



FOR IMMEDIATE RELEASE: 27 OCTOBER 2021

Media Contact: Teri Chouinard CBC, APR, SPE Automotive Div. Comm. Chair 248.701.8003. [teri@intuitgroup.com](mailto:teri@intuitgroup.com)

### **SPE® AUTOMOTIVE DIV. NAMES FINALISTS FOR 50<sup>TH</sup> ANNUAL AUTOMOTIVE INNOVATION AWARDS COMPETITION**

**TROY, (DETROIT) MICH.** – The Automotive Division of the Society of Plastics Engineers (SPE®) today announced the Finalists for its 50<sup>th</sup> annual *Automotive Innovation Awards Gala*, the oldest and largest recognition event (established in 1970) in the automotive and plastics industries. Nominations were first subjected to a pre-qualification review and then were presented before a panel of industry experts on September 23-24, 2021; that panel sent forward the most innovative nominations (category finalists) to the Blue Ribbon judging round, which was held October, 1, 2021. Category and Grand Award winners selected during the Blue Ribbon judging round will be announced on the evening of November 10, 2021, during the 50<sup>th</sup> SPE Automotive Innovation Awards Gala. Finalists from this year’s competition are listed below in category and submission order.

#### **CATEGORY: Additive Manufacturing**

##### **Chassis Spring Sleeve**

- **OEM Make & Model:** 2005 Ford Motor Co. Ford Mustang GT
  - **Tier Supplier/Processor:** Ford Performance Parts / Ford Advanced Manufacturing Center
  - **Material Supplier/Toolmaker:** BASF Corp. / Not Applicable
  - **Material /Process:** Ultrasint® TPU01 TPU / Additive Manufacturing
- Replacing extruded rubber moldings with 3D printed TPU and post-process vapor smoothing, these aftermarket polymeric spring sleeves were designed with DFAM principles, eliminating the adhesive normally used to bond rubber sleeves to springs. The unique design balances assembly feasibility, performance, weight, and material usage and provides an interesting aesthetic not typically seen in such applications. When the traditional supplier no longer could provide parts, Ford designed and produced the kits in house, reducing mass, cost and material usage, improving water-shedding capabilities, and saving \$150,000 through tooling avoidance.

## CATEGORY: Additive Manufacturing (*continued*)

### Integrated Tether System

- **OEM Make & Model:** 2021 Ford Motor Co. Ford Maverick
- **Tier Supplier/Processor:** IAC Group / IAC Group
- **Material Supplier/Toolmaker:** Not Available / Not Applicable
- **Material /Process:** Not Available / Additive Manufacturing
- In an industry first, customers can select, download NPTL files, and 3D print their own swappable accessories (e.g. cupholders, trash bins, etc.) that fit in storage slots of their vehicle across the entire Maverick series. Initial designs were developed by Ford and its supply teams, but future ones could be suggested by customers. A variety of printer types and suggested materials can be used. This provides customers with flexible, customizable storage and use features or the option to maximize cabin space while avoiding significant tooling investment.

## CATEGORY: Body Exterior

### Cowl Vent Grille

- **OEM Make & Model:** 2020 Ford Motor Co. Ford F150
- **Tier Supplier/Processor:** US Farathane / US Farathane
- **Material Supplier/Toolmaker:** The Materials Group / Not Available
- **Material /Process:** Optipro CP47GB Post Industrial Recycle PP / Injection Molding
- This is the first exterior, weatherable, MIC application to use low-density microspheres plus PP from PCR carpet. The application lowered mass 0.2 kg/ and cost \$0.50-1.00/vehicle while offering enhanced weatherability, excellent dimensional stability, and surface aesthetics in a more environmentally friendly form. The drop-in application required minimal tooling modifications, yet was 16% less dense than talc-filled prime PP while offering better processing, mechanicals, surface finish, scratch & mar, weatherability, and a shorter cycle time. It contributes to 680,000 kg of potential landfill avoidance and reduces carbon emissions 83%.

### Grille with Integrated Lit Emblem

- **OEM Make & Model:** 2021 Ford Motor Co. Ford Mustang Mach E GT
- **Tier Supplier/Processor:** Magna Exteriors / LexaMar Div. of Magna Exteriors
- **Material Supplier/Toolmaker:** Covestro / Inevo Group
- **Material /Process:** PC / Injection Compression Molding
- This hardcoated and painted front grille with lit emblem provides a 3D, futuristic effect in a single part. Injection/compression molding forms the large-format clear PC grille with variable wall thicknesses (ranging from 3-5 mm) in a lower-tonnage press that helped minimize or eliminate flow lines and stress marks. After molding, the optical-quality part is undergoes hardcoat silicone dip to provide excellent weathering and abrasion resistance, the pony emblem is milled out, and primer and paint are selectively applied to the B side of the part—the first use of paint-over-hardcoat for an auto exterior trim application.

