Second CNCG School on Global Navigation Satellite Systems and Related Technologies

Telespazio and **CNIT** (Consorzio Nazionale Interuniversitario per le Telecomunicazioni) will host, in **April 2026,** the **Second CNCG School on Global Navigation Satellite Systems and Related Technologies.**

The school is organized within the framework of the **Centro Nazionale di Competenze GNSS**, a project funded by **Agenzia Spaziale Italiana (ASI),** and it is addressed to Graduate students (with at least a first university degree), Ph.D. candidates, early-stage researchers in the areas of Information and Communication Technologies, Aerospace Engineering, as well as the following STEM subjects: Science, Technology, Mathematics and Physics.

A maximum number of sixty (60) participants will be admitted for online sessions; at the end of the online sessions, a maximum number of twenty-four (24) of the participants who have successfully attended the online sessions will be invited – based on the selection criteria specified below - to participate to the on-site sessions at Telespazio's Headquarters in Rome (Via Tiburtina, 965, 00156 Roma), Italy.

The participation fees (Registration and teaching materials) and lunches during the on-site days (23 and 24 April 2026)[1] are to be borne by Centro Nazionale di Competenze GNSS while the other expenses not mentioned above (e.g. accommodation, transportation, dinners etc.) are the responsibility of each participant.

The total number of participants shall not exceed sixty (60) for the online sessions and twenty-four (24) for the on-site lessons**.**

PROGRAMME

The schedule of the *Second CNCG School on Global Navigation Satellite Systems and Related Technologies* is structured into 14 (fourteen) online modules and 2 (two) on-site practice lessons (laboratories):

Online Sessions

April 9th
Module 1 – *Introduction and Fundamentals of Radionavigation* (Prof. Alex Minetto)
Module 2 – *Receiver state estimation and error sources* (Prof. Fabio Dovis)

April 10th
Module 3 – *Performance metrics and reference systems* (Prof. Fabio Dovis)
Module 4 – *Orbits of different GNSSs* (Prof. Marco Luise)
Module 5 – *Direct sequence spread spectrum, auto and cross correlation* (Prof. Nicola Laurenti /Francesco Ardizzon)

April 16th
Module 6 – *GNSS signal and navigation message structure formats* (Prof. Marco Luise)
Module 7 – *Different GNSS signals* (Prof. Marco Luise)
Module 8 – *GNSS link and error budgets* (Prof. Nicola Laurenti /Francesco Ardizzon)

[1] Free lunches will be provided only at Telespazio's canteen located at Telespazio's Headquarters in Rome (Via Tiburtina, 965, 00156 Roma), Italy.

April 17th
Module 9 – *GNSS receiver technologies* (Prof. Nicola Laurenti /Francesco Ardizzon)
Module 10 – *GNSS corrections for clock, code, atmospheric, transit time, etc.* (Prof. Alessandro Neri)
Module 11 – *Integrity of GNSS* (Prof. Alessandro Neri)

April 21st
Module 12 – *SBAS and EGNOS augmentation systems* (Prof. Alessandro Neri)
Module 13 – *RTK, NRTK, PPP-RTK advanced positioning systems* (Prof. Alessandro Neri)
Module 14 – *Vulnerability of GNSS signals* (Prof. Nicola Laurenti /Francesco Ardizzon)

Lessons will be held in English.

On-site Sessions (laboratories)

Participants selected for the on-site lessons will have the opportunity to visit the laboratory of the Centro Nazionale di Competenze GNSS, located at the Telespazio's Headquarters in Rome.

April 23rd
Lab 1 – *Familiarize with GNSS fundamentals with real signals in realistic scenarios – Part 1* (Prof. Alex Minetto)

a) Collection and analysis of GNSS observables via Android Smartphone and Google tools (GNSS logger app e post-processing code)
b) Development of high-level language procedure to perform Least-Squares multilateration via Gauss-Newton iterative solver within the above framework.

NOTES: The two activities are well-established "introductory" workshops to introduce the fundamentals of GNSS and to get acquainted with the use of CNCG resources. Google's post-processing code already includes a PVT calculation section; the student will have the opportunity to compare their own developed solution procedure with what obtained by Google.

April 24th
Lab 2 – *Familiarize with GNSS fundamentals with real signals in realistic scenarios – Part 2 (*Prof. Nicola Laurenti /Francesco Ardizzon)

a) Generation of jamming signals using a signal generator (I/Q samples), such as continuous wave, random walk frequency hopping, and Gaussian noise. Observation of the effects of each attack using a spectrogram. Development of a jamming detector.
b) Generation of simple spoofing attacks, and testing of spoofing detection algorithms through innovation testing.

