

NADCAP NEWSLETTER



CONTENTS

- 1 My Nadcap Audit Experience
- 5 Nadcap Electronics Audit Insights (ETG)
- 10 Nadcap Operating Procedure (OP) 1117 - Auditor Consistency
- 11 Joseph G. Pinto retires from PRI at the end of 2018
- 12 eAuditNet: Beyond the Audit
- 14 Nadcap Supplier Survey Preliminary Results

IN BRIEF...

Nadcap is an approach to conformity assessment that brings together technical experts from Industry to manage the program by establishing requirements for accreditation, accrediting Suppliers and defining operational program requirements. This results in a standardized approach to quality assurance and a reduction in redundant auditing throughout the aerospace industry.

Nadcap is administered by the Performance Review Institute (PRI), a not-for-profit organization headquartered in the USA with satellite offices in Europe and Asia.

www.p-r-i.org/Nadcap/

WELCOME TO THE TENTH ISSUE

This is the tenth issue of this Nadcap newsletter, which we have been publishing and sharing for three years now. I would like to thank everyone who has contributed to the newsletter and who has given us feedback to help improve this newsletter, as well as for the positive comments my staff and I have received on the content to date.

The intent of the newsletter continues to be to develop content for companies that are not normally able to send a representative to Nadcap meetings, to share technical information and knowledge that will help them better prepare for a Nadcap audit and understand how to utilize Nadcap effectively to improve their performance.

In this issue, there is an article sharing the audit experience of a successful Nadcap accredited Supplier which is actively participating in the Nadcap program, and one explaining how PRI maintains a focus on the Nadcap Auditor consistency, as described in Nadcap Operating Procedure (OP) 1117. Also highlighted are the results of the biennial Nadcap Supplier Survey conducted by the Nadcap Supplier Support Committee (SSC), as well as how to make the most of eAuditNet by going beyond the audit itself.

In addition to general Nadcap articles, each newsletter has a particular technical focus. In this issue, there is detailed information regarding Nadcap Electronics (ETG). More than 150 Nadcap ETG audits are conducted annually, yet we know that many people are not able to attend Nadcap meetings and benefit from free training and other information shared there.

I hope you continue to find the content valuable.

Joseph G. Pinto
Executive Vice President & Chief Operating Officer
Performance Review Institute

MY NADCAP AUDIT EXPERIENCE

Undertaking a Nadcap audit requires a large amount of resources, including personnel and time, which can be seen as a significant investment, especially for smaller businesses. In the Nadcap Newsletter survey conducted in 2017, feedback indicated that the Nadcap community would like to read "real audit case studies". In response, PRI has spoken with Wilfried Weber, Director of Quality and Strategy for PFW Aerospace GmbH and Supplier Voting Member on the Nadcap Management Council about his perspective and experience of Nadcap audits.

Continued on next page



MY NADCAP AUDIT EXPERIENCE

Continued from previous page

Can you briefly describe your company to set the scene?

PFW Aerospace GmbH has over 100 years of experience in the Aerospace Industry. Founded in 1913, PFW Aerospace GmbH has more than 2,000 employees between its four sites, in Germany and Turkey. The company is highly active when it comes to Quality in general. Member of several Quality organizations, including the German Aerospace Industry Association (BDLI), European Aerospace Quality Group (EAQG) and International Aerospace Quality Group (IAQG), it had its first Nadcap audit in 2005 and now holds six accreditations in four different commodities between its two production sites, with five accreditations on a 24-month Merit (Heat Treating, Welding and NonDestructive Testing for the German site and NonDestructive Testing and Welding in Turkey).

How did you first hear about Nadcap?

I first heard about Nadcap back in 2005, because my customers began to require it.

How easy is it to find the information you need to help you prepare for a Nadcap audit?

Keeping in mind that English is not everyone's first language, it is not that easy. However, eAuditNet is full of good and useful documents – it only needs some time to get used to it, and to the way information and documents are structured. For us, being actively involved with Nadcap for the past 13 years, eAuditNet looks familiar and we have learned how to navigate and use its content. Therefore, I think the eAuditNet Tutorials given at each Nadcap meeting, along with the Nadcap symposia held in different places throughout Asia, Europe and the USA are helpful. When I first became involved with Nadcap, the symposia did not exist, and I believe that the situation might be different since they have been introduced.

How long before the actual audit do you start preparing and what do you do to prepare for a Nadcap Audit?

We start preparing for a Nadcap audit four to six months

prior to the actual audit date – it all depends on the process being audited and whether or not it is on Merit – by holding a “kick off meeting”. The team consists of the responsible persons performing the process. It includes Quality individuals overseeing the process, internal auditor, work order planning and (preventive) maintenance functions. The Team Leader, an individual from Quality as well, is then tasked to define the upcoming “audit status” by:

- Gathering information from the past: last audit results, non-conformances (NCRs), results of internal audits and related NCRs raised.
- “Status of today”: taking into account any open issues that need to be addressed, reviewing the sustaining implementation of corrective/preventive actions performed, making sure that our audit scope is still in line with the checklist slash sheets.
- Future plans: is there anything new or coming up that needs to be taken into account for the audit?

In addition to discussing the above, we also create an “action register”, where every action is listed with its owner as well as a date for implementation/completion. Moving forward from this meeting, we then monitor our progress and hold monthly meetings to ensure that everything is on track and the self-audit checklists are ready to be uploaded in to eAuditNet no later than 30 days prior to the actual audit date.

How do you find the audit scheduling process?

