachi³, Masayoshi Kozai⁴, Yuki Shimizu⁵, Tetsuya Yoshida²¹*Aoyama Gakuin University, ²JAXA, ³Tokai University, ⁴ROIS, ⁵Kanagawa University***2022-m-09 (9:40 - 10:00)****Development of Atmospheric Density Probe aboard S-520-32 Sounding Rocket***Shoma Taira¹, Taishi Kato¹, Momoka Shimoi¹, Taiga Adachi¹, Towa Ushijima¹, Yusuke Yamashita², Takashi Ozawa³, Takumi Abe^{3,4}, Yoshinori Nakayama⁵, Kumiko Yokota¹, Masahito Tagawa¹¹*Kobe University, ²The University of Tokyo, ³Japan Aerospace Exploration Agency, ⁴Institute of Space and Astronautical Science,*⁵*National Defense Academy*

Session m-3)**Mar 2 (Wed) 11:00 - 12:20 [Meeting Room1]****Flight Demonstraion of Detonation Engine**

*Chairpersons: Jiro Kasahara (Nagoya University)
Yusuke maru (Japan Aerospace Exploration Agency)*

2022-m-10 (11:00 - 11:20)**In-Space Flight Demonstration Results of a Detonation Engine System on Sounding Rocket
S-520-31: System Design**

*Akira Kawasaki¹, Koichi Matsuyama¹, Ken Matsuoka¹, Hiroaki Watanabe¹, Noboru Itouyama¹, Keisuke Goto¹, Kazuki Ishihara¹, Valentin Buyakofu¹, Tomoyuki Noda¹, Jiro Kasahara¹, Akiko Matsuo², Ikkoh Funaki⁴, Daisuke Nakata³, Masaharu Uchiumi³, Hiroto Habu⁴, Shinsuke Takeuchi⁴, Satoshi Arakawa⁴, Junichi Masuda⁴, Kenzi Maehara⁴, Tatsuro Nakao⁵, Kazuhiko Yamada⁴

¹Nagoya University, ²Keio University, ³Muroran Institute of Technology, ⁴ISAS/JAXA, ⁵JAXA

2022-m-11 (11:20 - 11:40)**In-Space Flight Demonstration Results of a Detonation Engine System on Sounding Rocket
S-520-31: Flight Path and Attitude**

*Hiroaki Watanabe¹, Koichi Matsuyama¹, Ken Matsuoka¹, Akira Kawasaki¹, Noboru Itouyama¹, Keisuke Goto¹, Kazuki Ishihara¹, Valentin Buyakofu¹, Tomoyuki Noda¹, Shiro Ito¹, Jiro Kasahara¹, Akiko Matsuo², Ikkoh Funaki³, Daisuke Nakata⁴, Masaharu Uchiumi⁴, Hiroto Habu³, Shinsuke Takeuchi³, Satoshi Arakawa³, Junichi Masuda³, Kenzi Maehara³, Tatsuro Nakao⁵, Kazuhiko Yamada³

¹Nagoya University, Department of Aerospace Engineering, ²Keio University, Department of Mechanical Engineering,

³Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science,

⁴Muroran Institute of Technology, Aerospace Plane Research Center, ⁵Japan Aerospace Exploration Agency

2022-m-12 (11:40 - 12:00)**In-Space Flight Demonstration Results of a Detonation Engine System on Sounding Rocket
S-520-31: Rotating Detonation Engine**

*Keisuke Goto¹, Koichi Matsuyama¹, Ken Matsuoka², Akira Kawasaki², Hiroaki Watanabe², Noboru Itouyama¹, Kazuki Ishihara², Valentin Buyakofu², Tomoyuki Noda², Jiro Kasahara², Akiko Matsuo³, Ikkoh Funaki⁴, Daisuke Nakata⁵, Masaharu Uchiumi⁵, Hiroto Habu⁴, Shinsuke Takeuchi⁴, Satoshi Arakawa⁴, Junichi Masuda⁴, Kenji Maehara⁴, Tatsuro Nakao⁶, Kazuhiko Yamada⁴

¹Nagoya Univ. Institute of Materials and Systems for Sustainability, ²Nagoya Univ. Department of Aerospace Engineering,

³Keio Univ. Department of Mechanical Engineering, ⁴Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science,

⁵Muroran Institute of Technology, Aerospace Plane Research Center,

⁶Japan Aerospace Exploration Agency, Unit I, Research and Development Directorate

2022-m-13 (12:00 - 12:20)**In-Space Flight Demonstration Results of a Detonation Engine System on Sounding Rocket
S-520-31: Pulse Detonation Engine**

*Valentin Buyakofu¹, Ken Matsuoka¹, Koichi Matsuyama¹, Keisuke Goto¹, Akira Kawasaki¹, Hiroaki Watanabe¹, Noboru Itouyama¹, Kazuki Ishihara¹, Tomoyuki Noda¹, Jiro Kasahara¹, Akiko Matsuo², Ikkoh Funaki³, Daisuke Nakata⁴, Masaharu Uchiumi⁴, Hiroto Habu³, Shinsuke Takeuchi³, Satoshi Arakawa³, Junichi Masuda³, Kenji Maehara³, Yamada Kazuhiko³, Tatsuro Nakao⁵

¹Nagoya University, ²Keio Univesity, ³JAXA/ISAS, ⁴Muroran Institute of Technology, ⁵JAXA

Session m-4)**Mar 2 (Wed) 16:00 - 17:00 [Meeting Room1]****Research and Development of Advanced Flight Vehicle**

*Chairpersons: Daisuke Akita (Tokyo Institute of Technology)
Akira Kawasaki (Nagoya University)*

2022-m-14 (16:00 - 16:20)**Development and Flight Demonstration of Reentry and Recovery Module with Deployable Aeroshell Technology for Sounding Rocket Experiment**

*Kazuhiko Yamada¹, Tatsuro Nakao¹, Hitoshi Hamori¹, Yasunori Nagata¹, Takahiro Ishimaru¹, Shun Imai¹, Kaho Maeda¹, Kenji Maehara¹, Takahiro Moriyoshi¹, Hideo Takayasu¹, Yuuki Akimoto², Hideto Takasawa³, Minami Mori⁴, Marie Mitsuno⁴, Koshiro Hirata⁵, Tatsuma Kawakubo⁶, Yuuma Yagi¹, Ryosuke Ono¹, Hiroto Habu¹, Kojiro Suzuki⁷

¹*Japan Aerospace Exploration Agency*, ²*Nagoya University*, ³*Hokkaido University*, ⁴*Tokyo University of Science*,

⁵*The University of Agriculture and Technology*, ⁶*Tokyo Institute of Technology*, ⁷*The University of Tokyo*

2022-m-15 (16:20 - 16:40)**Flight Test and Simulation of Active Aeroelastic Control Technology Demonstrator for Realization of Small Pseudo-Satellite**

*Naoto Morita, Shinichi Nakasuka, Takeshi Tsuchiya

The University of Tokyo, Department of Aeronautics and Astronautics

2022-m-16 (16:40 - 17:00)**Optimum Configuration of Super-Pressure Balloon Covered by a Diamond-Shaped Net**

*Kyoichi Nakashino¹, Yoshitaka Saito², Daisuke Akita³, Takuma Matsuo⁴

¹*Tokai University, Department of Aeronautics and Astronautics*, ²*Institute of Space and Astronautical Science*,

³*Japan Aerospace Exploration Agency*, ⁴*Tokyo Institute of Technology, Department of Transdisciplinary Science and Engineering*,

⁴*Meiji University, Department of Mechanical Engineering*

Session n-1)**Mar 2 (Wed) 9:00 - 10:40 [Meeting Room33]****Earth Environmental Observation by Optical Imager**

Chairperson: Rigen Shimada (Japan Aerospace Exploration Agency)

2022-n-01 (9:00 - 9:20)**Global Environment Observation by GCOM-C "SHIKISAI"**

*Hiroshi Murakami

Japan Aerospace Exploration Agency, Earth Observation Research Center

2022-n-02 (9:20 - 9:40)**APAR Variability in the Northeast Asia Seas**

*Robert J Frouin¹, Jing Tan¹, Toru Hirawake², Hiroshi Murakami³

¹*Scripps Institution of Oceanography*, ²*National Institute of Polar Research*, ³*JAXA*

2022-n-03 (9:40 - 10:00)**Monitoring of Simultaneous Floods Around a Retarding Basin Using Satellite Images**

*Toshiro Sugimura¹, Kuniaki Isobe², Yuuki Uchida¹

¹*Nihon Univ. Department of Civil Engineering*, ²*Chuo College of Technology*

2022-n-04 (10:00 - 10:20)

Quantification of Submerged Aquatic Vegetation in Lake Biwa Using GCOM-C

*Hiroaki Sato¹, Junichi Susaki², Kanako Ishikawa³, Daikichi Seki⁴, Yosuke Alex. Yamashiki^{1,4}

¹Graduate School of Advanced Integrated Studies in Human Survivability Kyoto University, ²Kyoto University, ³Lake Biwa Environmental Research Institute, ⁴SIC Human Spaceology Center, GSALS, Kyoto University

2022-n-05 (10:20 - 10:40)

Image Matching Strategy with Other Satellite Imageries for Geostationary Earth Observation Satellite

*Yosuke Takeo¹, Takeshi Sekiguchi¹, Shinji Mitani¹, Makoto Maruya²

¹Japan Aerospace Exploration Agency, ²Geoinsight LLC.

Session n-2)

Mar 2 (Wed) 11:00 - 12:40 [Meeting Room33]

Satellite Precipitation Measurement and Application

Chairperson: Keiji Imaoka (Yamaguchi University)

2022-n-06 (11:00 - 11:20)

Accuracy Assessment of the Global Satellite Mapping of Precipitation (GSMaP) by Future Small Precipitation Radar Constellation

*Moeka Yamaji, Takuji Kubota

JAXA

2022-n-07 (11:20 - 11:40)

An approach to Rainfall Normalization Module for GSMAp Microwave Imagers and Sounders

*Munehisa K. Yamamoto¹, Takuji Kubota²

¹Remote Sensing Technology Center of Japan, ²Japan Aerospace Exploration Agency

2022-n-08 (11:40 - 12:00)

Validation of the Flood Simulation Utilizing Satellite Observation in Japan

*Kosuke Yamamoto^{1,2}, Masato Ohki¹, Kei Yoshimura^{2,1}

¹JAXA, ²The University of Tokyo

2022-n-09 (12:00 - 12:20)

A Bias Correction Algorithm for the GSMAp in GEO IR observing areas

*Hitoshi Hirose¹, Tomoko Tashima¹, Takuji Kubota¹, Tomoaki Mega², Tomoo Ushio²

¹Japan Aerospace Exploration Agency, ²Osaka Univ. Department of Engineering

2022-n-10 (12:20 - 12:40)

Precipitable Water Estimates from AHI Infrared Bands

*Keiji Imaoka¹, Misako Kachi²

¹Center for Information Infrastructure, Yamaguchi University, ²Earth Observation Research Center, Japan Aerospace Exploration Agency

Session n-3)**Mar 2 (Wed) 16:00 - 17:00 [Meeting Room33]****Small Satellites and New Approaches***Chairperson: Hiroshi Murakami (Japan Aerospace Exploration Agency)***2022-n-13 (16:00 - 16:20)****Urban Growth Impact Assessment for Outdoor Thermal Comfort and Urban-Heat Island in Manila City, Philippines***Mark Angelo Purio^{1,3}, Tetsunobu Yoshitake², Mengu Cho³¹*Electronics Engineering Department, Adamson University, Philippines,*²*Department of Civil and Architectural Engineering, Kyushu Institute of Technology, Kitakyushu City, Japan,*³*The Laboratory of Lean Satellite Enterprises and In-Orbit Experiments (LaSEINE), Kyushu Institute of Technology, Japan***2022-n-14 (16:20 - 16:40)****Observations of Middle Atmosphere Using Artificial Meteors, Especially Effect of Atmospheric Density Distribution***Chiho Motegi¹, Tsubasa Higashi¹, Ryo Oguro¹, Marin Uchikado¹, Kei Ishikawa¹, Hironori Sahara¹, Yusuke EGAWA², Koh KAMACHI²¹*Tokyo Metropolitan University, Japan*, ²*ALE Co., Ltd.***2022-n-15 (16:40 - 17:00)****Infrasound Investigation on Rocket Launches from Tanegashima Space Center, Japan***Islam Hamama^{1,2}, Masa-yuki Yamamoto¹¹*School of Systems Engineering, Kochi University of Technology, Japan*, ²*National Research Institute of Astronomy and Geophysics, NLAG, Egypt***Session n-4)****Mar 3 (Thu) 9:00 - 10:20 [Meeting Room33]****Land Optical Observation and Application***Chairperson: Rei Mitsubashi (Japan Aerospace Exploration Agency)***2022-n-17 (9:00 - 9:20)****Generalized Segmentation Model for Imbalanced High-Resolution Satellite Images Using Entropy Weighted Loss***Kenichi Sasaki¹, Tatsuyuki Sekine², Makoto Yoshioka²¹*University of Colorado Boulder, Department of Aerospace Engineering and Sciences*, ²*Amanogi corp.***2022-n-18 (9:20 - 9:40)****Volcano Monitoring on Suwanosejima Island by Satellite Images***Yuuki Uchida¹, Kuniaki Isobe², Toshiro Sugimura¹¹*Nihon Univ. Department of Civil Engineering*, ²*Chuo College of Technology***2022-n-19 (9:40 - 10:00)****Calibration Facilities and Method Based on Point-Source Reflectors for Optical Satellite Data Application**

*Masahiko Nagai, Noppawan Tamkuan, Dorj Ichikawa, Yumiko Nagai, Tsuyoshi Eguchi, Vaibhav Katiyar

Yamaguchi University, Japan

2022-n-20 (10:00 - 10:20)

New spaceborne LIDAR waveform analyse method applied to GEDI waveforms

*Rei Mitsuhashi, Yoshito Sawada, Masato Hayashi, Tadashi Imai

Japan Aerospace Exploration Agency

Session n-5)

Mar 3 (Thu) 11:00 - 12:40 [Meeting Room33]

Synthetic Aperture Radar and Application

Chairperson: Haemi Park (Japan Aerospace Exploration Agency)

2022-n-21 (11:00 - 11:25)

ALOS-2 PALSAR-2 based Soil Moisture Estimation in Chitose, Hokkaido, Japan

*Haemi Park, Takeo Tadono

JAXA Earth Observation Research Center

2022-n-22 (11:25 - 11:50)

ALOS-2 - the Pioneer Mission for L-band SAR Long-term Pantropical Forest Monitoring

*Christian Koyama¹, Manabu Watanabe², Izumi Nagatani¹, Masato Hayashi¹, Masanobu Shimada², Takeo Tadono¹

¹*JAXA, 2Tokyo Denki University*

2022-n-23 (11:50 - 12:15)

Geometric Condition of Reinforced Slopes for InSAR Analysis using ALOS-2/PALSAR-2 Data

*Tomohito Asaka, Takashi Nonaka

Nihon University

2022-n-24 (12:15 - 12:40)

ALOS-4 Signal Simulation

*Katia Nagamine Urata, Takeo Tadono, Takeshi Motohka

Japan Aerospace Exploration Agency

Session p-1)

Feb 28 (Mon) 15:40 - 17:20 [Meeting Room1]

Space Life Science

Chairperson: Takeshi Nikawa (Institute of Medical Biosciences/Institute of Space Nutrition Tokushima Univ. Graduate School)

2022-p-01 (15:40 - 16:05)

Mars Glass Town

*Takuya Ono, Makiko Nagura, Juniya Okamura

Kajima Corporation Kansai Branch

2022-p-02 (16:05 - 16:30)

Effects of Electrically Stimulated Eccentric Contraction of Antagonist Muscle on Strength and Muscle Mass of the Agonist Muscle

*Hiroshi Tajima^{1,2}, Ryuki Hashida¹, Masayuki Omoto^{1,2}, Takeshi Nago¹, Hiroo Matsuse¹, Naoto Shiba¹

¹*Kurume Univ. Department of Rehabilitation, 2Saiseikai Iizuka Kaho Hospital Department of Rehabilitation*

2022-p-03 (16:30 - 16:55)**Development of Experimental Approach for Hypervelocity Impact Sterilization**

*Takashi Ozawa¹, Satoshi Nomura¹, Kotone Miyajima², Kumi Nitta¹, Naomi Takizawa¹, Akira Nakamura², Akihiko Yamagishi³, Haruna Sugahara¹, Kazuhisa Fujita¹

¹*Japan Aerospace Exploration Agency*, ²*University of Tsukuba*, ³*Tokyo University of Pharmacy and Life Sciences*

2022-p-04 (16:55 - 17:20)**Space Exposure Experiments in Post-Tanpopo Experiments in Progress and in Future.**

*Hajime Mita¹, Hajime Yano², Itsuki Sakon³, Yoko Kebukawa⁴, Kensei Kobayashi⁴, Kaori Yokotani Tomita⁵, Kazumichi Nakagawa⁶, Masanobu Sugimoto⁷, Tetyana MILOJEVIC⁸, Akihiko Yamagishi⁹, Yoshitaka Bessho^{10,11}, Hiroshi Katoh¹², Tomoko Abe¹³, Izumi Endo³, Shunta Kimura², Midori Ong⁵, Tomomichi Fujita¹⁴, Shin-ichi Yokobori⁹, Satoshi Kodaira¹⁵, Yukio Uchibori¹⁵

¹*Fukuoka Institute of Technology*, ²*JAXA/ISAS*, ³*University of Tokyo*, ⁴*Yokohama National University*, ⁵*University of Tsukuba*, ⁶*Osaka University*, ⁷*Okayama University*, ⁸*University of Wien*, ⁹*Tokyo University of Pharmacy and Life Sciences*, ¹⁰*RIKEN/Spring-8I Academia Sinica*, ¹¹*Mie University*, ¹²*Tokyo Denki University*, ¹³*Hokkaido University*, ¹⁴*QST*

Session q-1)**Mar 3 (Thu) 9:00 - 10:20 [Conference Room]****Space Power Systems 1**

Chairperson: TBD

2022-q-02 (9:00 - 9:20)**Discharge Phenomena Occurred on High-Power Radiation Antennas and Circuit**

*Soki Akutsu¹, Koichi Ijichi², Hirobumi Saito³, Masato Tanaka⁵, Tomohiko Saitoh¹, Koji Tanaka⁴

¹*Tokyo University of Science. Faculty of science, Department of applied physics*, ²*Japan Space Systems*,

³*Waseda University. Waseda Research Institute for Science and Engineering*,

⁴*Japan Aerospace Exploration Agency. Institute of Space and Astronautical Science*, ⁵*Synspective Inc.*

2022-q-03 (9:20 - 9:40)**Energy Harvesting Using Magnetostrictive Material Based on Active Control**

*An Li¹, Taishi Watanabe¹, Yushin Hara¹, Yu Jia², Yu Shi³, Constantinos Soutis⁴, Keisuke Otsuka¹, Kanjuro Makihara¹

¹*Tohoku university. Department of Aerospace Engineering*, ²*Aston University. Department of Mechanical Engineering and Design*,

³*University of Chester. Department of Faculty of Science and Engineering*, ⁴*The University of Manchester. Department of Aerospace Engineering*

2022-q-04 (9:40 - 10:00)**Evaluation of Space Environment Resistance of WPT System for Solar Power Satellite**

*Yusuke Kishida¹, Tatsuya Yamagami², Shuji Higashigawa³, Miki Kaneko³, Takahisa Tomoda⁴, Kazuyoshi Arai³, Koji Tanaka^{4,2}

¹*HOSEI Univ. Graduate School of Science and Engineering*, ²*SOKENDAI Department of Space and Astronautical Science*,

³*HOSEI Univ. Faculty of Science and Engineering Course of Mechanical Engineering*, ⁴*Japan Aerospace Exploration Agency*

2022-q-05 (10:00 - 10:20)**Aluminum Collection from Laser Ablated Alumina Using Heated Recovery Plate Towards Lunar Regolith Utilization**

*Seiya Tanaka¹, Naoki Tanaka¹, Kimiya Komurasaki¹, Hiroyuki Koizumi², Rei Kawashima²

¹*The University of Tokyo, Department of Aeronautics and Astronautics*, ²*The University of Tokyo, Department of Advanced Energy*

Session q-2)

Mar 3 (Thu) 11:00 - 12:00 [Conference Room]

Space Power Systems 2

Chairperson: TBD

2022-q-06 (11:00 - 11:20)

The Outline of the Current Development Activities of the Space Solar Power System (SSPS) Project towards the Prospective Space Experiment

*Ijichi Koichi¹, Kenji Sasaki¹, Hirotaka Machida¹, Osamu Kashimura¹, Koji Tanaka², Kosei Ishimura³, Ryo Ishikawa⁴, Kazuhiko Honjo⁴

¹Japan Space Systems, ²Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency, ³Waseda University,

⁴The University of Electro-Communications

2022-q-09 (11:20 - 11:40)

Examination of Candidate Reception Sites for Ground Evaluation of SPS Demonstration Test Satellite

*Yoshiyuki Fujino¹, Takuya Inoue¹, Li Jialin¹, Koji Tanaka²

¹Toyo University, ²ISAS/JAXA

2022-q-10 (11:40 - 12:00)

An electric power and hydrogen management on the lunar surface

*Atsushi Uchida, Hiroki Ichihashi, Anna Kobayashi, Maria Amemiya

Mitsubishi Research Institute, Inc.

Session q-3)

Mar 3 (Thu) 16:00 - 17:40 [Conference Room]

Space Power Systems 3

Chairperson: TBD

2022-q-11 (16:00 - 16:20)

Time variation of electrical performance of perovskite solar cells

Teppei Okumura¹, *Momoko Kohsaka², Taishi Sumita¹, Mitsuru Imaizumi¹

¹JAXA, ²Advanced engineering services

2022-q-12 (16:20 - 16:40)

Development of Thin Perovskite Solar Cells for Balloon Experiments

*Shusaku Kanaya¹, Hideyuki Fuke¹, Yu Miyazawa¹, Hiroyuki Toyota¹, Kazuyuki Hirose¹, Ryoto Funayama², Masashi Ikegami³

¹JAXA, ²Kishu Giken Kogyo Co., ³Toin Univ. of Yokohama

2022-q-13 (16:40 - 17:00)

Integrated Fuel Cell Development for Spacecraft Applications

*Hitoshi Nagasaki¹, Takehiro Mugishima¹, Kotaro Horiai¹, Hitoshi Naito², Makoto Kawase², Yoshitugu Sone^{3,4}, Satoshi Yonezawa¹

¹Honda R&D Co., Ltd., Tochigi, Japan, ²Research and Development Directorate, JAXA, Tsukuba, Japan,

³Institute of Space and Astronautical Science, JAXA, Kanagawa, Japan,

⁴The Department of Space and Astronautical Science, SOKENDAI, Kanagawa, Japan

2022-q-14 (17:00 - 17:20)**Degradation and State Estimation of Lithium-Ion Batteries in Aerospace**

*Linda Juliane Bolay^{1,2}, Birger Horstmann^{1,2}, Tobias Schmitt^{1,2}, Simon Hein^{1,2}, Omar S. Mendoza-Hernandez⁴, Eiji Hososno⁶, Yoshitsugu Sone^{4,5}, Arnulf Latz^{1,2,3}

¹Institute of Engineering Thermodynamics, German Aerospace Center (DLR),

²Helmholtz Institute Ulm for Electrochemical Energy Storage (HIU), ³Institute of Electrochemistry, Ulm University,

⁴Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency (JAXA),

⁵The Graduate University of Advanced Studies (SOKENDAI),

⁶Global Zero Emission Research Center, National Institute of Advanced Industrial Science and Technology (AIST)

2022-q-15 (17:20 - 17:40)**Demonstration of Efficient Aerospace Power Controller Prototyping on the DLR Core Avionic Testbed**

*Janis Sebastian Haeseker, Niklas Aksteiner, Michael Jetzschmann, Christian Strowik, Norbert Toth

Institute of Space Systems, German Aerospace Center (DLR), Bremen, Germany

Session r-1)**Mar 1 (Tue) 16:00 - 16:55 [Conference Room]****Space Environment**

Chairpersons: Hiroaki Miyake (Tokyo City University)

Kiyokazu Koga (Japan Aerospace Exploration Agency)

2022-r-01 (16:00 - 16:20)**Analysis of Wake Region Phenomena Behind a Solar Probe in the Solar Corona Through Particle-In-Cell Simulation**

*Jorge Alberto Garcia Perez, Kojiro Suzuki

Suzuki Laboratory, Department of Aeronautics and Astronautics, Graduate School of Engineering, The University of Tokyo

2022-r-02 (16:20 - 16:40)**Ground-based Experiment for Simultaneous N2 Collisions Effect on Atomic Oxygen-induced Polyimide Erosion in sub-low Earth Orbit**

*Sasuga Horimoto¹, Atsushi Fujita¹, Shohei Urakawa², Santa Nishioka², Wataru Ide¹, Kumiko Yokota¹, Masahito Tagawa¹

¹Kobe Univ. Graduate School of Engineering, ²Kobe Univ. Depertment of Mechanic Engineering

2022-r-03 (16:40 - 16:55)**Performance Evaluation of Electron Emitting Film for Preventing Spacecraft Charging under Vacuum Ultraviolet Environment**

*Daiki Hamada

Kyushu Institute of Technology

Session r-2)

Mar 2 (Wed) 9:00 - 10:20 [Conference Room]

NEO, Space Debris Observation

*Chairpersons: Hideaki Hinagawa (Japan Aerospace Exploration Agency)
Toshiyuki Yanagisawa (Japan Aerospace Exploration Agency)*

2022-r-04 (9:00 - 9:20)

On Orbital Dynamics of Gravity Tractor Spacecraft Exploiting Artificial Halo Orbit

*Kohei Yamaguchi, Xinbo Gu, Takaya Inamori, Ji Hyun Park

Nagoya University, Department of Aerospace Engineering

2022-r-05 (9:20 - 9:40)

POLARIS: Software to Extract Angle Measurement from Optical Image

*Takuya Hatakeyama, Yuki Akiyama, Hideaki Hinagawa, Shinichi Nakamura

Japan Aerospace Exploration Agency

2022-r-06 (9:40 - 10:00)

A Target Object Classification of Radar Observation Data with Constrained Admissible Region Analysis

*Koki Fujita¹, Yuya Ariyoshi¹, Yasuhiro Yoshimura², Yasunobu Ogawa³, Toshiya Hanada²

¹*Department of Aerospace Engineering, Nippon Bunri University*, ²*Department of Aeronautics and Astronautics, Kyushu University*,

³*National Institute of Polar Research*

2022-r-07 (10:00 - 10:20)

Experiment of HTV-X Attitude Motion Estimation by SLR Data

*Yuki Akiyama, Sachio Kasho, Masato Watanabe, Shinichi Nakamura

Japan Aerospace Exploration Agency

Session r-3)

Mar 2 (Wed) 11:00 - 12:40 [Conference Room]

Collision Avoidance, Modelling, Space Traffic Management

*Chairpersons: Toshiya Hanada (Kyushu University)
Yukihito Kitazawa (Japan Aerospace Exploration Agency)*

2022-r-09 (11:00 - 11:20)

RABBIT, a space debris collision avoidance tool ~ for satellite's safety operation ~

*Arimi Uemoto, Yuki Akiyama, Shinichi Nakamura

JAXA

2022-r-10 (11:20 - 11:40)

Development of Atmospheric Density Calibration and Preliminary Results

*Hideaki Hinagawa, Yuki Akiyama, Shinichi Nakamura

Japan Aerospace Exploration Agency

2022-r-11 (11:40 - 12:00)**Analysis of Orbit Propagation Error**

*Kazunobu Takahashi, Yasuhiro Yoshimura, Hongru Chen, Toshiya Hanada

Kyushu Univ. Department of Aeronautics and Astronautics

2022-r-12 (12:00 - 12:20)**Environmental Impacts of GTO Objects on LEO**

*Ryusuke Harada¹, Satomi Kawamoto¹, Nobuaki Nagaoka¹, Toshiya Hanada²

¹*Japan Aerospace Exploration Agency*, ²*Kyushu Univ. Department of Aeronautics and Astronautics*

2022-r-13 (12:20 - 12:40)**Space Traffic Management and Emerging Space Countries: a Right to Pollute?**

