

Innovative Hydrogen Storage Systems

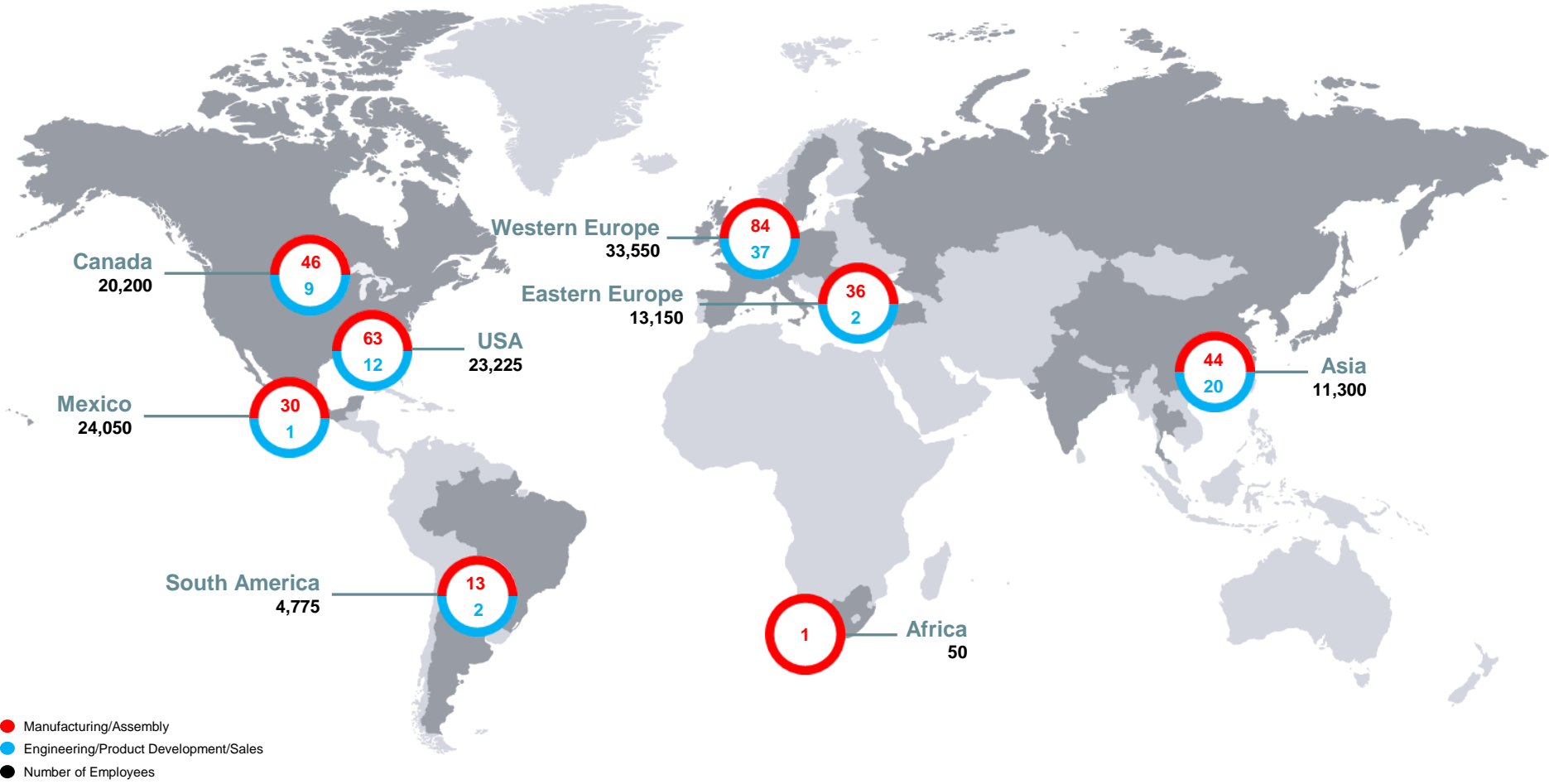
Benjamin Pessl
Project Manager – Alternative Propulsion Systems
Advanced Development – MAGNA STEYR Engineering Graz

A3PS Eco-Mobility 2014
October 20 – 21, Tech Gate, Vienna, Austria

A3PS The logo for A3PS, consisting of the letters 'A3PS' in a bold, sans-serif font, followed by three red circles of increasing size that form a right-pointing arrow.

 **H₂** BY MAGNA STEYR
The logo for H2, featuring a blue circle containing three white circles of varying sizes, followed by the text 'H2' in a large, bold, sans-serif font, and 'BY MAGNA STEYR' in a smaller font to the right.

Global Presence



~ 130,000 People | 29 Countries | 317 Manufacturing | 83 Engineering | \$34.8 Billion (2013 Sales)

(@ Q2 2014)

Management Structure MAGNA Int.



