INTERNATIONAL ACADEMY OF ASTRONAUTICS

ANNUAL REPORT 2012

Gopalan Madhavan Nair

President

September 30th, 2012

Naples, Italy

Available on the IAA Web Site http://www.iaaweb.org
The International Academy of Astronautics (IAA) had an excellent year of achievements during 2011. The Academy continued its activities in fostering studies on advance topics in the field of astronautics, published a large number of cosmic studies and organized several conferences in different continents extending its reach all over the globe. The IAA founded in 1960 by Theodore von Karman with a mission to recognize the global significance of astronautics and space exploration, celebrated its 50th Anniversary in November 2010 in a meeting at Washington DC. In this meeting thirty Heads of space agencies, welcomed the IAA Declaration to advocate renewed and enlarged cooperation in the area of human spaceflight, robotic space exploration, disaster management and climate change. Deliberations at this unprecedented Summit led to the need to have advanced research in other areas as well and specifically on cosmic studies.

In view of a proposed second Summit, the IAA is preparing grounds for concrete investigations through a number of studies and regional meetings focusing on programs, policy and plans in niche areas in science and technology pertaining to Astronautics. It is also preparing through a Summit Steering Committee and four Summit Coordinating Groups in the four Summit topics. Particular attention is being made to emerging space countries and former eastern European countries to take cognizance of their contributions and major involvement in the renewed cooperation. All major space agencies such as NASA, CNSA, JAXA and ISRO have recently reaffirmed their support to the initiatives of the International Academy of Astronautics. In this effort the Academy will pay attention not to duplicate efforts with existing organizations but to strengthen their contributions.

The last few years saw the establishment of several new space agencies in Algeria, Mexico, South Africa, etc. The Academy has welcomed among its newly elected members in 2012, eleven Heads of space agencies from Argentina, Canada, Guatemala, Israel, Malaysia, Mexico, Netherlands, Peru, Saudi Arabia, Thailand and the UK. The IAA Board of Trustees currently includes fourteen Heads or former Heads of space agencies. This unique environment will drive IAA to develop a forum for stimulating new international cooperation in the relevant areas of Space Science and Technology.

IAA has made significant contribution to the 62nd International Astronautical Congress organized in October 2012 in Cape Town, South Africa. The Academy Day was celebrated on this occasion. In addition, the IAA organized several standalone conferences and regional meetings. The first IAA-CRPSM International Workshop on "Remote Sensing of the Environment for the Sub Saharian regions" - ReSESS 2011, was held in Nairobi, Kenya, from 31 October to 4 November 2011. Participants were from Botswana, Burundi, Comoros, Ethiopia, France, Italy, Japan, Kenya, Lesotho, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Senegal Somalia, South Africa, Sudan, Swaziland, Tanzania, Uganda, United Kingdom, United States and Zambia. IAA Workshop on Drake Equation took place in CNES, Paris, France in November 2011. The European CubeSat Symposium, took place in Brussels, Belgium during January / February 2012. The first IAA Conference on Dynamics and Control of Space Systems took place in Porto, Portugal in March 2012. The Regional Meeting of IAA took place in Kiev, Ukraine in May 2012.
The 4th Symposium (Small Satellites Systems & Services Symposium), in Portoroz, Slovenia, co-sponsored by the International Academy of Astronautics took place during June 2012. The 17th Conference on Systems Analysis, Control and Navigation took place in Yevpatoria, Crimea during July 2012. The second IISL/IAA Space Law and Policy Symposium took place in Toulouse, France on 26 June 2012. The main theme of the symposium was Space Sustainability. There were four main sessions namely: towards effective sustainability for outer space activities, institutional parameters; observers’ perspectives, sustainable use of the radio spectrum, responding to space situational awareness and space debris and transposing sustainability into effective legal solutions.

During the Academy Day in Mysore, India on 14th July 2012, on the occasion of the 39th COSPAR Scientific Assembly, lectures were presented on the Meghatropiques satellite, the role of clouds in Earth’s climate (Cloudsat mission), the NASA’s ‘GRAIL mission and heliophysics in the US. The Academy concluded with a Heads of Space Agencies Summit Follow-on Roundtable focusing on Robotic Space Exploration. ISRO has reiterated its support to the Academy for its unprecedented effort to promote international cooperation.