The process works fine, although there may be some areas of improvement. Auditees have to keep an eye on their audit administrator email address for an incoming email detailing the audit date. Upon receipt, the Auditees have to work internally to make sure that it does not fall during vacation time or bank holidays. I have to say, however, that whenever it was necessary to reschedule an audit, it was quick and easy to do and if you do it right away after receiving the notification email, there is no additional cost.

Do you have much interaction with PRI staff before the Nadcap audit and how is it?



Yes, I do. While preparing for the actual audit, working down from the checklist, there are always questions that come up, sometimes related to recent checklist changes. Usually, PRI staff is available, friendly and helpful. I guess they appreciate if you ask before the audit instead of complaining afterwards.

What are your expectations of the following and how do they compare with what actually happens...

...The Auditor and his/her way of conducting the audit?

Although English is generally neither the Auditee's first language, nor the Auditor's one, I would say that it is most helpful to create a trustworthy environment where the Auditor realizes that his task, auditing, is respected and every answer to a question is an honest answer. As generic as this may sound, the better the audited organization is prepared, the smoother the audit will be, as both parties would know the requirements of the process and the content of driving documents from customer(s).

...Opening session?

I strongly advise that the audited organization makes sure that every single one of its departments involved in the Nadcap audit process attend the opening session, or is at least invited. This meeting is crucial to get everyone "up to speed" on what happened and will happen. It is also a time when questions can be asked directly to the Auditor and the ground can be laid out for a smooth run of the audit. At PFW Aerospace GmbH, we have these departments involved from the very beginning of the audit preparation process.

...Closing session?

In my opinion, there are two types of closing meetings. On the one hand, the daily debrief, which is particularly important if some NCR(s) have been raised. The people involved with the NCR(s) should be part of this meeting to review the wording of the NCR(s) as the memory is still fresh. The wording must be clear to avoid any confusion as this is what the Nadcap Staff Engineer will

review. On the other hand, the audit closing meeting should be held on the same basis as the opening meeting, with all internal departments involved in the audit attending.

What did you find was the most challenging during the audit?

Three areas come to mind when asked this question. Language is the first one. As mentioned earlier, English is sometimes not the Auditor's first language. This may also be the case of the Auditee, who is sometimes even struggling with the English language. This can create confusion and sometimes situations which are not easy to overcome for both sides. The second area is production schedule. Accommodating the Auditor can create issues like "production flow delay" if an Auditor wants to see something specific but is still busy observing another process/part. Availability of personnel is the last area as Nadcap Auditees have to make sure that the required employees are working during the actual audit.

What could be done to improve the experience of going through a Nadcap Audit as well as having an Auditor on site?

There are two main areas that I think could benefit from improvements. The first one is related to the recently introduced self-audit. Nadcap Auditees are required to perform a self-audit and upload the completed checklist(s) no later than 30 days prior to the actual audit date. These checklists contain a lot of information on where to find objective evidence for the "yes" questions and I believe that these same checklists could be used during the actual audit to reduce duplication of work.

The second area of improvement involves Nadcap Subscribers:

- Subscribers should take the audit results and merit status into account when creating their audit programs

Continued on next page

NADCAP NEWSLETTER

MY NADCAP AUDIT EXPERIENCE

Continued from previous page

- All Subscribers' requirements for a special process should be covered by the Nadcap checklists
- Documents provided by the Subscribers for a contract or a purchase order should be in line with what was agreed to with the Task Group at the Nadcap meetings

What is the first thing you do once the Nadcap Auditor leaves?

The first thing we do when the Nadcap Auditor leaves is have a meeting with the people involved during the audit. The aim is to gather information and insights on lessons learned from the audit, such as: What did we observe during the audit? What can be improved for the next audit? Was there anything we found difficult explaining or showing evidence for? We also create a "work down plan" for every NCR(s) we received, which includes questions such as "what to do?" "who is doing it?" and "what is the deadline for reporting the result?".

These meetings are run by our focal point for PRI/ Nadcap, who is also leading the NCR(s) resolution. At PFW Aerospace GmbH, this is the role of our Quality Specialist, who holds the knowledge about the methods e.g. "5 – Why" to get to the real root cause.

Stringent monitoring of actions assigned during the above meeting is the next important step to ensure the deadlines are met. If necessary, we also get in touch with the Nadcap Staff Engineer(s) to clarify some issues.

How did the outcome of the audit and your company performance compare to your expectations?

To me, a Nadcap audit is always of benefit. We see it as a reflection of our knowledge and whether we really know what is required to perform the process. It is also a good way to make sure that we have all the necessary objective evidence and ensure people performing the tasks are aware of all the driving documents, as well as if the content is properly understood.

What tools do you find most useful in the RCCA process?

We prefer the "5 – Why Approach to Root Cause" which we also upload into eAuditNet as it enables us to show the way to root cause. In other words, we state the cause followed by the word "why", and depending the following answer, we reapply the word "why" again, and so on until the "real root cause" is detected. This approach helps us understand clearly what the root cause is, as well as making sure that we do our best to have anyone who needs to review this process understands it, and hopefully agree if what we laid out is plausible and accurate.

Finally, PFW Aerospace GmbH has limited contact with Nadcap staff after the audit. But I would like to highlight that each time we are in touch with any of the Nadcap staff, the exchange is friendly, and I feel treated seriously.

