The Themes List of JAXA Aerospace Project Research Association recruitment 2016

Attached Sheet #1

No.	Fields	Places of work	Themes	Details	Required Abilities	Environment	Research Leaders	Contacts	Ratios (Own research: Project contribution)
1	Department of Space Astronomy and Astrophysics	Sagamihara Kanagawa	Reserch work in the astronomical instrumnentation for SPICA and future space infrared missions	The infrared astronomy group in the department is promoting the next-generation infrared astronomical satellite project, SPICA, to solve the key issues in modern astronomy, e.g., birth and evolution of galaxies and planetary systems. SPICA is a 2.5m, cold telescope which has outstanding sensitivity and angular resolution. SPICA is proposed to be launched in 2020's under extensive international collaboration. We supplement the large mission with sub-orbital small experiments. We have opportunities for postdoctral researchers, who will work in basic research and development including highly-sensitive infrared detectors, focal plane instruments, optics, and cryogenics, and/or system design of the instrumentation for above missions.	Experience in the satellite instrumentation, astronomical instrumentation for ground-based telescopes, or experimental physics related to this research area is expected.	Succesful applicants will be involved in the international research group that drives the SPICA project under the supervision of faculty of the Infrared Astronomy Group in the Department of Space Astronomy and Astrophysics. With two professors, four associate professors, and two assistant professors, the Infrared Astronomy Group at ISAS is one of the largest research groups in infrared astronomy in Japan. The group has test facilities for the experimental research.	Professor, Takao Nakagawa	Professor, Takao Nakagawa nakagawa@ir.isas.jaxa.jp	5 : 5
2	Dept. Solar Sytem Sci., ISAS	Sagamihara Kanagawa	Learn from existing data to propose a compelling new mission	We welcome an applicant who will have a fresh look at the existing data from solar system missions (including those for solar physics) and shed a new ligh on planning of future missions at ISAS. The new perspective includes development and application of new data analysis tools and ideas. The dataset to be inspected can be those from ISAS missions or others. Some understanding on where ISAS stands in the world-wide landscape of the solar system exploration may help putting an application form in a better shape.	Experience in analysis of data from missons exploring the solar system including the sun	The Department is composed by reseachers studying solar physics, space plasma physics, planetary atmospheres including ionospheres and planetology including asteroids as one of the research targets. A sucessful applicant will work with these members. Since many members are oriented towards hardware development for solar system missions, it is natural for a successful applicant to be exposed to the opportunities to learn how space instrments work to produce the data that he/she works hard to decypher.	Director, Masaki Fujimoto	Director, Masaki Fujimoto fujimoto@stp.isas.jaxa.jp	7 : 3
3	Department of Interdisciplinary Space Science	Sagamihara Kanagawa	Development of an advanced information system to promote interdisciplinary space science research and an original research using that system	In the department of interdisciplinary space science, we carry out research on informatics and information technologies in order to promote interdisciplinary space sciences, as well as individual researches in various domains of space sciences. We collect various space science data, archive them and release thme from DARTS (http://darts.isas.jaxa.jp). We develop web-applications to facilitate using the data archived at DARTS. The applicant will develop an advanced information system to access these data and to promote interdisciplinary space sciences, in cooperation with staff members in the department. Also, he/she is expected to achieve innovative scientific results using that system, which would have been difficult unless that system.	Doctoral degree in space science, informatics, or information technologies. He/she is expected to have sufficient experiences of analyzing space science data, and development of data analysis system/web system.	In our group, there are world experts on astronomy, solar physics, solar-terrestrial-physics, database, and informatics, etc. The applicants can access various archival data in these fields, and can use high performace computers to develop a new system.	Associate Professor Iku Shinohara, Associate Professor Ryoji Takaki, Associate Professor Keiichi Matsuzaki	Associate Professor Iku Shinohara iku@stp.isas.jaxa.jp	7 : 3
