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AUTOMOTIVE DIVISION

**PLASTICS**  
ENABLING GLOBAL  
AUTOMOTIVE DESIGN

NOVEMBER 7, 2018



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# PLASTICS

## ENABLING GLOBAL AUTOMOTIVE DESIGN

NOVEMBER 7, 2018

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# Welcome

## to the 2018 Innovation Awards Gala

November 7, 2018

Welcome to the 48th-annual SPE® Automotive Innovation Awards Gala, sponsored by the Automotive Division of the Society of Plastics Engineers (SPE). I'm honored to once again lead this annual program, the world's oldest and largest recognition event in the automotive and plastics industries. Each year we see the latest and best results of cooperative innovation by automotive engineers, designers and their suppliers whose combined ingenuity and creativity reinforce the dynamic nature of the automotive industry. My colleagues in the Automotive Division are excited to offer this tribute to the latest innovations in plastics and composites in ground transportation.

This year's theme, "Plastics – Enabling Global Automotive Design", reflects the notion that design and performance of automotive components is an intricate blend of materials, assembly, interfaces and execution. Each year, I think we have uncovered the last of the true clear targets for cost, weight and performance and every year I am proved wrong. The automotive design and engineering teams, including their partner supply base, continue to find new ways of developing components that deliver on the intended function at lower cost and weight than the preceding technologies while meeting or exceeding the performance of yesterday's solutions. This Innovation Awards program continues to demonstrate that plastics play an important role in delivering what car buyers ultimately want in terms of performance, fuel economy, safety and comfort through innovations in lighter weight components, powertrain technologies, and surprise & delight features on new vehicle programs. Several of these new technologies, materials, and processes will be presented tonight.

The competition this year, as always, was intense, with over 70 nominations across 9 different categories including the addition of the Additive Manufacturing category. This latest addition demonstrates a new frontier in the use of plastics to deliver real JIT (just in time) delivery for parts used in vehicle operations and parts used in vehicle assembly. This is clearly an area of very rapid growth which could ultimately allow automakers to reach something previously referred to as mass customization. We are just in the infancy of this technology which could dramatically change how we think of automotive component manufacturing.

Tonight's program will recognize the accomplishments of the people and companies involved in this year's most innovative use of plastics with awards in the following areas:

- Additive Manufacturing
- Body Exterior
- Body Interior
- Chassis/Hardware
- Environmental
- Materials
- Powertrain
- Process, Assembly and Enabling Technologies, and
- Safety





We will also recognize the latest entry into our SPE Automotive Division Hall of Fame and our newest recipient of the Lifetime Achievement Award, an award that recognizes the technical achievements of individuals whose work – in research, design, and/or engineering – has led to significant integration of polymeric materials on passenger vehicles.

Before we begin tonight's program, I would like to thank the many volunteers, sponsors, and judges who make this event possible. It is their dedication and commitment – their passion – for innovation that enable the SPE Automotive Division to recognize the industry's most innovative use of plastics and composites in automotive applications.

Once again, welcome to the 2018 SPE Automotive Innovation Awards Gala. Thank you for joining us and we hope you enjoy the event.

Sincerely,

*Jeffrey Helms*

Innovation Awards Chair 2010-2018  
Global Automotive OEM Corporate Accounts Director  
Engineered Materials  
Celanese

## SCHEDULE OF EVENTS

4:00-6:00 pm VIP Reception

4:30-6:00 pm Reception /  
Preview of Nominated Parts & Vehicle Displays

6:00 pm Seating Begins

6:15-7:00 pm Welcome / Dinner

Jeffrey Helms, Celanese, '10-'18 SPE Automotive Innovation  
Awards Program Chair

Teri Chouinard, Intuit Group

7:00-9:00 pm Gala Program

**Additive Manufacturing** Mark Bahm, BASF

**Body Exterior** Tom Pickett, General Motors Company

**Body Interior** Yvonne Merritt, Ford Motor Company

**Lifetime Achievement** Jeffrey Helms, Celanese

**Chassis & Hardware** Rose Petrella-Lovasik, Ford Motor Company

**Environmental** Crystal VanHouten, Grupo Antolin

**Hall of Fame** Kevin Pageau, International Marketing Alliance

**Materials** Suresh Shah, Delphi Corp. (retired)

**Powertrain** Joel Meyers, Hyundai-Kia Technical Center America

**Process, Assembly & Enabling Technologies**

Steven VanLoozen, Celanese

**Safety** Suzanne Cole, Miller Cole LLC

**Grand Award** Jeffrey Helms, Celanese

9:00-11:00 pm Afterglow Reception

Everyone Invited to Attend

*Special thanks to our student usher organizers, Teri Chouinard,  
Crystal VanHouten, Steven VanLoozen & David Helmer*

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## BLUE RIBBON JUDGES

Marc Bahm  
BASF

Subi Dinda  
Chrysler (retired), Oakland University

Brendan Dooley  
IHS Markit

Larry Drzal  
Michigan State University

John Fillion  
Chrysler (retired)

Ryan Gehm  
Automotive Engineering  
International

Norm Kakarala  
SPE Automotive Division

Gary Kogowski  
Ravago Holdings Americas

Audrey LaForest  
Plastics News

Peggy Malnati  
Composites World/Plastics  
Engineering

David Mattis  
General Motors Company (retired)

Tom Moore  
Chrysler (retired)

Al Murray  
SPE Emeritus

Natalia Ortega  
Plastics Technology Mexico

Nippani Rao  
Rao Associates, Automotive  
Plastics & Composites Consultants

Jay Raisoni  
Inteva Products (retired)

Tom Russell  
Allied Composite Technologies LLC

Lilli Sherman  
Plastics Technology Magazine

Kevin Smith  
Decoma (retired)

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## Plastics Terms

ABS	acrylonitrile butadiene styrene
ACM	alkyl acrylate copolymer
ASA	acrylic-styrene-acrylonitrile
CF	carbon fiber
CFRP	carbon fiber-reinforced plastic
D-LFT	direct-(ILC) long-fiber thermoplastic
EPP	expanded polypropylene foam
EVA	ethylene vinyl acetate
GF	glass fiber (reinforced)
GMT	glass-mat thermoplastic
GR	glass (fiber) reinforced
HDT	heat-deflection temperature
ILC	inline compounded
ITR	isophthalate terephthalate resorcinol
LCP	liquid crystal polymer
LFT	long-fiber thermoplastic
MFI	melt flow index
MFR	melt flow rate
MIC	molded-in-color
MPPE	modified-polyphenylene ether (also called MPPO, modified-polyphenylene oxide)
OOA	out-of-autoclave (process)
PA	polyamide (also called nylon)
PC	polycarbonate
PC/ABS	polycarbonate/acrylonitrile butadiene styrene
PC/ASA	polycarbonate/acrylic-styrene-acrylonitrile
PC/PBT	polycarbonate/polybutylene terephthalate
PE	polyethylene
PEI	polyetherimide
PET	polyethylene terephthalate
PMMA	polymethyl methacrylate (also called acrylic)
POM	polyoxymethylene (also called acetal)
PP	polypropylene
PPA	polyphthalamide
PPS	polyphenylene sulfide
PTFE	polytetrafluoroethylene
PVC	polyvinyl chloride (also called vinyl)
PVB	polyvinyl butyral
PVDF	polyvinylidene fluoride or polyvinylidene difluoride
SMA	styrene maleic anhydride
SMC	sheet-molding compound
TiO <sub>2</sub>	titanium dioxide
TPC-ET	thermoplastic copolyester elastomer
TPE	thermoplastic elastomer
TPO	thermoplastic polyolefin
TPV	thermoplastic vulcanizate

## Automotive Terms

A/C	air conditioning
AGS	active grille shutter
BEV	battery-electric vehicle
BIW	body in white
BSR	buzz/squeak/rattle

CAD	computer-aided design
CAE	computer-aided engineering
CLTE	coefficient of linear thermal expansion
CNC	computer-numerical control
CUV	cross-over (sport-) utility vehicle
EA / EAs	energy absorber(s)
EGR	exhaust-gas recirculation
EPA	U.S. Environmental Protection Agency
EU	European Union
FIP	foam-in-place
FMVSS	U.S. Federal Motor Vehicle Safety Standard
GOR	grille-opening reinforcement
HDT	heat-deflection temperature
HEV	hybrid-electric vehicle
HIC	head-injury criterion
HID	high-intensity discharge
ICE	internal combustion engine
IP	instrument panel
LED	light-emitting diode
Li-Ion	lithium-ion
MPV	multi-purpose vehicle
NVH	noise/vibration/harshness
OEM	original-equipment manufacturer
PCR	post-consumer recycle
ped-pro	pedestrian protection (requirement)
PHEV	plug-in hybrid-electric vehicle
PIR	post-industrial recycle
SUV	sport-utility vehicle
TPC-ET	thermoplastic copolyester elastomer
VOCs	volatile organic compounds

## Other Terms

2D	two-dimensional
3D	three-dimensional
cm	centimeter
CO <sub>2</sub>	carbon dioxide
ft	foot
g	gram
in	inch
IR	infrared
kg	kilograms
lb	pound
KMPH	kilometers/hour
km/h	kilometers/hour
m	meter(s)
mm	millimeter
MM	million(s)
MPG	miles/gallon
MPH	miles/hour
N	Newtons
sec	second
SG	specific gravity
USD	U.S. dollars





AUTOMOTIVE

2018 INNOVATION AWARDS COMPETITION & GALA

# Additive Manufacturing

## 3D Printed Steel Inserts for Speaker Grille Molding 2019 General Motors Company Chevrolet Silverado / GMC Sierra



System Supplier:	General Motors Company
Material Processor:	Inteva
Material Supplier:	EOS-NA
Resin:	ADX 5321 TPO
Tooling Supplier:	Hi-Tech Mold & Engineering, Inc.

These speaker grille inserts were manufactured with no limits on the design, enabling injection mold build time reductions and cost savings. Vents can be placed at strategic locations as mold flow predictions require. Previous speaker grille mold materials were \$300 per lb and limited at times to availability. Average weight per insert is 17 lbs and average savings is 14% per speaker grille insert. Maintenance savings by the molder for cleaning the inserts is \$500 per mold cavity (42 mold cavities).

## Air Temperature Aspirator 2017 General Motors Company Holden Commodore



System Supplier:	3D Systems Australia
Material Processor:	3D Systems Australia
Material Supplier:	3D Systems Australia
Resin:	PA
Tooling Supplier:	3D Systems Australia

Adapting an existing OE component using additive manufacturing solved a production part supply issue for an HVAC system. The existing part was a two-piece assembly which was redesigned to a one piece, to take advantage of selective layer sintering. A weight savings of 1g and a cost saving of \$0.94 per part was achieved. By not having to create new tooling, etc. there was a \$37,880 cost avoidance. Lead time to first sample was 2 days compared to 12 weeks if traditional processing was used.

## Additively Manufactured Body Tools 2018 General Motors Company Chevrolet



System Supplier:	General Motors Company
Material Processor:	Stratasys
Material Supplier:	Stratasys
Resin:	ASA & PA
Tooling Supplier:	na

These additive manufactured B-side body tools are 50% lighter than traditional metal fabrications, making handling much easier. The 3D printed tools pass same repeatability validation with a 94% build cost savings and 84% shorter lead times. Traditional tooling program cost is \$900,000 versus 100% 3D printed tools for only \$50,000.

