United Nations/South Africa Symposium on Basic Space Technology
"Small Satellite Missions for Scientific and Technological Advancement"

STELLENBOSCH, SOUTH AFRICA, 11 - 15 DECEMBER 2017

SUP'SAT:

Development of the Tunisian SUP'COM Spatial program

To bring knowledge to life ….

Riadh Abdelfattah

COSIM Lab (Communication, Signal et Image)
(SUP'COM) Higher School of Communications of Tunis
University of Carthage

Université de Carthage
University of Carthage
جامعة قرطاج

COSIM
Communications, Signals and Images

SUP'COM
Higher School of Communication of Tunis

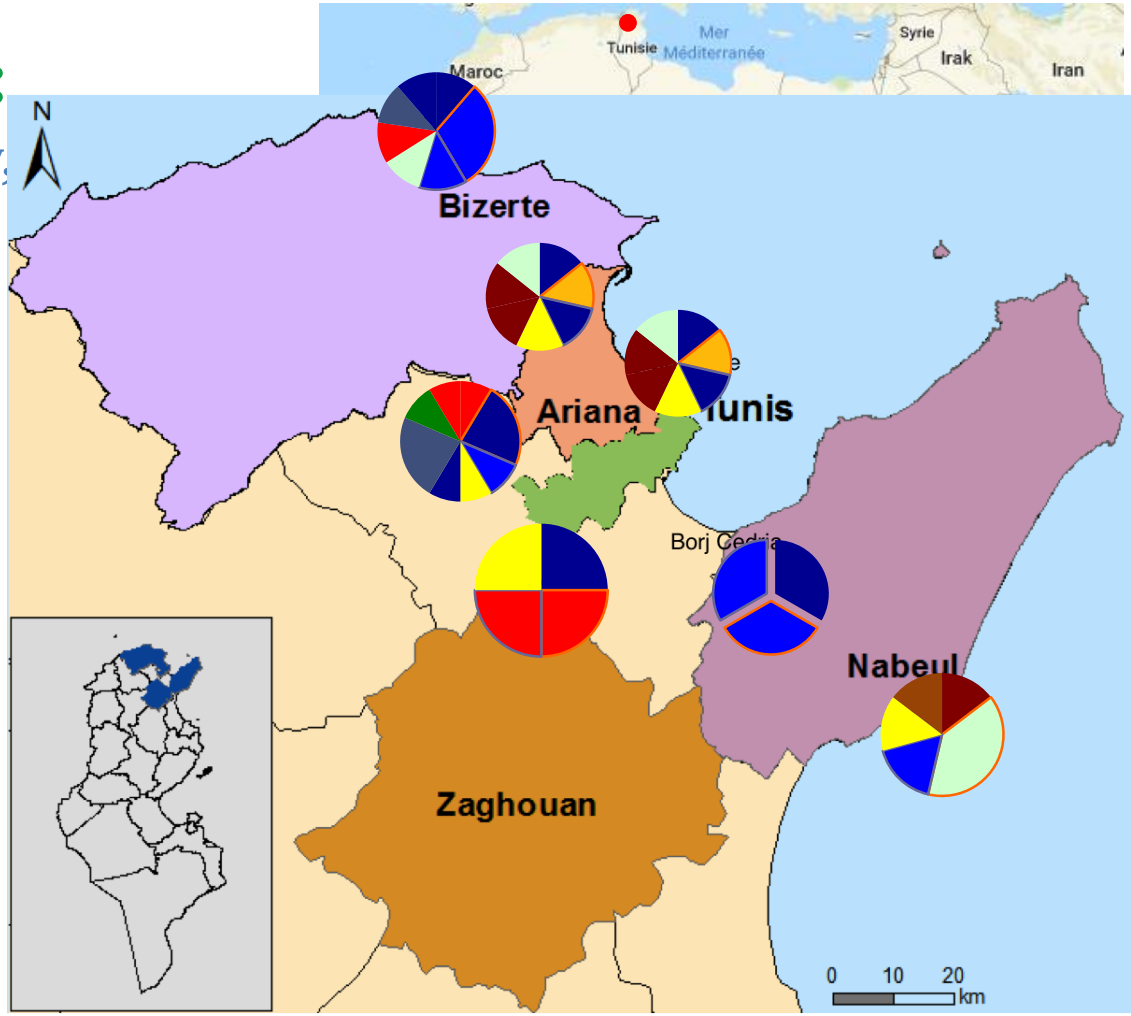
Tunisia

University of Carthage:

A multidisciplinary university,

35 institutions distributed on 7 campus

- Humanities and Social Sciences
- Political and legal sciences
- Management and economic sciences
- Arts, Cinema and Tourism
- Agronomy
- Architecture
- Engineering sciences
- Technologic sciences



SUP'COM:

Engineering school of Telecommunications

80 High-tech companies
A dozen of multinationals
4000 top executives

SUP'COM:

Engineering school of Telecommunications

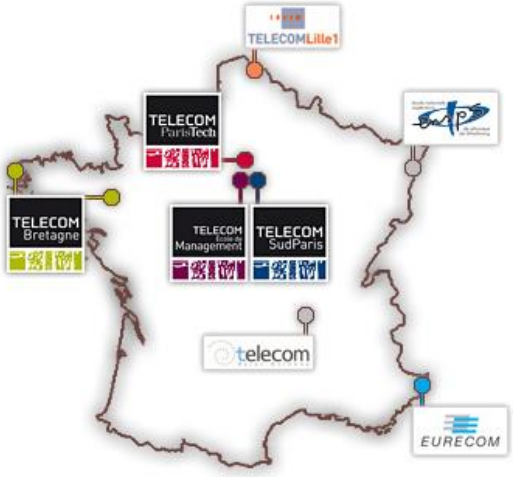
UNIVERSITÄT PASSAU
Fakultät für Informatik und Mathematik

