The SAS-027 Historical SSC Database With Application to an Analysis of Past Canadian Operations

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INTRODUCTION

NATO's Studies, Analysis, and Simulation (SAS) Panel has sponsored a series of studies on long term defence planning (LTDP) issues in recent years. Study SAS-027 was given the mandate to investigate methods and techniques suitable for supporting LTDP with the focus on Smaller Scale Contingency (SSC) operations. The term 'SSC' is widely defined to include any operation short of war – this includes the full range of peace support operations, and humanitarian and disaster relief efforts. Many NATO and 'Partners for Peace' nations participated in the study, as well as other invited nations such as Australia.

Nations have been conducting SSC operations for decades. Indeed, Canada has established its international reputation as peacekeepers. However, the end of the Cold War has permitted NATO nations to view participation in SSC type operations as more of a primary rather than secondary role, resulting in increased frequency of participation in such operations. Canada, like most NATO nations during the Cold War, designed its force structures on the notion that if one prepares for mid-intensity conflict in Europe against the Warsaw Pact threat, then one should be able to handle the less demanding spectrum of SSCs. Although there is some logic to this reasoning in terms of operational effectiveness, we are discovering that defence forces designed for a Cold War role are not necessarily fully

effective, nor in the right balance to handle the number and diversity of SSC operations faced today.

The SAS-027 study covers the full range of issues surrounding LTDP for SSCs, focussing mainly on analytical methods, supporting data sources, and a 'code of best practice' for applying these methods and data. One of the fundamental data inputs to any LTDP exercise will be historical information on SSC operations that have conducted in the recent past. This paper outlines the historical data collection exercise that was led by Canada. It also provides an analysis of the historical data from Canada's perspective, investigating the summary nature of Canada's SSC commitments since 1990 and the utilization rates for various components of Canada's defence forces and major equipment fleets.

The further we look into the past, the further we can see into the future.

Winston Churchill

THE SAS-027 HISTORICAL SSC OPERATIONS DATABASE

The SAS-027 Historical SSC Operations Database contains information on all instances between 1990 and 2001 world-wide where a nation deployed its defence forces outside its own national borders on a SSC mission. Canada led this data collection task, hiring an experienced Canadian military historian, Dr. Sean Maloney, to research and compile the information. These data were scoured from diverse unclassified sources, many provided directly by the NATO nations participating in the study.

For each SSC operation the following data elements were collected:

- Geographic location;
- Start and finish dates
- Alliance or coalition context;
- Operation code name;
- Description of the overall mission;
- General classification of the operation; and
- Background description.

For each individual nation that participated in this SSC operation, the following data elements were collected:

- Name of contributing nation.
- Start and finish dates for that nation's contribution.

- National operation name (if applicable).
- Number and type of troops deployed.
- Numbers of major military platforms (ships, aircraft, armoured fighting vehicles, helicopters, etc.) deployed.
- Rotational information if available.
- Regular/reserve and volunteer/conscript ratios, if available.

Table 1 provides an example of the database entries that were compiled. The table presents Canada's efforts under Operation ASSIST, a humanitarian relief mission under the international banner Operation PROVIDE COMFORT that provided assistance to Kurds in northern Iraq after the Gulf War (1991).

As in all research efforts, resources are limited. Some data, especially data on numbers and types of troops and major equipments, are incomplete in some operations due to the unavailability or unreliability of data.

Dr. Maloney's research identified over 2,000 individual national deployments during the 12 year time period, involving a total of 70 countries world-wide. This information has been compiled into a Microsoft Access database and has been released to all nations participating in the SAS-027 study.

HISTORICAL ANALYSIS OF CANADIAN OPERATIONS SINCE 1990

ENHANCING THE DATABASE FOR CANADIAN OPERATIONS

Canada's Operational Research Division was interested in taking the information generated by this SAS-027 effort to produce a summary perspective for all Canadian operations — national and international, SSC and non-SSC — between 1990 and 2001.

