# How to Model a Confrontation – Computer Support for Drama Theory

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## Abstract

A Peace Support Operation can be seen as a linked sequence of "confrontations". Confrontations are effectively handled by a technique known as Confrontation Analysis. This is a method of applying Drama Theory, a development of Game Theory that considers how players apply rational-emotional pressure on each other to redefine the game *prior* to it being played. The process of applying pressure is called a confrontation. A player "wins" a confrontation by forcing or persuading others to redefine the game so that it has an agreed solution in line with the player's objectives. Confrontation Analysis, when used as a decision support tool, is best used in the mode of Participative Decision Support. This means that a facilitator works with the client to build models that enhance and embody the client's own intuitive understanding of the problem. It contrasts with the more traditional mode of Operational Analysis, whereby models are built in the "back room" and results only are communicated to the user. It is this kind of participative support that a PSO Commander will need from a Command and Control system for conducting confrontations. The authors describe work on two software tools (Confrontation Analysis and Simstage) that could be used by the staff of a PSO Commander tasked with confronting non-compliant parties, such as formerly warring factions, in order to bring them into compliance with his superior's objectives.

**Keywords:** Peace Support Operations, Command and Control, War-gaming, Drama Theory; Confrontation Analysis, Immersive Briefings

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## 1. Introduction

Drama Theory and the associated technique of Confrontation Analysis are attracting increasing attention within the defence community. They have inspired a number of papers on modelling political-military-diplomatic operations and have been taken up by the UK's Defence Evaluation and Research Agency as a way to provide a framework for analysing these low intensity conflicts.

Any problem involving multiple parties with conflicting objectives can be studied using these tools. As a result, they can support the analysis of conflict at all levels, including:

- political strategy;
- campaign planning;
- negotiation;

- interpersonal relationships.

Starting from initial work in Game Theory, Drama Theory developed to deal with "anomalies" such as irrational behaviour. This led to the concept of a "confrontation" as a rational-emotional interaction in which players define (and hopefully solve) the game *prior* to playing it. The application to defence is straightforward. Confrontations – eg, between peace-keepers and potentially warring parties – play an essential role in low-intensity conflicts. A low-intensity campaign can be seen as consisting of a number of linked confrontations taking place at various levels.

Confrontation Analysis focuses on the needs of military strategy planners – avoiding complex analytical concepts and representations. Simple yet informative analyses can be conducted in minutes on a single sheet of paper. However, there is a need to store, edit and communicate these analyses. The authors have therefore begun work on a number of software tools. These will support the process by which models are developed live with clients (Commanders and their staffs), who continue to revise them during the course of a campaign.

The approach known as Participative Decision Support uses models to enhance clients' own expertise and understanding, improving the process by which a Commander and his staff form and implement a common strategy to fulfil his superior's intent. "Back room" work supports understanding, rather than trying to replace it with some form of incomprehensible "wizardry".

Software tools offer the following benefits to Participative Decision Support:

- **Easy, painless revision**. When models are easy to change, there is less resistance to large scale changes, or to examining alternatives.
- **Ability to communicate findings**. Communication between analyst/model and "client" needs to be clear and instantaneous. Good, visual software assists this. Analyses need to be communicated clearly between horizontal or vertical levels within a command structure. Standardised software assists this. Also, when an analysis has been done, findings may need to be included in a larger report. A software-based report generator provides a written summary. Finally, software tools simplify the task of building, and making accessible, a library of past analyses accurately reflecting the judgements of Commanders and their staff at the time. This will enhance the impact of "lessons learned".
- **Sanity checks**. When working under the kind of time pressures often faced in military operations, simple mistakes can be made in an analysis, or important issues missed. Software support can point out mistakes and issues that may be worth attention. Automated advice can of course be overridden, but this should be from an informed perspective – not through oversight.
- **Remote participation**. Military operations involve co-ordination between geographically dispersed commands. Software tools (connected over a wide area network) can simplify the sharing of information and allow direct collaboration between command staffs.

This paper describes on-going research into the development of a suite of decision support tools, based on Drama Theory, to assist strategic planners both in the military and commercial domains. This suite of tools will be known as a Confrontation Analysis Tool Set (CATS). Note that the CATS programme is at present a (largely) voluntary project, in which much of the work is being done part-time, by individuals outside of their normal working commitments. The

authors believe that the ideas underpinning this research need to be brought into service sooner rather than later, and ask that any organisations or individuals interested in collaborating to use the ideas, or pursuing them in parallel with the authors, should contact Dr Peter Murray-Jones (pmurrayjones@dera.gov.uk).