*Quentin Verspieren

Graduate School of Public Policy, The University of Tokyo

Session r-4)**Mar 2 (Wed) 16:00 - 17:00 [Conference Room]****Space Debris Removal**

Chairpersons: Hironori Sahara (Japan Aerospace Exploration Agency)

Kumi Nitta (Japan Aerospace Exploration Agency)

2022-r-14 (16:00 - 16:20)**A De-Orbit Strategy with Reinforced Learning for Satellites Losing Attitude Control**

*Masahiro Furumoto, Hironori Sahara

Tokyo Metropolitan Univ. Department of Aeronautics and Astronautics

2022-r-15 (16:20 - 16:40)**A Post Mission Disposal Strategy for Small Satellites without Complete Attitude Control**

*Momoko Asano, Masahiro Furumoto, Hironori Sahara

Tokyo Metropolitan Univ. Department of Aeronautics and Astronautics

2022-r-16 (16:40 - 17:00)**Selection of Targets to Be Removed with Considering Timeliness**

*Takahiro Maruyama¹, Hongru Chen¹, Yasuhiro Yoshimura¹, Satomi Kawamoto², Toshiya Hanada¹

¹*Kyushu Univ. Department of Aeronautics and Astronautics*, ²*JAXA Research and Development Directorate*

Session t-1)

Mar 3 (Thu) 16:00 - 16:45 [Meeting Room33]

Satellite Data Application

Chairperson: Masanori Kawamura (MELCO)

2022-t-01 (16:00 - 16:15)

In-Company-Activity to Create Innovative Applications using Satellite Information using "System x Design Thinking" - Insights from Six-Year-Long Mitsubishi Design Project

Shoji Yoshikawa¹, Akihiko Honda¹, *Masanori Kawamura¹, Mao Konishi¹, Tomoko Tanabe¹, Komi Matsubara², Kazuyuki Kikuchi³, Fumihiito Oura⁴, Tsuyoshi Hirose⁴, Makoto Ioki⁴

¹Mitsubishi Electric Corp. Advanced Technology R&D Center, ²Mitsubishi Electric Corp. Integrated Design Center,

³Mitsubishi Electric Corp. Kobe Works, ⁴Keio Univ. Graduate School of System Design and Management

2022-t-03 (16:15 - 16:30)

Embedding Machine learning for Spacecraft Simulations

*Samir Khan¹, Seiji Tsutsumi², Takehisa Yairi¹, Shinichi Nakasuka¹

¹University of Tokyo, ²Jaxa

2022-t-04 (16:30 - 16:45)

Dictionary Learning on Satellite Housekeeping Data: Profiling, Imputation, Novelty Detection

*Ryosuke Tanida¹, Chun Fui Liu², Takehisa Yairi², Yusuke Fukushima²

¹The University of Tokyo. Department of Aeronautics and Astronautics,

²The University of Tokyo. Research Center for Advanced Science and Technology

Session t-2)

Mar 4 (Fri) 9:00 - 10:15 [Meeting Room33]

Systems Engineering for Satellite Design

Chairperson: Ryohei Takahashi (University of Tokyo)

2022-t-05 (9:00 - 9:15)

Knowledge Moleculization and Its Application to Efficient Reuse of Knowledge for Space Systems Development

*Ryohei Takahashi, Toshihiro Obata, Ryu Funase, Shinichi Nakasuka

The University of Tokyo

2022-t-06 (9:15 - 9:30)

A Case Study on Quantitative Impact Assessment of Regressive Process by using Worker-Hour in Systems Engineering Process for Satellite Development

*Yoshinobu Okano, Hironori Sahara

Tokyo Metropolitan University

2022-t-07 (9:30 - 9:45)

Fault Diagnosis by Using Information Transmission Path Model and Its Application to an Earth Orbiting 6U CubeSat

*Shingo Nishimoto¹, Ryohei Takahashi¹, Shintaro Nakajima², Ryu Funase¹, Shinichi Nakasuka¹

¹The University of Tokyo, Department of Aeronautics and Astronautics, ²JAXA, Institute of Space and Astronautical Science

2022-t-08 (9:45 - 10:00)**A Case Study to Develop Systems Engineering Tools for Enhancing Reliability and Efficiency of CubeSat Design and Development**

*Ryohei Takahashi, Masahiro Fujiwara, Shunichiro Nomura, Taiki Karakawa, Shingo Nishimoto, Keidai Iiyama, Kanta Yanagida, Akihiro Ishikawa, Shuhei Matsushita, Ryu Funase, Shinichi Nakasuka

The University of Tokyo

2022-t-09 (10:00 - 10:15)**Snippet Based Electronics Design for Spacecraft Avionic Controllers**

*Niklas Aksteiner, René Schulz, Janis Sebastian Häseker

Institute of Space Systems, German Aerospace Center (DLR)

Session t-3)

Mar 4 (Fri) 11:00 - 12:15 [Meeting Room33]

Model Based Systems Engineering

Chairperson: Yuuki Tomita (JAXA)

2022-t-10 (11:00 - 11:15)**Model-Based Development Method Construction Utilizing Multi-Physics System-Level Modeling and Simulation towards Automatic Docking System Demonstration on HTV-X**

*Kaname Kawatsu¹, Tadashi Masuoka¹, Kenta Nagahama¹, Yuki Tomita¹, Takashi Uchiyama¹, Takara Tanaka², Koshiro Usuku², Jun Sasaki²

¹*Japan Aerospace Exploration Agency, ²IHI-Aerospace*

2022-t-11 (11:15 - 11:30)**Behavior Analysis and Integration of HTV-X Automated Docking Demonstration Mission with Model Based Systems Engineering Approach**

*Yuki Tomita¹, Hiroki Umeda¹, Kaname Kawatsu¹, Shunsuke Iwai², Koshiro Usuku³, Daisuke Tsujita⁴, Hideki Nomoto⁵, Shohma Takatsuki¹, Masatoshi Horikawa¹, Takashi Uchiyama¹, Maki Maeda¹

¹*Japan Aerospace Exploration Agency, ²Mitsubishi Electric Corporation, ³IHI Aerospace Corporation, ⁴Mitsubishi Heavy Industries, Ltd,*

⁵*Japan Manned Space Systems Corporation*

2022-t-12 (11:30 - 11:45)**Novel Design Methodology of Satellite FDIR Architecturewith Trade-off Between Reliability and Complexity**

*Taiki Karakawa, Ryu Funase, Shinichi Nakasuka

The University of Tokyo

2022-t-13 (11:45 - 12:00)**Framework for Model-Based Approach of Life Cycle Risk Management for Spacecraft Liquid Propulsion System**

*Kaname Kawatsu^{1,2}, Yu-ichiro Izato², Atsumi Miyake²

¹*Japan Aerospace Exploration Agency, ²Yokohama National University*

2022-t-14 (12:00 - 12:15)

Development of a Dynamic Response Model Considering Trapped Gas Effect for Spacecraft Liquid Propulsion Systems

*Himeko Yamamoto, Kaname Kawatsu, Yu Daimon, Go Fujii

Research and Development Directorate, JAXA

Session u-1)

Feb 28 (Mon) 15:40 - 16:20 [Meeting Room33]

STEM and outreach

Chairperson: Kaori Sasaki (JAXA)

2022-u-01 (15:40 - 16:00)

Lecture on Satellites at Cosmic Academy for Kids -Implementing Online Courses for Elementary and Junior High School Parents and Children-

*Toshiaki Iwata^{1,2}, Tomoko Ito²

¹*Secondlife Activation Academy*, ²*Cosmic Academy for Kids*

2022-u-03 (16:00 - 16:20)

Career Path Project for Tsukuba Technical High School Using Space Technology

*Toshiaki Iwata¹, Toshio Kameda², Hiroyuki Ienaka³, Takayuki Suzuki³, Satoshi Suzuki³, Keita Hagiya³

¹*Secondlife Activation Academy*, ²*Warpsspace Inc.*, ³*University of Tsukuba, Faculty of Engineering, Information and Systems*,

³*Tsukuba Technical High School*

Session u-2)

Mar 1 (Tue) 9:00 - 9:40 [Meeting Room33]

New approach in space education

Chairpersons: Mohammed Khalil Ibrahim (Egyptian Space Agency)

Rei Kawashima (University Space Engineering Consortium)

2022-u-06 (9:00 - 9:20)

UNISEC-Global Initiative on Government Policies in Support of Space Education

*Quentin Verspieren¹, Rei Kawashima², Nate Taylor²

¹*Graduate School of Public Policy, The University of Tokyo*, ²*UNISEC-Global, Japan*

2022-u-08 (9:20 - 9:40)

Application of the Astronaut Training for Building Teamwork in Remote Work

*Nobuaki Minato¹, Ryo Sakurai², Kazuya Kito¹, Kohei Sasazawa¹, Tomoya Fukushima¹, Kenji Yamagata³

¹*Ritsumeikan Univ. Graduate School of Technology Management*, ²*Ritsumeikan Univ. College of Policy Science*,

³*Japan Aerospace Exploration Agency*

Session u-3)**Mar 1 (Tue) 11:00 - 12:00 [Meeting Room33]****Hands-on Education with hybrid rocket**

*Chairpersons: Akihiro Iwasaki (Yspace INC)
Yutaka Wada (Chiba institute of technology)*

2022-u-10 (11:00 - 11:20)**Aerodynamic Roll Attitude Control Using Movable Fins in Students' Hybrid Rocket Missions**

*Yasuaki Sakamoto, Kazuhide Kuroda, Shunsuke Onibuchi, Susumu Hara

Nagoya University

2022-u-11 (11:20 - 11:40)**A Study on Influences of Nozzle Throats and Oxygen Quantity on Combustion Performance of a Proposed Hybrid Rocket using a Plastic-bottle as an Educational Material**

Masaya Nakahara¹, *Koichi Yamaguchi¹, Kazuki Nishida¹, Fumiaki Abe¹, Kenichi Tokunaga¹, Atsushi Ishihara²

¹Ehime University, ²Saitama Institute of Technology

2022-u-12 (11:40 - 12:00)**Development of Hybrid Rocket Engine using Saccharide by High School Students**

Tomoyasu Tanigawa, *Riichi Ohta, Toshiyuki Sakita

Hyogo prefectoral Sumoto Senior High School

Session u-4)**Mar 1 (Tue) 16:00 - 17:20 [Meeting Room33]****Education with Nanosatellites**

*Chairpersons: Masahiko Yamazaki (Nihon University)
Hironori Sahara (Tokyo Metropolitan University)*

2022-u-13 (16:00 - 16:20)**Cultivation of Space Human Resources by Nationwide KOSEN Online Lectures and Idea Contest to Develop Mission Planning Ability**

*Makoto Wakabayashi¹, Kazumasa Imai², Masafumi Imai¹, Masahiro Tokumitsu³, Jun Nakaya⁴, Yukikazu Murakami⁵, Nobuto Hirakoso⁶, Taku Takada⁷, Kazuo Shimada⁸

¹National Institute of Technology (KOSEN), Niibama College, ²National Institute of Technology (KOSEN), Kochi College,

³National Institute of Technology (KOSEN), Yonago College, ⁴National Institute of Technology (KOSEN), Gifu College,

⁵National Institute of Technology (KOSEN), Kagawa College, ⁶National Institute of Technology (KOSEN), Gunma College,

⁷Tokyo Metropolitan College of Industrial Technology, ⁸Human Network KOSEN

2022-u-14 (16:20 - 16:40)**Three-year Achievements in Human Resource Development Program in Space Engineering**

*Kentaro Kitamura¹, Mitsumasa Ikeda², Sei-ichiro Miura², Kazumasa Imai³, Taku Takada⁴, Makoto Wakabayashi⁵, Yoshihiro Kajimura⁶, Nobuto Hirakoso⁷, Manabu Shinohara⁸, Masahiro Tokumitsu⁹, Jun Nakaya¹⁰, Yukikazu Murakami¹¹, Yoshihiro Kakinami¹²

¹Kyushu Institute of Technolology, ²NIT, Tokuyama College, ³Kochi College, ⁴Tokyo Metropolitan College of Inds. Tech., ⁵NIT, Niibama College, ⁶NIT, Akashi College, ⁷NIT, Gunma College, ⁸NIT, Kagoshima College, ⁹NIT, Yonago College, ¹⁰NIT, Gifu College, ¹¹NIT, Kagawa College,

¹²Hokkaido Information Univ.

2022-u-16 (16:40 - 17:00)

Proposal and Practice of Knowledge Management Methodology Incorporating Model-Based Systems Engineering in Satellite Development

*Takumi Sato, Taiga Zengo, Masahiko Yamazaki

Nihon University. Graduate School of Science and Technology Department of Aerospace Engineering

2022-u-17 (17:00 - 17:20)

Contribution of Academic and Research Collaborations to Diplomacy and Trade: Examples and Lessons from Space Capacity Building

*Quentin Verspieren^{1,2}, Xuan Phong Do^{2,3}, Naoko Shimmi¹, Yuichiro Nagai^{1,4}, Shinichi Nakasuka², Hideaki Shiroyama^{1,5}

¹*Graduate School of Public Policy, The University of Tokyo*, ²*Graduate School of Engineering, The University of Tokyo*,

³*Vietnam National Space Center, Vietnam Academy of Science and Technology, Vietnam*, ⁴*College of International Relations, Nihon University*,

⁵*Graduate Schools for Law and Politics, The University of Tokyo*

Session v-1)

Mar 1 (Tue) 9:00 - 10:40 [Meeting Room3]

Space Policy, Security and History

Chairpersons: Hirotaka Watanabe (Osaka University)

Yasuaki Hashimoto (National Institute for Defense Studies)

2022-v-01 (9:00 - 9:25)

The Evolution of Japan's Space Policy and Organizations: Domestic, Diplomatic and Security Challenges

*Hirotaka Watanabe

Osaka University

2022-v-02 (9:25 - 9:50)

History of Japanese Security Space Activities

*Yasuaki Hashimoto

The National Institute for Defense Studies

2022-v-03 (9:50 - 10:15)

Past, Present, and Future of Military Use of Space: From the Perspective of Space Power Theories

*Yasuhito Fukushima

National Institute for Defense Studies, Japan

2022-v-04 (10:15 - 10:40)

The Efforts of Private Sector in Space Governance

*Yuichiro Nagai

Nihon University College of International Relations

Session v-2)

Mar 1 (Tue) 11:00 - 12:15 [Meeting Room3]

Space Law

*Chairpersons: Yasuaki Hashimoto (National Institute for Defense Studies)
Masahiko Sato (Japan Aerospace Exploration Agency)*

2022-v-05 (11:00 - 11:25)

The History of the Legal System concerning Space Activities in Japan

*Masahiko Sato

JAXA, Evaluation and Audit Department

2022-v-06 (11:25 - 11:50)

A Wholistic Approach for Understanding the Current Space Law and Policy

*Yu Takeuchi

Japan Aerospace Exploration Agency

2022-v-07 (11:50 - 12:15)

Some consideration for immunity and third party liability concerning the outer space activity of private company

*Hajime Shinomiya

Japan Aerospace Exploration Agency

Session v-3)

Mar 1 (Tue) 16:00 - 17:40 [Meeting Room3]

Space Business and Governance

*Chairpersons: Souichirou Kozuka (Gakushuin University)
Masahiko Sato (Japan Aerospace Exploration Agency)*

2022-v-09 (16:00 - 16:25)

Space Investment To Encourage to Growth of Space Economy

*Misuzu Onuki

Space Access Corporation

2022-v-10 (16:25 - 16:50)

Avatar Collaboration in Space: Opportunities and Challenges of Technology and Business Development

*Naoko Sugita¹, Chiaki Ichikawa²

¹*Japan Aerospace Exploration Agency*, ²*Japan Aerospace Exploration Agency*

2022-v-11 (16:50 - 17:15)

Risk Governance of Outer Space and Cyberspace: Managing new risks and threats in coordination with commercial actors and international partners

*Masanori Muto, Yuki Kokubo, Shodai Ishii

Mitsubishi Research Institute

2022-v-12 (17:15 - 17:40)

Building Lunar and CisLunar Governance for Sustainable Space Operations partnering with Private Sector

*Yuki Kokubo, Shodai Ishii, Masanori Muto

Mitsubishi Research Institute

Session w-1)

Mar 4 (Fri) 9:00 - 10:20 [Meeting Room1]

Safety&Reliability

Chairpersons: Hiroyuki Shindou (JAXA)

Ryoji Kobayashi (JAXA)

2022-w-01 (9:00 - 9:20)

Development of Autonomous Flight Termination Software

*Takafumi Akiyama, Toru Ishikawa, Naomi Ohbuchi, Naomasa Dairaku

Advanced Technology Development Group, Department of Space System Technology, Space Engineering Development Co., Ltd.

2022-w-02 (9:20 - 9:40)

Comprehensive Safety Design for Time-critical HTV-X Automated Docking Operations

*Daisuke Tsujita¹, Hiroshi Kozawa², Hideki Nomoto³, Yuki Tomita⁴, Shunsuke Iwai⁵, Koshiro Usuku⁶, Takashi Uchiyama⁴, Maki Maeda⁴

¹*Mitsubishi Heavy Industry, Ltd.*, ²*MHI Aerospace Systems Corporation*, ³*Japan Manned Space Systems Corporation*, ⁴*Japan Aerospace Exploration Agency*, ⁵*Mitsubishi Electric Corporation*, ⁶*IHI Aerospace Corporation*

2022-w-03 (9:40 - 10:00)

JAXA/ISAS Safety Review and Safety Requirement of Sounding Rocket

*Akihide Kobayashi¹, Koichi Suzuki²

¹*Safety and Mission Assurance, JAXA, Sagamihara, Japan*

²*Safety and Mission Assurance officer, JAXA, Japan*

2022-w-04 (10:00 - 10:20)

Cable Electrostatic Discharge (ESD)

*Hiroshi KINODA, Seiichiro KAN, Tsuyoshi ITO

JAXA

Session w-2)

Mar 4 (Fri) 11:00 - 12:20 [Meeting Room1]

EEE parts

Chairpersons: Shuji Araki (JAXA)

koji Oga (JAMSS)

2022-w-05 (11:00 - 11:20)

Space Environment Tolerance of High-Density Mounting Technology

*Koichi Shinozaki, Masao Suzuki

Japan Aerospace Exploration Agency

2022-w-06 (11:20 - 11:40)

Au Wire Bonding Applicability in Integrated Circuits for Space Applications

*Shouichi Terada, Koichi Suzuki

JAXA Safety and Mission Assurance Department

2022-w-07 (11:40 - 12:00)

Experimental Approach to Make an Evaluation Guideline of Space Usable COTS

*Akifumi Maru, Koichi Suzuki

JAXA Safety and Mission Assurance Department

2022-w-08 (12:00 - 12:20)

The Online Qualification Review of JAXA EEE parts Qualification System

*Koichi Suzuki

JAXA

Finalist Student Session

Session s-1)

Mar 3 (Thu) 9:00 - 10:30 [Meeting Room2]

Finalist Student Session 1

Chairpersons: Yuichi Ikeda (*Shonan Institute of Technology*)
Yasuhiro Yoshimura (*Kyushu University*)

2022-d-69s (9:00 - 9:15)

Bifurcated Quasi-Satellite Orbits for Martian Moons eXploration (MMX)

*Nishanth Pushparaj¹, Yasuhiro Kawakatsu²

¹Department of Space and Astronautical Science, The Graduate University for Advanced Studies, SOKENDAI,

²Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency

2022-d-70s (9:15 - 9:30)

Research for Real-Time onboard Precise Orbit Determination using Precise Point Positioning

*Yoshinari Gyu, Satoshi Ikari, Ryu Funase, Shinichi Nakasuka

The University of Tokyo

2022-d-71s (9:30 - 9:45)

Landing Guidance Control Combining Powered Descending with Nonlinear Optimization and Vertical Descending with Model Prediction

*Yusuke Nakatsuka, Satoshi Satoh, Katsuhiro Yamada

Osaka Univ. Department of Mechanical Engineering

2022-d-72s (9:45 - 10:00)

Round Trip Trajectory Design by Trajectory Parts Connecting Method

*Daichi Ito¹, Yasuhiro Kawakatsu²

¹The Graduate University for Advanced Studies, ²Japan Aerospace Exploration Agency

2022-d-73s (10:00 - 10:15)

Robust Hybrid Decentralized Filter for Relative Navigation for Spacecraft Swarms

*Nobuhiro Funabiki, Satoshi Ikari, Ryu Funase, Shinichi Nakasuka

The University of Tokyo. Department of Aeronautics and Astronautics

2022-d-74s (10:15 - 10:30)

Integrated Optimization of Guidance and Navigation Scheduling for Deep Space Exploration via Stochastic Trajectory Optimization Approach

*Kota Kakihara¹, Naoya Ozaki², Akihiro Ishikawa¹, Takuya Chikazawa³, Shinichi Nakasuka¹, Ryu Funase¹

¹Department of Aeronautics and Astronautics, The University of Tokyo, ²Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency, ³Department of Advanced Energy, The University of Tokyo

Session s-2)**Mar 3 (Thu) 10:50 - 12:35 [Meeting Room2]****Finalist Student Session 2**

*Chairpersons: Hiraku Sakamoto (Tokyo Institute of Technology)
Tomohiro Yokozeiki (The University of Tokyo)*

2022-a-36s (10:50 - 11:05)**Effect of Concentration of H₂O₂ on Burning Characteristics of H₂O₂-soaked Polyethylene Foam**

*Daiki Matsugi, Yuji Nakamura

Toyohashi University of Technology, Department of Mechanical Engineering

2022-a-37s (11:05 - 11:20)**Investigation of Combustion Instability in a Hydrogen-fueled Model Ram Combustor of Pre-cooled Turbojet Engine**

*Koichi Omi¹, Kotaro Yoshihara¹, Daiki Ito¹, Hideyuki Taguchi², Shinji Nakaya¹, Mitsuhiro Tsue¹

¹*The University of Tokyo. Department of Aeronautics and Astronautics, ²Japan Aerospace Exploration Agency*

2022-a-38s (11:20 - 11:35)**Experimental Study on Airflow Mixing with a Lobed Mixer**

*Tomoaki Kaneta¹, Katsuyoshi Fukiba¹, Yusuke Maru²

¹*Shizuoka Univ. Department of Mechanical Engineering, ²Japan Aerospace Exploration Agency (JAXA)*

2022-a-39s (11:35 - 11:50)**Experimental Investigation of Hybrid Rocket Acoustics**

*Shintaro Nakamura¹, Mikiya Araki¹, Juan C. González Palencia¹, Koki Yamagishi², Kazuki Yasuda², Daisuke Nakata², Masaharu Uchiumi²

¹*Gunma University. Graduate School of Science and Technology, ²Muroran Institute of Technology. Division of Aerospace Engineering*

2022-c-28s (11:50 - 12:05)**Parametric Design Modeling in Form Finding for a deployable Structure on the Moon**

*Luciana Tenorio¹, Jun Sato², Tomohiro Yokozeiki¹

¹*The University of Tokyo Department of Aeronautics and Astronautics, ²The University of Tokyo Graduate School of Frontier Sciences*

2022-n-25s (12:05 - 12:20)**Coastline Change Detection Based on Sentinel-2 Imagery data in Jembrana Regency, Bali Province**

*Amandangi Wahyuning Hastuti^{1,2}, Masahiko Nagai^{1,3}, Komang Iwan Suniada²

¹*Graduate School of Science and Technology for Innovation, Yamaguchi University, ²Institute for Marine Research and Observation, Ministry of Marine Affairs and Fisheries Republic of Indonesia, ³Center for Research and Application of Satellite Remote Sensing, Yamaguchi University*

2022-t-15s (12:20 - 12:35)**Investigation of Anomaly Detection Method Using an Index of the System Health**

*Shun Katsube, Hironori Sahara

Tokyo Metropolitan Univ. Department of Aeronautics and Astronautics

Session s-3)

Mar 3 (Thu) 16:00 - 17:30 [Meeting Room2]

Finalist Student Session 3

*Chairpersons: Yutaka Wada (Chiba institute of technology)
Junichiro Aoyagi (University of Yamanashi)*

2022-v-13s (16:00 - 16:15)

Neo-Realism and US Space Policies, Capabilities and Endeavours

*Munazza Khalid

*Quaid-I-Azam University, Islamabad, Pakistan,
Air University, Islamabad, Pakistan*

2022-b-51s (16:15 - 16:30)

Thruster Development and Plasma Diagnostics of Microwave Discharge Ion Thruster

*Yusuke Yamashita¹, Ryudo Tsukizaki², Kazutaka Nishiyama²

¹*Tokyo Univ. Department of Aeronautics and Astronautics, ²JAXA. Institute of Space and Astronautical Science*

2022-b-52s (16:30 - 16:45)

Laser-Induced Fluorescence Measurements of a Visualized Microwave Cathode

*Takato Morishita¹, Ryudo Tsukizaki², Kazutaka Nishiyama², Hitoshi Kuninaka²

¹*The University of Tokyo, ²Japan Aerospace Exploration Agency*

2022-b-53s (16:45 - 17:00)

Experimental Prediction of Performance Degradation during Space Operation in Thrust-enhanced Microwave Discharge Ion Thruster μ10

*Kana Hattori¹, Yusuke Yamashita¹, Ryo Shirakawa², Satoshi Hosoda³, Ryudo Tsukizaki³, Kazutaka Nishiyama³

¹*The University of Tokyo. Department of Aeronautics and Astronautics, ²Kobe University. Department of Mechanical Engineering,*

³*JAXA. Institute of Space and Astronautical Science*

2022-e-36s (17:00 - 17:15)

Preliminary Experiments of Supersonic Microjets by TGI

*Tenta Tashiro¹, Shinichiro Nakao¹, Yoshiaki Miyazato¹, Yojiro Ishino²

¹*The University of Kitakyushu. Department of Mechanical Systems Engineering*

²*Nagoya Institute of Technology. Department of Mechanical Engineering*

2022-e-37s (17:15 - 17:30)

Electron Density Measurement in front of and behind the Shock Wave by a Laser Interferometer with a Variable Optical Path Length

*Tatsuru Ishikawa¹, Makoto Matsui¹, Satoshi Nomura², Kazuhisa Fujita²

¹*Shizuoka University, ²JAXA*

Technical Session Poster

Poster Session

Mar 3 (Thu) 18:00 - 20:00 [Entrance Hall]

2022-b-54p (18:00 - 20:00)

Study on Thermal Efficiency of Laser-Supported Detonation by p-v and Q-W Diagrams

*Ichiro Nakano, Hiroyuki Shiraishi

Daido University

2022-b-55p (18:00 - 20:00)

Computational and Experimental Study on the Electrohydrodynamic and Thermal Effects of DBD Plasma Actuator

*Yutaka Kaneko, Hiroyuki Nishida, Yoshiyuki Tagawa

Tokyo University of Agriculture and Technology. Department of Mechanical Systems Engineering

2022-b-57p (18:00 - 20:00)

Beam-riding Characteristic Evaluation on Multi-parabola Thruster Using Pendulum-type Measurement System

*Masayuki Takahashi¹, Kenichiro Ashikawa¹, Koichi Mori², Naofumi Ohnishi¹

¹*Tohoku Univ. Department of Aerospace Engineering, ²Osaka Metropolitan Univ. Department of Aerospace Engineering*

2022-b-59p (18:00 - 20:00)

Performance and Grid Erosion of a Miniature Water Ion Thruster during an Ongoing Long-duration Test

*Fuya Ezuka¹, Yuichi Nakagawa², Daiki Tomita², Kazuya Yaginuma², Jun Asakawa², Hiroyuki Koizumi¹, Kimiya Komurasaki³

¹*University of Tokyo Department of Advanced Energy, ²Pale Blue Inc., ³University of Tokyo Department of Aeronautics and Astronautics*

2022-b-60p (18:00 - 20:00)

Triple-probe Measurement for Microwave Discharge in Beam using 28 GHz Gyrotron

*Tatsuki Hirano, Kaisei Miyawaki, Maho Matsukura, Kohei Shimamura, Shigeru Yokota, Ryutaro Minami, Tsuyoshi Kariya

University of Tsukuba

2022-b-62p (18:00 - 20:00)

Study of the JXB Arc Thruster to Develop Low-Cost Space-Transporters

*Tetsu Mieno^{1,2}, Mikihito Tanaka¹, Yoshitaka Hisanaga¹

¹*Faculty of Science, Shizuoka University, ²Graduate School of Science & Technology, Shizuoka University*

