



Mission Idea Contest
for Micro/Nano-satellite Utilization

Overview and Selection procedure of The 2nd Mission Idea Contest (MIC) for Micro/Nano Satellite Utilization

October 10th, 2012

UN/Japan Nano-Satellite Symposium

MIC2 Review Team

Contents

- Remarks from General Chairperson
 - Overview of MIC2 - Shinichi Nakasuka
- Remarks from chairs of category 1, 2 and awards & prize
 - Category 1 – Jerry Sellers
 - Category 2- Hiroshi Kawahara
 - Student Prize- Rainer Sandau
 - IAA award – Rainer Sandau
 - Best Poster Award- Rustem Aslan



Mission Idea Contest
for Micro/Nano-satellite Utilization

Overview of the 2nd Mission Idea Contest (MIC2) for Micro/Nano Satellite Utilizations

Shinichi Nakasuka,
General Chairperson for MIC2
Professor, the University of Tokyo

Overview of MIC2

Objective:

- To encourage innovative exploitation of micro/nano-satellites to provide useful capabilities, services or data.
- To contribute to capacity building in space science, application and engineering.

2 Categories:

- 1) Mission Idea and Satellite Design
- 2) Mission Idea and Business Model

Target satellite(s): weighing **less than 50 kg**,

Organizer: University Space Engineering Consortium (UNISEC)

Sponsor: University of Tokyo (funded by Hodoyoshi-project)

This contest is granted by the Japan Society for the Promotion of Science (JSPS) through the "Funding Program for World-Leading Innovative R&D on Science and Technology (FIRST Program)," initiated by the Council for Science and Technology Policy (CSTP).

Changes from 1st MIC

	1 st MIC	2 nd MIC
Satellite mass	< 15 kg	< 50 kg
Number of satellites	2 or more (constellation only)	Any number (no requirement for constellation)
Category	Only 1 category: Mission idea for nano-satellite constellation	2 categories: 1) Mission idea and satellite design 2) Mission idea and business model

Schedule of MIC2

- August 2011 Call for Paper
- August 2011- April 2012 Regional Seminar/Dissemination of info