The paper begins with general descriptions of Drama Theory and Participative Decision Support. This is followed by discussion of two tools under development:

- a Confrontation Analysis system;
- an Immersive Briefing distributed virtual environment.

## 2. Drama Theory

Drama Theory addresses problems involving multiple parties with conflicting objectives. It describes how these problems, known as dramas, evolve towards a resolution. Historically, the theory has its roots in game theory, but has been developed to overcome many of the weaknesses encountered in game theoretic treatments of problems; in particular, it removes the stifling assumptions of fixed situations and rationality.

A comprehensive discussion of Drama Theory, and its mathematical development, is beyond the scope of this paper. A number of more detailed discussions (e.g. Tait 1998, Howard 1998) are available in the open literature. In this section, the basic ideas of the theory are introduced to act as context for the remainder of the paper.

Confrontations are the principal element of dramas. A confrontation contains a number of *characters*[1] (parties involved in the conflict), each of whom holds a particular *position*. A character's position is the "solution" it is advocating to the other parties. For example, in the current Kosovo conflict, (part of) NATO's position is the withdraw of Serbian forces from Kosovo. In addition to holding positions, characters also hold *fallback position*s - strategies they intend to pursue if they do not get their own way. For example, in the aforementioned Kosovo conflict, NATO's fallback position involved continued air strikes.

A formal representation scheme as been developed to "capture" a confrontation. This representation is termed a *card table*. Figure 0 illustrates one of these cards tables, representing a conflict from a merger in the financial sector – serving to illustrate that Drama Theory applies to more than just military confrontations.

[1] A "character" can be an individual (e.g. Tony Blair) or an institutional character (e.g. NATO).

The metaphor of a card table is used to encourage the idea that each character has a set of cards (or options) that it can choose to play. For example, in Figure 0, BNP can choose to merge with Paribas, or, in "card table" terminology, play the "Merge with Paribas" card.

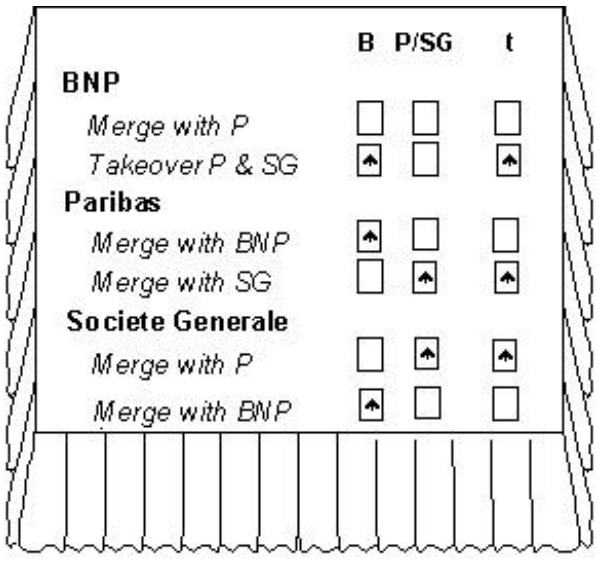


**Figure 0: A card table**

In each confrontation, characters will face a number of Drama Theoretic *dilemmas*. In fact, it can be shown, via the mathematical framework of Drama Theory, that confrontations containing no dilemmas have been resolved. As a result, they cease to be confrontations.

In Figure 0, BNP faces a Deterrence Dilemma[2]. Both of the banks it is attempting to acquire (i.e. Paribas and Société Générale) would prefer to continue to fend off the bid – a potentially expensive strategy.

Confrontations evolve through the process of parties attempting to resolve dilemmas. For example, to resolve a Deterrence Dilemma, a party may attempt to escalate the threatened future. In the confrontation shown in Figure 0, BNP could bring public opinion to bear on Paribas and Société Générale by publicly declaring that they are hindering the formation of a world-class French financial institution. Continued resistance by Paribas and Société Générale would then begin to erode their image with consumers – a potentially disastrous outcome for a bank.

As this example illustrates, dilemmas may lead the formation of new strategies. These change the form of the confrontation and, as a result, lead to a new card table with new dilemmas. Drama Theory defines six dilemmas (see Howard, 1998) – Threat, Deterrence, Inducement, Co-operation, Trust and Positioning. Each dilemma has its own associated resolution strategies. In general, these strategies take into account the crucial subjective factors (e.g. emotion) often ignored by other approaches.