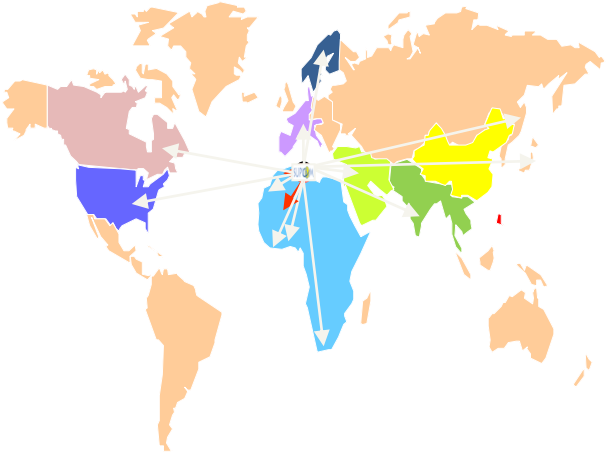
CONFERENCE DES GRANDES ECOLES

INSTITUT TELECOM

Cti

RMEI réseau méditerranéen des écoles d'ingénieurs





SUP'COM: Challenges

Engineering school of Telecommunications

1. International accreditation of our school: Training and research quality enhancement for better ranking

2. Complete the training with other new skills and other professional qualities

3. Strengthening participatory governance for better management quality

4. Retain our best students for the complete cycle of training (3 years) and motivate them for starting up their ideas and projects.

Constraints :

1. Courses well suited to the employability market

2. Economic issues

3. Faculty professor reluctance

Spatial program ?

Outline

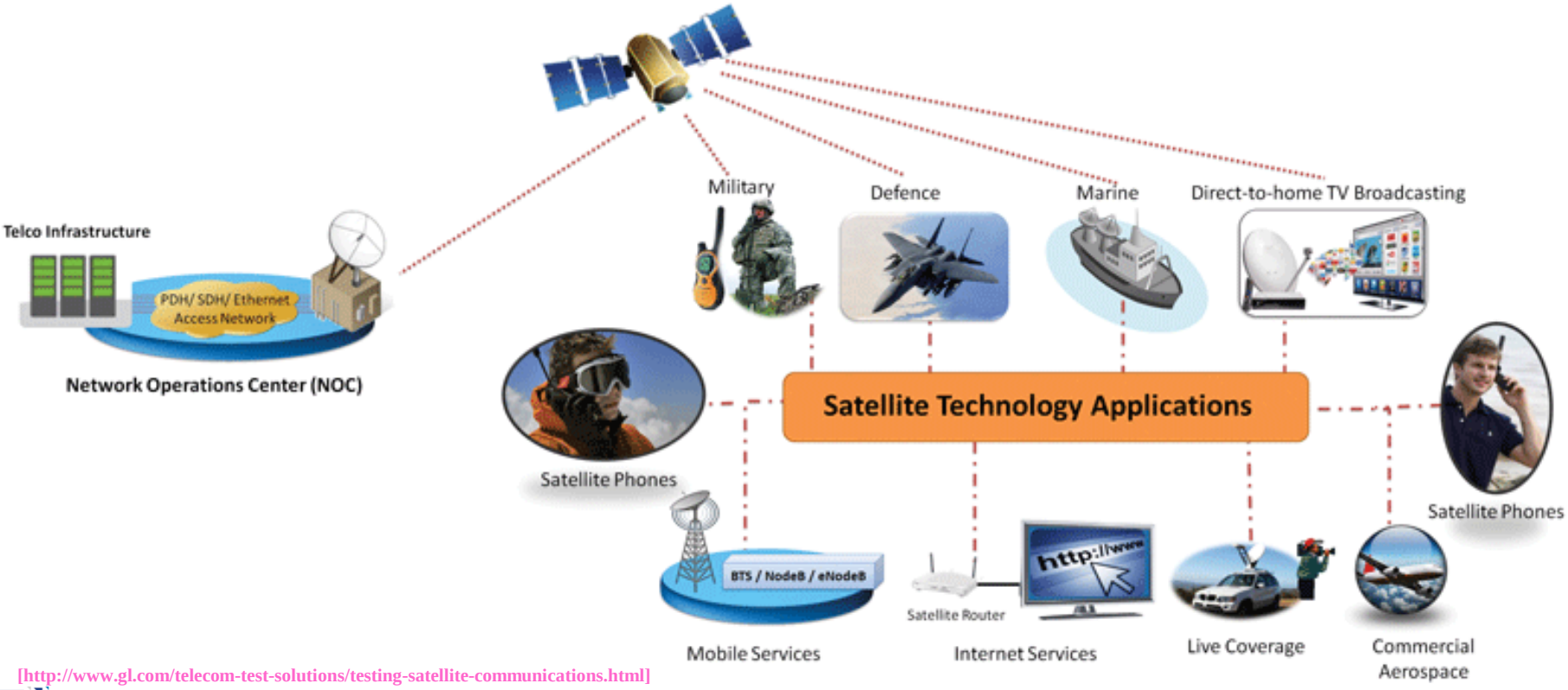
I. Spatial program at SUP'COM: Why a nanosatellite?
   a. Education and training for employability
   b. Societal problems : water resource management, smart agriculture

