MANUFACTURING OUTLOOK

AUTONOMOUS VEHICLE TECHNOLOGIES

A tectonic shift for the supply chain

THURSDAY OCTOBER 20 2016

An independent member of UHY International
OPENING COMMENTARY

Thomas Alongi
National manufacturing and global automotive practice partner
UHY LLP
DREAM A LITTLE
CROSSROADS – TIME OF DISRUPTION
CROSSROADS – REMEMBER THIS TIME?
CROSSROADS – WILL WE REMEMBER THIS TIME?
WHAT IS DRIVING CHANGE – TECHNOLOGY TODAY
WHAT IS DRIVING CHANGE – EXPERIENCES
WHAT’S DRIVING CHANGE – URBANIZATION
2015 brought the first increase in automotive deaths in several years. Total deaths rose to 38,300, a rise of 8% to 11.87 per 100,000 population.
HOW SUPPLIERS CAN TAKE ADVANTAGE OF THIS SHIFT

Integrator
HOW SUPPLIERS CAN TAKE ADVANTAGE OF THIS SHIFT

Innovator

AUTO INNOVATION

UHY LLP Certified Public Accountants
HOW SUPPLIERS CAN TAKE ADVANTAGE OF THIS SHIFT

Relationship Builder

Efficiency

Quality

Cost

Speed
HOW SUPPLIERS CAN TAKE ADVANTAGE OF THIS SHIFT

Global Supplier
HOW SUPPLIERS CAN TAKE ADVANTAGE OF THIS SHIFT

HOW IS YOUR COMPANY POSITIONED FOR THE FUTURE?

SUCCESS
ROAD AHEAD
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MICHIGAN LEGISLATIVE UPDATE

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Michigan Manufacturers Association
WHO IS MMA?

The Michigan Manufacturers Association is:

• Nearly 2,000 member companies
• Michigan’s only statewide advocate dedicated to manufacturers
• Advocacy:
  - Protecting and improving through legislative representation
  - Reducing unnecessary regulations and bureaucracy
  - Speaking on the industry’s behalf in the court system
• Educational opportunities – events, information and networking
• Strategic partnerships across Michigan
ELECTION 2016

Ballot Proposals in 2016

• None gained the 252,523 signatures necessary
• But 12 approved by Board of Canvassers
• Issues of concern:
  - Mandatory paid leave
  - Ban on fracking
  - Double CIT
  - Legalize marijuana
Michigan – House Election

• Currently large Republican majority 62 – 45 – 3
• Majority unless a Clinton landslide
• Incumbents – 66
• Open seats – 44
• Competitive seats – 15
Michigan Supreme Court

Important for rule of law majority
• 2 open seats
• Republicans hold a 5 – 2 majority on the court
• If Republicans Justice David Viviano & Justice Joan Larsen, are defeated the balance will shift to a 4 – 3 Democratic majority
Manufacturing focused. Member driven.

www.mimfg.org
Michigan’s Economic Resurgence

• 450,000+ new private sector jobs since 2010
• #1 in job creation in Midwest
• Per capital personal income is up 4.1%,
• Nationally, #6 in job creation and #4 in personal income growth
• Unemployment has dropped to 4.5%, a 15 – year low
• Michigan’s economic health #2 in the nation
Michigan Manufacturing Drives the State

• 21.4% of Michigan’s gross state product
• Total manufacturing output nearly $83 billion
• Employs 602,500 people
  - Average MFG annual compensation 2014: $75,539
  - Average non farm business compensation: $47,290
• High economic multiplier effect
• Billions in investment
• 149,300 new jobs since January 2010
How did we get here?

• A fundamental shift in Michigan’s business climate
• Historic change in its regulatory environment
• Eliminating barriers to competitiveness on all fronts that impact manufacturers
MICHIGAN LEGISLATIVE UPDATE

MMA – Driven Legislative and Regulatory Change

• Elimination of industrial PPT: $576 million annual savings
• “Cost of service” energy rates: $100 million annual savings
• Millions in state funding dedicated to manufacturing training
MICHIGAN LEGISLATIVE UPDATE

MMA – Driven Legislative and Regulatory Change

• Workers’ Comp Reform: $390 million saved since 2011
• Unemployment Reform
• Self – Insurers’ Security Fund Stabilization
• Preempt Local Government Employment Mandates
• HICA Tax reduction: $82 Million Annual Savings
• Defense of Certificate of Need Process
• Blocking Health Care Mandates
MICHIGAN LEGISLATIVE UPDATE

MMA – Driven Legislative and Regulatory Change

• 2,015 Administrative Rules Eliminated
• Elimination of Michigan – only Mercury Rule
• Comprehensive Beneficial Reuse
• Electrician Apprentice Ratio
Looking Forward

• General Election November 8
• “Lame Duck” session
• New House for 2017 – 2018 Legislative session
Looking Forward

- Energy policy
  - Ensure reliability and affordability
  - Preserve 10% choice
  - Eliminating mandate programs
  - Letting resources stand on their own merits
Looking Forward

• Tax policy
  - Block “Dark Stores” legislation
    ▪ Preserve your right to appeal your taxes
  - Competitive economic development incentives
Looking Forward

- Environmental Policy
  - Part 201 Remediation Regulations
  - Proliferation of local requirements
Looking Forward

- Health Care Policy
  - Health Insurance Claims Assessment (HICA) tax
  - Specific Benefit Mandates
  - Pharmaceutical issues
Looking Forward

• Talent
  - Funding for manufacturing training
  - Make existing programs work for manufacturers
Looking Forward

• Employer issues
  - Continued reform of unemployment
  - Paid leave
  - Medical marijuana/legalized marijuana
  - “Guns in the Trunk”
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New frontiers; possible roadblocks

