





Much ADO About Everything – Adaptive Dispersed Operations

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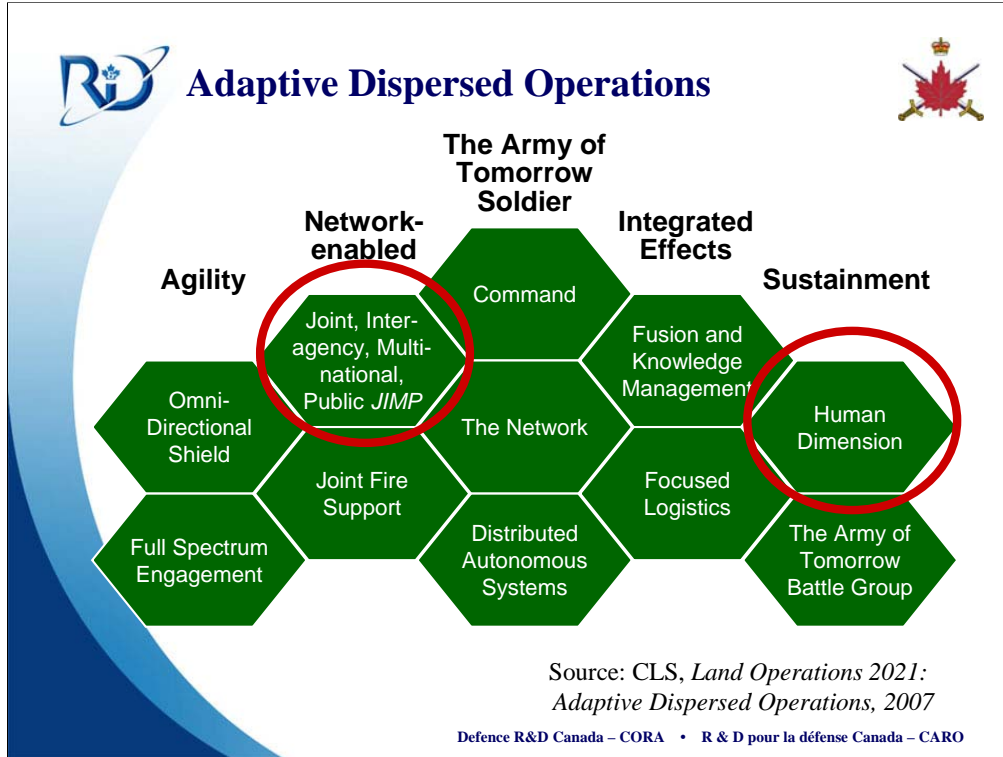
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Introduction

For the Canadian Army, “Adaptive Dispersed Operations” or ADO provides a series of interlocking concepts that describe an approach to future land operations. Within the ADO framework, the human dimension plays a substantial role, both in terms of the Army’s own people – mainly our soldiers – and in terms of the civilians with whom they interact when on operations. The Centre for Operational Research and Analysis has a team in Kingston, Ontario, studying ADO concepts for the Army of Tomorrow (circa 2021).

The ADO concept of operations is intended for what we call “The Army of Tomorrow”. In the nearer term, the Canadian Army will be governed on COIN operations by a new doctrine publication that was approved last year. In parallel the army recently implemented a radio station called RANA in connection with operations in Kandahar.

After some background on “Adaptive Dispersed Operations” and its associated concepts, I will explore the two analytical areas of “opinion surveys and polls” and related statistical techniques, and how all of this is likely to impact on “modelling and simulation” – a sub-discipline to which, traditionally, military OR professionals have devoted considerable resources.



You can see that the operating concept called “Adaptive Dispersed Operations” has many constituent parts. Shown here are the five functional concepts and the eleven enabling concepts. The five functional concepts are composites of the enabling concepts below. There was an attempt to keep the enabling concepts distinct and mutually exclusive – “orthogonal”, if you will. But practicality got in the way and you will find that enabling concepts have considerable overlaps.