II. Education reform program at SUP'COM?
   a. National strategy for research and development (reform of programs at SUP'COM)
   b. Technology innovation and development

III. Our strategy
   a. Creation of new course program (Master and engineering)
   b. Association with the national and international ecosystem

I. Spatial program at Sup'Com: Why a nanosatellite

The presence of satellites has made important changes in our lives and they contribute in all aspects of life

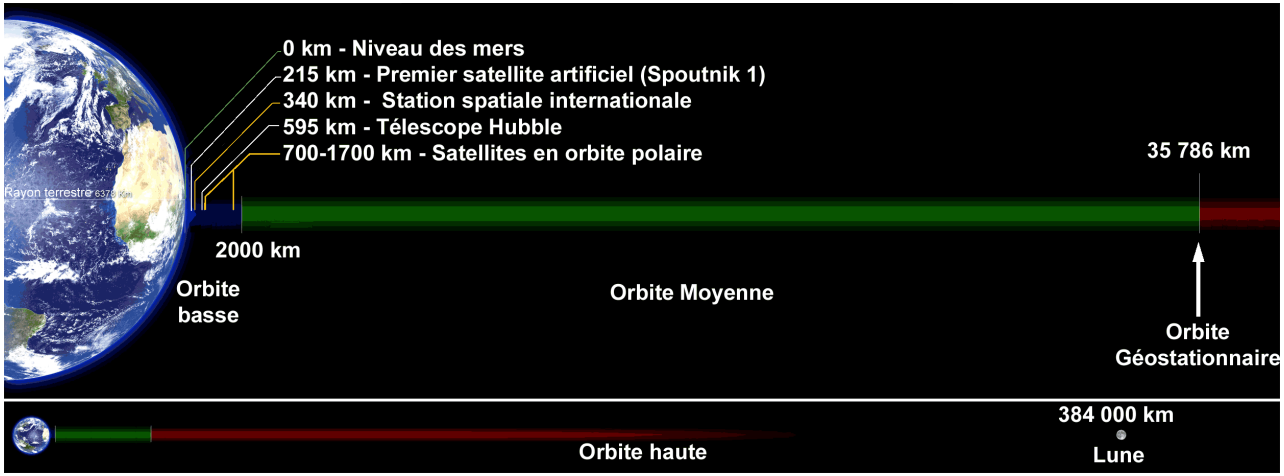


[http://www.gl.com/telecom-test-solutions/testing-satellite-communications.html]

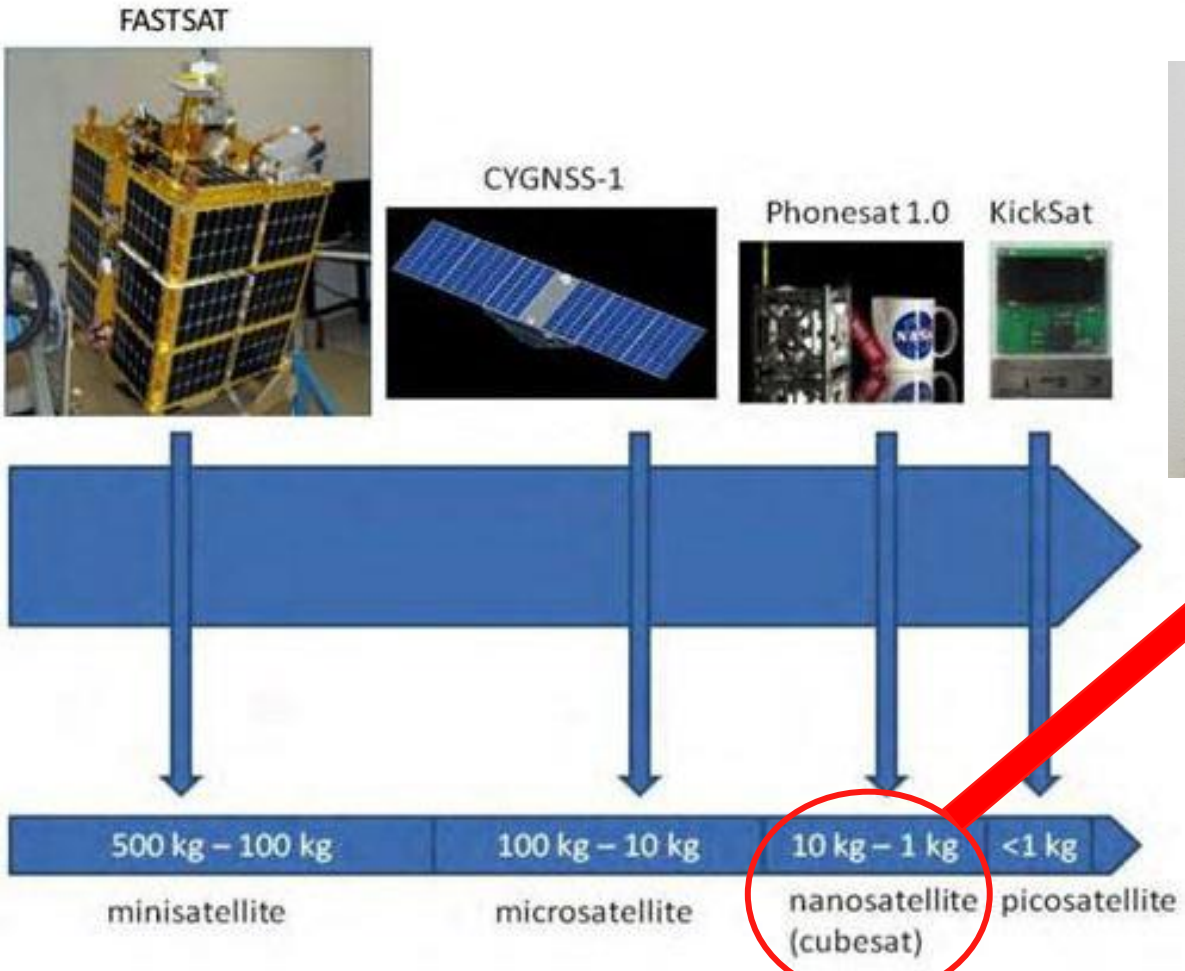
I. Spatial program at Sup'Com: Why a nanosatellite

