

THE MASTER IN NAVIGATION AND RELATED APPLICATIONS

*A PROGRAMME TO PREPARE THE FUTURE
EXPERTS IN THE FIELD OF GNSS*

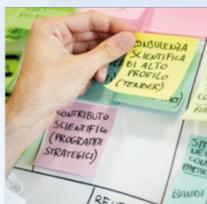
**ISTITUTO SUPERIORE
MARIO BOELLA**

M. Boella
I S M B

Istituto Superiore Mario Boella

**Workshop on the Use of GNSS for Scientific
Applications| ICTP, Trieste, 1-5 Dec 2014**

Gabriella POVERO



ISTITUTO SUPERIORE MARIO BOELLA

To create *value-driven* and *socially relevant* technological & process innovations in close collaboration with industry and institutions.

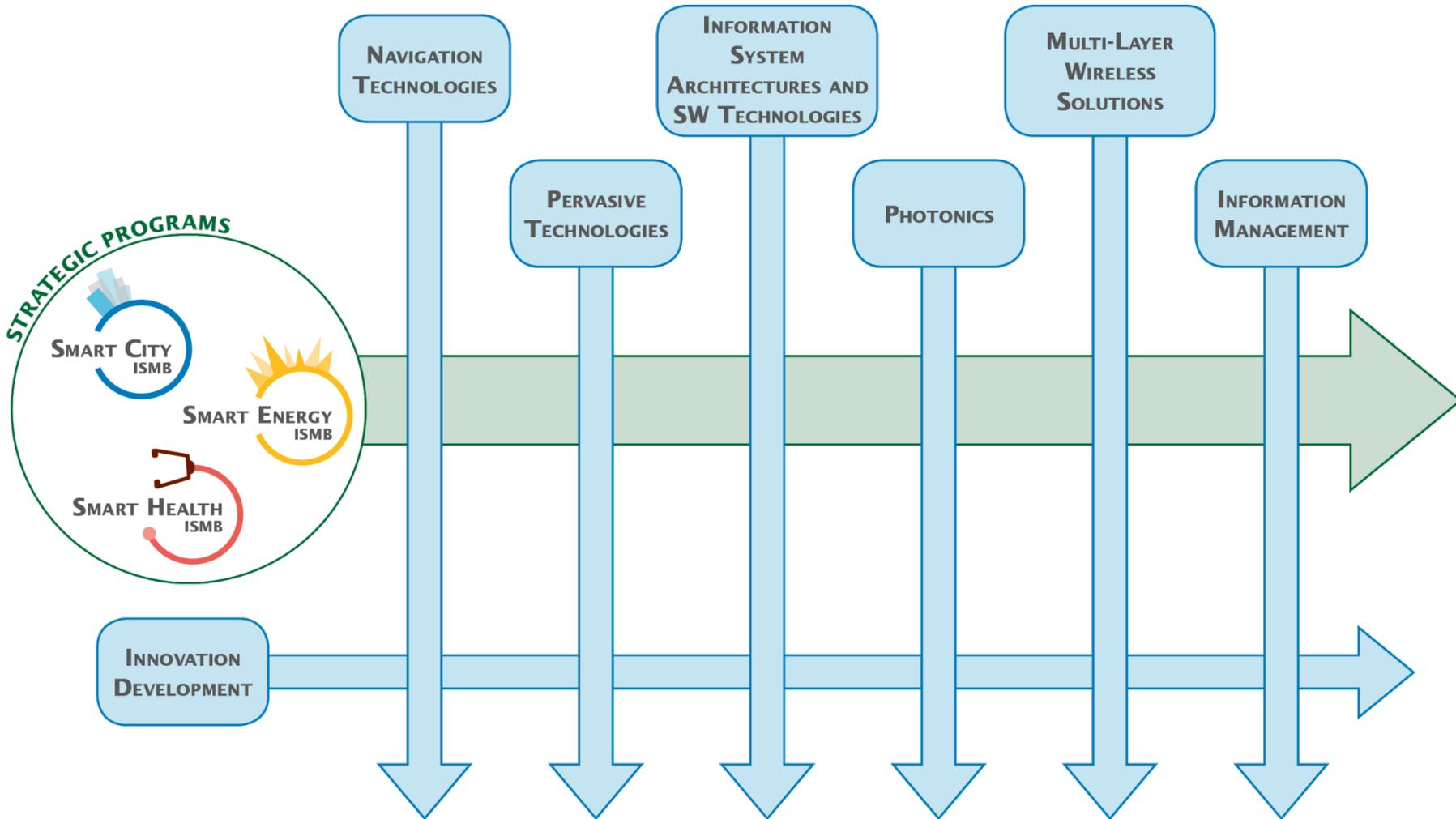
ISMB is a no profit Research & Innovation center operating in the ICT domain. It is an Operating Body of Compagnia di San Paolo and it has been founded in 2000 with Politecnico di Torino.