## 3D Printed IMM Tool Lifter Action 2019 Ford Motor Company Ford Ranger



System Supplier:	Faurecia Interior Systems
Material Processor:	Faurecia Interior Systems Fraser
Material Supplier:	Advanced Composites
Resin:	ADX 5328 TPO
Tooling Supplier:	Hi-Tech Mold & Engineering, Inc.

To solve a problem of inadequate venting, a new 3D printed insert was designed with integrated venting channels to allow gas to escape to the atmosphere. The new design included vents along the tops and sides of each vane, improving venting 100%. Time to manufacture the insert was reduced by 70% for 3D printed vs. P-20 steel. The integrated design eliminates the need for a separate grill.



**AUTOMOTIVE**

2018 INNOVATION AWARDS COMPETITION & GALA

# Additive Manufacturing

## 3D-Printed Tools & Fixtures 2018 Ford Motor Company Ford Focus



System Supplier:	Ultimaker 3, EOS P770
Material Processor:	Ford RTC and R&A
Material Supplier:	Ultimaker & EOS
Resins:	PA3200GF (PA12+GF15) & PLA
Tooling Supplier:	Ultimaker & EOS

A suite of additively manufactured tools and fixtures have been deployed for the trim & final assembly area. They are much more ergonomic, lightweight, significantly lower cost and have much shorter lead time. This is the first time where more than 50 tools & fixtures have been entirely 3D-printed at the OEM, without the need of having backup tools or backup solutions. A 5% to 95% weight reduction, depending on the fixture, is achieved. On average, there was an approximate \$1,000 cost savings per fixture (up to 90% cost reduction).

## Window Alignment Fixture 2017 Ford Motor Company Mustang Convertible



System Supplier:	Stratasys
Material Processor:	Stratasys
Material Supplier:	Stratasys
Resin:	PA12 35% short carbon fiber
Tooling Supplier:	Stratasys Direct Manufacturing

This additive fixture was 30% lighter and cheaper to produce vs. a traditional welded fixture. It was also much faster to manufacture – only 50 hours to build the integrated fixture with handles and mounting brackets. Ergonomics were improved significantly. The plastic fixture allows for easier handling and avoided the requirement for lift assist. The printed fixture integrated pneumatic control, eyelets for stowage rack, trigger switch housing, ergonomic handles, gage protector deflector and pneumatic tubing retainers and switch mounts.

## 3D Printed Spare Parts 2006 Ford Motor Company Ford Focus



System Supplier:	Ford Motor Company
Material Processor:	na
Material Supplier:	Carbon
Resin:	EPX82 Epoxy
Tooling Supplier:	na

This application proved that spare parts can be 3D printed on demand, passing all functional requirements. This is the industry first use of Carbon's CLP technology for HVAC components in a production vehicle. No tooling need, significant cost savings over re-tooling and a major decrease in time to market over re-tooling are the benefits of this technology.

## Lift Assist 2018 Ford Motor Company Ford Escape and Ford Fusion



System Supplier:	Ford Motor Company
Material Processor:	Stratasys
Material Supplier:	Stratasys
Resin:	Multiple
Tooling Supplier:	Eckhart

This lift assist (used in assembly) can lift anything from a half shaft to an instrument panel. This first time use of the AM Fused Deposition Process (FDM) for this application allowed for the creation of more complex geometries to better interface with the casting at 50% the cost of a traditional fixture. A significant savings in weight (222 lbs) makes it better for operators to use and results in less repetitive motion injuries. A significant savings in lead time was also achieved.



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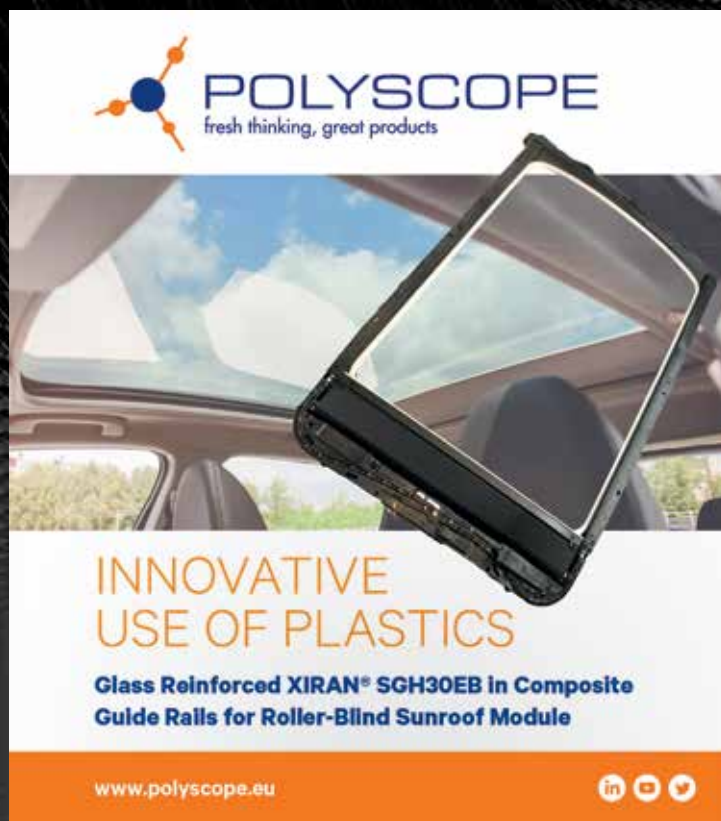
# Body Exterior

## Composite Guide Rails for Sunroof Module 2016 Groupe Renault Renault Scenic MPV



System Supplier:	Webasto
Material Processor:	Shapers ARRK
Material Supplier:	Polyscope Polymers BV
Resin:	XIRAN SGH30EB GF SMA/ABS
Tooling Supplier:	Shapers ARRK

This is the first time that a thermoplastic composite has successfully replaced aluminum for guide rails on roller-blind sunroof modules. Guide rail production was reduced from 7 steps to 2 and sunroof installation on the assembly line was reduced from a 2-3 step bottom-loaded process to a 1 step top-loaded process resulting in a 20% cost savings. The new design provides for more head space and lower operating noise in the interior.



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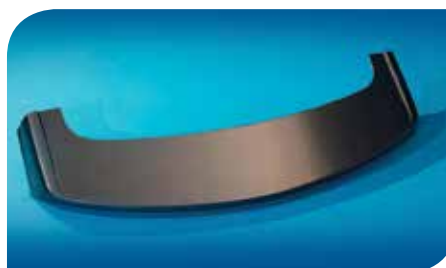
## Decorative Front End Trim 2017 General Motors Company Chevrolet Colorado ZR2



System Supplier:	Creative Liquid Coatings Inc.
Material Processor:	Creative Liquid Coatings Inc.
Material Supplier:	M-Holland Company
Resin:	Bayblend T85 PC/ABS
Tooling Supplier:	Commercial Tool & Die

Extensive use of injection molding capabilities, including direct injection into part against Class A surface with 9 gates to overcome the material's mold flow limitations eliminated the need of add-on attachment brackets on this large exterior trim component. This part was formerly produced with SMC and carbon fiber injection molded with a two-part design. Now as a single thermoplastic component, a 20-30% mass savings and a \$1.4 million annual cost savings is achieved.

## Full Display Mirror Camera with Wash Nozzle 2019 General Motors Company Cadillac XT4

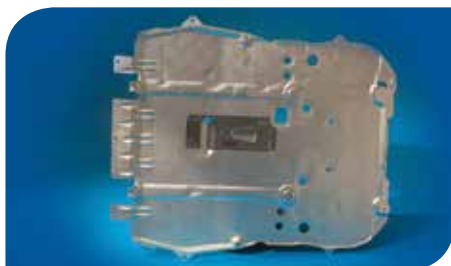


System Supplier:	AP Plasman /Valeo
Material Processor:	AP Plasman
Material Supplier:	Lotte
Resin:	Samsung HP1000 XA PC/ABS
Tooling Supplier:	AP Plasman/ Build-A-Mold

A full display mirror camera with a wash nozzle is integrated in a spoiler, that also has an antenna and CHMSL, overcoming packaging and EMC/EMI and styling challenges. A coax cable routing was discovered that allowed camera packaging without EMI and the routing was enabled by features that can be formed in the plastic making this industry first application possible.

# Body Exterior

## Self-Extinguishing Undershield 2018 Peugeot Peugeot 3008



System Supplier:	Röchling Automotive
Material Processor:	Röchling Automotive
Material Supplier:	Röchling Automotive
Resin:	Seralite - GF PP + Aluminum
Tooling Suppliers:	HWF Hessische Werkzeug- und Formenbau GmbH

This is the first time that a thermoplastic composite has successfully replaced aluminum for guide rails on roller-blind sunroof modules. Guide rail production was reduced from 7 steps to 2 and sunroof installation on the assembly line was reduced from a 2-3 step bottom-loaded process to a 1 step top-loaded process resulting in a 20% cost savings. The new design provides for more head space and lower operating noise in the interior.

## Front and Rear Skid Plates 2019 General Motors Company Cadillac XT4



System Supplier:	Flex-N-Gate
Material Processor:	Ventra Plastics
Material Supplier:	LyondellBasell
Resin:	Hifax TYC 1168P 668D TPO
Tooling Supplier:	B and B Tool

The appearance of silver metallic paint is achieved on these front and rear injection molded skid plates. A smaller particle size metallic flake, than what has been traditionally used, was developed for even distribution throughout the part. The result is a fully recyclable part with superior scratch and UV resistance without the cost and environmental impact of painting

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## Thermoplastic Liftgate 2019 Fiat Chrysler Automobiles Jeep Cherokee



System Supplier:	Magna International Inc.
Material Processor:	Magna Exteriors Belvidere
Material Supplier:	Trinseo & LyondellBasell
Resin:	DLGF 9411 PP & Hifax TYC TPO
Tooling Supplier:	Tycos Tool & Die

Replacing a steel liftgate with a new thermoplastic design enabled a 28% mass reduction and a 50% tooling and capital investment savings through part integration and manufacturing efficiency. An industry first use of conformal infrared welding behind the MIC grain class A surface increased structural and dimensional performance and enabled quicker processing. Bonded in brackets enabled patent pending tethering attachments without fasteners, improved metal reinforcement efficiency and maintained styling surface wrap in D pillars without sacrificing DLO. All this was accomplished within an 18-month window.



# Body Exterior

## Rear Bumper Injection Molded Step Reinforcement 2019 Fiat Chrysler Automobiles Ram 1500



System Supplier:	Flex-N-Gate
Material Processor:	Flex-N-Gate
Material Supplier:	Celanese Corporation
Resin:	Celstran PPGF30-03 LGF PP
Tooling Supplier:	Integrity Tool & Mold

This one-piece plastic reinforcement enables a hybrid rear bumper assembly to replace an all metal one, for significant weight savings, while maintaining its chromed metal shell. An 8 lb weight savings was achieved with this plastic design with supporting metal brackets that spans the entire length of the bumper. The innovation includes 36 molded-in metal threaded inserts and compression limiters robotically loaded via end of arm tooling. To improve low speed crash worthiness, the metal bumper shell attaches to the frame rail/hitch ASM via the metal mount brackets, thus creating a collapsible structure that supports step load after an impact.