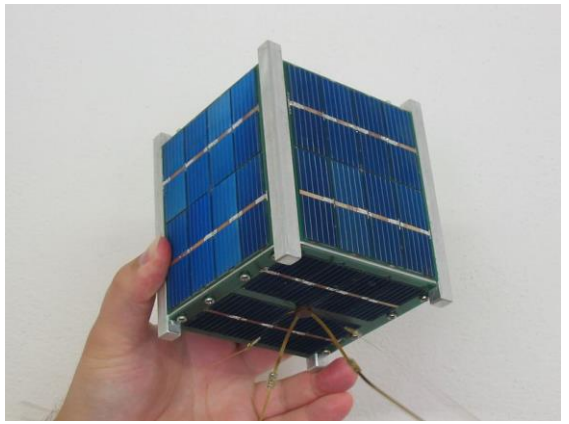
However: In the majority of developing countries, **access to space** technology is still very low due to the **high cost** of the space mission and the **duration** of the project.

Average time of satellite design:	Ten years
Manufacturing costs:	Several hundred millions Euros
Launch costs:	Several hundred millions Euros



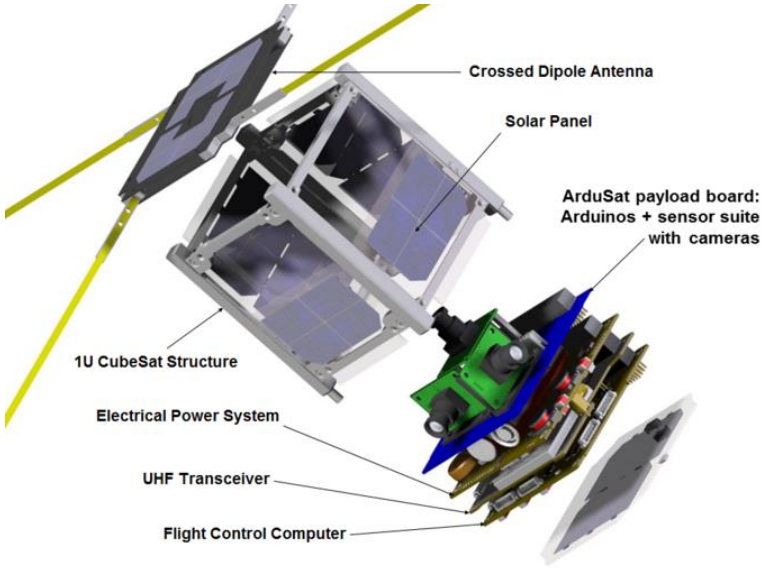
I. Spatial program at Sup'Com: Why a nanosatellite

