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Issues of Visualisation in Peacekeeping Operations

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1. The Users

Commanders of multinational peacekeeping forces and leaders of small units in the field have related but different problems, many of which might be alleviated if they had access to displays of data relating to the various political and individuals with whom they are required to interact.

1.1 Technological support

There are at least two classes of technological support systems—support for fixed or mobile HQ operations, and support for officers in the field.

Support for HQ operations can be based on standard office-quality displays, databases, and communication systems. Support for officers in the field may be limited to hand-held devices (like Palm Pilots, for example) that have little display real-estate, small internal memories, and low-bandwidth communications, though it is conceivable that in the future, even field officers may be provided with non-intrusive head-mounted displays.

These two levels of support must be matched with the kinds of things Commanders (including logistics officers and other HQ personnel) and Field Officers need to know.

2. The Problem

Many independent groups are usually active in an area in which peacekeepers are deployed. Belligerents may not be cooperative; Non-Governmental Organizations (NGOs) may have overlapping self-determined areas of interest; formally allied peacekeeping forces may have different structures and national interests. Civilians need to be protected, and possibly housed and fed.

How does a commander at a high or low level determine with whom to interact, and in what manner?

How does a soldier in the field determine what to do when confronted with an unexpected situation?

2.1 Problems relating to Belligerents

2.1.1 (Commander's view)

A commander needs to be able to communicate with both belligerent parties, both to ascertain how they view the existing situation and each other, and to keep them informed of the intentions of the peacekeeping forces. Difficult and dangerous situations may occur if a harmlessly intended action is viewed as provocative or other than even-handed by either party. This need to communicate may be affected by the commander's lack of knowledge about the parties.

1. *Who's in charge here?* One or both of the opposing parties may have no defined command structure. The peacekeeping commander must determine who has the moral authority to ensure that agreements are made and kept.
2. *Where are the main communication channels?* Who in each of the belligerent parties is likely to be providing the "responsible authorities" with the data and advice on which they will base their actions?
3. *Who do they trust?* Which allies among the peacekeeping forces, and which NGOs do the belligerents trust and which do they mistrust?
4. *What are their social or religious taboos?* What should I avoid doing if I am to gain and retain the trust of the parties?

2.1.2 (Field Officer's view)

The Field officer is accompanied by a small number of soldiers, or may be alone. Rather than dealing with persons of authority among the belligerents, the Field officer may deal with individuals under orders, with individuals acting independently, or with organized or disorganized groups who are acting with intent to provoke or are simply congregated with no immediate purpose.

1. *Who's in charge here?* A potentially threatening group or situation has been encountered. Who among those present should be addressed, and in what manner?
2. *Should this person be detained?* A person has been observed who may be under indictment from Den Haag. Is this person the one indicted, and is the situation appropriate to execute an arrest?
3. *What should be done about this construction?* A structure, such as a roadblock or a gun emplacement, has been encountered. Is it in the database of permitted structures? Is it within the scope of agreements? How should it be treated, and who should discuss the issue if there is one?
4. *What of my possible actions might be viewed as unnecessarily provocative?* Are there actions that in my culture would be appropriate for the situation that might here lead me into difficulty or danger?

2.2 Problems relating to NGOs

2.2.1 Commander's view

It is normal to assume that any NGO in the field has the intention of helping the civilian population in some way, whether it be with medical assistance, food, housing, social support, or in some other way. However, in attempting to help, an NGO might well impede the work of the peacekeeping forces, or disturb each other's humanitarian operations. The peacekeeping commander normally has no authority over the operations of an NGO, but nevertheless may need to influence their operations by exerting moral authority, perhaps backed by the potential of requesting political authorisation to enforce some requirement.

The commander needs to know what the NGOs are attempting, how they are organized, and how they relate to the belligerents. An NGO whose work is confined to aiding one of the belligerents to the exclusion of the other may be seen by the other as provocative, if the peacekeeping forces do not in some way provide a countervailing assistance to the party ignored by the NGO.

1. *Who's in charge here?* How is this NGO structured? Is it a loose-knit collection of volunteers doing what they can, or are the workers tasked by some local or remote central authority?
2. *Who is doing what?* What is each NGO trying to do? There may be dozens or even hundreds of different organizations in the area. Overlaps and friction are likely. How does the commander determine what they are trying to do, and how can he/she maximize their effectiveness?
3. *How can the NGOs help the formal peacekeepers, and vice-versa?* Some tasks may be better done by NGOs than by the military, or vice-versa. How does the commander assess the balances?