## Overmolded Hybrid Structural Bracket 2018 Fiat Chrysler Automobiles Jeep Wrangler



System Supplier:	ABC Group
Material Processor:	ABC Group
Material Supplier:	Salflex Polymers
Resin:	S8325CIW RXF Color GF PP
Tooling Supplier:	Integrity Tool & Mold

This is the industry's first plastic reinforced structural running board bracket. The hybrid structural bracket consists of a 1.5mm e-coated steel substrate that is overmolded with a blend of 30% glass filled co-polymer polypropylene. It replaces steel brackets and is able to withstand 1,000 lbs of load while being aesthetically pleasing. A weight savings of 3.72 lbs per vehicle and a 27% cost savings was achieved.

## Side Truck Storage Compartment 2018 Fiat Chrysler Automobiles Ram Truck



System Supplier:	ABC Group
Material Processor:	ABC Group
Material Supplier:	Salflex / LYB
Resin:	Sequel 1588 TPO
Tooling Supplier:	Valiant

Switching from blow molding to injection molding, design improvements, and material formulation adjustments enhanced the functionality of this DT Ram Box assembly. Injection molding of the lids allowed for packaging of wiring between the lid components and allowed for LED lights to be added. The number of components was reduced by 7 per side. Vehicle environment changes led to concerns with meeting functional objectives so additional structure was added to the bin.

## Bumper Bracket 2019 General Motors Company Chevrolet Silverado



System Supplier:	Flex-N-Gate
Material Processor:	Flex-N-Gate Ventra Evart
Material Supplier:	Lotte / Mitsui
Resin:	SUPRAN PP1340 GF PP
Tooling Supplier:	Integrity Tool & Mold

The most innovative feature of this hybrid application is the replacement of a structural steel bracket, in a stamped pickup bumper, with a glass fiber filled plastic one. The plastic with metal inserts design enabled a mass savings and tailored geometry for improved stress and modal performance. Utilizing a plastic bracket also enabled integrating a fog lamp mounting bracket into the design. A 2.5kg weight savings per vehicle was achieved.





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# Body Interior

## High-efficiency Air Cleaner 2019 JAC-VW SOL E20X



System Supplier:	Iclean
Material Processor:	XJR
Material Suppliers:	King Fa, DuPont, Vulcaflex S.p.A.
Resins:	MAC-701LV PC/ABS, HR-527AP ABS, Delrin 500 POM, Vulcaflex PVC
Tooling Supplier:	na

This is the first time an air cleaner was incorporated into the arm rest. The parts are made with POM material with low VOC. Using double-field clean engine and corona technology, PM2.5, bacteria and VOCs are reduced. The system replaces costly traditional HEPA and carbon filters that are hard to recycle.

## Lightweight Structure of Over Head System 2018 Ford Motor Company Ford Focus



System Supplier:	Grupo Antolin
Material Processor:	Grupo Antolin
Material Suppliers:	BASF / Covestro
Resins:	E3953-107 / Baynat 2504 PU Foam
Tooling Supplier:	Grupo Antolin

Headliner thickness is reduced for a mass reduction and a cost savings. Foam mass is reduced 35% and a \$4 per vehicle savings is achieved with the elimination of NVH pads. The use of a perforated foam, to improve NVH performance and porosity, enables a 30% improvement on NVH properties. A 7-10% piece price substrate cost savings and an estimated \$0.5 million savings on warranty issues are also achieved. Mechanical properties are improved by 35%.

## Lighted Headliner 2013 Peugeot Peugeot 2008



System Supplier:	Grupo Antolin
Material Processor:	Grupo Antolin
Material Supplier:	Orogas
Resin:	PMMA
Tooling Supplier:	Grupo Antolin

This decorative application of ambient lighting, without increasing part thickness, for a headliner offers unique product design and styling differentiation opportunities. A solvent free adhesive, developed for this process, ensures quality and homogeneity of light for day and night effects. This innovation is based on the integration of a planar light guide with LEDs embedded in a flexible cable in a wet PU compression molding process. Common tooling allows for vehicle upgrades compatible with standard versions.

## Door Trim Panel 2016 SAIC General Motors Corporation Limited Buick Lacrosse



System Supplier:	Yanfeng Automotive Interior Systems Co., Ltd.
Material Processor:	Yanfeng Automotive Interior Systems Co., Ltd.
Material Suppliers:	Runjia Engineering Plastics Limited Company / EIWA Chemical
Resin:	5050C-LI PP
Tooling Supplier:	YFAI

An innovative combination of engineered structure and material, injection tool functionality, and injection process parameters achieve a new level of surface quality and appearance on this door trim panel. Mass reduction for the door trim main substrate reached 26%. It was processed via chemical foaming with core-back process enabling a class A appearance requirement. An approximate 20% injection cycle time savings was also achieved.







**AUTOMOTIVE**

# Body Interior

## IP Substrate With Partial Visual Structure 2019 Geely Auto Group FE-6



System Supplier:	SH Global
Material Processor:	SH Global
Material Supplier:	Celanese Corporation
Resin:	Celstran PP-GF20-0553 PP LGF
Tooling Supplier:	Tianhui Mould

This is the first instrument panel with long glass fiber on a visual surface. An integration of the polished area and grained area to one part in one tool contributed to the development of this innovation. Reducing the area of the soft skin and avoiding additional tooling for the partial visual structure of the long glass fiber material was a cost savings factor. This new design contributed to a 300g weight reduction and a \$2.2 per vehicle cost savings was achieved.

## Assembly Facilitator For C-pillar Upper 2018 Ford Motor Company Ford Focus



System Supplier:	Industrias Alegre
Material Processor:	Industrias Alegre
Material Supplier:	Mitsui
Resin:	EDX 8305 TPO
Tooling Supplier:	Industrias Alegre

Using plastics with molded in features allowed for eliminating plug covers on this assembly facilitator for a 4-door CD pillar upper trim to package tray support. A unique and tune-able design and assembly sequence, versus standard practices of separate clips and one direction assembly, enabled this innovation. A 3% weight savings resulted as snap feature and corresponding reinforcement ribs are not required.

## Integrated Modular Pelvic Bolster 2018 Ford Motor Company Lincoln Navigator



System Supplier:	Faurecia Interior Systems
Material Processor:	Faurecia Interior Systems
Material Supplier:	LyonellBasell
Resin:	Profax SG702 PP
Tooling Supplier:	Roush Tooling

This application combines 2 unique side impact bolster designs to meet the requirements for 5th and 50th percentile occupants. Integrating them into the map pocket resulted in tooling cost savings estimated at \$100K. There was an additional \$100K indirect savings in testing time and \$8 per vehicle cost avoidance if add on bolsters were used. An approximate 10% weight savings was achieved. Modular features were added to improve performance, by increasing flexibility of design, and reduce use of multiple bolster parts.

## Multiple-Piece Runner All Weather Mat 2018 Ford Motor Company Lincoln Navigator



System Supplier:	Hope Valley Industries
Material Processor:	Hope Valley Industries
Material Supplier:	Americhem
Resin:	Sevrene 6650-70A TPE
Tooling Supplier:	Hope Valley Industries

A two-piece mat design, that includes a mushroom headed post attachment on the lower mat and hole in the upper mat, makes removing debris from the mat easier for the consumer. A one-piece mat is heavier and more awkward to remove causing dirt and debris to spill out while removing the mat for cleaning. The new design is also more efficient than traditional 2-piece matts that use gravity to hold the top mat down over the edge of the lower mat, because the mushroom headed post seals tightly so debris does not slip through onto the vehicle carpet.



# Lifetime Achievement Award



## SPE® ANNOUNCES “LIFETIME ACHIEVEMENT AWARD WINNER” – DR. ROSE A. RYNTZ

**Dr. Rose A. Ryntz**, vice president, Global Advanced Development and Material Engineering at International Automotive Components Group (IAC) has been named the 2018 **Lifetime Achievement Award** winner by the Automotive Division of the **Society of Plastics Engineers (SPE®)**.

Ryntz is a technical specialist and research leader in automotive plastics technology with more than 35 patents and five trade secrets in production and material technology that have advanced the industry. Her game-changing innovations include the development of damage resistant fascias, automotive interior skin technologies for use in seamless passenger airbag instrument panels and interior and exterior automotive coatings on plastics. Her technical support, with several automotive suppliers, led to several Joint Development Agreements further advancing the industry. These include functionally integrated interior automotive components with heating, lighting, and Human Machine Interface (HMI) content, bi-laminate and compact sheet technologies for use in vacuum formed and In-Mold grain laminate doors and instrument panels and lightweight technologies incorporating natural fiber and bio-based solutions.

Ryntz has won more than 20 prestigious industry awards internationally (including three SPE Automotive Innovation Awards for Sustainability and Lightweighting) and is respected as an industry expert and a key opinion leader. She has been interviewed over 40 times by industry trade journals, been featured as a keynote speaker more than 15 times, presented more than 120 technical papers worldwide and authored four technical books.

“I am very honored to be recognized to receive this very prestigious award and hope it will help to inspire more women to pursue careers in Science, Technology, Engineering & Manufacturing (STEM) programs, and become more involved in their industry” said Ryntz.

“Working with Rose is always a positive experience,” said Lonnie S. Holmquist, vice president – Quality at IAC Group. “Not only is Rose innovative and intelligent but also brings to the team a strong desire to make a difference, improve the situation as well as provide support,” continued Holmquist. “Rose embodies the character traits of a strong leader and one who is truly valued - Rose rocks!”

“Dr Rose Ryntz is a unique visionary who goes above and beyond in everything she does,” said Davida Barrett, senior account manager at Celanese. “She is a mentor to many, who asks the best of herself and

everyone she works with,” continued Barrett. “I am proud to know her and call her my friend and colleague - Rose congratulations on winning the SPE Lifetime Achievement Award. Bravo!”

“Rose is a true automotive industry innovator - her ability to tie the results from relentless research and development iterations to true commercial and performance benefits has led her and her teams to many successes over her career,” said Joe Schulcz, automotive market manager, Kraton Corporation. “This award is well deserved as her leadership was instrumental in many successes in the automotive marketplace,” continued Schulcz. “Congratulations on her achievement of this prestigious award and to many more future successes.”

Ryntz credits her success to her education, work experience and participation in SPE and other professional trade associations. Ryntz obtained a Ph.D degree in Organic Polymer Chemistry from the University of Detroit in 1983, a MBA in Business Supply Chain from Michigan State University in 2002 and a Bachelor of Science degree in Chemistry from Wayne State University in 1979. She was employed at various companies (Dow Chemical, DuPont, Ford Motor Co., Akzo Nobel, Collins & Aikman and Visteon) prior to her current role as Vice President, Global Advanced Development and Material Engineering at IAC Group North America. She was elected as a Fellow to the Society of Plastics Engineers in 2006 and has served on the board of directors of the Detroit Section of SPE and contributed to the success of many SPE events and conferences over the years. Ryntz is also very active in many other professional societies, trade associations, and Universities including WardsAuto Interiors Conference (Moderator), Member of the University of Detroit Engineering and Science Board of Advisors, and Industry Mentor for Wayne State University Department of Chemistry.