As a conclusion, I would like to share some advice to other Nadcap Auditees:

- As most know, being prepared is key to being successful during a Nadcap audit. This means that you have to know what the requirements are and assure that all of them are implemented beforehand, starting with the self-audit.
- Awareness throughout the company and commitment from leaders are key to a successful Nadcap audit.
- Have the responsibilities and authorities clearly defined to avoid any confusion.
- Communication and involvement of all related departments needed for the upcoming audit.
- If possible, have someone who is fluent in English to oversee the Nadcap audit process within your company.
- Try to create a climate/environment that is trustworthy to the Auditor, proving that nothing will be hidden or dishonestly answered.

If you would be interested in reading or contributing to future real audit case studies, please email prinadcap@p-r-i.org.

NADCAP ELECTRONICS AUDIT INSIGHTS (ETG)

Over the years, Electronics have become an integral part of products from small consumer items such as torches up to the plethora of parts and systems on-board today's aircraft. The contribution these systems make to the safety and reliability of the overall platforms is significant.

The Nadcap Electronics Task Group (ETG) was established in 2005 and is currently led by Chairperson Roger Bloomfield from UTC Aerospace Systems (Goodrich), supported by Vice Chairperson, Vijay Kumar from Lockheed Martin. Within the Task Group there are 10 Subscriber voting members and 14 Supplier voting members.

Much of their activity takes place at the Nadcap meetings that are held three times per year, but the Task Group recognizes that not all industry stakeholders are able to participate and benefit from the opportunities the meetings offer, such as learning, debating and networking.

Hence, the intent of this article is to assist to some degree, by providing insights into common non-conformances found in audits and sharing lessons learned regarding the Nadcap ETG audit experience.

Electronics Audit Criteria

Virtually every part of an aircraft will be either monitored or controlled by electrical or electronic systems. Failure of these systems is seldom predictable or visible, and the commodity has many opportunities for introduction of latent defects which can surface at any time during the system's life.

The Electronics Task Group works in three commodity areas and maintains three sets of checklists, all of which are based on applicable industry standards issued by IPC and using the IPC defined Class 3 criteria for high reliability products.

AC7119: Nadcap Audit Criteria for Printed Boards – the bare printed wiring boards on which circuit card

assemblies are produced. Based mainly on IPC-6010 series of specifications, AC7119 has a core checklist and slash sheets:

Slash Sheet	Title	Scope
AC7119/2	Flexible and Rigid-Flexible Printed Boards	Flexible and Rigid-Flexible Printed Boards
AC7119/4	Printed Board Personnel Qualification	Personnel qualification criteria as an alternate route to formal IPC certification
AC7119/5 (in development)	Radio Frequency Printed Boards	In development to address Printed Boards for High Frequency applications

AC7120 – Nadcap Audit Criteria for Printed Board Assemblies, primarily based on IPC-J-STD-001 and a number of sub-tier standards including IPC-A-610 and IPC-J-STD-033. AC7120 has a core checklist and slash sheets for specific processes.

Slash Sheet	Title	Scope
AC7120/1	Printed Board Assemblies Personnel Qualification	Alternate route to formal IPC certification
AC7210/2	General Soldering of Printed Board Assemblies	General hand soldering using soldering irons and solder pots
AC7210/3	Plated Through-Hole Technology (PTH)	Molten solder wave processes
AC7210/4	Surface Mount Technology (SMT)	Solder Paste and reflow

Continued on next page

NADCAP NEWSLETTER

NADCAP ELECTRONICS AUDIT INSIGHTS (ETG)

Continued from previous page

Slash Sheet	Title	Scope
AC7210/5	Mixed Metallurgy for Ball Grid Array (BGAs)	Mixing leaded and lead-free materials
AC7210/6	Lead-Free Soldering	Using lead-free solders
AC7210/7	Conformal Coating of Printed Board Assemblies	Coating types include Acrylic, Eurathane and Paraxylene types
AC7210/8	Encapsulation	Other than conformal coating
AC7210/9	Programming	For programmable components and assemblies performed at component or assembly level
AC7210/10	Final Testing	Manual and automatic test methods
AC7210/11	Repackaging	Conversion of termination finishes on components, normally from pure tin to Tin-Lead
AC7210/12 (in development)	Board De-panelling	Removal of sub-assemblies or images from assembled panels

AC7121 Nadcap Audit Criteria for Cable and Harness Assemblies, based on IPC/WHMA-A-620. AC7121 has one slash sheet for alternate methods of personnel qualification.

These checklists are available on eAuditNet under Resources / Documents / Audit Criteria / Electronics. In addition, although the PDF checklists are the official versions of the audit criteria, editable Word copies of checklists are also available in this folder. The Word documents are a useful tool for completing the self-audit but are unofficial copies, so they should be verified

against the PDF versions before use.

Additional information on the checklist requirements, question intent, acceptable objective evidence and other useful information is included in the Audit Handbooks available in eAuditNet under Resources / Documents / Public Documents / Task Groups / Electronics as shown below.

Documents

- Expand All
- Public Documents

Task Groups

- Electronics
 -  [ETG RAIL 15June2018](#)
 -  [IPC Standards Tree - OCT 2017](#)
 -  [Subscriber Matrix 18Jun2018](#)
 -  [US/International Electronic Standards References](#)
 - [ETG Supplier Welcome](#)
 - [b-fm blank](#)
 - Audit Information
 - Auditor Advisories(Not all Advisories are viewable to t
 - b-fm updates & revision
 - Handbooks & Guides

Items of more immediate concern or interest are published and circulated to Task Group members via Auditor Advisories. A summary of all Auditor Advisories can be found in the Task Group area of the Public Documents, which also contains other useful reference information and data presented during meetings.