William J. Kohler
Presentation Outline

• Credentials
• U.S. Department of Transportation/NHTSA
  – New Federal Automated Vehicles Policy
• Michigan Proposed Legislation
  – House Substitutes for Senate Bills 995, 996 and 997 and Senate Bill 998
  – MDOT Automated Vehicle-Related Technologies Partnership
• Questions and Answers
William J. Kohler is a senior counsel in Dykema’s Corporate Finance Practice Group. His practice is focused on the automotive industry where he served many years as general counsel at several automotive related companies covering domestic and international matters. Mr. Kohler is an authority on legal issues relating to autonomous and connected vehicles. His work in that area has involved investment transactions, technology development and licensing arrangements, and legislative and regulatory issues. He is the author of "Current Law and Potential Legal Issues Pertaining to Automated, Autonomous and Connected Vehicles," published in 2015 in the Santa Clara High Technology Law Journal.
ARTICLES

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2014 COMMENT CONTEST WINNER

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EVOLVING BUSINESS AND LEGAL ISSUES IN
ARTIFICIAL INTELLIGENCE, BIG DATA AND
THE INTERNET OF THINGS

Texas CEO
MAGAZINE

OF HAL, SKYNET AND IROBOT

Discussions regarding artificial intelligence (AI) are not
limited to the annual Comic Con and other fan
conventions. At this time in the United States,
some schools is experimenting with the use of
artificial intelligence to teach students. A
machine can teach a person how to think in
the same communication with another human. As
time has passed, it’s been 12 years since the
release of the movie, “I, Robot.”

If you’ve watched the movie, it’s easy to see
why the term “Artificial Intelligence” has been
adapted to other industries and applications.

The term “artificial intelligence” was
originally coined by John McCarthy in 1956.
He defined it as “the science and engineering
of making intelligent machines.”

Since then, the field of artificial
intelligence has expanded significantly.

However, what is artificial intelligence,
and how does it relate to our daily lives?

Artificial intelligence is a branch of
computer science that focuses on creating
machines that can perform tasks that
normally require human intelligence.

In recent years, artificial intelligence
has become increasingly popular in various
industries, including healthcare, finance,
and transportation.

While the field of artificial intelligence
has shown tremendous growth in recent
years, there are still many challenges to
overcome before it can reach its full
potential.

One of the biggest challenges is the
issue of data privacy. As AI becomes
more advanced, it will be able to
analyze vast amounts of data to make
predictions and decisions. However,
this also raises concerns about the
privacy and security of personal
information.

Another challenge is the need for
increased transparency in the decision-
making process of AI systems. It’s
important that the public understands
how these systems work and how they
make decisions.

Despite these challenges, the field of
artificial intelligence continues to
grow and evolve. As researchers and
developers continue to push the
boundaries of what’s possible, it’s
likely that we’ll see even more
innovations in the future.”
Autonomous and Connected Vehicle Practice

Dykema’s nationally recognized Autonomous and Connected Vehicle Team understands the complexities of advanced automotive technologies. Our lawyers are at the forefront of these emerging technologies, and are already helping clients navigate the difficult legal challenges and opportunities that automated vehicles present. The following is a summary of our capabilities and recent experiences involving the transformation of transportation.
Autonomous and Connected Vehicle Practice

• **Investments in Technology Providers**
  Dykema’s clients include investment firms and automotive companies making investments in, and acquiring, technology providers and mobility start-ups. In addition, the firm has advised technology providers on acquisition opportunities and strategies and automotive companies in making investments in mobility investment companies.

• **Technology Development Arrangements**
  As the pace of collaborations has accelerated, Dykema has assisted technology providers and up-stream incorporators on technology development arrangements involving joint development efforts, testing and integration. With clients in both the automotive and technology industries, our lawyers have a broad perspective and deep understanding of their businesses, which enhances their ability to complete transactional matters.
Autonomous and Connected Vehicle Practice

- **Product Liability**
- Dykema has long been a leader in automotive product liability litigation defense, representing almost every major automotive manufacturer in individual cases and related class action litigation. Our lawyers also have deep experience in product liability prevention advice. From the very beginning of connected vehicle development, it was a team of Dykema lawyers who advised a major automotive industry consortium on product liability. Our lawyers not only represent industry members, but are also leaders of major legal associations, chairing national and international programs on automated and connected vehicle technologies. Dykema is the only national law firm to recently sponsor a major university symposium focused on liability risk reduction.
Autonomous and Connected Vehicle Practice

- Legislative and Regulatory Development and Compliance
  - Dykema’s regulatory experience with automated and connected vehicles extends back well over a decade and is a logical outgrowth of the firm’s long-standing regulatory experience with motor vehicle safety issues. Dykema has been closely involved, on behalf of clients, in the development of state-level autonomous vehicle legislation and the National Highway Traffic Safety Administration’s (NHTSA) rulemaking with respect to vehicle-to-vehicle (V2V) communications technology. The firm closely tracks and advises on the development of state and federal legislation and regulations pertaining to vehicle automation and connectivity. With respect to various types of emerging advanced driver assistance systems (ADAS) and automated vehicle systems, ranging from electronic stability control (ESC) to more recent innovations such as forward collision avoidance systems, we have assisted clients on all aspects of federal regulatory involvement, including rulemakings, compliance with any applicable Federal Motor Vehicle Safety Standards and NHTSA policy guidance. Our continuing regulatory work involving automated and connected vehicles includes representation of manufacturers of vehicles and equipment for both the passenger and commercial vehicle sectors.
Autonomous and Connected Vehicle Practice

• **Supply Chain Risk Management**
  As supply chains involving technology providers and sub-component suppliers have begun to develop, Dykema has advised clients with respect to supply chain risks that could impede continuity of supply when proprietary technology relating to autonomous and connected vehicles becomes inaccessible due to business failure. Though supply chain risk is not new, the degree of risk pertaining to proprietary technologies is growing with potentially disastrous results if not addressed strategically in applicable contracts.

