

CAN SPACE BE PROFITABLE FOR CANADIANS?

I would like to begin my talk with a brief story: A manufacturer had decided to switch pension plans from one to which employees contributed, to a fully-paid plan that would go into force when all employees signed an agreement for the change. All had signed save Willy -- an old-time, trusted employee who would have no part of the new plan. His foreman pleaded with him to no avail. Willy simply wanted nothing to do with something that he saw as yet another socialistic plot. The matter went up the line to the plant manager and then to the vice president of personnel. All made the same entreaty, pointing out that the new plan would provide better benefits at no cost. Willy would have no part of it.

Finally he was called into the chairman's office, who greeted him from behind his big mahogany desk. He looked Willy right in the eye, handed him a pen and pushed a piece of paper at him: "Willy, I want you to sign this ... or you're fired." Without a word Willy picked up the pen and signed.

Somewhat taken aback the chairman said: "What am I to make of this? The foreman asked you, the plant manager asked you and then the vice president for personnel. Each time you

refused. Just what made you sign now?" Willy thought for a moment and replied: "Well, sir, they just never really explained the program to me!"

In some respects Willy's dilemma is similar to the one experienced by Canadians regarding our own space program. Many, both in government and industry, have made eloquent statements about the benefits of the space program: That domestic communications satellites draw closer together our farflung nation with cost efficient telephone and television transmissions, that other satellites, such as navigation, weather, land resource and search and rescue spacecraft, hold the promise of bettering our condition here on earth.

But somehow these rationalizations -- factual as they are -- fall short of the larger importance of the space program. They make the points made by Willy's foreman, manager and vice president -- but miss the one made by the chairman.

Canada was the third nation in the world to launch a spacecraft -- the Alouette in 1962 -- and the world's first in 1972 to put into geostationary orbit a domestic communications satellite -- the Anik. When explained by men with green eyeshades and sharp pencils, the space program begs the

obvious question: If space is so beneficial, why not shop around elsewhere for the cheapest satellites, rather than making them here at home?

Why, indeed! Above all else, Canada's space program is the cutting edge of our determination to be counted with other nations in the high stakes economic league of advanced technology. As did Willy, we either sign up or risk being booted out to the bush leagues.

Sputnik instantly catapulted the Soviet Union from the technological backwaters of the 19th Century to the forefront of the 20th. The Space Station promises a similar windfall for the United States. Canada has been invited to join in this endeavour and again, like Willy, we cannot afford to not be part of it.

However, I'm getting ahead of myself for I intend to give you a thumbnail sketch of Canada's history in space, particularly the industrial involvement, and to suggest that space technology is a worthy business venture for Canadians.

My experience has been principally coupled with Spar Aerospace which traces its origins in space back to the immediate post-Arrow era at deHavilland's Special Products Division:

- o approached in 1960 by Dr. Chapman to build mechanical systems and structure for Alouette I, launched on September 29, 1962.
- o had a long antenna (150 feet tip-to-tip) - STEM (demo)
- o STEMs have been on over 1000 satellites
- o Alouette II - November 29, 1965
- o ISIS I - June 30, 1969 and ISIS II March 31, 1971 (Still Working)

Here begins two threads which develop separately, then intertwine in a most interesting way.

- o The first is the communication satellite story which starts with RCA in Montreal and Hughes Aircraft.
- o Anik A1 - HAC with Spar (13%) November 9, 1972
A2 - April 20, 1973
A3 - May 7, 1975
- o Hermes - January 17, 1976 - first DBS experiment
- o Anik B - dual purpose (TRW), 1978 - regular plus DBS.
- o In 1978 Spar bought the space and communications divisions of RCA in Montreal
- o Anik C - HAL with Spar, contact in 1978, launch 3 with shuttle starting in November, 1982.
- o Anik D - Was first Spar prime contract let in 1979 - 50% Canadian content, launch 2 with shuttle starting in August, 1982.

The second thread starts with the STEM device I just demonstrated.

- o Performance of the STEM established Spar's reputation with NASA
 - it was used in Mercury, Gemini and Apollo, all three US manned spacelight programs.
 - After Apollo, NASA turned its attention to the commercialization of space, starting with the shuttle - STS.
 - Needed an extension of the astronaut's arm - a crane - to more payloads into and out of the cargo bay.
 - Spar and NRC saw opportunity for Canadian involvement and contribution which would provide Canada preferential treatment on future shuttle flights.
 - Canada proposed SRMS (Canadarm) and contributed \$100 million, the technology emerging from STEM deployment systems.
 - negotiated in 1974, took 4 years to develop-weighed 1000 lbs, but joints weighed 800, so ultra light weight structure.
 - NASA hedged its bet and set aside \$50 million to revise the arm after first flight - Canada was brave indeed to attach the large CANADA hallmark on the arm.
 - the successful flight of STS-3 in fall of 1981 came at a crucial time.

Here is where the threads come together. At that time Spar was competing with France's Aerospatiale for Brazil's communication satellite program.

- Brazilians impressed equally with Aerospatiale's capacity and Spar's to build Brazilsat, the Canadarm success convinced the Brazilians that Canada had world-class technology - a key element to their decision.

- Spar clinched the deal by offering to train Brazilians in satellite technology.
- Brazil success opens up many other countries including Nigeria and Thailand.

Where is technology going from here? NASA's next big step is the Space Station to which they have budgeted \$8 Billion.

- o Space Station is essentially a large bus that will provide a microgravity and near vacuum facility as well as an observation platform for commercial users.
- o NASA has invited international participation - Japan has pledged \$1 Billion worth of contribution.
- o Europeans about to become involved with their own space systems (Columbus) at a level comparable to Japan's.
- o Canada about to decide whether or not it will, and for how much.
- o Canadarm and astronaut program has created a lot of goodwill, expect Canada will join.
- o CCL and PALL working jointly on mobilization of the private sector to participate in some fashion.
- o It is worth pointing out that the space supply industry has matured rapidly.
- o Canada is the only nation in the world whose space industry sells more - primarily abroad - than its government spends within industry, by twice over. Last year the government spent \$135 million on space (including intramural expenditures), while industry sales exceeded \$300 million.

- o Currently PALL and others are scouring the universities for potential commercially-significant experiments that can utilize the unique environment of space.
- o Early experiments on Shuttle as get-away specials or mid-deck experiments - later in space station.
- o Looking both for space manufacturing opportunities and research possibilities (e.g. electrophoresis and John Deere's interests in cast iron castings).

In the immortal words of (your chairman), nice guys finish fast, so I'll wind up my remarks by saying that I have not mentioned the many other Canadian companies that are heavily committed to the space business. The list includes:

MDA in Richmond, B.C. where I am a director
SED Systems in Saskatoon
Comdev Ltd., Cambridge, Ontario
CAE Electronics, Montreal

The movie I now show illustrates the success of the Canadarm on the shuttle. It features Sally Ride's STS-7 exercising of the Canadarm - She was the original astronaut charged with being the expert on the Arm, now it is John Fabian.

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