



SPACE SCIENCE & TECHNOLOGY DEVELOPMENT IN COSTA RICA:

Achievements & challenges
of local human capacity-building

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ASOCIACION ESTRATEGIA SIGLO XXI (ESXXI)

ASOCIACION CENTROAMERICANA DE AERONAUTICA Y EL ESPACIO (ACAE)

A satellite map of Costa Rica, showing the country's coastline, major rivers, and forested interior. The map is overlaid with a grid of latitude and longitude lines.

COSTA RICA:

Long Historical Commitment to Sustainable Development

- 1869: Education free and mandatory = High indices of literacy
- 1948: Constitutional abolishing of army forces = Political stability
- 1970's: Large-scale reforestation efforts & eco-tourism innovation = 25% forest coverage
- 1990's: Innovative approach = payment for ecosystem services
- 2017: 97% of electricity matrix clean of CO2 emissions!
- Recurrent: happiest country ranking = social + environmental well-being

- 1) Protect the environment and restore ecosystems;
- 2) Allows businesses and local economies to operate profitably in the present and into the future;
- 3) Support social improvement and protect cultural identity.

SUSTAINABLE PROSPERITY!

HOW COSTA RICA STARTED LOOKING UP TO THE STARS...



Costa Rica's Interest in Accessing & Applying Space Technology:

Monitoring of environmental and natural resources:

- Water scarcity and management
- Agriculture and land use
- Strategic urban design and transportation planning
- Natural disaster prevention and response planning
- Coastal and ocean activities (marine spatial planning, IUU fishing, drug trafficking)
- Reporting of national commitments (REDD+, UNFCCC NDCs, etc.)
- Among others...



17 PARTNERSHIPS FOR THE GOALS



Only by working together can we achieve a sustainable future with improved health for all.

Human capacity building in the XXIst century requires:

- multi-sectorial alliances and synergies
- inter-cultural environment/exposure
- inter-disciplinary approach to solutions

* Examples from Costa Rica:

- Government leadership
- Industry driver
- Education initiatives
- Civil society engagement
- UN system partnership



* caveat: lots of overlap, most are cross-sector partnerships

GOVERNMENT LEADERSHIP

- 2010: National Development Plan (2010-2014) identified promotion of aerospace sector as an area of interest
- 2010: Creation of CONIDA (National Council on Aerospace Research and Development).
Mandate: “to position CR on the map of aerospace development, promote international cooperation and strengthen human capacity”



2012: Full Member of UNCOPUOS

2014: First Draft of National Aerospace Development Policy Program



INDUSTRY DRIVER



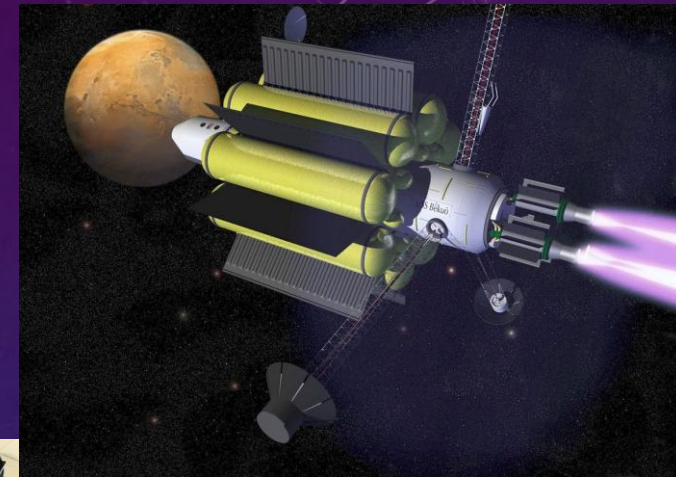
Cohesive Effort from Private Sector
+ Government + Academia



<http://www.costaricaaerospace.com/>

- Launched in 2015: 34 companies in 2017
- In 2016: \$100m in exports - 6% increase from 2015
- Technological capabilities to develop/manufacture aeronautical/aerospace solutions (electronic components, harnesses, accessories, software,
- Collaboration on capacity building, certification processes, supply chain development
- Mission to:
 - Increase Costa Rican participation in the global industry value chain
 - Assist in the attraction of foreign direct investment

INDUSTRY DRIVER



EDUCATIONAL INITIATIVES



1) Participation of Costa Rica at FISE's United Space School program



Process:

- Review panel of applications (>120)
- Finalist interview (10-12)
- 14 alumni between 2011-2017

EDUCATIONAL INITIATIVES

COSTA RICA: Listos para una pasantía en la escuela del espacio



Marco Tulio Acuña y Luis Diego Bolaños no se imaginaron que se sentirían tan cerca del espacio igual que s
Estos dos jóvenes de 17 años realizarán una pasantía en el Centro Espacial Johnson de la NASA en Houston.
Ellos conocerán cómo se planifican las misiones espaciales, el trabajo de los astronautas, científicos, cosm
Física, Química y Biología por dos semanas, con mentores de la NASA.

