

TENEMOS  
MUCHO  
QUE HACER  
JUNTOS

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# EL ACERO EN LOS TRANSPORTES DEL FUTURO

tecnalia  Inspiring  
Business



Bilbao 13 Junio 2016



DSS2016.EU



DSSINNOVA  
2016

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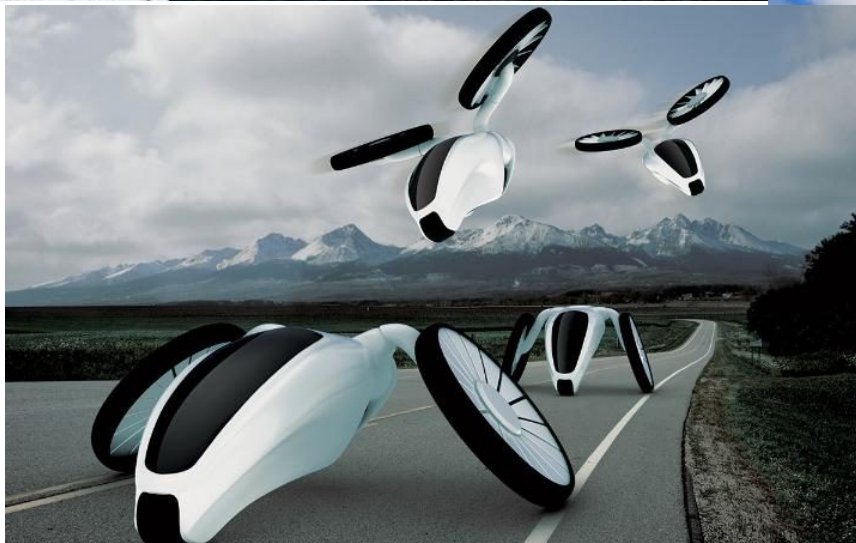
Proyectos