## CATEGORY: Body Exterior (*continued*)

### Bumper with Park-Aid Sensor Integration

- **OEM Make & Model:** 2021 Ford Motor Co. Ford Bronco
- **Tier Supplier/Processor:** ABC Technologies/ABC Technologies
- **Material Supplier/Toolmaker:** ABC Technologies / Rocand Inc.
- **Material /Process:** Salflex 615 PP/ Blow Molding
  
- This is the first time integrated park-assist sensors have been successfully incorporated into production blow-molded bumper assemblies. Versus stamped steel, blow-molded PP beams are lighter, lower cost, and offer greater design freedom and versus injection molded beams, they offer excellent structural rigidity, reduced assembly complexity, and lower-cost tooling. The resulting fully capable, lightweight bumper system makes use of snap-fit features that eliminate additional hardware to retain the sensors in place.

## CATEGORY: Body Interior

### 3<sup>rd</sup> Row Seatback

- **OEM Make & Model:** 2021 Toyota Motor Corp. Toyota Sienna
- **Tier Supplier/Processor:** Toyota Boshoku Corp. /Flex-N-Gate Corp.
- **Material Supplier/Toolmaker:** BASF Corp. / Concours Technologies, Inc.
- **Material /Process:** Ultramid B3ZG7 CR PA 6/ Injection Molding
  
- A 16-piece steel assembly was replaced with a single, shoot & ship plastic assembly for this 3rd-row seatback that reduced mass 30%, cost 15%, represented a 2x improvement in crash performance, and takes 63% less effort for occupants to raise the seat to its upright position, eliminating the need for a seat motor. This is industry's first fully-plastic freestanding seatback offering excellent energy absorption without need for metal support brackets. A new 35% short-glass, impact-modified PA6 resin was developed for this sequentially injected application.

### Max Recline Seat

- **OEM Make & Model:** 2021 Ford Motor Co. Ford F150
- **Tier Supplier/Processor:** Adient PLC /Leggett & Platt, Windsor Machine Group
- **Material Supplier/Toolmaker:** DuPont, BASF Corp., Advanced Composites Inc. / Various
- **Material /Process:** Delrin, Zytel, Ultramid, ADX, Delrin POM, Zytel PA, Ultramid PA, TPO Acetal, GF Nylon, TPO/ Injection Molding/Overmolding
  
- A helpful feature in this entry-level model are special front driver and passenger seats that recline fully yet support both neck and chest (via a special thoracic bolster with 5 lockable positions) as well as hip and lower back (via a cushion-lift mechanism). Plastics were key to achieving the proper balance of support and flexibility for comfort and to provide a durable solution without BSR concerns in the cushion-lift assembly. To date, 6 patents/innovations have been granted on this design.

## CATEGORY: Body Interior (*continued*)

### 1<sup>st</sup> Row Center Seat Mobile Work Station

- **OEM Make & Model:** 2021 Ford Motor Co. Ford F150
- **Tier Supplier/Processor:** Mitchell Plastics / Mitchell Plastics
- **Material Supplier/Toolmaker:** Celanese, Techno-UMG Co., Ltd. / Acuway Molds Ltd.
- **Material /Process:** Hostaform XGC15-LW01 and SlideX C0313 XAP POM, Celstran LFT-PP, HushlloyPC + ABS, PP/ABS, POM, GF PP/ABS, PC + ABS/ Injection Molding
- To offer truck owners a weather-safe workspace inside the vehicle, a multipurpose, multiposition flat work surface on the back side of the middle front jump seat (on models with bench seats) can be used for writing, computer work, etc., while leaving access to cupholders and power to recharge electronics. The unit offers 121 lockable positions every 4.5 and stands up to rough customer use, yet stows away when no needed. Plastic is used on ≈95% of the assembly. Four patents have been granted on the design.

### Work Surface Fold Out Armrest

- **OEM Make & Model:** 2021 Ford Motor Co. Ford F150
- **Tier Supplier/Processor:** Motus Integrated Technology / : Motus Integrated Technology
- **Material Supplier/Toolmaker:** BASF Corp. / Lamko Tool & Mold Inc.
- **Material /Process:** Ultramid B3EG6 Nylon 6 30% GF / Injection Molding
- This foldout work surface with injection molded double-pivot hinge produces a completely flat 56 x 34 cm work surface that deploys along the center console but stores in the armrest. A new two layer ultrasoft-touch paint system on the ABS panel provides pleasing haptics. Versus a metal piano-style hinge, the plastic hinge is 30% lighter and an estimated 15% less costly.

