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OVERALL SOCIO-ECONOMIC ANALYSIS  
OF THE MSAT PROJECT  
EXECUTIVE SUMMARY

# Econanalysis Incorporated

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/ Evans, John C. /

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OF THE MSAT PROJECT  
EXECUTIVE SUMMARY

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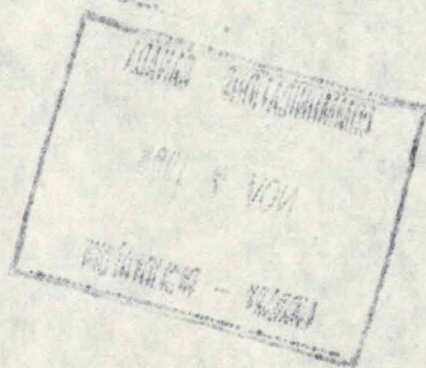


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**ECONANALYSIS INCORPORATED**

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June 5, 1985

Mr. John Braden  
Manager,  
MSAT Economic Studies  
Department of Communications  
Room 210  
Journal Tower North  
300 Slater Street  
Ottawa,  
Ontario  
K1A 0C8

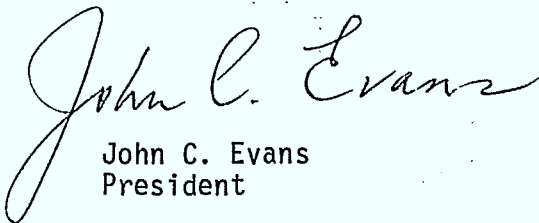
Dear Mr. Braden:

I am pleased to forward a copy of the Executive Summary of our final report for the Overall Socio-Economic Analysis of the MSAT Project. Due to the considerable detail and complexity of our study the final report will be submitted in two volumes. The first volume contains a methodological summary as well as the results of our analysis. The second volume contains appendices that include a sensitivity analysis, detailed tables and graphs of the overall economic costs and benefits and of the financial returns to each of the major participants, and the financial data bases.

Our study results indicate that the MSAT project appears to be economically attractive for Canada. Thus further investigation into the alternate financial assistance packages is warranted in order to ensure the commercial viability of the project.

Philip Hampson and the rest of the study team thoroughly enjoyed working with you and your staff to complete this project. We will be happy to be of further assistance if you so desire.

Yours sincerely,



John C. Evans  
President

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OVERALL SOCIO-ECONOMIC ANALYSIS  
OF THE MSAT PROJECT  
EXECUTIVE SUMMARY

Summary of Key Findings

The Overall Socio-Economic Analysis of MSAT revealed that the MSAT project appears economically attractive for Canada. Canadians can expect not only to recover their investment and earn an annual, net of inflation rate of return of 10 per cent over the project's lifetime, but also to earn additional economic benefits of either \$1,159.4 M or \$513.2 M depending on market conditions. Available data indicate that there are potentially significant end-user benefits, indirect social benefits, returns to private investors, as well as tax returns to government.

## Objectives

The chief objective of the Overall Socio-Economic Analysis of MSAT is to measure, in a systematic and consistent fashion, the MSAT project's contribution to the net economic well-being of Canadians. The key issue is whether MSAT would likely use Canada's scarce resources efficiently. This is measured by the net present value (NPV) of MSAT's incremental net economic benefits discounted by the social discount rate.<sup>1</sup> Only if this NPV is positive, can MSAT claim to improve net economic well-being.

A second objective of the overall socio-economic analysis of MSAT is to measure its financial attractiveness to the private investors, namely Telesat, the Service Providers, and the Manufacturers. The key issue from their perspective is whether the expected net-of-tax returns are sufficient to offset their costs of capital. This is measured by the NPV of their respective net cash flows discounted by their respective private discount rates.

