Contents

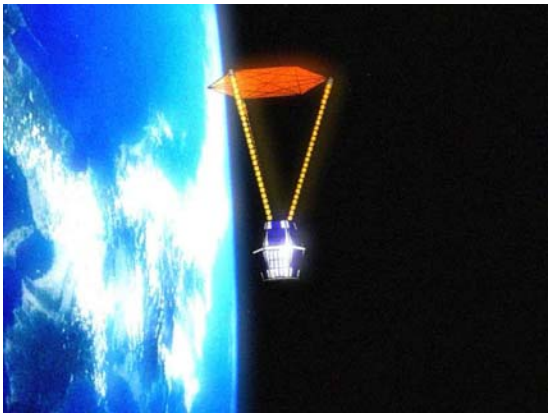
A-1 Waseda University

In Waseda University, Yamakawa and Miyashita laboratory, the Nano satellite development project is advanced by students, to give the place of common experiments to the space inflatable structures that attract attention as a super-light space structural technology in the future.

Concretely, the satellite we develop has the drag chute with the Inflatable mechanism as measures to the debris in space, and its size is about 20 centimeters cube and its weight is about 5 kilograms. The main mission of this satellite is to prove a Deorbit system that decelerates the satellite, and removes from the orbit by developing the drag chute with the Inflatable structure because of the drag force of the air molecule that exists slightly on the orbit.

Students are seven in all the members, and each has been assigned to each system of the mission equipment, the structure system, the thermal control system, the attitude control system, the electrical power system, the data processing system, and the communication system.

To our regret, it was not possible to remain in the advertising selection by JAXA this time though we'd been developing our satellite aiming at the H-IIA rocket piggyback of the launch schedule in August, 2008. However, we will keep developing the satellite.



A-2 Tokyo University

The vehicle name of TENRAI's primary mission will join the CANSAT competition take place in the Black Rock Desert, Nevada. The vehicle will demonstrate return to a designated target point following a launch to an altitude around 4 km (ASL) as an open-class payload on an ARLISS rocket. When the vehicle is deployed from the rocket

the vehicle will maintain folded configuration, whilst safely descending using a weight single or weight-parachute system. Having descended to an operating altitude, where a suitable density for steady flight is available, the vehicle will cut the first wire around its body and expand wings for flight ready configuration from its folded configuration. After changing, the vehicle will cut the second wire to cut out the weight(or weight –parachute) and proceed autonomously towards its target. Due to drift caused by the wind during the low speed descent, this may require a significant distance cruise or slow powered descent to the target. Having identified the landing site the vehicle will enter into a final descent and cruise to target mode. This will involve very low altitude flight to the target and a method such as (most likely) a controlled pitch-up stalled crash. The vehicle should therefore be resilient to such impacts.

Before CANSAT competition, we had to do performance test with NOSHIRO events, September 2007. At the event, we were going to check the stability and the performance of the vehicle. Unfortunately, we failed to get success level for CANSAT competition. But, at the event, very valuable data were acquired for the next challenge.

Two ultra-small satellites are developed in ISSL (Intelligent Space Systems Laboratory).

The development of an ultra-small remote sensing satellite PRISM stated in 2002 and PRISM is going to be launched in 2009 by H2A rocket.

The main mission of PRISM is a test of extensible-boom-based refractive optics and sub-missions are extensive COTS-based bus technology verification and extensive services for amateur radio operators.

In this year we developed 2nd EM and develop FM. The pace of development has accelerated because the launch rocket has been determined.

Nano-Japan Astrometry Satellite Mission for INfrared Exploration (Nano-JASMINE) is a nano-satellite currently underdevelopment at Intelligent Space System Laboratory (ISSL) Univ. of Tokyo in cooperation with National Astronomical Observatory of Japan (NAOJ).The mission is to measure the 3D positions of stars and their proper motion to a high accuracy. In order to get accurate star position data, attitude should be stabilized to less than 740 mas / 8.8s (equivalent to4e-7rad/s) accuracy and detector should be cooled less than -50 degree Celsius with 0.1deg thermal stability during observation. Several new methods are developed to meet the mission requirements and some are underdevelopment. The launch is scheduled for 2009.

In CubeSat project, XI-IV, which was launched in 2003 and XI-V, which was launched in 2005 work well in orbit.

A-3　Space Development Forum (SDF)

Space Development Forum Planning Committee held “Space Development Forum 2007” in JAXA Tokyo Office (Marunouchi, Chiyoda-ku, Tokyo) on September 2007 for two days. All sorts of people within and outside aerospace community attended. The total number of the audience is about 200.

This Forum holds up “International Cooperation” as a main theme.

