Capital Availability for Small Businesses with Dual-Use Applications

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Executive Summary

The defense drawdown is causing a contraction in the defense industrial base. The impact will vary among regions of the country and among industries. Defense-oriented contractors will need capital to convert to commercial work. Depending on where the company is in its conversion effort, it may need financing to conclude product development or modification, to purchase or modify plant and equipment, to develop a marketing and sales staff, or to support higher levels of inventory and receivables. In the current situation, the small business community is concerned that it may be hurt disproportionately because it will be unable to obtain capital for converting products, processes, and technologies with dual-use applications to remain competitive in commercial markets.

On the basis of available studies of small businesses in general, it appears that 15 to 30 percent of small businesses have difficulty obtaining capital. Among defense-oriented small businesses we polled, 28 percent of the respondents said that lack of access to capital was hindering their conversion efforts. Without specific information on each company's situation, it is impossible to determine whether the difficulty results from a market failure or simply from an efficient capital market rationing the available supply to the best use.

We also found that many defense-oriented small businesses are having trouble dealing with commercial markets. Many report that they are finding it hard to identify markets and to establish commercial channels of distribution. Those companies reporting difficulty in obtaining capital indicate that the most pressing need is for capital for marketing and promotional activities. We conclude that defense-oriented small businesses need more access to information and to advisory assistance, including information on sources of capital, in order to commercialize their products, processes, and technologies that have dual-use applications.

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CHAPTER 1

Summary and Conclusions

THE PROBLEM

Continuing reductions in the defense budget will have adverse impacts on the defense industrial base. The number of firms dedicated to defense work will decline; some regions and industries will be affected more than others. DoD is concerned that military-unique capabilities not be lost and wants to ensure that the industrial base retains the ability to respond to future emergencies. In order to preserve capabilities and promote technological innovation, DoD is encouraging defense contractors to seek dual-use (i. e., commercial) applications for defense products.

Defense conversion will require a number of changes in the way DoD and its contractors do business. This report examines only one potential problem of conversion: lack of access to financing for dual-use applications. Furthermore, we focus specifically on small businesses attempting to commercialize dual-use applications, as a portion of the industrial base that may be affected with particular severity by lack of financing. Large defense contractors are employing a number of strategies to deal with the decline in defense budgets. Some have merged; others either have bought divisions to enhance their capabilities or have sold divisions to concentrate on specific products. Also, large firms have a variety of options in the capital markets. They can issue debt or equity securities, and they have long, established relationships with large commercial banks. Small businesses usually do not have this kind of access to capital, and, basically, they operate in a different segment of the capital market from large contractors.

The drawdown in defense will have severe impacts in some regions and on some industries. As part of the downsizing, the capital markets will re-allocate capital to those firms with the projects and capabilities judged most likely to succeed. However, since the capital markets do not work perfectly, this report will examine whether small businesses may be suffering disproportionately as a result of market imperfections.

AVAILABLE DATA

This section discusses the lack of data on the group of defense-oriented small businesses that may have dual-use applications that they are trying to commercialize. While DoD does business with many small businesses as prime contractors, there are many others that are involved indirectly in defense work only as subcontractors or suppliers. DoD has good information on those that receive prime contracts, limited information on the first tier of subcontractors for major weapon systems, and little or no information on the many small businesses in the lower tiers that provide parts and components for defense items.

Small business trade associations from time to time survey their memberships about problems facing small businesses. While these surveys provide some information on capital availability for small business, they do not focus on defense-oriented businesses separately. Several states and regional authorities have performed studies of the impact of the defense drawdown on their areas. These studies tend to be broad and oriented toward directing companies to available resources for assistance. Capital availability is just one of many problems discussed.

Several companies and trade groups have provided anecdotes regarding the impact of downsizing on their firms or their regions. But anecdotal information is not acceptable for this study, because it may not present an accurate picture of the situation for the majority of defense-oriented small businesses.

Survey and Results

LMI conducted a survey to obtain data on whether capital availability is a serious problem for the target population of defense-oriented small businesses attempting to commercialize dual-use applications. We selected a random sample of 1,519 small businesses that were awarded prime contracts between 1988 and 1992. The survey asked three types of questions. The first question collected basic information such as number of employees, the defense share of sales, and whether the company operates primarily as a prime contractor or as a subcontractor. Questions 2, 3, and 4 collected information on the company's conversion efforts and the types of problems encountered. The final two questions asked specifically about financing problems. Appendix A is a copy of the survey instrument.

We received 253 responses out of 1,219 deliverable surveys, for a response rate of 20.8 percent. Table 1-1 shows the percentage of response by company size. While most of the companies responding had between 1 and 50 employees, we received responses in all size classes. This result is consistent with data from the Small Business Administration (SBA) indicating that the average size of a small business firm in the manufacturing sector is 34 employees. Relatively few of the respondents are highly dependent on defense. Twenty-eight percent said that defense accounted for over half their business. Sixty percent work primarily as prime contractors, while the remainder work mostly as subcontractors.

Table 1-1.
Responses by Size Class

Size class — number of employees	Percentage of responses
1 - 50	67
51 - 100	14
101 - 200	11
201 - 500	6
501 - 1,000	2

Chapter 3 presents a complete analysis of the survey. The main result is that 72 percent of the respondents said that lack of capital availability is not hindering their conversion efforts. This result means that 28 percent do feel that capital availability is a problem. But without information on each company's business situation, we cannot determine whether the problem is caused by a market failure. The top three responses describing conversion difficulties are "identifying markets" (28 percent), "no problems" (26 percent), and "obtaining capital" (25 percent). The respondents having difficulty obtaining capital were asked to identify specific needs. The highest ranking need is for capital for marketing (63 percent), followed by product development, inventory, plant and equipment, and establishing a customer service operation.[1]

Commercial markets seem to present a problem to our respondents. Several of the difficulties encountered are marketing-related. Aggregating the percentages of respondents saying that they had difficulty identifying markets (28 percent), establishing distribution channels (14 percent), or recruiting key personnel for commercial business activities (7 percent) shows that commercial marketing issues accounted for 49 percent of the responses. Of those who had difficulty obtaining financing, 87 percent identified a need for financing for marketing and for establishing a customer service infrastructure. These types of activities would not normally be financed with external capital, especially not debt capital. The predominance of problems related to marketing may indicate a need for information more than a need for capital.

Other Studies

While other studies do not focus specifically on our target population, they provide additional information about small businesses in general and about conversion difficulties encountered by defense contractors. The National Federation of Independent Businesses (NFIB), a trade association for small business, periodically surveys its members about their problems. NFIB conducts its survey every four years. Over the last decade, access to capital (either short-term or

[1]Since respondents were allowed to choose more than one response to the questions about conversion difficulties and financing problems, percentages add to more than 100.

long-term) has never ranked as a critical problem for more than 15 percent of the membership at any given time.[2] National Small Business United (NSBU) conducts somewhat less formal surveys. The latest survey, from 1993, reported that lack of available capital is a "challenge" for 30 percent of the members.[3] Capital availability ranked fifth as a challenge after the recessionary environment, health care costs, regulatory burdens, and Federal taxes.

An effort conducted by the state of Texas is an example of a regional study of the impact of defense conversion.[4] The study task force surveyed defense prime contractors and their first-tier subcontractors in Texas. When the subcontractors were asked what type of assistance they needed from the state, 39 percent said that they needed marketing assistance, 36 percent wanted help with financing, and 30 percent wanted help identifying overseas markets. Of the 13 prime contractors responding, 9 wanted help retraining their labor forces, 7 wanted marketing assistance, 7 needed financing assistance, and 7 wanted help identifying overseas markets.

Conclusions

We conclude that access to capital for small businesses with dual-use applications is not in general hindering their ability to convert to commercial work. While some defense-oriented small businesses are having difficulty obtaining capital, we would need additional data to understand why problems are occurring and what type of assistance is required. Studies of the small business community overall also report similar proportions of small business in general as having difficulty obtaining capital.

The transition from defense to commercial markets requires small businesses to acquire skills and to establish processes not needed for their defense work. We found that defense-oriented small businesses have a number of problems in learning to deal with commercial markets. We conclude that improved access to advisory services and to information, including information on financing, would be more helpful to those small business than merely improving their access to capital would be.

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[2] *Small Business Problems and Priorities*, William J. Dennis, Jr., The NFIB Foundation, 1992.

[3] *Survey of Small and Mid-Sized Businesses: Trends for 1993*, Arthur Andersen's Enterprise Group for National Small Business United, June 1993.

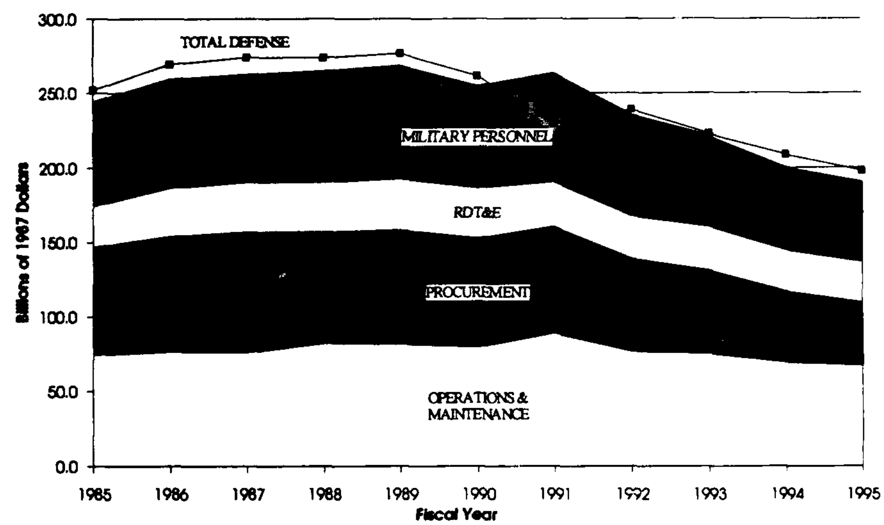
[4] *Defense Transition: Economic Promise for Texas*, A Report from the Governor's Task Force on Economic Transition, John Hannah, Jr., Chair, February 1993.

CHAPTER 2

Statement of the Problem

PROBLEM

The defense budget has been declining for several years and is expected to continue declining before leveling off at relatively low levels of spending. Figure 2-1 shows the trend in outlays in constant 1987 dollars for the major DoD budget categories from FY85 through FY95.[1] Defense outlays peaked in FY89, with the total budget expected to decline 28.5 percent between the peak and the projected FY95 level. The procurement category will experience the largest decline – 45.1 percent – while R&D and operations and maintenance (O&M) will experience smaller-than-average declines of 20.9 percent and 17.7 percent, respectively.



Notes: Total defense includes all other budget categories. Total in 1991 is less than sum of categories as a result of Gulf War financing.

Figure 2-1.
Defense Outlays 1985 - 1995

The decline in the defense budget means that the defense industrial base will contract. On the other hand, national security requires that DoD continue to have access to advanced technologies at a reasonable cost. One part of DoD's

[1] *Budget for Fiscal Year 1994,* Historical Tables, Table 3.2 – Outlays by Function and Subfunction: 1962 - 1999.

strategy to maintain defense industrial base capabilities is to encourage defense-oriented firms to develop dual-use applications for defense-unique products, technologies, and processes. Dual-use applications are those that can be used both in the commercial and in the military environment. This means that DoD will use more products, processes, and technologies developed commercially and also that commercial applications will be sought for products, processes, and technologies developed for military use.

This dual-use strategy provides a number of benefits to DoD. Defense contractors can enlarge their business base by adding commercial customers, thereby maintaining capabilities that might otherwise have disappeared. Serving commercial markets will make defense contractors more competitive domestically as well as internationally. Thus DoD will be assured of access to the most advanced technologies at a reasonable cost.

Defense contractors will face a number of problems both internal and external to their organizations, and also some problems resulting from government-imposed regulations. The most significant internal problem facing defense companies trying to enter commercial markets may be the development of a sales and marketing capability. Defense companies are used to dealing with a single customer within a well-defined, regulated framework. For commercial markets, those companies must learn how to work with many customers. They will also have to enlarge or develop distribution channels and develop customer service organizations. Some commercial applications may require additional investment in plant and equipment. Furthermore, they must take these innovative steps as DoD budgets decline and cash flow from defense business is reduced. Thus, defense contractors wishing to convert to dual-use applications must be able to raise both working capital and long-term capital to fund the transition.

The most significant external problem may be identifying a viable commercial market (including export markets) for the dual-use application. The logical commercial market for the application may not be any healthier than the defense market for it. Or the commercial market may already have a number of strong competitors, making it difficult for a new entrant to gain a foothold.

The structure and regulations governing defense procurement are quite different from the way commercial business is conducted. Although small businesses are exempt from the requirements of the Cost Accounting Standards Board, small defense companies with dual-use applications will still have to comply with government-mandated accounting requirements and cost principles.[2] Socioeconomic requirements not placed on private-sector firms are placed on firms doing government business. Compliance with government-peculiar requirements consumes defense contractor resources that firms dealing only with commercial customers can apply to developing their business. Defense contractors may also have more stringent export restrictions than private-sector firms, particularly if their product or technology has been designated militarily critical.

[2]Companies can avoid the burden of DoD-unique requirements by separating the production of commercial products from that of defense products, but doing so negates those benefits of dual-use applications that arise from economies of scale.

Export restrictions unique to militarily critical products and technologies eliminate a large potential market.

While companies must resolve the problems that have been outlined, this report focuses on the problems of raising capital to develop and harness dual-use applications of defense products, technologies, and processes. Specifically, it examines whether small businesses are at a disadvantage in the capital markets when attempting to convert.

FUNCTIONING OF CAPITAL MARKETS

An efficient capital market allocates capital to projects starting first with the highest rate of return and stopping at the point where the return equals the cost of capital. The return is a risk-adjusted rate: it takes into account not just the time value of money but also the uncertainty of the future cash flows. Risk arises from macroeconomic uncertainties such as future inflation levels, firm-specific characteristics such as the firm's capital structure, project-specific characteristics such as the technical risk of the application, the relative strength of competing firms, and competing technologies. Economic viability of a project is established by discounting the stream of investment costs and revenues at the firm's risk-adjusted cost of capital. Viable projects have positive net present value. Many of the data for these calculations are subjective (e.g., size of the market, share captured, cost of R&D, and rate of technical obsolescence).

A perfect capital market will make financing available to firms for dual-use applications *provided* returns are greater than or equal to the firm's cost of capital. The firm's cost of capital will reflect prevailing market conditions for capital and the perceived risks involved in the project. Thus, a firm with a high debt-to-equity capital structure undertaking a risky technological project is likely to have a relatively high cost of capital. If that firm is a small business that has been doing defense work, the capital market is likely to perceive the firm as even more risky. Thus, denial of access to capital is a necessary but not sufficient condition for a market failure.

DEFINING THE POPULATION

Legislation has defined a small business as one with fewer than 500 employees.[3] The Census Bureau recently performed a special survey of small business for the SBA. The results show that 99 percent of U.S. firms are classified as small businesses and that those firms employ 54 percent of the total work force. No sources of data focus on the target population of small businesses doing business with DoD that have a dual-use application they may wish to convert. The following paragraphs discuss data sources that do provide at least a partial picture of that target population.

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[3] Some industries have higher size standards, and service-type businesses are measured by annual receipts, not number of employees.

DoD depends on small businesses for a variety of goods and services. Between 1983 and 1992, small businesses collectively have on average received 20 percent (by dollar volume) of DoD prime contract awards. The proportion differs greatly among procurement categories. Figure 2-2 shows the proportion of prime contract awards going to small and large businesses in FY92.[4] The largest amounts of dollars received by small business were in the categories of services and construction. The small business share for textiles, clothing, and equipage (52 percent) exceeded the large business share, but that category accounts for the smallest amount of dollars.[5] Small businesses are least likely to participate as prime in the procurement categories for major end items such as aircraft, missiles, and ships. The proportions of prime contract awards to small business in these categories range from 3.5 percent of aircraft award dollars to 16 percent of the award dollars in the tank-automotive category.

The data in Figure 2-2 are only for small businesses that receive prime contract awards. Many additional small businesses participate in defense work as subcontractors or suppliers. DoD has very little information on those businesses and does not even know how many suppliers there are below the prime contractor level. Some information exists indicating that the number of small business suppliers in the lower tiers is far greater than those receiving prime contract awards.

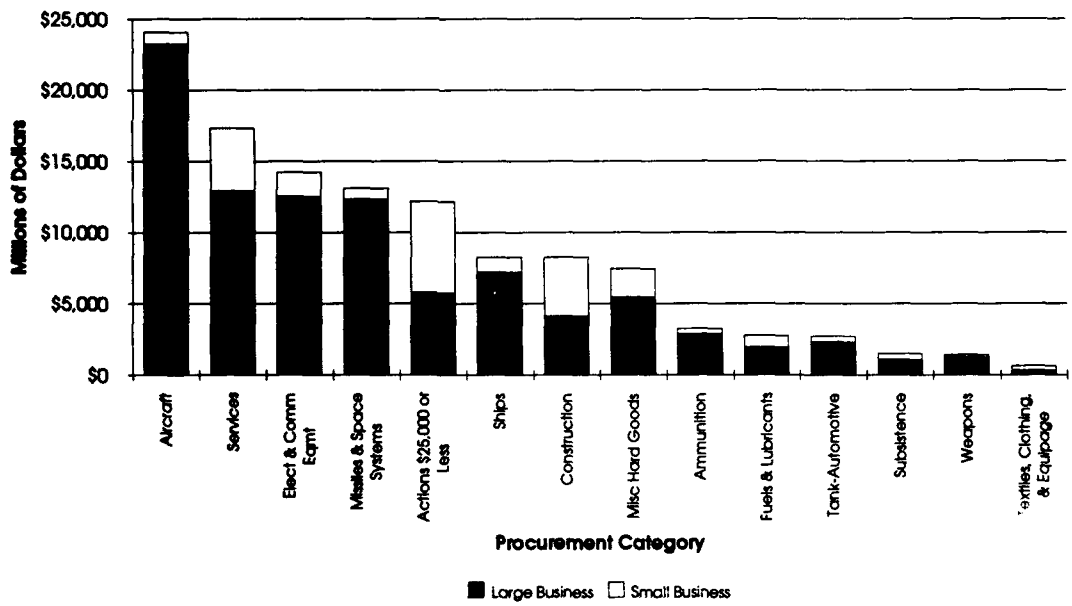

Figure 2-2.
DoD Prime Contract Awards to Small and Large Businesses by Procurement Procurement Category — FY92

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[4] Washington Headquarters Services, Directorate for Information Operations and Reports (DIOR), *Prime Contract Awards for Fiscal Year 1992*, Table 6.

