

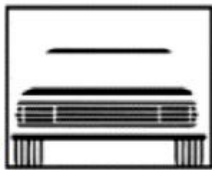
Winter 2019

# Automotive

E X C E L L E N C E



Automotive  
Division  
The Global Voice of Quality



# LETTER FROM THE CHAIR



**Ken Coll,**  
**2018-2019 Chair,**  
**ASQ Automotive**  
**Division**

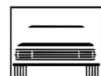
Happy 2019!

The pace of change in the automotive industry continues to accelerate. The passing of Sergio Marchionne, Ford and FCA's announcement that they are phasing out cars in favor of trucks and SUVs, Ford's purchase of the Michigan Train Station, and development of a vehicle campus in Detroit are events that will have a profound effect on the direction of the automotive industry.

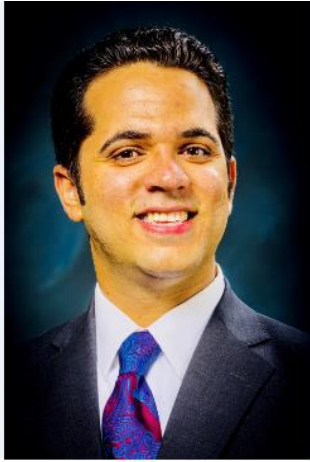
Over the past months, the Automotive Division sponsored the Guangbin Yang Reliability Symposium, delivered four core-tool training sessions, and provided three webinars. We will continue to provide webinars, conferences/symposiums, training, and information that will help keep you up to date and be part of what is happening in our industry. These are made available free or at minimum cost in order to provide the maximum value and benefit to you. Watch our website at [www.asq-auto.org](http://www.asq-auto.org) for details about upcoming events.

And, I hope to meet you at one of our events. I would love to get your input on what is happening in the industry and what are the ways that the Automotive Division can better help you. I hope this year finds you all doing well.

Best Regards,  
Ken Coll  
2018-2019 Chair, ASQ Automotive Division



# LETTER FROM THE PUBLICATION CHAIR



**Mohammadsadegh  
Mobin,  
Publications Chair,  
ASQ Automotive  
Division**

Dear ASQ Automotive Division Members,

Welcome to the Winter 2019 issue of the Automotive Excellence Newsletter. In this issue, we have a few updates about our division and several practical articles authored by quality experts around the world.

The technical articles cover a variety of cutting-edge and stimulating quality-related topics, including Advanced Driver Assistance Systems (ADAS), Automotive SPICE, Quality of Autonomous Systems, etc. As a new addition to the newsletter, there are a few interesting quality stories and photos provided by ASQ Fellows. We cordially invite you to share your quality stories with the ASQ Automotive Division members in future issues of Automotive Excellence Newsletter.

The ASQ Automotive Division will be the main sponsor of 2019 Guangbin Yang Reliability Symposium (GYSR). It will be held at Lawrence Technological University on Tuesday August 20, 2019. There will be several presenters with interesting and up-to-date topics. In addition to this, we will host an expo session followed by a poster presentation session. Please let us know if you want to be a part of the conference ([www.gyrsreliability.com](http://www.gyrsreliability.com)). We are looking forward to meeting many of you at the symposium this year.

I would like to thank the ASQ Automotive Division leadership team, authors of the articles, and ASQ Fellows. I also appreciate the reviewers Ameneh Forouzandeh, Richard Harpster, Vahab Vahdatzad, and John Katona for their technical comments on the articles and Alexa Druckmiller for editing. To have continuous improvement in our newsletter, send an email with comments to [mobin.sadegh@gmail.com](mailto:mobin.sadegh@gmail.com). This edition, as well as past publications, can be found at [ASQ-auto.org](http://ASQ-auto.org). Also, if you are interested in publishing your articles and promoting your research, please contact us. Thank you for your support of the newsletter and we look forward to hearing from you.

Best regards,  
Mohammadsadegh Mobin,  
Publications Chair, ASQ Automotive Division

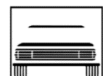
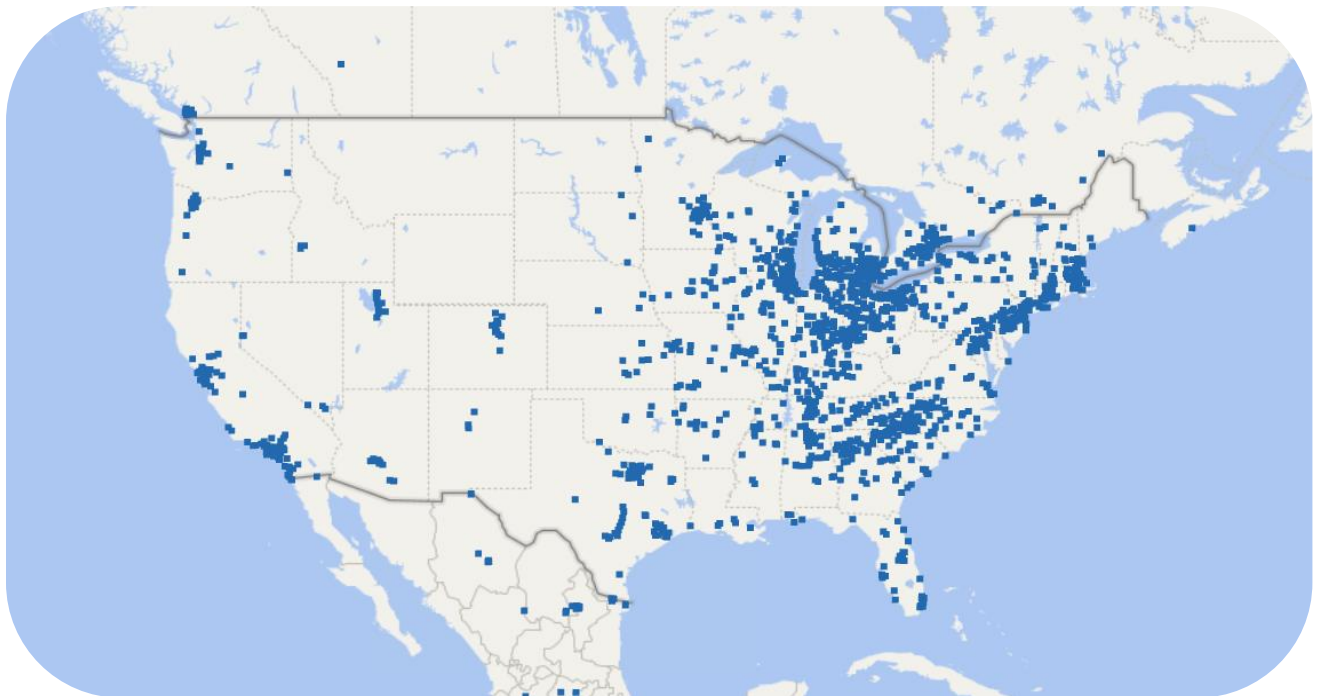


# *BECOME A MEMBER*

We invite you to be a part of the Automotive Division! You can select one division when you join ASQ at no additional cost, or you can add the Automotive Division to your existing membership for \$10 per year.

To add the Automotive Division to an existing ASQ membership, go to <http://asq.org/join/addforum.html> and click on the link at **add Forum or Division to your existing ASQ membership**.

## *A GRAPH OF MEMBERSHIP DISTRIBUTION (ASQ Automotive Division)*



# 2018/2019 ASQ AUTO DIVISION COUNCIL

## 2018 Division Officers/Committee Chairs

### **Elected:**

Chair	Ken Coll
Chair-Elect	Mohammad Hijawi
Treasurer	Larry Smith
Secretary	Mary Beth Soloy
Past-Chair/Nominating	David Butler
Audit Chair/VOC	Jd Marhevko

### **Committee Chairs:**

Social Responsibility	John Katona
Membership	Fernando Gurgel
Webinars	Lisa Rosenbaum
Marketing	Afshan Roshani
Publications	Mohammadsadegh Mobin
Student Liaison	Lou Ann Lathrop
Historian	Roderick Munro
Recertification/Events	Jaynie Vize
Website	Sherri Anne Rapley
Core Tools	Jd Marhevko/Rod Munro
WCQI	David Butler
Joint Activities/Conferences	David Butler
Google Group	Lisa Rosenbaum

### **Awards:**

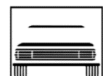
Koth Award	Cheryl Franks-Denham
Jarvis Award	Harold Brubaker
Quality Professional	Jd Marhevko
Quality Leader	Jd Marhevko
Craig Award	Larry Smith
Scholarships	David Butler



# *ASQ Automotive Division at 2018 World Conference on Quality and Improvement, Seattle, WA, USA*



Looking forward to meeting all ASQ Automotive Division members at the  
2019 World Conference on Quality and Improvement!  
(May 20 – 22, 2019 | Fort Worth, TX)



# GYRS 2018 Reliability Symposium



Join us at 2019 Guangbin Yang Reliability Symposium. Visit [www.gyrsreliability.com](http://www.gyrsreliability.com) for more information.