Don Walker Chief Executive Officer

- Vince Galifi** Chief Financial Officer
- Jim Tobin** Chief Marketing Officer, President Magna Asia
- Jeff Palmer** Chief Legal Officer
- Tom Skudutis** COO Magna Interiors, Exteriors, Seating, Mirrors, Closures and Cosma
- Swamy Kotagiri** Chief Technology Officer
- Marc Neeb** Chief Human Resources Officer
- Guenther Apfalter** President Magna Europe
- Mike Sinnaeve** VP Operational Improvement & Quality

Joe Pittel
President

Mike Bisson
President

MAGNA SEATING



Seating

Joe Pittel
Acting President

MAGNA EXTERIORS



Exteriors

Albert Lidauer
President

MAGNA INTERIORS



Interiors

Frank Seguin
President

MAGNA MIRRORS & MAGNA CLOSURES



Vision, Closures, Lighting, Sealing & Roof Systems

John Farrell
President

COSMA INTERNATIONAL



Body & Chassis

Jake Hirsch
President

MAGNA POWERTRAIN & MAGNA ELECTRONICS



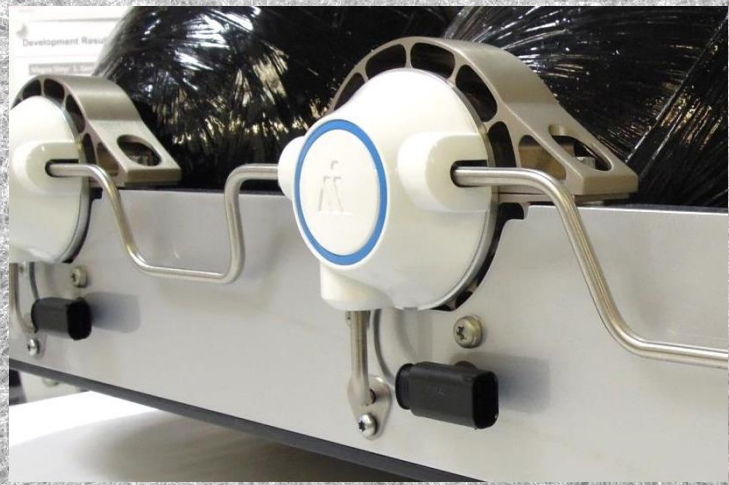
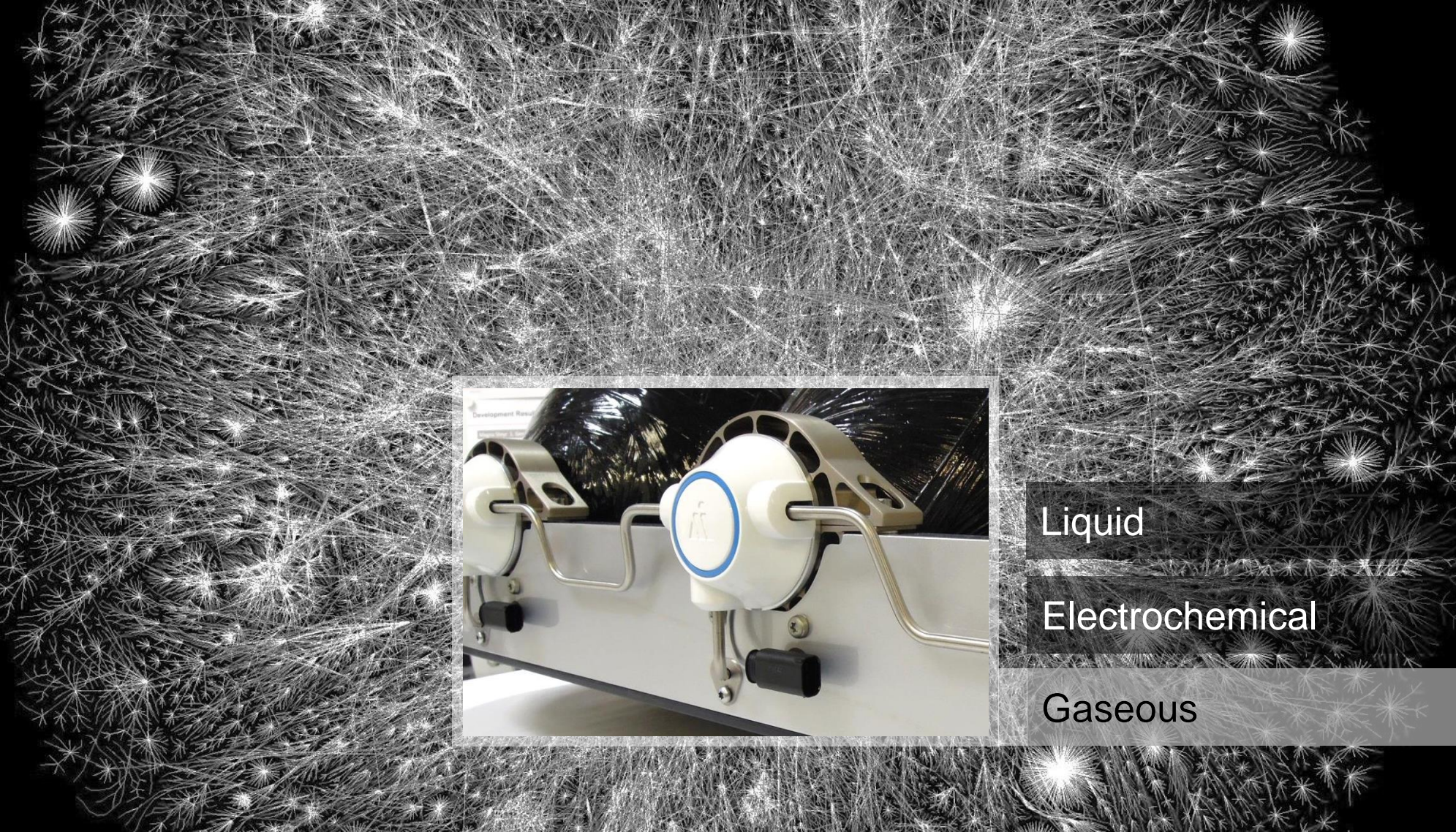
Powertrain & Electronics