Program of SDF 2007 is;

1st Day:

Workshop Seminar: the Workshop School for high school students

Speech: Introduction of outer space development

Workshop: International Operation Workshop

2nd Day;

Workshop: Opportunities and problems in outer space business

Panel Discussion: Future of Japanese space activities and international cooperation in Asian developing region

Moreover, various actors in outer space activity, Corporations, laboratories of colleges, and students’ club activities, put up posters in the place for both days, and an Reception held in 1st day’s night. In these times, Lecturers and participants enjoyed exchange

courtesies and opinions validly.

A-4 Tokyo Denki University Project F

No data

A-5 Soka University

This paper describes the Soka University satellite projects including CanSats and CubeSat project to be flown in space.

Two CanSats were developed for ARLISS2007, i.e., a rover nicknamed “MP5”, and a fly-back test model nicknamed “Mirai-kun”. “MP5” is a rover CanSat for Comeback Competition which emphasizes on much durable structure against anticipated strong shock to happen on its grounding from the sky. The mission of fly-back test CanSat or “Mirai-kun” is to acquire basic technology for fly-back. It features GPS with a servomotor for basic fly-back control.

A CubeSat nicknamed “Excelsior” is under development in Soka University. Excelsior has three missions: (1) Space verification of a radiation tolerant computer system using FPGA (Field Programmable Gate Array). (2) Acquisition and compression of Earth images. (3) Radio communication technology with telemetry data providing for amateur radio community. In July 2007, Engineering Model or EM was completed, followed by the space environmental tests such as temperature test, vibration test and vacuum chamber test. Radiation test was performed in component level. These tests have been successfully completed. The ground station conducted the compatibility test with EM successfully. Some of ground software for future operation of the satellite has been developed.

A-6 Kyushu University

Space Systems Dynamics Laboratory (SSDL) at Kyushu University has developed, “Polar Plasma Observation Satellite QSAT (Kyushu Satellite)” cooperating with Space Environment Research Center (SERC), Kyushu Institute Technology (KIT), Fukuoka Institute Technology (FIT) and local industries. As the mission instruments, the magnetometer developed by SERC and the plasma probe developed by KIT will be carried and the bus system integrated by the SSDL and FIT will be mounted. Nowadays,

to be completed the satellites in this year, the detail design of the proto-type flight model of the bus system and its components, the calibration tests of the sensor units, and the operation test of the mission instruments are conducted. Furthermore, the ground-station has been developed and upgraded to support the orbit determination method. The CANSAT project is done mainly by the new comer of the laboratory to educate them. This report will present the progress and status of these activities and future work.

QSAT Official Website URL: http://ssdl-www.aero.kyushu-u.ac.jp/qsat/
Key Words: Micro Satellite, Cansat, Ground Station

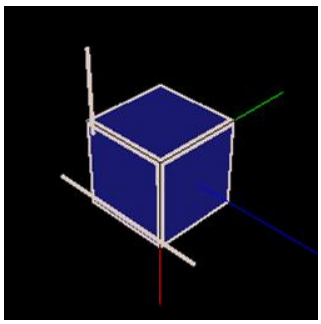
A-7 Keio University

This paper presents results of the 2007 activity of student's CanSat Project in Keio University. CanSat Project is the project that students build small simulated satellites called "CanSat" that is launched by amateur rocket 4km high. After activated the parachute, CanSat performs several missions for 10-15 minutes before land. It is a space education program that includes both the technological skills and project management experiences. Students learn all the step of satellite development in 4 or 5 months. In our laboratory, we are focusing on CanSat Project as a practical curriculum to acquire system engineering and project management skills. In this paper, we address the result of our project through the challenge of Noshiro Space Event 2006, 2007 and ARLISS 2007. In addition to the CanSat Project, We also address the result of water rocket activity for children in elementary school.

A-8 Hokkaido University

The group of Space System in the Chaotic Engineering Lab. takes part in the Hokkaido Satellite Project. Our laboratory designs and develops the attitude control and determination system in the project. We developed the attitude control system of HIT-SAT in the project. HIT-SAT was launched on Sep. 2006. This year, we determined the attitude of HIT-SAT during the experiment of the attitude control. We used the sensor data of HIT-SAT obtained on orbit for the attitude determination on the ground. But we supposed that the attitude determination system should estimate the satellite attitude on-board and real-time for the developing attitude determination system. According to this attitude determination, we could understand the attitude of HIT-SAT on orbit and study the attitude determination system for the developing satellite.