# ADAPTING TO VEHICLE TECHNOLOGY CHANGES



Steve Sibrel

Harman International Title: Supplier Quality Manager, Electronics  
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Steve Sibrel is a business process improvement manager, trainer, coach and auditor with over 35 years of experience in the business and manufacturing world. He is currently working as a Supplier Quality Manager for Harman International, a manufacturer of audio and infotainment systems, and a professional for automotive industries. He has held a number of engineering and management positions in diverse industries at Applied Materials (Semiconductors), NEC (Telecommunications), and Texas Instruments (Military). He has conducted over 200 supplier audits in North America, Europe, and Asia and has expertise in IATF 16949; ISO 9001, 13485, 17025; and 21 CFR 210, 211, and 820 Quality Management Systems. He was the Chair for the ASQ Detroit Section from 2016 through 2017 and has been the Professional Development Chair from 2008 to present. He received the ASQ Distinguished Service Award and the Leadership Award. Current ASQ Certifications are Six Sigma Black Belt, Quality Engineer, Quality Inspector, Quality Auditor, Manager of Quality/Organizational Excellence, and Supplier Quality Professional. Steve received a BSEE degree from Rose Hulman Institute of Technology, an MSEE degree from Southern Methodist University, and an MBA degree from the University of Dallas.

## INTRODUCTION

The automotive industry seems to be changing faster all the time. This is representative of what is happening in our world as the pace of technology advances at an ever-increasing pace. There is no time for reflection; there is only a time for trying to integrate the latest piece of technology into our lives before the next one comes along.

One of the areas that already has and will continue to have a huge impact on vehicles is called the ADAS (Advanced Driver Assistance System). This article will focus on an overview of ADASs and delve into more details in the specific area of blind spot monitoring. This area is one that affects our safety every time we get into a vehicle. We will take a look at the systems that are being developed to make us more comfortable with them so we can more easily adapt to the use of their technology.

## WHAT ARE ADASs?

A definition of ADASs is “systems developed to automate/adapt/enhance vehicle systems for safety and better driving” (Himabindu & Yasmeen, 2014) [1]. ADASs are systems to help the driver in the driving process [2]. When designed with a safe human-machine interface, they should increase car safety and general road safety.





The European Commission has taken the following definition when applying it to the automotive industry in Europe. “Advanced Driver Assistance Systems (ADASs) are defined here as vehicle-based intelligent safety systems, which could improve road safety in terms of crash avoidance, crash severity mitigation and protection, and post-crash phases. ADAS can, indeed, be defined as being integrated in vehicle or infrastructure-based systems. These contribute to more than one of these crash phases. For example, intelligent speed adaptation and advanced braking systems have the potential to prevent the crash or mitigate the severity of a crash” [3].

## WHAT VEHICLE FEATURES ARE INVOLVED WITH ADASs?

This list of ADAS examples shows just how extensive and safety-critical these features are [2]:

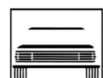
- Adaptive Cruise Control (ACC)
- Adaptive light control: swiveling curve lights; glare-free high beam and pixel light
- Anti-lock braking system
- Automatic parking
- Automotive navigation system with GPS and TMC for providing up-to-date traffic information.
- Blind spot monitor
- Crosswind stabilization
- Driver monitoring system
- Electric vehicle warning sounds used in hybrids and plug-in electric vehicles
- Emergency driver assistant (including emergency braking)
- Forward or rear collision warning
- Hill descent control
- Lane change assistance or lane departure warning system
- Night vision
- Pedestrian protection system
- Surround view system
- Tire pressure monitoring
- Traffic sign recognition
- Vehicular communication systems
- Wrong-way driving warning

## COLLISION AVOIDANCE SYSTEMS

A collision avoidance system is a vehicle safety system designed to prevent or reduce a collision’s severity. When a collision becomes imminent, these systems may provide a warning to the driver or take action autonomously without driver input (by braking, steering, or both).

Looking at the list of ADAS features, you can see that most of them are collision avoidance or collision mitigation systems. I will use the term collision avoidance in this article to refer to both types of systems.

**Advanced crash avoidance features are already being integrated into many vehicles.**



Advanced technologies include warnings or assistance, such as automatic braking to help avoid or mitigate a crash. Other technologies include blind spot monitoring, front crash prevention, park assist, rear crash prevention, and lane departure warning. Lane departure and blind spot detection are two of the three parts of the ADAS “circle of safety.” The three parts are used to avoid collisions in the front (adaptive cruise control and forward collision warning), the side (lane departure warning), and the rear side (blind spot detection). In this article, we will cover blind spot monitoring and lane departure warning systems in more detail.

## BLIND SPOT MONITORING SYSTEMS

Blind spots are areas that the driver does not have clear visibility for with the unaided eye or when using the standard side-view or rear-view mirrors on a vehicle. Blind spots are clearly an area of risk for the driver. In the past, blind spots have been difficult to manage, but more systems are being developed to help warn us of potential collisions. These blind spot monitoring systems detect obstacles on the rear and sides of the vehicle and provide a warning indicator of a possible collision (Figure 1).

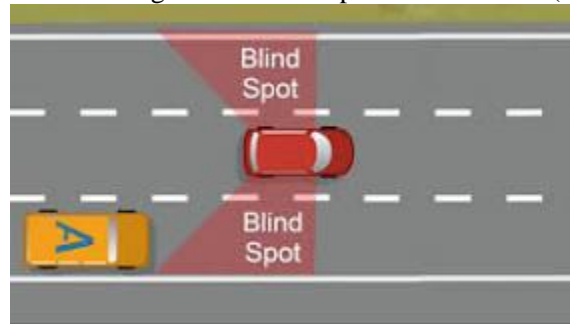


Figure 1. Blind Spot Visualization [4]

Cameras and sensors are used to provide information to the driver on what is in their blind spots. The information from these devices is interpreted to give the driver a warning under the side-view mirror where the blind spot occurs (Figure 2).

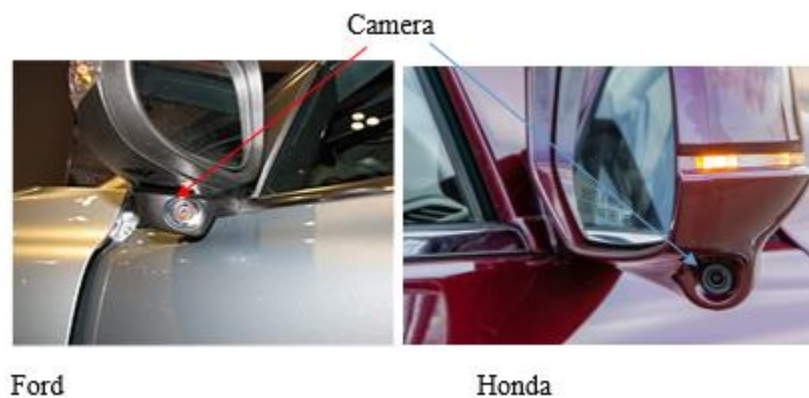
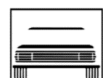


Figure 2. Examples of Side-View Cameras [5]

Blind spot sensors are radar units located on the sides of the vehicle, behind the rear bumper cover, in the quarter panel, and sometimes behind the front bumper (Figure 3). These sensors monitor the locations of



other vehicles that the driver cannot see. Some systems controlled by blind spot sensors include blind spot detection, rear cross traffic, and front cross traffic.



Figure 3. Bumper Blind Spot Sensors on a 2015 Toyota Tundra [6]

If you engage your turn signal, some cars will also provide a further warning, a flashing red light, or another kind of indicator in the side-view mirror (Figure 4).



Ford Motor Company

Mazda

Figure 4. Blind Spot Alert Icons in Side-View Mirrors

“Most basic systems will let you know if a car is currently in your blind spot, but more advanced versions will let you know when a vehicle is about to be there. Lane change assist, as Hyundai calls it, extends the range of the side sensors as much as three to five car lengths back and monitors the speed of oncoming vehicles. With this information, the system can sort of predict the future, alerting you to an upcoming car in your blind spot before it's even there” [7].

In addition to side mirrors monitoring blind spots, Honda's lane watch system employs a camera mounted in the right side mirror. When the right turn signal is activated, the interior display shows you a view of your blind spot. The display uses markers to show where the back bumper of your car would be if you moved over to that spot (Figure 5). A recent announcement from Honda says that they will be discontinuing this system in the future because many customers found the system too complicated to use. They will go to a more standard approach similar to other vehicle manufacturers in the future starting with the 2018 Accord.





Figure 5. Honda Display Showing Possible Impact Areas of your Rear Bumper [8]

Some newer systems are also beginning to use interior mirrors with cameras on the outside of the vehicle. This is now becoming mandatory in Japan to reduce damage caused by or to the side mirrors. Note: The roads and parking spaces are often narrower in Japan, which makes it easier for the side mirrors to impact other objects or vehicles.

Some blind spot systems also have warning signals for the driver when backing up a car. These warnings are similar to the previous ones mentioned, such as the side-view mirror indicators or audible tones when backing up. Starting back in 2018, all new vehicles in the USA will have backup cameras.

