

*Ag 20. 1*

CANADA IN SPACE - THE INTERNATIONAL CONNECTION

IT IS NO NEWS TO YOU THAT CANADA'S STANDARD OF LIVING DEPENDS ON EXPORTS. THIRTY PERCENT OF THE NATION'S GROSS NATIONAL PRODUCT, IS DERIVED IN THAT FASHION. THE HIGHEST PERCENTAGE OF ANY OF THE WORLD'S FREE-TRADING NATIONS. INDEED, YOU RECOGNIZE THIS FACT BY PLACING INTERNATIONAL BUSINESS AS THE FIRST ITEM ON YOUR AGENDA. THIS AFTERNOON YOU WILL CONSIDER THE SUBJECT OF HIGH TECHNOLOGY. IN MY REMARKS I WOULD LIKE TO LINK THE TWO THEMES AND SUGGEST THAT CANADA'S SPACE INDUSTRY HAS A ROLE TO PLAY IN THAT LINK.

SPACE AND CANADA WERE MADE TO ORDER FOR EACH OTHER. AS THE SECOND LARGEST NATION IN THE WORLD, WITH THE LEAST POPULATION DENSITY OF ANY - 3 PERSONS PER SQUARE KILOMETER ON AVERAGE - CANADA WOULD BE HARD PRESSED TO MEET ITS TELECOMMUNICATIONS NEEDS BY LAND-BASED MEANS. TRUE, WE HAVE A MARVELLOUS INFRASTRUCTURE HERE IN THE ONTARIO GOLDEN CRESCENT - WHICH, BY THE WAY, HAS THE POPULATION DENSITY OF THE NETHERLANDS. FOR YOU COLLECTORS OF RANDOM BITS OF COMPARATIVE DATA, YOU MIGHT ALSO BE INTERESTED IN THE FACT THAT ONTARIO ITSELF ENJOYS A GROSS PROVINCIAL PRODUCT THAT IS EQUIVALENT TO THE GNP OF THE NETHERLANDS - OR THAT MORE THAN HALF OF ALL CANADIANS LIVE WITHIN 10 MILES OF THE 401.

THE POINT IS THAT CANADIAN TELECOMMUNICATION - EVER SINCE ALEXANDER GRAHAM BELL FIRST CONCEIVED THE NOTION OF THE TELEPHONE WHILE ON A TRAIN RIDE FROM BRANTFORD - HAS BEEN SECOND TO NONE IN AREAS WHERE MOST CANADIANS LIVE - AND HAS GAINED A GLOBAL

REPUTATION FOR EXCELLENCE. THE PROBLEM WAS IN REACHING THE REST OF CANADA WHERE THE FEWEST OF US LIVE - YET, WHO WERE JUST AS IMPORTANT TO BE REACHED TO ALLOW THE NATION TO BE STITCHED TOGETHER IN ITS PERSONAL, BUSINESS AND CULTURAL TIES BY MEANS OF TELEPHONE, RADIO AND TELEVISION.

TO REACH ITS FARFLUNG HINTERLAND BY RADIO, CANADA MADE USE OF NEAR-SPACE, OR THAT UPPER LAYER OF THE ATMOSPHERE KNOWN AS THE IONOSPHERE. HERE, WHERE THE ENVELOPE OF GASES SURROUNDING THE EARTH ARE CHARGED BY PARTICLES STREAMING FROM THE SUN, RADIO SIGNALS EMITTED FROM ONE POINT CAN BE BOUNCED FROM THE IONOSPHERE TO A FAR-DISTANT LOCATION. HOWEVER, SUCH COMMUNICATIONS WERE ERRATIC - THE IONOSPHERE SHIFTED BETWEEN DAY AND NIGHT AND HAD THE ANNOYING HABIT OF DISTURBING OR DESTROYING COMMUNICATIONS DURING SOLAR STORMS. THESE LIMITATIONS PROVIDED A FERTILE FIELD FOR CANADIAN SCIENTISTS, ONE OF WHOM, JOHN H. CHAPMAN, DID HIS PHD THESIS ON THE TOPIC AT MCGILL UNIVERSITY IN 1949. CHAPMAN WAS A MAN OF REMARKABLE INSIGHT AND ENERGY AND HAS, SINCE HIS UNTIMELY DEATH IN 1979, BEEN GENERALLY RECOGNIZED AS THE FATHER OF THE CANADIAN SPACE PROGRAM.