4	Department of Space Flight System	Sagamihara Kanagawa	Study on Space Flight System	Multi-dicipline space flight engineering including space flight systems as well as ground support systems and their basic diciplines such as system engineering, space transportation engineering, structure and materials engineering. The candidates are required to contribute space science programs and projects in ISAS through their stuidy on the space flight systems.	The candidates should possess wide knowledge and ability in soace engineering and should have studied in one of the space engineering fields.	Research will be supervised by the academic staffs in Department of Space Flight Systems as well as the collaboration with other research staffs in JAXA including ISAS. The applicants can accesse various facilities in ISAS and can receive various supports by the technicians in charge of them.	Prof. Eiichi Sato and other members in Department of Space Flight System	Prof. Eiichi Sato Director of Department of Space Flight Systems sato@isas.jaxa.jp	7 : 3
5	Department of Space Flight Systems	Sagamihara Kanagawa	Deep Space Mission Desgin	Unlike earth-orbiting satellites, deep space explorers must reach their target objects by themselves. Trajectory desgin is the first step of deep space mission planning, which strongly constrains schedule and scale of the mission and provides critical conditions for the spacecraft design. Accordingly, trajectory design of deep space mission is not a simple energy optimization process, but a high level synthesis process of spacecraft design, operation plan, and program management. For this reason, it is also frequently called "mission design."Therefore, a researcher is expected to join the study team on future deep space missions and to cope with the problems on mission analysis and spacecraft design. The researcher is also expected to study on the design process specific to deep space missions.	What is required to perform this research is a wide range of knowledge and capability in space technology. In particular, to have research experience in the field of astrodynamics (mainly of trajectory design), or research/development experience of spacecraft system is preferable.	The research is done under the lead of research staffs in ISAS Department of Space Systems and Astronautics, as well as the colaboration with other research staffs in JAXA (ISAS, JSPEC, etc.). A PC for design and analysis use will be provided to the researcher, and the JAXA super computer is also available on research necessity.	Associate Professor Yasuhiro Kawakatsu	Associate Professor Yasuhiro Kawakatsu Kawakatsu.Yasuhiro@jaxa.jp	5 : 5
6	Institute of Space and Astronautical Science, Spacecraft Engineering Devision	Sagamihara Kanagawa	Research on Synthetic Aperture Radar for Small Satellite	A dream comes true. Real-time earth observations at any time at any weather become possible with satellite constellation if a synthetic aperture radar (SAR) can be compatible with a 100kg small satellite. In order to realize SAR observation with a small satellite, a compact SAR antenna and a RF amplifier with high-efficiency and high- duty cycle, an efficient power/thermal system that can manage its high peak-power requirement will be developed in this research. The main focus is to develop hardware system. For an example we will develop a X-band honeycomb slot array antenna with dual polarization. The research includes a conceptual idea, numerical design, and hardware measurement. We will make an antenna system broadband and robust against material dielectric properties.	Knowleges and experimences that are required for this research are either of microwace theory, micorwave measurement, powe and thermal engineering and thermal engineering.	Our institute can provide research guidance on microwave antenna, micrawave measurement and SAR sensor. RF measurement systems and space environment test equipments are available at our institute. Above all, we can provide you with a flight chance of your idea.	Professor Hirobumi Saito	Professor Hirobumi Saito saito.hirobumi@jaxa.jp	5 : 5
7	Department of Spacecraft Engineering	Sagamihara Kanagawa	Research and development on the sophisticated mobile systems applied to very small planetary rovers over the surface of high-gravity extraterrestrial bodies	We seek for a motivated postdoctoral researcher to make research on sophisticated mobile systems fitted for a tiny rover which explores over the high-gravity extraterrestrial bodies such as the Moon or Mars. Many of high-gravity extraterrestrial bodies in the Solar System having a solid surface are covered with soft soils scattered with small rocks. The past rovers exported to such surfaces by foreign space agencies were typically equipped with many wheels that made the mass of the rover more than ten kilograms. We are thinking of much smaller rovers less than five kilograms for the future mission. But the traversability above the natural terrain by the small wheels of the rovers is drastically degraded because the size of the wheels is compatible with the one of the rocks. Thus sophisticated new mobile systems applicable to tiny rovers are expected based on the different ideas.	