Dr. Maloney's database provided the ideal starting point, but it needed to be augmented with data on Canadian national and non-SSC operations during this era. Also, detailed force and equipment deployment information had to be researched to flesh out many of these operations to the level of detail required to conduct an analysis of utilization rates for the various force structure components of the CF and its major equipment fleets.

The following data sources were utilized during this supplementary information research phase.

- SAS-027 SSC Database.
- Departmental information systems and documents.

Country	CANADA
Location and Year	TURKEY and IRAQ, 1991
Coalition/Alliance Context	Coalition outside IO/RO contexts
Operation Code Name	Canadian Code Name: Op ASSIST Coalition Code Name: Op PROVIDE COMFORT
Coalition/Alliance Mission	To provide humanitarian assistance and protection to the Kurdish population in northern Iraq in the wake of the Persian Gulf War of 1990-91.
Type of Operation	Intervention, non-permissive humanitarian assistance
Start Date	10 Apr 91
End Date	28 May 91
National Forces Employed	1 medical unit (4 Field Ambulance: 250 pers regular force unit), C-130 and 707 airlift (regular force units)
Background	Operation ASSIST was the Canadian contingent for Operation PROVIDE COMFORT, the humanitarian relief effort to the Kurds in northern Iraq and southern Turkey in the wake of the Gulf War of 1990-1991. Op PROVIDE COMFORT consisted of 22 000 personnel from nine countries. Op ASSIST was designed to assist the Kurdish refugees in the border area. 4 Field Ambulance was deployed from West Germany (4 Canadian Mechanized Brigade) to Turkey aboard CF strategic airlift. Two C-130s and a 707 were dedicated to the in-theatre air life, while 40 vehicles and 62 members of 4 Field Ambulance were based in Incirlik, Turkey. A total of 122 CF personnel were involved in the operation. There is no indication that reserve personnel were employed in Op ASSIST. [Ref listed] This operation was conducted in an environment in which the Iraqi forces had the potential to employ the full range of high-intensity warfare-capable forces against the coalition forces.

Table 1: Sample SSC Operations Database Entry Canadian Assistance to Kurds in Operation PROVIDE COMFORT.

- Sealift manifests.
- CF History Directorate documents (books on Gulf War, etc.).
- Organizational web sites (UN, NATO, CF, OSCE, etc.).
- Operational Unit's web sites.
- Governmental inquiry documents.
- The usual library resources (Jane's, etc.).

- CF personnel who were there.
- Operational Research databases.

Military organizations keep some historical documents, like war diaries, ships logs, annual unit histories, etc. Unfortunately, most of the historically useful information on past operations (who and what was in theatre, and what they did there) either was not collected, was collected but not saved, or was saved but is very difficult and laborious to extract.

Identifying and querying to CF personnel who were there proved to be one of the most productive methods. The events are recent enough that most of the facts can be readily picked up if one talks to the right person.

It is interesting to note that some of the best historical information on major equipment fleet utilization was from databases developed and maintained by our own Operational Research teams. Deployment records on past operations for transport aircraft and navy ships were relatively easy to locate, thanks to the foresight and efforts of our air transport and maritime OR teams.

On the navy side, we were fortunate to have a database rendered from photos of the monthly operational schedule boards. We have been able to resurrect the activity of every CF ship over the past 20 or so years down to the resolution of a single day.

The transport aircraft database (primarily on the Hercules and Boeing/Airbus fleets) was produced from the CF K1017 forms that air crew completed after every flight leg. Table 2 presents the database information extracted for flights in support of Canada's assistance to the Kurds after the Gulf War under Op ASSIST (see Table 1). Although this information collection process is automated today, it doesn't have nearly the same level of quality control that was imposed by the old manual collection process.

The additional research provided fuller details to be fleshed out on the chronology of events and what forces and major equipments were utilized. For example, on Operation ASSIST the following details were established to supplement the information from the SAS-027 database shown in Table 1.