## CATEGORY: Chassis/Hardware

### Composite Tunnel Reinforcement

- **OEM Make & Model:** 2021 Stellantis Jeep Grand Cherokee L
- **Tier Supplier/Processor:** L & L Products, Inc. / L & L Products, Inc.
- **Material Supplier/Toolmaker:** BASF Corp. / Multiple
- **Material /Process:** Elastocoat, Ultramid 74850, 8350 PUR, PA / Pultrusion, Injection Molding, Extrusion
- Replacing a multipiece stamped and welded ultrahigh-strength steel (UHSS) assembly with a hybrid composite construction consisting of a PUR pultrusion (80% FVF fiberglass) injection overmolded with high-impact GR PA6 and integral mounting hardware, this tunnel reinforcement reduced component mass 40% and subsystem weight another 20%, lowered systems cost 2.9% and tooling costs 18.5%, while meeting or exceeding all functional requirements. The application featured new materials, new simulation tools, and a new method for mechanically bonding thermoset and thermoplastic composites with integral hardware. Although lightweight, the structure carries very-high loads, and is easier to assemble.

## **CATEGORY: Chassis/Hardware (continued)**

### **Multi-Material Rear Leaf Spring**

- **OEM Make & Model:** 2021 Ford Motor Co. Ford F150
- **Tier Supplier/Processor:** Rassini Suspensiones/ Rassini Suspensiones, SGL Carbon
- **Material Supplier/Toolmaker:** Hexion Inc., SGL Carbon / Not Available
- **Material /Process:** EPIKOTE Resin TRAC 06150, EPIKURE Curing Agent TRAC 06150, HELOXY Additive TRAC 06805/ High Pressure Transfer Molding (HP-RTM)
- This new hybrid rear leaf spring combines a high-strength steel main pack plus an HP-RTM fiberglass-reinforced epoxy composite helper that reduces mass 30% while providing the same stiffness and durability as a conventional steel leaf spring system. Additional benefits include increased payload capability, lower part count, decreased interleaf friction, smoother engagement, lower noise, and lower carbon footprint.

### **Active Tuned Mass Module**

- **OEM Make & Model:** 2021 Stellantis Ram 1500
- **Tier Supplier/Processor:** Hutchinson SA/ Not Available
- **Material Supplier/Toolmaker:** BASF Corp. / Not Available
- **Material /Process:** Ultramid A3ZG3 BK23325 PA66+IM+GF / Low Pressure & High Pressure Injection Molding
- This drop-in solution for reducing engine vibration with any “cylinder on demand” methodology provides closed-loop vibration control. Versus passive mass dampers that are largely metal, the new system offers greater design flexibility, is tunable to a wider range of low-frequency vibrations, reduces mass 27%, improves fuel efficiency >1%, simplifies assembly, and increases occupant comfort. The composite housing and bracket were key to the success of the device.

### **Plug-in Hybrid EV Battery Cover**

- **OEM Make & Model:** 2021 Honda CR-V pHEV
- **Tier Supplier/Processor:** SANKO GOSEI/ Minghsiang
- **Material Supplier/Toolmaker:** SABIC / S-VANCE LTD
- **Material /Process:** SABIC FR PPc H1030 PP / Injection Molding
- This is the first thermoplastic solution for a battery cover that meets stringent new fire safety requirements that went into effect earlier this year in China. The non-halogenated FR 30% GR polypropylene copolymer (PPc) is 40% lighter than the outgoing metal solution, offers inherent electrical insulation, seals against moisture intrusion, and will not corrode. The 1.6 m long injection molded part is 2.0 mm thick and reduces cost and mass, increases safety, and contributes to extended driving range and sustainability.

**CATEGORY: Chassis/Hardware (continued)**

**Folding Shifter**

- **OEM Make & Model:** 2021 Ford Motor Co. Ford F150
- **Tier Supplier/Processor:** SL America/ Daeoh Science
- **Material Supplier/Toolmaker:** Solvay SA/ Daeoh Science
- **Material /Process:** Amodel A-1130 FW PPA+GF 30%+PTFE / Overmolding
- This folding console gear shifter is key to the function of another application, the flat work surface. The shifter stows with the push of a button. Novel park-by-wire technology provides automatic return-to-park function. The plastic/metal hybrid features sintered metal gears overmolded with 30% GR PPA with PTFE, which reduced mass, noise, CLTE, and friction.