Electronics Task Group Activity at a Glance

With so many different platforms and control systems, high reliability can only be assured by good control of processes and mitigation of risks. The Electronics Task Group regularly analyzes and reviews the results of audits and occurrences of non-conformances against checklist questions or process areas and assesses

whether questions are effective or need improvement.

The basis of the checklist requirements are the specifications issued by IPC for electronic manufacture and inspection. For aerospace applications, “Class 3” is required where acceptable deviations from optimum conditions are more onerous than those required for applications such as domestic appliances.

IPC continually updates their documents to address new technologies, and the Electronics Task Group needs to maintain awareness of these changes and update the checklists accordingly. For example, the Task Group recently introduced questions for new Solder Jet Printing processes to the AC7120. In addition, the Task Group is currently looking at robotic soldering processes for conventional through-hole soldering as these processes and equipment require additional controls but are significantly improving the consistency and reliability of soldering, reducing rework and variation.

The introduction of 3D laser automatic optical inspection equipment also enhances the ability to detect variation as well as defects or non-conformance of product. Other items for the future could include electronics printed on fabrics, and laser soldering.

AC7119 has added provision for the use of LED imaging as an alternative to current laser imaging.

AC7121 will need to add provisions for fiber optics cable assemblies.

So, for all these requirements, what are the most significant risks?

Top Non-Conformances found in Electronics Audits

The following topics consider some of the most common issues resulting in non-conformances during Nadcap Electronics audits.

The AC7120 core checklist has a section on the control and use of Moisture Sensitive Devices (MSD).

Over the years, the capability of plastics to perform in severe environments has improved significantly and many electronic components used today are plastic encapsulated. However, many of these are still designated as Moisture Sensitive and must be controlled in accordance with IPC-J-STD-033.

Adequate control starts with good preservation and packing of devices followed by use in controlled conditions. Packing must use certified bags with proven Water Vapor Transmission Rate specifications, desiccant material in sufficient quantity for the size of bag and humidity indicator cards to indicate that the parts have remained dry.

If parts have absorbed moisture, there is a high risk that, when soldered through a reflow oven, the moisture in the device will boil, expand and damage the integrity of the component. This damage may not be visible or readily detectable but will eventually result in device failure.

AC7120/2 considers general hand soldering. Consistency of solder joints requires consistency of materials and heat application. Several non-conformances are raised for inadequate control of soldering iron temperature where operators are able to increase temperature significantly. This action can increase the risks of bare board delamination, particularly if the boards are not adequately dried before soldering heat is applied, and solder/flux ‘spitting’ causing the formation of small solder balls which can be considered as Foreign Object Debris (FOD).

AC7120/6 considers lead-free soldering. Today, with the European and Chinese Restriction of Hazardous Substances (RoHS) and Waste in Electrical and Electronic Equipment (WEEE) regulations, many companies are transitioning to lead-free soldering but the use of Tin-Lead solder for certain high reliability applications is exempted and required by customers. For those using lead-free soldering, the

Continued on next page

NADCAP ELECTRONICS AUDIT INSIGHTS (ETG)

Continued from previous page

segregation of materials and assurance that cross contamination risks are minimized is important as a lead contaminated joint made with lead-free solder will fail in time and standard Environmental Stress Screening (ESS) methods may not detect this deterioration.

AC7120/7 considers conformal coating. Several types of coating are used in today's products and they all rely on board cleanliness (surface tension) to assure adhesion. Handling disciplines and control of the ambient work area conditions are critical. For some types of coatings, the presence of small quantities of silicones will result in failure.

Today, coatings are applied for two primary reasons. Firstly, the traditional coating is applied to provide some level of liquid splash protection (not moisture ingress protection). Secondly, and more recently, coatings are used as a mitigation against the formation of tin whiskers where pure tin terminated components or solders are used.

AC7120/11 is a new checklist for refinishing of component terminations. The introduction in 2006 of the Restriction of Hazardous Substances (RoHS) Act by the European Union, and later, a similar act in China, outlawed the use of traditional Tin-Lead solders, except for certain applications such as military systems. This has led to a reduction of components available using Tin-Lead terminations and an increase in Suppliers needing to procure the new pure tin terminated devices as well as re-process them both for tin whisker growth prevention and for process material compatibility.

Many Contract Electronics Manufacturers (CEM) and systems manufacturing facilities outsource refinishing processes to specialist houses. The introduction of the new checklist AC7120/11 makes it possible for these sub-tier houses to attain Nadcap accreditation.

The AC7120 core checklist and AC7121 require consideration and control of Electro-Static Sensitive Devices (ESD). The requirement is for facilities and

controls to prevent static discharge from operators or equipment.

As with Moisture Sensitive Devices, a susceptible component which receives an electrostatic discharge can sustain small damage which will 'grow' over time to the point of failure. This damage will be on the internal silicon chip and not detectable or inspect-able until destructive evaluation after the point of failure.

AC7121 issues are often similar to those found during AC7120 audits with materials controls, and soldering iron controls occurring regularly.

AC7119 is different to the other two core checklists as it is mostly based around the chemical processing and machining of laminates. These laminates are typically types of FR4 material, which are glass reinforced resins and thin copper layers.

The technologies today require precision machining and chemical processing, and more specifically the controls for production of blind and buried micro-via holes interconnecting selected layers in multi-layer boards. These features are very small and can only be evaluated by micro-section evaluation of the coupons using 2,000x magnification on well prepared samples. Such features cannot be assured without adequate control of processes, materials and process equipment.

Frequently found issues include the incorrect application of IPC-6012 test methods using prescribed test coupons placed on the manufacturing panels. These coupons are used to provide assurance of the compliance and robustness of boards.