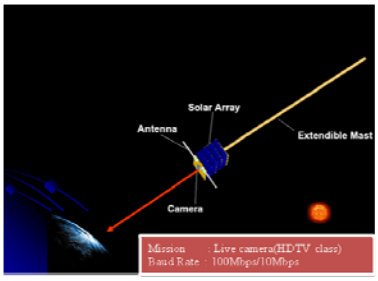
Group of Space System, Chaotic Systems Engineering, Hokkaido University
URL : http://chaosweb.complex.eng.hokudai.ac.jp/group/space.html



A-9 Hokkaido Institute of Technology

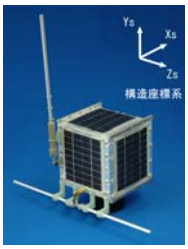
1. Hokkaido Satelite：Taiki

Development of a micro satellite "Hokkaido Satellite：Taiki" is performed mainly by Hokkaido Institute of Technology. The missions of a Taiki are animation photography , the earth observation with a hyper spectral camera, and communication between the satellite-grounds by laser communication. This paper reports the outline of Taiki and laser communication equipment.



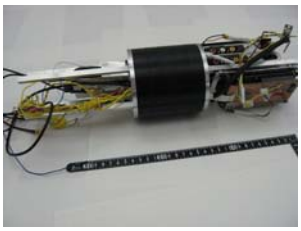
2. HIT-SAT

HIT-SAT is a micro satellite at the orbital actual proof of the bus part of a Taiki. The volunteer of Hokkaido Institute of Technology, Hokkaido University, and a private enterprise developed it. As for it, the volunteer of Hokkaido Institute of Technology, Hokkaido University, and a private enterprise was launched with the M-V rocket in development and September, 2006. This paper reports the outline of HIT-SAT, and the operation situation by present.



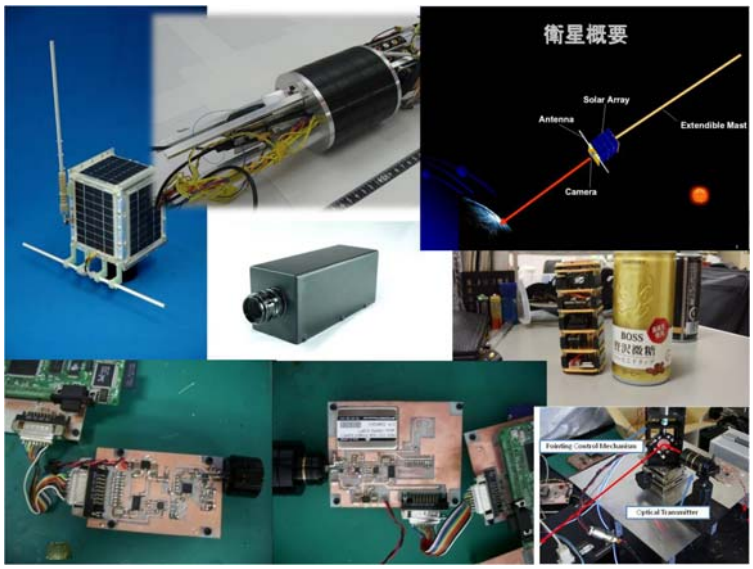
3. Measurement and recovery system of CAMUI rocket

The CAMUI rocket which Hokkaido University and the Uematsu electrical machinery developed was launched in August, 2007. H.S.U. developed Spirit2 and Spirit3 aiming at Acquisition of the flight data and recovery of CAMUI rocket. This paper reports the outline and result of Spirit2 and Spirit3.



4. CanSat：Boss

H.S.U. developed "CanSat:Boss" aiming at a miniaturization and simplification, and carried it in the payload of the CAMUI rocket launched in December, 2007. This paper reports the outline and result of Boss.



A-10 Tohoku University

In this laboratory, we are doing research activities with three groups (satellite team, rover team, manipulator team) and one others (professor direct control team).

By this report, we write the development result of “MSI” that was a cumulonimbus observing system made for the S520 rocket. ”MSI” was developed by our satellite team.

Noshiro competition and ARLISS and satellite developing project “Sprite-Sat” are described in 2.2.1, 3.9 and 6.12.

A-11 Osaka Prefecture University / Space Environment Utilization Lab.

In this year, the main project was to develop a small rocket (CEES-3A) which has the maximum ceiling of 200 m for launch of a Can-Sat as the payload. In launching test, the rocket reached a height of approximately 202 m, and we were also successful in recovering the rocket with reusable body. It was found that the rocket had a performance as requested. As a next step, to lift a rocket off at an altitude of 300 m over, we have been studying on an upgrade engine. Moreover, Noshiro was reviewed as a candidate site for launching place. To let it be known that the CEES rocket is safe, eco-friendly, and economical, we joined the UNISEC-WS and worked on some social contributions. Through these activities, we were able to make a good relationship with many groups in 2007.

A-12 Tsuyama National College of Technology

In Professor Okuyama's laboratory at the Tsuyama Technical College, electronic control engineering department, there are three students who belong to the advanced engineering course (3rd or 4th year university students) and fifth students (2nd year university students). In addition, about 15 students of the Tsuyama Space Engineering Club are members. The main activity of Professor Okuyama Lab., relating to UNISEC,

is research and development, such as a small autonomous control machines and ultra lightweight heat shield materials for re-entry vehicle and products made with CFRP (Carbon Fiber Reinforced Plastic) for rocket housing. Outlines of these projects are shown below.

