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Title of Paper:
Measuring the Effects of Cumulative Influence: Using NCW to Prevent or Minimize Civilian Causalities

Topics
C2 Metrics and Assessment; C2 Concepts, Theory, and Policy; Cognitive and Social Issues

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Abstract

We are interested in discovering if "Influence" is measurable. We define influence as the power of producing effects using either kinetic and non-kinetic actions, or a combination of both. This paper will focus on the use of non-kinetic means to achieve the effect of encouraging non-combatants to vacate a potential hostile environment. By considering influence as a key element of effects based planning, the authors believe that it should be possible to measure the results of influence based operations. As a strategic framework, this paper will introduce the notion of "influence packages" to arrive at a desired set of metrics. We hypothesize that an influence network, consisting of diverse nodal entities, each with a unique capacity to generate a specific type of influence, can be orchestrated in such a manner that "influence packages" can be quickly devised, implemented, and the effects measured.

"The skillful leader subdues the enemy's troops without any fighting".
Sun Tzu – The Art of War[1]

Introduction

These words written by Sun Tzu several millennia before us, show that the warfighter has always sought to influence the enemy and the enemy's allies to achieve victory in the least costly manner. The use of influence as a strategic tool to improve one's position against a superior adversary has been clearly demonstrated as an important tool in determining the outcome of modern armed conflict. In the case of Viet Nam, influence was used as a tool to assist a relatively small military force (North Viet Nam) in overcoming a significant military disadvantage against superior American forces. General Giap[2] used influence as a key process tool in his removal of American occupiers from Indo-China. Giap successfully orchestrated world public opinion and U.S. public opinion to remove American forces from Viet Nam. Also, by targeting the U.S. with a successful influence campaign, Congress was persuaded to defund the South Vietnamese Army, granting Giap the final victory. These achievements by General Giap, accomplished in part by his use of a strategic framework of cumulative influence, required a multi-faceted approach to influence management through the application of simple and clear processes. The process was to clearly state your strategic goals, create a plan, adapt the plan constantly and smartly, combine armed and unarmed influence, design and implement tactical level influence campaigns in the form of influence packages (authors term) with specific goals whose effects will cumulatively sum towards the strategic goal of the removal of US forces from Viet Nam. In a sense, General Giap should be considered the father of modern successful influence package based warfare, although much of his planning was based upon Maoist[3] theory.

More recently, Hezbollah successfully used influence to arouse world opinion against Israel for causing civilian casualties. World opinion was thus used to impose restrictions on the Israeli Army which clearly aided in Hezbollah's survival and in effect achieved a Maoist strategic stalemate against the Israeli military.

The authors believe that influence should be considered cumulative over the course of the conflict and that its results can be measured in rather simple terms. The authors also believe that the cumulative nature of effective influence is best managed through the application of "Influence Packages". Influence packages define the influence strategy, the influence campaign plan, influence campaign command and control, influence types and tools appropriate for each type, and the success criteria and metrics required for a successful influence campaign. Non kinetic influence packages should exploit the current state of the art in communications, internet and marketing techniques in an orderly, orchestrated and coherent manner in order to achieve its impact upon enemy forces, enemy home populations, and the enemy's allies.

This paper continues with a few basic definitions so that the reader may understand the authors' intent, followed by a hypothetical scenario used to demonstrate how simple influence based goals and metrics can be identified and used to perform effects based management command and control of influence operations. The particular example we

will use to examine the impact of influence is the example of minimizing civilian casualties through the use of influence package techniques.

Definitions

Influence is a term that refers to the ability to indirectly control or affect the actions of other people or things. The meaning of influence therefore depends on who or what is being affected, and to what end[4].
The Navy's Strategic Studies Group has defined Influence as "the power of producing effects without obvious exertion of force or direct exercise of command." Influence is created and achieved through propaganda, information operations, ideology, and memetic manipulation. Influence has an aspect which is translated into a pressure towards dynamic tipping point(s) which produce a behavior(s). Influence can also be considered as a form of social network reinforcement (positive and negative).

Information operations[5]: "The integrated employment of the core capabilities of electronic warfare [EW], computer network operations [CNO], psychological operations [PSYOP], military deception, and operations security [OPSEC], with specified supporting and related capabilities to influence, disrupt, corrupt, or usurp adversarial human and automated decision making while protecting our own.

Cumulative Influence – the total synergistic effect of multiple concurrent influence operations or the aggregate effect of a long series of timed or orchestrated influence operations

Influence Package
An influence package is a set of information operations and tools which are designed to be executed as a military campaign to effect a change in a given number of people's behaviors, beliefs, attitudes, voting patterns, buying patterns, etc. such that a shift in behavior patterns occurs in the target audience to the benefit of the initiator of the influence campaign.

