

Geneva Motor Show

Press release

The Bolloré Group announces the World Premiere of its BlueCar Electric Concept Car

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I. The Bolloré Group

presents an Electric car at the 2005 Geneva Motor Show.

The Bolloré group, which ranks among the top 500 groups in the world, operates in a wide range of services and industries. Until now, the group has had no interest in the automobile business.

Jean-Louis Bouquet, chairman of **BatScap**, which is 80% owned by the Bolloré group and 20% owned by EDF, explains the group's history:

From thin papers to electric car batteries

Originally, the group specialised in the production of thin papers, a very specific area of expertise that we extended to metallized paper and, later, plastic films used in the manufacture of electric capacitors. From capacitors to batteries, it was a new technological step.

It took twelve years of research and an investment of €70 million to build the group's battery business, which now employs 70 engineers and technicians in Quimper, Brittany.

The Lithium-Metal-Polymer battery was a new and challenging application for the expertise in extrusion that Bolloré has acquired, thanks to its position of world leader in production of dielectric films for capacitors.

The new battery has many possible applications. Apart from use in cars, it can provide a backup power source in stationary installations or fulfil a range of aeronautic and military uses.

Its main features are as follows:

- 5 times lighter than a lead battery (lithium has a density of 0.5 - lead has a density of 11),
- liquid-free (no risk of explosion) polymer with lithium salts,
- fully recyclable,
- an estimated service life of 10 years (150,000 km),
- 100% rechargeable in 6 hours, but an emergency charge of just a few minutes will provide enough energy for a car to cover several dozen kilometres,
- operating range of 200 km depending on the car and driving conditions,
- When a partnership with an automaker will be established, Bolloré will have the capacity to equip 15,000 vehicles.

BlueCar as a showcase for BatScap

Group President & CEO Vincent Bolloré decided to promote the **BatScap** battery by building an electric vehicle that would exploit its full potential. The Bolloré group has no ambitions to become a automaker, but is eager to work with vehicle manufacturers on a **BlueCar** type vehicle. Negotiations for European and international collaboration are already underway.

II. Origin of the project and birth of the concept

In order to demonstrate the superior performance provided by **BatScap's** Lithium-Metal-Polymer battery, Bolloré decided to fit one in a specially designed electric car.

There was a simple reason for this choice: powering an electrical vehicle is the most demanding of all battery applications. Throughout their long history, which dates back to the beginnings of the car industry, electric vehicles have never been able to store enough energy to deliver a satisfactory level of performance and operating range. This largely explains the tiny number of electric vehicles in use today.

Without a doubt, an electric vehicle that could fulfil the needs of drivers would be the best possible solution to the thorny problem of exhaust pollution.

The world is now aware of the need to preserve the environment, which will be one of the main challenges of this century. With this in mind, all the major automakers are developing solutions to reduce the pollution generated by internal combustion engines. Diesel engines with particulate filters, direct injection and camless petrol engines, and hybrid propulsion systems have reduced petrol consumption and CO₂ emissions. None of these solutions will result in zero pollution, however, nor will they free us from our dependence on oil.

A credible electric car

An Electric vehicles-with high-energy batteries- is particularly well adapted to urban and suburban use. In general, it has the following advantages:

- zero pollution;
 - silent operation
 - electronically controlled automatic transmission
 - recovery of braking energy
 - very low centres of gravity (approximately 7 cm lower than in traditional vehicles)
 - remarkable mechanical reliability: The motors are guaranteed for up to 1 million km!
- Moreover, they also benefit from significant economic advantages:
- free parking in cities
 - a government grant of €3,050 per vehicle in France
 - lower insurance premiums: -20% in France
 - ultra-low fuel costs: approximately €1 per 100 km

A talented designer

To showcase all the benefits of **BatScap's** high-performance Lithium-Metal-Polymer batteries in a specifically designed electric car, Vincent Bolloré chose to call on the services of one France's most talented car designers, Philippe Guédon, CEO of Espace Développement and ex-chairman of Matra Automobiles.

