



# **“BEST PRACTICE” R&D VIEW FROM A LARGE TIER ONE SUPPLIER**

- *SWAMY KOTAGIRI*  
*EXECUTIVE VICE PRESIDENT - ENG, R&D*

**COSMA INTERNATIONAL**

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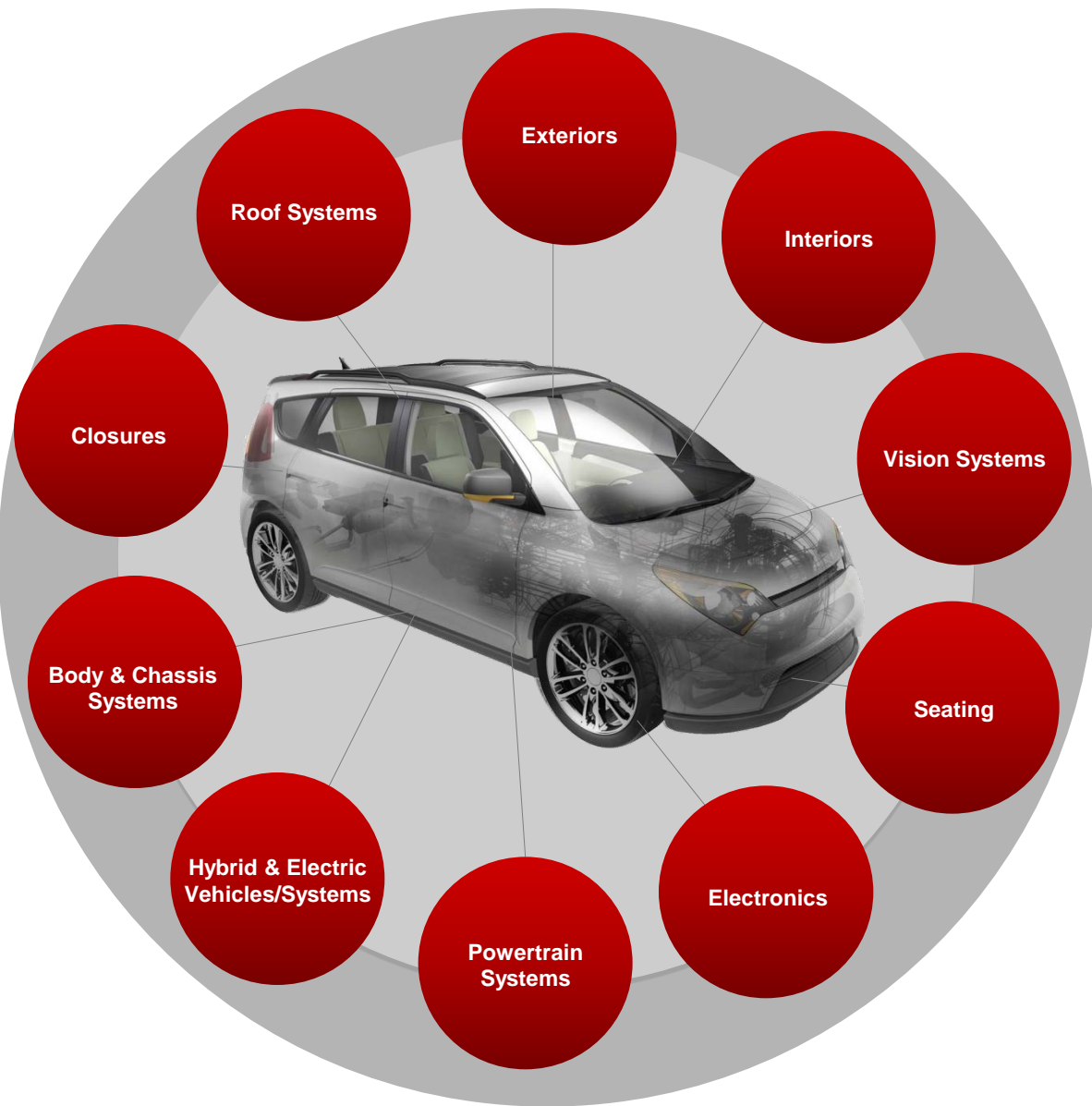
# Agenda