### DR. RYNTZ'S SIGNIFICANT ACCOMPLISHMENTS AND AWARDS INCLUDE:

- Society of Plastic Engineers (SPE) – Detroit Section Lifetime Achievement Award, 2017
- Automotive News Top 100 Leading Women in Automotive Award, 2015
- Society of Plastics Engineers Detroit Section Outstanding Member Award, 2013-2014.
- SPE TPO in Automotive Emeritus Founding Member Award, TPO in Automotive Conference, 2014
- Society of Plastics Engineers Detroit Section Keynote Speaker at the TPO in Automotive Conference, Oct. 2013

- Society of Plastics Engineers Fellow, May 2006
- Joseph Matiello Award, Federation of Societies for Coatings Technology, 2005.
- Women's Automotive International Association, Professional Achievement Award, 2004
- Visteon Corporation, Leading the Way Award, 2004
- Roy W. Tess Award, American Chemical Society, 2003
- George B. Heckel Award, Federation of Societies for Coatings Technology (FSCT), 2000
- Roon Foundation Award, Federation of Societies for Coatings Technology (FSCT), 2000
- Ford Motor Company Customer Driven Quality Award, instrument panel skin technology implementation, 1999
- Ford Motor Company Customer Driven Quality Award for Implementation of Damage Resistant Fascias, 1999
- Strathmore's Who's Who Registry of Business Leaders, in Recognition of Outstanding Contributions to the Automotive Industry 1997/98
- Elias Singer Best Paper Award (Honorable Mention) for Presentation and Technical Content of Friction Induced Paint Damage: Effects of Coating Attributes, 1997
- Engineering Society of Detroit (ESD) Outstanding Leadership Award for Chairing Coatings Conference, 1995
- Henry Ford Technology Award for Conceiving a Systems Approach to New Painted Plastic Materials, 1994
- Ford PTPD General Manager's Excellence Award for Holistic Approach to Painted Plastics: Windstar Control Plan, 1994
- Society of Plastics Engineers ANTEC Best Paper Awards, 1994, 1996
- Engineering Society of Detroit (ESD) Gold Award for Outstanding Contributions to Advancing the Knowledge of Science and Engineering, 1994
- Elias Singer Best Paper Award for Presentation and Technical Content of Novel Dispersing Aides, 1993

- Best Speaker Awards, FSCT, 1986, 1991
- A.F. Voss Best Paper Awards, FSCT, for Technical Content of Society Papers 1987, 1988, 1989,

#### DR. RYNTZ'S MANY LEADERSHIP ROLES AND PROFESSIONAL AFFILIATIONS INCLUDE:

- **Board of Advisors**, University of Detroit College of Engineering, 2015 – present
- Federation of Societies for Coatings Technology (FSCT) **President**, 2006-2008 (led transition into new BOD structure, initiated discussions with NPCA on education **President Elect**, 2004 – 2005 (initiated AC Series educational seminars) **Technical Advisory Board**, 1992-1994 (led discussions on split of technical and member information journals) **Professional Development Committee Chair**, 1991-1996 (directed committee members and FSCT staff to develop programmatic initiatives for educational seminars) **Program Committee**, 1992, 1999-2002 **Program Committee Chair**, 2000 – 2002 **Editorial Review Board**, 1990- 2007 **Board of Directors, Member-At-Large**, 1993-1995 **FSCT Industrial Relations Task Force Chair**, 1996 **Coatings Industry Research Fund**, 1997 – 2001
- Society of Plastics Engineers Detroit Section **Board of Directors Member at Large** 2007-2011 **Chair/Co-Chair "Surface Enhancements" in TPO in Automotive Conference** - 1993 -present
- American Chemical Society **PMSE Board Member at Large**, 2003-2005
- NIST Review Board Member on Material Assessment **Vice-Chair**, 1997 (worked within member committees to review BFRL lab) **Chair**, 1999-2000 (led group of industry/academic experts in reviewing the BFRL lab) **NSF Environmentally Conscious Coatings Proposal Review Board**, 1996 (reviewed academic proposals on environmentally friendly coatings and advised on budgeting) **NRC Manufacturing Review Board, Low Emission Coatings**, 1999- 2000 (reviewed manufacturing processes and contributed to document analyzing best practices)
- **Technical Chairman**, Detroit Society for Coatings Technology, 1988- 1994 **Chairman**, Younger Chemists Steering Committee, ACS 1988-1990

First given in 2001, the SPE Automotive **Lifetime Achievement Award** recognizes the technical achievements of individuals whose work – in research, design, and/or engineering – has led to significant integration of polymeric materials on passenger vehicles. Past winners include:

- J.T. Battenberg III, then chairman and chief-executive officer of Delphi Corp. (2001)
- Bernard Robertson, then executive vice-president of DaimlerChrysler (2002)
- Robert Schaad, chairman of Husky Injection Molding Systems, Ltd. (2003)
- Tom Moore, retired vice-president, Liberty and Technical Affairs at then DaimlerChrysler (2004)
- Mr. Shigeki Suzuki, general manager - Materials Division, Toyota Motor Co.(2005)
- Barbara Sanders, then director-Advanced Development & Engineering Processes, Delphi Corp. (2006)
- Josh Madden, retired executive at General Motors Corp. (GM) & Volkswagen of America (2007)
- Frank Macher, former CEO of Collins & Aikman Corp., Federal Mogul Corp., and ITT Automotive (2008)
- Irv Poston, retired head of the Plastics (Composites) Development-Technical Center, GM (2009)
- Allan Murray, Ph.D., retired technology director at Ford Motor Co. (2010)
- David B. Reed P.E., retired staff engineer, Product Engineering, GM (2011)
- Gary Lownsdale, P.E., then chief technology officer, Plasan Carbon Composites (2012)
- Roy Sjöberg, P.E., retired staff engineer - Body, Chevrolet-Pontiac-Canada Div.,GM and retired executive engineer-Viper Project, Chrysler Corp. (2013)
- Dr. Norm Kakarala, retired senior technical fellow, Inteva Products LLC (2014)
- Fredrick Deans, P.E., chief marketing officer, Allied Composite Technologies LLC (2015)
- Dr. Lawrence T. Drzal, university distinguished professor of Chemical Engineering and Director-Composite Materials and Structures Center at Michigan State University College of Engineering (2016)
- Dr. Suresh Shah, retired senior technical fellow at Delphi Corporation, formerly General Motors – ACG (Automotive Components Group) (2017)





# Chassis/Hardware

## Low Mass Door System 2018 Fiat Chrysler Automobiles Jeep Wrangler



System Supplier:	Brose North America Inc.
Material Processor:	Arkal
Material Supplier:	Trinseo
Resin:	PP LGF30
Tooling Supplier:	Cavalier Tool & Manufacturing Ltd.

A 17% weight savings and a 13% cost reduction were achieved by reducing the wall thickness of this injection molded door system without additional gates or modifications in the process. The lower weight results in improved fuel efficiency and reduced emissions. Due to the mass reduction, the removable doors are now easier to lift and remove.

## Ditch Molding End Cap with Integrated Stud Mount 2019 General Motors Company Chevrolet Silverado / GMC Sierra



System Supplier:	Stanley Engineered Fastening
Material Processor:	Stanley Engineered Fastening
Material Supplier:	Ineos Styrolution / Entec Polymers
Resin:	Luran 777K UV ASA
Tooling Supplier:	Stanley Engineered Fastening

This industry first four-way low profile stud mount, used to secure roof ditch molding, incorporates an integrated roof ditch molding end cap. The design eliminates the need for double sided foam adhesive tape. A 5% weight savings and a 50% direct cost savings was achieved. Improved fit and finish of the vehicle and reduced noise and warranty issues are also achieved with the design.

## Thermoplastic Window Regulator 2018 Peugeot DS7 Crossback



System Supplier:	Inteva Products
Material Processor:	Shuang Lin
Material Supplier:	Thermofil
Resin:	Thermofil F611X99 PP GF30%
Tooling Supplier:	Shuang Lin

This is the first significantly lower-weight window regulator without compromise to safety, assembly time, strength or cost. By utilizing thermoplastics, the weight is similar to regulators that use aluminum guide rails but no more expensive than conventional regulators that use steel guide rails. The weight was decreased by 23% on the front doors and by 14% on the rear doors.

## Hybrid Control Arm with Integral Ball Joint 2019 Fiat Chrysler Automobiles Ram 1500



System Supplier:	Iljin
Material Processor:	Iljin
Material Supplier:	BASF
Resin:	Ultramid B3WG10 PA6 GF50
Tooling Supplier:	Yooil Tech

This is the first usage of engineered plastic in the structure of a control arm for a high-volume production, light duty full size truck. The assembly process is simplified by integrating the ball joint which is formed during the plastic injection molding process. The result is a significantly lower and more stable torque as compared to conventional ball joint manufacturing. Control arms have previously been produced utilizing stamped/welded steel, cast iron, cast aluminum, forged aluminum and stamped/welded aluminum. Weight is reduced by 13% resulting in a higher MPG rating.





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# Chassis/Hardware

## Integrated Window Regulator System 2019 Ford Motor Company Ford Focus



System Supplier:	Brose North America Inc.
Material Processor:	ElringKlinger
Material Supplier:	Lanxess / Borealis
Resin:	Multiple
Tooling Supplier:	Brose North America Inc.

This integrated window regulator system has integrated organo fibers over molded in plastic for window function. Plastic sliders attach to the glass for up/down operation. It replaces steel rails mounted to door inner panels for window operation. A 2.5kg per vehicle weight savings is achieved. A 30% cost reduction is also achieved with tooling efficiencies. The application results in a very efficient, ergo lightweight, no grease installation.

## Sonic Welded Fog Lamp and Air Curtain Bracket 2018 Ford Motor Company Ford Mustang



System Supplier:	Flex-N-Gate
Material Processor:	Flex-N-Gate
Material Supplier:	SABIC
Resin:	TPO
Tooling Supplier:	Omega Tool Corporation

This one-piece, sonic welded, bracket with fog lamp attachments forms an air curtain for greater fuel efficiency. It also provides additional stiffness to the fascia assembly and reduces visible sink marks on the class A fascia surface. A living hinge, molded into the bracket, forms the duct for the air curtain itself. An annual weight savings of 0.2 lbs per vehicle is achieved and 1,620,000 fasteners are eliminated annually. There is an \$800,000 savings over the life of the program, as well as a \$230,000 tooling savings.

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### CONGRATULATIONS

to the finalists and to those who partner with us to bring unique solutions to the Automotive Industry!





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2018 INNOVATION AWARDS COMPETITION & GALA

# Chassis/Hardware

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- Nelson Mandela



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## High Strength Self-tapping Composite Nut 2016 Fiat Chrysler Automobiles Chrysler Pacifica



System Supplier:	ITW Deltar Fasteners
Material Processor:	ITW Deltar Fasteners
Material Supplier:	Asahi Kasei
Resin:	Leona 90G55 PA66
Tooling Supplier:	Maple Mold

This composite nut has self-healing properties enabling it to maintain sufficient torque and clamp load even after it has been stripped, unlike the metal nut that this composite nut replaces. Total mass savings is 8g per location x 121 locations for a total vehicle mass savings of 2.1 lbs specific to the Chrysler Pacifica. The estimated cost savings per vehicle is \$3.25. The composite nut can be translated across all OEMs and in many additional applications.

