

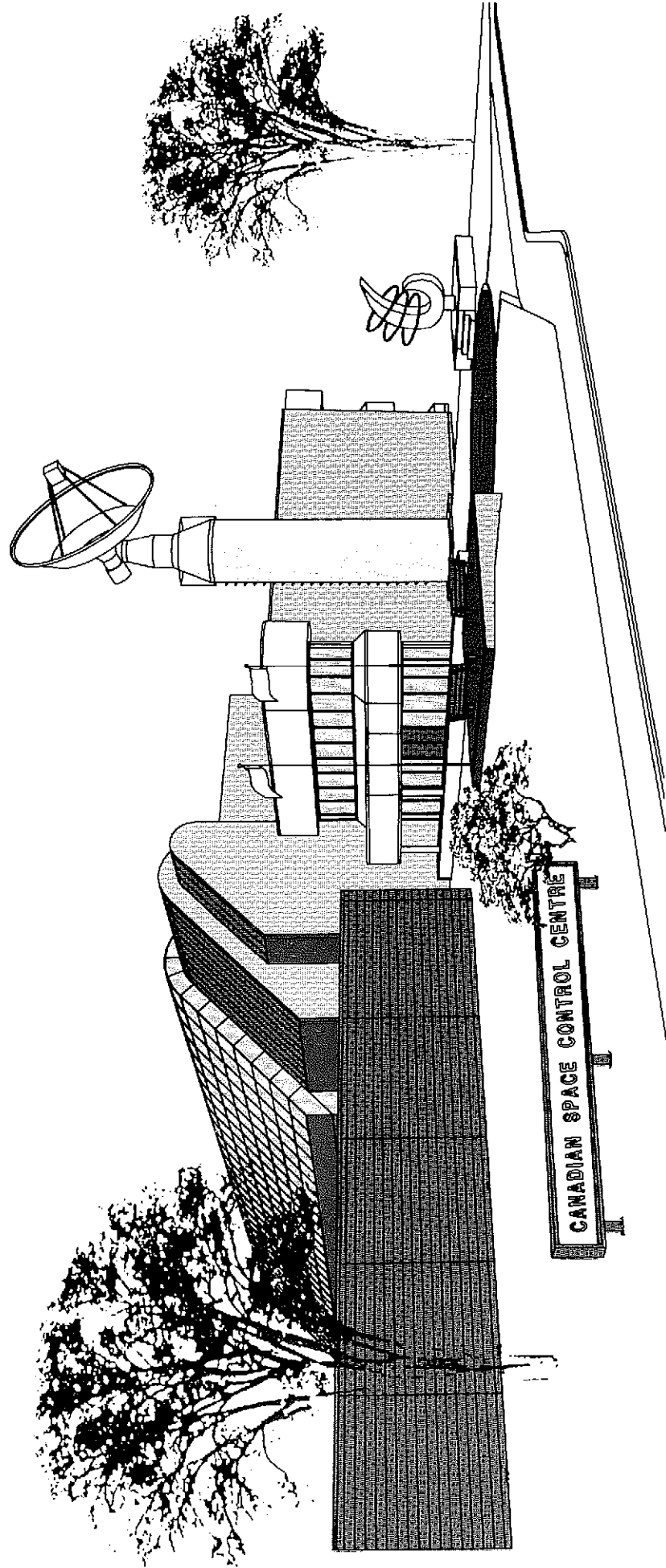
SED SYSTEMS INC.

STUDY FOR
A CANADIAN SPACE
CONTROL CENTRE

AUGUST 1989
EXECUTIVE SUMMARY

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in consultation with:

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CANADIAN SPACE CONTROL CENTRE

EXECUTIVE SUMMARY

INTRODUCTION

In 1988, SED Systems Inc. (SED) conceived the need for a Canadian centre to control and monitor scientific satellites and space platforms in support of national and international space activities. In order to expand the concept, SED sought support from the Department of Regional Industrial Expansion and the Saskatchewan Department of Science and Technology, which jointly funded this feasibility study under the Canada/Saskatchewan Subsidiary Agreement on Advanced Technology.