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Plataforma Tecnológica

# Tendencias

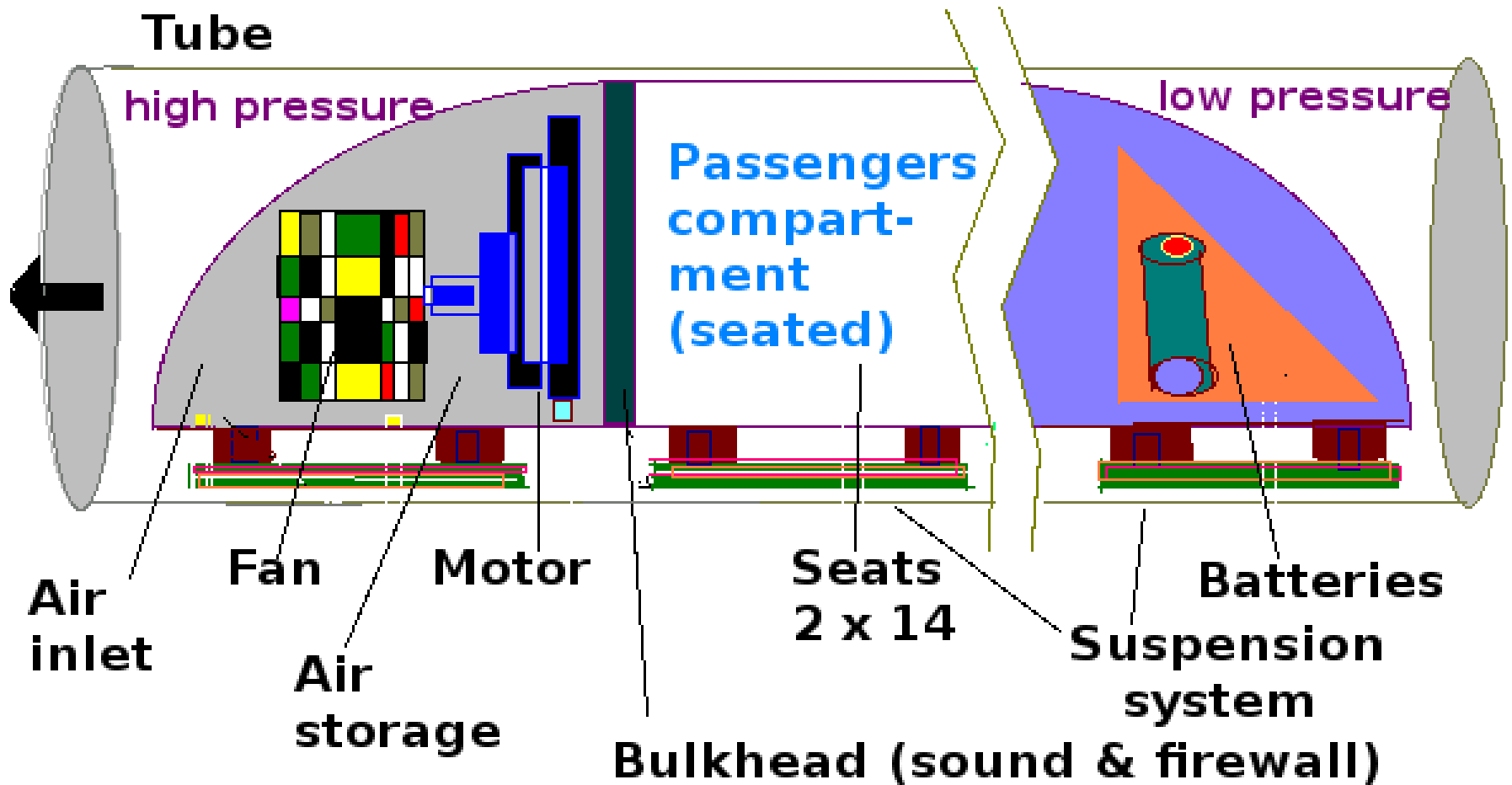
## TENDENCIAS



<http://www.telegraph.co.uk/technology/2016/04/07/from-jetpacks-to-flying-cars-the-crazy-future-of-transport/>

# Hyperloop

design by Elon Musk  
SpaceX Tesla Motors





# TENDENCIAS



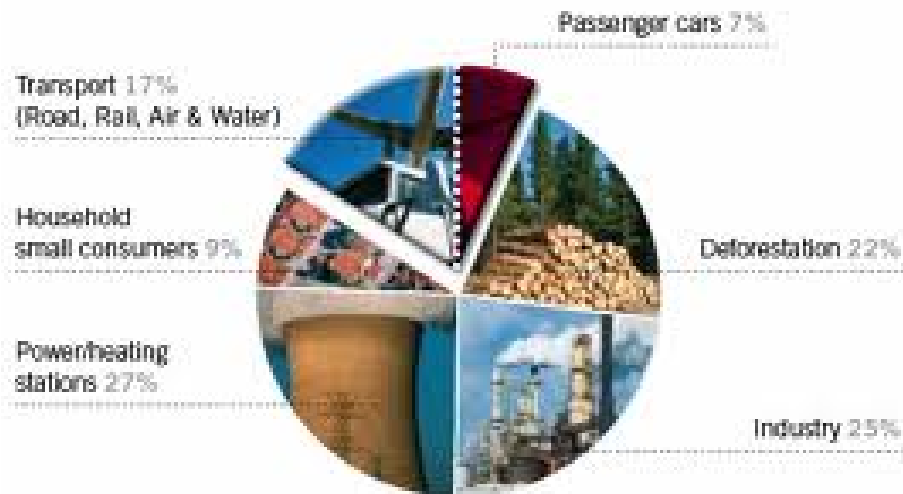


TENDENCIAS

## TENDENCIAS-NECESIDADES DE DESARROLLO

- Aligeramiento
- Mejora de prestaciones:
  - Fatiga
  - Corrosión
  - Desgaste
  - Altas T, P
  - ...