• **Cybersecurity**
  Cybersecurity is a paramount challenge essential to the acceptance of advanced vehicle technologies that presents particularly significant legal risk. The firm’s lawyers have counseled vehicle manufactures on measures to enhance cybersecurity and mitigate risks. Our lawyers are familiar with the planning and development of such systems, including identifying and allocating risk and liability based on interface and other physical or logical boundaries within vehicle systems.
Autonomous and Connected Vehicle Practice

• **Data Privacy**
  - Dykema lawyers frequently advise clients on privacy obligations, including regarding cross-border data transfer. Involvement has included all stages from privacy impact assessments (PIA programs) to planning, executing and monitoring privacy programs like in-app consent, US-EU Privacy Shield, Standard Contractual Clauses and other measures. Several Dykema lawyers hold IAPP certifications for both the United States private sector (CIPP/US) and are certified in European privacy (CIPP/E).
  - Also, starting in the mid-1990’s, Dykema began representing a consortium of major global automakers engaged with the U.S. Department of Transportation to perform various preliminary assessments of the feasibility of development and deployment of connected vehicle systems, both vehicle-to-vehicle (V2V) and vehicle to infrastructure (V2I).
Autonomous and Connected Vehicle Practice

- **Insurance**
  - Dykema is assisting insurance providers to understand and plan for the implications, issues and opportunities that will arise as automated vehicles are deployed.

- **Artificial Intelligence**
  - Dykema lawyers are thought leaders in the area of AI liability and current and potential regulatory schemes.
U.S. Department of Transportation/NHTSA

- The U.S. Department of Transportation (DOT) oversees NHTSA and hosts the Intelligent Transportation Systems Joint Program Office (ITS JPO).
- NHTSA was established and given limited powers by the Highway Safety Act of 1970.
- NHTSA’s essential function is to maximize highway safety.
- Mission: “to save lives, prevent injuries, and reduce economic costs due to road traffic crashes,” and as to “achiev[e] the highest standards of excellence in motor vehicle and highway safety.”
U.S. Department of Transportation/NHTSA

• Powers:
  – Establish vehicle safety standards for new motor vehicles and motor vehicle equipment.
  – Require the recall and remedy of vehicles and equipment that do not comply with standards.
  – Conduct investigations into safety defects.
  – Require the recall and remedy of motor vehicles and motor vehicle equipment determined to have a safety defect.

• NHTSA has announced its interest in regulating autonomous vehicles, as well as its willingness to advance and support the wide adoption of related technology.

• Possesses broad authority to regulate the design and use of future autonomous motor vehicles, including the power to preempt contrary state regulation.
Generally, NHTSA/FMCSA safety regulations preempt any conflicting state regulation
  – States may issue supplemental regulations if not in conflict with federal standards
  – State regulations mainly focused on vehicle use (e.g., operator licensing and restrictions, safety inspections, vehicle registration)
U.S. Department of Transportation/NHTSA

- Federal Motor Carrier Safety Association (FMCSA)
  - Incorporation of NHTSA safety regulations plus specialized equipment regulations for commercial vehicles and operator requirements
  - *Unlike* NHTSA and passenger vehicles, FMCSA may regulate operation of vehicles through commercial driver regulations (e.g., hours of operation; substance abuse; cell phone restriction rule; video display prohibition)
NHTSA Enforcement – Emerging Technologies

• Fiat Chrysler voluntary recall 7/2015 – software adjustment to prevent remote manipulation
• NHTSA 9/23/2016 Enforcement Guidance: Safety-related Defects and Automated Safety Technologies
  – Traditional enforcement analysis will apply
  – Software in motor vehicles is “motor vehicle equipment”
  – Could include software outside vehicle that connects to and operates vehicle systems (further guidance to follow)
  – Cybersecurity (hacking) vulnerability – NHTSA defers assessment to future date
Preliminary Automation Policy Statement

U.S. Department of Transportation Releases Policy on Automated Vehicle Development

NHTSA 14-13
Thursday, May 30, 2013
Contact: Karen Aldana, 202-366-9550, Public.Affairs@dot.gov

Provides guidance to states permitting testing of emerging vehicle technology

WASHINGTON - The U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) today announced a new policy concerning vehicle automation, including its plans for research on related safety issues and recommendations for states related to the testing, licensing, and regulation of "autonomous" or "self-driving" vehicles. Self-driving vehicles are those in which operation of the vehicle occurs without direct driver input to control the steering, acceleration, and braking and are designed so that the driver is not expected to constantly monitor the roadway while operating in self-driving mode.

http://www.nhtsa.gov/About+NHTSA/Press+Releases/U.S.+Department+of+Transportation+Releases+Policy+on+Automated+Vehicle+Development
Automated Vehicles Policy announced

Sept. 20: Industry leaders, experts in the field, state governments, the public, and safety advocates were consulted in developing the policy.

Read More

www.nhtsa.gov
New Federal Automated Vehicles Policy

• The U.S. Department of Transportation issued its Federal automated Vehicles Policy on September 20, 2016, pertaining to both highly automated vehicles and lesser-automated vehicles

• The policy was issued as agency guidance rather than rules, but it is likely going to be influential in shaping new state laws, acting as best practices for automated vehicle testing and development

• The policy also advises that NHTSA will investigate any safety concern associated with highly automated vehicles and exercise its enforcement authority to the fullest extent

• The policy is still in the 60-day period when stakeholders can comment on the policy
## New Federal Automated Vehicles Policy

### Safety Assessment Requirement

The policy states that the NHTSA will request voluntary Safety Assessments regarding the compliance of highly automated vehicles with each of the following 15 elements of guidance:

|---|-----------------------------|------------|-----------------|------------------------|----------------------------|------------------|-------------------------------|------------------------|-------------------------|-------------------------|------------------------|------------------------|-------------------------|-------------------------|------------------------|-------------------------|

* These same elements of guidance will also apply to vehicles at the SAE Level 2, with the exception of those marked with an asterisk, and might be mandatory in the future.
New Federal Automated Vehicles Policy
New Automation Levels

- At SAE Level 0, the human driver does everything;
- At SAE Level 1, an automated system on the vehicle can *sometimes assist* the human driver conduct *some parts of* the driving task;
- At SAE Level 2, an automated system on the vehicle can *actually conduct* some parts of the driving task, while the human continues to monitor the driving environment and performs the rest of the driving task;
- At SAE Level 3, an automated system can both actually conduct some parts of the driving task and monitor the driving environment in some instances, but the human driver must be ready to take back control when the automated system requests;
- At SAE Level 4, an automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated system can operate only in certain environments and under certain conditions; and
- At SAE Level 5, the automated system can perform all driving tasks, under all conditions that a human driver could perform them.
New Federal Automated Vehicles Policy Safety Assessment Requirement

• For those highly automated vehicles already tested and deployed, Safety Assessments would be due within four months after the completion of the Paperwork Reduction Act process.

