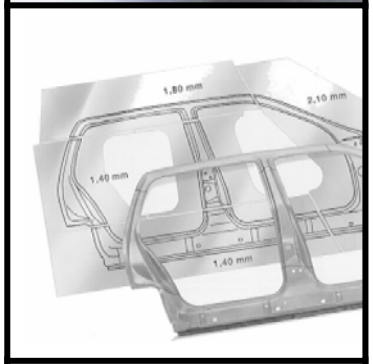
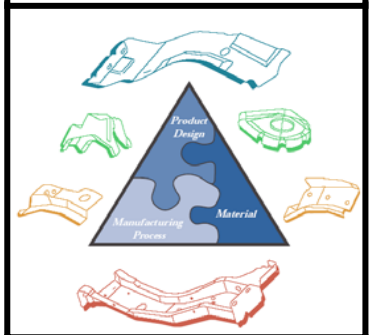
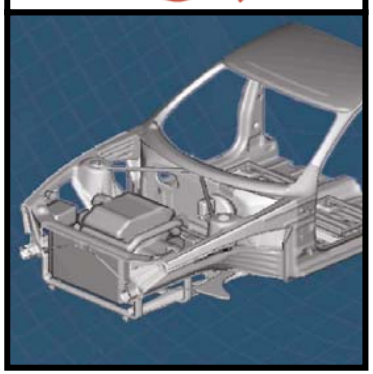




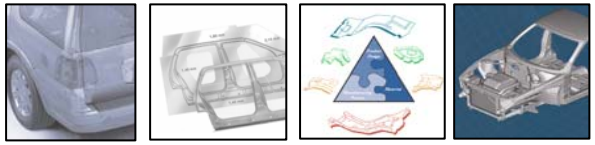


Overview: STEEL
Auto/Steel Partnership

Dr. Roger Heimbuch
Auto/Steel Partnership

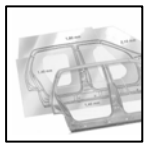
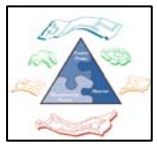
Auto/Steel Partnership

www.a-sp.org



OUTLINE OF PRESENTATION

- Overview of the Auto/Steel Partnership (A/SP).
- Connection to USAMP/Department of Energy.
- Strategy.


MEMBERS OF A/SP - Chartered in 1987

AK Steel

ArcelorMittal

GM

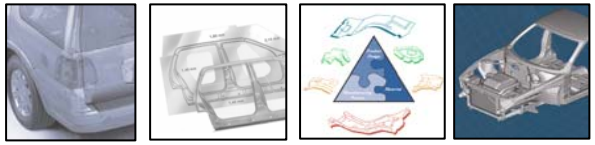
SeverStal North America

CHRYSLER

USS

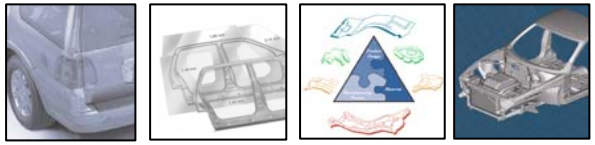
Ford

NUCOR



PARTNERSHIP VISION

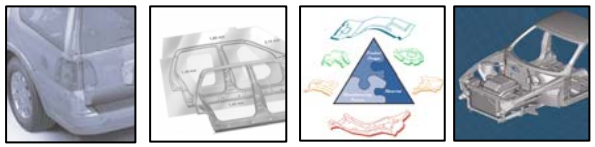
The vehicles produced by member OEMs will have best-in-world, cost- effective, lightweighting and safety performance through the use of optimized steel solutions developed with the member steel companies.



PARTNERSHIP MISSION

The Auto/Steel Partnership:

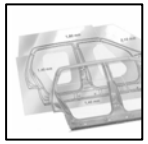
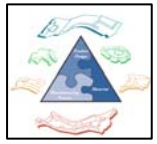
- Leverage the resources of the automotive, steel and related organizations.
- Develop solutions where steel remains the "competitive material of choice" in a changing automotive market.
- Use inter-company and inter-industry cooperative programs to ensure success.