The Espace, produced by Renault but designed by Philippe Guédon and his team at Matra Automobiles, is just one of the models developed by this visionary and highly pragmatic designer.

Once the design was finalised, the building of the prototype was entrusted to D3, a subsidiary of Pininfarina Engineering.

The reciprocating engine and reduction gear were developed by Matra Auto Engineering, which is also a subsidiary of Pininfarina.

Styling was undertaken jointly by Espace Développement, D3, and the Bolloré group. The prototype, named **BlueCar**, will be presented at the Geneva Motor Show, and testing will commence as early as 2005.

Bolloré Group's partners in the **BlueCar project**

- **Designer:** Philippe Guédon/Espace Développement
- **Prototype building:** 3D, a Pininfarina subsidiary
- **Battery:** Batscap, a Bolloré Group subsidiary
- **Motor and reduction gear:** Matra Auto Engineering, a Pininfarina subsidiary
- **Styling:** Espace Développement, D3, and Bolloré

III. BlueCar: 3.05 m of pure technology

As well as suffering from the low levels of performance and reduced range due to the low mass energy of traditional batteries, electric cars have in the past been created using a simplistic design process consisting of electrifying existing petrol models.

As well as the remarkable energy performance of the new **Batscap** Lithium-Metal-Polymer batteries produced by Bolloré, **BlueCar** features a special design adapted to the reality of future use, which has made it a fully optimised electric vehicle.

BlueCar has been specifically designed for urban and suburban use:

- local business or personal driving/urban traffic
- silent night deliveries
- a new option for multiple vehicle owners
- a vehicle for fleets operating in urban conditions

These usage characteristics necessitate a compact vehicle that does not require much parking space, and a tight turning circle for added manoeuvrability. At a length of 3.05m, **BlueCar** is as short as a first-generation Mini.

At the same time, this vehicle must have substantial load and passenger capacity, requiring a new generation added-interior-height design that offers enhanced accessibility and better visibility. The 1.60m high and 1.71m wide **BlueCar** has three seats in front and a rear load volume of 810dm³. The rear volume can also be equipped with folding seats for two extra passengers. The back of the front passenger seat can be folded down to increase the length of the load volume to 2.35m and raise the overall load capacity to 2.3m³.

The reduced space requirement for the electric motor facilitated the creation of this roomy interior. The mound-rotor synchronous motor positioned horizontally at the front of the car-**BlueCar** is a front wheel drive-does not require a gearbox, which allowed the designers to build in EU standard deformation zones without lengthening the front compartment.

The location of the 200 kg weight of the Lithium-Metal-Polymer batteries, under the seats in the centre of the car and in front of the rear axle, has resulted in a considerable lowering of the centre of gravity. All the drive electronics are also installed under the floor, under the feet of the driver and the front passengers.

Despite being designed for urban use, **BlueCar**'s suspension system guarantees a high-level of passenger comfort and excellent road handling. MacPherson suspension has been used in front, and leading arms and torque arm suspension has been used in the rear.

BlueCar delivers a level of performance that is perfectly adapted to the use for which it was designed. It is a remarkably pleasant drive; a quality enhanced by the silence of the motor and the absence of any vibration, and also by the dynamic acceleration. The 30 kW electric motor delivers a level of torque at low speeds well in excess of that of an internal combustion engine. As there is no gearbox, acceleration increases smoothly until the **BlueCar** reaches its maximum speed of 125 km/h, which is more than sufficient for a vehicle destined for urban use.

Depending on the conditions of use, **BlueCar's** 27 kWh **BatScap** battery pack allows for maximum range in excess of 200 km. A full battery recharge takes less than six hours, and a two-hour rapid charge-e.g. during a meeting-will recover 50% capacity.

