

VOLVO

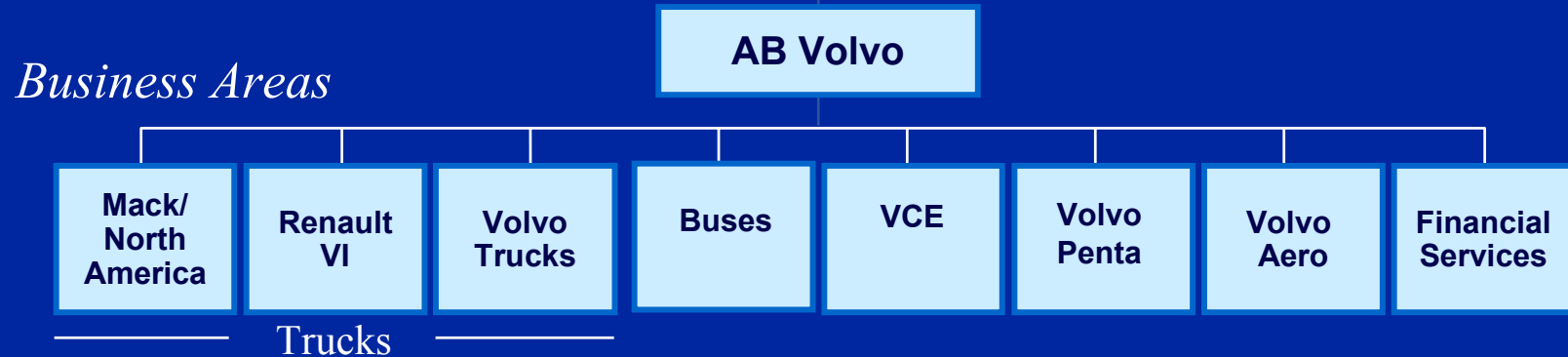
**Timeline for Vehicle and Engine
Integration -- Facilitating Field Testing**