I will not go into **all** of the concepts shown here, and recommend that those interested refer to the Army’s recently published booklet on ADO – it’s available over the Internet. See http://www.army.forces.gc.ca/DLCD-DCSFT/pubs/landops2021/Land_Ops_2021_eng.pdf

I will however highlight two of the enabling concepts: “Joint, Interagency, Multinational, and Public” issues, and the “Human Dimension”.



“Joint, Interagency, Multinational, Public” (JIMP) Issues

- Operations in a world of ethnic, religious, ideological and material drivers – the **Human Dimension** of the environment
- JIMP brings to bear all instruments of national and coalition power and influence: diplomatic, economic, military, informational
- Operations today and in the future will resemble the “Three Block War” construct
- **But** potential JIMP partners will not always share identically the goals of the Canadian Army

See [CLS 2007], [Gizewski 2007], and [Krulak 1999]



Canadian International Development Agency (CIDA)
MSF assess heavily hit areas after Peru earthquake



ICRC



Oxfam
Canada



UNHCR



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The term JIMP has been used in the Canadian Forces for a year or so now to characterize the many players with whom our armed forces will have to operate, with issues in the Joint, Interagency, Multinational, and Public realms. Those nations with troops deployed in locations like Afghanistan and Iraq are certainly aware of the issues. The nearly corresponding term in the US Army lexicon is JIIM: *Joint, Interagency, Intergovernmental, and Multinational*

The ADO concept calls for substantially greater engagement with JIMP partners. One of the issues we must investigate is where JIMP partners will share goals with the Canadian Army, and where they will not. Then, the consequences of sharing of goals (or otherwise) must be pursued to determine how they will affect operations.

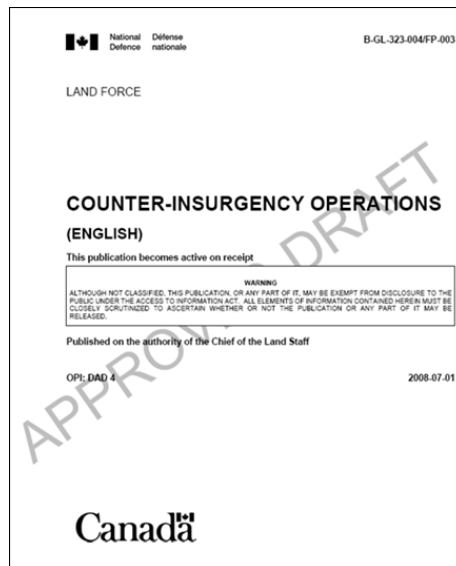


Canadian Land Force COIN Operations Doctrine



- Section 10 – Measures of Effectiveness
 - ‘A commander will assess the conduct of the campaign through measures of performance (MoP) and measures of effectiveness (MoE). Whilst MoP ask the question, “Are we doing the task right?” MoE ask the question, “Are we doing the right tasks to create the desired effects?”’
 - ‘MoE are defined as: “a criterion used to evaluate how a task has affected system behaviour or capabilities over time.” MoE refer to the desired effects and whether or not the activities conducted have created those effects, that is, achieved results. They apply to both fires and influence activities.’

Source: Land Force COIN Operations Doctrine, p. 6-27



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This is a short extract from the recently published Canadian doctrine on counter-insurgency operations as it will be conducted by our land forces.

While the doctrine does not elaborate on measures of effectiveness, the inclusion of material like this provides the operational research community with a framework for developing measures that might be implemented for future COIN operations.



