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Defense Contract Management Agency's Investigation
and Control of Nonconforming Materials

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Acronyms and Abbreviations

AARGM	Advanced Anti-Radiation Guided Missile
CAR	Corrective Action Request
CSI	Critical Safety Item
DCMA	Defense Contract Management Agency
GAO	Government Accountability Office
GCQA	Government Contract Quality Assurance
GIDEP	Government-Industry Data Exchange Program
NSD	Navigation Systems Division
PQE	Product Quality Engineer
QAR	Quality Assurance Representative
SBIRS	Space Based Infrared Systems
SCAR	Supplier Corrective Action Request



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March 9, 2012

MEMORANDUM FOR DIRECTOR, DEFENSE CONTRACT MANAGEMENT AGENCY

SUBJECT: Defense Contract Management Agency's Investigation and Control of
Nonconforming Materials (Report No. DODIG-2012-060)

We are providing this report for your information and use. We initiated this audit (Project No. D2011-D000CD-0264) because of a DoD Hotline complaint made in 2009 concerning the Defense Contract Management Agency's (DCMA's) actions following the discovery of nonconforming cables used in avionics systems produced by Northrop Grumman's Navigation Systems Division (NSD). We reviewed the hotline complaint and evaluated DCMA's actions taken to address the nonconforming cables. We also reviewed DCMA's current policies and procedures on investigating and controlling nonconforming cables for avionic systems produced by NSD. However, since the 2009 DoD Hotline complaint, there have not been any nonconforming cables identified.

The Hotline complaint included allegations related to the cables that Rapid Manufacturing (Rapid) produced for NSD. We determined that DCMA officials took appropriate actions to address the nonconforming Rapid cables. Specifically, DCMA issued three corrective action requests (CARs), notified customers, and conducted an evaluation of Rapid's cable production to validate the corrective actions NSD took. According to DCMA-Los Angeles officials, they conducted reviews of suppliers based on contract administration delegations, work priorities, and critical safety items (CSIs).¹ In addition, the DCMA-Los Angeles Quality Assurance Supervisor stated that her office had not followed the Government Contract Quality Assurance (GCQA) surveillance plan as directed by DCMA policy because of limited personnel resources.

Audit Objective

Our overall objective was to examine DCMA's investigation and control of nonconforming cables used in avionics systems. Specifically, we determined whether DCMA adequately monitored and evaluated nonconforming cables used by NSD. Our review determined that DCMA and NSD addressed and resolved the Rapid cable problem and that there have not been any nonconforming cables since the Hotline complaint. As a result, this memorandum discusses the actions NSD and DCMA took to correct the nonconforming cables and also addresses DCMA's oversight of NSD's cable suppliers.

Background

NSD provides electronic systems and products for defense, civil, and commercial markets. These electronic systems include gyroscopic inertial navigation systems, which calculate the

¹ CSIs have characteristics that in an event of failure would likely cause serious injury or death to the user or catastrophic failure of a major platform; for example, aircraft. CSIs are determined by military service Engineering Support Activities, not by DCMA.

position of aircraft, ships, and missiles. NSD used cables produced by Rapid in these inertial navigation systems. Rapid is an electronics manufacturing company that specializes in custom-designed wire and cable harnesses, electro-mechanical assemblies, and box-build assemblies for original equipment manufacturers.

NSD officials considered Rapid cables as low-risk, non safety-related items. According to NSD officials, using MIL-STD-882D, “Standard Practice for System Safety,” February 10, 2000, the probability of an adverse consequence from a Rapid cable failure was low because the aircrew would either detect the failure or, when undetected, the failure would not be hazardous to the aircrew. NSD officials concluded that there was an acceptable level of risk, and they did not have any safety concerns about the failure of a Rapid cable.

NSD’s Supplier Quality System Division in Woodland Hills, California, is responsible for purchasing and vendor surveillance. The DCMA-Los Angeles Contract Management Office is responsible for providing oversight of NSD’s Supplier Quality System. The actual production of the avionics systems is completed at NSD’s facility in Salt Lake City, Utah. DCMA-Salt Lake City, a command under the DCMA-Denver Contract Management Office, is responsible for monitoring NSD production at Salt Lake City.