1. Small autonomous control machine

It is important to manage a rover (below "the Rover") by autonomous control for successful planetary probes, such as the Mars Rover. We started research and development of autonomous control small Rover in April 2006 and trial manufacture principle confirmation model BBM (Bread Board Model) at present. After this, we set a basic systems architecture demand of the Rover experiment machine with the BBM. To be concrete, we set the wheel style and the heat structure style that could keep within the launching restrictions of the rocket (mass and size). Next, we produced technical proof model the EM (Engineering Model) based on a result of the BBM and participated in a rocket contest in the Tanegashima space center. And we confirmed the control logic which uses GPS data, the wheel design and the validity of the heat structure design. We started research and development of the FM (Flight Model) based on the EM test result from April 2007. The FM is that the EM increased various sensors like the communication system, the parachute separation mechanism and the drive communication system. We did various examinations under Noshiro condition with this FM and aimed at participating in ARLISS. We launched the small rockets twice in ARLISS. After all we could confirm the validity of designs of heat structure system, GPS system, control system, communication system and parachute system. But we experienced parachute separation mechanism technical problem. This is the subjects which should be solved to next year

2. Ultra lightweight heat shield material

Okuyama laboratory is researching in ultra lightweight heat shield material that is lighter than material of the REM capsule of USERS space system. The capability of this material confirmed by several test, was the same grade as the PICA of NASA.

3. Rocket body tube made with CFRP

We are pushing forward the research and development of a housing made by CFRP for small rockets jointly with Tokai University.

A-13 Tokai University

The Tokai student rocket project team did three activities for the development of the rocket and the CanSat. In addition, we taught the space development in a high school, and exhibited the panels and a rocket in Noshiro space event 2007 and space development forum 2007.

①Collaborative rocket project with University of Alaska Fairbanks

For launching of the SRP-5 rocket, we invited the Prof. Hawkins of the University of Alaska Fairbanks (UAF) and held a workshop. We and Prof. Hawkins presented situation and preparation for SRP-5. And each other presented about activity of each educational program. Launching of the SRP-5 rocket was postponed in spring, 2009 from 2008 by the circumstances of the launching schedule of NASA.

②Hybrid rocket experiments

We launched hybrid rocket #12 with Keio University in Noshiro space event 2007. The hybrid rocket #12 carried the CanSat that Keio University manufactured, and we succeeded to launch #12, release the CanSat, recovery and acquire the data of the instruments completely. And we also calculated attitude and trajectory of #12. Furthermore, we schedule hybrid rocket experiment in Hokkaido Tomoki-cho in March, 2008. The purposes of this experiment are investigation of the load of the rocket body in the parachute open and a technical study to recover the rocket safely in an appointed area.

③ Development of CanSat

We have developed the CanSat for three years. We participated in the Comeback Competition in the Noshiro space event 2007. As a result of competition, we were not able to supply altitude information of the GPS with the barometer manufactured by ourselves and to record a control history. In addition, problems was left about control technology of the CanSat and the record of the control history.

A-14 Kyushu Institute of Technology / Space systems Lab.

A small scaled winged experimental rocket using solid motor of model rocket is under development at the Kyushu Institute of Technology aiming realization of winged reusable sounding rocket. Beside the development, pre-development test rocket was launched for the functional tests of parachute ejection mechanism and onboard guidance and control system.

Up to date, the flight experiment of the small scaled winged experimental rocket was conducted for the first time to investigate the attitude controllability of scent phase. The development of onboard navigation, guidance and control system using navigation data from GPS, air data from pitot tube, attitude data from IMU and recording to ROM was successful.

After improving the navigation, guidance and control system, the small scaled winged experimental rocket will be launched again to evaluate the total flight control performance from launching to aiming point for recovery.

An experimental rocket was developed for the rocket launch campaign held at La Courtine in France. The mission was the autonomous gliding guidance using parafoil. There were many modifications required by CNES. But the launching of the rocket was finally permitted to be launched on August 4th, 2007.

We will participate in the rocket launch campaign in the next fiscal year, too.

A-15 Tokyo Institute of Technology / Matunaga Laboratory for Space Systems

Matunaga laboratory for space systems (LSS) at Tokyo Institute of Technology has developed small satellites since 1999, and launched CUTE-I (2003) and Cute-1.7+APD (2006). Based on these activities, we conducted three projects in this fiscal year, the flight model development of Cute-1.7+APD II, conceptual design of TSUBAME, the CanSat project Phoenix. These projects and future vision of LSS are introduced in this paper.

