2011 Aviation Week
Program Excellence Award Submission
C-17 Globemaster III Sustainment Partnership
I. Program Overview

<table>
<thead>
<tr>
<th>Organization Program Name:</th>
<th>The Boeing Company, Integrated Logistics Division C-17 Globemaster III Sustainment Partnership (GSP)</th>
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<tbody>
<tr>
<td>Program Leader Name/Position/Contact information – E-mail, Phone</td>
<td>Mr. Gustavo (Gus) M. Urzua, Boeing Vice President/ C-17 GSP Program Manager Email: <a href="mailto:gustavo.m.urzua@boeing.com">gustavo.m.urzua@boeing.com</a> Office Phone: 478-929-5764</td>
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<tr>
<td>Customer: Organization/Name/Position/Contact information – E-mail, Phone</td>
<td>Globemaster Division, United States Air Force (USAF)/ Colonel Christopher A. Garrett, Chief, WR-ALC/GRG Email: <a href="mailto:christopher.garrett@robins.af.mil">christopher.garrett@robins.af.mil</a> Office Phone: 478-327-5647</td>
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<tr>
<td>Program Category</td>
<td>System Level Production/Sustainment Program</td>
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Program Background: What is this program all about? (No more than one page). Describe:
- The overarching need for this program
- History of the program
- The product that is created by this program
- Scope of work – original & updated
- Expected deliverables
- Current status of the program

Overarching Need: The Boeing C-17 GSP program guarantees a rate of C-17 operational availability by providing worldwide support services for the multi-national C-17 fleet, the backbone of military airlift.

Program History: The C-17 GSP program began as a U.S. Air Force lifecycle acquisition vision in 1998, requiring highly innovative support concepts. The result was a C-17 system-level performance-based contract structure that effectively incentivized Boeing’s behavior to perform, continually improve and deliver readiness.

Program Product & Scope: Boeing is fully responsible and accountable for total weapon system availability executing program management, sustaining logistics, material and equipment management, sustaining engineering, depot-level aircraft maintenance, engine management, long-term sustainment planning, Air Logistics Center partnerships, and support of foreign military customers.

Current Program Status: With over 230 C-17s in service, all C-17 customers operate the most reliable and technically advanced airlifter supported by the most effective sustainment contract in DoD history, C-17 GSP. In November 2009, the Secretary of the Air Force for Acquisition approved a 10-year Justification and Approval that will continue Boeing sole-source C-17 support from FY2012 through FY2021.

II. Value Creation = 20 points

| Value: What is the value, competitive positioning, advantage, and return created by this program to your: | Customer Value: C-17 GSP enables better buying power for our customers. C-17 fleet performance far exceeds other mobility platforms in availability and cost. In the performance period, government data reveals that C-17 support costs were reduced by approximately 16 percent while C-17 fleet Mission Capable rates averaged 85 percent – all during wartime operations, a growing C-17 fleet and new U.S. and international base stand-ups. One of |
| Customers – National interests, war fighter | |
Company – Strength, bottom line, and shareholders

Scientific/technical value (particularly for R&D programs)

Excellence and Uniqueness:
What makes this program unique? Why should this program be awarded the Program Excellence Award?

“Conservative estimates indicate Mil-AHM will reduce C-17 NMC- Unscheduled rates by 33% - this effectively adds five C-17’s to the fleet, a value over $1B. Through 2036, an additional $3.5B will be saved in man-hour, logistics costs and bring added revenue to AMC’s Transportation Working Capital Funds (TWCF).”

Mr. Lou Righi
Boeing Mil-AHM Technical Director

“The C-17 Virtual Fleet has leveraged airlift capability for the U.S. Air Force and other nations.”

Lt General Tom Owen
Commander, ASC

“The Virtual Fleet is all about affordability - extreme affordability, like none before.”

Mr. Trevor Burke
Team Leader, NATO Airlift

the many examples of GSP cost reductions is when Field Engineering and Technical Services teams provide more efficient maintenance solutions in the operational environment. In addition to an estimated FETS maintenance cost avoidance exceeding $21 million, GSP FETS teams provided over 32 thousand hours of informal training to maintenance personnel.