Actions Taken by NSD and DCMA

NSD Initial Actions Addressed Nonconforming Rapid Cables

NSD officials initiated corrective actions when cable failures started to occur. An NSD official explained that the NSD Production Division at Salt Lake City discovered a high number of factory test failures in late 2007 and notified the NSD Supplier Quality team. Subsequently, the cable failures decreased, but then rose to an unacceptable level in March 2008. NSD officials identified Rapid nonconforming cables as the root cause of the failures in September 2008.

According to DCMA officials, NSD had already taken action to correct the Rapid cables before informing DCMA of the problem. Between September 2008 and December 2008, NSD officials took the following actions to rectify the Rapid nonconforming cables.

- The NSD Supplier Mission Assurance team conducted an audit at Rapid. The team identified process control deficiencies and that Rapid’s certification for soldering (J-STD-001C²) had expired in December 2005. Rapid continued to supply cables without a valid certification to NSD for almost 3 years. Rapid was recertified for J-STD-001C on October 17, 2008.
- NSD officials issued two supplier corrective action requests (SCARs) to Rapid; one for the process deficiencies and one for the lapse of its J-STD-001C certification.

² The J-STD-001, Revision C, “Requirements for Soldered Electrical and Electronic Assemblies,” describes materials, methods, and acceptance criteria for producing soldered electrical and electronic assemblies to ensure consistent quality levels during the manufacture of products.

- NSD officials issued a manufacturing stop order on Rapid cables, which they later elevated to a stock sweep. During the stock sweep, NSD officials temporarily suspended all shipments of products containing Rapid cables, and they selected, for review, a representative sample of all Rapid cable part numbers in stock.
- NSD officials assessed their supplier oversight program and found that NSD did not perform periodic audits of Rapid as required by NSD's own policies and procedures. They also found that NSD considered Rapid a certified supplier, which allowed the shipment of cables directly from Rapid to NSD's production facility in Salt Lake City without inspection before shipment. In addition, they found that NSD was not performing adequate oversight of Rapid and that the inadequate oversight of subcontractors was systemic throughout NSD operations.

NSD officials briefed DCMA-Los Angeles and DCMA-Salt Lake City on Rapid's nonconforming cables in November and December 2008, respectively.

DCMA Actions Taken Were Appropriate

DCMA officials took appropriate actions to address the nonconforming Rapid cables. After NSD informed DCMA about the nonconforming cables, DCMA issued three CARs, validated NSD's response to the DCMA-Los Angeles CAR, conducted an evaluation of Rapid, and notified the customers of the problems with the cables.

DCMA-Los Angeles issued one Level II CAR³ in December 2008; DCMA-Salt Lake City issued two Level II CARs in December 2008 and January 2009, respectively, to NSD. The DCMA-Los Angeles CAR addressed NSD's use of nonconforming cables when Rapid's J-STD-001C certification for soldering expired. DCMA-Salt Lake City's first CAR addressed NSD's consideration of the Rapid cable problem as a minor nonconformance. The CAR was issued because NSD's initial safety assessment of the nonconforming cables indicated that their effect on the LN-260 system⁴ was a safety issue, which led the CAR originator to consider the nonconforming cables as a major nonconformance. DCMA-Salt Lake City's second CAR addressed inadequate certificates of conformance that NSD received from Rapid. The CAR was issued because Rapid certified that its cables adhered to Rapid's own manufacturing and performance requirements rather than NSD's specifications. All three CARs required NSD to address the root cause of the deficiencies and take actions to correct the deficiencies.

DCMA-Los Angeles validated NSD's response to the DCMA-Los Angeles CAR and found that all NSD's proposed corrective actions and process improvements were effective and acceptable. As a result of the positive findings, DCMA-Los Angeles officially closed the CAR. However, the two DCMA-Salt Lake City CARs were not closed. According to DCMA-Salt Lake City officials, the originator of the two CARs was transferred to another facility before he was able to

³ According to the DCMA Guidebook, when nonconformities associated with a Supplier's Quality Management System, processes, or product characteristics are independently discovered by DCMA, DCMA is to notify the suppliers and request that they initiate corrective actions in accordance with contractual requirements. To notify suppliers, DCMA generates a CAR. The level of the CAR depends on the severity of the nonconformity and the level of supplier management visibility required to adequately address corrective actions.

