

« AGP-TEC / DEGE » 2027 GRANT CAMPAIGN

PHD, POSTDOCTORAL AND RESEARCH ENGINEER POSITIONS « TELECOMMUNICATIONS AND NETWORKS » AND « DETECTION AND ELECTRONIC WARFARE »

Under the « Telecommunications and Networks » (TEC) and « Electromagnetic Detection and Electronic Warfare » (DEGE) strands of the General Partnership Agreement [1], a joint call for applications is launched with the DGA and the AID to fund PhD projects, 18- or 24-month postdoctoral projects, and 18- or 24-month research engineer projects.

Eligible to apply as thesis supervisor, or as scientific supervisor of a postdoctoral or research engineer project, are researchers accredited to supervise research (HDR) within the scientific institutions that are signatories to the General Partnership Agreement (the supervisory bodies of the IETR, IRISA, IRMAR, Lab-STICC and IODE research units), together with the Saint-Cyr Coëtquidan military academy and the École navale, as well as ENSAI and the FOTON research unit (UMR 6082).

Applying entities choose the framework they propose: PhD, postdoctoral position or research engineer position.

Topics of the « AGP-TEC / DEGE » 2027 call

Through the AGP-TEC/DEGE 2027 call, the DGA (DGA MI) invites academic institutions to investigate scientific approaches, techniques and innovative methods on the five topics listed below and detailed in Annex 1:

- Radio propagation
- Radio-frequency measurement techniques
- Radiating systems and antenna processing
- Waveform protection / protection against telecom electronic warfare [2]
- Counter-drone operations (DEGE) [3]
- Networks

The full terms of the call are available on the CREACH LABS website [4].
For any question regarding this call, you may contact CREACH LABS [5].

KEY DATES

4 December 2026	Deadline for submitting scientific projects
12 February 2027	Deadline for submitting PhD projects on the Brittany Region extranet (ARED scheme)
19 February 2027	Publication of the list of pre-selected projects (main and reserve lists)
9 April 2027	Progress review on the search for students
28 May 2027	Deadline for submitting the students' CVs — closing of the call
4 June 2027	Publication of the funded projects

CALL PROCEDURE

PHASE 1: PRE-SELECTION OF SCIENTIFIC PROJECTS

- 1) **By Friday 4 December 2026** at the latest, the thesis supervisor or the scientific supervisor of the postdoctoral or research engineer project completes the online pre-application form on the CREACH LABS intranet:

<https://intranet.creachlabs.fr/depot?appel=jkIMNMYJpagm12C36pkEXx7C5JzIVdJ2xskJeUxZnQ>

The form includes online help that guides you at each step. You will specify whether the request concerns a postdoctoral or a research engineer position, the duration envisaged (18 or 24 months) and the proposed research project. The submission must include a project description of 6 to 10 pages (excluding publications) together with the keywords locating the topic within the reference framework (Annex 2).

At the end of the process, you must upload the CV of the thesis supervisor, or of the scientific supervisor of the postdoctoral or research engineer project (two pages maximum, in PDF format), containing the following information:

- First name, surname, position held, employer and career path;
- List of the main publications related to the submitted topic;
- List of the students, researchers or engineers supervised, indicating for each one the year the thesis or project began, whether it was funded by the AGP/TEC, and whether the thesis, postdoctoral project or research engineer project is still ongoing.

The jury will pay particular attention to proposals presenting at least one of the following characteristics:

- A strong synergy with the cybersecurity cluster of DGA Maîtrise de l'information;
- Synergies between different teams, or the exploration of what new approaches can bring to the field of security (law, sociology, geopolitics, etc.).

- 2) **From 5 January to 12 February 2027:** all PhD project leaders must also submit their application on the Brittany Region extranet [6].

- 3) **Friday 19 February 2027:** publication of the ranking of the pre-selected proposals, as a main list and a reserve list.

PHASE 2: SEARCH FOR CANDIDATES AND FINAL SELECTION

For postdoctoral positions, priority will be given to applications whose candidates have spent at least 18 months abroad over the past three years. Project leaders whose projects are eligible will also be invited to apply to the Brittany Region's Bienvenue Bretagne scheme (submission period between April and May 2027).

