Mse procurement policy pdf

Registration of suppliers on GeM according to rule 150 GFR,2017-reg. Amendment of the General Financial Rules (GFR), 2017 - Global Competitive Enguiry Definition of the Notice on public limited liability companies owned by SC/ST concerning ammendment in the proposals/comments of public procurement policy for the revision of 358 reserved items Public procurement policy — Appointment of an aggregator- reg. Clarification of cpsu procurement data (HAL) of central/ministries/departments/ communication on the PSU Memorandum. CoS meeting of 22-01.2014. Constitution grievance cells. Letter from the Secretary to all Ministries/Departments/CPSU. Letter from the Minister (MSME) to the Chief Minister. Subsequent letters form O/o DC (MSME) to ministries/departments/CPSU GIZ-To Consulting Study-TOR. ANCILLARY ACTIVITIES & SCOPE FOR SMES IN M&R COMPLEX, DAMANJODI. The GTE Mobile Subscriber Equipment (MSE) system is designed to become the centerpiece of the U.S. Army battlefield radio telephone network. Awarded in 1985 to the $4.2 billion U.S. Army Communications and Electronics Command in Fort Monmouth, New Jersey, the MSE contract is reportedly the largest communications program ever placed by the military. MSE replaces many unintegrated, uncoordinated telecommunications equipment, some of which date back to the 1950s. Our first delivery was made in February 1988, just 22 months after the program was launched; The Army's procurement plan calls for MSE equipment to be fielded at one corps per year between 1988-1993. After that date, the contract requires GTE to provide operational and maintenance training, spare parts, hardware and software maintenance and management of warehouse and regional centre-centre support by 2009. The funding program is required from, and attributed to Congress annually. When fully fielded, MSE will supply the oversupply, secure voice, data, and facsimile services of the Army's five Corps and 28 Active, National Guard and Reserve Divisions. The entire system connects more than 8,000 mobile-like mobile radio and 30,000 landline phone subscribers (users). With MSE, field commanders can send and receive calls, e-mails and facsimiles without interruption throughout the five-division corps area, spanning 37,500 square miles (an area the size of Massachusetts, Rhode Island, and Connecticut combined). MSE also connects with, and replaces, Army Corps-level Tri-Service (Army, Air Force and Marine Corps) Tactical (TRI-TAC) communications equipment, much of which gte is supplied. MSE also communicates with army's Combat Net Radio (walkie-talkie), North Atlantic Treaty Organisation (NATO) telecommunications systems in Europe and commercial satellite and land-based telephone networks around the world. The system offers a new dimension in military communication by providing telephone services to mobile subscribers, even if vital connective elements of the system are in motion. In the event that the The Army Tactical Communications System (ATACCS), which MSE also replaces, does not allow commanders to communicate while their command stations are relocated. To achieve this prodigious program, GTE Government Systems Corporation Mobile Subscriber Equipment Division (MSED), based in Taunton, Massachusetts, leads a team of 32 subcontractors, 700 suppliers, and several internal GTE suppliers who together will produce MSE over 8,000 mobile radios, 1,400 telephone switching centers, and 25,000 phones. MSE received many and very enthusiastic praise from its operators and users during the Gulf War; and in 1989, GTE won the DOD Value Engineering Contractor of the Year Award for realizing $21.7 million in cost savings for the program. Our MSE program provides a high-quality, high-performance tactical communication system as planned and under strict cost control. The development requirement of MSE replaces two older and only partially successful tactical communications programs that, by the 1980s, had saddled the military community with hedge-podge aging and not always interoperable telephone equipment. In the 1960s, Mallard's program set off to develop a corps-level tactical communication system. But because each service purchased its own telephone switch, interoperation with auxiliary equipment was at best problematic due to this segmental approach to purchasing the system. In 1970, a requirement for inter-service communication capabilities prompted the Department of Defense (DOD) to designate the Tri-Service Tactical (TRI-TAC) office as coordinator of communications systems. However, the development of responsibility for the telephone switch remained with the army; air force bought a man-pack phone switchboard (GTE is a 30-line smallboard); the Marine Corps procured the facsimile machine. Responsibility for assistive devices was placed among the cooperating services, with each program managed by the host service, again with problematic results. Army TRI-TAC circuit (voice) and message (data) switches, along with existing smallboard, as developed by GTE, have been successfully fielded at corp level (division-level communications have been handled by the Army Tactical Communications System). Other device programs lagged one to several years behind schedule; some have never matured under the TRI-TAC umbrella. And there was still no firm guarantee that the resulting pieces would work together. MSE System Acquisition: A new concept in 1981, James Ambrose, then Secretary of the Army, persuaded dod to make systems of coordination/integration responsibility for the army post-ATACCS communication suites to apply. His initiative mandated six acquisition guidelines that would distinguish MSE from previous procurement programs: From cradle to grave supplier's responsibility. The supplier shall be responsible for all aspects of the acquisition/production of systems, and logistical support, including ownership and management of the maintenance support system. The army does not take ownership of any MSE system until it is tested on the ground and proven to work, and until the contractor has trained the army to acquire the unit (users) to operate and maintain it. Function-driven statement of work. The contractor provides 19 required structural and functional elements and the maximum of the 82 required functions. The army supplies no detailed design specifications; the supplier is free to meet the functional requirements in the most cost-effective way possible in accordance with system reliability standards. Procurement of non-development items. The supplier only provides fully developed equipment that already works in this area. Technical development is limited to the mechanical integration of protective devices and to the interface (interconnection) of the software. An accelerated fielding plan. The contractor demonstrates the system during the competitive design phase, begins fielding the first 85-shed system 22 months after the award of the contract and completes user training on this system in month 26. MSE is to be fully fielded during the basic contract and five option years (from scratch development projects such as ATACCS usually require ten or more years to complete). Warranty on all-inclusive equipment. The contractor buys every piece of equipment needed for each system, even the equipment the army already uses. Fixed price contract. The supplier accepts all cost risks; depends on productivity and attention in cost control. The discussions that follow identify the costs, schedule, and quality management issues, risks, approaches and achievements of the MSE program that, to this day, are still driven by Jim Ambrose's bold new vision of military procurement policy. ACQUISITION MANAGEMENT As soon as MSE entered the early planning phase of THE DOD in 1981, GTE began to keep a close eye on this opportunity. When, in 1984, the DOD invited qualified defence contractors to offer the programme, we submitted a draft offer and successfully negotiated the contract. Our proposal covered issues such as cooperation agreements, technical approach, programme management, programme costs and the timetable and demonstration of the system. Teaming Questions Secretary Ambrose's non-development-item procurement strategy virtually dictated that the winning contractor would have to team up with an established supplier of tactical communications equipment. When planning our team, we were looking for a partner whose products and overall technical competencies would best complement our own. Our own strengths in switching telecommunications and project management of system integration, measured according to overall system requirements, led us to seeker partners who had the ability off the shelves in the field of radio communication and network management. The search for the technological best cut eventually led us