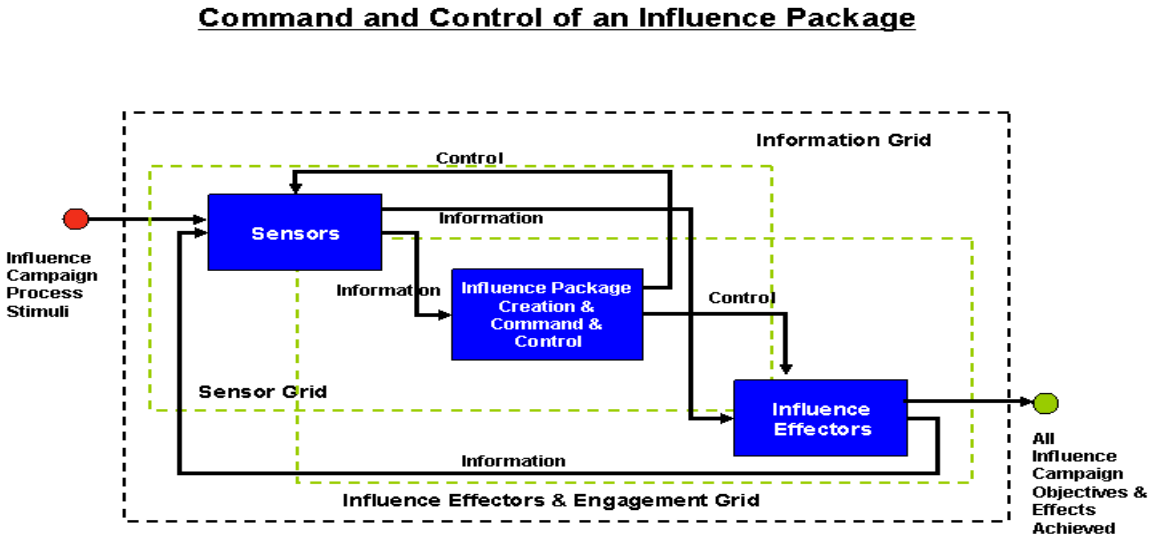

Figure 1 – Influence Operations Command and Control Model

The command and control of an influence package can be modeled as in the above graphic. In this model, sensors provide information to the influence mission planners regarding activities deemed threatening but which require an influence based response with or without an associated military response. The information is then processed and the best influence response types are selected and grouped into an influence package. The influence package is then assigned the proper effectors according to the plan and execution begins. At this time various effects are monitored, metrics are gathered and assessed, and the influence plan and package are dynamically changed as required.

Influence Metrics are parameters used to measure the success or failure of a particular influence campaign. Strategic examples would include the prevention of a war; or the conclusion of hostilities to ones favor while minimizing our own casualties and expense; minimization of overall casualties; the minimization civilian casualties in a given engagement, etc.; Tactical metrics would include increasing the percentage of a population in support of a war; decreasing the percentage of a population in favor of a war, lost profit amounts by corporations due to lost sales due to an influence campaign targeting the foreign buyers of the adversary's goods; influence that decreases the amount of money allocated to a war; influence that increases the number of senators or congressmen who will vote in favor of withdrawal from a conflict, etc.

Influence Network[6]
A specialization of Bayesian nets which have been used in determining an adversary's pressure points and actions that may lead to desired effects. Usually each node in the network is defined probabilistically such that the effects of crossing an activation threshold will influence nodes downstream on the network from the current node. Timed

influence networks assume that the influence opportunity is finite and therefore must occur within a specified time frame after the original node's activation threshold is crossed.

The scenario

Red guerilla fighters have deployed anti-aircraft defense batteries and offensive rocket launch capabilities in a densely populated suburb of a major red city near the border of the blue country. The red city is a known haven for red guerillas and is also a popular world tourist destination. Even though red and blue have been openly hostile towards each other in the past, global tourists have ignored the conflict or assumed that blue is really the culprit and not the guerillas. This is in response to a red influence campaign. Following Mao and General Giap's models, Red now wishes to move from guerilla activities to mobile warfare. Red begins rocket attacks against blue's civilian population. Blue wishes to retaliate and destroy the red rocket launching capability but they do not wish to harm innocent civilians or international tourists. Blue's intelligence operatives have now discovered the embedded anti-aircraft batteries and rocket launchers. Blue now begins an extensive influence campaign designed to get the red civilians and the tourists out of the red city. Blue uses the following influence package and process:

1. Identify the strategic and tactical goals and target of the influence campaign. Primarily, blue wishes to remove the military threat while causing minimum red civilian and tourist casualties.
2. Tactically, Blue wishes to encourage civilians in the targeted areas to leave the city by a particular time and date.
3. Next calculate the number of total persons to be influenced to leave the city.
4. Determine the acceptable number of red civilian casualties. Subtract this from the number of tourists and red civilians; this becomes the minimum acceptable refugees from the targeted city.
5. Identify the most probable effective influence means by determining the available red "influence-able" assets which can be targeted.. How many computers, how many web site visits, how many TV channels, how many text capable cell phones, the number of email accounts, fax machines in hotels, drop areas for RFID tagged leaflets, etc.
6. Compose a simple and easy to understand evacuation request message for the emails, text messages, web sites, and leaflets.
7. Design an automated workflow process which will synchronize the web and email influence efforts.
8. Design the process instrumentation and metrics capture strategy which will permit the following metrics to be captured:
    a. Total number of people who have left the city – (data captured by drones and other sensors)
    b. Total number of emails sent
    c. Total number of emails responded to
    d. Total number of cell phone text messages transmitted
    e. Total number of cell phone text messages replied to
    f. Build a location map of the city's drop zones for the leaflets with RFID tags

g. Monitor the actual drop locations of the paper leaflets such that a map of the RFID tags is created.
h. Count the number of times the RFID tags move
i. Count the number of RFID tags that are destroyed (stopped transmitting – another predictive variable)

9. Instrument the process and Launch the influence operation, RFID sensors, and population movement drones. (Activate and deploy the influence package)

The hypothetical influence campaign

After defining the above process, Blue now must devise an influence campaign to encourage the inhabitants of the red target city to leave. It must also verify that they have left. To accomplish this mission the following influence campaign is assigned. Determine the neighborhood population counts in the target areas and which languages are spoken. Next, Blue's information ops must determine how many of the identified people have email accounts, web pages, web logs or cell phone text capabilities. The campaign goes something like this:
Blue defines a campaign of multiple modes of information assault combined with persistent drone coverage to take videos of the fleeing population should they decide to vacate the target areas. The chosen strategic goal of the campaign is to guarantee that 80% of the civilian population has vacated the target areas prior to the start of bombing. The influence package will execute as follows. First, on day 1, a series of emails are transmitted to all known email accounts with the message warning the civilians of an impending ruthless attack. Concurrently, leaflet warning messages are prepared with embedded RFID tags. The paper messages are to be dropped by aircraft over the target areas of the red city. Persistent overhead sensors will begin to monitor the RFID tag locations after they have been dropped to validate the paper messages have reached the intended drop zones. If the RFID's all appear to be in one big pile then the enemy has picked up the paper messages and placed them away from their target audience or red may be conducting some sort of counter information activity of their own. At this time the video capable drones and RFID sensor aircraft are deployed in a persistent pattern close enough to the red city to detect meaningful metrics. The video and RFID data is then transmitted back to blue influence campaign headquarters. On day 2, the campaign continues with the additional sequenced activities of web log entries into popular red web logs, and the transmission of the warning message as cell phone text messages to known cell phone users. The video drone now is beginning to relay the images back to influence campaign headquarters and feed it into pattern recognition software such that an actual refugee count can begin. This will be the primary metric of success since blue has calculated the preferred number of refugees it wishes to see prior to beginning the assault of red's rocket launchers. The RFID sensor is reporting that 88% of the tagged paper messages fell into the desired reader zone correctly but several hours later 75% of all tags stopped transmitting, indicating that red had indeed discovered and destroyed most of the paper messages. To counter this, blue begins an aggressive web page overwrite activity which installs the warning message as a banner onto popular red websites. Refugees now begin to appear at the exits of the red city. On day 3, the video sensors and a local blue

friendly news organization concur that the refugee exodus is increasing dramatically and finally on day 4 the desired number of refugees have indeed left the city. Blue air drops food and medicine to the red refugees to attempt physical influence to lessen the damage done to their reputation by the attack and also drops a second set of leaflets on the fleeing refugees promising resettlement and financial reconstruction aide and after the destruction of the rocket launchers. On day 5, blue attacks and successfully destroys the rocket launchers with no civilian casualties. On the following days, humanitarian food and medical assistance begins to arrive along with reconstruction aid. This concludes a very successful influence campaign. But what was the influence package comprised of? Red email address determination capability, RFID tagged leaflets, RFID sensors, RFID dispersal pattern recognition software, capable sensors, video capable drones, web page overwrite capability, cell phone number detection capability, large scale cell phone text message broadcast capability, food and medical assistance, and reconstruction financing to both rebuild and provide work for the returning red refugees to reduce their likelihood of joining the red forces, etc.

