



Nadcap Measurement & Inspection Newsletter

June 2014

Issue Highlights

From the Chair	1
Nadcap Meeting Schedule	2
M&I Development	3
What is M&I	3
Why M&I	3
M&I Task Group	3
Checklist Structure	4
Task Group Meeting in London	4
Timeline.....	5
Supplier Symposium	5
Auditors.....	5
M&I Voting Members	6
PRI Staff Contact Details	7

Editors

James Bennett

Melanie Petrucci



Editorial Note: The goal of the first M&I newsletter is to explain the M&I Nadcap Program and its progress. Future newsletters and Supplier Symposia will go into more specific detail as the program matures about where M&I fits under the Nadcap umbrella. If throughout these articles there are additional questions or clarifications required, please feel free to contact PRI Staff (contact details at the end of the newsletter).

From the Chair...

Hello and welcome to the first newsletter from the Measurement and Inspection (M&I) Task Group. I am Simon Gough-Rundle and the current Chair of the Task Group. I work for Rolls-Royce and hold the position of Assistant Chief Metrologist in the group, but have spent my entire working life in manufacturing and measurement. I started as an apprentice for ABB at the age of 16. In fact, I left school on the Friday, and started work on the Monday where I was trained for 4 years to tool room standards in a company manufacturing and testing large industrial flow meters and gas analyzers. After my 7th year in the company, I moved to Renishaw where I went through CMM programming, Production Engineering and Applications Engineering, ending up as the Senior Applications Engineer for probing software. I first started work for Rolls-Royce in 2006 working for the defence sector but quickly moved to the central team to watch over the full Rolls-Royce group. It was in this position we started to look for solutions to overcome inconsistent approaches to measurement and inspection.



Simon Gough-Rundle

The Nadcap Measurement and Inspection Task Group has been running since 2012 and has some 16 companies involved, made up of both Subscribers and Suppliers. Our vision statement is based on the common needs seen throughout industry, and I feel it really has the potential to simplify measurement and inspection requirements, freeing that much needed resource.

The global aerospace industry has a single approach to M&I, defined by a unified standard and audit programme allowing aerospace organizations to meet regulatory, customer & business requirements in a cost-efficient manner

Within the aerospace industry, there really does not seem to be any one unified standard for measurement and inspection. Opponents to our Task Group often quote AS9100 requirements and suggest that the audit program around this already provides adequate cover – but it truly does not. While base standards like the AS series cover all the basics, the interpretation, understanding, and implementation of solutions to deliver the requirements often come up short. It has taken the development of an Industry Managed aerospace checklist facilitated by the Performance Review Institute (PRI), who administer

Nadcap Meeting Schedule

2014	
Jun 23 - 27	Dublin, Ireland
Oct 20 - 24	Pittsburgh, Pennsylvania, USA
2015	
Mar 2 - 6	Berlin, Germany

* For specific meeting days and times, refer to the applicable agenda available on the PRI Website www.p-r-i.org and selecting Nadcap Meeting Information (underneath Nadcap toward the left side of the screen). Note – Only the latest agenda for the upcoming meeting and previous agendas and minutes are available.

From the Chair cont...

the Nadcap program, to gain agreement that measurement and inspection is a key issue for ALL aerospace OEM's.

So what the M&I Task Group has done is deliver an audit program based on a core checklist of the basics for measurement and inspection, (Quality System, Calibration, Training, Visual Acuity, Software, Verification, Inspection Planning, and Environments). In addition, the core checklist is supplemented with 'slash sheets' specifically focussed on a single technology associated with measurement and inspection. The Task Group now has checklists for Coordinate Measuring Machines (CMM) and Air Flow Testing of components. Also in draft form are checklists for Laser Trackers and Articulated Arms. The Task Group has been blessed with recognized company experts in all technologies and has been a surprise and pleasure to work in harmony across the sector to generate a common, pragmatic base level checklist.