PARTNERSHIP STRATEGY

To achieve the Vision, the Auto/Steel Partnership:

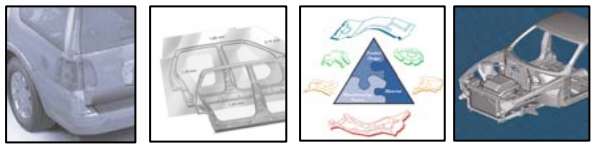
- Evaluate, prioritize and completes projects that meet the vision.
- Communicates the technical results and benefits to the automotive industry.


THE PARTNERSHIP LINKAGES

Auto/Steel Partnership

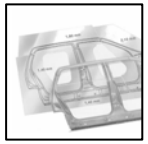
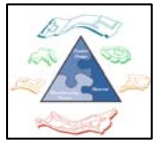
- Chrysler LLC, Ford Motor Company, General Motors Corporation
- AK Steel, ArcelorMittal, Nucor Corporation, Severstal North America, United States Steel Corp.
- Contractors
- Academia
- AISI, IISI, WorldAutoSteel Consortia Partnerships
- Department of Energy (DOE)
- CANMET
- National Laboratories
- NSF



FreedomCAR Goals:

- Mass Reduction (50%).
- Affordable Cost (less to +5%).
- Durability/Life (same).
- Recyclability.
- Develop/Transfer Technology.