CHRONOLOGY OF EVENTS

5-Apr-91.	UN SC Resolution 688 called for humanitarian support.
11-Apr-91.	First airlift flight departed Trenton (Boeing 707).
14-Apr-91.	Two Hercules departed Trenton to deploy ALCE.
18-Apr-91.	Began flying 2 missions/day from Incirlik into Iraq.
18 to 22-Apr-91.	CFE medical unit deployed to Incirlik.
12 to 23-Apr-91.	6 Hercules flights from Lahr to Tehran.
24-Apr-91.	Medical unit deploys by road to Turkey/Iraq border.
28-May-91.	Mission completed, units returned to Lahr.

FORCE COMPONENTS DEPLOYED

2 mo. x 47 pers.	Air Lift Control Element to Incirlik, Turkey.
2 mo. x 75 pers.	Medical Unit, including command and administration.

Tail No.	Depart DTG	Departed	Arrived	Flt Hrs
317	4/14/91 18:10	CYTR Trenton	CYYR Goose Bay	3.4
317	4/14/91 22:35	CYYR Goose Bay	EDAN Lahr	8.9
317	4/16/91 12:20	EDAN Lahr	LTAG Turkey	5.8
317	4/18/91 8:10	LTAG Turkey	LTAG Turkey	4.2
317	4/19/91 8:40	LTAG Turkey	LTAG Turkey	4.3
.....	.....	.....	.....	.....
317	5/1/91 12:40	LTAG Turkey	LTAG Turkey	3.7
317	5/2/91 8:30	LTAG Turkey	EDAN Lahr	7.0
317	5/2/91 17:15	EDAN Lahr	LTAG Turkey	7.2
317	5/5/91 6:40	LTAG Turkey	EDAN Lahr	6.6
317	5/5/91 8:50	EDAN Lahr	CYYT St John's	9.1
317	5/5/91 19:00	CYYT St John's	CYTR Trenton	4.4

Tail No.	Depart DTG	Departed	Arrived	Flt Hrs
702	4/18/91 6:45	EDAN Lahr	OIII Tehran	5.4
702	4/18/91 14:20	OIII Tehran	EDAN Lahr	5.8
702	4/19/91 7:55	EDAN Lahr	OIII Tehran	5.5
702	4/19/91 21:10	OIII Tehran	EDAN Lahr	6.0
702	4/20/91 6:55	EDAN Lahr	OIII Tehran	5.2
.....	.....	.....	.....	.....
702	4/21/91 6:45	EDAN Lahr	OIII Tehran	5.3
702	4/21/91 13:25	OIII Tehran	EDAN Lahr	6.0
702	4/22/91 8:55	EDAN Lahr	OIII Tehran	5.5
702	4/22/91 17:10	OIII Tehran	EDAN Lahr	6.2
702	4/23/91 7:45	EDAN Lahr	OIII Tehran	5.3
702	4/23/91 15:20	OIII Tehran	EDAN Lahr	6.3

Table 2: Hours Flown During Operation ASSIST (1991) by Canadian Forces Transport Aircraft

MAJOR EQUIPMENTS DEPLOYED

2 mo. x 40 veh.	Small trucks, ambulances, jeeps.
237.1 flight hrs.	Hercules fleet.
76.8 flight hrs.	Boeing 707 fleet.

DURATION OF OPERATIONS

It is illustrative to look at the distribution of the duration times for the 72 Canadian operations that were identified in this twelve-year window. Figure 1 presents this distribution.

Note from the figure that all national operations were less than a year in length. That is consistent with the nature of national operations, which tend to deal with disaster, humanitarian, or internal security issues that get resolved over weeks or perhaps months, but certainly not years.

Some of the international operations started before 1990, or were still active at the end of 2001. These are labelled 'Extended International' in the figure. The number plotted represents only the time which this operation overlapped the 1990-2001 time window. Note that Canada's participation in four UN operations — UNTSO (Israel), UNDOF (Golan Heights), MFO (Sinai), and UNFICYP (Cyprus) — overlapped both ends of the entire 12-year window.

