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THE STRUCTURE OF INTELLIGENCE

THE INTELLIGENCE INFORMATION MANAGEMENT NEEDS OF AN NGO OPERATION IN THE LIGHT OF THE MIP INTEROPERABILITY DATA MODEL

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Abstract

During the establishment an NGO Maritime Rescue Service (MRS) in the Lake Albert region in Uganda, the intelligence information management (IM) needs of the operation were compared with earlier IM experiences of a combined peace keeping mission. This paper describes the MRS operation IM needs. Furthermore, the Joint Command and Control Information Exchange Data Model (JC3IEDM) is introduced as the reference information model for combined military operations, and the possibility to apply that same, or a similar, data model for the structuring of the IM for both types of operations is discussed.

Just as in peacekeeping operations, the success of an NGO mission depends on situation awareness drawn from the gathered intelligence. Keeping track of people and equipment is vital, as is information on different relationships, agreements etc. in order to maintain a neutral stance. In the Lake Albert case, if one rescue boat would be caught trafficking weapons between the Democratic Republic of Congo and Uganda, the NGO would be taken out in its entirety. Superior awareness is just as dangerous as it is essential and requires a controlled degree of transparency.

As in many peace keeping missions, the MRS mission mainly obtained its information through human intelligence. Many traditional (military) information sources such as accurate charts, radar or transponder sensors are lacking. This means that establishing a rescue station will be highly dependant on using local knowledge and traditional methods such as interviews with elders and fishermen and finding open roads and obstacles through reconnaissance missions. The amount of information quickly surmounts that manually manageable, and IT support to document, manage and communicate information has to be considered to provide adequate situation awareness.

There are obvious similarities in operation profiles between the compared missions, as in the needs for intelligence and other asset IM. The JC3IEDM is well suited for this IM, except for some limitations. With modern IT support a lot can be achieved, and the functionality required is mainly similar. However, the priorities and order of implementation of the IT support for the military user differs from these of the NGO organisation.

BACKGROUND

In order to understand how and why an NGO operation come to consider using an information structure mainly associated with military operations and NATO, a few circumstances have to be considered. In a totally non-professional context, the two authors of this paper, the DO (Director of Operations) to be and the DT (Director of Technical Development) came to discuss their everyday work and plans for the future. As the DO described the coming operation, its social networks mapping and intelligence gathering, its need to track various things in the AOR, and the DT described the different C4I trends and the different systems successfully supporting the military customers of Saab, it soon became obvious that the structure of the information showed some resemblance, though it was unclear to what extent.

It also became obvious that in most, if not all, areas of conflict where the current Swedish policy would put Swedish armed forces, NGOs would already be present. Hence, the ability to inherit information from the NGOs upon entry into an AOR could potentially benefit the unit, and thus also improve the business case for the NGO in search of public funding.

Another similarity discussed was the need for operational security, the ability to protect the information assets of the organization and share a deliberate subset of the information available.

METHOD

After a first informal discussion regarding the applicability of the data model, initial tests were performed on the then available Tacticall application, based on the Odin tool suite of Saab Systems (Saab Danmark A/S). The first tests were brief and inconclusive due to the imminent departure of key staff to the NLRI in Uganda. Later, the raw intelligence [LocInt 2006] was retrieved from the operation, and the information was manually mapped to the JC3IEDM [JC3IEDM 2006] to the extent possible, using database design and management tools and the current (draft) specifications from MIP.

OPERATION

Background and purpose

The National Lake Rescue Institute is a Ugandan Non Governmental Organization (NGO) specialized in Maritime Search and Rescue. It was founded 2002 with the aim at preventing losses on the great lakes of East Africa. Being a young organization operating with a tight budget it is run basically by one man supported by a two man administrative team. At present it has seven rescue stations operative with volunteer crews, it has gained recognition by the East African Commission (EAC), has a MOU with Ugandan Metrological Institute and a partnership with Ugandan Wildlife Authority (UWA) for covering the national parks.