## **ALTERNATE SOLUTION FOR BLIND SPOT DETECTION: MANUAL MIRROR ADJUSTMENT**

George Platzer received a patent for his blind spot monitor, and it has been incorporated into various products associated with Ford Motor Company. He also developed a system for manually adjusting side mirrors to avoid blind spots. This method is very simple and can reduce or eliminate blind spots. It requires the driver to get used to the placement of the mirrors, which are different than their usual placement. If you are interested in this, you can try this method and see if it works for you! Platzer documented this method in a 1995 paper from SAE and is often referenced in driving instruction courses [9] [10]. A video is also available on YouTube [11].

Note: This method may not be 100% effective, especially when dealing with smaller vehicles like motorcycles, so checking over your shoulder is still worth doing even after you have adjusted your mirrors [12].

## **LANE DEPARTURE WARNING SYSTEMS**

Lane departure systems, as the name implies, are ADASs that detect when a car is leaving the current lane and entering a different lane. Different versions of this can either: only provide a warning or attempt to steer the car back into the lane. In the second version, all of the systems will attempt to bring you back into the lane, but some will try to center the vehicle in the lane and some will leave it up to the driver. If



the driver does not want to return to the lane, the driver just has to take control of the steering wheel and direct the vehicle to the desired lane.

The main technology used for lane departure warning systems is to use a camera in the front windshield to monitor the road in front of the vehicle. Images from the camera are sent to a processor and used to identify the lane and how it behaves ahead. The system cannot be used well at low speeds because there is not enough distance to view many lane indicators (Figure 6).

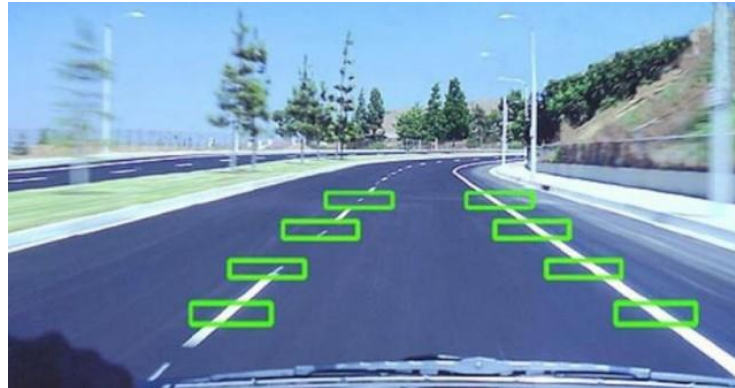


Figure 6. Example of Camera Identifying Lane Markings [12]

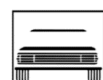
Warning signals are typically audible for Asia, haptic for Europe, and one or the other for America. Most audible alerts are beeping sounds. Mazda uses a synthesized rumble strip sound alert. An example of the haptic approach is the lane departure warning system on a General Motors vehicle, which has the Safety Alert Seat feature. This will cause the driver's seat to vibrate in the event of lane departure. "The Safety Alert Seat works in conjunction with other collision-avoidance warning technologies in the vehicle. It uses haptics in the cushion of the driver's seat — a tactile feedback technology that re-creates the sense of touch by using left and/or right 'tapping' vibration pulses — to direct the driver to the location of a crash threat. An alternate method of receiving audible beeps instead of the seat vibration is also available" [13].



Figure 7. General Motors Safety Alert Seat Vibration Areas (in yellow) [13]

## SCORECARD: THE SAFETY RESULTS OF IMPLEMENTING BLIND MONITORING SYSTEMS

"Like other types of collision avoidance systems, blind spot monitoring systems appear to be effective in preventing the types of crashes they were designed to address. In 2015, about 350,000 passenger vehicle lane change crashes relevant to blind spot monitoring were reported to the police in the United States that resulted in nearly 70,000 injuries. If every U.S. passenger vehicle in 2015 had been equipped with a blind



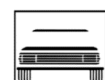
spot monitoring that performed like those on the study vehicles, about 50,000 police-reported crashes could have been prevented. Although not significant, the effect on lane-change crashes with injuries suggests that almost 16,000 injuries in these crashes may have been prevented in 2015 if all U.S. passenger vehicles were equipped with a similarly-performing system” [14].

The Highway Loss Data Institute (HLDI) published a study on the effectiveness of blind spot monitoring systems in August 2017. Blind spot monitoring systems were defined as “blind spot detection, blind spot warning, lane change alert, side blind zone alert, or side-view assist” systems. They found that vehicles with blind spot monitoring systems had 2-11 percent lower property damage claims through the years of 2009-2015. The number of crashes for the lane change category was 21 percent less for those involving injuries and 11 percent less overall for all vehicles studied with blind spot monitoring systems. That means that if all passenger vehicles had been equipped with lane departure warning, nearly 85,000 police-reported crashes and more than 55,000 injuries would have been prevented in 2015. A 2015 study of lane departure warning on trucks in U.S. fleets found the technology cut the rate of relevant crashes nearly in half, and a study of Volvo cars in Sweden found a reduction of relevant injury crashes of 53 percent. Note that it is not always possible to get accurate analysis of the crash statistics for different ADAS categories since many vehicles have multiple crash prevention systems installed in them [14].

The effectiveness of blind spot monitoring systems depends on a number of factors. One of the most important is the driver. The vehicle may take action by slowing itself down if the system is semi or fully automatic. However, if only a warning is made, then it is up to the driver to take action. When you first start using a warning system, you are aware of a noise or blinking light and react to it. However, over time, you may become begin to ignore the warning. If it happens frequently in busy traffic, it can become an annoyance or distraction. Having an understanding that the system is there to help protect your (and others’) safety will help to produce a positive mindset toward finding a good way to continue using ADASs. The selection of a system that will be comfortable for the driver to use and not an irritation is important and is best accomplished by doing some research and test driving vehicles prior to purchasing the vehicle.

## **CONCLUSION:**

The future looks very promising as new technologies mature in the ADAS features for vehicles. The two areas studied in this article (blind spot monitoring and lane departure systems) are growing and becoming common. These features are becoming more available, sometimes as standard features, on new vehicles. As ADAS evolves and becomes more common, we will be able to evaluate the different approaches of vehicle manufacturers and determine what systems best fit our needs and preferences. Then we can begin to adopt them and use them to improve our driving experience. The implementation of these systems is resulting in a significant reduction in vehicle crashes and injuries, as shown by industry recognized agencies like IIHS and HDLI. As ADASs are made available on a higher percentage of vehicles, the number and severity of crashes related to blind spots will continue to decrease. The overall effectiveness of warning systems may be limited by the ability and motivation of people to adopt this new technology. This will probably lead to the use of more automated systems in the future where the vehicle makes the decision for the driver in order to improve road safety. Blind spot monitoring and lane departure systems are just a small part of the Advanced Driver Assisted Systems (ADASs) technologies being introduced today. Other forms of ADAS will be addressed in future articles.



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# SOFTWARE PROCESS MANAGEMENT ACCORDING TO IATF 16949



**ROXANA ROHDE:** Chief Consulting Officer of iProcess LLC

Roxana Rohde is helping automotive R&D executives to deliver better software and better product quality through improved product design, requirements engineering, and validation. She is the founder and CCO of iProcess LLC, a software process assessment and improvement consultancy in Silicon Valley. For the past seven years she successfully worked with traditional OEMs and Tier 1 suppliers and with agile, value-driven modern OEMs and Tier 1 and Tier 2 suppliers.

## ABSTRACT

The objectives of this paper are:

- Understand the IATF 16949 requirements related to embedded software
- Get a good overview of Automotive SPICE
- Learn where and how to get started

IATF 16949, the automotive quality management standard for automotive industry, introduced specific requirements for products with software or embedded software.

Considering that electronics and software have grown significantly over the years, the new IATF requirements were definitely needed. “In 2010, some vehicles had about 10 million Software Lines Of Code (SLOC); by 2016, this expanded by a factor of 15 to roughly 150 million lines.”

What exactly is required by IATF 16949?

1. If the organization is responsible for developing software or products with embedded software for automotive, then the organization is required to perform capability assessment(s) – see clause 8.3.2.3 development of products with embedded software – and to perform the assessment(s) at regular intervals, e.g. as part of the internal audit program – see clause 9.2.2.1 Internal Audit Program.
2. If the organization has suppliers responsible for developing software or products with embedded software for automotive, then the organization is required to include software capability assessment results as supplier criteria – see clause 8.4.1.2 supplier selection process – and to assess or request self-assessment results of supplier as controlling externally provided processes, products, and services – see clause 8.4.2.3.1 automotive product-related software or automotive products with embedded software.

**Key words:** software development process, assessment methodology, software development capabilities





## CAPABILITY ASSESSMENT MODELS

There are two capability assessment models applicable:

1. **CMMI®** (Capability Maturity Model Integration) is “a globally-recognized set of best practices that enable organizations to improve performance, key capabilities, and critical business processes” – see [cmminstitute.com](http://cmminstitute.com) for details.
2. **Automotive SPICE®** (Software Process Improvement and Capability dEtermination) contains “(...) specific guidance available for the basis of process design and assessment in the Automotive Industry.” – see [automotivespice.com](http://automotivespice.com) for details.