Company Value: C-17 GSP is one of Boeing’s highest performing defense programs. The GSP program is seen both internally and externally as the sustainment program benchmark. As recognized industry leaders, program experts regularly share best-practices designed to improve aircraft availability and lower customer support costs.

Scientific/Technical Value: C-17 GSP invests in research and development as a sustainment technology pathfinder. What began as a Boeing commercial aircraft application, the Military Aircraft Health Management prognostic tool was recently designated an Air Mobility Command C-17 requirement. Boeing has invested over $10 million in C-17 Mil-AHM development. When Mil-AHM is fully operational, it will be a C-17 maintenance game-changer. Boeing invested significant resources to start the S1000D Interactive Electronic Technical Manual format conversion. IETMs are environmentally sustainable and affordable, eliminating the need for paper reproduction and distribution costs. In December 2010, the USAF awarded Boeing a contract to provide IETMs to the C-17 fleet using the S1000D standard.

Excellence and Uniqueness: Break-through performance and innovation is the GSP program discriminator

Unlike other programs, C-17 airlift availability directly impacts all military branches and their ability to perform a multitude of wartime and humanitarian missions. Through the years, C-17 GSP has custom-built processes and tools designed to continuously improve C-17 supportability.

Unique to C-17 GSP is the “Virtual Fleet” spares and support model - all C-17 customers “buy-into” whole-fleet spares and support services, making the C-17 more affordable to own and operate, especially for smaller fleets. Like an airline, if a C-17 needs a part and one is available at or near its current location – it is provided on the spot.

Because of the value C-17 GSP brings to Boeing, its customers and the world, we believe the GSP program is worthy of the 2011 Aviation Week Program Excellence Award.
### III. Organizational Processes/Best Practices: (How do you do things) = 30 points

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<thead>
<tr>
<th>Strategic: Opportunity Management – Describe how your program has identified its operational and business opportunity, and manages this opportunity throughout the program’s life cycle.</th>
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<td>GSP’s opportunities are identified as a direct result of our customer’s most important requirements – C-17 readiness and affordability. GSP’s support strategy is strengthened by the flexibility found in a system-level, long-term Performance Based Logistics contract. The Boeing Long Range Business Plan process uses the Opportunity Data System to manage and track opportunity progress. GSP also monitors progress toward achieving its strategic goals through direct customer feedback and a regular battle rhythm of internal and external financial, risk and technical interchange meetings. Managing opportunities with a long-term C-17 life cycle perspective allows GSP to make improvements with time to realize a return on investments.</td>
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<th>Strategic: Strategic Supply Chain Integration and Cost Effectiveness Management: – Describe how your program is integrating its supply chain to assure visibility and adapting long-term cost effectiveness up and down the supply chain.</th>
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<td>As the Contractor-Inventory Control Point, GSP supply chain management allows the government to focus primarily on its critical mission. This strategy eliminates duplication of effort and provides a more responsive, cost-effective solution than multiple providers servicing each customer as a stand-alone entity. Forward integration via wholly-owned subsidiaries such as Boeing Defence Australia allows the C-17 supply chain to serve as the in-country interface for international customers with reach-back capability to the resources in the United States. These customers also benefit from existing import and export licenses and agreements that can be utilized for expanded efforts. Additionally, GSP’s Depot Partnering program strengthens the C-17 supply chain operation. The GSP PBL contracts support the 50/50 work share requirements under the Title 10 laws while traditional repair contracts ensure the availability of a secondary source of repair.</td>
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<th>Strategic: Operational Integration and Systems Engineering – Describe the challenges faced by your program in terms of integrating the system into its operational environment and its impact on systems engineering planning and management.</th>
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<td>On a daily basis, unexpected C-17 challenges arise that can shock the GSP support system – threatening to throw program resources off balance. GSP’s proven integrated focus is to remain agile and responsive, generating the velocity needed to make the right logistics decisions that do not sub-optimize other program functions. Either within the GSP normal program battle rhythm, or at a moments notice, the GSP Systems Engineering group provides program management with the necessary situational awareness to ensure that C-17 operations are optimized.</td>
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<th>Operational: Planning, Monitoring, and Controlling – Describe your planning and resource allocation processes. How do you monitor and review your program’s progress and make corrections to keep the program on track?</th>
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<td>Joint USAF/Boeing Management Structure and Reviews: The C-17 GSP program established a Combined Program Office at Warner Robins Air Logistics Center, Ga. in June 2010. The jointly-managed Boeing/USAF CPO utilizes Integrated Product Teams. The Boeing GSP Program Manager is the only known industry Vice President working daily behind the gates of a USAF installation. The joint IPT structure sets up a one-to-one management relationship, and daily interaction occurs to achieve</td>
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the goals of the program. Reviews are conducted quarterly with USAF counterparts to address program status; risk, issues, and opportunities; and monthly for schedule critical-path variance analysis and interim award fee assessments. The USAF and Defense Contract Management Agency representatives participate in weekly Program Management Meetings and have direct access to all information from these meetings.

