



**Defence Academy**  
of the United Kingdom

Research & Assessment Branch

# Special Series

Targeting Restraint Analysis Model (TRAM)

Michael Christensen, Thorbjørn Knudsen and Sidney G. Winter



# Preface

In this paper on “Targeting Restraint and Analysis Model” (TRAM), Michael Christensen, Prof Thorbjørn Knudsen and Prof Sidney G Winter discuss a framework for strategy-making and campaigning in non-conventional conflict.

Michael Christensen is a software developer and has contributed to recent research on decision making under uncertainty; Thorbjørn Knudsen is a Professor specializing in evolutionary and adaptive organizations. Together, Michael Christensen and Thorbjørn Knudsen are working on the design of decision making organizations and how to improve the quality of collective decision making. From his early work at RAND, Sidney Winter continues to make important contributions to the literature and research on evolutionary economics, business strategy, and other fields.

We are delighted to have such distinguished scholars contributing to our Working Papers. Although they would not count themselves as full time defence or security specialists, different scholarly perspectives are important, if a more *comprehensive approach* to conflict is to be realised. TRAM is an example of ways to achieve integration and coherence, for which calls are persistent and growing more insistent. The paper adds to the multidisciplinary approaches needed for research and learning to keep pace with the complex and fast changing pattern of events in which we live.

Gen Sir Rupert Smith’s phrase “war amongst the people” neatly encapsulates an issue of the day, which this working paper considers. In particular, TRAM addresses the question of how forces combine (lethal, injurious, coercive, economic and more subtle cultural and behavioural influences). It offers insights on how to strive for more durable and desirable outcomes, when adversaries are spread through populations of non-combatants. TRAM is open to the uncertainty inherent to the nature of conflict and evolutionary competition; it does not fixate on current or topical characteristics. The abstraction TRAM offers is an empirically relevant framework that can evolve and be useful for assessing strategies and campaigning in future conflicts. Overall, the paper’s focus is on the overriding friction of politics (or more accurately competing political-economies) and how behaviours evolve with more or less healthy friction between bodies and their environments.

The Working Paper’s assessment echoes Barry Watt’s concerns about the heavy reliance of precision weapons on “precision information”<sup>1</sup>. Forces in dynamic networks present a challenge whatever the circumstances. Conflict has always been complex and uncertain and even in the Cold War – with a relatively simple structure – estimating military power and capabilities and evaluating outcomes for particular contingencies was a difficult exercise and involved understanding doctrines, organizations, human errors, etc<sup>2</sup>. Modern conflict and its multi-polar, multi-network, state and non state actors have not made things easier.

Andrew Marshall remarked that military organizations “have become ever more finely balanced on the edge of chaos”<sup>3</sup>. Clashing networks of state and non-state combatants meshed with wider social networks of non-combatants spanning multiple jurisdictions, which are directly and indirectly involved in conflict, make the stakes and the consequences for the use of force – however sophisticated – perhaps less tractable for timely reasoning and decisive actions. Conventional analyses are found wanting. Corroborating many other

---

<sup>1</sup> B. Watts (2007): “Six Decades of Guided Munitions and Battle Networks: Progress and Prospects” and also see (2004) Clausewitzian Friction and Future War (Revised Edition), McNair Paper 68, National Defense University: Washington DC.

<sup>2</sup> A.W. Marshall (1966): Problems of Estimating Military Power. RAND Working Paper, P-3417.

<sup>3</sup> A,W, Marshall (1999): “Foreword”. In Z. Khalilzad & J. White (eds): Strategic Appraisal: The Changing Role of Information in Warfare. Published by the RAND Corporation. P. 3.

studies, the need to upgrade our knowledge of the how cultures and behaviours evolve through time is underscored.

Sceptics find it easier to say such classes of challenge remain entirely intractable. Conversely, poorly grounded aspirations and visions tend to eventually reinforce scepticism. Between these two poles, reasoning that is open to falsification can add value if it is well attuned to the bounded rationality of interacting bodies. TRAM seeks to contribute to more tractable approaches that work with the deep cultural grain and promote the possibility of adaptive behaviour and learning. On these terms the knowledge produced may be modest and has to remain ready to evolve but the pay-off can be huge. Knowing the limitations of the self and that of others makes confounding the expectations of all possible. This is not a verity limited to war strategy, operational design or combat.

What is surprising is how often and how slow we are to re-learn such verities. The Game Theorist Martin Shubik notes: “Even if we assume that the individual countries, sides, or players know their own value system, very often they may be quite ill-informed about the goals of their opponents or competitors”<sup>4</sup>. *Fog and friction* is the product of bodies and their environments interacting through time; its traces can reveal and conceal energies propelling the flow of events. By focusing exclusively on what we know or don’t know about particular bodies as separate entities, we often miss what is most salient. Understanding how and why bodies behave in relation to others, even if only to anticipate possibilities rather than predict, is vital information. Needless misperceptions, misunderstandings, miscommunications and error as well as the consequences that stem from these can in part be mitigated. Good investments in interdisciplinary scholarship are the key to learning and reasoning our ways through these wicked challenges. Comforting ourselves with tame solvable problems is of more limited relevance.