**CATEGORY: Environmental**

**Positive Crankcase Vent Tube**

- **OEM Make & Model:** 2018 General Motors Co. Small Black CSS Engines
- **Tier Supplier/Processor:** dlhBOWLES/ dlhBOWLES
- **Material Supplier/Toolmaker:** Arkema/ Not Available
- **Material /Process:** Rilsan® HT CESV Black P0101 TL PPA / Extrusion and Thermoforming
- This is the first use of PA11 produced from monomer derived from castor bean oil in a positive crankshaft vent tube. The bio-monomer based resin provides high thermal stability (1000 hr @ 160°C), chemical resistance, and flexibility. Castor beans are grown in soil that supports little else, providing an additional income source for poor farmers in India without competition with food/feed crops or deforestation. Versus steel/rubber assemblies, the PA11 vent tube is 50% lighter, \$5/part less costly, and more flexible, facilitating assembly, while helping decarbonize the supply chain.

**Headlamp Housing**

- **OEM Make & Model:** 2020 Ford Motor Co. Lincoln Continental
- **Tier Supplier/Processor:** Varroc Lighting Systems/ Varroc Lighting Systems
- **Material Supplier/Toolmaker:** Competitive Green Technologies/ Varroc Lighting Systems
- **Material /Process:** CGTECH BCR CGTECH BCR-HMS30-40 PP / Injection Molding
- In this PP headlamp housing, 20% biochar from coffee chaff replaced 40% talc while offering better mechanicals (including better impact strength), higher HDT, tighter dimensions, lighter weight (SG 17% lower), no odor/outgasing, and a lower carbon footprint—meeting or exceeding all of Ford's performance requirements. Additionally, cycle time was lowered, cost was reduced, 25% less energy was required to manufacture the headlamp housing, and no modifications were needed to existing tooling on this drop-in application.

## CATEGORY: Environmental (*continued*)

### Wiring Harness Clip

- **OEM Make & Model:** 2021 Ford Motor Co. Ford Bronco Sport
- **Tier Supplier/Processor:** Lear/ HellermannTyton North America
- **Material Supplier/Toolmaker:** DSM/ HellermannTyton North America
- **Material /Process:** Akulon RePurposed PA6 PA6 / Melt Compounding, Injection Molding
- These 15% GR rPA6 wire-harness clips are injection molded from 100% PCR ocean plastics. Ghost gear (fishing nets) are collected by fishermen in the Indian Ocean and Arabian Sea, providing jobs, more sustainable livelihoods, and healthier marine life. The material provides comparable performance to petroleum-based prime resin at 10% cost savings, lower energy, improved supply-chain stability, and LCA benefits. No tooling changes and minimal process changes were needed for this drop-in change.

## CATEGORY: Industry Solutions for COVID-19

### Ventilator Main Chassis Production

- **OEM Make & Model:** 2020 General Motors Co. / Ventec Life Systems V+Pro Emergency Ventilator
- **Tier Supplier/Processor:** HiTech Mold & Engineering, Inc. / HiTech Mold & Engineering, Inc.
- **Material Supplier/Toolmaker:** SABIC / HiTech Mold & Engineering, Inc.
- **Material /Process:** Lexan 500R 10% GF PC / Injection Molding and Threaded Insert Assembly
- In less than 18 days, the team sourced materials, built tooling, brought dimensional quality into spec, automated installation of 48 brass insert nuts (verified by vision systems), converted a manufacturing facility, trained a workforce, and scaled up production of tight-tolerance ventilator chassis components from thousands/year to thousands/week, eventually delivering 30,000 over 154 days. Whereas the previous supplier had struggled to meet accuracy, FTQ was raised to 98.7 at faster production times.

### Emergency Ventilator

- **OEM Make & Model:** 2020 General Motors Co. / Ventec Life Systems V+Pro Emergency Ventilator
- **Tier Supplier/Processor:** Cascadia Custom Molding / West Michigan Molding, Inc.
- **Material Supplier/Toolmaker:** Avient Corp. / Proper Group International, Inc.
- **Material /Process:** Versollan OM1262NX-1 TPE / Injection Molding
- The team developed a unique TPE—offering modified flow, high adhesion to the PC/ABS substrate, and excellent chemical resistance—and shipped it within 24 hr. High-cavitation tooling was rapidly produced to ensure sufficient supply. A solid supply chain was established that met demand throughout 2020.