[5] Small businesses received 53 percent of the value of awards under $25,000, but there are no data on what commodities are purchased.

Large prime contractors typically subcontract 40 to 60 percent of the amount of the prime contract dollars. DoD requires large contractors to submit a subcontracting plan showing subcontracts that will be placed with small businesses. In FY92, 1,742 reporting contractors subcontracted $18.2 billion worth of work to small businesses. (This figure is in addition to the $24 billion that small businesses received as primes.) A survey of defense subcontractors and suppliers conducted by the state of Texas in September 1992 provides additional indications regarding the size of the lower tiers.[6] Large prime contractors in the state provided a list of their first-tier subcontractors. Of the 411 companies responding, 82 percent said that they participated in defense work only as subcontractors or commercial suppliers. Thus, the number below the prime contractor level far exceeded the number participating as prime contractors or as primes and subcontractors. The report states that 23 percent of the respondents said they were small businesses but does not say whether they are more likely to participate as primes or as subs.

The participation of small businesses differs by defense procurement category and also by industry in the economy as a whole. The small business survey performed for SBA collected information by business size on the number of firms and establishments, the number of employees, payrolls, and estimated receipts (sales), but it does not show the proportion of those businesses doing defense work. DoD's Defense Economic Impact Modeling System (DEIMS) takes the defense budget, translates it into DoD's direct industry demand by standard industrial classification (SIC), and performs an input-output analysis to determine the portion of each industry's output going into defense goods and services. The value of the input-output analysis is that it includes both direct demand (direct purchases by DoD from an industry) and indirect demand (the prime contractors' purchases from subcontractors and suppliers). The DEIMS model does not make distinctions based on the size of the businesses in the industry.

Table 2-1 is a cross-reference between DEIMS data on defense share and SBA data on small business share. It shows those industries where DoD consumes more than 10 percent of the output (direct and indirect) and where small businesses account for at least 20 percent of the industry's receipts. These industries are important to DoD, and DoD is an important customer for them. Thus Table 2-1 gives some indication of which industries would be most likely to provide small business candidates for dual-use applications.

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[6] *Defense Transition: Economic Promise for Texas*, Governor's Task Force on Economic Transition, John Hannah, Jr., Chair, February 1993.

Table 2-1.
Industries with Highest Proportion of Defense Work and Small Business

Industry	Percent of business with DoD	Percent of receipts to small business
Small arms	100.0	36.9
Electronic resistors	58.3	22.6
Industrial trucks and tractors	52.9	46.4
Laboratory apparatus and furniture	44.7	50.2
Analytical instruments	44.7	31.0
Nonferrous foundries, nec	41.2	20.6
Optical instruments and lenses	33.8	37.2
Nonferrous forgings	33.8	26.9
Electronic coils and transformers	31.0	70.6
Electronic components, nec	26.6	38.1
Electronic capacitors	26.6	22.2
Machine tools, metal cutting types	23.0	41.6
Instruments to measure electricity	22.8	28.2
Electronic connectors	21.0	21.2
Aluminum die-castings	20.5	45.9
Watches, clocks, watchcases, and parts	18.7	40.5
Fabricated plate work (boiler shops)	17.0	58.5
Plating and polishing	15.0	87.5
Screw machine products	14.3	90.6
Bolts, nuts, rivets, and washers	14.3	50.9
Mechanical rubber goods	13.9	34.9
Iron and steel forgings	13.8	47.7
Nonmetallic mineral products, nec	13.1	81.0
Copper rolling and drawing	12.9	30.0
Machine tools, metal forming types	12.6	44.0
Speed changers, drives, and gears	12.0	48.7
Power transmission equipment, nec	12.0	41.9
Special dies, tools, jigs, and fixtures	11.5	25.2
Nonferrous rolling and drawing, nec	11.5	23.8
Industrial patterns	11.2	82.3
Metalworking machinery, nec	11.2	64.2
Process control instruments	11.0	37.5
Fluid meters and counting devices	11.0	23.5
Measuring and controlling devices, nec	11.0	43.0
Special dies, tools, jigs, and fixtures	10.8	82.3
Machine tool accessories	10.8	57.9
Primary metal products, nec	10.4	30.5
Electrical industrial apparatus, nec	10.4	60.0
Coated fabrics, not rubberized	10.3	53.7

Note: nec = not elsewhere classified.

SOURCES AND USES OF CAPITAL

Sources

This section describes potential sources of financial support for the small business that is seeking to commercialize a dual-use application. A number of private-sector and government sources are discussed. For each source, we describe its availability and the circumstances for which it is appropriate.

PRIVATE SOURCES

Funds generated from continuing operations are one of a small business firm's most easily accessible sources. For defense contractors, they include expenditures for independent research and development (IR&D) that form a portion of the cost base for government contract cost-recovery purposes. Recent changes in the regulations specifically recognize that dual-use conversion activities are a legitimate purpose for IR&D, eliminating the prior stipulation that the expected outcome have direct military relevance or application. Internally generated funds do not arise without cost to the business, however, nor are they unlimited. The extent to which internally generated funds are available to the business is a function of its financial health, its cash flow situation, and the degree to which it can fund IR&D while still remaining competitive. Nevertheless, funds generated from continuing operations may be the ones most readily available to the firm.

A common source of financing for businesses is credit from commercial financial institutions such as banks, finance companies, and asset-based lenders. Commercial loans are typically secured by some form of collateral. Loans fall into two basic categories: revolving and term. A revolving loan, often referred to as a line of credit, is normally available only to finance working capital needs and is not intended by the lender to be a permanent form of financing. The typical line-of-credit arrangement includes a fixed or floating interest rate, an upper limit on the amount available, a periodic renewal interval, specific collateralization (which usually forms the "borrowing base"), a requirement for periodic reports of financial performance, and, frequently, certain operating restrictions dealing with financial ratios and the treatment of the underlying collateral. A term loan is usually for a fixed amount to be repaid over a specified period at either fixed or floating interest rates. Normally, such loans are made for a specific purpose, and often the collateral is the very item(s) for which the loan was procured. Receivables are also used as collateral, and some finance companies specialize in "buying" outstanding receivables. A capital lease, financed either by the manufacturer of the goods or by a financing company, operates in most respects like a term loan. A more recent form of debt financing is the development of the asset-based lender. This type of lender looks only to the underlying value of the assets to be pledged (with valuation set assuming a forced sale of the collateral) and tends to limit its exposure by carefully screening out assets that are not readily salable.

The past several years have been marked by a general decline in the availability and use of bank loans by businesses, due in part to general economic conditions, the crisis in the banking industry, and new, stricter credit regulations for banks. Figures presented by NSBU indicate that bank loans accounted for 45 percent of the small businesses financing sources in 1992.[7] Most small businesses rely upon small community-based banks for their banking relationships, and this segment of the banking industry has reportedly been most severely impacted by the new regulations. The Board of Governors of the Federal Reserve System reports that small-bank commercial and industrial loan activity declined by slightly over 6 percent between December 1990 and September 1992. Certain geographic regions have had particularly severe banking problems, and small businesses in those regions are likely to suffer disproportionately as a result of their lack of banking alternatives.

Small businesses are increasingly seeking and obtaining loans from finance companies. The portion of short-term business borrowing accounted for by finance companies doubled between 1960 and 1992; it now accounts for about 20 percent of such borrowing. Recently, there has also been an increase in the number of firms focusing on buying business receivables (known as "factoring"). Many of these firms are themselves small and are consciously focusing on the small business sector. While this is a positive trend, to the extent that the converting small business has not yet generated a significant amount of receivables from its new commercial endeavors, such sources of capital will be of little practical use to it.

Depending upon the characteristics of the borrower and the relative amount of financing sought, any of these sources of debt financing may be available to a small business borrower. Firms seeking to finance dual-use conversion activities with this form of capital will find varying degrees of interest from the financial community, depending upon overall economic conditions and the history, characteristics, and financial condition of the company itself. Other forms of debt financing, such as commercial paper or corporate bonds, are normally not available to the small business borrower and are therefore not described.

The sale of ownership interests in the firm constitutes a frequent source of financing for small business. Such transactions can be either public or private offerings and may be made with relatives, employees, interested third parties, or the general public. Equity sales require significant lead-time and involve significant transaction costs. For small businesses, direct access to the general public markets is usually not an available alternative. Such firms must rely on either venture capital firms or, on rare occasions, that private individual or group known as "angels." In 1993, private venture capital funds invested $4.2 billion overall.[8] While this level of investment represents an industry record and a strong recovery from the 10-year lows registered in 1990 and 1991, most of the increased activity was committed to leveraged buyouts and well-established

[7] *Survey of Small and Mid-sized Businesses: Trends for 1993*, Arthur Andersen's Enterprise Group for National Small Business United, June 1993.

[8] *Venture Capital Association 1992 Annual Report*, Venture Economics, Inc., Bridget E. Murray, ed., 1992.

firms. A converting small business, to the extent that it seeks to do commercial business for the first time or to a much greater extent than in the past, almost irrespective of age would be considered an early-stage company by the venture industry. According to the National Venture Capital Association's annual report, venture fund investments going to early-stage opportunities during the six-year period from 1987 through 1992 averaged just under 28 percent of total venture investments.

Venture investments by private funds have, in the 1990s, tended to be highly concentrated both geographically and in certain industry groups. Four states received more than 60 percent of the funds dispersed, and four industries – software and services, medical/healthcare-related, telephone and data communication, and biotechnology – accounted for 63 percent of all funding. The industry groupings likely to contain defense-oriented small businesses with dual-use applications (electronics, industrial automation, and industrial products and machinery) received only 10 percent of the funding. Defense-oriented small businesses may also be at a disadvantage if they are seeking capital for evolutionary improvements to existing products, because the venture capital industry tends to invest in leading-edge products with the potential for rapid and significant growth. Additionally, the venture capital industry is unlikely to regard defense firms with dual-use applications as viable competitors if the market they are entering is already crowded.

Small businesses may be more successful with Small Business Investment Companies (SBICs). SBA charters SBICs to provide equity capital to small businesses. *But total SBIC funding in 1992 was only $484 million, which is less than* the private venture funds put into the software industry that year. The SBIC industry has had few real success stories with which to encourage an increased flow of capital to it, and a large number of SBICs formed during the 1980s are no longer viable. Recent legislation proposes increased funding for the SBICs, and they could become a more attractive source of equity capital for small businesses.

A consideration especially problematic for the firm in any equity sale is the amount of ownership that the current owners are willing to give up in return for the infusion of capital. Additionally, owners may be distracted from ongoing business operations during the significant period of "due diligence" work that precedes any equity transaction.

Another potential source of financing for dual-use conversion efforts is the joint venture or some other form of strategic business relationship with a supplier, customer, or other business that would stand to gain from the successful commercialization of a dual-use application. Although many strategic relationships do not involve the direct infusion of capital from one party to the other, a certain subset can involve exchange of capital for some business advantage, such as access to an advanced product, process, or area of research. For the small business firm, the advantages of a formal strategic relationship with the right partner(s) may be worth much more than any amount of capital and may mean the difference between hitting a market window of opportunity and jeopardizing the enterprise's long-term viability. There are firms that specialize in finding strategic partners for clients and helping structure the formal relationship. This type of intermediary often can perform a service for the small business that it could not perform for itself even if it had the time and money needed to do the required work. Some large businesses have established internal venture investment units charged with finding both profitable investment opportunities and strategic relationships advantageous to the firm.

If the small business has developed intellectual property with potential commercial value, a means of raising capital is through selective licensing of some or all of its holdings. Under certain conditions, small defense contractors may elect to retain ownership of patentable developments that arise under or as a result of their government contract work. Selective licensing of such property can be a source of both current capital and of an ongoing royalty revenue stream. However, it may be that the defense-oriented small firm will find that the technologies it has been working on in its defense work are subject to special limitations or restrictions regarding licensing. Such limitations may adversely affect the commercial value of the licenses or limit the range of potential licensees.

Government Sources

Both Federal and state governments have a variety of programs that can be used by small businesses as sources of financing for their dual-use conversion activities. Although most of these programs were not designed specifically for dual-use commercialization, a small business firm can make use of them to minimize or avoid recourse to other forms of financing. The following paragraphs provide a brief overview of some of the most significant sources of financing available at the state and Federal levels.

Some programs provide direct aid, including grants from either state or Federal organizations, cooperative R&D agreements (CRADAs) with Federal laboratories or research centers, and other forms of cash or in-kind support that do not carry a repayment obligation. A small firm undertaking dual-use conversion activities may have access to an existing program that can be used either to pay for conversion-related activities or to obtain at no cost the support of a government organization that can help in the work. Many Federal laboratories have very active outreach programs for CRADAs in which Federal scientists and engineers will do R&D work in Federal facilities in cooperation with private-industry partners. A small business firm may be able to use such an arrangement to reduce the cost of R&D leading to a commercial product and to gain access to sophisticated facilities and equipment without having to finance their purchase or rental. Federal and state programs that subsidize the cost of worker training or retraining can be used to reduce work force conversion costs.

The Federal government has two programs specifically focused on small-business product development: the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. Under these programs, a primary criterion used to select proposals for award is commercialization potential. A few states have enacted programs supplementing the SBIR and

STTR programs with additional possible funding in the form of grants or contracts. A successful SBIR participant can receive as much as $850,000 in direct contract support for its product development and commercialization work, and, if it happens to be in a state with an SBIR-related supplementation program, it may be able to obtain as much as $1 million. All of this can be done without contracting debt or giving up an equity interest. Also, the special patent and data rights provisions of these programs make it possible for small business firms to develop and retain ownership of commercially valuable intellectual property. The levels of funding for these programs are significant and growing,[9] and many of the participating Federal agencies have established outreach programs to introduce program participants to potential investors, commercial customers, and partners.

A small business firm is not limited to special programs to fund dual-use conversion activities. Often the work under a normal defense prime contract or subcontract will further research or product development that can lead to commercialization. Since small business status confers some very desirable intellectual property rights, it makes sense for the firm to pursue such work as a part of its financing strategy. Also, the availability of progress payments under a defense prime contract or subcontract represents a significant advantage over the terms of a comparable commercial contract.

Several government loan programs are available to small businesses. The SBA is the major source of financial assistance for small businesses, but the Farmers Home Administration (FmHA), the Economic Development Administration (EDA) of the Department of Commerce, and the Maritime Administration (MARAD) all provide financial assistance to businesses.[10] The available programs at the Federal level are of two general types: direct loans and guaranteed loans. In recent years, the amount of direct loans has been small in relation to the loan guarantee programs. In FY93, the SBA provided guarantees for $6 billion worth of loans and $45 million in direct loans to small businesses. Funding authority was increased to $7 billion for FY94 and $9 billion has been requested for FY95. Additionally, SBA is establishing a program to provide working capital to small businesses in the form of a line of credit.

Eligibility criteria vary among the programs. To qualify for participation in SBA loan guarantee programs, applicants must be unable to obtain a loan elsewhere at reasonable terms. No such prerequisite exists for participation in loan guarantee programs offered by the EDA, the FmHA, or MARAD. Loan size limitations and percentage guarantee levels also vary among the Federal programs.

[9] The SBIR program, established in FY82, made awards totaling over $3.2 billion during its first two years of operation. FY92 awards alone were $508.4 million. Legislation reauthorizing the SBIR program in 1992 increased the percentage of participating agencies' R&D budgets used to fund the research from 1.25 percent to 2.5 percent, to be phased in over a four-year period. The STTR program was established in FY93 using a similar funding formula. No data are yet available on this program's actual award levels.

[10] The Maritime Administration (MARAD) runs a loan guarantee program, but its industry-specific orientation and the large size of the projects for which it is intended make it an unlikely candidate for helping small business firms undergoing conversion.

SBA-guaranteed loans are limited to $750,000, and the guarantee levels vary from 70 percent to 85 percent. FmHA-guaranteed loans can be as much as $10 million in principal amount, and they carry a somewhat higher percentage guarantee. Also, while the SBA loan programs are limited to firms meeting the small business size standards, the FmHA, MARAD, and EDA loan programs have no such eligibility criterion. Typically, the SBA programs rely upon the commercial banking industry for applicant assistance, loan administration, and servicing. The FmHA and MARAD guarantee programs are handled directly by the personnel in those agencies.

The SBA program is the primary government loan guarantee program available to small business. That the major guaranteed loan programs are quite popular can be seen from the percentage of authorized loan capacity used each year and from the fact that it is normally committed quite early in the fiscal year. The private financial institutions that participate in the SBA's guaranteed loan program, for example, are principal lobbyists for expanding the program. The fact that there is an active and vibrant secondary market for the guaranteed portions of loans made indicates the continuing and strong level of participation by lenders. In the recent past, sales of the guaranteed portions to the secondary market were so strong that premiums of as much as 14 percent were being achieved by the loan originators. Legislation has since been enacted to require sharing of premiums above 10 percent with the SBA in the future.