FreedomCAR & Fuel Partnership


ULSAB SERIES OF PROJECTS

ULTRALIGHT STEEL AUTO BODY

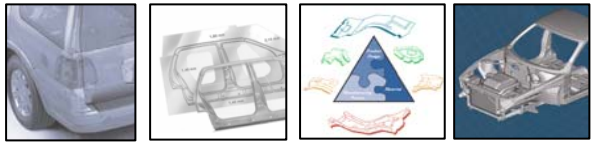
ULTRALIGHT STEEL AUTO CLOSURES

ULTRALIGHT STEEL AUTO SUSPENSION



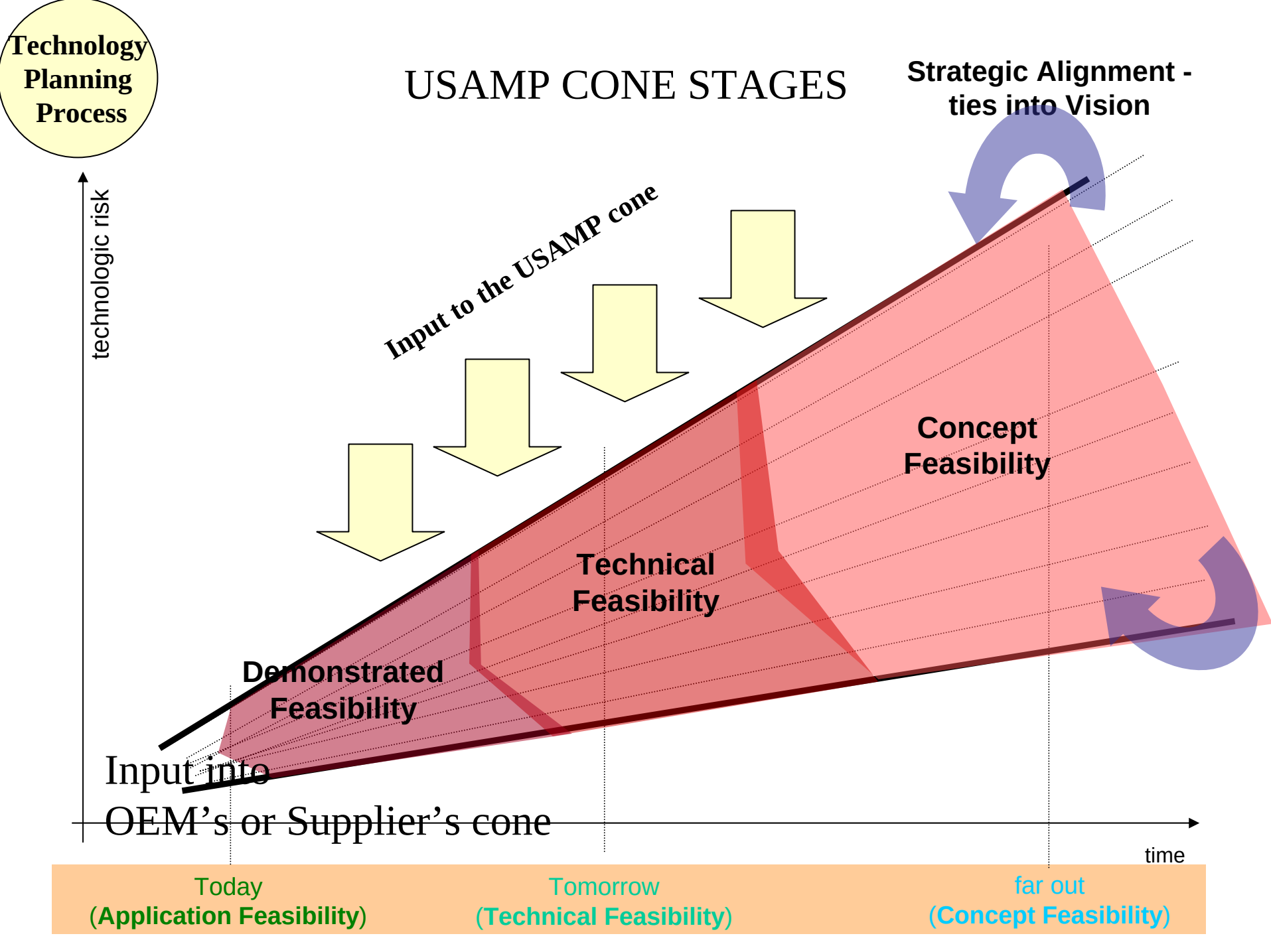


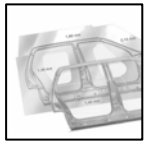
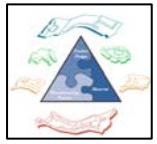
ULSAB-AVC Advanced Vehicle Concepts

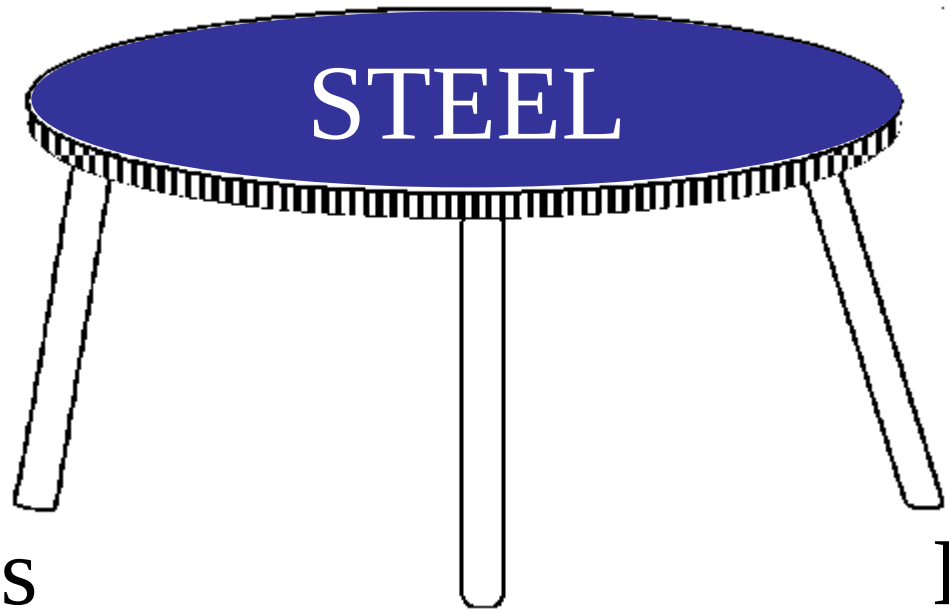
USAMP/DOE FUNDING

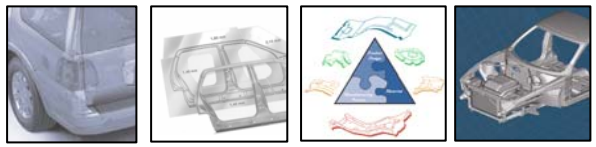
- A/SP approached USAMP for funding.
- DOE agreed to fund steel projects based on potential shown by ULSAB Projects.
- USAMP/DOE support is about $1.8 million/year.