## **CATEGORY: Industry Solutions for COVID-19 (*continued*)**

### **Warpage Correction in Ventilator O2 Bracket**

- **OEM Make & Model:** 2020 General Motors Co. / Ventec Life Systems V+Pro Emergency Ventilator
- **Tier Supplier/Processor:** PTI Engineered Plastics / PTI Engineered Plastics
- **Material Supplier/Toolmaker:** Victrex PLC / PTI Engineered Plastics
- **Material /Process:** Vitrex 450FC30 PEEK / Injection Molding
- In less than 1 week, the PEEK resin was fully characterized for CAE material cards and tooling for a key ventilator component was redesigned using mold morphing/windage techniques to address warpage issues that had previously required post-mold fixturing and machining. New tooling was produced and first parts were shot 9 days later. This allowed the team to hold extremely tight tolerances without post-mold countermeasures. This enabled production to be scaled from thousands/year to thousands/week to meet high demand. Costs were reduced 30-40% by eliminating post-mold machining.

### **Ventilator Diaphragm**

- **OEM Make & Model:** 2020 Ventec Life Systems V+Pro Emergency Ventilator
- **Tier Supplier/Processor:** Ventec Life Systems / Lumenflow Corp.
- **Material Supplier/Toolmaker:** Wacker Chemical Corp. / 2K Tool
- **Material /Process:** Elastosil LR 30003/50 Silicone Rubber / Liquid Silicone Injection Molding
- The team used its automotive skillset to retrofit processing equipment to switch from optical-grade silicone to conventional liquid silicone rubber, solve a void issue, build new tooling in just 19 days, and ramp up production of a critical ventilator diaphragm from 1,000/year to 4,000/week.

### **Powered Air Purifying Respirator**

- **OEM Make & Model:** 2020 Ford Motor Co. Limited Use PAPR
- **Tier Supplier/Processor:** Ford Motor Co. / Denso Corp.
- **Material Supplier/Toolmaker:** Asahi Kasei America, Inc., Celanese / 3Dimensional Services, Protolabs
- **Material /Process:** PPTD40, POM Asahi P-40TC-1102 NT101, Celanese M90 CF2001 PolyPro, POM / Injection Molding
- The team produced the first all-plastic PAPR, converting previously metal components to plastic to reduce mass and costs and improve user comfort for this personal protective equipment used by medical workers caring for COVID patients. The lighter, more efficient design improved battery life, enabling workers to complete a 12-hr shift without needing to recharge the battery. NIOSH certification was achieved in just 3 days on the first try. Production was increased to 8,500 units/week from the 650/week the previous supplier achieved. All profits from sales were donated to COVID-19 relief funds and 4 patents are pending on the unit.

## **CATEGORY: Industry Solutions for COVID-19 (*continued*)**

### **Flexible Air Breathing Tube for Powered Air Purifying Respirator (PAPR)**

- **OEM Make & Model:** 2021 Ford Motor Co. Powered Air Purifying Respirator
- **Tier Supplier/Processor:** TI Fluids Systems / Flexaust
- **Material Supplier/Toolmaker:** Celanese, AT Polymers, TechmerPM, INEOS Styrolution Group GmbH, DuPont / Not Available
- **Material /Process:** EVA, LDPE, PE, ABS, PA6/6/ Thermoforming and Injection Molding
- To meet NIOSH certification requirements, the team used automotive tools to deliver on all project objectives in less than 30 days. A new breathing tube design was developed where one size fits bodies ranging from 5th percentile female to 95th percentile male in a variety of postures. The design features quick connects to ensure a robust connection and offers 25% greater airflow but consumes 24% less current for extended battery life. It also is lighter and 8 dB quieter. The team delivered 42,000 breathing tubes during the program.

### **PPE Production Through #TyvekTogether and Project Airbridge**

- **OEM Make & Model:** Not Applicable
- **Tier Supplier/Processor:** Not Applicable / Not Applicable
- **Material Supplier/Toolmaker** DuPont / Not Applicable
- **Material /Process:** Tyvek®/ Not Applicable
- Two different programs—Operation Airbridge and #TyvekTogether—dramatically increased production capacity for hospital gowns and coveralls for healthcare workers and first responders. Additionally, a new fabric was formulated in just 3 weeks to optimize utilization and increase downstream production. Idle capacity and resources at 15 U.S.-based partners were used. In total, the team produced and shipped 17.6-million garments to replenish the National Stockpile.