While the program is popular, it does have some negative features. Figures in the FY94 budget show loan default and termination rates of 4.2 percent for FY92, 3.7 percent for FY93, and 3.1 percent for FY94. Loss experience figures for traditional commercial and industrial (C&I) loans are said to run about 1.5 to 2.0 percent. Furthermore, published figures may considerably understate the true default rate. The loss rate for 1986 published by SBA was 3.5 percent, but a published doctoral research paper estimates that the true rate was 10 percent.[11] Since the SBA loan programs are, in effect, intended to be in the nature of guarantor of last resort (i.e., the participating lender has to state that the applicant would not be granted credit at reasonable terms), a somewhat higher loss experience is to be expected. However, significant ranges of uncertainty concerning the prospective loss experience can have a large impact on the SBA's future budgets (witness the S&L deposit insurance fund shortfalls), and any new program of loan guarantees focused on dual-use conversion by small defense businesses must expect a somewhat higher-than-average loss experience because of its narrower array of potential borrowers and their concentration in a few industrial sectors.

The longer maturities available from the lenders constitute a major advantage of this loan guarantee program to converting small business firms. Whereas the typical C&I loan from a commercial bank will rarely exceed 3 to 5 years, SBA-guaranteed loans average more than 10 years. The interest rates are either fixed or variable and can be as much as 2.75 points above New York bank prime. A detailed analysis by a doctoral researcher indicates that the rates charged are not

[11] *Small Business, Banks, and SBA Loan Guarantees: Subsidizing the Weak or Bridging the Credit Gap?*, Elisabeth Holmes Rhyne, Quorum Books, 1988.

out of line with those charged for similar C&I loans to similar borrowers. It also indicates that many of the loans would have been possible to obtain without the guarantee, except for the longer maturity lengths found under the SBA program.[12] Access to such "patient" capital is a very important consideration for the converting small business firm. (The average maturity for the SBA program far exceeds the patience horizon of the typical venture capital fund investment manager, who seeks opportunities for 35 percent compounded annual returns and a liquidity exit in four to seven years.) The primary limitations on the usefulness of the SBA guarantee program are the $750,000 size cap and the possibility that the program's loan authority may be committed quite early in the fiscal year, making timing significant for firms counting on using this source to finance conversion activities.

Aside from its loan guarantee program, the SBA operates a much smaller direct loan program. Direct loans of up to $150,000 are available to small businesses unable to obtain an SBA-guaranteed loan. The direct loan program amounted to slightly less than $45 million in FY92 and, of that amount, only $4.6 million went to small businesses engaged in manufacturing. Given the small maximum size and the limited funding committed to the direct loan program, it will not be a particularly useful source of funds for defense conversion. However, since it is available to firms unable to qualify for or obtain a guaranteed loan, it may truly be a firm's source of last resort.

The business and industrial loan guarantee program operated by the FmHA is available only to applicants located in rural areas. Loans of up to $10 million are available, with a sliding scale guarantee of 90 percent on loans up to $2 million, declining to 70 percent on loans of more than $5 million. The applicant does not have to show inability to obtain financing on reasonable terms to qualify for a loan guarantee under this program. The program is not limited to small businesses and can include individuals, public organizations, and Indian tribal groups. Although the FmHA business and industrial loan guarantee program is only a small portion of overall FmHA activities, it is growing. The total guaranteed portion of such loans amounted to $100 million in FY93 and is expected to be $240 million in FY94. Estimates of default and termination rates are not available, because FmHA does not publish those data. Most of the loans under this program are for industrial and infrastructure development by public-sector entities. Given the program's rural focus and the restriction that proceeds not be used to attract industry from other rural locations, this program will not be available to most converting small businesses.

All Federal loan guarantee programs are "fully insured"; that is, the loan guarantee percentage is fully backed by the agency regardless of any future liabilities the agency may incur. In contrast, some state loan guarantee programs have been operated on a "non-fully-insured" basis. Under such a program, there is no specific predetermined loan guarantee percentage. Rather, the amount of the loan default fund underlying the guarantee is fixed at a predetermined level, setting an upper limit on the budget impact of the guarantee program.

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[12] *Ibid.*

Uses

A small business firm seeking to commercialize a dual-use technology will need capital for a variety of uses. The company's need will depend upon the nature of the product, process, or technology involved; how significant a departure from the current design and production levels the commercial result needs to be; how close to commercialization it is; and the financial condition of the performing company. Irrespective of the foregoing, however, there are certain quite well-defined classes of uses of funds into which all financing needs can be placed. The following paragraphs describe these classes.

Capital may be needed to undertake or continue basic research in a technology that is essential to eventual commercialization of the result. This use of funds encompasses basic and applied research and initial development but not actual product development. A firm requiring capital for R&D is unlikely to have a product close to commercialization but still may have products, processes, or technologies with dual-use applications.

Product development is likely to be the most urgent need for a small business attempting to commercialize a dual-use application. While the firm may be well positioned with respect to the underlying technology and have a strong patent position, it still may need significant capital to complete the development of a competitive product for a commercial market. Some product development activities that may be necessary before entering a commercial market include reducing the production cost to competitive levels, qualifying the product to an industry standard or through a recognized commercial certification laboratory, and supporting the product's beta testing in the hands of potential customers. Such activities may be particularly difficult for a defense-oriented small business, since many of them require specialized expertise not already possessed by the firm. The greater the differences between the defense product and its commercial version, the longer and more expensive the product development phase of the conversion will be.

One of the most significant adjustments a firm will have to make in the transition from defense to commercial work has to do with how it finances working capital. The realities of cash flow management in a commercial business may pose a significant hurdle for a small business used to progress payments and fast pay procedures, fairly rapid turnaround of receivables, and production-to-order inventory levels. With a substantial commercial component of total sales, the firm will need much more working capital for levels of finished goods inventory sufficient to support an extended channel of distribution, longer payment terms, the prospect of uncollectible accounts, and the provision of samples (frequently in lots large enough to accommodate product qualification by new customers).

Marketing and promotion are likely to constitute new territory for a firm that has worked primarily on defense contracts. The firm will need to undertake research to identify potential markets, to define the necessary characteristics for a successful commercial product (including such things as price, specifications, warranty terms, customer service and support, ability to compete, directions for future research and product development, channels of distribution, etc.), to develop sales literature and promotional plans, and to contribute to the sales forecasts that will underpin financial and strategic plans. Since most of those activities have no direct counterparts in defense work, it is likely that a substantial investment will be necessary, much of which will have to be made before revenues begin to flow from commercial sales.

A small defense-oriented firm may have to invest in new upgraded, or expanded plant and equipment to meet the volume and cost targets of the commercial marketplace. This is a potentially substantial investment that must be made before actually entering the market. Defense work may have been characterized by relatively small volumes of production, whereas commercial markets may require larger plants. With the need to be able to meet competitive market costs often dictating plant scales of great magnitude, the firm's financial capacity will often be strained to or beyond its limits. In terms of both absolute and relative magnitude, investment in plant and equipment is likely to be the firm's largest single capital need.

Appropriateness of Sources for Various Uses[13]

A rule of thumb for business is not to use short-term financing for long-term needs and vice versa. Financial market realities may dictate either the suitability or the unavailability of certain sources of financing for certain types of uses. These apply generally without reference to the characteristics or condition of the specific firm. There are other, firm-specific conditions and characteristics that may dictate the use of one source of financing over another. This section attempts to address both the theoretical and the practical aspects of small business conversion financing.

Table 2-2 indicates the shifting importance of the various activities to which capital is devoted during the progression from defense to commercial applications. The stages of conversion from the defense market to the commercial market are viewed in much the same way that the capital markets view a company's stages of development and maturity. For purposes of the subsequent discussion, the following conversion phases are defined:

- *Stage I* – The firm has no revenue from its conversion product(s) and little or no financial history in the intended commercial line of business. The team that will be responsible for the success of the conversion may not be complete, but an idea and initial plan may be in place.
- *Stage II* – Tentative market and cost information has been developed, and product development is under way, but there is still no revenue from the conversion product(s).

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[13] This section is not intended to be a definitive discussion but rather is a compilation of conventional wisdom.

- *Stage III* – The conversion product(s) have been formally introduced, but the product line is not yet operating at a self-sustaining or profitable level, and the market has not yet fully responded to the offering.
- *Stage IV* – There is significant revenue from the conversion product(s), and the product line is operating at a profit. The firm is now operating regularly in the commercial marketplace.

Table 2-2.
Relative Importance of Uses of Financing During Dual-Use Conversion

Uses of capital	Conversion maturity levels			
	Stage I	Stage II	Stage III	Stage IV
R&D	High	Moderate	Moderate	Moderate
Product development	Low	High	High	High
Inventory and receivables	N/A	Low	Moderate	Moderate
Marketing and promotion	Low	Moderate	Moderate	High
Plant and equipment	N/A	Low	Moderate	High

Note: N/A = not applicable.

The foregoing classification is essentially an adaptation of the stages in the life of a startup company that are assigned by the venture capital industry. It is quite appropriate for use in this context, since a defense-dependent small business trying to adapt its products to commercial markets will exhibit many of the same features during its conversion and adaptation that a newly formed company would. The sources and uses of capital will vary as the defense-dependent firm progresses through the stages of conversion, and the capital markets will have differing levels of interest in the firm, also based upon the degree of maturity of its conversion efforts.

As shown in Table 2-2, capital is needed for different uses in the various conversion stages. In Stage I, funding for R&D and product development is more important than funding for product development and marketing. As the conversion efforts progress from Stage I to Stage II, funds for basic research become less important, while initial plans for plant and equipment increase the importance of investment in plant and equipment. Similarly, the transition from Stage II to Stages III and IV raises the level of importance of inventory and receivable financing and will bring about the need to commit to potentially large investments in plant and equipment to allow the commercial cost and volume targets to be met.

Just as the stage of commercial conversion will dictate the relative importance of different uses of funds, there is a relationship between sources of capital and uses to which it will be put. Table 2-3 shows the typical relationship between sources and uses of capital for small firms moving into the commercial market. Lenders and independent investors are usually reluctant to commit their resources to basic R&D. Bankers typically feel much more comfortable lending money for tangible assets such as inventory, receivables, and plant and equipment and are reluctant to commit loans to activities such as product development, market research, and sales promotion. In choosing the potential source of capital most likely to be receptive to the request, the firm must keep in mind the orientations of the sources. The SBIR and STTR programs may be the best sources of funding for R&D and product development activities. The further the firm can progress through the stages of its conversion process before approaching external capital sources, the more receptive those sources are likely to be.

Table 2-3.
Matching Sources and Uses of Capital

	Uses of capital				
Sources of capital	R&D	Product development	Inventory and receivables	Marketing and promotion	Plant and equipment
Direct programs					
SBIR/STTR	X	X			
Contracts	X	X	X		
Grants, CRADAs, etc.	X	X			
Internal funds					
IR&D	X	X			
Cash from operations	X	X	X	X	X
Debt and commercial credit			X		X
Equity		X	X	X	X
Strategic relationships	X	X			X
Licensing	X	X	X		X

In addition to the traditional reasons why certain forms of capital are more appropriate for certain types of uses, there are also firm-specific characteristics that may affect the range of available choices for financing. A firm that already has a significant debt load (high debt service expense relative to its income and/or a high debt-to-equity ratio) and needs to finance a significant expansion in its inventory may find that traditional bank financing is not available to it. Similarly, considerations of control and the results of prior equity transactions may impair the firm's equity capacity to such an extent that a venture capital investor will be reluctant to commit funds to what otherwise seems to be a viable opportunity.

The entity's age may affect the likelihood of its success in the capital market. A newly formed company with little financial history and no track record in the marketplace will generally have little success with traditional banks. The sophistication of the firm and the perceived competence of its key management team will influence the range of financing alternatives that might be attempted and determine how sources evaluate the company.

The geographic location of the firm may have an effect on its ability to raise capital. Venture capital disbursements tend to be quite highly concentrated in a few geographic areas. In 1992, companies in California and Massachusetts received 52 percent of the funds invested by the private venture industry, while the West Coast and Northeast regions received almost 70 percent of the total invested.[13] This situation may, in part, be due to the concentration of high-technology businesses in those areas, but it is also a reflection of the informal policy, adopted by some venture firms following the business failures of the late 1980s, not to invest in firms outside a small radius from their location. The commercial banking industry also has shown significant geographic differences in lending activity and in pursuing new customer relationships. In the late 1980s, partially as a result of overall economic conditions but chiefly as a byproduct of the crisis in the banking industry, lending to businesses virtually stopped in the Northeast. Many creditworthy borrowers were unable to renew lines of credit or to expand borrowing relationships. Small businesses, which tend to deal primarily with community banks, still face tight credit conditions in certain parts of the country.

Lastly, a defense firm may have difficulty obtaining financing simply because it is in a declining market. The research director of a major West Coast venture capital analysis firm stated that a small, formerly defense-oriented firm seeking funding from a venture capitalist for a conversion to commercial markets will most likely be treated as a "restart situation" — that is, a firm that is changing direction, its original business plan having failed. Restarts are not looked upon with great favor in the venture community. Even though the defense business has declined for reasons totally beyond the control of the firm, it may still be considered a restart and therefore will be unlikely to generate a great deal of investment interest.

No data exist that address industry-specific capital availability or the prospects of small defense-oriented firms in the capital markets. The widely publicized reductions in defense spending cannot help but negatively influence the views of potential lenders and investors on the desirability of forming relationships with these firms. Another factor tending to make it difficult to interest lenders and investors in the prospects of dual-use conversion opportunities is the lack of readily identifiable success stories about such endeavors. There have been few successful direct transitions from defense work to commercial markets even among the larger and more well known defense firms. Whether or not it would be admitted, lenders and venture funds tend to go through periods of intense interest in particular types of products and industries, following upon some well-publicized major success. For example, after the initial success of Apple, a significant flow of venture funding went into the personal computer field. Until some financially rewarding cases of dual-use conversion are

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[13] *National Venture Capital Association 1992 Annual Report*, prepared by Venture Economics, 1992.

documented, the small business firm seeking financing in the traditional capital markets for such efforts will have to rely entirely on the quality of its own case.

CHAPTER 3

Evidence and Supporting Data

EXISTING MATERIALS AND SURVEYS

Little data exist that specifically address the prospects of defense-oriented small business firms attempting conversion. Several states have sponsored studies of the impact of defense downsizing, but these studies do not provide information on financing problems, nor do they focus separately on small businesses. The following sections describe two studies that examine problems of small business, as well as the results of LMI's survey of small businesses doing defense work.

National Federation of Independent Business

The NFIB is a trade association for small businesses with a membership of over half a million independent businesses and professionals. Its research arm, The NFIB Foundation, conducts large surveys of the members every four years asking them to rate the importance of each of the 75 problem issues. The most recent survey (in 1991) presents results from a sample of 5,000 NFIB members. The largest proportion of respondents are in retail trade (27 percent), followed by construction, services, and manufacturing/mining. The businesses in the survey tend to be relatively small, with 91 percent of the respondents having fewer than 50 employees.

Survey participants were asked to state how important to their businesses each issue was, on a numerical scale from one (critical problem) to seven (not a problem). The survey report presents a ranking of the issues, along with the percentage of respondents saying the issue is critical. The issues list is kept quite constant from one survey to the next, so that it is possible to determine trends in the relative importance of specific issues over time. Table 3-1 summarizes the most recent survey's responses concerning financing issues, specifically: obtaining short-term business loans (less than 12 months or revolving), long-term business loans (over 12 months in duration), and investor (equity) financing.

Clearly, the survey population in general did not feel that access to capital was an important business problem. The NFIB Foundation conducted two previous surveys in 1982 and 1986 in which essentially the same issues were included, and we examined whether the relative importance of financing issues has changed over a period including both economic downturns and relative prosperity. The rankings of these issues have remained quite low throughout the 10-year span of the surveys.

Table 3-1.
Rank and Criticality of Financing Issues

Issue	Rank	Percent critical	Percent not a problem
Obtaining long-term business loans	46	13	40
Obtaining short-term business loans	53	11	42
Obtaining investor financing	69	7	52

Source: *Small Busines Problems and Priorities*, William J. Dennis, Jr., The NFIB Foundation, 1992.

The 1991 survey has sufficient data to make it possible to look at particular characteristics of the survey respondents in relation to how these respondents rank financing issues. Table 3-2 shows the rank of the financing issues for a variety of respondents. The percentage of respondents identifying these issues as "critical" was similar to the percentages reported in Table 3-1.

Table 3-2.
Rank of Financing Issues by Type of Respondent

		Long-term loans (rank)	Short-term loans (rank)	Equity (rank)
Respondent characteristic				
Employment:	10 – 19	47	48	69
	20 – 49	54	60	70
	50 – 99	55	63	69
	100+	53	55	73
Age of company:	< 4 years	29	31	51
	6 – 10 years	40	50	63
	20+ years	62	63	71
Companies in the manufacturing sector		42	45	69
Companies whose primary market is government		41	51	67

Source: *Small Busines Problems and Priorities*, William J. Dennis, Jr., The NFIB Foundation, 1992.

On the basis of the NFIB surveys, it does not appear that access to either debt or equity capital is a critical business problem for other than very young companies.

National Small Business United

NSBU is another trade association representative small business owners; it claims a membership of over 65,000. NSBU has conducted three recent surveys of small businesses, seeking opinions on their economic outlook and on the challenges to their survival and growth. The most recent survey, conducted in June of 1993, contains some information concerning capital availability and success in obtaining bank loans for small businesses. The scant demographic information about the survey respondents indicates that 87 percent had fewer than 19 employees and that 65 percent had revenues of less than $1 million. There are no data provided to show the industrial categories in which the respondents are involved. According to the survey report, 38 percent of the respondents claimed that they had unfulfilled capital needs. Further, 30 percent ranked "lack of available capital" as the most significant challenge to their future growth and survival. A further breakdown of respondents by size indicates that capital availability problems are most acute among the smallest firms and decline in importance with increased firm size. While 31 percent of firms with under 20 employees cited lack of available capital, only 19 percent of firms with more than 100 employees felt likewise.