The distribution of duration times has a clear exponential shape (which pleases mathematicians). The mean duration time for the 43 International operations that both started and finished within the 12-year window was 2.0 years.

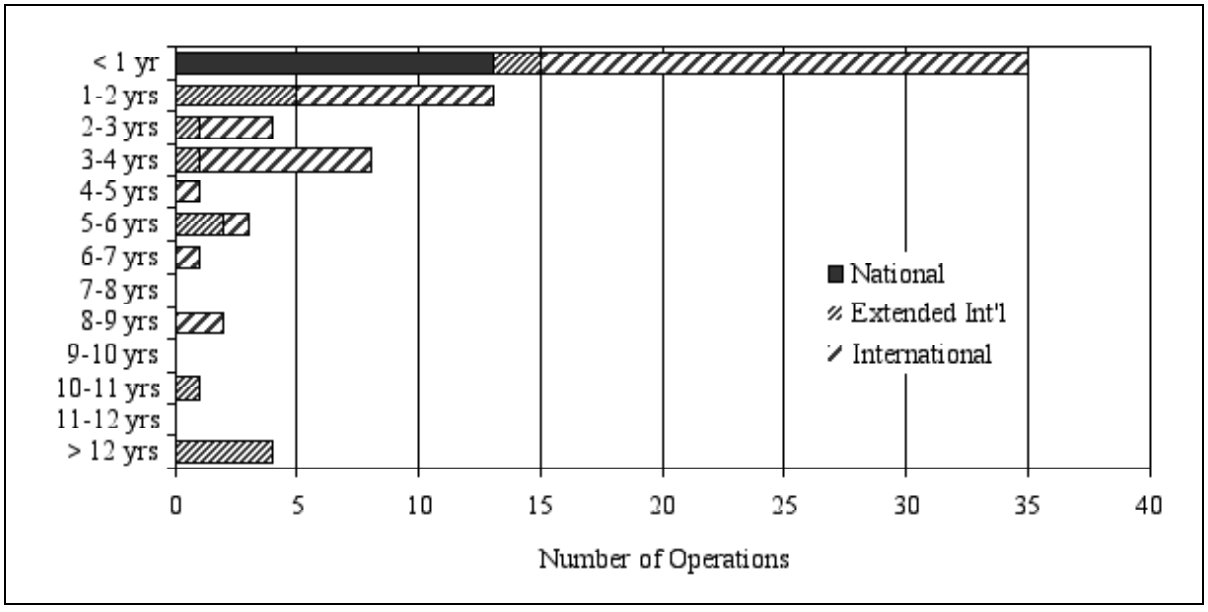

Figure 1: Duration of Canadian Operations 1990-2001.

OPERATIONAL TASKS CONDUCTED

The general nature of all SSC operations was captured in the SAS-027 database. This taxonomy was expanded somewhat with the subsequent enrichment research for the Canadian operations. The ideal level of detail seemed to be at what might be called the 'task' level. The challenge was to generate a set of generic operational 'tasks' that would provide

sufficient detail to permit broad force requirements to be assessed, yet would not be so detailed as to be unworkable. The resulting taxonomy emerged from examining only the subset of operations world-wide in which Canada was involved, but it covered the entire mission of each of these coalition/alliance contingencies (not just those aspects that the CF deployments tackled).

A total of 37 distinct tasks were identified in this process, which we have aggregated under five headings: Peace Enforcement, Peace Keeping, Nation Building, Humanitarian Relief, and National Tasks. The number of operations (of the 72 Canada undertook in the period) that involved each task is presented below.