Guenther Apfalter
President

MAGNA STEYR



Vehicle Eng & Contract Mfg; Fuel & Battery Systems



Liquid

Electrochemical

Gaseous

> 20 Years of H₂ - Activities

First Start of Ariane 5
Feed Lines
(1996 – today)



BMW Hydrogen 7
Cryo Tank
(2001 – 2007)



Mercedes B-Class F-Cell
H₂ Storage System 70 MPa
2006, SOP2010 – EOP2012



Aston Martin Hydrogen Hybrid
H₂ Storage System 35 MPa
(2012 – 2013)



1996

2001

2004

2006

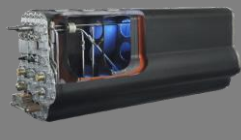
2007

2010

2012

2014

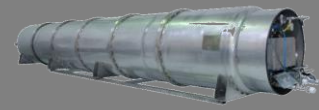
StorHy Cryo Tank
(2004 – 2008)



Flat CFRP Cryo Tank
(2006 - 2008)



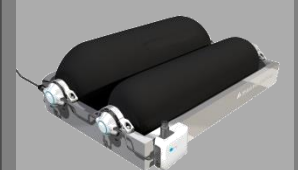
BVG Cryo Tank
(2007 – 2010)



Aircraft Cryo Tank
Mock – Up



H₂ Storage System
Technology Carrier 70 MPa



... 1996 ... Today



75th Launch – Sept. 11, 2014