The in-house journal Acta Astronautica is now ranked 9th in the world for aerospace scientific journals in scientific content and presentation of original articles. IAA has opened online ‘iaashop’ for dissemination of our publications on cosmic studies. Software for electronic online payment is now operational and the conference management software developed by ISRO is under testing. IAA is publishing four new book series on small satellite, proceedings, remote sensing and history.

Cooperation with National Academies

The International Academy of Astronautics continues the tradition of the great classical scientific academies of the 17th century in Rome, London and Paris, which fostered scientific inquiry and the exchange of ideas and new information in the earliest days of modern science. The IAA closely cooperates with national academies to foster a spirit of cooperation and progress that permeates national boundaries, cultures, and institutions.

We had in 2010 a joint meeting with the Czech Academy of Sciences in Prague with a presentation of Prof Drahös, President. In October 2011, the Academy Day was joint with the Academy of Sciences of South Africa (ASSAf) and the Royal Society of South Africa with the presence of Prof Don Cowan (President of RS) and Prof Robin Crewe (President of ASSAf). In September 2012 a joint meeting with the Pontificia Academia Scientiarum is planned with the presence of H. Ex. The Most Rev. Marcelo Sánchez Sorondo, Chancellor.

Awards

In order to promote excellence and recognize the achievements of our members, the Academy has an active program of awards.

The Von Karman Award for 2012 is given to Jean-Jacques Dordain, France, Member of the Engineering Sciences Section of the IAA, “In recognition for his dedicated efforts in advancing space propulsion and human spaceflights while
promoting peaceful uses of outer space, his outstanding leadership and management of the European Space Agency, and his valued contributions to advancing international cooperation through the International Academy of Astronautics.”

The 2012 Section Awards and their recipients are:

Basic Sciences Award to Louis Lanzerotti, USA
Engineering Sciences Award to Volodymyr Shnyakin (†), Ukraine
Life Sciences Award to Adilya R. Kotovskaya, Russia,
Social Sciences Award to Dumitriu-Dorin Prunariu, Romania

The 2012 Laurels for Team Achievement recognizing extraordinary performance and achievement by a team of scientists, engineers and managers in the field of Astronautics, are given to the team of engineers and managers, whose talent, skills and dedication made possible the Messenger Mission.

The citation reads as follow:
The 2012 Laurels for Team Achievements is given to the team of scientists and engineers whose creativity and expertise made possible the development and operation of the Messenger Mission, the first to orbit Mercury, as a breakthrough in scientific solar system exploration. During its unprecedented one-year primary mission, this robotic explorer has provided an extraordinary, comprehensive scientific overview of the planet, its makeup, its exosphere and its magnetosphere, providing the text for a new and overdue chapter of humankind's knowledge of the smallest of the terrestrial planets. This unique achievement of technology was conducted by the JHU APL and accomplished with the collaboration of NASA, namely:

Team
S. C. Solomon (PI), M. H. Acuña (†), B. J. Anderson, D. Baker, W. Boynton,
C. Chapman, A. Cheng, D. Domingue, W. Feldman, G. Gloeckler, R. Gold, J. Head III,
S. Krimigis, W. McClintock, R. McNutt Jr., S. Murchie, S. Peale, R Phillips,
L. Prockter, M. Robinson, J. Slavin, D. Smith, R. Strom, J. Trombka, M. Zuber,
T. Zurbuchen
Management Team
P. Bedini, D. Grant, M. Peterson, E. Finnegan, S. Jaskulek, M. Holdridge,
J. McAdams, W. Huntress
Instrument and Spacecraft Engineering Support Team
G. B. Andrews, O. Barnouin, R. Bokulic, J. Cavanaugh, C. DeBoy, C. Ercol,
J. Goldsten, T. Hartka, E. Hawkins III, A. Hill, G. Ho, H. Korth, M. Lankton, D. Lohr,
R. Moore, L. Mosher (†), G. Neumann, J. Raines, E. Rhodes, C. Schlemm II,
R. Stillwell, R. Vaughan, S. Wiley