VOLVO POWERTRAIN CORPORATION

Bob Ernharth

Chief Project Manager

The Volvo Group Organization



Business Units

3P

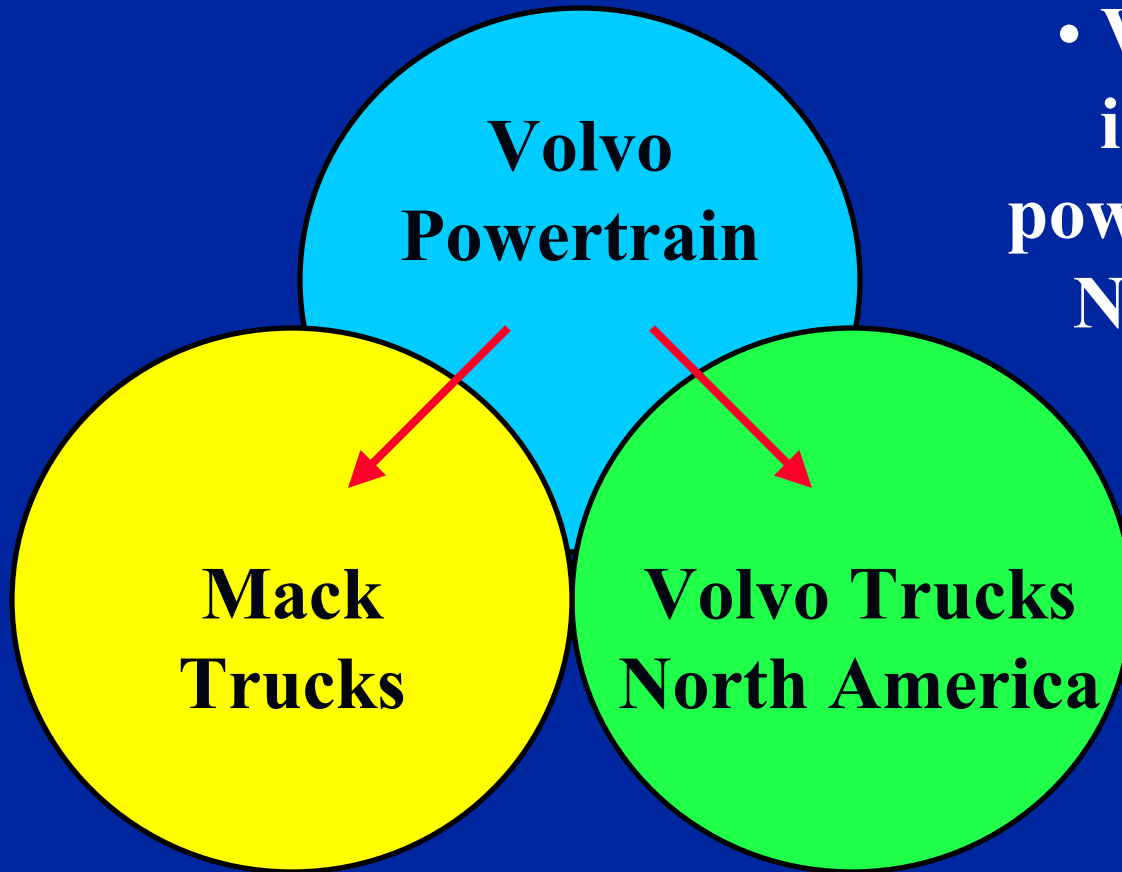
Powertrain

Parts

Information Technology

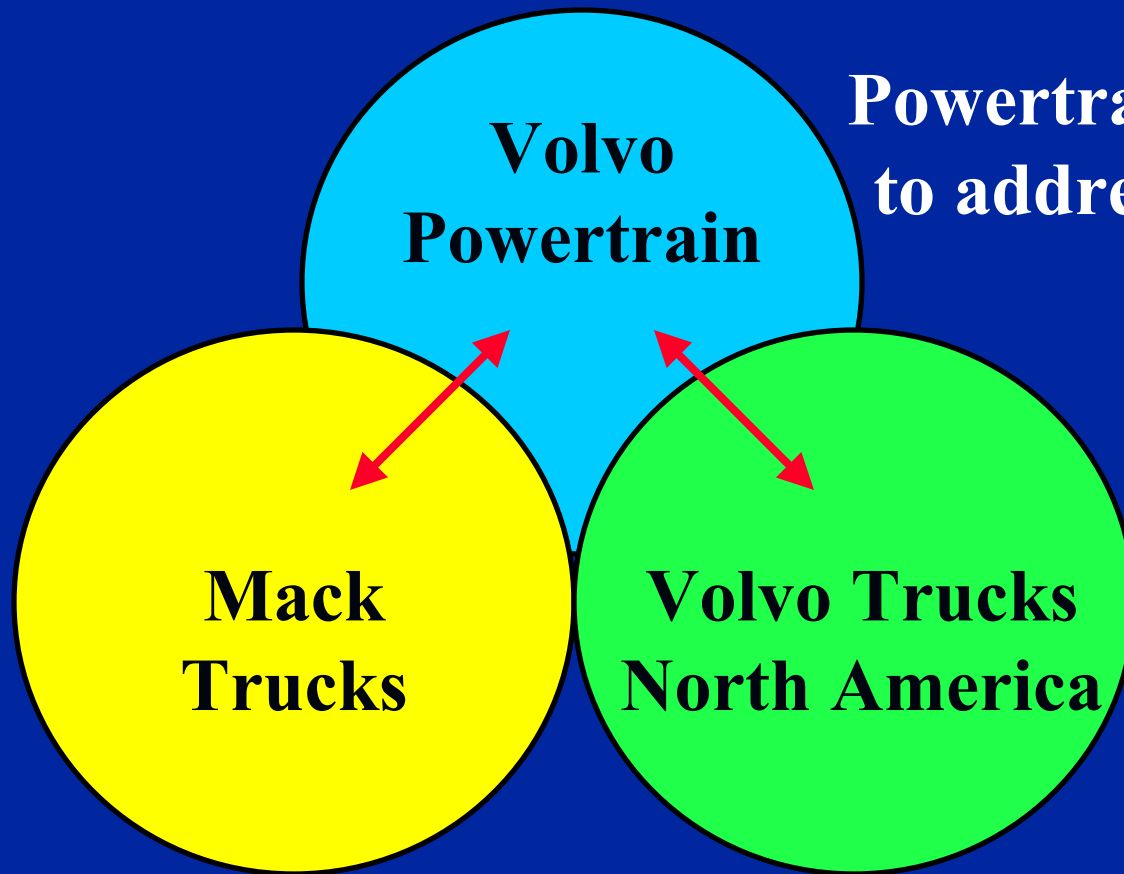
Volvo Powertrain is now the worlds largest producer of heavy duty engines from 9 to 16 liters.