Material certification is a major concern. Bare board materials are normally copper clad glass reinforced laminates encased in resins. The bonding layers are partially cured resin. Materials absorb moisture at different rates and the ability to bond under pressure can be affected, which then results in boards delaminating under subsequent soldering operations.

Counterfeit Parts Risks

One other area which needs consideration is the risk of counterfeit parts entering the systems. Electronics is a rapidly advancing technology and the aerospace market is very small when compared with automotive and telecommunications. Components designed into today's aerospace electronic systems are common to both these other industries and therefore are manufactured for only as long as the other industries demand the larger quantities. This results in frequent obsolescence and the opportunity for counterfeit infiltration of the market through both manufacture of fakes and recovery of used parts to clean and re-sell as new.

It is essential that Suppliers are aware of who they are procuring parts from. Best practice is to source parts from the original manufacturer or their franchised distributors. Approved stockists should be required to provide evidence of traceability to the original manufacturer.

The use of 'Grey market' sources should be avoided, but where absolutely necessary, Suppliers must take all reasonable steps to verify the integrity of parts procured.

The manufacture or production of counterfeit electronics material is becoming increasingly ingenious and difficult to detect. An example is the original 'Black-Top' process whereby device package tops were ground and re-marked is now often detectable by looking at the encapsulating plastic material grain structures under Scanning Electron Microscope level magnification.

AC7120 core checklist seeks to verify that all applicable risk assessment processes and detection systems are in-place and flowed down to approved distributors or test houses and that all staff have received awareness training.

Worldwide Electronics participation in Nadcap

At this time, of the 42 Nadcap subscribing companies,

only 14 list ETG in their subscription. Of these, only nine actively support the Task Group, some with multiple members, and only seven of them mandate certification of their electronics supply chain.

Some of the basic principles of the Nadcap Program are 'Equitable Contribution' and development of consensus standards for auditing and compliance to the international standards defined by industry customers. Almost all 42 subscribing companies will procure electronics in one form or another and fit the equipment to airborne systems, potentially benefiting from the work of the ETG and our team of specialist Auditors.

This article has little more than sampled the significant risks and, hopefully provided some insights into the complexity of electronics manufacture. The opportunities for latent defects or poor reliability are significant. Process control and reduction of variation together with continued risk assessment and mitigation for constantly developing materials and processes are key to assured product.

In order to be more effective, the ETG Task Group needs more participation from both Subscribers and Suppliers. After all, it is the Suppliers who are improving their processes and technologies, and raising the bar to meet the developing platform technologies. They also drive performance improvement and reliability, which is paramount to assure the safety of the systems we build and fly.

For more information, please do not hesitate to contact:



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NADCAP NEWSLETTER

NADCAP OPERATING PROCEDURE (OP) 1117 - AUDITOR CONSISTENCY

Nadcap Operating Procedure (OP) 1117 – Auditor Consistency transitioned from NOP-012 in 2015, aiming to provide a standard approach for Nadcap Task Groups to assess Auditor consistency and take action to improve that consistency.

This procedure is key in the development and constant improvement of the Nadcap program. Richard Blyth, Nadcap Management Council Chairperson and Engineering Manager for Rolls-Royce Plc, mentioned in the March 2018 Nadcap newsletter, *“As the Nadcap audit process utilizes the same questionnaires and auditors are trained to the same processes and procedures, consistency is a key aspect of the program we continue to improve.”*

OP 1117 applies to all Nadcap Task Groups and their Auditors, and the procedure specifies that each Task Group is responsible for reviewing its Auditors and working to improve their proficiency and consistency. Each Task Group must take several actions in order to keep improving the Nadcap program as a whole. Some of these actions are described below:

- Identify and maintain specific Auditor qualification and experience requirements in OP 1116 – Auditor Staffing, available on eAuditNet under Resources / Documents / Procedures and in their applicable OP1116 Appendix, available on eAuditNet under Forms / Nadcap Operating Procedures / OP 1116 Appendices.
- Develop and maintain training modules for new Auditors that are specific to the Task Group requirements. These requirements can be found in eAuditNet under OP 1114 Appendices or OP 1116 Appendices, following the same path as the one described in the previous bullet point.
- Consider the need for, and if required, develop and/or maintain Auditor proficiency assessments to determine the knowledge of Auditors for the processes in the scope of accreditation.
- Analyze the Standard Dataset, a key element in Auditor consistency – described later in this article –

and any additional data as considered applicable on an annual basis and identify any required actions to address concerns.

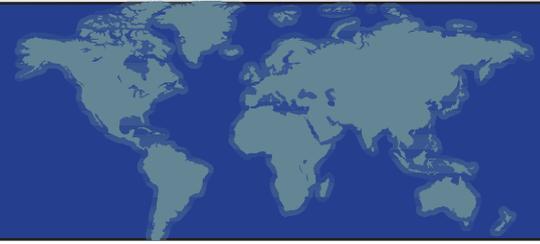
- Create and maintain an Auditor observation schedule. Annex A of OP 1117 – Auditor Consistency can be taken as an example. It is important to note that this schedule shall, as a minimum, include observation audits of new Auditors and those Auditors who are considered of concern, based on Dataset analysis as illustrated in Annex B.
- Carry out Observation Audits in accordance with OP 1118 – Audit Observer. The Observer is also strongly encouraged to observe any linked audits, such as Satellites, AQS, Etch, etc.
- Identify and implement improvements in Task Group documents, based on data analysis.

All these actions are summarized on a yearly basis in a report which takes OP 1117 – Audit Consistency, Annex C as a basis. This report is then shared at the first regularly scheduled Nadcap meeting each year with the Nadcap Management Council (NMC) Oversight Committee.