1st round: extended abstract evaluation step

- May 1, 2012 Abstract Deadline
- July 1, 2012 Selection of 10 Finalists

2nd round: paper and presentation step

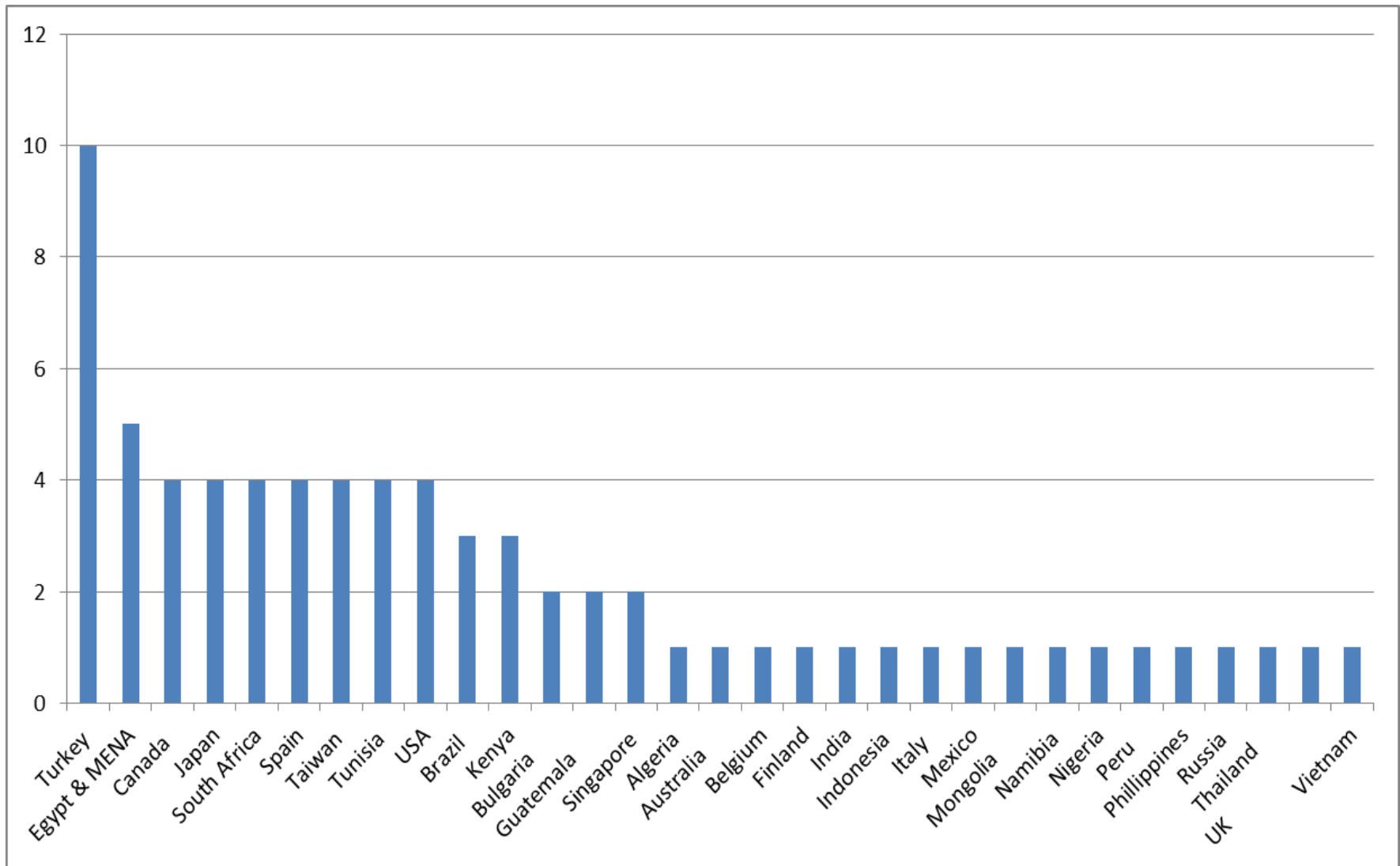
- Sep 1, 2012 Final Paper Deadline
- **Oct 10, 2012 Final Presentation** at the UN/Japan Nano-satellite Symposium (in Nagoya)



72 applications
from
31 countries

<http://www.spacemic.net>

Country Distribution of Submissions



Mission Ideas of 10 Finalists

Category	Title	Country
1	Nano-satellite constellation collecting global pre-earthquake signals for space-borne early earthquake detection	Singapore
1	AlbertaSat-1: Greenhouse Gas Monitoring for Industrial and Environmental Improvement	Canada
1	ADR Mission with small Satellite	Italy
1	SOLARA/SARA: Solar Observing Low-frequency Array for Radio Astronomy/Separated Antennas Reconfigurable Array	USA
1	Project of Micro-Satellite Constellation for Earthquake Precursor Study	Japan
1	The OuterNet: A novel satellite communication relay constellation	South Africa
1	SWIMS - Short Wave Infrared Maritime Surveillance	UK
2	Thermal Infrared Remote Sensing Using Nano-Satellites for Multiple Environmental Applications	Philippines
2	Underground and surface water detection and monitoring using a microsatellite.	South Africa
2	Global Tracking System	Egypt

Mission Ideas of 9 Semi Finalists

Category	Title	Country
1	IDEA: In-situ Debris Environmental Awareness	Japan
1	Commercializing Weather Prediction	India
1	SofiaUniversitySAT (Small Communication Satellite Mission for Enhancement of Antarctic Investigations)	Bulgaria
1	Satellite real time monitoring of water flood and quality in Tunisia	Tunisia
2	Integrated Rescue Service Satellite (IRS-Sat)	Japan
2	Laser-Assisted Rain Control Constellation	Thailand
2	Droplet Stream Orbital Debris Remediation	USA
1	ASAT. "Ad Solis, Ad Terram"	No attendance Spain
1	LeSTAR; Lessius Satellite for Teaching and Autonomous Research	No attendance Belgium

Reviewers



Dr. Jerry Sellers
(Chair of Category 1)
Teaching Science &
Technology, Inc.



