The role of the IAA Subcommittee on Small Satellites for Developing Nations in providing education and training for space scientists and engineers

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UN/IAA Workshops on Small Satellites at the Service of Developing Countries – I.

- 5 October 2000, Rio de Janeiro, Brazil, 1st Workshop: The Latin American Experience

Follow-up to the IAA Workshop on Small Satellites for Latin America held in São José dos Campos, Brazil, in June 1994, and the Workshop on Small Satellites at the Service of Developing Countries organized within the framework of the Technical Forum held in Vienna from 18 to 23 July 1999 during the UNISPACE III.

The main objective of the Workshop was to review the advancements made in Latin America in the development and utilization of small satellites in the light of the recommendations of the two other workshops organized by the IAA Subcommittee.

- 2 October 2001, Toulouse, France, 2nd Workshop: The African Perspective

This workshop clearly demonstrated the tremendous benefits that can accrue from introducing space activities through a small satellite program. In this regard, it was stressed that the main focus should be placed on those applications that would provide sustainable economic benefits for Developing Countries in Africa.

UN/IAA Workshops on Small Satellites at the Service of Developing Countries – II.

- 12 October 2002, Houston, Texas, 3rd Workshop:
  Beyond Technology Transfer

The emphasis was on operational aspects of the use of small satellites and on existing and proposed applications and on associated benefits for Developing Countries.

- 30 September 2003, Bremen, Germany, 4th Workshop:
  Contribution to Sustainable Development

The emphasis was placed on international cooperation in support of environment monitoring and security, including disaster mitigation.

- 5 October 2004, Vancouver, Canada, 5th Workshop:
  Current and Planned Small Satellite Programmes

It covered scientific, Earth observation and telecommunication missions. Emphasis was placed on international cooperation, education and training, and the benefits of such programmes at the service of Developing Countries.

Some recommendations of the UN/IAA Workshops – I.

- the main focus should be placed on applications that provide sustainable economic benefits for developing countries;

- small satellite projects could result in fruitful cooperation between different countries in the planning, implementation and maintenance of a constellation of satellites, as well as in the effective utilization of the data acquired;

- there is the need for greater awareness among the public and among decision makers of the benefits of space programmes;

- the interest of young students and young professionals for the subject of small satellites was a positive sign of growing public awareness.

Some recommendations of the UN/IAA Workshops – II.

The participants of the Workshop recognized that the proposals made during UNISPACE III were fully applicable, but they made or reconfirmed the following additional conclusions and recommendations:

- coordinated action be continued to identify significant problems that were common to different countries in a region and that could be addressed with the help of small satellite technology. The Workshop also recommended that partnerships be developed between regions with common needs, such as the equatorial regions of different continents;

- to provide maximum economic and social benefits, programmes should ensure continuity and sustainability;

- long-term strategic programmes be developed to ensure the sustainable acquisition and processing of the data needed for monitoring the environment and natural resources, for the mitigation of man-made or natural disasters, as well as for decision-making.

Some recommendations of the UN/IAA Workshops – III.

The participants of the Workshop recognized that the proposals made during UNISPACE III were fully applicable, but they made or reconfirmed the following additional conclusions and recommendations:

- space activities should be an integral part of any national programme devoted to the acquisition and development of technology and capacity-building;
- each country should recognize the important role that space assets could play in education and the need to incorporate space science and technology in curricula;
- each country or group of countries should consider establishing a minimum level of space capabilities as they could be invaluable in enhancing socio-economic development as well as the health and quality of life of the population.

CONCLUSIONS (education)

- Presentations were made at the Workshops of programmes conducted *inter alia* at Universities in Argentina, Brazil, Indonesia, Malaysia and South Africa;

- It was demonstrated that such programmes are efficient vehicles for hands-on training of students, covering such aspects as solving technological problems, providing efficient project management and coping with short-schedule pressure;

- As a result, important lessons are learnt that would benefit engineering students. However, they also express the difficulties encountered and the challenges of executing a resource-limited university programme;

- Developing a corps of highly trained engineers and scientists generates new applications and provide an opportunity for local industry to start developing necessary manufacturing capacity. This is particularly important in ensuring the sustainability of the space sector.

CONCLUSIONS (general)

- Small satellites are particularly suited for technology transfer to developing countries;
- The extensive use of commercial off-the shelf products, the small dedicated science and engineering teams, and the quick turn-around time from design to flight model are some of the commendable qualities;
- The modest cost of development makes small satellites an affordable path to the acqusition of space technology, making them invaluable for building indigenous capability. The crucial condition is that space applications become operational.

Thank you for your attention