In addition to this report, each Task Group then updates specific dashboard metrics which are used to assess the Task Group performance in relation to Auditor consistency. These metrics include questions such as “Was the Auditor consistent in their application of requirements as compared to previous audits?” and “Has the Task Group identified Auditors that require observation for the calendar year?”

Auditor consistency is also assessed on an annual basis by PRI staff directly. The aim of this approach is to identify any issues that need to be discussed on a one-to-one basis. PRI tries to provide verbal feedback to Auditors that have been identified as being of concern as results are more positive and this also gives the opportunity for discussion.

As mentioned previously, the Standard Dataset is a key element of OP 1117 – Auditor Consistency. Below is a



JOSEPH G. PINTO RETIRES FROM PRI AT THE END OF 2018

description of the Standard Dataset and the information it contains, which is reviewed annually:

- Non-conformances (NCRs) per Audit or NCRs per Audit Day: used to identify Auditor variance in NCRs issued. Although there is no limit for number of NCRs, this metric is reviewed to highlight potential Auditors of concern who require further evaluation by the Task Group.
- NCRs per Checklist Paragraph: used to identify what paragraphs Auditors raise NCRs against. A lack of findings in a particular location may be indicative of an Auditor's lack of expertise in particular technology, or interpretation of a checklist question.
- Supplier feedback: reviewed to spot issues with core auditing skills, procedural compliance, interaction with Supplier personnel, audit/time management, and more.
- Auditor Evaluation, from eAuditNet: used to isolate issues with NCR writing or missed NCRs, Auditor compliance with procedures, and Task Group expectations.
- Observer feedback: used to identify/confirm weaknesses with auditing skills and Nadcap requirements. Further explanation is given in the March 2018 Nadcap newsletter, available on the Nadcap homepage on the PRI website.

Finally, OP 1117 – Auditor Consistency is among the key procedures of the Nadcap program as it is via this document that PRI endeavours to assure that all Nadcap Auditors are consistent in their assessments, so that Suppliers and Subscribers are audited in the fairest way possible.

For more information on OP 1117 – Auditor Consistency, please contact your Staff Engineer or Justin Rausch.



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Joseph G. Pinto joined the Performance Review Institute in 2010 as its third Executive Vice President and Chief Operating Officer. During his tenure, PRI fulfilled its mission of ensuring quality improvements throughout the aerospace supply chain; and the Nadcap program grew both in scope and breadth:

- The annual number of Nadcap audits conducted grew by 34% — 23% in the Americas sector, 27% in Europe and an 109% in Asia;
- Four new Nadcap commodities were initiated— Nonmetallic Materials Manufacturing (NMMM), Measurement & Inspection (M&I), Metallic Materials Manufacturing (MMM), and Aero Structures Assembly (ASA);
- Six additional companies became Nadcap Subscribers — three from Asia (COMAC, Mitsubishi Heavy Industries, Ltd) and Singapore Technologies Aerospace Ltd) and three from the Americas (Harris Corporation and NASA from North America, and Embraer SA from South America); and
- 89% of Nadcap accredited companies reported quality improvement in the area(s) related to their Nadcap accreditation(s) in the Global Supplier Survey in 2017;

Joe's legacy will be a strengthened Performance Review Institute and a more robust Nadcap Program that always places the needs of the customer at the center of business.

PRI engaged Coleman Search Consulting and is in the process of seeking an Executive Vice President and Chief Operating Officer successor.

If you are interested in this opportunity, or know an outstanding leader who may be interested, please contact Jeff Dressler, Managing Director at Coleman Search Consulting, at jtd@colemansearch.com.

NADCAP NEWSLETTER

EAUDITNET: BEYOND THE AUDIT

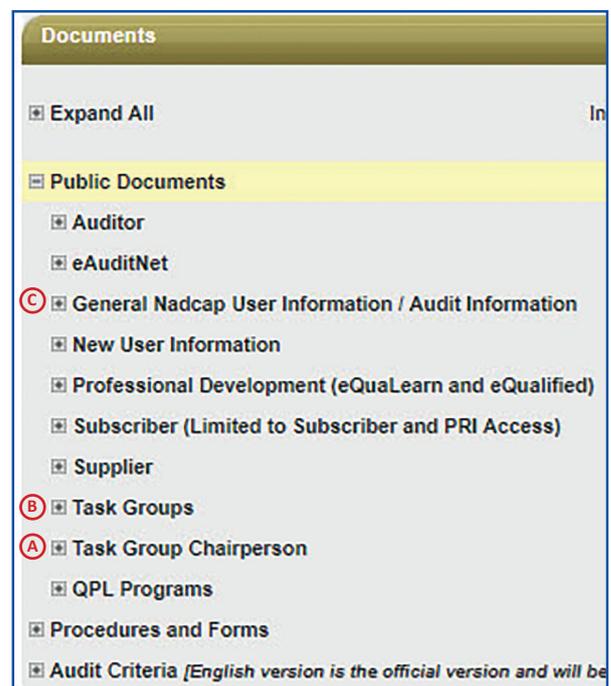
eAuditNet was created in 2003 to assist Auditees through their Nadcap audit(s) more smoothly and ensure the Nadcap program remains cost-effective. Transitioning from a paper audit process to a digital audit process made it more efficient and easier for Auditees to schedule, prepare and carry out their Nadcap audit(s) including the Task Group Review. Additionally, Auditees can access their audit data from at least the past six years.