NOTES: Both activities will initially use own resources by CNGC to generate attack signals, allowing students to test the potential of the tools provided. Then, dataset generated by the tool will be analyzed by the students to:
a) develop simple jamming detectors based on C/N0 evaluation and total received energy and evaluate performance with wideband/ narrowband jamming.
b) process a dataset containing pseudo range observables and develop the code for a Kalman filter to implement a spoofing detector based on innovation testing.

Lessons will be held in English.

Dates, duration and other details

a) **Dates**:
   - Online sessions: 9th, 10th, 16th, 17th, 21st April 2026
   - On-site sessions: 23rd and 24thApril 2026

b) **Classes schedule: approx. from 9 am to 5 pm** (more details about the schedule will be communicated to the admitted participants with specific notice)

c) **Exam**: participants are required to complete an exam during the online session.

d) **Attendance:**
   - Certificate of participation will be issued to the students who attend the online sessions for 100% of the online course duration.
   - Certificate of participation will be issued to the students who fully attend the on-site session**.**

Requirements for application

Candidates who wish to apply must have:

a) a bachelor's degree (at least 3 years academic path). The academic background of the candidates must include STEM subjects: Science, Technology, Mathematics, Physics, Aerospace Engineering and Information and Communication Technology. Economic, financial, humanistic, politics backgrounds shall not be admitted to the selection process.

b) Proficiency in English language.

c) Each student must have his own laptop with an academic Matlab license

The *Second CNCG School on Global Navigation Satellite Systems and Related Technologies* is dedicated to participants <u>who are not</u> employed by Leonardo Group at the time of application and for the entire duration of the course.

Candidates who do not meet the criteria indicated above shall not be admitted to the selection process.

Benefits

- Participation fees (Registration and teaching materials) borne by Centro Nazionale di Competenze GNSS.
- Free lunches on the on-site days (23 and 24 April) only at Telespazio's canteen.
- Opportunity to develop new capabilities, solutions and technologies to face the actual and future challenges in the field of GNSS and Navigation.

- Opportunity to visit the CNCG laboratory at Telespazio's Headquarters only for participants selected for on-site sessions.

Selection of Candidates and criteria

The selection of the candidates will be made, at the sole discretion of a Committee composed of qualified company and academic members, based on the following criteria:

For the online sessions:

- Vitae and academic Curriculum:
    - the latest Degree grade/GPA
    - every experience related to school areas will be valued
- Motivation Statement.

For the on-site sessions:

- Vitae and academic Curriculum:
    - the latest Degree grade/GPA
    - every experience related to school areas will be valued
- Motivation Statement
- 100% attendance at the online sessions
- The passing of the exam during the online session (17th April)

How to Apply

Those interested in applying are requested to fill in the registration form and upload their own CV and to write the Motivation statement at the following link: https://it.surveymonkey.com/r/Application_CNCG_School_2026

Deadline for Application: March 24th, 2026

Communication to Participants

Telespazio will send an email:

- to the candidates who will be admitted to participate in the online sessions, no later than April 3rd, 2026.

- to the 24 candidates who will have attended 100% online sessions and successfully passed the exam and who will be selected for the on-site sessions, no later than April 18th, 2026.

Rules for Participation

The submission of the application implies the acceptance of the regulation stated in this announcement.

The candidates admitted to on-site sessions shall respect throughout the entire duration of the on- site sessions of the *Second CNCG School on Global Navigation Satellite Systems and Related Technologies*, Telespazio's Environmental Health and Safety Rules and Telespazio's Internal Regulations.

Processing of Personal Data

The personal data provided by candidates will be processed in accordance with the provisions of Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 ("GDPR") and Italian Legislative Decree No. 196/2003 as amended by Legislative Decree No. 101/2018 and any subsequent amendments and additions (hereinafter, the "Applicable Privacy Law"), and as set forth in the privacy notices made available from time to time by Telespazio.

By way of example only, "personal data" means "any information relating to an identified or identifiable natural person ('data subject') – an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person".

Candidates acknowledge and accept that, for the purposes of processing — where "processing" means "any operation or set of operations which is performed on personal data or on sets of personal data, whether or not by automated means, such as collection, recording, organization, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure or destruction" — Telespazio shall act as **Data Controller** pursuant to Article 24 of the GDPR, with responsibility for fulfilling the obligations established under national and/or EU regulations.

Telespazio ensures that its employees will process such personal data with due care and only to the extent strictly necessary to perform the activities for which the personal data was collected.