

# **VOLVO AERO**

## **Press Information**

### **Volvo Aero in collaboration with PWR and NASA on the return to the moon**

**Pratt & Whitney Rocketdyne (PWR) has selected Volvo Aero to participate in the early development phase of the nozzles for the J-2X engine, destined for NASA's new manned launcher ARES I, the successor of the current Space Shuttle.**

**PWR has chosen Volvo Aero for its extensive experience in development and manufacturing of rocket nozzles. The contract may develop into Volvo Aero's most significant US space endeavor, and it is the first time Volvo Aero participates in the development of a manned system.**

Introduced by President Bush in 2004, the US Vision for Space Exploration lays out the plans for NASA to develop a successor to the space shuttle, which is to retire by 2010. The plan includes the development of a space shuttle that will enable manned travels to the moon and eventually Mars. The first version of the new system is expected to be ready in 2014.

PWR was chosen by NASA to develop the J-2X rocket engine. The J-2X engine builds on the Apollo heritage, and is a derivative of the J-2 engine, which powered the second and third stages of the Saturn 5 moon rocket. The baseline concept for J-2X includes a nozzle with significant resemblance to the nozzle Volvo Aero today produces for the Vulcain 2 engine, propelling the Ariane 5 ECA rocket.

In addition to Volvo Aero's extensive experience, including more than 1000 nozzles flown on Ariane, PWR selected Volvo Aero because of the technologies Volvo Aero has developed for actively and passively cooled nozzle extensions in close collaboration with the Swedish National Space Board (SNSB). The lead theme in the development of new technologies at Volvo Aero has been to combine as simple as possible designs with robust manufacturing processes thus enabling a high reliability at a low product cost.

At Volvo Aero one is convinced that the technologies will be used on the next generation of rockets. The PWR decision to select Volvo Aero for the pre-study of the J-2X is yet another acknowledgment to Volvo Aero that the development efforts, supported by SNSB, have been well spent money.

“It is very satisfying that our technologies have been recognized by PWR and NASA. It is our ambition to establish a Volvo Aero presence on the US space market, and I hope

this is the first step in a long relationship with PWR and NASA”, says Olof Persson, CEO at Volvo Aero

Roland Rydén, Manager Space Marketing and Sales, US, explains:

“The benefits of our sandwich technology are many. Manufacturing is based on simple commercial materials, such as sheet metal and forgings, and standard Volvo Aero core processes with a high degree of process control. Combined with simplicity in design the result is a safe, simple and cost effective product.”

“The Vulcain 2 film cooling technology was developed on a requirement from ESA to increase performance at a lower cost. For the J-2X engine this will enable a light weight design with maximized performance at a minimum of lead time and cost”, he adds.

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*Free video clips from space propulsion at Volvo Aero are to be found at  
<http://www.thenewsmarket.com/Assets/AssetDetailsPage.aspx?GUID=27ae7d79-a50e-4118-976f-2f8ffe57019f>*

*Photos showing Olof Persson and space propulsion at Volvo Aero are available at  
<http://www.volvo.com/volvoaero/global/en-gb/newsmedia/image+bank/>*

#### **More facts on the J-2X nozzle**

The J-2X nozzle has two components, an upper regenerative cooled nozzle and a lower film cooled extension.

For the upper part Volvo Aero will propose a sandwich design, the same technology that was chosen by Pratt & Whitney in 2001 for the RL60 engine. In the RL60 program Volvo Aero managed to concurrently design and build a sandwich demon nozzle in the record time of 18 months. The sandwich technology, patented by Volvo Aero, has also been selected by ESA for a full scale demonstration on the Vulcain 2 engine late 2007.

The lower J-2X nozzle extension will be cooled with a supersonic film injection of turbine exhaust gases. This is a technology Volvo Aero developed with great success for the Vulcain 2 engine, and is the only flight proven super sonic film cooling technology system in the world. This experience puts Volvo Aero in a unique position and enables a straight forward development of a similar system for the J-2X engine