HE WAS ONE OF THE FORTUNATE YOUNG PEOPLE GRADUATING IN CANADA WHO WAS ABLE TO BUILD A CAREER ON THE PIONEERING WORK OF HIS DOCTORAL DISSERTATION..... AND DO SO IN CANADA. WITHIN TEN YEARS HE WAS LEADING A TEAM AT WORK ON CANADA'S FIRST SATELLITE - THE ALOUETTE I - WHICH, WHEN LAUNCHED IN 1962, MADE CANADA THE THIRD NATION IN THE WORLD TO PLACE A SATELLITE IN ORBIT. IT WAS NO

COINCIDENCE THAT ITS MISSION WAS TO STUDY THE IONOSPHERE FROM ABOVE.

HOWEVER, ITS IMPACT WENT WELL BEYOND THE SPECIFICS OF ITS MISSION. PERHAPS THE MOST SUCCESSFUL OF ALL THE EARLY SATELLITES, IT SENT BACK IN FIGURATIVE TERMS A WAREHOUSE FULL OF DATA UNTIL IT WAS FINALLY TURNED OFF A DECADE LATER. THE ALOUETTE GAVE A SIGNAL TO THE WORLD THAT CANADA WAS IN THE SPACE ARENA - A MAJOR LEAGUE, IF YOU WILL, THAT WOULD MARK THE HIGH-STAKES PLAYS IN WHAT HAS OFTEN BEEN CALLED THE THIRD INDUSTRIAL REVOLUTION OR THE ERA OF INFORMATION. MORE THAN THAT, THE HIGH QUALITY OF THE ALOUETTE'S PERFORMANCE - WHILE PERHAPS NO SURPRISE TO THOSE OF US WHO WORKED ON IT - GAVE AN EQUALLY POWERFUL MESSAGE THAT CANADIAN TECHNOLOGY WAS WORLD CLASS - BUILT RIGHT THE FIRST TIME. IT IS THIS REPUTATION THAT WOULD SERVE US WELL IN OTHER SPACE PROJECTS STILL TO COME.

BY THE EARLY SIXTIES SPACE HAD GRIPPED THE IMAGINATION OF PEOPLE ALL OVER THE WORLD - THE UNITED STATES WAS GIRDING FOR A MANNED MISSION TO THE MOON BY THE END OF THE DECADE, THE SOVIET UNION WAS PREPARING UNMANNED SPACECRAFT FOR TRIPS TO THE MOON AND VENUS, WHILE CANADA CHIPPED AWAY AT ITS STRONG SUIT - COMMUNICATIONS. THE IONOSPHERE AS A COMMUNICATIONS UMBRELLA WAS ABOUT TO BE SUPERCEDED IN FAVOUR OF A NEW KIND OF SATELLITE - ONE THAT WAS LITERALLY PARKED SOME 36,000 KILOMETERS ABOVE THE EARTH IN WHAT IS KNOWN AS A GEOSTATIONARY ORBIT. AT THAT ALTITUDE THE SPEED OF THE SPACECRAFT JUST MATCHES THE EARTH'S

RATE OF ROTATION AT THE EQUATOR - WHICH MEANS FOR ALL INTENTS AND PURPOSES, THE SATELLITE IS PARKED ABOVE A SINGULAR POINT ON EARTH. THE SATELLITE WITH ITS ELECTRONIC REPEATER THUS BECAME A COMMUNICATIONS LINK THAT WAS IMMUNE TO DISTANCE - A PHONE CALL FROM TORONTO TO FROBISHER BAY COULD BE MADE AS EASILY AS ONE ACROSS TOWN: A FOOTBALL GAME IN CALGARY COULD BE SEEN SIMULTANEOUSLY IN HALIFAX, OR, AGAIN, A RADIO MESSAGE FROM OTTAWA TO INUVIK WOULD NEVER AGAIN HAVE INTERFERENCE FROM A SOLAR STORM AGITATING THE IONOSPHERE.

HAVING PROVEN THE FEASIBILITY OF HIGH SPACE TELECOMMUNICATIONS BY SATELLITE, CANADIAN ENGINEERS WERE AT WORK WITH THEIR COUNTERPARTS AT HUGHES AIRCRAFT COMPANY IN CALIFORNIA TO BUILD THE ANIK A - THE WORLD'S FIRST DOMESTIC COMMUNICATIONS SATELLITE IN GOESTATIONARY ORBIT. THE ANIK SERIES OF SATELLITES ARE A COMMERCIAL PROPOSITION, SERVING TELECOMMUNICATIONS NEEDS IN CANADA UNDER THE AEGIS OF TELESAT CANADA, A GOVERNMENT-INDUSTRY MIXED CORPORATION DESIGNED IN ITS BROADEST SENSE TO BRING SPACE DOWN TO EARTH AS A PROFITABLE ENTERPRISE. TODAY IT SERVES AS AN INTERNATIONAL MODEL FOR SUCH UNDERTAKINGS, BUT IN 1972 IT WAS THE FIRST OF ITS KIND.