to Thomson-CSF based in Coublay near Paris, France. Integral Their reseau Integre de Transmissions Automatiques (RITA) system (already fielded by the French and Belgian armies), Thomson had an excellent radio and control center system that was designed to interact with NATO communication suites. While Thomson has a $1.6 billion stake in MSE (about 25 percent of the total) in contract years three through five, RITA radios are assembled at the Kansas City facility Wilcox Corporation, thereby ensuring about 80 percent of MSE's efforts for U.S. companies. Technical Strategy GTE design met mse program 19 required features with nondevelopmental-item equipment. In addition, we satisfied 69 of the 82 required system options. Of the 13 options we didn't have for our offer, most involved then front-edge technologies that weren't matured at the time. During the design and pre-award efforts, we proposed solutions to mobile subscriber coverage requirements; equipment integration and interoperability; system performance, survival and endurability; logistical support; and cost insulation. Figure 1. MSED Org Chart Our most significant post-award engineering efforts focused on network management. In order to live within the undeveloped limitations, we have adapted the rita system control center hardware to fit in smaller MSE S-250 shelters (cubicle approximately 5.8' x 7.6') and modified the RITA electrical interfaces to work with our circuit switches. Since the U.S. Army Corps are twice the size of their French counterparts, we have developed a new magnetic disk to store a larger U.S. network data base control. Also in the post-assignment phase, we engineered a packet switching option, which allows MSE the ability to move standard size data packages quickly across the network through store-and-forward memory cells on each switch node. The MSE packet network supports a number of useful data services, including e-mail. Systems supplied since January 1991 have packet capabilities. Management strategy A key element of GTE's strategy was to devote the entire new business unit to leading MSE's programming efforts. GTE would charter a one-program news division directly to the President and CEO of GTE Government Systems Corporation. Such organisational relationship shall invest the highest level of corporate governance with responsibility for (1) allaying all necessary human, technical and financial resources into the programme; and (2) closely monitor the state of play of the programme in order to take swift corrective action in case the programme deficiencies are to develop. The new division should be tasked with directing and coordinating the programming efforts of all participating GTE business units, team members and subcontractors. Provide a single management focus on the efficient and economical performance of all GTE assembly and subcontractor tasks, integration, testing and delivery. Coordinate all logistical support tasks with the logistical structures and resources of the U.S. military. Our $4.2 billion winning design prize undermines competition by more than $3 billion, especially since our system was based on already field switches at GTE TRI-TAC and other DIVISION-level ATACCS facilities, as well as NATO-compatible RITA components. By based our system on equipment already used by the military, we have strengthened the credibility of our control over the risk of a schedule. Other elements of our cost/plan strategy included pre-award completion of virtually all system engineering at our own expense Maximized use of standard non-development-item equipment Maximized use of in-place army logistics support facilities and organizations Minimized retraining requirements for system operators, maintainers, and participants minimized the impact of the fielding system on each army acquires combat readiness units Demonstrating MSE's largely nondevelopmental-point program, candidates were asked to field a pre-award demonstration system. We agreed to have our MSE system deployed across 4,200 square miles of wooded hillland around Nancy in eastern France in the late winter of 1985. We hired the American company Army Signal from its base in nearby West Germany to learn and operate the system. Military units from France and the North Atlantic Treaty Organisation also took part in the exercise. For ten days, mobile subscribers careened down mushy roads, through snowy fields, and from one area of mobile radio coverage to another, automatically reaffiliating (reconnecting) in each new area. Knot switches have been repeatedly jumped (moved) to simulate the movement of the Army Corps. Overall, the GTE system played well; solutions have been designed and adopted for a number of glitches that have evolved. The army was extremely pleased with the demonstration, presented, as it were, under the most inhospitable conditions of weather and terrain. But the really unique happening in gte exercise was that a number of high-ranking army officers voluntarily spent an extended week in the dank, hazy French countryside to be the first to test a new communication system (see page 10). PROGRAM MANAGEMENT GTE has an extensive set of policies and procedures for managing programs that have been developed and refined over 35 years of defense contracting. Our implementation of these guidelines for operational methodology, programming, package structure, programming planning, requirements control, engineering and automated project management is discussed here. Subcontracting, manufacturing and integrated logistics support management issues and solutions for MSE are described in detail in the following sections of our report. Operational methodology Success on the program with the scope and complexity of MSE requires that working associations be based on open-communication, win-win relationships. At the same time, all exchanges that have a contractual impact (e.g. related to programme scope, timetable and costs), costs); Structured. GTE's standard policies and procedures have been applied to our business relationships, both internal and with our customers, with this policy. Gte's internal relationships are governed by the following procedures. All GTE Mobile Subscriber Equipment Division (MSED) management and performing organizations are collected in one building in Taunton, Massachusetts with the exception of production support organizations in other GTE divisions. Msed CEO and its executives meet weekly to review the status of the program and identify accountability issues for each manager. Informal communication between meetings of staff shall be promoted; formal direction/redirection of the programme. The monthly meeting of the Director-General's staff examines the trends identified in the Management Information Centre in order to plan any necessary adjustments to the direction of the programme, organisation, personnel and operational methods. The President and Director-General of GATE Government Systems Corporation (GSC) shall chair the Steering Committee of the MSE Programme, which shall be at the disposal of the MSED General Manager for coordinating resources from the GSC and other GTE business units as necessary for the successful completion of the programme. Communication between GTE and the Army Communications-Electronics Command (CECOM) follow these instructions: Each MSE manager is expected to be in constant contact with his CECOM counterpart to maintain a common understanding of the state of the program, problems, risks, action items, etc., in their area of responsibility. MSE technical specialists and executives often visit Fort Monmouth, New Jersey for an informal information exchange with their CECOM counterparts. MSE personnel shall be in a technical direction from the army only through CECOM; formal management of the contract shall be assumed only from the ContractIng Officer for The Procurement of the Army through the MSED Contract Office. Program plans Our efforts to meet the requirements for the program as planned and within the budget were routed through a series of plans proposed by the GTE and adopted by the military during the contract negotiations. Each plan shall be documented to determine the relevant standards, timetable and cost milestones and review and audit procedures. Each of them shall be responsible for a separate msed staff function which coordinates the activities under the plan with all participating internal GTE organisations, with all subcontractors and with the military. Configuration management plan. MSED Configuration Management ensures that the impact of any proposed hardware or software change on any part of the system is assessed and that the allowed changes are documented and incorporated into the output product. production plan. MSED Production Management plans the human and material resources needed