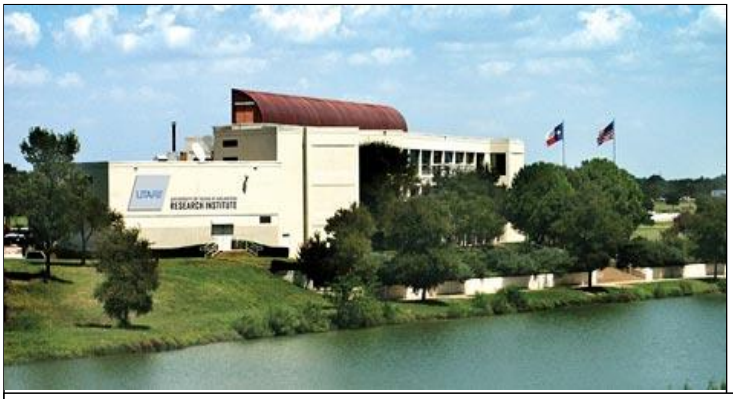
QIF Symposium 2015

Presentation Abstracts

October 6 – 7, 2015

QIF SYMPOSIUM
CALL FOR ABSTRACTS

During the 2015 DMSC / QIF Summit
October 5-9, 2015



Hosted at UTARI

University of Texas at Arlington Research Institute

The Dimensional Metrology Standards Consortium, Inc. invites you to join us in Arlington, Texas for this Special Conference on **QIF: the Quality Information Framework Standard.**

The overall **QIF Summit** is a week-long event that includes a **DMSC Meeting**, **QIF Symposium**, and **DMSC/QIF/DMIS Workshop**. The QIF Symposium will occur on Tuesday and Wednesday, October 6-7, 2015 during the QIF Summit week. You are invited to attend this meeting whether or not you submit an Abstract.

The **QIF Symposium** will bring together metrology specialists from industry, government and academia to exchange ideas on the implementation and benefits of the QIF Digital Metrology Standard. Presentation topics are expected to include implementation strategies, use cases, lessons learned, unique benefits, applications, an enterprise-wide standard solutions**,** process control, special techniques, values for the Model-Based Enterprise, complete and accurate 3D product definition, measurement resources, templates for measurement rules, and statistical functionality. All of this to satisfy the digital interoperability needs for a wide variety of use cases including feature-based dimensional metrology, quality measurement planning, first article inspection, and discrete quality measurement.

The mission of **Dimensional Metrology Standards Consortium (DMSC™, Inc.)** is to identify urgently needed standards in the field of dimensional metrology, and to promote, foster, and encourage the development and ***interoperability*** of these standards, along with related and supporting standards that will benefit the industry as a whole. Both the Quality Information Framework (QIF) and the Dimensional Measuring Interface Standard (DMIS) are standards that the consortium has the responsibility to develop, maintain and support. The **DMSC™ is an ANSI Accredited Standards Developing Organization, as well as an A-Liaison to ISO.**

All Abstracts should be sent to: Bailey Squier**:** bsquier@dmis.org for forwarding to the Abstract Review Committee. Every submitter will receive a response regarding the status of the abstract.

Key Dates: Deadline for Abstracts	Notification of Acceptance	Final Agenda to be Published
June 30, 2015	July 31, 2015	September 1, 2015

All Abstracts must be related to the QIF or DMIS Standards

Title:	QIF Summit - QIF Symposium
Location:	University of Texas at Arlington Research Institute
Date:	Tuesday, October 6th, 2015