Cute-1.7+APD II is the successor of Cute-1.7+APD, successfully launched and operated for about a month in 2006. The second model is going to complete the same missions as the first one, which had stopped replying to any uplink command because of radiation damage. We modified some parts of the first model systems, and developed flight model of the second model in this year. We also conducted various environmental tests of Cute-1.7+APD II, and completed the development by January 2008. Cute-1.7+APD II is launched by Indian rocket PSLV on this April.

TSUBAME is the satellite program after Cute series. TSUBAME's main mission is polarized X-ray observation by high-speed attitude maneuver with CMGs. We advanced the development mainly in conceptual design and the CMG test model development with Tamagawa Seiki.

Seven members in LSS conducted CanSat project, Phoenix. Phoenix tried flyback

mission by using deployable and foldable wings and propellers. In order to stabilize the attitude after released from the rocket, Phoenix mounted parachute and release unit which separated the main body from the parachute. In Noshiro space event, a milestone in the development, the release unit had not worked well. So we modified the release unit for ARLISS, and confirmed most of the functions worked well in ARLISS first flight.

A-16 The University of Electro-Communications

Takadama laboratory has been aimed at developing an AI-based rover using Information Technology since 2004. We are able to modify programs and extract log-data easily, because our rover has PDA that can use SD card. In addition, the PDA communicates with H8 and confirms whether each runs normally, and robustness improves. Our rover is equipped with an outside antenna for the acquisition of more correct GPS data and introduce self position estimate algorithm made from the GPS data. Furthermore, we review the material of the body and reduce weight.

We participated in Noshiro space event and ARLISS. Unfortunately our rover did not work well. We are planning the improvement of a new problem.

A-17 University of Hyogo

Recently, the activity of the development of a small rocket in universities has been enhancing. Focusing on safety, we have been developing a small rocket engine using two liquids (LN2 and H2O) without combustion process. In order to improve reliability and performance of this engine, we developed the engine without a valve in a LN2 flow line. In this engine system, initial water temperature and GN2 pressure was changed within the ranges of 120~170 ℃ and 1.0～2.0 MPa for reducing weight of water and getting higher performance. As a result, thrust was increased with increasing the initial water temperature because the flow rate of H2O was decreased with increasing the water temperature. In addition, thrust was increased with decreasing the GN2 pressure under these experimental conditions. Therefore, we decide the best conditions for getting the best performance as follows; the initial water temperature is 170 ℃, and the GN2 pressure is 1.0 MPa. The experiment with such best conditions was conducted, and the maximum thrust of about 250 N and the average thrust of about 230 N during 2.9 s were obtained with 240.8 mm2 of a nozzle throat area. As a result, the ratio of LN2 and H2O weight could be reduced from 3:4 to 1:1.

A-18 Kagawa University

Satellite STARS that "Kagawa satellite development project" around Kagawa University Nohmi laboratory pushed forward development was chosen as candidate deployment to H-2A rocket in last May. It was chosen as a riding together satellite of

greenhouse gas observation satellite GOSAT scheduled launch in the next fiscal year. Therefore, this year's main activities were development of EM, environmental examinations, and detail adjustments of the FM design for completion of FM.

Environmental examinations are especially important in the development activities. The main examinations are an aircraft experiment, an EM vibration examination. At the aircraft experiment, we had behavior proof of the separation mechanism which acts as an interface with the rocket. And we were able to confirm that satellite separation will function well. Based on this result, we will produce FM.

In addition, because of we decided component layout that had a hard time, the prospect of EM completion was in sight. Therefore, we plan an EM vibration examination at the end of the fiscal year. If this result is OK, we will produce FM.

At other activities, we did positive publicity work by holding a meeting for announcing satellite development for people in the community, and conducting a tour at open campus or other some events. As the part, we carried out "mini ARDF" in local elementary schools. This is simple one of an amateur radio use competition called ARDF, we held it with members of Kagawa Sat promotion club that our project gets their supports. Through these activities, we think so that we were able to have not a little contributing to local science education and increase of interest in space science.

A-19 Kyushu Institute of Technology / Space Dynamics Laboratory

The cansat was developed for Noshiro Comeback Competition in 2007 at the Space Dynamics Laboratory. It was designed so that the pawafoil achieves deployment and the control history is surely recorded. The propeller was mounted on the cansat for the elimination of the drift due to a wind.

At the competition, it flew according to the guiding method and landed about 32m from the target. In addition, it recorded the GPS data and control history.

In the future, we develop the original cansat for the ARLISS.

A-20 Kyushu Institute of Technology / Cho Laboratory

KIT Satellite Project started in April 2006, as a part of KIT's 100th anniversary celebrations in 2009. We consist of twelve-member and development a satellite with the University of Surrey. Before we started this project, we participated in the 13th Satellite Design Contest 2005, where we acquired basic knowledge concerning satellite design. After this project started, we participated in the Noshiro Space Event in August, and we are producing a detailed design and Bread Board Model of a small satellite now.

