

1998

Malcolm Baldrige National Quality Award

Recipient



# Application Summary

**AIRLIFT &  
TANKER**  
P R O G R A M S



## BUSINESS OVERVIEW

The Boeing Company Airlift and Tanker Programs (A&T) designs, manufactures, and supports the aircraft that transport people and cargo safely throughout the world. Headquartered in Long Beach, California, A&T has approximately 9,000 employees; 91% are located in California, 7% in Macon, Georgia, and 1% at Charleston Air Force Base in South Carolina; the remaining 1% are collocated at various customer sites. A&T was part of the McDonnell Douglas Corporation from 1982 to 1997. In 1997, McDonnell Douglas merged with the Boeing Company, blending two complementary cultures; both focused on continuous improvement. Many A&T processes are now recognized as “Best-in-Boeing.”

The C-17 aircraft (Figure 1) is our primary product and accounted for 99% of our 1998 revenues. The C-17 transports oversized cargo to locations around the world. It was used to evacuate citizens to safety from a civil war in Liberia, move equipment and personnel from the United States to small airfields in South Korea, and fly hurricane relief supplies to the Caribbean. During the United Nations’ Bosnia peacekeeping effort, the C-17 flew one-fourth of the missions yet delivered half the cargo. It also brought nearly 4,000 people into Bosnia, including President Bill Clinton, who dubbed the C-17 “the world’s best moving van.”

**Figure 1. C-17 in Action**



HOLDS 22 WORLD RECORDS

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The C-17 development program began in 1982. Because we were on the leading edge of technology, we experienced significant technical problems, along with late deliveries and cost overruns. In the early 1990s, a time when jobs were scarce, the Department of Defense threatened to cancel the C-17 program unless immediate improvements occurred. We turned the program around by investing in our people, being process-focused and customer-driven, and by partnering with our customers, unions, and suppliers. In 1996, because of the C-17’s exemplary performance, we received the largest multiyear contract (\$14.2 billion) ever signed by the US Government. At the signing ceremony, Secretary of the US Air Force Dr. Sheila Widnall remarked, “The C-17 program has shattered decades-old paradigms of how we develop and buy weapon systems.” She also described the C-17 as the “most potent tool this nation has for shaping the international arena.”

We serve four major markets and three major customer groups. Our primary customer is the US Air Force (USAF) for whom we are currently delivering C-17 aircraft, C-32 VIP aircraft, and providing logistics support in addition to supporting the fleet of KC-10 tankers. We also provide C-40 special mission aircraft to the US Navy. We are also unique in our industry in how we partner with our government customers. They are an integral part of our team at all levels of the organization. We have continuous, real-time involvement with them in many areas, including product development, production, and service in the field. Our Leadership Team heavily involves our customers, suppliers, and unions in executing its leadership responsibilities to ensure we meet or exceed customer expectations. Principal requirements for our suppliers are quality, technical performance, delivery performance, affordability, and certification status. The complexity of our products drives a low production rate; therefore, our facilities are sized to produce up to 25 aircraft per year. Our tooling is sized to produce 15 aircraft per year, with over 125,000 different parts per aircraft. Based on customer orders, we currently produce nine aircraft per year; however, we are increasing our production rate to meet increased customer demand. Our Macon facility provides subassemblies. We also provide maintenance and support at customer locations.



**LEADERSHIP**

Our Leadership Team sets the company direction using our Integrated Planning Process (Figure 2-1). In doing so, they are strong role models in understanding and staying focused on stakeholder needs, requiring alignment of plans, empowering teams, analyzing performance, motivating our workforce, and continuously improving our systems and processes, including the Integrated Planning Process.

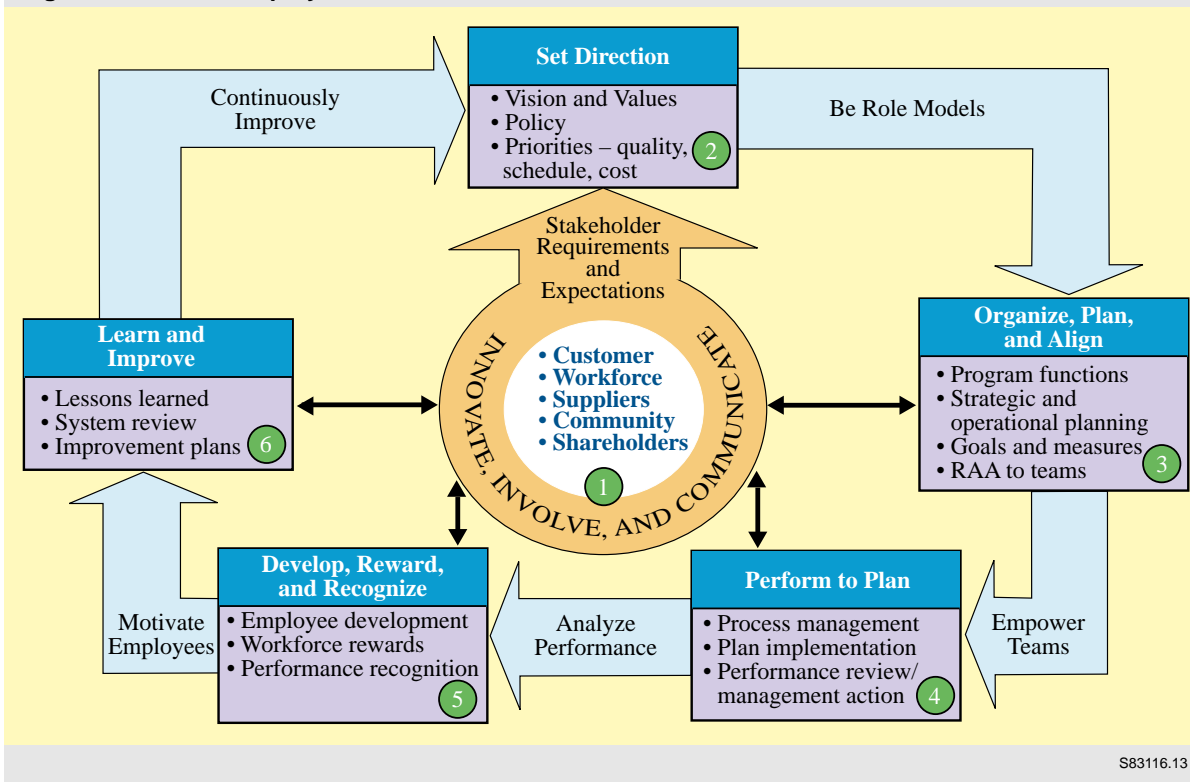
Our Leadership System is an outgrowth of our maturation as we changed from a traditionally functional hierarchy of silos to our current product- and service-oriented, customer-focused organization, committed to improvement through process management. The Leadership System is a series of interdependent steps that interact to enhance individual and enterprise performance (Figure 1-1). For ease of communication, we describe the system in sequential steps. It is a flexible and iterative system, however, that does not require sequential movement.

At the center of our leadership system are our stakeholders. In **Innovate, Involve and Communicate** ①, our senior executives work closely with stakeholders to understand their

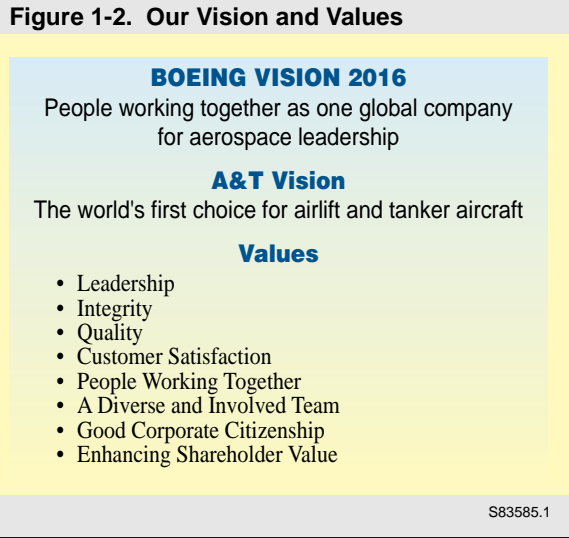
requirements and expectations. They spend up to 50% of their time working directly with the customer. Understanding and acting upon input from our workforce is another aspect of our leadership system. Leaders at all levels are visible and accessible to the workforce. Leaders gather input from our workforce through various communication methods and an enterprise-wide employee survey that provides feedback to improve our Leadership System. Interaction with suppliers to determine their expectations and requirements is facilitated by participation in a joint annual review. To understand the requirements and expectations of community stakeholders, we systematically seek the opinions of and interact with community leaders.

Based on stakeholder expectations and requirements, senior executives **Set Direction** ②, which encompasses our Vision, Values, policy and priorities. Our Vision and Values (Figure 1-2) integrate with the specific responsibilities of all levels of employees to achieve business excellence. Our leadership reinforces our Vision and Values through a wide range of communication channels and uses

Figure 1-1. Leadership System



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them as a basis for essential business decisions and actions. Communication methods include all-hands meetings, and roundtables, a Quality/Customer satisfaction hotline, focus groups, and team celebrations.

As we apply our values throughout the organization, we develop and apply the appropriate policy and then focus on the following priorities: **quality first, followed by schedule, then cost.** Managers at all levels communicate and reinforce our priorities through multiple methods, such as daily “stand-up” meetings, floor walks, and meetings with union and supplier representatives. To improve focus, the Leadership Team established four enterprise councils: *Resource, People, Strategic Business, and Process.* (Figure 1-3)

**Figure 1-3. A&T Council Focus**

Council	Primary Focus
Strategic Business	<ul style="list-style-type: none"> <li>• Integrated Planning Process</li> <li>• Market planning and goal setting</li> </ul>
People	<ul style="list-style-type: none"> <li>• Integrated People System</li> <li>• Human resources planning and goal setting</li> </ul>
Process	<ul style="list-style-type: none"> <li>• PBM methodology and deployment</li> <li>• Process improvement planning and goal setting</li> <li>• Information systems integration</li> </ul>
Resource	<ul style="list-style-type: none"> <li>• Resource allocation and management</li> </ul>

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Our executives then **Organize, Plan, and Align** ③. We are organized in a program management and functional management structure. Programs produce

products and services, and functions develop people and processes. Programs are further organized around Integrated Product Teams (IPTs), which include our customers and suppliers. This organizational structure is integrated with that of our major customers and helps us jointly deploy process management on our major programs. All team and individual goals are aligned, actionable, and link to our A&T Vision and direction. Additionally, we have line-of-site measures (e.g., performance goals throughout the organization, down to the individual employee) to enable us to **Perform to Plan** ④ more effectively.