In his assessment of Iran, the former CIA operative Robert Baer<sup>5</sup>, reiterates conclusions drawn since the end of WW II. Consistency with, for example, Edward Said<sup>6</sup> and Adda Bozeman<sup>7</sup>, is reinforced by their all hailing from quite different intellectual traditions, operational experience and points on the political spectrum. Afghanistan and Pakistan today present another operational theatre of growing complexity in which the cultural dynamics of many interacting bodies make glossing over the puzzle of evolving differences dangerous<sup>8</sup>. Getting over or seeing through cultural and language barriers may be hard work and a tricky investment to sustain but the cost of ignorance and fear is more damaging, harder to overlook and can fast sap public confidence. This is only going to become more of an issue for the West as Powers shifts in a multipolar world.

Such developments will present a growing challenge to institutions and organisations that the West has become accustomed to running. Zbigniew Brzezinski refers to the changing dynamics as reflecting the “waning of the Post-World War II global hierarchy and the simultaneous dispersal of global power” and has argued that this, combined with increasing political unrest creates new challenges for the West’s hitherto most successful institutional body ~ NATO<sup>9</sup>. But institutions, military or not, tend to resist change and the lack of change can itself becomes a barrier to strategy-making and strategy implementation. *Organizations and other adaptive systems, facing uncertainties and ambiguities, tend to become trapped in*

---

<sup>4</sup> M. Shubik (1968): On the Study of Disarmament and Escalation. The Journal of Conflict Resolution, Vol. 12 (1): 83-101. p. 86.

<sup>5</sup> See R. Baer, “The Devil We Know” (2009) and R. Baer, “Iranian Resurrection”, The National Interest, Nov/Dec, 2008

<sup>6</sup> See, Said, EW (1981) *Covering Islam: How the Media and the Experts determine how we see the rest of the World*, Routledge: London.

<sup>7</sup> See, Bozeman, A (1971) *The Future of Law in a Multicultural World*, Princeton University Press: Princeton NJ and (1992) *Strategic Intelligence and Statecraft: Selected Essays*, Brassey: New York.

<sup>8</sup> See for instance A. Rashid (2009): “Trotsky in Baluchistan”. The National Interest, Nov/Dec, 2009.

<sup>9</sup> Z. Brzezinski (2008): “An Agenda for NATO”, *Foreign Affairs*, Vol 88, no 5.

*doing what they know*<sup>10</sup>. The resulting rigidities and failure to learn through acting strategically can have very destructive consequences. Changes in the character of conflict require timely adaptation by our organizations in order for our strategies, or any strategy, to gain traction. Faith in chance is as weak as just muddling through.

TRAM is a contribution to the kind of learning needed to gain traction with the challenges we face as they evolve. It is not a panacea nor does it contrive to solve ideal problems. But the paper joins a small but growing body of literature that evidences how the integration of deep scholarship spanning a wide range of disciplines can move us towards learning how to put any would-be comprehensive approach on a sounder conceptual footing. Gaining and maintaining capabilities that are agile, versatile and durable can thereby be given a nudge.

Dr JP MacIntosh  
Chief of Research & Assessment  
Defence Academy of the UK

Dr Mie Augier  
Senior Association Research Fellow  
Defence Academy of the UK

---

<sup>10</sup> J. G. March (2010): *The Ambiguities of Experience*. Cornell: Cornell University Press.

# Targeting Restraint Analysis Tram (TRAM)

Michael Christensen, Thorbjørn Knudsen & Sidney G. Winter

## Abstract

The present note introduces an assessment method that can aid strategy development in conflicts where unconventional adversaries (e.g. insurgents) are spread through a more or less peaceful population. Our method allows scenario development and assessment of the viability of combining conventional military intervention with psychological operations and cultural influence. The conflict in Afghanistan is a notable recent example where our analytical engine can be used to question, refine and enhance the methods used against insurgent forces. We consider conflicts where an intervening party is confronted with the following strategic challenges. What are the most effective instruments: use of force, operations that influence cultural dynamics, or both? We offer a structured analysis and provide some answers to these questions. Our results indicate that restraint in use of lethal weapons generally increases success for an intervening party – in particular if the available intelligence is imprecise and/or incomplete. We point to effective shaping of attitudes towards collateral damage as a factor that significantly increases likelihood of success. This effect is reinforced over the long term. But the most effective approach is the influence of deep cultural values – strengthening the culture of the peaceful fraction of the population while weakening extremist culture. Our results are preliminary and suggestive, but we hope they can inspire further development of the targeting restraint analysis method.