2022-b-65p (18:00 - 20:00)

Experimental Investigation of Plasma Parameter inside a Miniature Ion Thruster Using Langmuir Probe

*Ataka Yasuho, Hiroyuki Koizumi, Kimiya Komurasaki

The University of Tokyo

2022-b-66p (18:00 - 20:00)

Experimental investigation of Magnetic Field Effect on Electron Transport in a Miniature Microwave Discharge Neutralizer

*Ryo Minematsu, Hokuto Sekine, Yasuho Ataka, Hiroyuki Koizumi, Kimiya Komurasaki

The University of Tokyo

2022-d-75p (18:00 - 20:00)

Study of Cubesat Attitude Stabilization using Low Power MTQ

*Dulani Chamika Withanage, Mengu Cho, Mariko Teramoto, Sangkyun Kim, Hirokazu Masui, Abhas Maskey, Yuta Kakimoto, Yuji Sasaki, Makiko Kishimoto, Tharindu Lakmal Dayaratna Malmadayalage, Hari Ram Shrestha, Pooja Lepcha

Kyushu Institute of Technology

2022-d-76p (18:00 - 20:00)

Model Predictive Control for Planetary Landing Considering On-off Input Constraint

*Takefumi Kosaka, Yusuke Ozawa, Toshio Kamiya

Space Systems Division, NEC Corporation, Tokyo, Japan

2022-d-77p (18:00 - 20:00)

Development Status Report of Sample Return Capsule for MMX

*Takayuki Shimoda, Toshiyuki Suzuki, Kazuhiko Yamada, Daisuke Nakayama, Takashi Ozawa, Hiroki Takayanagi, Hirokazu Adachi, Tatsuro Nakao, Yuma Yagi, Hiroshi Yagasaki

Japan Aerospace Exploration Agency

2022-d-78p (18:00 - 20:00)

Optimal Transfer Trajectory Analysis of Relative QSOs around Phobos

*Nishanth Pushparaj¹, Nicola Baresi², Yasuhiro Kawakatsu³

¹*The Graduate University for Advanced Studies, SOKENDAI*, ²*University of Surrey*, ³*Japan Aerospace Exploration Agency*

2022-e-38p (18:00 - 20:00)

Verification for Validity of the Flow Field behind the Shock Wave after through the Density Modulated Field

*Syuuusuke Hishida¹, Kazuma Mori¹, Taisei Hukuyo¹, Tomoki Inoue², Atsushi Matsuda¹

¹*Meijo University*, ²*Toshiba Infrastructure Systems & Solutions Corporation*

2022-e-39p (18:00 - 20:00)

Fluid-Structure Interaction Simulation for Estimating the Deformation of the Ballutes for Re-entry Vehicles in Supersonic Regime

Hirotaka Otsu, *Shinichiro Mekata, Tomoya Fukumoto, Yuya Oshio

Ryukoku University

2022-e-40p (18:00 - 20:00)

Experimental Investigation of Deformation of the Ballutes for Re-entry Vehicles in Supersonic Regime

Hirotaka Otsu, *Tomoya Fukumoto, Shinichiro Mekata, Yuya Oshio

Ryukoku University

2022-e-41p (18:00 - 20:00)**Numerical Investigation of Aerodynamic Characteristics of a Re-entry Capsule with Hyperbolic Contours**

Hirotaka Otsu,^{*}Masaya Nagasawa, Ryoga Tsujimoto, Yuya Oshio

Ryukoku University

2022-e-42p (18:00 - 20:00)**Experimental Investigation of Aerodynamic Characteristics of a Re-entry Capsule with Hyperbolic Contours**

Hirotaka Otsu,^{*}Ryoga Tsujimoto, Masaya Nagasawa, Yuya Oshio

Ryukoku University

2022-e-43p (18:00 - 20:00)**Arc Heating Supersonic Test for SiC**

*Koya Minami¹, Kazutaka Kitagawa², Makoto Takagi²

¹Graduate student, Dept. of Mechanical Engng., Aichi Institute of Technology (AIT),

²Dept. of Mechanical Engng., Aichi Institute of Technology (AIT)

2022-e-44p (18:00 - 20:00)**Effects of Interference Between Two Facing Plasma Actuators on Their Performance Characteristics**

*Takafumi Saito, Hiroyuki Nishida, Yutaka Kaneko, Yusuke Kakuya

Tokyo University of Agriculture and Technology. Department of Mechanical Systems Engineering

2022-e-45p (18:00 - 20:00)**Flow Diagnostics by Laser Absorption Spectroscopy Using Multi-pass Cell in Expansion Tube**

*Kota Gunji¹, Ryuji Kobayashi², Makoto Matsui¹, Kazuhiko Yamada³

¹Shizuoka Univ. Department of Mechanical Engineering, ²Shizuoka Univ. Department of Engineering, ³JAXA/ISAS

2022-g-18p (18:00 - 20:00)**Study on Orbit Control of Orbital Elevator by Propulsion System and Variable Length Tether**

*Ren Terada¹, Yoshiki Yamagiwa¹, Shoko Arita¹, Yoji Ishikawa², Kiyotoshi Otsuka²

¹Shizuoka University, ²Obayashi Corporation

2022-g-19p (18:00 - 20:00)**Analytical Study of the Dynamics of Lunar Space Elevator with considering the Ellipticity of the Orbit**

*Ryota Kato¹, Yoshiki Yamagiwa¹, Shoko Arita¹, Yoji Ishikawa², Kiyotoshi Otsuka²

¹shizuoka university, ²Obayashi Corporation

2022-j-13p (18:00 - 20:00)**Implementation of the method to estimate the propagation direction of laser beam transmitted from ground to satellite**

*Tatsuki Ikeuchi, Hiroki Yamashita, Hiroyuki Sato, Yoshihisa Takayama

Tokai University

2022-j-14p (18:00 - 20:00)

Acquisition of communicating partner by retroreflection of transmitted optical beam

*Akihiro Omura¹, Hiroki Yamashita¹, Yoshihisa Takayama¹, Norihito Yanagimoto², Jyunichi Nakajima²

¹Tokai University, ²SoftBank Corp

2022-j-15p (18:00 - 20:00)

System Design and Model Comparisons of High-Speed Data Relay Infrastructure Using Optical Communication Between Earth and Moon

*Ryuichi Hirayama, Shinichi Nakasuka

The University of Tokyo. Department of Aeronautics and Astronautics

2022-m-18p (18:00 - 20:00)

Electric Field Observation during the Medium-Scale Traveling Ionospheric Disturbance occurrence by the S-520-32 Sounding Rocket

*Miyuki Matsuyama¹, Keigo Ishisaka¹, Yuki Ashihara²

¹Toyama Prefectural University, ²National Institute of Technology, Nara College

2022-m-19p (18:00 - 20:00)

DC Electric Field Measurements in the Cusp Region by SS-520-3 Sounding Rocket

*Keigo Ishisaka¹, Takahiro Zushi², Satoshi Kurita³, Hirotugu Kojima³

¹Toyama Prefectural University, ²National Institute of Technology, Nara College, ³RISH, Kyoto University

2022-n-26p (18:00 - 20:00)

The Experiments on Corner Reflector for SAR Data Calibration at Yamaguchi University, Japan

*Noppawan Tamkuan, Dorj Ichikawa, Vaibhav Katiyar, Masahiko Nagai, Yumiko Nagai, Tsuyoshi Eguchi

Yamaguchi University, Japan

2022-n-27p (18:00 - 20:00)

The relationship between aerosol and CO₂ emissions from biomass burning

*Kazuhisa Tanada, Hiroshi Murakami

JAXA

2022-n-28p (18:00 - 20:00)

Overview and Updates of GCOM-W/AMSR2 and GOSAT-GW/AMSR3

*Rigen Shimada, Misako Kachi, Hideyuki Fujii, Keiichi Ohara, Kazuya Inaoka, Marehito Kasahara, Yasushi Kojima

Japan Aerospace Exploration Agency

2022-n-29p (18:00 - 20:00)

A Transfer Learning Approach for Flood Monitoring Among SAR Satellites

*Vaibhav Katiyar, Noppawan Tamkuan, Dorj Ichikawa, Masahiko Nagai

Yamaguchi University, Japan

2022-n-30p (18:00 - 20:00)**Satellite Attitude Optimization for Automatic Earth Observation with Cloud Detecting CNN**

*Takatomo Osaki, Takaya Inamori, Ji Hyun Park, Kohei Yamaguchi

Nagoya Univ. Department of engineering

2022-n-31p (18:00 - 20:00)**Evaluations of Long-term Trend of Total Precipitable Water Observed by the Japanese Spaceborne Microwave Radiometers**

*Keiichi Ohara¹, Takuji Kubota¹, Misako Kachi¹, Masahiro Kazumori²

¹*Japan Aerospace Exploration Agency (JAXA). Department of Space Technology Directorate 1. Earth Observation Research Center (EORC),*

²*Japan Meteorological Agency (JMA)*

2022-q-16p (18:00 - 20:00)**Evaluation for High-Rate Discharge Operation of Space Lithium Ion Cells**

*Hitoshi Hitoshi, Makoto Kawase, Ken Watanabe, Ayaka Mori

Japan Aerospace Exploration Agency

2022-q-17p (18:00 - 20:00)**Development of High Energy Density Lithium Ion Cell for Lunar Exploration**

*Ayaka Mori, Ken Watanabe, Makoto Kawase, Hitoshi Naito, Takeshi Hoshino

Japan Aerospace Exploration Agency

2022-r-19p (18:00 - 20:00)**Basic Research on Debris Deorbiting by Electric Thrusters and Electrodynamic Tethers, and Development of the 4th Osaka Sangyo University Nano-Satellite for Space Experiments**

*Hirokazu Tahara¹, Takahiro Itsuki², Tomoyuki Ikeda³, Yoshiyuki Takao⁴, Takashi Wakizono⁵, Tatsuo Onishi⁶

¹*Osaka Sangyo University, Department of Mechanical Engineering, ²Osaka Sangyo University, Graduate School of Engineering,*

Division of Mechanical Engineering, ³Tokai University, ⁴Nishinippon Institute of Technology, ⁵High Serve, Inc.,

⁶Massachusetts Institute of Technology

2022-r-21p (18:00 - 20:00)**Effects of Temperature on Ejecta from UHMwPE Fiber Composites/Aluminum Alloy Plates**

*Daichi Kimura¹, Masahiro Nishida¹, Yukihiko Nomura²

¹*Nagoya Institute of Technology, Department of Electrical and Mechanical Engineering, ²Toyobo Co., Ltd.*

2022-r-22p (18:00 - 20:00)**Simulation Study on Radio Wave Scattering by Small Objects covered with a Charged Particle Layer**

*Yohei Miyake^{1,2}, Junya Takagi², Nobuyuki Kaya³

¹*Education Center on Computational Science and Engineering, Kobe University, ²Graduate School of System Informatics, Kobe University,*

³WaveArrays, Inc.

2022-r-23p (18:00 - 20:00)**Collision Avoiding Control of Space Debris Removal Satellites with Operational Satellites**

*Noriyuki Nishijo, Hiroshi Hirayama

Department of System Design Engineering, Graduate School of Engineering Science, Akita University

2022-r-24p (18:00 - 20:00)

A Study on Attitude Motion Estimation of a Decommissioned Spacecraft in Nutation Motion

*Kanta Miyazaki^{1,2,3}, Katsuyoshi Tsujita^{1,2,3}

¹*Osaka Institute of Technology*, ²*Department of electrical, electronic and mechanical engineering*, ³*Section of electrical and electronic engineering*

2022-r-25p (18:00 - 20:00)

Quantitative Evaluation of Energy Distribution for Charged Particles Invading the Magnetic Shield for the Protection of Cosmic Rays

*Yoshihiro Kajimura¹, Morito Iizuka¹, Kazuki Akasaka¹, Yuya Oshio², Ikkoh Funaki³

¹*National Institute of Technology, Akashi College, Department of Electrical and Computer Engineering*, ²*Ryukoku University, Faculty of Advanced Science and Technology, Course of Mechanical Engineering and Robotics*, ³*Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science*

2022-r-27p (18:00 - 20:00)

Study of Voltage and Current Characteristics of Conductive Tape Tethers with Different Tape Widths and Surface Conditions

*Masahiko Tetsuya

Kyushu Institute of Technology Graduate School

2022-r-28p (18:00 - 20:00)

Development of Harpoon to Catch Space Debris

*Yasuhiro Akahoshi, Yuki Nakamura, Teo Lenormand

Kyushu Institute of Technology, Department of Space Systems Engineering

2022-r-29p (18:00 - 20:00)

Drag Force Evaluation of Large-Scale Charged Membrane for Space Debris Removal in Laboratory Experiment

*Kazuma Ueno¹, Takanobu Muranaka¹, Teppei Okumura², Yasushi Ohkawa²

¹*Chukyo University, School of Engineering*, ²*Japan Aerospace Exploration Agency, Research and Development Directorate*

Authors' Index

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Abe F.	71	2022-u-11	Mar 1	u-3	Atarashi H.	46	2022-g-16	Mar 4	g-3
Abe T.	57	2022-m-09	Mar 2	m-2	Azami M. H.	39	2022-f-21	Mar 2	f-5
Abe T.	63	2022-p-04	Feb 28	p-1		49	2022-i-07	Mar 4	i-2
Abe Y.	15	2022-b-41	Mar 3	b-10	Baba H.	53	2022-k-21	Mar 2	k-5
Abrahamsson M.	56	2022-m-01	Mar 1	m-1	Baba K.	9	2022-a-32	Mar 3	a-8
Adachi H.	80	2022-d-77p	Mar 3	Poster Session	Baba M.	47	2022-h-05	Mar 1	h-2
Adachi M.	53	2022-k-15	Mar 1	k-4	Bagas Pangestu B.	42	2022-f-44	Mar 3	f-10
Adachi T.	57	2022-m-09	Mar 2	m-2	Bando M.	25	2022-d-23	Mar 1	d-5
Afshar N. F.	9	2022-a-31	Mar 2	a-7		26	2022-d-30	Mar 1	d-7
Agdlet F. A.	38	2022-f-12	Mar 1	f-3		30	2022-d-58	Mar 4	d-14
Aicher M.	46	2022-g-13	Mar 4	g-3	Bando N.	54	2022-l-04	Mar 1	l-2
Akahoshi Y.	84	2022-r-28p	Mar 3	Poster Session	Barato F.	4	2022-o-1-25	Mar 4	o-1-5
Akasaka K.	84	2022-r-25p	Mar 3	Poster Session	Baresi N.	23	2022-d-15	Mar 1	d-3
Akimoto Y.	59	2022-m-14	Mar 2	m-4		80	2022-d-78p	Mar 3	Poster Session
Akita D.	31	2022-e-01	Mar 2	e-1	Benner L. A.	55	2022-l-05	Mar 1	l-2
	57	2022-m-07	Mar 2	m-2	Bernardini N.	23	2022-d-15	Mar 1	d-3
	59	2022-m-16	Mar 2	m-4	BERTHET M.	24	2022-d-19	Mar 1	d-4
Akiyama K.	35	2022-e-28	Mar 3	e-6		24	2022-d-22	Mar 1	d-5
Akiyama K.	21	2022-d-01	Feb 28	d-1		40	2022-f-25	Mar 2	f-6
Akiyama M.	2	2022-o-1-16	Mar 4	o-1-3	Bessho Y.	63	2022-p-04	Feb 28	p-1
Akiyama T.	74	2022-w-01	Mar 4	w-1	Bierhaus E. B.	55	2022-l-05	Mar 1	l-2
Akiyama Y.	66	2022-r-05	Mar 2	r-2	Bisin R.	4	2022-o-1-26	Mar 4	o-1-5
	66	2022-r-07	Mar 2	r-2	Bolay L. J.	65	2022-q-14	Mar 3	q-3
	66	2022-r-09	Mar 2	r-3	Bonardi S.	51	2022-k-08	Mar 1	k-2
	66	2022-r-10	Mar 2	r-3	BÖRner M.	9	2022-a-29	Mar 2	a-7
Aksteiner N.	47	2022-h-07	Mar 1	h-2	Braun B.	46	2022-g-13	Mar 4	g-3
	65	2022-q-15	Mar 3	q-3	Buyakofu V.	58	2022-m-10	Mar 2	m-3
	69	2022-t-09	Mar 4	t-2		58	2022-m-11	Mar 2	m-3
Akutsu M.	35	2022-e-24	Mar 3	e-6		58	2022-m-12	Mar 2	m-3
Akutsu S.	63	2022-q-02	Mar 3	q-1		58	2022-m-13	Mar 2	m-3
Amaki Y.	42	2022-f-39	Mar 3	f-9	Campagnola S.	31	2022-d-67	Mar 4	d-16
Ambatali C. M.	43	2022-f-49	Mar 4	f-11	Carlotti S.	5	2022-a-04	Feb 28	a-1
Amemiya M.	64	2022-q-10	Mar 3	q-2	Carmicino C.	2	2022-o-1-09	Mar 3	o-1-2
Ando S.	47	2022-h-01	Mar 1	h-1	Cerejo H. U.	24	2022-d-21	Mar 1	d-5
Anyoji M.	36	2022-e-34	Mar 4	e-8	Chae D.	3	2022-o-1-20	Mar 4	o-1-4
Aoyagi K.	13	2022-b-24	Mar 2	b-6	Chan C.	39	2022-f-20	Mar 2	f-5
	37	2022-f-07	Mar 1	f-2	Chen H.	55	2022-l-10	Mar 1	l-4
Arai F.	7	2022-a-15	Mar 1	a-4		67	2022-r-11	Mar 2	r-3
Arai H.	42	2022-f-41	Mar 3	f-9		67	2022-r-16	Mar 2	r-4
Arai K.	63	2022-q-04	Mar 3	q-1	Chikazawa T.	23	2022-d-14	Mar 1	d-3
Arai T.	41	2022-f-37	Mar 3	f-9		26	2022-d-35	Mar 2	d-8
Arai T.	55	2022-l-07	Mar 1	l-3		31	2022-d-67	Mar 4	d-16
Arakawa M.	22	2022-d-05	Feb 28	d-1		76	2022-d-74s	Mar 3	s-1
Arakawa S.	58	2022-m-10	Mar 2	m-3	Cho M.	27	2022-d-41	Mar 2	d-10
	58	2022-m-11	Mar 2	m-3		37	2022-f-06	Mar 1	f-2
	58	2022-m-12	Mar 2	m-3		37	2022-f-09	Mar 1	f-2
	58	2022-m-13	Mar 2	m-3		38	2022-f-10	Mar 1	f-3
Araki M.	77	2022-a-39s	Mar 3	s-2		38	2022-f-14	Mar 1	f-3
Araki T.	35	2022-e-27	Mar 3	e-6		39	2022-f-21	Mar 2	f-5
Areda E. E.	43	2022-f-51	Mar 4	f-12		42	2022-f-40	Mar 3	f-9
Arita S.	81	2022-g-18p	Mar 3	Poster Session		42	2022-f-44	Mar 3	f-10
	81	2022-g-19p	Mar 3	Poster Session		43	2022-f-51	Mar 4	f-12
Ariyoshi Y.	66	2022-r-06	Mar 2	r-2		44	2022-f-52	Mar 4	f-12
Armbruster W.	7	2022-a-18	Mar 1	a-4		44	2022-f-53	Mar 4	f-12
Armellin R.	23	2022-d-15	Mar 1	d-3		44	2022-f-54	Mar 4	f-12
Asahara M.	11	2022-b-07	Mar 1	b-2		48	2022-i-05	Mar 3	i-1
Asai T.	11	2022-b-13	Mar 1	b-3		49	2022-i-07	Mar 4	i-2
Asai T.	54	2022-k-26	Mar 2	k-6		61	2022-n-13	Mar 2	n-3
	54	2022-k-27	Mar 2	k-6		80	2022-d-75p	Mar 3	Poster Session
Asaka T.	62	2022-n-23	Mar 3	n-5	Chow C. L.	39	2022-f-21	Mar 2	f-5
Asakawa J.	79	2022-b-59p	Mar 3	Poster Session	Chujo T.	24	2022-d-18	Mar 1	d-4
Asano M.	67	2022-r-15	Mar 2	r-4		26	2022-d-31	Mar 1	d-7
Asano Y.	28	2022-d-51	Mar 3	d-12		27	2022-d-37	Mar 2	d-9
Ashida Y.	10	2022-b-04	Feb 28	b-1		42	2022-f-39	Mar 3	f-9
Ashihara Y.	82	2022-m-18p	Mar 3	Poster Session	Ciccarelli E.	23	2022-d-15	Mar 1	d-3
Ashikawa K.	79	2022-b-57p	Mar 3	Poster Session	Clatworthy K.	38	2022-f-16	Mar 1	f-4
Aso S.	1	2022-o-1-03	Mar 3	o-1-1	Cordova-Alarcon J. R.	27	2022-d-41	Mar 2	d-10
	45	2022-g-07	Mar 4	g-2		42	2022-f-40	Mar 3	f-9
Ataka Y.	80	2022-b-66p	Mar 3	Poster Session		39	2022-f-21	Mar 2	f-5

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Crespo P.O.	44	2022-f-53	Mar 4	f-12	Fujita A.	20	2022-c-18	Mar 1	c-4
Da Silva Curiel A.	38	2022-f-12	Mar 1	f-3	Fujita K.	33	2022-e-13	Mar 2	e-3
Daimon Y.	38	2022-f-16	Mar 1	f-4		47	2022-h-05	Mar 1	h-2
Dairaku N.	47	2022-h-05	Mar 1	h-2		53	2022-k-19	Mar 2	k-5
Daisuke S.	70	2022-t-14	Mar 4	t-3		63	2022-p-03	Feb 28	p-1
Darau V. D.	74	2022-w-01	Mar 4	w-1	Fujita K.	78	2022-e-37s	Mar 3	s-3
Dayarathna T.	8	2022-a-23	Mar 2	a-6		18	2022-c-08	Mar 1	c-2
Deeken J.	38	2022-f-12	Mar 1	f-3	Fujita K.	56	2022-l-17	Mar 2	l-6
Deeken J. C.	39	2022-f-21	Mar 2	f-5	Fujita K.	66	2022-r-06	Mar 2	r-2
Dei Tos D.	44	2022-f-53	Mar 4	f-12	Fujita M.	20	2022-c-18	Mar 1	c-4
del Valle S. C.	9	2022-a-31	Mar 2	a-7		49	2022-i-08	Mar 4	i-2
Desmariaux J.	9	2022-a-29	Mar 2	a-7	Fujita M.	49	2022-j-02	Mar 3	j-1
DESTINY+ Project Team	30	2022-d-60	Mar 4	d-14	Fujita M.	9	2022-a-32	Mar 3	a-8
Dixit K.	46	2022-d-21	Mar 1	d-5	Fujita S.	37	2022-f-03	Feb 28	f-1
Dong S.	46	2022-g-13	Mar 4	g-3		39	2022-f-19	Mar 1	f-4
Dong Z.	55	2022-g-13	Mar 1	l-3	Fujita T.	43	2022-f-46	Mar 3	f-10
dos Santos Hahn R.	72	2022-u-17	Mar 1	u-4	Fujita T.	63	2022-p-04	Feb 28	p-1
Drobczyk M.	18	2022-c-08	Mar 1	c-2	Fujiwara M.	39	2022-f-20	Mar 2	f-5
Dumont E.	34	2022-c-17	Mar 3	e-4		41	2022-f-37	Mar 3	f-9
Ecker T.	9	2022-a-29	Mar 2	a-7	Fujiwara M.	42	2022-f-41	Mar 3	f-9
Edamoto M.	46	2022-h-07	Mar 1	h-2		69	2022-t-08	Mar 4	t-2
Egawa Y.	46	2022-g-12	Mar 4	g-3	Fukada M.	57	2022-m-07	Mar 2	m-2
Eguchi H.	15	2022-b-41	Mar 3	b-10		2	2022-o-1-15	Mar 4	o-1-3
Eguchi T.	61	2022-n-14	Mar 2	n-3	Fukai K.	3	2022-o-1-22	Mar 4	o-1-5
Eichel S.	61	2022-n-14	Mar 3	o-1-1		40	2022-f-23	Mar 2	f-5
Ejima F.	18	2022-c-07	Mar 1	c-2	Fukatsu T.	11	2022-b-12	Mar 1	b-3
Emori K.	61	2022-n-19	Mar 3	n-4	Fuke H.	48	2022-i-01	Mar 3	i-1
Endo I.	82	2022-n-26p	Mar 3	Poster Session		56	2022-m-02	Mar 1	m-1
Enokida K.	46	2022-g-13	Mar 4	g-3	Fukiba K.	57	2022-m-03	Mar 1	m-1
Ertl M.	46	2022-g-14	Mar 4	g-3	Fukuda S.	57	2022-m-05	Mar 1	m-1
Ezaki K.	46	2022-g-14	Mar 4	g-3	Fukuda Y.	57	2022-m-08	Mar 2	m-2
Ezuka F.	10	2022-b-04	Feb 28	b-1	Fukumoto T.	64	2022-q-12	Mar 3	q-3
Fajardo I.	79	2022-b-59p	Mar 3	Poster Session	Fukuba K.	77	2022-a-38s	Mar 3	s-2
Fischer H.	37	2022-f-02	Feb 28	f-1	Fukuda S.	79	2022-d-52	Mar 3	d-13
Franquesa F. G.	37	2022-f-05	Mar 1	f-2	Fukuda Y.	39	2022-f-21	Mar 2	f-5
Froissart L.	50	2022-d-60	Mar 4	d-14	Fukumoto T.	80	2022-e-39p	Mar 3	Poster Session
Frouin R. J.	51	2022-k-08	Mar 1	k-2		80	2022-e-40p	Mar 3	Poster Session
Fu X.	59	2022-n-02	Mar 2	n-1	Fukushima D.	80	2022-g-16	Mar 4	g-3
Fuchiwaki O.	23	2022-d-15	Mar 1	d-3	Fukushima T.	70	2022-u-08	Mar 1	u-2
Fujigaki M.	25	2022-d-25	Mar 1	d-6	Fukushima Y.	72	2022-v-03	Mar 1	v-1
Fujii G.	19	2022-c-16	Mar 1	c-4	Fukushima Y.	68	2022-t-04	Mar 3	t-1
Fujii H.	21	2022-c-23	Mar 2	c-5	Fukuyo T.	42	2022-f-41	Mar 3	f-9
Fujii H.	70	2022-t-14	Mar 4	t-3		43	2022-f-49	Mar 4	f-11
Fujii M.	82	2022-n-28p	Mar 3	Poster Session	Funabiki N.	43	2022-f-50	Mar 4	f-12
Fujii M.	6	2022-a-12	Mar 1	a-3		43	2022-f-50	Mar 4	f-12
Fujii M.	54	2022-k-22	Mar 2	k-5	Funabiki N.	44	2022-f-55	Mar 4	f-13
Fujii M.	25	2022-d-25	Mar 1	d-6		44	2022-f-57	Mar 4	f-13
Fujii T.	36	2022-e-31	Mar 4	e-7		76	2022-d-73s	Mar 3	s-1
Fujii Y.	46	2022-g-16	Mar 4	g-3	Funaki I.	10	2022-b-01	Feb 28	b-1
Fujikawa T.	46	2022-g-05	Mar 4	g-1		10	2022-b-05	Feb 28	b-1
Fujimori Y.	46	2022-g-16	Mar 4	g-3		11	2022-b-12	Mar 1	b-3
Fujimoto K.	47	2022-g-17	Mar 4	g-3		12	2022-b-15	Mar 1	b-3
Fujimoto K.	6	2022-a-12	Mar 1	a-3		12	2022-b-18	Mar 1	b-4
Fujimoto K.	40	2022-f-27	Mar 2	f-6		12	2022-b-20	Mar 1	b-4
Fujimoto K.	44	2022-f-55	Mar 4	f-13		16	2022-b-42	Mar 3	b-10
Fujimoto K.	44	2022-f-57	Mar 4	f-13		16	2022-b-43	Mar 3	b-10
Fujimoto K.	28	2022-d-51	Mar 3	d-12		16	2022-b-44	Mar 4	b-11
Fujino Y.	64	2022-q-09	Mar 3	q-2		58	2022-m-10	Mar 2	m-3
Fujioka S.	15	2022-b-41	Mar 3	b-10		58	2022-m-11	Mar 2	m-3
Fujita A.	65	2022-r-02	Mar 1	r-1		58	2022-m-12	Mar 2	m-3
						84	2022-r-25p	Mar 3	Poster Session
					Funase R.	26	2022-d-34	Mar 2	d-8
						28	2022-d-49	Mar 3	d-12
						31	2022-d-67	Mar 4	d-16
						39	2022-f-20	Mar 2	f-5
						40	2022-f-27	Mar 2	f-6
						40	2022-f-28	Mar 2	f-6
						41	2022-f-37	Mar 3	f-9
						42	2022-f-41	Mar 3	f-9
						43	2022-f-49	Mar 4	f-11
						44	2022-f-55	Mar 4	f-13