In **Develop, Reward, and Recognize** ⑤, development of employees at all levels is facilitated through our employee survey, and our compensation strategies are designed to reward performance in areas that are important to the business and to reinforce team performance. Every person on the A&T team plays an important role in our journey toward continuous improvement, and we have a well-deployed employee recognition program, which reinforces our Values and supports customer expectations.

As evidenced in **Learn and Improve** ⑥, senior executives serve as role models for continuous learning and development. Various feedback methods are in place to provide opportunities for learning and continuous improvement of both the individual and the enterprise. Since 1992, we have conducted an annual assessment based upon the Malcolm Baldrige criteria, core values, and concepts to drive continuous improvement. In addition to assessing enterprise performance, our senior executives review their own performance using several methods. The Leadership Team also evaluates the effectiveness of individual elements of our Leadership System on a regular basis and reviews the total system annually.

**COMPANY RESPONSIBILITY AND CITIZENSHIP**

We recognize the community as an essential stakeholder. Its requirements and expectations are systematically taken into account during **Assess and Understand** (Figure 2-1) of our Integrated Planning Process. We meet or exceed the requirements for environmental and hazardous material protection through a comprehensive environmental planning process. The process includes analysis of laws and regulations, operations analysis of facilities and equipment, and annual risk assessments. We developed a comprehensive Occupational, Safety, Health, and Environmental Plan that establishes strategies, actions, and goals. The plan ensures that

we have the right organizational and management systems in place to properly manage risks and lead us to our desired future world-class state. We work in partnership with our government customer and have initiated several pollution-prevention projects. These projects have significantly reduced hazardous material risks to our customers, employees, and the public.

We proactively promote legal and ethical conduct with a multifaceted approach. In 1991, we chartered a Responsible Executive Program to promote legal and ethical responsibility. Our goal is 100% accountability for all elements. Employees receive mandatory ethics training shortly after hiring and in regular refresher courses. The Business Conduct and Ethics office is available for employees to discuss ethical dilemmas and report allegations of unethical conduct anonymously and with no fear of reprisal.

We have a systematic process for anticipating public concerns and assessing impacts to our community. Our Communications and Community Relations organization is responsible for improving our

community effectiveness and responsiveness. By working closely with local and state governments, we maintain our awareness of and proactively anticipate public concerns. We are then able to address issues that arise by leading and participating in governmental and professional task forces and maintaining a strong interface with regulatory agencies.

A&T executives and employees generously support the Employee Community Fund, which is a nonprofit employee-owned and operated organization that provides financial support to charitable organizations through payroll deductions. Our employees have given more than \$2.7 million over the last 4 years to organizations in the communities where our employees live and work. We support our community through the participation of employees and the leadership in organizations that link to business needs community focus areas, or regulatory/legislative areas. All A&T Leadership Team members are involved in some type of community activity.

## STRATEGIC PLANNING

### STRATEGY DEVELOPMENT PROCESS

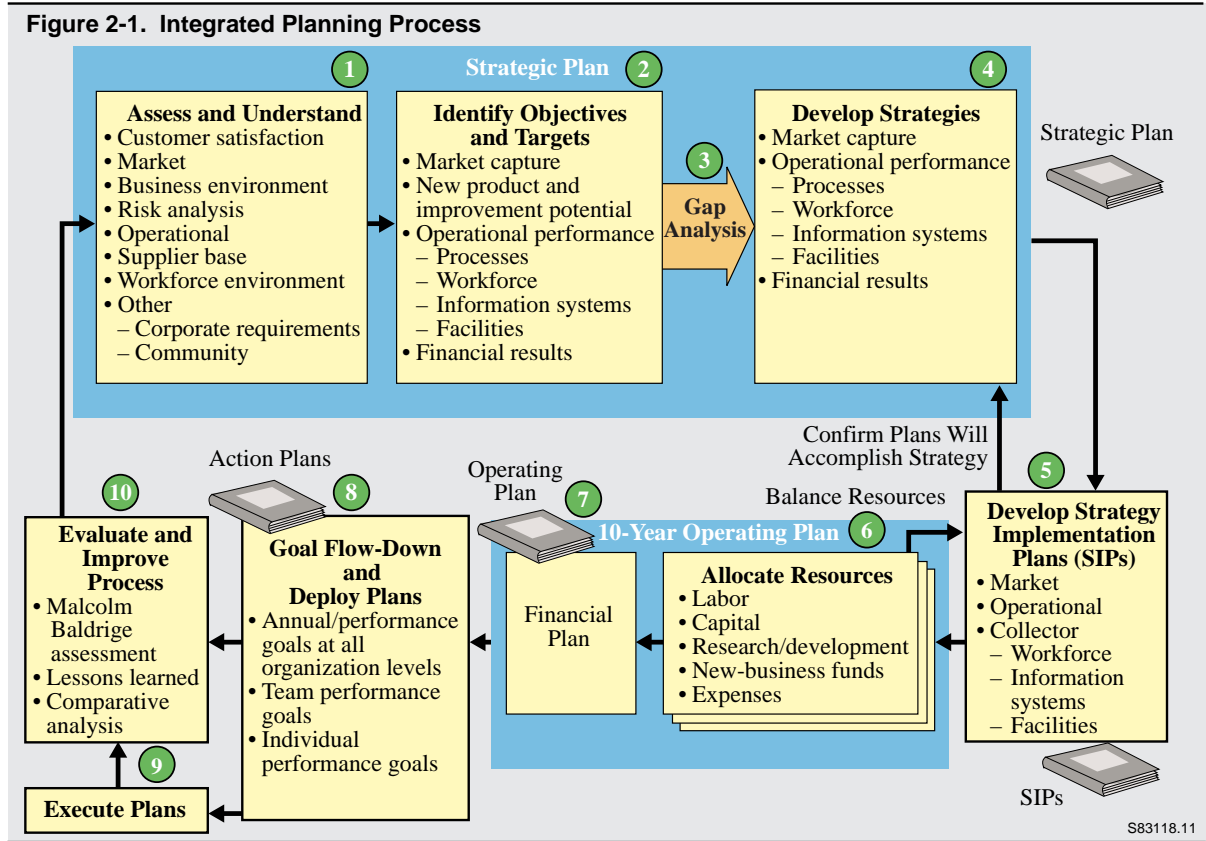
The Leadership Team sets strategic direction through our Integrated Planning Process (Figure 2-1). This grouping of processes focuses on developing and implementing strategies that use our Vision and Values to enhance customer satisfaction, improve processes, and increase our market position. Our human resources planning has evolved from being a stand-alone effort to being fully integrated with our Integrated Planning Process. During **Assess and Understand ①** of the Integrated Planning Process, a Workforce Environment Assessment defines key external and internal factors that influence the workplace and workforce.

A multifunctional planning team implements the process and represents all programs, processes, and technology areas. This creates involvement and buy-in at all organizational levels, ensuring successful action plan deployment. All planning steps are linked, producing one set of integrated resource-action plans. The planning process begins with the development of the Strategic Plan, which documents our strategic direction, ① through ④, and completes with an operating plan and goal deployment throughout A&T.

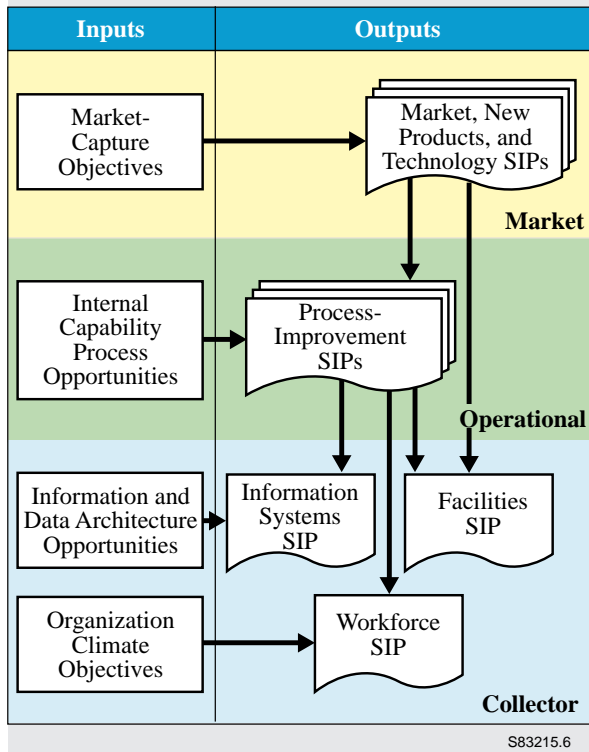
During **Assess and Understand ①**, we achieve an understanding of the environments that influence major business factors. These assessments use comparative and benchmarking data to help determine our competitive position and operational capabilities. The direction assessment is used to help **Identify Objectives and Targets ②**. Strategic objectives and associated short-term (1 to 5 years) and long-term (6 to 10+ years) targets are established, along with measurable performance requirements. In our **Gap Analysis ③**, we compare the current market and operational capabilities to targets. The Gap Analysis is used to define our actions and enable the planning team to **Develop Strategies** focused on closing the market and operational performance deficiencies. Strategies are translated into realistic, actionable plans by an iterative activity that integrates and prioritizes approaches with resources. This iterative process step, **Develop Strategy Implementation Plans (SIPs) ⑤** and ⑥ (Figure 2-2), ensures that the approved action plans incorporated into 5- and 10-Year Operating Plans are realistic and achievable.

⑦ After the SIPs are approved, executive-level action plans are developed and summarized in a





**Figure 2-2. Strategy Implementation Plans (SIPs)**

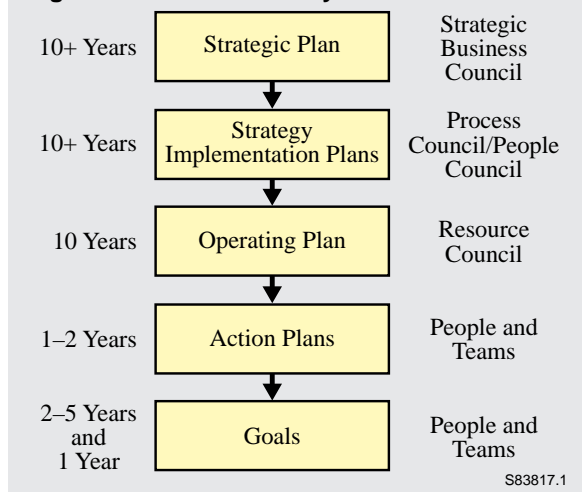


10-Year Operating Plan, along with our financial commitment to The Boeing Company. This plan forms the basis for annual individual and team performance goals, which are deployed throughout the organization by the **Goal Flow-Down and Deploy Plans** 8 process step. After goals are established, they are integrated into specific action plans for implementation. Throughout the planning process, the **Evaluate and Improve Process** 9 occurs at each step. We annually assess and improve our goal development and deployment through a structured process.