to deliver the products on time, in the required quantities and within the budget. the quality programme plan. MSED Quality Assurance develops inspection standards, train inspectors, timetable inspections and tests, and audits of incoming and test results. Material Fielding Plan. MSED support oversees all aspects of field support, training and logistics, including post-development software support. Work Breakdown Structure Our Work Breakdown Structure (WBS) reorganizes mse work statement into the work package hierarchy to the lowest manageable task. Developed initially during the design phase as a basis for estimating costs, the MSE WBS program has evolved, at the contract stage, into an overall program plan and resources for designing, checking and reporting the plan's status and application resources. WBS provides a structure for documenting, both for GTE and army, exactly who does what, with what, when and at what cost throughout the program. It also serves as a basis for the cost of potential future orders for additions to equipment or services not covered by the base contract. By scheduling programs by using WBS as the basis for defining MSE tasks and products, we network program plan using commercially available Artemis™ planning and project management support system. The overall program plan network is actually a hierarchy of plan networks that tracks WBS. A top-level network or program master plan summarizes critical paths from all lower levels. As efforts have been made to complete tasks, plan networks are updated to reflect real values. Changes to the programme plan are also incorporated because they are approved. These network plan are maintained and displayed in the MSE Management Information Center (MIC). Artemis™ and MIC are further treated in our discussion of automated management tools. Checking requirements The main concern about the fixed price of the contract is the issue of the flow requirement, a situation in which the customer asks you to do more work than you think the contract requires. In the MSE programme, we respond to changes to requirements by developing and submitting proposals for formal engineering and value engineering changes that aim to better define those requirements and develop mutually beneficial solutions to related technical, planning and cost issues. Proposals for technical changes. We respond to any significant change in requirements by submitting a proposal for a change of engineering (ECP). The ECP must convince the military (1) that their interpretation of a particular requirement constitutes a new requirement and (2) that our approach will result in significant benefits for the military. When the military adopts an ECP, it becomes subject to treaty change (regardless of whether it affects costs). We are rechedule the (recalled equipment and paste) change in all fielded facilities either in our regional support centers or at the army gaining a unit post, and incorporating it into all subsequent deliveries from the factory. Proposals to change technical engineering value. A proposal to change value engineering (VECP) is usually initiated by the supplier, generally reducing the costs, and may provide more functionality than required by the contract. Typically, the customer shares savings with the vendor. In 1989 only, we incorporated several VECPs with the army, which together led to a $21.7 million cost reduction and for which we received the DOD Value Engineering Contractor of the Year Award (see sidebar for value engineering award). Engineering Management Since MSE is largely a non-development-item program, we designed and demonstrated most of the system during the design and pre-assignment phase. Therefore, post-assignment engineering work was primarily focused on designing installation kits and on developing new, or using existing, technologies to meet the requirements of system capabilities required by the military, such as packet switching capabilities. Other technical activities focused on Value Engineering initiatives to improve the production, testing, fielding and support of MSE hardware and software products. Matrix project organization is the norm throughout GTE Government Systems Corporation, a structure in which project personnel are assigned from a central engineering organization only for the duration of the program. On programs as large as MSE, we found that project organization is a more effective approach to the use of engineering resources. As a result, at the beginning of the program, MSE staff engineers were permanently reassigned from our central engineering organization to the newly-forrned GTE Mobile Subscriber Division. Automated management tools We have set up a Management Information Centre (MIC) at MSED headquarters to capture and provide quick access to program information needed to deliver all MSE products as planned, specifications and within budget. Mic consolidates and coordinates several automated management tools: Material Information Data System (MIDAS) Artemis™ Project Scheduler (Artemis is a trademark of Lucas Management Systems) Automated Cost Estimation (ACE) application Integrated Line Item Processing System (ISLIP) SprintMail Material Information Data System. GTE has developed MIDAS as an integrated material management system consisting of several discrete but interconnected applications: Engineering Data Control, Material Procurement Control, Incoming Inspection Control, Inventory Control, Manufacturing Planning and Control and Quality Data System. Together, these applications track and control material handling from the release of technical data through component purchases to product assembly integration and testing. Project planner Artemis. Artemis is a production planning and control tool, one of many such tools used throughout GTE. On the MSE program, in addition to being the primary plan network tool (look back at our discussion on program planning), artemis data base is loaded with make/buy delivery time and material work, and overhead costs for all shelter components, along with shelter integration and Requirements. When there are input delivery requests, artemis outputs a production plan that includes schedule milestones, personnel and overtime requests, and action report entries. If delivery requirements or production schedules should change during a specific report, Artemis automatically adjusts personnel and other requirements. Automatic cost estimate. ACE is a GTE-developed cost estimate application. ACE accepts the structure of the work breakdown and the cost of the current data and outputs of the proposal, plan, or program cost-to-complete report. Integrated system for processing line items. ISLIP tracks output products shipped under government DD 250 documentation form from the moment the products are signed by a government representative on the GTE ship ping dock via GTE invoicing. SprintMail. SprintMail is a U.S. Sprint service that is used by MSE to provide programwide, online messaging and data networks. It is used to collect information about the status of the subcontractor and for other internal and external communication. In addition to receiving contractually requested status reports from GTE over the network, the Army MSE program office in Fort Monmouth, New Jersey, has network access to project data bases available to GTE. SUBCONTRACTOR MANAGEMENT Our current MSE program team includes 32 subcontractors, 700 suppliers and a number of internal GTE suppliers. In addition to the French firm Thomson-CSF, key members of our programming team are AM General for trucks, Gichner for shelters, Libby Welding for power generators, Litton for telephone switch processors, General Electric for communications security equipment, Magnavox for telephones and facsimile machines, Bolt Baranek & Newman for packet switches and Canadian Marconi and Ericsson (excluding Thomson) for radios. Team Management Our approach to mse subcontractor reports assigns a project manager to manage, monitor and control the technical and planned performance of each subcontractor and to ensure internal coordination of subcontractor activities. These project managers are assigned to MSE Acquired Systerns; some individual project managers oversee more than one subcontractor. The GTE-Thomson partnership is the only exception to the subcontractor management system. Responsibility for this partnership was allocated at the beginning of the programme to the Assistant General Manager of the MSED; all other subcontractors report through their respective project managers. In recognition of Thomson's significant programme contribution, we have agreed on a formal Memorandum of Understanding with our partner during the design phase. This Agreement shall apply to technical and ongoing performance and evaluation; reporting on progress; an