"No me lo imaginaba, pero lo considero una bendición de Dios y una gran oportunidad para mi vida futura"
Jorge Debravo de Turrialba.

"Mi mayor expectativa es aprender mucho y nutrirme con el conocimiento de los expertos en el área espacial"
Colegio Bilingüe Santa Cecilia de Heredia.

El cosmonauta costarricense Franklin Chang Díaz fue quien impulsó el programa en el país mediante la Asoc

"Ellos van a ser expuestos a una gran gama de posibilidades. Van a darle un atisbo al mundo espacial, a ver cómo opera la Nasa... Esto les va a permitir más", comentó Chang.



Colegiales irán a Escuela del Espacio en la NASA

Jóvenes ticos están listos para
'acampar' al estilo espacial



NASA recibirá a jóvenes ticos en el mes de julio

NASA offers internships for Tico high school students

NASA abre puertas a ticos

EDUCATIONAL INITIATIVES

Con la misión de contribuir al desarrollo de Costa Rica mediante el fomento de la Ciencia, la Tecnología y la Innovación, tenemos el agrado de invitarle al Foro:
La Participación Costarricense en el Programa Escuela del Espacio, 2011-2014



Fecha: Viernes 19 de diciembre
Hora: 4:00 pm
Lugar: Auditorio Oficentro Meridiano (edificio de color terracota diagonal a Multiplaza Escazú)
Público: Estudiantes de colegio, preferiblemente entre 13-17 años.

Cupo limitado. Los espacios se reservarán según orden de las confirmaciones.
Por favor confirmar asistencia vía correo electrónico a: escueladelespacio@estrategia.cr

Giving back:

- Final written report
- Network of alumni
- Peer-to-peer
- Outreach to general public



EDUCATIONAL INITIATIVES

2) Aerospace & Rocketry Camp at University of Costa Rica



- 2015 & 2016
- Cont' in 2018
- 2 day event
- 50 particip.
- 60/40 M/W
- High school & university stud.

EDUCATIONAL INITIATIVES



- Astronomical observation night
- Technical visit to Ad Astra Rocket Co.
- Leadership, science communication, team work.

Lectures on:

- Physics of rocketry, computational analysis & simulation software
- Applications of remote sensing for earth observation, climate, etc



EDUCATIONAL INITIATIVES

Spin-off →

Organic formation of Aerospace Engineering Group

- Supportive learning community.
- Pursued rocketry certification level II in Nevada, USA.
- Organize lectures, invited speakers, divulge scholarship opportunities.
- Seek funding for conference participation.





EDUCATIONAL INITIATIVES



Costa Rica's Road towards its First Satellite!



- Declaration of Public Interest in 2014
- On land, sensors (dendrometers) to monitor tree growth will link to satellite 2x per day as it passes over Costa Rica
- Will gather information about capacity of Costa Rican forest to absorb CO₂





CIVIL SOCIETY ENGAGEMENT



PROYECTO
IRAZÚ



\$81,369
de la meta de \$75,000

+908 patrocinadores
contribuyeron al proyecto

PARTNERSHIP WITH UN SYSTEM

Host of UN/Costa Rica Human Space Technology Initiative Workshop

March, 2016

- 10 plenary sessions
- 6 poster sessions
- 3 workshops
- 1 joint session
- → 12 recomms
- Report to UN GA