POLITECNICO
DI TORINO



ISMB IN A NUTSHELL



THE NAVSAS GROUP



Private
Research
Centre

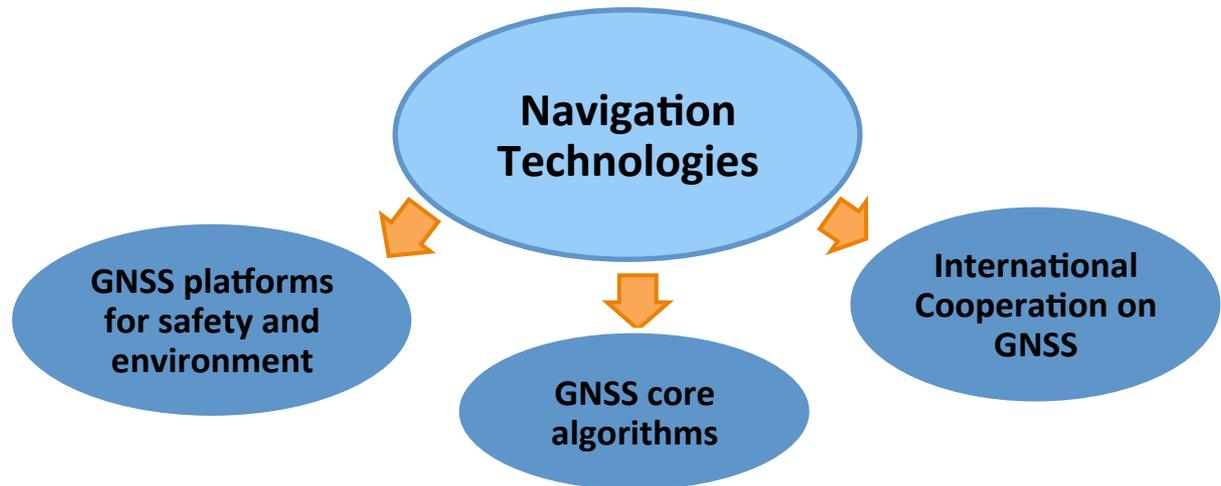
Top
Technical
University



THE NAVSAS GROUP



- The NavSAS research group is a joint team between Istituto Superiore Mario Boella (Navigation Technologies) and Politecnico di Torino (Electronics and Telecommunications)
- Background on Telecommunications Engineering
- Focus on advanced technologies for positioning systems and Global Navigation Satellite System (GNSS) receivers and applications



THE GNSS CHALLENGE

- Modernisation of GPS and GLONASS, development of Galileo and Beidou, QZSS and IRNSS regional systems deployment
- Global process involving industry and research institutions which enables applications with a relevant impact on the life of citizens
- Need of skilled workforce in university and research centres, industries, companies

THE GNSS CHALLENGE

In Italy since 2004, Politecnico di Torino put great attention to the training of highly specialized technicians with the **Master on Navigation and Related Applications.**



POLITECNICO
DI TORINO

Master in Navigation
and related applications



An answer to the work market demands in terms of high level technicians endowed with a broad vision of the navigation/ localization world but also with specific skills on related technical topics.

SPECIALIZING MASTER ON NAVIGATION

The Master on Navigation and Related Applications aims to train specialists and technicians able to operate in GNSS both at core system and services level.

A joint initiative of Politecnico di Torino and ISMB, with the support of INRIM and the UN-Office for Outer Space Affairs.