(a) The applicants must have a knowledge and experiences on the robotics research based on terramechanics. Terramechanics covers all the interaction problems between the soil and the vehicles which work over the soil. Thus it includes mobile systems, landing, drilling, and so on. (b) The applicants can use 3D CAD for developing a robot in-house.	Two professors from the Department of Spacecraft Engineering in the Institute of Space and Astronautical Science (ISAS) supervise your research. You can also work for the development and evaluation processes in practical missions, if necessary. 3D printers and several analytical tools are available.	Associate professor Tetsuo YOSHIMITSU	Associate professor Tetsuo YOSHIMITSU kikko@nnl.isas.jaxa.jp	7 : 3

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8	Department of Spacecraft Engineering	Sagamihara Kanagawa	Research and development of sophisticated autonomy for tiny planetary probes based on the image processing on the hardware	Image processing is a key issue for improving the autonomous capability of rovers, landers, and general probes used for the deep space explorations. But for the tiny robots, complicated image processing is not practical for the low-speed onboard computers, mainly due to the power consumption. This research seeks for the image processing using programable hardware circuits needed for the deep space probes in order to make the sophisticated image processing installable for tiny probes.	Applicants are (a) required to have experiences on image processing. (b) requested to have experiences on the application development using FPGAs.	Two professors from the Department of Spacecraft Engineering in the Institute of Space and Astronautical Science (ISAS) supervise your research. You can also work for the development and evaluation processes in practical missions, if necessary. The FPGA development environment required for making the research is provided.	Professor Takashi Kubota	Professor Takashi Kubota kubota@isas.jaxa.jp	8 : 2
9	SOLAR-B Project	Sagamihara Kanagawa	Solar physics researches based on Hinode observations	ISAS/JAXA is leading solar physics researches with the Hinode satellite. Hinode was developed and launched on September 2006 by ISAS, with NAOJ as domestic partner and with international partners.Applicants are expected to make major contributions to Hinode's scientific operations and to perform data analysis for leading researches on solar physics and its related field. Hinode has three advanced telescopes, providing high spatial resolution data of magnetic and velocity field at the photosphere and diagnostics of the hot plasma in the corona. Depending on the applicants' interests, the research topics can be selected from various kinds of topics, including the heating of the corona and chromosphere, coronal dynamics, solar flares, generation, development, and dissipation of solar magnetic fields, Sun-heliosphere connection, and Sun-laboratory plasma comparisons. In addition to science researches with Hinode, applicants are encouraged to participate in conceptual studies and research developments for the future solar physics missions, such as Solar-C.	Research experiences on solar physics or its relevant research field are required for applicants. Applicants are expected to promote his/her researches (either observationally or theoretically) based on observations including Hinode. Researches should make contributions to further improvements on our knowledge on the Sun.	Researches can be promoted in deep collaboration with researchers in ISAS and NAOJ. Also, applicants can promote research works with foreign residents at ISAS. The computers at ISAS allow researchers to access all the Hinode data on line. Applicants are highly encouraged to participant in scientific operations of Hinode. With such opportunities, he/she can realize new observations with Hinode.	Associate Professor Taro Sakao, Associate Professor Toshifumi Shimizu	Associate Professor Toshifumi Shimizu shimizu.toshifumi@isas.jaxa.jp	5 : 5
10	SOLAR-B Project	Sagamihara Kanagawa	Research and Development on Scientific Payloads for Future Solar Missions	Applicants for this position shall participate in future Japanese space solar programs such as SOLAR-C and contribute to the relevant program through R&D studies of on-board scientific instrument(s). Towards future solar missions, ISAS solar physics group are now engaged in studying photon-counting soft X-ray telescope and its focal-plane detector, and are also developing high-reliability mechanisms allowing >10 million movements in space which are indispensable for observing continuously magnetic activities in the solar atmosphere. Applicants are requested to be engaged in either such R&D studies on scientific instruments that can bring break-through in space solar physics, or in the development of on-board acquisition/processing systems for science data, performance evaluation on scientific instruments followed by detailed assessment on their science performance, or in the study on engineering aspects of the spacecraft system.	