Throughout the planning process, an executive-level Strategic Business Council takes an enterprise view of the initiatives and balances improvement opportunities with resource allocation. A quantitative prioritization methodology is used to evaluate how well a SIP supports strategic objectives, expected payback, cost effectiveness of the investment, and contribution to process improvement

**COMPANY STRATEGY**

Our strategies, strategy implementation plans, operating plan, action plans, and goals are deployed as indicated in Figure 2-3. This deployment begins

**Figure 2-3. Plan Hierarchy**

with A&T's approval and subsequent publication of the Strategic Plan. Strategy implementation plans are reviewed and approved to ensure organizational integration and strategy linkage to detailed action plans. In addition, the operating plan documents, at the enterprise level, A&T's overall people, process product, and financial commitments to our workforce, Boeing, and our customers. As the planning process nears completion, goal flow-down occurs. This is a "catch ball" process, starting with A&T's senior executive and his direct reports and concluding at the individual-contributor level of the organization. Once goal flow-down is complete, performance reporting and review occurs as part of **Information and Analysis**.

## CUSTOMER AND MARKET FOCUS



### CUSTOMER AND MARKET KNOWLEDGE

Our customer relationship is one of our most important competitive advantages. In 1993, the US Air Force (USAF) and A&T determined that our mutual success depended on both groups working together as a single team. We work with our customer daily and improvement is continuous. We also meet at least once a year to systematically improve our relationship. Our daily relationship with the customer is built around a shared destiny through joint plans, goals, and reviews using shared data. We deploy the Integrated Business Acquisition Mega-Process (Figure 3-1) in five basic steps.

① We listen to the customer in several ways: (1) operationally, A&T and its USAF customer use a shared set of goals and metrics that are set regularly and reviewed daily, weekly, monthly, and quarterly; (2) we also frequently visit senior USAF executives and attend customer and industry conferences to understand customer levels of satisfaction and changing needs; and (3) we listen constantly through our joint teams, where team priorities, schedules, and resources are jointly managed on a daily basis.

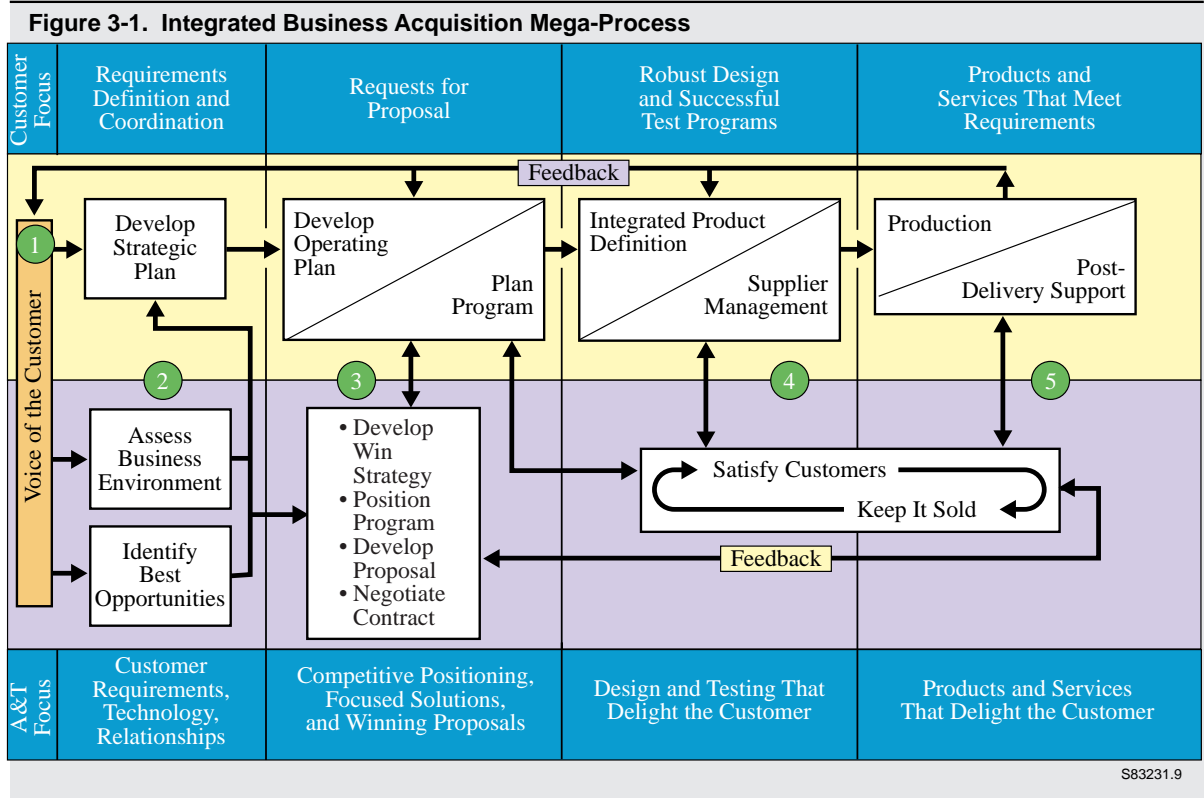
② We continuously conduct competitive, market, product, and customer analyses to identify the best opportunities for A&T to pursue. In addition, we participate in the development of a Business Environment Assessment, which produces short- and long-term forecasts of key strategic factors. To put A&T in a winning position, government-oriented program managers and Business Development personnel use a process to interact directly with key

Department of Defense, USAF, and foreign military executives to identify emerging customer needs that represent potential business opportunities. Once opportunities and associated assessments are complete, they are input into the strategic planning process.

③ We use four interrelated processes to competitively position, develop, and propose winning solutions to meet customer requirements. The four processes in this step are highly integrated and focus our efforts on winning with an integrated proposal, contract, operating plan, and program plan. This ensures technical capabilities, resource requirements, and financial commitments are consistent. Because we interact constantly with the customer and have strong, positive relationships across the entire customer community, we are able to constantly determine changing customer requirements and assess how well we are satisfying them ④ and ⑤.

We currently serve primarily one market, USAF airlift, and provide support for aerial refueling; however, within the USAF customer segments, we actually serve over 7,000 customers. We focus on this large population in the context of three customer segments: **owners, evaluators, and users**.

This segmentation is important because customer requirements and relationships frequently require tailoring by customer segment and by customer within each segment to ensure our processes support our teaming efforts with the customer. In addition, markets are segmented, based on military or commercial applications and whether the primary



market need is air cargo, in-flight refueling, derivative commercial aircraft, or post-delivery support of products and services.

We have over 100 people stationed with the customer and approximately 900 employees who are prepared to travel to remote sites on a 24-hours-per-day, seven-days-per-week basis. They support the C-17, C-32, C-40 airlift aircraft. This level of commitment is extraordinary for our industry.

We use a variety of media to obtain information in support of business acquisition. These include an external customer survey and several joint USAF and A&T assessment processes. Furthermore, we attend trade shows, customer-sponsored conferences, and program-specific meetings and belong to various industry associations. Customer retention and complaint data are augmented by an external customer survey to help rank customer requirements and concerns. Finally, our strongest approach for understanding customer requirements is through our organizational teaming with the customer, using process-based management (PBM) to address recurring and single-event improvement needs.

Our approach for assessing and improving our market focus and customer satisfaction has evolved with the C-17 program since 1993 (Figure 3-2). Our success at creating and improving customer

relationships through joint teams continues today and forms the basis for our future.

**CUSTOMER SATISFACTION AND RELATIONSHIP ENHANCEMENT**

Most of our customer access occurs through joint teams. These jointly staffed teams typically hold daily meetings, using electronic-conferencing technology. Teams participate in weekly

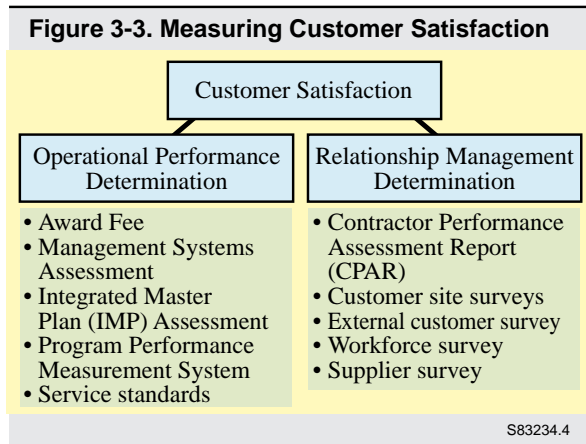
**Figure 3-2. Customer-Approach Improvements**

Year	Improvement
1994	<ul style="list-style-type: none"> <li>Joint teams formed</li> <li>Acquire Business and Satisfy Customers processes deployed</li> <li>Win Strategy Steering Committee formed</li> <li>Joint Award Fee and Contractor Performance Assessment Report processes implemented</li> </ul>
1995	<ul style="list-style-type: none"> <li>Joint Integrated Master Plan developed</li> <li>Joint Program Management System implemented</li> <li>Government Streamlining implemented</li> <li>Annual Customer Survey implemented</li> <li>Joint Award Fee and Contractor Performance Assessment Report processes integrated</li> </ul>
1996	<ul style="list-style-type: none"> <li>Joint team philosophy updated</li> <li>Annual Customer Survey improved</li> <li>Customer on Win Strategy Steering Committee</li> <li>Integrated problem management developed</li> <li>Strategic Planning and Acquire Business integrated</li> </ul>
1997	<ul style="list-style-type: none"> <li>Customer Satisfaction added to new-employee orientation</li> <li>Analysis Integration organizational restructuring</li> <li>Workforce and external customer survey correlation</li> </ul>

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videoconferences, monthly program reviews, and quarterly executive reviews. Frequent contact through our joint meeting structure has become a systematic process, encompassing complaint management and strengthening customer relationships through daily interaction. Our joint teaming approach has been cited by military and commercial customers as unique and unparalleled in the industry.