Since capital is a scarce resource, finding respondents that feel they do not have enough of it is neither surprising nor particularly probative. One must keep in mind that 62 percent of the respondents said that they had no unfulfilled capital needs. That, in itself, may be the most illuminating statistic in the survey. Only one other set of questions in the survey is of interest to our research. They concern the issue of success in obtaining a bank loan. Only 45 percent of the respondents reported having tried to obtain a bank loan in the preceding 12 months. Of that number, 75 percent reported success in obtaining a loan. Data about the unsuccessful group indicate that they had, on average (when compared to the successful group), fewer employees and lower revenues. In addition, only 51 percent of the unsuccessful group earned a net profit, and 25 percent had laid off employees. This group appears to be less one that is suffering credit discrimination than it does a group of troubled small firms. On balance, it cannot be said whether the apparent differences between the results of the NFIB and NSBU surveys are, in fact, real. On the bases of larger sample size, better demographic visibility, and more thoughtful analysis, one has to resolve apparent inconsistencies between the two organizations' surveys in favor of the NFIB study.

LMI Survey

In order to mitigate some of the problems with existing data, we conducted a survey of defense-oriented small businesses that might be converting from defense work to commercial work. Our sample is derived from the DD 350 data base, "Prime Contract Awards Actions over $25,000," FY88 through FY92. About 25,000 unique small businesses received prime contract awards during that period. Those businesses sell products and services designated as R&D or as supplies and equipment. We excluded businesses providing commercial-type services (such as janitorial services) but included businesses providing software and engineering services. We selected a random sample of 1,519 firms from the original list of 25,000.

Appendix A contains a copy of the survey questionnaire. The questions fall into three broad categories: those that provide characteristics of the firm (e.g., number of employees and portion of sales to defense), those that document the firm's experiences with defense conversion (e.g., degree of success and difficulties encountered), and those that describe approaches used in financing conversion. Since most firms are reluctant to provide details of their finances, we deliberately kept the survey short and we avoided questions on specific sales, debt, and profit levels that might have required proprietary information.

We received 253 survey responses. (See Appendix B.) This number gives us good confidence in the results for our survey population (i.e., small businesses doing business with DoD in the past five years). For this population, our exact confidence varies with the question (depending on the number and nature of answers), but we are in general at least 95 percent confident that the true (but unknown) results lie within a range of plus or minus 6 percent from the survey results. Differences between this population and the large pool of remaining small defense businesses (those doing defense work but not directly for the government) will not be reflected in our results.

As Table 3-3 shows, our response rate is comparable with those of similar surveys by NFIB and NSBU. Of the surveys sent out, 292 were returned as undeliverable. We computed the 20.6 percent response rate by dividing the 253 responses by the 1,227 surveys that were delivered (1,519 - 292 = 1,227).

Table 3-3.
Comparison of Response Rates

Survey originator	Date	Number sent out	Number of replies	Response rate (percentage)
NFIB	Nov. 1991	15,001	5,020	33.5%
NSBU	Jun. 1993	5,000	687	13.7%
LMI	Apr. 1994	1,227[a]	253	20.6%

We tested the validity of the survey instrument by contacting respondents to determine if they understood the questions. We randomly selected a total of 15 firms for direct telephonic follow-up focused specifically on the survey form. Each person contacted was asked a standard set of questions so that each follow-up would cover the same issues. Of the 15 selected, we were not able to contact or obtain useful input from five for reasons ranging from the fact that the respondent was not willing to spend additional time on the survey to the circumstance that the point of contact had left employment with the responding firm subsequent to completing the form (a period of about three weeks). Respondents generally felt that the questionnaire was easy to understand and complete, and they had reasons for selecting the answers they chose that matched our reasons for including the question. Only one issue was interpreted somewhat differently by respondents than we had anticipated when developing the instrument. While we thought that a product designated a critical product or technology would be more difficult to export because of the International Traffic in Arms Regulation

(ITAR), some of those who checked "Export Restrictions" as a conversion issue expressed different interpretations in the follow-up interviews. They felt that special market restrictions in Europe having to do with ISO-9000 certification constituted an export limitation or that international competition for small jobs has increased as more large domestic firms attempting to enter foreign markets are going after those smaller jobs. However, "Export Restrictions" received the least number of responses of all problems, with only 4 percent of the respondents choosing it.

We conclude that the responses we received to our survey do in fact reflect accurately what the respondents meant to tell us on this subject and that the level of understanding of the instrument was quite high. None of the firms selected for follow-up was confused about the reasons for the questions, and the majority were very willing and cooperative in assisting us to interpret their responses properly.

Characteristics of Respondents

Figure 3-1 shows the size distribution of the respondents. Most respondents are very small businesses with 1 to 50 employees. Only 2 percent of respondents have more than 500 employees.[1]

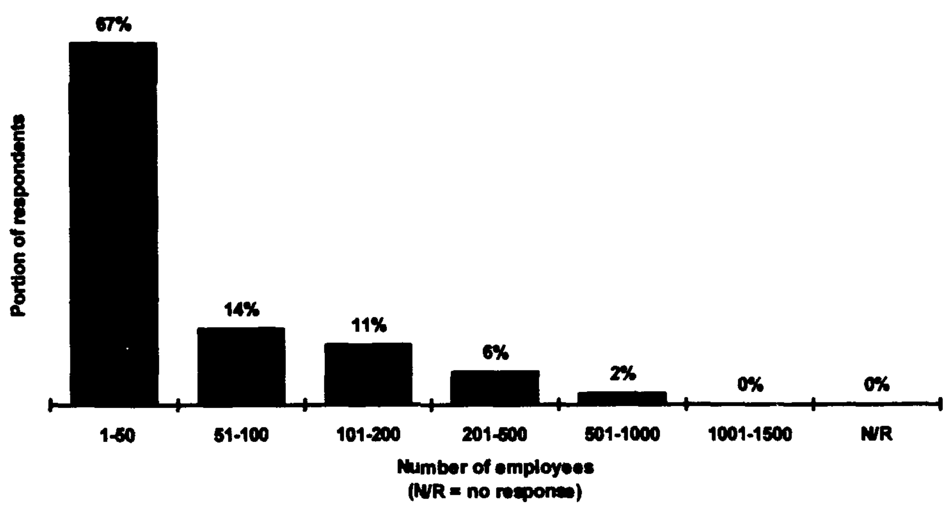

Figure 3-1.
Full-Time Equivalent Employees

Small businesses sell to defense directly as prime contractors (by providing services, end items, or spare parts to DoD via prime contracts) and indirectly as subcontractors (vendors selling piece parts and subsystems to primes and higher

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[1]For most SIC industries, 500 employees is the maximum size to be considered a small business; however a few may go up to 1,500 employees.

tier suppliers). As shown in Figure 3-2, 60 percent of our respondents describe their defense business as mainly direct dealing with DoD.

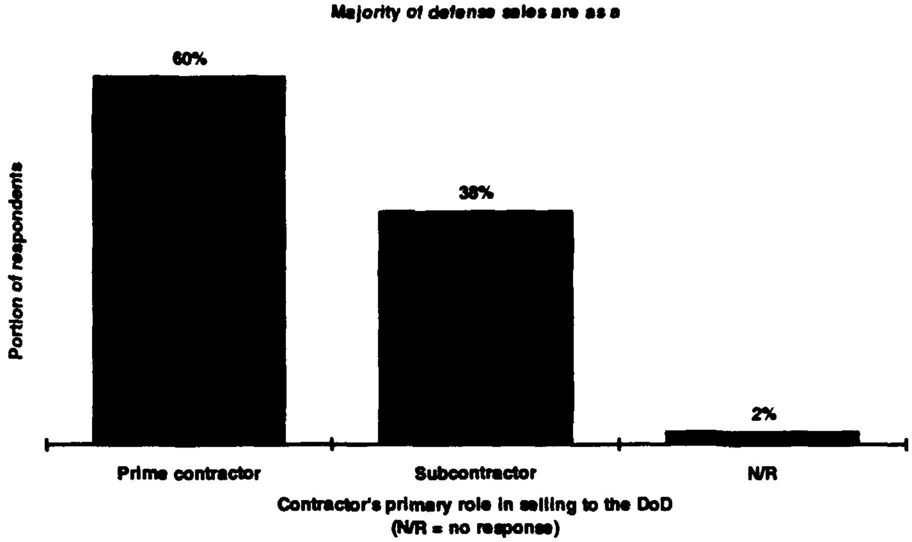

Figure 3-2.
Contractor's Primary Role in Selling to the DoD

We also asked respondents to tell us what proportion of their sales is attributable to defense products or services. Figure 3-3 displays the results. Over two-thirds of the respondents currently do 50 percent or less of their business with defense. Only 6 percent of the respondents are "dedicated" to defense, having more than 95 percent of their business with DoD.

The respondents also provided information on how the proportion of defense business has changed in the past five years and how they expect it to change in the next five years. As Figure 3-3 shows, a downward trend is anticipated in the number of firms that will be heavily dependent (greater than 75 percent) on defense. Thirty percent of respondents stated that they had greater than 75 percent defense share five years ago. Only 11 percent of respondents predict that they will have greater than 75 percent defense business five years hence.

Most respondents expect little change in defense business as a proportion of sales; 52 percent reported no change between five years ago and now, and 56 percent anticipate no change five years from now. Between five years ago and now, 38 percent of respondents lost DoD share, while 21 percent expect their defense business to decline in the next five years. Between five years ago and now, 6 percent increased defense as a share of total sales, and 15 percent expect their defense share to increase in the next five years. For the 10-year period, there is a trend for fewer companies to be highly defense-dependent (over 75 percent of sales) and for more companies to have less defense dependence (under 50 percent).

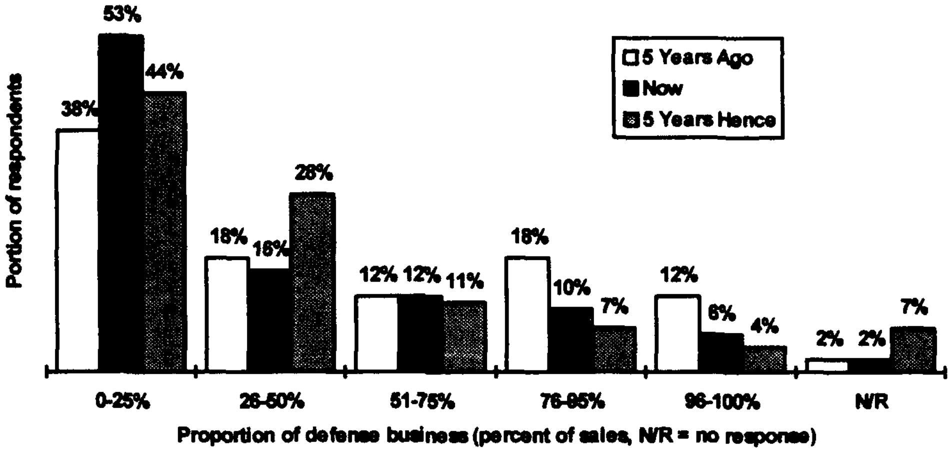

Figure 3-3.
Proportion of Defense Business

Respondents' Experiences with Conversion

We asked our respondents about their plans for converting their products to commercial use (survey question 2). Sixty percent of respondents plan either to sell defense products "as is" to commercial customers or to modify existing defense products into commercial products, or both (See Figure 3-4). Thirty-four percent of respondents plan to remain focused on defense, presumably because their products are not appropriate for commercialization or because of a desire to keep defense product lines separate from commercial lines. Only 6 percent plan to abandon defense business. Most firms (11 of 14) planning to discontinue defense work are already principally commercial (0 percent to 25 percent defense).

The 201 respondents that rated the success of their conversion efforts showed no trend (Figure 3-5). The largest portion, 41 percent, reported a moderate degree of success, while 33 percent report low success and 25 percent report a high degree of success.

Having determined the firms' overall plans for conversion and their success to date, we asked several questions dealing with the difficulties faced by those firms that are attempting to convert.

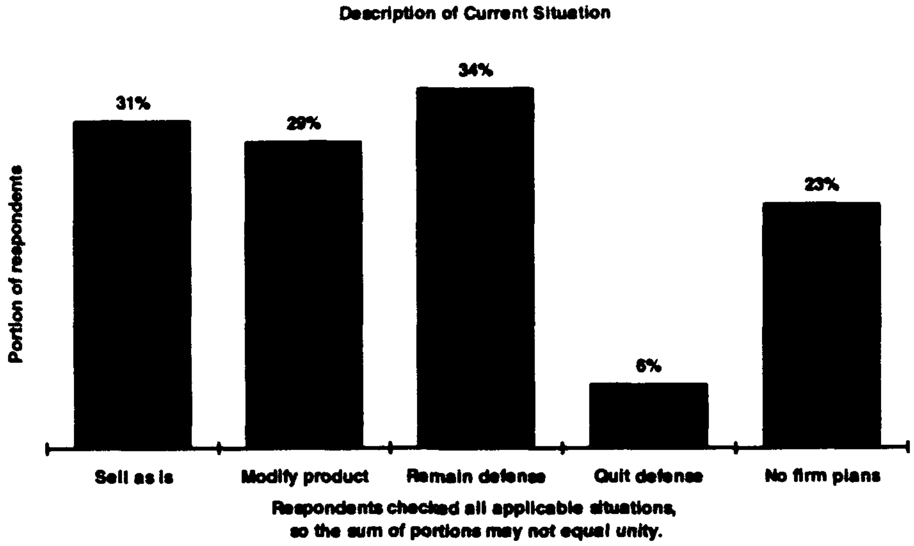

Figure 3-4.
Conversion Plans

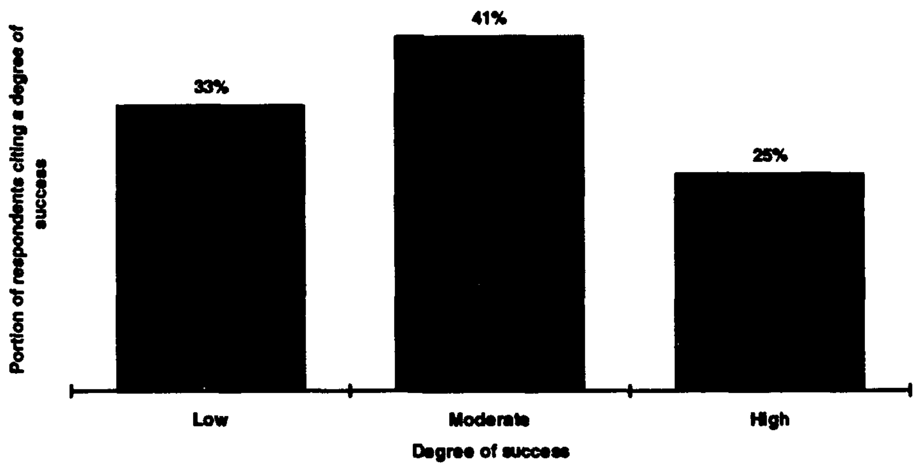

Figure 3-5.
Success in Converting

Respondents indicate that financing, while difficult for some to get, is not limiting their conversion from defense to commercial work. As shown in Figure 3-6, of the 200 firms that answered the question, 72 percent said "No" to "Has the inability to raise funds inhibited or restricted your conversion to commercial work?" (survey question 6).

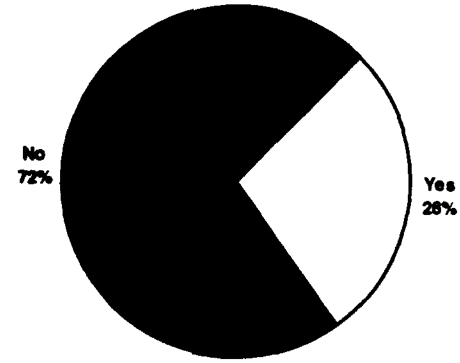

Figure 3-6.
Has the Inability to Raise Funds Inhibited Conversion?

We asked firms about a broad array of difficulties they might be having in converting (survey question 3). Figure 3-7 displays the results. The leading difficulties are identifying markets and obtaining finance. No single difficulty dominated as a problem. However, the problem areas labeled "exporting," "identifying markets," and "establishing distribution channels" are all a part of serving the commercial market that is not necessary in the defense market.

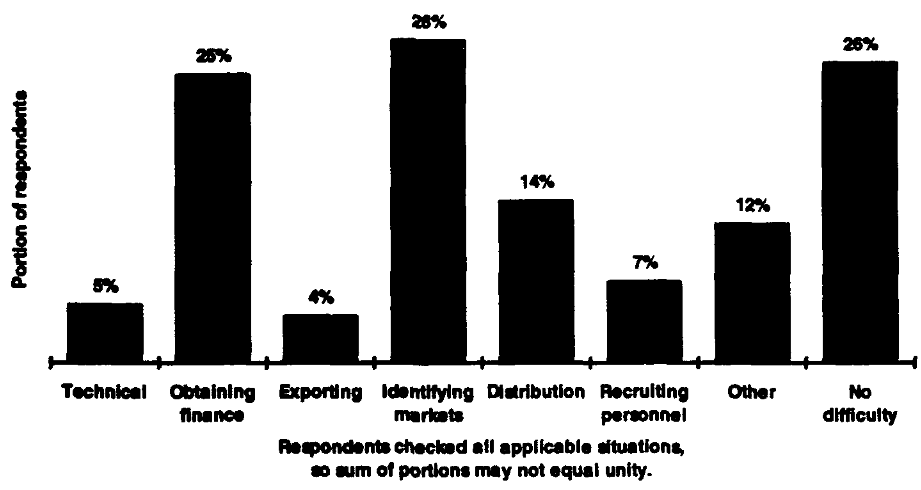

Figure 3-7.
Conversion Difficulties Encountered

Figure 3-8 (also from survey question 3) lists the uses for which financing was intended for those 60 respondents citing difficulties in obtaining finance. At least two and perhaps three of the financing difficulties are directly related to marketing issues. Perceived funding needs for marketing and promotion, for a customer service infrastructure, and perhaps for product development represent a symptom of a level of concern about how to serve commercial markets. What to build can be decided only after basic market intelligence is available. Similarly, how it (the eventual product) will be supported can be intelligently decided only after prior decisions about the market targets have been made. Choosing a channel of distribution is a part of the full product definition and is also a result of having identified target markets.