⁴ The LN-260 system is a gyroscopic inertial navigation system produced by NSD.

officially close out the CARs. Nevertheless, to address DCMA-Salt Lake City's second CAR, NSD issued a SCAR to Rapid to correct the certificate of conformance deficiency.

NSD officials discussed their corrective action in the response to the DCMA-Los Angeles CAR, which was validated by DCMA. DCMA-Salt Lake City's first CAR addressing NSD's consideration of the nonconforming Rapid cables as a minor nonconformance did not require NSD to address actions taken to alleviate nonconforming Rapid cables, but rather, to consider the problem as a major nonconformance. In addressing the CAR, NSD officials reassessed the Rapid cables used in the LN-260 system and revised their safety assessment report. NSD concluded that there was an acceptable level of risk, and they did not have any safety concerns related to the failure of a Rapid cable. Although the two CARs issued by DCMA-Salt Lake City were not officially closed, DCMA-Los Angeles determined that NSD took appropriate corrective actions to address the nonconforming Rapid cables.

As part of the validation, DCMA-Los Angeles conducted an evaluation of Rapid in order to establish confidence in the cables being used in Government systems. DCMA-Los Angeles concluded that NSD's oversight at Rapid imposed sufficient controls that would significantly reduce nonconforming cables from being manufactured. In addition, the DCMA-Los Angeles administrative contracting officer sent a letter of notification to customers potentially affected by nonconforming Rapid cables. The notification included an explanation of the Rapid cable nonconformances and the actions taken by DCMA.

NSD's Corrective Actions to Address the CARs

In response to the CARs issued by DCMA-Los Angeles and DCMA-Salt Lake City, NSD officials took several corrective actions, including issuing a SCAR to Rapid, removing the "certified" status for all of its suppliers, inserting inspection points in Rapid's manufacturing process, increasing Product Quality Engineer (PQE) staffing and training, conducting quarterly audits, creating a system to flag supplier followup, developing supplier oversight process metrics, issuing a Government-Industry Data Exchange Program (GIDEP) Problem Advisory,⁵ and notifying affected customers.

NSD officials issued a SCAR to address the issue of Rapid providing inadequate certificates of conformance to NSD. NSD removed the "certified" status for all of its suppliers, including Rapid, to ensure that materials received from those suppliers would be inspected until their certification status could be re-verified. They also inserted in-process and final inspection points in Rapid's manufacturing process before accepting any product. In addition, NSD officials took steps to increase PQE staffing and ensure the PQEs were trained to conduct supplier surveys. Moreover, NSD generated a plan to conduct quarterly audits of its supplier oversight function. They also created a system to notify buyers and PQEs when supplier certifications, such as the

⁵ According to the DCMA Guidebook, a GIDEP Problem Advisory reports a problem with a part, component, material, specification, or process that has an unknown or low probability of causing functional failure. GIDEP is a cooperative activity between Government and industry participants to reduce or eliminate expenditures of resources by sharing technical information during research, design, development, production, and operational phases of the life cycle of systems, facilities, and equipment.

J-STD-001C, were due to expire. NSD also began developing metrics to assist management in the supplier oversight process.

Additionally, NSD officials issued a GIDEP Problem Advisory to thousands of Government and industry participants to report the nonconforming Rapid cables. The GIDEP Problem Advisory also addressed NSD's actions taken, including NSD officials' informing all affected customers of the nonconforming cables.

Current Cable Supplier Manufacturing Processes Exhibit More Control

A cable supplier, NewVac, had appropriate controls over the cable production. According to DCMA officials, NSD solicited additional cable suppliers for the inertial navigation systems using competitive procedures and stopped purchasing cables from Rapid for military systems. NSD selected two new subcontractors to supply cables, and during our site visit, we observed one of the new subcontractors, NewVac (a division of DCX-CHOL Enterprises). Our audit team, which included a mechanical engineer, conducted a facility walkthrough, observing NewVac's cable production procedures and the soldering of cables, which was a more complex soldering than required of the nonconforming Rapid cables. Based on our following observations, we determined that the new subcontractor had appropriate controls over its quality assurance process.