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- **Magna /Cosma Overview**
- **Fundamental vs. Application Research**
- **R&D Process**
- **Case Studies**
- **Industry Collaboration**
- **Conclusions**



# MAGNA / COSMA OVERVIEW

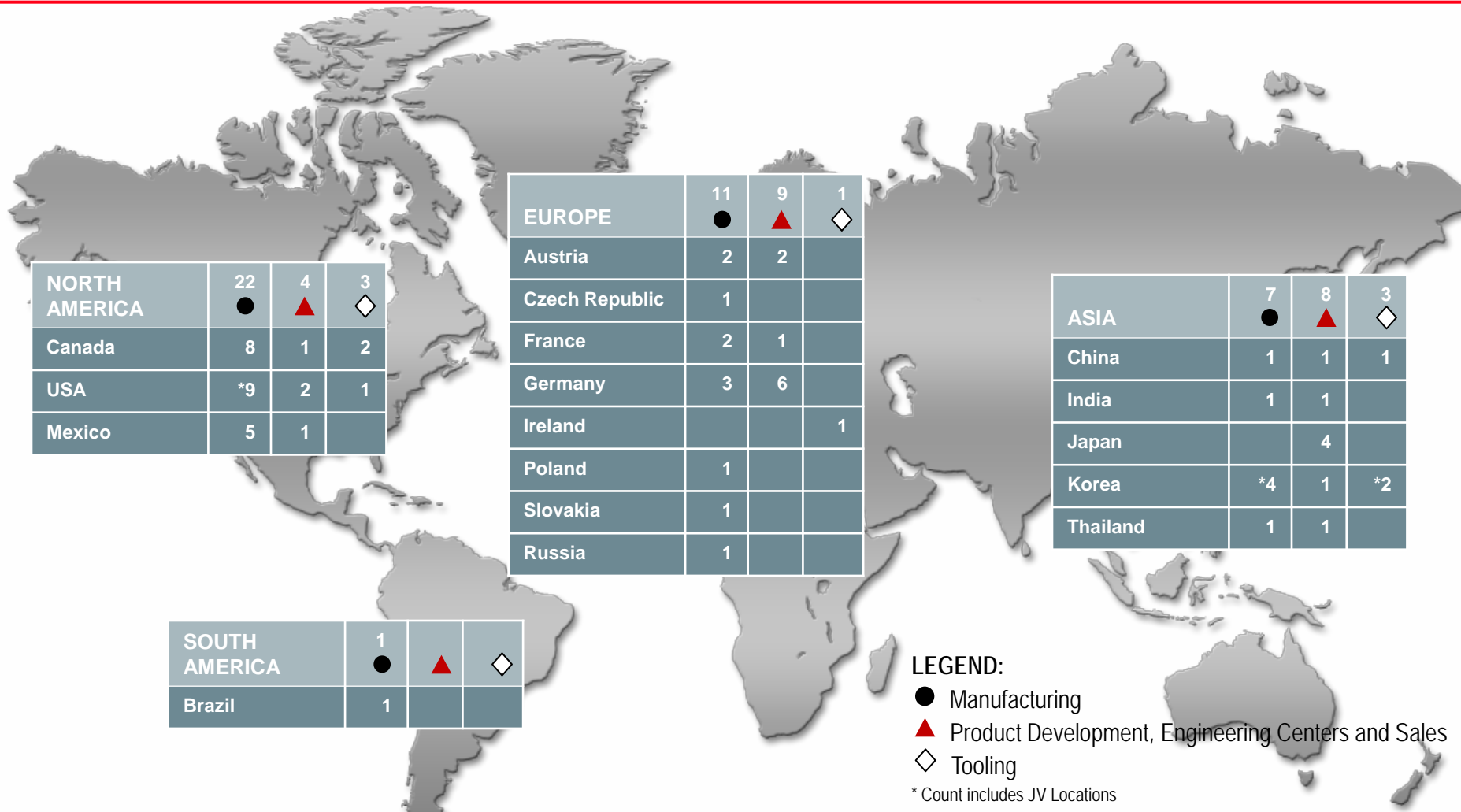


**engineering + services**

**product systems**

**vehicle assembly**

# Global Locations



**Manufacturing + Engineering**

41 Production/ 21 Engineering, R&D & Sales/ 7 Tooling | ~ 16,800 People

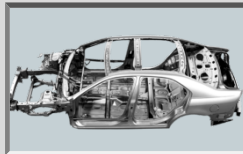
# body + chassis systems

## BODY SYSTEMS



Cosma produces a complete range of body-in-white solutions from small stampings up to fully assembled body-in-white modules such as the SMART roadster built for Daimler in Europe.

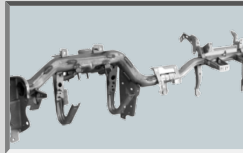
- Exterior Sheetmetal
- Closures Systems
- Body Structure Assembly
- Energy Management Solutions



COMPLETE BODY-IN-WHITE



BODY PANELS & ASSEMBLIES



I/P BEAM ASSEMBLY



BUMPERS & DOOR BEAMS



UNDERBODY ASSEMBLIES

## CHASSIS SYSTEMS



Cosma is a market leader in complete chassis structure assemblies and modules. A variety of innovative metalforming processes including hydroforming, rollforming, stamping and bending can be applied to meet specification.

- Complete Chassis Modules
- Frames, Subframes & Cradles
- Suspension Links & Arms



FRAMES



CRADLES & SUBFRAMES



TWIST AXLE



STEEL & ALUMINUM  
BI-METALLIC STRUCTURES



CONTROL ARMS