Operation profile, organization and resources

The organization is influenced by the Swedish Sea Rescue Society (SSRS) in organizational structure as well as in management philosophy. A small HQ mainly based on the Manager and two office clerks forms the basis of the organization. In addition to this, short time European or US volunteers with SAR or other relevant background have been appointed to the organization. At the HQ there is a school building where sea safety training can be conducted with other NGO´s or other interested parties. The organization has seven rescue stations, of which two are outback development stations on Lake Albert (Kaiso and Panyimor), two are partnership stations with UWA (Queen Elisabeth National Park and Murchinson Falls National Park), one at the rafting zone in Jinja (the Nile), one at the Kampala HQ and one at Entebbe Airport.

Information to be managed

The following information types have been identified as important to document and manage:

- *Social networks, affiliations, alliances, partnerships and individual contacts* on all levels ranging from governmental officials to local fishermen. The entire philosophy of the NGO builds upon local engagement as a driving force and the organization as a facilitator. Social networks are then vital to promote the establishment and expansion of the organization, not only to keep track of your friends but also the enemies of your friends. An NGO without the financial backup through the UN system or other big aid organizations is always depending upon following the money trail, being on top of the information regarding possible ways of funding.

- Organizational control over own *staff/crewmembers, training records and agreements* (HR). Running an organization that relies heavily on volunteers and that demands a certain level of training and certification creates a need of keeping records of staff, their background, ancestral village, health status, training received and other types of agreements that are connected to the individual crewmember.

- Asset management control over *containers, boats, equipment and consumables*. As the organization expands more and more equipment will be acquired and fed to the system. Basically we are talking about boats, outboard engines, containerized rescue stations, power generators, fuel and things that can be used commercially to provide cash to the individual station such as a TV-set with DVD player for public film shows.

- Operational profiling in AOR regarding *people, tribes, landing sites, religion, navigational information, geographical features etc*. The documentation of the different AOR´s is scarce, no reliable maps are available, sea charts none existing and the population extremely heterogeneous. One way of dealing with the lack of information is basically to perform operational profiling of your own AOR, documenting as much information as possible about different features. Things covered are tribal belonging, religious belief, geographical features regarding landing sites, beach condition, vegetation and terrain, major landmarks etc. Also covered is the relation between villages/landing sites and the surrounding communities.

THE JOINT C3 INFORMATION EXCHANGE DATA MODEL

Background

The unambiguous exchange of information is a vital capacity in most human endeavours, in the conduct of a military operation as well as in any civil enterprise. The successful execution of military operations requires an accelerated decision-action cycle in an increased tempo of operations, and the ability to conduct operations simultaneously within joint (multiple branches), combined (multinational) and multilingual formations.

Commanders require timely and accurate information. Also, supporting command and control (C2) systems need to pass information within and across national and language boundaries. Additionally, forces must interact with non-governmental bodies, and international and national aid organisations.

The work to establish a formal data model for the unambiguous representation of the information of the battlefield has been performed in many forums over the past decades. The current Multilateral Interoperability Program (MIP) has its roots in e.g. ATCCIS, founded in 1980.

Current status

The MIP programme currently (early 2007) consists of a steering group, programme management and five working groups, covering operational issues, systems engineering, data modelling, technical exercise and configuration control, respectively, with 24 nations currently active.

The MIP programme is in the beginning of the process towards its "Baseline 3", with the "Joint Information Exchange Data Model (JC3IEDM) being the main document published in baseline 3 so far. A full description of MIP can be found at www.mip-site.org.

Object types, items and relations

As the first discussions regarding the applicability of the JC3IEDM information model in support of the MRS mission took place, the focus of the application became on the representations of the "things" of the operation, rather than on the "activities". The "things" in the JC3IEDM are represented mainly through the use of two entities, the OBJECT-ITEM and the OBJECT-TYPE.