**Program Management Meetings:** Using the “GSP PMM Dashboard” tool, program management, IPT leaders, and functional managers meet weekly to ensure program execution through:
- Weekly Performance Metrics – including suppliers
- Weekly Earned Value – recovery plans when appropriate
- Integrated Master Plan/Schedule execution
- Technical Performance Measures
- Risks, Issues, and Opportunities
- Help Needed – from all stakeholders

### Operational:

**Supply Chain and Logistics Management** – What processes, tools and relationship-building methods have you used to develop, refine and improve supply chain and stakeholder integration? Please indicate also methods used to analyze/fact-find regarding supplier proposals. This is one of the most imperative needs of our industry – please provide specific details and data that assisted you in gauging the effectiveness.

**Processes:** Flexibility to meet emerging customer requirements is built into all facets of the GSP supply chain operation processes, from forecasting and procurement to depot partnering and asset/inventory management. To analyze/fact-find and measure supplier quality, delivery, contract timeliness and affordability performance, GSP uses the Boeing Enterprise Supplier Tool. The BEST tool leverages Boeing’s vast commercial and defense supplier base to ensure GSP customers receive the greatest value possible. From 2008-2011, GSP supplier quality performance met or exceeded the 99 percent requirement.

**Tools/Metrics:** GSP uses the Boeing Spares Requirements and Allocation Model forecasting system that features a flexible spares leveling tool in which Boeing can adjust, or establish levels, based on fluctuating operational or maintenance requirements. As a measure of BSRAM’s value, GSP Issue Effectiveness (part available when needed) for repairable parts in the thirty-six month performance period averaged over 90 percent.

**Relationship Building/Metrics:** GSP understands that our customer commitments can only be realized by a strong partnership with our key suppliers. GSP maintains extensive two-way communications with its suppliers at all levels through weekly conference calls and regular performance management meetings. Supplier Program Council meetings are conducted quarterly to engage key suppliers in cost, schedule, and compliance issues.
Operational: System Integration, Testing & Reviews
Describe the activities and processes used to succeed in your system integration, and testing. How did you conduct system design and technical reviews?

A formal nine-phase change process is used to authorize and implement changes to the C-17 weapon system. It incorporates both Systems Engineering principles and concurrent engineering practices. Consequently, GSP support design plays an active role in the earliest phase of a new project. The C-17 “Support-To” plan includes all elements to be in place and ready to sustain the first aircraft delivered with a new capability. To verify all sustainment products are in place, GSP conducts System Sustainment Readiness Reviews and Functional/Physical Configuration Audits.

Operational: Risk / Opportunity Management
Describe the processes used to identify both risks and opportunity and to assure potential for both is addressed effectively. Please indicate any forward-leaning processes to support.

Risk/Issue Management: C-17 GSP uses the Boeing Opportunity Risk & Issue System tool to increase awareness of risk, issues and opportunities within the program. GSP IPTs systematically develop risk mitigation plans to lessen a potential issue’s likelihood, consequence or both. Risk, Issue and Opportunity board meetings are part of the GSP program’s battle rhythm. Additionally, a comprehensive monthly Joint Strategic Risk Management Meeting is held with all GSP customer and Boeing stakeholders.