# Contents

Introduction	1
Analysis	2
Components of the Analysis	3
The Environment	5
The Parties	5
Dynamics	5
Results	6
Summary of Main Results	7
Bibliography	9

# Targeting Restraint Analysis Tram (TRAM)

**Michael Christensen, Thorbjørn Knudsen & Sidney G. Winter**

"The United States and its allies must reduce the number of civilians killed in the hunt for the Taliban in Afghanistan, US Defense Secretary Robert Gates said Friday 12 June. He called the civilian deaths "one of our greatest strategic vulnerabilities."

New York Times, Global Edition, June 13-14 2009, p3

"War is merely a continuation of politics by other means."

Carl von Clausewitz

## Introduction

The background for the present note is the changing nature of conflict and the changing nature of actors that are populating the international security environment.<sup>1</sup> Within the broader context of international security, we focus on scenarios where insurgents are spread out through a more or less peaceful population. Recent examples include Iraq and Afghanistan.<sup>2</sup> In such scenarios, we consider how an intervening party may benefit from coordinating conventional warfare with psychological operations and careful influence of cultural dynamics.<sup>3</sup>

The purpose of the present note is to introduce the targeting restraint analysis model (TRAM). TRAM aids assessment and strategy development in conflicts where unconventional adversaries (e.g. insurgents) are spread out through a peaceful population. Our model allows scenario development and assessment of the viability of combining conventional military intervention with psychological operations and cultural influence. The conflict in Afghanistan is a notable recent example where our analytical engine can be used to question, refine and enhance the methods used against insurgent forces.<sup>4</sup>

More specifically, our effort is intended to promote insight into how an intervening party (A) may defeat a population of hostile extremists (X) who are spatially distributed amongst a second population of "centrists" (C). The notion of extremist is meant to cover insurgents, terrorists and other adversaries that use the entire population as a centre of gravity in conflict. Such scenarios are demanding for an intervening force because they require

---

<sup>1</sup> See e.g. Johnson and Russell, 2005; Shubik, 1997; Shubik et al., 2006.

<sup>2</sup> Useful references include Metz, 2007 on Iraq, Rothstein 2006 on Afghanistan, and Sepp 2005 on a brief history of 20th-Century insurgencies.

<sup>3</sup> The reality of terrorism and insurgency has led to a growing recognition that culture has an increasingly important role in determining outcomes of regional conflicts (Kim, 2009).

<sup>4</sup> See Rothstein, 2006.

capabilities in unconventional warfare where use of weapons is combined with careful influence of cultural dynamics.

Two basic intuitions motivate our analysis. The first is essentially socio-political whereas the other is tactical. First, the conflict should be expected to affect attitudes, which in this case means that it affects the probabilities of conversion events that change C types to X types and vice versa. Apart from the effects of conflict events, we can also consider the possibility of social pressure effects that tend to convert a local minority to the local majority type.<sup>5</sup>

The second intuition has to do with the character of the spatial distributions of the two populations. A massed army of extremists is a different sort of target than a sprinkling of an equal number of "guerilla" extremists randomly through the population, for several reasons. The reason featured here has to do with the attitudinal response to collateral damage. There is clearly a much better chance of inflicting heavy casualties on a massed army without inflicting large collateral damage on centrists than there is of attacking the dispersed guerillas with similar effect. If collateral damage affects the attitudes of centrist survivors adversely, the guerilla cause may be strengthened by the attack.

## Analysis

The objective is to reduce the frequency of extremists (X types) relative to centrists (C types). This objective can be achieved either by use of force or by use of instruments that influence culture. The analysis considers important determinants of reaching the stated objective in unconventional conflict where "guerilla" extremists are spread among a population of peaceful centrists.

We calculate our examples here on the basis of assumptions that we believe to be plausible and with the intention of illustrating the key qualitative mechanisms. However, an important purpose of the analysis is to identify the questions of fact - reflected in parameter values - to which outcomes are sensitive.

### *Use of force*

The direct effect of using force to eliminate X types is a short term reduction in their number. The difficulty lies in the dispersion of X types throughout a peaceful population. While X types do have centres of gravity (COG), the decisive points that are required to weaken them are spread (much) thinner and are much more difficult to identify than usual targets in a conventional war context. When religious ideology becomes the catalyst for insurgent movement, the support of the entire population is the centre of gravity.<sup>6</sup> Insurgents must gain a sufficient proportion of support of people in order to sustain the movement -- and an intervening party has a similar objective in order to weaken the movement.<sup>7</sup>

If intelligence allows careful selection of targets and the applied weapons are fairly precise, the objective of reducing X types relative to C types would be achieved over time. However, if intelligence is noisy, the unintended (and regrettable) result may well be that C types are eliminated. The same unfortunate result is likely if powerful but rather imprecise weapons are used (because X types tend to mix with C types). The downside is twofold. First, C types may be enraged by observable collateral damage and therefore convert to the X camp.