RANA Radio



- “Every minute they are listening to us is a minute they are not listening to them.”
 - Source: British Major-General Freddie Viggers, Multinational Division South West, Bosnia
- For more on RANA Radio, see: <http://www.vanguardcanada.com/MusicToTheirEarsThatcher>
- To listen to RANA Radio, see: <http://www.ranafm.org/>



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One rather interesting initiative associated with COIN and influence activities is RANA Radio. RANA has studios in Kingston, Ontario with transmitters in Kandahar Province in Afghanistan. There is a recent article in the public domain that describes the operation. And there is a URL where you can listen directly to the broadcast in real time over the Internet.

Many of the broadcast staff are civilian contractors from the Afghan-Canadian community.

One issue with such an initiative is how to measure how it is viewed by the listeners in Kandahar Province. One means Canadian radio stations employ to assess their audience is through marketing surveys or opinion surveys – going directly to members of the public to get their input. And that has been employed in Afghanistan as well.



Opinion Surveys and Polls



- Many impediments, BUT
- Skills are available in the private sector
- Contractors for surveys and polls:
 - ACSOR www.acsor-surveys.com
 - Subsidiary of D3 Systems www.d3systems.com
 - Altai Consulting www.altaiconsulting.com
 - Sayara Media and Communication www.sayara-media.com
 - SENLIS www.senliscouncil.net
- Recent publications of survey results:
 - The Asia Foundation www.asiafoundation.org
 - Center for Strategic and International Studies www.csis.org
 - SENLIS Council www.senliscouncil.net
 - Canadian Broadcasting Corporation Poll in Afghanistan: <http://www.cbc.ca/news/background/afghanistan/afghan-survey2007.html>

How would you rate the security situation in your area: excellent, good, fair, or poor? (N=16, Base 0226)

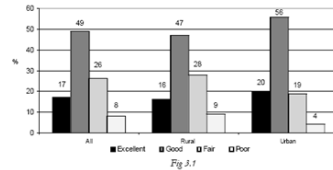


Table 3.2. Awareness of actual investment projects

	Eastern (%)	South Central (%)	Western (%)	Central Kabul (%)	South Western (%)	Northern (%)	Central Hazarajat (%)
Reconstruction of Roads and Bridges	80	56.7	75	49	58	52	19
Education	69	70	50	62	51	59	37
Health care	53	59	39.3	40.6	40	41	30
Water supply	39	53	49	32	55	32.2	14.8
Electricity	22.6	28.6	39.1	32	27.8	16.9	27.8
Democratization	64.3	51.1	42.3	46.7	40	67	19.3
Development	56.4	48.8	39	38.3	47	59	3.2

Source: Asia Foundation 2006

The Canadian Forces began running opinion surveys in Kandahar Province in early 2007. There were many obstacles to be overcome, but with the assistance of some very enthusiastic contractors, several waves of data collection have since been completed.

Those not familiar with Afghanistan may think that such methods would be unworkable in a place like Afghanistan. But there are a surprising number of companies who offer a capability to conduct surveys and polls – but beware, some are more professional than others. The CF already has some experience with one or two of these and other nations represented here may have comments as well.

For those who may be interested, some recent opinion surveys have been reported in publications available over the Internet. Canada's national broadcaster, the CBC, published their own poll results in 2007, see link.

The published results from many of these sources are typically at the national level. For the Canadian Forces the issue is to draw the application of the methods down to the provincial level, in the CF case to Kandahar province.



Practical Issues Opinion Surveys for Afghanistan



- Challenges:
 - Violence and Security
 - Long Distances and Lack of Infrastructure
 - Illiteracy and Other Educational Aspects
 - Unfamiliarity with Survey Research
 - Cultural Restrictions on Access to Women
 - Ethno-linguistic Fragmentation
 - Outdated and Inconsistent Population Data
- Field Team Selection, Training, and Quality Control
- Tests for Validity:
 - Patterns of consistent responses across questions by a respondent.
 - Patterns of consistent responses within an interviewer's pool of respondents
 - Patterns of non-response, e.g., interviewers with substantially higher average rates
 - Interviewer productivity (a test and a diagnostic)

Source: [Warshaw 2006]

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There are, of course, many reasons why conducting opinion surveys and polls must be handled differently in Afghanistan than in Europe or North America.