TENDENCIAS



(SOURCE: IPCC Fourth Assessment Report, WG III, 2007; World Business Council for Sustainable Development, 2004)

REDUCING THE WEIGHT OF MATERIALS TO CUT DOWN FUEL CONSUMPTION AND CO<sub>2</sub> EMISSIONS

# FOR A SIGNIFICANT REDUCTION IN THE WEIGHT OF VEHICLES AND AIRCRAFT



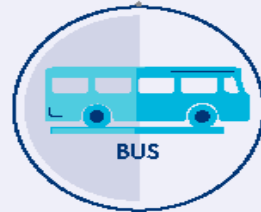
**100 KG WEIGHT REDUCTION**

- Roof
- Technical engine components



↓ - 0.4 L fuel/100 km

↓ - 10 g CO<sub>2</sub>/km



**1000 KG WEIGHT REDUCTION**

- Structural components
- Luggage container



↓ - 6000 T kerosene\* i.e.

↓ - 20,000 T CO<sub>2</sub>\* i.e.

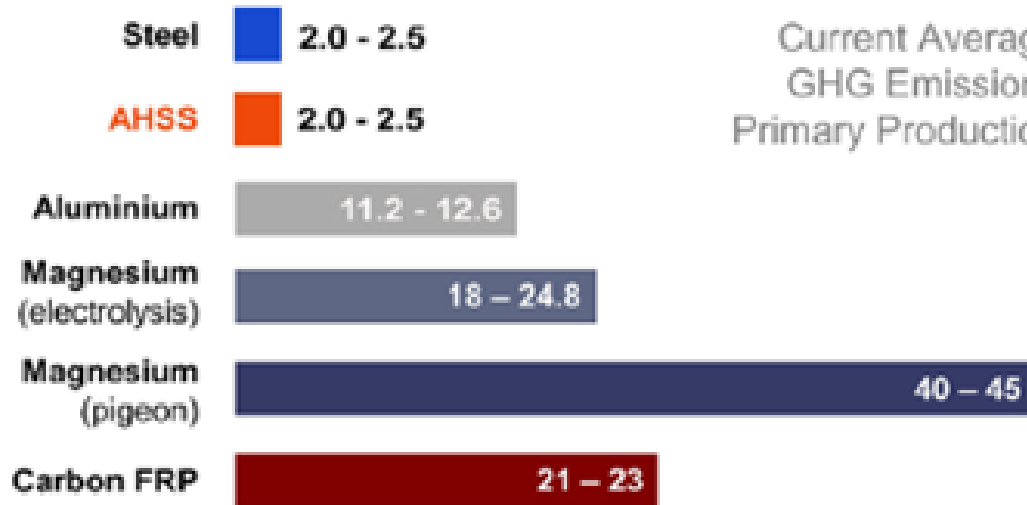
\* over the lifetime of an aircraft (around 30 to 40 years)



TENDENCIAS

**GHG from Production (in kg CO<sub>2</sub>eq/kg of material)**

Current Average  
GHG Emissions  
Primary Production



On average, **900 kg of steel is used per vehicle**, totalling approximately **80 million tonnes** of steel used by the automotive sector every year.

The steel in a vehicle is distributed as follows:

- **34% is used in the body structure**, panels, doors and trunk closures for high-strength and energy absorption in case of a crash
- **23% is in the drive train**, consisting of cast iron for the engine block and machinable carbon steel for the wear resistant gears.
- **12% is in the suspension**, using rolled high-strength steel strip. The remainder is found in the wheels, tyres, fuel tank, steering and breaking systems. <sup>2</sup>