The purpose of the study was to investigate the feasibility of establishing a Canadian Space Control Centre in Saskatoon, Saskatchewan and, if appropriate, to recommend further actions required to define and establish the Centre.

THE CONCEPT

The proposed Canadian Space Control Centre will be a manned facility which will control and monitor scientific satellite and space platforms. The Centre's ultimate objective will be to provide a multiuse satellite ground control facility including data collection and dissemination capabilities. The Centre is envisioned to grow in stages. As a beginning, the Centre will perform the Telemetry Tracking and Command functions for the Radarsat program. The Centre's "start-up core group" will identify further opportunities and requirements, and promote and market the facility's resources and capabilities for both domestic and foreign programs. The Centre's marketing and business development activities will identify new operational, technical and project development requirements. As the Centre grows operationally, the recognition of Canadian space capabilities will increase proportionally, providing further opportunities for Canadian participation in space activities.

The Centre will transfer the technical requirements to academic institutions and industry so that advanced technologies, systems and projects may be developed and produced. These systems will be implemented at the Centre for specific programs and/or products for domestic and foreign markets. Thus, the Centre will be a focus of space control technologies and applications.

SYNOPSIS OF CONCLUSIONS

The study concludes that the placement of a Canadian Space Control Centre in Saskatoon is feasible and highly desirable. The Centre will provide clear benefits in the management and control of Canadian space program operations, and in the technological, social, economic and educational development of the region. In addition, the Centre will assist in achieving national political objectives of regional distribution. The Centre is projected to be a viable and self-sustaining business venture in the short term. The key conclusions of the study can be summarized as follows:

A Space Control Centre is a Viable Business Venture

The Space Control Centre will require financial assistance only during the first two years to cover formulation and start-up costs. Once the Centre initiates a revenue stream from the Radarsat program in 1993, it will become a financially self-sustaining operation as shown in Table I. Capital costs of the program will be financed through long-term debt, and the Centre will easily meet the standard interest coverage and debt-to-equity requirements once it is in an operational mode.

As additional programs are attained, the Centre will become more cost effective, thereby offering a competitively-priced service and providing an excellent return on investment. The Centre will then be in a favourable position in 1995 to attain programs for the export market to meet its growth potential.

The Space Control Centre is Best Located in Saskatoon

The principal reason for locating the Centre in Saskatoon is that it can be built from an existing facility and infrastructure. Using the SED facility significantly reduces start-up costs that would be incurred if a new facility were required. Also, in the first few years of operation, SED's existing administrative services can be utilized, further reducing initial cost.

TABLE I

**CANADIAN SPACE CONTROL CENTRE
10 YEAR FINANCIAL SUMMARY (\$000's)**

| | <u>1991</u> | <u>1992</u> | <u>1993</u> | <u>1994</u> | <u>1995</u> | <u>1996</u> | <u>1997</u> | <u>1998</u> | <u>1999</u> | <u>2000</u> |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| REVENUE | - | - | 2451 | 2644 | 2775 | 8525 | 8904 | 9284 | 9699 | 12,508 |
| OPERATING INCOME (AFTER RECOVERIES) | (1051) | (830) | 109 | 120 | 126 | 811 | 846 | 884 | 922 | 1375 |
| OPERATING INCOME AS % OF REVENUE | - | - | 4.4% | 4.6% | 4.6% | 9.5% | 9.5% | 9.5% | 9.5% | 11.0% |
| SUSTAINING GRANTS | 958 | 730 | - | - | - | - | - | - | - | - |
| NET INCOME | - | - | 53 | 72 | 90 | 290 | 353 | 376 | 443 | 682 |
| NET INCOME AS % OF REVENUE | - | - | 2.2% | 2.8% | 3.3% | 3.4% | 4.0% | 4.0% | 4.6% | 5.5% |
| CAPITAL COSTS | 67 | - | 771 | - | - | 2260 | - | 596 | - | 658 |
| EMPLOYMENT | 5 | 5 | 22 | 24 | 24 | 73 | 73 | 73 | 79 | 90 |