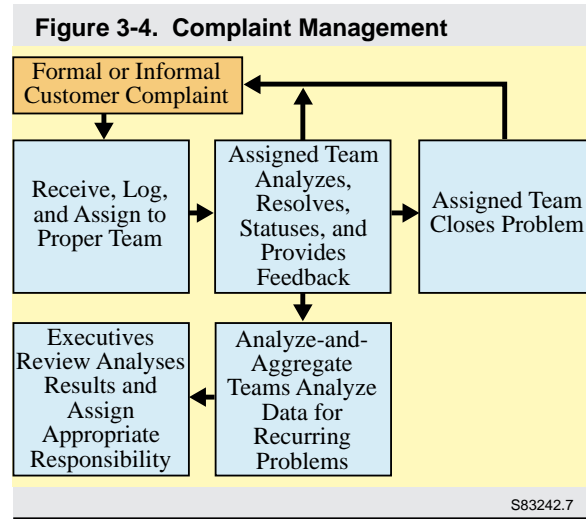
To support this highly interactive and team-oriented environment, we use a variety of measures to ensure that customer satisfaction remains high and complaints are addressed quickly (Figure 3-3).



Our approach assesses both operational and relationship components of satisfaction. The primary tools used are the Contractor Performance Assessment Report (CPAR) and Award Fee processes. These processes have been jointly tailored and aligned by the USAF and A&T to ensure that we have agreed-upon performance criteria for each review period, standard reviews, and strong linkage to PBM. These processes are integrated to ensure that satisfaction determination is consistent for both CPAR and Award Fee; in fact, Award Fee is a predictor of CPAR. The approach taken by the customer and A&T is cited as an industry Best Practice by the customer and is being modeled throughout The Boeing Company.

We use various methods to ensure that customer complaints and inquiries are handled properly and

that the customer receives prompt feedback. These methods include service standards, which are jointly set and linked to our processes. We proactively manage customer contacts and complaint resolution through our joint teams. This team approach facilitates quick response and immediate feedback regarding customer complaints. The approach used to manage complaints is shown in Figure 3-4.



Our teams' handling of complaints is facilitated by a systematic management meeting process that involves the customer as a partner. The process begins with a daily C-17 customer video conference, followed by a Long Beach A&T "stand-up" meeting. This is augmented with weekly customer meetings and video conferences, weekly Leadership Team and program reviews, and a joint quarterly executive review. These meetings have standard agendas, jointly established performance evaluation criteria, and formal tracking systems.

Teams with customer interfaces maintain logs of customer complaints, issues, concerns, and warranty claims. Their complaint-management assessments are correlated with the other customer-satisfaction data, which provides teams a means of assessing the quality of complaint management.



## INFORMATION AND ANALYSIS

### SELECTION AND USE OF INFORMATION AND DATA

Our Performance Management System (Figure 4-1) drives all that we measure at every level of the enterprise. The Integrated Planning Process (Figure 2-1) gathers requirements and expectations that result in a set of company performance goals, performance indicators, targets, and action plans ❶.

These company performance goals, indicators, and targets are flowed down to our various programs and functional organizations ❷ and shared with our customers and suppliers at each level ❸. Supporting performance measurements and goals for our programs and functional organizations are flowed down to their supporting teams, who incorporate these measurements and goals into their team and individual measures and goals ❹.

Our Performance Management System addresses five main categories of performance-measurement data and information that support our company goals:

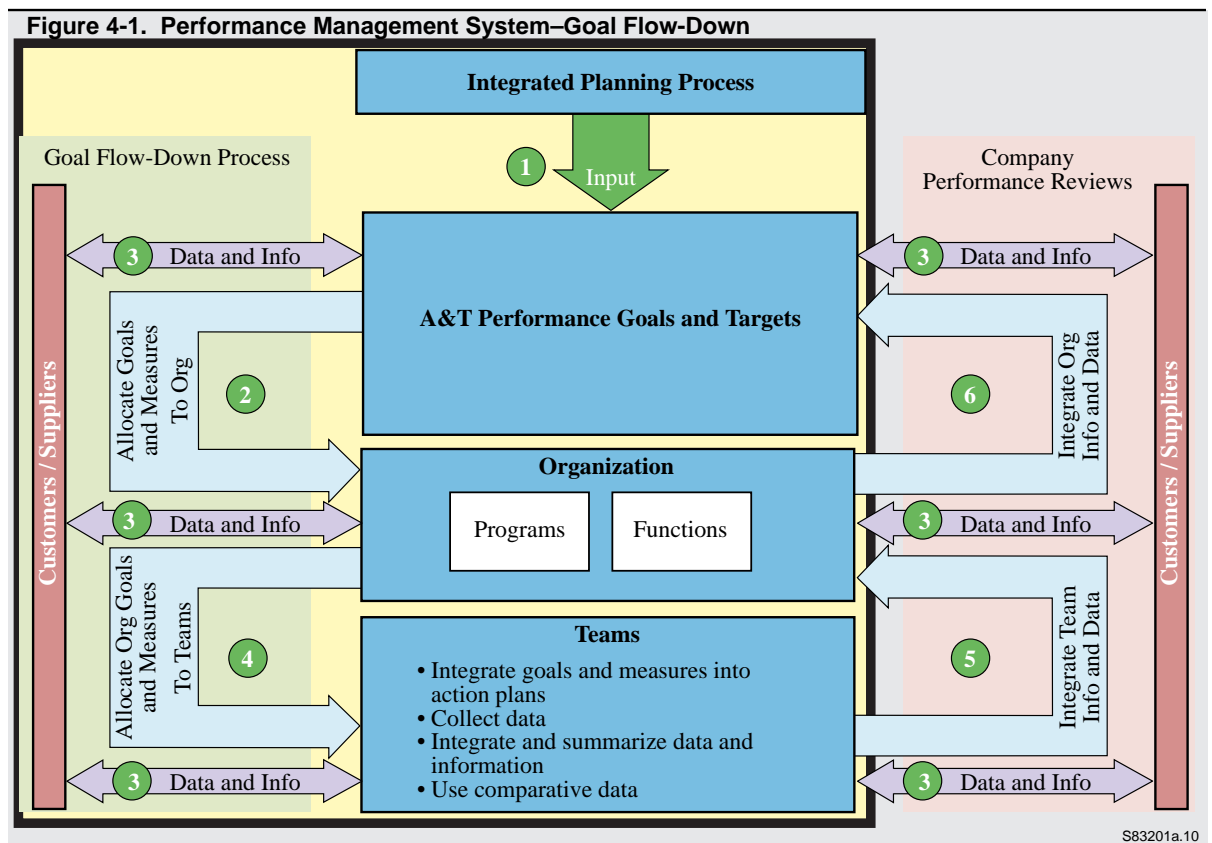
- Customer satisfaction.
- Program performance.

- Workforce effectiveness.
- Operational and process performance.
- Financial results.

These Performance Management System categories are an integration of data and information from our customers, teams, and suppliers. Data are analyzed, and actionable goals and measures are allocated to our programs and functions. Five criteria are used to select the data in accordance with our philosophy that data must be usable in the achievement of the following actionable program goals:

- Important to our customers.
- Effective in measuring performance.
- Effective in forecasting results.
- Actionable.
- Easily collected with integrity.

In addition to allocating goals and measures to programs and functional areas ❷, we share these data and information between our customer, our suppliers, and ourselves ❸. The data are analyzed, and supporting program measures are used to report progress toward achieving program goals. We achieve



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rapid access and reliability by reducing data redundancy and manual data transfer. We ensure data accuracy by continuing to improve our information infrastructure and our capability to capture data for localized use needs.

Our data and information, including their deployment and use, are evaluated, improved, and kept current with changing business needs through several means: Integrated Planning Process; senior executive review; program risk assessments; Process-Based Management (PBM); and annual reviews of our information technology. User satisfaction is determined through surveys, trouble-call responsiveness and closure data, and information system use measures.

**SELECTION AND USE OF COMPARATIVE INFORMATION AND DATA**

We determine comparative data analysis needs in two ways: First, the needs and priorities for comparative data are determined during the Assess-and-Understand ① phase of the Integrated Planning Process (Figure 2-1). Second, using our PBM methodology, process owners determine the need for process improvement (Figure 6-2). Our process owners select comparative data and information that will best help them determine superior process

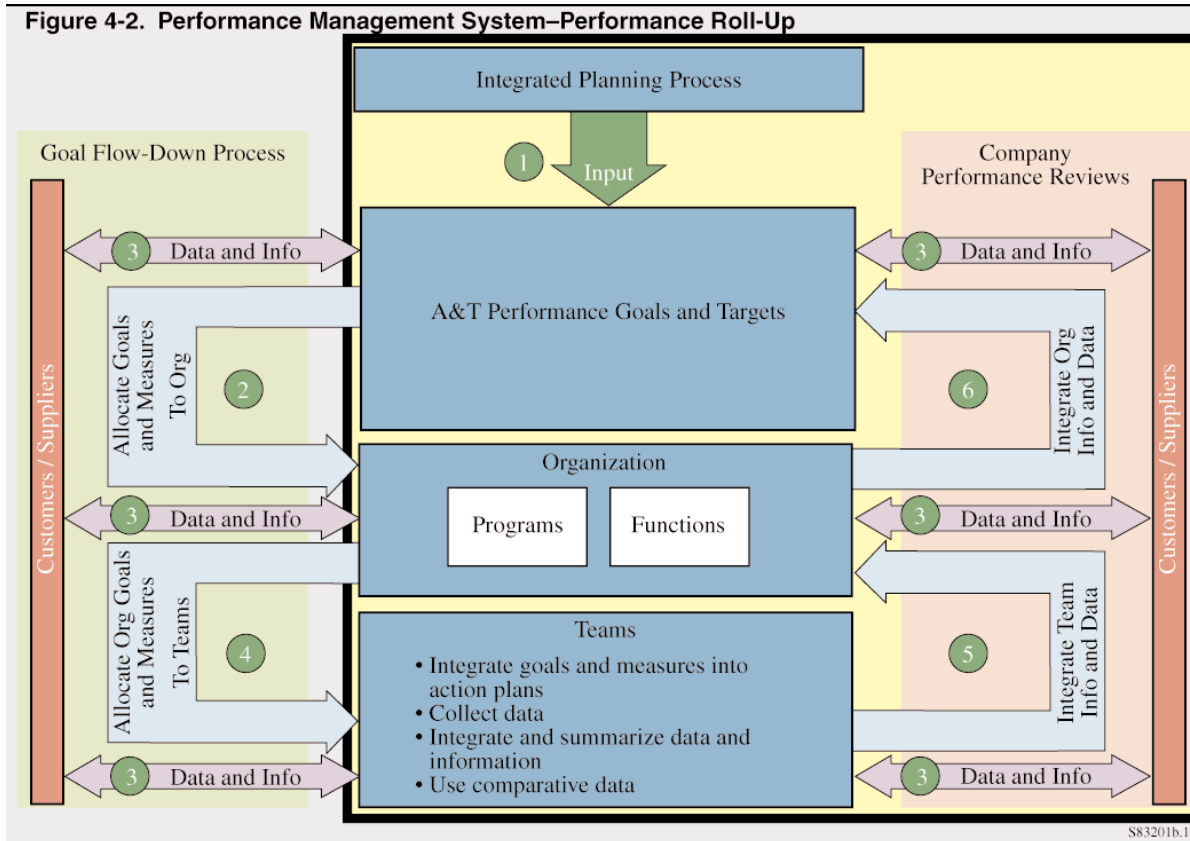
performance, areas for process improvement, and opportunities for setting stretch goals. Our criteria for seeking sources for appropriate comparative information and data from inside and outside our industry are that the sources must be:

- *Best-in-Boeing*—High-performing processes identified through various company-level councils.
- *Best-in-Industry*—Companies are identified in various benchmarking centers throughout the US, the International Benchmarking Clearinghouse, and our own Business Environmental Assessment.
- *World Class*—Leading-edge companies, winners of national awards, or those cited by customers, suppliers, and industry experts.