Start	Time	Item	Presenter	Comment
8:00 AM	15	**QIF Symposium Initation**	Ray Admire	
8:15 AM	30	Welcome & Introductions	Ray Admire	
8:45 AM	15	QIF Brief	Curtis Brown	
9:00 AM		**Symposium Session I: QIF Benefits**		
9:00 AM	40	QIF – An enabler for Manufacturing Quality to Join the Digital Product Realization Enterprise	Curtis Brown /Honeywell FM&T	30 min + 10 min Q&A
9:40 AM	40	QIF Standard - How can it Make your Quality Organization More Affordable	Ray Admire /QIF Solutions	30 min + 10 min Q&A
10:20 AM	15	Break		
10:35 AM	40	QIF and the British Manufacturing Supply Chain	Jennifer Wallace /MTC	30 min + 10 min Q&A
11:15 AM	40	QIF Resources: Supporting Measurement Planning	Ed Morse /UNC Charlotte	30 min + 10 min Q&A
11:55 AM	45	Lunch at UTARI		
12:40 PM		**Symposium Session II: QIF Implementaions/Success Stories**		
12:40 PM	40	QIF – A Real World Implementation Case Study using Mitutoyo MeasurLink	Bob Brown /Mitutoyo America	30 min + 10 min Q&A
1:20 PM	40	Implementing QIF with Legacy CMM systems	Bob Stone /Origin International	30 min + 10 min Q&A
2:00 PM	15	Break		
2:15 PM	40	QIF standard in the Quality Evaluation Process	Kostadin Doytchinov, Tibor Prokai, Arpad Tari /Kotem	30 min + 10 min Q&A
2:55 PM		**Symposium Session III: QIF In Broader Manufacturing Enterprises**		
2:55 PM	40	Overview of Applications Supporting the QIF Standard	Lyle Fischer /Capvidia	30 min + 10 min Q&A
3:35 PM	40	Intelligent Manufacturing and QIF: from a Conceptual Model to Practical Experiences	Toni Ventura/DataPixel; Borja de la Maza/Innovalia	30 min + 10 min Q&A
4:15 PM	15	Remarks /Discussion	Ray Admire	
4:30 PM		QIF Symposium Evening Recess		

Note:	DMSC NoHost Dinner will start at 6:30pm
	Joe T Garcias
	2201 N. Commerce St
	Fort Worth, TX 76164

Title:	QIF Summit - QIF Symposium
Location:	University of Texas at Arlington Research Institute
Date:	Wednesday AM, October 7th, 2015

Start	Time	Item	Presenter	Comment
8:00 AM	15	QIF Symposium Continuation	Ray Admire	
8:15 AM	15	Address	Ray Admire	
8:30 AM		**Symposium Session III: QIF In Broader Manufacturing Enterprises (Continued)**		
8:30 AM	40	QIF and Pundit CMM as Key Enablers of an Automated Measurement Framework	Daniel Campbell /Metrosage	30 min + 10 min Q&A
9:10 AM	40	Standardization for Model-Based Definition Automatic Testing Processes	Atsuto Soma /JEITA	30 min + 10 min Q&A
9:50 AM	15	Break		
10:05 AM	40	System Level Quality Related Research Issues	Hui-Min Huang /NIST	30 min + 10 min Q&A
10:45 AM	40	First Article Data Values to Technical Data Packages, Digital Thread, MRL's, and Sustainment	G.M. (Greg) Wetsig /Northrop Grumman	30 min + 10 min Q&A
11:25 AM	40	Digital Manufacturing and Design Innovation Institute and Quality Information Framework	Brian Pippenger /Rolls-Royce	30 min + 10 min Q&A
12:05 PM	10	Closing Remarks / Discussion	Ray Admire	
12:15 PM		**QIF Symposium Adjourn**		
12:15 PM	45	Lunch at UTARI		
1:00 PM		Lunch Ends		

** Presentations are 30 min. followed by 10 min. of Q & A.
** Authors are invited to submit their slides (after clearing for public releases with respective employers) to be used for preparing a post symposium report.

QIF – An Enabler for Manufacturing Quality to Join The Digital Product Realization Enterprise

Curtis W. Brown – Honeywell FM&T

Incompatibilities in manufacturing quality information are costly and affect everyone, and it impedes a proactive contribution back to product design; furthermore it is a huge inhibitor toward achieving a model-based enterprise. Remarkably, the digital metrology community lacked an enterprise-wide standard solution, until know. A significant breakthrough for digital manufacturing, specifically to product acceptance and the metrology community in general was realized in the new ANSI/QIF standard. The QIF is the Quality Information Framework; a suite of XML based information schemas that contain everything from product model definitions with associated GD&T, bill of characteristics, inspection plans, measurement results, to multi-part statistics all via a common QIF document format. This presentation will describe the new ANSI QIF 2.0, future enhancements and discuss how it is the key enabler for your manufacturing quality to contribute toward digital product realization.