Dr. Rainer
Sandau
DLR



Dr. Masaya
Yamamoto
Weathernews Inc.



Prof. Shinichi
Nakasuka,
Univ. of Tokyo



Dr. Masami Takai
INVENIO Co. Ltd.



Prof. Sir Martin
Sweeting
SSTL
SSC



Prof. Herman
Steyn
Stellenbosch
Univ.



Dr. Yasushi Horikawa
Tokai University
Japan Aerospace
Exploration Agency
(JAXA)



Prof. Hiroshi
Kawahara
Cyber Univ.
(Chair of
Category 2)



Mr. Takeshi Motohashi
NTT, Tokyo Univ. of Science,
MIT Enterprise Forum of Japan

MIC Regional Coordinators

(as of October, 2012)



Fernando Stancato
University of São Paulo, Brazil



Esaú Vicente Vivas
Instituto de Ingeniería, UNAM, Mexico



Jordi Puig-Suari,
Cal Poly, USA



Mohammed Khalil Ibrahim
Cairo University, Egypt



Faith Njoki Karanja
University of Nairobi, Kenya



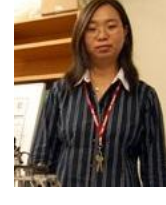
Low Kay Soon
Nanyang Technological University, Singapore



Pham Anh Tuan,
VAST, Vietnam



Fernando Aguado-Agelet
Univ of Vigo, Spain



Regina Lee,
York Univ, Canada



Hyo choong Bang
KAIST, Korea



Marco Schmit
Würzburg University, Germany



Robert van Zyl
Capetown Peninsula univ
South Africa



Andrés J. Arenas
Unefa, Venezuela



Seiko Shirasaka,
Keio Univ, Japan



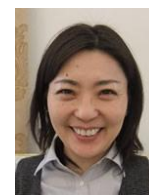
Vidmantas Tomkus,
Lithuania



Hector Bedon,
UNI, Peru



Rustem Aslan, ITU,
Turkey



Tsolmon Renchin,
National Univ of Mongolia



Jyh-Ching Juang, Cheng
Kung Univ



Jose Edgardo Aban,
Universiti Brunei Darussalam,
Brunnei



Kamel Besbes
Monastir, Tunisia



Willy Cabañas
Guatemala



Naomi Mathers
The Australian National University, Australia



Cem Ozan Asma
The von Karman Institute Belgium



Sotir Sotirov
Burgas Univ, CASTRA, Bulgaria



Nnadih S. Ogechukwu
ARCSSTE-E Nigeria



Igor V. Belokonov
Samara State Aerospace University, Russia



Sawat Tantiphawadi
NSTDA Thailand



Velibor Vukasinovic
UVIS, Serbia



Tarek Islam
BUET, Bangladesh



Ariel Blanco
The Univ of Philippines



Smita rFancis,
Polytechnic of Namibia, Namibia



Manfred Quarshie
KNUST & ANUC, Ghana

Global network through Mission Idea Contest and CanSat Leader Training Program (MIC:33, CLTP: 21 countries) 38 countries in total