• Those introduced during or after that process would be due four months before public testing begins.

• New safety assessments would be required whenever significant updates are made to a vehicle.
New Federal Automated Vehicles Policy
New and Existing NHTSA Powers

• The Agency identified four potential additional powers, each of which would require an amendment of the National Traffic and Motor Vehicle Safety Act:
  1. Pre-deployment approval process
  2. Cease and desist power in case of imminent hazard
  3. Expanded exemption authority
  4. Post-sale regulation of software changes

• The policy potentially deviates from its current self-certification regulatory structure by requiring pre-market approval
New Federal Automated Vehicles Policy
State Policy Recommendations

- The policy acknowledges respective federal and state regulatory responsibilities for motor vehicles and their operation
- The agency recommends a model regulatory framework (the “Model State Policy”) for states that wish to regulate procedures and conditions for testing, deployment and operations of highly automated vehicles
New Federal Automated Vehicles Policy
State Policy Recommendations

- The Model State Policy includes a requirement that manufacturers – broadly defined as OEM’s, alterers and modifiers – submit to a designated state agency an application for testing stating that the highly automated vehicle follows the policy’s 15 elements of guidance and complies with the Federal Motor Vehicle Safety Standards.

- The policy recommends certain other requirements, such as testing only by trained persons designated by the manufacturer and reporting all crashes to the state.
The Model State Policy contemplates a “jurisdictional automated safety technology committee” staffed with:

- Representatives of the governor’s office
- The motor vehicle administration
- The state’s department of transportation
- Law enforcement agency
- Highway safety office
- Office of information technology
- Insurance regulator
- The state’s offices representing the aging and disabled, toll authorities and transit authorities
Federal Policy

• The policy can be found in full at:

http://www.dykema.com/assets/htmldocuments/Federal_Automated_Vehicles_Policy.pdf
Michigan Proposed Legislation

- Michigan Senate approved historic autonomous vehicle legislation on September 7, 2016
- The legislation package is comprised of four bills: House Substitute for Senate bills 995, 996 and 997 and Senate bill 998
- The bills permit driverless vehicles on Michigan roads
- The bills are currently in the Michigan House of Representatives awaiting a floor vote
Michigan Proposed Legislation: House Substitute for Senate Bill 995

• Permits:
  – the operation of individual automated motor vehicles ("AMV’s")
  – platoons of electronically coordinated vehicles
  – “on-demand automated motor vehicle networks” on Michigan roads
Michigan Proposed Legislation: House Substitute for Senate Bill 995

- Immunizes a “manufacturer of automated technology” or an “automated driving system” against civil liability for damages arising from modifications without the manufacturer’s consent
- Specifies that an AMV’s automated driving system would be considered the driver or operator of a driverless vehicle for purposes of determining compliance with traffic and motor vehicle laws
Michigan Proposed Legislation: House Substitute for Senate Bills 996 and 997 and Senate Bill 998

- **996**
  - Permits self-certifying vehicle manufacturers to deploy “SAVE projects,” which are on-demand automated motor vehicle networks within certain types of geographical areas (e.g. municipal and regional authority areas, university campuses, senior citizen developments)

- **997**
  - Excludes roads within a mobility research center from Michigan Vehicle Code provisions applicable to private roads open to the general public (e.g. the planned American Center for Mobility in Ypsilanti, Michigan)

- **998**
  - Limits the civil liability of motor vehicle mechanics or motor vehicle repair facilities that repair an AMV

• Insurance Requirements
  – A motor vehicle manufacturer has to have insurance, surety bond or self-insurance in the amount of at least $10,000,000.00

• Liability
  – The automated driving system, when engaged and allowing for operation without a human operator, is considered the driver or operator of the vehicle for purposes of determining conformance to any applicable traffic or motor vehicle laws
  – “A manufacturer of automated driving technology, an automated driving system, or a motor vehicle is immune from liability that arises out of any modification made to a motor vehicle, an automated motor vehicle, an automated driving system, or automated driving technology by another person without the manufacturer’s consent, as provided in section 2949B of the Revised Judicature Act of 1961 . . . .”

- Insurance Requirements
  - A motor vehicle manufacturer must insure each vehicle in a participating fleet
- Liability
  - “For each SAVE project in which it participates, during the time that an automated driving system is in control of a vehicle in the participating fleet, a motor vehicle manufacturer shall assume liability for each incident in which the automated driving system is at fault, subject to Chapter 31 of the Insurance Code of 1965 . . . .”

- Liability
  - “A motor vehicle mechanic or a motor vehicle repair facility that repairs an automated motor vehicle according to specifications from the manufacturer of the automated motor vehicle is not liable in a product liability action for damages resulting from the repairs.”
MDOT Automated Vehicle-Related Technologies Partnership

- In August of 2016, the Michigan Department of Transportation (“MDOT”) released a Request for Partnership seeking potential partners interested in working with the MDOT and 3M to test connected and automated vehicle technology.
- MDOT and 3M intend to use the I-75 construction project to offer a real-life opportunity, on local and freeway networks, to test the communications and the interactions between two or more vehicles and between a vehicle and the surrounding infrastructure.
MDOT Automated Vehicle-Related Technologies Partnership

• MDOT specifically expressed interest in technologies related to the roadways, construction or traffic signs and traffic barrels or barriers that would communicate and interact directly with the vehicle

• The project seeks to improve the mobility of motorists and reduce the number of traffic fatalities through the implementation of automated and connected vehicle technologies
Conclusion

• NHTSA is increasing its authority in the area of AMV’s by publishing new guidelines, and it welcomes comments from stakeholders to be submitted by November 22, 2016

• The State of Michigan is embracing AMV’s by proposing legislation that would permit the operation of AMV’s on Michigan roadways and by initiating partnership projects between private entities and MDOT
Autonomous and Connected Vehicle Team

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http://www.dykema.com/services-industries-autonomous-and-connected-vehicle-team.html
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THE “NEW” R&D TAX CREDIT:
A GAME-CHANGER FOR MANUFACTURERS

Scott Earls
Partner
UHY LLP
WHAT ARE THE BIG CHANGES AHEAD FOR THE R&D TAX CREDIT?