**ANALYSIS AND REVIEW OF COMPANY PERFORMANCE**

The systematic, regular reviews of our Performance Management System ensure that we regularly integrate and analyze performance data at every team level to assess performance to action-plan commitments (Figure 4-2).

Teams at each level regularly integrate and analyze their performance data and are responsible for achieving the goals established at that level. Information is then integrated to the next-higher team



level and analyzed; recommendations are made or action taken. This process continues until the data are integrated at the program or functional level ⑤ (Figure 4-2). Performance data are integrated at the company level and analyzed; recommendations are then made and appropriate actions taken to meet or adjust our plans and targets ⑥.

Assessments are made as to the risk of not achieving the annual goal. Risk Integration plans are developed and tracked if appropriate. Examples of this process are the daily review of workplans and the weekly review of metric charts on the production floor, monthly review of process performance data and improvement plan process, and weekly reviews of IPT action plans.

Our Leadership Team reviews company performance and takes action in two main forums in a systematic review process ⑥. The first of these is at the enterprise level, which includes all programs and functions. The Leadership Team meets weekly to review issues affecting the entire enterprise. The second executive review forum is at the program level (e.g., C-17, MD-17, Tanker, etc.), where senior executives conduct weekly program reviews, quarterly Executive Program Management Readiness Reviews (EPMRs), and frequent videoconferences with the customer. Monthly, our Analysis and Integration Teams analyze and integrate the IPT and functional data and provide a roll-up of our total plan performance to senior management, including customer management. Similarly, we are in constant communication with our suppliers. Regular performance reviews are held at all major suppliers. Our performance is shared through the Supplier Advisory Council, and our suppliers regularly participate in customer reviews.

As a designer and producer of high-technology products and services, we ensure that the integration and assessment of data into decision-making

information remains an integral part of our processes. To accomplish our work, we regularly divide high-level requirements into manageable pieces through a systems engineering process. Data analysis at this “work-package” level may involve a simple comparison to plan and use of quality-analysis tools, up to highly sophisticated computer modeling. Another method for analyzing and assessing customer relationship performance is the cross-correlation of external customer, workforce, and supplier surveys.

At each process level, our teams use four standard measures: **quality, timeliness, cycle time, and efficiency**. These data are integrated into the next-higher process level and analyzed. The PBM reporting system aggregates the process-assessment data from teams and process owners for use in business decisions. On our production floor, these four standard PBM measures are augmented with measures for safety, work-plan performance, overtime and attendance, foreign-object debris and housekeeping, nonconformance costs, and team issues. These data are posted weekly and are available on the Airlift and Tanker Intranet.

We use a variety of methods to integrate and analyze our operational performance. For example, along with our customers, we streamlined processes to move from a government-regulated quality system to a commercial quality system, with the primary element of the ISO 9001 quality standard. We have been ISO-certified by an industry team.

A&T reviews company performance to assess progress to action plans, performance goals, and targets through a series of systematic, regular reviews (Figure 4-3). Each team aggregates its performance data and rolls it up to the applicable IPT or function. The program IPTs and functions roll up their performance data in support of program goals and measures. Organizational data are then aggregated, and information is rolled up to our Leadership Team.

Figure 4-3. Review of Company Performance

Performance Metric Category	Leadership Team	Organizational Reviews	
		Program	Function
Customer Satisfaction	Monthly	Weekly	Daily/ Weekly
Program Performance	Monthly	Daily	Daily
Workforce Effectiveness	Quarterly/ Monthly	Monthly/ Daily	Daily/ Weekly
Operational and Process Performance	Quarterly	Daily/ Weekly/ Monthly	Daily/ Weekly/ Monthly
Financial Results	Monthly	Monthly	Monthly

A&T senior executives monitor performance by reviewing a balanced set of metrics

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**HUMAN RESOURCES**



**WORK SYSTEMS**

A significant factor in achieving A&T’s goals and objectives is our team-based work design. To support this effort, we are evolving our process-oriented culture toward more teaming and more employee involvement to accelerate continuous improvement and work redesign enterprise-wide.

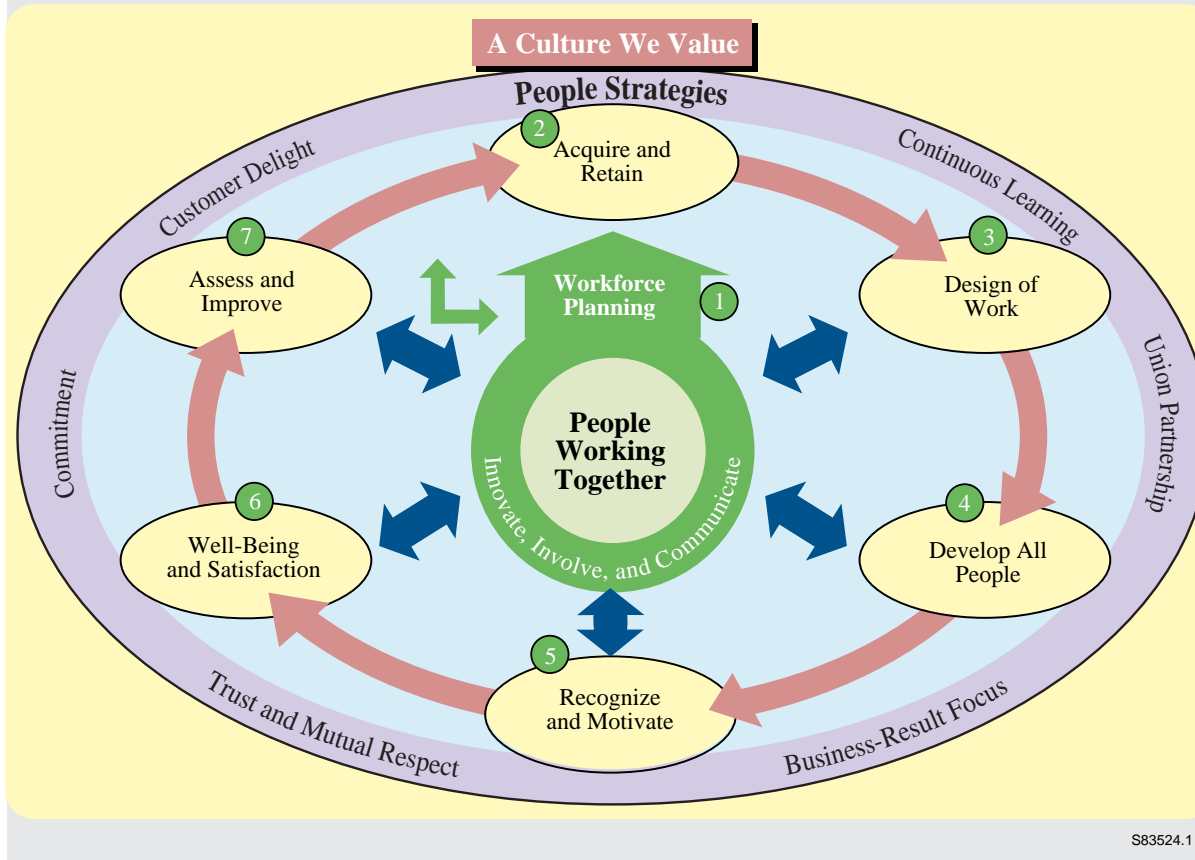
During the Integrated Planning Process, programs and functional organizations establish key quality and operational targets, surface work-related issues, and determine human resource improvement needs. These enterprise improvement needs are collected and documented in our Workforce Strategy Implementation Plan (SIP). We have continuously improved our approach to managing work systems. To demonstrate our integrated, systematic approach to managing human resource processes, we developed the Integrated People System (IPS). We use the Integrated People System (Figure 5-1) to deploy the Workforce Strategy Implementation Plan and manage our human resource plans. This system is managed

and improved by the People Council. As part of our **Workforce Planning** process ❶, work-force strategies and key human resource action plans are developed and incorporated into organizational workforce performance goals. We recognize that employee involvement based on communication, cooperation, and shared knowledge and skills better supports our workforce strategic objective of developing a high-performing, self-motivated workforce.

We use the Integrated People System to deploy the Workforce Strategic Implementation Plan and process to manage our human resource plans. This system is managed and improved by the People Council.

Workforce planning feeds each of the IPS elements. While the elements appear sequential, they are, in fact, interdependent and interact with each other concurrently. The primary function of **Acquire and Retain** ❷ is to ensure that we have a highly trained and skilled workforce, responsible for

Figure 5-1. Our Integrated People System (IPS)



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deploying our processes in a team-based culture. In **Design of Work** ④, we take our customer, culture, process, people, and other stakeholder needs and design our work to satisfy these needs and meet our short- and long-term goals. Through **Develop All People** ⑤, we train and develop teams and people to implement the work design(s) as an organization of high-performing teams and employees. In **Recognize and Motivate** ⑥, we create and manage monetary and non-monetary rewards and formal and informal recognition programs that reinforce our team-based culture. As a result, **Well-Being and Satisfaction** ⑦ creates and manages a workplace environment and climate that generates high levels of employee motivation and satisfaction.