For this article, the focus will be on Automotive SPICE® only. It is the model that iProcess uses as the basis for software process improvements.

## INTRODUCTION TO AUTOMOTIVE SPICE

Automotive SPICE is a framework for designing and assessing software development processes. It covers numerous processes, such as system and software engineering, management, acquisition, supporting processes, quality assurance, etc.

If the model is implemented correctly, it will lead to better processes and better product quality. Besides, it helps to improve the cooperation among the complex supply chain and between globally distributed development and engineering centers. Automotive SPICE and ISO 26262 Functional Safety have a strong relationship.

## AUTOMOTIVE SPICE HISTORY

The model evolved from an ISO project and was published originally as ISO/IEC TR 15504. It was first used in the car industry in 2001 with the decision of OEM Software Initiative Group (SIG) to evaluate suppliers in software and electronics sectors.

Automotive SIG included AUDI AG, BMW Group, Daimler AG, Fiat Auto S.p.A., Ford Werke GmbH, Jaguar, Land Rover, Dr. Ing. h.c. F. Porsche AG, Volkswagen AG, and Volvo Car Corporation. Automotive SPICE® is a registered trademark of the Verband der Automobilindustrie e.V. (VDA).

## AUTOMOTIVE SPICE STRUCTURE

### *Capability Dimension*

Automotive SPICE has six capability levels:

- Level 0 – Incomplete
- Level 1 – Performed
- Level 2 – Managed
- Level 3 – Established
- Level 4 – Predictable
- Level 5 – Innovating



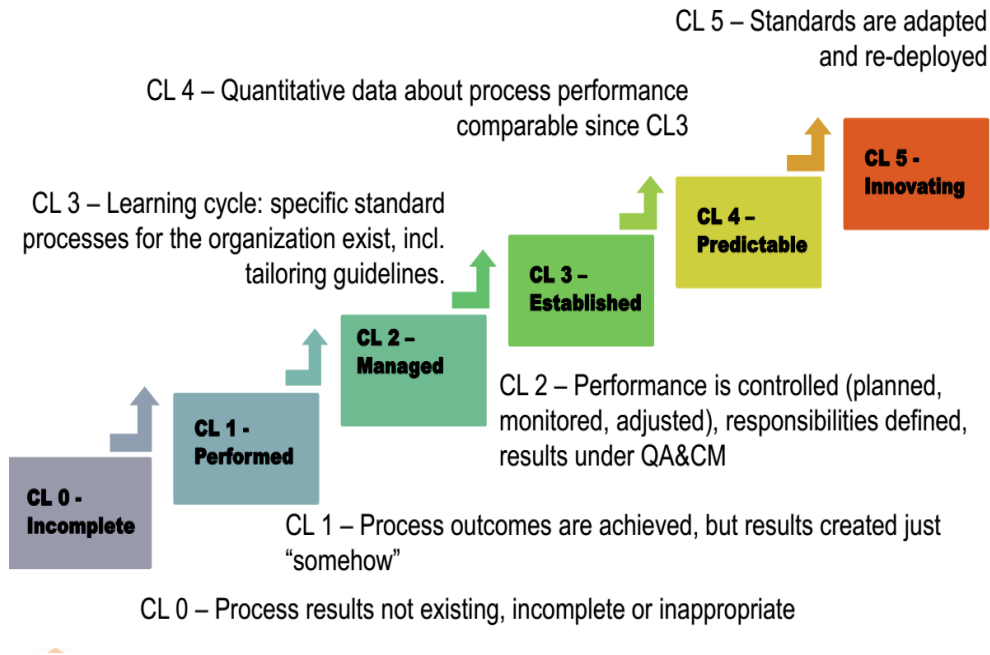


Figure 1. Capabilities levels

## PROCESS DIMENSION

Processes are grouped based on the type of activity they engage and are classified into primary life cycle processes (system engineering, software engineering, acquisition, and supply processes), organizational life cycle processes (management and reuse and process improvement processes), and supporting life cycle processes (supporting processes). The following tables list the processes in each category:

System Engineering	Software Engineering
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> SYS.1 Requirements Elicitation	<input type="checkbox"/> SWE.1 Software Requirements Analysis
<input type="checkbox"/> SYS.2 System Requirements Analysis	<input type="checkbox"/> SWE.2 Software Architectural Design
<input type="checkbox"/> SYS.3 System Architectural Design	<input type="checkbox"/> SWE.3 Software Detailed Design and Unit Construction
<input type="checkbox"/> SYS.4 System Integration and Integration Test	<input type="checkbox"/> SWE.4 Software Unit Verification
<input type="checkbox"/> SYS.5 System Qualification Test	<input type="checkbox"/> SWE.5 Software Integration and Integration Test
	<input type="checkbox"/> SWE.6 Software Qualification Test

Figure 2. System and Software Engineering Processes



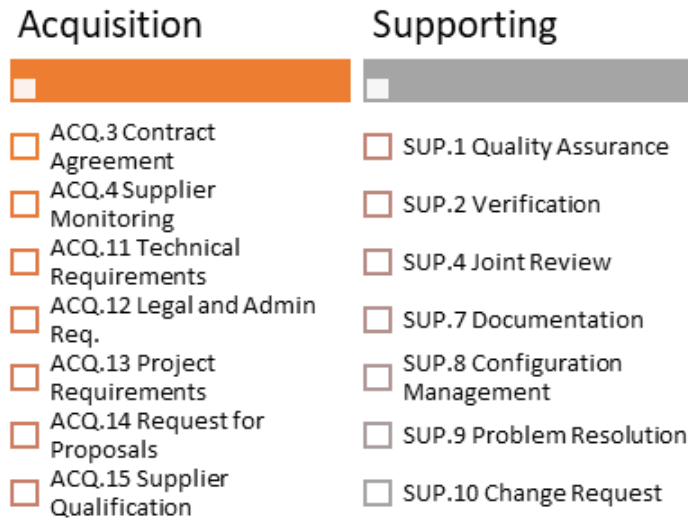


Figure 3. Acquisition and Supporting Processes

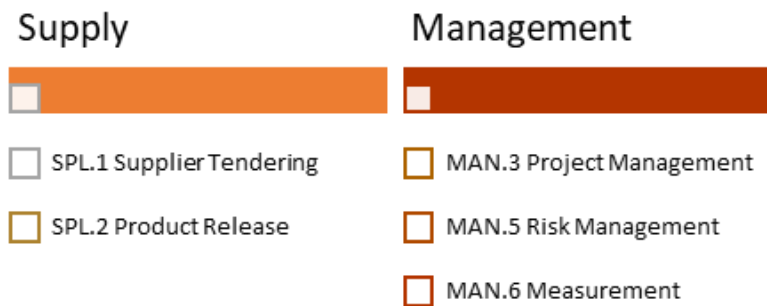


Figure 4. Supply and Management Processes

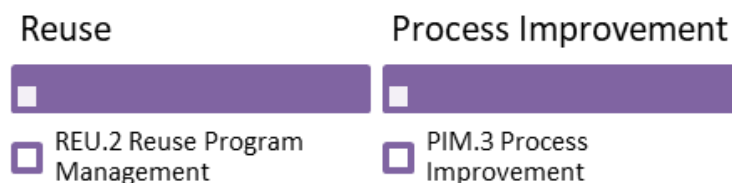
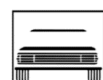


Figure 5. Reuse and Process Improvement Processes

The System Engineering group (SYS) addresses the elicitation and management of customer and internal requirements, the definition of systems architecture, and the integration and testing at systems level.

The Software Engineering process group (SWE) comprises of processes addressing software requirements derived from the system requirements, the development of the corresponding software architecture, and design as well as the implementation, integration, and testing of the software.

The Acquisition process group (ACQ) consists of processes that are done by the customers or by the supplier when acting as a customer for its own suppliers when acquiring products or services.



Supporting process group (SUP) covers processes that may be utilized by any of the other processes at various points in the life cycle.

The Management process group (MAN) addresses the management of the project or program.

A subset of highly significant processes assessed within the automotive industry is known as VDA Scope.

List of processes in VDA Scope
ACQ.4 Supplier Monitoring
SYS.2 System Requirements Analysis
SYS.3 System Architectural Design
SYS.4 System Integration and Integration Test
SYS.5 System Qualification Test
SWE.1 Software Requirements Analysis
SWE.2 Software Architectural Design
SWE.3 Software Detailed Design and Unit Construction
SWE.4 Software Unit Verification
SWE.5 Software Integration and Integration Test
SWE.6 Software Qualification Test
MAN.3 Project Management
SUP.1 Quality Assurance
SUP.8 Configuration Management
SUP.9 Problem Resolution Management
SUP.10 Change Request Management

Table 1. List of Processes in VDA Scope

## DETERMINING THE PROCESS CAPABILITY

The rating is based on a two-dimensional approach. Individual processes receive their own rating. If, for example, Process 1 receives level 2, Process 2 receives level 0, Process 3 receives level 1, and etc., then to determine the capability we will not calculate the average of the three processes in this case. The assessment results will showcase all processes with their individual rating.