## Front Fascia Compression Bracket with Molded In Studs, 2018 Ford Motor Company Ford Mustang



System Supplier:	Magna International Inc.
Material Processor:	Magna International Inc.
Material Supplier:	SABIC
Resin:	ASA
Tooling Supplier:	Plastec

This front fascia to front fender compression bracket molds the metal attachment studs directly into the bracket, enabling smaller bracket geometry and reduced labor for installation. Since the studs are embedded in the plastic and located to the fender and fascia, only a compact nut runner is required to fasten the assemblies together. A 5% reduction in weight compared to other programs results as well as a \$500,000 labor and cost reduction.



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# Environmental

## Foamed Extension Dash Panel 2019 Ford Motor Company Ford Edge



System Supplier:	Windsor Mold
Material Processor:	Windsor Mold
Material Suppliers:	Wellman & Lehigh Technologies
Resins:	Ecolene PP8004-BK MR PP / Tire Rubber
Tooling Supplier:	na

This extension dash panel is made from recycled PP from carpet backing filled with recycled tire rubber and 20% glass. It is injection molded with Mucell foaming enabling a weight savings of 0.52 lbs per part and a cost reduction of 28%. A cost avoidance of 21% was incurred from a reduction in injection molding cycle time. The application improves noise and vibration. 11.9 million sq. ft. of carpet and 26,250 lbs of tire material were recycled for this application.

## Recycled High Flow PC/ABS Resin 2015 Ford Motor Company Ford F150



System Supplier:	Summit Polymers
Material Processor:	Summit Polymers
Material Supplier:	Enviroplas, Inc
Resin:	ENVIROLOY 1500-70104 EZ PC/ABS
Tooling Supplier:	Mold King

A new high flow PC/ABS material, made from 100% post-industrial recycled resins, improved processing and part performance of thin wall parts. A 10% to 20% cost savings was achieved vs. using prime material. Indirect cost savings were realized from the material running at lower temperatures resulting in shorter cycle times. Since the material has high flow, parts can be designed with fewer gates being required further benefiting production cost savings.



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# Environmental

## Front Grille Carrier 2018 Ford Motor Company Ford Explorer & F150



System Supplier:	SRG Global
Material Processor:	SRG Global
Material Supplier:	The Materials Group
Resin:	Optilac ASA134U ASA
Tooling Supplier:	Integrity Tool & Mold

This is the industry first use of Post Industrial Recycled (PIR) ASA for exterior class A performance on a front grille carrier. The PIR material was developed to meet the virgin material specs and exterior performance qualifications and performed on par to the prime ASA product. A \$1.5 million annual cost reduction over 2 programs was realized. Material landfill avoidance is 3.3 million lbs per year. CO<sub>2</sub> emissions avoidance is 1.6 million lbs of CO<sub>2</sub>.

## Sustainable Hybrid Composites 2018 Ford Motor Company Lincoln Continental



System Supplier:	Summit Polymers
Material Processor:	Summit Polymers
Material Supplier:	Celanese Corporation and International Paper
Resin:	THRIVE/Celstran PP+HC (CF/LGF) PP/RPP
Tooling Supplier:	Summit Polymers

This is an industry first application of composites combining tree (cellulose) fiber with long glass fiber (LGF) in a polypropylene (PP) matrix to replace 35% short glass-mineral filled PP. A 24% weight savings and a 13% cost savings were realized. A total \$2 million cost savings resulted by reducing weight and reducing cycle times by 20% - 40%. A life cycle assessment improvement was also attained.

## Recycled MIC Exterior Trim 2019 Ford Motor Company Ford Transit



System Supplier:	Magna International Inc.
Material Processor:	Nascote
Material Supplier:	Canuck Compounders
Resin:	BK 8-8-7RMF20 UV TPO
Tooling Supplier:	na

This is the first-time recycled MIC TPO was used for Class A components. Recycled polypropylene from automotive regrind and FDA plastic materials were used. The formula consists of recycled polypropylene, performance modifiers including ultra-violet stabilizer, nucleating agents, lubrication/dispersion aides, coupling agents, impact modifiers and colorant. A 20% cost reduction material savings totaling 5.6 million in cost savings annually across multiple vehicle lines resulted.

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- Thermally Conductive Polymers



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# Celanese ramps up value delivery to customers with launch of intimate engagement model

**Customer Options Mapping** solves a manufacturer's full range of materials problems by leveraging Celanese's industry-leading breadth of solutions and enabling capabilities

**F**inding a partner that is more than a materials supplier is a frequent challenge for manufacturers. Broad lists of available products, generalized explanations of potential value, and limited understanding of a customer's strategies increase the transactional nature of supplier and customer relationships. Celanese is challenging this norm with a much more customized, intimate model that results in mutual value creation with customers.

## A UNIQUE PARTNERSHIP

"Manufacturers partner with Celanese because of our broad portfolio of polymers, our global customer enabling capabilities, and our ability to translate their needs into the right solution," explained Scott Sutton, Celanese's Chief Operating Officer.

Celanese's project-based model partners teams of engineers and product specialists with customers to solve a full range of materials challenges. Teams leverage an industry-leading portfolio of material solutions and technical capabilities including part processing, testing, design and prototyping to provide a full solution set that solves customer problems.

## CUSTOMER OPTIONS MAPPING

"We engage deeply with our customers and build an initial

perspective on their strategies and critical needs. We proactively do this; collaboratively working on a deep-dive assessment of how our full set of differentiated solutions and, if necessary, customized offerings, match up and solve the full range of a customer's materials problems," shared Verghese Thomas, Celanese's Chief Technology & Innovation Officer.

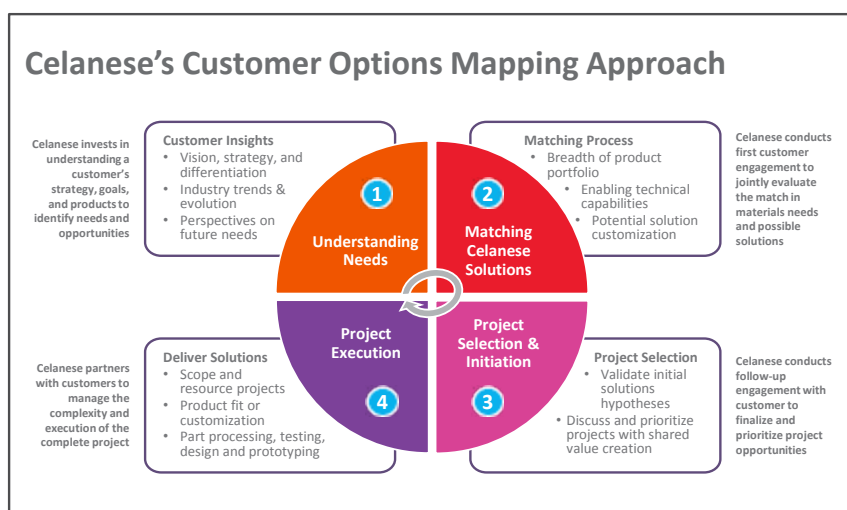
This approach, called **Customer Options Mapping** (see figure below), is a commitment to partner with customers to identify mutually high value opportunities and launch collaborative projects.

## IN DEPTH, INTIMATE, CUSTOMIZED

As Verghese Thomas noted, "when Celanese engages in a Customer Options Mapping effort we customize our approach and solutions in a one-on-one setting.

We are making this approach our primary mode of technical customer engagement. We are investing in more frequent, higher-value, intimate customer interactions because we fundamentally believe it will significantly increase value for our customers." Celanese further enhances these engagements by bringing parts and prototypes that illustrate the value proposition to customers.

Customers should expect more from their materials suppliers – not a flashy booth and a 15-minute conversation at a trade show. Customers should expect a partner that is committed to their success through one-on-one, tailored engagements. Customers should expect Celanese.



For questions on Celanese's intimate engagement model or Customer Options Mapping approach, please contact [Customer.Inquiries@celanese.com](mailto:Customer.Inquiries@celanese.com).

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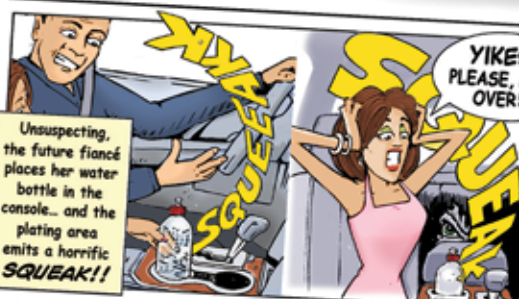


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# Hall of Fame

## First Injection Molded Thermoplastic (PC/PBT) Energy Absorber Named 2018 SPE® Automotive Innovation Awards Hall of Fame Winner

The first injection molded thermoplastic (PC/PBT) rear energy absorber for a vehicle bumper system, used on the 2003 Honda Element compact crossover SUV from Honda Motor Company, has been named the 2018 Automotive Innovation Awards Hall of Fame winner by the Automotive Division of the Society of Plastics Engineers (SPE®). The energy absorber, made with XENOV Polycarbonate/Polybutylene Terephthalate (PC/PBT) resin from SABIC (then known as GE Plastics), replaced expanded polypropylene (EPP) foam energy absorbers in less package space at lower cost with better damageability performance.

To be considered for a Hall of Fame Award, an automotive plastic or composite component must have been in continuous service in some form for at least 15 years and broadly adopted in the automotive industry. This application certainly qualifies as over 80 million pounds of XENOV (PC/PBT) injection molded energy absorbers have been validated and launched on multiple vehicles, in both front and rear bumper system applications, leading to numerous innovations improving crash safety worldwide.

Energy absorber technology with XENOV resin set the precedent for many other industry-first applications. The use of XENOV (PC/PBT) resin was first recognized in the industry in 2004, when Ford Motor Company won the SPE® Hall of Fame Award for the bumper on the 1984 Escort developed by Ford Milan (Visteon). The material was recognized again in 2005 when Suzuki Motor Corporation won an SPE Automotive Innovation Award in the safety category for the first pedestrian protection energy absorber on the 2005 Swift. Tekagi Seiko was the system and tooling supplier and material processor. In 2013, it was recognized for an SPE Automotive Innovation Award in the chassis category, as the first global one-piece front bumper energy absorber on the 2013 Fusion and Mondeo sedans produced by Ford Motor Company. Magna Exteriors & Interiors was the tier supplier/processor.

The energy absorption technology has also been recognized as a finalist, two times, in the 2011 SPE Automotive Innovation Awards. Those finalists included use of XENOV resin on: the

first lower leg protector/undertray with protection-safety functionality on the 2011 C-MAX from Ford Motor Company (Faurecia: system supplier and material processor), and the injection molded pedestrian-safety upper load path/fascia reinforcement on the 2011 Range Rover Evoque compact utility vehicle. Also in that year, the technology was recognized on another innovative nomination – crash boxes for truck cabin occupant protection on the 2011 India 7T LCV commercial truck produced by Volvo-Eicher Commercial Vehicle Pvt. Ltd. (Machino Plastics Ltd: system supplier and material processor).