PEACE ENFORCEMENT TASKS

Enforce maritime sanctions.	6	of 72 operations
Enforce cross-border sanctions.	2	"
Secure a cease fire.	2	"
Create stable & secure environment.	4	"
Create demilitarized zones / safe areas.	3	"
Supervise demobilization / disarmament.	8	"
Enforce no-fly zone.	3	"
Provide emergency extraction force.	3	"
Offensive conventional land-air ops.	2	"
Air-to-ground attack.	3	"
Conduct maritime sweep & escort ops.	1	"

PEACE KEEPING TASKS

Monitor political / humanitarian situation.	4	of 72 operations
Maintain stable & secure environment.	10	"
Monitor / verify cease fire agreement.	20	"
Monitor redeployment of combatants.	6	"
Monitor zones of separation / safe areas.	11	"
Monitor repatriation of refugees.	4	"
Preventative border monitoring.	2	"
Verification of human rights.	2	"

NATION BUILDING TASKS

Observe / verify elections.	8	of 72 operations
Assist development of functional gov't.	9	"
Professionalize armed forces & police.	3	"
Conduct mine clearance / EOD operations.	4	"
Provide mine clearance / awareness trg.	6	"
Rehabilitate infrastructure.	7	"

HUMANITARIAN RELIEF TASKS

Support delivery of humanitarian aid.	7	of 72 operations
Provide humanitarian aid (non-permissve).	6	"
Provide humanitarian aid (permissive).	6	"

Provide refuge for displaced persons.	1	“
Disaster relief – international.	4	“

NATIONAL OPERATIONS TASKS

Disaster relief – national.	6	of 72 operations
Provide emergency accommodation.	4	“
Aid to civil power – civil disobedience.	3	“
Aid to civil power – international law.	3	“
Aid to civil power – property protection.	1	“
Aid to civil power – major event security.	1	“
Assist in major air disaster.	1	“

On the Peace Enforcement side, tasks such as supervision of demobilization and/or disarmament and enforcing maritime sanctions were the most frequent.

Peace Keeping tasks have predominated Canadian operations since 1990 with tasks such as monitoring cease-fire agreements, zones of separation (or safe areas), and the redeployment of combatants being the dominant ones. The general task of maintaining a stable and secure environment is a common requirement as well.

Nation Building tasks are usually heavier on civil-military cooperation, with election supervision/monitoring and advising on the establishment of sound governance being commonly required. Military engineering tasks such as the rehabilitation of infrastructure after a conflict, the conduct of mine clearance operations, and the provision of mine awareness training have been called on most frequently.

Historically, Canada has participated in a very steady stream of humanitarian relief operations over the years, both in permissive and non-permissive environments, and including situations where the military provide protection to the non-military organizations that provide the actual humanitarian relief.

National operations have typically been heaviest on the disaster relief side – occurring only about once every two years, but usually demanding heavy resources when they do occur. We have seen the occasional requirement to provide aid to the civil powers in Canada with diverse objectives.

UTILIZATION RATES: CANADIAN FORCES COMPONENTS

Detailed information is still being compiled on the breakdown of the types of units and soldiers that have been deployed across these 72 operations. From the data currently available, the following has been extracted on deployment frequencies.

Observers / HQ Staff.	29	of 72 operations
C3I.	22	“
Infantry.	24	“
Armoured.	8	“
Artillery.	1	“

Engineers.	29	“
Tactical Aviation.	12	“
Medical.	9	“
Logistics/Maintenance.	19	“
Special Forces.	3	“
Air Force (excl. deployment).	21	“
Navy.	17	“
Air Defence.	2	“
EW.	2	“

Past utilization rates are a potentially useful indicators for future force planning. It is useful to know what force components are heavily tasked and which are not. What percentage of the total person-months available for each sector of the Canadian Forces were consumed with operational deployments of all types over the 12-year period between 1990 and 2001? The preliminary results are presented in Figure 2. Note that we are still researching the breakdowns of which types of units were deployed on some operations. Also, it should be noted that it is not always straightforward to clarify some of these categories (eg. ‘observers’ often can be from any service, but sometimes they must be strictly from a single service). Therefore, several categories of soldiers that were discussed above have no information plotted for them in Figure 2, and are listed in the figure with an asterisk ‘*’.