Now let's look at the metrics, we know that these metrics are valid in our imaginary scenario because blue friendly media television reporters have interviewed many of the fleeing refugees. When a refugee was asked by the reporter why are you fleeing? They would usually respond about an email, text message, leaflet, etc. The cumulative influence package methodology worked as follows:

Emails convinced 15% of red's civilians to vacate
Cell text messages convinced 10% of red's civilians to leave
Web page banners convinced 15% of red's civilians to leave
The RFID tagged leaflets convinced 30% of red's civilians to leave
Web log entries convinced 10% of red's civilians to leave
Red's informed civilians convinced the remaining 20% to leave (a secondary influence, the influenced themselves influencing others)

Reviewing the Metrics

Figure 2 depicts the hypothetical distribution of our influence campaign metrics. The influence package components are mapped to their corresponding success metrics as a percentage of the total population that left. The top line could be conceived of as an influence network. The nodes (email generators, web page banner generators, etc.) each provide the network as a whole with a unique capability to probabilistically produce influence through the use of a time sequenced orchestration, such that a cumulative effect can be impacted upon the enemy versus each node acting independently. However, a serious alternative would be to assign each node rules, such that when a given stimulus occurs to all nodes on the network, the nodes could behave as a swarming entity. But due to time constraints, a discussion of this is outside the scope of this paper.

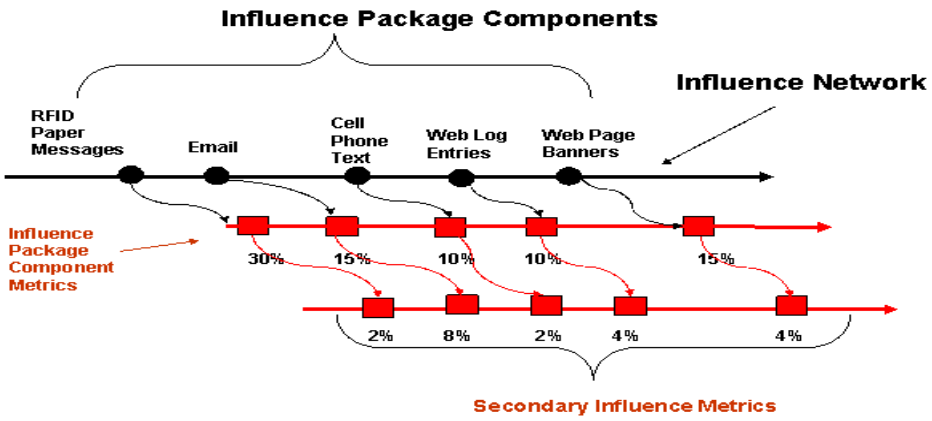

Figure 2 – Influence Package Cumulative Metrics Analysis

The scenario provided the metrics context. These metrics should only be considered valid for this hypothetical scenario. But they demonstrate the point that simple influence metrics can be devised. The number of people leaving a city is easily counted. The numbers of email accounts, web sites, etc, are simple countable metrics which can assist in the command and control of an influence operation. These metrics can be interpreted in several ways. First, they can be represented as vectors[7] through an "influence space" where the direction can represent failure, success, or no activity. Second, they can be represented as viral memes[8] infecting the red civilian population. The viral memes, if acted upon will induce new behaviors in the target population. Hopefully, the memes will initiate new red behaviors which will achieve the proper effects when the influence package is executed.

Summary

Sun Tzu suggested that influencing an enemy to surrender without taking casualties is the greatest of all possible victories. General Giap effectively implemented influence processes during the Viet Nam war. We have defined influence for this paper as the ability to achieve effects without the use of kinetics. We have defined metrics as context specific measures which can be used to determine the success or failure of an influence process or package. The metrics should provide an easy to understand methodology for dynamically assessing if the influence package needs adjustment. Our hypothetical scenario suggests that simple countable metrics can be used to monitor the effectiveness of the influence package. The influence campaign planners and package creators were able to determine the number of civilians who must leave, devise a multi-faceted approach to deliver their messages to other red civilians and then monitor the success by counting the number of refugees and conducting simple interviews as to why the refugees decided to leave. The scenario and the results capture permitted the influence

package creators to establish linkages between different types of influence tools, and their relative cumulative effects for later use as effects based influence mission planning aids.

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