Illiteracy: 71% of Kandahar respondents indicated they had had no formal education, and 11% responded they had had 1 to 5 years of formal education.

There are also a variety of ethnic groups. The general demographics:

Nationwide ethnic groups: Pashtun, 38% - 40%; Tajik, 29% - 34%; Hazara, 8% - 10%; Uzbek, 8% - 10% (though higher on Pashtun in Kandahar).

Nationwide languages: Official language is Dari (~50% of the population); Pashtu 35%; Turkic languages 11% (higher on Pashtu in Kandahar)

One cultural issue is that a respondent from one ethnic group would tend to be suspicious when approached by someone from a different ethnic group, especially in a rural area that gets few visitors. This means that the field teams must allow for such cultural/societal issues. The teams must include representation from the different ethnic groups, so the ethnic animosities will not create problems from the start of an interview. Likewise, it is necessary that around half the interviewers be women, to get input from other women.

To maintain professional standards of the results, companies have reported on quality control measures they have implemented to maintain a high professional standard. Many of these measures are statistical tests on raw results from the field teams – followed, where necessary, by reviewing procedures with field teams where potential problems are identified.



Sample of Results



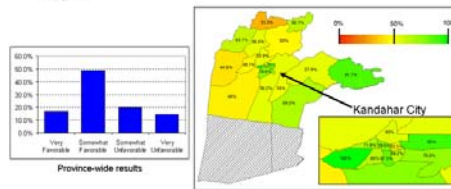
- First comprehensive poll of the Afghan population of Kandahar Province
- Conducted 14-28 March 2007 by 56 Afghan interviewers from ACSOR Surveys (Afghan-American joint venture)
- 1287 interviews across 18 Districts of Kandahar Province
- Most interviews conducted in Pashto (others in Dari)
- Women interviewed by female interviewers

Reference Map



Perception of ISAF

Do you have a favourable or unfavourable opinion of ISAF / Foreign Troops?



Very/somewhat favourable: 65.6%

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In the lower right is an analysis of responses on just one question, the perception by the local population of the ISAF and other foreign troops.

This view of the foreign troops in Kandahar (who, until recently, were mostly Canadian soldiers) is actually quite positive in one particular comparison, a survey conducted in Canada of the perception our own population has of the value of the CF presence in Kandahar. Nearly 70% were favourable to the ISAF forces.

For comparison, a CBC-Enviro-nics poll had a similar question conducted of some 2000 Canadian respondents in November 2006. When asked “Regarding Canada’s military involvement in Afghanistan”, of those polled, 19% responded that they “strongly approved” and 31% responded with “approved” – a total of 50% in support. In this poll 48% responded that they “disapproved” or “strongly disapproved”.



Some of Opinion Survey Questions



- **Q-1.** How often do you listen to the radio?
- **Q-2.** Which radio stations do you listen to most often? Any other stations? Any more? (*Open-Ended with Pre-codes. Record up to three responses in order of mentions.*)
- **Q-5.** What is your main source of information about what is happening in Afghanistan? What is your second most important source of information? (*Open-Ended with Pre-Codes. Record up to two responses in order of mention.*)
- **Q-6.** How much trust do you have in the information coming from electronic media such as radio and TV?
- **Q-7a.** Turning to another subject, tell me, compared to 12 months ago, is your family now much more prosperous, more prosperous, the same, less prosperous or much less prosperous?
- **Q-7b.** And speaking of 12 months from now, do you think that your family will be much more prosperous, more prosperous, the same, less prosperous or much less prosperous?

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Here are a few of the other questions asked in the March 2007 survey. You can see that we have considerable interest in what media sources are used by the local population.

One reason is to discover more about the reaction to RANA Radio.

