World premiere: first prototype vehicle with IBIS breakthrough technology begins real-life road tests

- **Intelligent Battery Integrated System (IBIS) is a joint research project in France focused on developing a more efficient, sustainable and affordable energy storage and electric conversion system**
- **IBIS integrates the electric charger and inverter functions into the battery modules replacing them with electronic conversion cards freeing up space in the vehicle and facilitating maintenance**
- **This technology represents a breakthrough for mobile and stationary applications**
- **Stellantis leads the project and intends to make it commercially available by the end of this decade**

After years of design, modeling, and simulation, the two main industrial partners of the IBIS project, Stellantis and Safta subsidiary of TotalEnergies, have reached a significant milestone thanks to research work carried out with the support of industrial engineers from E2-CAD and Sherpa Engineering, in collaboration with researchers from CNRS, Université Paris-Saclay and Institute Lafayette. Today, the first fully functional battery electric vehicle (BEV) equipped with IBIS technology has begun testing on open roads. The prototype system has been integrated into a New Peugeot E-3008, built on the STLA Medium platform.

A New Electric Powertrain Architecture

IBIS, short for Intelligent Battery Integrated System, is a collaborative research program coordinated by Stellantis. Since summer 2022, an initial demonstrator for stationary applications has been in operation. That first phase validated many new technical concepts, resulted in numerous patents, and marked a breakthrough from conventional energy conversion architectures.

How It Works: Integration That Simplifies Everything

Unlike today's EV powertrains, the IBIS system integrates the inverter and charger functions directly into the battery, regardless of its application, whether stationary or automotive. This enables a more compact, efficient, and cost-effective architecture that is compatible with any battery chemistry and both AC and DC charging stations. Thanks to its advanced control system, the battery can deliver alternating current (AC) directly either to the electric motor or to the grid, producing simultaneously a continuous direct current (DC) to supply the 12-volt network and auxiliary systems.

Performance and Design Benefits

By simplifying the powertrain architecture, the IBIS system helps reduce vehicle weight (around 40 kg, notably by removing the onboard charger and inverter) and manufacturing complexity. It also improves range and energy efficiency up to 10% on WLTC cycle and contributes to a strong performance gain (+15% power output: 172 kW vs 150 kW with the same battery size), with durability gains and positive impact on reliability and longevity. Its compact design facilitates vehicle integration freeing up to 17 liters of volume and gives designers more freedom to improve aerodynamics, especially important for highway efficiency.

In all its applications, automotive and stationary, the IBIS battery facilitates and improves charging operations: early results show a 15% reduction in charging time, so important for EVs: for example, from 7 hours to 6 hours on a 7 kW AC charger, with 10% in energy saving.

In addition, the system facilitates maintenance operations and second-life battery reuse for stationary or automotive applications by reducing the need for heavy reconditioning.

Ned Curic, Chief Engineering and Technology Officer at Stellantis, commented: *"This project* reflects our belief that simplification *is* innovation*. By rethinking and simplifying the electric powertrain architecture, we* *are making it* lighter, more efficient, and more cost-effective*. These are the kinds of innovations that help us deliver better, more affordable EVs to our customers."*

Hervé Amossé, EVP Energy Storage Systems at Saft, *"The IBIS project is a powerful testament to Saft's innovation leadership. By embedding IBIS technology into our next-generation applications, we're unlocking a new era of intelligent, flexible, and sustainable energy solutions. This breakthrough extends battery life, simplifies field maintenance and updates, and supports multi-chemistry systems — delivering unmatched value, availability, and durability to our customers. Saft continues to lead the way in advanced research, offering long-term, cost-effective solutions tailored to evolving market needs."*

A Collaborative Innovation Effort

Launched six years ago, IBIS is the result of a unique collaboration between academic research and industry. Coordinated by Stellantis, the project brings together a team of 25 engineers and researchers from industrial partners Saft, a subsidiary of TotalEnergies, E2CAD, and Sherpa Engineering, as well as the as the Paris Electrical and Electronic Engineering laboratory (GeePs - CNRS/CentraleSupélec/Univ. Paris-Saclay/Sorbonne Université), the Electrochemistry and Physical-Chemistry of Materials and Interfaces laboratory (LEPMI-Grenoble INP/Univ. Savoie Chambéry/Univ. Grenoble Alpes/CNRS), the Information and Energy Technology Systems and Applications laboratory (SATIE-CNAM/ENS Paris-Saclay/Univ. Cergy-Pontoise/CNRS/Univ. Paris-Saclay/Univ. Gustave Eiffel) and Institut Lafayette. It is supported by France's Future Investment Plan, administered by ADEME (the Environment and Energy Management Agency).

What's Next: Toward Production Readiness

Phase 2 of the project began in June 2025, with continued support from the French Government through France 2030, administered by BPIfrance. With most of the same partners involved, the project has now entered a new phase of testing under representative driving conditions. A key milestone is expected in early 2026 to support a potential decision on the integration of this technology into Stellantis production vehicles by the end of the decade.

At the same time, the consortium will continue building a long-term development roadmap for both automotive and stationary applications. The IBIS project represents a major technological breakthrough in both mobile and stationary applications and could be deployed across a wide variety of markets, such as rail, aerospace, marine, and data centers. For Stellantis and Saft, it represents another example of commitment to advancing efficient, sustainable, and scalable electrification solutions for the future.

KPI	Benefit	Performance
System Efficiency	Energy saving in AC charging mode	10%
	Energy saving on WLTC	Average 10%, with a better performance on urban cycles
Charging Compatibility	Compatibility with various charging stations	AC mode 7, 11, 22 kW and >200 kW
		DC mode 400V, 800V and 1200V
Charging Time	Reduced charging time (at iso range)	Around 15% reducing charge time (ex: 6 h instead of 7h / AC mode 7kW)
Power Output	Electric machine power output	+15% (172 kW vs 150 kW)
Durability	End of life range	+10%, as a consequence of the dynamic cluster management
	Life time extended	+ several years by changing the weakest clusters of cells
Reliability	Failure rate	3 times fewer breakdowns The vehicle remains operational with cluster failure (cluster bypass)
Safety	Thermal runaway	slows down the speed of propagation of a fire in case of thermal runaway / limits exacerbated short circuits
After sale	Reparability	Easy to repair (no HV inside the battery when the battery packaging is opened)
	maintenability	Possibility to change a cluster with an up to date electrochemistry (gain in range)
Manufacturing	Electrical accreditation	Remove all electric risk when battery assembly
	Li-ion module shortage	Constraint removal of maintaining in production old generations of chemistries
Volume	Inverter and charger removal	gain of 17 liters
		Opportunity for designer to improve vehicle Scx for more range on highway
Weight	Inverter and charger removal	Gain around 10 kg (IBIS electronic boards - Onduleur mass – charger mass)
	Induced by energetic efficiency	Less embedded electrochemistry at iso range – gain around 30 kg
Economic efficiency	Production cost	Lower production cost in comparison to best in class Kaizen ePWT
	Total Cost Ownership	Better residual value induced by all benefits offered by the technology