- 1) **A formal progress review is scheduled for Friday 9 April 2027.** If, by that date, the project leader has not yet found a candidate, they must contact CREACH LABS to review the steps taken and assess the chances of success, so that the reserve list can be activated if necessary.
- 2) **By Friday 28 May 2027 at the latest,** the project leader uploads the candidate's CV to the CREACH LABS intranet;
- 3) The list of funded projects will be published **on Friday 4 June 2027.**

References

[1] General partnership agreement signed in 2021, bringing together the DGA, the AID, the Brittany Region, ANSSI, CentraleSupélec, the CNRS, ENS Rennes, ENSTA, IMT Atlantique, INP Bretagne ENIB, Inria, INSA, UBO, UBS, UR and UR2

[2] EW: electronic warfare

[3] DEGE: electromagnetic detection and electronic warfare

[4] Call regulations and TEC-DEGE reference framework: <http://www.creachlabs.fr/en/call-agp-tec-dege-projects-2027>

[5] Karine Chatel: karine[dot]chatel[at]creachlabs[dot]fr

[6] Submission of application files on the Brittany Region extranet: <https://region.bretagne.bzh/rech>

Annex 1

TOPICS OF THE « AGP-TEC/DEGE » 2027 CALL

Radio propagation

- Modelling radio propagation through AI approaches (deep learning, etc.) or classical algorithms. The aim is to obtain classical or AI algorithms able to predict propagation, either through theoretical modelling or by learning from propagation measurement data and/or from deterministic propagation computations such as those produced with the DGA MI/TEC tool CARDIF (radio attenuation computation with diffraction in the terrestrial environment, the reference propagation model).
- Characterising and modelling propagation channels for which no model exists, whether because of the band (15–22–27 GHz) or the environment (air-to-air, ground- to-air).
- Modelling the spatial dimension for MIMO, and antenna directivity aspects.
- This topic is also open to other subjects.

Radio-frequency measurement techniques

- Open topic.

Radiating systems and antenna processing

- Open topic.

Waveform protection and telecom electronic warfare

- Protecting waveforms (PHYsec) against jamming, detection, interception and/or localisation. Solutions may include the following optional and non-exhaustive elements: discreet or even stealthy communications, radio tagging, artificial noise generation (OPALS, spatial encryption), spatial modulation, antenna processing (beamforming, beamsteering, beamnulling, spatial encryption, direction finding of legitimate or illegitimate signals alongside the communication), frequency hopping (FHSS), spread spectrum (DSSS), faster-than-Nyquist signalling (FTN), and so on.
- Attacking waveforms: in-band full-duplex jamming, energy-discreet signal detectors and interceptors, and so on. The aim is to bring to light attacks and threats against emerging telecommunication assets, in order to better protect telecom systems.
- Protecting the physical layers for the benefit of semantic networks.
- This topic is also open to other subjects.

Counter-drone operations (DEGE)

This topic falls within counter-drone operations. The aim is to characterise remote-control waveforms in order to define effective jamming waveforms — for instance to take control — without resorting to high-power jamming. Characterising the remote-control waveform requires:

- Spectrum analysis (AI, FFT, time–frequency);
- Characterisation of the modulations (OFDM/FSK, etc.);
- Bitstream analysis (error-correcting codes, scramblers, etc.);
- Protocol analysis.

The application and development of drone localisation techniques (TDOA, FDOA) are to be studied, with a view to focusing the jamming in a single direction. The effectiveness of the jamming waveforms developed will have to be demonstrated.

Localisation techniques from LEO satellites, protocol characterisation, localisation of network disruptors, vulnerability analysis.

Networks

The « Networks » topic will address one or more of the following themes (non-exhaustive list):