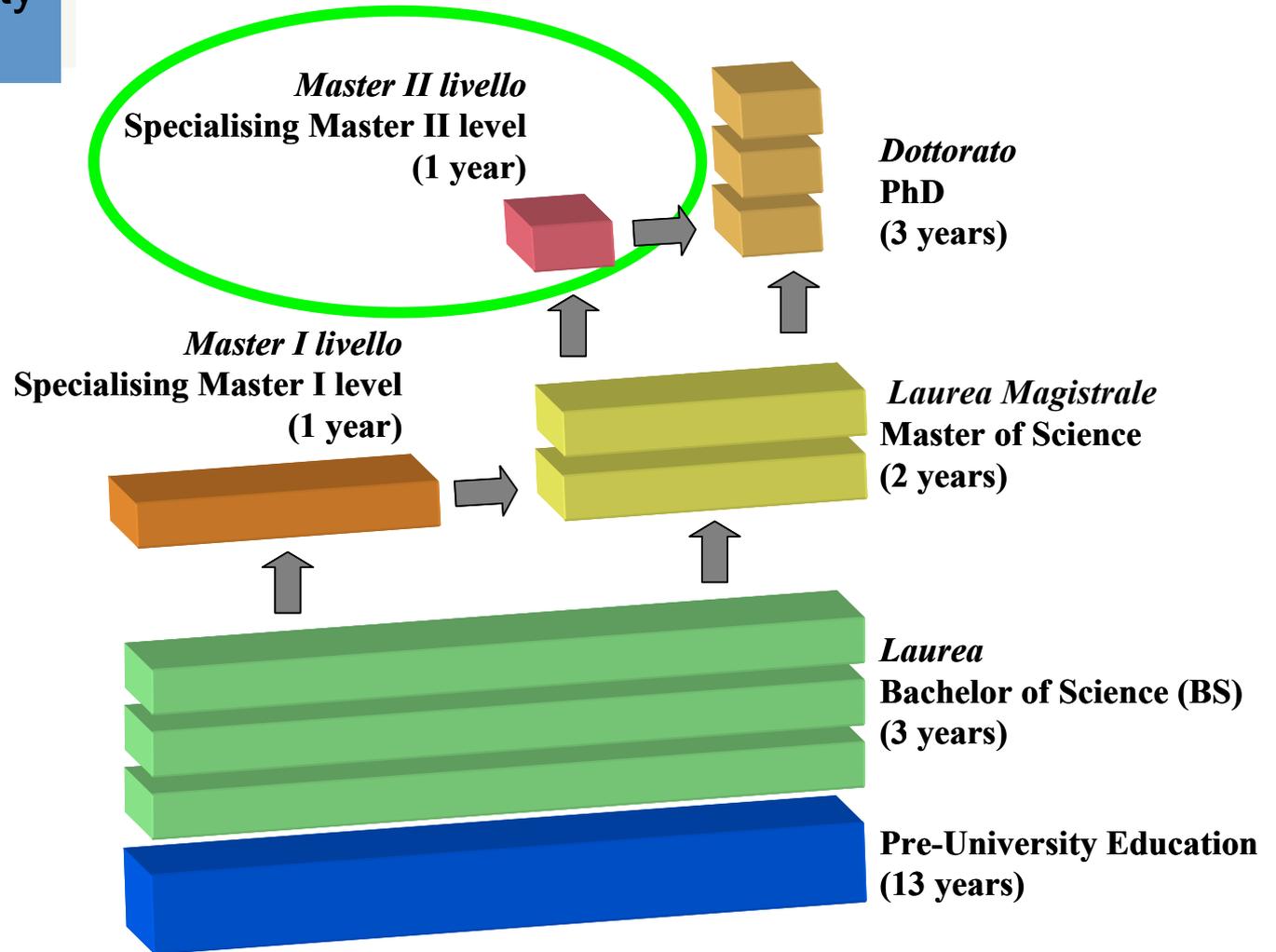
UN-OOSA

“Istituto Superiore Mario Boella (ISMB) and Politecnico di Torino of Italy have established a long term fellowship programme which will provide scientists and specialists from developing countries with an opportunity to receive a Master degree in Navigation and related applications.”

