



Postdoctoral fellow proposal in Computer Science



Section CNU 27

Employer :	AMVALOR
Ministry in charge :	Ministry of Defence
Location:	BRITTANY, Finistère, Lanvéoc
Host laboratory:	French Naval Academy Research Institute (IRENav - EA 3634) member of the French Naval Academy and <i>Arts et Métiers</i>
Duration of the contract:	1 year (CDD)
Expected Start of contract:	Vacant from Septembre 1 st 2022
Keywords :	Computer science, Knowledge Engineering, Logic, Unmanned Aerial Vehicle (UAV), Artificial Intelligence

CONTEXT

The French Naval Academy is a major school of engineering (EPSCP-GE status) whose main mission is the initial training of French marine officers. Officer cadets receive training in engineering or master's degree. Advanced courses (specialized masters or vocational training) are also offered to civilian and military students in the field of maritime engineering.

The French Naval Academy Research Institute (IRENav - EA 3634) conducts research and scientific training. It develops its research according to the needs of the French Navy requirements while strongly oriented towards innovation fields. IRENav is a multidisciplinary institute, accredited by the HCERES as part of the assessing of *Arts et Métiers laboratories*. IRENav's research groups work in two domains related to the maritime sector: « Maritime Information Modeling and Processing » (MOTIM group), and « Mechanics and Energy in Naval Environment » (M2EN group).

To pursue its research mission, the French Naval Academy is recruiting a postdoctoral fellow in computer science.

- Website: <https://www.ecole-navale.fr>

POSITION DESCRIPTION

Postdoctoral candidate should have a PhD in computer science, (he/she will be part of MoTIM group) the person recruited will be integrated into MoTIM group (Maritime Information Modeling and Processing) and will participate in the realization of the project TECTONIC (An environmentAl knowlEdge-based approaCh for real-time navigaTiOn of uNmanned aeriAl vehiCles beyond GNSS). TECTONIC is a research project conducted in collaboration with the CIAD laboratory (*Connaissance et Intelligence Artificielle Distribuées* - EA 7533) of the *Université de Technologie de Belfort-Montbéliard*.

The candidate should ideally have skills in computer science and artificial intelligence (symbolic approaches, knowledge representation, classical and non-classical logic).

- Full-time position at the French Naval Academy

RESEARCH:

The aim of the TECTONIC project is to develop a proof of concept for detecting the UAV's GNSS signal disturbance and then to determine how to handle it: keep navigating without GNSS, change the trajectory, cancel the mission, etc. The mission of the UAV is to navigate around a land or coastal environment looking down on the ground to reach a destination. Our first objective is to develop a video scene simulator to validate the proof of concept and to verify if the planned trajectory of a UAV corresponds to its real trajectory. In this project, we focus our research on (i) the UAV **operational positioning** based on video-images and (ii) the environment and mission **semantic representations** based on classical and non-classical logic. In order to develop this project, 2 postdoctoral fellows will be recruited for 12 months, each of them assigned to a research laboratory (CIAD or IRENav), while collaborating closely in the development of a common simulator based on video scenes. At the IREnav side, postdoctoral fellow will work on environment and mission semantic representations based on classical and non-classical logic.

An environment/mission knowledge modeling approach consists of categorizing real-world objects into abstract concepts. At this point, we will describe semantics of the mission and the environment in which it will take place through a descriptive logic formalism. This formalism will be used to model the transition between GPS and non-GPS navigation. Uncertainties coming from the environment and/or from other external agents must also be taken into account in order to estimate/predict or modify the mission objectives (continue, cancel, modify). Therefore, a non-monotonic reasoning, more specifically through default logic, will allow to infer conclusions on partial, incomplete and/or contradictory information, according to general and specific rules. This modeling phase will be integrated within a simulation platform integrating the accomplishments from operational positioning (see research (i)) and semantic representations (see research (ii)).

In order to participate in the scientific research work of the IRENAV, the candidate will be involved in a proactive approach of scientific dissemination and academic publication of his/her research work.

PROFILE

Ph.D. in Computer Science.
Good scientific writing skills.
Good modeling skills on complex problems.
Mastery of first order logic.
Mastery of semantic web technologies, ontologies, etc. (desired).
Mastery of programming in several languages (Java, Python, C++, etc.)
Fluency in French and English (read, written, spoken).
Good ability/disposition to work collaboratively.
Good interpersonal skills, dynamism and charisma.

SALARY

2 150 €/mois (net)

APPLICATION AND CONTACTS

Projet TECTONIC

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Research direction

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Human Resources department

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To apply please send an updated CV, cover and recommendation letters, academic records (sous référence FDP-2_2022-2023-DDR-Post_doc-INFOR to: rozenn.carriou@ecole-navale.fr and marisnel.olivares@ecole-navale.fr and eric.saux@ecole-navale.fr

Application deadline: 8 July 2022