Our satellite is a CubeSat that the KIT students will design, produce, and operate. The satellite's nickname is "HORYU", after the KIT emblem. The full name of HORYU is "Space Material Exposure Experiment and Imaging Satellite". The mission is the following.

A) Space material exposure test
B) Contribution to local Kyushu area
C) Demonstration of a CMOS camera module for a small satellite in space

We aim to observe the degradation of space materials by atomic oxygen and ultraviolet light in space by taking images.

A-21 Aoyama Gakuin University

AGU-SC (Aoyama Gakuin University Space Club) established at 2006 to develop a mini satallite and rocket by student's hand.

In 2007, we developed both CanSat and CubeSat.

【Noshiro Space Event '07】

Our system didn't work well by a power supply unit trouble, hence our CanSat body was dropped with parachute opened, but without any record.

【ARLISS2007】

AGU-SC decided not to join the ARLISS2007 due to the incomplete finish system development in our schedule.

【CubeSat project】

AGU-SC is collaborating with CU,Irvine and is in charge of Attitude Determination and Control Subsystem of UCISAT-1.AGU-SC tested its performance of hysteresis damper on passive control.

A-22 Tokyo Metropolitan University

Introduction of YUASA lab

The staffs are Prof. Yuasa and Asist. Prof. Sakurai. Our research relates to the propulsion and combustion of jet engines and rockets. Now we are studying the hybrid rocket engine, micro gas turbine combustor and metal combustion for solid fueled rocket motor.

1. Research of 1500N-thrust Swirling-Oxidizer-Flow-Type Hybrid Rocket Engine

We studied swirling-oxidizer-flow-type hybrid rocket engines, using gaseous oxygen (GOX) and PMMA and clarified their combustion mechanism. A flight test of a rocket with the engine was carried out at Taiki - cho, Hokkaido, Japan on March 2001 and the

rocket reached an altitude of about 600m, which recorded the first successful flight of a hybrid rocket in Japan.
For the next stage, we have been developing a 1500N-thrustswirling-oxidizer-flow-type hybrid rocket engine using liquid oxygen (LOX) and polypropylene (PP) to reach a higher altitude of 25km. In order to put the 1500N-thrust hybrid rocket engine into practical use, there are two issues. One is the achievement of long duration burning and the other is the development of the LOX vaporization nozzle to increase the performance of the engine.

2. Research of micro gas turbine combustor and ultra micro gas turbine

We study of a burner for small size gas turbines of 200W class with Propane gas, a burner for small size gas turbines with digestive gas, and a burner for Ultra Micro Gas Turbines of the 1 yen coin size with Hydrogen or Propane gas.

3. Research of metal combustion

In a study of metal combustion, we study of combustion promotion of Boron prospective as a rocket fuel, a jet engine for Mars which used Mg for fuel, and the CO2 fixation that used Fe / CO2 reaction, and a study of blue fireworks.

A-23 Akita University

Rocket Section

In 2007, we succeeded to launch and recover our rocket by Separation system that were

improved. But we could't get acceleration data. And that couldn't reach altitude that we expected.
We have many problems those solved until next rocket launch.
In March ,2008 we will launch new hybrid rocket that shoot for high-altitude. We get acceleration data from this rocket exactly .

Satellite Section
In the first half ,2007 Satellite Section get history of control absolutely at Noshiro Space event. We didn't get data of control. We can participate in ARLISS 2007 because we get history of control from EEPROM. After Noshiro Space event we could get telemetry data of control by radio communication. At Arliss 2007 , we could track our cansat by GPS data .
In the second half, 2007 Satellite Section separate 2project. One is balloon project , the other is Power Supply project .
Balloon project have experiment for long-distance radio communication.
Power Supply project's purpose is to charge to Li-ion battery. When Li-ion battery was charged complete,we have test for this battery to actuate motor.

A-24 Kagoshima University

In our laboratory, we studied the following：observations of atmospheric water vapor distributions have been made on bases of propagation time fluctuations of low earth orbit (LEO) satellite beacons, and their relationship between meteorological phenomena are studied for regional prevention such as prediction of thunderstorms and local downpours, developing a small satellite (K-sat) in order to observations of atmospheric water vapor and developing the system of a 75-cm diameter optical telescope for educational usage.

This work about small satellite is made as Industry-University-Government collaborated activities, and we are taking responsibility for development of a power control unit and an attitude control unit. Producing the EM of the power control units has been finished in this year. We continue to examine the EM of the attitude control units and produce the both of FM.

A-25 Tokyo Metropolitan College of Aeronautical Engineering

Since April 2004, we have been developing a small satellite (a 150mm per side cube, mass about 3.1 kg) with students from ages 15 to 20 years old. This satellite's purpose is mainly to demonstrate feasibility, securing transmission, taking pictures of Earth, and to conduct technical demonstration in space of the micro-thruster and 3 axes attitude control mechanism. An Engineering model is complete and we are currently designing flight model (FM).