★ : CLTP participant

★ : MIC coordinator

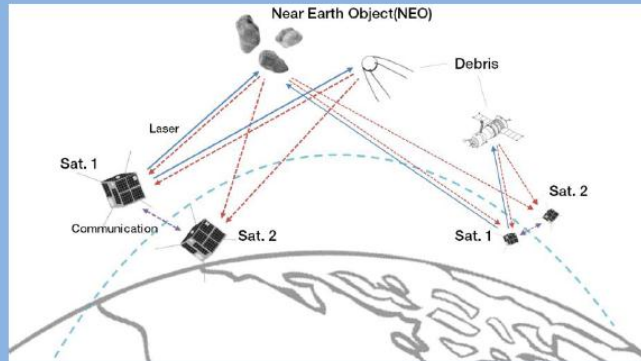
Awards

- 1st and 2nd place in category 1 and 2
- IAA Award for environmental issues
- Student Prize (for category 1)
- Best Poster Award (for poster session presented by semi finalists)

Acknowledgement

- Collaborators:
 - United Nations Office for Outer Space Affairs (UNOOSA)
 - International Academy of Astronautics (IAA)
- Sponsor for Student Prize:
 - Gesellschaft zur Förderung des akademischen Nachwuchses (GeFaN) translated as the "Society for Academic Youth Promotion"
- Supporters for Applicants:
 - Analytical Graphics, Inc.
 - Princeton Satellite Systems
 - Teaching Science & Technology, Inc.

R. Sandau, S. Nakasuka, R. Kawashima, J. Sellers (eds)



Novel Ideas for Nanosatellite
Constellation Missions

IAA book series
Small Satellites – Programs, Missions, Technologies and Applications



Publication from MIC1

Full papers of
finalist and
semi-finalist were
published as one of
IAA book series.



Schedule on MIC2 Final Presentation (Oct.10, 2012)

11:30–12:00 MIC2 Opening Remarks (Review team)

12:00–13:00 Category 2 presentation (3 teams)

13:00–14:30 Lunch

14:30–16:50 Category 1 presentation (7 teams)

➔ *move to the Poster Session (8th floor)*

16:50–17:50 Poster Session (7 teams)

➔ *move back to the Conference Hall (2–3rd floor)*

18:00–18:30 MIC2 Award Ceremony

19:00–21:00 Reception at Castle Plaza Hotel



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Category 1

Mission Idea and Satellite Design

Jerry Sellers

Chair of Category 1;

Partner with Teaching Science & Technology

Requirement (Category 1)

Exploitation of micro/nano-satellites
(less than 50 kg)

(both constellation and non-constellation mission ideas will be welcome.)

Awards: 1st place and 2nd place

Evaluation Criteria (category 1)

Originality (50 points)

- Novel mission concept not yet realized or proposed, or a new implementation of an existing capability or service (25)
- Impact on society (25)

Feasibility (50 points)

- Technical (20)
- Programmatic (cost estimate, development schedule, infrastructure requirements) (15)
- Operational (description of ground segment and communications architecture, e.g., planned use of existing infrastructure) (15)



Category 2

Mission Idea and Business Model

Hiroshi Kawahara

Chair of Category 2;

President, Cyber University

What you should do in Category 2

- **Mission Idea is already fixed;**
 - Remote sensing
 - Information collecting (from ground sensors)
 - Rental space (and optional internal camera)
- **Create your own business plan which;**
 - is interesting to (many) potential customers
 - will make more return than investment
- **You should make clear;**
 - Detailed plan on how to use the equipment
 - Optimal system configuration to maximize return
 - Calculate the amount of investment and return

Requirement (Category 2)

Proposal of business model using micro/nano-satellite (less than 50 kg) technology

(both constellation and non-constellation mission ideas will be welcome.)