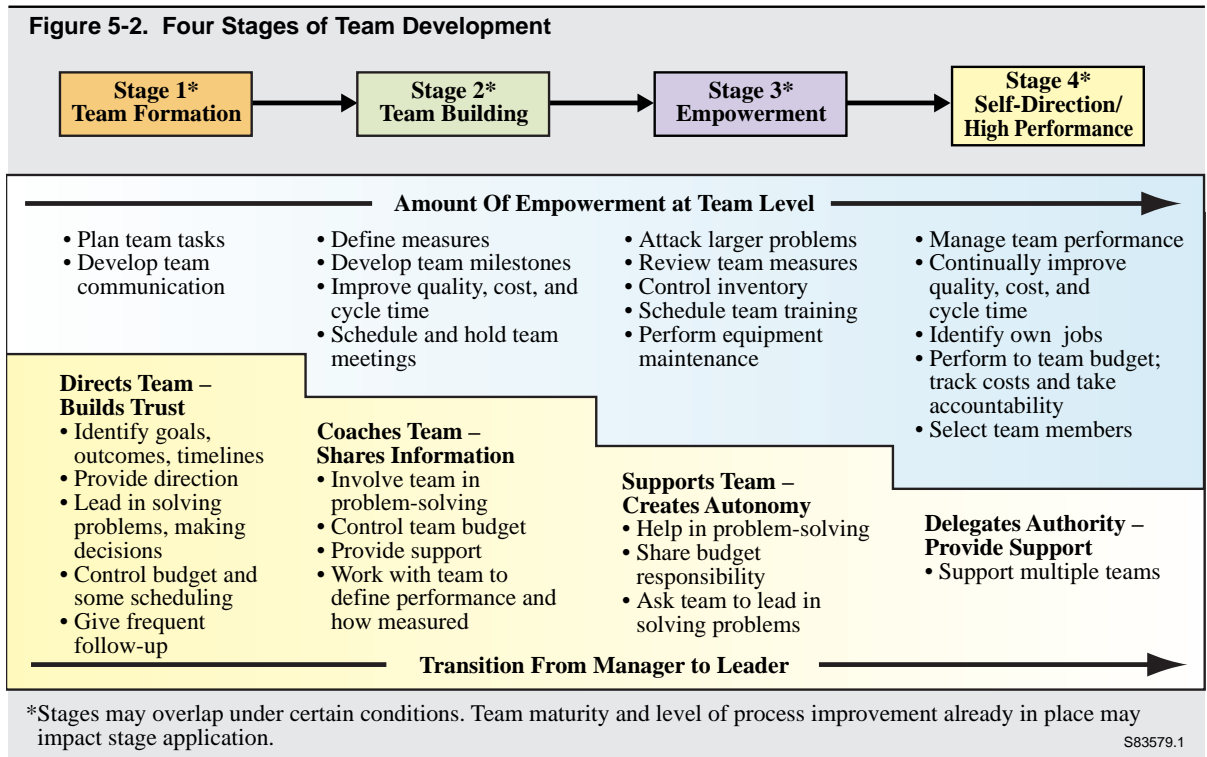
In **Assess and Improve** ⑧, we review the overall performance of the IPS and link our finding to the Integrated Planning Process (Figure 2-1).

In 1993, in conjunction with our customer, we took our first steps to begin implementing our team-based work design strategy by forming joint Integrated Product Teams (IPTs) supported by functional work teams. Operating as small businesses, IPTs manage their own resources and are responsible for meeting all quality, technical, schedule, and cost requirements. IPT membership includes our customer, and IPTs interface with other IPTs to ensure that plans are integrated. Our functional support teams (i.e., Business Management, Quality,

and Product Definition) develop and provide people to the IPTs. They are also responsible for ownership, control, monitoring, and improvement of processes.

In 1995, the senior leadership of both A&T and the United Auto Workers (UAW) union determined that a comprehensive employee involvement and gainsharing incentive approach was essential to achieving the world-class productivity necessary to the future of our programs. During contract negotiations, we jointly developed a historic agreement committing the company and the union to a concept that encourages all employees to participate and take ownership in the everyday operations of their work teams. High-performance and self-direction are facilitated through a four-stage development process encompassing “hard: or technical skills and team-based decision-making competencies (Figure 5-2).

The team’s manager, team leader, and support groups accompany the team on its journey to high performance. At the Long Beach and Macon facilities, over 100 production IPTs and 200 support teams in traditional white-collar professional areas are currently in various stages of development. Teams assess their maturity through a three-tier approach. Our investment in teaming has paid off. Performance has improved 27%, the cost of quality has been reduced 86%, and overtime dropped from 4% to 0.5%. We currently use only 10 hourly



production classifications. On the factory floor, over 67% of our workforce holds a single job classification, allowing for movement of people, extensive cross-training, and effective utilization free of the previous restrictive work rules.

To achieve flexibility, rapid response, and learning, IPTs and high-performing teams are involved in improving processes, setting goals, establishing PBM and statistical process control measures, and regularly reviewing measures to drive improvement. As teams gain knowledge, management control is reduced, giving teams greater responsibility in meeting business objectives and changing customer requirements. The role of managers changes as well to that of coach/facilitator.

To reinforce recognition for performance and motivation, we reward individuals, teams, customers, and suppliers through numerous formal and informal types of programs, including our annual Gold and Silver Eagle awards. These awards recognize the outstanding performance of teams and individuals that best exemplify quality values with their customer in providing products and services of the highest quality at the lowest possible cost. In 1997, more than 2000 employees, customers, and suppliers were nominated for these awards. Our compensation and recognition system promotes a commitment to quality, productivity, teamwork, and innovation related to affordability. Cornerstones in **Recognize and Motivate** ⑤ are Gainsharing and the Boeing ShareValue program. Our pay-for-knowledge program at Macon, Georgia, provides individuals with additional base compensation for demonstrating new job skills.

#### EMPLOYEE EDUCATION, TRAINING, AND DEVELOPMENT

In **Workforce Planning** ① of the Integrated People System, we identify education and training needs from customer requirements, workforce design specifications, team and individual growth requirements, and other stakeholder input. At the local level, all training and development needs are identified, reviewed, and refined through advisory groups from A&T organizations such as the Learning Resources Board. This board identified future needs and resources and created an Integrated Learning Plan. Through our enhanced education-reimbursement program, "Learning Together," every individual at A&T can take advantage of development and training opportunities.

Our customer relationship training for customer-contact employees addresses the skills involved in

promoting customer satisfaction and managing expectations. The Advanced Craftsmanship Learning Center (ACLC) provides production workers at Long Beach training in advanced skills for mechanics. Training is delivered by union members and includes practical hands-on experience and reinforcement of self-inspection techniques. Line managers and employees often design their own training programs.

Workforce planning also addresses meeting current business requirements through process improvements. We are actively involved in promoting a Lean Manufacturing strategy. Utilizing our team-based work environment and supporting the belief that ownership belongs to all players, we conduct Accelerated Improvement Workshops. In these sessions, teams learn quick planning and problem solving tools to effectively support manufacturing process improvements while reducing waste. We have also developed a proactive approach to orient transferred employees to the expectations of A&T's team environment and learning requirements. Employees transferring into Production receive both technical skills training and certification as well as team skills to effectively operate in High-Performing Work Teams.

Training delivery includes a full range of techniques, on and off company time, by internal subject matter experts, line management, team leaders, professional trainers, and college instructors. The Learning, Training, and Performance Development department provides a "Train-the-Trainer" program for personnel interested in becoming trainers and subject matter experts. Innovative methods of training delivery accommodate various learning styles and resources. Additionally, we created A&T University, an after-hours curriculum designed to complement professional growth and development for all employees. A&T University provides training on leadership development, performance development, computing and Internet skills, safety, and trainer development. Currently, excluding college study, 71% of all training at A&T is on company time. Training partnerships exist with local colleges for courses, certificates, and degrees targeted toward quality and technology.

#### EMPLOYEE WELL-BEING AND SATISFACTION

We achieve employee well-being and satisfaction through the A&T Integrated People Systems process. Our attention to "People Working Together" is an essential value within A&T. We maintain a safe and healthy workplace through preventive approaches

and provide opportunities for personal growth. We establish feedback mechanisms and surveys to hear what our employees have to say and validate the direction of our various programs.

We recognize the need for continuous improvement in safety. Our Safety Improvement Plan includes approaches and measures used to improve our safety performance. The plan is approved by customer and union leadership and is driven by the Executive Safety Council.

We improve safety by applying PBM to proven safety programs, with all levels of management, union, actively involved. We use PBM to measure compliance to key safety processes, identify problems, and conduct systematic root-cause analysis. Macon has now gone over six years without a lost-time injury. Based on injury data and workplace surveillance, we focus on ergonomic factors in both the production and office environments. Over \$17 million has been invested in A&T tooling improvements over the past few years, much of which in support of safety and ergonomic improvement activities.

Additionally, we have several types of teams involved in identifying and finding solutions to quality-of-work-life issues. "Relationship by Objectives", a partnership between employees, management, and the People Organization at Long Beach, resolves issues related to non-contractual working conditions. In addition, for those issues

related to ethical standards of business conduct and compliance, we have an 800-number Helpline.

We use both formal and informal survey methods to measure well-being and satisfaction. Since the late 1980s, an all-employee survey has been conducted every three years. In the 1998 employee survey, we included the addition of 35 corporate-wide items that were administered to a 20% sample of all Boeing employees. This allowed for comparisons of A&T results with other Boeing business units as well as industry leaders, including the Mayflower Group. This group comprises 33 industry benchmark leaders (e.g., IBM, Corning) who share employee-satisfaction data every two years. Several of these companies are also previous Malcolm Baldrige National Quality Award recipients. A&T received some of the highest responses in the corporation on these items, especially those related to employee recognition, employee input in new ways of doing things, involvement in decision-making, and making changes necessary to be competitive.

Based on survey findings, strengths are revealed (along with opportunities for improvement), and we work both simultaneously at an A&T- and work-group level. A&T-level opportunities are incorporated into workforce improvements in the Integrated Planning Process. This information is guiding improvement activities for training, strategy development, empowerment, effective leadership, and well-being factors in our evolution to high-performing, self-directed work teams.

## PROCESS MANAGEMENT

### MANAGEMENT OF PRODUCT AND SERVICE PROCESSES

Because all work in the organization is accomplished through processes, we define our business as a series of interconnected processes. Our Enterprise Process Model (Figure 6-1) provides a framework for managing individual processes or groups of processes.