Source ESA

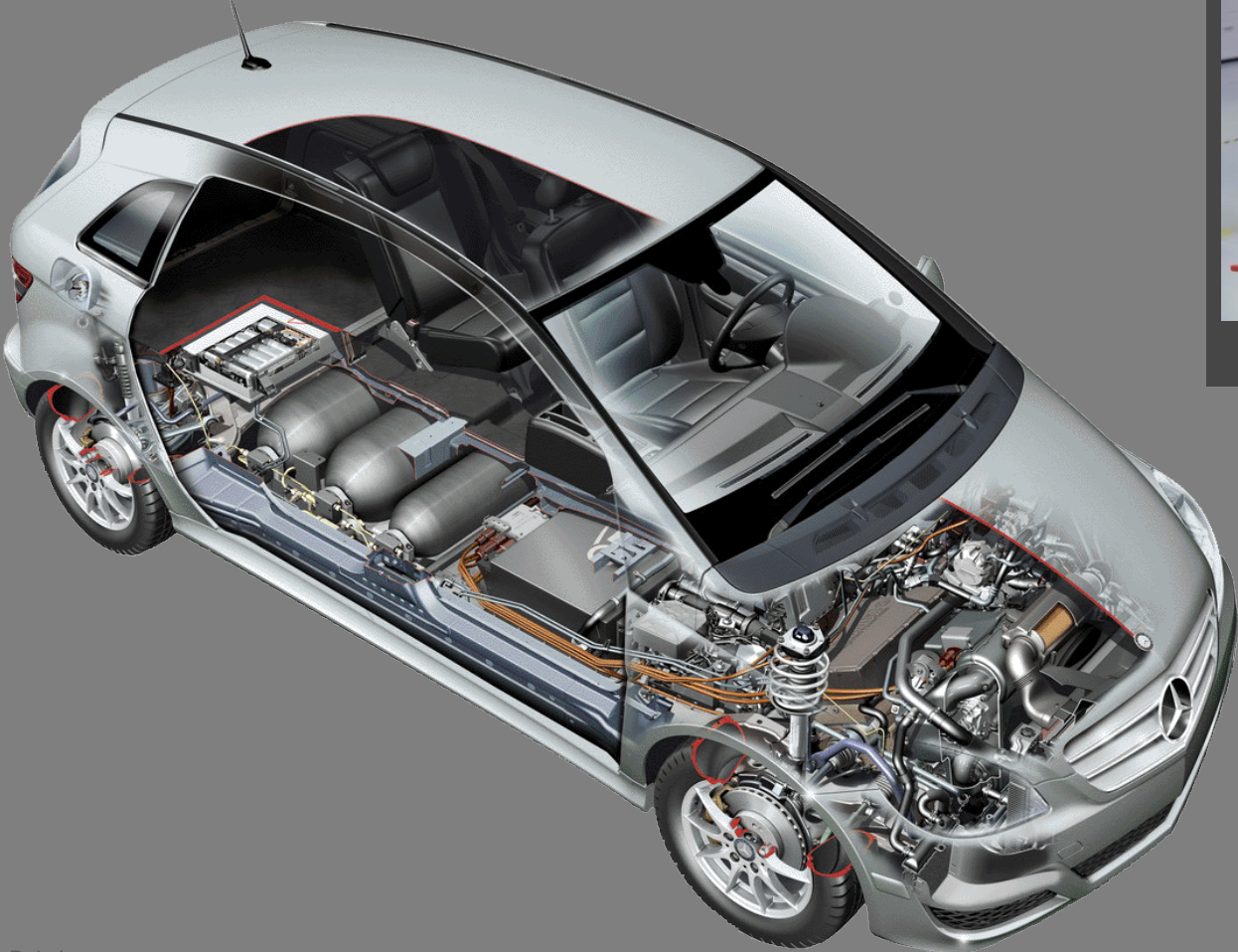
2001 – 2007



Source BMW

Mercedes B-Class F-Cell

SOP 2010 – EOP 2012



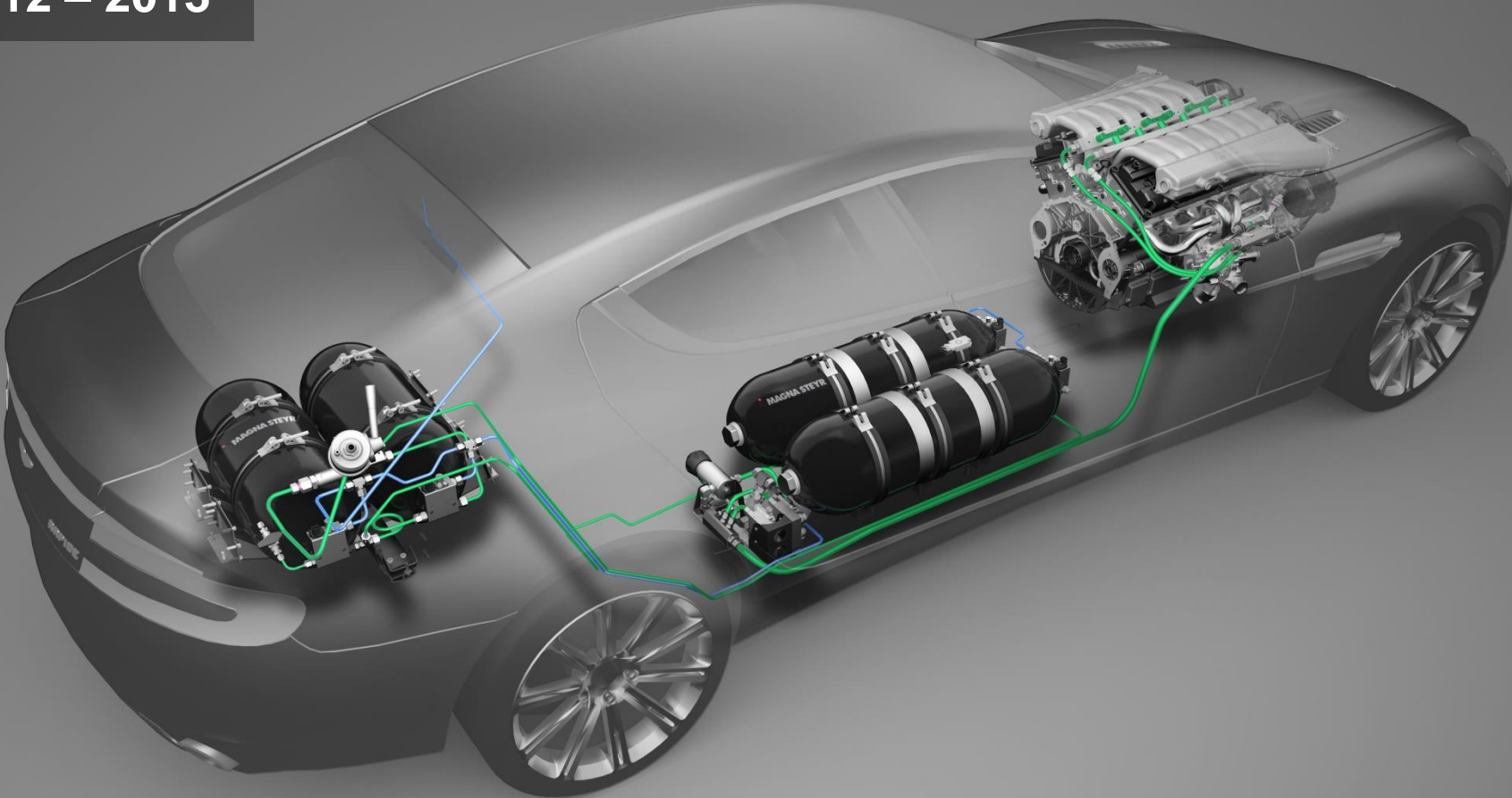
Assembly Line



Vehicle Integration

Source Daimler

2012 – 2013

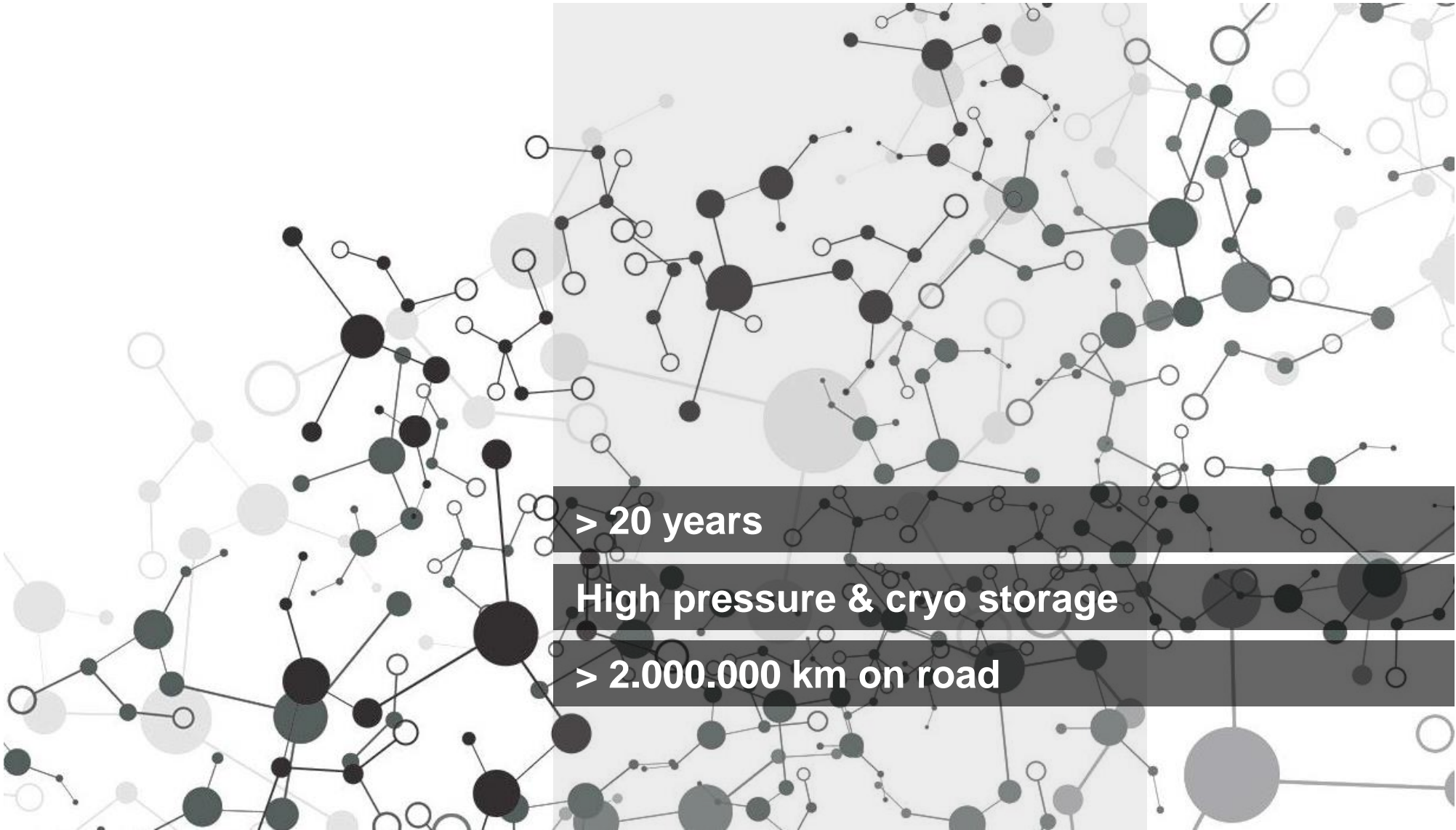