United Nations Vienna, June 2004

HIGHER EDUCATION IN ITALY

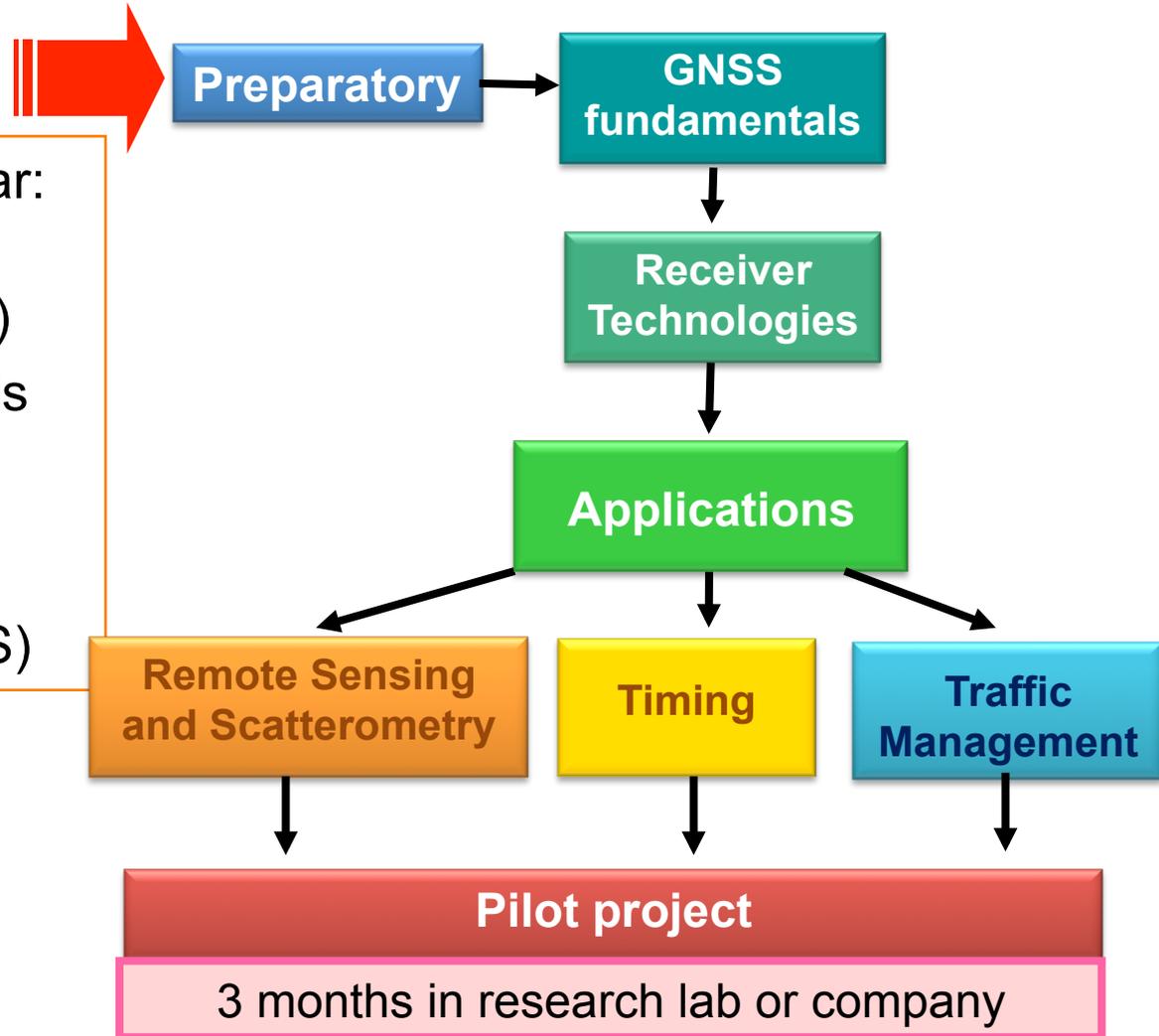
The Italian University system after 1999



OVERVIEW OF THE MNRA

The Master lasts 1 year:

- Classes over **3 quarters** (50 ECTS)
- The fourth quarter is devoted to **an internship** to be carried out in a company (20 ECTS)



MNRA SYLLABUS

Communications System and DSP

Basics on Geomatics and Satellite Orbits

GNSS Introduction

Front-End Technologies and Antennas

FALL

Augmentation Systems

Time Scale and Timing in GPS and Galileo

GPS and Galileo Receivers

Carrier Phase Positioning

WINTER

GNSS Applications and Market

Environmental Applications of GNSS technology

Integration of Satellite and other Positioning Technologies

Fundamentals on Timing and Frequency Metrology

Atmospheric effects for navigation and remote sensing

Traffic Mgm

Laboratory on Time and Frequency Metrology

SPRING

Preparatory

Receivers and applications

GNSS fundamentals

Timing

Remote sensing

Transport

UN/ITALY FELLOWSHIP

Master Organization

The Masters programme has been organised with the co-operation of officers of UN-OOSA

Master Curriculum definition

The program of the courses has been prepared by the Masters Scientific Committee and discussed with the UN-OOSA representatives

Master Promotion

The Masters and the Fellowship initiatives are promoted through the UN web site and in all the UN Educational Centres in the world

Student Selection

4-5 students are selected yearly by UN through UN network worldwide

Financial Support

The students that are selected by UN receive a scholarship by ISMB to attend the Master plus support for travel expenses by UN