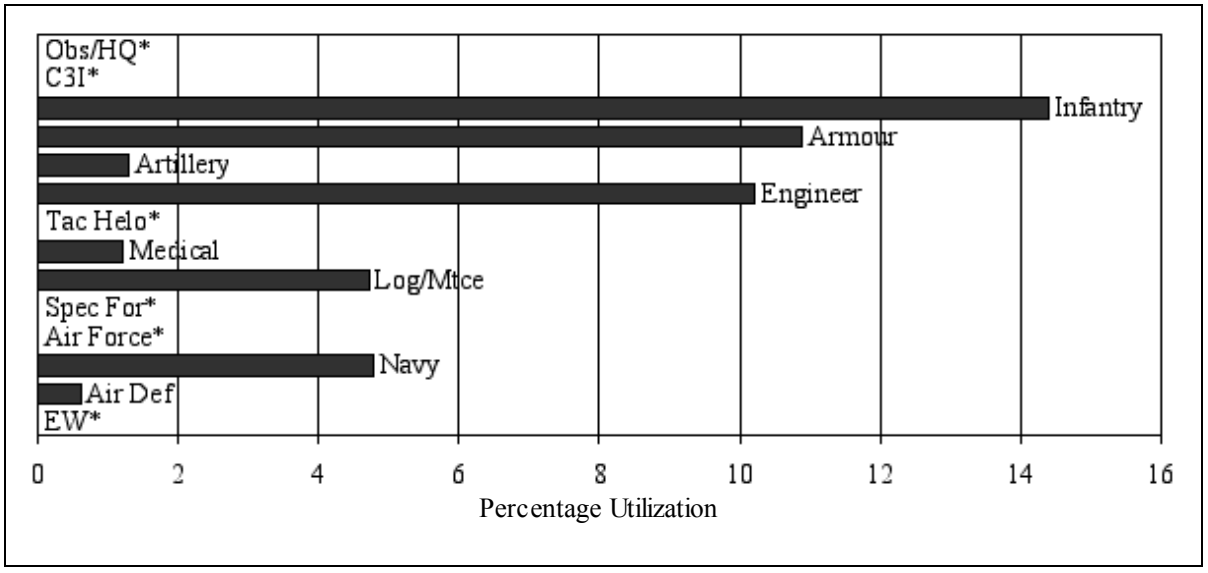

Figure 2: Percentage of Total Available Person-months Committed (1990-2001).

Figure 2 confirms that some occupations are much more heavily utilized in actual operations than others. The infantry are the most heavily tasked. Over the years each infantry soldier can expect to be deployed on an operation about 14.4 percent of the time. This reflects the broad utility of infantry across the SSC spectrum.

Some might be surprised to see that armoured elements of the CF are called upon relatively heavily as well. This is not heavy armour (see next section), but rather armoured reconnaissance units.

The third group that is most heavily tasked is the engineers (all services). Mine clearance and training, construction of accommodation, and providing general engineer support are common themes in fully 40 percent of past operations.

Artillery, medical, and air defence troops were under-utilized in comparison.

UTILIZATION RATES: MAJOR EQUIPMENT FLEETS

We can also examine historical utilitzation from the perspective of the major equipment fleets operated by the Canadian Forces. Again, full details are still being fleshed out for some operations so the following should be treated as preliminary statistics. The list below notes the frequency of deployment of the major equipment fleets during the 12-year window between 1990 and 2001.

ARMY

Leopard MBT.		3 of 72 operations
M113 APC.	7	“
TOW (M113).	4	“
Grizzly APC.	14	“
Cougar AVGP.	6	“
Bison APC.	10	“
Coyote Recce LAV.	5	“
LAV 3 .	3	“
M109 SP Arty .	0	“
C3/LG1 Towed.	1	“
ADATS.	1	“
Javelin .	1	“

NAVY

Destroyers.	9 of 72 operations	
Frigates.	9	“
Supply Ships.	9	“
SSK.	2	“

AIR FORCE

Hercules.	31 of 72 operations	
Boeing or Airbus.	33	“
Griffon UTTH.	13	“
CF-18.	4	“
Aurora MPA.	6	“
Sea King MH.	13	“

The vehicles/system deployed most frequently by the Army are the armoured personnel carriers (APCs) and/or light armoured vehicles (LAVs) that deploy along with the infantry or armoured reconnaissance troops. Newer vehicles such as the Coyote and the LAV 3 (both

wheeled) will take over for the older generation tracked M113 and the wheeled Bison, Grizzly, and Cougar. Note that artillery (including air defence) systems and main battle tanks have seldom been deployed since 1990.