Applicants are requested to have good knowledge of physics or astrophysics. For applicants who aim to carry out engineering study, basic knowledge and research capability for the relevant area are required. It is desired that the applicants have experience in hardware R&D studies on physics and/or astrophysics. It is requested that the applicants can promote collaborative research activities with other groups inside or outside JAXA whenever needed. Those who have strong will to push next generation space solar physics forward through hardware development are highly welcomed.	ISAS solar physics group (SOLAR-B project) will supervise the research and it is possible to use various test facilities in ISAS. Meanwhile, collaborative research activities with solar physics group at NAOJ (with which ISAS solar group have years-long working relationship) as well as use of test facilities at NAOJ are also available and encouraged.	Associate Professor Taro Sakao Associate Professor Toshifumi Shimizu	Associate Professor Taro Sakao sakao.taro@jaxa.jp	3 : 7
11	PLANET-C (AKATSUKI) Project	Sagamihara Kanagawa	Observation of Venus using Venus explorer Akatsuki and data analysis	Akatsuki will arrive at Venus on December 7, 2015. The aim of the project is to reveal atmospheric dynamics, cloud physics and trace gas transport using optical remote sensing. The researcher is expected to participate in this project and contribute to the operation of science instruments, data analysis and publication of scientific findings. The researcher will also learn the strucutre of spacecraft operation and observatin methods through participation in the initial operation phase, and accumulate experience which would help the researcher to play important roles in future space exploration.	The resarcher should have strong interest in observations and have high level of skills in data processing. It is desirable that the researcher has background on planetary science or atmospheric physics.	ISAS staffs in the field of plataru atmosphers will surpervise the researcher. Participation in the group seminars is encouraged. Computers for personal use will be provided. Travel fees for researches will be provided.	Associate Professor Takeshi Imamura	Associate Professor, Takeshi Imamura imamura.takeshi@jaxa.jp	7 : 3
12	Science Satellite Operation and Data Archive Unit	Sagamihara Kanagawa	Construction of AKARI data archive and astronomical researches using the AKARI data	The infrared astronomical satellite AKARI had carried out an all-sky survey in the mid- and far-IR wavelengths as well as almost 20,000 pointed observations in various wavelengths from near- to far-IR. The AKARI data processing and analysis team is in charge of data processing and archiving of this huge amount of data to provide "Science Ready" data archive to world-wide astronomical community. The successful candidates will participate in the construction of AKARI data archive via data processing, evaluation, and archiving, and improvement of data processing techniques toward the future space infrared missions. In addition, the persons are expected to carry out (1) astronomical researches based on the AKARI data, and/or (2) researches in the data processing / archiving technology. Contribution to the data promotion activity is also encouraged.	The candidates must be self-standing researchers in astronomy or software science. The candidates must have skills in astronomical data analysis and software development.	The successive candidates will work together with AKARI data processing and analysis team (1 research staff, 3 post-docs) and members in the infrared astronomy group of the Department of Space Astronomy and Astrophysics (9 research staffs, 3 post-docs, 10 graduate students). Computer facilities are provided.	AKARI data processing and analysis team, leader/Associate Professor, Issei Yamamura	AKARI data processing and analysis team, leader/Associate Professor, Issei Yamamura yamamura@ir.isas.jaxa.jp	4 : 6
13	Science Satellite Operation and Data Archive Unit	Sagamihara Kanagawa	Development of the all-sky X-ray monitor MAXI data archive system	MAXI is the all sky X-ray monitoring instrument on-board the ISS "Kibo" experimental module since 2009, which is the most sensitive all sky monitor in 2--10 keV. MAXI continues the operation, and its all-sky monitoring results are announced to the world-wide science community immediately. In parallel, MAXI archive system is being developed to make the MAXI data available permanently. The candidate in this position will work on the MAXI data archive development. He/she will convert the MAXI raw data to the standard astronomical data format, and maintain the data analysis software package. Also, the candidate develops web-applications which enable one to access the MAXI archival data easily. In addition, candidate is expected to produce scientific outputs primarily using the MAXI data.	Experience of analyzing astronomical X-ray or gamma-ray data. Should be interested in the experimental astrophysics.	The candidate will work at Sagamihara campus, and join the development of the MAXI data archive system. MAXI team members are in JAXA, RIKEN, Osaka univesity, Kyoto university, Tokyo Institute of Technology, etc. The candidate will work with senior and young staff from these institutes.	Professor, Ken Ebisawa	Unit of Scienceo satellite Operation and Data Archive, Ken EBISAWA ebisawa@isas.jaxa.jp	5 : 5