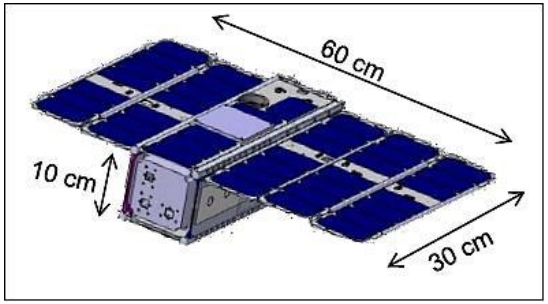


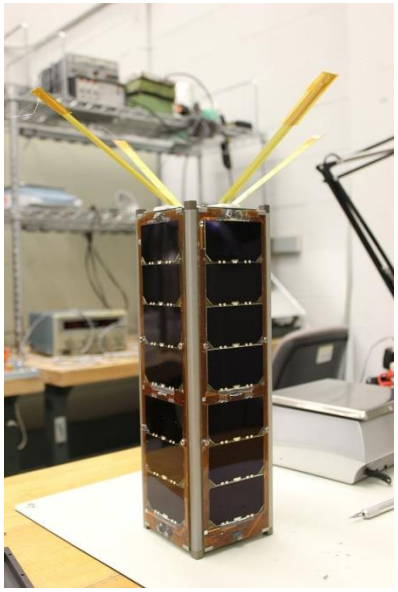


I. Spatial program at Sup'Com: Why a nanosatellite

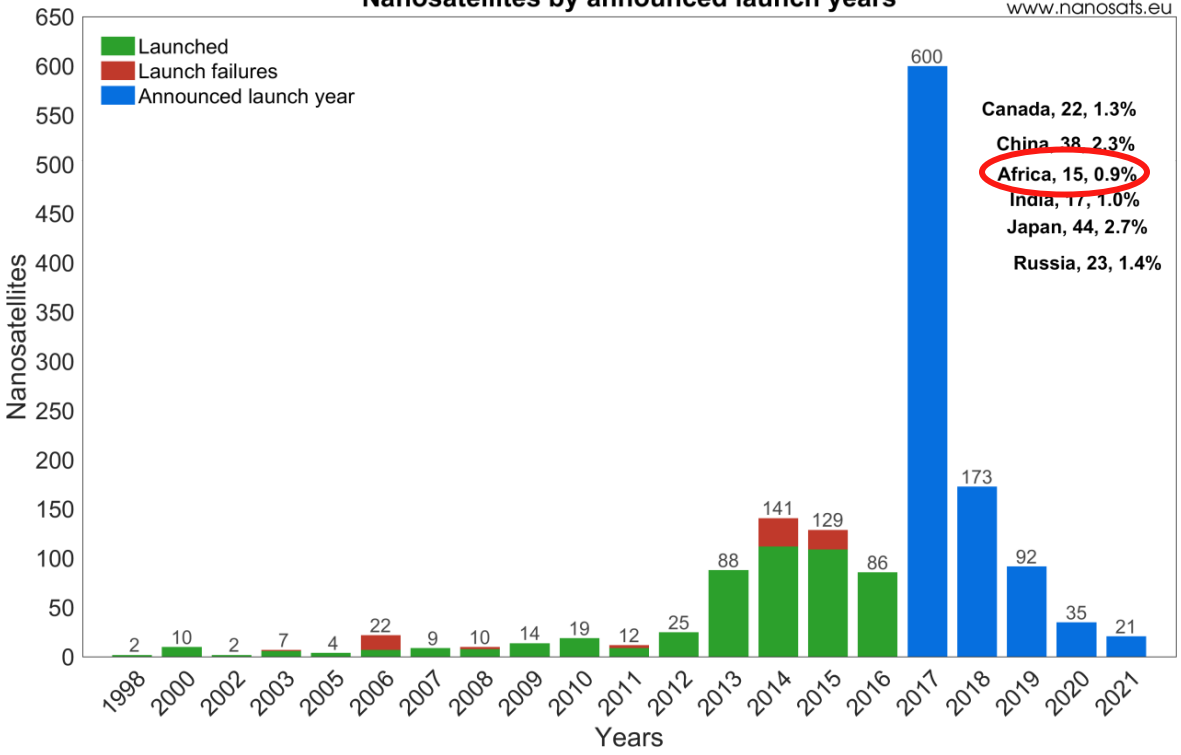
Average time of nanosatellite design: 3 years (from project planning to final assembly)
Manufacturing costs: 30 000 Euros
Launch costs: 50 000 Euros negotiable untill free

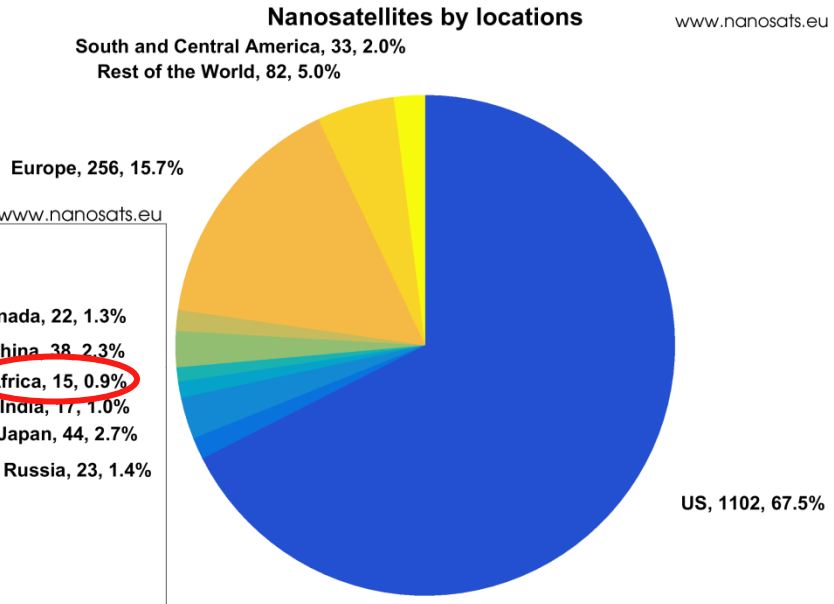






I. Spatial program at Sup'Com: Why a nanosatellite





I. Spatial program at Sup'Com: Why a nanosatellite

I. Spatial program at Sup'Com: Why a nanosatellite

The use of small satellites, Micro and Nanosatellite can contribute to the development of developing countries through accessing to vital sectors:

1- Disaster Monitoring

2- Support for agriculture and resource management

3- Education

I. Spatial program at Sup'Com: Why a nanosatellite

The use of small satellites, Micro and Nanosatellite can contribute to the development of developing countries through accessing to vital sectors:

CNN INSPIRATIONS Out of This World!

India in record satellite launch as Asia's space race heats up

India successfully put a record 104 satellites from a single rocket into orbit on February 15 in the latest triumph for its famously frugal space agency.