---

<sup>5</sup> The need to influence conversion events is a commonly recognized success factor in counterinsurgency (COIN) campaigns (Johnson, 2006). COIN operations that are designed to win the hearts and minds of the local population can serve a purpose of: 1) reducing conversion from C types to X types, 2) increasing conversion from X to C types, and 3) increasing C types' tolerance of collateral damage.

<sup>6</sup> This point is consistent with the views on counterinsurgency operations expressed in Field Manual Interim (FMI) No. 3-07.22 (2004, p. 1-3). Washington, DC: Headquarters, Department of The Army.

<sup>7</sup> See FMI No. 3-07.22 (2004). Washington, DC: Headquarters, Department of The Army.



Second, X types may be enraged, both by the elimination of their own comrades and by the collateral damage that the unfortunate (and innocent) C types are suffering. Of course, demoralization of the X types is also a possible consequence, but history suggests this effect should not be relied upon.<sup>8</sup>

Important determinants of success/ failure:

- Quality of intelligence.
- Quality of target assessment, given available intelligence
- Quality of target selection and assignment
- Precision of weapon system
- Possibility of deterrence through non-lethal attacks.

The costs and gains are measured on a scale of collateral damage. Note that we are limiting the analysis to lethal attacks. It would be interesting to extend the analysis to the possibility of deterrence (or isolation of X types) through non-lethal attacks.

### *Influencing culture*

Because of the potential longer term drawbacks of using lethal weapons in such unconventional engagement, it is obvious to consider alternative ways to achieve the objective (of reducing X types relative to C types). In that regard a key instrument would be carefully designed influence of culture.

The influence of culture is best seen in a dynamic perspective. Influence should be aimed at weakening the cultural basis of X types while strengthening the cultural basis of C types. The effect would be an overall (net) reduction of transition from X to C types at all times. In addition to a possible long term influence of deep cultural values and norms, it may be possible to achieve a quicker short term effect by appropriate influence of attitude. The instrument would be a directed effort aimed at C types. By using information and appropriate incentives, C types may gain a more positive attitude towards the intervening force. In effect, this would increase tolerance of collateral damage and thereby reduce the rate of conversion from C to X type.

Important cultural determinants of success/ failure:

- Quality of intelligence
- Quality of cultural assessment, given available intelligence
- Effective instruments with respect to strengthening the culture and identity of Centrists.

The costs and gains are measured on a scale of conversions from C to X types – and from X to C types – in the presence/absence of collateral damage.

## **Components of the Analysis**

The analysis includes the following components: *environment*, *centrists (C types)*, *extremists (X types)*, *intervening party* and *cultural dynamics*. Extremists can be thought of as insurgents and TRAM should be seen as a device that aids strategic assessment of counterinsurgency scenarios. The analysis is based on knowledge about interaction mechanisms that are well understood.<sup>9</sup> The engine of the analysis is driven by the way culture can enhance or dampen net conversion of a peaceful population into extremists. Long term background conversion dynamics mediates the extent to which attitudes towards