There will naturally be a lot of concern in the industry about the new audit program and the potential risks and work load it might bring. I am very proud of the checklists and their pragmatic approach to assessing the standards of measurement. The Task Group has covered all the basics, and spent a considerable amount of time on trials testing the checklists before even going to ballot to ensure there are no unrealistic requirements. I often quote the requirement for temperature compensation and environmental control, which is often seen as a profitable business opportunity for companies. What is key is that the manufacturing companies are aware of the effects of temperature on the measurement process through expansion or contraction of components or equipment through temperature. While 68°F (20°C) is the standard, what is important is that the manufacturer is aware of the effects, and has assessed the measurement system to ensure measurement results are correct. The checklists' pragmatic approach asks – "Is there a documented procedure addressing environmental conditions affecting the measurement process?" This does not require a temperature controlled room, or even specific control over the environment, it simply asks if the company has a procedure to manage environmental effects, and has it been effectively implemented.

There is a lot of benefit in the deployment of this audit program, and its pragmatism is testament to the dedication and hard work of the M&I Task Group. It is only with such a team of experts that a single audit program can be brought together in such a coherent audit program to cover the entire aerospace manufacturing sector. I personally thank all those involved to date.

I invite your feedback and once you have had the opportunity to review the newsletter and perhaps even look up the audit program on eAuditNet, I look forward to hearing from you. Hopefully I might even get chance to meet you at an upcoming meeting, and, once again, thank all of those who were instrumental in getting our baseline established.

Sincerely,

Simon Gough-Rundle

M&I Chair and Rolls-Royce (Assistant Chief Metrologist)

M&I Development

At the October 2012 Nadcap meeting in Pittsburgh, the Nadcap Management Council (NMC) approved Measurement & Inspection (M&I) as a formal Nadcap Task Group.

At the February 2013 Nadcap meeting in Dallas, the M&I Task Group, comprising of technical experts from the Subscribers and Suppliers, met 'face-to-face' for the first time to discuss development of the M&I program.

At the July 2013 Nadcap meeting in Paris, France, the first two checklists (AC7130 - Core Checklist and AC7130/1 - Coordinate Measurement Machines) were drafted and subsequently balloted.

At the October 2013 Nadcap meeting in Pittsburgh, the M&I Task Group discussed and resolved the ballot comments.

During December 2013, the M&I Subscribers approved their first Nadcap M&I auditor. In addition the NMC approved the checklists.

On 1 January, 2014 the Nadcap M&I program was released and became operational.

Why M&I?

Dimensional measurement of components is routinely used throughout industry to verify the conformance of the manufactured product to the specification. To ensure measurements are reliable, it is important to ensure the measurement capability is suitable for the feature being measured.



Failure to implement and maintain effective measurement processes can lead to quality problems. It is therefore important for all aerospace manufacturers to operate effective measurement processes.

The aerospace industry did not have a unified approach to identifying measurement & inspection risk within the supply chain. Further, experience suggested that there are many differing approaches to M&I in the supply chain.

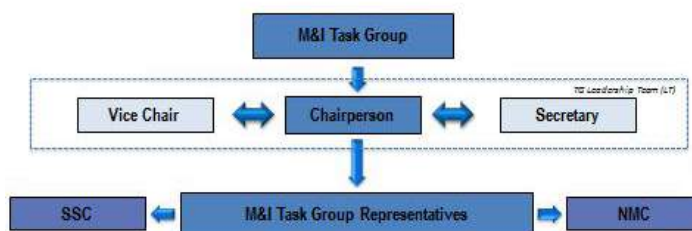
Existing audit programs such as AS9100 do not cover the full scope of M&I in the appropriate level of detail. Topics such as calibration are covered at a high level; however the specifics such as inspection planning or the detailed operation of specific equipment types like CMM's or Laser Trackers are not.

Within the Nadcap program, the development of the M&I accreditation will provide adequate systemic and detailed auditing capability dedicated to the means, people, methods, and all other conditions required to be fulfilled in order to control the "geometric inspection process". Like any other Nadcap audit, it has to be considered as a complement to a global 9100 quality management system: focusing on a very specific process at high stake for any supplier and customer within the aerospace supply chain.

M&I Task Group

Our role is to speak for the needs of the global aerospace industry and their organizations in promoting teamwork, facilitating consensus, focusing on quality and ensuring the Nadcap program is robust and representative, from a technical perspective.