## body + chassis systems

### HYDROFORMING



Hydroforming allows for flexibility in product design, reduction in the number of system components and enhanced vehicle performance.

### ROLLFORMING



Cosma brings rollforming of ultra high strength materials to a new level. With the ability to pierce, weld and tightly bend (sweep), rollformed components in sequence.

### STAMPING



Our Class A and body structure solutions strive to exceed customer targets for weight and crash performance through innovative manufacturing processes.

### BENDING



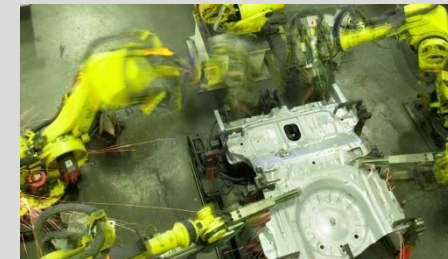
Innovative bending technologies are continuously under development to support ongoing product and process improvements.

### HOT STAMPING



Cosma has taken an industry lead in bringing this forming process to body structure applications. These include body pillars, rockers, roof rails, bumpers and door intrusion beams.

### ASSEMBLY



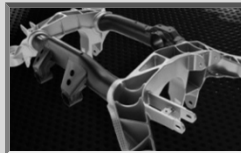
Our capabilities range from complete closure systems, chassis modules and full frame assemblies to fully assembled body-in-white modules.

# body + chassis systems

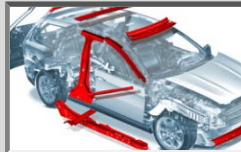
## RESEARCH & DEVELOPMENT



Cosma has multiple facilities worldwide focused on advanced engineering, research and development. The constant stream of innovation that flows from these R&D centers is aimed at the goal of providing our customers with a "Better Product for a Better Price™".