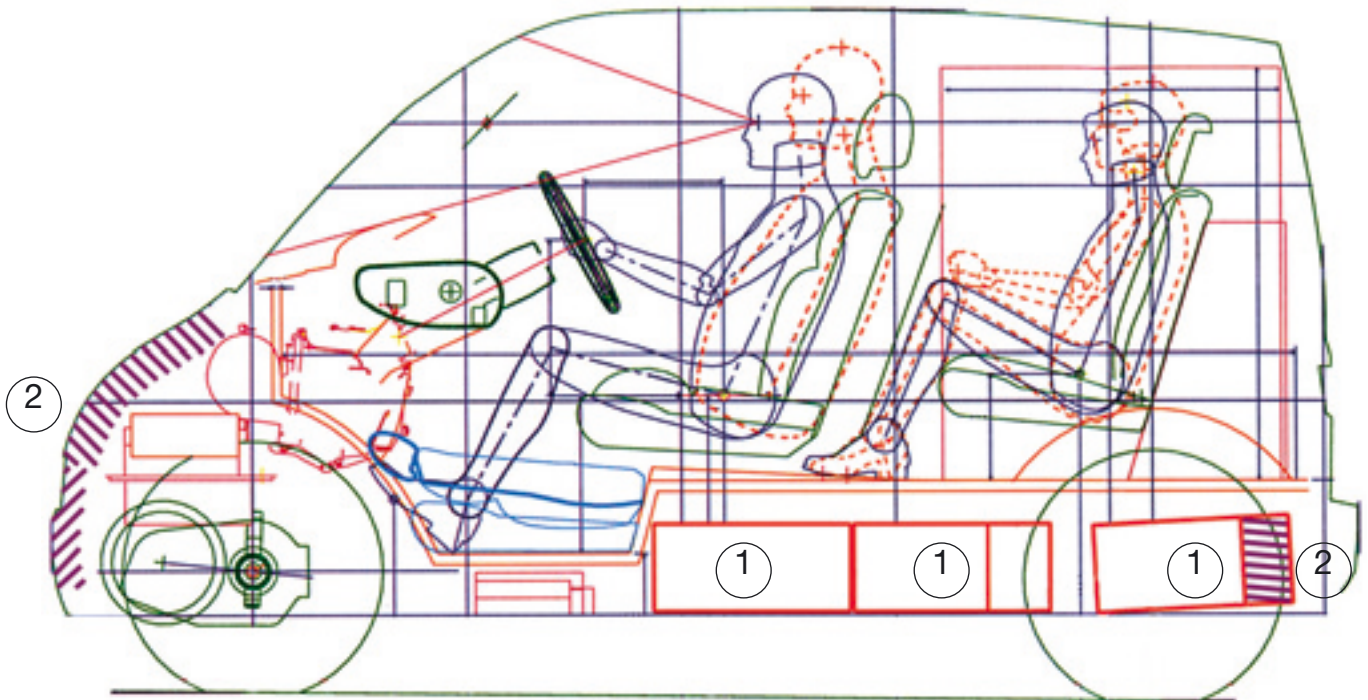
General Characteristics

- Front wheel drive
- 3 seats + 2
- Length: 3.05m
- Width: 1.72m
- Height: 1.61m
- Total weight with batteries: 980kg
- Tyres : Michelin Energy 3 Pax System (195-630 R 42)

Electric motor

Maximum power output:	50 kW
Power output at steady state:	30 kW
Maximum torque:	170 Nm
Maximum motor speed without derating:	10,000 rpm
Maximum battery voltage:	374 V
Minimum battery voltage:	243 V
Maximum temperature for air-cooling system:	40°C
Variable speed drive dimensions:	330x300x189 (excluding mountings)
Variable speed drive weight:	15kg
Motor weight:	65kg
Differential speed reducer weight:	20kg
BatScap battery pack	27 kWh
Battery pack weight:	< 200kg
100% recharging time:	6 hours
Rapid 24% recharging time:	A few minutes for a range of 20km
Front suspension:	McPherson
Rear suspension:	Leading arms and torque arm
Body	- High-resistance steel - Aluminium - Recyclable composite
Vehicle compliant with latest safety standards	
Maximum speed:	135 kph
0-60 kph acceleration:	6.3 seconds
Average operating range:	200-250 km

A Fully Electric BlueCar



BlueCar's fully and exclusively electric design offers maximum performance and advantages.