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
	44	2022-f-57	Mar 4	f-13	Hanaoka K.	15	2022-b-38	Mar 3	b-9
	44	2022-f-58	Mar 4	f-13	Hanazawa A.	42	2022-f-44	Mar 3	f-10
	48	2022-i-04	Mar 3	i-1	Handa Y.	31	2022-e-02	Mar 2	e-1
	68	2022-t-05	Mar 4	t-2	Hara R.	16	2022-b-42	Mar 3	b-10
	68	2022-t-07	Mar 4	t-2	Hara S.	51	2022-k-04	Feb 28	k-1
	69	2022-t-08	Mar 4	t-2	Hara S.	14	2022-b-29	Mar 2	b-7
	69	2022-t-12	Mar 4	t-3	Hara S.	71	2022-u-10	Mar 1	u-3
	76	2022-d-70s	Mar 3	s-1	Hara Y.	63	2022-q-03	Mar 3	q-1
	76	2022-d-73s	Mar 3	s-1	Harada H.	39	2022-f-21	Mar 2	f-5
	76	2022-d-74s	Mar 3	s-1	Harada R.	22	2022-d-03	Feb 28	d-1
Funatsu M.	32	2022-e-03	Mar 2	e-1	Harada R.	67	2022-r-12	Mar 2	r-3
Funayama R.	57	2022-m-05	Mar 1	m-1	Haraguchi S.	45	2022-g-03	Mar 4	g-1
	64	2022-q-12	Mar 3	q-3	Hardi J.	7	2022-a-18	Mar 1	a-4
Furukawa T.	14	2022-b-33	Mar 3	b-8		9	2022-a-29	Mar 2	a-7
	14	2022-b-34	Mar 3	b-8	Hartzell C. M.	55	2022-l-05	Mar 1	l-2
Furumoto M.	67	2022-r-14	Mar 2	r-4	Haruyama J.	51	2022-k-04	Feb 28	k-1
	67	2022-r-15	Mar 2	r-4		51	2022-k-05	Mar 1	k-2
Furya H.	19	2022-c-12	Mar 1	c-3		51	2022-k-06	Mar 1	k-2
	19	2022-c-13	Mar 1	c-3		51	2022-k-07	Mar 1	k-2
	19	2022-c-15	Mar 1	c-4		52	2022-k-14	Mar 1	k-4
	39	2022-f-18	Mar 1	f-4		53	2022-k-16	Mar 1	k-4
Furya Y.	8	2022-a-26	Mar 2	a-6	Hasebe H.	54	2022-k-26	Mar 2	k-6
Galla D.	37	2022-f-05	Mar 1	f-2	Hasegawa K.	9	2022-a-32	Mar 3	a-8
Garcia Perez J. A.	40	2022-f-25	Mar 2	f-6	Hasegawa N.	45	2022-g-04	Mar 4	g-1
	65	2022-r-01	Mar 1	r-1	Hasegawa S.	17	2022-c-04	Feb 28	c-1
Geshi N.	51	2022-k-06	Mar 1	k-2	Häseker J. S.	65	2022-q-15	Mar 3	q-3
Gilimalage A. S.	22	2022-d-07	Feb 28	d-2		46	2022-g-15	Mar 4	g-3
Gokce M.	23	2022-d-10	Feb 28	d-2		69	2022-t-09	Mar 4	t-2
González G. R.	38	2022-f-12	Mar 1	f-3	Hashida R.	62	2022-p-02	Feb 28	p-1
González Palencia J. C.	77	2022-a-39s	Mar 3	s-2	Hashimoto H.	36	2022-f-01	Feb 28	f-1
Gopal S.	5	2022-a-02	Feb 28	a-1	Hashimoto T.	54	2022-l-04	Mar 1	l-2
Goto K.	58	2022-m-10	Mar 2	m-3	Hashimoto Y.	72	2022-v-02	Mar 1	v-1
	58	2022-m-11	Mar 2	m-3	Hashimoto Y.	1	2022-o-1-05	Mar 3	o-1-1
	58	2022-m-12	Mar 2	m-3	Hashish A. E.	4	2022-o-1-26	Mar 4	o-1-5
	58	2022-m-13	Mar 2	m-3	Hastuti A. W.	77	2022-n-25s	Mar 3	s-2
GRIMM C.	46	2022-g-15	Mar 4	g-3	Hata R.	46	2022-g-10	Mar 4	g-2
Groll C.	8	2022-a-27	Mar 2	a-7	Hatakeyama T.	66	2022-r-05	Mar 2	r-2
Gu X.	23	2022-d-12	Mar 1	d-3	Hatamoto A.	34	2022-e-22	Mar 3	e-5
	41	2022-f-36	Mar 3	f-8	Hattori K.	78	2022-b-53s	Mar 3	s-3
	66	2022-r-04	Mar 2	r-2	Hattori M.	5	2022-a-07	Mar 1	a-2
Gubarevich A.	17	2022-c-01	Feb 28	c-1	Hayakawa Y.	54	2022-k-27	Mar 2	k-6
Gulmammadov F.	23	2022-d-10	Feb 28	d-2	Hayama M.	50	2022-j-07	Mar 3	j-2
Gunji K.	81	2022-e-45p	Mar 3	Poster Session	Hayashi K.	32	2022-e-07	Mar 2	e-2
Ramon R. G.	23	2022-d-13	Mar 1	d-3	Hayashi M.	62	2022-n-20	Mar 3	n-4
	53	2022-k-18	Mar 2	k-5		62	2022-n-22	Mar 3	n-5
Gyu Y.	39	2022-f-20	Mar 2	f-5	Hayashi R.	20	2022-c-20	Mar 2	c-5
	44	2022-f-58	Mar 4	f-13	Hayata M.	7	2022-a-19	Mar 2	a-5
	76	2022-d-70s	Mar 3	s-1	Hayatomo R.	7	2022-a-21	Mar 2	a-5
Habu H.	7	2022-a-19	Mar 2	a-5		8	2022-a-23	Mar 2	a-6
	58	2022-m-10	Mar 2	m-3		41	2022-f-32	Mar 2	f-7
	58	2022-m-11	Mar 2	m-3	Hayne P.	55	2022-l-05	Mar 1	l-2
	58	2022-m-12	Mar 2	m-3	Hein S.	65	2022-q-14	Mar 3	q-3
	58	2022-m-13	Mar 2	m-3	Henmi R.	53	2022-k-20	Mar 2	k-5
	59	2022-m-14	Mar 2	m-4	Henninger S.	9	2022-a-31	Mar 2	a-7
Hagiwara H.	49	2022-i-08	Mar 4	i-2	Herbertz A.	8	2022-a-27	Mar 2	a-7
Hagiwara Y.	29	2022-d-57	Mar 4	d-14	Herdrich G.	13	2022-b-26	Mar 2	b-6
Hagiya K.	70	2022-u-03	Feb 28	u-1		37	2022-f-05	Mar 1	f-2
Hahn R.	9	2022-a-30	Mar 2	a-7	Hestroffer D.	55	2022-l-10	Mar 1	l-4
	9	2022-a-31	Mar 2	a-7	HIBARI Development Team	42	2022-f-39	Mar 3	f-9
Haji K.	52	2022-k-11	Mar 1	k-3					
Hamada D.	65	2022-r-03	Mar 1	r-1	Higashi T.	61	2022-n-14	Mar 2	n-3
Hamaguchi R.	42	2022-f-42	Mar 3	f-10	Higashigawa S.	63	2022-q-04	Mar 3	q-1
Hamajima K.	50	2022-j-12	Mar 3	j-3	Higuchi T.	25	2022-d-25	Mar 1	d-6
Hamama I.	61	2022-n-15	Mar 2	n-3		29	2022-d-57	Mar 4	d-14
Hamashima Y.	56	2022-l-17	Mar 2	l-6	Hijikuro M.	36	2022-e-34	Mar 4	e-8
Hamori H.	18	2022-c-07	Mar 1	c-2	Hinagawa H.	66	2022-r-05	Mar 2	r-2
	59	2022-m-14	Mar 2	m-4		66	2022-r-10	Mar 2	r-3
Hanada H.	53	2022-k-16	Mar 1	k-4	Hirabayashi M.	53	2022-k-20	Mar 2	k-5
Hanada T.	66	2022-r-06	Mar 2	r-2	Hirai S.	1	2022-o-1-02	Mar 3	o-1-1
	67	2022-r-11	Mar 2	r-3		2	2022-o-1-13	Mar 4	o-1-3
	67	2022-r-12	Mar 2	r-3		2	2022-o-1-15	Mar 4	o-1-3
	67	2022-r-16	Mar 2	r-4		3	2022-o-1-22	Mar 4	o-1-5

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
	4	2022-o-1-24	Mar 4	o-1-5		42	2022-f-41	Mar 3	f-9
	27	2022-d-44	Mar 2	d-10	Hosono E.	65	2022-q-14	Mar 3	q-3
Hiraiwa N.	25	2022-d-23	Mar 1	d-5	Hsu K.	41	2022-f-35	Mar 3	f-8
	30	2022-d-58	Mar 4	d-14	Hsu Y.	18	2022-c-05	Feb 28	c-1
Hiraki K.	31	2022-e-02	Mar 2	e-1	Hu Z.	10	2022-b-02	Feb 28	b-1
Hirakoso N.	40	2022-f-23	Mar 2	f-5	Huang N.	39	2022-f-20	Mar 2	f-5
	71	2022-u-13	Mar 1	u-4	Hukuyo T.	80	2022-e-38p	Mar 3	Poster Session
	71	2022-u-14	Mar 1	u-4	Hyun W.	1	2022-o-1-08	Mar 3	o-1-2
Hirano T.	17	2022-b-49	Mar 4	b-12	Ichihashi H.	64	2022-q-10	Mar 3	q-2
	79	2022-b-60p	Mar 3	Poster Session	Ichikawa C.	73	2022-v-10	Mar 1	v-3
Hirasawa N.	57	2022-m-07	Mar 2	m-2	Ichikawa D.	61	2022-n-19	Mar 3	n-4
Hirasawa R.	54	2022-l-04	Mar 1	l-2		82	2022-n-26p	Mar 3	Poster Session
Hirata K.	33	2022-c-12	Mar 2	c-3		82	2022-n-29p	Mar 3	Poster Session
	59	2022-m-14	Mar 2	m-4	Idé W.	65	2022-r-02	Mar 1	r-1
Hirata M.	48	2022-i-02	Mar 3	i-1	Iemura K.	7	2022-a-15	Mar 1	a-4
Hirata N.	53	2022-k-20	Mar 2	k-5	Ienaka H.	70	2022-u-03	Feb 28	u-1
Hirawake T.	59	2022-n-02	Mar 2	n-1	Iguchi K.	7	2022-a-20	Mar 2	a-5
Hirayama H.	83	2022-r-23p	Mar 3	Poster Session	Iida T.	39	2022-f-22	Mar 2	f-5
Hirayama K.	7	2022-a-21	Mar 2	a-5	Iijima I.	57	2022-m-04	Mar 1	m-1
	8	2022-a-23	Mar 2	a-6	Iijima T.	7	2022-a-21	Mar 2	a-5
Hirayama R.	41	2022-f-32	Mar 2	f-7		8	2022-a-23	Mar 2	a-6
	39	2022-f-20	Mar 2	f-5		41	2022-f-32	Mar 2	f-7
	41	2022-f-37	Mar 3	f-9	Iijima T.	53	2022-k-19	Mar 2	k-5
	44	2022-f-57	Mar 4	f-13	Iiyama K.	22	2022-d-02	Feb 28	d-1
	82	2022-j-15p	Mar 3	Poster Session		44	2022-f-55	Mar 4	f-13
Hiroi T.	53	2022-k-20	Mar 2	k-5		69	2022-t-08	Mar 4	t-2
Hiroike N.	10	2022-b-02	Feb 28	b-1	Iizuka H.	32	2022-e-09	Mar 2	e-2
Hirokazu M.	43	2022-f-51	Mar 4	f-12	Iizuka M.	84	2022-r-25p	Mar 3	Poster Session
Hirose C.	54	2022-l-04	Mar 1	l-2	IIZUKA N.	46	2022-g-15	Mar 4	g-3
Hirose H.	60	2022-n-09	Mar 2	n-2	Iizuka T.	7	2022-a-21	Mar 2	a-5
Hirose K.	57	2022-m-05	Mar 1	m-1		8	2022-a-23	Mar 2	a-6
	64	2022-q-12	Mar 3	q-3		41	2022-f-32	Mar 2	f-7
Hirose T.	68	2022-r-01	Mar 3	r-1	Ijichi K.	63	2022-q-02	Mar 3	q-1
Hirotni T.	45	2022-g-05	Mar 4	g-1	Ijspeert A.	51	2022-k-08	Mar 1	k-2
Hisanaga Y.	79	2022-b-62p	Mar 3	Poster Session	Ikami T.	56	2022-l-17	Mar 2	l-6
Hishida S.	80	2022-e-38p	Mar 3	Poster Session	Ikari S.	28	2022-d-47	Mar 3	d-11
Hitoshi H.	83	2022-q-16p	Mar 3	Poster Session		28	2022-d-49	Mar 3	d-12
Hiwatashi R.	14	2022-b-31	Mar 3	b-8		38	2022-f-11	Mar 1	f-3
Hoang Xuan T.	41	2022-f-36	Mar 3	f-8		39	2022-f-20	Mar 2	f-5
Hodokami S.	1	2022-o-1-03	Mar 3	o-1-1		41	2022-f-34	Mar 3	f-8
Hokamoto S.	25	2022-d-23	Mar 1	d-5		41	2022-f-37	Mar 3	f-9
	26	2022-d-30	Mar 1	d-7		42	2022-f-41	Mar 3	f-9
	30	2022-d-58	Mar 4	d-14		43	2022-f-50	Mar 4	f-12
Holden K. H.	39	2022-f-21	Mar 2	f-5		44	2022-f-55	Mar 4	f-13
Holt H.	23	2022-d-15	Mar 1	d-3		44	2022-f-58	Mar 4	f-13
Honda A.	28	2022-d-51	Mar 3	d-12		48	2022-i-06	Mar 4	i-2
	68	2022-r-01	Mar 3	r-1		76	2022-d-70s	Mar 3	s-1
Honda A.	45	2022-g-03	Mar 4	g-1		76	2022-d-73s	Mar 3	s-1
Honda C.	53	2022-k-20	Mar 2	k-5	Ikebe M.	15	2022-b-40	Mar 3	b-10
Honda R.	22	2022-d-05	Feb 28	d-1		15	2022-b-41	Mar 3	b-10
Honda T.	51	2022-k-06	Mar 1	k-2	Ikeda H.	25	2022-d-24	Mar 1	d-5
Honjo K.	64	2022-q-06	Mar 3	q-2		31	2022-d-65	Mar 4	d-16
Hori K.	2	2022-o-1-14	Mar 4	o-1-3	Ikeda K.	25	2022-d-23	Mar 1	d-5
	9	2022-a-32	Mar 3	a-8		26	2022-d-30	Mar 1	d-7
	54	2022-l-04	Mar 1	l-2	Ikeda K.	18	2022-c-09	Mar 1	c-2
Horiai K.	64	2022-q-13	Mar 3	q-3		20	2022-c-18	Mar 1	c-4
Horikawa M.	69	2022-r-11	Mar 4	r-3	Ikeda M.	71	2022-u-14	Mar 1	u-4
Horimoto S.	65	2022-r-02	Mar 1	r-1	Ikeda T.	19	2022-c-16	Mar 1	c-4
Horisawa H.	11	2022-b-13	Mar 1	b-3	Ikeda T.	11	2022-b-11	Mar 1	b-3
	12	2022-b-16	Mar 1	b-4		11	2022-b-13	Mar 1	b-3
	12	2022-b-20	Mar 1	b-4		12	2022-b-16	Mar 1	b-4
	13	2022-b-25	Mar 2	b-6		13	2022-b-21	Mar 2	b-5
	16	2022-b-44	Mar 4	b-11		13	2022-b-22	Mar 2	b-5
Horstmann B.	65	2022-q-14	Mar 3	q-3		13	2022-b-24	Mar 2	b-6
Hoshii K.	21	2022-c-25	Mar 2	c-6		16	2022-b-44	Mar 4	b-11
	21	2022-c-26	Mar 2	c-6	Ikeda Y.	37	2022-f-07	Mar 1	f-2
Hoshika N.	25	2022-d-25	Mar 1	d-6		83	2022-r-19p	Mar 3	Poster Session
Hoshino T.	83	2022-q-17p	Mar 3	Poster Session		7	2022-a-21	Mar 2	a-5
Hoshiya Y.	6	2022-a-12	Mar 1	a-3		8	2022-a-23	Mar 2	a-6
Hosoda S.	10	2022-b-03	Feb 28	b-1		41	2022-f-32	Mar 2	f-7
	78	2022-b-53s	Mar 3	s-3	Ikegami M.	57	2022-m-05	Mar 1	m-1
Homonuma T.	41	2022-f-37	Mar 3	f-9		64	2022-q-12	Mar 3	q-3

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Ikemoto R.	13	2022-b-21	Mar 2	b-5		44	2022-f-58	Mar 4	f-13
	13	2022-b-22	Mar 2	b-5		48	2022-i-04	Mar 3	i-1
Ikenaga T.	54	2022-l-04	Mar 1	l-2		69	2022-t-08	Mar 4	t-2
Ikeuchi T.	81	2022-j-13p	Mar 3	Poster Session		76	2022-d-74s	Mar 3	s-1
Illig M.	46	2022-g-12	Mar 4	g-3	Ishikawa K.	60	2022-n-04	Mar 2	n-1
	46	2022-g-13	Mar 4	g-3	Ishikawa K.	16	2022-b-45	Mar 4	b-11
Imada T.	53	2022-k-21	Mar 2	k-5	Ishikawa K.	16	2022-b-46	Mar 4	b-11
Imagi A.	28	2022-d-51	Mar 3	d-12	Ishikawa R.	61	2022-n-14	Mar 2	n-3
Imaguchi D.	10	2022-b-05	Feb 28	b-1	Ishikawa T.	64	2022-q-06	Mar 3	q-2
	12	2022-b-18	Mar 1	b-4	Ishikawa T.	47	2022-h-03	Mar 1	h-1
Imai K.	40	2022-f-23	Mar 2	f-5	Ishikawa T.	36	2022-e-30	Mar 4	e-7
	71	2022-u-13	Mar 1	u-4	Ishikawa T.	78	2022-e-37s	Mar 3	s-3
	71	2022-u-14	Mar 1	u-4	Ishikawa T.	74	2022-w-01	Mar 4	w-1
Imai M.	40	2022-f-23	Mar 2	f-5	Ishikawa Y.	81	2022-g-18p	Mar 3	Poster Session
	71	2022-u-13	Mar 1	u-4		81	2022-g-19p	Mar 3	Poster Session
Imai R.	15	2022-b-37	Mar 3	b-9	Ishimaru R.	54	2022-k-22	Mar 2	k-5
	15	2022-b-38	Mar 3	b-9	Ishimaru T.	59	2022-m-14	Mar 2	m-4
Imai S.	10	2022-b-05	Feb 28	b-1	Ishimoto S.	46	2022-g-12	Mar 4	g-3
	12	2022-b-15	Mar 1	b-3	Ishimura K.	46	2022-g-13	Mar 4	g-3
	12	2022-b-18	Mar 1	b-4		19	2022-c-14	Mar 1	c-3
	59	2022-m-14	Mar 2	m-4		19	2022-c-16	Mar 1	c-4
Imai T.	62	2022-n-20	Mar 3	n-4		20	2022-c-19	Mar 2	c-5
Imaizumi M.	64	2022-q-11	Mar 3	q-3		21	2022-c-23	Mar 2	c-5
Imamura H.	55	2022-l-07	Mar 1	l-3		64	2022-q-06	Mar 3	q-2
Imamura S.	45	2022-g-05	Mar 4	g-1	Ishino Y.	78	2022-e-36s	Mar 3	s-3
Imamura T.	39	2022-f-20	Mar 2	f-5	Ishisaka K.	82	2022-m-18p	Mar 3	Poster Session
	41	2022-f-37	Mar 3	f-9		82	2022-m-19p	Mar 3	Poster Session
	42	2022-f-41	Mar 3	f-9	Ishiwata M.	39	2022-f-18	Mar 1	f-4
Imaoka K.	60	2022-n-10	Mar 2	n-2	Isobe K.	59	2022-n-03	Mar 2	n-1
Imoto Y.	28	2022-d-50	Mar 3	d-12		61	2022-n-18	Mar 3	n-4
Inamori T.	23	2022-d-12	Mar 1	d-3	Isono T.	5	2022-a-07	Mar 1	a-2
	40	2022-f-29	Mar 2	f-7		5	2022-a-08	Mar 1	a-2
	41	2022-f-36	Mar 3	f-8	ITABASHI K.	33	2022-e-13	Mar 2	e-3
	42	2022-f-42	Mar 3	f-10	Itatani K.	10	2022-b-04	Feb 28	b-1
	66	2022-r-04	Mar 2	r-2	Ito D.	76	2022-d-72s	Mar 3	s-1
	83	2022-n-30p	Mar 3	Poster Session	Ito D.	77	2022-a-37s	Mar 3	s-2
Inaoka K.	82	2022-n-28p	Mar 3	Poster Session	Ito H.	10	2022-b-06	Mar 1	b-2
Inatomi T.	15	2022-b-40	Mar 3	b-10		11	2022-b-14	Mar 1	b-3
	15	2022-b-41	Mar 3	b-10		12	2022-b-19	Mar 1	b-4
Inoue C.	8	2022-a-24	Mar 2	a-6	Ito K.	11	2022-b-10	Mar 1	b-2
	8	2022-a-25	Mar 2	a-6	Ito K.	22	2022-d-08	Feb 28	d-2
Inoue K.	21	2022-d-01	Feb 28	d-1	Ito R.	36	2022-e-33	Mar 4	e-8
Inoue K.	16	2022-b-44	Mar 4	b-11	Ito S.	58	2022-m-11	Mar 2	m-3
Inoue S.	2	2022-o-1-15	Mar 4	o-1-3	Ito T.	28	2022-d-45	Mar 3	d-11
	3	2022-o-1-22	Mar 4	o-1-5		30	2022-d-63	Mar 4	d-15
Inoue T.	64	2022-q-09	Mar 3	q-2	Ito T.	70	2022-u-01	Feb 28	u-1
Inoue T.	80	2022-e-38p	Mar 3	Poster Session	Ito T.	47	2022-h-03	Mar 1	h-1
Ioki M.	68	2022-t-01	Mar 3	t-1		74	2022-w-04	Mar 4	w-1
Ise T.	15	2022-b-40	Mar 3	b-10	Ito Y.	44	2022-f-58	Mar 4	f-13
	15	2022-b-41	Mar 3	b-10	Itoigawa Y.	2	2022-o-1-13	Mar 4	o-1-3
Ishibashi K.	22	2022-d-05	Feb 28	d-1	Itokawa K.	50	2022-j-12	Mar 3	j-3
Ishige Y.	54	2022-l-04	Mar 1	l-2	Itouryama N.	58	2022-m-10	Mar 2	m-3
Ishigooka Y.	56	2022-l-21	Mar 2	l-7		58	2022-m-11	Mar 2	m-3
Ishiguro K.	34	2022-e-19	Mar 3	e-5		58	2022-m-12	Mar 2	m-3
	34	2022-e-20	Mar 3	e-5		58	2022-m-13	Mar 2	m-3
Ishihara A.	71	2022-u-11	Mar 1	u-3	Itsuki T.	11	2022-b-11	Mar 1	b-3
Ishihara K.	58	2022-m-10	Mar 2	m-3		37	2022-f-07	Mar 1	f-2
	58	2022-m-11	Mar 2	m-3		83	2022-r-19p	Mar 3	Poster Session
	58	2022-m-12	Mar 2	m-3	Iwabuchi S.	18	2022-c-10	Mar 1	c-2
	58	2022-m-13	Mar 2	m-3	Iwai S.	69	2022-t-11	Mar 4	t-3
Ishii K.	9	2022-a-35	Mar 3	a-8		74	2022-w-02	Mar 4	w-1
Ishii S.	73	2022-v-11	Mar 1	v-3	Iwamoto K.	54	2022-k-26	Mar 2	k-6
	74	2022-v-12	Mar 1	v-3	Iwasa T.	21	2022-c-24	Mar 2	c-6
Ishikawa A.	23	2022-d-14	Mar 1	d-3	Iwata M.	17	2022-c-03	Feb 28	c-1
	39	2022-f-20	Mar 2	f-5		19	2022-c-16	Mar 1	c-4
	40	2022-f-27	Mar 2	f-6	Iwata T.	51	2022-k-07	Mar 1	k-2
	41	2022-f-37	Mar 3	f-9		52	2022-k-14	Mar 1	k-4
	42	2022-f-41	Mar 3	f-9		53	2022-k-16	Mar 1	k-4
	43	2022-f-49	Mar 4	f-11	Iwata T.	70	2022-u-01	Feb 28	u-1
	43	2022-f-50	Mar 4	f-12		70	2022-u-03	Feb 28	u-1
	44	2022-f-55	Mar 4	f-13	Iwata Y.	8	2022-a-22	Mar 2	a-5
	44	2022-f-57	Mar 4	f-13	Izato Y.	7	2022-a-20	Mar 2	a-5