I HAD MENTIONED EARLIER THAT JOHN CHAPMAN WAS A MAN OF REMARKABLE INSIGHT. HE WAS THAT AND MORE - HE WAS IN MANY RESPECTS AN EVANGELIST FOR THE CANADIAN SPACE EFFORT. HE NOTED THAT WHILE SPACE WAS A NATURAL ARENA FOR CANADA AND THAT WE AS A NATION SHOULD BE IN IT, WE OUGHT ALSO TO BUILD FOR SPACE. THE FIRST

ANIK WAS LARGELY BUILT BY HUGHES AIRCRAFT OF CALIFORNIA AND HAD BUT 13% CANADIAN CONTENT. OUR ENGINEERS WORKED WITH HUGHES ENGINEERS TO EFFECT A TRANSFER OF TECHNOLOGY ON HUMAN TERMS - AS WE LEARNED FROM THEM SO WE WOULD BE ABLE TO APPLY THESE SKILLS NOT ONLY TO OUR OWN NEEDS, BUT WHERE IT COUNTS THE MOST: IN THE INTERNATIONAL MARKETPLACE.

AT THIS POINT I WOULD LIKE TO WEAVE TOGETHER TWO STRANDS OF THIS EFFORT AND HOW - TAKEN TOGETHER - THEY ADD UP TO THE VERY EXCITING JUMP-OFF PLACE WE HAVE REACHED TODAY. TELECOMMUNICATIONS IS ONE STRAND. THE OTHER IS THE REMOTE MANIPULATOR SYSTEM - MORE POPULARLY KNOWN AS THE CANADARM. AT THE VERY TIME THAT WE WERE FLEXING OUR SKILLS IN COMMUNICATIONS SATELLITES IN THE EARLY SEVENTIES, NEGOTIATIONS WERE UNDERWAY WITH NASA TO CONTRIBUTE TO THE NEXT PHASE OF THE U.S. SPACE PROGRAM: THE SPACE TRANSPORTATION SYSTEM.

SPAR AEROSPACE HAD ALREADY BEEN INVOLVED WITH NASA THROUGH ITS STEM TECHNOLOGY - LITERALLY THE STORABLE EXTENDIBLE TUBULAR MEMBER - WHICH SERVED AS BOTH AN ANTENNA AND BOOM ABOARD ALL THE NASA MANNED SPACECRAFT - THE MERCURY, GEMINI AND APOLLO AND ON SUCH EXOTIC MISSIONS AS THE VOYAGER, WHICH RETURNED BACK TO EARTH SPECTACULAR PHOTOGRAPHS OF JUPITER AND SATURN AND WILL, IF ALL GOES WELL, BRING TO US THE FIRST CLOSE-UP OF URANUS IN A FLYBY IN 1986; ALSO THE PIONEER, THE FIRST MAN MADE OBJECT TO LEAVE THE SOLAR SYSTEM IN JUNE OF 1983. IT WAS A LONG REACH TO EXTRAPOLATE THE STEM TECHNOLOGY TO THE CANADARM, THE CRANE IN

SPACE THAT WOULD PERMIT THE SHUTTLE TO PLACE PAYLOADS IN ORBIT AND RETRIEVE SATELLITES FOR SERVICING OR RETURN TO EARTH.

THE NATIONAL RESEARCH COUNCIL OF CANADA OFFERED TO DESIGN, DEVELOP AND BUILD, FOR THE U.S. THE FIRST RMS - AT A COST OF SOME \_100 MILLION, IN RETURN FOR FUTURE ORDERS FOR THE CANADARM, WHICH TODAY NUMBER 3. THE PROJECT WAS ENORMOUSLY COMPLEX - AN ARM THAT COULD WEIGH NO MORE THAN 1000 POUNDS (OF WHICH 800 POUNDS ALONE COMPRISED THE INTRICATE GEARBOXES) THAT WOULD HAVE THE CAPABILITY OF LIFTING THE EQUIVALENT OF A FULLY LOADED BUS - OR 65,000 POUNDS - IN SPACE. THE TOUGHEST PART OF THE JOB WAS WHAT YOU DON'T SEE - THE SOFTWARE THAT PERMITS THE ARM TO WORK LIKE AN EXTENSION OF THE ASTRONAUTS'S BRAIN AND HANDS. THE MAIN PART OF THE ARM - THE BOOMS STRETCHING OUT SOME 50 FEET, WERE ONLY 3 MM THICK, MADE OF TOUGH GRAPHITE EPOXY.