QIF Standard - How Can It Make Your Quality Organization More Affordable

Ray Admire – QIFsolutions

QIFsolutions can provide your team with the tools and processes to drive your success. You're already successful in manufacturing but inspection is perceived to be non-value added. What if your measurements didn't cost you as much or provided you with in-process measurements that improved your manufacturing processes? Or perhaps you would like to drive your supply chain to measure features or characteristics a specific way, QIF provides that capability in standard non-proprietary methods. Incompatibilities between manufacturing and quality information are costly and affect everyone, and it impedes a proactive contribution back to product design; furthermore it is a huge inhibitor toward achieving a model-based enterprise. Remarkably, the digital metrology community lacked an world-wide standard solution, until the development of QIF. Since FAI was considered during the development of the QIF infrastructure the aerospace community can become more affordable for the AS9102 & AS9103 requirements.

This presentation will describe the capabilities of the new ANSI QIF 2.0 and discuss how it is the key enabler for your manufacturing and quality organizations and will allow your quality department to contribute in the digital product realization. It will show how FAI's can be streamlined using the same characteristic from the engineering model through the automated inspection processes and finally through SPC and FAI reports.

QIF and The British Manufacturing Supply Chain

Jennifer Wallace – Manufacturing Technology Centre

The use of the QIF standard within the British manufacturing supply chain is a good example of how it can be implemented and the benefits it can bring. The Manufacturing Technology Centre (MTC), based in Coventry, UK, has been working on a range of projects with different companies across the supply chain looking at standardising measurement and integrating with manufacturing process software. Some of the work completed at the MTC, including a use cases utilising the QIF standard, will be presented.

QIF Resources: Supporting Measurement Planning

Saeed Heysiattalab, Edward Morse*, UNC Charlotte

Center for Precision Metrology 9201 University City Blvd. Charlotte, NC 28223-0001 * emorse@uncc.edu (704)687-8342

This paper provides a report on recent (post-QIF 2.0) proposed changes to the QIF Resources schema. These changes are intended to enhance the range of dimensional measuring equipment and other resources that can be defined within QIF, which in turn will allow measurement planners access to necessary resource information through a standard model. The contents of this work are broken into three sections: the first section describes the theoretical hierarchy in which the resources are captured; the second section discusses specific examples of changes proposed to the QIF Resources schema; the third section will outline additional changes that are planned and some of the challenges posed by attempting to classify metrology resources in a general, hierarchical structure.

A main purpose of this paper is to describe work that has been ongoing within the QIF Resources group, and to solicit both technical feedback on the work, and to encourage others to contribute to the efforts of this group.

QIF – A Real World Implementation Case Study Using Mitutoyo Measurlink

Robert Brown - Mitutoyo America

This presentation will highlight how QIF provides a mechanism to solve several real-world customer information flow problems as an quality control interoperability enabling specification. The presentation will discuss the MeasurLink implementation of QIF Results in for both Variable and Attribute Inspection and QIF Results/QIF Statistics out for downstream data flow to ERP and MTConnect. Both Customer and Vendor perspectives will be provided.

Implementing QIF with Legacy CMM Systems

Bob Stone – Origin International Inc.

Origin's CMEngine software application will be demonstrated loading legacy CMM report data and augmenting the content of existing QIF MBD and QIF Plans instance files with QIF Results. The benefits of automatic source generation will be discussed. A pseudo-source-code implementation example will be presented showing how MBD data is preserved by automatically generated C++ classes with zero effort. (Note: the CMEngine capability to be demonstrated is different than that shown at IMTS 2014. There, the conversion of QIF MBD/QIF Plan instance files to DMIS inspection programs, and separately, the conversion of CMM results to QIF Results instance files were demonstrated. In the current demonstration the circle will be closed and the QIF Results derived from legacy CMM reports will be added to existing QIF MBD/QIF Plan instance files.)

QIF Standard in The Quality Evaluation Process

Kostadin Doytchinov[1], Tibor Prokai[2], Arpad Tari[3] -- Kotem

Kotem's SmartProfile software provides manufacturers with independent and correct Geometrical Dimensioning & Tolerancing (GD&T) analysis for dimensional process control and problem solving.