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Izui K.	69	2022-t-13	Mar 4	t-3	Kariya T.	17	2022-b-49	Mar 4	b-12
	28	2022-d-51	Mar 3	d-12		79	2022-b-60p	Mar 3	Poster Session
Jara A.	42	2022-f-44	Mar 3	f-10	Kasahara J.	58	2022-m-10	Mar 2	m-3
Jara-Cespedes A.	42	2022-f-40	Mar 3	f-9		58	2022-m-11	Mar 2	m-3
Jedicke R.	55	2022-l-05	Mar 1	l-2		58	2022-m-12	Mar 2	m-3
Jeong B.	50	2022-j-09	Mar 3	j-3		58	2022-m-13	Mar 2	m-3
	50	2022-j-10	Mar 3	j-3	Kasahara M.	82	2022-n-28p	Mar 3	Poster Session
Jetzschmann M.	65	2022-q-15	Mar 3	q-3	Kashimura O.	64	2022-q-06	Mar 3	q-2
Jhozaki T.	15	2022-b-41	Mar 3	b-10	Kashioka S.	22	2022-d-04	Feb 28	d-1
Jia Y.	63	2022-q-03	Mar 3	q-1	Kashitani M.	36	2022-e-32	Mar 4	e-7
Jialin L.	64	2022-q-09	Mar 3	q-2	Kashiwagi Y.	36	2022-e-33	Mar 4	e-8
Johzaki T.	15	2022-b-40	Mar 3	b-10	Kasho S.	66	2022-r-07	Mar 2	r-2
Jotaki Y.	10	2022-b-04	Feb 28	b-1	Katagiri K.	20	2022-c-22	Mar 2	c-5
Juang J.	41	2022-f-35	Mar 3	f-8	Katayama M.	1	2022-o-1-03	Mar 3	o-1-1
	42	2022-f-38	Mar 3	f-9		45	2022-g-07	Mar 4	g-2
	44	2022-f-56	Mar 4	f-13	Katiyar V.	61	2022-n-19	Mar 3	n-4
Kachi M.	60	2022-n-10	Mar 2	n-2		82	2022-n-26p	Mar 3	Poster Session
	82	2022-n-28p	Mar 3	Poster Session		82	2022-n-29p	Mar 3	Poster Session
	83	2022-n-31p	Mar 3	Poster Session	Kato A.	11	2022-b-07	Mar 1	b-2
Kadono T.	22	2022-d-05	Feb 28	d-1	Kato C.	49	2022-j-03	Mar 3	j-1
Kaieda S.	25	2022-d-25	Mar 1	d-6		50	2022-j-07	Mar 3	j-2
Kaiser C.	37	2022-f-05	Mar 1	f-2	Kato I.	37	2022-f-09	Mar 1	f-2
Kaji K.	13	2022-b-21	Mar 2	b-5	Kato M.	10	2022-b-03	Feb 28	b-1
	13	2022-b-22	Mar 2	b-5	Kato N.	2	2022-o-1-14	Mar 4	o-1-3
Kajimura Y.	15	2022-b-41	Mar 3	b-10	Kato R.	81	2022-g-19p	Mar 3	Poster Session
	71	2022-u-14	Mar 1	u-4	Kato T.	57	2022-m-09	Mar 2	m-2
	84	2022-r-25p	Mar 3	Poster Session	Kato T.	31	2022-d-68	Mar 4	d-16
Kajiwara K.	12	2022-b-15	Mar 1	b-3	Kato T.	7	2022-a-21	Mar 2	a-5
Kakami A.	8	2022-a-22	Mar 2	a-5	Katoh H.	63	2022-p-04	Feb 28	p-1
	8	2022-a-26	Mar 2	a-6	Katsube S.	43	2022-f-45	Mar 3	f-10
Kakihara K.	23	2022-d-14	Mar 1	d-3		77	2022-t-15s	Mar 3	s-2
	31	2022-d-67	Mar 4	d-16	Katsumata Y.	51	2022-k-04	Feb 28	k-1
	43	2022-f-49	Mar 4	f-11	Katsuyama H.	16	2022-b-47	Mar 4	b-11
	43	2022-f-50	Mar 4	f-12		32	2022-e-07	Mar 2	e-2
	44	2022-f-57	Mar 4	f-13		32	2022-e-08	Mar 2	e-2
	76	2022-d-74s	Mar 3	s-1		32	2022-e-09	Mar 2	e-2
Kakimoto Y.	80	2022-d-75p	Mar 3	Poster Session	Katsuyama M.	44	2022-f-55	Mar 4	f-13
Kakinami Y.	71	2022-u-14	Mar 1	u-4	Kawabata Y.	2	2022-o-1-14	Mar 4	o-1-3
Kakuya Y.	81	2022-e-44p	Mar 3	Poster Session	Kawabata Y.	22	2022-d-02	Feb 28	d-1
KAMACHI K.	61	2022-n-14	Mar 2	n-3		26	2022-d-34	Mar 2	d-8
Kambayashi M.	28	2022-d-45	Mar 3	d-11		31	2022-d-67	Mar 4	d-16
Kameda T.	70	2022-u-03	Feb 28	u-1		39	2022-f-20	Mar 2	f-5
Kamei M.	50	2022-j-11	Mar 3	j-3		40	2022-f-27	Mar 2	f-6
Kamitani K.	38	2022-f-10	Mar 1	f-3		43	2022-f-49	Mar 4	f-11
Kamiya T.	80	2022-d-76p	Mar 3	Poster Session	Kawachi A.	48	2022-i-01	Mar 3	i-1
Kamogawa M.	39	2022-f-22	Mar 2	f-5		57	2022-m-08	Mar 2	m-2
Kamps L.	2	2022-o-1-13	Mar 4	o-1-3	Kawaguchi J.	40	2022-f-26	Mar 2	f-6
	2	2022-o-1-15	Mar 4	o-1-3		49	2022-j-02	Mar 3	j-1
	3	2022-o-1-22	Mar 4	o-1-5		56	2022-l-21	Mar 2	l-7
	4	2022-o-1-24	Mar 4	o-1-5	Kawaguchi K.	21	2022-c-26	Mar 2	c-6
	27	2022-d-44	Mar 2	d-10	Kawaguchi N.	27	2022-d-42	Mar 2	d-10
Kamps L. T.	1	2022-o-1-02	Mar 3	o-1-1		42	2022-f-39	Mar 3	f-9
KAN S.	74	2022-w-04	Mar 4	w-1	Kawahara K.	32	2022-e-04	Mar 2	e-1
Kan T.	50	2022-j-09	Mar 3	j-3	Kawakatsu Y.	23	2022-d-13	Mar 1	d-3
	50	2022-j-10	Mar 3	j-3		23	2022-d-14	Mar 1	d-3
Kanamaru M.	53	2022-k-20	Mar 2	k-5		30	2022-d-60	Mar 4	d-14
Kanaya S.	57	2022-m-05	Mar 1	m-1		53	2022-k-21	Mar 2	k-5
	64	2022-q-12	Mar 3	q-3		76	2022-d-69s	Mar 3	s-1
Kanda S.	53	2022-k-20	Mar 2	k-5		76	2022-d-72s	Mar 3	s-1
Kanda T.	52	2022-k-10	Mar 1	k-3		80	2022-d-78p	Mar 3	Poster Session
Kaneko K.	56	2022-l-17	Mar 2	l-6	Kawakubo T.	59	2022-m-14	Mar 2	m-4
Kaneko M.	63	2022-q-04	Mar 3	q-1	Kawamoto H.	52	2022-k-12	Mar 1	k-3
Kaneko Y.	79	2022-b-55p	Mar 3	Poster Session	Kawamoto R.	25	2022-d-26	Mar 1	d-6
	81	2022-e-44p	Mar 3	Poster Session	Kawamoto S.	67	2022-r-12	Mar 2	r-3
Kaneta T.	77	2022-a-38s	Mar 3	s-2		67	2022-r-16	Mar 2	r-4
Kanou H.	50	2022-j-12	Mar 3	j-3	Kawamura G.	5	2022-a-05	Mar 1	a-2
Karakawa T.	39	2022-f-20	Mar 2	f-5	Kawamura M.	49	2022-j-04	Mar 3	j-1
	44	2022-f-57	Mar 4	f-13	Kawamura M.	68	2022-t-01	Mar 3	t-1
	44	2022-f-58	Mar 4	f-13	Kawana H.	9	2022-a-35	Mar 3	a-8
	69	2022-r-08	Mar 4	t-2	Kawanabe R.	45	2022-g-03	Mar 4	g-1
	69	2022-t-12	Mar 4	t-3	Kawano I.	21	2022-d-01	Feb 28	d-1
Kariya K.	51	2022-k-04	Feb 28	k-1	Kawano T.	18	2022-c-07	Mar 1	c-2

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Kawasaki A.	29	2022-d-53	Mar 3	d-13	Kobayashi A.	74	2022-w-03	Mar 4	w-1
	58	2022-m-10	Mar 2	m-3	Kobayashi A.	64	2022-q-10	Mar 3	q-2
	58	2022-m-11	Mar 2	m-3	Kobayashi D.	54	2022-k-26	Mar 2	k-6
	58	2022-m-12	Mar 2	m-3	Kobayashi H.	54	2022-k-27	Mar 2	k-6
	58	2022-m-13	Mar 2	m-3	Kobayashi H.	42	2022-f-39	Mar 3	f-9
Kawasaki K.	9	2022-a-35	Mar 3	a-8	Kobayashi K.	6	2022-a-14	Mar 1	a-4
	64	2022-q-13	Mar 3	q-3	Kobayashi K.	5	2022-a-02	Feb 28	a-1
	83	2022-q-16p	Mar 3	Poster Session	Kobayashi K.	63	2022-p-04	Feb 28	p-1
Kawase M.	83	2022-q-17p	Mar 3	Poster Session	Kobayashi M.	35	2022-e-25	Mar 3	e-6
	9	2022-a-35	Mar 3	a-8	Kobayashi M.	54	2022-k-22	Mar 2	k-5
	40	2022-f-28	Mar 2	f-6	Kobayashi R.	25	2022-d-27	Mar 1	d-6
	40	2022-f-29	Mar 2	f-7	Kobayashi R.	81	2022-e-45p	Mar 3	Poster Session
	63	2022-q-05	Mar 3	q-1	Kobayashi S.	48	2022-i-01	Mar 3	i-1
Kawashima H.	70	2022-u-06	Mar 1	u-2	Kobayashi T.	56	2022-l-17	Mar 2	l-6
	9	2022-a-35	Mar 3	a-8	Kobayashi T.	10	2022-b-06	Mar 1	b-2
	40	2022-f-28	Mar 2	f-6		11	2022-b-14	Mar 1	b-3
Kawashima R.	40	2022-f-29	Mar 2	f-7		12	2022-b-17	Mar 1	b-4
	63	2022-q-05	Mar 3	q-1		12	2022-b-19	Mar 1	b-4
	70	2022-u-06	Mar 1	u-2	Kobayashi Y.	5	2022-a-05	Mar 1	a-2
Kawatsu K.	69	2022-t-10	Mar 4	t-3	Kodaira S.	63	2022-p-04	Feb 28	p-1
	69	2022-t-11	Mar 4	t-3	Kodama S.	26	2022-d-35	Mar 2	d-8
	69	2022-t-13	Mar 4	t-3	Kodera M.	6	2022-a-10	Mar 1	a-3
Kaya N.	70	2022-t-14	Mar 4	t-3	Koga M.	6	2022-a-11	Mar 1	a-3
	50	2022-j-08	Mar 3	j-2		30	2022-d-62	Mar 4	d-15
	83	2022-r-22p	Mar 3	Poster Session		51	2022-k-04	Feb 28	k-1
Kazuhiko Y.	58	2022-m-13	Mar 2	m-3	Kogiso N.	19	2022-c-16	Mar 1	c-4
	83	2022-n-31p	Mar 3	Poster Session		20	2022-c-17	Mar 1	c-4
	63	2022-p-04	Feb 28	p-1		21	2022-c-24	Mar 2	c-6
Kebukawa Y.	25	2022-d-26	Mar 1	d-6		42	2022-f-43	Mar 3	f-10
	78	2022-v-13s	Mar 3	s-3	Koguchi H.	54	2022-k-27	Mar 2	k-6
	68	2022-t-03	Mar 3	t-1	Kohma M.	57	2022-m-07	Mar 2	m-2
Khoo K. S.	27	2022-d-41	Mar 2	d-10	Kohsaka M.	64	2022-q-11	Mar 3	q-3
	14	2022-b-29	Mar 2	b-7	Koichi I.	64	2022-q-06	Mar 3	q-2
	53	2022-k-20	Mar 2	k-5	Koide Y.	10	2022-b-02	Feb 28	b-1
Kikuchi J.	30	2022-d-62	Mar 4	d-15	Koike S.	39	2022-f-18	Mar 1	f-4
	54	2022-l-04	Mar 1	l-2	Koizumi H.	49	2022-i-08	Mar 4	i-2
	68	2022-t-01	Mar 3	t-1		2	2022-o-1-16	Mar 4	o-1-3
Kikuchi K.	22	2022-d-05	Feb 28	d-1		4	2022-o-1-23	Mar 4	o-1-5
	25	2022-d-24	Mar 1	d-5		7	2022-a-16	Mar 1	a-4
	27	2022-d-38	Mar 2	d-9		63	2022-q-05	Mar 3	q-1
Kikuchi T.	29	2022-d-56	Mar 3	d-13		79	2022-b-59p	Mar 3	Poster Session
	54	2022-k-26	Mar 2	k-6		79	2022-b-65p	Mar 3	Poster Session
	27	2022-d-41	Mar 2	d-10		80	2022-b-66p	Mar 3	Poster Session
Kim S.	39	2022-f-21	Mar 2	f-5	Kojima H.	25	2022-d-26	Mar 1	d-6
	42	2022-f-40	Mar 3	f-9	Kojima H.	82	2022-m-19p	Mar 3	Poster Session
	44	2022-f-53	Mar 4	f-12	Kojima K.	39	2022-f-21	Mar 2	f-5
Kimoto Y.	44	2022-f-54	Mar 4	f-12	Kojima M.	9	2022-a-35	Mar 3	a-8
	80	2022-d-75p	Mar 3	Poster Session	Kojima M.	50	2022-j-11	Mar 3	j-3
	17	2022-c-04	Feb 28	c-1	Kojima M.	15	2022-b-41	Mar 3	b-10
Kimura D.	83	2022-r-21p	Mar 3	Poster Session	Kojima T.	15	2022-b-40	Mar 3	b-10
	1	2022-o-0-01	Mar 3	o-1-1	Kojima T.	82	2022-n-28p	Mar 3	Poster Session
	22	2022-d-07	Feb 28	d-2	Kokubo Y.	73	2022-v-11	Mar 1	v-3
Kimura S.	29	2022-d-52	Mar 3	d-13		74	2022-v-12	Mar 1	v-3
	63	2022-p-04	Feb 28	p-1	Komatsu G.	51	2022-k-06	Mar 1	k-2
	13	2022-b-24	Mar 2	b-6	Komatsu T.	52	2022-k-10	Mar 1	k-3
Kinoshita H.	37	2022-f-07	Mar 1	f-2	Komurasaki K.	2	2022-o-1-16	Mar 4	o-1-3
	40	2022-f-29	Mar 2	f-7		4	2022-o-1-23	Mar 4	o-1-5
	74	2022-w-04	Mar 4	w-1		7	2022-a-16	Mar 1	a-4
Kisaka S.	29	2022-d-52	Mar 3	d-13		63	2022-q-05	Mar 3	q-1
	54	2022-k-27	Mar 2	k-6		79	2022-b-59p	Mar 3	Poster Session
	63	2022-q-04	Mar 3	q-1		79	2022-b-65p	Mar 3	Poster Session
Kishida Y.	39	2022-f-21	Mar 2	f-5		80	2022-b-66p	Mar 3	Poster Session
	80	2022-d-75p	Mar 3	Poster Session	Kondo H.	39	2022-f-20	Mar 2	f-5
	20	2022-c-22	Mar 2	c-5	Kone Y.	5	2022-a-08	Mar 1	a-2
Kishimoto N.	54	2022-k-26	Mar 2	k-6	Konishi M.	68	2022-t-01	Mar 3	t-1
	20	2022-c-17	Mar 1	c-4	Konoshenko V.P.	51	2022-k-01	Feb 28	k-1
	81	2022-e-43p	Mar 3	Poster Session	Kosaka T.	80	2022-d-76p	Mar 3	Poster Session
Kitagawa K.	3	2022-o-1-21	Mar 4	o-1-4	Koshida Y.	46	2022-g-16	Mar 4	g-3
	9	2022-a-33	Mar 3	a-8	Koyama C.	47	2022-h-03	Mar 1	h-1
	45	2022-g-01	Mar 4	g-1	Koyama C.	62	2022-n-22	Mar 3	n-5
Kitamura K.	40	2022-f-23	Mar 2	f-5	Koyama C.	47	2022-h-01	Mar 1	h-1
	71	2022-u-14	Mar 1	u-4	Kozai M.	48	2022-i-01	Mar 3	i-1
	46	2022-g-16	Mar 4	g-3					
Kitazono Y.	70	2022-u-08	Mar 1	u-2					
	31	2022-e-02	Mar 2	e-1					
Klein H.	46	2022-g-13	Mar 4	g-3					
	37	2022-f-05	Mar 1	f-2					

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Kozawa H.	57	2022-m-08	Mar 2	m-2	Luebken A.	47	2022-h-07	Mar 1	h-2
Kozawa H.	74	2022-w-02	Mar 4	w-1	Luis U. G.	38	2022-f-12	Mar 1	f-3
Krummen S.	46	2022-g-13	Mar 4	g-3	Ma X.	14	2022-b-33	Mar 3	b-8
Krziwanie F.	46	2022-g-14	Mar 4	g-3	Machida H.	64	2022-q-06	Mar 3	q-2
Kubo Y.	26	2022-d-35	Mar 2	d-8	Maeda K.	59	2022-m-14	Mar 2	m-4
Kubo Y.	24	2022-d-18	Mar 1	d-4	Maeda M.	69	2022-t-11	Mar 4	t-3
Kubo Y.	17	2022-c-04	Feb 28	c-1	Machara K.	74	2022-w-02	Mar 4	w-1
Kubosaki K.	6	2022-a-09	Mar 1	a-3	Machara K.	58	2022-m-12	Mar 2	m-3
Kubota T.	51	2022-k-08	Mar 1	k-2		58	2022-m-13	Mar 2	m-3
Kubota T.	60	2022-n-06	Mar 2	n-2		59	2022-m-14	Mar 2	m-4
	60	2022-n-07	Mar 2	n-2		58	2022-m-10	Mar 2	m-3
	60	2022-n-09	Mar 2	n-2		58	2022-m-11	Mar 2	m-3
	83	2022-n-31p	Mar 3	Poster Session	Maggi F.	5	2022-a-04	Feb 28	a-1
Kuhm H.	37	2022-f-05	Mar 1	f-2	Makihara K.	18	2022-c-08	Mar 1	c-2
Kumagai S.	54	2022-k-27	Mar 2	k-6		63	2022-q-03	Mar 3	q-1
Kumagai S.	22	2022-d-03	Feb 28	d-1	Malmadyalage T. L.	80	2022-d-75p	Mar 3	Poster Session
Kumamoto A.	51	2022-k-07	Mar 1	k-2	Mamashita T.	45	2022-g-01	Mar 4	g-1
Kuninaka H.	78	2022-b-52s	Mar 3	s-3	Mariño A. C.	38	2022-f-12	Mar 1	f-3
Kuo T.	18	2022-c-05	Feb 28	c-1	Markgraf M.	46	2022-g-13	Mar 4	g-3
Kurachi K.	3	2022-o-1-17	Mar 4	o-1-4	Markov A. V.	51	2022-k-01	Feb 28	k-1
Kuramoto E.	15	2022-b-40	Mar 3	b-10	Martens H.	46	2022-g-13	Mar 4	g-3
	15	2022-b-41	Mar 3	b-10	Martin J.	7	2022-a-18	Mar 1	a-4
Kuramoto K.	53	2022-k-21	Mar 2	k-5	Maru A.	75	2022-w-07	Mar 4	w-2
Kuri T.	13	2022-b-24	Mar 2	b-6	Maru Y.	6	2022-a-13	Mar 1	a-3
	37	2022-f-07	Mar 1	f-2		47	2022-h-05	Mar 1	h-2
Kurihara J.	37	2022-f-03	Feb 28	f-1		53	2022-k-18	Mar 2	k-5
	39	2022-f-19	Mar 1	f-4		77	2022-a-38s	Mar 3	s-2
	43	2022-f-46	Mar 3	f-10	Maruta I.	28	2022-d-51	Mar 3	d-12
Kurihara T.	10	2022-b-06	Mar 1	b-2	Maruya M.	60	2022-n-05	Mar 2	n-1
	11	2022-b-14	Mar 1	b-3	Maruyama E.	10	2022-b-06	Mar 1	b-2
	12	2022-b-17	Mar 1	b-4		11	2022-b-14	Mar 1	b-3
	12	2022-b-19	Mar 1	b-4		12	2022-b-17	Mar 1	b-4
Kurita S.	82	2022-m-19p	Mar 3	Poster Session		12	2022-b-19	Mar 1	b-4
Kuroda K.	71	2022-u-10	Mar 1	u-3	Maruyama M.	16	2022-b-43	Mar 3	b-10
Kuroda S.	47	2022-h-03	Mar 1	h-1	Maruyama T.	67	2022-r-16	Mar 2	r-4
Kurokawa F.	12	2022-b-15	Mar 1	b-3	Maskey A.	80	2022-d-75p	Mar 3	Poster Session
Kurosawa C.	47	2022-h-03	Mar 1	h-1	Masuda H.	40	2022-f-29	Mar 2	f-7
Kusaka K.	54	2022-k-27	Mar 2	k-6	Masuda J.	58	2022-m-10	Mar 2	m-3
Kusawake H.	12	2022-b-15	Mar 1	b-3		58	2022-m-11	Mar 2	m-3
Kusu S.	32	2022-e-09	Mar 2	e-2		58	2022-m-12	Mar 2	m-3
Kusumoto T.	20	2022-c-18	Mar 1	c-4		58	2022-m-13	Mar 2	m-3
	24	2022-d-18	Mar 1	d-4	Masuda K.	25	2022-d-27	Mar 1	d-6
	29	2022-d-54	Mar 3	d-13		30	2022-d-59	Mar 4	d-14
Kuwabara Y.	6	2022-a-12	Mar 1	a-3	Masui H.	30	2022-d-64	Mar 4	d-15
Kuwahara D.	14	2022-b-34	Mar 3	b-8		37	2022-f-09	Mar 1	f-2
Kuwahara T.	37	2022-f-03	Feb 28	f-1		38	2022-f-10	Mar 1	f-3
	39	2022-f-19	Mar 1	f-4		38	2022-f-14	Mar 1	f-3
	43	2022-f-46	Mar 3	f-10		39	2022-f-21	Mar 2	f-5
	56	2022-l-21	Mar 2	l-7		44	2022-f-53	Mar 4	f-12
Lainey V.	55	2022-l-10	Mar 1	l-4		48	2022-i-05	Mar 3	i-1
Lam T. K.	27	2022-d-41	Mar 2	d-10		49	2022-i-07	Mar 4	i-2
Laterza M.	27	2022-d-41	Mar 2	d-10		80	2022-d-75p	Mar 3	Poster Session
Latz A.	65	2022-q-14	Mar 3	q-3	Masuoka T.	69	2022-t-10	Mar 4	t-3
Laufer R.	40	2022-f-28	Mar 2	f-6	Matsubara K.	68	2022-t-01	Mar 3	t-1
Le Corre L.	55	2022-l-05	Mar 1	l-2	Matsuda A.	80	2022-e-38p	Mar 3	Poster Session
Lee C.	1	2022-o-1-08	Mar 3	o-1-2	Matsuda R.	46	2022-g-16	Mar 4	g-3
	3	2022-o-1-20	Mar 4	o-1-4	Matsugi D.	77	2022-a-36s	Mar 3	s-2
Lee J.	2	2022-o-1-11	Mar 3	o-1-2	Matsui K.	3	2022-o-1-21	Mar 4	o-1-4
Leepcha P.	39	2022-f-21	Mar 2	f-5		9	2022-a-33	Mar 3	a-8
Lenormand T.	84	2022-r-28p	Mar 3	Poster Session	Matsui M.	16	2022-b-45	Mar 4	b-11
Lepcha P.	44	2022-f-53	Mar 4	f-12		16	2022-b-46	Mar 4	b-11
	80	2022-d-75p	Mar 3	Poster Session		16	2022-b-47	Mar 4	b-11
Leung Y. M.	4	2022-o-1-24	Mar 4	o-1-5		32	2022-e-09	Mar 2	e-2
Li A.	63	2022-q-03	Mar 3	q-1		34	2022-e-19	Mar 3	e-5
Lim J.	27	2022-d-41	Mar 2	d-10		34	2022-e-20	Mar 3	e-5
Lin A.	39	2022-f-20	Mar 2	f-5		78	2022-e-37s	Mar 3	s-3
Lin H.	18	2022-c-05	Feb 28	c-1		81	2022-e-45p	Mar 3	Poster Session
Ling J.	39	2022-f-20	Mar 2	f-5	Matsui M.	50	2022-j-12	Mar 3	j-3
Liu C. F.	68	2022-t-04	Mar 3	t-1	Matsui T.	1	2022-o-1-01	Mar 3	o-1-1
Long C. J.	26	2022-d-32	Mar 2	d-8	Matsukami T.	46	2022-g-16	Mar 4	g-3
López P. S.	24	2022-d-21	Mar 1	d-5	Matsuura M.	17	2022-b-49	Mar 4	b-12
Lu Z.	19	2022-c-14	Mar 1	c-3		79	2022-b-60p	Mar 3	Poster Session

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Matsumoto K.	6	2022-a-13	Mar 1	a-3	Minesugi K.	18	2022-c-10	Mar 1	c-2
Matsumoto K.	17	2022-c-02	Feb 28	c-1	Mita H.	63	2022-p-04	Feb 28	p-1
Matsumoto T.	22	2022-d-03	Feb 28	d-1	Mitani S.	60	2022-n-05	Mar 2	n-1
Matsumoto T.	43	2022-f-47	Mar 4	f-11	Mitsuhashi R.	62	2022-n-20	Mar 3	n-4
	43	2022-f-49	Mar 4	f-11	Mitsuno M.	59	2022-m-14	Mar 2	m-4
	43	2022-f-50	Mar 4	f-12	Miura S.	71	2022-u-14	Mar 1	u-4
Matsumoto Y.	30	2022-d-62	Mar 4	d-15	Miyabara T.	55	2022-l-07	Mar 1	l-3
Matsumoto Y.	12	2022-b-16	Mar 1	b-4	Miyajima K.	63	2022-p-03	Feb 28	p-1
	12	2022-b-20	Mar 1	b-4	Miyake A.	7	2022-a-19	Mar 2	a-5
Matsunaga H.	7	2022-a-19	Mar 2	a-5		7	2022-a-20	Mar 2	a-5
Matsunaga Y.	12	2022-b-15	Mar 1	b-3		69	2022-t-13	Mar 4	t-3
	12	2022-b-18	Mar 1	b-4	Miyake Y.	83	2022-r-22p	Mar 3	Poster Session
Matsuo A.	45	2022-g-05	Mar 4	g-1	Miyamoto H.	53	2022-k-20	Mar 2	k-5
	58	2022-m-10	Mar 2	m-3	Miyamoto K.	45	2022-g-04	Mar 4	g-1
	58	2022-m-11	Mar 2	m-3	Miyamoto K.	26	2022-d-31	Mar 1	d-7
	58	2022-m-12	Mar 2	m-3		42	2022-f-39	Mar 3	f-9
	58	2022-m-13	Mar 2	m-3	Miyamura N.	38	2022-f-11	Mar 1	f-3
Matsu T.	57	2022-m-07	Mar 2	m-2		41	2022-f-34	Mar 3	f-8
	59	2022-m-16	Mar 2	m-4		48	2022-i-06	Mar 4	i-2
Matsu T.	11	2022-b-13	Mar 1	b-3	Miyasaka A.	20	2022-c-20	Mar 2	c-5
	12	2022-b-16	Mar 1	b-4		21	2022-c-25	Mar 2	c-6
Matsuoka K.	58	2022-m-10	Mar 2	m-3		21	2022-c-26	Mar 2	c-6
	58	2022-m-11	Mar 2	m-3	Miyasaka T.	11	2022-b-07	Mar 1	b-2
	58	2022-m-12	Mar 2	m-3	Miyase T.	35	2022-e-24	Mar 3	e-6
	58	2022-m-13	Mar 2	m-3	Miyashita N.	22	2022-d-03	Feb 28	d-1
Matsuoka M.	29	2022-d-56	Mar 3	d-13	Miyata K.	43	2022-f-47	Mar 4	f-11
Matsuoka Y.	32	2022-e-03	Mar 2	e-1	Miyawaki K.	79	2022-b-60p	Mar 3	Poster Session
Matsuse H.	62	2022-p-02	Feb 28	p-1	Miyazaki K.	84	2022-r-24p	Mar 3	Poster Session
Matsushita M.	20	2022-c-18	Mar 1	c-4	Miyazaki K.	21	2022-c-23	Mar 2	c-5
Matsushita S.	41	2022-f-37	Mar 3	f-9	Miyazaki Y.	19	2022-c-11	Mar 1	c-3
	42	2022-f-41	Mar 3	f-9		20	2022-c-18	Mar 1	c-4
	43	2022-f-50	Mar 4	f-12	Miyazato Y.	78	2022-e-36s	Mar 3	s-3
	44	2022-f-55	Mar 4	f-13	Miyazawa J.	50	2022-j-07	Mar 3	j-2
	44	2022-f-57	Mar 4	f-13	Miyazawa Y.	57	2022-m-05	Mar 1	m-1
	48	2022-i-04	Mar 3	i-1		64	2022-q-12	Mar 3	q-3
	69	2022-t-08	Mar 4	t-2	Miyoshi K.	54	2022-l-04	Mar 1	l-2
Matsuura Y.	9	2022-a-33	Mar 3	a-8	Mizobata K.	45	2022-g-03	Mar 4	g-1
Matsuyama K.	58	2022-m-10	Mar 2	m-3		45	2022-g-04	Mar 4	g-1
	58	2022-m-11	Mar 2	m-3	Mizumura Y.	56	2022-m-02	Mar 1	m-1
	58	2022-m-12	Mar 2	m-3	MIZUNO M.	33	2022-e-13	Mar 2	e-3
	58	2022-m-13	Mar 2	m-3	Mochihara Y.	55	2022-l-07	Mar 1	l-3
Matsuyama M.	82	2022-m-18p	Mar 3	Poster Session	Mochizuki T.	43	2022-f-49	Mar 4	f-11
Matumoto Y.	11	2022-b-13	Mar 1	b-3	Momozawa A.	13	2022-b-21	Mar 2	b-5
Matunaga S.	26	2022-d-31	Mar 1	d-7		13	2022-b-22	Mar 2	b-5
	42	2022-f-39	Mar 3	f-9	Morelli J.	54	2022-k-26	Mar 2	k-6
McMahon J.	26	2022-d-32	Mar 2	d-8	Mori A.	83	2022-q-16p	Mar 3	Poster Session
	55	2022-l-05	Mar 1	l-2		83	2022-q-17p	Mar 3	Poster Session
Medina F. N.	38	2022-f-12	Mar 1	f-3	Mori H.	57	2022-m-03	Mar 1	m-1
Mega T.	60	2022-n-09	Mar 2	n-2	Mori K.	80	2022-e-38p	Mar 3	Poster Session
Mekata S.	80	2022-e-39p	Mar 3	Poster Session	Mori K.	79	2022-b-57p	Mar 3	Poster Session
	80	2022-e-40p	Mar 3	Poster Session	Mori M.	59	2022-m-14	Mar 2	m-4
Mendoza-Hernandez O. S.	65	2022-q-14	Mar 3	q-3	Mori O.	18	2022-c-06	Mar 1	c-2
Meyer A.	55	2022-l-05	Mar 1	l-2		18	2022-c-09	Mar 1	c-2
Michel P.	53	2022-k-20	Mar 2	k-5		20	2022-c-18	Mar 1	c-4
Michiganami K.	18	2022-c-07	Mar 1	c-2		27	2022-d-36	Mar 2	d-9
Michiganami T.	51	2022-k-06	Mar 1	k-2		29	2022-d-54	Mar 3	d-13
	53	2022-k-20	Mar 2	k-5		47	2022-h-05	Mar 1	h-2
Mieno T.	79	2022-b-62p	Mar 3	Poster Session	Mori Y.	15	2022-b-40	Mar 3	b-10
Mifune R.	1	2022-o-1-03	Mar 3	o-1-1		15	2022-b-41	Mar 3	b-10
Mikami T.	13	2022-b-25	Mar 2	b-6	Morimoto H.	54	2022-l-04	Mar 1	l-2
MILLET-LACOMBE L.	46	2022-g-15	Mar 4	g-3	Morino K.	11	2022-b-10	Mar 1	b-2
MILOJEVIC T.	63	2022-p-04	Feb 28	p-1	Morioka S.	49	2022-j-06	Mar 3	j-2
Mimasu Y.	25	2022-d-24	Mar 1	d-5	Morisita N.	54	2022-l-04	Mar 1	l-2
	27	2022-d-38	Mar 2	d-9	Morisita T.	78	2022-b-52s	Mar 3	s-3
	31	2022-d-68	Mar 4	d-16	Morita N.	45	2022-g-05	Mar 4	g-1
	53	2022-k-18	Mar 2	k-5		59	2022-m-15	Mar 2	m-4
Minami K.	81	2022-e-43p	Mar 3	Poster Session	Morita T.	15	2022-b-40	Mar 3	b-10
Minami R.	17	2022-b-49	Mar 4	b-12		15	2022-b-41	Mar 3	b-10
	79	2022-b-60p	Mar 3	Poster Session	Morita T.	20	2022-c-19	Mar 2	c-5
Minato N.	70	2022-u-08	Mar 1	u-2	Morita T.	2	2022-o-1-11	Mar 3	o-1-2
Mine Y.	46	2022-g-16	Mar 4	g-3	Morita T.	10	2022-b-06	Mar 1	b-2
Minematsu R.	80	2022-b-66p	Mar 3	Poster Session		11	2022-b-14	Mar 1	b-3