- Routing for ad hoc networks (MANET: mobile ad hoc network; FANET: flying ad hoc network) with a discretion objective, with or without associated AI techniques;
- Quality of service (QoS) management for heterogeneous and sporadic flows across different types of network (traffic engineering: adaptive routing according to network capacity and application needs, granularity of quality-of-service policies, taking quality of experience — QoE — into account);
- Distributed architectures and processing based on virtualised network functions (VNF) or cloud-native network functions (CNF), with optimised placement and dynamic reconfiguration of network hardware (YANG modelling of services, automatic event-driven reconfiguration);
- Network traffic generation combining telemetry techniques with AI techniques;
- Innovative network management and monitoring, with or without associated AI techniques (filtering of network alarms, root-cause analysis and identification of possible solutions through a feedback loop);
- Optimising secure network performance (taking cyber elements into account, such as the integration of encryption devices into the new virtualised architectures based on SDN/SDWAN/NFV technologies);
- Network impacts of the new « semantic network » approaches. Semantic communications aim to transmit the meaning of a piece of information rather than its binary encoding. For example, rather than transmitting an image bit by bit in compressed form, its description is transmitted: an AI agent extracts the information from an image (« an armoured vehicle in front of the forest ») and, at reception, another agent reconstructs an image that carries the information without being identical. The use of AI will accelerate these new network approaches;
- NDN networks: named data networking technologies make it possible to address information — the data itself — without regard to its location (IP address or DNS name). NDN is a way of accessing information, whereas semantic communications are a way of transporting it. The two approaches could complement each other: transforming information semantically also allows it to be named explicitly, which would let NDN make it available more easily;
- This topic is also open to other subjects.

Annex 2

TEC-DEGE REFERENCE FRAMEWORK

Scope of the « TELECOMMUNICATIONS AND NETWORKS » and « DETECTION AND ELECTRONIC WARFARE » themes

The scope of the « Telecommunications and Networks » (TEC) field is defined by the list of keywords below, organised along three scientific and technical axes: I/ « Propagation, frequencies, antennas », II/ « Transmission systems », and III/ « Networks ».

I/ Propagation, frequencies and antennas

Propagation and frequencies

- Spectrum engineering
- Moving up in frequency
- Millimetre-wave communications
- Frequency management and planning (conventional systems and cognitive radio)
- Wave propagation (study of propagation channels, complex media, etc.)
- Influence of wave propagation on the performance of transmission systems and waveforms
- Sounding, measurement, spatial characterisation and modelling of the propagation channel (channels of various types: ground-to-ground, ground-to-air, air-to-air, etc.)
- Propagation modelling through deep learning, AI algorithms for propagation prediction by learning

Antennas

- Materials for microwave frequencies (absorbers, metamaterials and metasurfaces, miniaturisation, agility, multifunctional surfaces, etc.), magneto-dielectric materials (MDM), etc.
- Additive manufacturing of antennas
- Antenna technologies, co-design and co-construction
- Optimisation of conventional antennas with active modules
- Multi-band, beamforming and multimodal antennas
- MIMO and massive MIMO systems
- Advanced antenna architectures (electronically steered array antennas, multifunction antennas, integrated antennas, compact low-frequency antennas, etc.)

- Antenna design to limit self-interference in in-band full-duplex operation
- Design of direction-finding antennas (angle-of-arrival estimation)
- Reconfigurable intelligent surfaces (RIS)
- RF and antenna filters, electromagnetics and optics (optically switched multi-band filters, etc.)
- Optimising antenna performance (gain, agility, bandwidth, dimensions, etc.)
- Characterisation of antenna systems (antenna gains, far field, near field, etc.)
- Advanced antenna measurement techniques (possibly including AI techniques), antenna measurement techniques in adverse environments
- Embedded systems, integration of antenna systems onto platforms (land, air, naval, space), including drones and robots

Radio-electrical compatibility (REC)

- Study of interference between radio transmitters and receivers on the same platform, through the antennas, across a broad frequency spectrum (in-band and out-of-band)
- Coexistence of co-located radio systems on the same platform (vehicle, ship, aircraft, mast, etc.) and processing of electromagnetic signals emitted by the antenna of one system and received by the antenna of another

Inter-system electromagnetic compatibility (ISEMC)

- Study of radio interference between different systems
- Coexistence of non-co-located radio systems, and processing of electromagnetic signals emitted by the antenna of one system and received by the antenna of another

Modelling and simulation

- Electromagnetic modelling and simulation
- Multiphysics modelling (incorporating material and temperature models, etc.)