Entity name	Entity definition	Role in the model
OBJECT-ITEM	An individually identified object that has military or civilian significance. Examples are a specific person, a specific item of materiel, a specific geographic feature, a specific coordination measure, or a specific unit.	Identifying individual things. (Who and What)
OBJECT-TYPE	An individually identified class of objects that has military or civilian significance. Examples are a type of person (e.g., by rank), a type of materiel (e.g., self-	Identifying classes of things. (Who and What)

propelled howitzer), a type of facility (e.g., airfield), a type of feature (e.g., restricted fire area), or a type of organisation (e.g., armoured division).

The mandatory classification of an item as a specific type ensures that the item inherits the characteristics of that specific type.

Items and types are subdivided into hierarchies, with more specific characteristics. Each item also has records of the perceived condition of the item, called the OBJECT-ITEM-STATUS. Multiple records for the same item allows the reflection of changes over time or differing assessments on items for with no authoritative statement is available. Furthermore, the position and geometry of the item may be represented through the assigning of an OBJECT-ITEM-LOCATION to the item.

Of specific interest when using the model to establish the social network is the ability to create associations between the items, especially persons and organisations. The defined list of associations includes "is brother of", "has as a member", "is protected by" and many other.

IT SYSTEM SUPPORT

In order to enable practical field tests of the applicability of the JC3IEDM in the MRS, arrangements were made to use a non-classified version of the Odin system, used in a specific configuration by the Danish Army under the name DACCIS. Odin is designed to support land, air and sea-based military units with command, decision support and communication and builds on several sets of NATO standards including MIP's JC3IEDM. The system supports the entire command process: the collection and distribution of information, the preparation of plans and calculations, follow-up and control of ongoing operations and monitoring of the communication channels from HQ to the individual units.

INFORMATION TO BE MANAGED

The information selected to perform the experiments consists of the following classes.

- Tribes and ancestral villages
- Landing sites, including harbours and beaches
- Districts, towns, parishes and real estate
- Key staff and other persons
- Materiel, equipment as well as consumables (not further described)
- Routes (not further described)

Tribes and ancestral village

The tribe and ancestral village information proved to be of primary importance in the MRS mission. Basically any relationship is based on the mutual exchange of tribe information and the credentials of a person rely on tribal belonging. The tribe is non-formal in nature and classes together its members due to mutual and common circumstances and is thus suggested to be modelled as a GROUP-ORGANISATION-TYPE. The following key attributes apply.

Object-type-name	"Tribe"
Organisation-type-description-text	
Group-organisation-type-category	"Not otherwise specified" (NOS)
Object-item-name	"Bagungu"
Organisation-nickname-name	"Ugandan Magungu"
Object-item-location	A polygon area surface for the extension of the tribe

The use of the NOS category code would preferably be replaced by a "Tribe" category in addition to the categories defined by the JC3IEDM.

Defining tribes using the GROUP-ORGANISATION-TYPE would provide the necessary reference to associate other OBJECT-ITEMS for e.g. facilities that the tribe owns or controls.

In addition to the key attributes above, the actual intelligence gathered [LocInt 2006] contains the information that may be represented by the AFFILIATION entity. Several different affiliations have been considered, but in many cases the actual information of the religion and ethnic group are more detailed in the actual intelligence than the model allows.

Affiliation-religion	"Tribal religion", "Catholic", "Pentecostal" and other
Affiliation-ethnic-group	"Other African not elsewhere specified"

Some of the information is not easily mapped to the JC3IEDM and is probably best maintained as free text in association with the object item.

There is also another religion of the Mbandwa. Its ancestral being of those worshipping the mountain and water plus forest spirits. It has a very great and top secrets in it. Unless you are a member you can't know what its like. And when you leave them, they curse you not to talk of it to any one. If you do, you just die.

Their youths don't like the habits of drug addicting, they are generally smart at all times. But for the older people it's the habit of being drunk at all times. [LocInt 2006]

Harbours and other landing sites

The operation profile of an NGO MRS operation is by nature focussed on harbours and landing sites. The actual intelligence contains approximately 80 simple harbours and landing sites. The information regarding the harbour or landing site is often intertwined with the information related to a nearby village etc. When inserting the information into the JC3IEDM, one problem is that of separation of "harbour" from a "beach" (a geographical feature).