Le nanosatellite étudiant de l'UM en orbite

ROBUSTA 1B, deuxième nanosatellite de l'Université de Montpellier, qui a décollé ce vendredi 23 juin, à 5h59 (heure de Paris), depuis la base de Shriharikota en Inde, à bord d'un lanceur PSLV, a donné tous les signaux de bon fonctionnement lors des tests achevés hier.

I. Spatial program at Sup'Com: Why a nanosatellite

The use of small satellites, Micro and Nanosatellite can contribute to the development of developing countries through accessing to vital sectors:

TERRAN ORBITAL

Nano Satellites Work with Ground Sensors to Offer New Eye on Disaster Relief and Agriculture

A swarm of small satellites could give critical infrastructure an Internet connection that never goes down.

Being able to collect data in emergency situations where conventional networks are cut off could be widely useful.

Microsoft

Internet of Things

Inspiring the next generation of space entrepreneurs through IoT

Posted October 5, 2016 by Elena Branet - IoT & Data Lead, Audience Evangelism - DX

I. Spatial program at Sup'Com: Why a nanosatellite

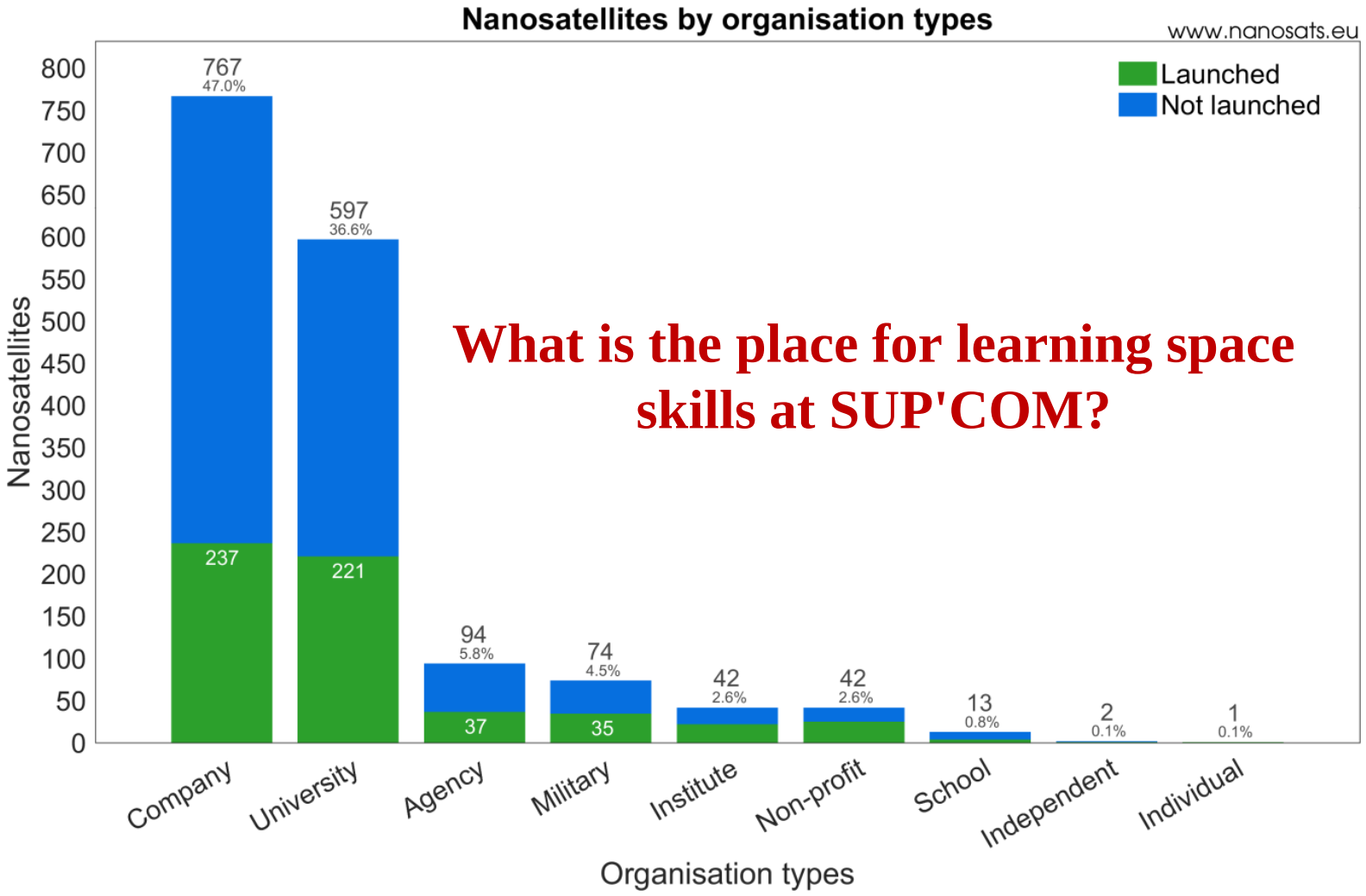
1. Need for the development of an educational and industrial ecosystem in space,

2. Consolidate the national space program within the framework of the National Atmospheric Space Commission (CNEEA),

3. Assist in the resolution of priority issues in Tunisia, including water resources management and natural disasters, security, ...

4. Accentuating our educational cooperation with African countries through the space applications

II. Education reform program at SUP'COM?



What is the place for learning space skills at SUP'COM?