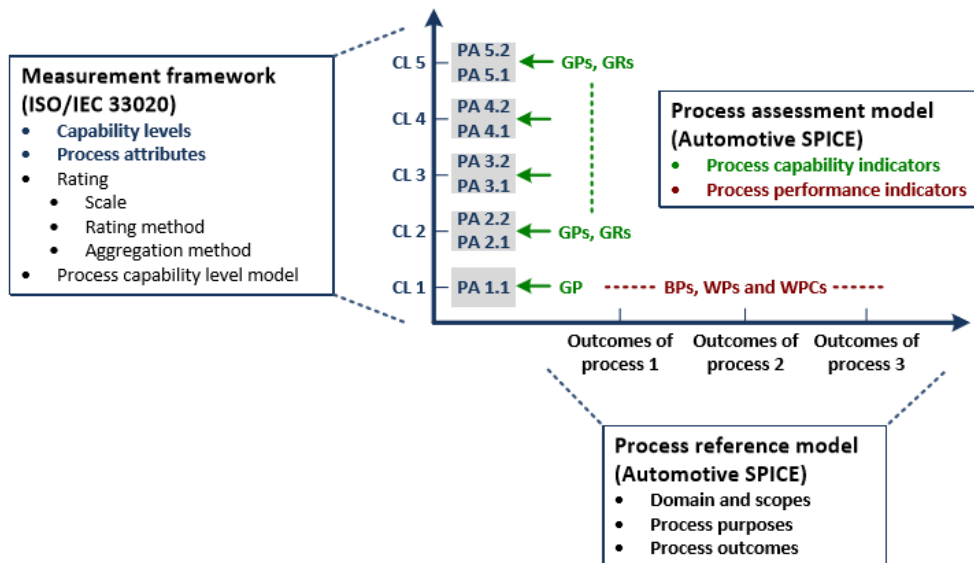


Figure 6. Process Assessment Model Relationship (reused without modifications from Automotive SPICE PAM v3.1)



In order to determine the capability and process achievements, an assessment is used to gather the objective evidence.

## AUDIT VS. ASSESSMENT

### *Audit Definition*

ISO 19011 defines an audit as a systematic, independent, and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which audit criteria are fulfilled.

### *Assessment Definition*

According to VDA, a software process assessment can be defined as the disciplined examination of the software processes used by an organization based on the process model. The primary objective is to measure the maturity of those processes.

### *Difference between Assessment and Audit*

While audits and assessments have a lot of common elements, some of the major differences are listed below:

Audit	Assessment
End-to-end business processes	Product development with focus on projects
Abstract processes	Detailed development processes
Pass/Fail in terms of requiring certification	No certification; evaluation done according to 6 capability levels via assessment with report available for results
Fixed scope	Adaptable scope depending on selectable processes and capabilities

Table 2. Audit vs. Assessment

## MAPPING AUTOMOTIVE SPICE TO PDCA

### *Overview of PDCA Cycle*

Plan, Do, Check, and Act (PDCA) is a simple model that describes the steps to process improvement. There are four steps: Plan, Do, Check, and Act.

**Plan:** This involves the selection of the need to implement the change, definition of the current status and opportunity for improvement, planning of how monitoring the progress and effectiveness will be done, and the goals and objectives of the plan to be documented.

**Do:** This involves implementation of what has been planned. Also, documentation is required of what is being implemented.

**Check:** Monitoring the progress and effectiveness of the change according to the plan, record the observation, and compare to original data of the objectives. Did the plan and implementation work?

**Act:** If the plan and its implementation worked, action will be taken to scale up the process improvement throughout the organization; if the plan did not return the expected results, then this step will identify the root causes and define the needed corrective actions (Figure 7).

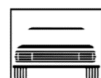




Figure 7. PDCA Cycle

Approaching Automotive SPICE from the PDCA perspective the following mapping could result:

PDCA Step	Automotive SPICE Processes
<i>Plan – set objectives, resources needed to deliver results based on customer’s requirements, and identify risks and opportunities</i>	<ul style="list-style-type: none"> <li>• MAN.3 Project Management</li> <li>• SYS.1 Requirements Elicitation (if the case)</li> <li>• SYS.2 System Requirements Analysis/SWE.1 Software Requirements Analysis</li> </ul>
<i>Do – implement what was planned</i>	<ul style="list-style-type: none"> <li>• SYS.3 System Architectural Design</li> <li>• SWE.2 Software Architectural Design</li> <li>• SWE.3 Software Detailed Design and Unit Construction</li> </ul>
<i>Check – monitor and measure processes and the resulting products and services against requirements, objectives, plans, etc.</i>	<ul style="list-style-type: none"> <li>• SWE.4 Software Unit Verification</li> <li>• SWE.5 Software Integration and Integration Test</li> <li>• SWE.6 Software Qualification Test</li> <li>• SYS.5 System Integration and Integration Test</li> <li>• SYS.6 System Qualification Test</li> <li>• SUP.1 Quality Assurance</li> </ul>
<i>Act - take actions to improve performance</i>	<ul style="list-style-type: none"> <li>• SUP.1 Quality Assurance</li> <li>• SUP.9 Problem Resolution Management</li> <li>• SUP.10 Change Request Management</li> </ul>

Table 3. PDCA – ASPICE Mapping

## GETTING STARTED WITH AUTOMOTIVE SPICE

Similar to the PDCA cycle, an Automotive SPICE Improvement project will have the following format:

- **Gap Analysis** – select project(s) and perform an Automotive SPICE Assessment
- **Improvement Plan** – define and prioritize corrective actions; select processes for improvement
- **Reassessment** – evaluation of results and lessons learned

For the improvement project to be successful, consider the following:

- Automotive SPICE is a bottom-up approach with focus on product development
- Levels in Automotive SPICE are building on top of each other (e.g., Level 2 cannot be achieved if Level 1 is not fully achieved)
- There is no Automotive SPICE certification provided; compliance is demonstrated via assessment
- Additional effort has to be planned for the project team(s) to work on the improvement actions
- Management commitment is crucial in this type of project
- Improvement has to be a continuous effort



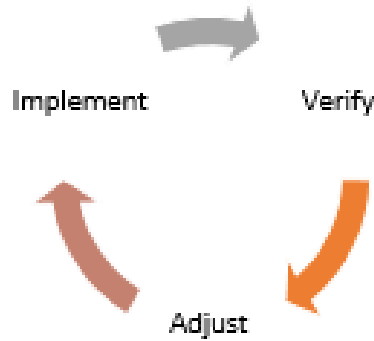


Figure 8. Continuous Effort

## Conclusion

IATF requires that if the organization is responsible for developing software or products with embedded software for automotive, then the organization shall perform capability assessment(s). The assessments should be done at regular intervals as part of the internal audit program. Requirements are also valid for the organization's suppliers responsible for developing software or products with embedded software. Suppliers have to be assessed/self-assessed in order to determine the capability of supplier's development processes.

## REFERENCES

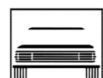
[www.automotivespice.com](http://www.automotivespice.com)

[www.cmmiinstitute.com](http://www.cmmiinstitute.com)

Automotive SPICE PAM v3.1

IATF 16949, 1<sup>st</sup> Edition, 1 October 2016

ISO 9001, 5<sup>th</sup> Edition, 2015-09-15



# WHO NEEDS HIGH QUALITY?



Dr. Isaac Mostovicz's breakthrough research into the psychology of luxury revealed the reasons for why people purchase luxury. Being a veteran of the diamond industry for more than 35 years, Isaac was able to test and apply this knowledge working with his clients. Isaac's ideas were applied during his post-doctoral work into organizational behavior. Prof. Leslie De Chernatony personally trained Isaac on brands. He holds the highest professional diplomas in the marketing world: Fellow of the Chartered Institute of Marketing (UK) and Chartered Marketer. Upon returning to Israel, Isaac established Isaac Mostovicz, Strategic Marketing Consulting

LTD., where he uses his unique approach to marketing. Isaac can be reached at [office@imos.to](mailto:office@imos.to).

## INTRODUCTION

In 2005, an Israeli software company tried to do business in Japan. Their representative was frustrated. "They ask for the impossible. They want cutting-edge, yet bug-free software." He was right, as no brand-new software can be bug-free, and he needed to devise an answer. I suggested he offer the Japanese that he'd work *in situ* side-by-side with their people and check his program for possible flaws. They found bugs and fixed them, and after six months the Japanese company asked to purchase the program.

What happened? Remember Theodore Levitt's famous words, "When people ask for a quarter-inch drill, they want a quarter-inch hole." While the Japanese asked for their quarter-inch drill – a bug-free program – they actually meant the quarter-inch hole. They were in a dilemma: on the one hand, they could see the benefits of the software, but on the other hand, they were afraid of possible problems down the road. More so, they feared the unknown. Working with the program for half a year, they witnessed that the software is workable. They saw the flaws but realized that the company wouldn't become the slave of the software or possible bugs, and they could manage their business while the bugs were fixed. What's important was that the Japanese, like many other customers, expressed their concerns and anxiety – or their need for a quarter-inch hole in a form of an ideal imperative "solution"– concerning the software.