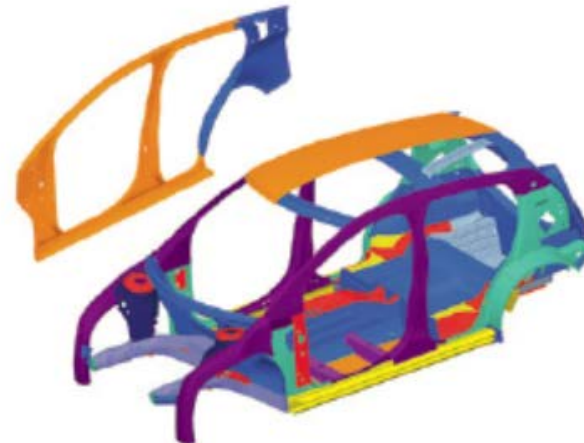
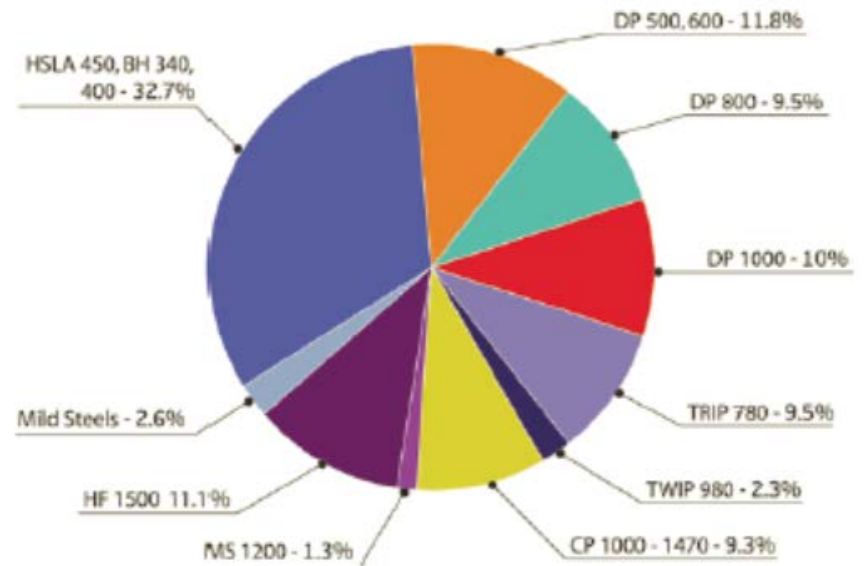
Advanced High-Strength Steels (AHSS) are now used for nearly every new vehicle design. Steel makes up more than 50% of today's vehicles and using AHSS makes lighter, optimised vehicle designs that enhance safety and improve fuel efficiency.

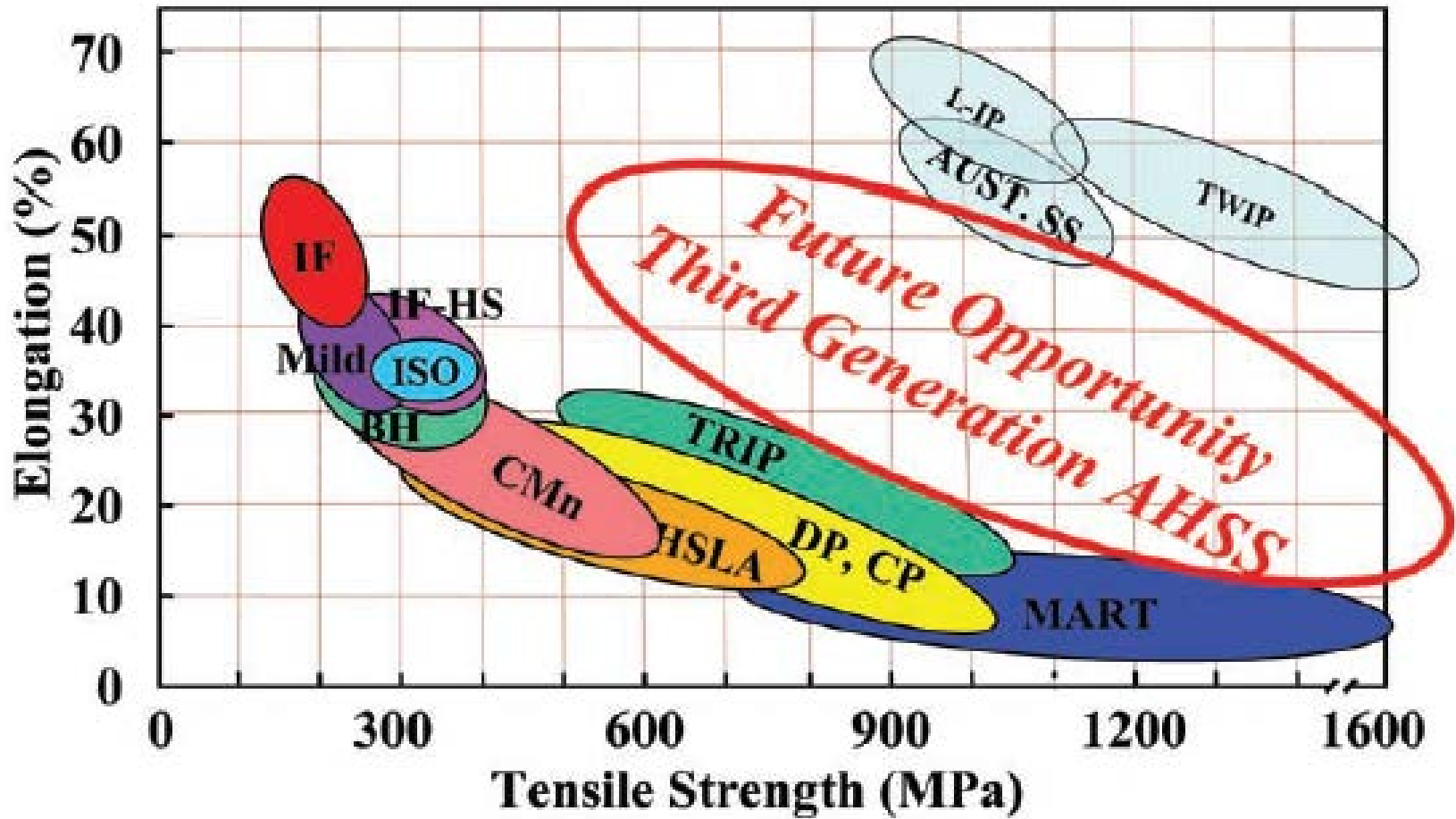
[www.worldsteel.org](http://www.worldsteel.org)