The Volvo Group Organization



- Volvo Powertrain is an integrated supplier of powertrain solutions to two North American Truck Customers

The Volvo Group Organization



Powertrain: Engine development to address engine-out emissions

Powertrain ↔ Truck interfaces address packaging, cooling, validation, schedule, etc.

Truck: Vehicle development to incorporate after-treatment

US 2007 Engine Offerings

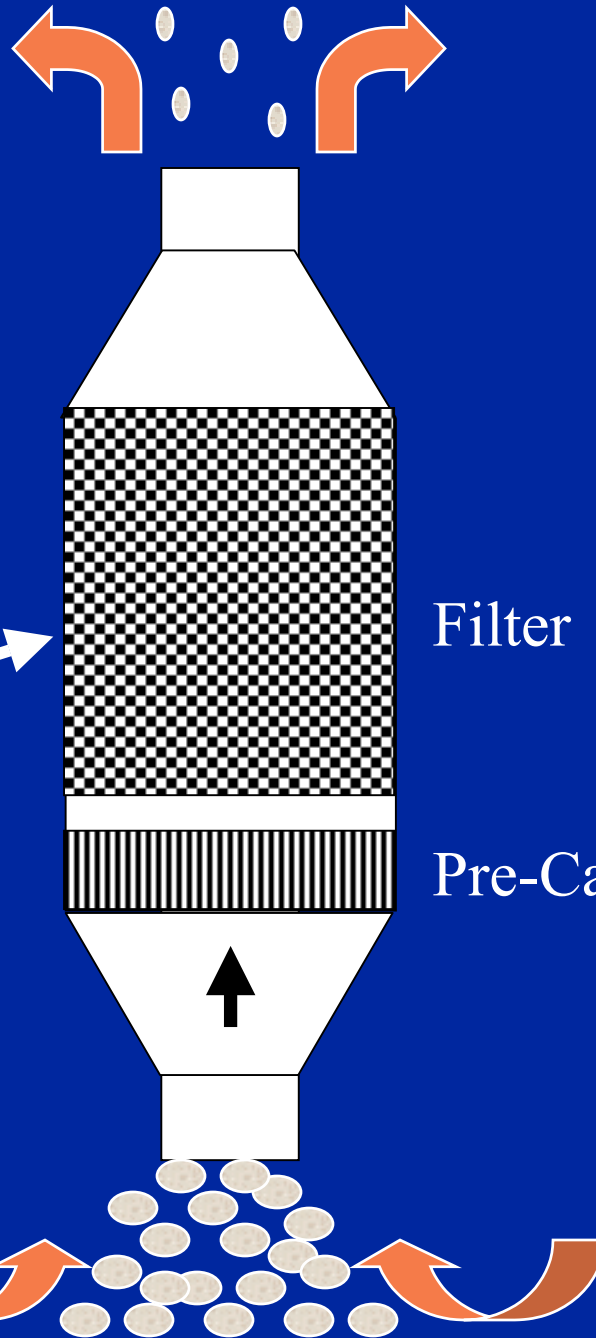
- **Volvo Powertrain will offer a complete line of diesel engines which fully comply with US07 requirements.**
- **Engines supplied to Mack Trucks and Volvo Trucks North America will be customized to meet their unique market needs and customer expectations.**

US 2007 Challenges

- **Best technology solution for end user**
- **Technology selection by VPT and Truck considers:**
 - **Engine attributes**
 - **Vehicle attributes**
 - **Interface issues**
 - » **Packaging**
 - » **Cooling**
 - » **Validation**
 - » **Schedule**
 - **Product Continuity (2007 ... 2010)**
- **Technology selection expected Sept 2003**

Diesel Particulate Filter

Particulate
matter is burned
in catalytic filter



Filter 90+% Efficiency

Pre-Catalyst

- All potential 2007 technologies require DPF

Diesel Particulate Filter

- **Volvo Powertrain Experience**
 - 450 trucks in European field test
 - » 23 Million Miles
 - US field test initiated
 - » 7 trucks in service
 - » 58 planned
 - Experience growing in US retrofit market (trucks)
 - » Primary issues have been plugging, heat damage, and cracking.