Opportunity Management: Joint IPTs also identify opportunities, assess benefits, and develop achievement plans within BORIS for improvement in technical, schedule, and cost performance better than plan. GSP affordability opportunities are a program priority and are also tracked in BORIS. Internally, C-17 GSP business opportunities are managed within the Boeing Opportunity Development System database.

Forward-Leaning Processes: GSP focuses on leading indicator metrics so the program can implement actions to correct negative trends. One leading indicator metric is Maintenance Man-Hour per Flight Hour which illustrates the amount of time dedicated to maintaining the C-17. Throughout the program’s history, the MMH/FH trend has decreased (good). From 2008 to 2011 MMH/FH has been further reduced from 5.5 hrs to 4.5 hours. Additionally, the Program Management and Affordability IPT proactively leads Lean 10X and Value Stream Mapping events, then capture resulting affordability opportunities. Lifecycle cost analyses identify high cost drivers within the GSP program then target these areas as the best return on investment affordability prospects.

Team Leadership: Team Culture and Motivation
Describe how you created your team spirit and culture, and accomplished entire team integration and individual team member motivation.

The extraordinary product we support, and our reputation as a world premier sustainment program is a natural source of pride for all GSP teammates. Team integration is accomplished through various means of communication at all levels of the organization. The program manager shares successes, challenges and provides a strategic view of the program’s future during regular “All-hands” and employee round-table discussions. Both forums encourage...
two-way communication between management and employees. GSP’s quarterly “Quick-Turn” employee newsletter shares program highlights, employee accomplishments and service milestones. Employees are recognized by GSP leadership with several formal recognition programs including Employee of the Month, Boeing Pride Points and the Excellence in Quality award. A GSP cultural norm is the use of the “Yellow Card”, a badge extender named after the yellow card a soccer referee may show to a player warning of a rules violation. The “Yellow Card” lists C-17 program Operating Principles in five areas: Open and Honest Communication, Trust, Teamwork, Meeting Commitments and Embracing Change. If a customer or Boeing teammate feels that one or some of these principles have been violated, they pull out their “Yellow Card” and let it be known.

### Team Leadership: Lessons Learned and Knowledge Management

Describe how you collect lessons learned and best practices, and how they are shared with your team and company to improve performance. Also how are you capturing expertise and knowledge to assure availability over the life of the program?

Lessons learned are reviewed, evaluated, and applied throughout the change process. The GSP program effectively manages lessons learned using a formal Process-Based Management system driving continuous improvement. GSP also adopted the Boeing Program Management Best Practices process that regularly evaluates GSP’s processes against enterprise best practices. For example, C-17 modification lessons learned at the Boeing San Antonio, Texas maintenance depot facility were shared with the WR-ALC depot resulting in leaner operations and increased installation quality for the USAF, reducing average cycle time for mod installations by 21 percent.

### Team Leadership: Leadership Development

How do you develop team’s skills and build future leaders

Together with their manager, all GSP team members create an annual career development plan that establishes a personal roadmap combining formal training, career goals and special job assignments. GSP leaders have participated in the Boeing Executive Program and Program Management Workshops among other courses at the Boeing Leadership Center – a center of excellence where people from across Boeing come to learn, network, and hone their leadership skills. In addition, GSP lives the Employee Involvement culture, which enables employees at all levels to lead work teams. GSP is also involved with multiple specialized “high potential” and mentoring programs which identify and create opportunities for individuals who exhibit the potential for upward mobility in a leadership role.

### Best (& Next) Practices:

Identify your program’s specific Best Practices that you believe are unique, and could be shared with others and become industry’s Next Practices.