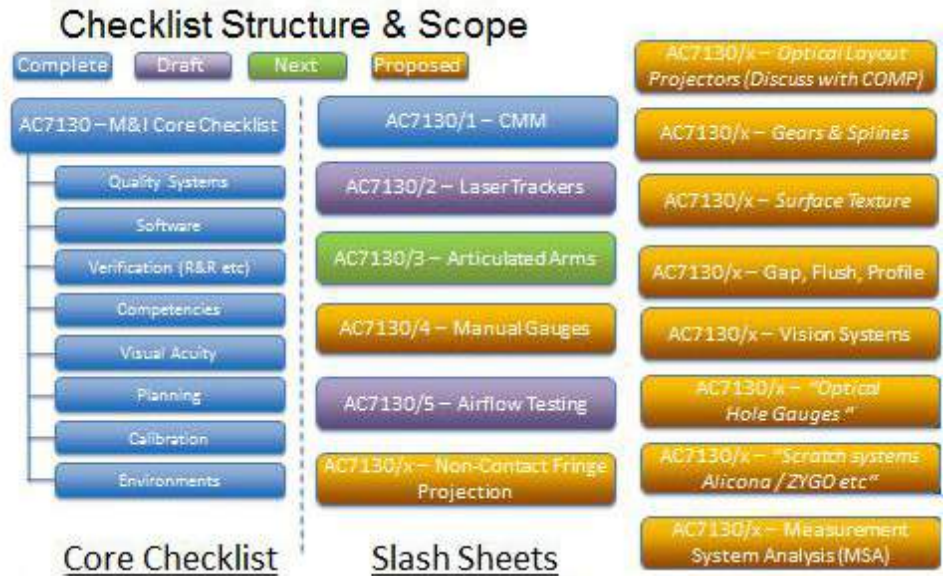
TASK GROUP ORGANIZATION



The M&I Task Group is currently supported by 10 Subscriber Voting Members and 5 Supplier Voting Members. Rolls-Royce plc and The Boeing Company support the M&I Task Group Leadership Team.

Checklist Structure

The M&I Checklist Structure comprises of a Core Checklist (AC7130) and technology specific “slash” sheets. For CMM, the slash sheet is known as AC7130/1, for Laser Trackers AC7130/2, and so on. To become accredited to AC7130/1 it is necessary to meet the core requirements in AC7130 in addition to AC7130/1. This methodology applies to all the technologies. The graphic to the right outlines the contents of AC7130 and the technologies M&I is looking into. This will be dependent on what is of interest to the Nadcap Subscribers and any possible mandates flowed down to the supplier base.



Task Group Meeting in London

In February 2014 the M&I Task Group met face-to-face in London, UK with the other Nadcap commodity Task Groups. The meeting was very productive with resolution to a number of items and development of new checklists. Key topics discussed:

- Nadcap M&I Mandates – Four Nadcap Subscribers close to a structured roll-out mandate
- Edits made to the existing checklists (AC7130 and AC7130/1) and agreed upon. Anticipate another ballot to be issued in June of 2014 (waiting for any additional changes)

- 44 attendees at the M&I Meeting – 3 Subscriber and 3 Supplier members voted in
- Airflow checklist drafted and ready for testing
- Laser Tracker draft checklist completed