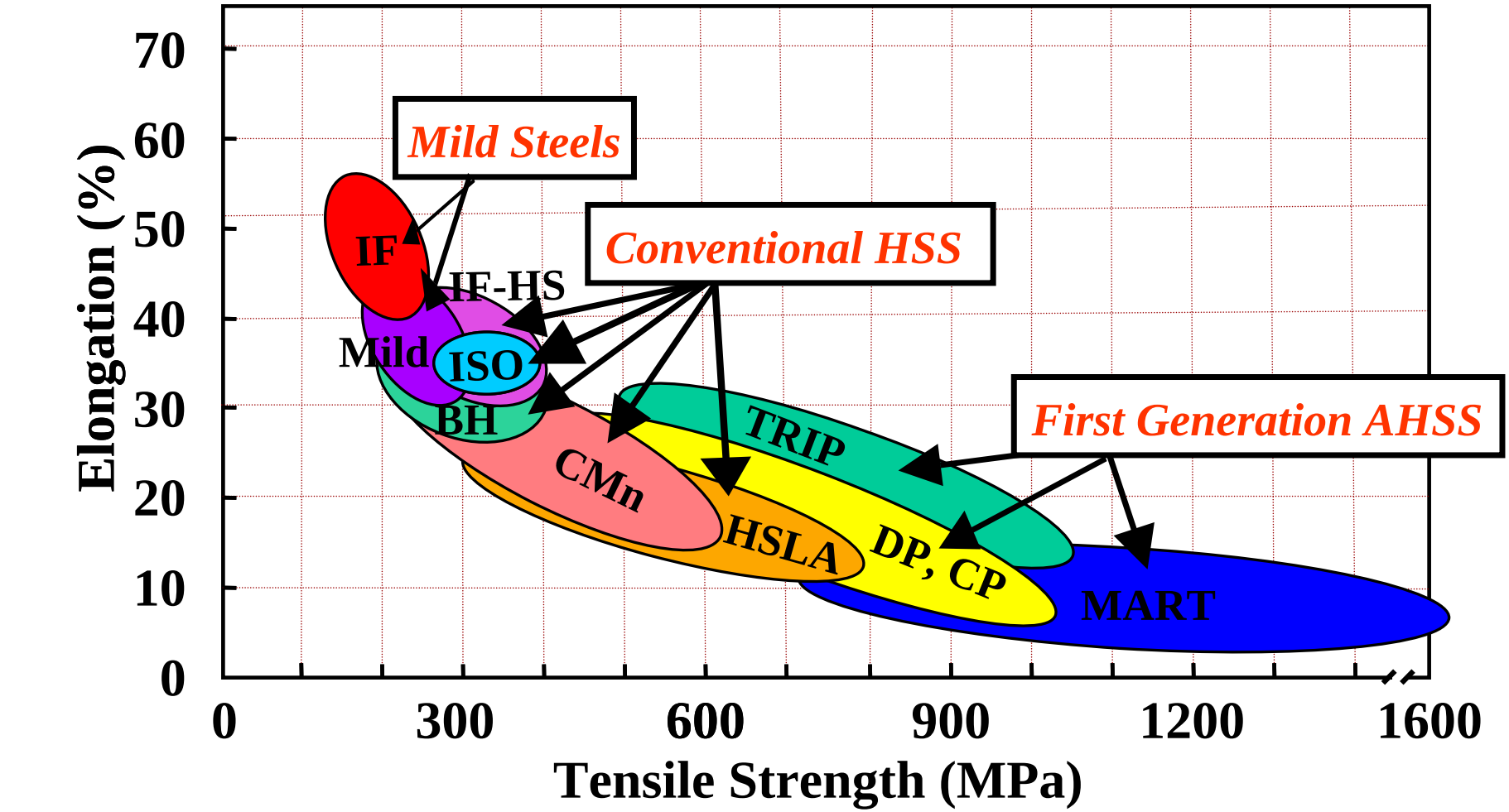

Technology Planning Process
USAMP CONE STAGES
Strategic Alignment - ties into Vision
technologic risk
Input to the USAMP cone
Concept Feasibility
Technical Feasibility
Demonstrated Feasibility
Input into OEM's or Supplier's cone
time
Today (Application Feasibility)
Tomorrow (Technical Feasibility)
far out (Concept Feasibility)