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
	12	2022-b-17	Mar 1	b-4		4	2022-o-1-24	Mar 4	o-1-5
	12	2022-b-19	Mar 1	b-4		27	2022-d-44	Mar 2	d-10
Moritani M.	39	2022-f-18	Mar 1	f-4	Nagata Y.	29	2022-d-56	Mar 3	d-13
	49	2022-i-08	Mar 4	i-2		33	2022-e-12	Mar 2	e-3
Morito T.	46	2022-g-16	Mar 4	g-3		36	2022-e-31	Mar 4	e-7
Moriue O.	47	2022-h-01	Mar 1	h-1		59	2022-m-14	Mar 2	m-4
Moriyama K.	32	2022-e-07	Mar 2	e-2	Nagatani I.	62	2022-n-22	Mar 3	n-5
	32	2022-e-08	Mar 2	e-2	Nagayoshi T.	11	2022-b-11	Mar 1	b-3
Moriyoshi T.	59	2022-m-14	Mar 2	m-4	Nago T.	62	2022-p-02	Feb 28	p-1
Morota T.	51	2022-k-06	Mar 1	k-2	Nagura M.	62	2022-p-01	Feb 28	p-1
	53	2022-k-20	Mar 2	k-5	Naidu S.	55	2022-l-05	Mar 1	l-2
Motegi C.	61	2022-n-14	Mar 2	n-3	Naito H.	64	2022-q-13	Mar 3	q-3
Motoe K.	13	2022-b-24	Mar 2	b-6		83	2022-q-17p	Mar 3	Poster Session
	37	2022-f-07	Mar 1	f-2	Nakadai M.	49	2022-j-03	Mar 3	j-1
Motohka T.	62	2022-n-24	Mar 3	n-5		50	2022-j-07	Mar 3	j-2
Mugishima T.	64	2022-q-13	Mar 3	q-3	Nakagami Y.	57	2022-m-08	Mar 2	m-2
Munoz P.	40	2022-f-26	Mar 2	f-6	Nakagawa H.	35	2022-e-26	Mar 3	e-6
Murakami H.	59	2022-n-01	Mar 2	n-1	Nakagawa I.	3	2022-o-1-19	Mar 4	o-1-4
	59	2022-n-02	Mar 2	n-1	Nakagawa K.	63	2022-p-04	Feb 28	p-1
	82	2022-n-27p	Mar 3	Poster Session	Nakagawa Y.	79	2022-b-59p	Mar 3	Poster Session
Murakami K.	14	2022-b-29	Mar 2	b-7	Nakahara M.	71	2022-u-11	Mar 1	u-3
Murakami M.	46	2022-g-16	Mar 4	g-3	Nakajima J.	82	2022-j-14p	Mar 3	Poster Session
Murakami T.	36	2022-f-01	Feb 28	f-1	Nakajima S.	40	2022-f-27	Mar 2	f-6
Murakami Y.	40	2022-f-23	Mar 2	f-5		54	2022-l-04	Mar 1	l-2
	71	2022-u-13	Mar 1	u-4		68	2022-t-07	Mar 4	t-2
	71	2022-u-14	Mar 1	u-4	Nakajima Y.	22	2022-d-03	Feb 28	d-1
Muranaka T.	10	2022-b-03	Feb 28	b-1	Nakamiya M.	49	2022-j-04	Mar 3	j-1
	84	2022-r-29p	Mar 3	Poster Session	Nakamura A.	63	2022-p-03	Feb 28	p-1
Murata H.	14	2022-b-29	Mar 2	b-7	Nakamura H.	41	2022-f-37	Mar 3	f-9
Murata I.	57	2022-m-07	Mar 2	m-2	Nakamura K.	20	2022-c-18	Mar 1	c-4
murayama Y.	16	2022-b-42	Mar 3	b-10		21	2022-c-23	Mar 2	c-5
Murayama Y.	10	2022-b-06	Mar 1	b-2	Nakamura N.	21	2022-c-23	Mar 2	c-5
	11	2022-b-14	Mar 1	b-3	Nakamura R.	23	2022-d-09	Feb 28	d-2
	12	2022-b-17	Mar 1	b-4	Nakamura S.	66	2022-r-05	Mar 2	r-2
	12	2022-b-19	Mar 1	b-4		66	2022-r-07	Mar 2	r-2
Murohara M.	7	2022-a-16	Mar 1	a-4		66	2022-r-09	Mar 2	r-3
Musha M.	28	2022-d-47	Mar 3	d-11		66	2022-r-10	Mar 2	r-3
Muto D.	35	2022-e-27	Mar 3	e-6	Nakamura S.	77	2022-a-39s	Mar 3	s-2
Muto M.	73	2022-v-11	Mar 1	v-3	Nakamura T.	53	2022-k-20	Mar 2	k-5
	74	2022-v-12	Mar 1	v-3	Nakamura Y.	77	2022-a-36s	Mar 3	s-2
Muto T.	45	2022-g-01	Mar 4	g-1	Nakamura Y.	84	2022-r-28p	Mar 3	Poster Session
Nada Y.	49	2022-j-02	Mar 3	j-1	Nakanishi H.	27	2022-d-42	Mar 2	d-10
	56	2022-l-21	Mar 2	l-7		39	2022-f-18	Mar 1	f-4
Nagahama K.	69	2022-r-10	Mar 4	t-3	Nakano I.	79	2022-b-54p	Mar 3	Poster Session
Nagai H.	18	2022-c-08	Mar 1	c-2	Nakano M.	10	2022-b-01	Feb 28	b-1
	54	2022-k-25	Mar 2	k-6		31	2022-d-65	Mar 4	d-16
	56	2022-l-17	Mar 2	l-6	Nakano T.	25	2022-d-28	Mar 1	d-6
Nagai K.	39	2022-f-18	Mar 1	f-4	Nakao K.	35	2022-e-24	Mar 3	e-6
Nagai K.	41	2022-f-36	Mar 3	f-8	Nakao S.	78	2022-e-36s	Mar 3	s-3
Nagai M.	61	2022-n-19	Mar 3	n-4	Nakao T.	33	2022-e-12	Mar 2	e-3
	77	2022-n-25s	Mar 3	s-2		58	2022-m-10	Mar 2	m-3
	82	2022-n-26p	Mar 3	Poster Session		58	2022-m-11	Mar 2	m-3
	82	2022-n-29p	Mar 3	Poster Session		58	2022-m-12	Mar 2	m-3
Nagai Y.	72	2022-u-17	Mar 1	u-4		58	2022-m-13	Mar 2	m-3
	72	2022-v-04	Mar 1	v-1		59	2022-m-14	Mar 2	m-4
Nagai Y.	61	2022-n-19	Mar 3	n-4		80	2022-d-77p	Mar 3	Poster Session
	82	2022-n-26p	Mar 3	Poster Session	Nakashima H.	15	2022-b-40	Mar 3	b-10
Nagamatsu A.	54	2022-l-04	Mar 1	l-2		15	2022-b-41	Mar 3	b-10
Nagamatsu H.	55	2022-l-07	Mar 1	l-3		19	2022-c-13	Mar 1	c-3
Nagamine M.	11	2022-b-07	Mar 1	b-2	Nakashima T.	57	2022-m-07	Mar 2	m-2
Nagao K.	9	2022-a-32	Mar 3	a-8	Nakashino K.	59	2022-m-16	Mar 2	m-4
Nagao M.	14	2022-b-29	Mar 2	b-7	Nakasuka S.	22	2022-d-02	Feb 28	d-1
Nagaoka N.	67	2022-r-12	Mar 2	r-3		26	2022-d-34	Mar 2	d-8
Nagasaki H.	64	2022-q-13	Mar 3	q-3		28	2022-d-47	Mar 3	d-11
Nagasaki Y.	16	2022-b-43	Mar 3	b-10		28	2022-d-49	Mar 3	d-12
Nagasawa M.	81	2022-e-41p	Mar 3	Poster Session		38	2022-f-11	Mar 1	f-3
	81	2022-e-42p	Mar 3	Poster Session		39	2022-f-20	Mar 2	f-5
Nagasawa S.	36	2022-e-33	Mar 4	e-8		40	2022-f-28	Mar 2	f-6
Nagata H.	1	2022-o-1-02	Mar 3	o-1-1		41	2022-f-34	Mar 3	f-8
	2	2022-o-1-13	Mar 4	o-1-3		41	2022-f-37	Mar 3	f-9
	2	2022-o-1-15	Mar 4	o-1-3		42	2022-f-41	Mar 3	f-9
	3	2022-o-1-22	Mar 4	o-1-5					

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
	43	2022-f-47	Mar 4	f-11	Nishimura A.	41	2022-f-31	Mar 2	f-7
	43	2022-f-49	Mar 4	f-11	Nishimura K.	31	2022-d-65	Mar 4	d-16
	44	2022-f-55	Mar 4	f-13	Nishimura S.	20	2022-c-20	Mar 2	c-5
	44	2022-f-57	Mar 4	f-13	Nishio M.	40	2022-f-23	Mar 2	f-5
	44	2022-f-58	Mar 4	f-13	Nishioka K.	26	2022-d-35	Mar 2	d-8
	48	2022-i-04	Mar 3	i-1	Nishioka S.	65	2022-r-02	Mar 1	r-1
	48	2022-i-06	Mar 4	i-2	Nishiyama K.	10	2022-b-03	Feb 28	b-1
	59	2022-m-15	Mar 2	m-4		10	2022-b-04	Feb 28	b-1
	68	2022-t-03	Mar 3	t-1		31	2022-d-68	Mar 4	d-16
	68	2022-t-05	Mar 4	t-2		55	2022-l-07	Mar 1	l-3
	68	2022-t-07	Mar 4	t-2		78	2022-b-51s	Mar 3	s-3
	69	2022-t-08	Mar 4	t-2		78	2022-b-52s	Mar 3	s-3
	69	2022-t-12	Mar 4	t-3		78	2022-b-53s	Mar 3	s-3
	72	2022-u-17	Mar 1	u-4	Nishiyama M.	53	2022-k-19	Mar 2	k-5
	76	2022-d-70s	Mar 3	s-1	Nitta K.	63	2022-p-03	Feb 28	p-1
	76	2022-d-73s	Mar 3	s-1	Noda M.	7	2022-a-19	Mar 2	a-5
	76	2022-d-74s	Mar 3	s-1	Noda T.	58	2022-m-10	Mar 2	m-3
	82	2022-j-15p	Mar 3	Poster Session		58	2022-m-11	Mar 2	m-3
Nakata D.	1	2022-o-1-05	Mar 3	o-1-1		58	2022-m-12	Mar 2	m-3
	1	2022-o-1-07	Mar 3	o-1-2		58	2022-m-13	Mar 2	m-3
	3	2022-o-1-18	Mar 4	o-1-4	Nogawa Y.	13	2022-b-21	Mar 2	b-5
	13	2022-b-21	Mar 2	b-5	Noguchi S.	53	2022-k-19	Mar 2	k-5
	13	2022-b-22	Mar 2	b-5	Noguchi T.	53	2022-k-20	Mar 2	k-5
	58	2022-m-10	Mar 2	m-3	Nohmi M.	29	2022-d-53	Mar 3	d-13
	58	2022-m-11	Mar 2	m-3	Nomoto H.	69	2022-t-11	Mar 4	t-3
	58	2022-m-12	Mar 2	m-3		74	2022-w-02	Mar 4	w-1
	58	2022-m-13	Mar 2	m-3	Nomura S.	33	2022-e-13	Mar 2	e-3
	77	2022-a-39s	Mar 3	s-2		53	2022-k-19	Mar 2	k-5
Nakatsuka Y.	76	2022-d-71s	Mar 3	s-1		63	2022-p-03	Feb 28	p-1
Nakatsukasa T.	35	2022-e-27	Mar 3	e-6		78	2022-e-37s	Mar 3	s-3
Nakaya J.	40	2022-f-23	Mar 2	f-5	Nomura S.	69	2022-t-08	Mar 4	t-2
	71	2022-u-13	Mar 1	u-4	Nomura Y.	83	2022-r-21p	Mar 3	Poster Session
	71	2022-u-14	Mar 1	u-4	Nonaka M.	10	2022-b-06	Mar 1	b-2
Nakaya S.	45	2022-g-05	Mar 4	g-1		11	2022-b-14	Mar 1	b-3
	47	2022-h-02	Mar 1	h-1		12	2022-b-17	Mar 1	b-4
	77	2022-a-37s	Mar 3	s-2	Nonaka S.	45	2022-g-01	Mar 4	g-1
Nakayama C.	28	2022-d-51	Mar 3	d-12	Nonaka T.	62	2022-n-23	Mar 3	n-5
Nakayama D.	37	2022-f-06	Mar 1	f-2	Nono A.	10	2022-b-03	Feb 28	b-1
	39	2022-f-21	Mar 2	f-5	Nozawa H.	51	2022-k-07	Mar 1	k-2
	80	2022-d-77p	Mar 3	Poster Session	Obana S.	49	2022-j-06	Mar 3	j-2
Nakayama K.	49	2022-i-07	Mar 4	i-2	Obara I.	1	2022-o-1-05	Mar 3	o-1-1
Nakayama Y.	10	2022-b-03	Feb 28	b-1	Obata T.	28	2022-d-50	Mar 3	d-12
	16	2022-b-44	Mar 4	b-11		68	2022-t-05	Mar 4	t-2
	57	2022-m-09	Mar 2	m-2	Oboshi A.	38	2022-f-14	Mar 1	f-3
Nakazawa S.	29	2022-d-56	Mar 3	d-13	Oda H.	47	2022-h-03	Mar 1	h-1
	32	2022-e-04	Mar 2	e-1	Oda T.	9	2022-a-32	Mar 3	a-8
	53	2022-k-19	Mar 2	k-5	Oda Y.	17	2022-b-48	Mar 4	b-12
Namba S.	15	2022-b-40	Mar 3	b-10	Odagiri K.	48	2022-i-02	Mar 3	i-1
	15	2022-b-41	Mar 3	b-10	Ofosu J. A.	39	2022-f-21	Mar 2	f-5
Namiki N.	53	2022-k-20	Mar 2	k-5		48	2022-i-05	Mar 3	i-1
Nerome S.	42	2022-f-39	Mar 3	f-9	Ogawa H.	15	2022-b-36	Mar 3	b-9
Nguyen T. D.	36	2022-e-32	Mar 4	e-7		35	2022-e-28	Mar 3	e-6
Nikado H.	45	2022-g-03	Mar 4	g-1	Ogawa H.	48	2022-i-01	Mar 3	i-1
Nikaido T.	51	2022-k-08	Mar 1	k-2		48	2022-i-02	Mar 3	i-1
Nishida H.	14	2022-b-31	Mar 3	b-8	Ogawa K.	22	2022-d-05	Feb 28	d-1
	14	2022-b-33	Mar 3	b-8	Ogawa N.	53	2022-k-18	Mar 2	k-5
	14	2022-b-34	Mar 3	b-8	Ogawa S.	16	2022-b-44	Mar 4	b-11
	16	2022-b-42	Mar 3	b-10	Ogawa Y.	66	2022-r-06	Mar 2	r-2
	34	2022-e-22	Mar 3	e-5	Ogimoto K.	40	2022-f-26	Mar 2	f-6
	36	2022-e-30	Mar 4	e-7	Oguro R.	61	2022-n-14	Mar 2	n-3
	79	2022-b-55p	Mar 3	Poster Session	Ohara K.	82	2022-n-28p	Mar 3	Poster Session
	81	2022-e-44p	Mar 3	Poster Session		83	2022-n-31p	Mar 3	Poster Session
Nishida K.	71	2022-u-11	Mar 1	u-3	Ohbuchii N.	74	2022-w-01	Mar 4	w-1
Nishida M.	83	2022-r-21p	Mar 3	Poster Session	Ohira G.	20	2022-c-18	Mar 1	c-4
Nishiguchi H.	6	2022-a-10	Mar 1	a-3		22	2022-d-04	Feb 28	d-1
Nishii K.	4	2022-o-1-23	Mar 4	o-1-5		29	2022-d-55	Mar 3	d-13
Nishijo N.	83	2022-r-23p	Mar 3	Poster Session	Ohkawa Y.	10	2022-b-01	Feb 28	b-1
Nishikawa T.	31	2022-d-66	Mar 4	d-16		84	2022-r-29p	Mar 3	Poster Session
Nishimoto S.	48	2022-i-04	Mar 3	i-1	Ohki M.	60	2022-n-08	Mar 2	n-2
	68	2022-t-07	Mar 4	t-2	Ohnishi N.	11	2022-b-09	Mar 1	b-2
	69	2022-t-08	Mar 4	t-2		17	2022-b-50	Mar 4	b-12
Nishimura A.	14	2022-b-28	Mar 2	b-7		33	2022-e-15	Mar 3	e-4

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.	
	33	2022-e-16	Mar 3	e-4	Oshio Y.	10	2022-b-05	Feb 28	b-1	
	34	2022-e-23	Mar 3	e-5		12	2022-b-20	Mar 1	b-4	
	79	2022-b-57p	Mar 3	Poster Session		14	2022-b-31	Mar 3	b-8	
Ohno K.	9	2022-a-35	Mar 3	a-8		16	2022-b-42	Mar 3	b-10	
Ohnuki S.	54	2022-k-26	Mar 2	k-6		80	2022-e-39p	Mar 3	Poster Session	
Ohta M.	55	2022-l-07	Mar 1	l-3		80	2022-e-40p	Mar 3	Poster Session	
Ohta R.	71	2022-u-12	Mar 1	u-3		81	2022-e-41p	Mar 3	Poster Session	
Ohtaki R.	30	2022-d-64	Mar 4	d-15		81	2022-e-42p	Mar 3	Poster Session	
Oikawa K.	25	2022-d-25	Mar 1	d-6		84	2022-r-25p	Mar 3	Poster Session	
Onuma M.	35	2022-e-24	Mar 3	e-6	Oshiro T.	49	2022-i-07	Mar 4	i-2	
Oishi K.	24	2022-d-17	Mar 1	d-4	Ostu H.	14	2022-b-31	Mar 3	b-8	
Oishi R.	34	2022-c-19	Mar 3	e-5	Otake H.	53	2022-k-21	Mar 2	k-5	
	34	2022-c-20	Mar 3	e-5	Otani Y.	44	2022-f-52	Mar 4	f-12	
Oishi T.	2	2022-o-12	Mar 4	o-1-3		44	2022-f-54	Mar 4	f-12	
Oishi Y.	8	2022-a-25	Mar 2	a-6	Otsu H.	80	2022-e-39p	Mar 3	Poster Session	
Oka K.	13	2022-b-24	Mar 2	b-6		80	2022-e-40p	Mar 3	Poster Session	
	37	2022-f-07	Mar 1	f-2		81	2022-e-41p	Mar 3	Poster Session	
Okada K.	20	2022-c-18	Mar 1	c-4	Otsuka K.	18	2022-c-08	Mar 1	c-2	
Okahashi T.	55	2022-l-07	Mar 1	l-3		63	2022-q-03	Mar 3	q-1	
Okamoto H.	23	2022-d-09	Feb 28	d-2	Otsuka K.	81	2022-g-18p	Mar 3	Poster Session	
Okamoto K.	16	2022-b-45	Mar 4	b-11		81	2022-g-19p	Mar 3	Poster Session	
	16	2022-b-46	Mar 4	b-11	Otsuka S.	10	2022-b-03	Feb 28	b-1	
Okamoto T.	14	2022-b-27	Mar 2	b-6		Otsuki K.	42	2022-f-42	Mar 3	f-10
Okamura J.	62	2022-p-01	Feb 28	p-1		Otsuki M.	54	2022-l-04	Mar 1	l-2
Okano Y.	33	2022-e-15	Mar 3	e-4		Otsuki T.	46	2022-g-16	Mar 4	g-3
Okano Y.	68	2022-r-06	Mar 4	r-2		Oura F.	68	2022-t-01	Mar 3	t-1
Okawa M.	56	2022-l-17	Mar 2	l-6		Oya Y.	32	2022-e-03	Mar 2	e-1
Okawara T.	52	2022-k-09	Mar 1	k-3		Ozaki H.	3	2022-o-1-17	Mar 4	o-1-4
Okazaki S.	48	2022-i-01	Mar 3	i-1		Ozaki N.	23	2022-d-14	Mar 1	d-3
Oki J.	45	2022-g-05	Mar 4	g-1		26	2022-d-35	Mar 2	d-8	
	53	2022-k-19	Mar 2	k-5		40	2022-f-28	Mar 2	f-6	
Oki Y.	31	2022-d-65	Mar 4	d-16		55	2022-l-07	Mar 1	l-3	
Okudaira T.	55	2022-l-07	Mar 1	l-3		76	2022-d-74s	Mar 3	s-1	
Okudara O.	54	2022-k-22	Mar 2	k-5	Ozawa K.	33	2022-e-14	Mar 3	e-4	
Okuzumi N.	18	2022-c-07	Mar 1	c-2		35	2022-e-27	Mar 3	e-6	
	20	2022-c-18	Mar 1	c-4	Ozawa T.	10	2022-b-04	Feb 28	b-1	
Okumura T.	64	2022-q-11	Mar 3	q-3		53	2022-k-19	Mar 2	k-5	
	84	2022-r-29p	Mar 3	Poster Session		57	2022-m-09	Mar 2	m-2	
Okumura Y.	30	2022-d-59	Mar 4	d-14		63	2022-p-03	Feb 28	p-1	
Okuyama K.	36	2022-f-01	Feb 28	f-1		80	2022-d-77p	Mar 3	Poster Session	
	37	2022-f-02	Feb 28	f-1	Ozawa T.	15	2022-b-36	Mar 3	b-9	
	38	2022-f-13	Mar 1	f-3		80	2022-d-76p	Mar 3	Poster Session	
Omi K.	77	2022-a-37s	Mar 3	s-2	PARAVAN C.	4	2022-o-1-26	Mar 4	o-1-5	
Omoto M.	62	2022-p-02	Feb 28	p-1	Park H.	62	2022-n-21	Mar 3	n-5	
Omura A.	82	2022-j-14p	Mar 3	Poster Session	Park J.	41	2022-f-36	Mar 3	f-8	
Ong M.	63	2022-p-04	Feb 28	p-1	Park J. H.	40	2022-f-29	Mar 2	f-7	
Onibuchi S.	71	2022-u-10	Mar 1	u-3		42	2022-f-42	Mar 3	f-10	
Onishi N.	12	2022-b-18	Mar 1	b-4		66	2022-r-04	Mar 2	r-2	
Onishi T.	83	2022-r-19p	Mar 3	Poster Session		83	2022-n-30p	Mar 3	Poster Session	
Onishi Y.	54	2022-k-27	Mar 2	k-6	Pedros-Faura A.	26	2022-d-32	Mar 2	d-8	
Ono H.	36	2022-e-32	Mar 4	e-7	Perret A.	40	2022-f-26	Mar 2	f-6	
Ono K.	7	2022-a-21	Mar 2	a-5	Petkov I.	46	2022-g-14	Mar 4	g-3	
	8	2022-a-23	Mar 2	a-6	Petterson H.	56	2022-m-01	Mar 1	m-1	
	41	2022-f-32	Mar 2	f-7	Phong D.X.	43	2022-f-49	Mar 4	f-11	
Ono R.	59	2022-m-14	Mar 2	m-4	Pignolet G.	40	2022-f-26	Mar 2	f-6	
Ono T.	62	2022-p-01	Feb 28	p-1	Ponamale V.	40	2022-f-26	Mar 2	f-6	
Onodera R.	27	2022-d-44	Mar 2	d-10	Potrivitu G.	27	2022-d-41	Mar 2	d-10	
Onodera T.	5	2022-a-07	Mar 1	a-2	Pravec P.	55	2022-l-05	Mar 1	l-2	
	5	2022-a-08	Mar 1	a-2	project M.	37	2022-f-09	Mar 1	f-2	
	6	2022-a-14	Mar 1	a-4	Purio M. A.	61	2022-n-13	Mar 2	n-3	
Onuki M.	73	2022-v-09	Mar 1	v-3	Pushparaj N.	76	2022-d-69s	Mar 3	s-1	
Orger N. C.	27	2022-d-41	Mar 2	d-10		80	2022-d-78p	Mar 3	Poster Session	
	39	2022-f-21	Mar 2	f-5	Qi R.	22	2022-d-06	Feb 28	d-2	
	42	2022-f-40	Mar 3	f-9	RAJ R.	40	2022-f-25	Mar 2	f-6	
	44	2022-f-53	Mar 4	f-12	Rambaux N.	55	2022-l-10	Mar 1	l-4	
	49	2022-i-07	Mar 4	i-2	Ravine M.	55	2022-l-05	Mar 1	l-2	
Osaki T.	42	2022-f-42	Mar 3	f-10	Reimann B.	46	2022-g-13	Mar 4	g-3	
	83	2022-n-30p	Mar 3	Poster Session	Ribeiro W. F.	52	2022-k-11	Mar 1	k-3	
Oschwald M.	7	2022-a-18	Mar 1	a-4	Riehmer J.	46	2022-g-13	Mar 4	g-3	
	8	2022-a-27	Mar 2	a-7	Rodrigo C.	43	2022-f-51	Mar 4	f-12	
	9	2022-a-31	Mar 2	a-7	Rodriguez Leon R. A.	38	2022-f-13	Mar 1	f-3	
Oshima K.	24	2022-d-16	Mar 1	d-4						