Worldsteel Association  
Steel Solutions in the Green Economy  
FutureSteelVehicle

FSV BEV Steel types  
as % of body structure mass





# Proyectos

## DISAUTO: aceros de automoción mediante dispersión inducida de nanopartículas

- **Objetivo:** Obtención de importantes ventajas competitivas en sectores tales como el siderúrgico o automoción mediante la investigación de aceros especiales nanoaleados
- **Socios:** Gerdau , Alkorta, GKN.

# NAMOS: Nanoparticle Addition into Molten Steel

Objetivo: Design & Develop a novel steel grade with enhanced mechanical properties by means of NP safe addition in microalloyed steel.

•Socios: GERDAU, VTT, AALTO, KTH, CONDICAST, CENIM, TECNALIA



EUROPEAN COMMISSION / European Research Area / Coal & Steel



# ROLLINGAHSS: Novel methods for Advanced High Strength Hot Rolled Steels

- Objective: evaluation and optimization of the challenging *rolling phenomena* and methods to enable fabrication of *thin advanced hot rolled high strength steels* (AHSS) in the production scale with *good strip flatness and excellent profile minimizing cobble risk*
- Partners: ArcelorMittal España, CSM, BFI, Univ Oulu, Mefos TECNALIA



## GPHS: Green Press Hardening Steels

- Objective: Development of a new Usibor grade more efficient and sustainable than the current one, allowing a reduction of energy consumption and hot stamping process cycle.
- Partners: ArcelorMittal, VolksWagen, Uni. Padua, TECNALIA



Copyright: Volkswagen

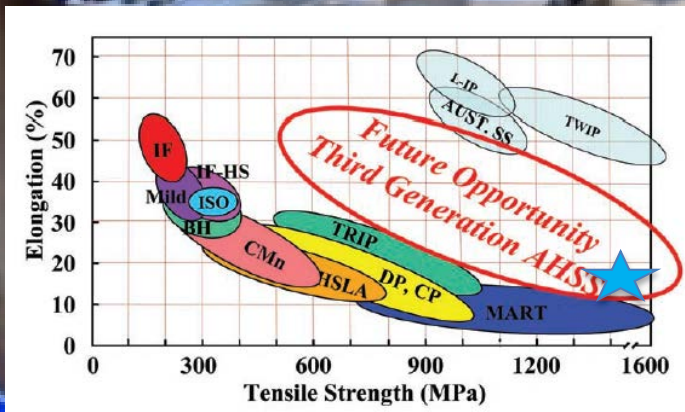
PROYECTOS

# ELONHOTSTAMP: New hot stamping steel with improved elongation

- Objective: Development of a new hot stamping steel grade with higher elongation and keeping the mechanical resistance.
- Partners: ThyssenKrupp Steel Europe, VW, CSM, TECNALIA