THE FIRST REAL TEST CAME IN SPACE IN THE FALL OF 1981. THINK OF THE SUPERB CONFIDENCE - THE HUBRIS, IF YOU WILL - EXHIBITED BY THE NRC'S ART HUNTER, PROJECT MANAGER FOR THE CANADARM AT CAPE CANAVERAL, WHEN HE INSISTED THAT THE CANADIAN FLAG BE PAINTED ON THE ARM. TRUE, NASA RAISED A QUIBBLE OR TWO - WHAT IF EVERY SUBCONTRACTOR PAINTED THEIR DECAL ON THE PART THAT THEY HAD MANUFACTURED? WHY, THE SHUTTLE WOULD SOON RESEMBLE A RACE CAR SPORTING PRODUCT STICKERS ON THE BODY. IN THE END INTERNATIONAL COMITY WON OUT, AND I WOULD SUSPECT, THE FEELING THAT IF IT DIDN'T WORK - WELL, THAT WOULD BE CANADA'S PROBLEM, NOT NASA'S!!

THE REST, OF COURSE, IS HISTORY. THE ADVERTISING GAMBLE PAID OFF BEFORE MILLIONS OF VIEWERS AND THE CANADARM BECAME AN INTERNATIONAL BYWORD FOR EXCELLENCE IN SPACE. IN A SHUTTLE THAT COST CLOSE TO \$2 BILLION, THE ARM WAS A MISSION-CRITICAL SYSTEM BROUGHT IN ON TIME AND ON BUDGET. IT ALSO PERFORMED FLAWLESSLY. MORE THAN ANY OTHER SINGLE EXAMPLE OF CANADIAN ADVANCED TECHNOLOGY, THE ARM BECAME A SYMBOL OF THE SKILLS THAT ARE INHERENT IN THIS NATION. IT WAS A HIGHLY VISIBLE SUCCESS STORY, ONE THAT MADE MORE OF AN IMPACT THAN ANY OTHER SINGLE TECHNOLOGICAL ACHIEVEMENT - OR A MULTI-MILLION DOLLAR ADVERTISING CAMPAIGN.

FOR A MODEST INVESTMENT CANADA HAD BOUGHT A STAKE IN THE NEXT MAJOR STEP IN MANKIND'S VENTURE INTO SPACE - ONE THAT WILL LEAD ON TO MORE SHUTTLE MISSIONS AND A PLANNED SPACE STATION PLANNED FOR OPERATION IN THE LATTER PART OF THE CENTURY. AT A FRACTION OF THE COST INVESTED BY U.S. TAXPAYERS, CANADA HAS FIELDDED A PLAYER IN THE MAJOR LEAGUE OF SPACE UTILIZATION,

AND THAT LEAGUE IS IMPORTANT FOR TWO REASONS:

FIRST IT IS AN EXCELLENT BUSINESS OPPORTUNITY. FROM 1980 TO 1982, SPAR AEROSPACE DOUBLED ITS PERCENTAGE OF SALES IN THE EXPORT MARKET, FROM 30.6% TO 60.4%. IN THE SAME TIME PERIOD THE COMPANY ALMOST TRIPLED ITS REVENUES IN THE EXPORT OF ADVANCED TECHNOLOGY - FROM \$38 MILLION TO \$106 MILLION.

SECOND, SPACE IS A HIGHLY VISIBLE ARENA, ONE THAT COMMANDS WIDESPREAD INTERNATIONAL ATTENTION AND PROVIDES AN EXCELLENT SHOW CASE FOR DEMONSTRATING CANADIAN CAPABILITIES.