DPF on MACK Vehicle

US07 Product Development & Validation

- **Must demonstrate:**

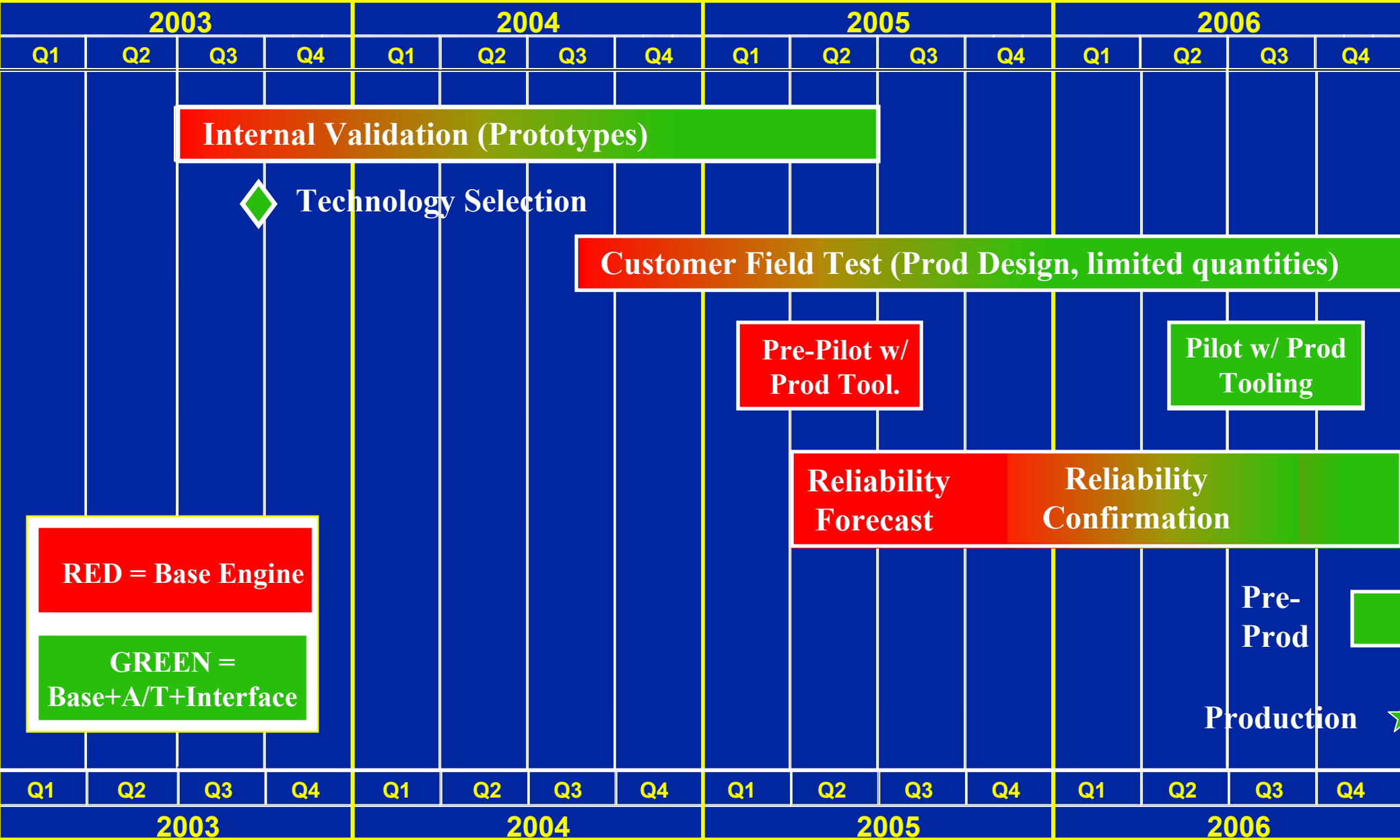
- **Functionality**
- **Durability**
- **Reliability**

- **Product development includes a combination of analytical, laboratory, and field test resources**

Planned US07 Validation Activities

	<u>Internal</u>	<u>Customer</u>
■ DPF Vehicle testing (in process)		✓
■ US07 Engine testing	✓	✓
■ US07 Vehicle testing	✓	✓
■ US07 Reliability testing	✓	✓

US07 Availability



**The Volvo Group is confident
that we can draw on our Global
expertise to deliver proven
US07 products that meet the
expectations of our Customers.**