We tested the relationship between the respondents' conversion situation (survey question 2) and the conversion difficulties they reported (survey question 3). We employed Chi-square contingency table tests using two methods, the first being an overall comparison of the 5 possible responses to question 2 with the 12 possible responses to question 3, and the second being 5 pair-wise comparisons (checked box/did not check box, one for each choice of question 2) with the responses to question 3. At the 95 percent confidence level, the responses to the two questions are independent in the overall comparison. However, using the pair-wise method, however, we did find that respondents checking "Plan to develop commercial products by modifying or adapting existing defense products" in question 2 have a profile of responses to question 3 that is significantly different from those not checking that box. Those "... modifying or adapting ..." respondents reported significantly more difficulties "obtaining financing for product development" and also reported significantly fewer "no difficulties encountered" than the overall pool of respondents.

These results suggest that our conclusions and recommendations based on the overall profile of conversion difficulties are representative and that no special consideration (regarding capital availability) need be given according to the business' conversion situation. One possible exception would be for companies that are converting by "... modifying or adapting ..." and having difficulty financing product development. However, companies rarely utilize debt financing for product development. More importantly, several government programs, such as the Technology Reinvestment Program (TRP), SBIR, and STTR, already exist to provide small businesses with product development financing.

Taken together, Figures 3-7 and 3-8 indicate that difficulties related to entering new markets (identifying the market, establishing distribution and service channels, and financing those activities) are the principal barrier to conversion. Second in importance is overcoming technical and financial challenges in adapting defense products for commercial use. Of the 12 percent of respondents who cite "other" difficulties in conversion and then describe them, the predominant themes are the same: challenges to establishing a marketing operation, and problems with product development.

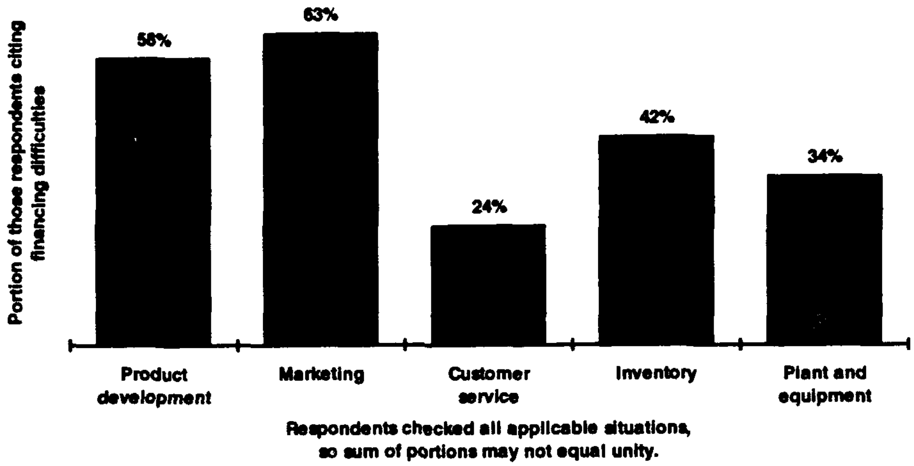

Figure 3-8.
Difficulties in Obtaining Financing

The difficulties in obtaining financing differ between those firms where financing is limiting conversion and those where it is not. Figures 3-9 and 3-10 respectively show the difficulties in obtaining financing for firms that answered "yes" and "no" to "Has the inability to raise funds inhibited or restricted your conversion to commercial work?" (these figures combine the results from survey questions 3 and 6). Respondents were asked for additional written comments on these questions. The comments, reproduced in Appendix C, support these conclusions.

Twenty-eight percent, or 56 of the 200 respondents who answered question 6, said that the inability to raise capital is limiting conversion. Of these, 45 cite the financing difficulties reflected in Figure 3-9. Financing for product development and marketing are difficult for two-thirds of these respondents, while obtaining financing for inventory is also difficult for 51 percent.

We decided to follow up on a selection of respondents that said obtaining capital is a problem, that capital availability is hindering their conversion efforts, and that they have been unsuccessful in getting a commercial loan to determine their creditworthiness. The denial of credit to a seemingly creditworthy firm might indicate a market failure for small defense-oriented businesses. We obtained a Dun & Bradstreet financial statement and ratio report and a TRW payment performance report for the six firms selected. Although our somewhat cursory analysis cannot substitute for that of banking professionals who have access to more information, the data from those sources provide some evidence of the apparent financial condition of the firms as seen by potential lenders. One company had a strong balance sheet and a good payment record, and another had a good payment record as the only data available. The remaining four

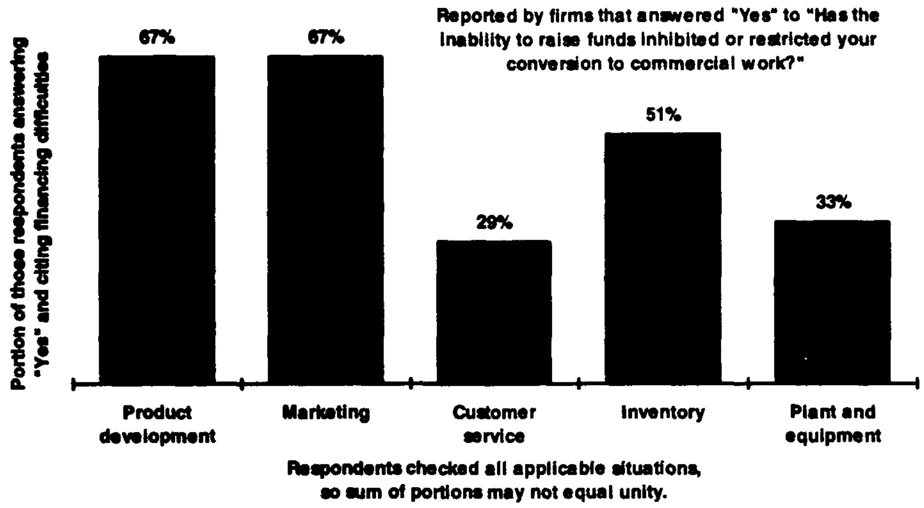

Figure 3-9.
Difficulties in Obtaining Financing ("Yes" responses)

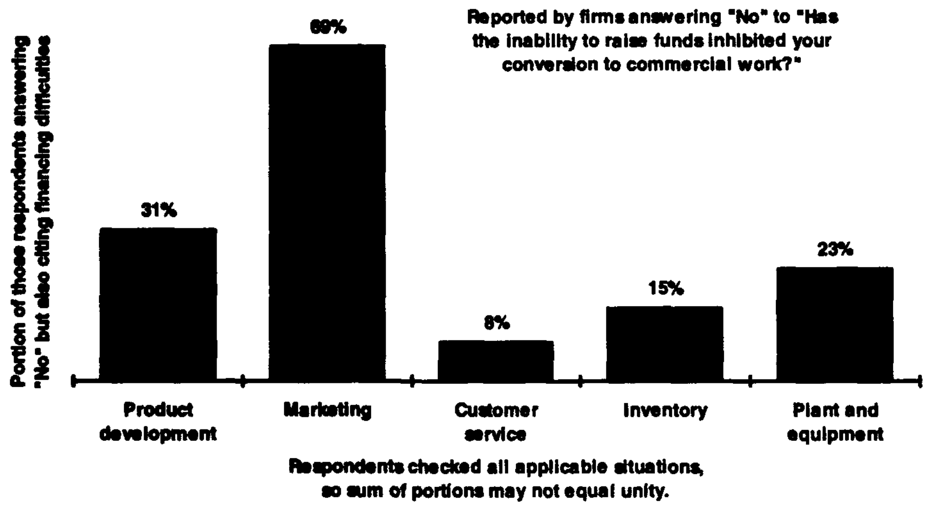

Figure 3-10.
Difficulties in Obtaining Financing ("No" responses)

companies displayed a variety of signs of financial distress, including low net worth, declining profitability, declining liquidity, high levels of debt, and a record of late payments to creditors. (No company displayed all signs.) Small firms do not usually deal with large banks with a national network of offices. Thus, even if a small business appears strong financially, regional economic conditions and the health of the banking industry in the firm's immediate area may have as much to do with the firm's borrowing prospects as do its own situation and condition.

One hundred-forty-four respondents said that the inability to raise financing is not limiting conversion. While financing is not limiting conversion, 13 do cite financing difficulties, which are shown in Figure 3-10. Financing for marketing is the main problem. One explanation for this difficulty may be that few of the available sources of capital discussed in Chapter 2 would be likely to provide financing for marketing activities.

We conclude that access to financing is one of many problems a small business must solve to succeed with a dual-use application. Identifying markets and other marketing-related areas (such as developing distribution channels and exports) account for a significant portion of difficulties encountered. A possible explanation for marketing difficulties being rated equally with obtaining financing is that many small businesses are not far enough along with their conversion efforts to have identified financing needs.

In general, these data lead us to conclude that the availability of capital is not limiting conversion and that the chief challenge to firms attempting conversion is the identification and penetration of new markets.

Approaches to, and Success in, Financing Conversion

Figure 3-11 shows the distribution of approaches used in seeking financing for the commercialization of defense products. Figure 3-12 shows the rates of success associated with each approach portrayed. The rates of success reported for public offerings and other approaches are omitted because of the small response rate for those categories.

Of the 71 respondents seeking commercial loans, 37 failed (and others did not report success). Of those 37, only 15 also sought government loans. At first glance, the low number of respondents seeking government loans after failing to obtain commercial loans is quite surprising. Several hypotheses might be formed to explain this observation:

- Small businesses possess a low level of awareness of the government sources of loans.
- Small business firms are not aware that, in order to qualify for an SBA-guaranteed loan, it is necessary to demonstrate that a loan cannot be obtained under normal commercial terms.

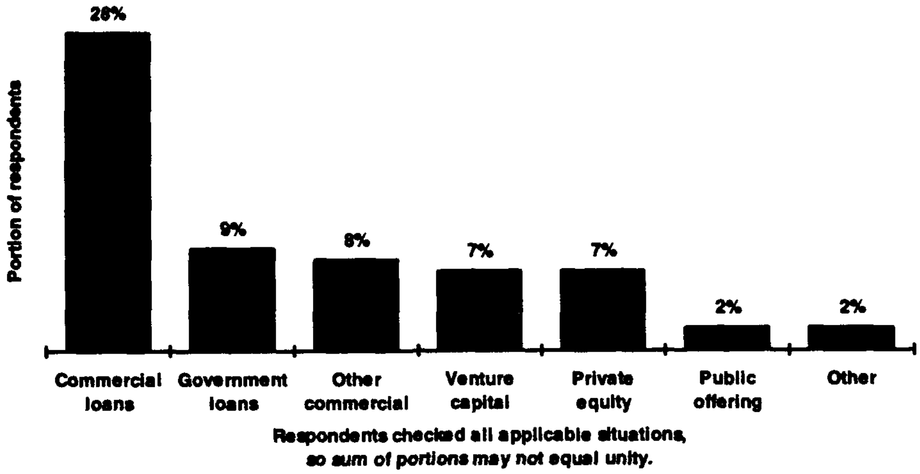

Figure 3-11.
Approaches Tried in Obtaining Financing for Conversion

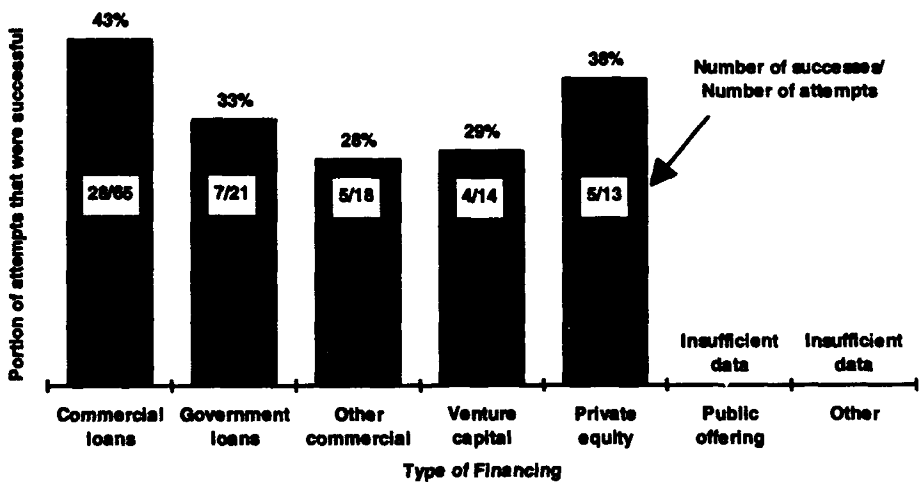

Figure 3-12.
Success in Obtaining Financing for Conversion

- The same bankers who turn down commercial loans do not know about or participate in SBA or FmHA programs.

- Since SBA programs become fully subscribed long before the fiscal year is over, potential applicants may be discouraged from trying.

Unfortunately, our survey data give us no insight into the real cause; further research is required to test these hypotheses.

Interestingly, the success rate in applying for government loans is lower than that for commercial loans and private equity and only slightly higher than that for venture capital and other commercial sources. One would expect government loan applicants' success rates to be higher than commercial loan applicants', because most government loan programs have the government acting as a lender (or a guarantor) of last resort. The survey results indicate that this is not the case. The number applying for government loans (9 percent of respondents) is significantly smaller than the number applying for conventional loans (28 percent of respondents). One explanation could be that the relatively low number of government loan applicants and the relatively low success rate shown in Figure 3-12 are both due to the early exhaustion of loan guarantees each year. This situation may discourage potential applicants and force those who do apply to be served on a first-come, first-served basis.

We found no correlation between groupings of respondents and success in obtaining commercial or government loans. We ran regressions between company size and success in getting loans, and between proportion of defense business and success in getting loans. In no case was the regression model or any variable significant.

Other Survey Observations

In addition to asking categorical questions, we gave respondents the opportunity to comment or elaborate on the challenges of defense conversion. We have compiled their comments into the following observations. (See Appendix C.)

Several respondents expressed the belief that the specifications and quality levels of their defense work were too high for them to be effective in commercial markets. Given the intense effort that has been made to address and improve quality throughout the manufacturing sector in recent years, it is doubtful that such perceptions accurately reflect the reality of today's commercial marketplace. The fact that price competition may be more severe in commercial markets than in the defense market does not mean that quality is necessarily less important or given less attention in those markets.

A few respondents expressed a strong conviction that their remaining defense business is being artificially restricted by socioeconomic programs, such as the 8(a) set-aside program, or by unfair competition from government-sponsored organizations such as Federal Prison Industries (Unicor). According to these respondents, the opportunities to gain defense work with which to stabilize their earnings while undertaking conversion have been significantly reduced. Although this subject was raised only a few times, the fervor of the opinions expressed was quite high.

The accounts of the nature of the difficulties encountered in converting — and the comments made throughout the survey in the areas intended for additional respondent input — seem to indicate a significant uncertainty on the part of firms seeking to enter commercial markets. The need to lower costs and prices and to find out more about the nature of the competition in a market, concerns about the lack of a well-experienced commercial marketing team and organization, and fears about the high degree of competition already in the commercial markets were all mentioned by firms planning to — or knowing they need to — convert in order to survive. On occasion, the tone of the comments of this type seemed almost to indicate a fatalistic acceptance that the unknowns were so great that only token attempts to enter commercial markets would be made.

Summary of Key Findings and Conclusions

We surveyed 253 small defense-oriented companies to determine their plans for and experiences in converting to commercial work, and to determine the effect of financing on that conversion. Two-thirds of these companies employ fewer than 50 people. Two-thirds do 50 percent or less of their business with defense, but over half do most of their defense business directly with the government (as opposed to being principally subcontractors).

Sixty percent of these companies plan to sell their defense products "as-is" to commercial markets or to adapt defense products for commercial use. Two-thirds cite moderate or high success to date in converting.

Financing, while sometimes difficult to obtain, is not generally restricting conversion. Seventy-two percent of these companies report that financing is not inhibiting conversion, but 28 percent do cite obtaining financing as a difficulty. The largest difficulty in converting seems to be the identification and penetration of new markets. Twenty-eight percent claim that they are confronted by marketing challenges, and 14 percent claim that they are having difficulty establishing distribution channels. Twenty-five percent of survey respondents report no difficulty in converting.

The leading source of financing for conversion is commercial loans, applied for by over one-quarter of these companies. Government loans, venture capital, and private equity are each sought about one-third as often as commercial loans. Both the rate of attempt and the rate of success in applying are lower than expected for government loans. Possible causes of this phenomenon include lack of awareness on the part of both lenders and borrowers and oversubscription to government programs.

From our follow-up discussion with some of the respondents, it appears that many of the banks with which these small firms deal are not proving good service. The lack of awareness of — or encouragement to consider — the SBA guaranteed loan program makes the prospect of adding yet another program to the SBA portfolio an unlikely solution for most of the small businesses that we contacted. Clearly, the Federal government needs to improve the level and quality of information about existing financial assistance programs for small businesses.