assessment of the status of the programme; exchange of resident technical and managerial staff; the handling of Thomson's proposals for engineering changes and requests for derogations from the provisions on subcontracting or for the waiver of subcontracts; and configuration management. To Important personal contacts, our technical people visit Thomson plants as needed to support the three liaison people residing there. By sending quality inspectors to Thomson factories to witness factory tests, we will dramatically reduce the time it takes to carry out an incoming inspection at the Taunton plant. Our programme manager Thomson exchanges visits with his counterpart in France to review progress and briefings. These meetings occasionally include an ARMY MSE contracting authority and a program manager. Similar contacts are maintained with all our subcontractors. In addition to simply facilitating the exchange of information on the status of the program, such meetings generate goodwill between members of the MSE program team and with the military. Our good relationship with our MSE teammates grows from the perception that they are just as eager as we are to make the program work. All our subcontractors have direct access to MSED's Artemis project planning tool, an agreement that allows both GTE and subcontractors to identify supply problems in a timely manner and take appropriate remedial action. Internal GTE team Several GTE government systems business units participate in the MSE program. Our main internal subcontractor, GTE Communication Systems Division (CSD), manufactures sheet metal parts, printed circuit cards and telephone switch sub-sets for MSE. To speed up production, the CSD load parts assembly for each assembly operation supports on transportable trucks for just-in-time delivery to Taunton assembly teams. Other GTE business units with roles in MSE are electronic systems and services (ESS) organizations in Needham, Massachusetts; the electronic defence sector in Mountain View, California; and C Systems sector of the North Carolina Systems Center at Triangle Park Research. PRODUCTION MANAGEMENT The undevented nature of MSE focused on production management issues that affect the role of equipment, process, resources and integration and test management. Equipment Management Our approach to the MSE project report identified a number of factors that led to the decision to build a new production facility for MSE; the design of the equipment was also strongly influenced by the same factors: the bulk of the working content was to be the installation of the system and integration into shelters, testing and preparation for shipping. Sub-sets (perimeter cards, nests, wiring and backplanes) would continue to be produced in other GTE installations where they were already produced. We have recognised the need to avoid the impact on ongoing production commitments in our existing facilities. Our approach to resource management involved the use and strengthening of self-managed, self-service assembly teams. We required an available, appropriately qualified work pool. Our continuous production philosophy, aimed at eliminating loops and rear tracks, required the arrangement of the production floor, which was not then available in existing GTE facilities. Location was Taunton, Massachusetts, just over 30 miles from Needham, the site of our existing manufacturing facility. MSED Production Floor Work Cell & The factory is housed in a 300,000-square-foot building, with an additional 88,000 square feet of warehouse and storage space in three adjacent buildings. The factory receiving the bay and the transport dock shall be collated on one side of the plant; the work cells are arranged in the middle of the production floor, lined on one side with stock and kitting stations and test area on the other. We evaluated two factory floor layouts for their suitability to support continuous flow production. One was the assembly line approach, typical of the automotive industry, in which the product goes through successive stages of assembly. At each stage, one or more persons assemble one or more parts of the product. The second was the concept of a working cell in which the product–in this case the device shelter–remains in one place while successive sets of material cycle through the cell. We have chosen the working cell approach because the MSE communication package has 17 types of shelters, some or all of which may be on the floor at the same time. Assembly lines are not suitable for handling multiple products. Entering a small group of people to assemble each shed increases productivity and insties pride in ownership and pride in quality processing. Today our factory supplies more than 80 shelters every month (90 per month in 1990). Since the start of operation in 1987, we have not missed the contractual delivery date. He owes credit for this success, especially to our people, but also to some small part of the design of their physical environment. Task management Responsibility for task management rests with the project manager who prepares and permits tasks that define and authorize work packages and related budgets for work to be performed by engineering and manufacturing organizations Maintains task authorization file and document changes to work content, budgets, and schedules to reflect the directional changes Maintains and updates the work breakdown structure as needed to reflect the directional changes Maintains the plans of the main programme; examine them in order to resolve any inconsistencies with task authorisations, task planning lists and detailed operational plans The Facility Manager shall supervise a group of task managers, each responsible for completing the work to be carried out under one or more authorisations to perform the task. These task managers participate in weekly and monthly program progress assessments and initiate changes to the contents of the work package in response to changes in the product mix or production plans. ASRS Robotic Equipment Process Management GTE has combined four individual production concepts into a state-of-the-art, integrated, computer-driven system that saves money, time and effort and greatly improves the quality of our products: Just-in-time (JIT) planning first-in, first-out (FIFO) a lot Automatic Storage and Retrieval System (ASRS) Paperless Factory Just-in-Time Scheduling. The JIT eliminates costly storage of equipment components. Mse's inventory is procured from 32 subcontractors and 700 suppliers and from several internal GTE suppliers to be assembled into transportable shelters at the Taunton factory. The JIT schedules these purchases to save storage space by concentrating each purchase on one particular assembly job at a time and eliminating the duplication of warehouse capacity elsewhere in GTE. In fact, we use the modified JIT approach. Instead of using a clean deliver at 2:00 p.m., use it at 2:05 p.m. Jit standard, we plan a small amount of material, in conjunction with a small reserve stock Internal GTE components (sheet metal parts, printed circuit boards and sub-sets) are supplied in single-purpose trucks designed specifically for the transport of MSE parts. With this approach, stocks are minimized; inventory of work in the process practically does not exist. A side benefit of JIT planning is the timely identification of quality problems. Since we have low inventory levels, these problems surface quickly and are resolved quickly, rather than remain buried in large, aging stocks. Control of the first, first lot. The selection of components from the warehouse is controlled by the computer to send the oldest parts in stock to the kitting station first. This practice reduces the risk of long-term storage of sensitive parts such as integrated circuits and batteries, which may deteriorate over time. Computerized FIFO kitting also provides traceability of fielded shelters if quality components defects are identified after dispatch. Automated storage and search system. An important element in the MSE factory is mechanized/robotic material handling and kitting. In older factories, kitting is done manually, with people walking up and down stock aisles to get components and bring them to kitting stations. In the beginning, we knew that this approach would not keep up with the requirement to supply the army for a mix of up to 17 different types of shelters amounting to 80 to 100 shelters per month. Our automated storage and search system eliminates manual handling of components and thus accelerates production. The ADR consists of a network of conveyors that transport materials to totes from receipt through incoming inspections to the warehouse for direct storage in three carousels. When a factory order comes to the floor, robots remove the required components