Injection molded (XENOV) energy absorber technology offers improved styling freedom and functional integration as 15 mm less packaging space is required, compared to EPP foam used previously, as the resin energy absorber efficiency enables smaller offsets (approximately 20% - 30% reduction at equal load) resulting in a 20% weight savings. The Honda Element rear energy absorber with XENOV resin demonstrated the best performance results in 2003 Insurance Institute for Highway Safety (IIHS) testing. It demonstrated the lowest rear bumper repair costs (over 50% lower costs in most applications and the highest bumper rating in 5 MPH crash test results of large luxury cars and small and midsize SUVs. Improved consistency over temperature ranges is also achieved (impact consistency from -30 degrees centigrade to 60 degrees centigrade). In addition, better low-speed performance is gained with lower rail loads (approximately 20% -30% reduction at equal intrusion), lower intrusion, and lower peak loads resulting in less damage to the beam and improved driver and passenger safety.





On Wednesday, November 7, 2018, representatives from Honda R&D Americas, Net Shape (now part of Shape Corp.), Shape Corp., and SABIC will accept the award on behalf of the original team that worked to develop the first injection molded thermoplastic (PC/PBT) energy absorber for a vehicle bumper system on the 2003 Honda Element at the 48th-annual SPE Automotive Innovation Awards Gala, at the Burton Manor in Livonia, Michigan.

The SPE Automotive Innovation Awards is the oldest and largest competition of its kind in the world. Dozens of teams made up of OEMs, tier suppliers, and polymer producers submit nominations describing their part, system, or complete vehicle and why it merits the claim as the Year's Most Innovative Use of Plastics. This annual event typically draws over 800 OEM engineers, automotive and plastics industry executives, and media. As is customary, funds raised from this event are used to support SPE educational efforts and technical seminars, which help educate and secure the role of plastics in the advancement of the automobile.

The mission of SPE is to promote scientific and engineering knowledge relating to plastics worldwide and to educate industry, academia, and the public about these advances. SPE's Automotive Division is active in educating, promoting, recognizing, and communicating technical accomplishments in all phases of plastics and plastic-based composite developments in the global transportation industry. Topic areas include applications, materials, processing, equipment, tooling, design, and development. For more information about the **SPE Automotive Innovation Awards Competition and Gala** see [www.speautomotive.com](http://www.speautomotive.com). For more information on the **Society of Plastics Engineers**, see [www.4spe.org](http://www.4spe.org).

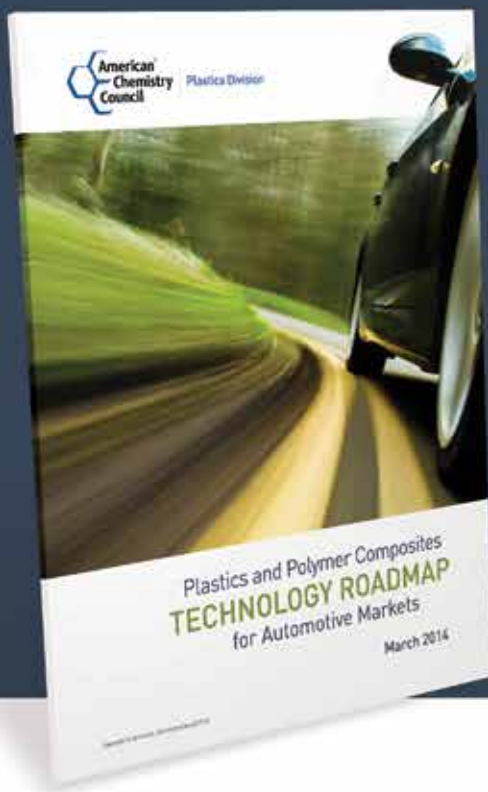
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The 2018 SPE Automotive Division Hall of Fame committee was chaired by **Nippani Rao**, Chrysler LLC, retired and co-chaired by **Dave Reed**, General Motors Corp., retired. Committee members include:

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General Motors Company;
- **Fred Deans**,  
Allied Composite Technologies, LLC;
- **John Fialka**,  
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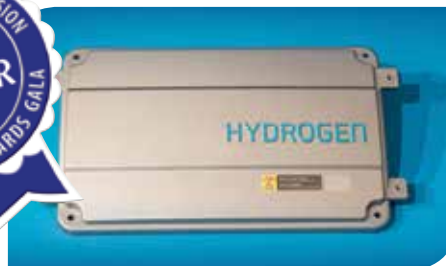
### Timing Belt Cover 2019 Hyundai Motor Company Hyundai Kona



System Supplier:	NTM (NVH Korea)
Material Processor:	NK
Material Supplier:	DuPont Korea Inc.
Resin:	Zytel NVH70G35HSLA PA66
Tooling Supplier:	NVH Korea

This timing belt cover, made with a 35% glass fiber reinforced heat stabilized polyamide 66 resin, provides a 2 ~ 3dBA improvement of vehicle radiation noise performance and significant damping improvements compared to incumbent aluminum die cast or general PA6 systems. A 30% weight reduction and a 10% cost reduction are also achieved.

### EMI Shielding Compounds For High-Voltage Cover 2019 Hyundai Motor Company Hyundai Nexa



System Supplier:	Yura Corporation
Material Processor:	Yura Corporation
Material Supplier:	Hanwha Compound
Resin:	Hanwha Compound ESM-204B PA6
Tooling Supplier:	Hyundai Motor Company

New conductive plastic compound materials for EMI (Electromagnetic Interference) shielding were developed for high-voltage junction box upper covers. The material replaces conventional die cast aluminum covers for reduced weight and manufacturing costs. The materials are Polyamide 6/ PPO compounds with hybrid conductive carbon filler (Carbon fiber, nano carbon fiber filler – CNT, Carbon black) not containing metal powder or metal coated fiber. The weight savings is estimated at 30% (0.3kg) and the cost savings is estimated at 70% (\$50 per vehicle.)

### Radiator Grille 2018 General Motors Company Cadillac XT4



System Supplier:	Lacks Trim Systems
Material Processor:	Lacks Trim Systems
Material Supplier:	NB Coatings
Resin:	Luran S 777K UV ASA
Tooling Supplier:	Plastics Molding Technology, Inc.

This application uses selective applied bright finishes through the use of Kurz hot stamped foil. NB Coatings R925 clear paint provides improved exterior durability for hot stamped foil and ASA. The new clear paint from NB Coatings meets GM requirements while providing the ASA resin with an improved high gloss finish and weather resistance.

### Lightweight Elastomeric Material 2017 Ford Motor Company Lincoln Continental



System Supplier:	Cooper Standard
Material Processor:	Cooper Standard
Material Supplier:	Cooper Standard
Resin:	Fortrex TPE
Tooling Supplier:	Cooper Standard

These glass sealing parts are made with a new lightweight elastomeric EPDM and TPV material, which can be extruded, calendered, injection molded, foamed or converted to thin applications. The material offers automakers a 30% mass reduction versus EPDM and a 10% mass reduction versus TPV. It is non-blooming, non-fogging and offers improved scratch resistance and better NVH performance resulting in less warranty issues. It is plasticizer free, has low VOCs, and has a smaller carbon footprint — 22% better than TPV and 53% better than EPDM due to a less energy-intensive manufacturing process.





AUTOMOTIVE

# Materials

## PC Light Bar for Unique LED Headlamp General Motors Company Sierra 1500 LD Truck



System Supplier:	Valeo Lighting Systems
Material Processor:	Valeo Lighting Systems
Material Supplier:	Covestro
Resin:	Makrolon LED2245 PC
Tooling Supplier:	Proper Tool

This new high transparent polycarbonate is used in a thick light bar, providing a unique sculptured ice appearance. The novel light pipe design incorporates non-standard thick molding tooling and an industry first proprietary multi-shot molding process. Dusk and inclement weather visibility is improved due to a larger and brighter DRL (Day Time Running Lamp) function.

## MIC PP for Finish Panels 2018 Ford Motor Company Ford Escape



System Supplier:	International Automotive Components
Material Processor:	Nanogate
Material Supplier:	Sumika
Resin:	PP
Tooling Supplier:	Chicago Mold

A 25% cost savings (\$4.25 per part) is achieved on these MIC PP finish panels by eliminating paint while maintaining appearance. A revised part gating system (reduced # of gates) was designed to enable the use of existing tooling. Formerly, the parts were molded from paintable PC/ABS and painted. Part recycling is improved without paint.

## TPU Skin for Foam in Place Instrument Panels 2018 Ford Motor Company Ford Focus



System Supplier:	Faurecia Interior Systems
Material Processor:	APCB
Material Supplier:	Sanyo
Resin:	Therpus F TPU
Tooling Supplier:	na

This TPU material innovation provides an improved weight and performance alternative for IP back foamed instrument panel skins to replace the PVC slush technology. Key areas of improvement include a 1.1 lb weight savings, improved airbag deployment performance in cold temperatures, opening line follows intended score line, stability of material over time and compatibility with existing PVC slush equipment.

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# Materials



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### Thermoset Binder for a Non-Woven Fabric 2018 Ford Motor Company Ford F150



System Supplier:	Cadillac Products Automotive Company
Material Processor:	Cadillac Products Automotive Company
Material Supplier:	BASF
Resin:	Acrodur
Tooling Supplier:	Briggs / ODC

This innovation included replacing a thermoplastic binder with a new environmentally friendly water-based thermoset binder, replacing some PET with glass fibers for heat stability and stiffness, and utilizing recycled PET with a specialized coating for enhanced heat stability. The technology improvements resulted in a 1.1 kg weight savings, improved acoustic performance and improvement in maximum heat range from 120 degrees C to 240 degree C at half the cost of the original technology.

### Hot Charge Air Duct 2019 General Motors Company Cadillac XT4



System Supplier:	Cikautxo
Material Processor:	Cikautxo
Material Supplier:	DSM Engineering Plastics
Resin:	Arnitel HT8027 TPC-ES
Tooling Supplier:	SIMOP

This is the industry first use of TPC in a high temperature hot charge air duct in production. The application reduces cost by 20%, mass by 35% and offers more efficient manufacturing and assembly (5 parts instead of 11) and improved performance (2 leak paths instead of 4) compared to current thermoset elastomer hose/rigid hose assembly – and it can be recycled.

### Truck Sunvisor 2017 Volkswagen AG MAN Phevos



System Supplier:	Fastplas Automotive
Material Processor:	Fastplas Automotive
Material Supplier:	SABIC
Resin:	Cycology HMD CM 8622 PC/ABS
Tooling Supplier:	Fastplas Automotive

A thermoplastic solution replaces SMC (thermoset) for a 40% weight savings and a 40% cost savings by minimizing production steps. Additional benefits include process reduction, productivity increases, greater ease of manufacturing, quality surface and styling freedom.



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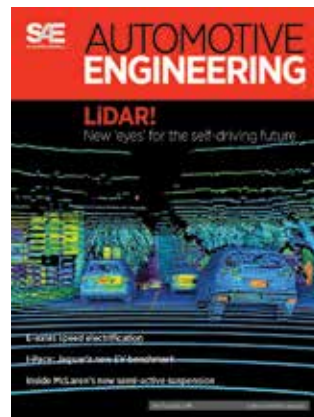
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## Powertrain

### Vacuum Generation System for Brake Assist 2017 Ford Motor Company Ford F-150



System Supplier:	Dayco Products
Material Processor:	MacLean-Fogg, Engineered Plastics Company
Material Supplier:	DuPont Automotive
Resin:	Delrin 73M30 POM+PTFE, Minlon 520MP PA6
Tooling Supplier:	Kald Tool & Die

The open/close valve actuation is accomplished via two complimentary resin systems acting in concert to provide for critical no "stick-slip" and no measurable wear after 2,500,000 hot/cold test cycles. Injection molding allows for very close tolerances of critical details necessary for total system performance. A 40% weight savings and a 25% cost savings over current pump systems was achieved.