2.2.2 Field Officer's view

The Field Officer encounters individual members of an NGO who are doing the job for which they came. But in the circumstances, what they are doing may appear to the field officer to be potentially dangerous to themselves or to others, or may overlap what ought to be the officer's own area of responsibility. To know how best to act, the officer needs to know at least a few facts of the situation.

1. *Who's in charge here?* A bunch of civilians is doing something. Who are they and who is in charge of them? Who should the officer deal with?
2. *Who is doing what?* Who are these people and is what they are doing likely to be helpful or damaging? what should be done to encourage or discourage them?

3. *How can the NGOs help the formal peacekeepers, and vice-versa?* Can the officer assist the NGO personnel on the ground in a difficult situation, perhaps physically, perhaps by acting as liaison to some other NGO? Can the local NGO personnel assist his/her forces in an assigned task?

2.3 Problems relating to Coalition units

Commander or Field Officer

The units of forces in the coalition from other nations should, in principle, be structured and tasked in a way known to the commander and to the field officer. But that information must reside somewhere, and the facts may well not match the formally defined structure.

1. *Who's in charge here?* What is the Order of Battle of the coalition units? Who is responsible for liaison and for the actions of those units?
2. *Who is doing what?* What are the responsibilities of the Coalition units, and how are they to be coordinated?
3. *What are the political objectives of the different allied elements?* Do some Coalition units favour one belligerent over the other? Are some NGOs more closely linked with some coalition elements than with others?

3. Problem Abstraction

Many of the problems listed above have in common that the key requirement is for the user to visualise *relationships*.

The commander may need to visualise who talks to whom, who can authorise what kinds of action on the part of the belligerents or the NGOs, how civilian refugees relate to each other—who is likely to help whom, and who is likely to harm whom. Are there family relationships to consider?

The field officer may need to visualise the political relationships relating to an unexpected roadblock or an opportunistic encounter with a suspected war criminal.

How should relationships be displayed? Does the answer depend on the screen real-estate available?

3.1 Displaying Relationships

If there are only a few entities of interest, the existence of a relationship between two (or among three) may be shown by connecting lines between icons. This does not, however, allow the user to visualise the nature of the relationship.

The interesting relationships often centre around an individual or a place. This suggests that the representation may often have a “fisheye” quality, relationships being displayed in detail around the core individual or place, and more generally for more distant relationships.

Relationships come in many flavours. They often correspond to verbs. Verbs may be dynamic, suggesting that the display of such relationships might map best onto a dynamic display. Verbs (in English) often relate three entities in a particular way, which also suggests that relationship displays might normally be 3-way rather than linking just two entities. *How?*

Most relationships are not symmetric. *A owns B* does not imply *B owns A*. Connecting lines—even lines with arrowheads—do not make the relationship intuitively obvious. When the relationship is triple (e.g. *A gives B to C*) the problem is worse.

Connecting lines also create problems when there are many entities with pairwise or triple relationships. In the real world, relationships are often visualised from common movement, colour, spatial relationship or other Gestalt factors. This suggests that not only intrinsically dynamic relationships may usefully be displayed through related movements on displays, but also asymmetric relationships may benefit from motion in the display.

Consider the problem of a field officer unexpectedly seeing a person who might be a war crimes suspect. Before making an arrest, the officer needs to know the ramifications of making or not making the arrest at that moment. The available display is on a hand-held device, but it must display relationships such as the political tensions and support systems around the person, the position of the person within the belligerent organization, and so forth. *How?* We do not know. Research is needed.

4. Conclusion

This paper has noted a few of the multitude of problems that face officers involved in peacekeeping, which is an increasingly important part of the activities of most militaries. It is asserted that the officers could be helped by the provision of displays that could show them some of the relationships among individuals and groups that may be encountered during the operations. These relationships are of several types. They may be symmetric or asymmetric, and may be bilateral, trilateral, or possibly even more complex. Little is known about how to display relationships, especially complex relationships within large numbers of individuals and groups. It is asserted that however the relationships are best displayed individually, the display of large sets is likely to depend on some kind of fish-eye view, in which the most detailed information concerns a central individual or group, with more distant relationships shown in less detail.

Note

1. The original specification of this problem was provided by C.A.McCann of the Defence and Civil Institute of Environmental Medicine, Box 2000, North York, Toronto, Ontario, Canada M3M 3B9.