The approach selected was as follows: landing sites without significant man made facilities were defined as GEOGRAPHICAL-FEATURE, while more significant facilities were modelled as HARBOUR-FACILITY. The following example shows the two types of landing sites considered.

Object-type-name	"Beach Landing Site" (or in some instances "Natural Harbour Landing Site")
Geographic-feature-type-category	"Coastal hydrography"
Geographic-feature-type-subcategory	"Beach" (or in some instances "Harbour, Natural")

Object-item-name	"Kaiso" (a Beach Landing Site)	"Kyehoro" (a Natural Harbour Landing Site)
Feature-surface-category	"Solid surface"	"Liquid surface"
Feature-solid-surface-composition	"Sand"	"Bedrock"
Feature-terrain	"Flat"	"Hilly"
Feature-vegetation	"Scrub/brush"	"Savannah"
Object-item-location	A polygon area surface	A polygon area surface

More substantial man-made facilities on the landing site justified the creation of a HARBOUR-FACILITY.

Object-type-name	"Minor harbour"
Object-type-category	"Facility type"

Object-item-name	"Wanseka harbour" (a Minor Harbour)
Facility-category	"Harbour"
Facility-primary-construction-material	"Concrete"
Facility-hight-dimension, length- and –width-	- Not used for harbours, rather the location is used to represent the extent of the harbour.
Harbour-*	The harbour facility contains a large number of attributes, and the exact use of these is beyond the scope of this article.
Object-item-location	A polygon area surface describing the extent of the harbour

Figure 1.   Harbour or beach?   *Figure 2.   Sample view*

Real estate, formal districts and other administrative boundaries

In the MRS operation, several different geographical areas of administrative character needed to be managed. This ranged from the territorial border and administrative district areas to the small hamlets, villages and towns of the area, and small pieces of land formally donated to the MRS. Some of these seem straightforward to represent in the JC3IEDM.

Object-type-name	"Administrative district", "Parish", "Real-estate" etc.
Control-feature-type-category	"Boundary; political/administrative"

Object-item-name	"Hoima District" (an Administrative district)	"XXX" (a Real-estate)
Object-item-location	A polygon area surface	A polygon area surface

However, in the fine print of the JC3IEDM, a.k.a. the "Business Rules", a limitation of the use of the "Boundary; political/administrative" control feature category eliminates the use of a polygon area surface, and allows only a line, albeit a potentially closed line. In the case of the real-estate, another peculiarity with the model is that it prevents an organisation and a person from being the owner of the control feature.

The other approach to the real-estate tried was to regard them as facilities with respect to JC3IEDM. However, this appears in conflict with the basic definition of a facility ("virtually anything man-made", which a property is not). As a consequence, there is no suitable facility type category for the real-estate. Also the ownership association in the model is limiting. A

person may be the owner of a facility, while an organisation may not. This prevents e.g. the representation of tribal ownership as well as the NLRI owning the MRS station.

The towns and villages are represented by facilities of the corresponding facility type category (also hamlet and city are available), with the facility category set to "Not otherwise specified". One oddity noted is that towns and villages are allowed to be a surface and not a closed line, i.e. exactly the opposite compared to the "Administrative district" above.

Key staff and other persons

The management of social relations as well as own staff requires use of the PERSON entities of the JC3IEDM. These are well suited to the purpose as is shown below. Most of the data (gender, birth date etc.) is straightforward and hence not described below.

Object-type-name	"Civil MSR Volunteer"
Person-type-category/subcategory	"Civil"/"Non-government employee"

Object-type-name	"Government official", "Military official", "Wildlife ranger"
Person-type-category/subcategory	"Civil"/"Government employee", "Military"/"Not otherwise specified", "Paramilitary"/"Not otherwise specified"

Object-item-name	"Amuriat Michael" (a wildlife ranger)	"Tom Tayomba" (a civil MSR volunteer)

In the analysis, one specific concern was that of person names. In the AOR, persons have one first name and one Christian name. Comparing with the normal definition of the Christian name as synonymous with first name, it's not unlikely that Amuriat Michael would be entered equally often as Michael Amuriat.