APPENDIX A

Survey Instrument

Small Business Defense Conversion Survey

1. **Company Characteristics**

   A. **Full-time equivalent employees (most recent pay period)**
   ☐ 1-50 ☐ 51-100 ☐ 101-200 ☐ 201-500 ☐ 501-1000
   ☐ 1000-1500 ☐ 1501+

   B. **Proportion of defense business (percentage of sales as a prime or subcontractor)**

5 years ago	☐ 0-25%	☐ 26-50%	☐ 51-75%	☐ 76-95%	☐ 96-100%
Now	☐ 0-25%	☐ 26-50%	☐ 51-75%	☐ 76-95%	☐ 96-100%
5 years from now (target)	☐ 0-25%	☐ 26-50%	☐ 51-75%	☐ 76-95%	☐ 96-100%

   C. **Majority of defense sales are as a** ☐ Prime Contractor
   ☐ Subcontractor

   D. **Primary 4-digit SIC code (if known)**____________________

2. **Which of the following describes your current situation? (Check all that apply)**

   ☐ Plan to or do sell defense products "as is" to commercial customers (i.e., without modifying or adapting product).
   ☐ Plan to develop commercial products by modifying or adapting existing defense products.
   ☐ Plan to remain focused on defense or other government business.
   ☐ Plan to discontinue defense business.
   ☐ No firm plans yet in place.

3. **If you have <u>already attempted</u> to enter or convert to selling commercial products, have you encountered any of the following difficulties? (Check all that apply)**

   ☐ Technical difficulties
   ☐ Obtaining financing
      ☐ For product development
      ☐ For marketing and promotional activities
      ☐ For establishment of a customer service infrastructure
      ☐ For inventory and/or receivables
      ☐ For plant and equipment
   ☐ Export restrictions
   ☐ Identifying markets
   ☐ Establishing channels of distribution
   ☐ Recruiting key personnel for commercial business activities
   ☐ No difficulties encountered
   ☐ Other difficulties not listed above (please specify)

   ____
   ____
   ____
   ____

4. **How would you rate your degree of success so far in converting to commercial markets and business practices?**

☐ **Low** ☐ **Moderate** ☐ **High**

5. **Have you tried recently to obtain financing or raise capital for commercializing defense products in any of the following ways? (Check all that apply)**

	Have tried	Successful? Yes	No	Haven't tried
Commercial loans from banks	☐	☐	☐	☐
Government direct or guaranteed loans	☐	☐	☐	☐
Other commercial sources	☐	☐	☐	☐
Venture capital	☐	☐	☐	☐
Private equity placements	☐	☐	☐	☐
Public offering	☐	☐	☐	☐
Other (specify)__________________	☐	☐	☐	☐

6. **Has the inability to raise funds inhibited or restricted your conversion to commercial work?**

☐ **Yes (If yes, discuss below)** ☐ **No**

7. **In the space below, please provide any comments on other factors that aided or hindered your conversion toward commercial business.**

May we contact you for clarification or follow up? ☐ **Yes** ☐ **No**

If yes, please provide name and phone # of the appropriate person

Name______________________________

Phone______________________________

APPENDIX B

Survey Responses

Question 1A

Number of Respondents 253

5/16/94

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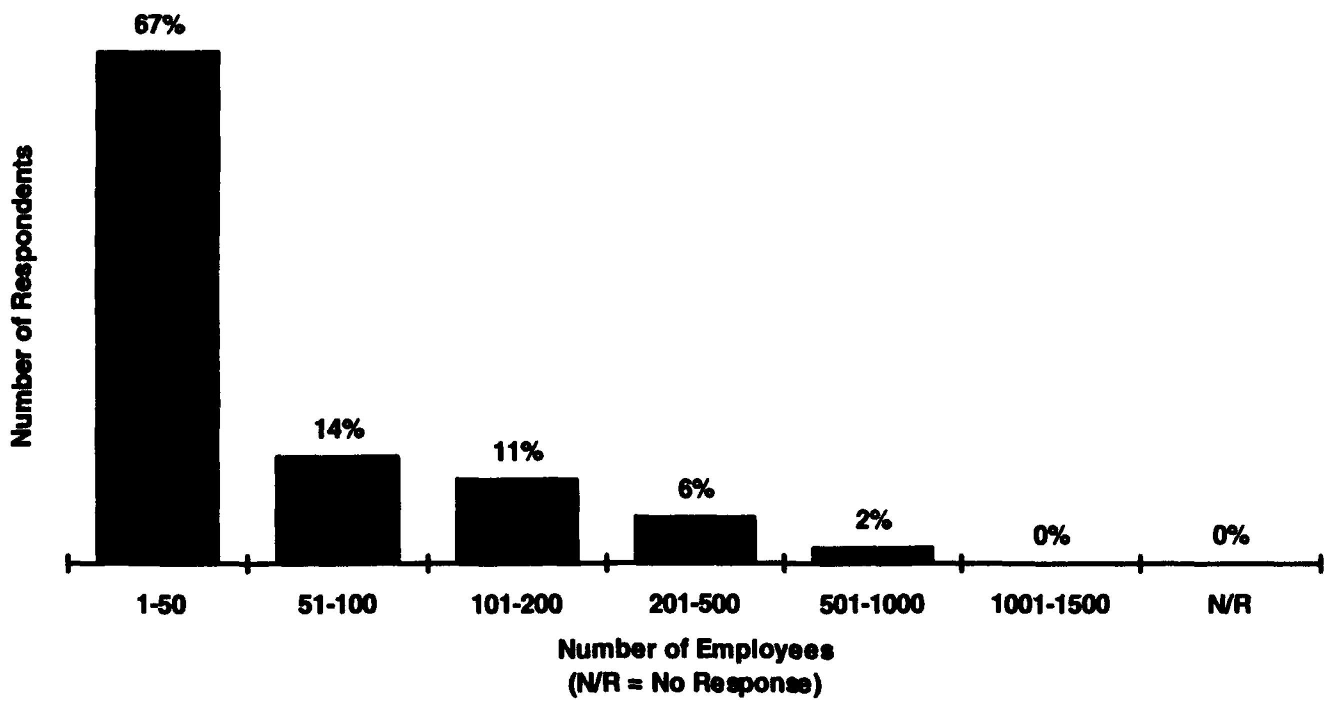
Full-time Equivalent Employees



Question 1B

Number of Respondents 253

5/16/94

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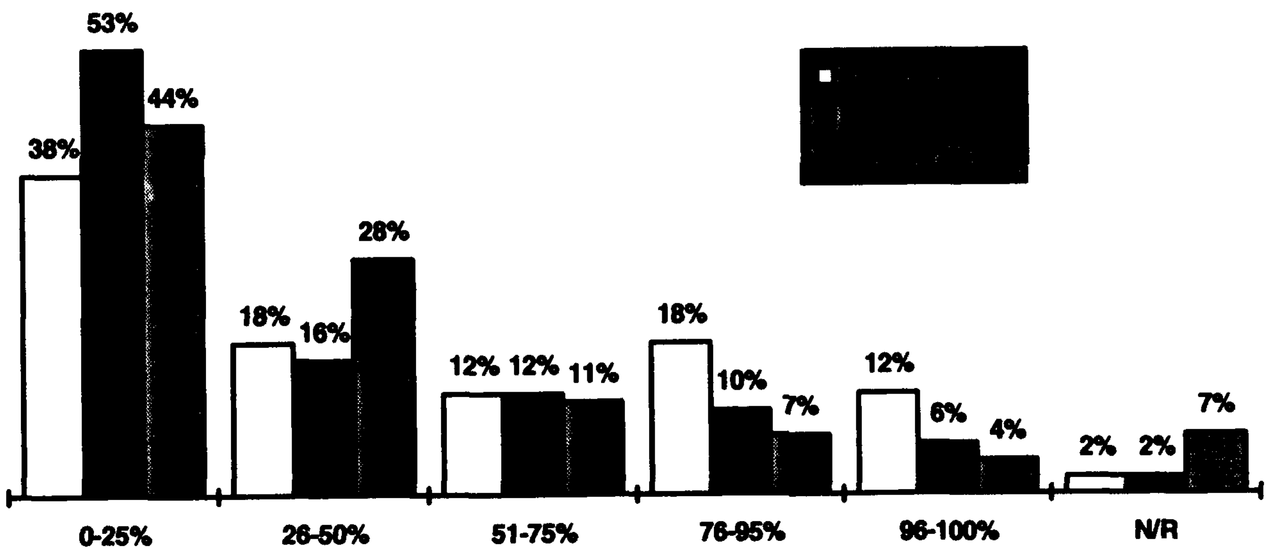
Proportion of Defense Business



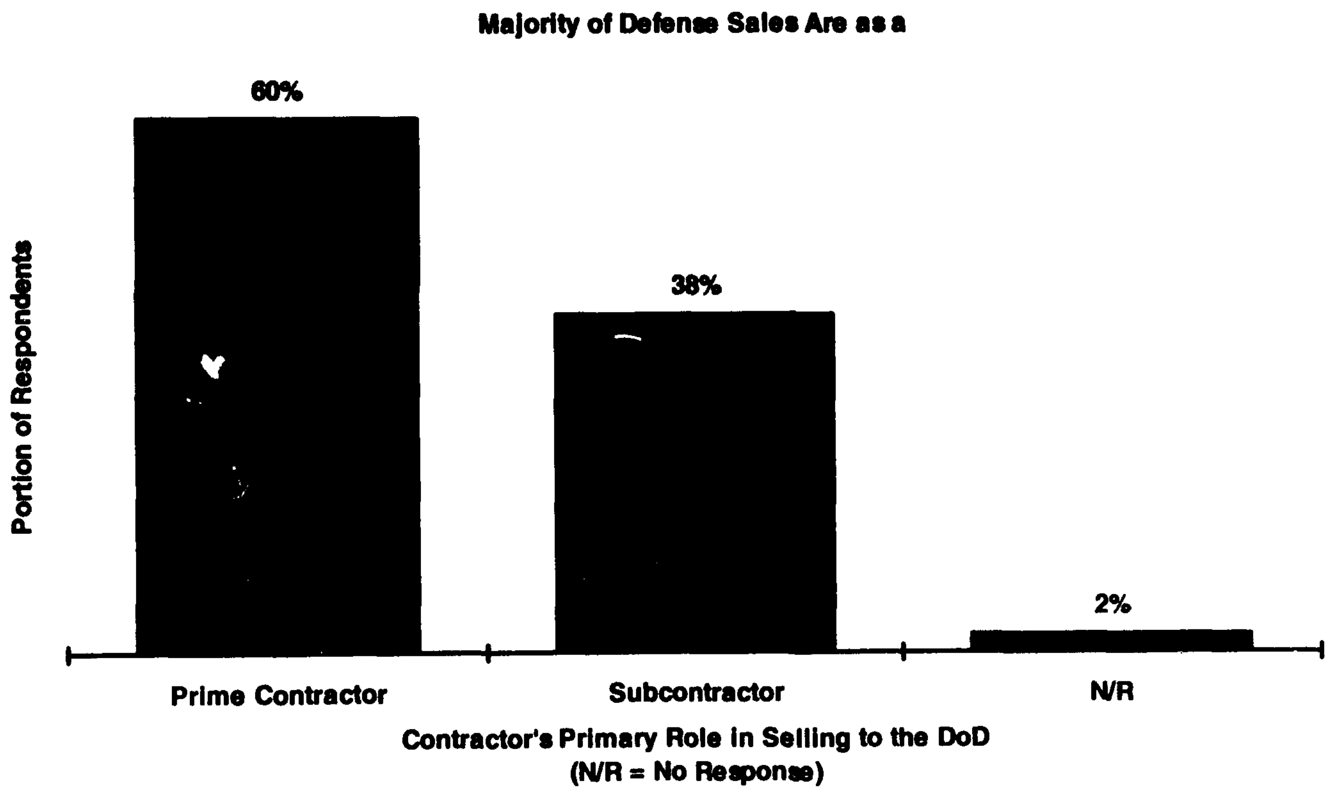
Proportior of Defense Business (percent of sales, N/R = No Response)

Question 1C

Number of Respondents 253

5/16/94

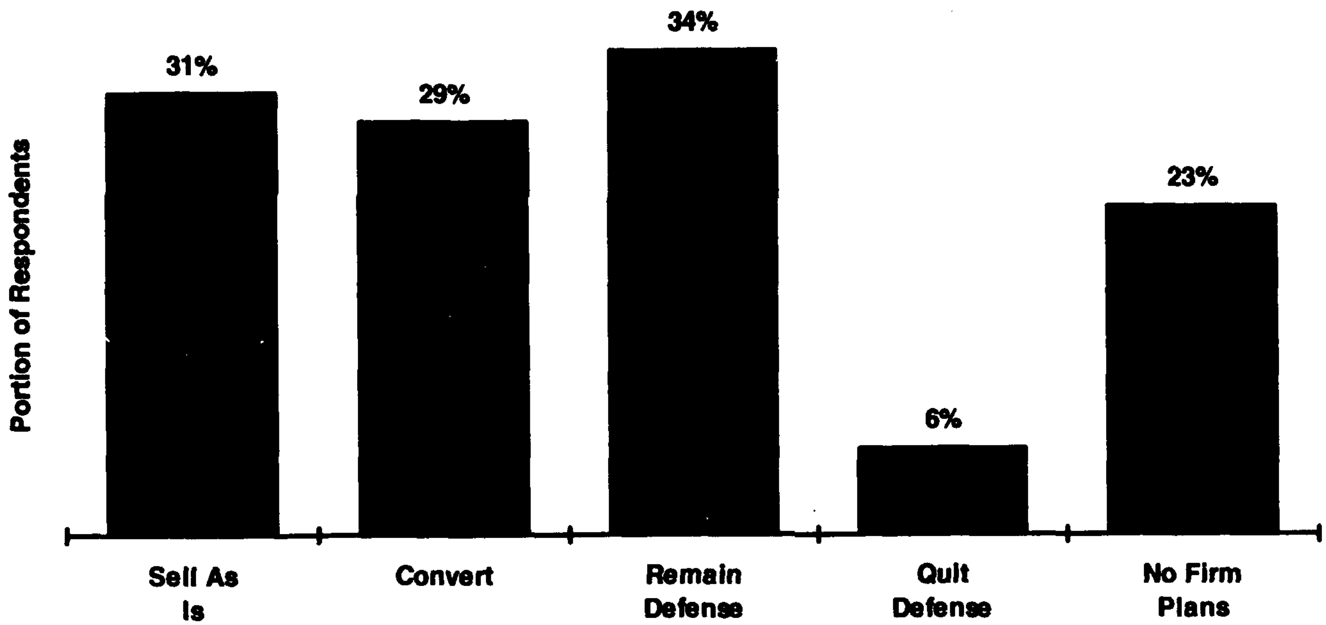
5:04:19 PM



Question 2

Number of Respondents	253		5/17/94
Number Checking at Least One	236		3:24:59 PM

Description of Current Situation



Respondents checked all applicable situations, so the sum of portions may not equal unity.

Question 3

Number of Respondents	253		5/17/94
Number Checking at Least One	194		3:29:37 PM

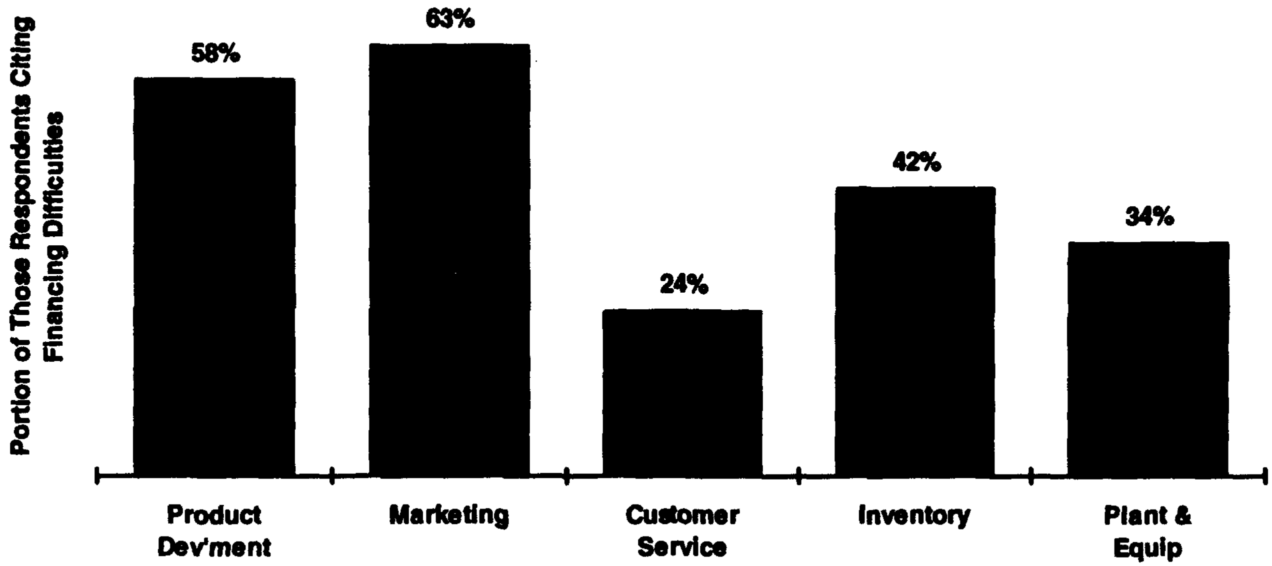
Conversion Difficulties Encountered

Respondents checked all applicable situations, so sum of portions may not equal unity.