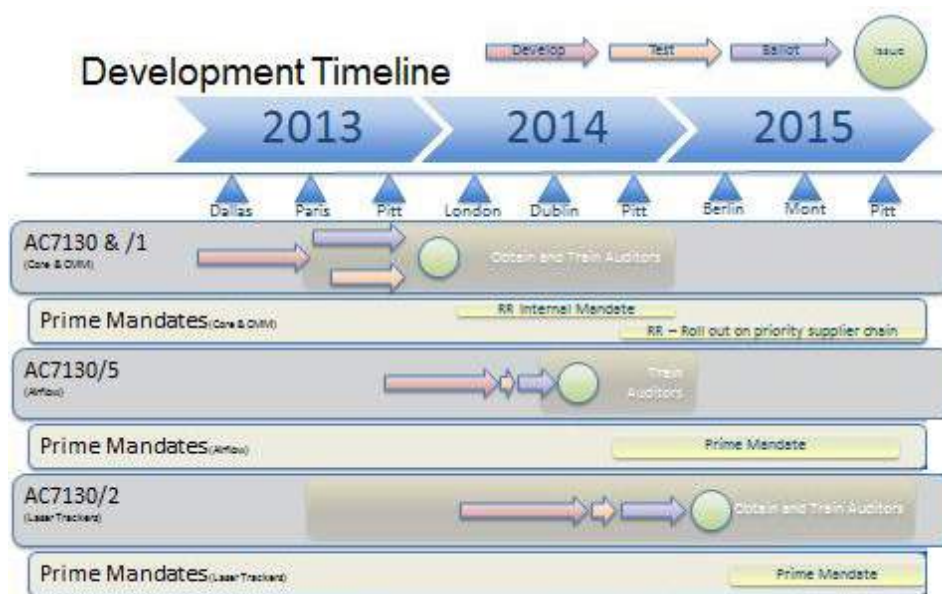
For details relating to the Nadcap Task Group Meetings, including minutes and the upcoming Supplier Symposium, please visit the Nadcap website at:

www.p-r-i.org/Nadcap



Timelines

As seen earlier in this newsletter, the M&I Task Group has progressed a great deal in 12 months to have a program operational. In addition, and to assist the Subscribers in releasing mandates, the M&I Task Group is looking into Air Flow and Laser Trackers. The following slide identifies the time lines involved in creating and developing additional checklists.



Supplier Symposium

The M&I Task Group plans to hold supplier symposia during the Nadcap Task Group Meetings, from October 2014 onwards. These symposia will be planned initially for one day and will be applicable to anyone that is new to M&I and who will be seeking accreditation in M&I. The content of the symposium is still under development with the M&I Symposium Sub Team comprising of Nadcap Subscriber and Supplier Voting Members. More detail will be provided later in the year, however

some of the topics that will be included are:

- The Nadcap Program as it pertains to M&I
- Supplier's perspective
- Nadcap Audit Preparation
- How to respond to Nonconformances
- eAuditNet

James E. Bennett – PRI Staff

M&I Auditors

The M&I group currently has four auditors approved to perform audits to AC7130 & AC7130/1. They are as follows:



Jim Bennett (US)

PRI Staff Engineer



Rich Harens (US)

Independent Contractor



John Tattersal (EU)

Independent Contractor and Nadcap auditor for AQS, NDT, CP, DIS, NDT, NMSE



Ron Dodson (EU)

Independent Contractor and Nadcap auditor for NDT & CP

M&I Auditors cont...

The year-end plan is to have five or six auditors in place. Once mandates are rolled out, the need for auditors will significantly increase. Location of audits and Export Controlled companies will also determine the need for auditors. Preliminary numbers would indicate that initially more audits will be required in the Americas, compared to Europe and Asia.

The M&I Task Group approve auditors based on the following considerations:

- 5 years' experience as a Manufacturing / Quality Engineer
- Metrology knowledge
- Ability to read and understand engineering drawings / CAD Data
- Inspection System Experience

- Method
- Computer Aided Inspection (Laser Trackers, CMM's, etc.)
- First principles (clocks, gage blocks, sine plate, micrometers, calipers, etc.)
- Measurement Analysis
- Inspection jigs and fixtures
- Programming experience
- Degree or equivalent in an Engineering field
- Relevant training and inspection in M&I
- Auditing experience

If you are interested in becoming an auditor for M&I, please refer to **www.eAuditStaff.com** for further details.

Supplier Voting Members

Name	Company	E-mail contact
Dave Michaud	Fountain Plating Co	davidm@fountain-plating.com
Takahito Araki	IHI Corporation	takahito_araki@ihi.co.jp
Tammi Schubert	LMI Finishing Inc (primary)	tschubert@lmiaerospace.com
Gordon Cameron	LMI Finishing Inc (alternate)	gcameron@in-tec.com
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