While this is eAuditNet's primary purpose, it has also evolved into a tremendous resource for Nadcap-related information over the years. This article aims to highlight how eAuditNet can be used to gain insights into the industry itself as well as to help companies identify useful resources to support the Nadcap accreditation process.

Public Documents

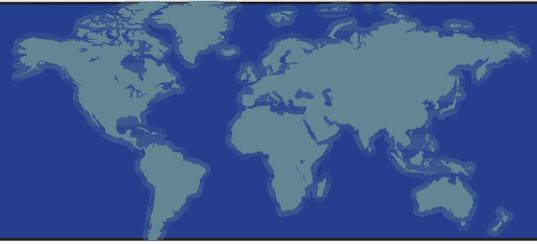
Three areas of eAuditNet are discussed here. Public Documents is a good place to start. Available under Resources / Documents / Public Documents, this section contains useful documents to help Auditees make the most of their Nadcap accreditation(s).

1. The Task Groups sections **(A)** offer insights beyond the audit itself. Most of the Task Groups publish "Top NCR report", such as Chemical Processing, Heat Treating, NonDestructive Testing or Welding. These reports can be used in comparison to your company's Nadcap audit performance. For example, if you had a successful Nadcap audit without any NCR(s) listed amongst the top ones, this represents a competitive advantage. In other words, your company went successfully through the Nadcap audit and avoided the most common mistakes made by Nadcap Auditees.
2. The "Nadcap Business Development Tool", available under Public Documents / Supplier / SSC Documents **(B)**, is a great resource when it comes to making the most of your Nadcap accreditation.



It explains the benefits of promoting your Nadcap accreditation and details ways to do so, from offline to online promotion as well as events and internal communication.

3. Under General Nadcap User Information / Audit Information **(C)**, the "Audit Communications Kit" takes you through the crucial steps towards achieving a successful Nadcap audit. Sent to each Nadcap Auditee as soon as a Nadcap audit is scheduled, the Kit highlights the key Nadcap Operating Procedures (OP). It also refers to documents to help Auditees better understand the Nadcap program as a whole, such as the "Introduction to PRI/Nadcap", and suggested ways to promote your accreditation, such as "Nadcap accreditation press release templates" or "How to Promote Your Nadcap Accreditation". Aware that the Nadcap program uses many acronyms, PRI has also developed a "PRI Aerospace Dictionary" – also available under General Nadcap User

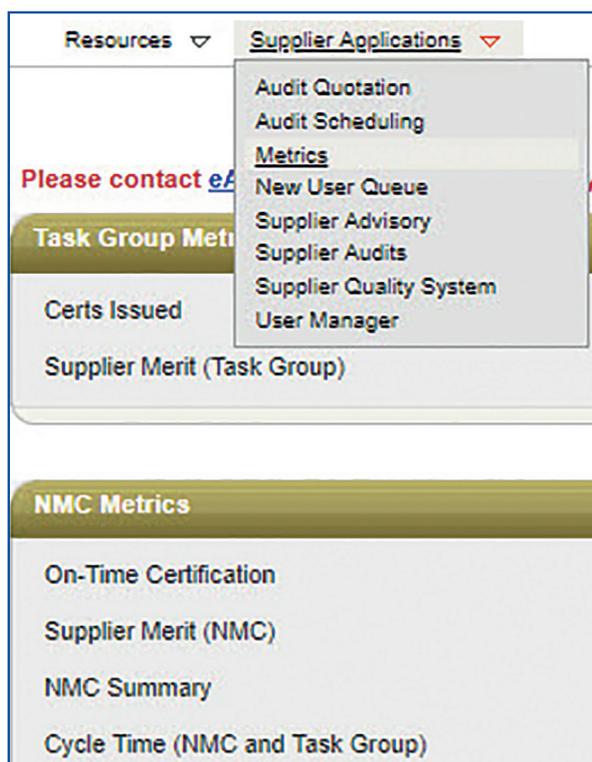


Information / Audit Information – to assist Auditees in understanding Nadcap driving documents, and especially Operating Procedures.

Metrics

Metrics, accessible under Supplier Application / Metrics as shown below, is the second area within eAuditNet which Auditees can use to gain information about the Nadcap community.

The “Supplier Merit (NMC)” metric – which can be analyzed by commodity and sector – shows, over the past 24 months, the percentage and number of Suppliers currently on Merit status as well as the ones eligible for Merit. If your company has been on Merit for the past two years and the percentage of Suppliers on Merit has decreased over the same period, this data can be used



to show that your company is among the top performers within its Task Group audit results.

“Cycle Time (NMC and Task Group)” can be used with the same purpose as the “Supplier Merit (NMC).” Cycle Time shows the average, maximum and minimum time needed by Auditees to go through their audit, from the first day of the actual audit to the appropriate Task Group review, granting accreditation.

This metric – which can be analyzed by commodity, audit type, sector and time component – is a great tool to promote your company’s performance during a Nadcap audit. For example, a company which had a successful Nadcap Heat Treating (HT) audit and gained accreditation in 40 days in May 2018, has a cycle time below the average of 47 days. In other words, this company outperforms the Nadcap average cycle time needed to complete a successful HT audit and, can use this fact in promoting their Nadcap accreditation.

Qualified Manufacturers List (QML)

Finally, the Qualified Manufacturers List (QML) is available under Resources / Aerospace QML. This tool is particularly useful when looking into business development opportunities as it provides data about all Nadcap Auditees. For instance, global and regional information is available about companies holding similar Nadcap accreditation(s). This can be used to determine whether working toward achieving a Nadcap accreditation for a new commodity would be beneficial or not depending on the volume of competition.