For more on the RANA-FM radio station, see: Chris Thacher, “Music to their ears”, www.vanguardcanada.com, May 2007.

For the purposes of determine MOE/MOP for RANA Radio, we would link the popularity of various media, including RANA, to a number of factors on the minds of the local population. See for example Question 7 – with two parts, one on prosperity to date, and the other on anticipated prosperity.



Measures of Effects (MOE)



- Mission-related. MOE must “relate to the strategic objectives for the mission”.
- Comprehensive. MOE should “cover all tasks in support of the mission and should expand if the mission expands”.
- Meaningful. Two broad levels of MOE: “Mission-level MOE should focus on the effectiveness of the mission, [and] task-performance MOE should focus on the effectiveness of tasks”.
- Measurable. Data should be “collected and measured consistently over time and across areas”.
- Sensitive. They “should provide enough detail to ascertain whether the situation is changing”.
- Timely. They “should be responsive to the changes they are trying to measure”.
- Cost-effective. The process should “not to levy too high a burden on those tasked with the effort”.

[DND 1999 – Civil-Military Operations (CIMIC)]

The Petraeus-Mattis List

- Measurable
- Discrete
- Relevant
- Responsive

[US Army, USMC 2006]

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The Canadian Forces has doctrine on civilian-military operations that outlines the desirable characteristics of measures of effectiveness for the assessment of success or otherwise in the “human dimension”. These were largely derived in the 1990s when the CF off-shore operations were focused on the Balkans.

The characteristics of MOE/MOP (shown here) were not intended specifically for the results of surveys, but they certainly provide a usable framework. This framework, incidentally, was derived from work undertaken by the OA Branch of the NATO ARRC Headquarters in the early 90s and folks like George Rose and his British colleagues are bound to see some of their ideas incorporated.

US Army General Petraeus and USMC General Mattis, when they were responsible for the US Army-Marine Corps doctrine in COIN, put out four characteristics of MOEs/MOPs (see list of four). These map well to the Canadian Forces’ list.



Surveys and the Petraeus-Mattis Criteria (FM 3-24/MCWP 3-33.5)



- Measurable
 - Yes – but always have to reconsider what is being measured. Is it a surrogate for an underlying factor?
- Discrete
 - Yes and no. Typically hard to discrete-ize topics of social interest: unemployment and confidence in government, security and willingness to work, economy and optimism
- Relevant
 - Need to develop linkage between questions and potential initiatives
- Responsive
 - Depends on many factors
 - Latency to allow opinions to develop or information to circulate
 - Mechanics of data collection and analysis – critical path from “start” to “finished”

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Our familiarity with the use of opinion polls as a methodology is growing. We can make some initial assessments against the military requirements – in this case the Petraeus-Mattis criteria in the US Army-USMC COIN field manual of December 2006.

In many respects the comments here would be about the same if we were considering opinion surveys in a domestic commercial application. Certainly in terms of relevance, it will generally come down to how questions are framed – can responses to the questions be linked to issues over which the military component has some control or influence?

In terms of responsiveness, there are of course, the usual issues of delays due to mechanics – conducting interviews and compiling data will take some time. But we have to be aware that, when local communications is poor, it may be nugatory to be too quick to poll the population on an issue. News of some new event, perhaps an initiative of the government or of the military force, will take time to circulate in the community. If the sampling takes place too soon, it could simply be a measure of how slowly it takes for new information to circulate.



Modelling and Simulation



- Cold-war era combat models
- Measures of Effectiveness (MOE) were mission success, RED and BLUE casualties, loss-exchange ratios, FEBA movement, and similar characteristics
- Underlying algorithms were largely physics based:
 - Ballistics
 - Lethality
 - Mobility
 - Detection probabilities
- M&S must incorporate social issues, and the problems are getting *wicked*

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The operational research community is justly proud of what it has done in the areas of modelling and simulation. Indeed, in many military circles, there is sometimes a misplaced understanding that operational research and M&S constitute the same discipline or profession.