Question 3 | 5/16/94

Respondents Citing Difficulties Obtaining Finance: 62 | 5:07:23 PM

Difficulties in Obtaining Financing



Respondents checked all applicable situations, so sum of portions may not equal unity.

Question 4

Number of Respondents 201

5/16/94

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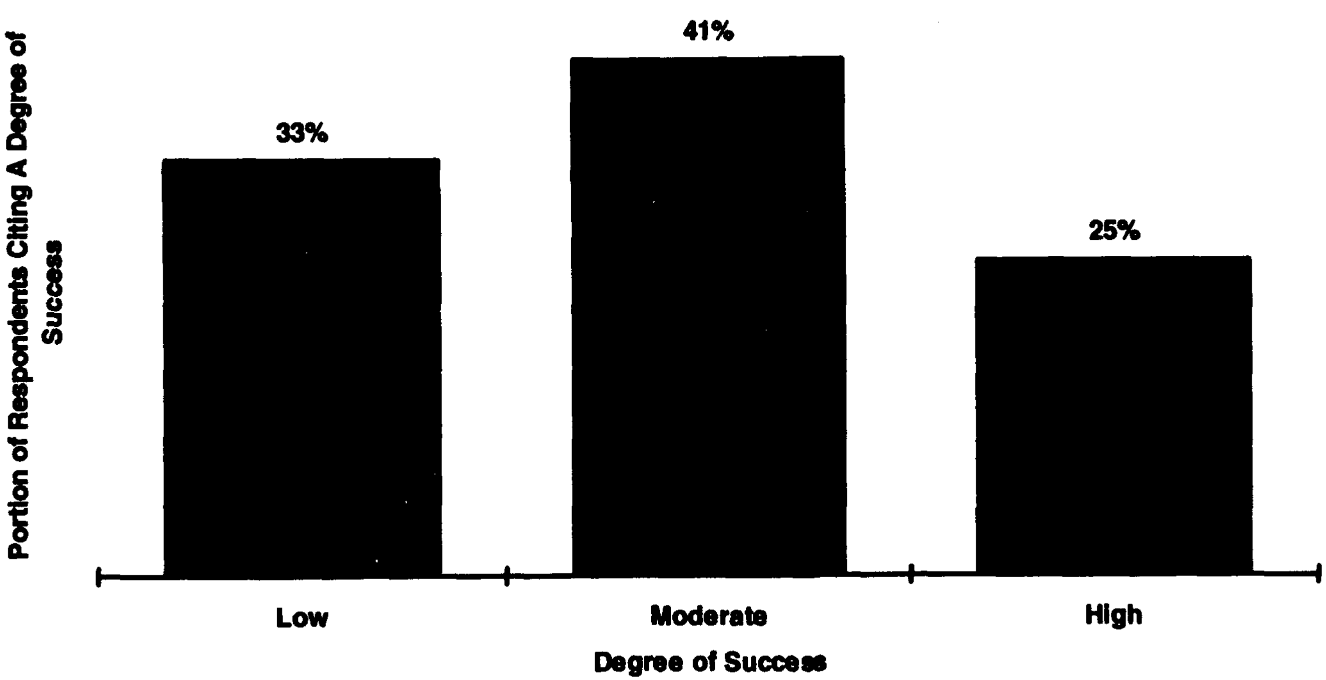
Success in Converting



Question 5

Number of Respondents 253

5/16/94

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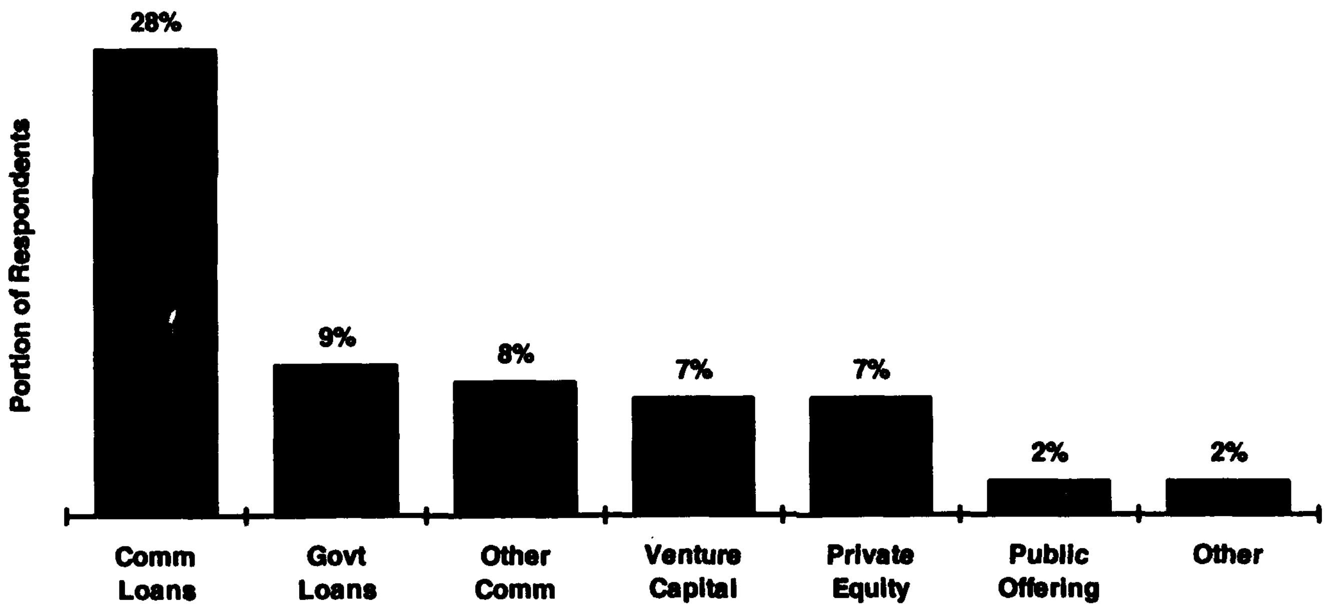
Approaches Tried in Obtaining Financing



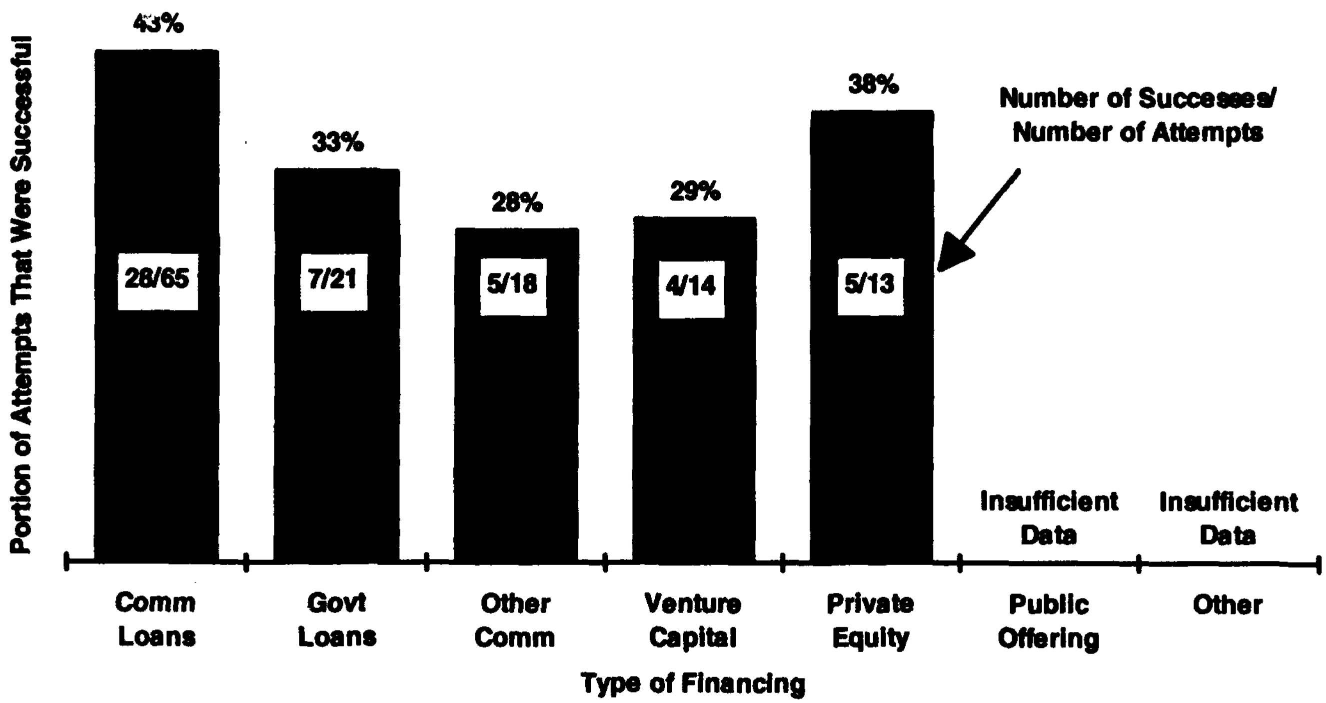
Respondents checked all applicable situations, so sum of r ⁻tions may not equal unity.

Question 5

5/17/94

3:28:32 PM

Financing Success Rates



Question 6

Number of Respondents 200

5/16/94

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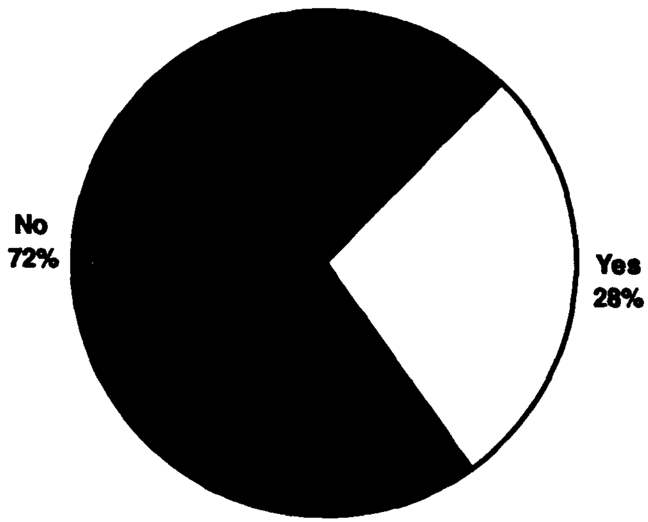
Has the Inability to Raise Funds Inhibited Conversion?



APPENDIX C

Written Comments

Question 3 Qualitative Responses: Other Difficulties in Converting

A. Government Policy and Programs

Problems dealing with the bureaucracy that seems to surround almost all government agencies.

We participated in the SBIR portion of the TRP. The funds allocated changed from > $60M when the RFP was issued to less than $8M when the contracts were awarded. We feel the program was misrepresented and was a waste of our time and resources. We don't appreciate or need additional "help" like this from the Federal government.

Government specification compliance is very expensive. No commercial customers will pay for overkill of specs and excessive documentation. Conversion to commercial involves significant de-staffing and streamlining (i.e. layoffs). On the plus side, reductions in defense spending equals dramatically reduced technological advances in US industry. This will result in US becoming second class economy as the industrial heart of the world continues to move to the Pacific Basin. Our company will soon evaluate the possibility of relocating manufacturing to SE Asia due to government intrusion and overregulation by fringe elements in the US government.

B. Difficulties Financing

Contacted all state agencies for help in financing. Met this so-called model at a manufacturer. Bank refused to extend line of credit yet company was turned down for any state or federal assistance in transition.

Pay final invoice in 120 days. Unrealistic opinions concerning price of changes.

C. Difficulties Marketing

Difficulties in obtaining detailed market data to guide market development and product direction.

Getting opportunity to see and develop commercial customers.

Obtaining help and guidance in marketing to non-military customers. Attempting to develop new products with commercial application.

We have no field sales or representative organization and have in the past tried them for our business with no success. With the cutbacks in government sales, we have limited financial and manpower resources and need to keep them focused on our current business which has no chance to commercialize and finding new products would require more than we could provide in resources.

Question 3 Qualitative Responses: Other Difficulties in Converting

Finding markets that use products that we are set up to produce to the quailty and specs of what is required in the defense industry. By cutting back on defense products this country will lose its ability to return to producing them when they are needed. We are jeopardizing the USA and its citizens with this policy.

Private sector markets exist but we need to establish a presence in them and to simultaneously explore other potential private markets.

D. Difficulties Competing

Attention : Our business is in bank forclosher[sic].

Image, cost culture.

Reducing our costs and increasing our direct hours in an effort to develop a marketable commercial rate.

Converting plant personnel used to following explicit sets of regulations - to think.
Converting plant from steady large production runs to small lot orders.

Overhead structure required for Government Defense work makes us less competitive at commerical work.

Leadtimes not adequate.

Meeting market prices.

Cutting labor times to be competitive in the commercial markets.

E. Lack of Demand/Tight Market

Finding business to replace the percentage of government sales.

Lack of new aerospace program.

With reorganization by DoD, it's been difficult to keep our contract.

No commercial market for some products.

Expansion into a slow commercial market.

We are consulting mechanical engineers. The private/commercial activities is also down in southern California.

Question 3 Qualitative Responses: Other Difficulties in Converting

Commercial markets are already saturated.

Competition already in place.

F. Difficulties with Personnel

Manpower dilution.

Our defense related business has been growing such that we do not have adequate personnel resources available to fully exploit the commercial potential of some of our products.

G. Already Dual-use or Commercial

Basically, already a commercial product builder. Aim to sell commercial product and modifications to military.

We sell mostly commercial business (approximately 90-95%).

Commercial has always been the majority of our business. We will not change our business plans.

Our products have always been commercial first with defense sales a part thereof.

We have been doing commercial business for forty years and defense business for thirty years.

We manufacture commercial products and modify them for government sale.

N/A. Already sell commercial products.

Note that we are a manufacturer that chose to do some govenrment business, not a government contractor trying to get into non-government commercial products/ business.

Approximately 90% of our business has always been in the commercial market. Government jobs were additional work and revenue. We plan to phase out of being a prime contractor to subcontracting status.

We don't have a "Government Product Line" to convert as such. Our products can be used without any conversion process for industrial, scientific, laboratory, R&D & many other applications.

Question 6 Qualitative Responses: "Has the inability to raise funds inhibited or restricted your conversion to commercial work?

A. General/Multiple Difficulties

Response: Yes
Capital is always a problem (& a discipline).

Response: Yes
We need to have a sales force plus we need operating capital.

Response: Yes
Absolutely, cannot upgrade tooling, technical designs for commercial applications, inventory or all other financing to convert a 102 year old company with lots of products including uninterruptible power supplies, battery charger, wind power and frequency changing transformer.

Response: Yes
Our limited success in raising funds has restricted our ability to finance government related sales growth. As a result, we have fewer funds available to invest in commercial related enterprise. The success of one aspect of our business is important to the success of our remaining business. We believe a mix of business between federal and government markets is important and will help to ensure the long term viability of technology oriented small business.

Response: Yes
No money available to small business for new product development or acquisition. No money for establishing a service department or personnel. No money for marketing and marketing personnel to provide needed coverage. No money for equipment. No money for internal automation. No money to meet new federal, state, local and industry quality assurance requirements.

B. Difficulties Financing

Response: Yes
We have downsized by 66% in order to reorganize and maintain vendor and bank relationships, however no further funds were available to us.

Response: Yes
Loss of defense business has brought losses and banks have cut back on credit lines and want payout. New banks won't touch a company operating in the red.

Response: Yes
Commercial banks are not responding to Government guaranteed loans to small businesses as they do to larger businesses. More need for Government sponsored SBIC (Venture Capital).

Question 6 Qualitative Responses: "Has the inability to raise funds inhibited or restricted your conversion to commercial work?

Response: Yes
The sudden and constant decline in our government sales since 1992 was not forecast in our business plan. We now have decided not to include government sales in any of our projections. Our export sales have increased, and this has offset the effect of the lower sales to the U.S. government. We are in a "no-growth" situation at the present time. It is very difficult to convince sources of commercial capital to invest in a situation of little or no growth.

Response: Yes
Federal bank restrictions too tight.

Response: Yes
Growth and sales outgrowing sources and credit available. Our government sales to Ft. Bliss (US Army) are off too.

Response: Yes
Banks reluctant to support creative products - no future interests.

Response: Yes
See above [Unsuccessful at getting commercial and gov't. loans]

C. Difficulties Marketing

Response: Yes
Marketing, advertising, literature as well as in-house sales force expenses are substantial. Banks are still very reluctant to lend, especially if they have knowledge that a good percentage of total sales has been in the defense industry.

Response: Yes
Market research and marketing require commitment of up-front dollars. Similarly, re-engineering and development require up-front capital investment, not readily available from financial institutions.

Response: Yes
We have developed small number of customers in medical, commercial avionics, industrial telecom. Need to spend on literature, marketing, staffing, product development. Downturn in defense sales has weakened us financially making us unattractive to lenders.

Question 6 Qualitative Responses:
"Has the inability to raise funds inhibited or restricted your conversion to commercial work?

Response: Yes
A) Need to further develop markets. B) Need to convert defense product ideas to commercial lower cost products.

Response: Yes
We would need a study to identify potential markets in the commercial sector.

Response: Yes
Capital necessary for focussed marketing of new products, additional "qualified" staffing and additional assembly employees. In addition, many trips are required and additional capital is needed to allow air travel.

Response: Yes
Conversion of product went well. However, money for ads, demos, customer visits is tight.

D. Product Development Issues

Response: Yes
We need money to fund development of new product on which we have already done some development work.

Response: Yes
Need funding for R&D and conversion.

Response: Yes
Has restricted new product development. Have had to cut back on commercial R&D.