EUROPEAN COMMISSION / European Research Area / Coal & Steel



# HOTFORM: New Multiphase AHSS steel grades for hot forming, with improved formability and reduced springback

- Objective: Develop two new steel grades for hot stamping (1000MPa), Increase formability, Reduce the springback, Integrate the annealing process.
- Partners: Tata Steel, CRF, VW, TECNALIA



EUROPEAN COMMISSION / European Research Area / Coal & Steel



# Noticias

Mr Armin Plath VW's head of materials research and manufacturing said that "Volkswagen is using **high strength steels** in increasing amounts. It is a **very cost effective way of reducing weight**. Using new innovations in steel engineering it is possible to reduce weight without the use for more costly materials such as aluminum and carbon fiber."

2013 - [www.thetruthaboutcars.com](http://www.thetruthaboutcars.com)

### **SMDI recognizes Honda and Gestamp for use of AHSS steels (May 2016)**

The Steel Market Development Institute, a business unit of the American Iron and Steel Institute, awarded the "Automotive Excellence Award" to Honda R & D Americas, Inc. and Gestamp for their work in implementing advanced high-strength steel (AHSS) innovations in a hot stamped rear frame. The award was presented today at the 15th annual Great Designs in Steel (GDIS) seminar in Livonia, Mich.

The goal of the project was to reduce rear frame mass and design complexity, while maintaining performance through implementation of hot stamped high-strength steel. The result was a 20 percent weight reduction compared to previous models and full realization of the rear frame crush mode.

[www.steelguru.com](http://www.steelguru.com)

**ArcelorMittal received the *Technical Cost Savings award for its ability to propose cost-saving solutions* during PSA's Best Suppliers Awards ceremony. (2016)**

“They are working on weight and cost savings, and finding the best material solution for each vehicle. The best example is the systematic review of the body-in-white which we undertake in the very early stage of all our new projects”.

**VW chooses ArcelorMittal for new supplier programme (May 2016)**

VW has chosen ArcelorMittal for a new supplier programme that will see greater collaboration between the two companies around vehicle development. The new initiative –Future Automotive Supply Tracks (FAST) – is the carmaker's answer to key challenges facing the automotive industry in the form of globalisation and the increasing speed of innovation cycles. It recognises that the supplier network will play a much more significant role in vehicle development at VW.



## Harmony of the seas

**ArcelorMittal supplies 100% of steel used in cruise ship Harmony of the Seas**

Harmony of the Seas, dubbed “Europe’s biggest hotel”, has docked at the UK port of Southampton today after leaving Saint-Nazaire in France at the weekend. ArcelorMittal sites in Spain and France provided 100% of the steel used in this 362m-long, 65m-wide floating city, the largest cruise ship ever built.

### **30/03/2015 - Gerdau desarrolla un nuevo acero un 20% más resistente para motores diésel de alta eficiencia**

El centro de excelencia de I+D de la empresa ha desarrollado el nuevo acero con una elevada resistencia a la oxidación, óptimo para trabajar a temperaturas y presiones más altas destinado a los pistones de motores diesel.

### **09/06/2016 - ArcelorMittal to launch new high strength steel Usibor 2000 by mid 2017 [www.steelguru.com](http://www.steelguru.com)**

The Financial Times reported that ArcelorMittal will launch a new high-strength automotive steel later this year, throwing down the gauntlet to its rivals in the race to make cars lighter. The world's biggest steel producer by tonnage said that its new grade, called Usibor 2000, would be about one-third stronger than those currently available for carmaking.

ArcelorMittal said that for applications requiring complex shapes, its Usibor 2000 product would bring potential weight saving of up 10 per cent on the previous best steel grade. It is more than three times stronger than leading automotive aluminium alloys, according to the company. Launch is expected by the end of this year in Europe and mid-2017 in the US.