14	Astromaterials Science Research Group	Sagamihara Kanagawa	Studies on the sample preparation and sample description in curation work	More than 500 particles was successfully recovered from the re-entry capsule of Hayabusa, the recovery work is currently in progress. Recovered micro-sized particles after the initial description by our group, are distributed to the detailed analysis of world-wide researchers. In the initial description, there is a need to describe without terestrial contamination. Our group is developing a new technology to minimize the contamination caused by ultramicrotome and FIB operation. The handling technology of particle, and the description scheme of these particles will be considered in this study. It is developed an appropriate sample preparation in accordance with the request of the detailed analysis to be carried out in the future. Especially for contamination controle, it is expected to adapt to the mission following the Hayabusa. The resulting knowledge will be reflected in the sample receiving facility design of the following mission. Also, data archives of the sample description will contribute to make use in subsequent research promotion.	To have an experience of experimental research in the astromaterials or terestrial materials.	Engage in research at the curation facility (Extraterestrial Smple Curation Center). Atmospheric pressure plasma equipment (for cleaning), FTIR, FE-SEM/EDS, XRD and API-MS (for sample description), ultra-microtome, and FIB (for sample preparation), and micro-sample handling manipulator are provided. And sample analysis team that has been selected from all over the country through the practice of the united of curation work, can receive the expertise and technical support for chemical analysis. In particular, analysis and evaluation is carried out in collaboration with national laboratories. Collaboration with the super technician of curation facility in my advance the research.	Associate Professor Masanao Abe	Associate Professor Masanao Abe abe.masanao@jaxa.jp	5 : 5

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15	Astromaterials Science Research Group	Sagamihara Kanagawa	Research for Hayabusa 2 return sample receiving	Hayabusa 2 project is expected to bring back samples from C-type asteroid in 2020 to the Earth. It is planned that the acceptance and initial description will be operated in JAXA Sagamihara campus. Some samples will be also planned to used for detailed analysis by our group. Our group, while based on the experience of Hayabusa sample acceptance, taking into account the characteristics of the Hayabusa 2 return sample, will be developing research of new sample handling techniques and describing technology. The samples are distributed to a detailed analysis after the initial description. In the initial description of the particle, to maximize the scientific gain, we need to execute appropriate description for optimal distribution but minimize the sample damage for following detailed analysis. The theme of this study is the research for the necessary development toward the Hayabusa 2 return sample receiving, but is not limited to technology development for the receiving facility instoration, the development of the improvement of sample handling techniques and analysis technology will be included.	To have an experience of experimental research in the astromaterials or terestrial materials.	Engage in research at the curation facility (Extraterestrial Smple Curation Center). Atmospheric pressure plasma equipment (for cleaning), FTIR, FE-SEM/EDS, XRD and API-MS (for sample description), ultra-microtome, and FIB (for sample preparation), and micro-sample handling manipulator are provided. And sample analysis team that has been selected from all over the country through the practice of the united of curation work, can receive the expertise and technical support for chemical analysis. In particular, analysis and evaluation is carried out in collaboration with national laboratories. Collaboration with the super technician of curation facility in my advance the research.	Associate Professor Masanao Abe	Associate Professor Masanao Abe abe.masanao@jaxa.jp	**5 : 5**