LET US MOVE BACK AGAIN TO THE OTHER STRAND, THE TELECOMMUNICATIONS SATELLITES. THANKS TO THE TIRELESS PUSHING BY JOHN CHAPMAN, BY THE TIME TELESAT WAS PREPARED TO PURCHASE ITS ADVANCED ANIK D SATELLITE CANADIAN INDUSTRY WAS IN A POSITION TO FIELD A PRIME CONTRACTOR. SPAR, HAVING ACQUIRED THE SPACE SYSTEMS DIVISION OF R.C.A. IN STE ANNE DE BELLEVUE OUTSIDE MONTREAL, WAS AWARDED THE PRIME CONTRACT. HUNDREDS OF CANADIAN SUBCONTRACTORS WERE ALSO INVOLVED, NOTABLY COMDEV OF CAMBRIDGE, SED SYSTEMS OF SASKATOON AND FLEET INDUSTRIES OF FORT ERIE, WITH THE NEXT RESULT THAT ON THIS PROJECT - THE FIRST OF TWO ANIK D SATELLITES LAUNCHED A DECADE AFTER THE ANIK A IN 1982 - THE CANADIAN CONTENT WAS OVER 50%. THIS WAS THE PAYOFF FOR JOHN CHAPMAN'S DREAM - THAT CANADA SHOULD ALSO BUILD IN SPACE - ONE THAT HE COULD NOT PERSONALLY SEE FULFILLED.



BUT IT WAS ONLY A PARTIAL FULFILLMENT. ANY NATION CAN UNDERTAKE TO SHIELD A DOMESTIC INDUSTRY IN A HOTHOUSE ENVIRONMENT, BUILDING UP A CAPABILITY PROTECTED FROM FOREIGN INTERFERENCE. THE REAL PAYOFF HAS TO COME IN THE INTERNATIONAL MARKETPLACE, WHERE CANADIAN INDUSTRY CAN BE TESTED IN THE ARENA OF FIERCE COMPETITION. IT WAS IN 1982 - SOME MONTHS BEFORE THE ANIK D LAUNCH AND SEVERAL MONTHS AFTER THE SUCCESSFUL FIRST TEST OF THE FIRST CANADARM - THAT THE TWO STRANDS CAME TOGETHER IN A POWERFUL LOOP THAT PITTED SPAR AGAINST AEROSPATIALE OF FRANCE IN THE CONTRACT COMPETITION FOR THE FIRST DOMESTIC COMMUNICATIONS SATELLITE SYSTEM IN LATIN AMERICA - TWO SATELLITES AND RELATED GROUND SYSTEMS FOR BRAZIL.

THE EFFORT WAS A REMARKABLE EXAMPLE OF PRIVATE AND PUBLIC SECTOR COOPERATION WITH THE BANKS STANDING BY WITH THE ALL IMPORTANT FINANCING. AEROSPATIALE, WHOSE PRESIDENT IS THE BROTHER OF FRANCOIS MITTERAND, THE FRENCH PRESIDENT, WAS ABLE TO ENLIST HELP FROM ON HIGH - SUCH AS SENDING DOWN A GENERAL OR TWO TO AWARD MEDALS. CANADA COUNTERED WITH A TOUR OF THE CANADIAN MOUNTED POLICE JAZZ BAND.

MORE SERIOUSLY, THANKS TO THE ASSISTANCE OF THE CANADIAN INTERNATIONAL DEVELOPMENT AGENCY, WE ARE ABLE TO OFFER A PROGRAM TO BRAZILIAN ENGINEERS AND TECHNICIANS TO LEARN - AS WE ONCE DID FROM HUGHES AIRCRAFT - HOW TO BUILD AND OPERATE THEIR OWN SATELLITE SYSTEM. COUPLED WITH FINANCING AND ASSISTANCE IN

MARKETING BRAZILIAN GOODS WORLDWIDE, WE HAD A STRONG SUIT. BUT THE SUCCESS OF THE ARM AND THE PREMATURE FAILURE OF THE FORD AEROSPACE/AEROSPATIALE SATELLITE OVER INDIA ALSO PLAYED AN IMPORTANT ROLE IN PERSUADING THE BRAZILIANS THAT CANADA WAS A NATION THAT COULD DELIVER HIGH QUALITY TECHNOLOGY ON TIME AND AT THE AGREED UPON PRICE.

IN THIS, THE BEGINNING OF THE 22ND YEAR OF CANADA IN SPACE, OUR NATION HAS COME OF AGE IN THIS EXCITING ADVENTURE, WHEN I SAID A MOMENT AGO THAT THE INVESTMENT HAS BEEN MODEST, LET ME CITE SOME COMPARATIVE FIGURES. NASA'S BUDGET FOR 1983 WAS \$7.5 BILLION - THE FRENCH BUDGETED \$460 MILLION FOR SPACE AND THE JAPANESE \$630 MILLION. CANADIAN TAXPAYERS INVESTED \$136 MILLION - CANADIAN - ALMOST ALL OF IT EXPENDED WITHIN THE NATION.