PARTNERSHIP WITH UN SYSTEM

FORO internacional de ASTRONAUTAS

EN EL MARCO DEL



UNITED NATIONS/COSTA RICA
WORKSHOP ON HUMAN
SPACE TECHNOLOGY
MARCO 67318 2014 • SAN JOSÉ, COSTA RICA



Challenges for growth of STEM-skilled workforce in Costa Rica

→ Partly technological, partly cultural, partly economic

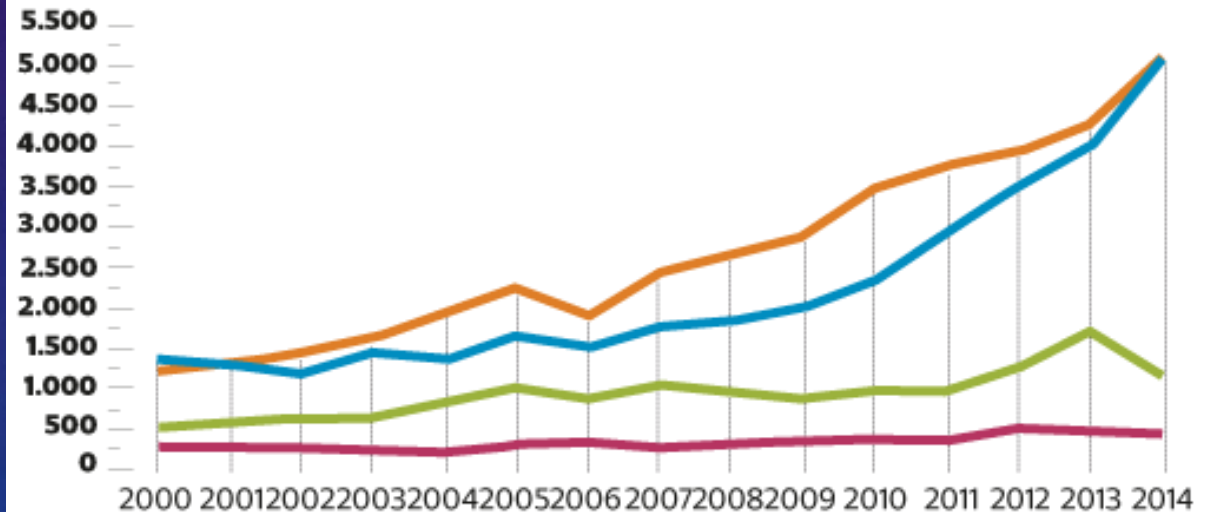
- Language barriers to access resources
- Cultural, social, gender stereotypes
- Insufficient funding specifically designated for STEM programs
 - Insufficient professional development for STEM teachers
 - Insufficient STEM education infrastructure
- Even if talent grows abroad... “Brain Drain”
 - How to incentivize national retention?

Más tecnólogos graduados

Crecimiento del 11,1% entre 2000 y 2014.

Cifras en números absolutos

■ Ciencias agrícolas ■ Ciencias exactas y naturales ■ Ciencias médicas
■ Ingeniería y tecnología



Nota:

Cantidad de graduados Badagra según el grado académico más alto y más reciente (n): 89841.

Cantidad de graduados ORE según el grado académico más alto y más reciente (n): 3460.

Fuente: Hipatia, Estado de la Nación.