Diagram captions

The reduced-height battery packs (1) positioned under the floor take up little space and lower the centre of gravity significantly, enhancing stability and manoeuvrability. The compact electric motor and reducer (which does not require a gearbox), allow space for EU standard deformation zones (etched zones) (2) - without adding to the **BlueCar**'s length.

With three passengers, **BlueCar** offers a load volume of 810dm³. Folding seats can accommodate two extra passengers.

IV. Electric cars today

Electric cars are not really a novelty. The first ever electric car designed by J. Raffard dates back to 1881. In 1899, the Jamais Contente, which was equipped with lead acid batteries, became the first vehicle to travel at more than 100kph. Paris even had electric taxis in 1911. But electric technology failed to live up to initial expectations. Battery capacity did increase over time but never enough to provide an operating range comparable with internal-combustion engine cars.

The trouble with “electrified” cars

Mounting oil prices and increased pollution in cities led to a renewed interest in electric cars in the 1980s. In 1988, the California Clean Air Act prompted the re-launch of research programs in the United States. The EEC followed suit with the AVERE (Association européenne des véhicules électriques routiers) program. On a French initiative, European cities that were interested in electric car programs established the CITELEC label. In response to this emerging demand, automakers launched vehicles that were nothing more than “electrified” versions of conventional cars.

It was not so much poor performance as low operating ranges and high prices that deterred the consumers. Each of the three French automakers produced at least one electric model: Renault an electric Clio, Peugeot an electric 106, and Citroën an electric AX and an electric Saxo. Peugeot/Citroën and Partner/Berlingo utility vehicles also appeared. Low market demand eventually led to their discreet exit from the catalogues. Clearly, the electric cars are not a booming market. In 2003, there were 113 registrations in France, just 0.01 % of the general car market.

Strong potential demand

There is, however, a strong demand for ecologically friendly and cheap-to-run vehicles, especially from companies with car fleets operating in urban and suburban areas (i.e. power and postal services companies). These companies were responsible for the growth of the market in 2004, which increased to 460 registrations.

Consumers who only drive locally could be induced to invest in a high-performance, silent, and manoeuvrable car that is also cheap to run, if such a vehicle was available. Cost savings are reinforced by grants for the purchase of this type of vehicle: private individuals who purchase an electric car in France are offered a grant of €3,050, or €3,810 if the purchase is coupled with the scrapping of a vehicle produced before 1 January 1993.

All this amounts to a very favourable context for the launch of an electric car that has been designed from scratch for the urban environment. The future looks bright for [BlueCar](#).

V. BatScap, 70 high-technology experts

BatScap, which is 80% owned by Bolloré and 20 % owned by EDF, was founded in December 2001 to take advantage of a 12-year research program in Lithium-Metal-Polymer batteries conducted by Bolloré in collaboration with EDF and several laboratories. **BatScap** is also conducting research in supercapacitor energy storage.

Located in Brittany at the Bolloré group's historic headquarters site in Ergué Gabéric, **BatScap** employs 70 research engineers and technicians who have all the necessary expertise to develop very high-technology products.

BatScap has registered 22 patents to protect the innovative aspects of its Lithium-Metal-Polymer batteries, supercapacitors, and the original production processes that ensure their quality and reliability as well as their low production costs.

BatScap is currently building its production capacity to fulfil a medium-term production goal of 10 to 15,000 vehicle batteries per year.

The BatScap team

Chairman of the board Jean-Louis Bouquet gave up his post as financial director of the Bolloré group to take on his current position at **BatScap**. Before joining Bolloré, Jean-Louis Bouquet was financial director of Valeo.

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Jean-Marc Métais, industrial engineer and director of the plastic films division, is in charge of the operational management of **BatScap**.

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VI. Interview with

Vincent Bolloré, Chairman of the Bolloré group

Your group is mainly focused on non-automotive industries and services. What was the strategy that led to the building of a concept car?