II. Education reform program at SUP'COM?

- **Reform of studies at SUP'COM and new challenges for Tunisia**

- Telecom-generalist engineer who:
  - master ICTs
  - has a solid training and hands on for the use of ICTs within domains associated with societal issues
  - Has a strong sense of initiative and innovation in digital world
  - Communicates well and autonomously
- Quality and type of education
  - Listening and responsive to the ICT market
  - Regularly adapt the specialization of training
  - Involving industrialists

II. Education reform program at SUP'COM?

- **Reform of studies at SUP'COM and new challenges for Tunisia**

hands on for the use of ICTs

societal issues

initiative innovation in digital world

autonomously

ICT market

– Regularly adapt

II. Education reform program at SUP'COM?

- **Reform of studies at SUP'COM and new challenges for Tunisia**

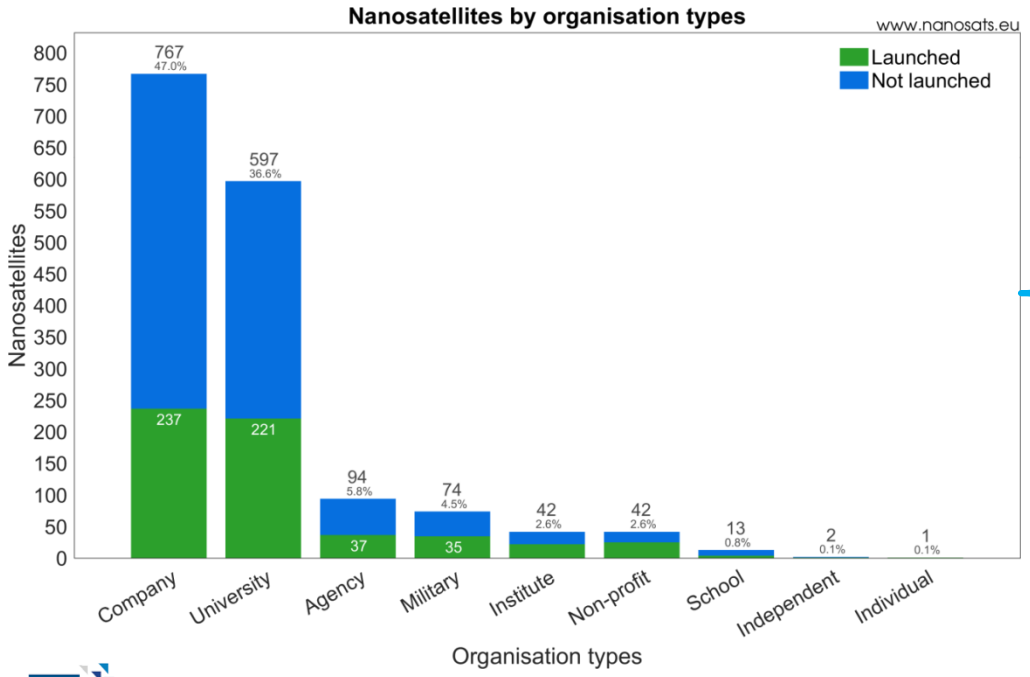
• How to act on the contents and the form to deliver the training programs in order to realize the innovation in the digital world:

✓ Capturing the action and significance of innovation for societal issues

✓ Ensure scientific and technical monitoring to inform and anticipate technological innovation

II. Education reform program at SUP'COM?

The design and launch of small satellites, Micro and Nano Satellite are **engineering projects** that can help in improving and reforming **education**.



1. Engineering: Synthesis of a real functional system

2. Project Management: Teamwork, conflict resolution, time, cost and risk management.

3. Collaboration with industrialists and development actors

4. Learn from failure (low cost project, relatively)

II. Education reform program at SUP'COM?

1. Multidisciplinary training in telecommunications for elites: Communication, Transmission, Electronics, Antenna, Embedded, Security, Data analysis ...

2. Partner school (in dual degree and mobility) with several European Universities renowned in the space field,

3. Conventions with the Tunisian industrial leaders national and international in Telecoms,

4. A double-tutoring school: benefit from this framework for a targeted partnership with the agencies of the Ministry of TICEN (ANF, ANSI, ANCE, CERT, ...)

III. Our strategy?

Developing partnership with the main international actors in space applications: Education and research, research and development, Industry

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APSTAR
by APT Satellite

武漢大學
WUHAN UNIVERSITY

III. Our strategy?

Step 1 : Composition of a multi-disciplinary team for the management of the SUP'COM nanosatellite project

COSIM
Communications, Signals and Images

GRESCOM
Green & Smart Communication Systems

TELNET

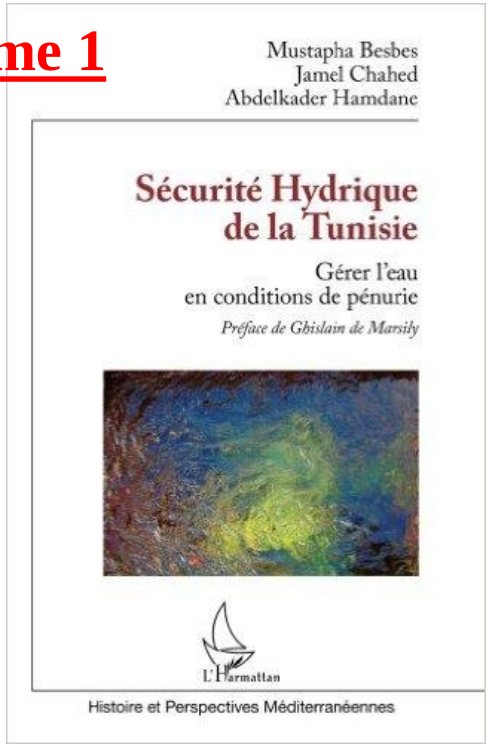
MEDIATRON

isprs
information from imagery

III. Our strategy?

Step 2 : Launch of a study project for the choice of the priority theme to be considered as an application for SUP'COM nanosatellite

