30TH WORKSHOP ON SPACE TECHNOLOGY FOR SOCIO-ECONOMIC BENEFITS

DEVELOPING AN INTEGRAL SPACE EDUCATION PROGRAM
BASED ON ROBOTICS AND AI
TO ADVANCE THE VENEZUELAN EDUCATION SYSTEM
ENG. ROGELIO MORALES

BAKU-AZERBAIJAN, 29 SEPTEMBER - 01 OCTOBER 2023

AbaeVzla
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Today, the space sector presents itself as an unquestionable driver of economic and social development in a country by bringing together a variety of disciplines, scientific and technological innovations, and a diversity of high-value-added industries that could offer Venezuela the opportunity to establish and consolidate a sustainable national development with a long-term strategic vision.
**Space Sector Statistics**

**Space Market Value Chain**
- Manufacturing: $25B
- Launch Services: $8B
- Ground: $4B
- Satellite Operators: $15B
- Services Providers: $285B

**Space Market by Application**
- Satcom: 41%
- Navigation: 51%
- Others: 4%
- EO: 4%

**Space Market by Client**
- Commercial: 82%
- Gov. Civil: 9%
- Defense: 9%

Value Chain: $337B

Euroconsult
**SCIENTISTS**
- Space Scientist
- Physical Scientists
- Life Scientists
- Physicians

**ENGINEERS & TECHNICIANS**
- Aerospace Engineers
- Electronics Engineers
- Computer Scientists
- System Engineers

**OTHER PROFESSIONALS**
- Contract Specialist
- Financial Analysts
- HR Professionals
- Business Strategists
To accomplish this goal, a coherent, viable, and disruptive national education strategy must be established in order to build the critical mass of personnel needed to accelerate and consolidate a national space sector.

In that sense, there are important capacities and possibilities in the country to meet the challenge proposed.
**EDUCATION SYSTEM STATISTICS**

**SCHOOL-AGE POPULATION BY EDUCATION LEVEL**

<table>
<thead>
<tr>
<th>Level</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-primary</td>
<td>1,487,246</td>
</tr>
<tr>
<td>Primary</td>
<td>3,261,349</td>
</tr>
<tr>
<td>Secondary</td>
<td>2,627,453</td>
</tr>
<tr>
<td>Tertiary</td>
<td>2,660,784</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10,036,832</strong></td>
</tr>
</tbody>
</table>

Represents **27%** of the total

**HUMAN TALENT DEDICATED TO R&D ACTIVITIES BY EMPLOYMENT SECTOR**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universitary</td>
<td>9,163</td>
</tr>
<tr>
<td>Government</td>
<td>4,155</td>
</tr>
<tr>
<td>Others</td>
<td>764</td>
</tr>
<tr>
<td>Public &amp; private companies</td>
<td>90</td>
</tr>
</tbody>
</table>

**HUMAN TALENT DEDICATED TO R&D ACTIVITIES BY TYPE OF PERSONNEL**

- Technical: 3,045 (21.6%)
- Support: 2,302 (16.3%)
- Research: 8,774 (62.1%)

**R&D ORGANIZATIONS OF THE UNIVERSITY INSTITUTIONS IN THE COUNTRY**

- Public Universitaries / 56
- Private Universities / 25
- Public Universities R&D / 210
- Private Universities R&D / 43

Source UNESCO

Source ONCTI
In this regard, an integral space education program based on robotics and artificial intelligence (AI) is proposed as an after-school format to advance and place the Venezuelan education system at the top level in order to meet the capacities required to ensure a sustainable and resilient national space industry. In that sense, ABAE has implemented diverse initiatives in order to accomplish those objectives.
PROPOSAL
PROGRAM PURPOSE & GOALS

Develop national capacities in autonomous robotic platforms, to carry out space exploration missions in all its modalities and permanently in the Solar System. The program is designed to be completed in 12 years, from 2024 to 2036.

1. Develop an intensive and top-level education and research system to support the national space industry.
2. Develop an autonomous, robust and reliable robotic swarm platform to guarantee the permanent exploration and study of the Solar System.
3. Develop a high-tech national space industry to produce high value-added products and services.
PROPOSAL
PROPOSAL PILLARS

01
SELF DEVELOPMENT

02
AI-POWERED TEACHING AND MENTORING

03
COLLABORATIVE WORKING

MODULAR

ADAPTABLE

PURPOSE-DRIVEN
PROPOSAL STRATEGY

For all levels of education, a curriculum with an emphasis on science, technology, engineering, mathematics, design, and science fiction is proposed. This approach will develop in students problem-solving skills, creativity, innovative thinking, multidisciplinary teams, leadership, critical thinking, and a proactive attitude applied to challenging robotics projects about space exploration topics.

TEACHERS EDUCATION

Teachers and AI to educate and prepare new teachers.

SPACE-RELATED EDUCATIONAL OPPORTUNITIES

Learning opportunities at all educational levels, with a broad selection of subjects and courses (primary and secondary education).

PROMOTE STUDIES ON THE SUBJECT

Space robotics-related professions and academic fields. Additionally, events and competitions to promote space robotics-related careers.

SPECIALIZED EDUCATION

Develop specialized educational plans and facilities for young researchers and entrepreneurs.
PROPOSAL
STRATEGY

**PRIMARY SCHOOL**
- Robotic Space Kit (basic)
- SaaS Education Platform
- Itinerant Robotic Laboratory
- Robotic Holidays & After-School Programs
- Local and Regional Robotic Competitions
- Student Grants

**SECONDARY SCHOOL**
- Robotic Space Kit (advanced)
- SaaS Education Platform
- Itinerant Robotic Laboratory
- After School Programs
- Robotic Camps
- Local, Regional and National Robotic Competitions
- Student Grants

**UNIVERSITY**
- Robotic Space Kit (pro)
- SaaS Design & Simulation Platform
- Robotic R&D Laboratories
- Robotics Training & Internship
- Local, Regional, National & International Robotic Competitions
- Student Grants
- Startup Incubator
CHALLENGES

01 HIGH-QUALITY EDUCATIONAL INFRASTRUCTURE
02 QUALIFIED TEACHERS AND PROFESSORS
03 STUDENTS LEARNING CONDITIONS
04 PARENTS INVOLVEMENT
05 EDUCATIONAL INDICATORS
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