II/ Transmission systems

Waveforms, signal processing and modems

- Digital communications
- Digital architectures (manycore — GPP + DSP — DSP, FPGA, GPP, MCU, GPU, ASIC, etc.)
- RF characteristics (filtering, ADC, linearity, gains, etc.)
- Microwave components for the radio-frequency chain (filtering, interference cancellation, power limiters, controllable components, etc.)
- Multi-antenna processing and precoding (MIMO, mMIMO, etc.)
- Hybrid analogue/digital antenna processing, reconfiguration of antenna elements
- In-band full-duplex communications (same time slots, same frequency), analogue and digital self-interference cancellation
- Combining spatial modulation and in-band full-duplex operation
- Power amplifiers (satellite communications / SATCOM)
- Non-linear class-D power amplifiers (output transistors operated as switches)
- PAPR optimisation (modulation, predistortion, envelope tracking, etc.)
- Drivers for communications, modems
- Reprogrammable modems: multifunction, multi-waveform, wideband, multi-level security
- Optimal use of resources (time, spectrum, space, power)
- Moving up in frequency, in multispectral capacity and in throughput

- Very high spectral efficiency, spectral and energy efficiency
- Signal processing (classical, sparse), AI and signal processing
- Multi-user access (TDMA, CDMA, SDMA, FDMA, etc.)
- Secure waveforms
- Physical-layer security (PHYSEC, TRANSEC)
- Digital algorithms for interference reduction
- Optimisation of synchronisation mechanisms
- Optimising the jamming resistance of communication waveforms
- Discreet, stealthy and undetectable waveforms
- RadCom waveforms (radar and communications)
- New waveforms, AI and waveforms
- Communication coding
- Coding for blind operation
- New channel coding for waveforms (channel coding as FEC, etc.)
- New source coding for waveforms
- Joint source–channel coding
- Threats to the physical layer of waveforms: detection, interception, localisation, blind recognition and classification of communication signals

Transmission systems

- Software-defined radio (SDR)
- Cognitive radio (dynamic frequency reconfiguration)
- Reconfiguration of communications, dynamic reconfiguration of hardware
- Radio transmission systems (land, air, maritime)
- Satellite transmission systems (space segment and ground segment)
- Joint communication and direction-finding systems
- Optical transmission systems (free space, satellite — FSO — or optical fibre)
- Quantum communications (QSN/QKD, QIN)
- Embedded systems, integration of transmission systems onto platforms (land, air, naval, space), including drones and robots

Vulnerability of transmissions

- Geolocation and localisation
- SATCOM jamming techniques
- Counter-drone operations (characterisation, identification, localisation, jamming)
- Analysis of frequency-hopping techniques (reconstructing the hopping sequence)
- Analysis of digital telecommunication processes (reconstructing scramblers, FEC, interleavers)
- RF fingerprinting

III/ Networks

Network protocols

- Network protocols, transport protocols
- Control-plane protocols (routing and signalling protocols, etc.)
- Network security protocols
- Threats to the MAC (media access control), network (IP) and transport (TCP/UDP) layers
- Network management, monitoring and administration protocols

- Metrology and telemetry protocols
- Network virtualisation and softwarisation (SDWAN, SDN, NFV, etc.)
- Network programmability
- Dynamic network reconfiguration

Network architectures

- Heterogeneous network architectures
 - Radio networks (mobile 5G, 6G, etc.)
 - Satellite networks (including 5G/NTN)
 - Optical networks
 - Infrastructure networks
 - Infrastructure-less networks (MANET type)
 - IoT networks
- Routing
- Network virtualisation and softwarisation
- VPNs (L3VPN, EVPN, IPsec, etc.)
- Secure network architecture (including virtualised networks)
- Distributed architecture and processing (MEC, IAB, automatic reconfiguration, etc.)
- Network topology models
- Quantum networks (QSN/QKD, QIN)

Cross-cutting network services

- Handling of heterogeneous and sporadic flows, traffic engineering
- Performance on single networks and between heterogeneous networks (throughput, latency, etc.)
- QoS and QoE
- Optimisation of resource allocation
- Reconfiguration of communications, dynamic reconfiguration of hardware
- Network metrology
- Network management, monitoring and administration
- Detection and handling of network anomalies
- Resilience of communications and hardware
- AI and networks (routing, monitoring, network data, etc.)
- Telemetry and network data bases (the « AI and networks » question)
- Optimisation of time synchronisation mechanisms, real-time constrained networks (TSN type, etc.)
- Energy efficiency
- Network simulation

Network evolution

- Network impacts of the new « semantic network » approaches
- Named data networking (NDN) technologies