A third objective of the Overall Socio-Economic Analysis of MSAT is to determine what financial assistance, if any, is justified on financial and economic grounds. As a rule, financial assistance to private investors is warranted only when the NPV of net economic benefits is positive and when one or more of the NPV's of the net financial cash flows to private investors (Telesat, the Service Providers, or the Manufacturers) is negative. However, there could be other considerations of an intangible social nature which could favour some support. This issue is important because the Department of Communications is examining

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<sup>1</sup> The calculation of a NPV and its use as an investment criterion are explained in Section 3.1 of the report.

the possibility of providing part of the funding needed to defray Telesat's Satellite purchase costs and/or to assist Canadian manufacturers with the research and development of MSAT equipment.

### Methodology

The Overall Socio-Economic Analysis of the MSAT project relies on a number of other studies for detailed marketing, engineering and financial data for the two generation satellite system. The first task undertaken by Econanalysis was to check the methodology, data, and assumptions used by the other contractors (Woods Gordon, Telesat Canada, and KVA) to ensure their consistency and conformity to the overall socio-economic appraisal methodology. Our earlier reports identified a number of inconsistencies between the various studies that by and large have since been resolved by the members of the MSAT project team at the Department of Communications who made a major effort to ensure data consistency. All financial and economic data necessary for the overall analysis have been assembled into a computer data base for analysis.

There are four major classes of incremental economic benefits that have been examined in the Overall Socio-Economic Analysis of MSAT, namely:

- (a) Returns to Private Investors
- (b) Returns to Government
- (c) User Benefits, and
- (d) Indirect Social Benefits.

User benefits are a type of economic benefit that are not reflected in the financial cash flows and occur because some consumers of MSAT services may be willing to pay more for MSAT services than they would likely have to pay. This economic benefit, called consumers' surplus,



tends to be large whenever a new, nontradeable good or service is introduced into the market place. It captures communications cost savings, gains in organizational efficiency and expanded business opportunities that would not be available without MSAT.

Indirect social benefits are another economic benefit not reflected in the financial cash flows. They accrue to third parties affected by the activities of end-users of MSAT services or to society as a whole. They consist largely of an improved provision of public services such as emergency medical and fire protection services.

The NPV of the net economic benefits of MSAT to all Canadians is the sum of the NPV of the returns to private investors, the returns to government, user benefits, and indirect social benefits all calculated at a social discount rate. The benchmark net-of-inflation social discount rate used in this study is 10 per cent, and it measures the social opportunity cost of invested funds to the economy. Therefore, when the NPV of the net economic benefits of MSAT is positive it indicates that MSAT would likely generate an economic rate of return greater than the social opportunity cost of capital.

Since any government funds used to assist MSAT could be used to reduce the government's deficit, government financial assistance for MSAT should be carefully considered, especially at a time when overall government deficits and real interest rates are high. A reduction in the government's deficit entails leaving more funds in the capital market where they can be expected to earn an economic rate of return equal to the social discount rate, and any investment that has a rate of return equal to the cost of capital will have a zero NPV. Thus, only if the NPV of MSAT's incremental net economic benefits is positive, would the MSAT



programme be considered superior to reducing the government's deficit.

### Empirical Results and Conclusions

Based on the results of the analysis to date, the MSAT project appears to be economically attractive for Canadians in general. The NPV's of the total net economic benefits reported in Table A are significantly greater than zero for both the baseline and pessimistic market scenarios considered in this report. This indicates that Canadians not only could expect to recover their investment in MSAT and earn an annual rate of return over the project's lifetime equal to a 10 per cent (net of inflation) social discount rate, but they could also be better off by either \$1,159.4 M or \$513.2 M depending on market conditions.

The results in Table A show that the lion's share of economic benefits would accrue to end-users of MSAT services. In Section 5 of the report we indicate that users would likely be willing to pay much more for MSAT services than they actually would be expected to pay. Hence, user benefits are large as measured by a willingness to pay criterion. Returns to private investors and indirect social benefits are the next largest source of economic benefits, followed by returns to government. Indirect social benefits accrue to third parties affected by end-users of MSAT services, and returns to government accrue to Canadian taxpayers as a whole in the form of net increases in tax revenues. Clearly, the non-monetary returns (user benefits and indirect social benefits) heavily outweigh the monetary returns (returns to private investors and government).