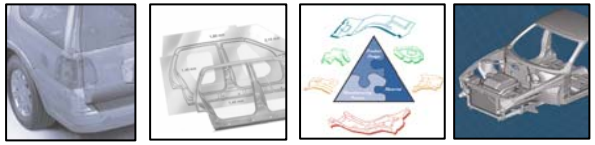





OVERALL STRATEGY

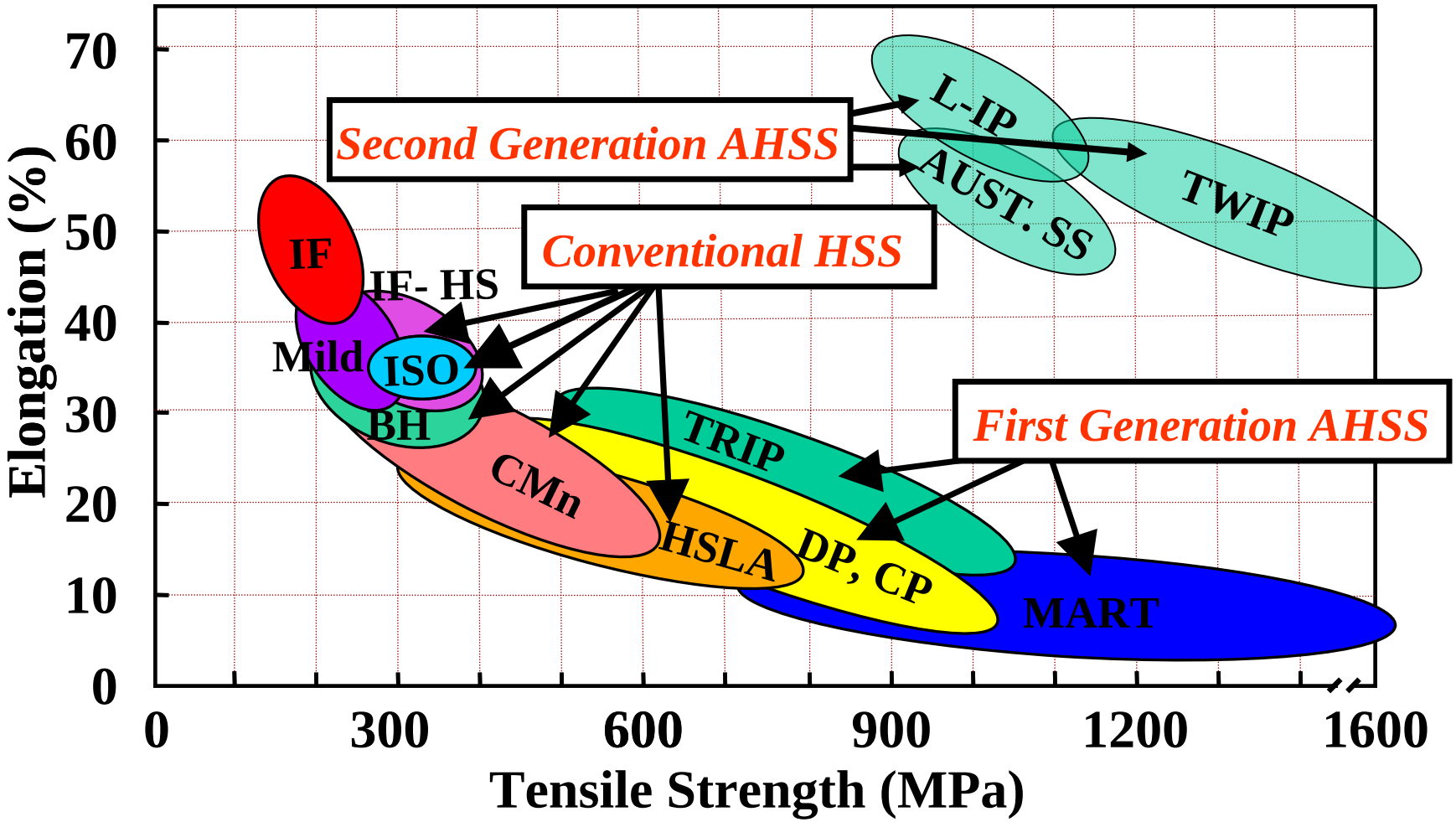


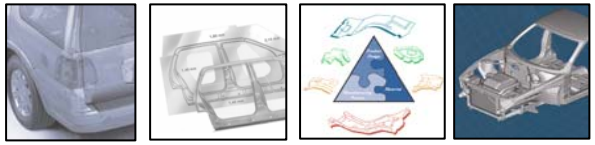



Mild Steels
Conventional HSS
First Generation AHSS
IF
IF-HS
Mild
ISO
BH
CMn
HSLA
TRIP
DP, CP
MART
Elongation (%)
70
60
50
40
30
20
10
0
0
300
600
900
1200
1600
Tensile Strength (MPa)