• It’s Finally Permanent!
• The PATH Act Retroactively Restored 2015 and Permanently Extended The R&D Credit
• Eligible Small Businesses Can Offset AMT Starting in 2016
• Start-Up Small Business Can Apply R&D Credit Against Payroll Tax in 2016
WHY HAVE AN R&D CREDIT?

• Enacted in 1981, the Research and Development (R&D) tax credit of IRC §41 was a temporary credit for 34 years. Extended 17 times

• Why have it?

• Congress perceived that research spending declines had adversely affected the Country's economic growth, productivity gains, and competitiveness globally

• American Automakers (worried about them)

• Helps level the playing field between U.S. business and foreign competition

• It wasn’t enough to just maintain annual R&D Spending levels - they needed to increase each year
WHAT’S THE R&D TAX CREDIT REALLY WORTH?

• Three types of expenses qualify
  - Wages
  - Supplies
  - Contract research

• These expenses are already taken on the front page of the tax return

• Think of it as putting these into a pool of expenses

• The R&D credit is around 7% of this pool

• It’s like a cash rebate for your R&D spend
CONSIDERATIONS...

- Are you making a profit?
- Is AMT an issue? If not, what is the spread?
- This will change for 2016 – more on this later
- Are there a lot of NOLs?
- Should you consider prior years?
- Audit concerns
- Number of shareholders impacted by amended returns
- Add Back on amended return if 280C election not taken
- Are the Shareholders Active or Passive?
In the eyes of the Internal Revenue Service:
**R&D begins at concept inception and ends at implementation or commercial production.**
Under IRC §174, to qualify for the R&D credit, activities must:

- Be technological in nature. Relies on physical science, biological science, engineering or computer science.
- Have a permitted purpose. Relates to a new or improved business component’s function, performance, reliability, quality or price.
- Include a process of experimentation. Involves evaluation of alternatives, confirmation through evaluation, testing, modeling or refining or discarding of hypotheses.
- Eliminate uncertainty. Involves identification of uncertainty at the onset of the project or activity. This may relate to production method, product capability, appropriate design or application of product.
NEW OR IMPROVED BUSINESS COMPONENT

• Business component is a:
  - Product or process
  - Computer software
  - Formula, technique, or invention

• Activity must relate to a new or improved aspect of the business component

• Improvements may be evolutionary in nature
WHAT DOES NOT QUALIFY FOR CREDIT?

Statutorily – Excluded Activities IRC Sec. 41(d)(4)

• Related to style, taste, cosmetic or seasonal factors
• Relies on social science, arts or humanities
• Research conducted after beginning of production
• Conducted outside the U.S.
• Reverse engineering
• Market research, management surveys, etc.
• Routine data collection and ordinary quality control
There are two major misunderstandings about the R&D Credit. 
1. It’s only for companies with labs doing scientific research 
2. It’s only for large companies 

Neither of these is true. **Less than 1 in 20 small businesses takes the credit.** In fact, 80 percent of the R&D tax credits go to companies with receipts of more than $250 million. About 7 percent of the credits go to companies with less than $5 million in receipts. This is due largely to lack of awareness. 

**Don’t leave money on the table.**

The federal R&D tax credit benefits all businesses that qualify, large and small.
WHO TAKES THE R&D CREDIT?

Any business with qualifying activities

- Aerospace
- Agriculture
- Architecture
- Automotive
- Banking
- Chemical
- Commercial Contractors
- Computer Hardware
- Electronics
- Energy
- Engineering
- Fabrication

- Food & Drink
- Injection Molding
- Insurance
- Manufacturing
- Medical
- Oil & Gas
- Packaging
- Pharmaceuticals
- Plastics
- Robotics
- Software
- Telecommunications
- Tool & Die
WHAT ARE QUALIFYING R&D ACTIVITIES?

- Developing new or improved products, processes or formulas
- Developing prototypes or models
- Developing or applying for patents
- Developing new technology
- Developing or improving software technologies
- Developing, implementing or upgrading systems
- Designing tools, jigs, molds or dies
- Engineering
- Certification testing
- Environmental testing
- Trying new or different raw materials
- Preparation of RFP quote
- Equipment maintenance or modification
HOW MUCH OF MY TIME WILL THIS TAKE?

• Initial phone call is about an hour
• Site visit, team discussions, and fact finding vary depending on:
  - Size of organization
  - Number of locations
  - Scope of study
  - Number of years involved
• Smaller studies may require 1 – 4 hours
• Larger companies could be a full day or longer
• R&D questionnaires average an hour per project
HOW WILL START-UPS BENEFIT FROM NEW LAW?

• Many small businesses are S-Corps limited by AMT
• Start-ups are often the most innovative, but are not profitable yet
• No Profit = No Income Taxes
• The PATH Act will open the credit up to more small businesses for these reasons
For a small business or individual to qualify as a start-up, one must:

• Have gross receipts of less than $5 million and
• Not have had gross receipts above $5 million for any tax year preceding the 5-tax-year period ending with the tax year
• Meet the requirements above, taking into account the aggregate gross receipts received by the individual in carrying on all trades or businesses
WHAT’S THIS WORTH?

Equal to the lesser of:

• Current Year Payroll Taxes (capped at $250,000)
• Current Year Research Credit
• Applied against employer’s OASDI (social security tax excluding Medicare)
• Annual election can be made for 5 years

The mechanics to it haven’t been published yet.
Eligible Small Businesses can offset AMT liability with R&D credits

Eligible Small Business (ESB) is:
1. A corporation the stock of which is not publicly traded
2. A partnership, or
3. A sole proprietorship
4. Three-year average annual gross receipts do not exceed $50 million
WHAT NEW INDUSTRIES TAKE THE CREDIT?

• We’re seeing lots of activity in software development.

• Software development’s been going on for years. But a lot has changed in the industry, and, therefore in the R&D credit world.