Book Awards

The 2012 Basic Sciences Book Award is given to:
and
From Space to Earth. The Laboratory and Marketplace by Berndt Feuerbacher and Ernst Messerschmid, Schiffer Publishing Ltd, 2011
The 2012 Engineering Sciences Book Award is given to:
and
Turning Dust to Gold. Building a Future on the Moon and Mars, by Haym Benaroya Springer-Praxis, Chichester, UK, 2010

The 2012 Life Sciences Book Award is given to:

The 2012 Social Sciences Book Award is given to:
and

Membership

Academician Yannick d’Escatha, France, has led our member’s selection program in a successful year. The four Peer Review Committees under the direction of the section chairmen have continued to improve the quality of the candidates. We have a regular increase in nominations from the major space countries, and in addition, we have the effect of new conferences such as in Africa that generated many nominations from newly represented countries.

The statistics by Section are as follows:

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<th>Section</th>
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<th>Total CM</th>
<th>Total M+CM</th>
<th>Total HM</th>
<th>Total</th>
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<td>CM4</td>
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<td>1176</td>
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<tr>
<th>Ratio</th>
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<tr>
<td>CM1/M1</td>
<td>Inactive</td>
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<tr>
<td>CM2/M2</td>
<td>Out 5-year Term</td>
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<tr>
<td>CM3/M3</td>
<td>Resign</td>
<td>226</td>
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<tr>
<td>CM4/M4</td>
<td>Deceased after 1960</td>
<td>531</td>
</tr>
<tr>
<td>CM/M</td>
<td>Number Active &lt;70</td>
<td>693</td>
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<tr>
<td></td>
<td>Number members &gt;70</td>
<td>462</td>
</tr>
<tr>
<td></td>
<td>Average age</td>
<td>66</td>
</tr>
</tbody>
</table>
Members deceased in 2012: Leslie R. Shepherd, UK, Honorary Member, Jeffrey MacLure, USA, M4, Gyula Gal, Hungary, M4, Hans J. Rath, Germany, M2, Neil Armstrong, USA, Honorary Member.

Members deceased in 2011: Roger Chevalier, France, M2, Stanislav N. Konyukhov, Ukraine, M2, Hermann H. Koelle, Germany, Honorary Member, Liana Dumitrescu, Romania, CM4, Eduardo Gaggero, Uruguay, M4, Wang Daheng, China, M1, Edward R. Finch, Jr., USA, M4, Angioletta Coradini, Italy, CM1, Huang Weilu, China, M2.

Publications

The dissemination of current information on developments in astronautics and related science and technology has been a primary function of the IAA since its establishment. The Academy produces cosmic studies and position papers along with the proceedings of symposia, technical reports, an e-newsletter and press releases. The journal Acta Astronautica first appeared in 1955, and is published monthly under the auspices of the IAA Publications Committee, by Elsevier Sciences Ltd. The Acta Astronautica Journal covers developments in space science, engineering, life science and social science related to “peaceful scientific exploration of space and its exploitation for human welfare and progress.”

Prof. Liu Jiyuan (China) has been leading the IAA publication activities. Beside the improvement of impact factor from 0.508 in 2009 to 0.609 in 2010, the ranking of Acta Astronautica journal has also been improved from 14th to 9th among the 27 scientific space journals of the world, thanks to the action of Dr. Rock Jeng-Shing Chern (China Taiwan) and the new team of managing editors: Commission I Space Physical Sciences: Nickolay Smirnov (Russia), Commission II Space Life Sciences: Rupert Gerzer (Germany) and Martina Heer (Germany), Commission III Space Technology & Systems Development: Maria Antonietta Perino (Italy), Christophe Bonnal (France), Filippo Graziani (Italy), Commission IV Space Systems Operations & Utilization: Vipparthi Adimurthy (India), Yu Lu (China), Commission V Space Policy, Law & Economics: TBD, Commission VI Space and Society: Culture and Education: A. Ingemar Skoog (Sweden).