NO WHERE IN THE WORLD IS THERE A SPACE EFFORT OF SUCH IMPACT FOR SUCH A MODEST INVESTMENT - AND ONE THAT IS SO MUCH IN PRIVATE HANDS.

IT HAS OFTEN BEEN SAID THAT SMALL ENTERPRISES ARE THE ENGINE OF ECONOMIC GROWTH - AND REAL GAINS IN EMPLOYMENT. THAT IS PARTICULARLY TRUE OF CANADA'S SPACE INDUSTRY. SPAR, THE LARGEST COMPANY IN THE FIELD, ONLY THIS YEAR REACHED THE \$200 MILLION MARK IN ANNUAL SALES. IN THAT CONTEXT THE SPACE INDUSTRY REPRESENTS A TOUGH, SLENDER LINE OF INITIATIVE.

ALL CANADIAN SPACE INDUSTRIES ARE IN PRIVATE HANDS, VIABLE AND PAYING TAXES ON THEIR EARNINGS: SPAR, CANADIAN ASTRONAUTICS OF OTTAWA, DSMA ATCON OF TORONTO, COMDEV OF CAMBRIDGE, FLEET INDUSTRIES OF FORT ERIE, SED SYSTEMS OF SASKATOON, BRISTOL OF WINNIPEG, MACDONALD DETTWILER OF VANCOUVER, TO NAME BUT A FEW,

THERE ARE LITERALLY HUNDREDS THROUGHOUT CANADA WORKING ON THE SPACE PROGRAM, SUBCONTRACTORS LARGE AND SMALL. ONE OF THE LATTER IS MRS. LOVEDAY NEWBY OF SNELGROVE, ONTARIO. SHE DID A JOB THAT HAD STUMPED THE EXPERTS: HOW TO SEW THE TETHERS FOR THE SPACE HARNESS DESIGNED BY SPAR FOR USE BY THE ASTRONAUTS IN A TEST OF WEIGHTLESSNESS ABORD THE FIRST SPACELAB FLIGHT IN LATE 1983. MRS. NEWBY, A SKILLED SEAMSTRESS IN BUSINESS FOR HERSELF, USED HER SKILLS AND INGENUITY TO DO THE JOB TO PERFECTION. AND, AS WAS REPORTED IN THE WORLD'S PRESS, THE WEIGHTLESSNESS EXPERIMENT USING THE HARNESS WAS ONE OF THE SUCCESS STORIES OF THE MISSION. PRIVATE ENTERPRISE SERVING THE SPACE MARKET!

THIS IS NOT TO SAY THAT GOVERNMENT INVOLVEMENT IS NOT ESSENTIAL. INTERNATIONAL COMPETITION IN SPACE MANDATES THAT GOVERNMENTS PLAY A ROLE AND I WOULD SUBMIT THAT THE CANADIAN GOVERNMENT HAS BEEN MAGNIFICENT IN THIS REGARD. COMPLEMENTED BY CANADIAN BANKS, THE NATION'S OUTREACH INTO INTERNATIONAL MARKETS HAS BROUGHT BACK DIVIDENDS THAT GO WELL BEYOND SPACE.

CASE IN POINT. WE AT SPAR RECENTLY RECEIVED A CALL FROM HUB CLAPPER, A FLORIDA DISTRIBUTOR OF PIERREVILLE FIRETRUCKS - MADE

IN QUEBEC - WITH THE PLEA THAT HE WAS GETTING A LOT OF STATIC FROM LOCAL MUNICIPALITIES: WHY DIDN'T HE SELL AMERICAN - WHY GO FOR CANADIAN TRUCKS? HE ALLOWED THAT HE HAD HEARD OF THE CANADARM AND WONDERED IF HE COULD USE THIS EXAMPLE OF U.S./CANADIAN TECHNOLOGICAL COOPERATION TO HELP HIM SELL THE TRUCKS. WE SUPPLIED HIM WITH PHOTOS AND PRINTED MATERIAL AND HE SENT US HIS REVISED MARKETING SCRIPT - WHICH HAD AS A BOTTOM LINE THAT IF THE TWO NATIONS COULD COOPERATE IN SPACE, WHY NOT HERE ON EARTH IN A TOP-OF-THE-LINE FIRE ENGINE CAPABILITY. THE PAYOFF WHEN LAST WE HEARD: HE HAD SOLD A PIERREVILLE FIRE ENGINE SYSTEM TO SARASOTA, FLORIDA.