Source Alset

2014 +



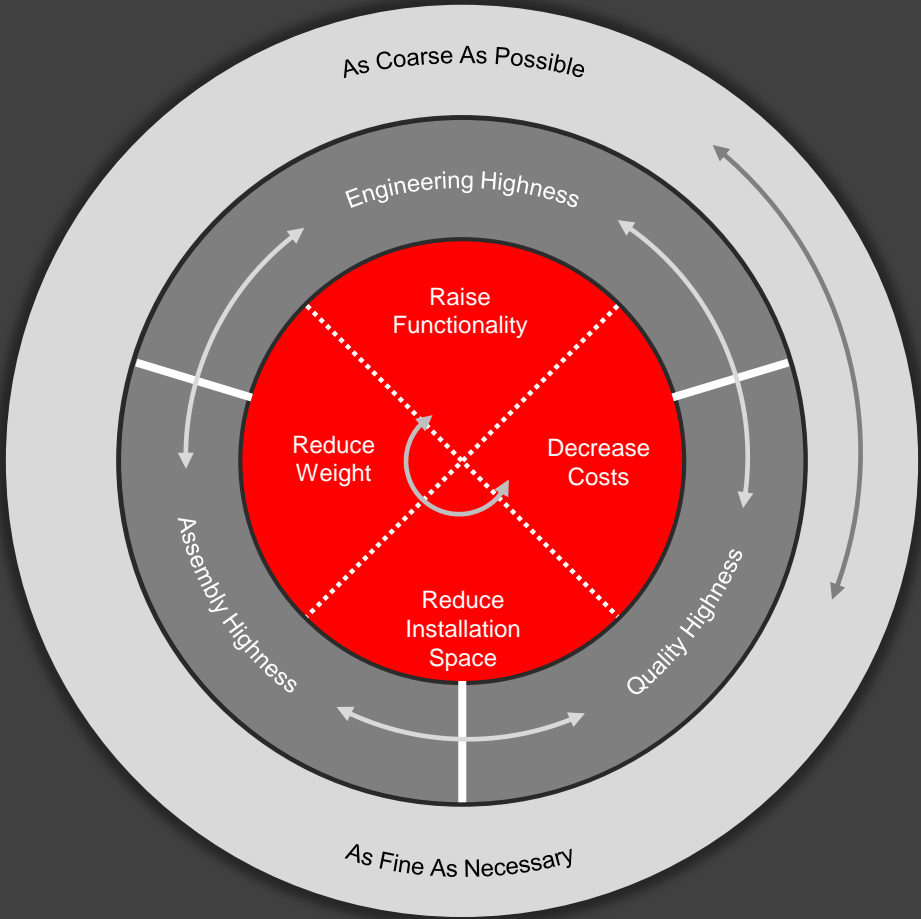
Source Honda



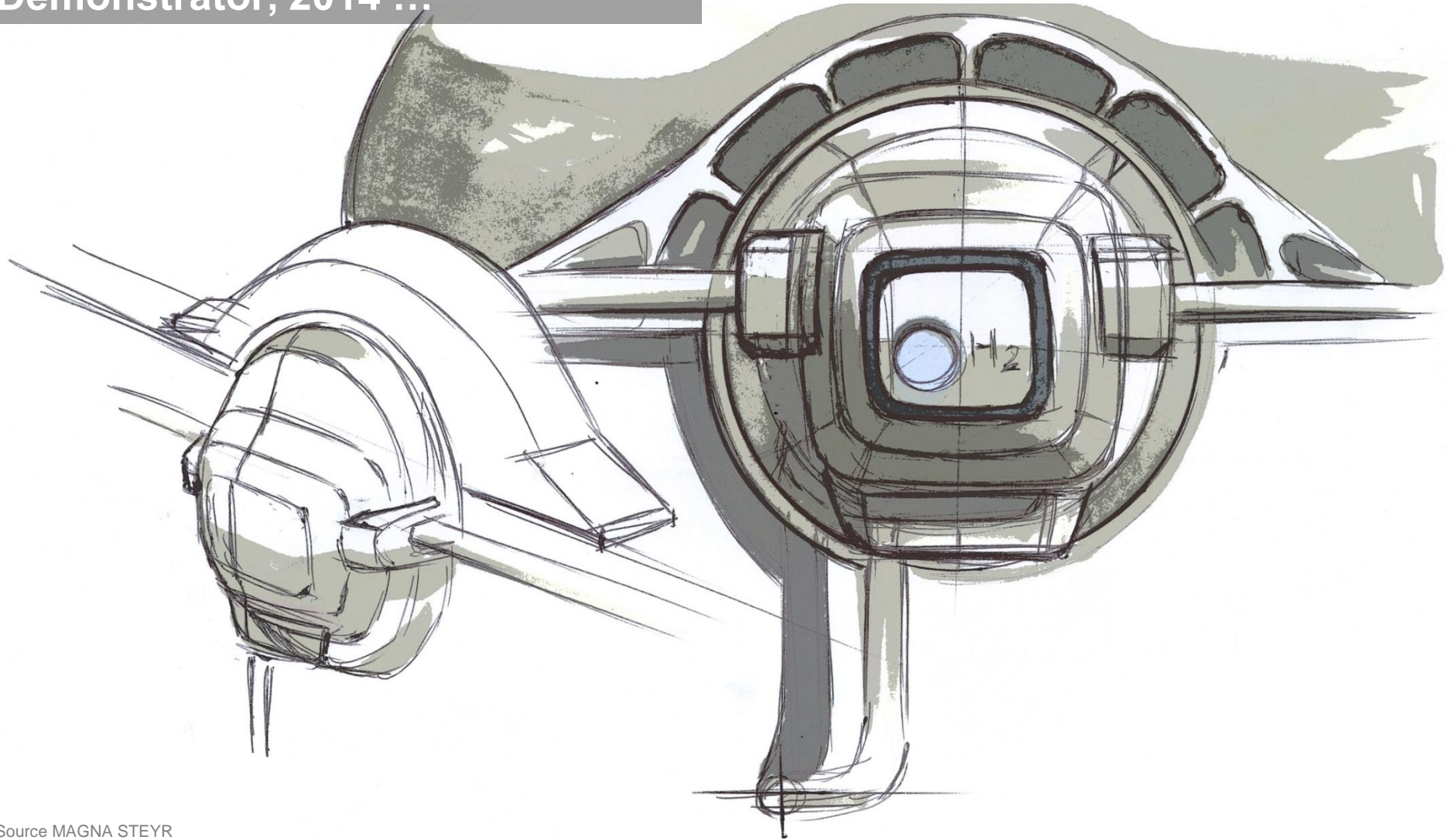
> 20 years

High pressure & cryo storage

> 2.000.000 km on road

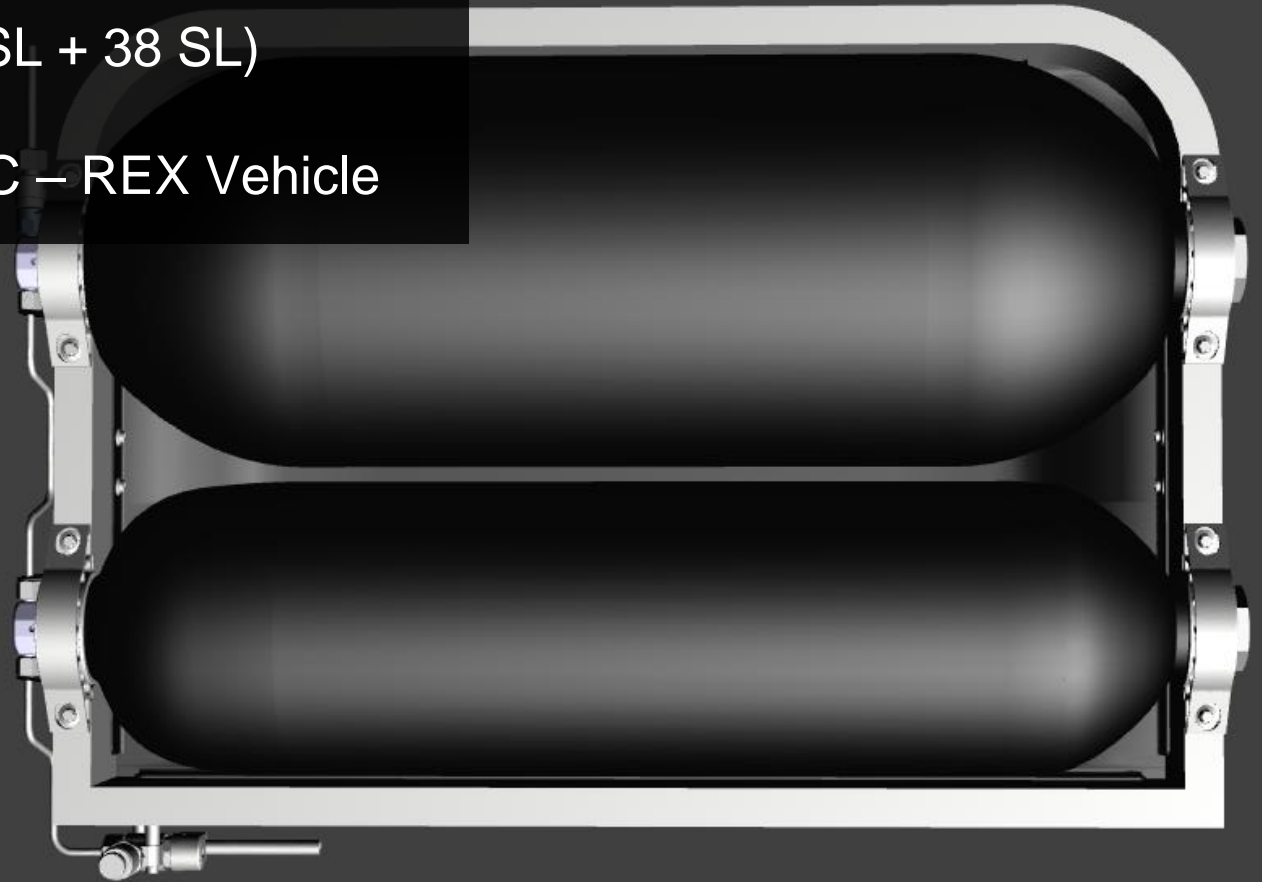


Demonstrator, 2014 ...