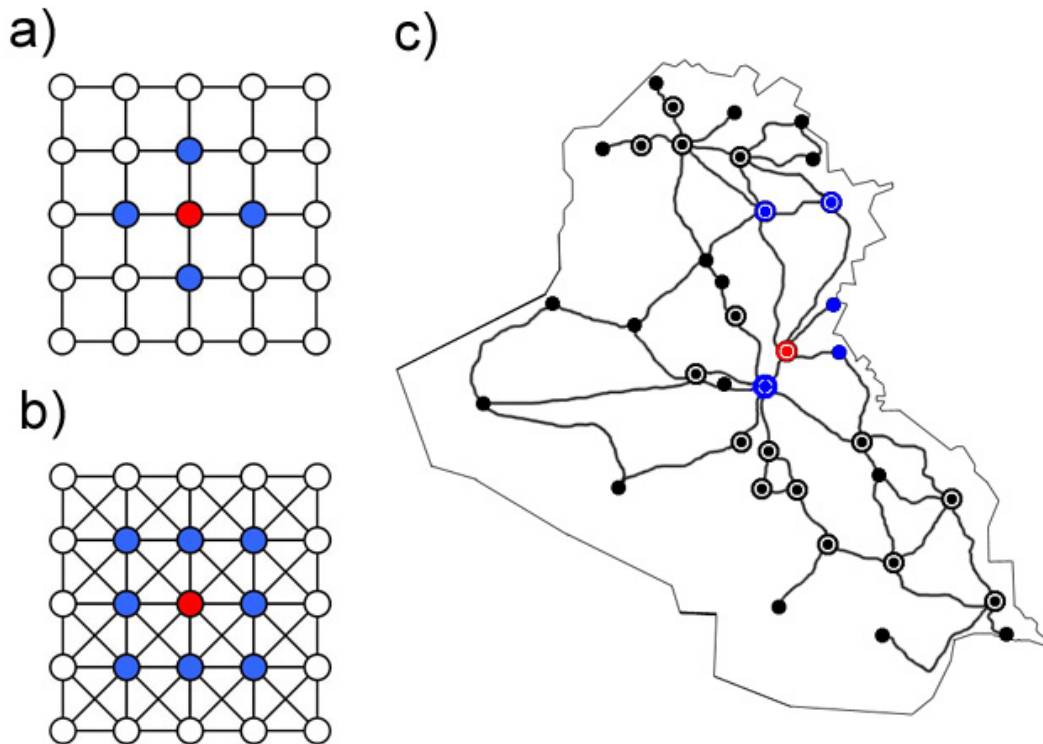
---

<sup>8</sup> Rothstein, 2006; Shubik et al., 2006.

<sup>9</sup> From a technical viewpoint, the mechanisms that we use to characterize social interaction, culture and conversion events are based on standard approaches. See the technical references in the bibliography.

an intervening party may speed up conversion events. However, the ability to influence peaceful centrists may considerably dampen hasty conversion as a response to collateral damage.

The conflict plays out in a context that in a basic way influences and channels cultural interaction. This context is represented by a graph where main pathways and scenes of cultural interaction are included (see examples in Figure 1). Strategic points in the world include meeting places, cities, densely populated regions, etc. These points are characterized in terms of the features that are relevant to the objective of containing X types. We keep the analysis fairly simple here, but it is quite easy to scale up the realism by including terrain type, natural resources, availability of shelter, water or electricity, etc.



**Figure 1: Three typical graphs of the environment: a) a regular grid, b) a diagonally connected grid, and c) an arbitrary (non-regular) graph. The blue nodes form the neighbourhood of the red node.**

Pathways connect strategic points. Examples include roads, railroads, bridges, sea-routes, air-routes, etc. Again, we keep the analysis simple, but realism can easily be enhanced.

It is further critical to consider whether the conflict area is fairly self-contained or whether porous boundaries offer easy access from (un)friendly neighbouring powers. Our preliminary analysis is centred on self-contained conflict with closed borders, but we can easily provide additional results for the alternative scenario of porous borders.<sup>10</sup>

We set parameters for each determinant of success/ failure as listed above. Parameter values are calibrated to values that give sensible results. For example, the boundary condition for maximum use of force is that the world becomes void of people.

<sup>10</sup> As mentioned in Sepp, 2005 (p.10) open borders, airspace and coastlines are generally associated with unsuccessful counterinsurgency practices (similar views in Field Manual, No. 90-8/MCRP 3-33A, Washington, DC: Headquarters, Department of The Army). Open or porous borders tip the dynamics in favour of extremists (insurgents) and are therefore of critical importance, unless outside supporters for extremists are *perceived* to act in ways that clashes with local inhabitants.

## The Environment

The environment is constructed to give a reasonable abstract representation of a relevant context. Inhabitable parts of the environment are randomly filled with centrists and extremists. See figures 2 and 3 for illustrations. The two right panels of these two figures show the environment at the beginning of a particular history (upper right panel) – and at the end of a history (lower right panel). C types are represented by a green color and X types are represented by a red colour. Uninhabitable parts of the environment (e.g. mountains) are grey and unpopulated (but potentially habitable parts) are yellow. As previously mentioned, we assume closed borders for all examples considered in this note.

## The Parties

There are 3 parties in this analysis. The intervening party (A), the hostile extremists (X), and the friendly centrists (C). Cultural dynamics result in conversion from C to X types -- and from X to C types. The conversion rates are modulated by the local attitudes and the pressures of the neighbourhood. In the long run, replacement by birth enters as an important ingredient in the analysis.

C and X types are situated in the graph that describes the conflict scenario. Their attitudes depend on spatial location, interaction with self and other parties and influence dynamics orchestrated by the intervening party. Each party also has a set of attributes describing their behaviour and potential set of actions (see below). We assume that the intervening party has global access to the environment (control of air space).

## Dynamics

The model generates individual histories in discrete time steps. In each time step, the intervening party collects intelligence, makes assessment of possible targets, selects targets and possibly executes an attack. This conventional approach to intervention may be guided by more or less constraint and precision in target selection, assignment and execution. The conventional approach may be combined with unconventional methods that aim to influence culture in favourable ways (as previously described).