### **Multi-Use Isolation Gown**

- **OEM Make & Model:** 2020 Ford Motor Co. Isolation Gown
- **Tier Supplier/Processor:** Joyson, Windsor / Not Applicable
- **Material Supplier/Toolmaker** Highland Industries, Aunde / Not Applicable
- **Material /Process:** Nylon 6,6, Polyester / Weaving, Coating, Sewing
- Responding to the scarcity of PPE early in the pandemic, the team repurposed airbag and seat trim materials and used idle cut & sew facilities to produce 50x washable isolation gowns for frontline workers. Two different fabrics were developed and approved in less than 2 weeks (PA6/6 with silicone coating and PET with paraffin/C6 fluorocarbon coating) and gown designs were modified to prevent sleeves from riding up when workers were gloved. A total of 1.32-million gowns have been shipped to date. Efforts were made to reduce gown cost to health-care providers.

**CATEGORY: Industry Solutions for COVID-19 (continued)**

**Apollo PPE Face Shield**

- **OEM Make & Model:** 2020 Ford Motor Co. PPE face Shield
- **Tier Supplier/Processor:** Troy Design Manufacturing / Placon
- **Material Supplier/Toolmaker:** Ex-Tech / Placon
- **Material /Process:** PET APET & RPET PE / Die Cutting and Rotary Cutting
- This is the first time this type of PPE equipment has been produced at extremely high volumes. Within 2 days' time, the team developed its first clear face shields and within 13 days, 1.1-million units had been produced and delivered. To address supply constraints and potential failure modes, material was changed from RPET to APET and pushpin attachments replaced stapling. Supply streams and manufacturing teams were capacitized to over 5-million pieces/week. In total, over 21-million units were shipped to protect frontline workers.

**Acteev Technology**

- **OEM Make & Model:** Not Available
- **Tier Supplier/Processor:** Not Available / Not Available
- **Material Supplier/Toolmaker:** Not Available / Not Available
- **Material /Process:** Not Available / Spunbond and Meltblown NonWoven Media; Continuous Filaments, Monofilaments and Staple Fibers; Molded Applications
- A new low-odor fabric introduced in Nov. 2019 was repurposed to produce washable and reusable nonwoven face masks for the pandemic. Key to the material's efficacy is the fact that zinc ions are embedded in the polymer matrix during polymerization, so the antibacterial treatment doesn't wash or wear off and remains active for the life of the product. The technology also can be used for knits, woven fabrics, and engineering plastics and is covered by more than 100 patents to date.

**CATEGORY: Materials**

**Composite Roof Receivers**

- **OEM Make & Model:** 2021 Stellantis Jeep Wrangler and Jeep Gladiator
- **Tier Supplier/Processor:** Stellantis / Not Available
- **Material Supplier/Toolmaker:** Mitsubishi Chemical Advanced Materials / Maple Mold Technology
- **Material /Process:** KyronMAX S-4330 PPA w /30% USCF/ Injection Molding
- Six brackets for removeable hardtop and soft top roofs were converted from investment cast steel to 30% ultrashort carbon fiber (USCF)-reinforced PPA, providing comparable part strength while reducing costs 38% and mass 79%. Powder coating was eliminated and scratch & mar improved while providing a weatherable, MIC, Class A finish that allowed for mid-program replacement and backwards service compatibility. The USCF composite molds like neat polymers but outperforms LFT materials, is fully recyclable, and has a lower carbon footprint than metal/alloy parts. Direct-drop valve gates and T-nut fasteners also were key enablers.

**CATEGORY: Materials (continued)**

**Electric Drive Unit Mount Bracket**

- **OEM Make & Model:** 2022 General Motors Co. Cadillac LYRIQ
- **Tier Supplier/Processor:** DTR Automotive Corp. / Not Available
- **Material Supplier/Toolmaker:** DuPont Mobility & Materials / Not Available
- **Material /Process:** PA / Injection Molding
- A new PA resin formulated for enhanced damping/NVH without loss of mechanical properties was developed for the EV's drive unit mounting brackets. This enabled the structural support brackets to be tuned, along with elastomeric bushings, to provide broad vibrational filtering, while reducing mass 34% and costs 19.5%. The material must provide stable performance under high stresses and varying ambient and loading conditions.

**Speckled Plastic Door Trim**

- **OEM Make & Model:** 2021 Ford Motor Co. Ford Maverick
- **Tier Supplier/Processor:** IAC Group / IAC Group
- **Material Supplier/Toolmaker:** LyondellBasell Industries Holdings B.V. / Lamko Tool & Mold Inc.
- **Material /ProcessNot Available:** Hostacom TRC 483N NA TPO/ Injection Molding Mold In Color
- Careful part design and tooling considerations, coupled with a uniform-distribution carbon fiber-based speckled filler provides a unique appearance for interior TPO parts vs. solid colors. This eliminates the need for stiffer polymers required for painting / filming, eliminates paint's environmental impacts, reduces costs \$12/vehicle, and saves \$400,000 in painting/filming equipment avoidance. Only a single tool is needed for both solid and speckled colors on the program.