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Rodriguez R.	36	2022-f-01	Feb 28	f-1	Sasaki S.	45	2022-g-03	Mar 4	g-1
	37	2022-f-02	Feb 28	f-1	Sasaki T.	23	2022-d-09	Feb 28	d-2
Rotarmel W.	46	2022-g-14	Mar 4	g-3	Sasaki T.	50	2022-j-07	Mar 3	j-2
Sagawa F.	42	2022-f-39	Mar 3	f-9	Sasaki Y.	80	2022-d-75p	Mar 3	Poster Session
Sagliano M.	46	2022-g-13	Mar 4	g-3	Sasazawa K.	70	2022-u-08	Mar 1	u-2
Sahara H.	7	2022-a-21	Mar 2	a-5	Sashida H.	7	2022-a-21	Mar 2	a-5
	8	2022-a-23	Mar 2	a-6		8	2022-a-23	Mar 2	a-6
	37	2022-f-04	Feb 28	f-1		41	2022-f-32	Mar 2	f-7
	41	2022-f-32	Mar 2	f-7	Sato H.	60	2022-n-04	Mar 2	n-1
	43	2022-f-45	Mar 3	f-10	Sato H.	81	2022-j-13p	Mar 3	Poster Session
	61	2022-n-14	Mar 2	n-3	Sato J.	77	2022-c-28s	Mar 3	s-2
	67	2022-r-14	Mar 2	r-4	Sato K.	57	2022-m-07	Mar 2	m-2
	67	2022-r-15	Mar 2	r-4	Sato M.	73	2022-v-05	Mar 1	v-2
	68	2022-r-06	Mar 4	t-2	Sato N.	51	2022-k-04	Feb 28	k-1
	77	2022-t-15s	Mar 3	s-2	Sato S.	33	2022-e-15	Mar 3	e-4
Saijo M.	48	2022-i-01	Mar 3	i-1		33	2022-e-16	Mar 3	e-4
Saiki T.	23	2022-d-13	Mar 1	d-3		34	2022-e-23	Mar 3	e-5
	25	2022-d-24	Mar 1	d-5	Sato S.	42	2022-f-39	Mar 3	f-9
	27	2022-d-38	Mar 2	d-9	Sato T.	72	2022-u-16	Mar 1	u-4
	29	2022-d-56	Mar 3	d-13	Sato T.	6	2022-a-12	Mar 1	a-3
	31	2022-d-68	Mar 4	d-16		6	2022-a-13	Mar 1	a-3
	53	2022-k-18	Mar 2	k-5		35	2022-e-24	Mar 3	e-6
Saito H.	63	2022-q-02	Mar 3	q-1		45	2022-g-05	Mar 4	g-1
Saito M.	7	2022-a-15	Mar 1	a-4	Sato Y.	37	2022-f-03	Feb 28	f-1
Saito T.	81	2022-e-44p	Mar 3	Poster Session		39	2022-f-19	Mar 1	f-4
Saito T.	6	2022-a-14	Mar 1	a-4		43	2022-f-46	Mar 3	f-10
Saito Y.	46	2022-g-13	Mar 4	g-3	Satoh N.	30	2022-d-62	Mar 4	d-15
Saito Y.	57	2022-m-07	Mar 2	m-2	Satoh S.	24	2022-d-17	Mar 1	d-4
	59	2022-m-16	Mar 2	m-4		28	2022-d-46	Mar 3	d-11
Saitoh T.	63	2022-q-02	Mar 3	q-1		28	2022-d-50	Mar 3	d-12
Sakaguchi H.	32	2022-e-08	Mar 2	e-2		76	2022-d-71s	Mar 3	s-1
Sakai M.	31	2022-e-02	Mar 2	e-1	Satou J.	52	2022-k-10	Mar 1	k-3
Sakai S.	28	2022-d-45	Mar 3	d-11	Satou Y.	20	2022-c-18	Mar 1	c-4
	30	2022-d-63	Mar 4	d-15	Sawada H.	22	2022-d-05	Feb 28	d-1
Sakai T.	32	2022-e-07	Mar 2	e-2	Sawada Y.	62	2022-n-20	Mar 3	n-4
	32	2022-e-09	Mar 2	e-2	Sawahashi T.	21	2022-c-25	Mar 2	c-6
Sakai T.	54	2022-k-27	Mar 2	k-6		21	2022-c-26	Mar 2	c-6
Sakamoto H.	20	2022-c-18	Mar 1	c-4	Sawai S.	18	2022-c-07	Mar 1	c-2
	39	2022-f-18	Mar 1	f-4		47	2022-h-05	Mar 1	h-2
	49	2022-i-08	Mar 4	i-2		29	2022-d-53	Mar 3	d-13
Sakamoto H.	33	2022-e-16	Mar 3	e-4	Schafer F.	13	2022-b-26	Mar 2	b-6
Sakamoto K.	32	2022-e-07	Mar 2	e-2	Scheeres D.	23	2022-d-11	Mar 1	d-3
	32	2022-e-09	Mar 2	e-2	Scheeres D.J.	26	2022-d-29	Mar 1	d-7
Sakamoto R.	26	2022-d-29	Mar 1	d-7		55	2022-l-05	Mar 1	l-2
Sakamoto R.	1	2022-o-1-03	Mar 3	o-1-1	Schlechtriem S.	8	2022-a-27	Mar 2	a-7
Sakamoto T.	22	2022-d-03	Feb 28	d-1		9	2022-a-29	Mar 2	a-7
Sakamoto Y.	71	2022-u-10	Mar 1	u-3		9	2022-a-31	Mar 2	a-7
Sakamoto Y.	37	2022-f-03	Feb 28	f-1	Schmitt T.	65	2022-q-14	Mar 3	q-3
	39	2022-f-19	Mar 1	f-4	Schneider A.	46	2022-g-14	Mar 4	g-3
	43	2022-f-46	Mar 3	f-10	Schneider P. S.	53	2022-k-15	Mar 1	k-4
Sakamoto Y.	35	2022-e-24	Mar 3	e-6	Schroder S.	46	2022-g-14	Mar 4	g-3
Sakano Y.	35	2022-e-24	Mar 3	e-6	Schultz V. H.	42	2022-f-40	Mar 3	f-9
Sakaoka E.	45	2022-g-09	Mar 4	g-2		39	2022-f-21	Mar 2	f-5
Sakatani N.	22	2022-d-05	Feb 28	d-1		44	2022-f-53	Mar 4	f-12
	53	2022-k-20	Mar 2	k-5	Schulz R.	69	2022-t-09	Mar 4	t-2
Sakita T.	71	2022-u-12	Mar 1	u-3	Schwarz R.	46	2022-g-13	Mar 4	g-3
Sakon I.	63	2022-p-04	Feb 28	p-1		46	2022-g-15	Mar 4	g-3
Sakurai R.	70	2022-u-08	Mar 1	u-2	Seelbinder D.	46	2022-g-13	Mar 4	g-3
Sakurai T.	2	2022-o-1-12	Mar 4	o-1-3	Sejera M.	44	2022-f-52	Mar 4	f-12
	3	2022-o-1-17	Mar 4	o-1-4	Sejera M. P.	39	2022-f-21	Mar 2	f-5
Samo R.	33	2022-e-11	Mar 2	e-3		44	2022-f-54	Mar 4	f-12
San Juan A. G.	38	2022-f-12	Mar 1	f-3	Seki D.	60	2022-n-04	Mar 2	n-1
Sandau R.	40	2022-f-28	Mar 2	f-6	Seki T.	54	2022-k-26	Mar 2	k-6
Sande C. U.	38	2022-f-12	Mar 1	f-3		54	2022-k-27	Mar 2	k-6
Sano T.	11	2022-b-12	Mar 1	b-3	Sekiguchi T.	60	2022-n-05	Mar 2	n-1
Saraf A. M.	9	2022-a-29	Mar 2	a-7	Sekimoto S.	36	2022-e-30	Mar 4	e-7
Sasagawa Y.	42	2022-f-39	Mar 3	f-9	Sekine H.	41	2022-f-37	Mar 3	f-9
Sasaki J.	69	2022-t-10	Mar 4	t-3		42	2022-f-41	Mar 3	f-9
Sasaki K.	61	2022-n-17	Mar 3	n-4	Sekine H.	80	2022-b-66p	Mar 3	Poster Session
Sasaki K.	64	2022-q-06	Mar 3	q-2	Sekine T.	61	2022-n-17	Mar 3	n-4
Sasaki S.	53	2022-k-20	Mar 2	k-5	Senba A.	19	2022-c-14	Mar 1	c-3
	54	2022-k-22	Mar 2	k-5		19	2022-c-15	Mar 1	c-4

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Seta H.	6	2022-a-13	Mar 1	a-3		64	2022-q-13	Mar 3	q-3
Shang J.	39	2022-f-20	Mar 2	f-5	Sorli K.	55	2022-l-05	Mar 1	l-2
Shi Y.	63	2022-q-03	Mar 3	q-1	Sorokin I. V.	51	2022-k-01	Feb 28	k-1
Shiba N.	62	2022-p-02	Feb 28	p-1	Sotome T.	19	2022-c-12	Mar 1	c-3
Shibata T.	21	2022-c-23	Mar 2	c-5	Soutis C.	63	2022-q-03	Mar 3	q-1
Shibukawa T.	39	2022-f-20	Mar 2	f-5	Souverein L.	9	2022-a-30	Mar 2	a-7
	42	2022-f-41	Mar 3	f-9	Sozen N.	23	2022-d-10	Feb 28	d-2
	43	2022-f-50	Mar 4	f-12	Sperl M.	53	2022-k-15	Mar 1	k-4
	48	2022-i-04	Mar 3	i-1	Steyn H.	40	2022-f-28	Mar 2	f-6
Shibutani K.	13	2022-b-21	Mar 2	b-5	Strowik C.	47	2022-h-07	Mar 1	h-2
	13	2022-b-22	Mar 2	b-5		65	2022-q-15	Mar 3	q-3
Shigekiyo T.	45	2022-g-04	Mar 4	g-1	Stützer R.	7	2022-a-18	Mar 1	a-4
Shiina T.	1	2022-o-1-05	Mar 3	o-1-1	Suda K.	28	2022-d-49	Mar 3	d-12
	3	2022-o-1-18	Mar 4	o-1-4		39	2022-f-20	Mar 2	f-5
Shima T.	28	2022-d-51	Mar 3	d-12		44	2022-f-55	Mar 4	f-13
Shimada K.	71	2022-u-13	Mar 1	u-4	Suenaga Y.	35	2022-e-29	Mar 4	e-7
Shimada M.	62	2022-n-22	Mar 3	n-5	Sugahara H.	63	2022-p-03	Feb 28	p-1
Shimada R.	82	2022-n-28p	Mar 3	Poster Session	Sugawara Y.	27	2022-d-36	Mar 2	d-9
Shimada T.	13	2022-b-24	Mar 2	b-6		18	2022-c-09	Mar 1	c-2
	37	2022-f-07	Mar 1	f-2	Sugihara K. A.	18	2022-c-06	Mar 1	c-2
Shimada T.	2	2022-o-1-09	Mar 3	o-1-2		20	2022-c-18	Mar 1	c-4
Shimada Y.	41	2022-f-37	Mar 3	f-9		27	2022-d-36	Mar 2	d-9
	42	2022-f-41	Mar 3	f-9	Sugimoto K.	49	2022-j-02	Mar 3	j-1
Shimaki Y.	22	2022-d-05	Feb 28	d-1	Sugimoto M.	10	2022-b-04	Feb 28	b-1
Shimamura K.	10	2022-b-06	Mar 1	b-2	Sugimoto M.	63	2022-p-04	Feb 28	p-1
	11	2022-b-14	Mar 1	b-3	Sugimura T.	59	2022-n-03	Mar 2	n-1
	12	2022-b-19	Mar 1	b-4		61	2022-n-18	Mar 3	n-4
	17	2022-b-49	Mar 4	b-12	Sugita N.	73	2022-v-10	Mar 1	v-3
	79	2022-b-60p	Mar 3	Poster Session	Sugiura K.	20	2022-c-18	Mar 1	c-4
Shimizu H.	51	2022-k-06	Mar 1	k-2		27	2022-d-36	Mar 2	d-9
Shimizu T.	26	2022-d-35	Mar 2	d-8	Sugita S.	53	2022-k-20	Mar 2	k-5
Shimizu T.	26	2022-d-35	Mar 2	d-8	Sujikai H.	50	2022-j-11	Mar 3	j-3
Shimizu Y.	1	2022-o-1-07	Mar 3	o-1-2	Sumita T.	64	2022-q-11	Mar 3	q-3
Shimizu Y.	57	2022-m-08	Mar 2	m-2	Sumitomo Y.	54	2022-k-27	Mar 2	k-6
Shimmi N.	72	2022-u-17	Mar 1	u-4	Sunahara A.	15	2022-b-40	Mar 3	b-10
Shimoda T.	80	2022-d-77p	Mar 3	Poster Session		15	2022-b-41	Mar 3	b-10
Shimoi M.	57	2022-m-09	Mar 2	m-2	Suniada K. I.	77	2022-n-25s	Mar 3	s-2
Shimomura S.	36	2022-e-30	Mar 4	e-7	Suraweera M.	15	2022-b-36	Mar 3	b-9
Shimonishi R.	47	2022-h-03	Mar 1	h-1	Susaki J.	60	2022-n-04	Mar 2	n-1
Shingu T.	14	2022-b-29	Mar 2	b-7	Suslov D.	7	2022-a-18	Mar 1	a-4
Shinohara M.	71	2022-u-14	Mar 1	u-4		9	2022-a-29	Mar 2	a-7
Shinohara R.	33	2022-e-11	Mar 2	e-3	Susukita H.	50	2022-j-10	Mar 3	j-3
Shinohara S.	14	2022-b-34	Mar 3	b-8	Suzuki D.	41	2022-f-32	Mar 2	f-7
Shinomiya H.	73	2022-v-07	Mar 1	v-2	Suzuki K.	74	2022-w-03	Mar 4	w-1
Shinozaki K.	74	2022-w-05	Mar 4	w-2		75	2022-w-06	Mar 4	w-2
Shintate K.	22	2022-d-03	Feb 28	d-1		75	2022-w-07	Mar 4	w-2
Shiota K.	7	2022-a-20	Mar 2	a-5		75	2022-w-08	Mar 4	w-2
Shirai K.	22	2022-d-05	Feb 28	d-1	Suzuki K.	24	2022-d-19	Mar 1	d-4
Shirai K.	37	2022-f-04	Feb 28	f-1		24	2022-d-22	Mar 1	d-5
Shiraishi H.	79	2022-b-54p	Mar 3	Poster Session		31	2022-d-66	Mar 4	d-16
Shirakawa R.	78	2022-b-53s	Mar 3	s-3		34	2022-e-17	Mar 3	e-4
Shiraki R.	10	2022-b-01	Feb 28	b-1		34	2022-e-18	Mar 3	e-4
Shirane A.	20	2022-c-18	Mar 1	c-4		34	2022-e-21	Mar 3	e-5
	49	2022-i-08	Mar 4	i-2		35	2022-e-29	Mar 4	e-7
Shirao M.	51	2022-k-06	Mar 1	k-2		52	2022-k-13	Mar 1	k-3
Shiroyama H.	72	2022-u-17	Mar 1	u-4		59	2022-m-14	Mar 2	m-4
Shitara S.	11	2022-b-13	Mar 1	b-3		65	2022-r-01	Mar 1	r-1
	12	2022-b-16	Mar 1	b-4	Suzuki M.	74	2022-w-05	Mar 4	w-2
	13	2022-b-25	Mar 2	b-6	Suzuki M.	29	2022-d-53	Mar 3	d-13
Shoda K.	10	2022-b-04	Feb 28	b-1	Suzuki S.	70	2022-u-03	Feb 28	u-1
Shoji D.	51	2022-k-06	Mar 1	k-2	Suzuki S.	17	2022-b-50	Mar 4	b-12
Shoji Y.	57	2022-m-04	Mar 1	m-1	Suzuki T.	70	2022-u-03	Feb 28	u-1
Shoyama T.	1	2022-o-1-01	Mar 3	o-1-1	Suzuki T.	17	2022-b-49	Mar 4	b-12
Shrestha H. R.	44	2022-f-53	Mar 4	f-12	Suzuki T.	28	2022-d-47	Mar 3	d-11
	80	2022-d-75p	Mar 3	Poster Session		41	2022-f-37	Mar 3	f-9
Shuto M.	13	2022-b-25	Mar 2	b-6		42	2022-f-41	Mar 3	f-9
Sicat M. M.	2	2022-o-1-09	Mar 3	o-1-2	Suzuki T.	32	2022-e-07	Mar 2	e-2
Soken H. E.	23	2022-d-10	Feb 28	d-2		32	2022-e-09	Mar 2	e-2
Solari M.	46	2022-g-13	Mar 4	g-3		33	2022-e-11	Mar 2	e-3
Someno K.	26	2022-d-35	Mar 2	d-8		53	2022-k-19	Mar 2	k-5
Sone K.	56	2022-l-17	Mar 2	l-6		80	2022-d-77p	Mar 3	Poster Session
Sone Y.	65	2022-q-14	Mar 3	q-3					

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Suzuki Y.	21	2022-c-24	Mar 2	c-6	Takahashi T.	12	2022-b-15	Mar 1	b-3
Suzumoto R.	38	2022-f-11	Mar 1	f-3	Takahashi T.	54	2022-k-26	Mar 2	k-6
	39	2022-f-20	Mar 2	f-5	Takahashi Y.	36	2022-e-31	Mar 4	e-7
	41	2022-f-34	Mar 3	f-8	Takahashi Y.	49	2022-i-08	Mar 4	i-2
	42	2022-f-41	Mar 3	f-9	Takano S.	16	2022-b-45	Mar 4	b-11
	43	2022-f-50	Mar 4	f-12		16	2022-b-46	Mar 4	b-11
	44	2022-f-58	Mar 4	f-13	Takao Y.	14	2022-b-28	Mar 2	b-7
	48	2022-i-06	Mar 4	i-2		14	2022-b-29	Mar 2	b-7
Sweeting M.	38	2022-f-16	Mar 1	f-4		15	2022-b-39	Mar 3	b-9
	40	2022-f-28	Mar 2	f-6	Takao Y.	11	2022-b-11	Mar 1	b-3
Tabuchi I.	28	2022-d-46	Mar 3	d-11		13	2022-b-21	Mar 2	b-5
Tachikawa R.	19	2022-c-11	Mar 1	c-3		13	2022-b-22	Mar 2	b-5
Tachikawa S.	17	2022-c-03	Feb 28	c-1		13	2022-b-24	Mar 2	b-6
Tada T.	1	2022-o-1-05	Mar 3	o-1-1		37	2022-f-07	Mar 1	f-2
Tadono T.	62	2022-n-21	Mar 3	n-5		83	2022-r-19p	Mar 3	Poster Session
	62	2022-n-22	Mar 3	n-5	Takao Y.	20	2022-c-18	Mar 1	c-4
	62	2022-n-24	Mar 3	n-5		22	2022-d-04	Feb 28	d-1
Tagai R.	18	2022-c-07	Mar 1	c-2		27	2022-d-36	Mar 2	d-9
Tagawa M.	10	2022-b-04	Feb 28	b-1		27	2022-d-37	Mar 2	d-9
	17	2022-c-03	Feb 28	c-1		29	2022-d-55	Mar 3	d-13
	19	2022-c-16	Mar 1	c-4		49	2022-j-02	Mar 3	j-1
	57	2022-m-09	Mar 2	m-2	Takasago T.	9	2022-a-32	Mar 3	a-8
	65	2022-r-02	Mar 1	r-1	Takasaki H.	25	2022-d-28	Mar 1	d-6
Tagawa Y.	79	2022-b-55p	Mar 3	Poster Session	Takasawa H.	33	2022-e-12	Mar 2	e-3
Taguchi H.	6	2022-a-12	Mar 1	a-3		36	2022-e-31	Mar 4	e-7
	45	2022-g-05	Mar 4	g-1		59	2022-m-14	Mar 2	m-4
	77	2022-a-37s	Mar 3	s-2	Takashima K.	44	2022-f-55	Mar 4	f-13
Taguchi M.	36	2022-e-32	Mar 4	e-7		48	2022-i-04	Mar 3	i-1
Tahara H.	11	2022-b-11	Mar 1	b-3	Takashima T.	55	2022-l-07	Mar 1	l-3
	13	2022-b-21	Mar 2	b-5	Takatsuki S.	69	2022-t-11	Mar 4	t-3
	13	2022-b-22	Mar 2	b-5	Takayama Y.	81	2022-j-13p	Mar 3	Poster Session
	13	2022-b-24	Mar 2	b-6		82	2022-j-14p	Mar 3	Poster Session
	37	2022-f-07	Mar 1	f-2	Takananagi H.	33	2022-e-11	Mar 2	e-3
	83	2022-r-19p	Mar 3	Poster Session		36	2022-e-31	Mar 4	e-7
Taichi M.	10	2022-b-02	Feb 28	b-1		53	2022-k-19	Mar 2	k-5
Taira S.	57	2022-m-09	Mar 2	m-2		80	2022-d-77p	Mar 3	Poster Session
Taishi A.	35	2022-e-27	Mar 3	e-6	Takayasu H.	59	2022-m-14	Mar 2	m-4
Tajima H.	62	2022-p-02	Feb 28	p-1	Takeda K.	56	2022-l-17	Mar 2	l-6
Takada N.	36	2022-e-30	Mar 4	e-7	Takeda S.	49	2022-i-08	Mar 4	i-2
Takada S.	17	2022-c-02	Feb 28	c-1	Takeda Y.	49	2022-i-08	Mar 4	i-2
Takada T.	40	2022-f-23	Mar 2	f-5	Takegoshi M.	6	2022-a-14	Mar 1	a-4
	71	2022-u-13	Mar 1	u-4	Takei Y.	23	2022-d-13	Mar 1	d-3
	71	2022-u-14	Mar 1	u-4		25	2022-d-24	Mar 1	d-5
Takada Y.	3	2022-o-1-22	Mar 4	o-1-5		27	2022-d-38	Mar 2	d-9
Takagi J.	83	2022-r-22p	Mar 3	Poster Session		31	2022-d-68	Mar 4	d-16
Takagi M.	81	2022-e-43p	Mar 3	Poster Session		53	2022-k-18	Mar 2	k-5
Takagi Y.	32	2022-e-07	Mar 2	e-2	Takeo Y.	60	2022-n-05	Mar 2	n-1
Takahashi A.	7	2022-a-17	Mar 1	a-4	Takeuchi H.	47	2022-h-03	Mar 1	h-1
Takahashi H.	6	2022-a-12	Mar 1	a-3	Takeuchi H.	27	2022-d-38	Mar 2	d-9
	45	2022-g-05	Mar 4	g-1		29	2022-d-56	Mar 3	d-13
Takahashi J.	55	2022-l-07	Mar 1	l-3		31	2022-d-68	Mar 4	d-16
Takahashi K.	67	2022-r-11	Mar 2	r-3		54	2022-l-04	Mar 1	l-2
Takahashi K.	15	2022-b-37	Mar 3	b-9	Takeuchi S.	26	2022-d-30	Mar 1	d-7
	15	2022-b-38	Mar 3	b-9	Takeuchi S.	58	2022-m-10	Mar 2	m-3
	15	2022-b-39	Mar 3	b-9		58	2022-m-11	Mar 2	m-3
Takahashi K.	7	2022-a-17	Mar 1	a-4		58	2022-m-12	Mar 2	m-3
Takahashi K.	42	2022-f-39	Mar 3	f-9		58	2022-m-13	Mar 2	m-3
Takahashi M.	6	2022-a-11	Mar 1	a-3	Takeuchi S.	48	2022-i-01	Mar 3	i-1
	6	2022-a-14	Mar 1	a-4	Takeuchi Y.	73	2022-v-06	Mar 1	v-2
Takahashi M.	11	2022-b-09	Mar 1	b-2	Takeyama H.	46	2022-g-16	Mar 4	g-3
	17	2022-b-50	Mar 4	b-12	Takizawa N.	63	2022-p-03	Feb 28	p-1
	79	2022-b-57p	Mar 3	Poster Session	Tamkuan N.	61	2022-n-19	Mar 3	n-4
Takahashi R.	41	2022-f-37	Mar 3	f-9		82	2022-n-26p	Mar 3	Poster Session
	42	2022-f-41	Mar 3	f-9	Tamura M.	57	2022-m-03	Mar 1	m-1
	43	2022-f-50	Mar 4	f-12	Tamura S.	39	2022-f-18	Mar 1	f-4
	68	2022-t-05	Mar 4	t-2	Tan A.	42	2022-f-38	Mar 3	f-9
	68	2022-t-07	Mar 4	t-2	Tan J.	59	2022-n-02	Mar 2	n-1
	69	2022-t-08	Mar 4	t-2	Tanabe K.	30	2022-d-62	Mar 4	d-15
Takahashi S.	23	2022-d-11	Mar 1	d-3	Tanabe M.	7	2022-a-15	Mar 1	a-4
Takahashi S.	5	2022-a-05	Mar 1	a-2	Tanabe S.	1	2022-o-1-01	Mar 3	o-1-1
Takahashi T.	50	2022-j-09	Mar 3	j-3	Tanabe T.	68	2022-t-01	Mar 3	t-1
	50	2022-j-10	Mar 3	j-3					