Attacks by the intervening party are exogenous shocks to the local population, followed by a period where a new local equilibrium is restored. After an attack, empty sites are re-occupied, and attitudes are updated (collateral damage increases negative attitude).

### *Attacks*

Each simulation analyzes a weapon that is characterized by a certain level of precision. Precision is measured in terms of the area of lethal effect: 1-by-1, 2-by-2, etc. We systematically vary the amount of available resources that can be deployed in attacks (less resources, fewer attacks).

We consider four different ways of sampling targets:

- Random
- Inhabitants with most negative attitudes
- Random extremists
- Extremists with most negative attitude.

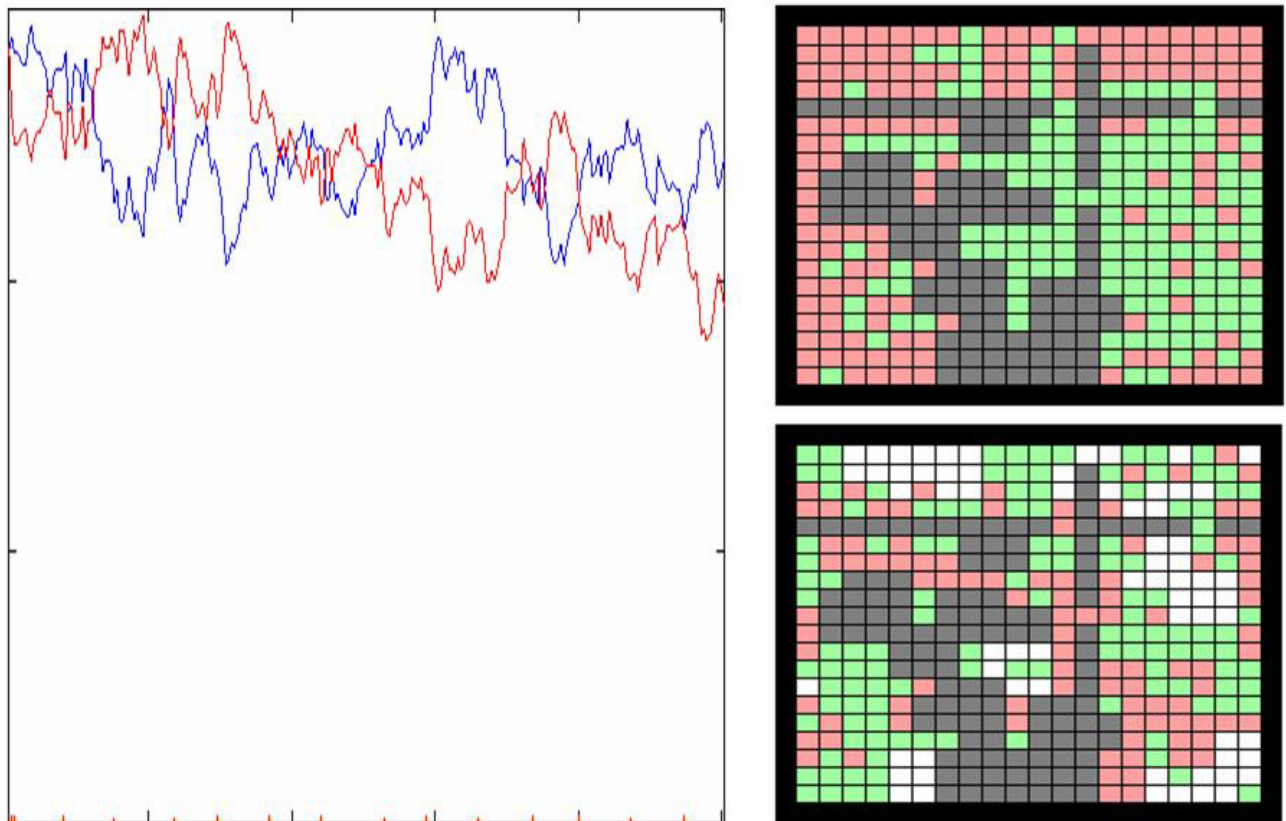
Each of these modes samples a few targets (e.g. 5) and then uses a preference model in order to pick one target and choose whether to execute. The preference model allows systematic variation of the extent to which target selection is guided by an element of

“exploration” or whether the effect is a certain “greedy” execution of the assignment. When an attack is executed, then the process is repeated.

The attitudinal response towards collateral damage at any site depends on the number of friendly casualties (elimination of C types) and the number of hostile casualties (elimination of X types) within the neighborhood of the site.

## Results

We first report results from two individual histories: 1) conventional approach with use of lethal weapons, and 2) an approach that combines use of weapons with influence of attitude towards collateral damage. After a brief comparison of the consequences of using these two approaches, we provide a summary of main results from a larger series of experiments.