WHO WOULD HAVE THOUGHT THAT CANADA'S ADVENTURE IN SPACE WOULD HELP SELL CANADIAN FIRE TRUCKS? IT IS A SPINOFF THAT MUST STAND AS ONE OF COUNTLESS EXAMPLES OF WHAT OUR MOVE INTO SPACE REPRESENTS IN TERMS OF POSITIVE BENEFIT TO THE NATION.

LET ME CLOSE WITH ONE OTHER BENEFIT OF INCALCULABLE VALUE - A SUGGESTED STRATEGY FOR THE FUTURE AND A PLEA FOR NATIONAL COMMITMENT THAT I WOULD HOPE POLITICIANS, REGARDLESS OF PERSUASION, COULD SUBSCRIBE TO.

THE MOST VALUABLE ASSET THAT CANADA HAS IS HER YOUNG PEOPLE. TOO OFTEN IN THE PAST WE HAVE LOST OUR BEST AND BRIGHTEST, BOTH IN THEIR STUDIES AND LATER IN THEIR CAREERS, TO OTHER NATIONS BECAUSE OPPORTUNITIES HERE WERE UNAVAILABLE OR WERE NOT OF SUFFICIENT MAGNITUDE OR APPEAL. DR. TAUBE OF REGINA WENT TO

STANFORD IN 1936 WHERE IN 1983 HE WON THE NOBEL PRIZE: DR. CHAPMAN STAYED HERE AND THE NATION WAS BLESSED WITH HIS PRESENCE. DR. WILLIAM TATTON, A NOTED CANADIAN NEUROLOGIST, WAS EDUCATED AT STANFORD, BUT HAS RETURNED TO CANADA. PERHAPS HE EXPRESSES IT MOST ELOQUENTLY WHEN HE STATES: I KNOW OF AT LEAST 60 CANADIAN SCIENTISTS IN MY FIELD UNDER THE AGE OF 40 WHO ARE ENGAGED ELSEWHERE. IF ONLY WE COULD BRING THEM BACK HOME, SO THAT THEIR EFFORTS HERE COULD ATTRACT OTHER CANADIANS TO WORK WITH THEM AT THE FRONTIERS OF TECHNOLOGY.

SPACE OFFERS SUCH AN OPPORTUNITY AND THE NEW CANADIAN INSTITUTE FOR ADVANCED RESEARCH, WHICH SPAR HAS FUNDED WITH ITS FIRST MAJOR GRANT - A QUARTER OF A MILLION DOLLARS FOR EACH OF THE NEXT THREE YEARS - IS ONE OF THE MEANS TO BRING THIS DREAM TO REALITY. THE PROJECT WHICH SPAR IS FUNDING WILL SEEK TO EXPAND ON THE LEAD TAKEN WITH THE CANADARM IN THE AREA OF ARTIFICIAL INTELLIGENCE. SPAR ENGINEERS WILL WORK WITH UNIVERSITY RESEARCHERS AT THE UNIVERSITIES OF TORONTO AND BRITISH COLUMBIA AND MCGILL UNIVERSITY. THESE CENTRES OF EXCELLENCE WILL FOCUS THEIR PROVEN PROWESS ON THE SUBJECT AT HAND AND DEVELOP THE CRITICAL MASS THAT WILL HELP ENSURE CANADIAN LEADERSHIP IN THIS CRITICAL AREA.

THEIR PRESENCE HERE WILL HELP ENSURE THAT THE BEST AND BRIGHTEST CANADIAN STUDENTS WILL BE PERSUADED TO STAY HERE TO CONTINUE THEIR STUDIES. MORE, A VIBRANT AND EXCITING CANADIAN SPACE PROGRAM WILL ENCOURAGE THEM TO STAY HERE TO FORGE THEIR CAREERS. THAT, MORE THAN ANYTHING ELSE I HAVE CITED, IS THE TRUE PROMISE

OF THE NATION'S INVESTMENT IN THIS NEW FRONTIER.