The development of the satellite has the following unique characteristics both in the education, the research and development of the satellite system as

1. Promotion of space education from young age
2. Development of the flexible satellite system that can easily change mission components
3. Using consumer products for satellite parts as many as possible
4. First space demonstration of a laser ignition microthruster

The missions of the satellite are planned to be

1. Communications to the ground station
2. Capture of the image of Earth
3. Attitude control using the laser ignition microthruster

The ground station succeeded in receiving the packets from the pico-satellite XI-IV

developed by the University of Tokyo. The experiment model used for CW communications experiment between the Tokyo metropolitan college of aeronautical engineering and Mt. Tsukuba will be manufactured. The wireless machine used in the model was made by Nishi-Musen cooperation and the TNC circuit consists of the modem IC (FX614) and H8/3664 (Ax25 protocal.) The satellite also has a power unit, and the power is provided to the satellite from the Lithium-Ion Battery.

Fig.1 KKS-1 (Kouku Kosen Satellite - 1) Bread Board Model

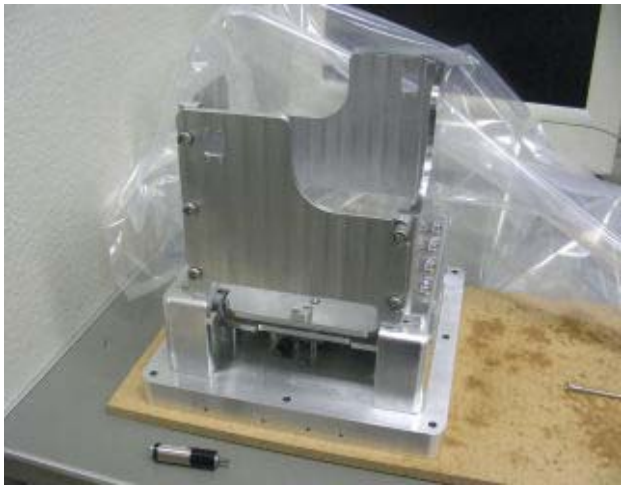


Fig.2 Picture of Separation Mechanism

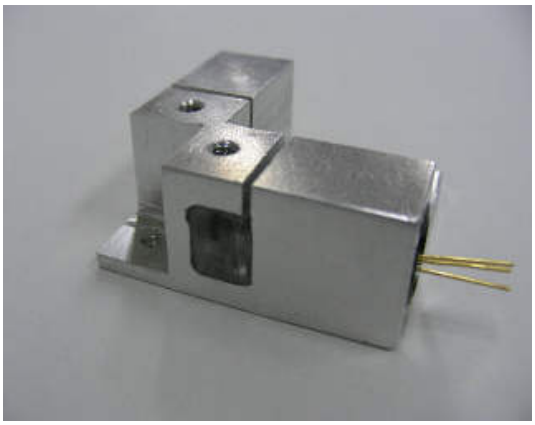


Fig.3 Micro Thruster

A-26 KSE

No data

A-27 Nihon University

In the current year, we, Nakamura & Miyazaki Laboratory Nihon University, acted mainly the development and launch campaign of CubeSat SEEDS(Space Engineering EDucation Satellite), and also acted the development and experiment of 2 Cansats.

SEEDS's launch was failed as the rocket's engine trouble in 2006. We fixed the minor software bugs and enhanced the features of SEEDS for 2nd launch. We will launch SEEDS on spring 2008. Meanwhile we have been developing the second nano-satellite since November 2005. We named the Satellite SPROUT (SPace Research On Unique Technology). SPROUT's main mission is the experiment of unfolding a membrane using inflatable tube in space. And SPROUT will offer amateur radio service.

We developed 2 Cansats. One Cansat is a fly-back type Cansat which is named CBC-04 (ComeBackCansat-04). And another Cansat is to experiment the hand-made transmitter. Its name is ECHO (Experimental Cansat for Handmade & Original transmitter).

And we hosted UNISEC Workshop 2007 at Nihon University. The Workshop is successfully end.

SEEDS開発・打上げキャンペーン

Cansat 開発

UNISEC Workshop2007

A-28 University of Tsukuba

The University of Tsukuba Space Technology Project (STEP) is an established group mainly by the students majoring in engineering in May, 2006. We develop activity mainly on manufacturing space technology for the purpose of leaning with enjoying STEP as a training of what we cannot learn in lecture of university class -technology, experience of the project administration, communication and presentation ability.

In 2007 that was establishment the second year, we put an important point for not only the launching experiment of the 2 meters grade rocket in Noshiro space event but also the publicity work that had they feel space close, such as holding Yuri's night in TSUKUBA or model rocket experience society.