Table A

Economic Benefits of MSAT  
(millions of 1984 constant dollars)

	<u>Baseline Market Scenario</u>	<u>Pessimistic Market Scenario</u>
NPV of Net Cash Flows to Investors <sup>1</sup>	145.9	6.7
NPV of Net Returns to Government <sup>2</sup>	49.6	29.2
NPV of Net User Benefits	806.6	410.3
NPV of Indirect Social Benefits	157.3	67.0
	<hr/>	<hr/>
NPV of Total Net Economic Benefits	1,159.4	513.2

<sup>1</sup> The net returns to government have been revised downward to incorporate change in the treatment of risk, and thus are lower than the estimates previously submitted. There have also been revisions made to some of the other items. The net result of these changes has been to raise slightly the total estimated net economic benefits.

<sup>2</sup> By private investors, we mean Telesat, the Canadian manufacturing industry, and the service providers (Telco's and Radio Common Carriers).

Table B reports the financial returns to individual MSAT investors. The NPV's of the net cash flows for the Service Providers and the Manufacturers are positive and robust with respect to the baseline and pessimistic scenarios, indicating that the MSAT project is financially attractive for them even under adverse market conditions. Note that a private NPV greater than zero implies that not only would investment funds be recovered and an annual real rate of return over the project's lifetime equal to the private discount rate (6 per cent) be earned, but investors' net wealth has also been increased by an amount equal to the NPV.

However, Telesat's NPV of net cash flow is not robust with respect to the different market scenarios. For the baseline scenario Telesat's NPV is \$32.8 M, whereas for the pessimistic scenario Telesat's NPV is negative at (\$56.5 M), indicating that an insufficient rate of return would likely be earned on invested funds, i.e., a real rate of return less than the required risk-adjusted rate of return of 7.4 per cent. In this latter case Telesat's shareholders would experience a \$56.5 M reduction in their net wealth as a consequence of investing in the MSAT project.

The maximum amount of financial assistance that Canadians not investing in MSAT-related activities would want to make available is measured by the sum of the NPV's of incremental net returns to government, user benefits and indirect social benefits. Thus, given the results in Table A, the maximum amount of government financial assistance becomes \$1,013.5 M under the baseline scenario and \$506.5 M under the pessimistic scenario. However, non-investors have no incentive to offer this amount of financial assistance if a participant would require less. In theory each participant should receive only enough assistance to offset any negative NPV of net cash flows at the private discount rate.

Table B

Financial Returns for MSAT Participants  
(millions of 1984 constant dollars)

	<u>Baseline Market Scenario</u>	<u>Pessimistic Market Scenario</u>
NPV of Returns to Telesat	32.8	(56.5)
NPV of Returns to Service Providers	58.4	29.3
NPV of Returns to Manufacturers	54.6	34.0
	<hr/>	<hr/>
NPV of Total Returns to Private Investors	145.9	6.7



The results presented in Table B indicate that only under the pessimistic market scenario assumptions should any financial assistance be rendered and in this case only to Telesat. The net present value of financial assistance necessary to give Telesat its required rate of return is \$56.5 M. Clearly, the \$56.5 M required is far less than the maximum amount of \$506.5 M that could be rendered, and it would still leave Canadians in general substantially better off with the MSAT project. The problem is that the amount by which taxpayers in general are better off, \$29.2 M, is less than the required assistance for Telesat. Hence, it appears that \$56.5 M in assistance to Telesat would carry with it a \$27.3 M implicit subsidy to end-users and the recipients of MSAT's social benefits. Whether this implicit subsidy and the need for assistance can be avoided by raising the prices for MSAT services warrants further study.

A number of factors ought to govern the type of financial assistance offered. Most important among these is incentive compatibility, i.e., the financial assistance package ought to encourage a recipient to take actions that would maximize overall net economic benefits. Furthermore, since financial assistance is a transfer of wealth from taxpayers in general to a MSAT participant, the government has an obligation to keep the assistance to a minimum. The encouraging results of the present study appear to warrant further investigation of alternate financial assistance packages.



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