NOW FOR MY SUGGESTED STRATEGY. CANADA CANNOT BE ALL THINGS TO ALL PEOPLE. WE ARE A RICH AND GREAT LAND, BUT WE NUMBER BUT 25 MILLION. OUR TRADING BASE IS IN LARGE MEASURE IN AGRICULTURE, MINERALS AND FORESTRY. THERE ARE THOSE WHO WOULD CITE THE OLD CANARD THAT WE ARE CONDEMNED TO BE HEWERS OF WOOD AND HAULERS OF WATER. RUBBISH! WE ENJOY A HEALTHY BALANCE OF TRADE AND DESPITE ALL OF THE NOISE ABOUT JAPANESE IMPORTS, FOR EXAMPLE, THE TRADE BALANCE WITH THAT NATION IS IN OUR FAVOUR. EVEN WITH CHINA THE BALANCE IS ONE BILLION DOLLARS IN CANADA'S FAVOUR!..... MOST OF IT IN WHEAT. HOW, THEN, CAN WE SPURN SUCH A MIGHTY ENGINE OF INTERNATIONAL TRADE?

MY SUGGESTION IS THAT WE PUT TECHNOLOGY IN PROPER PERSPECTIVE - THAT WE WORK HARD TO ACCOUNT FOR OUR OWN NEEDS AND THEN DEVELOP THIS BASE INTO AN INTERNATIONAL CONNECTION THAT IS PREDICATED ON COOPERATION RATHER THAN EXPLOITATION.

FOR EXAMPLE, WE HAVE RECENTLY CONCLUDED AN AGREEMENT WITH CHINA TO SHARE OUR TECHNOLOGY IN SATELLITE GROUND STATIONS. IT IS NOT YET A BUSINESS DEAL AND WITH THE MASSIVE SUMS THAT THE CHINESE SPEND IN CANADA TO FEED THEMSELVES, IT WOULD BE WRONG-HEADED TO INSIST THAT THEY SPEND IN THE SAME MEASURE TO BRING THEIR COMMUNICATIONS UP TO THE STANDARDS THAT WE ENJOY. CANADA HAS AN ENORMOUS MORAL CREDIT RATING WORLDWIDE. WHY NOT CASH IN ON THAT, AS WE ARE DOING WITH CHINA, TO SHARE OF THAT WHICH WE DO BEST AND

THEREBY HELP ENSURE THAT WHEN THE CHINESE ARE READY TO INVEST WE WILL BE IN A PRIME POSITION TO ACCOMMODATE THEM - AND, ULTIMATELY, TO JOINTLY MARKET THE FRUITS OF OUR LABOURS TO OTHER DEVELOPING NATIONS. THIS IS A STRATEGY THAT REQUIRES PATIENCE AND COOPERATION - SOMETHING NOT ALWAYS INHERENT IN OTHER FIRST WORLD NATIONS. BUT IT IS A VITAL ROLE THAT CANADA CAN FULFILL - ONE THAT WILL PAY OFF HANDSOMELY NOT ONLY IN MARKETING THE SKILLS OF OUR FUTURE GENERATIONS, BUT IN HARNESSING THEIR IDEALS IN MAKING THIS TRULY A BETTER WORLD. YES, WE NEED EXPORT MARKETS TO PROSPER. INTELLIGENTLY STRUCTURED, WE CAN MARKET A BROAD MIX OF ALL THAT OUR GREAT LAND HAS TO AFFORD - BASIC MATERIALS AS WELL AS ADVANCED TECHNOLOGY.

FINALLY, MY PLEA FOR AN UNEQUIVOCAL POLITICAL DEDICATION TO OUR SPACE PROGRAM. CANADA DOES NOT HAVE A NASA - AND I WOULD SAY, ON BALANCE, THAT A STRENGTHENED INTER-DEPARTMENTAL COMMITTEE ON SPACE CAN ADEQUATELY SERVE OUR NEEDS. WHAT WE DO NEED IS A CONSISTENCY OF FINANCIAL COMMITMENT. IF OUR INVESTMENT IS TO BE \$136 MILLION A YEAR, LET US SUSTAIN IT! NOT IN FITS AND STARTS, BUT YEAR AFTER YEAR. PRIVATE INDUSTRY IS PREPARED TO SHOULDER ITS SHARE OF THE BURDEN IN RESEARCH AND DEVELOPMENT, BUT ENLIGHTENED GOVERNMENT POLICY AND ACTION MUST BE THERE TO PRIME THE FRONT END OF THE ENGINE IN THIS EXCITING AND IMPORTANT NEW FRONTIER OF TECHNOLOGY.

LET US KEEP UPPERMOST IN MIND THE VISION OF JOHN CHAPMAN - THAT CANADA NOT ONLY BE IN SPACE, BUT BUILD FOR SPACE. IT IS AN EXCITING PROSPECT - FOR OUR YOUNG PEOPLE, FOR OUR NATIONAL ECONOMY AND FOR OUR FUTURE.

I THANK YOU FOR YOUR ATTENTION.