(May-04-2016) “The challenge of light-weighting continues today. **Steve Parrett from Nissan North America** told me that with the third-generation Murano, the company “lowered mass by 146 pounds with higher body rigidity versus the outgoing model while increasing the vehicle’s overall exterior and interior dimensions” by using HSS. He added that the vehicle’s “lower mass was a key contributor to its 20% fuel economy improvement over previous generation.”

(May-04-2016) “HSS and ultra HSS with the utilization of hot stamping allowed Toyota to improve cabin energy management and rigidity while decreasing mass,” **said Mike Sweers, chief engineer at Toyota.** “The improved rigidity and sectional properties improves vehicle performance and overall safety performance for NHTSA regulations as well as outside organizations' safety ratings.”

[\(<http://www.bizjournals.com>\)](http://www.bizjournals.com)

## Steel Muscle in New Vehicles

Here you'll find brief, and maybe not so brief sometimes, stories (because we're darn proud of steel) about vehicles that used High-Strength and Advanced High-Strength Steels to achieve lightweighting, safety and performance goals. Feel free to share....

- 2016 Chevy Cruze , HSS Global Platform
- 2016 Chevy Malibu: Larger, Lighter, More Efficient with HSS
- 2016 Kia Optima Smart Performance & Safety with HSS
- 2016 Nissan Maxima Light on Its Wheels with HSS
- 2017 AHSS-Intensive Kia Sportage Receives Top Safety Pick Plus Rating From IIHS
- 2017 Chrysler Pacifica, Re-designed, Lighter
- 2017 GMC Acadia drops 700 lbs. with Steel
- Hyundai's 2016 Tucson Offers Sporty Styling, Outstanding Efficiency and Cutting-edge Safety Technologies
- 2015 Acura TLX, Safe, Lean, Luxurious
- 2015 Hyundai Genesis Redesigned with AHSS
- [VIDEO] 2015 Hyundai Genesis: High-Strength Steel Luxury
- 2015 Honda Fit: Fit and Strong
- High-Strength Steels Improve 2015 Ford Edge Stiffness
- 2015 Nissan Murano Redesigns with AHSS
- Engineering, Advanced Materials Slim Down 2015 Chevy Colorado
- 'Toughnology' Concept Shows Silverado's Built-In Strength
- 2014 7th Generation Golf – a lightweight marvel
- Honda CR-Z, AHSS Light Weight, Safe