Marketers know that while people purchase emotionally, they justify their decision logically post-purchase. In other words, there is a gap between our actions, which are emotionally motivated, and our explanations, which are expressed logically. I am not sure if the Japanese were aware of their fear and anxiety. They definitely couldn't express it in words. That's why they express themselves in a logically by saying that they wanted a bug-free solution. Many times we offer the customer exactly what he said he wanted just to discover how disappointed he was. This is because we related to the logic he expressed to himself, which was nothing but a metaphor to explain his emotional concerns that weren't addressed.

The only one way to find out what the true, deeply held need of the customer is by asking the customer. George Kelly, the forefather of Cognitive Psychology, said, "If you don't know what is wrong with someone, ask them; they may tell you." Finding out those needs is not easy and calls for some skills and experience, but until we figure out what they are, we cannot offer any suitable solution at all.

A market is the aggregation of all products or services that customers regard as being capable of satisfying the same need. This definition of a market is from the customer's perspective. Can you identify





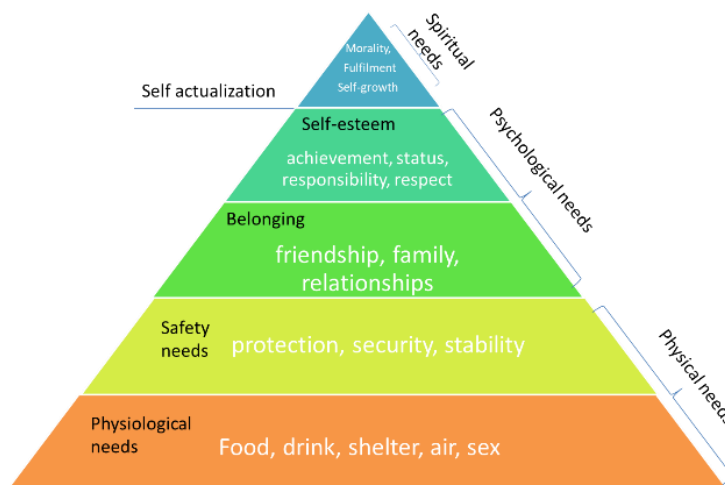
the specific purpose or the intended use your customer has in mind for the product you have? Try to precisely complete the following sentence: “My customer’s need is to....” One element that will be missing is the product itself. The customer will never mention your product. They don’t even need the features of the product. All they need are the benefits that these features provide as long as those benefits satisfy their inner needs. The division is clear. A product and its features can be described in a logical way. Benefits and needs are emotional. Nobody needs a car or the various features it has. People need the benefits that the car can provide as long as they answer to their concerns.

Not all have the same concerns. These concerns are embedded in values or beliefs that are almost unchangeable and unique to each of us. To be able to offer a good and sustainable solution, we need to explore the five-level interpretation ladder: product, features, benefits, needs, and values.

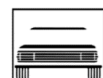
In the following segments I will discuss the possible roles of high quality. As this discussion tries to capture the customer’s view, the question is whether high quality is something that the customer needs. Using Maslow’s Hierarchy of Needs Motivational Model, we will try to understand the role high quality has in consumption and discuss how high quality is not that important. This poses a double question: what is really important and how can we use high quality for truly improving our business?

## WHAT IS HIGH QUALITY?

High quality is an ambiguous term. There are no clear criteria for measuring high quality, and it is unknown who made these criteria or why those rules were established in first place (if they were established at all). We can ask what might happen if we changed these rules. High quality has different meaning to different people in different contexts, especially when we try to understand it from the consumer’s perspective. Most importantly, is high quality one of the customer’s needs? As discussed, this is very doubtful since high quality is perceived, in many cases, to be a logic term. To explain this point, let’s examine what needs are.



This chart illustrates Abraham Maslow’s Hierarchy of Needs Motivational Model. In 1943, Maslow, an American psychologist, mapped the various needs that motivates us and arranged them in hierarchical form as the chart illustrates.



The bottom two layers refer to our physical needs. These needs are the DOs and DON'Ts of survival. The bottom layer lists the DO: the basic life needs of food, shelter, air, drink and reproduction. Above those are the safety needs, the DON'Ts: what we need to avoid to survive or what the means are that help us to do so. Still physical, they refer to aspects such as protection, security, stability, and so on.

Next, we have two psychological layers divided between those needs external and internal. The external one is about love and belonging. We refer here to friendship, family, and relationships. Then we have the self-esteem level, where we meet the need for achievement, status, responsibility, and respect. The top level is the self-actualization one. The top level is spirituality – self-actualization. It answers one question: who am I? The needs we address at this level are of purpose, vision, self-growth, fulfillment, and morality. All lower needs are static. Each need can be fulfilled by something, but “who am I” cannot be answered. Even when we are constantly trying, we can't fully form an answer. Self-actualization is a dynamic mode. We constantly improve our position, but we'll never reach our goal.

It is easy to see how the five levels of Maslow's motivational model correspond with the five levels of interpretation. Physiological needs are expressed in product terms. The need for food can be described as a list of food products, for example. Safety needs are the various attributes or features that the product must have. The need for belonging is already emotional: reflecting the benefits one is seeking from the product. The level of self-esteem reflects the interpretive level of need and explains what one really needs to satisfy. We are driven by the need to enhance our self-esteem. Finally, self-actualization is based on our deeply held values.

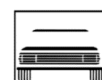
If we try to satisfy the consumer's need for high quality in the context of the automotive industry, we usually refer to the physical needs of the customer or, to be more precise, we try to cater for the best safety needs. Psychological and spiritual needs cannot be associated with quality, which resides at the product or features levels.

## **DIE-HARD FANS**

Since customers are motivated by emotion, we need to tap their psychological and spiritual needs. When we address their benefit level, we can create a bond and turn our customers into loyal ones. When we refer to higher levels of needs and values or self-esteem and self-actualization, they stop to become customers and turn into die-hard fans. Die-hard fans “own” the product or the brand and see it as an extension of their self. At these high levels of needs, quality doesn't play a role.

Consider this. Chicago Cubs didn't win one championship since 1908, and with the exception of 2004 and 2007, Boston Red Sox suffered from a 96-year drought. Both teams have a strong and loyal fan base. They are loyal “die-hard fans”: ready to pay top price and make the competition irrelevant. Die-hard fans are a core asset to the company. By no measure do those teams play high-quality baseball, but they manage to have loyal customers.

This marketing talk has serious financial meaning. Whatever high quality stands for, it falls into what many marketing consultants advocate as “superior experience” ranging from upgrades to better customer service. However, these suggestions have one big problem – they can and will be copied since they reside



in the logic levels of products and features. All that is left is competing on price or commoditization of the market. Trying to outsmart the competitors is never profitable and leads to losses.

Neither a superior product nor exceptional customer service makes your customers die-hard fans! Die-hard fans invest in their “fandom” believing that they play a fundamental role in their team’s life. These fans identify with their team and benefit from being part of the team. They focus on contributing instead of what they receive. They feel they have a stake in the success of the product or service.

## THE CASE OF HARLEY DAVIDSON

So far, I argued against pursuing high quality and instead make a case to create a core group of die-hard fans. From a business perspective, searching for high quality is trying to provide the customer with superior experience, which is usually more expensive and easily copied. Such a practice is imitable and would lead to a price war that threatens the survival of the company. On the other hand, having a fan base would enable higher margins and create superior loyal customers to make the competition irrelevant. Is this always the case?

One of the most painful examples is Harley Davidson. This brand has the largest and most active fan group in the world: the Harley Owners Group (HOG). Not surprisingly, HOG is the symbol of Harley Davidson in the NY stock exchange as well. There is a fusion between the company and its fans and yet, it failed. Their financial results are not great, and the company is shrinking. If the true purpose of a company is to create and keep the customer, they definitely weren’t following this purpose. They are closing a plant in Kansas City, Missouri, while opening a new one in Thailand. You might say that this is a wise economic move, but I would question it. How many of the 800 workers laid off in Kansas City were Harley fans, riding these motorcycles and acting as the ambassadors of the brand? Die-hard fans are an extension of the company, like a limb on a body. Would someone in his sane mind cut his hand just for a dubious economic reason?

I tried to understand where Harley Davidson failed. Trying to gain more marketing information, I found only one related to sociology. An ethnographic research from 25 years ago captured the many subcultures of Harley riders. These subcultures are different at the belonging or benefit level. However, as we climb up the ladder, the various needs tend to converge. It works both ways. On the one hand, it is possible to talk to a wider audience with the same language, and going down the ladder we can find many more ways to satisfy the higher needs. Harley Davidson has one million die-hard fans: people who are very much aware of their values. Few companies enjoy such a gold mine. All they need is to plot the ladders from the product to values and see where the untapped opportunities for growth are. I wish them success.

## MARKET SEGMENTATION

Proper marketing would, therefore, look to develop a solution that is based on the customer’s needs. It is clear that sometimes a customer might express his need for a high quality product, but this is an ambiguous term that calls for exploration and clarification. Only when we understand what this term represents in the eyes of the customer and *why* he asks for it can we try to satisfy that particular need.