GSP maintains a C-17 global fleet performance network, a GSP-unique best practice designed to maintain 24/7 situational awareness of fleet health and readiness. The network uses a Boeing-funded, “GSP Program Management Web Portal” to maintain full visibility of all C-17 bases and their respective fleets. With each base having full visibility of the rest of the fleet, on-site Boeing personnel ask for and offer assistance whenever needed. Every duty day begins with a worldwide phone call to
C-17 GSP products and services are not new to our customers but are needed to enable expeditionary force projection and are best described as a “platform” offering. New generation improvements and upgrades are made to the existing C-17 weapon system using GSP sustaining engineering, program/configuration management, systems integration and touch labor. In the performance period, more than 1,000 different modifications were performed on the C-17 using the depot centers or at a C-17 operating base. These modifications differ in complexity from a “Class 2” Time Compliance Technical Order that does not change the design of the aircraft to a “Class 1” that has design changes incorporated. Some modifications only take one or two days to complete, others are highly complex that keep an aircraft in a depot center for nine months or longer. Heavy modifications take place in two primary locations, Warner Robins ALC, Ga. and Boeing’s San Antonio, Tx. facility. During the performance period, over two million labor hours were expended on aircraft block upgrades and Time Compliance Technical Orders. Depot modification performance is measured using the Depot Maintenance Scheduling Effectiveness metric, a measure of schedule flow accuracy. Jan 2008-Jan 2011 DMSE results averaged 100 percent effectiveness.

The GSP program’s technological uncertainty is medium to high technology. The C-17 is a highly advanced airlifter, incorporating state-of-the-art technologies in the cockpit, at the loadmaster’s station and throughout aircraft mission systems. As new C-17 avionics system requirements are introduced, operational risks are mitigated by using the Avionics Integrated Software/Support Facility to simulate C-17 aircraft operations in a laboratory environment. Any C-17 configuration change, or lack of change, introduces support uncertainties and risks that could affect supplier availability, obsolescence and logistics responsiveness. To address obsolescence, GSP, the C-17 Production program and USAF instituted the Diminishing Material Sources Action Team that uses industry and government tools to forecast support issues, then plan and execute proactive or corrective measures.
Identify the level of your System Complexity using the definitions below. Then explain how you are dealing with this level of complexity:

- An Assembly performing a single function.
- A Sub-system fitting within a larger system.
- A System – a collection of subsystems performing multiple functions.
- An Array – a “System of Systems”; a widely dispersed collection of systems serving a common mission.

The system complexity level for GSP is that for a system, an integrated collection of subsystems that perform multiple functions. GSP support system design integration brings a common support construct, philosophy and culture to a C-17 fleet having a wide range of configurations and individual differences. To deal with this level of complexity, GSP using the Global Reach Improvement Program, where every C-17 tail number is micromanaged as part of a specific block upgrade package. Block upgrades are a spiral development where later blocks include improvements not found in earlier ones. In 2010, five different block configurations were in active service, requiring support. In 2025, 18 block upgrades will have been installed on the entire fleet – achieving the goal to have a homogeneous, single configuration C-17 fleet. This type of long-term planning is an excellent example of GSP C-17 life cycle management and why long-term, multi-year PBL contracts work.

Identify the Pace and Urgency of your team’s effort using the definitions below. Then describe how you deal with the program’s pace requirements:

- Regular timing – no specific time pressures.
- Fast/Competitive – time to market is important for competitiveness.
- Time Critical – there is an absolute and critical-to-success deadline.
- Blitz – there is a crisis element driving the need for immediate response.

C-17 GSP’s pace and urgency directly correlates to warfighter needs, using the most efficient means possible. Regular timing applies to GSP’s mature processes such as regular technical order updates. Fast Competitive services include GSP’s “Speedline” aircraft modification process, where Recovery and Modification Services teams deploy to C-17 bases to install mission critical TCTO’s and modifications. GSP’s Time Critical pace kicks into gear when a C-17 is grounded anywhere in the world due to a maintenance or parts requirement condition. GSP supply chain management responds, on average, within 24 hours – exceeding the 48-hour requirement over 96 percent of the time. GSP prides itself on the ability to Blitz; this is demonstrated with the rapid deployment of RAMS teams into the Area of Responsibility to recover badly damaged C-17’s. The C-17 GSP Crisis Management Team process is also a highly-effective Blitz capability, immediately organizing all engineering and support functions around a potential fleet-wide critical issue. The joint USAF/GSP award winning CMT process has prevented grounding the C-17 fleet on several occasions.