E. Working Capital Issues

Response: Yes
We make 8 strand rope for Government. It is not well known in the commercial market. Most rope used in the commercial market is 12 strand or double braid. We have purchased a few double braid machines. Due to low working capital, we are only able to get a small amount of business.

Response: Yes
If the government paid on time and conducted it's side properly, funding would not be a problem, though DLA screws up and we pay.

Response: Yes
Lack of working capital limits options.

Question 6 Qualitative Responses: "Has the inability to raise funds inhibited or restricted your conversion to commercial work?

Response: Yes
Have not expanded as quickly as we could due to shortage of funds created by need to finalize large Government prime contracts.

Response: Yes
The decrease in sales has caused a significant decrease in the availability of working capital.

Response: Yes
We need additional working capital to replace government progress payments.

Response: N/R
Sold business to firm with large commercial business who had capital and who required part of our production.

F. Difficulties Obtaining Plant Equipment/Capacity

Response: N/R
To convert to commercial work, we would need a complete new plant and expensive high production equipment to compete with those who already have this facility and are struggling to survive. Furthermore, we do not have the knowledge to enter this field.

Response: Yes
Cannot buy equipment to manufature in volume to be competitive.

Response: Yes
Limits expansion.

Response: Yes
Not able to get building space large enough to house operation at one site.

Response: Yes
Have not been able to convert to high output facility, newer equipment and pursue larger contracts.

G. Difficulties with Personnel

Response: Yes
Lack of cash flow to retrain employees.

Response: Yes
Cannot hire to complete project.

Question 6 Qualitative Responses: "Has the inability to raise funds inhibited or restricted your conversion to commercial work?

H. No Major Problems

Response: Yes
Primarily slows the effort; we are self funding conversion.

Response: No
Not yet! Capital from private banking adequate to date. Activity is to lease vehicles through GSA, DC for up to 36 months. Vehicles then returned to us "used" and sold to private sector.

Response: No
Not yet. Financing has been sufficient so far.

I. Other Comments

Response: Yes
Close to putting the company out of business.

Response: Yes
Eventually operating (manufacturing) expenses will be beyond our present capabilities.

Response: Yes
Conversion to commercial work isn't a goal, but financing has been very difficult, a factor being assumed difficulties for a company whose sales are heavily defense.

Response: Yes
We need to develop product lines 100-500k because most of our defense products can only be used in defense. We can't afford $50k to certify to ISO 9000 which would get us into the European market.

Response: N/R
Haven't tried. Our business is foreign military sales.

Response: Yes
1) Detracts from completing existing defense contracts. 2) Unable to carry development further.

Response: Yes
Unable to fully respond to demand. Customers being lost to government-backed foreign companies.

Question 7 Qualitative Responses:
"Please provide any comments on other factors that aided or hindered your conversion toward commercial business."

A. Government Policy and Programs

1) Bias of TRP towards big companies with cash matching-- if they're awash in cash, why in hell do they need your money? (ask Lee Buchanan?) 2. Glacial progress, bureaucratic morass of SBIR. 3) Scant federal funding of succe[illegible]nversion program. 4) Failure to fund subtitle B section 211 7(A) of PL 102-366 [illegible] loans.

Our prime contracts are mostly SBIR research contracts that form a technology base for our products i.e., we are not in a conversion situation.

Identification of software reps in the global market. Hanover fair too expensive. SBIRs aided our effort very much. We bid TRP with McDonnel Douglas and lost. We won two SBIRs.

Tried for state funding -- never heard.

1) DOD backing down on commitments that were made in FY 93 for FY 94 funds. 2) Commercial products which needed a kickstart but were almost one-for-one defense to commercial were required to be stretched out. Manpower became overloaded. Important market opportunities were missed in some cases and deferred in others. 3) It is obvious that the transition from defense to commercial needed an overlap instead of a step function in DOD downturn.

Contracting officers are not knowledgable enough on technical issues.

Government regulations-- Federal and State.

We are not hindered in any way - we are a commercial business. However, we have made many attempts to obtain Federal R&D grants with very little success. This is surprising to us because our technical field is very critical to the advancement of the US manufacturing base, and we are the leader in the field (rapid prototyping and manufacturing).

I believe the present efforts of the U.S. government, particularily the TRP, are mis-directed and are actually hindering conversion efforts. The TRP is nothing but a subsidy program for large corporations and only wastes the time and resources of small business. Our conversion efforts will depend on our own entrepreneurial skills and the growth of the markets we enter. The government can help by staying out of the way and improving the environment for commerical loans and alternative financing.

Question 7 Qualitative Responses:
"Please provide any comments on other factors that aided or hindered your conversion toward commercial business."

Commercial manufacturing in an atmosphere of declining government spending on defense is very competitive today. Government mandates for family leave, healthcare, etc., will make it even worse. We already provide 80% of the healthcare insurance costs and don't need any payroll taxes to go along with that.

B. Difficulties Financing

Not large enough small business loans.

Banks want a sure thing. No interest in future. Bankers don't understand creative efforts. It is difficult to understand what other government agencies really need to grant loan.

We lack finance to develop or convert defense products for commercial applications over a short time period.

Lack of financing. Banks insist on backing loans with personal assets.

Loans

Lack of incentives by banks and other lending institutions to loan money to small business for expansion and increased inventory requirements. No tax incentives for hiring new employees (qualified). Slow payment of invoices by the military and other government agencies restricts needed cash.

C. Difficulties Marketing

Learning the marketplace is slow unless the expertise is purchased. [Marketplace is broadest definition; customer attributes, competition, etc.]

As pure contractor to DOD or exchange systems we had no marketing expertise. Military uniform headwear has limited commercial appeal and imports impact the pricing structure of that market. Our quality is too good for most commercial users and baseball style caps are becoming the common uniform headgear and we are not set up for baseball caps and do not have the capital to get into this market in a big enough way to make an impact on our overall health.

We have had trouble obtaining market/competitive information on foreign markets and foreign applications for our technology and products.

Limited opportunities and minimal resources to market services.

Question 7 Qualitative Responses: "Please provide any comments on other factors that aided or hindered your conversion toward commercial business."

1. Where is the business? 2. How can I get it? 3. All the foundries that I know of who are set up to do the type of business we did for the defense industry are in the same predicament as we are. We must do the same business that we are set up to do and can do efficiently.

The primary difficulty we have encountered in converting dual use technology is identifying the commercial user. Identifying the commercial application of technology developed under government contracts is especially challenging for small businesses.

Time and cost to develop catalogs and a range of products.

We need to develop other markets by learning about them. Develop a marketable rate (commercial business plan). Changing the machinist's Naval Nuclear mentality to commercial work is very difficult. You need to make a product more efficiently without sacrificing quality.

D. Difficulties Competing

All potential new markets are already fiercely competitive!

Could use help modernizing our equipment and capabilities since much of our work for the government is "low tech" and not easily transferable to competitive commercial markets.

Our cost structure for military aerospace is too high to compete on commercial work. Our equipment is specialized for aerospace.

Worker compensation rates.

Overhead required for govnerment work makes us uncompetitive on commercial items.

We now have to compete with off-shore companies such as Costa Rica whose minimum wage is $0.78 an hour and whose work week is 48 hours. We need a lower minimum wage in the United States.

E. Lack of Demand/Tight Market

A market doesn't exist.

Question 7 Qualitative Responses:
"Please provide any comments on other factors that aided or hindered your conversion toward commercial business."

Every company who ever supplied materials or services to the government is converting to more commercial sales. Each large government procurement center has above 6,000 vendors. How are 6,000 vendors going to sell to the existing or shrinking market? Too many converting sellers to a dormant economy equals a poor economy. Wrong solution. Stimulate defense spending or face the inability to be prepared for emergency situation. The government is now a broker of goods and services, without readiness.

Lack of business in industrial and commercial field. To replace the business that has been lost or will no longer exist in the near future due to Navy exiting Charleston.

Your premise of facile conversion from military to commercial work may be incorrect. We have been in business 44 years and like many others may be out of business soon.

There are not enough projects to bid and be at least 10% successful. As an OEM we are solely dependent on our vendors who are competing for the same job.

Conversion is not a factor. Lack of military requirements cut gross sales 50%. Commercial sales are not sufficient to justify overhead to continue business as general aviation is down to less than 700 new manufactured airplanes per year. Chinese copied our product and took over third of our sales away in 1993.

A) Building industry in southern California is down in general and as a small business there is not much we can do. B) All out of work engineers have also entered the market as consulting engineers so competition for smaller jobs is also greatly increased. C) There has not been a "real" conversion related to the building industry. The work has stopped!!!

The major problem is that many many are going after commercial work driving prices down due to supply and demand. This makes it difficult to be profitable and most companies in our situation are having trouble breaking even.

F. Commercial/Defense Sectors Segregated

Defense business and commercial business tend to be mutually exclusive. The goals and controls are so different

Contractual, marketing, documentation, quality and accounting are unique to our government business.

Not good mix from hi quality, precision machined high value (aerospace parts to poorly specified, loose toleranced commercial parts (need immediately)

Question 7 Qualitative Responses:
"Please provide any comments on other factors that aided or hindered your conversion toward commercial business."

Mind is different in commercial. Everything is cost-based. Aerospoace is driven by making part correctly, cost is 2nd. Not so in commercial world.

Comparing government business to commercial business is like comparing apples to oranges. Commercial business is based on "Better Design" at competitive prices. Government business is based on "Letter Of The Contract" and rigid resistance to innovation or practicality. If you "gear up for govrenment business", you cannot compete commercially. The major aid to conversion is the ability to draw on high tech designs (i.e. NASA, etc.) that defense industry produces.

We have encountered many difficulties in doing defense contracting. It has not been worth it to continue pursuing defense work.

G. Commercial Bias Against Defense Suppliers

A. We are developing in house resources to market new software products outside of the defense business. This has been a difficult transition. B. We have found a reluctance of non-DOD agencies to want to do business with support contractors who are presently doing defense business.

Being a defense contractor am frowned upon in the commercial marketplace.

H. Business is Defense-intensive

Our product is not a commercial convertible item.

Product has a limited scope of adaptability. Transportation market may be the best endeavor however our not being knowledgeable in this area is a major drawback.

Company rate of growth has increased over past 2 years such that focus has been kept on satisfying defense related product sales. In future years we will attempt to gain funds for commercial applications development work through the SBIR and STTR programs.

We have been custom fabricators of speciality products for Department of Defense (Navy) and Department Of Energy i.e., protective clothing for nuclear facilities. Also, worked through safety distributors manufacturing from plastic film by sealing and sewing. Finding uses and products we can market has not proved successful.

I. Already Dual-use or Commercial

Question 7 Qualitative Responses:
"Please provide any comments on other factors that aided or hindered your conversion toward commercial business."

Most of our government sales have been the reverse-we modified our commercial products to meet government specs.

We have maintained a 50/50 split between defense and commercial work. We use both sectors to cross-fertilize the other sector with ideas and new service approaches. While the language of the two sectors is completely different, the process of designing buildings for each sector is similar so we haven't had much problem working simultaneously in each.

We started in the commercial market and mixed it with government (approximately 30%). Therefore, no problem with serving both the private and public sectors.

We have filled our capacity with commercial business. Sales to defense have been standard products.

While we have sold to defense business we have not designed a specific product for those applications. We sell the same products to both commercial and defense industries. Hence we are not going through any type of changeover.

High quality of products has been a positive benefit in switching to selected commercial markets.

Government contracts supplemental to existing commercial markets.

We were and have been engaged in commercial business since we started in 1986. With decrease in defense contracts we focused more on commercial.

We have been providing the same service to DOD and commercial market.

We never went into government work 100%. We always kept up with our commercial accounts and tried to satisfy everyone. When the government work dropped off we bought a house and motel combination directly across the road from our shop property. This brings us in a steady cash flow income every month. Also, we are continuing our efforts to secure more commercial accounts and if the future government work increases we will take care of that also.

We were never locked into government products as such. So no problem for us.

Question 7 Qualitative Responses:
"Please provide any comments on other factors that aided or hindered your conversion toward commercial business."

We have only ever conducted a very small percentage of our business with the government- most of this was through the sales of commercial products to the government or it's contractors. Reductions in defense spending have caused a reduction in demand for our products but we do not propose a change in strategy as a result.

We are primary commercial with some defense business.

We have not had to convert from defense to commercial. We have always had a strong commercial business. Our defense business however, is unique in that it would not - design-wise - be necessary and therefore, convertible to commercial business or commercial requirements.

Since a high percentage of our volume is already commercial, we have not faced a sudden jolt due to the reduction of defense activities.

We have always been primarily involved with the commercial field of aircraft refueling equipment. Company headquarters are in Kansas City, KS. This is a branch office.

We marketed products to the government defense that we also marketed generally across the nation at the same time, ie. recreational vehicles.

We have always been in commercial business and four years ago converted to doing government contracts and is now 8% of our business.

We are primarily commercial business oriented. Defense purchases primarily standard product.

We have been primarily selling our instruments to the commercial market since inception of this company. However, we do sell to the government and will continue to do so given the opportunity.

We do not sell the government a " defense specific " item. It is a small percentage of our business so no need to convert.

We are subcontractors certified for military and commercial applications. Commercial applications/ business represents 85-90% of our business.

We feel we started our conversion sooner than others in our product market. Our products are compatible to commercial markets i.e., wireless communications etc.

Acquired a comparable product line with commercial and military products.

Question 7 Qualitative Responses:
"Please provide any comments on other factors that aided or hindered your conversion toward commercial business."

We do very little business with the DoD. Less than 5% of our business.

A portion of our business was always commercial. We have increased the emphasis on commercial by gearing our product development to that market.

We do not concentrate in defense projects, and therefore no conversion is necessary.

We have been selling commercial products.

We have always manufactured for the commercial markets.

Our product is adapted to use by DOD and suitable for other markets such as nuclear, power, ports, NASA, etc. (special cranes and hoists)

Uni Boring has been established as a commercial supplier for 22 years. During the past 3 years, Uni Boring has been trying to enter into the government arena.

Our company has successfully marketed itself in markets other than defense. We provide services not products for the highest percentage of sales.

Already more commercial than defense but still do some business with defense. Plan to continue both directions.

We started doing business with NSPCC approximately 7 years ago. We increased our percentage of business each year until 1992. At such time government spending and defense cuts began cutting into our business and now we are doing virtually 0% with the government. We are trying to revamp our business and go into the power generation field however this takes years and lots of money.

Our products and services were equally and directly suitable to other industries.

This survey does not really apply since our commercial business was in place for a long time and we never relied on government business so we do not have to make an effort to convert it.

We are a small laboratory focused on design and testing of all types of ropes and cables. We do not manufacture or sell products. Much of our prior work has been defense and we are attempting to expand our commercial business to replace diminishing defense business.

Our company specializes in engineering and testing services and is extremely customer oriented. We find ourselves competitive and gaining market share in commercial, aerospace, automotive and nuclear fields.

Question 7 Qualitative Responses:
"Please provide any comments on other factors that aided or hindered your conversion toward commercial business."

J. Other Comments

We do job shop (small quantity) work in high tech, high quality area (for example 5 contracts for Sea Wolf) and cannot be competitive in commercial work in our field-filters. We feel and so far have found that the government is finding it difficult to get companies to quote in our niche area. They are drifting toward purchasing policy that makes it difficult for small companies to do business with them but there is no question that prices would skyrocket if small businesses were eliminated from direct government sales- we feel as other companies like ours get pushed out we may have more opportunities.

Have been completely loaded with defense work.

Some subcontractors have discontinued their mil-spec products and do not plan to have new or commercial products tested under mil-spec and qualified on QPL now or in the future.

In order to get commercial work it requires our company to invest all R&D costs. We are also required to invest in sales programs of our commercial customer- supply free prototypes and pre-production units.

We developed our in-house sheet metal fabrication facility.

Most difficult conversion is retraining workforce.

We developed a software product for very high levels of security and tracking functions for document management, index storage, and retrieval for VAX/VMS to meet the requirements of our DoD and defense contractor clients. Since the government has moved its software requirement to UNIX, we have been attempting to port our product completely to that environment. This has been a drain on our resources while continuing to support the VAX product for current clients. Business advisors have recommended selling the company with its client base since raising capital for this highly competitive market has little chance of succeeding. This leaves no reserve for hiring marketing and management expertise.

We are not well known. We need to buy different machinery.

We have completed R&D and testing of exciting new product and are lacking the staff and funding to take same to market. Independent evaluation of potential as $30 million per year; current sales are down to $3 million per year.

It takes time! And very open minds.

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13. ABSTRACT *(Maximum 200 words)*

The defense drawdown is causing a contraction in the defense industrial base. The impact will vary among regions of the country and among industries. Defense-oriented contractors will need capital to convert to commercial work. Depending on where the company is in its conversion effort, it may need financing to conclude product development or modification, to purchase or modify plant and equipment, to develop a marketing and sales staff, or to support higher levels of inventory and receivables. In the current situation, the small business community is concerned that it may be hurt disproportionately because it will be unable to obtain capital for converting products, processes, and technologies with dual-use applications to remain competitive in commercial markets.

On the basis of available studies of small businesses in general, it appears that 15 to 30 percent of small businesses have difficulty obtaining capital. Among defense-oriented small businesses we polled, 28 percent of the respondents said that lack of access to capital was hindering their conversion efforts. Without specific information on each company's situation, it is impossible to determine whether the difficulty results from a market failure or simply from an efficient capital market rationing the available supply to the best use.

We also found that many defense-oriented small businesses are having trouble dealing with commercial markets. Many report that they are finding it hard to identify markets and to establish commercial channels of distribution. Those companies reporting difficulty in obtaining capital indicate that the most pressing need is for capital for marketing and promotional activities. We conclude that defense-oriented small businesses need more access to information and to advisory assistance, including information on sources of capital, in order to commercialize their products, processes, and technologies that have dual-use applications.

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