**Graphine Reinforce Brake Lines**

- **OEM Make & Model:** 2020 Ford Motor Co. Ford Explorer
- **Tier Supplier/Processor:** Martinrea International Inc. / Eagle Industries, Inc
- **Material Supplier/Toolmaker:** Nanoxplore, XG Sciences / Martinrea International Inc., Eagle Industries, Inc.
- **Material /ProcessNot Available:** EagleZorb SA-04G PA612, PU Foam / Mold Foaming and Extrusion
- Advanced coating technology featuring graphene-enhanced PA 6/12 has been used to significantly improve the abrasion and corrosion resistance, thermal performance, and NVH of brake lines. Whereas metal was exposed after only 8,000 cycles when a PA 6/12 coating was used alone, the graphene enhanced coating showed no exposed metal after 400,000 cycles, eliminating the need for additional protective coatings. Tube outer diameter did not change, although total tube weight was reduced 25%.

## **CATEGORY: Process/Assembly/Enabling Technologies**

### **Active' Air Intake Manifold Holder/Tuning Plates**

- **OEM Make & Model:** 2021 Nissan Frontier
- **Tier Supplier/Processor:** Mahle GmbH / MacLean-Fogg, EPC
- **Material Supplier/Toolmaker:** BASF Corp. / KTM Industries, Inc.
- **Material /Process:** Ultramid B3WG6 PA6 GF30% / Injection Molding
  
- Replacing multicomponent metal/plastic interfaces that made precision tuning and balancing of the door train for active air-intake modules more difficult, this single-piece injection molded tuning plate not only held demanding tolerances ( $\pm 0.025$  mm) and offered 0.040 mm adjustments, but also reduced mass 12% and cost 10% while improving performance. Key innovations were the use of a low-wear 30% GR-PA6 resin that molds very flat, use of 10 tuning pillars each per left and right plates for precision balancing, cavity pressure sensors for exacting process control and data-driven micro-processing adjustments.

### **Thick Lightbar Development**

- **OEM Make & Model:** 2021 General Motors Co. Cadillac Escalade
- **Tier Supplier/Processor:** Valeo Lighting Systems / Valeo Lighting Systems
- **Material Supplier/Toolmaker:** Covestro LLC / Windsor Mold Group
- **Material /Process:** Makrolon LED PC / Multi-cavity, Multi-shot Injection Molding
  
- This challenging 780 mm long and 18 mm thick transparent-red light blade for rear taillamps functions offers a unique appearance and homogeneous lit appearance. Keys to making the patented application work were advanced simulation tools for design and functional optimization and warpage control; complex runner, parting line, shutoff valves, and multi-shot injection process control; plus a custom-formulated optical-grade of PC that helped manage quality, cost, and molding capacity and met all legal rear-lighting requirements. Despite technical challenges, program timing was reduced by 3 months and \$250,000 in prototype tooling was avoided through virtual prototyping.

### **Liftgate Inner**

- **OEM Make & Model:** 2021 Ford Motor Co. Mach-E
- **Tier Supplier/Processor:** Plastics Omnium / Plastics Omnium
- **Material Supplier/Toolmaker:** SABIC / Omega Tool Corp.
- **Material /Process:** STAMAX 40YM240 PP-LGF-40% / Injection Molding
  
- This MIC LFT-PP injection molded liftgate features a clamshell design with integral interior trim integration and reinforcements plus styling flexibility that allows for design studio changes. Versus steel designs, the composite offered 35% cost and 15% mass savings and a lower carbon footprint. A high-flow copolymer filled the design featuring wall thicknesses that varied from 2.0 to 4.5 mm. A 6-axis robot inserted metal reinforcements for overmolding and removed parts. The highly controlled process used sequenced hot runners with PSP sensors and a part-presence sensor for overmold stamping.