C-17 GSP is a complex, multifaceted contract with inherent complexities requiring close collaboration to quickly identify and address issues. For example, to ensure there was no gap in sustaining the C-17 fleet, an Undefinitized Contract Action was needed for the FY09 GSP contract. UCAs transfer risk to the U.S. Government and results in no incentive for Boeing to perform efficiently, however, Boeing continued to perform to meet or exceed metrics. In 2009, a joint UCA Retirement Team was formed to definitize all outstanding contract UCAs. The team began with nine UCAs and as of January 2011, has...
definitized two worth over $210 million. Currently, all USAF GSP UCAs have been definitized and will not be used as a viable acquisition strategy for C-17 support in the future.

V. Metrics (How do you measure program's performance) = 30 points

(Note: We are not looking for $ results, but the relative percentage achieved. In particular indicate what specific metrics and data you are using that drive the program beyond standard measures of schedule, budget, and performance, and which have contributed to your program’s focus and its success.)

**Customer** – How do you measure the impact of your program on your customer and your customer’s satisfaction? Include a description of your metrics, as well as numerical evidence.

C-17 GSP uses a combination of formal and informal methods to measure customer satisfaction. The formal measures are Contractor Performance Assessment Reports and award fees. The annual CPAR grades performance in technical quality, schedule, cost control, communications, and program/risk management. In 2008, GSP was given some yellow CPAR scores due to the UCA issue described in the previous section. Since the UCA Retirement Team’s success, CPAR scores have steadily improved, with no yellow ratings in 2010. In 2010, GSP received 94 percent of the available contract award fee. Informally, we measure our customer satisfaction through direct feedback from flight crews, USAF acquisition personnel and senior Air Force executives.

**Performance** – How do you measure your program’s performance in traditional terms such as schedule, budget, requirements, and business results?

The GSP program measures schedule and budget performance using the Boeing Earned Value Management process and the Integrated Master Plan/Integrated Master Schedule processes. IMP/IMS encompasses disciplined processes and tools that effectively manage the program cost/schedule integration including the program’s performance measurement baseline, earned value assessments, variance analysis, and estimate-at-completion forecasts. Additionally, EVM reporting is required from major subcontractors. Cost and schedule metrics are reported weekly at the program management meeting.

**Preparing the Future** – How do you measure and assess the long-term contribution of your program to the corporation/organization?

After twenty years of supporting the C-17, GSP has proven the PBL business model is extremely effective. Though the program has a long-term history of success, GSP remains flexible to adjust its products and services based on customer needs. The 2009 10-year J&A is a testament to GSP’s future long-term business success. Financially, GSP’s Long-Range Business Plan is a 10-year business commitment to its parent division, Integrated Logistics. The LRBP is assessed monthly to ensure it is an accurate business performance forecast. With GSP’s PBL contract negotiated in multi-year periods, business performance is more predictable – this has allowed the company to invest in C-17 reliability and support process improvements. GSP’s financial performance and process innovations reveal Boeing is delivering the highest performance at the lowest possible cost.
**Team** – How do you measure and assess the impact of your program on your team development and employee satisfaction?

Employee survey results for 2009 and 2010 prove that C-17 GSP outperforms the industry in several key employee satisfaction elements, including:

- Encouraged to institute new ideas – 14 percent higher
- Well informed about expectations – 10 percent higher
- Job conditions allow productivity – 9 percent higher
- Boeing is a great place to work – 9 percent higher
- Clear understanding of customer needs – 8 percent higher

**Unique Metrics** – Describe any unique metrics you are using to measure your program’s progress and how do you focus it for outstanding success.

GSP is contractually bound to track and report several quality, cost and schedule metrics that exist to monitor program performance. In addition to contractual metrics, GSP tracks customer focus metrics – recognizing some customers want a higher awareness in areas that do not require metrics. An example of a customer focus metric is the supply chain Cannibalization rate. If a part is needed, one may be cannibalized from another C-17, creating a potential part supply problem and making the “donor” aircraft non-mission capable. The C-17 CANN rate is the lowest in military airlift at one percent. Other customer focus metrics include Dollar per Flight Hour and various availability metrics.

“Much of the RAF’s C-17 success has been as a result of the very close relationship between my engineers and the imbedded Boeing team, which provides exceptional technical support and advice to the Squadron.”

David Manning
Wing Commander, 99 Squadron