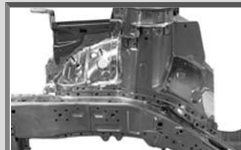
HYBRID STRUCTURES



HOT STAMPING



ADVANCED JOINING TECHNOLOGIES



ADVANCED HIGH STRENGTH STEELS



FLEXIBLE ASSEMBLY

## ENGINEERING



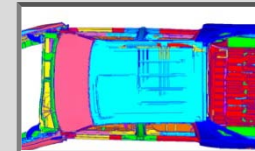
Our global engineering presence has proven itself in the areas of complete vehicle program management, product and process engineering, virtual engineering, prototype and testing.



CONCEPT DEVELOPMENT



PROGRAM MANAGEMENT



VIRTUAL TOOLS



PROTOTYPING



TESTING & VALIDATION





# FUNDAMENTAL VS. APPLICATION RESEARCH


# Drivers for Change

**EPA Fuel Economy Estimates**  
These estimates reflect new EPA methods beginning with 2008 models


<b>CITY MPG</b> <b>18</b> <small>Expected range for most drivers 15 to 21 MPG</small>	<b>Estimated Annual Fuel Cost</b> <b>\$2,039</b> <small>based on 15,000 miles at \$2.80 per gallon</small>	<b>HIGHWAY MPG</b> <b>25</b> <small>Expected range for most drivers 21 to 29 MPG</small>
<b>Combined Fuel Economy</b> This vehicle <b>21</b> <small>All SUVs</small>		

See the FREE Fuel Economy Guide at dealers or [www.fueleconomy.gov](http://www.fueleconomy.gov)