The Navy has deployed regularly in the past, with surface combatants (destroyers and frigates) and replenishment ships usually getting the call. Canada's conventional submarines have rarely been deployed.

The transport elements of the Air Force are the most frequently deployed assets of the entire Canadian Forces. The workhorse Hercules fleet and the commercial airliner fleets (Boeing and Airbus) are used in all but the smallest operations. The helicopter fleets, both the Griffon UTTH (and its predecessors) and the Sea King maritime helicopter are regularly tasked. The Sea Kings are deployed in concert with the surface ships. Fighters and maritime patrol aircraft have been less frequently deployed.

The number of flying hours committed to the various operations have been extracted for some of the aircraft fleets: the CF-18A, the Hercules, the Boeing and Airbus, and the Sea King. For all other major equipments the basic measure has been assumed to be the platform-month.

We can calculate the utilization rates for each fleet by summing the total platform-months the equipment was deployed, then dividing by the total available platform-months over the 12 year period. For example, the Leopard tanks were deployed on three missions:

LEOPARD MAIN BATTLE TANKS

UNPROFOR support, Bosnia.	76 platform-months
IFOR support, Bosnia.	24 "
KFOR support, Kosovo.	65 "
TOTAL:	165 "
Leopard fleet size.	114 tanks
Months each available.	12 x 12 = 144
Utilization Rate.	165/(114x144) = 1.0 percent

The same calculation was done for all fleets. The results are presented in Figure 3.

Figure 3 confirms that the transport aircraft fleets — the Hercules and the airliners — are the most heavily utilized at 20 and 37 percent of total flying hours, respectively.

Just behind the transport aircraft come the wheeled APCs and LAVs that accompany the infantry and armoured recce troops on the numerous peace support operations. They operate in the 15-18 percent utilization range. The newer wheeled LAVs — Coyote and LAV 3 — will likely increase in utilization to this level as they take over for the older generation Cougars, Grizzlies, and Bisons.

The Navy's replenishment fleet (two ships) are the only other fleet running above 10 percent utilization.