Members are encouraged to use the Acta Astronautica Journal as a vital scientific link to correspond with their peers by subscribing and publishing either regular articles (7-10 pages) or short ones called "Transaction Notes" (2-3 pages).

Scientific Activities

Under the leadership of Gal. Anatoly Perminov, the IAA has performed significant acceleration in conference activity. The Academy traditionally generates one third of the sessions and papers presented at the International Astronautical Congress (IAC) each year amounting 12 to 14 IAA Symposia, each one having multiple sessions. In addition, the Academy is now conducting each year 15 to 20 standalone conferences or symposia in all continents, with particular emphasis to Africa over the last five years (2 IAA standalone conferences in Africa each year on average). In 2011 the number of IAA regional meetings and standalone conference amounted 35 including 8 regional meetings, 14 standalone conferences and 13 Symposia at IAC as follows:
2011 IAA Standalone conferences

24-29 January 2011, 1st IAA Conference on University Satellites Missions and 1st CubeSat Winter Workshop in Europe, Roma, Italy
04-08 April 2011, 8th IAA Symposium on Small Satellite for Earth Observation, Berlin, Germany
11-15 April 2011, 18th Humans in Space Symposium "Integration and Cooperation in the Next Golden Age of Human Space Flight", Houston, Texas
20-22 April 2011, 3rd Intl Conference on Advanced Space Techno. for Humankind Prosperity (Space Technologies: present and future), Dnepropetrovsk, Ukraine
10-13 May 2011, 2nd IAA Planetary Defense Conference, Bucharest, Romania
30 May - 1st June 2011, 2nd Intl IAA Conference on Private Human Access to Space, Arcachon, France
21-23 June 2011, 9th IAA Intl Conf. Low-Cost Planetary Missions, Laurel, MD, USA
27-29 June 2011, 3rd IAA Symposium on Searching for Life Signatures, Saint Petersburg, Russia
27-30 June 2011, Scientific and Technological Experiments on Automatic Space Vehicles and Small Satellites, Samara, Russia
11-14 July 2011, 7th Symposium on Realistic Advanced Scientific Space Missions - Missions to the Outer Solar System and Beyond, Aosta, Italy
02-03 September 2011, 2nd IAA-SGEI Workshop on Coordination and Cooperation for Global Environmental Impact, Beijing, China
05-08 September 2011, 4th CSA-IAA Conference on Advanced Space Systems & Applications, Shanghai, China
31 October - 4 November 2011, 1st IAA-CRPSM Intl Workshop on "Remote Sensing of the Environment for the Sub Saharian regions" - ReSESS 2011, Nairobi, Kenya
21-22 November 2011, IAA Workshop on Drake Equation, CNES, Paris, France

2011 IAA Symposia at IAC Cape Town, South Africa, 3-7 October
IAA/IAF Space Life Sciences Symposium,
IAA Symposium on Search for Extraterrestrial Intelligence (SETI) – The Next Steps (40th Symposium),
IAA Symposium on Human Exploration of the Moon and Mars,
IAA Symposium on Space Debris,
IAA Small Satellite Missions Symposium,
IAA Symposium on Stepping Stones to the Future: Strategies, Architectures, Concepts and Technologies,
IAA Symposium on the Far Future,
44th IAA Symposium on Safety and Quality in Space Activities,
24th IAA Symposium on Space Policy, Regulations and Economics,
45th IAA Symposium History of Astronautics,
22nd Symposium on Space Activity and Society,
IAA Symposium on Space Terminology,
26th IAA/IISL Scientific Legal Round Table: The New Age of Small Satellite Missions.

The scientific work has been accomplished under the oversight and leadership of six Academy Commissions, thanks to the Chairs as follows:

Space Physical Sciences: Gregg Vane (USA),
Space Life Sciences: Ronald White (USA),
Space Technology and System Development: Guiseppe Reibaldi (Italy),
Space Systems, Operations and Utilization: Leon Alkalai (USA),
Space Policies, Law and Economics: Max Grimard (France),
Space and Society, Culture and Education: Geoffrey Languedoc (Canada).