It can also be used to find companies that could help you win new business by working together. The QML is currently being improved and a new version will be released in 2019. This newsletter will display an article dedicated to the new QML after its release.

If you have any questions or suggestions regarding eAuditNet, please contact eAuditNetSupport@p-r-i.org

NADCAP NEWSLETTER

NADCAP SUPPLIER SURVEY PRELIMINARY RESULTS

In 2017, the Nadcap Supplier Support Committee (SSC) conducted its biennial survey of the global Supplier base. Issued every two years since 2003, the 2017 survey is the most recent version and the purpose of this article is to share some preliminary results.

The primary objectives of this survey are to gather information to improve the Nadcap program from a Supplier perspective; and to further support the Supplier efforts for the benefit of all stakeholders. Responses are used to identify and consolidate the strengths of the program, as well as target opportunities for improvement.

As Nadcap is a global program, the survey was available in multiple languages to encourage maximum international participation. Over 1,770 individual representatives from Supplier companies gave their input.

At the Nadcap meeting in June 2018 in London, UK, the results of the survey were presented, but, for those who were unable to attend, the highlights are detailed below.

With regard to Nadcap accreditation:

- 93% of the respondents stated that accreditation added value for their companies (the same as in 2015)
- 89% agreed that quality had improved at their companies (compared with 88% in 2015)
- 84% believed that holding Nadcap accreditation has improved their customers' satisfaction with their companies (a slight increase from 81% in 2015)
- 77% thought that being Nadcap accredited had helped them win new customers or projects (a slight increase from 75% in 2015)
- 73% stated that Nadcap had helped improve their process efficiency (up from 68% in 2015)

- 67% believed that Nadcap had contributed towards increased revenue growth (up from 63% in 2015)

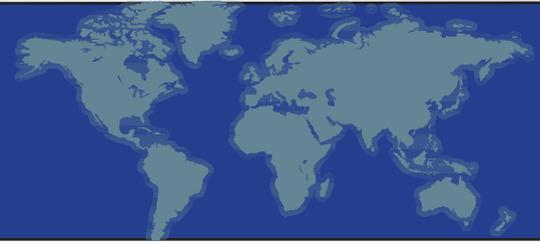
As indicated, the results either improved or remained constant compared to the previous global Supplier survey in 2015.

Another significant and positive figure from this survey relates to escapes: 75% of respondents said that they saw a reduction in product escapes to customers. In other words, 75% of the individuals who took the survey confirmed that they saw less non-conformances to engineering requirements that were discovered after the product was delivered to the customer.

Dale Harmon of Cincinnati Thermal Spray, and former SSC Chairperson, comments on why this biennial survey is crucial to the Nadcap program's development: "The SSC has been working diligently over the last 15 years to ensure that the Supplier base feedback and voice is heard as well as taken into account within the Nadcap program and its development. This survey is probably the most valuable means to achieve this as it provides us with "real, anonymous feedback", thus helping us better understand the experiences that the Nadcap Suppliers from all around the world go through. This survey gives us insights and information that we would not otherwise have access to."

Steve Payne of Praxair Surface Technologies is the SSC Secretary and led the 2017 Supplier Survey team. Delighted with the highly positive results, he added: "It feels great to be trusted by the SSC to lead the team analyzing the results. The experience is even better with the results of this year's survey, which is proof that our efforts are going the right direction. Thank you to all the Suppliers who spared some time to share their feedback."

In addition, the SSC is happy to announce Jeremy Needs



of Ultra Electronics Limited as the second Leadership Team member for Europe. Officially welcomed to the SSC at the London Nadcap meeting in June 2018, Jeremy commented that “being part of the Supplier Support Committee is a privilege, especially when joining the team at a time when they received great results from their most recent Supplier survey. I look forward to working with the SSC and more specifically in collaboration with Arno Tölkes of Euro-Composites, my fellow European SSC Leadership Team member, to support the European Supplier base even further.”

Finally, Joseph G. Pinto, Executive Vice President and Chief Operating Officer of PRI, added: “I reiterate my intention to make the Nadcap program as much for the Suppliers as it is for the Subscribers. Each time the Suppliers take advantage of the opportunities open to them to participate in Nadcap, we all get closer to this vision. I also wish to add my thanks to the 1,770 individuals who took part in the survey. Every contribution does make a difference.”

The SSC 2017 Supplier Survey team, under Steve Payne’s leadership, is currently analyzing the responses in more detail to identify appropriate actions to support the Supplier base moving forward.

EAUDITNET - AS/EN/JISQ 9100 CERTIFICATIONS RENEWAL

Following the recent 9100 certification transition, and the related note in the March 2018 Nadcap newsletter, PRI requires Suppliers to upload their current quality system certification into eAuditNet.

In addition, Auditees should also make sure that their contact details in eAuditNet are current for efficient communication.

Please contact Susan Frailey, Aerospace Quality Systems (AQS) and Electronics (ETG) Staff Engineer, at sfrailey@p-r-i.org or call +1 618 615 4478 if you have any questions.

SPECIAL PROCESS SUBJECT MATTER EXPERTS WANTED

There are currently opportunities for aerospace special process subject matter experts to become Independent Contractors for PRI, conducting Nadcap audits on behalf of the aerospace industry.

For more information on Independent Contractor Auditor opportunities, go to www.eAuditStaff.com or contact Jennifer Eckels, Talent Acquisition Specialist – Independent Contractors, at jeckels@p-r-i.org or call +1 724 772 8579.

NADCAP NEWSLETTER

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