**CAFE STANDARDS**



**EMISSION STANDARDS**



**CHANGING AUTO INDUSTRY**



**IMPROVED SAFETY STANDARDS**

**DRIVERS FOR CHANGE**

# Fundamental vs. Application Research



## DRIVERS

CAFE

EMISSIONS

CUSTOMER NEEDS

SAFETY

COST

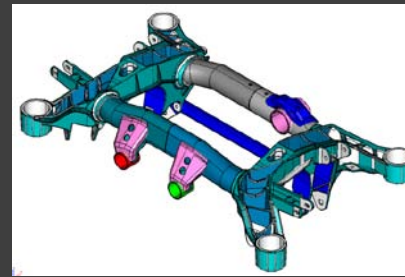


## RESEARCH

FUNDAMENTAL  
RESEARCH

UNIVERSITIES  
NATIONAL LABS

Eg. NEW ALLOY



## DEVELOPMENT

APPLICATION  
RESEARCH

PRODUCT/PROCESS  
DEVELOPMENT

TIER ONE SUPPLIER

NEW  
PRODUCT/PROCESS



## PRODUCTION

MASS PRODUCTION

OEM & TIER ONE  
COLLABORATION



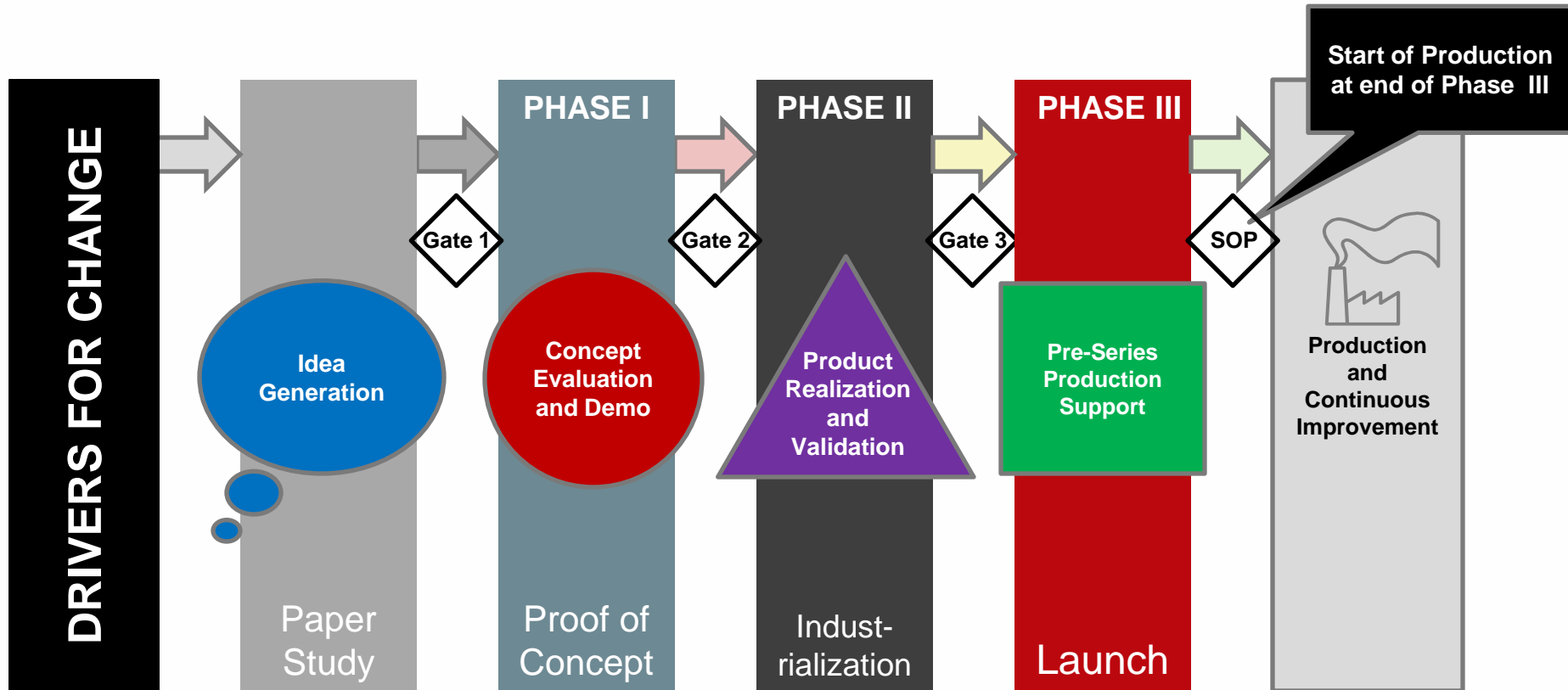
## Checklist for scientific and technical evaluation of a project:

- Will the existing Product:
  - Become **cheaper**?
  - Become **lighter**?
  - Be more **efficiently** made?
  - Create a **new market** or fill an existing market gap?
  - Have same or **better performance**?





## **COSMA R&D PROCESS**





## **CASE STUDIES**

# Front End Structural Module (FESM)

## DRIVERS FOR CHANGE

- Crash / safety
- CAFE / CO2 = Weight Reduction
- Product Stiffness
- Product Size / Design Constraints

- Tubular front end to replace traditional design
- Challenge = Joining tubes together

- New joining process
- Fundamental research = Material selection

- Application research = Development of Tubular FESM
- Prototypes

- Industrialization
- Production launch



**RESISTANCE  
BRAZED  
SPOT  
WELDING**

Idea Generation

Concept Evaluation and Demo

Product Realization and Validation

Pre-Series Production Support



# Hot Stamping

## DRIVERS FOR CHANGE

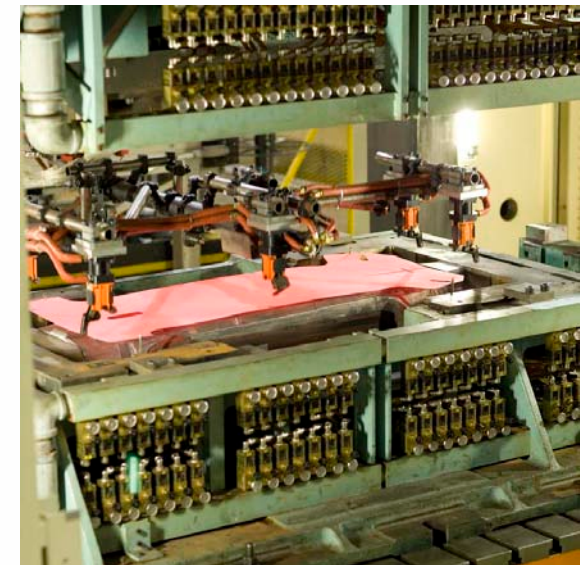
- Roof crush / safety
- CAFE / CO2 = Weight Reduction
- Increased performance