from the warehouse carousels and move them to the kitting station. After transferring these components to the trolley of the kit, the conveyor sends the excess parts back to the robot to return to its original position on the carousel. ASRS writes off the inventory database for a number of components kitted out and later credits the database for redundant parts returned to the warehouse. The alternative to ASRS is to do everything manually: stocking, place recording, kitting out lists and keyboard input to credit and post inventory. Manual access would require three times the current staff of the MSE storage room and would critically hinder production. Paperless factory. Extensive use of single-track factory orders enables virtually paperless factory and real-time computer control of production. Each kit trolley contains all the components necessary to perform one operation in one shed. After moving the cart or completing the operation, the responsible officer will use a laser reader to scan the accompanying factory barcode, eliminating the need for component transfer documents and moving tickets. Because the status of the work being processed is immediately sent to the MIDAS application running on the central computer (see our discussion of automatic management tools), the error-prone keyboard time-consuming item is removed. Real-time status for the entire production is therefore available to anyone who has access to the computer network, including our customer. In the same way, we create inspection records, and deficiencies become part of the computer quality database used to evaluate and correct errors. Alternatives to barcode factory orders are travel cards, component conversion documents, and hand-generated inspection records, all stitched to bulky move tickets. In less automated factory mountains paper are created and inaccuracies resulting from manual recording sneak into the database. Worst of all, because accumulated documents are entered into a database based on a one-day batch, real-time visibility is never really achieved. While none of the four production management techniques described above is original for GTE, our integrated use of them is so effective that production managers from both our MSE subcontractors and our army customers have asked to visit the MSED factory to learn about them. Resource Management V GTE implements government-supported production guidance known as Total Quality Management (TQM). In order to continuously improve all processes to meet customer needs, TQM is standard practice in GTE government systems and has particularly wide applications in production, where the process is also a production culture. TQM replaces the traditional culture of production and flooring, in which work planning, planning and problem-solving are interpreted by the chain of command of the line management and in which the worker knows only one process or function on the assembly line. TQM places responsibility for production and decision making right on the collective shoulders of the people who do their job. Under the leadership of TQM, production staff are organized into self-managed work teams. These teams include specialists from all departments who contribute to the work carried out. Assembly teams are usually supported by people from production control, manufacturing engineering and quality assurance and testing. and shelter integration tasks are performed by six teams, usually 15 people each. Each team is responsible for producing a certain number of reports each month (changing shelter takes about six weeks to build from the date of the factory order to dispatch; the other shelters are completed in two to four weeks, depending on the complexity). Teams meet every morning at 7 a.m. to decide what skills are needed to complete a task that day and schedule personnel tasks. Tasks rotate so that each member works on different tasks instead of performing the same day of tasks on the day off. The kits are built under the pull policy – each team pulls the components and tools it needs, instead of waiting for the assembly station to push them to the production floor. Teams are learning that quality is built into their product rather than controlled into it. They get it right for the first time by implementing the factory's self-stop policy, which empowers the responsible team to stop production whenever a problem arises that needs to be resolved. To meet production goals, teams initiate solutions to problems, monitor production and quality, and identify and implement productivity methods and processes. Team members are in close daily contact with each other, as well as with line managers as needed to ask for resources to implement the team's suggestions and solutions. Therefore, decisions on the order of tasks are developed from the bottom up, not directed from top to bottom. At Al Dettbarn, former director of MSED Production and current director of Total Quality Management, assembly teams are really the key to our success in the MSE program. Everyone else, including the senior managers of the division, plays a supporting role. Order at the barcode factory We recognize and reward team and individual performance and contributions to higher productivity and quality through team and individual outstanding performance awards and through employee evaluation exercise. Everyone has a personal share of being a member of the best team on the floor. In a program that includes community college involvement and career development, we encourage MSED workers to train for job enrichment and career progression beyond the learning curve needed for their particular function of major corporate resources- the technical, financial and human-available MSE program, our people, working under TQM, are making by far the greatest contribution to our outstanding contract performance. Integration and test management To incorporate a new communication system into the operational machine of the military unit, the unit it acquires must withdraw (become inactive) for the period during which the system takes place in the field, integration and training. Given the significant impact this standdown could have on national defense readiness, mse's contract requires that such downtime be held to an absolute minimum. System and test planning has become the focus of our efforts to ensure that the fielding system is run as smoothly and fastest as possible and that the equipment works from the very beginning. Excerpts of integration and test plan are we test equipment in several stages of the production and integration process, including acceptance testing, on fully integrated facilities and shelters in our plant. Subcontracted equipment tested before being sent to our factory. We confirm interoperability by testing devices at subsystem and system level. Before sending to the army acquires troops, we give all assemblies the final product of reassment and evaluation test, a formal process witnessed by government officials. Moon assembly team In the field, each MSE system is subjected to acceptance testing in the form of field training carried out by the unit it receives. Through careful implementation of our integration and test management plan, every MSE fielding date has been met and no Army unit has been required to withdraw for longer than expected. However, as the following story suggests, MSE, like most projects, has experienced its share of problems at the outset going on, and only through the extraordinary efforts of many dedicated people on both customers and supplier sides have we managed to meet our goals. In February 1988, we sent the first 85-shed MSE system to the 13th Century. It was supposed to be in operation for 26 months. To meet this schedule, we had to ship four shelters a day a few weeks before the deadline. To complicate matters, notifications of technical changes (CNs) were written almost daily in the first months of the contract. Every morning we decided which shelters to be delivered the next day. When all available SNS were installed in a given shelter, a government representative residing in the plant witnessed the final test and we read the transit shelters. Once shelters were secured for transit, all late-inbound CNs were held for installation at Fort Hood between months 22 and 26. Not unexpectedly, we sent some shelters that had uncritical CNs missing. So, as Month 24 approached, we transplanted the production team from Taunton, along with tools and parts kits, to Texas for six weeks to incorporate the missing CDs. This was done, with the approval of the army, so we could attach shelters to HMMWVs [army high-mobility Multi-purpose wheeled vehicles] while waiting for our CN kits to arrive. To house this effort, we built a huge tent capable of hiding four trucks, tools, kits and people. The tent