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Tanada K.	82	2022-n-27p	Mar 3	Poster Session		13	2022-b-22	Mar 2	b-5
Tanaka H.	19	2022-c-16	Mar 1	c-4	Toyokawa K.	52	2022-k-14	Mar 1	k-4
	21	2022-c-24	Mar 2	c-6	Toyota H.	54	2022-l-04	Mar 1	l-2
	21	2022-c-27	Mar 2	c-6		55	2022-l-07	Mar 1	l-3
Tanaka H.	56	2022-l-17	Mar 2	l-6		57	2022-m-05	Mar 1	m-1
Tanaka K.	63	2022-q-02	Mar 3	q-1	Traudt T.	64	2022-q-12	Mar 3	q-3
	63	2022-q-04	Mar 3	q-1		8	2022-a-27	Mar 2	a-7
	64	2022-q-06	Mar 3	q-2		9	2022-a-29	Mar 2	a-7
	64	2022-q-09	Mar 3	q-2		9	2022-a-30	Mar 2	a-7
Tanaka M.	63	2022-q-02	Mar 3	q-1	Tsuboi N.	9	2022-a-31	Mar 2	a-7
Tanaka M.	79	2022-b-62p	Mar 3	Poster Session		33	2022-e-14	Mar 3	e-4
Tanaka N.	63	2022-q-05	Mar 3	q-1		35	2022-e-27	Mar 3	e-6
Tanaka R.	6	2022-a-12	Mar 1	a-3	Tsuchiya T.	45	2022-g-05	Mar 4	g-1
Tanaka S.	63	2022-q-05	Mar 3	q-1		59	2022-m-15	Mar 2	m-4
Tanaka T.	69	2022-t-10	Mar 4	t-3	Tsuchiya T.	14	2022-b-28	Mar 2	b-7
Tani Y.	45	2022-g-07	Mar 4	g-2	Tsuda M.	16	2022-b-43	Mar 3	b-10
Tanida R.	68	2022-t-04	Mar 3	t-1	Tsuda Y.	22	2022-d-04	Feb 28	d-1
Tanigawa T.	71	2022-u-12	Mar 1	u-3		23	2022-d-13	Mar 1	d-3
Tanno H.	53	2022-k-19	Mar 2	k-5		25	2022-d-24	Mar 1	d-5
Tansyafri A.	18	2022-c-05	Feb 28	c-1		27	2022-d-38	Mar 2	d-9
Tapia I. F.	38	2022-f-13	Mar 1	f-3		29	2022-d-55	Mar 3	d-13
Tashima T.	60	2022-n-09	Mar 2	n-2		29	2022-d-56	Mar 3	d-13
Tashiro T.	78	2022-t-36s	Mar 3	s-3		31	2022-d-68	Mar 4	d-16
Tatara A.	19	2022-c-11	Mar 1	c-3		47	2022-h-05	Mar 1	h-2
TATIOSSIAN P.	46	2022-g-15	Mar 4	g-3	Tsue M.	53	2022-k-18	Mar 2	k-5
Tatsumi E.	53	2022-k-20	Mar 2	k-5		45	2022-g-05	Mar 4	g-1
Tauchi S.	8	2022-a-24	Mar 2	a-6		47	2022-h-02	Mar 1	h-1
Taylor N.	40	2022-f-28	Mar 2	f-6		77	2022-a-37s	Mar 3	s-2
	70	2022-u-06	Mar 1	u-2	Tsuji M.	43	2022-f-50	Mar 4	f-12
Tejika S.	46	2022-g-16	Mar 4	g-3	Tsujiimoto R.	81	2022-e-41p	Mar 3	Poster Session
Ten-Koh 2 Team	37	2022-f-02	Feb 28	f-1		81	2022-e-42p	Mar 3	Poster Session
	38	2022-f-13	Mar 1	f-3	Tsujiita D.	69	2022-t-11	Mar 4	t-3
Tenorio L.	40	2022-f-25	Mar 2	f-6		74	2022-w-02	Mar 4	w-1
	77	2022-c-28s	Mar 3	s-2	Tsujiita K.	41	2022-f-31	Mar 2	f-7
Terada R.	81	2022-g-18p	Mar 3	Poster Session		84	2022-r-24p	Mar 3	Poster Session
Terada S.	75	2022-w-06	Mar 4	w-2	Tsukizaki R.	78	2022-b-51s	Mar 3	s-3
Teramoto M.	39	2022-f-21	Mar 2	f-5		78	2022-b-52s	Mar 3	s-3
	80	2022-d-75p	Mar 3	Poster Session		78	2022-b-53s	Mar 3	s-3
Terashima H.	35	2022-e-27	Mar 3	e-6	Tsunezawa N.	11	2022-b-09	Mar 1	b-2
Tetsuya M.	84	2022-r-27p	Mar 3	Poster Session		49	2022-j-04	Mar 3	j-1
Tezuka A.	45	2022-g-05	Mar 4	g-1		68	2022-t-03	Mar 3	t-1
Toda H.	47	2022-h-02	Mar 1	h-1	Turnbull E.	38	2022-f-16	Mar 1	f-4
Tokumitsu M.	40	2022-f-23	Mar 2	f-5	Uchibori Y.	63	2022-p-04	Feb 28	p-1
	71	2022-u-13	Mar 1	u-4	Uchida A.	64	2022-q-10	Mar 3	q-2
	71	2022-u-14	Mar 1	u-4	Uchida Y.	59	2022-n-03	Mar 2	n-1
Tokunaga K.	48	2022-i-01	Mar 3	i-1		61	2022-n-18	Mar 3	n-4
	54	2022-l-04	Mar 1	l-2	Uchiyama T.	74	2022-w-02	Mar 4	w-1
Tokunaga K.	71	2022-u-11	Mar 1	u-3	Uchikado M.	61	2022-n-14	Mar 2	n-3
Toma K.	41	2022-f-37	Mar 3	f-9	Uchiumi M.	1	2022-o-1-05	Mar 3	o-1-1
	44	2022-f-57	Mar 4	f-13		3	2022-o-1-18	Mar 4	o-1-4
Tomikawa Y.	57	2022-m-07	Mar 2	m-2		58	2022-m-10	Mar 2	m-3
Tomiki A.	54	2022-l-04	Mar 1	l-2		58	2022-m-11	Mar 2	m-3
Tomioka S.	5	2022-a-07	Mar 1	a-2		58	2022-m-12	Mar 2	m-3
	5	2022-a-08	Mar 1	a-2		58	2022-m-13	Mar 2	m-3
	6	2022-a-09	Mar 1	a-3	Uchiyama K.	77	2022-a-39s	Mar 3	s-2
	6	2022-a-10	Mar 1	a-3		77	2022-d-27	Mar 1	d-6
	6	2022-a-11	Mar 1	a-3		30	2022-d-59	Mar 4	d-14
	6	2022-a-14	Mar 1	a-4		30	2022-d-64	Mar 4	d-15
	36	2022-e-33	Mar 4	e-8	Uchiyama T.	69	2022-t-10	Mar 4	t-3
Tomita D.	79	2022-b-59p	Mar 3	Poster Session		69	2022-t-11	Mar 4	t-3
Tomita K. Y.	63	2022-p-04	Feb 28	p-1	Ueda M.	50	2022-j-12	Mar 3	j-3
Tomita K.	32	2022-e-08	Mar 2	e-2	Ueda S.	30	2022-d-62	Mar 4	d-15
Tomita Y.	69	2022-t-10	Mar 4	t-3		30	2022-d-63	Mar 4	d-15
	69	2022-t-11	Mar 4	t-3	Uedahira M.	13	2022-b-24	Mar 2	b-6
	74	2022-w-02	Mar 4	w-1		37	2022-f-07	Mar 1	f-2
Tomoda T.	63	2022-q-04	Mar 3	q-1	Uemoto A.	66	2022-r-09	Mar 2	r-3
Tomura T.	39	2022-f-18	Mar 1	f-4	Ueno K.	10	2022-b-03	Feb 28	b-1
Torii W.	54	2022-l-04	Mar 1	l-2		84	2022-r-29p	Mar 3	Poster Session
Torin T.	14	2022-b-34	Mar 3	b-8	Ueno M.	40	2022-f-28	Mar 2	f-6
Totani T.	48	2022-i-03	Mar 3	i-1	Ueno S.	29	2022-d-57	Mar 4	d-14
Toth N.	65	2022-q-15	Mar 3	q-3	Uesugi K.	34	2022-e-19	Mar 3	e-5
Toyama M.	13	2022-b-21	Mar 2	b-5		34	2022-e-20	Mar 3	e-5

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
Ukai T.	35	2022-e-25	Mar 3	e-6	Yagasaki H.	80	2022-d-77p	Mar 3	Poster Session
	35	2022-e-26	Mar 3	e-6	Yagi K.	15	2022-b-40	Mar 3	b-10
	46	2022-g-10	Mar 4	g-2	Yagi Y.	15	2022-b-41	Mar 3	b-10
Umeda H.	69	2022-t-11	Mar 4	t-3	Yaginuma K.	80	2022-d-77p	Mar 3	Poster Session
Umeda K.	17	2022-c-04	Feb 28	c-1		59	2022-m-14	Mar 2	m-4
Umez S.	33	2022-c-11	Mar 2	e-3	Yairi T.	79	2022-b-59p	Mar 3	Poster Session
Unegawa T.	13	2022-b-24	Mar 2	b-6		68	2022-t-03	Mar 3	t-1
	37	2022-f-07	Mar 1	f-2		68	2022-t-04	Mar 3	t-1
Uno K.	52	2022-k-09	Mar 1	k-3	Yajima M.	49	2022-j-03	Mar 3	j-1
	52	2022-k-11	Mar 1	k-3		50	2022-j-07	Mar 3	j-2
Urakawa S.	65	2022-r-02	Mar 1	r-1	Yamada K.	24	2022-d-17	Mar 1	d-4
Urata K. N.	62	2022-n-24	Mar 3	n-5		28	2022-d-46	Mar 3	d-11
Usami N.	41	2022-f-37	Mar 3	f-9		28	2022-d-50	Mar 3	d-12
	42	2022-f-41	Mar 3	f-9		76	2022-d-71s	Mar 3	s-1
	43	2022-f-49	Mar 4	f-11	Yamada K.	33	2022-e-12	Mar 2	e-3
Ushijima T.	57	2022-m-09	Mar 2	m-2		36	2022-e-31	Mar 4	e-7
Ushio T.	60	2022-n-09	Mar 2	n-2		58	2022-m-10	Mar 2	m-3
Usuku K.	69	2022-t-10	Mar 4	t-3		58	2022-m-11	Mar 2	m-3
	69	2022-t-11	Mar 4	t-3		58	2022-m-12	Mar 2	m-3
	74	2022-w-02	Mar 4	w-1		59	2022-m-14	Mar 2	m-4
Verga A.	4	2022-o-1-26	Mar 4	o-1-5		80	2022-d-77p	Mar 3	Poster Session
Verspieren Q.	43	2022-f-50	Mar 4	f-12		81	2022-e-45p	Mar 3	Poster Session
	67	2022-r-13	Mar 2	r-3	Yamada M.	27	2022-d-38	Mar 2	d-9
	70	2022-u-06	Mar 1	u-2	Yamada M.	42	2022-f-43	Mar 3	f-10
	72	2022-u-17	Mar 1	u-4	Yamada S.	18	2022-c-06	Mar 1	c-2
Vincenzino S. G.	46	2022-g-14	Mar 4	g-3		20	2022-c-18	Mar 1	c-4
Wada K.	22	2022-d-05	Feb 28	d-1	Yamada T.	29	2022-d-56	Mar 3	d-13
Wada Y.	1	2022-o-1-01	Mar 3	o-1-1		32	2022-e-04	Mar 2	e-1
	2	2022-o-1-14	Mar 4	o-1-3		32	2022-e-05	Mar 2	e-1
	9	2022-a-32	Mar 3	a-8		53	2022-k-19	Mar 2	k-5
Wakabayashi M.	71	2022-u-13	Mar 1	u-4	Yamada Y.	41	2022-f-36	Mar 3	f-8
	71	2022-u-14	Mar 1	u-4	Yamagami T.	63	2022-q-04	Mar 3	q-1
Wakazono T.	13	2022-b-21	Mar 2	b-5	Yamagata K.	70	2022-u-08	Mar 1	u-2
	13	2022-b-22	Mar 2	b-5	Yamagishi A.	63	2022-p-03	Feb 28	p-1
	13	2022-b-24	Mar 2	b-6		63	2022-p-04	Feb 28	p-1
	37	2022-f-07	Mar 1	f-2	Yamagishi K.	1	2022-o-1-05	Mar 3	o-1-1
	83	2022-r-19p	Mar 3	Poster Session		77	2022-a-39s	Mar 3	s-2
Wang Y.	18	2022-c-08	Mar 1	c-2	Yamagiwa Y.	10	2022-b-05	Feb 28	b-1
Watabe K.	16	2022-b-44	Mar 4	b-11		16	2022-b-42	Mar 3	b-10
Watanabe A.	1	2022-o-1-05	Mar 3	o-1-1		81	2022-g-18p	Mar 3	Poster Session
Watanabe A.	20	2022-c-18	Mar 1	c-4		81	2022-g-19p	Mar 3	Poster Session
	39	2022-f-18	Mar 1	f-4	Yamaguchi H.	20	2022-c-22	Mar 2	c-5
Watanabe D.	20	2022-c-20	Mar 2	c-5	Yamaguchi K.	23	2022-d-12	Mar 1	d-3
Watanabe H.	58	2022-m-10	Mar 2	m-3		40	2022-f-29	Mar 2	f-7
	58	2022-m-11	Mar 2	m-3		66	2022-r-04	Mar 2	r-2
	58	2022-m-12	Mar 2	m-3		83	2022-n-30p	Mar 3	Poster Session
	58	2022-m-13	Mar 2	m-3	Yamaguchi K.	71	2022-u-11	Mar 1	u-3
Watanabe H.	10	2022-b-05	Feb 28	b-1	Yamaguchi S.	16	2022-b-44	Mar 4	b-11
	12	2022-b-15	Mar 1	b-3	Yamaguchi T.	5	2022-a-05	Mar 1	a-2
	12	2022-b-18	Mar 1	b-4	Yamaji M.	60	2022-n-06	Mar 2	n-2
	12	2022-b-20	Mar 1	b-4	Yamakawa M.	20	2022-c-18	Mar 1	c-4
Watanabe H.	72	2022-v-01	Mar 1	v-1		47	2022-h-05	Mar 1	h-2
Watanabe K.	26	2022-d-31	Mar 1	d-7		53	2022-k-18	Mar 2	k-5
	42	2022-f-39	Mar 3	f-9	Yamamoto H.	70	2022-t-14	Mar 4	t-3
Watanabe K.	83	2022-q-16p	Mar 3	Poster Session	Yamamoto K.	60	2022-n-08	Mar 2	n-2
	83	2022-q-17p	Mar 3	Poster Session	Yamamoto M.	61	2022-n-15	Mar 2	n-3
Watanabe K.	3	2022-o-1-19	Mar 4	o-1-4	Yamamoto M. K.	60	2022-n-07	Mar 2	n-2
Watanabe M.	62	2022-n-22	Mar 3	n-5	Yamamoto N.	10	2022-b-01	Feb 28	b-1
Watanabe M.	66	2022-r-07	Mar 2	r-2		10	2022-b-02	Feb 28	b-1
Watanabe R.	1	2022-o-1-07	Mar 3	o-1-2		11	2022-b-10	Mar 1	b-2
Watanabe S.	53	2022-k-20	Mar 2	k-5		15	2022-b-40	Mar 3	b-10
Watanabe T.	63	2022-q-03	Mar 3	q-1		15	2022-b-41	Mar 3	b-10
Watanabe T.	46	2022-g-16	Mar 4	g-3	Yamamoto T.	55	2022-l-07	Mar 1	l-3
Watanabe Y.	34	2022-e-17	Mar 3	e-4	Yamamoto T.	26	2022-d-34	Mar 2	d-8
	34	2022-e-18	Mar 3	e-4		39	2022-f-20	Mar 2	f-5
	34	2022-e-21	Mar 3	e-5		40	2022-f-27	Mar 2	f-6
Windelberg J.	46	2022-g-14	Mar 4	g-3		43	2022-f-49	Mar 4	f-11
Withanage D. C.	42	2022-f-40	Mar 3	f-9	Yamamoto T.	22	2022-d-03	Feb 28	d-1
	80	2022-d-75p	Mar 3	Poster Session		23	2022-d-09	Feb 28	d-2
Woicke S.	46	2022-g-13	Mar 4	g-3	Yamanaka R.	17	2022-c-01	Feb 28	c-1
Wood J.	55	2022-l-05	Mar 1	l-2	Yamasaki J.	10	2022-b-06	Mar 1	b-2
Yabuki R.	12	2022-b-16	Mar 1	b-4		11	2022-b-14	Mar 1	b-3

Name	Page	Paper No.	Date	Session No.	Name	Page	Paper No.	Date	Session No.
	12	2022-b-17	Mar 1	b-4	Yoshida K.	17	2022-c-01	Feb 28	c-1
	12	2022-b-19	Mar 1	b-4	Yoshida K.	52	2022-k-09	Mar 1	k-3
Yamashiki Y.A.	60	2022-n-04	Mar 2	n-1		52	2022-k-11	Mar 1	k-3
Yamashita F.	50	2022-j-12	Mar 3	j-3		56	2022-l-21	Mar 2	l-7
Yamashita H.	81	2022-j-13p	Mar 3	Poster Session	Yoshida L.	57	2022-m-07	Mar 2	m-2
	82	2022-j-14p	Mar 3	Poster Session	Yoshida M.	49	2022-j-06	Mar 3	j-2
Yamashita Y.	10	2022-b-04	Feb 28	b-1	Yoshida S.	46	2022-g-16	Mar 4	g-3
	57	2022-m-09	Mar 2	m-2	Yoshida T.	56	2022-m-02	Mar 1	m-1
	78	2022-b-51s	Mar 3	s-3		57	2022-m-03	Mar 1	m-1
	78	2022-b-53s	Mar 3	s-3		57	2022-m-08	Mar 2	m-2
Yamatani M.	57	2022-m-08	Mar 2	m-2	Yoshihara K.	32	2022-e-05	Mar 2	e-1
Yamauchi T.	44	2022-f-52	Mar 4	f-12	Yoshihara K.	77	2022-a-37s	Mar 3	s-2
Yamauchi T.	39	2022-f-21	Mar 2	f-5	Yoshii K.	48	2022-i-03	Mar 3	i-1
	43	2022-f-51	Mar 4	f-12	Yoshikawa M.	29	2022-d-55	Mar 3	d-13
	44	2022-f-53	Mar 4	f-12	Yoshikawa S.	28	2022-d-51	Mar 3	d-12
	44	2022-f-54	Mar 4	f-12		68	2022-t-01	Mar 3	t-1
	49	2022-i-07	Mar 4	i-2	Yoshimitsu T.	54	2022-l-04	Mar 1	l-2
Yamawaki T.	21	2022-c-24	Mar 2	c-6	Yoshimura K.	60	2022-n-08	Mar 2	n-2
Yamazaki A.	46	2022-g-16	Mar 4	g-3	Yoshimura Y.	66	2022-r-06	Mar 2	r-2
Yamazaki M.	20	2022-c-21	Mar 2	c-5		67	2022-r-11	Mar 2	r-3
	39	2022-f-22	Mar 2	f-5	Yoshioka M.	19	2022-c-13	Mar 1	c-3
	72	2022-u-16	Mar 1	u-4		61	2022-n-17	Mar 3	n-4
Yanagi R.	54	2022-k-27	Mar 2	k-6	Yoshitake T.	61	2022-n-13	Mar 2	n-3
Yanagida K.	26	2022-d-35	Mar 2	d-8	You D.	49	2022-i-08	Mar 4	i-2
	43	2022-f-49	Mar 4	f-11	Yuzawa T.	7	2022-a-21	Mar 2	a-5
	43	2022-f-50	Mar 4	f-12		8	2022-a-23	Mar 2	a-6
	44	2022-f-58	Mar 4	f-13		41	2022-f-32	Mar 2	f-7
	69	2022-t-08	Mar 4	t-2	Zengo T.	72	2022-u-16	Mar 1	u-4
Yanagihara D.	20	2022-c-21	Mar 2	c-5	Zhang Z.	13	2022-b-26	Mar 2	b-6
Yanagimoto N.	82	2022-j-14p	Mar 3	Poster Session	Zhong R.	22	2022-d-06	Feb 28	d-2
Yanao T.	22	2022-d-08	Feb 28	d-2	Zhu J.	7	2022-a-17	Mar 1	a-4
YANG X.	43	2022-f-45	Mar 3	f-10	Zushi T.	82	2022-m-19p	Mar 3	Poster Session
Yang Y.	2	2022-o-1-11	Mar 3	o-1-2					
Yang Y.	44	2022-f-56	Mar 4	f-13					
Yano H.	63	2022-p-04	Feb 28	p-1					
Yao F.	22	2022-d-06	Feb 28	d-2					
Yasuda K.	1	2022-o-1-05	Mar 3	o-1-1					
	1	2022-o-1-07	Mar 3	o-1-2					
	3	2022-o-1-18	Mar 4	o-1-4					
	77	2022-a-39s	Mar 3	s-2					
Yasuda S.	18	2022-c-07	Mar 1	c-2					
Yasuhira H.	7	2022-a-21	Mar 2	a-5					
	8	2022-a-23	Mar 2	a-6					
	41	2022-f-32	Mar 2	f-7					
Yasuho A.	79	2022-b-65p	Mar 3	Poster Session					
Yatsu Y.	42	2022-f-39	Mar 3	f-9					
Yeo S. H.	15	2022-b-36	Mar 3	b-9					
YiYong A.	1	2022-o-1-05	Mar 3	o-1-1					
Yokobori S.	38	2022-f-11	Mar 1	f-3					
	41	2022-f-34	Mar 3	f-8					
	41	2022-f-37	Mar 3	f-9					
	48	2022-i-04	Mar 3	i-1					
	48	2022-i-06	Mar 4	i-2					
	63	2022-p-04	Feb 28	p-1					
Yokota K.	20	2022-c-17	Mar 1	c-4					
Yokota K.	10	2022-b-04	Feb 28	b-1					
	57	2022-m-09	Mar 2	m-2					
	65	2022-r-02	Mar 1	r-1					
Yokota S.	10	2022-b-06	Mar 1	b-2					
	11	2022-b-14	Mar 1	b-3					
	12	2022-b-17	Mar 1	b-4					
	12	2022-b-19	Mar 1	b-4					
	17	2022-b-49	Mar 4	b-12					
	79	2022-b-60p	Mar 3	Poster Session					
Yokota Y.	22	2022-d-05	Feb 28	d-1					
Yokozeki T.	77	2022-c-28s	Mar 3	s-2					
Yomo K.	56	2022-l-17	Mar 2	l-6					
Yonemoto K.	46	2022-g-16	Mar 4	g-3					
	47	2022-g-17	Mar 4	g-3					
Yonezawa S.	64	2022-q-13	Mar 3	q-3					
Yoshida A.	13	2022-b-21	Mar 2	b-5					
	13	2022-b-22	Mar 2	b-5					

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Kyoichi NAKASHINO Tokai University
Norihide MIYAMURA Meisei University
Yasuhiro YOSHIMURA Kyushu University
Hiraku SAKAMOTO Tokyo Institute of Technology

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Hayabusa2 return to Earth



Future lunar base (image)

Reaching the Space Frontiers



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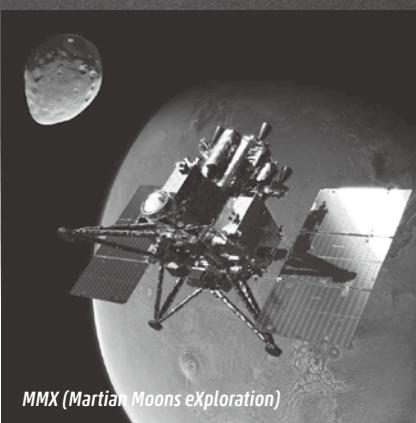


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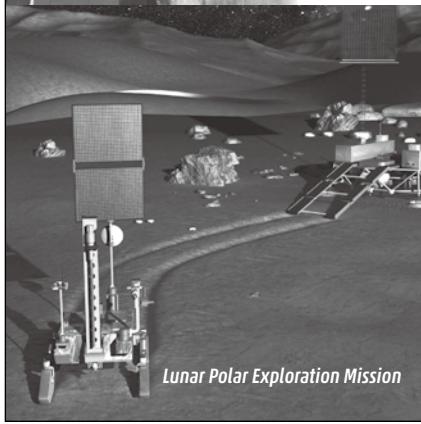
Hayabusa2 return to Earth



Epsilon-5



MMO (Martian Moons eXploration)



Lunar Polar Exploration Mission



Astronaut Hoshida conducting EVA ©JAXA/NASA

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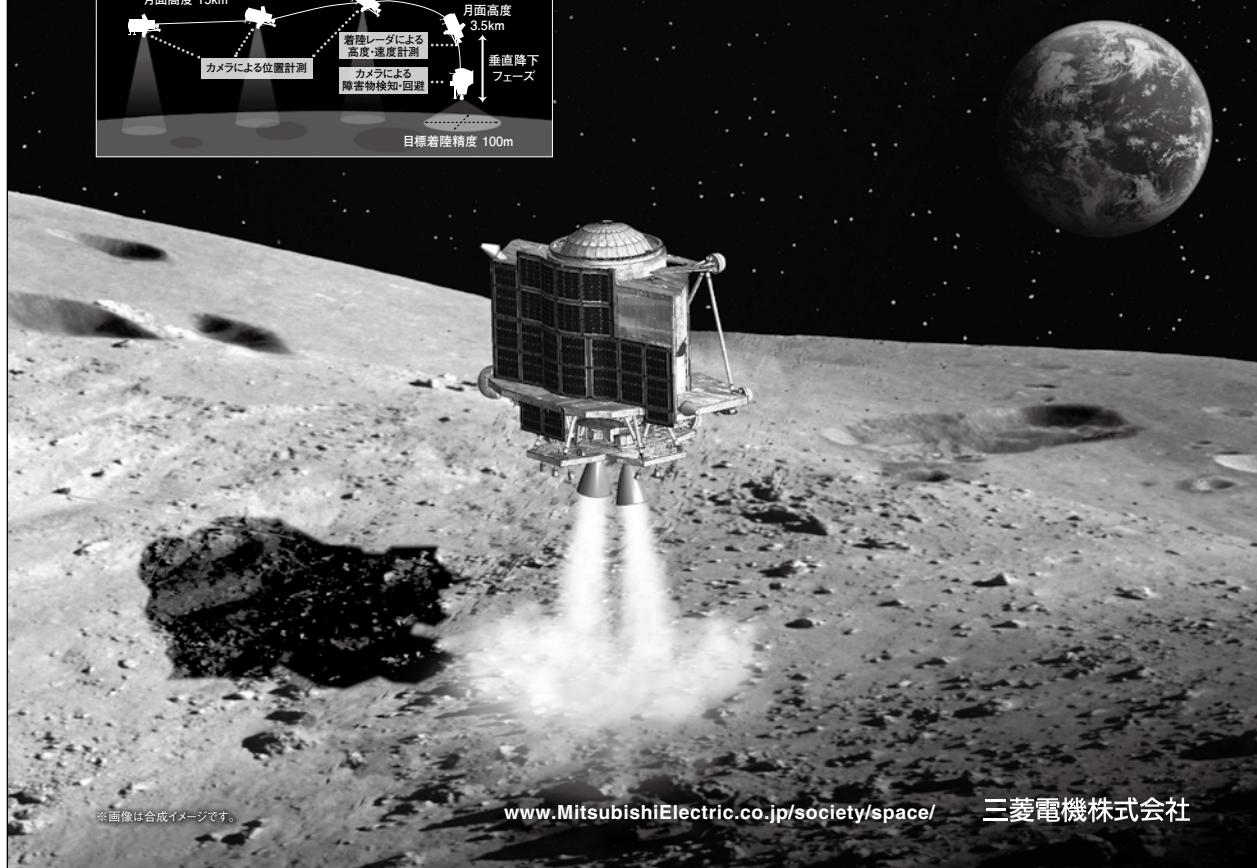
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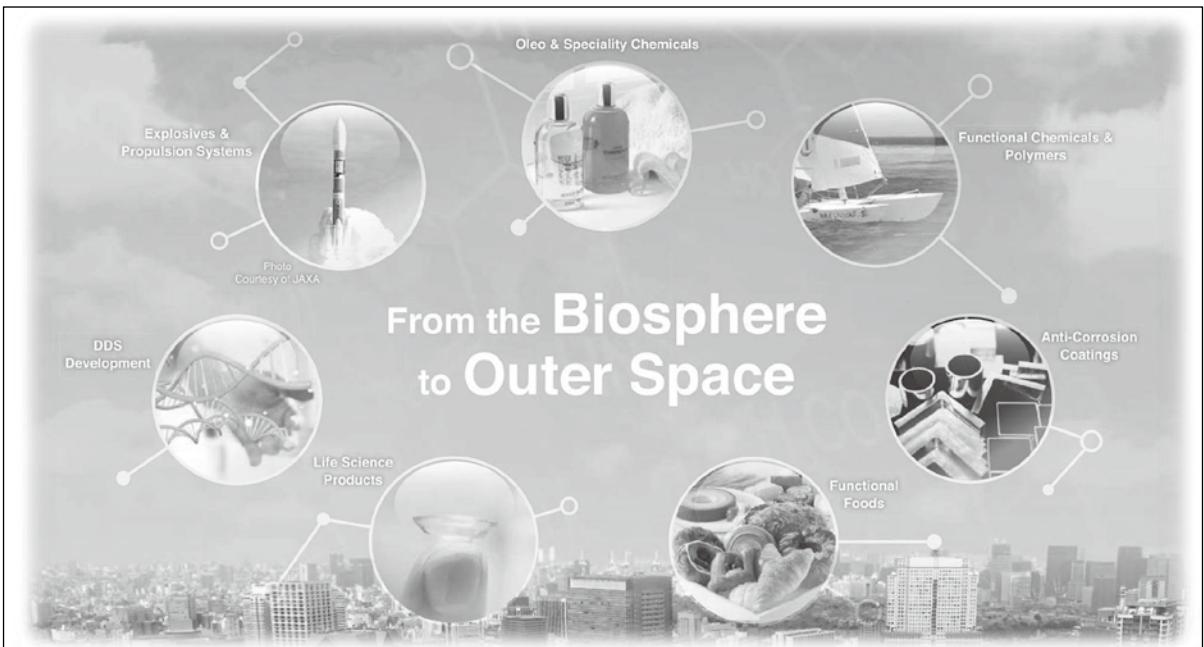
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