- Ultra high strength materials in key body structure areas
- Challenge = Economical process

- Tooling technology
- Fundamental research = Material treatment

- Application research = Tooling
- Prototypes

- Industrialization
- Production launch



Idea  
Generation

Concept  
Evaluation  
and Demo

Product  
Realization  
and  
Validation

Pre-Series  
Production  
Support

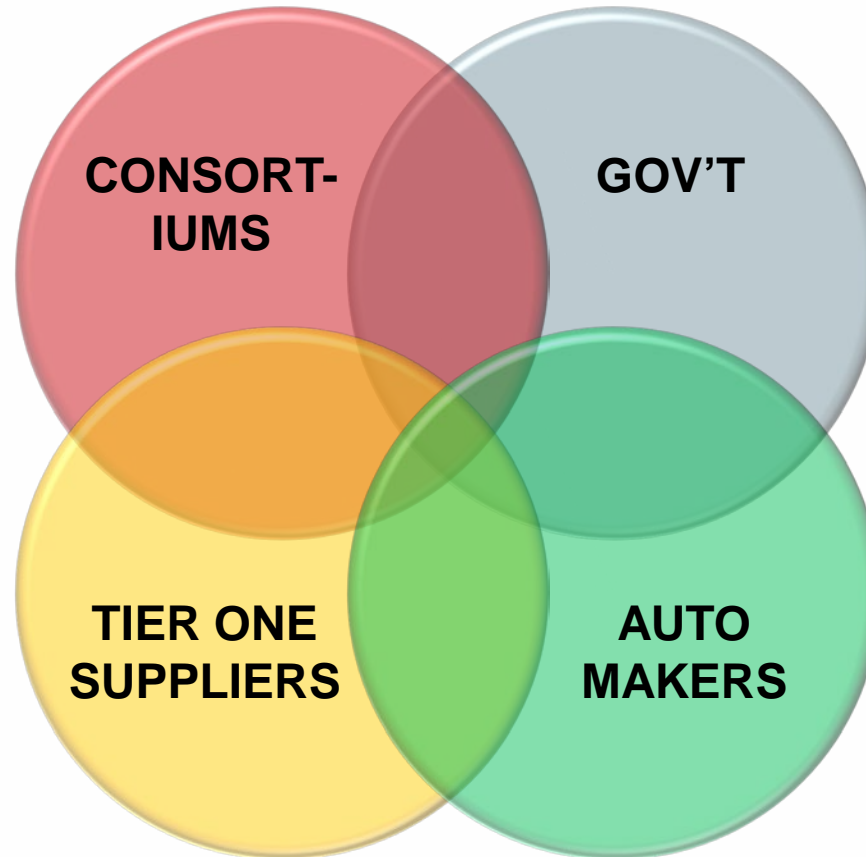


**INDUSTRY COLLABORATION**

**Drivers for Collaboration:**

- Changing requirements
- Technology enablers
- Future vehicles

- Vehicle, component design, and mfg expertise
- Develop theoretical materials data
- Verify crash and durability performance



- Program Management
- Funding
- Materials development

- Expertise on full system design
- Testing
- Identify requirements



## CONCLUSIONS

## Conclusions

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- **Drivers for Change in the industry require innovative and cost effective solutions**
- **The OEMs quest to remain competitive requires a strong supply base who invests in innovation**
- **Innovation will come to market more effectively with increased OEM / supplier collaboration**
- **Collaboration needs to occur across industries and disciplines**
- **Phased objective approach will improve ROI on R&D investment**



**THANK YOU**