BACKGROUND REQUESTED

To profitably attend the Specializing Master program, candidates should have some background in the areas:

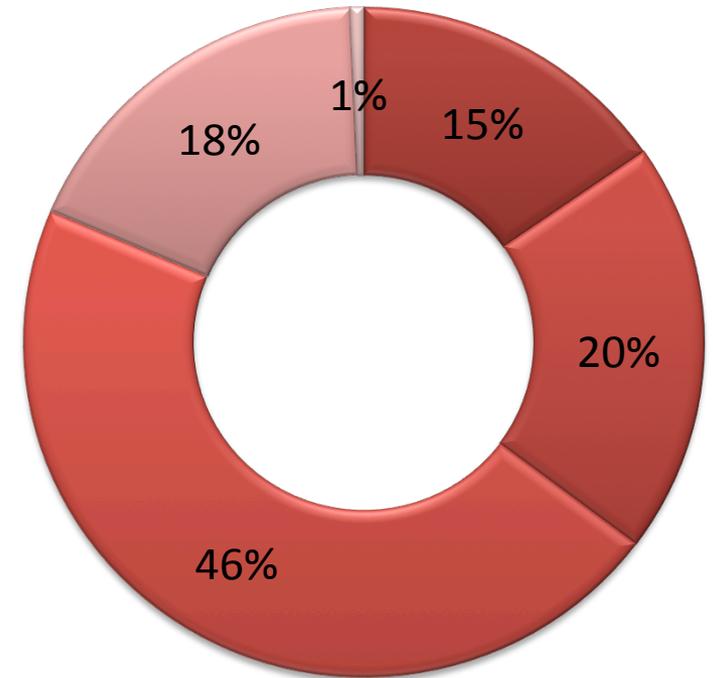
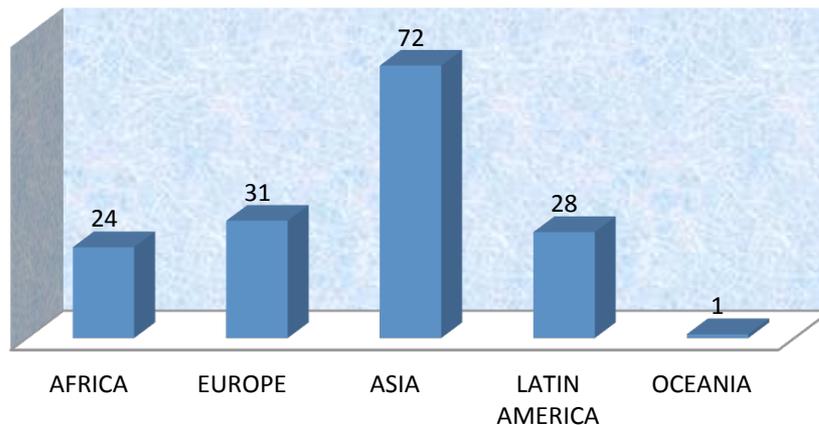
- Principles of digital communications.
- Principles of digital signal processing.
- Basics of electromagnetic wave propagation.
- Basics of software tools (e.g. Matlab) and programming languages (e.g. C).

No basic knowledge in navigation is required. A lack of background in one or two of the above listed areas is considered acceptable.

AN INTERNATIONAL ENVIRONMENT

- The Master is an interesting international environment for students and teachers
- It attracts students from all over the world
- All classes are taught in English to ease international attendance

Students



AFTER GRADUATION

- Most of the students are now working on GNSS
- Many UN-supported students return to their home countries (Space Cabinets or Agencies, Professors at University, Governmental Agencies, etc.)
- Former European students are now working in ESA and in several GNSS European industries and companies (Thales Alenia Space, GMV, Septentrio, Deimos)
- Some are in space agencies (ESA, DLR, ISRO, SUPARCO, . . .)

ONE SUCCESS STORY!

- In the 2nd Edition . . .



. . . the Director !



. . . and other 6
researchers in
other editions

CONCLUDING REMARKS

- **Education is crucial** to tackle the GNSS challenge for innovation creation, useful applications development, and let the user take a useful benefit of the space infrastructure
- There is still a urgent need to support the education step of the value chain, so as to open the access to **opportunities offered by GNSS** to people worldwide
- MNRA is answers this need . . . more than 150 students trained in 10 years most of them now working on GNSS

CONTATTI



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Thank you !

www.ismb.it