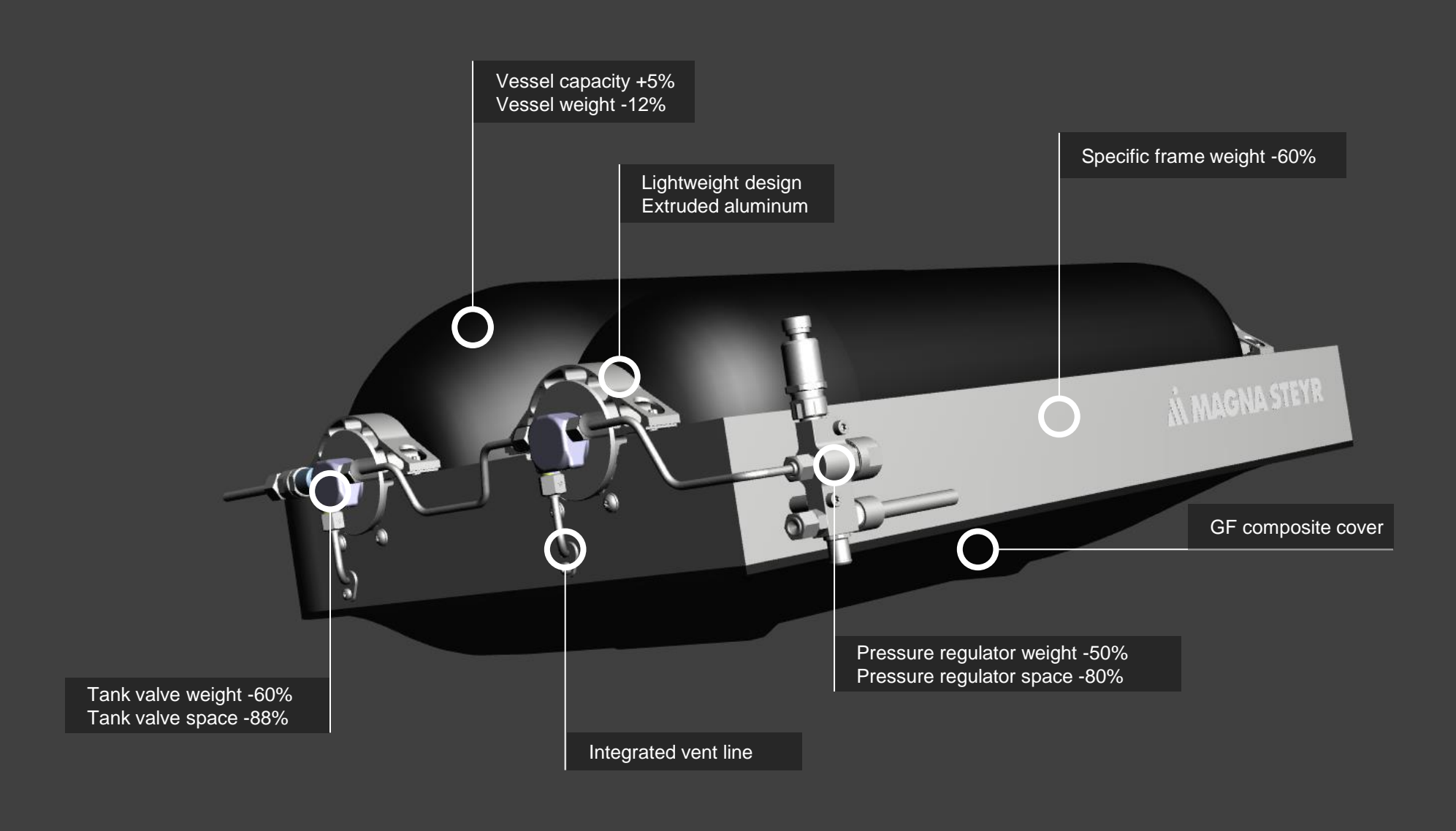


Source MAGNA STEYR

- Pressure 70 MPa
- 2 Vessels (57 SL = 19 SL + 38 SL)
- Capacity 2,3 kg H₂
- Scope of application: FC – REX Vehicle



Key Improvements





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