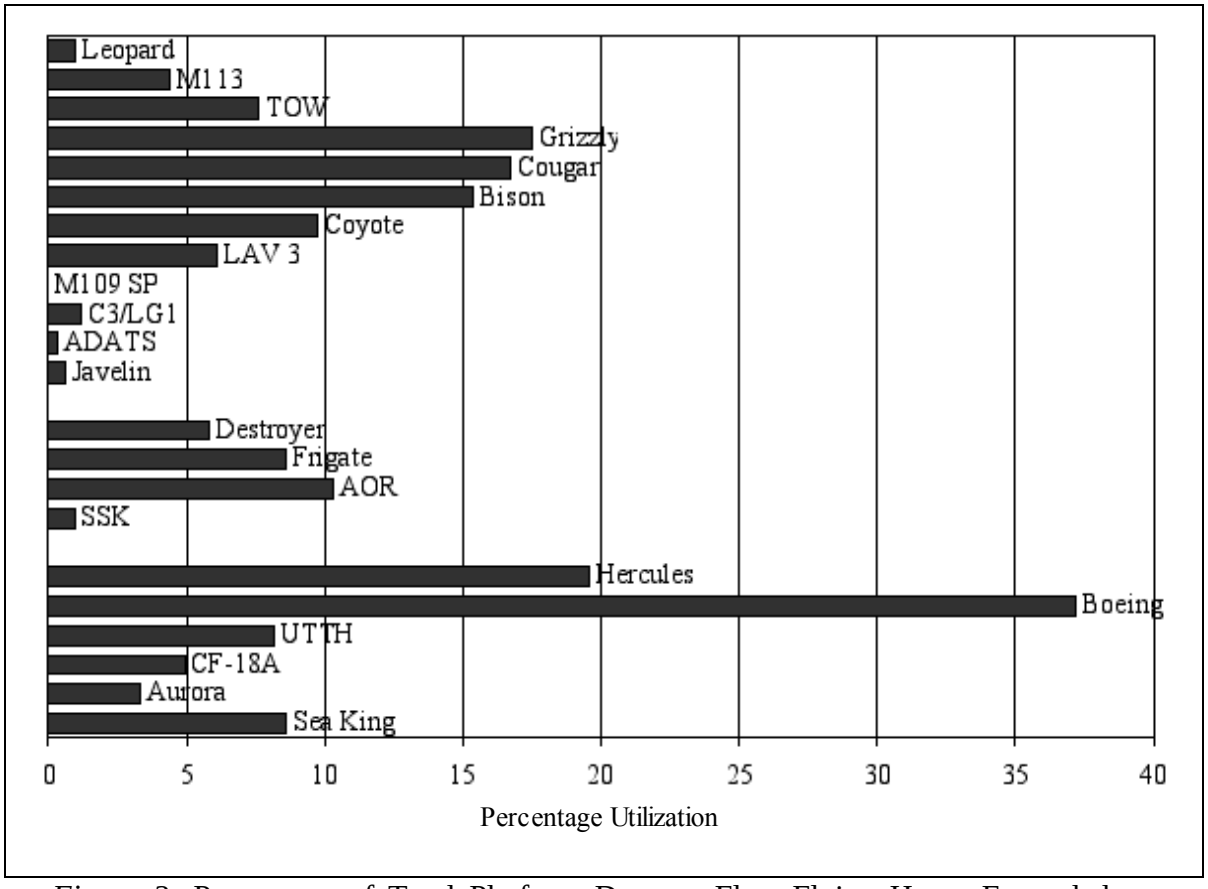

Figure 3: Percentage of Total Platform Days or Fleet Flying Hours Expended on Canadian Forces Operations (1990-2001).

With moderate utilization records in the 5 to 10 percent range are the Navy's surface combatants, the utility (Griffon) and maritime (Sea King) helicopters, and the Army's primary anti-armour missile system, the TOW (on a tracked M-113 platform).

The fighters (CF-18A) and maritime patrol aircraft (Aurora) have been running under 5 percent utilization.

Submarines, main battle tanks, and all artillery systems (including air defence) have experienced the lowest utilization rates – less than 2 percent. Note that Canada's M-109 self-propelled howitzers were not deployed at any time during the 12-year window.

WHAT DO WE MAKE OF ALL THIS?

What the Canadian Forces have done the past 12 years is likely the best single indicator of what it might face in the future. It seems reasonable to expect that equipments such as transport aircraft and wheeled armoured vehicles will continue to be heavily used on future CF operations. Others, like main battle tanks, submarines, and artillery systems likely will continue not to be heavily used.

Having said that, the value of history lies not so much in the answers it contains (and it may well contain some), but in the intelligent questions it permits us to ask.

For example, should Canada beef up some of its more heavily used force components, such as transport aircraft, infantry and infantry vehicles, engineers, and supply ships, at the expense of more lightly used force components, such as submarines, main battle tanks, and all artillery systems?

Indeed, should Canada even entertain getting out of some of these military businesses altogether? When considering that national defence is largely an insurance game, this type of severe response might not be advisable. In fact, some of the CF's capabilities arguably might already be below a minimum viability standard. Perhaps it makes sense to both modernize some lesser used capabilities (for example: armour and artillery) while simultaneously devolving the responsibility to reserve forces?

All good questions.

We cannot say 'the past is the past' without surrendering the future.

Winston Churchill