We flowed the energy into the production of the hybrid rocket that technology advanced from the last year, and aimed at the improvement of technology and the project administration ability.

Besides, on a theme called "the space", I participated in the events such as 雙峰祭 which is the school festival of University of Tsukuba, a Space Development Forum and, Meikei-Tsukuba ground festival and was able to open a new viewpoint by having met various people.

Through such an activity, I think that each member accomplished steady growth.

A-29 Osaka Prefecture University / The Small Spacecraft Systems Research Center

The Small Spacecraft Systems Research Center at Osaka Prefecture University started in April, 2005. This Center joined the UNISEC in April, 2007.

In this Center, "CanSat project", "SOHLA-1 project" and "the original micro-satellite project" are being carried out by the 26 students.

In "CanSat project", CanSat "HIBARI" was developed to take part in two competitions, the Noshiro Space Event and the ARLISS 2007. Our mission is to acquire techniques to develop Cansat which surely comes back to the goal. So, CanSat "Hibari" is a specialized simple CanSat for the fly back.

In "SOHLA-1 project", the development of flight model and some system tests of SOHLA-1 were carried out this year. SOHLA-1 be planned to be launched in 2008 and the operating room for SOHLA-1 will be built in this Center.

"The original micro-satellite project" started this year. We have been doing the initial conceptual design.

This Center is energetically working on these projects to goal the launch of the satellite which is made in this Center.

A-30 Kyoto University

Magnetic sail is a new space propulsion system utilizing the energy of the solar wind. The thrust of a magnetic sail is generated by utilizing the interaction between the plasma-flow solar wind and an artificial magnetic field around the spacecraft. The magnetic sail produces a continuous thrust pointed toward the outward radial direction from the sun, which possibly achieve short flight-time transfer to planets in the solar system. In order to obtain a continuous and high thrust, the use of a superconducting coil for generating the artificial magnetic field is considered. In the year of 2007, we focus on such superconducting characteristics as well as coil design parameters to evaluate the thrust of a magnetic sailcraft. As an analytical approach, two-dimensional analytical model describing the interaction between the solar wind and the coil was proposed and investigated. As an experimental approach, a small superconducting coil system is being established to evaluate the superconducting coil properties such as coil mass, dimension, current, magnetic field, and thermal behavior.

A-31 Kochi University of Technology

No data

A-32 Kogakuin University

No data

A-33 Tohoku University / T-Semi

Our circle, T-Semi is a group of Tohoku University students which builds and studies hand-made robots.In August 2007, we participated in the Rover Competition in Noshiro for the first time. In that competition, our rover didn't withstand the fall from 2m-hight and did not make it to the goal.With the lessons we learned from our failure in the Rover Competition 2007, we are now developing a new rover.
We did not achieve the satisfactory level of the result in 2007's competition because it our first time. We are now improving a new rover in both its software and hardware so that at least it reaches the goal.

A-34 Challengers Of Rocket Engineering (CORE)

Challengers Of Rocket Engineering (CORE) is a group which is composed of some university students living in Kanto area.The group provides the opportunities for students to work together on some project related to space science regardless their university. And the group was constituted on 21.March.2007.
Participants are from Saitama University, Tokyo metropolitan University, Tokyo University of Science, Yokohama National University and Rikkyo University. At present there are twelve members in CORE.
In Noshiro Space Event we launched two rockets. One of the rockets was our original. It is model rocket with a G-engine named 'Sazanque'.It didn't turn over because of an ignition. The other rocket is Rocket Girls hybrid rocket.
Our original project is a shot of 'Sazanque' again in March 2008. Therefore we are making the rocket.
And now we are working on the public relations in order that we can have more activities.

A-35 Osaka Institute of Technology

The Advanced Rocket Lab. thinks that they advanced greatly as one laboratory at current year. The time was chased by construction and the academic research environment of the research maintenance, because we had just been newly established in 2007.However, open lab, general lecture, and water rocket classroom could be held, and we were able to participate in UNISEC.

In "Project of OIT Electric-Rocket-Engine onboard Small Space Ship (PROITERES)" , that started by centering on the laboratory, we have improved the performance of Pulsed Plasma Thruster (PPT). This is a propulsion unit used as the main mission of the satellite, and, we contributed to the development of the model who was basic of magnetic Tolquer, the progress boom, and the sun sensor in the posture control actuator.

Various stories will wait by the launch day (2010) at which we aim in the future, but It is certain to need power of more cooperators and technologies.

A-36 Musashi Institute of Technology

We have been conducting experiment to obtain fundamental thrust characteristics of water/nitrogen rocket engine. This year, we redesigned injector and mixing chamber which affect performance of heat exchange between water and liquid nitrogen. As a result, we obtained 35% higher thrust force and 45% larger specific impulse values. For measurement of space environment, we are asked to conduct measurement of insulating performance for several dielectric material commonly used current spacecraft.