The Space Control Centre is Best Located in Saskatoon (Cont'd)

Colocating the facility at SED will allow existing expertise to be applied to the development and operation of the Centre. SED has been a part of Canadian space programs since 1965, and international projects beginning in the early 1980s. Today, SED is the only Canadian company actively promoting the development of satellite ground control technology and development. In parallel, SED works closely with Canada's space science community developing and producing space science instrumentation. SED provides the technical background, knowledge and capability to make the Centre a success.

Saskatoon provides some advantages because of its physical location. Saskatoon's latitude of 56 degrees provides exceptional tracking coverage over Canada's land masses. Saskatoon receives more sunshine in a year than any other Canadian city. This is technically advantageous for communications and commanding of satellites at higher frequencies.

The Space Control Centre is a Cost-Effective Means to Manage Canada's Space Operations

The Space Control Centre has been designed to be a cost-effective means of managing Canada's Space Control requirements. Because numerous programs can be controlled from a single facility, economies will be achieved by communalizing support functions. In addition, because space allocated to the Centre can grow and shrink as programs require, there is no need to build-in for future expansion. This results in an efficient cost-effective use of facility space.

The Space Control Centre Will Facilitate Regional Distribution of the Space Program

In the May 1985 Space Plan proposed by the federal government, the Prairie region was targeted to receive ten percent of the expenditures on space activities. To date, only the industrial portion of space expenditures has been addressed. Even on this portion of the plan, the Prairie region is falling well short of the targets established. The Prairie region will receive approximately eight percent

The Space Control Centre Will Facilitate Regional Distribution of the Space Program (Cont'd)

of the funds against a target of ten percent. This disparity of distribution versus the targets will probably be worse when the non-industrial portion of the work is distributed.

Establishing the Space Control Centre in Saskatoon is probably the most significant way to assist the Prairie region in meeting the ten percent target. It will help achieve the ten percent of the industrial portion, and because it provides a long-term operation, it will help meet the distribution targets of the non-industrial funding. Without the establishment of the Centre, Regional Distribution will be a significant problem in the Prairie region.

The Space Control Centre Will Bring Significant Socioeconomic Benefits to Western Canada

The principal socioeconomic benefit in establishing the Space Control Centre is the creation of employment in the Prairie region. Based on the analysis performed, the Space Control Centre will create over 100 direct jobs for managerial, technical, research and clerical personnel at the Centre. An additional 60 to 85 direct jobs will be created for the development of hardware and software technologies for ground control systems. The creation of approximately 175 direct jobs would result in 450 indirect jobs in the area.

The University of Saskatchewan and other Prairie universities will also benefit from the establishment of the Centre. The Centre will provide employment for graduates, as well as providing application-dependent research into space activities.

The Centre will also provide spin-off opportunities for other high tech and science-related companies.

RECOMMENDATIONS

Clearly, the establishment of a Space Control Centre in Saskatoon is technically feasible, and within a short time becomes financially viable. It provides significant socioeconomic benefits to Saskatoon and the Prairie region.

However, its establishment requires the support and financial backing of the government. The following actions are recommended:

- Canadian Space Agency support the concept of the Space Control Centre in Saskatoon and provide assistance in soliciting government funding to sustain the Centre's operation until it becomes financially viable.
- Canadian Space Agency and SPAR Aerospace commit to having relevant portions of Canadian space programs allocated to the Centre.
- The Centre's core management and marketing staff be established early in 1990 to begin the detailed planning required to make the Centre a success.

Commitments from the Canadian Space Agency, SPAR Aerospace, and government departments are required to make the Space Control Centre in Saskatoon a reality. These commitments are required in the immediate future so that imminent opportunities are not lost.