Applicants must use Cost-model and design guideline prepared by Prof. Nakasuka

Awards: 1st place and 2nd place

Evaluation Criteria (category 2)

- Key concept and impact on society and environment (40)
- Business model structure (5W2H: who, to whom, what, when, where, how, how much). (15)
- Business feasibility (15)
- Logistical feasibility based upon the cost model provided by the organizer. (15)
- Risk Analysis (15)



Student Prize (category 1)

Rainer Sandau

Chair of Student Prize; and

**The Honorary President, Gesellschaft zur
Foerderung des akademischen Nachwuchses**

(GeFaN)

Student Prize (1)

1. Overview:

- On the occasion of the 2nd Mission Idea Contest for Micro/nano satellite utilization, the GeFaN (Gesellschaft zur Förderung des akademischen Nachwuchses translated as the "Society for Academic Youth Promotion"), UNISEC and other supporters will award a Student Prize for the best and most imaginative design and applications of nanosatellite(s) as judged on a written paper and subsequent oral presentation.

Student Prize (2)

2. Purpose:

- To facilitate student participation and involvement in the contest.

3. Eligibility for Nominations/ Applications:

- A student group, or a University team with involvement of a significant number of students, which are selected as finalists by MIC Review Team will be eligible. The group/team composition must comprise more than 50% students and the paper must be written by the students and the presentation must be made by students.

Student Prize (3)

4. Criteria for Selection:

- The award will be given the best proposal in Category 1 (Mission Idea and Satellite Design) submitted by a student, a student group or a University team comprising a majority of students.

5. Selection Procedure

- The MIC Review Team for Category 1 will select the recipient(s) of the prize from finalists. In case that there is no such proposal among the finalists, the Review Team should select the best student/University proposal from all applicants.

6. Type of Prize:

- The prize consists of a certificate and small monetary prize



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IAA Award (Environmental Issue)

Rainer Sandau

Chair of IAA Award; Technical Director

Satellites and Space Applications,

International Academy of Astronautics (IAA)

IAA Award (1)

1. Overview:

- On the occasion of the 2nd Mission Idea Contest for Micro/nano satellite utilization, the International Academy of Astronautics will award the IAA Award to recognize “the imaginative application of micro/nano satellite technologies to environmental issues for the benefit of humankind.”

2. Eligibility for Nominations/ Applications:

- Among finalists selected by MIC review team, those who submitted full paper related to environmental issues will be nominated. Hence, no need nominations/applications for the IAA award.

3. Purpose:

- To recognize outstanding paper of micro/nano satellite application in the area of environmental issues for human benefit.

IAA Award (2)

4. Criteria for Selection:

- The award will be given to the best paper dedicating to environmental issues among selected paper as finalist in the 1st stage. Projects with an international emphasis will be given preference if such projects also fulfill the criterion of having achieved significant human benefit.

5. Selection Procedure

- The IAA evaluation committee for MIC will choose the recipient(s) of the Award by full paper and oral presentation held on Oct.10, 2012.

6. Type of Award:

- The award consists of a certificate and high visibility.



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Best Poster Award

Alim Rustem Aslan

**Chair of Best Poster Award;
MIC2 Regional Coordinator (Turkey);
Istanbul Technical University**

The Best Poster Award

Overview: MIC coordinators will award the best poster competition among semi-finalists

Purpose: Encourage semi-finalists to promote and improve their mission ideas.

Selection procedure: Selection is made by voting of about 10 MIC coordinators.

- 50% evaluation by full-paper
- 50% evaluation by poster presentation (Q&A on site)
- Voters select three papers with a question, "If you had enough financial resources, which mission idea would you support financially?" Each voter gives points for
 - 1st place: 3 points, 2nd place: 2 points, 3rd place: 1 point,

The Best Poster Award: poster with the most total points

Voters (MIC2 Coordinators)

- Alim Rüstem Aslan, Turkey (Chair)
- Arno Barnard, South Africa
- Esaú Vicente Vivas, Mexico
- Jordi Puig-Suari, USA
- Jyh-Ching Juang, Taiwan
- Larry Reeves, Canada
- Low Kay Soon, Singapore
- Marco Schmidt, Germany
- Mohammed Khalil Ibrahim, Egypt
- Ramón Martínez, Spain