had three canopy ports on each side to partially hide six other trucks so we could work on ten shelters at once. Our team worked a 12-hour shift, or until the day the goals were met, sometimes late in the evening or early in the morning. last night we worked continuously installing and testing the latest CDs. We got into one shelter with one cable, which the customer's representative in charge refused to sign. Our parts man returned to the hotel; so we called him back to the tent and passed parts of the box until, about 7am, we found a good cable. At 9:00, 15 hours before the scheduled contract, the 13th Signalers arrived and seized their system. Finally, we delivered a fully integrated, tested, signed and functional system within 26 months of being granted and without a detailed written specification for the system configuration received. In the meantime, our work surface has been given a sobriquet Merlin tent for the magical things we've done there. On April 19, 1988, the Army signed a transfer of ownership of the DOD for the system, and on April 9, 1988, the Army signed a transfer of ownership of the DOD for the system. Our field efforts have shown that the main communication programme may not take ten years or more to move from the definition of requirements to initial operational capability in this area. LOGISTICS SUPPORT MANAGEMENT MSED'S System Support Organization plans, schedules, and supervises the work of GTE Electronic Systems

and Services (ESS) organization in providing fielding, training, and integrated logistics support (ILS) for equipments built for the MSE program. System support is tasked with defining procedures to facilitate system deployment, operation and maintenance. Assign MSE maintenance and repair responsibilities to suitable devices. You will provide operational and maintenance data, training programmes and depot management plans. Ensure an orderly transition of MSE support tasks from GTE devices to the military logistics support system. Figure 3. MSED Systems Support's ILS team is staffed by highly qualified staff with practical experience in planning, fielding and tactical switch support. Fielding MSE Fielding, which began in Fort Hood, Texas, in February 1988, will continue until 1993 at army locations in the United States, Europe and Korea. The systems are in the field for signalling units and their associated user units, which are not a signal, as a total package. Usually, a location in the field is wintered near each signal unit. The site shall include the necessary assembly areas, equipment and facilities, plus storage, administrative and unit training areas, to transfer all equipment to the acquiring unit and to provide a fully trained, staffed and supported MSE system. There are 20 terrain sites within the continental United States and three overseas. The fielding schedule is especially important because each army division is gradually deactivated for MSE fielding and training. The unit may be able to perform routine maintenance or training exercises during its standdown; but, bemuse his system is out of order, not available for active service. After deactivation, the unit replaces its army tactical communication system equipment with MSE, is trained in system use, and conducts field exercises with the system. Equipment supplements vary from, say, cavalry, armored, or infantry division. The device usually flows first into the battalion of the signaling battalion unit and then into the entire division or corps. As shelters and other facilities begin to arrive on site, the ESS fielding team receives, supplies, and assembles all components to ensure optimal functionality. Testing and verification of destination and final acceptance shall identify and repair any damage during transport. Before turning the system to the incoming unit, we adjust the subsystem in the field using a representative subset of field covers. All major kits are tested for full functionality using live voice, data and facsimile traffic. When the network passes field testing, it is released to get the unit to start training. After training and field exercises, the acquiring unit is reactivated. Any deviation from the master plan for one unit creates a domino effect of delay that would be unacceptable to the military. Not once has GTE slipped fielding a start-up date or end date of a workout. MSE Fielding Site Layout The original sequence of MSE start dates for five U.S. Army Corps is shown below; the accompanying table shows the extent of the field effort: 3rd Corps – February 1988 at Fort Hood, Texas 5th Corps-March 1990 in Frankfurt, Germany 7th Corps-January 1991 in Ludwigsburg, Germany 18th Airborne Corps - December 1991 at Fort Bragg, North Carolina 1st Corps - December 1992 in Camp Casey, South Korea In January 1991, Camp Edwards of Cape Cod, Massachusetts was named consolidated staging site for the assembly and processing of MSE systems for ship-merit worldwide. Fielding's plan was subject to change by the military. For example, in December 1990, we sent systems to Germany to be executed on 7 December 1990. But because the seventh alternative mission is rapid deployment, the corps sent to Saudi Arabia the day after Christmas, leaving its MSE system in storage in Germany. When the seventh went stateside at the end of the Gulf War, we had to ship their MSE suite back home for fielding. Another factor expected to impact the fielding schedule is newly enacted cuts in army funding resulting in major shifts in troop assignments from regular army units to reserve and National Guard units. The training importance that the Army assigns to training on the MSE program is underlined by the fact that GTE can receive full payment only after completing two post-delivery program requirements: (1) acceptance testing of fielded equipment and (2) unit training, as evidenced by the successful completion of field exercises. Msed's support organisation plans and oversees users and MSE operators in each unit it acquires. Unit training is manned by GTE Electronic Systems and Services (ESS). In the beginning, we had to find and train civilian instructors to, in turn, teach the army scents and outs equipment and its support systems. In some units we are also trained army personnel to conduct high-level indoctrination courses for infantry, quartermaster corps, and other unit commanders with communications management responsibilities. GTE is under contract to train more than 45,700 army personnel to operate, use and maintain the MSE system. Groups of between 20 and 70 MSE instructors are sent to each unit it acquires because it is worth fielding. The teaching schedule must be integrated with production and field plans so that we can ensure an adequate level of staff for each area. When we fielded the first MSE system in Fort Hood, Texas, we provided training there for 3rd Corps active units, along with support reserves and National Guard units, from Texas and six other states. In 1990, we had up to 350 ess people in Germany on MSE fielding and training 5. GTE MSE support team moves with the STORM Hafar al-Batin RSC In operations Desert Shield and Desert Storm, GTE's Mobile Subscriber Equipment (MSE) was supported on site by 46 GTE Electronic Systems and Services (ESS) personnel and other civilian volunteers from MSE regional support centers at Fort Hood , Texas, and in Frankfurt, Germany, who set up an MSE support center at Hafar al-Batin. Saudi Arabia, a disappearing 10 miles from the Kuwaiti border. GTE has done something it has never done before in a fight, said regional center support manager Bob Dunn. Bob was at the time talking to us at the MSE GTE facility in Taunton, Massachusetts from an MSE phone linked to the GTE Spacenet Corporation satellite dish located just outside Kuwait City. We showed the military that we could go anywhere they go-and do everything they needed to do to keep their communications up and running. Mark Beranek, ess field support technician, was one of the first two GTE people to enter Kuwait City. Paul Thiffault and I were with 142. The Marines had an MSE mobile participant radio terminal (MSRT) in a staging area right outside the city, Beranek said. As the battle progressed, the node's center switch and large extension node skipped to maintain contact with our rear and command center in Riyadh. Some of General Swartzkopf's commands came through MSRTs, Beranek continued. The device worked well in its combat debut. We helped relay the MSE digital device with marines' analog radio phones. In addition to on-the-ground command and control, the Marines received and transmitted tactical satellite communications to assess the damage in combat. They then called air force units with information on the damage assessment in the battle to strike if necessary. Our MSE device worked directly