I suppose it is a defensible assumption, since, for most of the problems we address, we develop some sort of model of the situation – even if it may be simply a mental model or rudimentary wiring diagram derived from initial discussions of an issue.

Our computer-based models from the 1980s and 1990s (and earlier) were largely based on combat, and the MOEs were based on mission success and casualties, or derived measures like loss-exchange ratios.

The modelling was generally based on physics -- the algorithms and the underlying data came from engineering or field trials.

But now there is relatively little combat, certainly not on the scale anticipated when NATO faced the Warsaw Pact forces across the inter-German border.

These days, our models must address many social issues, and we are exploring the means to do this.

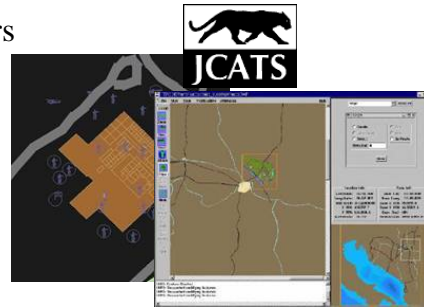
FEBA = Forward Edge of the Battle Area (i.e. a line between friendly and enemy forces)



Combat Simulations



- JCATS, OneSAF, VBS2, Others
- “Serious Games”
- Civilian Activity Modelling in Exercises and Xperiments (CAMX²)
- AI.implant, and other potential solutions



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Two of the “combat models” that the Canadian Army’s simulation centres currently support are shown here – JCATS and OneSAF. A product called VBS2 has recently garnered considerable attention and is being evaluated for future use. If we do not adopt VBS2, we will certainly go for a similar package.

We recently initiated a project called Civilian Activity Modelling in Xperiments and Exercises (or CAMX) – since we recognize that we must incorporate more of social behaviour into the simulations used for Army training, concept development, and experimentation.

In that regard we are investigating products that are already available on the market. One potential product is AI.implant, a package that the company is marketing to the developers of “shrink-wrapped” simulations.



Coalition Military Operations



- ABCA Armies' Program (Armies of America, Britain, Canada, Australia, and New Zealand, and US Marine Corps)
Several relevant coalition interoperability objectives:
 - Joint-Interagency-Intergovernmental-Multinational and Non-Governmental Organizations
 - Intelligence Structures
 - Cultural Awareness/Intelligence
- SIPRNet for the US Armed Forces – Secret (formerly Secure) Internet Protocol Router Network
- CENTRIXS for Various Coalitions – Combined Enterprise Regional Information Exchange System
- CRONOS – Crisis Response Operations in NATO Operating Systems
- “To date, no security technology solution has been certified and accredited ... to allow confidential, multi-level information sharing over a single network... Each network is built to the same enterprise standard, but cannot be interconnected.” [Boardman 2004, p 3]

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At this point, I believe it is important to introduce aspects of developing analysis methods (and ultimately solutions) that will work within a coalition, vice a national environment. To be blunt, non-US members of MORS often develop the impression that the MORS community tends to focus on US problems, and then proposes US solutions... solutions that are practically oblivious of coalition issues that reduce the potential contribution.

ABCA is a multi-national organization that has been active for decades to improve interoperability of ground forces working in coalitions. In recent years it set interoperability objectives with strong elements of the human dimension.

Take as an example, a fairly technical aspect, information technology. Those who have used operational systems like SIPRnet, CENTRIXS, and CRONOS will know of issues of sharing information across network boundaries. CENTRIXS is a US initiative that is generally provided to a coalition that is US-led, or that includes a large US component.

Note: I do not mean to pick on the US, it is just that the US can tend to have a lot of NOFORN information simply due to relative size. Apart from the US, most other leading nations in a coalition would have national digital systems and be similarly reluctant to share some of their national information with Allies.