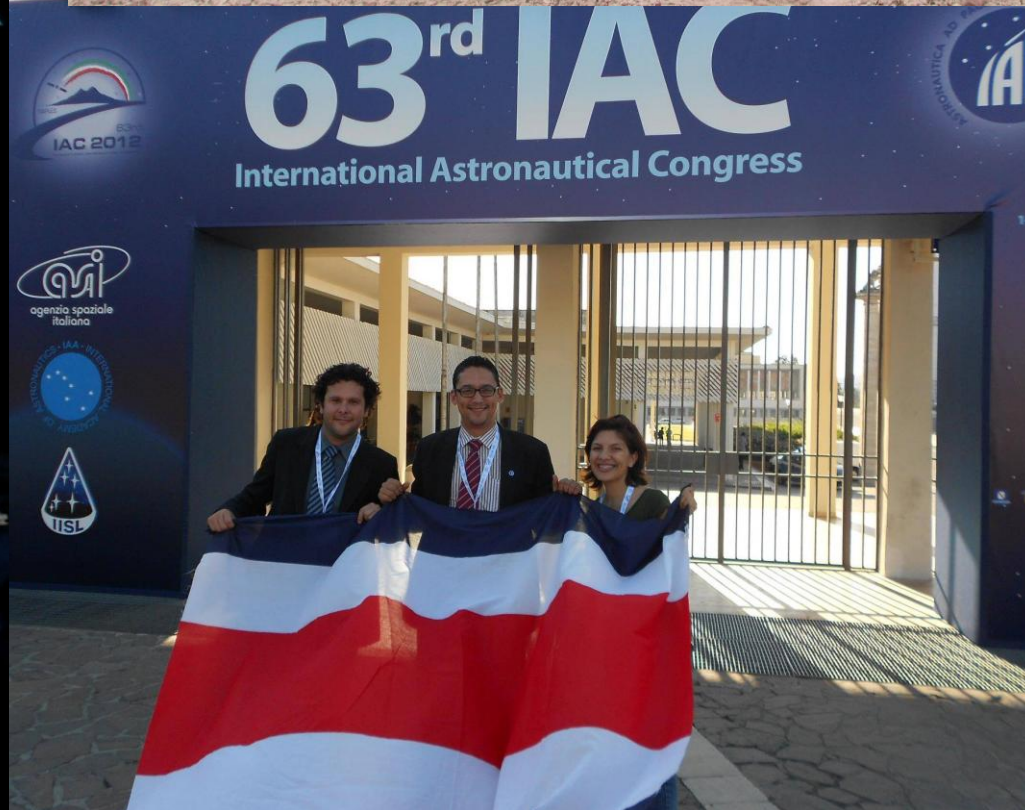
TICAS

EN EL ESPACIO

INGENIERAS LÍDERES EN CIENCIA Y TECNOLOGÍA

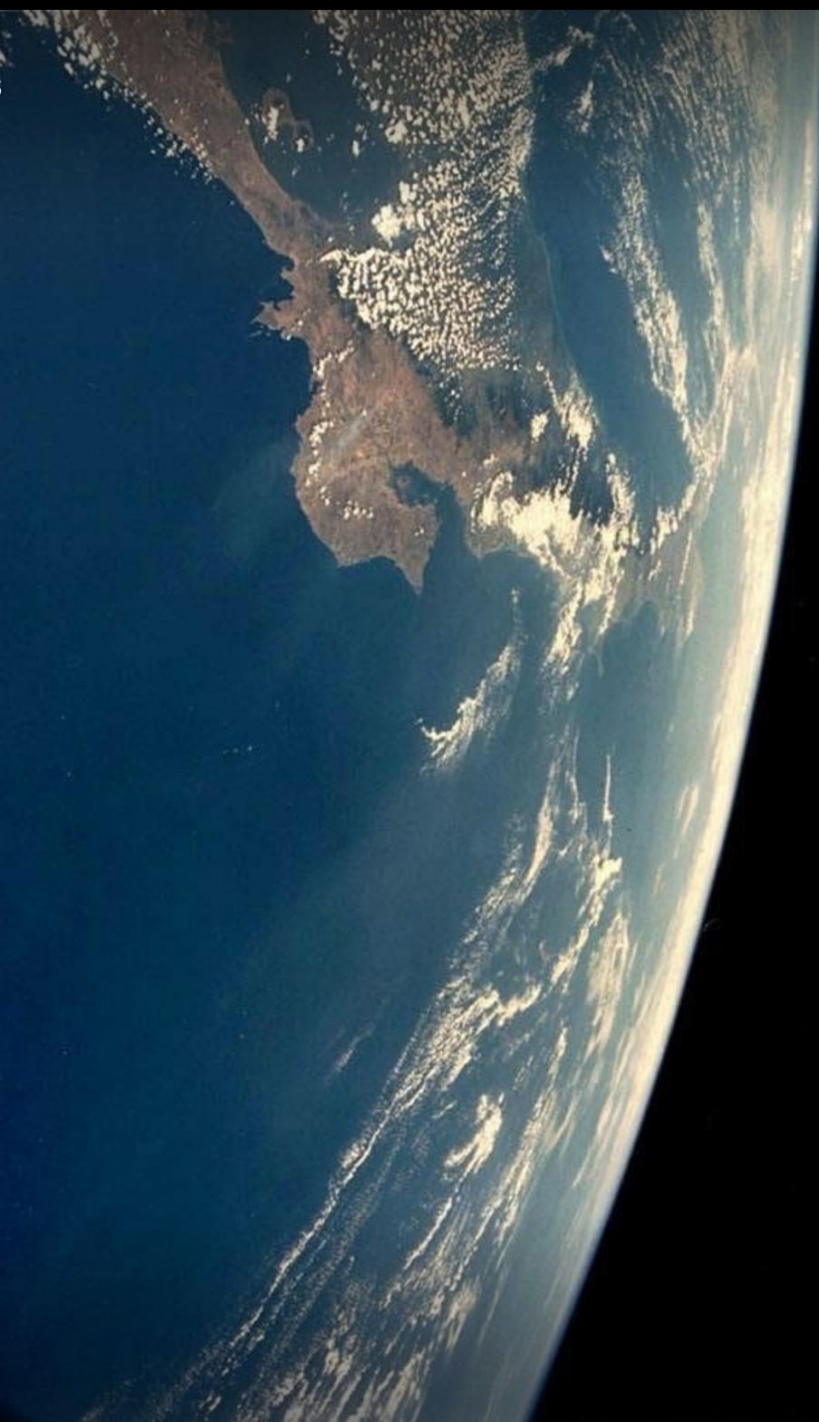


Reasons for hope!



In the beginning, all success stories start with inspiration...





THANK YOU!