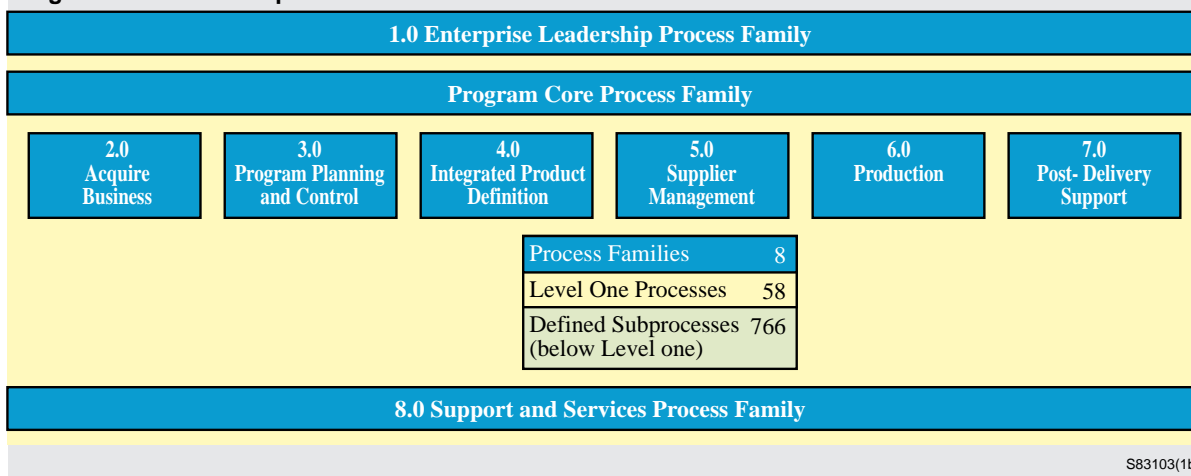
We use a seven-step process improvement methodology known as Process-Based Management (PBM) (Figure 6-2) to manage and improve our processes. PBM starts with teams defining their processes in terms of suppliers and inputs, customers and outputs, and the tasks required to transition from one to the other. Next, the teams establish metrics in the areas of quality, timeliness, cycle time, and efficiency and analyze them to determine process

performance. The teams stabilize the process by deploying such tools as variability reduction and operator process control, so that our processes become "repeatable" and, ultimately, "predictable."

The last three PBM steps enable the process to become better than its original design. To improve the process, the team sets an appropriate goal based on our "business needs." The team analyzes the process to determine the root cause of existing problems, or better ways to detect potential failures, and develops an improvement plan. While implementing improvements, process teams focus on simplifying, eliminating, combining, or rearranging the current steps of a process. Once improvements are implemented, we determine if performance meets our expectations. Process goals are reviewed yearly and adjusted to meet our "business needs." In this way,

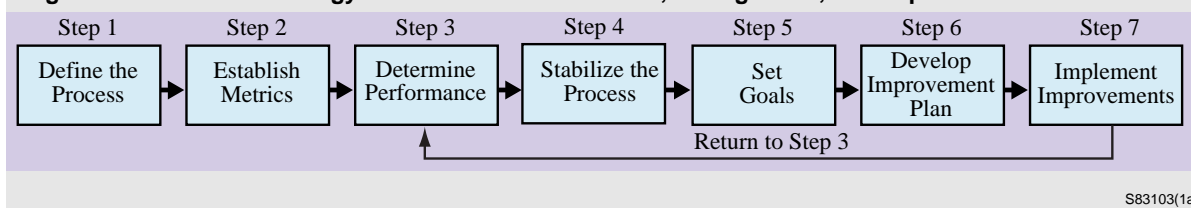


Figure 6-1. A&T Enterprise Process Model Defines the Business



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Figure 6-2. PBM Methodology Guides Process Definition, Management, and Improvement



S83103(1a)

PBM focuses our processes on continuous improvement.

Our A&T Process Council is focused on having healthy, competitive processes which are aligned with A&T strategies. The council’s role is to review and make decisions regarding process team actions, such as implementation planning, integration of improvement initiatives, and process corrective action.

We design our products and services using a mega-process that combines processes from three process families found in our Enterprise Process Model (Figure 6-1): 4.0 Integrated Product Definition, 6.0 Production, and 7.0 Post-Delivery Support. Using these processes, we design, produce, and support high-quality products and services that satisfy or exceed our customers’ needs and expectations. We use PBM to manage the processes used to design products, services, production, delivery, and post-delivery support.

The processes that define our product begin with the team identifying customer requirements. Next, we develop, review, and approve designs to address these requirements and generate the assembly layout. When these steps are complete, we develop packages to build the product, buy the necessary parts, and support the product once it is delivered. Throughout the processes that assemble our products, we look for

ways to build quality into the product instead of relying on inspection; i.e., prevention versus detection. As a result, we have eliminated more than 80% of our inspection points. Throughout the processes, we evaluate the product to ensure that it meets requirements. We continue to support and improve our product even after it is certified and delivered to our customer.

Design, production, and delivery processes and changes are coordinated and tested through the IPTs to ensure trouble-free introduction of products and services. The customer is integral to the management of our systems and processes (in that they are part of our IPTs), and customer representatives help manage the production processes on a daily basis.

**MANAGEMENT OF SUPPORT PROCESSES**

We design, manage, implement, and improve our support processes in the same manner as any process, by using PBM. Our support processes are in the 8.0 Support and Services process family (Figure 6-1).

Requirements are determined by involving partners and customers in each step of the process and by incorporating their input. The principal requirements for each process depend on the individual process and are established jointly by the process owner and customer. Support processes are designed and implemented to meet customer, quality, and operational performance requirements by obtaining

input from process customers and managing the process by designated process owners. Customers are also involved in the process teams and share responsibility for management and improvement of support processes.

The Department of Defense traditionally measures the compliance of many contractor management systems. At A&T, we manage those systems jointly with our customer, using the Management Systems Assessment process (MSA). This process tracks 13 management systems, with performance requirements determined jointly. The use of PBM and MSA are a part of our Best-Practice efforts to implement government streamlining.

**MANAGEMENT OF SUPPLIER AND PARTNERING PROCESSES**

We design, implement, manage, and improve our supplier processes, relationships, and performance using the same seven-step PBM methodology used for all of our processes ( Figure 6-2). The processes used to manage our suppliers are in the 5.0 Supplier Management process family.

Supplier processes are designed to meet overall performance requirements. We help suppliers meet those requirements through clear communication of the requirements, involving the suppliers in our teams, and building effective management techniques into the process. The 5.0 Supplier Management process family outlines three primary processes that define the supplier-selection criteria, which establish the negotiation parameters and documentation requirements, and which manage a supplier.

A&T has over 875 suppliers; however, 34 of them account for 88% of the procured-dollar-value of major subcontracts and high-cost items. A&T has 282 suppliers certified through the Preferred Supplier Certification process (Figure 6-3). Principal performance requirements are product quality and delivery, business process capability, and process-control techniques. An incentive system is used to ensure continuous improvement in supplier performance.

Supplier parts-rejection and delivery performance are measured and rated in our Supplier Performance

**Figure 6-3. Supplier Performance Measures**

Performance	Quality Rate	Delivery
Gold	100%	100%
Silver	99%	≥95%
Bronze	98%	≥90%
Unsatisfactory	<98%	<90%

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Measurement System (SPMS). High-performing suppliers are identified through SPMS, making it a key tool of Best-Value source selection.

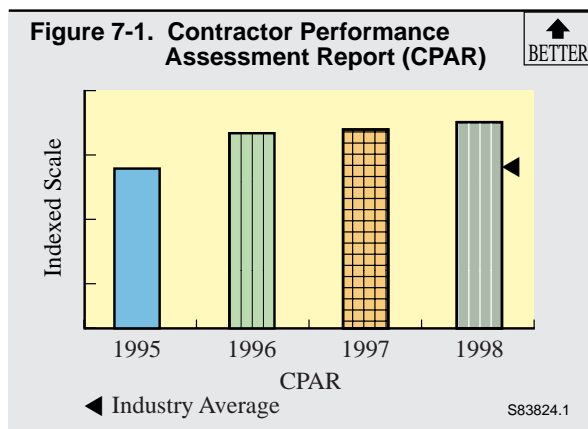
Performance information is communicated to suppliers and partners at program reviews and in written evaluations and quarterly performance notices from the SPMS. Supplier conferences and seminars are also used to share our vision and goals with our suppliers and to obtain their feedback.



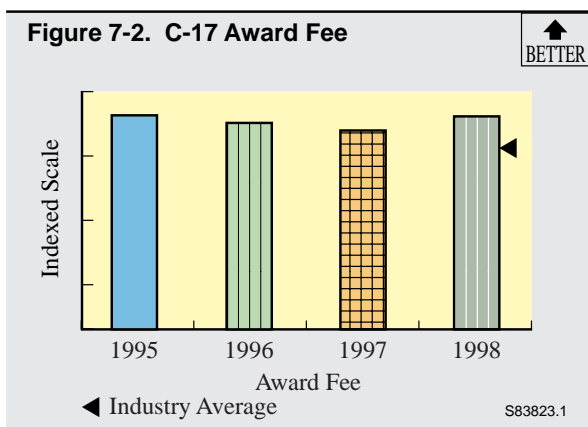
**BUSINESS RESULTS**

**CUSTOMER SATISFACTION RESULTS**

Our major customer satisfaction indicators are the US Air Force (USAF) Contractor Performance Assessment Report (CPAR) and Award Fee. We conduct site-specific customer surveys to receive actionable feedback on our performance, and we conduct baseline research (i.e., the external customer survey) to assist in verifying that we are focused on matters of long-term importance to the customer. We also measure several key items in which the customer has indicated a special interest. Since 1993, the C-17 program has demonstrated strong improvement and, since 1996, met or exceeded all CPAR requirements (rating of exceptional or satisfactory). The C-17 CPAR process is recognized as a Boeing Best Practice (Figure 7-1)



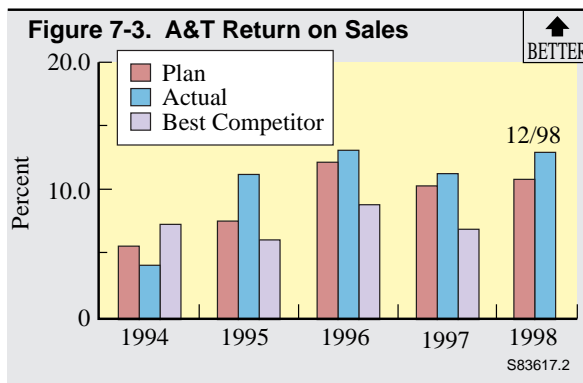
C-17 Award Fee process (Figure 7-2) is also recognized as a Boeing Best Practice and has consistently delivered excellent ratings. This performance indicates excellent customer satisfaction. In 1995, we initiated an external customer survey (TARP developed and administered) to provide



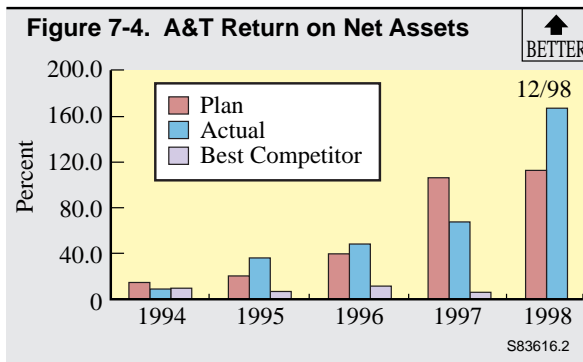
comprehensive feedback concerning customer satisfaction, loyalty, market impact, and drivers of satisfaction and dissatisfaction. We also track and show good results in customer loyalty, drivers of customer dissatisfaction, and overall customer satisfaction.