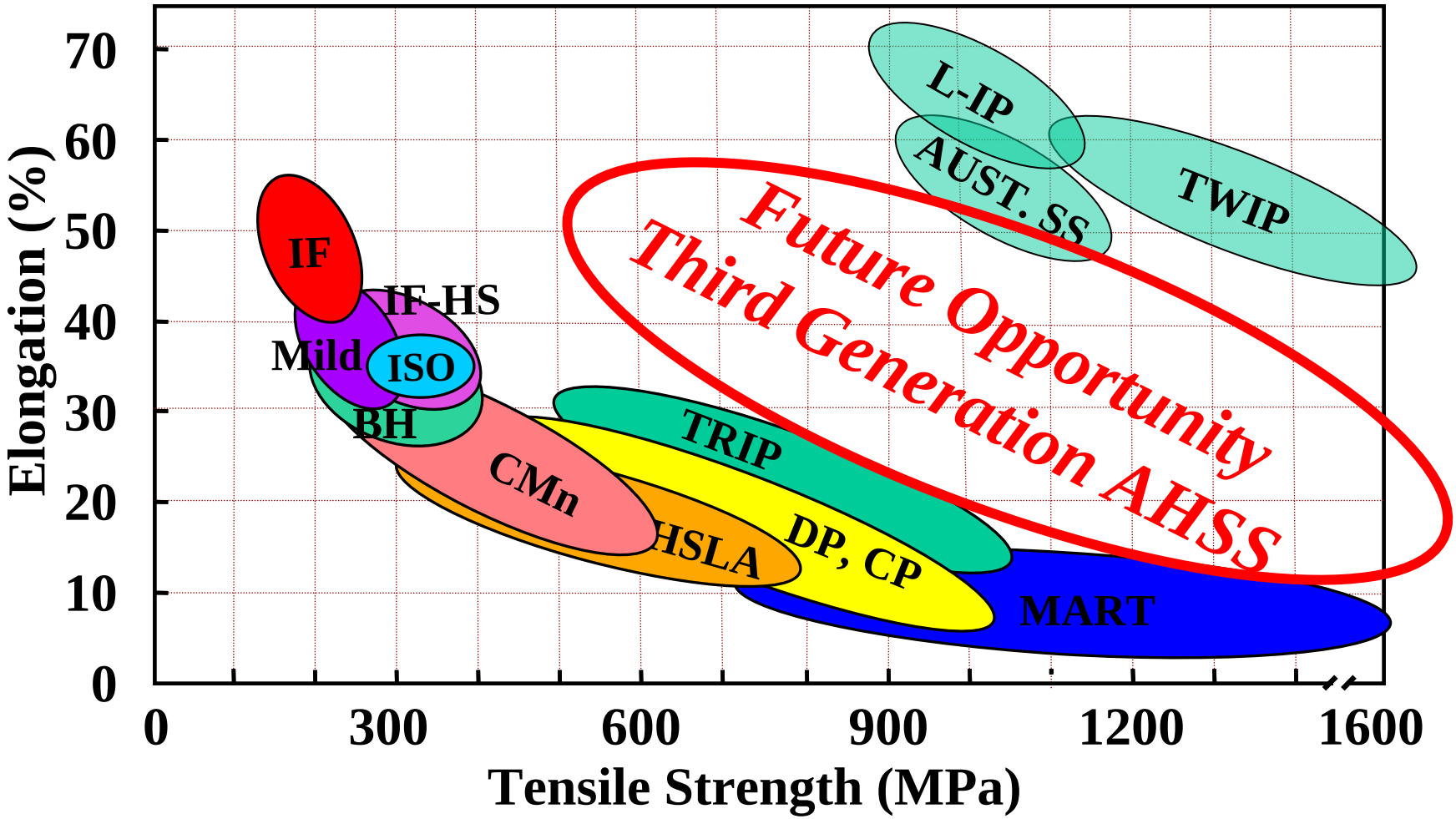


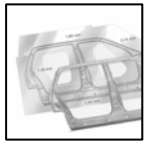
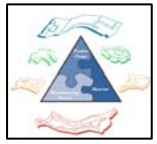
STEEL STRATEGY





STEEL STRATEGY - GAP

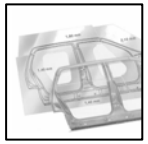
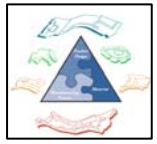