However, shifting our focus to that of the customer's perspective brings another challenge. As long as the interpretation of high quality was ours, we benefited from our personal interpretation. Once we try to adopt the perspective of our customers, we discover that there is no single solution. We will witness that different people have different interpretations on different occasions. High quality is a moving target.

To overcome this challenge, we need to segment the market. While each might have their unique needs, it is possible to aggregate these needs into manageable clusters: usually five to ten clusters. This moves away from one solution to fit all into the finer grain of acting in several markets. Each represents its own set of needs, customers, and competitors. Not all segments are interesting. Some are too small and some are too expensive to operate. On the other hand, we might discover underperforming segments; some have potential for growing and others might yield higher profit margins.

## **THE TRUE ROLE OF HIGH QUALITY**

Talking about high value is viewing a personal belief as a universal truth. This is useless when we try to convince the customer about our product. In many cases, this leads to a defensive approach. It helps to fight expensive customers' complaints and fewer defects might help reduce the amount of after-service. However, after spending my business life in luxury, I know how important high quality to luxury is. When Steve Jobs examined an iPhone, he discovered that he could feel one screw deep inside that stood out. Not one customer would have ever discovered this fault, but Jobs felt insulted. He would never provide a customer a product that was less than perfect.

All true luxury producers have this pride of creating the perfect product. Yes, the term is used subjectively, but it is the way to convey the owner's pride in his creation, his dedication, and his professionalism. It is part of him, and he is the die-hard fan of his product per excellence. From his perspective, high quality resides at the self-esteem and self-actualization levels. All the company has to do is to make this strive for high quality contagious. The customer should become part of the dream. This manufacturer's pride should become contagious and become the customer's pride.

Being a subjective term, the company's interpretation of what high quality means won't match with everyone. Therefore, the company's ideal customers are those who will share similar interpretation ladders only. In luxury, there is no "one solution fits all" existing. Even Apple never owned more than 10 percent of its market, and they did not perform badly. High quality calls for deepening the relationship with your core customers. This is your assurance for a sustainable and profitable organization.



# EXPLORING QUALITY OF AUTONOMOUS SYSTEMS



**Praveen Gupta** is an internationally recognized quality and innovation expert, a fellow of ASQ, and author of over ten books on quality, corporate performance and innovation. He teaches Management of Innovation at San Jose State University and works as Director of Quality at Stephen Gould Corporation. He also advises entrepreneurs in maximizing their value proposition by maximizing innovation. He can be reached at [praveen@igupta.com](mailto:praveen@igupta.com).

My career started with the early days of the semiconductor industry, and a few years later, techies started dreaming about the use of the large-scale semiconductor memory. Artificial Intelligence (AI) became a memory-intensive, rule-based intelligence. However, it took a back seat for a while due to unavailability of Big Data architecture, still evolving data formats, or format-free data. Almost 25 years later, AI made a comeback with a new power. By this time, hardware had also caught up with software and created a pull for AI. Advances in hardware and software have led to smart systems and eventually to autonomous systems. Starting with the vacuum cleaner Rumba to autonomous cars, robots or drones, and more in the making. As a quality and innovation professional, I can understand the evolution of systems, but we must also realize that success of innovative solutions depends upon the quality of execution. Quality of early mechanical systems evolved from inspected in to built-in or designed in, produced in collaboration with supply chain, or managed throughout the organization. Then, the software quality components were added to the systems, where the software quality was evolving around the software engineering, which later primarily pivoted to testing of software due to reduced product life cycle and speed of development.

As to an autonomous system, new dimensions were added, which need to be included in the overall quality of a system (Figure 1).

To develop a measure of overall quality of an autonomous system, one needs to first develop a method for determining the quality level of each dimension in Defective Parts Per Million (DPPM) and then add all DPPMs to establish an overall quality of an autonomous system.

Table 1 shows an example of DPPMs for various elements of an autonomous system. The cumulative DPPM will highlight need to drive improvement and innovations for safer and user-friendly experiences.



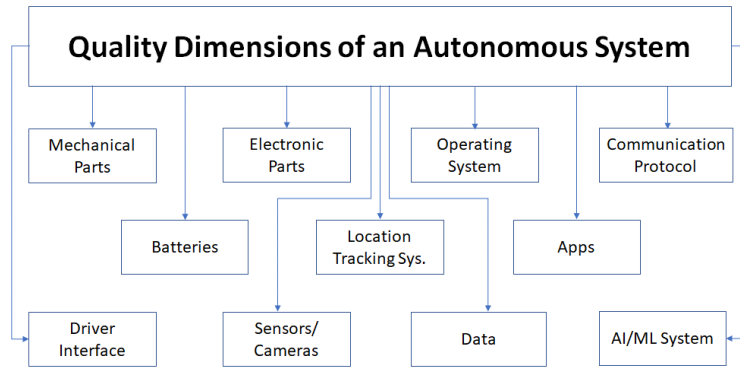
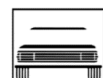


Figure 1. Quality Dimensions of an Autonomous System

QD #	Description of System	Unit	Opportunities	DPPM
1	Mechanical Parts	Parts	Key dimensions	$\Sigma_1(\text{DPPM}_{1\dots n})$
2	Electronics Parts	Parts	Key dimensions	$\Sigma_2(\text{DPPM}_{1\dots n})$
3	Operating System	Module	Features, Objects, Lines of Codes	$\Sigma_3(\text{DPPM}_{1\dots n})$
4	Communication Protocol	Module	Features, Objects, Interfaces, Lines of Codes	$\Sigma_4(\text{DPPM}_{1\dots n})$
5	Batteries	Battery Management System	Batteries, Monitoring, Management Modules	$\Sigma_5(\text{DPPM}_{1\dots n})$
6	Location Tracking System	Module	Features, Objects, Lines of Code, Interface Hardware	$\Sigma_6(\text{DPPM}_{1\dots n})$
7	Apps	Apps Numbers	Testing coverage, Accuracy, User Interface	$\Sigma_7(\text{DPPM}_{1\dots n})$
8	Driver Interface	Module	Identification Accuracy, Reproducibility Consistency	$\Sigma_8(\text{DPPM}_{1\dots n})$
9	Sensors/Cameras	Sensors, Camera, operating software, controller software	Items, coverage, accuracy	$\Sigma_9(\text{DPPM}_{1\dots n})$
10	Data	Data integrity, quality, database management software	Data types, entries, analytics	$\Sigma_{10}(\text{DPPM}_{1\dots n})$
11	AI/ML System	Integrity, modules, accuracy, rules	Testing, coverage, accuracy, complexity, features	$\Sigma_{11}(\text{DPPM}_{1\dots n})$
12	Others	H/W, S/W, Firmware, Driver, Environment, Weather, Traffic	A variety to be specified and scoped out	$\Sigma_m(\text{DPPM}_{1\dots n})$
Total DPPM = $\Sigma_{1\dots m}(\Sigma(\text{DPPM}_{1\dots n}))$				

Table 1. Quality Worksheet Example With Elements of an Autonomous System

To improve quality, reliability, and integrity of an autonomous system, quality must be designed instead of ensured through testing. An autonomous company may need multi-discipline design-quality engineers to ensure high quality of systems and sub-systems. As a first step, a set of quality goals must be determined for an autonomous system, and then allocated to various subsystems and components.



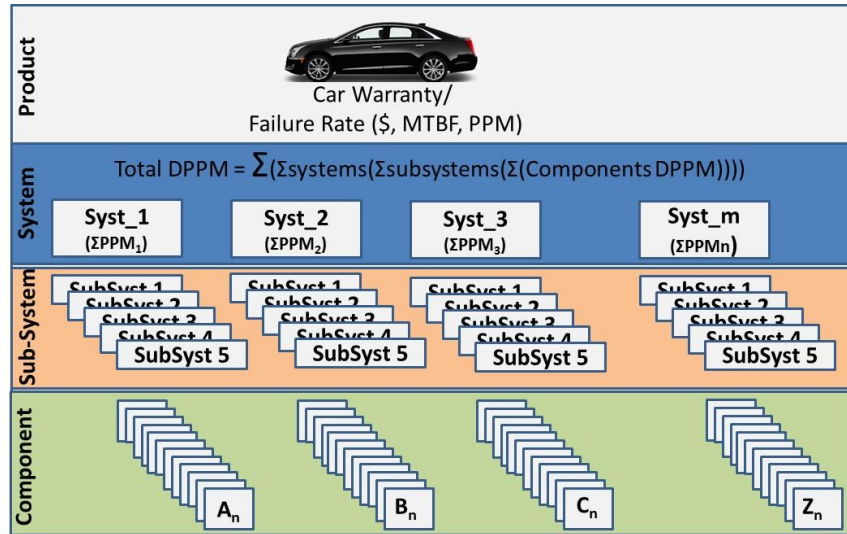


Figure 3. Aggregation of Quality of Components, Subsystems, and Systems

In the 1980s, quality trends started due to increasing competition from Japan, which then followed by competition from Taiwan, Korea, and China in the '90s onwards. The competition that started based on quality moved on to product cost, labor cost, engineering cost, design collaboration, assembly outsourcing, and offshore manufacturing. If the new generation of hardware manufacturing companies do not build a culture of excellence, design to target, and learn from earlier lessons, we can expect a similar outcome leading to outsourcing. We begin with a lead in design and innovations but lose it in manufacturing due to inexperience.