Theme 1



« Most of the Tunisian food production comes from rainfed agriculture! Irrigated crops largely come second: Need for optimization of rainfed agriculture? »

III. Our strategy?

Step 2 : Launch of a study project for the choice of the priority theme to be considered as an application for SUP'COM nanosatellite

Theme 2

III. Our strategy?

Step 2 : Launch of a study project for the choice of the priority theme to be considered as an application for SUP'COM nanosatellite

Theme 3

III. Our strategy?

Step 3 : Creation of a new option of 3rd year SUP'COM or a Master's degree in Co-graduation with a partner school (Exp of the UNOOSA Master in Japan, PNST)

III. Our strategy?

Step 4 : Launch of a university space center bringing together Tunisian researchers interested in space applications

III. Our strategy?

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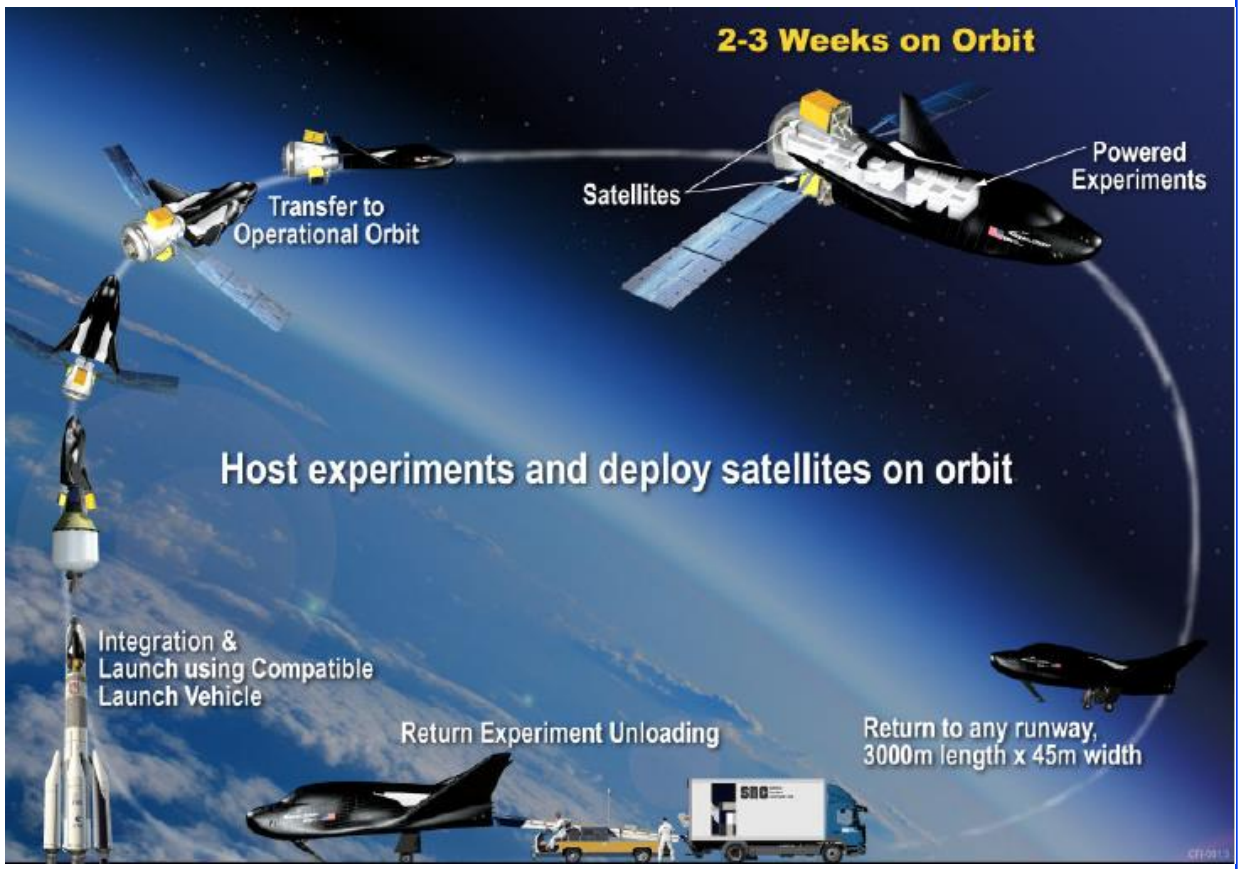
III. Our strategy?

Step 5: We answred the call of interest launched by the Sierra Nevada Corporation (SNC) to offer United Nations Member States the opportunity
to participate in an orbital space mission utilizing SNC's Dream Chaser space vehicle.



IV. Conclusion:

1. Building a new option for the Master to be launched next year at SUP'COM, in space activities: Support from UNOOSA is welcome,

2. Developing the study on the SUP'SAT nanosatillite mission with multiple socio-economic actors,

3. Partnership for training in the education program (master, PhD, supervising …)

4. Develop a capacity building project under the H2020 framework, involving African countries (research and innovation in Africa region)


Thank your