NSF 2007-2009

STEEL RESEARCH AWARDEES

University	Professor	Topic	Amount
Carnegie Mellon University	Warren Garrison	AHSS through microstructure and mechanical properties	$164,087/yr.
Case Western Reserve U.	Gary Michal	AHSS through C partitioning	$150,000/yr.
Catholic University of America	Abu Al-Rub Rashid	AHSS through particle size and interface effects	$88,687/yr.
Colorado School of Mines, Ohio State University	David Matlock (CSM) and Robert Wagoner (OSU)	Collaborative GOALI Project Formability and Springback of AHSS	$98,128/yr (CSM) $99,087/yr (OSU)
Drexel University	Surya Kalidindi	FEM using crystal plasticity simulation modeling tools	$143,333/yr.
Ohio State University	Ju Li	Multiscale modeling of deformation for design of AHSS	$142,277/yr.
University of Missouri Rolla	David C. Van Aken	AHSS through nano-acicular duplex microstructures	$166,667/yr.
Wayne State University	Susil K. Putatunda	High strength high toughness bainitic steel	$10,000/yr.
			$998,945/yr.

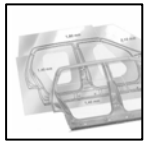
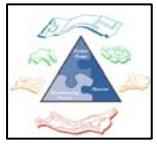





PROJECT STRATEGY

Lightweighting Initiatives

Enabling Projects

On-Going Activity

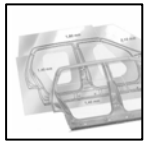
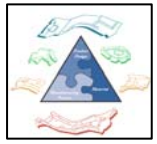

PROJECT STRATEGY

Lightweighting Initiatives

Enabling Projects

On-Going Activity

Strain Rate Characterization

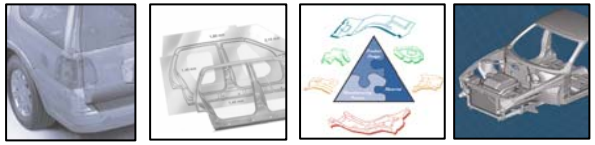

PROJECT STRATEGY

Lightweighting Initiatives

Enabling Projects

- Fatigue Characteristics
- Strain Rate Characterization
- Tribology

On-Going Activity



PROJECT STRATEGY

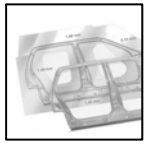
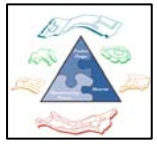
Lightweighting Initiatives

Enabling Projects

- Fatigue Characteristics
- Strain Rate Characterization
- Tribology
- Hydroforming
- High-Strength Steel Joining
- AHSS Stamping

On-Going Activity

- AHSS Application Guidelines


PROJECT STRATEGY

Lightweighting Initiatives

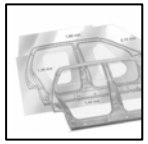
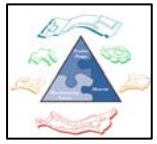
- Lightweight Chassis Structures
- Future Generation Passenger Compartment
- Mass Efficient Architecture for Roof Strength (MEARS)

Enabling Projects

- Fatigue Characteristics
- Strain Rate Characterization
- Tribology
- Hydroforming
- High-Strength Steel Joining
- AHSS Stamping