**FINANCIAL AND MARKET RESULTS**

**A&T Return On Sales** (Figure 7-3) leads the industry. The improvement in return on sales over the last few years is attributable to our focus on first-time quality.



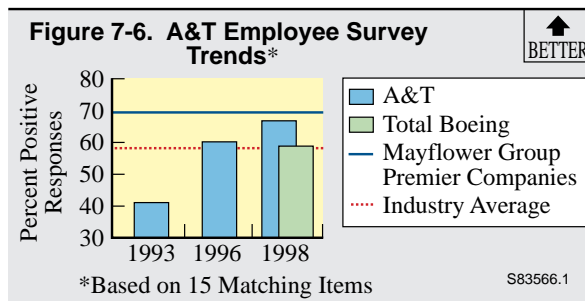
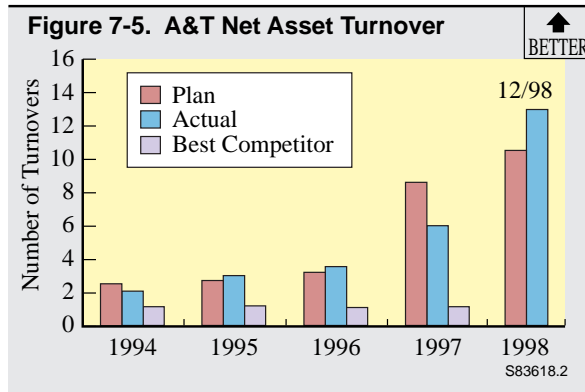
**A&T Return on Net Assets** (Figure 7-4), shows results were realized from the efficient use of assets required to produce goods and services. Our RONA surpasses other major airframe manufacturers.



**A&T Net Asset Turnover** (Figure 7-5) has improved steadily since 1994, and has led the industry by a significant margin.

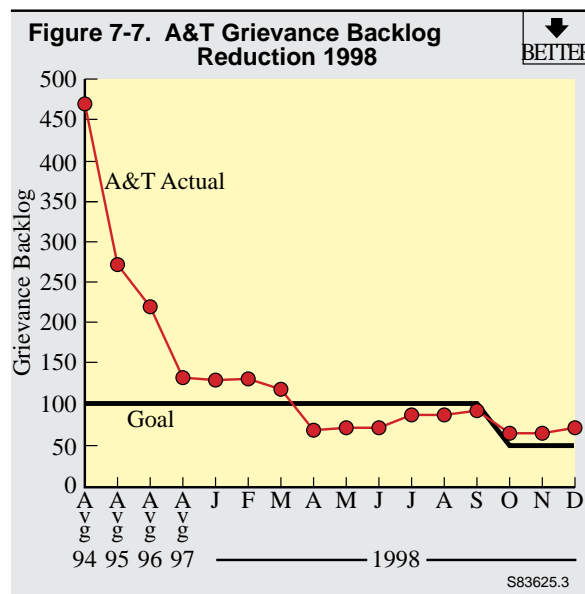
**HUMAN RESOURCE RESULTS**

**A&T Employee Survey Trends** (Figure 7-6), based on comparisons of like questions asked on the 1993, 1996 and 1998 employee satisfaction surveys,



show improvement. We are above industry average and closing in on the premier companies.

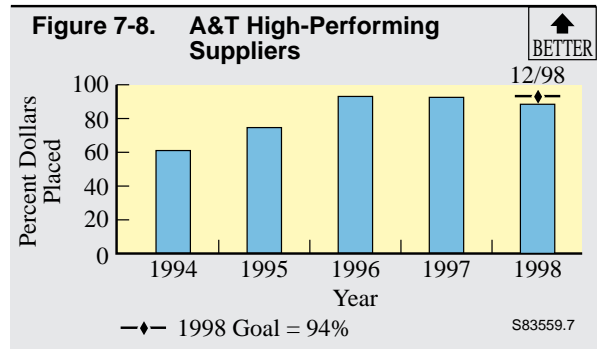
**A&T Grievance Backlog Reduction** (Figure 7-7) measures the grievance backlog filed by union employees. The number of grievances filed and the number of open (active) grievances are monitored continuously as a measure of improving company-union relationship. In April of 1998, we met our goal of fewer than 100 grievances backlogged. In 1994, we developed a grievance reduction plan to respond to union employee grievances, which led to a 61%



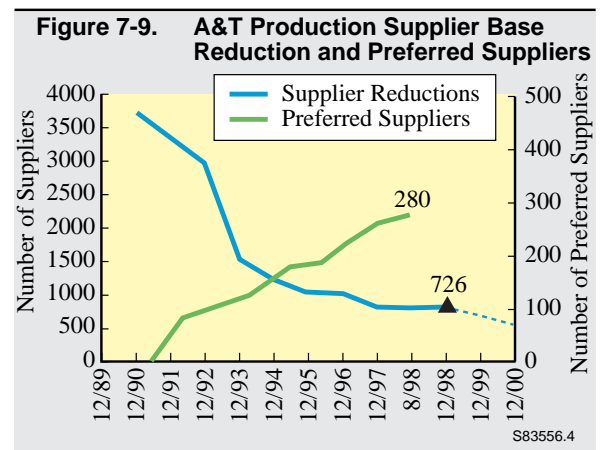
reduction in the number of grievances filed in 1995 and 1996. This reduction continued through 1997.

**SUPPLIER AND PARTNER RESULTS**

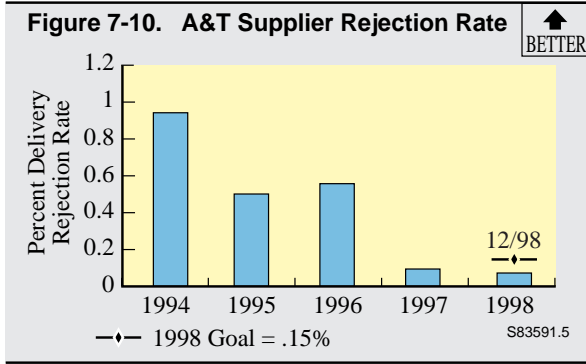
Supplier and materials management is process-oriented, and we have developed measures that accurately reflect the health of our supply line processes. (Figure 7-8) These measures represent supplier performance and supplier process effectiveness relative to company performance objectives.



**A&T Production Supplier Base Reduction and Preferred Suppliers** (Figure 7-9) shows our commitment to developing a core of high-quality suppliers based on superior rejection rate and delivery performance. As part of our strategy, we have realized a 43% reduction in the supplier base since beginning in 1994 and have increased the number of preferred suppliers by 122% through certification.



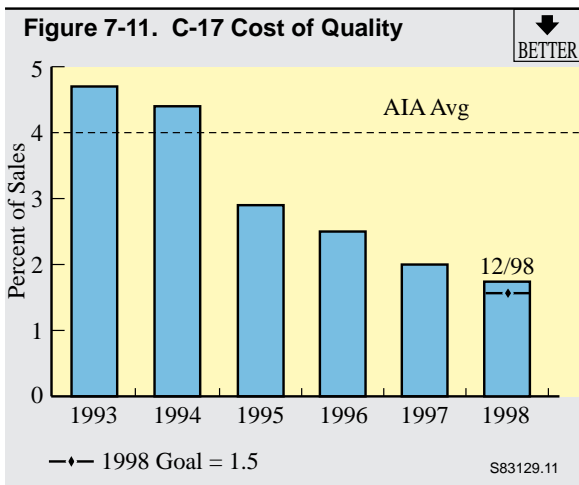
**A&T Supplier Rejection Rate** (Figure 7-10) includes rejections occurring either at the supplier's facility, at our receiving dock, or during assembly. It has improved 82% from 1994 to 1997. This is the result of improved supplier quality requirements, statistical process control, and corrective action.



**COMPANY-SPECIFIC RESULTS**

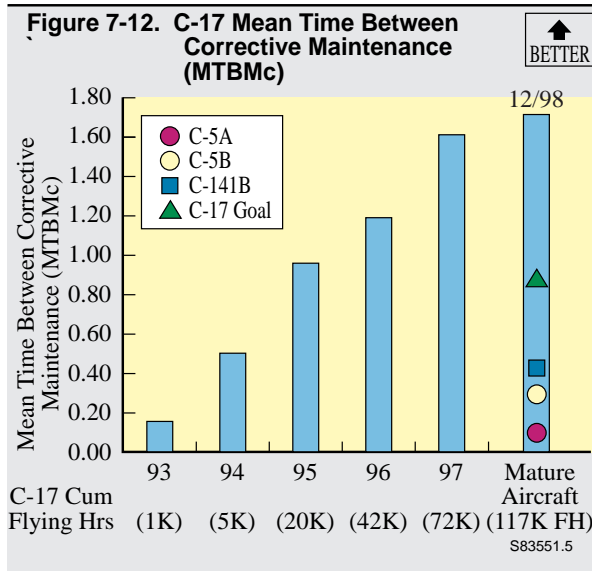
Our operational results are achieved through empowered teams who continuously improve their processes that create higher quality products and services to more aggressive schedules at less cost.

**C-17 Cost of Quality** (Figure 7-11), is less than the Aircraft Industry average (1.9% versus 4.0%) and is on a trend to reach the 1% world class level. This improvement is due in large part to switching from detection-based to prevention-based activities using an integrated approach. This approach focuses on operator control, process surveillance, variability reduction, and closed-loop corrective action.



**C-17 Mean Time Between Corrective Maintenance (MTBCM)** (Figure 7-12), which is the

mean time interval between on-aircraft unscheduled maintenance actions, has continuously improved.



**C-17 Maintenance Man-Hours Per Flight Hour (MMH/FH)** (Figure 7-13), which is the total maintenance man-hours expended in support of the aircraft per flight hour flown, exceeds the C-17 100,000-flight hours mature MMH/FH goal. The C-17 MMH/FH is performing at a lower level than comparable, mature competitor aircraft.