**CATEGORY: Process/Assembly/Enabling Technologies (*continued*)**

**Fabric Wrapped Speaker Grille**

- **OEM Make & Model:** 2021 Ford Mustang Mach-E
- **Tier Supplier/Processor:** Grupo Antolin / Williamston Products, Inc.
- **Material Supplier/Toolmaker:** Trinseo / Toolplas Systems Inc.
- **Material /Process:** Magnum 3325 MT ABS / Injection Molding
  
- To achieve the desired look for a series of fabric-wrapped speaker grilles on IP and doors, a number of technical challenges needed to be overcome, including finding the right size speaker holes as well as fabric and adhesives that did not interfere with sound performance yet met customer abuse, cleaning, and FR requirements and other auto industry performance standards. In the end, appearance, audio performance, and assembly requirements were met for this industry-first fabric wrapped speaker grille application.

**Hybrid Fleece Technology**

- **OEM Make & Model:** 2021 General Motors Co. Chevrolet Tahoe & Suburban, Cadillac Yukon & Escalade
- **Tier Supplier/Processor:** IAC Group / IAC Group
- **Material Supplier/Toolmaker:** Carver Non-Wover Technologies LLC, Celanese / Persico SpA
- **Material /Process:** NF PP Mat, Celstran NF PP, PP-GF PP / Injection Molding
  
- Panels of compression moldable natural fiber/PP hybrid fleece with up to 25% recycled PP plus an injection moldable LFT-PP substrate are being used for a variety of interior panels (e.g. door carriers, uppers, bolsters, and armrests; IP substrates, top pads, and mid-panels; and hard trim). Versus injection molded plastic panels, mass was reduced 50%, numerous secondary operations including welding, adhesive application, and insert molding were eliminated, and renewable materials were used in a single efficient process producing 320,000+ car sets/year. The first use of non-contact IR heating in North America supports fast cycle time.

Category and Grand Award winners selected from among these finalists during the Blue Ribbon judging by a group of journalists, academics, and retired industry chief engineers will be announced on November 10, 2021 during the 50<sup>th</sup> annual SPE Automotive Innovation Awards Gala at Burton Manor in Livonia, Michigan.

A Vehicle Engineering Team Award (VETA) will also be presented to recognize automotive designers and engineers, tier integrators, materials suppliers, toolmakers, and others – whose work in research, design, engineering, and/or manufacturing has led to significant integration of polymeric materials on a notable vehicle. A Lifetime Achievement Award will also be presented to honor a person who has made significant contributions to the industry.

Since 1970, the ***SPE Automotive Innovation Awards Competition*** has highlighted the positive changes that polymeric materials have brought to automotive and ground-transportation industries, such as weight and cost reduction, parts consolidation, increased safety, and enhanced aesthetics and design freedom. At the time the competition started, in 1970, many OEM designers and engineers thought of plastics as inexpensive replacements for more “traditional” materials. To help communicate that plastics were capable of far more functionality than their typical use as decorative knobs and ashtrays indicated, members of the board of directors of SPE’s Automotive Division created the competition to recognize successful and innovative plastics applications and to communicate their benefits to OEMs, media, and the public.

Over the years, the competition drew attention to plastics as an underutilized design tool and made industry aware of more progressive ways of designing, engineering, and manufacturing automotive components. From its humble beginnings, the competition has grown to be one of the most fiercely contested recognition events in the automotive and plastics industries. Today, polymeric materials are no longer substitutes for more expensive materials, but rather are the materials of choice in hundreds of different applications throughout the vehicle. Without plastics, many of the auto industry’s most common comfort, control, and safety applications would not be possible.

During the competition phase of the event, dozens of teams made up of OEMs and suppliers work for months to hone submission forms and presentations describing their part, system, or complete vehicle module to support claims that it is the year’s “***Most Innovative Use of Plastics.***” To win, teams must survive a pre-competition review and two rounds of presentations before industry and media judges.

There is no cost to nominate parts, however, nominations that are accepted into the competition need to be presented (in person or via webinar) by their nominating teams during the first round of ***Automotive Innovation Awards Competition*** judging. Finalists from that round advance to a second presentation before a panel of Blue Ribbon judges made up of media, retired chief engineers, and other industry experts. This annual event usually draws over 800 OEM engineers, automotive and plastics industry executives, and media. Funds raised from the event are used to support SPE educational programs including technical seminars and conferences, 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 Div., see <https://speautomotive.com/>. For more information on the Society of Plastics Engineers, see [www.4spe.org](http://www.4spe.org).

#####

For more info: <https://speautomotive.com/innovation-awards-competition-and-gala/>

Attn: Editors: Photos of the Finalists, as well as large collection of SPE Automotive Division digital photography, is available for download at: <https://www.flickr.com/photos/speautomotive/albums/with/72157673717033072>

SPE® is a registered trademark of the Society of Plastics Engineers. All other trademarks are the property of their respective owners.