The need to manage the different documents, such as education certificates, turned the interest to the JC3IEDM structure for person identification documents. Basically, any business card, diploma or certificate may be used as personal identification. In addition to the structured information, a supporting IT system would be required to handle non structured (non-standard) information, such as scanned diplomas etc.

The networks of information and its maintenance

In the JC3IEDM, there are a large number of different associations possible between the different objects. These associations are restricted by different business rules, sometimes for reasons that are non-obvious. The following sample associations are found in the actual intelligence [LocInt 2006].

Associations [LocInt 2006]	Mapping to JC3IEDM	Comment
Amuriat Michael belongs to the Bagungu tribe	ORGANISATION "has as a member" PERSON	
The MRS organisation owns (through a donation) the real-estate of the rescue facility	ORGANISATION "is owner of" FACILITY	Not allowed by business rule!
X knows Y,	PERSON "??" PERSON	No suitable value, resorting to "Not otherwise specified", "NOS"
X has some influence upon Y	PERSON "??" PERSON	No suitable value, resorting to "NOS"
X is a relative of Y	PERSON "??" PERSON	Unless the specific relation can be identified, "NOS" need to be used

Organisation X can be influenced by person Y	ORGANISATION "??" PERSON	No suitable value, resorting to "NOS"
Sam is the boss of the wildlife association	ORGANISATION "is under command of" PERSON	
Sam owes the MRS organisation (mutual back scratching)	ORGANISATION "??" PERSON	There is no suitable association to represent the possible pressure points

Maintaining the information to done by continuous information gathering, refreshing existing associations in the information as well as creating new associations. As in any customer relations management system, it is important for the NGO to keep track of the different tasks and events that are used to gather the information, be it interview trips or telephone calls. In the JC3IEDM, there is support for such actions, the applicability of which remains to be explored.

As in any military operation, also the NGO needs to maintain the information regarding the source of information, the trustworthiness of the information and the general reliability of the information source as well as the reporting date and time of the information. This need is well catered for in the JC3IEDM but has not been explicitly addressed in this analysis.

OBJECT SYMBOLS FOR THE NGO OPERATION

One limitation encountered in the trials to map the actual intelligence using existing IT support was the inadequacy of the symbol libraries. The standard APP6A contains a limited set of symbols for the non-military entities, and fishing landing sites and others are non-existent. For the experiments of this article, the efforts of Nordic Cimic Group (Defence forces of the Nordic countries) to create additional symbols for non-military objects as implemented in the Odin tool suite and Tacticall have been built upon.

It is obvious that though the information model can manage most of the information, additional effort is needed to get the intuitive symbols or icons for the information entities of interest.

OBSERVATIONS ON THE IT SUPPORT FOR THE JC3IEDM

In the work to assess the applicability of the JC3IEDM, different IT support has been applied in varying degrees. These include a development configuration of the DACCIS system, some "raw" configuration of the Tacticall / Odin tool suite and its development tools. Earlier experiences from the Swedish "SLB", a MIP inspired, battalion level C3 system, have also been considered. A few observations on the direct applicability of the military C3 systems are as follows.

- The military users favour ease of use for the main processes of battlefield information management opposed to the full flexibility of the information model

- The military users favour the map as the primary paradigm for interaction, thus putting less focus on information that is not geographically related (such as person/organisation networks) and that thus need to lend the interaction paradigm from e.g. graph and network visualization

- The generic software and tool suites underpinning the different customers' configurations are generally very flexible and can easily be used in a laboratory environment to explore different views on the data

REFERENCES

[JC3IEDM 2006]   The Joint C3 Information Exchange Data Model (JC3IEDM) Draft 3.04, 2006-10-10

 [LocInt 2006]   Intelligence gathered during the MRS operation 2006, informal and confidential