for two weeks with only 45 minutes off. And it was a true claim that it could be set up and taken for only 30 minutes, noted Beranek. Some of the army units had MSE fielded to them when they got to the Saudi-based what you might call receiving mail-order MSRTs, said Charlie Benjamin, logistics manager for the Desert Regional Support Center. Gene Kocmoud, Cordie Dennis, and I were training soldiers for equipment when they came to the region. Our unit training curricula use multimedia and graphic training tools such as interactive video and training simulators. We also provide detailed, hands-on training for system management for communication-electronics planners and operators who will set up a network and work in system management centers: We have training for getting unit subscribers in classrooms and in this field to familiarize themselves with the user features of the system. We provide Signal Corps training for train operators to work as a team to assemble, initialize, operate and maintain facilities in the area. We assist the army in field exercises in which the unit conducts extensive operational exercises in a simulated combat environment. We monitor the overall effectiveness of the exercise while the unit itself sets up and operates the system. The main limitation of the schedule in the field is staffing during the basic and option years of the contract. Staffing is an important factor in adjusting field schedules and contingency training, such as the reassignment of the Seventh Corps to Operation Desert Storm. In addition to the training incident and fielding, ESS will teach MSE systems courses to 5,000 students a year for the next 20 years at our resident school in Fort Gordon, Georgia. These efforts are equivalent to establishing a university, hiring 50 instructors, and educating a student body in highly technical subjects. Types of courses offered at Fort Gordon include operation and maintenance training of digital and microwave technology training instructors and key staff training staff training professional development maintenance MSE contract mandates central maintenance equipment to be separated from one of the army's two in-place electronic repair facilities in California and Pennsylvania. This facility will support a worldwide network of regional support centres. For the convenience of maintenance management and inspection, we have decided to send a central facility to our factory in Taunton, Massachusetts. Regional support centres are managed by ESS staff at four domestic and three overseas locations. A temporary regional support centre has been set up in Northern Arabia to service mse systems used in Desert Shield and Desert Storm operations (see gte mse support team sidebar). FOLLOW-UP OPERATIONAL TESTS AND EVALUATIONS As part of the U.S. Army's ongoing review Evaluation programme, MSE has been subjected to a formal follow-up operational test and evaluation (FOTE). The exercise was conducted by the Operational Testing and Evaluation Agency (OTEA), the army's independent testing service for electronic systems, from 9 to 10 September 2015. Given that the results of this test would influence the army's decision on whether to fund option years 3-5 (1991-1993) of MSE's core production contract, FOTE was a program-critical milestone for GTE. FOTE assessed MSE: Overall suitability and effectiveness in fulfilling the intended performance functions based on the contractual requirements and requirements specified by participant Deficiencies and consequent need for system modifications or improvements Test preparation During 18 months of gte exercise preparation, the MSE system consisted of nine different types of protected mobile communication kit (69 shelters), three types of user terminals (683 telephones) and four types of support devices (13 units) for a total of 785 separate test items fitted to 85 mobile vehicles. 1. The Cavalry shall be the 13th edif We trained the first cavalry subscribers to use MSE, 13. We also modeled a network (through computer simulations) to identify roads and time periods that would experience different traffic loads. We checked otea call simulators. And we provided four technical assistants to perform all necessary maintenance support during the exercise (no other contractor personnel were allowed to participate in the FOTE). Test results Subsequent operational tests and assessments have convincingly demonstrated that MSE is operationally fit, efficient and better than the army's sleaved communications system installed. Operational suitability. The suitability of MSE has been confirmed by: a high level of availability and reliability of its reports; Excellent performance of its support equipment; The ability of soldiers to effectively install, operate, use and maintain the system; Its easy transportability; the effectiveness of their emergency power supply systems; and its ability to successfully communicate with army Combat Net Radio (walkie-talkie) equipment. operational efficiency. The effectiveness of MSE has been demonstrated: Its consistent call throughput; Its high mobility; Its ability to provide continuous service, even if the node center elements of the system were in transit; Its interoperability with the communications equipment of the Army of Higher Echelons, with the North Atlantic Treaty Organization communications suites, and with commercial systems; and the ability of any suffix node to quickly reconnect to the adjacent hub of the node when to the associated hub node has been aborted. Operational superiority. MSE has proven to be better than the installed army tactical communication system in: Its higher call completion rate for a larger number of subscribers, its greater mobility, its faster service, and its requirement for significantly fewer support staff: At the conclusion of the FOTE exercise, key 1st Cavalry commanders and staff expressed the view of GTE personnel that MSE provides effective support for their command and control units. The final FOTE report identified the necessary improvements in system management, logistical support, training and communication security, which we subsequently resolved to the full satisfaction of the military. BATTLEFIELD DEBUT IN THE DESERT In early September 1990, the Army MSE-fielded 1. The Cavalry Division joined the ATACCS-equipped 18th Airborne Corps already in Saudi Arabia [ATACCS is the Army Tactical Communications System that MSE replaces]. When, in November, they were joined by the BY ATACCS-equipped Seventh Army Corps with its MSE-fielded Third Armored Division, a hybrid backbone communication system being deployed south of the Saudi-Kuwaiti border that included 50 GTE-built TRI-TAC circuit switches, 20 message switches and 20 MSE node center switches. Scores of other MSE devices were on the network with these switches to provide wired and radio communication between all ground forces between themselves and through the TRI-TAC gate with General Swartzkopf's headquarters in Riyadh. After launching a 100-hour ground campaign, the Third Armored Division, with its 143rd president, was the first to launch a 100-hour ground campaign. On the way north to cut off the retreat, a third headed east to engage and crush Iraq's elite Republican Guard inside Kuwait. The third commander received many of his orders via his MSE radio phone, while the 143rd Air force was 143. Mse's facilities played great during the Gulf War, operating for two straight weeks with just 45 minutes of downtime. The system has proved true to the claim that it can be set up and disparaged in just 30 minutes. He has fully achieved the stated goal of the TRI-TAC communication system: The President will be provided with effective communication from foxhole to the commander of the theater. Praise for MSE's performance in the Gulf War began to pour in from subscribers and operators much like weapons fell silent in the Persian Gulf: [In a desert storm, the military] fought with MSE as our primary communications tool, said Major General Paul E. Funk, Commander of the 7th AMSE is much better than ATACCS, especially in highly mobile and intense conflict.... During Operation Desert Storm, ... [143.] Signalers actually won their fight Radio access unit As stated in the Army Communicator, 16:2, Lieutenant General Franks, commander of the Seventh Corps spent two days with the Field Command of the Third Division and was always able to communicate. Told about the experience, this was the third armored division's best hour in any conflict ... 