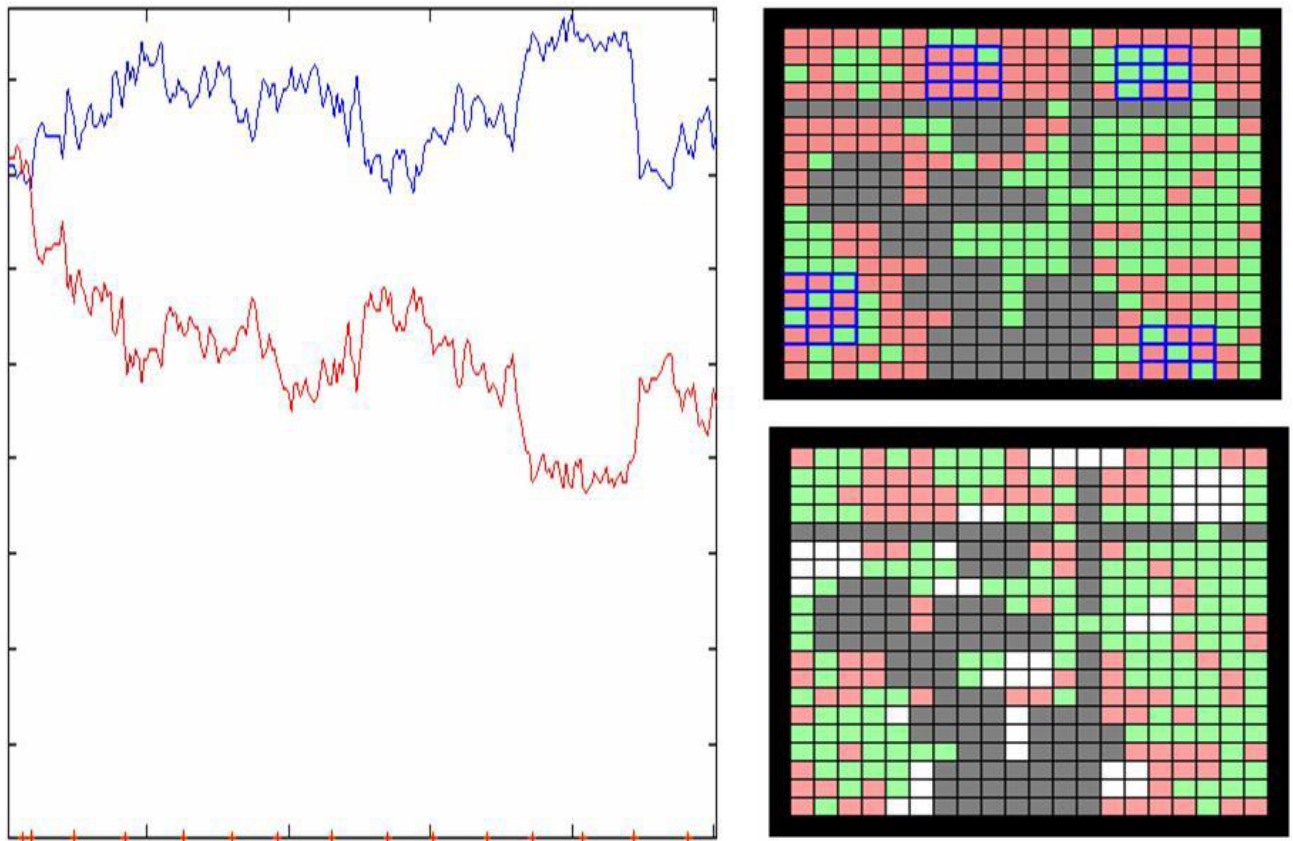


**Figure 2: Conventional intervention. Left panel: number of centrists (blue) and extremists (red) is shown on y-axis – x-axis shows time. The upper right panel shows the environment and its inhabitants at the beginning of engagement (green: centrists, red: extremists, grey: mountains, yellow: empty site). The lower right panel shows the theatre after 250 periods.**

Figure 2 shows one particular history of conventional engagement where the intervening party solely uses lethal weapons in order to contain extremists. Attacks are marked with red lines on the x-axis.

What is remarkable about the effect of conventional engagement is that the elimination of X types is countered by a population wide conversion of C to X types. This is because inhabitants that are witnesses to collateral damage develop a negative attitude towards the intervening party. The history shown here is representative in that averages over 100

samples produce similar results (with some variation in individual histories). The conclusion is simple: the use of conventional methods is not very promising.