On-Going Activity

- AHSS Application Guidelines


PROJECT STRATEGY

Lightweighting Initiatives

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Enabling Projects

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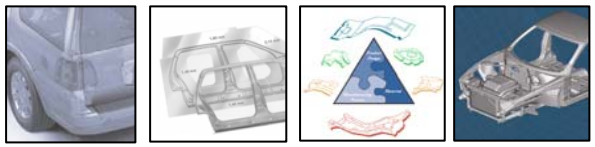
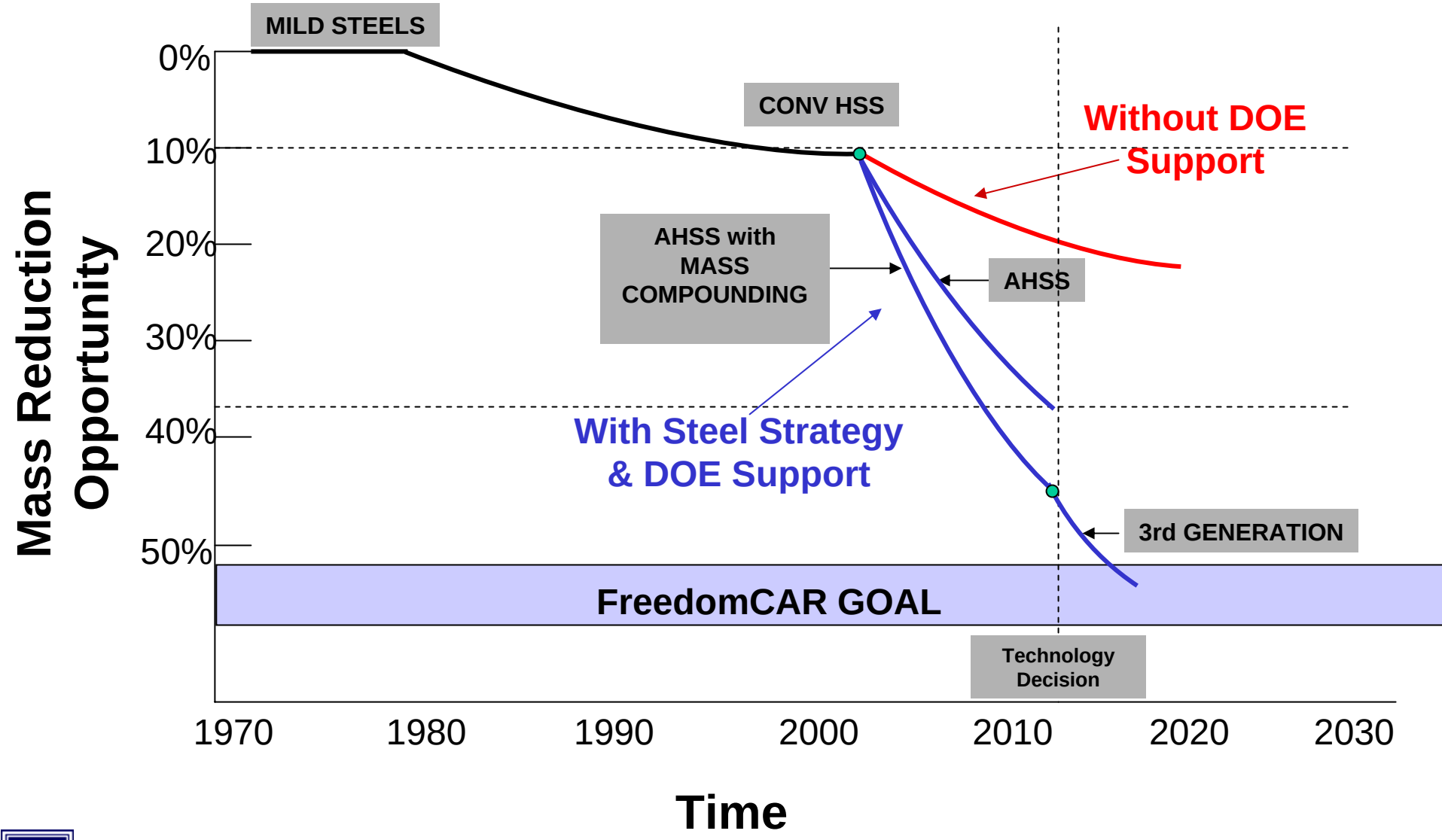
- Strain Rate Characterization
- Tribology
- Hydroforming
- High-Strength Steel Joining
- AHSS Stamping

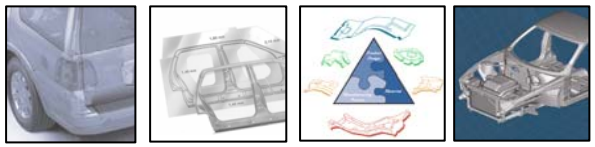
On-Going Activity

- AHSS Application Guidelines
- Technology Transfer



SUCCESS AND FUTURE OPPORTUNITIES





FreedomCAR & A/SP GOAL ALIGNMENT

FreedomCAR:

- 50% Mass Reduction.
- Affordable Cost.
- Life/Durability.
- Develop/Transfer Technology.
- Recyclability.

Auto/Steel Partnership:

- 40% Mass Reduction.
- Affordable Cost.
- Life/Durability.
- Develop/Transfer Technology.
- Recyclability.