3. Armored Division had the best communication in the corps. But perhaps the best praise of MSE's performance came from Lieutenant Duggan, the platoon leader with 93. Neil Munro, staff writer for Defense News reported enlisted soldiers and officers saying that the Army's overall command, control and communications system worked effectively. One soldier with a Third Armored Division confirmed: MSE is worth every dollar the army paid for it. MSE PROJECT MANAGEMENT-SUCCESS In its preproduction demonstration in the French countryside near Nancy; in its subsequent operational test and evaluation tests in Fort Hood, Texas; and in its battlefield debut in the Persian Gulf, GTE Mobile Subscriber Equipment has made its mark, has shown its value, and won its awards. DOD VALUE ENGINEERED CONTRACTOR OF THE YEAR AWARD In a ceremony at the Pentagon Auditorium on 24 July 1990, Honorary Donald Atwood, Deputy Secretary of Defense, presented gte government systems corporation with the Department of Defense (DOD) Value Engineering Contractor of the Year Award for 1989. The GTE award was awarded to Prime Minister Francis Gicca along with other members of the company's management team. This major DOD quality award recognized GTE's value engineering achievements on mobile subscriber equipment (MSE) contracts for the U.S. military. Value Engineering is a systematic functional analysis leading to action or recommendations to improve the value of defence electronics systems, equipment, equipment, services and supplies. It also aims to improve product quality, shorten supply schedules and reduce costs. This awards program was introduced in 1982 to highlight the potential of value engineering to contribute to DOD's efforts to increase the efficiency of defense procurement and the economy, as well as to support the development of productivity and cost reduction programs within military services and among defense contractors. GTE's success characterizes the continued commitment of its mobile device division participant to the overall principles of quality management and practice. Total Quality Management is dod's main human resources management initiative, at the division's factory in Taunton, Massachusetts, self-managed and self-service engineering, manufacturing and quality work teams meet production goals by designing problem solving, monitoring production and quality, and then identifying and implementing optimization methods and processes GTE's commitment to overall quality management has delivered strong results in employee productivity and morale, product quality, cost reduction and customer satisfaction in the mobile subscriber division and other government systems corporation business units. GTE's Value Engineering Contractor of the Year quote read in part, In FY 89, GTE contributed significantly to reducing the cost of the department's [Army] material [procurement] programs, resulting in savings for the government of $21.7 million. These savings were the culmination of proposals to change the evaluation engineering submitted under the mobile subscriber equipment contract. Mr. Atwood's presentation concluded with: I look forward to continued GTE support and success in [Value Engineering], with benefits for both the Department of Defense and your company's backing board reads: In recognition of the outstanding success in gte engineering of government systems Corporation 1989 The achievements of our MSE program to date reflect in no small measure his carefully crafted project plan; the implementation of many innovative and sophisticated project management techniques; and commitment of gte men and women, its MSE partners and subcontractors, and their counterparts in the Army Program Office to excellence in cost, schedule and quality performance. The MSE Desert Shield/Desert Storm Awards GTE Government Systems Corporation provided most of the command, control and communication (C3) systems used by U.S. ground forces during the 9-month Gulf crisis. The feat of excellence in C3 systems produced by the GTE Mobile Subscriber Equipment (MSE) Division (MSED) of Taunton, Massachusetts, has been honored in four U.S. Army awards. Pictured left to right: GTE Government Systems President Francis A. Gicca; Vice President and CEO Bernard Resnick; and U.S. Army General William G.T. Tuttle, Jr., Commander, Army Materiel Command The 57th Signal Battalion conferred its Certificate of Achievement (undated) on GTE for Superior Performance and Support of the [57th's] Soldiers and Families... before, during and after Operation Desert Shield/Desert Storm. 1. The Cavalry Division of the 3th Army Corps has awarded GTE a certificate of success of 17 October 1990, although in April 1991 during the deployment of the Division ... for Operation Desert Shield and Desert Storm. At a ceremony in Fort Gordon, Georgia, the 28th supporter and contributor to the strengthening of the United States Army Signal Corps. At 28 Tune 1991, General William G. T. Tuttle, Jr., commander of the U.S. Army Materiel Command, presented gte with the Army' certificate of recognition ... for excellent cooperation, and Responding to requests from the U.S. military to support Operation Desert Shield/Desert Storm. The GTE award was awarded to Bernard Resnick, Vice President and Ceo of MSED; guests at the ceremony were held at a division of the Taunton, Massachusetts facility including Taunton Mayor Richard Johnson and U.S. Army officials. In comments prepared for MSED's Staff Appreciation Day exercise, General Tuttle praised... this group of Americans who could put this [system] together, solve complex problems, produce on time and under cost ... this is a success story that transcends the desert.... Your care, your interest in quality, for getting things done on time, [and for] figuring out new ways to do the work–all of this has been an important part of MSE's success on the battlefield.... You were forced to use an absolutely amazing system in the desert. Albert A. Dettbarn is Director of Overall Management Qualifications for Management, Management and Communication Systems of GTE Government Systems Corporation. Previously, he was director of operations of the mobile participating equipment (MSE) division of government GTE systems, which was responsible for the production, quality assurance, procurement and operation management of the MSE system. Since joining GTE in the 1950s as an industrial engineer, Mr. Dettbarn has held positions of increasing responsibility as an industrial engineer division and in many manufacturing and program managers, including manufacturing manager, and program manager of the Tri-Service (Army, Navy and Marine Corps) tactical communications program, called TTC-39, the precursor to MSE. Mr. Dettbarn earned a degree in electrical engineering from Clarkson University, a postgraduate degree in industrial engineering from Columbia University and a postgraduate degree in computer science from Boston University. Richard E. Little directs the management systems of the Office of Command, Control and Communications System Sector gte Government Systems Corporation, where he is responsible for project management methodology and project management team development for a portfolio of more than 100 projects with a total value of more than $5 billion. He has 35 years of experience in technical design, software development and engineering and project management. Since 1985, he has been with GTE Government Systems Corporation as program manager for command, control and communications (C3) contracts for the U.S. Department of Defense. Mr. Little holds an AB degree in mathematics from Bowdoin College, Brunswick, Maine, is a member of the steering committee of Boston University's Center for Project Management, and has been invited to speakers at Boston University and the Massachusetts Bay chapter of the Project Management Institute. He holds several patents in the field of network management and control and is a certified project management professional. A. Dale McMullan is a design specialist GTE Government Systems Corporation's command, control and communication systems sector. He has more than 35 years of experience in various fields of the communication industry: first as a medical writer for Massachusetts Eye and Ear Infirmay, then as an English teacher at prep colleges in New Jersey, Texas and Massachusetts; and more recently, as an engineering writer/editor and editorial group supervisor, gradually, raytheon, digital, and honeywell corporations in Massachusetts. Mr. McMullan published corporate newsletters, style guides and business plans, as well as a monthly newsletter for the Boston chapter, the Society for Technical Communications. He worked as a city desk editor for the Worcester Telegram-Gazette in central Massachusetts. Educated at Milton Academy and Harvard College, Mr. McMullan has a master's degree in business administration from Babson College in Wellesley, Massachusetts, and has credits in Boston University's education. This material was reproduced with the permission of the copyright owner. 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