The last comment (from a US CENTCOM assessment of CENTRIXS) is dated 2004, but is still valid as far as I am aware.



Canadian Army Objectives for the MORS Workshop



Military Operational Research for the Following:

- Quantification (and Statistics)
 - “Measure twice, cut once.” Carpenter’s Proverb
 - “Measure what is measurable, and make measurable what is not so.” Galileo Galilei
 - “If you cannot measure it, you cannot improve it.” and “Until you can measure something and express it in numbers, you have only the beginning of understanding.” Lord Kelvin
 - “You can’t control what you can’t measure.” Tom Demarco
- Critical Thinking, aka “Devils’ Advocate”, “Red Teaming”
- Creative Thinking, e.g., Edward De Bono’s “Six Thinking Hats”, Peter Checkland’s “Soft Systems Methodology”
- Hypothesis Testing (or evidence-based reasoning) – Karl Popper’s approach to scientific revolutions
- Mental Models (with computer-based models to follow)

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I have yet to reach any conclusions on the role of military operational research in COIN operations. That said, I believe that the military operational research community can make contributions in a number of crucial areas.

First is my injunction that we must seek to measure more elements of the contemporary operating environment. The opinion research being conducted in Afghanistan shows that such measurement techniques can be applied even under the arduous circumstances found there. But this is just one aspect. Second, the MORS community needs to harness the many sceptics amongst us. Back home the OR team has taken on the role of “myth-busters”; and are highly regarded for it. The “New-Old” COIN environment seems replete with myths, so there is clearly a valuable contribution that critical thinkers can offer.

Third, the operational research community has many inspired thinkers. People like Edward De Bono and Peter Checkland may be viewed these days more as “management gurus” but for many in the OR community they are at least kindred spirits. Many others who are in or affiliated with operational research can contribute creative techniques as well.

Fourth, we should apply the mental rigour associated with Hypothesis Testing. But when I use the term Hypothesis Testing in this context, I don’t want to get bogged down just yet in the mechanics, e.g., arguing about significance levels.

Fifth (and finally) is an area I call “mental models”. Note that I relegate computer-based models to a parenthetical location in this bullet. I believe that, in many respects, we jump too quickly to computer-based models, often before we have developed the corresponding mental models.



Questions on COIN from the Canadian Army Analysis Community



- Are our mental models adequate? Are they correct?
Remember: “All models are wrong, but some models are useful.” (George Box)
- Do we have the appropriate data? How can we collect the data we need? How can we verify our measures?
- How can we develop and apply “measures of effectiveness” and “measures of performance”?
- What role should analysts have in ongoing operations? What is the role in theatre? What is the role in reach-back? What is the role in preparing for the next operation?
- What role is there for computer-based models?



Other Notable Quotations



- “Not everything that can be counted counts, and not everything that counts can be counted.”
 - Attributed to Albert Einstein
- “To understand God’s thoughts we must study statistics, for these are the measure of His purpose.”
 - Florence Nightingale
- “Statistics are the triumph of the quantitative method, and the quantitative method is the victory of sterility and death.”
 - Hilaire Pierre Belloc
- “At least one way of measuring the freedom of any society is the amount of comedy that is permitted.”
 - Eric Idle



Definitions



- Statistics. “In early use, that branch of political science dealing with the collection, classification, and discussion of facts (especially of a numerical kind) bearing on the condition of a state or community.”
- 1797 Encycl. Brit. “A word lately introduced to express a view or survey of any kingdom, county, or parish.”
- Statistician. “One versed in or engaged in collecting or tabulating statistics.”
- 1825 Pol. Econ.: “The object of the statistician is to describe the condition of a particular country at a particular period.”
- Oxford English Dictionary, 1971



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The references here are for this presentation. A paper from which some of parts of this presentation were drawn has considerably more background and a longer list of references – see the ISMOR web site:
<http://www.dcmt.cranfield.ac.uk/ismor/ismor2007.htm> .