The R&D program that we have conducted over the last twelve years in the field of Lithium-Metal-Polymer batteries resulted in the development of a battery that was vastly superior to traditional batteries. So we had a successful technology that we wanted to develop into an economic success. As we were new arrivals on this market, we had to prove that our technology was credible. So we chose to build an electric car. As you know, this is a very demanding battery application and we will be the first to present a car that offers a level of performance sufficient to fulfil the needs of motorists. I should add that our group is very concerned with the preservation of the environment and an electric car represents a considerable advance in this field.

Have you any ambitions to become an automaker in the future?

It is not very likely. Our expertise is in batteries. But our goal is not just to be a simple supplier for traditional manufacturers. We are looking to enter into partnerships with automakers who share our vision of what an electric car should be.

What is the purpose of your participation in the Geneva Motor Show? Are you trying to present Bolloré's expertise to potential industrial partners?

Absolutely, the Geneva Motor Show is an excellent showcase and we are glad to take this opportunity to present our car and develop our contacts with all the players on the car market, whether they be manufacturers, major consumers like fleet managers, or local authorities that are interested in reducing pollution in town centres.

BatsCap Managing Director Jean-Louis Bouquet

Your company BatScap, which is located in Brittany, develops and markets lithium batteries. What does being the first to install lithium batteries in a car mean to you?

*It is an opportunity to demonstrate the exceptional performance of Lithium-Metal-Polymer batteries. To meet the needs of an electric car, a battery pack has to provide a great deal of power, maintain performance over a very large number of cycles and be fully reliable. That is why we are so proud to present the **BlueCar**, which will begin testing in just a few months.*

What is BatScap's specific expertise in the field of energy storage?

***BatScap** is a young company, but it has more expertise in this field than many traditional players. **BatScap** inherited a range of technologies developed by Bolloré in the field of capacitors, which are another energy storage component. Moreover, **BatScap** has not only developed a new generation of Lithium-Metal-Polymer batteries, it has also perfected industrial processes and machinery that allow the production of a very high-quality and reliable product at a very attractive price. Finally, **BatScap** will shortly be entering the supercapacitors market with a range of components that offer truly exceptional levels of performance.*

The **BlueCar** is only one project. What are the other applications for this battery?

*The automotive application is our main priority, but **BatScap** is also working with partners on a number of other applications in the aeronautic, space, defence, and uninterruptible power supply fields. But the details of work in progress are confidential.*

Philippe Guédon, chairman of Espace Développement

When the Bolloré group suggested that you design its electric car, what was your first take on the project?

I was very enthusiastic. When I was at Matra I studied several electric car prototypes. It was an old dream that never really came true because we never had batteries that delivered a sufficient level of performance. This my first opportunity to design a vehicle that would really fulfil the needs of users. My second reaction was to avoid the route taken by other automakers who are happy to simply electrify existing petrol engine models, and to design a car around a battery so as to make full use of its features and specific advantages.

Having designed the Espace and led Matra Automobiles, this is yet another car project for you. But it is also your first electric car. What are its strong points?

There are a lot of strong points. Some of them derive from the fact that it is an electric car-no pollution, no noise, no gearbox, and the availability of power at all speeds, which allows very responsive acceleration, and, of course, the very low running cost. Then there are other strong points that derive from the design: the very short length coupled with the very roomy interior, the remarkable modularity that means that you can transport up to five passengers or carry a very large load. Finally, it is a very manoeuvrable vehicle, very nippy and pleasant to drive.

With **BlueCar** you managed to fit five passengers into just 3.05m. Many major carmakers would be delighted to succeed in a challenge like that. What was the key to your space solution in the **BlueCar**?

*It was very simple: an electric motor takes up very little space. There is no radiator, no gas tank, no gearbox... The batteries are stowed away under the floor... So the entire length of the vehicle can be devoted to the passenger compartment. The **BlueCar** is no longer than a first-generation mini, but it is a lot wider. This allowed space for three front passengers and the very large load capacity. Finally, I should say that there was no question of sacrificing safety for performance; **BlueCar** complies with all the current safety norms.*