### Air Intake Manifold with Integrated Water-Cooled Charge Air Cooler, 2018 Fiat Chrysler Automobiles 2.0L Turbocharged Engine



System Supplier:	Magneti Marelli
Material Processor:	Magneti Marelli
Material Supplier:	BASF
Resin:	Ultramid ENDURE D3G7 PA
Tooling Supplier:	Magneti Marelli

This air intake manifold with fully integrated charge air cooler is a unique packaging solution that enables a common CAC/manifold across multiple applications. The water cooler adds performance over an air-to-air cooler. Operating in a challenging harsh environment and tight packaging, the design has been optimized for light weight and low cost. The manifold was enabled by a high heat resin and innovative use of foam to protect the part from external heat sources.

### Optimized Engine Cover 2018 Ford Motor Company Ford F-150



System Supplier:	Windsor Mold
Material Processor:	Windsor Mold
Material Supplier:	BASF
Resin:	Ultramid B3WGM24 HPX PA6
Tooling Supplier:	Canam Tools Ltd.

The combination of MuCell, enhanced material, and innovative processing and part design resulted in a 32% weight savings compared to the incumbent cover. Enhanced colorant enabled a higher MuCell loading without compromise to the part. The process also provided uniform volumetric shrink which helped in part design and processing. Nominal wall stock was reduced to 2.0mm to aid in the overall weight savings of the part.

### Graphene Reinforced Polyurethane Foam 2018 Ford Motor Company Ford F-150



System Supplier:	Eagle Industries
Material Processor:	Eagle Industries
Material Supplier:	XG Sciences
Resin:	EagleZorb SA-04G PU
Tooling Supplier:	Eagle Industries

This is an industry first, cost neutral, application of graphene as a reinforcement and noise reduction material in polyurethane foam for under hood pump and rail covers. This improves foam properties while using very small concentrations of graphene (<0.5). Graphene reduces sound transmission by 17%, increases compression strength by 20% and increases heat sag properties by 30%. The manufacturing process used to produce the graphene is performed without chemicals and produces no by-products, either hazardous or non-hazardous.



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Wards Intelligence Outlook Conference	Birmingham, Michigan	December 13, 2018
WardsAuto FOCUS: Lightweighting	Birmingham, Michigan	December 13, 2018
Wards 10 Best Engines	Detroit, Michigan	January 16, 2019
Wards Intelligence Outlook Conference	Novi, Michigan	March 7, 2019
WardsAuto Interiors Conference	Novi, Michigan	May 9, 2019

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AUTOMOTIVE

2018 INNOVATION AWARDS COMPETITION & GALA

# Process, Assembly & Enabling Technologies

## Headliner with Integration of Components 2018 Volkswagen AG Audi A8



System Supplier:	Grupo Antolin
Material Processor:	Grupo Antolin
Material Supplier:	BASF
Resin:	Various
Tooling Supplier:	Grupo Antolin

An improvement in headliner and components dimensional stability was achieved by attaching them during the compression molding process. New grades of resin were developed to withstand the extreme temperature and pressure of the process. A solvent free adhesive was used for reduced VOC emissions. New tooling was developed to ensure component positioning location and repeatability. A cost savings of approximately \$0.50 per headliner and an investment reduction of \$300,000 (secondary assembly station savings) was achieved.

## Integrated Tire Carrier, Rear Camera & Brake Light Assembly, 2018 Fiat Chrysler Automobiles Jeep Wrangler



System Supplier:	TMD - Grammer AG Group
Material Processor:	Leggera Technologies
Material Supplier:	Dupont
Resin:	Zytel ST 801 AW PA66
Tooling Supplier:	Leggera Technologies

This hybrid composite technology utilizes magnesium injection molding for higher structural strength with reduced weight & polymer over molding for improved impact and corrosion resistance. A 60% weight savings is achieved compared to metal stamping and a 20% weight savings is achieved compared to die casting processing methods. A cost savings of 20% is achieved with an improved load rating from 85 lbs to 115 lbs. The new design eliminates the need for a steel bracket for an indirect cost savings.

## Dual Gas Assist Injection Molding 2018 Ford Motor Company Lincoln Navigator



System Supplier:	Faurecia Interior Systems
Material Processor:	Faurecia Interior Systems
Material Supplier:	Trinseo
Resin:	MAGNUM 3325 MT ABS
Tooling Supplier:	Roush Tooling

An industry first dual gas assist injection molding process was used to produce this door trim panel with improved stiffness, tactility and feel where two map pockets interface. By integrating two individual gas channels into one-part, tooling and assembly complexity was reduced, resulting in less labor and maintenance costs. A direct cost savings of \$6 and a weight savings of 800 grams was achieved.

## Cowl Panel & End Caps 2018 Fiat Chrysler Automobiles Jeep Wrangler



System Supplier:	The Plasman Group
Material Processor:	The Plasman Group
Material Supplier:	SABIC
Resin:	CYCOLOY XCM840 PC/ABS
Tooling Supplier:	Build-a-Mold

This is the industry first horizontal metal to plastic cowl vent assembly. Novel over-molded inserts enabled the injection molding process to provide the part with a metal-like look and feel. This process eliminates the need to process three steel components. The panel and end caps were previously stamped, welded, hemmed, assembled and painted. The streamlined process resulted in a 56% weight savings compared to the previous assembly.





**AUTOMOTIVE**

2018 INNOVATION AWARDS COMPETITION & GALA

# Process, Assembly & Enabling Technologies

## Thin Wall Door Trim Belt Bracket 2018 General Motors Company Chevrolet Silverado / GMC Sierra



System Supplier:	Inteva Products
Material Processor:	CS Manufacturing
Material Supplier:	Celanese Corporation
Resin:	Celstran GF20-0553 LGF PP
Tooling Supplier:	Reed City Tool and Die

This is the first thin wall (2.0mm nominal wall construction) structural appearance application that resulted in lower cost, lighter weight, improved appearance and better performance. Injection molding with sequential valve gating and 20% long glass fiber PP enabled this application. A 20% mass savings and a 8% cost savings resulted.



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## Modular Seat Bushing 2018 Ford Motor Company Focus Active



System Supplier:	Ford Motor Company
Material Processor:	na
Material Supplier:	DuPont Automotive
Resin:	Zytel ST801 PA
Tooling Supplier:	TWB Hagan

This new rear seat mounting bracket/pivot system self-locates, self retains and doesn't require tools for assembly or removal. It replaces a high royalty fee design that required tools for service and removal. The new design reduces the expensive high tolerance molded part with a much simpler design not requiring the same controls for tolerancing. Approximately \$2.50 per vehicle savings were achieved.

## Faux Stitch and Ditch Features 2019 Ford Motor Company Ford Focus



System Supplier:	Faurecia Interior Systems
Material Processor:	Faurecia Interior Systems
Material Supplier:	Benecke-Kaliko
Resin:	TPO
Tooling Supplier:	GS Engineering

This is the first-time faux stitch and ditch features were added to the in-mold grain & lamination process. The appearance of real stitching with thread twist and thread pull with ditches were achieved. This process replaces costly cast PVC and spray PU processes. A \$1.50 per door cost savings and 0.05 kg weight savings per door was achieved.

### High Strength Bonding of A-Pillar 2019 Volkswagen AG Audi A7



System Supplier:	Sika Automotive AG
Material Processor:	Sika Automotive AG
Material Supplier:	Sika Automotive AG
Resin:	Sikamid PA66-GF35
Tooling Supplier:	na

An innovative bonding solution (new body structural adhesive) provides this A-Pillar with higher strength and lower weight by enabling boron steel to be reinforced with a plastic bonded component. The system is optimized to meet safety standards for side crash, pole crash and frontal offset crash testing - but with lower weight (20% weight savings) and less cost (5% – 10%) when compared to traditional metal reinforcement solutions. An additional indirect cost savings is achieved due to avoiding welding processing and cost of thicker metal sections.

### Interlocking Mechanism Design for Side Impact 2019 Ford Motor Company Ford Transit Connect



System Supplier:	Faurecia Interior Systems
Material Processor:	Thermolympic SL
Material Supplier:	Trinseo
Resin:	Magnum 3325MT ABS
Tooling Supplier:	Meymol SL

This interlocking mechanism improves door trim performance during side impacts by preventing fracture or separation of components that could cause sharp edges. This patent pending design provides strong attachment, force absorption and high impact resistance between two components during side impact. It replaces the need for metal bracket reinforcement solutions (avoiding 3.7 kg in weight per vehicle). A cost avoidance savings of \$30.60 per vehicle and a tooling investment of \$9.88 million is achieved.

### Driver Airbag Cover 2019 Ford Motor Company Ford F150



System Supplier:	ZF Group
Material Processor:	ZF Group
Material Supplier:	Sumitomo Chemical Group
Resin:	Espolux WT546 TPE
Tooling Supplier:	ZF Group

The new material provides better deployment performance at extreme temperatures with excellent cosmetic appearance, lightweight design, reduced cycle times and cost reductions. Next generation proprietary formulations with special polyolefins and rubbers enabled this innovation, eliminated the need for paint and improved the safety rating. A 10% weight savings was achieved versus previous TPO injection molding methods.

### Autonomous Milliwave Radar Bracket 2019 American Honda Motor Co., Inc. Acura RDX



System Supplier:	Nifco America Corp.
Material Processor:	Nifco America Corp.
Material Supplier:	DuPont Automotive
Resin:	Zytel 70G33HS1L PA66 GF
Tooling Supplier:	Nifco America Corp.

This is the first known, all plastic, autonomous milliwave radar bracket with a pedestrian impact breakaway function to improve safety upon impact. It is located directly behind the badge at thigh/torso level height (vs. a lower position) reducing pedestrian injury in that area. The bracket is pre-aimed, when shipped, to save assembly time on the factory floor. The all-plastic design saves weight and cost compared to previous brackets made with a metal and plastic combination.





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# Safety

## Bumper Beam with Integrated Crash Can 2016 Geely Auto Group FE7/FE5



System Supplier:	Xinli
Material Processor:	Xinli
Material Supplier:	SABIC
Resin:	XENOY 1103 PC/PBT
Tooling Supplier:	Xinli

This is a global industry first use of a single-piece, all-plastic, beam integrated with crash cans to meet ECE R 42 low-speed damageability and RCAR impact for enhanced crash performance. A 50% weight savings vs. the incumbent 7-piece metal design was achieved. An estimated 10% per part was saved on direct costs. A cost avoidance savings resulted by eliminating the need for welding and replacing seven stamping tools with one injection molding tool.