In order to analyze GD&T information Kotem's SmartProfile software takes CAD models and measured points as input, tolerances are added manually with an advanced workflow within the software. Due to various CAD and CMM systems CAD models and measured point information come in different formats and provide different levels of detail which makes them hard to process. Kotem realized the extra effort caused by manually adding the tolerance information in SmartProfile which most of the time already exists electronically in customers' systems.

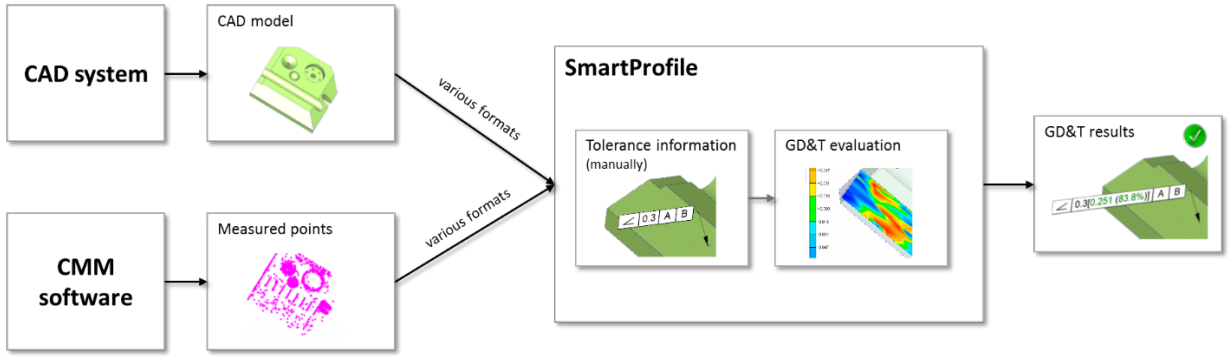


Fig. 1. GD&T evaluation current workflow in Kotem's SmartProfile

In our planned new workflow the CAD model is stored in QIF format along with PMI information eliminating the need of double entering tolerance information. There are several commercially available solutions that enable exporting PMI data in QIF format from the most popular CAD softwares. This solution saves time and reduces manual information processing which is often the cause of serious and hardly traceable errors. With the spreading of the QIF standard we also expect to import the measured points in QIF format in the near future. Furthermore we can export the results in QIF format which enables further processing of data for example in SPC systems, long-term archiving or web-based publishing etc.

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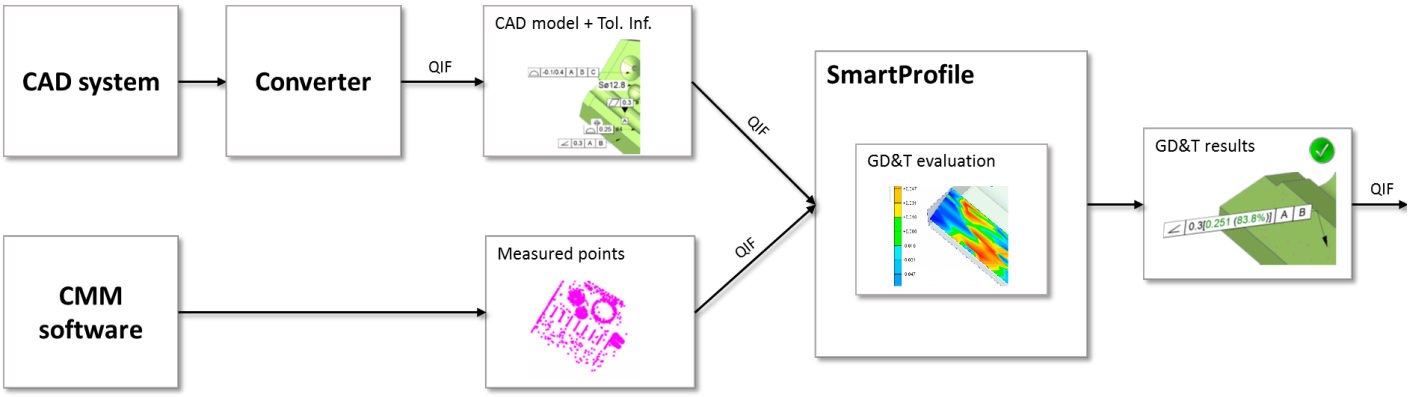

Fig. 2. GD&T evaluation new workflow in Kotem's SmartProfile

Kotem is a full supporter of the QIF standard and will include it in its next software releases.