16	Research Unit II	Tsukuba Ibaraki	Research of space robotics, that can be adapted to the environment	Addition of time delay under remote control is considered an essential technical problem in space robot field because it requires a semi-autonomous control that reinforces difficulties in locomotion and dexterous manipulation. The semi-autonomous control becomes even more problematic because the current robots cannot be adapted to the small environmental changes. Our research goal is to gain the integrated methodology that can be robustly adapted during subtle environmental changes. When the problem is solved, we believe new space utilization including on-orbit and space exploration missions are realized because of risk reduction and costs decrease. By referring the technologies on rescue robotics, whose semi-autonomous scheme is similar to space robotics due to significant amount of time delay, the applicant will seek research for three years in JAXA.	-Experience and knowlende in the robotics and mechatoronics, particularly, broad insight in ground robots -Ability to settlle and deepen the research problem in the field of mechanics, control, or robot intelligence	-To conduct research under multiple expert guidance on space robot technology -To collaborate with the professionals in the other fields in aerospace technology such as guidance, control, thermal technology, and mechatronics -We have the space robotics laboratory.	Director Hiroyuki Sugita	Researcher, Hiroki Kato kato.hiroki@jaxa.jp	**7 : 3**
17	Research Unit II,	Chofu Tokyo	ECLSS (air and water revitalization) for Manned Expolaration	Operation of the ISS has been extended until 2020. The research on environmental control and life support system(ECLSS) has progressed as a mission project. There is a limit to the supply of resources such in space station, Moon base and Mars base. In order to build the technology to reuse the material, circulation type life-support systems (especially focusing on air revitalization) is studied. i) Carbon dioxide separation and concentration from the atmosphere. ii) Water and methane are generated by the reaction of carbon dioxide and hydrogen (Sabatier reaction) iii) Oxygen is generated by water electrolysis Japan has advantage of environmental technology on the ground. JAXA should carry out study of environmental technology also in Space, including water re-vitalization.	It is desirable to have experience of analysis of gas and water. It is desirable to have knowledge of gas adsorption and desorption, catalysis, electrochemistry, chemical engineering. In addition, it is desirable to have a basic knowledge material balance, energy balance. It is desirable to have a wide range of knowledge and interest can combine studies and the project.	Research leader will instruct you directly. The experiment is carried out in cooperation with student trainees sometimes. Experiments on the air revitalization (CO2 removal device , CO2 reduction apparatus , water electrolysis equipment) Ventilation, Gas chromatography and mass spectrometer Experiments on the Water Reclamation	Senior Researcher Masato Sakurai	Senior Researcher Masato Sakurai sakurai.masato@jaxa.jp	**5 : 5**
18	Flight Research Unit	Chofu Tokyo	Fault Detection and Isolation (FDI) Algorithm for Flight Control and Its Evaluation Through Flight Tests with Research Airplane	The task of this research is to propose new "practical" algorithm to detect and isolate faults which are estimated from aircraft motion data in real flights. The algorithm must not only be supported by control theories, but also be confirmed to achieve sufficient performance in real use, because the algorithm is intended to be certified by civil aviatioin authorities in the future. The developed algorithm will be tested and evaluated in numerical simulations, in Hardware-In-the-Loop Simulations (HILS), and in real flight with MuPAL-alpha which is JAXA's fixed-wing research aircraft equipped with research fly-by-wire system. This research will be progressed with VISION 2020 project which is a Japan and EU collaboration research program.	Person who engages oneself in this research must have enough background of aircraft flight dynamics and control theories including identification theory. It is strongly recommended to have experience to study in the fields of fault detection and isolation, system identification, and statistical analyses is also welcome. Programming skills for Matlab and language-C are also required. Moreover, skills to conduct flight tests smoothly, such as communication with not only researcher but also pilots, are recommended. English skill is strongly required if Japanese skill is not enought for daily conversations.	We provide the following: - Personal PC - Hardware-in-the-loop simulation with research airplane (MuPAL-alpha) - Research airplane (MuPAL-alpha) to evaluate FDI performance	Senior Researcher Masayuki Sato	Senior Researcher Masayuki Sato sato.masayuki@jaxa.jp	**2 : 8**