• Mobile apps, web-based software and programs, online gaming – let’s take a look at software.
To qualify for the R&D Credit, **Development of Internal Use Software** has a higher threshold than other activities. In addition to meeting the Four-Part Test, it must meet the Three-Part Test below:

• **Be innovative in nature**

• **Involve significant economic risk**
  - Substantial uncertainty as to what is required and how to do it
  - Devote substantial resources to the development

• **Not be commercially available**
  - Results in reduction in cost, improvement in speed or other measurable improvement if development is or would have been successful
SOFTWARE THAT MEETS R&D FOUR-PART TEST

• Developed for sale, lease or license
• Used in R&D
• Developed as part of hardware/software product
• Developed for mobile apps
• Enables third party interaction
  - Financial transactions
  - Tracking of delivery/shipments
  - Inventory search
  - Cloud computing
  - Purchase of goods and services
Three components make up the R&D calculation. They are called QRES or Qualified Research Expenditures. Which expenses fall within the IRS definition of qualified research?
WAGES

• Box 1, W-2 Wages
  - This includes all the wages of personnel who are directly involved in, supervise or support research and development efforts.

• There is an 80% rule in effect
  - If 80% or more of an individual’s time is spent working in R&D, then 100% of their wages are counted as qualifying.
  - If less than 80%, the actual percentage is multiplied by the salary and allocated.
SUPPLIES

• These are non-capitalized materials and supplies
• They include costs for tangible, personal property used in qualified research

Examples are:
• Prototypes
• Tools
• Dies and Molds
• Travel expenses don’t count
CONTRACT RESEARCH

• Research performed by a third party on behalf of the taxpayer.

• Qualified R&D contract research is multiplied by 65% or 75% if performed by a University or consortium.
CAN I CLAIM R&D CREDITS FOR PRIOR TAX YEARS?

• Yes!
  - If your tax year is still open, you can choose to go back up to three years to claim prior credits.
  - In addition, you will want to determine the AMT (Alternative Minimum Tax) limitations which may affect decisions about what prior credit years to pursue. No longer an issue for 2016 tax year forward.

• Can’t use all of your credits up?
  - You can carry back one year, and carry forward for twenty years.
• The R&D tax credit represents a valuable tax savings opportunity
• Look beyond the obvious for potential qualified candidates
• Determine whether or not there’s a benefit in the current year
• Identify which calculation method provides greatest benefit
• Explore all possible qualified activities
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REFRESHMENT BREAK

We will reconvene in 15 minutes
THE INEVITABLE DRIVERLESS CAR REVOLUTION

Dave Bernard
Co-founder and CEO
The Intellection Group, Inc.
Any sufficiently advanced technology is indistinguishable from magic. -Arthur C. Clarke

Convenience trumps everything. -Dave Bernard
WHAT IS AN AUTONOMOUS CAR?

Vehicle Automation
National Highway Traffic Safety Administration

- Level 0 – No Automation
- Level 1 – Function Specific Automation
- Level 2 – Combined Function
- Level 3 – Limited Self-Driving Automation
- Level 4 – Full Self-Driving Automation

- Ceded to automotive history (i.e. ABS, ESC etc.)
- Differences / limitations between levels may not be clear to an “operator”
- Some would say this may be the only way to achieve all of the mobility and safety benefits

We are seeing level 2 in production. However, it remains to be fully understood how “we” will use these systems
Ann and Eddie’s Excellent Cross-Country Autosteer Electric Adventure

Objective: Attend wedding in Florida and Reunion in Ohio one week apart by car, rather than fly
Departed Yorba Linda, CA 25SEP15 in 2014 Tesla Model S, license plate: BLUE ZAP
Arrived Ponte Vedra Beach, FL 1OCT15 – 2,650 miles, **believe this to be first cross-country trip on Autosteer**
Returned Yorba Linda, CA 23OCT15 – Total 7,855 miles, over 95% Autosteer usage on entire trip.

235 mile diversion leg to West Des Moines...and 120 VAC recharge

240 mile diversion leg to New Orleans for beignets at Cafe Du Monde!
THE “BUG” IS IN THE SEAT
REDEFINING TRANSPORTATION
THE NEW MASS TRANSIT
Brooklyn Monthly Taxi Pickups
trailing 28 days, based on NYC TLC trip data

- Uber
- Green Taxi
- Lyft
- Yellow Taxi

Jan '14 | Jul '14 | Jan '15 | Jul '15 | Jan '16 | Jul '16

Graph source: toddwschneider.com
The auto industry will change more in the next 5 years than in the last 50. -Mary Barra, CEO, GM

- Silicon Valley is forcing the issue.
- Automotive companies are going to become the handset makers.
- It will be a core competency to have the most intelligent car.
REQUIRES A NEW VOCABULARY

Human Augmentation
The Internet of Cars
A Smartphone-on-Wheels
A Drivable, Connected Computer
A Robot or Drone

It’s Software-Driven!
HYPER-OPTIMIZED TRAFFIC

C'est le rush
UNPRECEDENTED TECH CONVERGENCE
MACHINE LEARNING

OUR MACHINE LEARNING TECHNOLOGY ALLOWS US TO TRACK CUSTOMER PREFERENCES AND USE THAT KNOWLEDGE TO MANIPULATE THEM.

THAT SEEMS LIKE THE STEP THAT HAPPENS RIGHT BEFORE THE MACHINES TAKE OVER THE EARTH AND ANNIHILATE ALL HUMANS.

THERE'S ALWAYS ONE PERSON IN EVERY CROWD WHO SAYS THAT.

NOT FOR MUCH LONGER, APPARENTLY.

Wise men learn from the mistakes of others; only fools learn from their own.
INTERNET OF THINGS

Figure 1: The Internet of Things is connecting homes, cars, people, organizations and even entire cities. 

