



## Logistics Association of Australia Ltd

### TEXAS INSTRUMENTS DEFENSE SYSTEM AND ELECTRONIC GROUP

In the second of his reports, 1993 International Study Award winner Terry Brookshaw reports on his visit to the eight largest defence electronics contactor in the US, TI-DSEG.

Formed during World War II, Texas Instruments Defence Systems and Electronics Group (TI-DSEG), a subsidiary of Texas Instruments Inc., has grown to become USA's eight largest defence electronics contractor. TI-DSEG employs 15,000 people and operates eleven manufacturing, testing, research and distribution facilities at sites located in North and Central Texas.

The group's major customer is the USA Defence Department which represents \$2 billion of sales out of \$7 billion total sales. About 10% of total sales are to US allies. In 1992 the company won contracts to make anti-armour weapon systems and airborne computers. These new markets are expected to account for a growing share of company revenue.

Approximately 10 minutes north of downtown Dallas is the Forest Lane site. There are 3000 employees in 100,000 square feet of buildings. The site designs and manufactures precision guided weapons and airborne radar systems, infrared vision equipment and other electro-optic systems this is where electronic warfare systems begin their life. TI-DSEG believes its full-scale conversion to Total Quality Management (TQM) is making it a stronger competitor; a competitor up to building market in a contracting defence industry.

TI-DSEG is aiming to achieve Six Sigma\* quality by 1995, and to reduce product development time by 25% each year - an incredibly challenging target. TI-DSEG systems reliability exceeds specification of its Defense Department customers by as much as four or five times. The company believes strategic planning, wide use of concurrent engineering methods and a strong relationship with key suppliers have helped penetrate new defence markets, while increasing its share of five of its existing markets.

TI-DSEG views TQM as the best approach to accomplish any objective - from increasing market share to controlling employee health care costs. The company sees teams as the most effective means to execute its quality

strategy. At TI-DSEG quality goals and business goals are one and the same. The aim is to trim organisational level and transfer day to day decision making authority to workers. The company has trimmed organisational layers to five (down from eight in 1990) and increased numbers of employees per supervisor.

For each market segment, TI-DSEG translates key requirements, such as reducing the power demand, size and weight of airborne radar systems into clear improvement goals for products, processes and services. They in turn establish for all work units, measures for tracking progress toward customer satisfaction objectives and managing internal processes.

TI-DSEG claims that its evolving TQM approach comes mostly from an accumulation of lessons learned from other companies. It has an active benchmarking program managed by full time "champions". The group's goal to achieve Six Sigma quality is founded on a study of the quality program of the Motorola Company.

TI-DSEG has significantly increased investment in training. The entire workforce completed Six Sigma statistical training and quality in 1992. With this completed training all the workforce are schooled in design quality, statistical tools and other quantitative problem-solving methods.

The company's thrust is to make information immediately available and easily accessible at all points in the company with on-line computer systems, standardised data formats and interfaces, barcoding and integrated data collection. TI-DSEG is linked electronically to customers and suppliers. Fifty six percent of purchases from suppliers are done electronically.

A US Navy evaluation of 17 Harm and Strike Missiles made by TI-DSEG found them more reliable compared to their competitor, with the largest mean time between failures. Since 1987 the number of quality audits conducted by customers decreased by 72%. Formal complaints have fallen 62% since 1988.

An anecdotal example of TI-DSEG's ability to meet customers' needs with a short cycle time, was during Desert Storm, when TI-DSEG played a critical role in quick development of a weapon, in particular, a weapon guidance system.

For days US warplanes had pounded the Iraqi military bunker complex of Al Traji airbase north of Baghdad without success. On the evening of February 17, four days into the ground offensive against Iraq, a US Airforce F-111 fighter bomber launched a long cylindrical device, guided by a laser, which entered an air duct entrance to Al Taji bunker. About seven seconds later a huge explosion ripped through the command post. Coincidentally or not, a few hours after the destruction of the Al Taji command post, Iraqi officials indicated their readiness for a cease fire.

This example serves to explain TI-DSEG's ability to fast track an effort to satisfy customer needs in less than two weeks, where months would normally be required. It's part of the company's preparedness to cut through red tape and not sit around waiting for a contract to be signed. TI-DSEG was prepared to figure out how to get paid later and when to get paid. This would go against the grain for most companies. But if the strategic/key customer is critical to the company business then TI-DSEG believes the customer needs are why it exists, from sales and marketing right through to suppliers, distribution and production.

TI-DSEG partly achieved the Desert Storm result because of reductions in cycle time, dock to stock from 35 days to 3.5 days, a procurement cycle of requisition generation to specification validation and clause checks from 16 days to 3.3 days. 30% of orders go to suppliers without human intervention. This is due to an electronic worldwide requisitioning "live" procurement system.

It's within this context and background that the real lessons from a logistics aspect, in particular supply management, can be learnt. TI-DSEG Materials Management Centre's objective is "To provide our customers with quality material at the lowest total cost of ownership and the shortest cycle time".

Its total cost of ownership process revolves around a Supplier Performance Multiplier (SPM), since up to half the content may consist of purchased parts. The SPM is a rating of supplier's quality and cost. The electronic purchasing system (Global Acquisition System), takes a sample of certain numbers of purchase orders per type of suppliers and type purchase order, and develops an algorithm which is then applied as a benchmark for all suppliers.

TI-DSEG spends as much time and resources training its suppliers as it does its own people. This comes after a focusing process to narrow its supplier base to those prepared to commit to TI-DSEG success.

TI-DSEG has a worldwide procurement council that looks at what is bought, the dollars, volume, number of suppliers. It benchmarked 17 companies worldwide to compare competitiveness. The group, however, does not measure the cycle time of need identified by the customer to supplier to customer delivery.

It claims the defence industry differs from the commercial market. It does measure total cost of ownership and quality. There is an Incoming Quality Plan (IQP). The company samples a certain number of deliveries to develop the algorithm for the (SPM) rating and does not inspect all items delivered. Twenty-five percent of deliveries are from certified suppliers. Suppliers are classified into four categories - Strategic, Critical, Transactional, Disengage. A sample is taken from each category and for given types of purchase orders and

suppliers to develop the algorithm. The performance rating is reported to suppliers monthly.

TI-DSEG had 1,500 direct suppliers in 1991, down from an optimised number 1,700 in 1988. In 1993 it had 900 suppliers with an ultimate goal of 500 in 1995. The Senior Materials Manager meets with marketing managers to review suppliers and needs for selection.

Fifty three suppliers (5% of total) represent 51% of dollars spent. Purchasing channels all orders, 0% are out of the system.

TI-DSEG has had a 12% productivity improvement and reduced inventory 13% over two years. Company wide revenues per worker have increased from about \$80,000 in 1987 to more than \$125,000 in 1991.

\* Six Sigma is a statistical term, indicating a defect rate of 3.4 defects per million opportunities or 99.99966% good product. Four Sigma is what the average company achieves. This is 6,210 defects per million opportunities or 99.379% good.