Commercially Available Software for QIF

Lyle Fischer – Capvidia

QIF is the new ANSI standard for transferring precise 3D model information with semantically linked PMI to metrology and manufacturing applications. QIF solves interoperability issues by using XML-based data exchange format created for computer-aided quality measurement systems. It enables the capture, use, and re-use of metrology-related information throughout the PLM/PDM domain.

This presentation provides an overview of commercially available products that create or use QIF and will briefly touch on development groups that may be planning to implement QIF. Capvidia offers a comprehensive QIF Software Development Kit (SDK) for 3rd party developers with neither the time nor resources to implement QIF on their own.

Intelligent Manufacturing and QIF: from A Conceptual Model to Practical Experiences

Toni Ventura – Traveset, Datapixel

Although there is a consensus on the need of evolving the manufacu turing methods and processes towards a knowledge based paradigm, practical implementation of intelligent manufacturing is facing enormous challenges. The complexity of the needed tools to develop and exploit truly adaptative cyberphysical systems, implementing interoperable equipment and flexible production setups, requires a systemic approach that need to be supported by a solid conceptual background. Starting from an holistic concept of intelligence, the presentation develops a layered model of knowledge based manufacturing. In this model, the QIF standard plays a crucial role, opening the door to a successful integration of the physical reality of production to the virtualized universe of knowledge management. Additionally some experiences of QIF implementation by Innovalia Metrology are presented. Finally, a reflection on what can be the next needed steps is presented.

QIF and Pundit CMM as Key Enablers of an Automated Measurement Framework

Daniel Campbell - Metrosage

Envision a PDM environment in which changing a tolerance on a part design can automatically spawn the generation of an optimized inspection program, adapted to that change. Imagine point-cloud data, tagged to specific part features and tied to the master model, passed real-time to analysis engines that assess 3D functional fits of mating parts, identify and monitor feature surface signatures, and feed information to production systems. Picture automatic refinement of decision rules and inspection plans, based on measurement uncertainty estimates, to prevent bad parts from being passed to downstream production. Why can't we do these things today? The truth is that technologies now exist for these and many other advanced scenarios, but, "We're just not communicating." This presentation will show how QIF and how Metrosage's Pundit Uncertainty technology can enable an automated and holistic measurement framework for manufacturing enterprise.

Standardization for Model Based Definition Automatic Testing Processes

Atsuto Soma – Japan Electronics and Information Technology Industries Association (Elysium Co. Ltd. CTO)

The 3D CAD Information Standardization Technical Committee of JEITA (Japan Electronics and Information Technology Industries Association) has published guidelines on 3D CAD data and has initiated several activities to verify those guidelines in practical workflows.

Recently, JEITA performed a benchmark where 3D Model Based Definition (MBD) CAD models with Product Manufacturing Information (PMI) were generated and mold designs defined from this data without 2D drawings. The manufactured object from this activity was analyzed by contactless measurement and this information used in a full loop MBD processes that allowed validation of this article back to the 3D CAD annotated model.

The goal was to realize a fully automated measurement/testing process based only on 3D CAD data with PMI. JEITA have identified issues via this benchmark and proposed resolutions to be discussed of which QIF will play an important role. Future planned utilization of QIF will also be explained.

System Level Quality Related Research Issues

Hui-Min Huang, Tom Hedberg, John Horst, John Michaloski - NIST

We attempt to explore a system wide approach, looking into two levels of manufacturing operation for areas to which QIF might be applicable as well as areas that might call for new requirements for QIF. The research issues include:

- Interfacing QIF and ISA95: How QIF, particularly Results and Statistics, might benefit the higher level manufacturing operations management (MOM) in terms of quality of production, maintenance, and inventory. And MOM is what ISA95 covers. Conversely, what should also be explored is how the high level requirements or directives (production orders, quality requirements) should/could be integrated/incorporated into a QIF based quality measurement and analysis enterprise.
- Exploring simulations or analytical system models on whether and how they could help the quality enterprise, including providing process feed forward—preventing manufactured parts from becoming having quality problems—as well as analyzing quality system performance.
- Forward/reverse analysis on causes/effects on part quality. Knowledge input from many participants would be need for the purpose of identifying common quality issues and either associating them with known causes, when available. This knowledge could serve as a starting point, from which the research aim would be higher capabilities in predicting potential quality issues and/or identifying problem areas in design, manufacturing, or measurement.
- Exploring error models and propagation from product design and down the manufacturing and inspection processes. Explore generating either physical or simulated QIF results that might correspond to known manufacturing issues (for example, simulating machined cylinders on a QIF block model with the effect of the machining tool wearing out).
- Exploring design/manufacturing practices such as Closed Loop Tolerance Engineering (CLTE) and Digital Tolerance Stack Up, Design for six sigma (DFSS), design for manufacturability (DFM), etc., in terms of whether/how QIF could support them for further improving the product quality from a system wide perspective.
- Explore applying code/report automation to assist advanced quality process.

Our goal would be an integrated approach encompassing these issues that significantly benefits a multiple level manufacturing enterprise.

One of our main objectives for the presentation in this Symposium would be to discuss these issues with the participants and identify critical and feasible issues. Another objective would be exploring WG wide collaborative research and development that centers around the core work of QIF.

First Article Data values to Technical Data Packages, Digital Thread, MRL's, and Sustainment

G.M. (Greg) Wetsig – Northrop Grumman Technical Services

First Article Inspection Report (FAIR) is one of the many elements of the ISO system documented to ensure that requirements are achieved. What does this function accomplish, and what can it provide? First, an FAIR's objective is to validate a repeatable manufacturing process: one that produces parts conforming to the initial engineering/technical data provided by contract. The manufacturing process details the steps to fabricate and process the part from raw material through material finish and/or test. To clarify, the FAIR does not include detailed work instructions since this is classified as Intellectual Property. However, the FAIR does identify materials, processing specifications, and if any unique OEM specifications for forming, heat treating, nondestructive inspection, and functional testing. Complete revisions of specifications and software used along with effectivity or serial numbers are required for the FAI report at initial manufacture. Can the FAIR be considered the foundation of a digital data thread that matures with MRLs? Is the FAIR considered an important element of future TDPs? Can a documented FAIR support/promote lifecycle sustainability?

Digital Manufacturing and Design Innovation Institute and Quality Information Framework (Interoperability and Innovation Now and into the Future)

Brian Pippenger – Rolls-Royce

This paper will look at the cost savings and sustainability associated with the implementation of innovative processes with the use of the Digital Manufacturing and Design Innovation Institute (DMDII) and interoperability of Quality Information Framework (QIF), within the development of a manufacturing system. With the opening of the DMDII in Chicago, a federally funded research and development organization encourages factories across America to deploy digital manufacturing and design technologies and QIF, which uses the information within models for conveying data that will be derived from common model libraries. This common information within the modeling components can be reused throughout the entire quality measurement process makes for a perfect combination of data reuse and interoperability. DMDII sponsors research projects in digital manufacturing and design by capturing data at every stage of the production process—and by deploying specially designed software and other digital tools—manufacturers can efficiently share and revise their digital designs. QIF defines, organizes, and associates quality information including measurement plans, results, part geometry and PMI, measurement templates, resources, statistical analysis for all metrology processes. Combining DMDII with the interoperability of QIF will provide for a robust system of data use and interoperability. The entire process will be inherently interoperable. Using these fundamental concepts of DMDII and QIF the ability of manufacturing to utilize the digital data to improve the efficiency of the processes and to be able to reuse the digital product definition will save many man hours of design time as well as eliminating the need for complete tear down and setup of the manufacturing floor. Some of the benefits of using this approach to a manufacturing system would be the streamline of the process, improved productivity, and enhanced traceability. The reduced cost in the development and implementation process, opportunity of reducing the time of development and dissemination of the product definition for the current process and the data reuse for future process introductions could be reduced by as much as 90%-95%. The possibilities of having only one file with all associated data attached and usable both up and down stream will reduce the risk of errors from translation between design and manufacturing personnel. The combination of DMDII and QIF will be able to move any organization to a higher level of sustainable manufacturing capability. The money savings from this partnership will contribute to a sustainable state of the art manufacturing practice that will provide an efficient and digital product definition. This process definition will be used for the entire lifecycle of the product.