- Connected Home
  - Safety & Security
  - Domotics & Entertainment
  - Energy Efficiency

- Connected Car
  - Safety & Security
  - Convenience
  - Live Navigation
  - Infotainment

- Connected Government
  - Connected Public Admin.
  - e-Government
  - Connected
  - Civil Protection

- Connected Health
  - Care-eHealth
  - Health Monitoring and Prevention
  - Wellness

- Connected City
  - Smart Meters
  - Smart Traffic
  - Connected Community

- Connected Enterprise
  - Real-time Analytics
  - Connected Workforce
  - Smart Processes
  - Robotics
SENSOR DISRUPTION
## TESLA ALREADY SUCCEEDING

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ELECTRIC CAR DOMINATION
ELECTRIC GRID DISRUPTION

TESLA
GIGAFACTORY

50 GWh in annual battery production by 2020
Enough for 500,000 Tesla cars
Powered by renewable energy
Net zero energy factory
Predicting the Big Crash

The amount of oil displaced by electric cars depends on when vehicle sales take off. Here are three scenarios for rising EV sales:

- **60% annual growth**
  - Current rate of adoption
- **45% annual growth**
- **30% annual growth**
  - BNEF’s forecast

### If growth continues at current rates, oil displacement would reach 2 million barrels per day—the size of the current glut—as early as 2023.

Source: Data compiled by Bloomberg
THEY ARE INEVITABLE

2005

2014
# Of Deals Into Auto Tech By Geography

- California
- International
- Washington
- New York
- Massachusetts
- South Carolina
- Virginia
- Nevada
- South Australia
- Georgia
- Tennessee
TIER 1

- Mobileye
- Delphi
- Bosch
- NVIDIA
TALENT WAR

**Star Search**
Electric- and autonomous-vehicle startups are siphoning workers with technology skills from established auto makers.

**Established car makers**
100,000 employed

- **Faraday Future**
  - 1,145

- **Karma Automotive**
  - 430

- **Atieva**
  - 261

- **GM**
  - 78,237

- **Ford**
  - 60,901

- **Tesla**
  - 14,000

Note: Employment figures include global white-collar workers or GM and Ford and excludes lending divisions; figures for Tesla and start-ups include all employees.

Source: the companies

THE WALL STREET JOURNAL.
OPEN SOURCE APPROACH
AFTERMARKET APPROACH
WHAT TO DO?

• Prepare for uncertainty
• Leverage partnerships, especially non-traditional ones
• Drive transformational change
• Reshape the value proposition
MACRO TRENDS

Fantastic acceleration and maturation of

• Robotics
• Machine learning
• Artificial vision
• General sensor tech
• IoT
• Biometrics
• Intelligent agents
• Neural networks
MACRO TRENDS

• What will people do with their freed up time?
  – Buy stuff
  – Build companies
  – Entertain themselves
• Convenience trumps everything!
• People will easily trust (or come to trust) machines more than people.
MACRO TRENDS

• Cheap supply chain mobility
• Small businesses with relatively high vehicle ownership and maintenance costs will benefit
• For subcontractors, transportation costs will shift from individuals to companies (no more mileage reimbursement)
• This will feed the On-Demand Economy, and encourage the rise of a Contractor-Based Economy
EXAMPLES

• Vehicle types based on function, rather than style
  - “Soccer mom” solution
  - School buses
  - Specialized work trucks
  - Pizza delivery (who needs a person?)
  - 10 drones in a pickup idea
  - Moving pets around (specialized vehicle)
  - Specialized emergency response vehicles
  - Drivable offices: Doctor does telemedicine in the car while driving between house calls.
  - Military uses (but, terrorism use, too)
EXAMPLES

• Web retailers are increasingly competing on speed of delivery (Amazon, e.g.)
• Retail parking might disappear (more showrooming and drive-thru’s)
• Employee benefit: unlimited Uber
• Vacation/Travel
• Parking real estate and car dealerships may be repurposed as automated recharging and maintenance facilities
• Planes...
WHEN?

Driverless Cars Are Closer Than They Appear

GM’s survival plan

p48
Exhibit 20
Timeline for Adoption

Phase 1 (now to 2016): 'Passive' autonomous driving

Phase 2 (2015 to 2019): Limited driver substitution

Phase 3 (2018 to 2022): Complete autonomous capability

Phase 4 (two decades): 100% autonomous penetration, utopian society

Source: Company data, Morgan Stanley Research

BUSINESS INSIDER
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OUT IN FRONT: THE VALUATION IMPLICATIONS OF EMERGING TECHNOLOGIES

Steve McCarty  
Partner, UHY LLP

Robert Kendall  
Senior vice president, UHY Corporate Finance

James Staargaard  
President and CEO, Plasan Carbon Composites
IN DETROIT???

GOLD RUSH!
Automotive airbag and seat belt supplier Key Safety Systems Inc. has agreed to be acquired by Chinese auto conglomerate Ningbo Joyson Electronic Corp. in a $920 million deal. The agreement, announced Feb. 2, will create a combined supplier generating revenue of approximately $3 billion worldwide, Key Safety said in a news release.

The transaction closed on June 2, 2016. Key Safety will operate as an independent subsidiary headquartered near Detroit in Sterling Heights, Mich., and its CEO Jason Luo will continue to lead the company under Joyson, the release said.

Joyson also owns injection molder Preh GmbH, a Bad Neustadt, Germany-based company that specializes in interior parts that integrate electronics.

Key Safety employs 12,000 worldwide. It uses plastics in components and housings for both seat belts and airbags.
Warren-based Paslin Company acquired by China's Wanfeng

Warren-based Paslin Co. has been acquired by China robotics Technology manufacturer Zhejiang Wanfeng Development Co. Terms of the deal, which closed Wednesday, were not disclosed. Paslin management, including CEO Kirk Goins, will remain with the company. The deal is expected to provide an influx of capital to Paslin, an assembly line robotics manufacturer, to expand
China’s Midea Offers $5 Billion for German Robot Maker Kuka

Bid aims to help satisfy Beijing’s ambitions to become high-end manufacturing power

Chinese home-appliance maker Midea Group launched a $5-billion-plus bid for German robotics specialist Kuka AG, in the latest instance of global Chinese dealmaking and a move targeting technology crucial for the country’s ambitions to become a high-end manufacturing powerhouse.

Midea said Wednesday it wants to keep the company listed and doesn’t plan a complete takeover. But by saying Wednesday it was seeking a stake of more than 30%, it is required to make an offer for all outstanding shares.