**Figure 3: Conventional intervention combined with cultural influence. Left panel: number of centrists (blue) and extremists (red) is shown on y-axis – x-axis shows time. The upper right panel shows the environment and its inhabitants at the beginning of engagement (green: centrists, red: extremists, grey: mountains, yellow: empty site). The lower right panel shows the theatre after 250 periods.**

Figure 3 shows one particular history of engagement where the use of weapons is combined with (a mild) influence of attitude towards collateral damage. The ability to influence culture dampens negative response to collateral damage. As a result, the objective of containing X types is to some extent realized.

## Summary of Main Results

In the interest of providing an easily accessible set of observations, we provide general results in summary form. The results were obtained by a systematic variation of the parameters in our model. For each parameter, we obtained estimates by averaging over 100 histories. When we refer to “success”, we refer to reduction of the population wide number of extremists while increasing (or, not reducing) the number of centrists. The main results are:

- Restraint in use of lethal weapons generally increases success – in particular if the available intelligence is imprecise and/ or incomplete.
- Effective shaping of attitudes towards collateral damage significantly increases likelihood of success. This effect is reinforced over the long term.
- Effective influence of deep cultural values – strengthening centrist culture while weakening extremist culture – is the most effective way of achieving success.

Restrained and careful use of lethal weapons may increase the speed of achieving success. The critical ingredients in that regard are: quality of intelligence, quality of target assessment, quality of target selection, and quality of target assignment. If the quality of intelligence, target selection and assignment is insufficient, the use of weapons is likely to be counterproductive.

- Weapons of “medium precision” are most effective. This is because very precise weapons will, on average, generate more witnesses to collateral damage.
- The use of more precise weapons requires better intelligence. That is, more powerful weapons are more likely to achieve success if the quality of intelligence is fairly low.

There is a question about reducing the number of extremists (while maintaining or even increasing the number of centrists) versus reducing the ratio of extremists to centrists (may entail an untenable reduction of the entire population). We shall leave this question to further studies in a follow-up project.

The purpose of the present note is to introduce the targeting restraint analysis model (TRAM). TRAM helps develop useful strategies in conflicts where unconventional adversaries are spread out through a peaceful population. The conflict in Afghanistan is an important recent example.

In the interest of brevity, we have limited our exposition and generation of results. Our note is first and foremost an invitation to consider TRAM as an analytical device that can improve strategic assessment. Our results are preliminary and suggestive. We hope they can inspire further development of TRAM.

**\*Acknowledgements:** The authors are grateful to Lt. Col. Palle Mørkøre for comments on the realism of TRAM – and its use for strategic assessment in unconventional combat. We also thank Mie E. Augier for comments on a prior draft.

## Bibliography

Department of The Army *Field Manual*, No. 90-8/MCRP 3-33A. *Counterinsurgency Operations*, Headquarters, Department of The Army (Washington DC, 1986).

Department of The Army *Field Manual Interim*, No. 3-07.22, Counterinsurgency Operations, Headquarters, Department of The Army (Washington DC, 2004).

Johnson M. (2006), The Growing Relevance of Special Operations Forces in U.S. Military Strategy. *Comparative Strategy*, 25(4), pp. 273-96.

Johnson T.H.& J.A. Russell (2005), A Hard Day's Night? The United States and the Global War on Terrorism. *Comparative Strategy*, 24(2), pp. 127-51.

Kim J., *Cultural Dimensions of Strategy and Policy*, Strategic Studies Institute, United States Army War College (Carlisle, Pennsylvania, 2009).

Metz S., *Learning from Iraq: Counterinsurgency in American Strategy*, Strategic Studies Institute, United States Army War College (Carlisle, Pennsylvania, 2007).

Rothstein M., *Afghanistan & the Troubled Future of Unconventional Warfare*, Naval Institute Press (Annapolis, 2006).

Sepp K.I. (2005). Best Practices in Counterinsurgency. *Military Review*, May-June, pp. 8-12.

Shubik M. (1997). Terrorism, Technology and the Socioeconomics of Death. *Comparative Strategy*, 16(4), 399-414.

Shubik M., A. Zelinsky & L. Krstic (2006). *Terrorism, Reality and Everyday Life*, SSRN paper <http://ssrn.com/abstract=959174>

**Disclaimer**

The views expressed in this paper are entirely and solely those of the author and do not necessarily reflect official thinking and policy either of Her Majesty's Government or of the Ministry of Defence.

ISBN 978-1-905962-81-5



**Published By:**

**Defence Academy of the**  
**United Kingdom**

**Research & Assessment Branch**

Defence Academy of the UK  
Greenhill House  
Shrivenham  
SN6 8LA  
England

Telephone: (44) 1793 314793  
Fax: (44) 1793 785953  
Email: [Publications.hq@da.mod.uk](mailto:Publications.hq@da.mod.uk)  
<http://www.da.mod.uk/r-and-a-b>

**ISBN 978-1-905962-81-5**