## Deployable Backpanel Airbag 2018 Ford Motor Company Lincoln Navigator



System Supplier:	Great Lakes Trim
Material Processor:	Great Lakes Trim
Material Supplier:	Advanced Composites
Resin:	TPO
Tooling Supplier:	Commercial Tool & Die

The back-panel design allows for the airbag to deploy from inside the seat back, though of the "hinging" of the back panel. Existing materials were used for best value. A 1.7 kg weight savings and \$3.00 - \$4.00 cost savings per vehicle resulted. An additional \$300,000 to \$400,000 cost savings was saved in testing by eliminating trim variants. The seat design does not require the existing "door cover", thus a more refined interior appearance is achieved.



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# Hall of Fame By Year

The Hall of Fame Award is given annually for an application that has been in continuous use for 16 years or more, and has made a significant and lasting contribution to the application of plastics in automobiles.

Year	Recognized OEM	Application	Material
2017	General Motors Company	Thermoplastics Polyolefin Skin Instrument Panel	TPO
2016	Ford Motor Company	Polycarbonate Instrument Panel	PC /PC blends
2015	General Motors Company	GMT Composite Bumper	PP/Glass GMT
2014	General Motors Company	Blow-Molded CVJ Half-Shaft Drive-Axle Boot	TPE
2013	Ford Motor Company	Integrated Front-End Module System	SMC
2012	General Motors Company	First Publicly Accessible Airbag System	multiple
2011	General Motors Company	Integrated Door Hardware Module	PC/PBT
2010	General Motors Company	Front & Rear TPO Bumper Fascias	TPO
2009	General Motors Company	Thermoplastic Vertical Body Panel	MPPE/PA
2008	Chrysler LLC	Rear Seat Cushion	PUR Foam
2007	Ford Motor Company	Radiator End Tank	PA 6/6
2006	General Motors Corp.	Thermoplastic Front Grille	ABS
2005	Porsche	Thermoplastic Intake Manifold	PA
2004	Ford Motor Company	Box Beam Bumper	PC/PBT
2003	General Motors Corp.	Dual-Density Energy Absorbing Bumper System	PP
2002	General Motors Corp.	Mini-Wedge Latch and Door-Lock Actuator	PA
2002	General Motors Corp.	Wiper-System Transmission Housing	PA
2001	General Motors Corp.	Instrument-Panel Retainer	SMA
2000	Volkswagon AG	Fuel Tank	HDPE
1999	Ford Motor Company	Hydraulic Clutch Actuator	PA
1998	Citroën	Fan Shroud	PA
1997	Ford Motor Company	Transmission Seal	PPS
1996	General Motors Corp.	Front Fenders	RIM-PUR
1995	General Motors Corp.	Guide-Flex Energy Absorbers	EVA
1994	Ford Motor Company	Headlamp Assembly	PC
1993	General Motors Corp.	Front/Rear Bumper Covers	RIM-PUR
1992	General Motors Corp.	Composite Exterior Body Panels	SMC
1991	General Motors Corp.	Tilt Steering-Wheel Centering Sphere	Acetal
1990	General Motors Corp.	Transverse Leaf Spring	Epoxy
1989	American Motors Corp.	Battery Case	PP
1988	Ford Motor Company	Windshield Interlayer	PVB
1987	General Motors Corp.	Grill-Opening Panel	SMC
1986	Chrysler Corp.	Heater Housing	PP
1985	Chrysler Corp.	Disc-Brake Piston	Phenolic
1984	General Motors Corp.	Front-Fender Wheel Liner	PP
1983	General Motors Corp.	Emissions Control Canister	PA





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# Grand Award By Year

Year	OEM	Application	Material
2017	Ford Motor Company	Structural Active Grill Shutter (AGS) with Integrated Loose Layer Construction	PP GF
2016	Ford Motor Company	Composite Suspensions for Upper and Lower Seat Backs	PA/TPO
2015	General Motors Company	Ultralight Class A Body Panels	SMC
2014	Ford Motor Company	Active Glove Box	TPO
2013	Nissan Motor Co.	All-Olefinic Liftgate	TPO/PP
2012	General Motors Company	All-Olefin, Soft Skin, Stitched Full IP System	TPO
2011	Ford Motor Company	Microcellular-Foam Instrument Panel	PP
2010	Ford Motor Company	Diesel-Exhaust Fluid (DEF) System	Multiple
2009	General Motors Company	Shielded Plastic Case Radio	PC/ABS
2008	BMW	Twin-Sheet Blow-Molded Fuel System	HDPE
2007	General Motors Corp.	Backlighting with Color-Converting Plastic	PC
2006	DaimlerChrysler	Blow-Molded Front- & Rear-Bumper System	TPO
2005	Honda Motor Co.	Composite In-Bed Trunk	SMC
2004	Ford Motor Company	Door Trim with Integrated Acoustic Chamber and Subwoofer	PP
2003	DaimlerChrysler	Roof Module	PC Copolymer
2002	DaimlerChrysler	Extruded Polymer Film Fascia	Multi-Layer Ionomer
2001	General Motors Corp.	Nanocomposite TPO	Nanocomposite TPO
2000	Ford Motor Company	Controlled Energy Management Bumper Isolator	HDPE
1999	DaimlerChrysler	Fan Shroud and Reservoir Assembly	PP
1998	Mitsubishi Motors	"I" Section Bumper Beam	PP-GMT
1997	Ford Motor Company	"Carpet to Car Parts"	PA
1996	General Motors Corp.	Structural Battery Tray	PP-GMT
1995	Ford Motor Company	Integrated Front-End System	SMC
1994	General Motors Corp.	Thermoplastic Air-Intake Manifold	PA Copolymer
1993	Ford Motor Company	Front-Suspension Stabilizer Link	POM
1992	Chrysler Corp.	Instrument-Panel System	PP-GMT, MPPE, PP & PU Foam
1991	Chrysler Corp.	Integrated Child's Seat and Top Impact Pad	PP-GMT, Expanded MPPE
1990	General Motors Corp.	Exterior Door Panel	PC/ABS
1989	Chrysler Corp.	Composite Wheel	SMC/XMC
1988	General Motors Corp.	Front Fender	MPPE/PA
1987	General Motors Corp.	Quarter-Panel Assembly – Sportside	SMC
1986	General Motors Corp.	Quarter Window	PMMA
1985	General Motors Corp.	Windshield with Anti-Lacerative Layer	Polyvinyl Butyral/PE Film
1984	Ford Motor Company	Drive Shaft	Vinylester/Graphite/Glass
1983	General Motors Corp.	Exterior Body Panels	SMC, RIM, RRIM, & TPO
1982	General Motors Corp.	Tailgate Assembly	SMC
1981	Ford Motor Company	Radiator-Core End Caps	PA
1980	General Motors Corp.	Rear-Axle Leaf Spring	Epoxy
1979	Ford Motor Company	Grille-Opening Panel Assembly	SMC
1978	General Motors Corp.	Bucket-Seat Frame	SMC
1977	Ford Motor Company	Instrument Panel	
1976	Ford Motor Company	Fender Aprons	PP
1975	American Motors Corp.	One-Piece Jeep Top	PC
1974	General Motors Corp.	Fascia and Rear Bumper Cover	RIM-PUR
1973	Ford Motor Company	Block-Heater Motor Housing	
1972	General Motors Corp.	Radiator Fan-Shroud Assembly	PP
1971	Ford Motor Company	Transmission Reactor	Phenolic



# SPE® Still Accepting Donations for Dr. Jackie Rehkopf Endowed Scholarship

The SPE® Automotive and Composites Divisions, in conjunction with The SPE Foundation®, have formed an endowed scholarship to honor the memory of Dr. Jackie Rehkopf and are still accepting donations. The groups hope to raise funds for a sufficiently large endowment to allow annual scholarships to be given to deserving undergraduate or graduate students studying engineering or science and with plans to work in the field of transportation composites.

Rehkopf spent her career doing research in the field of automotive plastics and composites. She was a long-time SPE ACCE committee member, session organizer, and two-times technical program co-chair. She also served on the SPE Automotive Division board as a director from 2005 through 2014, plus was intersociety chair for 2 years and treasurer for 2 years. She was active from the mid-1990s until 2014 with SAE International®, helping organize a large plastics session for over a decade for SAE Congress. Additionally, she wrote a book in 2011 entitled Automotive Carbon Fiber Composites: From Evolution to Implementation that was published by SAE. She was awarded an SAE Outstanding Technical Contribution Award for her work in co-developing and sponsoring the SAE Standard J2749 High Strain Rate Tensile Testing of Polymers. She authored many publications and presented at numerous technical conferences during her 20 year career.

In both academia and industry, Rehkopf's research interests were in mechanics of materials. After earning both B.S. and Ph.D. degrees in Civil Engineering from the University of Waterloo in Canada, she moved to the Detroit area and began work in 1994 as a materials engineer for Ford Motor Co. After 4 years, she became a technical specialist at Ford in the company's Research Lab Safety Department (from 1998-2003) and later in the Materials Engineering Department (from 2003-2006). She left the automaker in 2006 to join Exponent as a senior engineer and consultant in the areas of mechanics of materials, structural mechanics and dynamics, experimental testing, and failure analysis. Rehkopf's expertise was in high-strain-rate behavior of both metallic and polymeric materials, and fatigue and creep of reinforced and non-reinforced plastics. In 2010, she joined the R&D department of Plasan Carbon Composites as a senior researcher working on carbon fiber-reinforced composites. During her first 2 years at Plasan, she split her time between the company's Customer Development Center in Michigan and offices at Oak Ridge National Laboratory where she was principal investigator for a 3-year U.S. Department of Energy (DOE)-sponsored project that Plasan participated in on predictive modeling of carbon fiber composites in automotive crash. In 2013, Rehkopf became director of research at Plasan with a focus on developing new materials systems to facilitate the use of carbon fiber composites in mainstream automotive applications. She lost a year-long battle to cancer in 2014.



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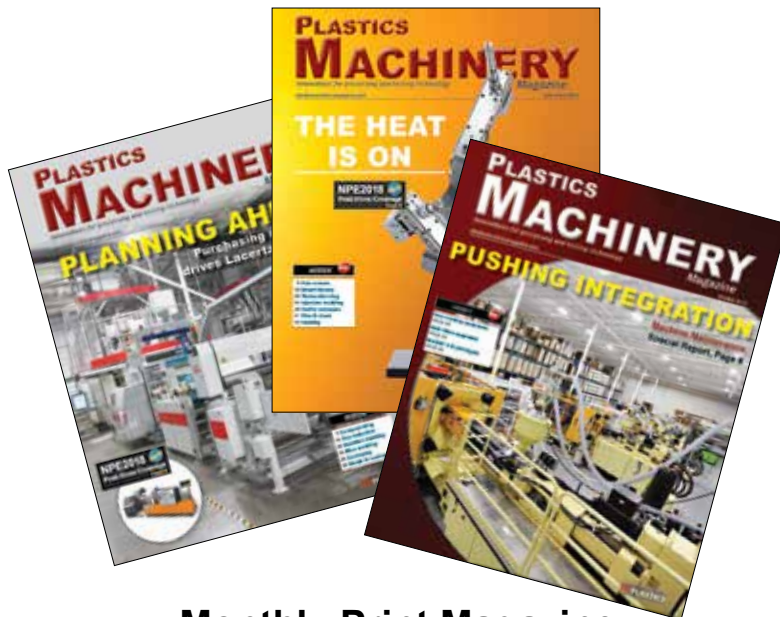
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