

Peterbilt's Walmart Advanced Vehicle Experience

Peterbilt's Walmart Advanced Vehicle Experience, represents a revolutionary approach to efficiency, performance, and mobility. Walmart is focused on cost savings to the consumer, and is at the forefront of technology meeting the customer's needs. This concept truck is the foundation for the future of cargo transportation worldwide. A clean power micro-turbine hybrid electric powertrain allows the flexibility of an all new architecture, creating a paradigm shift away from the traditional trucks with a large engine and cooling system. This radically new design provides superior aerodynamic performance, while putting the driver in command at the center of the vehicle for improved safety and extreme visibility.

The interior's glass cockpit, modular Flex Studio Space, and 180 degree canopy, give the driver a unique operating experience unlike anything currently available on the market.

Peterbilt and Walmart consistently engage in projects that look for new ways to improve transportation efficiency. While these projects have proved productive, Walmart challenged Peterbilt to make a dramatic improvement with this project, expecting double digit gains in efficiency. Walmart also challenged us to create a visually striking design that would grab people's attention, and be at the leading edge of technology and performance.

We designed a radically new vehicle using an existing chassis. Maximizing aerodynamic efficiency was a priority. It needed to be fuel efficient and light weight. We had to consider that this design could be a global solution and take into account driver preferences and acceptance, regional conditions and cultural influences.

A key goal was to improve the user experience for the driver and maximizing active and passive safety features. We needed to choose the right technology for the job. We also wanted to improve visibility without sacrificing safety.

We wanted to create a design that would have dramatic results in the vehicles overall efficiency, performance, weight reduction, safety, and be a stunning design while maintaining the Peterbilt DNA.

Keeping in mind that Walmart is primarily a single driver fleet, we knew that we could reduce the width of the front of the truck by moving the driver to the center of the vehicle. The unique powertrain technology and its reduced cooling requirements allow the frontal area for a radiator to be significantly reduced, together with the central driving position, create a revolutionary and aerodynamic design.

This narrow front end helps to split the airflow around to the sides of the vehicle, instead of forcing it up and over, reducing drag. Also by placing the driver in center of the vehicle, we were able to give the interior a more spacious feel, and improve visibility. The unique floating center console gives the driver visual access to the front of the vehicle. Similar to mirrors on a motorcycle, the

displays were mounted in a similar way, giving the driver a natural interaction with the information provided on the screens.

The cab and sleeper have been integrated into one module that sits independently above the powertrain. This allows for more air to flow around the powertrain in a more managed way, as well as increasing cooling. The cab steps are integrated in the front fenders and can be retracted once the driver is inside the vehicle, improving aero and safety by not allowing unwanted passengers access to the cab.

The Flex Studio portion of the cab uses a modular approach to space claim, providing maximum configurability and customization to the driver's needs. Whether the driver needs a full kitchen and restroom, or just a place to work out and catch up on movies, the Flex Studio can accommodate the driver. Removable storage, seating, and entertainment options all can be easily modified and updated as new options become available.

Moving the driver to the center of the vehicle is a radical shift from current practice. By doing so however, it opened up a whole new world of possibilities both inside the cab and out. Combined with the alternative hybrid power plant, we were able to achieve our goals and so much more.

The center driver package allowed us to change the overall exterior shape of the vehicle with a radically new aerodynamic profile. With a smaller cab cross section we were able to explore shapes that split the wind around the truck instead of over it. This new shape also allowed us to provide larger windows for 180 degree visibility for the driver.

The cab and sleeper, now referred to as a POD, is able to be its own module, sitting on the hybrid power platform which was designed to exist as a low profile power module. This split modular approach allowed us to have a flexible design which could be updated or modified without impacting the other, giving a wide range of flexibility and uses for the modules, whether they were used as a conventional truck, or simply a remotely controlled drone.

The modularity and split theme was carried through to the interior as well. By splitting up the instrument panel, we were able to give the driver more visibility, essentially removing it from the line of sight. The "glass cockpit" displays are distributed around the driver putting the appropriate content where the driver needs it most. The primary instrumentation is located just above the drivers line of sight allowing him to quickly glance at the display without really taking his eyes off the road.

The modularity also allowed us to provide a unique and personalized environment for the driver, allowing him to create a custom look as well as choose the functionality of the space. Modules were designed with specific needs kept in mind, whether it be for hygiene, health, entertainment or storage, the Flex Studio is able meet these needs and more, easily and effectively.

While this is just a concept, the production version would be made of fully recyclable materials such as steel for the frame and suspension components, aluminum for the exterior skins and lighter duty metal parts. Advanced composites would be used for some of the exterior parts as well as several types

of light weight bio-based recyclable plastics, for interior components such as cabinets and interior panels. Peterbilt and Walmart are committed to the goal of creating a 100% recyclable vehicle.

The concept truck features a Turbine Powered Range Extending Series Powertrain. The vehicle uses a 400kW electric motor to drive the truck around town and at highway speeds. The 65kW Turbine is not sized to run the truck, but to constantly recharge the batteries. This combined with regenerative braking provides the extended range when operating in highway and urban settings. The turbine can run on a wide range of fuels, ranging from clean burning bio-diesel to propane.