Quality begins with target-driven life cycle processes, budgeting early quality targets across the product life cycle, and setting up process capabilities accordingly. Success of autonomous vehicles, robots, drones, or systems depends upon quality of its elements to the level of quality required in aerospace beyond the automobile standards. It will take a determined leadership and sufficient quality resources to achieve the desired reliable and safe autonomous vehicles.



# CHANGE-POINT-MANAGEMENT, THE TOYOTA WAY



Hormoz Mogarei has been in management for 30 years: 20 years of those were directly in “Lean” environment with Toyota, both in Japan and in the U.S., and 8 years as the principal of Get Kaizened, Inc., a Lean Consulting and Training firm. In addition to Lean Manufacturing courses, Mogarei has presented many management workshops, is a lean production trainer, and is an International and Fortune 100 speaker. He has lectured and consulted in Armenia, Brazil, Canada, China, Germany, Japan, and others. Mogarei is a Lean expert across industries like Banking, Academia, Food, Accounting, Chemical Manufacturing, Electronics, Healthcare, Agri-business and Farming, Printing, Packaging, Startup and Entrepreneurship, Automotive, Aerospace, and Chip Design and Manufacturing. He teaches at UC Berkeley, DeVry (both in the U.S. and Brazil), and Keller University. Mogarei is a member of the Innovation District and Advanced Manufacturing City of Fremont Industry Advisory Board. He holds a Mechanical Engineering degree and an MBA.

As it has been said, change is the only constant these days. Good managers can see it coming, but the great ones do something about it before it occurs!

Throughout my 20-year involvements with Toyota, its subsidiaries, partners, and suppliers, it was evident that change and uncertainties were treated differently, and sometimes quite differently than the rest of the large organizations.

Here are the main assumptions and approaches:

- \* The nature of uncertainties is that they are unknown to us. However, we know that they may occur (e.g., we don't know how we may lose the electric power, but we know it might happen).
- \* If an uncertainty occurs, it will create some risks (i.e., unable to access to our laptop or the internet).
- \* Each risk will bring about potential impacts (i.e., loss of productivity).

There are normally six different areas where change may occur:

- A.) Change in human capital (when new team members are introduced to the process)
- B.) Change in process (when an element of a process is changed, modified, or deleted)
- C.) Change in the environment (when the ambient pressure, temperature, dust level, noise level, and/or etc. changes)
- D.) Change in material
- E.) Change in equipment
- F.) Change in customer's taste and/or demand

Now, we should learn about uncertainties (changes) and risks (impact).

Uncertainties are all around us, and we don't really know what the changes may be. However, we can predict their damage if they occur (impact). Since that's all we can do, we'd better be conclusive enough when doing CPM.





The list above shows six areas where change can occur that we should prepare for. We must anticipate the impact and close the exit, so to speak.

It's our responsibility as leaders and managers to present changes as positive, beneficial, and pleasurable. To the extent that we succeed at this, people don't resist them. If we notice that people around us resist the changes that we introduce, the problem and solution are both staring us in the face.

Here are a few pointers for correctly executing the CPM:

- 1) Build a culture around change from day one: show (rather than say) that change is inevitable, but it can be pleasant.
- 2) Get the upper management ready: remember the bottleneck is at the TOP of the bottle.
- 3) Gauge and develop every team member the Hoshin Kanri way.
- 4) Identify uncertainties, define risks, determine the impacts, and devise a plan B.
- 5) Drill and test before the inevitable occurs.

## **CALL FOR PAPERS**

### **Publish your practical papers in Automotive Excellence Newsletter!**

If you are interested in publishing a summary of your practical works as an article in the ASQ Automotive Division newsletter, please send your request to the Publications Chair, Mohammadsadegh Mobin ([mobin.sadegh@gmail.com](mailto:mobin.sadegh@gmail.com)).

Undergraduate and graduate students are welcome to submit the abstract of their senior project, master thesis, or PhD dissertation to be considered as a potential article in the upcoming issues of ASQ Automotive Division newsletter.

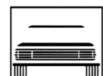


# QUALITY STORIES



**John Katona**  
Social Responsibility Chair,  
ASQ Automotive Division

Years ago, I had the opportunity to meet Dr. W. Edwards Deming. The company I worked for had a significant initiative to share his teachings. There was considerable competition to book time with Dr. Deming. I had been working outside of Michigan with a factory, and their leadership really wanted to have Dr. Deming come on site for a consulting and teaching session. I worked with the plant leadership and the folks in our company who held the calendar for Dr. Deming. After considerable work, I was able to arrange to have Dr. Deming visit our factory. I flew with him and delivered him to the plant where he consulted and taught for the day. He was elderly, and I got a wheelchair for him when I took him back to the airport. I wheeled him to the jet way for his flight to make certain that he made his departure. Before the flight attendant took him onto the airplane, Dr. Deming reached over his shoulder, and without saying a thing, he offered me a tip of \$3. I politely declined as my employer was paying me, and it just felt wrong to accept money outside of my paycheck. I sometimes think that I missed an opportunity for some bragging rights. "See these three dollars? Dr. Deming gave me these dollars!" Who else in my circle of friends could top that?





**Lou Ann Lathrop**

ASQ Fellow, ASQ CQE, ASQ Board Member 2006-2012

My first job out of engineering school in the mid '80s was quality engineering in military/avionic electronics at Delco Electronics in Milwaukee. This facility, at one point during the '60s, had over 8,000 people working at it during the race to the moon. They produced electronics for the space program.

The plant and company embraced learning about Deming. I was sent to a five-day simulcast of Deming teaching us his philosophy with other engineers, supervisors and plant leadership. I had had no statistics or quality classes in college. This is where I caught the quality bug. Deming talked about looking at everything as a system. I had wanted to be a systems engineer. I used the Deming philosophy as my approach to learning, business, and understanding how things worked. What Deming said made a lot of sense. He talked about supporting the worker in whatever form of work; the system and leadership were responsible for the performance of the system. He talked about measuring things, leadership being responsible for the system, and that the most important things are not measured.

After this class, many engineers, supervisor, and line workers took an SPC class called QE I. We then took QE II (Test of Hypothesis) and QE III (Design of Experiments).

During Desert Storm, the plant had extra security due to the product we made that was critical to the effort. The plant prided itself on being the only plant to win the top Military Quality award three times. This award was based on Mil-Std-105. Our plant also studied Theory of Constraints: everything is money in, money sitting, or money out. We were encouraged to take reduced, non-value added activities. Synchronous workshops were being held in different manufacturing areas. The plant, possibly through the ASQ network, reached out to share quality practices with other Milwaukee manufacturers; one of these was Harley Davidson.

I applied all my quality knowledge to every job I've had. I became a manufacturing engineer and co-developed SPC implementation plans for both Avionics and Automotive Electronics Manufacturing. As time went on, I became a manufacturing manager. I walked the line and looked at the SPC charts. I have told operators to stop the line if the process was out of control. I have many good stories from manufacturing.

I moved to Detroit Metro area to become the Business Manager/Quality Manager for the Powertrain Controls group at GM. The leadership wanted to apply manufacturing quality practices to engineering, and they needed someone to help the engineering group get through QS9000 audits, so I was out and about in the community, even getting to talk to Bill Harral. He invited me to my first ASQ meeting, which was the Automotive Division Council meeting. The meeting was held at ASI. Subir Chowdhury was the chair of the Automotive Division and Ron Atkinson was chair-elect. They asked if anyone wanted to help with anything, and I volunteered to help with Automotive Excellence. Ron had a way of "volunteering" people into roles.

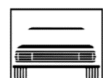




Past Automotive Council @ Automotive Division Awards with Quality Leader Awardee (2002)



Automotive Division Council @ turn of century relaxing (1998)



# ***SERGIO MARCHIONNE***

*June 17, 1952 – July 25, 2018*

**Ambition:** Mediocrity is never worth the trip.

**Legacy:** The true value of a leader is not measured by what he has gained during his career but rather by what he has given. It is not what you accomplish today, but the legacy you will leave behind.

**Commitment:** The future is not just the responsibility of governments. It's an individual and collective responsibility.

**Growth:** Easy and reassuring roads lead nowhere and certainly do not help you to grow. They only make you forget the reason for the journey.

**Difference:** The real question is, 'what do you want to be remembered for?' Making a difference is the best answer I have ever heard.



# ***GYRS 2019***

## ***CALL FOR PRESENTATION, POSTER, AND EXPO SESSIONS***



***Tuesday  
August 20, 2019  
7 AM to 5 PM***

*Please contact Dr. Mohammadsadegh Mobin at [mobin.sadegh@gmail.com](mailto:mobin.sadegh@gmail.com) (Symposium Chair) or Dr. Mohammad Hijawi at [mshijawi@gmail.com](mailto:mshijawi@gmail.com) if you are interested in being a main speaker, presenting a case study at the poster session, or presenting your product/service at the expo session.*

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