In terms of potential size, any deal would be a relatively modest foray amid a number of bigger deals globally by Chinese would-be buyers. In February, for example, China National Chemical Corp. agreed to buy Swiss seed and chemical company Syngenta AG for $43 billion.
Teijin Limited has agreed to acquire Continental Structural Plastics Holdings Corporation (CSP), based in Auburn Hills, Mich., for $825 million. Under the terms of the agreement, CSP will become a wholly owned subsidiary of Teijin. The company said that it made the acquisition with the hope of establishing a foundation for an automotive composite products business in North America.

“Through this transaction, Teijin aims to become an automotive solution provider by expanding its offerings beyond carbon fiber and glass fiber materials, in collaboration with other materials manufacturers,” the company said in a September 13 press release. “Teijin intends to expand its product portfolio from materials to component design, implement a global supply chain and help achieve vehicle weight reductions in order to comply with tighter environmental regulations being introduced after 2020.”
WHAT WILL HAPPEN NEXT?

THE SUSPENSE IS KILLING ME
OR ARE YOU FEELING MORE LIKE...

WHY IS THIS

HAPPENING TO ME
A PARADIGM SHIFT TO TECHNOLOGY
PLASAN COMPANY PROFILE

Plasan Carbon Composites (PCC) is the leading provider of Automotive Carbon Fiber components in North America

• 80% owned subsidiary of Plasan SASA
• International leader in Ballistic Armor & Survivability

• 20% owned subsidiary of Toray
• Global carbon fiber supplier and material manufacturer with operations in Japan, Europe and the United States
PCC NORTH AMERICAN OPERATIONS

Manufacturing
- 260,000 square foot manufacturing facility
- Higher-volume production through new manufacturing methods
- 30,000 to 50,000 vehicle production capacity
- Shipping 400+ assemblies per day

Customer Development Center
- 24,000 square foot facility
- 11,000 square feet of manufacturing space
- Scale-up facility for new technology
- Full scale pilot line
Garden Fresh Salsa Company has been sold to Campbell Soup Company

Proper Group International has recapitalized with PineBridge Investments

KS Holdings
KS Center Line Holdings, LLC has acquired Centerline Electric Inc.

The Paslin Company has been sold to Tower Three Partners

Sur-Flo Plastics & Engineering has been sold to Crowne Group

Smith Bros. Tool has been sold to Peninsula Capital Partners

General Hydroponics has been sold to Scotts Miracle-Gro

Vermicrop Organics has been sold to Scotts Miracle-Gro

Gentz Industries has been sold to MB Aerospace

Novo Motor Acoustic Systems has been sold to 3P Equity Partners

College Park Industries, Inc. has acquired Liberating Technologies, Inc.

BillHighway has been sold to BluePay Holdings

BluePay Holdings
OUR SESSION PANEL

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President and CEO  
Plasan Carbon Composites

Bob Kendall  
Senior Vice President  
UHY Corporate Finance
WELCOME TO Fabulous DETROIT MICHIGAN
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The Future of Mobility
A Venture Capital Perspective

Chris Thomas
Founder & Partner
"When America began moving west, we didn’t add more wagons; we built railroads. When we needed to connect our country after World War II, we didn’t add more two-lane roads; we built the interstate highway system.

Today we need that same leap in thinking for us to create a viable future.”

Bill Ford
Fontinalis Founding Partner and Executive Chairman of Ford Motor Company

TED Conference
What is Next-Generation Mobility?

Next-Generation Mobility:

The superior movement of goods, people, and services across all modes that is brought about by new technology solutions

Definition Conveys Four Key Themes
1) Efficiency
2) Movement of goods, people, and services
3) All modes of transportation / multi-modal
4) Enabled by new technology
Technology is Enabling New Mobility Trends

Transition from Transportation to Mobility enabled by:

**New Technologies**

**Emerging Trends**

Smart Logistics
Mobility Payments
Connected Vehicles
Intelligent Infrastructure
Location-Based Services
eetc.
Transportation Challenges Are Immense

Traffic

Unpredictable Travel Times

Limited Connectivity

Supply Chain Inefficiencies

Disconnected Systems

Stressful and Frustrating Experience

Legacy Infrastructure
... And Further Impacted by Demographic Trends

- **Global Population (billions):**
  - '16: 7.4
  - '30: 8.3
  - '50: 9.3
  - '16: +15%
  - '30: +15%
  - '50: +15%

- **Urbanization Rate (%):**
  - '16: 52%
  - '30: 60%
  - '50: 67%
  - '16: +45%
  - '30: +1%
  - '50: +1%

- **Global Vehicle Population (billions):**
  - '16: 1.1
  - '30: 1.6
  - '50: 2.5
  - '16: +45%
  - '30: 5%
  - '50: +36%

- **Annual Cost of Commuter Delays (billions, inflation-adjusted):**
  - 30 Yrs Ago: $24.4 billion
  - Today: $121.2 billion
  - There is a 71% gap between capital available and capital needed in the U.S.

- **Capital to Improve System:** $75 billion
- **Capital to Maintain Current Conditions:** $119 billion
- **Constant Revenue:** $75 billion

Global Gridlock
From Transportation to Systemic Mobility

**Transportation**
- Siloed and disconnected modes
- Inefficient traffic flows
- Limited use of technology
- Focused on powering individual units

**Systemic Mobility**
- Constant connectivity
- Optimized movement
- Flexible based on payment, mode, and time preferences
- Fundamental awareness of how urban centers move
Building an Autonomous Ecosystem

From the first mile...

...to the last mile

And everything in between
What sectors will mobility affect next?

**Mobility is at the Intersection of Mega-Markets**

- Small changes in behavior translate to massive commercial opportunities
- Strategic partners can propel growth in hard-to-navigate industries
- Innovative mobility solutions have global relevance and potential

### Car & Auto Sales: $9 trillion

### Public Transit: $64 billion

### Air Freight & Sea Freight: $70 billion & $54 billion

### Intelligent Transp. Systems: $34 billion

### Auto Insurance: $220 billion
## Investing in the Future of Mobility

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ATTENDEE CHECKLIST

✓ CPE materials

✓ Feedback
  • Tear out form in back of attendee booklet

✓ Questions

✓ Keep a look out for a post-event email
  • Download a copy of the presentation
  • Link to view the video

✓ Pre-register for 2017

✓ Get on our Manufacturing Insider mailing list
CONCLUDING THOUGHTS

Thank you!