



PRESS RELEASE – JUNE 23, 2023

The Institut Polytechnique de Paris (IP Paris), the Agence de l'Innovation de Défense (AID), Dassault Aviation, Dassault Systèmes, Naval Group and Nexter, a KNDS company, have announced the creation of a Teaching and Research Chair in the architecture of complex systems

On Thursday, June 22, 2023, at the Paris Air Show, the official creation of a teaching and research chair at the Institut Polytechnique de Paris (IP Paris), in the architecture of complex systems, was announced in the presence of Sébastien Lecornu, French Minister of the Armed Forces, and Emmanuel Chiva, Head of the Direction générale de l'armement (DGA). Dassault Aviation, Dassault Systèmes, Naval Group, Nexter, a KNDS company, and the Agence de l'Innovation de Défense (AID) are the sponsors and partners of this chair, which aims to develop teaching and research through a systemic, multi-disciplinary approach.

The growing complexity of industrial and operational systems (interconnection of hardware and software, networking of organizations) requires a comprehensive approach based on sound knowledge of the concepts and principles of system architecture, incorporating numerous scientific disciplines. Even more so in the defense sector, those systems have to be robust, secure, and designed to incorporate new technology over long periods of time.

Given the critical issues linked to national sovereignty in terms of defense, the chair in architecture of complex systems aims to set up an approach focusing on two main areas: teaching and research. It will be led by four permanent lecturer-researchers recruited by the chair, with support from engineers and postdoctoral students, who will outline the priority areas in terms of teaching and research to address the complexity of the subject using a comprehensive, complementary approach.

Training the engineers of tomorrow

The chair will channel its resources into boosting the training available in this systemic approach within four of the engineering schools under the umbrella of IP Paris (École polytechnique, ENSTA Paris, Télécom Paris, Télécom SudParis). The teaching

provided will give students a more solid understanding of defense-related challenges by providing them with knowledge of complex systems, and make them aware of the importance of national sovereignty, in line with the policy of the French Ministry of the Armed Forces.

Research to stay ahead of the game

Architecture of complex systems, which is essential for designing collaborative weapons systems that address new threats and anticipate future major disruptive technology, will be studied from all angles (concepts, methods, projects, etc.), in a wide variety of environments (air-land-sea, civil-military, etc.) and through numerous disciplines. More specifically, the researchers aim to address the complexity of the subject using three approaches that will be studied in detail during the first year:

- System engineering: how to design, understand and define a system architecture that is able to incorporate new technologies without compromising its robustness or security? This approach includes aspects such as the use of computational and digital models for complex systems. The 3DEXPERIENCE platform provided by Dassault Systèmes will be the vector for transforming system engineering.
- Integration of artificial intelligence: what degree of autonomy is suitable for what function, how do we manage interactions between systems and operators while guaranteeing overall security?
- Information and communication systems: how do we obtain secure, efficient and robust data exchanges between operated or autonomous weapons systems in multi-domain and GPS-denied environments?

This chair is a further boost to the interdisciplinary center for defense studies (CIEDS) created at IP Paris with support from the Direction générale de l'armement (DGA) and the Agence de l'innovation de défense (AID), and is perfectly in line with the center's ambition to cooperate on a large scale with the big players in the defense industry.

The partners' initial commitment runs until the end of 2028.

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ABOUT THE INSTITUT POLYTECHNIQUE DE PARIS:

The Institut Polytechnique de Paris (IP Paris) is a public higher education and research institution under the authority of the Direction générale de l'armement (DGA) and the French Ministry of Economy and Finance. It encompasses five prestigious engineering schools: École polytechnique, ENSTA Paris, ENSAE Paris, Télécom Paris and Télécom SudParis. Under the aegis of the Institute, they pool their expertise in pursuit of two major goals: developing world-class training programs and conducting ground-breaking research. Thanks to the strong academic roots of its five founding engineering schools, IP Paris is a leading education and research institution in France and internationally. <https://www.ip-paris.fr/en>

ABOUT DASSAULT AVIATION:

With over 10,000 military and civil aircraft delivered in more than 90 countries over the last century (including 2,700 Falcons), Dassault Aviation has built up expertise recognized worldwide in the design, development, sale and support of all types of aircraft, ranging from the Rafale fighter to the high-end Falcon family of business jets and to military drones and space systems. In 2022, Dassault Aviation reported revenues of €6.9 billion. The company has 12,700 employees. <https://www.dassault-aviation.com/en/>

ABOUT DASSAULT SYSTÈMES:

Dassault Systèmes, “the 3DEXPERIENCE® Company”, is an accelerator of human progress. We offer businesses and individuals collaborative virtual environments in which to create sustainable innovations. Using the real-world virtual twin experiences they create with the 3DEXPERIENCE platform and its applications, our customers are able to redefine the creation, production and life-cycle management processes of the products and services they offer and make a truly valuable contribution to a more sustainable world. The strength of the experience economy lies in the central role played by humans in creating a positive effect on everyone’s lives - consumers, patients, and citizens. Dassault Systèmes is a creator of value, serving over 300,000 customers of all sizes and in all economic sectors, in more than 150 countries. For more information: www.3ds.com/

ABOUT NAVAL GROUP:

As a global player in naval defense, and successor to France’s naval expertise, Naval Group is a trusted partner to customers seeking to control their maritime sovereignty. Naval Group develops innovative solutions to address the needs of navies worldwide. A key player at every stage of a ship’s life cycle, it designs, builds and integrates submarines and surface ships and their systems and equipment, as well as providing in-service support through to dismantling. It also provides services to naval bases and shipyards. As a manufacturer of state-of-the-art technology, it draws on its exceptional expertise, unique design and production facilities and ability to conclude strategic partnerships, especially in the key area of technology transfer. Present on five continents, the group reported revenues of €4.3 billion and employs some 16,029 people (full-time equivalent / 2022 data).

ABOUT KNDS:

KNDS (KMW+NEXTER Defense Systems) is the result of the association of Krauss-Maffei Wegmann and Nexter, two of the leading European manufacturers of military land systems based in Germany and France. KNDS forms a Group of around 9,000 employees, with turnover of €3.2 billion in 2022, an order backlog of around €11 billion and incoming orders of €3.4 billion. Its product range includes main battle tanks, armored vehicles, artillery systems, weapons systems, ammunition, military bridges, customer services, battle management systems, training solutions, protection solutions and a wide range of equipment. The formation of KNDS represents the beginning of consolidation in the land defense systems industry in Europe. The strategic alliance between KMW and Nexter enhances both groups’ competitiveness and international positions, as well as their ability to meet the needs of their respective national armies. In addition, it offers its European and NATO customers the opportunity of increased standardization and interoperability for their defense equipment, with a dependable industrial base. The headquarters of KNDS is based in Amsterdam.

ABOUT THE DIRECTION GENERALE DE L'ARMEMENT (DGA):

A source of expertise, responsible for testing and engineering within the French Ministry of the Armed Forces, the Direction générale de l'armement (DGA) is tasked with making sure the armed forces are sufficiently equipped to ensure their sovereignty, preparing the future of defense systems, promoting European cooperation, and supporting exports. As the French government’s leading procurement agency, in 2022 the DGA placed orders worth €16 billion

with manufacturers and invested €1.1 billion in innovation and defense technology projects. With 18 sites in France, 10,200 civilian and military women and men - 62% of whom are managers, engineers or experts - and its international network of partners, the DGA is present in all areas of the defense industry (land, sea and air combat, electronic communication and information systems, dissuasion, space, cyber-security, robotics, and more).

ABOUT THE AGENCE DE L'INNOVATION DE DEFENSE:

The Agence de l'innovation de défense, under the authority of the Head of the Direction général de l'armement (DGA), brings together the ministry's innovation initiatives, coordinating and overseeing the consistency of all innovation projects. As well as conducting work on long-term technological innovation, the Agency captures opportunistic innovations for the benefit of all end users, regardless of their field of activity: operations management, equipment, support, operations, administration.