- Routing reports and cable assembly instructions were revision controlled, readily available, and visible at all workstations for employees to use.
- NewVac had an office with one employee responsible for filing and controlling copies of all technical documents and revisions.
- Routing reports included a stamped inspection and a copy of the J-STD-001C certification to support that the specialist who soldered the cables held a current J-STD-001C certification.
- Each employee who soldered the cables was a certified specialist with the J-STD-001C certification clearly displayed at each workstation.
- Products had manufacturing and expiration dates clearly marked.

DCMA Oversight of NSD's Suppliers

DCMA personnel primarily relied on NSD officials to perform oversight of their suppliers. Federal Acquisition Regulation 46.405, "Subcontracts," states that the Government is to perform contract quality assurance on subcontracted supplies or services only when required in the Government's interest. DCMA-Los Angeles personnel stated that they relied on NSD officials to perform oversight of Rapid because Rapid cables were not CSIs. DCMA-Los Angeles

personnel also stated that Rapid was considered a “certified” supplier,⁶ and the users had not returned any of the 6,000 Rapid cables that were fielded.

In addition, DCMA-Los Angeles personnel stated that they had limited resources, which were allocated based on contract administration delegations, work priorities, and CSIs. When we asked how they conducted reviews of subcontractors, DCMA-Los Angeles personnel stated that they performed a review of randomly selected supplier purchase orders. A purchase order for cables from Rapid was selected for review only once between 2004 and 2008, before the nonconforming cable problem arose. DCMA-Los Angeles personnel explained that they did not focus on Rapid before the cable problem arose because Rapid was a low-risk supplier and did not produce CSIs.

DCMA Resource Challenges

On November 3, 2011, the Government Accountability Office (GAO) released the report, GAO-12-83, “DCMA: Amid Ongoing Efforts to Rebuild Capacity, Several Factors Present Challenges in Meeting Its Missions,” which discussed DCMA’s efforts to rebuild capacity after years of downsizing. Staffing and budget reductions since the 1990s brought strains on DCMA’s workforce. According to the GAO report, since 2008, DCMA has been increasing its workforce, particularly in the area of quality assurance. Still, according to the report, DCMA has ongoing concerns about its ability to effectively carry out its quality assurance responsibilities because of workforce size and capability shortfalls. However, according to DCMA officials, while DCMA has been resource challenged in the past, the DoD has recognized these challenges and, to alleviate these constraints, has supported DCMA budget relief across the Future Years Defense Program. If DCMA’s FY 2013 budget remains as currently projected, adequate quality assurance personnel will be available to perform critical oversight planning and surveillance.

When we spoke to DCMA-Los Angeles officials about their quality assurance functions, they reiterated that, due to limited personnel resources, they conducted reviews of suppliers based on contract administration delegations, work priorities, and CSIs. We met with one Quality Assurance Supervisor whose responsibility included the quality assurance review of the NSD facility at Woodland Hills, California. She had 12 quality assurance representatives (QARs) assigned to her; two of them deployed to Southwest Asia. Thus, she had 10 QARs responsible for performing quality assurance reviews of over 120 suppliers under her purview. She assigned one full-time QAR to perform DCMA-Los Angeles’s review of NSD’s total workload, including inspections, technical reviews, and surveillance plans; however, this QAR also performed reviews of other suppliers as needed. According to the Quality Assurance Supervisor, she would shift resources based on existing work priorities.

According to DCMA-Los Angeles officials, two critical programs required significant use of their quality assurance resources. DCMA-Los Angeles is the lead office for the Advanced Anti-Radiation Guided Missile (AARGM) program, which includes CSIs, and it is the delegated contract administration office for the Space-Based Infrared Systems (SBIRS) High Component Program.

⁶ A “certified” supplier’s part did not require inspection because of the quality history of the parts being procured.