The IAA branches of the secretariat in Bangalore (IAA Conferences) and in Beijing (IAA Studies Center) have supported the Paris Secretariat.

Finance

Prof. Hiroki Matsuo, Vice-President Finance, has led the finance activities with the contribution of Dr. Jean-Michel Contant, Secretary General, in order to maintain our treasury. Fund raising activities resulted in member contributions €86,162.25 Supporting Donor contributions amounted €126,216.26. This situation shows a return to stable support thanks to the support of new space agencies and industry. The companies and space agencies having contributed in 2011-2012 are listed in three categories: Platinum+: Lockheed Martin Corporation, Astrium Space Transportation, Platinum: ISRO, ESA, JAXA, DLR, CNES, CASC, CALT, CAST, CRESDA, Institute of Remote Sensing Applications, Boeing and OOSA; Gold: Arianespace, the Aerospace corp., Yuzhnoye, Polet, GAUSS, Lavochkin, Russian Space Systems, TsNiimash; Silver: IHI, Dassault Aviation and NSO.

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<th>2011-2012</th>
<th>2010-2011</th>
<th>2009-2010</th>
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<tr>
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<td>€ 382,552</td>
<td>€ 448,132</td>
<td>€258,396</td>
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<tr>
<td>Expenses</td>
<td>€ 379,716</td>
<td>€ 444,563</td>
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<td>Net</td>
<td>€  2,836</td>
<td>€   3,569</td>
<td>€1,356</td>
</tr>
</tbody>
</table>

The financial situation has been considerably modified by the Heads of Space Agencies Summit that received a new set of sponsors leaded by Lockheed Martin Corp. The regular financial activity of the supporting donors was maintained with especially Lockheed Martin Corp. and EADS Astrium. Recognition must be done to many space agencies such as CNES, DLR, JAXA, ESA, ISRO, NSPO, NASRDA which are supporting the Academy. A special mention is made to the new support of the Russian industry. The constant increasing number of members who contribute with annual fees is another source of satisfaction. The Academy is now able to devote a small budget for supporting developing countries and help participating to IAA conferences in Africa and Latin America.

Section Activities

All four sections have been assuming a proactive role in promoting interaction between, and participation of their members in the affairs of the Academy.

Section 1: Basic Sciences

This Section under the leadership of Dr. Stamatios Krimigis has 201 Members and 41 Corresponding Members. It is the home of space scientists of international renown with all the scientific specialties represented, and it maintains active cooperation with COSPAR and the International Astronomical Union.
Section 2: Engineering Sciences
This section under the leadership of B.N. Suresh has 360 Members and 130 Corresponding Members. It has members from a broad range of engineering disciplines coming from industry, academia and government laboratories.

Section 3: Life Sciences
This section under the leadership of Dr. Chiaki Mukai has 159 Members and 35 Corresponding Members. It includes prestigious space medicine specialists and biologists as well as a large number of astronauts and cosmonauts.

Section 4: Social Sciences
This section under the leadership of Dr. Peter Jankowitsch has 179 Members and 71 Corresponding Members. It includes leaders in management, law, economics history and other societal disciplines related to astronautics.

Conclusion
IAA activities were very productive during the last year. It had successfully completed number of regional conferences in various parts of the globe. The membership drive has certainly resulted in the induction of 65 corresponding and 48 full members. Fourteen space agencies chiefs/ former heads of space agencies have also been recognized. Publication related activities were strengthened and among the completed studies, the one on solar power mission is notable. IAA members and commissions have contributed significantly for organizing scientific activities this year. Actions towards the second summit of Heads of Space Agencies also are progressing satisfactorily. During the period of this report, the Academy has organized / co-sponsored fourteen standalone conferences and thirteen regional meetings in twenty seven cities encompassing all major continents. On-line registration for conferences have been enabled and a web- based publishing house have been commissioned at the IAA web.

Gopalan Madhavan Nair
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(*) Former Head or Head of Space Agency
(**) Former Minister or vice-Minister, or Ambassador
(***) Former astronaut