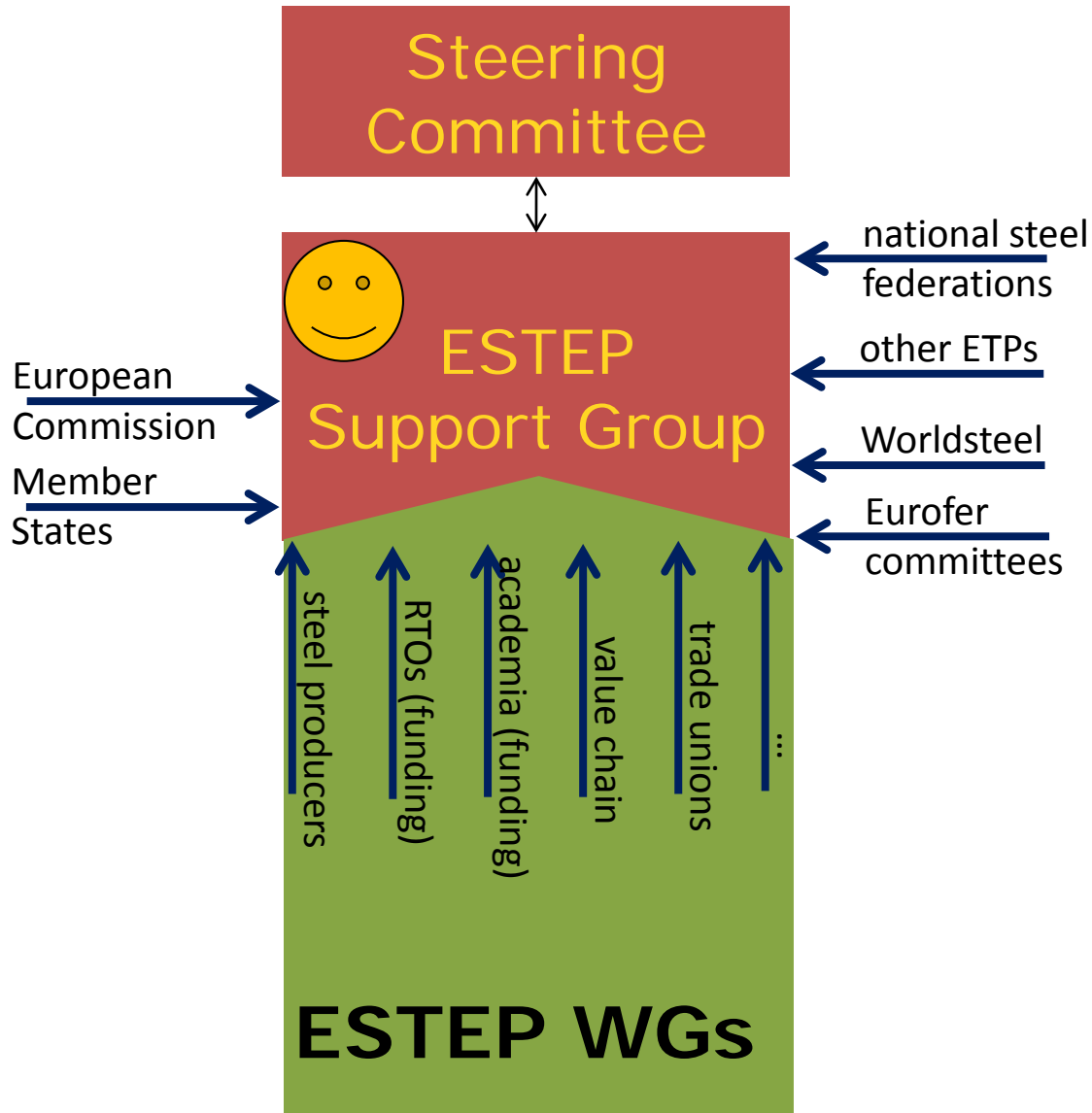
**STEEL  
MUSCLE**  
IN NEW VEHICLES  
[@worldautosteel.org](https://www.worldautosteel.org)

It's no surprise that we keep up on advanced steels in new cars

Connect with us on social media to see them as soon as we do. And come back often to [www.worldautosteel.org](http://www.worldautosteel.org) for the full stories. We're constantly adding new ones...and we're pretty proud of that.

<http://www.worldautosteel.org/why-steel/steel-muscle-in-new-vehicles/>

# Plataforma Tecnológica





## ESTEP WG2: TRANSPORT

### MISSIONS OF THE GROUP:

1. Act as a link between the steel industry, the transport industry (steel market) and the EC Research DG → update of legislation, tendencies, EU strategies,...
2. Interact with other EU Technological Platforms (EUCAR, EARPA,...), WorldAutoSteel.org, ...
3. Update the “Steel Priorities” for the RFCS programme (priority related to Transport): → For 2016:

“Cost effective lightweight steel solutions for new vehicle concepts or components with improved LCA or safety performance”

4. Provide a forum connecting steel industry, research centres and universities, for collaboration and creation of Research Projects
5. Find and disseminate innovation areas of Steel for Transport, to major stakeholders, by publications, press releases,...
6. Focused on automotive sector, but will address also ship manufacturing

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**IMPORTANT:**

- **Legislation in CO2 emissions**
- **Megatrends: urban vehicles, electric vehicles,...**





## MOVILIDAD

- AUTO+NAVAL+FERROCARRIL
- Foro de encuentro de EMPRESAS, CENTROS DE I+D Y UNIVERSIDADES
- Actualización AGENDA ESTRATÉGICA DE INNOVACIÓN
- Sinergias con otras Plataformas
- Propuestas de I+D

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