Furthermore, DCMA-Los Angeles had only one Supply Chain Specialist, who was responsible for providing supply chain oversight for over 630 suppliers. He stated that additional personnel for the supply chain function could only be added once the final policy for the supply chain management workforce was released and implemented. As of February 7, 2012, the final policy had not been released.

According to the DCMA-Los Angeles Quality Assurance Supervisor, her staff was unable to follow the GCQA surveillance plan for the NSD facility at Woodland Hills, California, as directed by DCMA policy because of limited personnel resources. The DCMA Guidebook, "GCQA Surveillance Planning," revised April 2010, states that quality assurance personnel are to develop risk-based GCQA surveillance plans. The guidance requires quality assurance personnel to use the surveillance plan for planning the appropriate surveillance activities.

According to the Quality Assurance Supervisor, DCMA-Los Angeles did not have enough staff to execute the majority of the surveillance plan. A temporary quality assurance specialist was to be provided for in-process reviews; however, as of December 31, 2011, the specialist had not yet been assigned. Even though DCMA-Los Angeles lacked adequate resources to perform all quality assurance surveillance activities noted in the plan, the Quality Assurance Supervisor said that there was appropriate oversight for NSD because her office conducted a Quality Management System audit every 3 years, and all activities identified in the surveillance plan must be completed by that time.

Internal Controls Over Nonconforming Cables Were Effective

DoD Instruction 5010.40, "Managers' Internal Control Program Procedures," July 29, 2010, requires DoD organizations to implement a comprehensive system of internal controls that provides reasonable assurance that programs are operating as intended and to evaluate the effectiveness of the controls. DCMA internal controls over investigating and controlling nonconforming Rapid cables were effective as they applied to the audit objectives.

Audit Scope and Methodology

We conducted this performance audit from August 2011 through February 2012 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

We reviewed allegations made to the Defense Hotline concerning NSD's use of nonconforming cables in the production of avionics systems. In addition, we reviewed DCMA's actions taken to ensure NSD no longer used nonconforming cables. We also reviewed DCMA's current policies and procedures on investigating and controlling nonconforming cables.

We reviewed DCMA surveillance documents and reports, DCMA CARs, and the corrective actions taken by NSD. In addition, we reviewed the Federal Acquisition Regulation and the DCMA Guidebook to identify policies and procedures on investigating and controlling nonconforming materials.

We visited DCMA-Los Angeles Contract Management Office and NSD (Supplier Quality) in Woodland Hills, California, and DCMA-Salt Lake City and NSD (Production) in Salt Lake City, Utah. We interviewed key DCMA and NSD personnel to determine whether the allegations about Rapid's nonconforming cables were addressed and resolved. In addition, we visited NewVac in Chatsworth, California, and while there, we interviewed key personnel to determine whether the new cables used in NSD's avionics systems were produced in a controlled environment.

Use of Computer-Processed Data

We did not use computer-processed data to perform this audit.

Use of Technical Assistance

We obtained the assistance of a mechanical engineer from the DoD OIG Technical Assessment Directorate to help validate whether NSD's current cable suppliers were producing cables in a controlled environment to ensure conforming cables were being used in NSD avionics systems.

Prior Audit Coverage

During the last 5 years, GAO and DoD OIG have issued reports discussing DCMA resources, quality assurance tests and surveillance, and quality problems related to parts, manufacturing processes, and materials across DoD. Unrestricted GAO reports can be accessed over the Internet at <http://www.gao.gov>. Unrestricted DoD OIG reports can be accessed at <http://www.dodig.mil/audit/reports>.

You can obtain information about the DoD OIG from DoD Directive 5106.01, "Inspector General of the Department of Defense," April 13, 2006, change 1, September 25, 2006; DoD Instruction 7600.02, "Audit Policies," April 27, 2007; and DoD Instruction 7050.3, "Access to Records and Information by the Inspector General, Department of Defense," April 24, 2000. Our Web site address is www.dodig.mil.

We appreciate the courtesies extended to the staff. If you have any questions, please contact me at (703) 604-9077 (DSN 664-9077).


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Inspector General Department of Defense