The resolution of a confrontation proceeds by dilemma elimination. Confrontation Analysis describes the formal mechanism by which dilemma elimination is employed to resolve confrontations. See Figure 1: The Confrontation Process.

[2] At the risk over oversimplifying, a Deterrence Dilemma occurs when a character's fallback position is not threatening enough to deter the other characters from maintaining their positions.

Parties begin by setting the scene. This is the phase where all the parties to a confrontation develop a common understanding of the confrontation. Without this common understanding, it is impossible to start resolving the conflict - if no-one understands your position, how can you argue for it?

After a common understanding (or common reference frame) has been developed, the negotiation begins. Parties decide on their positions and threats, and communicate these to the others. If all the positions are compatible, there is a resolution to the confrontation. Otherwise, the parties must begin to eliminate their dilemmas via negotiation. This leads to new confrontations. This cycle continues until all the dilemmas have been eliminated (a resolution) or until all the parties have exhausted their patience and begin to implement their fallback positions.

For each confrontation in a drama, the Confrontation Analysis database documents the following information:

- a description of the problem;
- the positions adopted by the various characters;
- the strategies available to the various characters and;
- a card table summarising the confrontation.

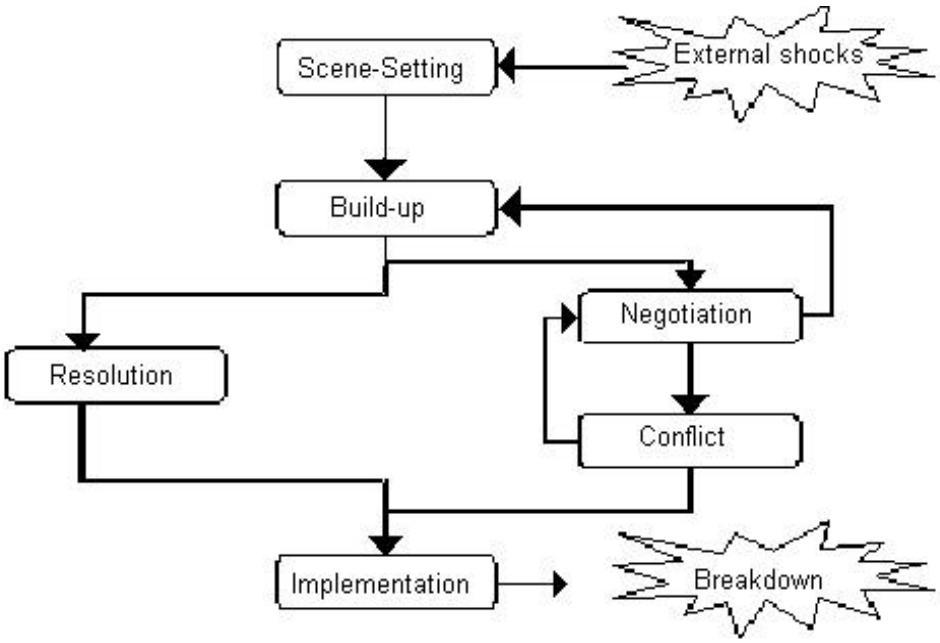


**Figure 1: The Confrontation Process**

In addition, for each character in the confrontation, the following information is recorded:

- the character's background;
- its values and;
- its projects (or goals).

The above information is documented *for each character* in the confrontation. This is due to the fact that each party may hold very different interpretations with respect to various parts of the confrontation. As shown in Figure 1, part of the process of resolving a confrontation is developing a common viewpoint.

Even from this brief description, it is clear that a confrontation contains a large amount of information. A Confrontation Analysis database helps to organise this information so that it can be easily assimilated and monitored by those responsible for strategic planning. In addition to its use in a briefing system, the data can be used to generate Immersive Briefings (role-playing exercises). These allow problem owners to explore the potential outcomes of a confrontation and gain insight into other viewpoints. Such a use of the data is described later in this paper.

Confrontation Analysis is an interactive planning tool for applying Drama Theory. It is often employed within a participative decision support context. This is the subject of the following section.

## 3. Participative Decision Support

Participative Decision Support (PDS) is, to some extent, a new paradigm in operational analysis. Instead of seeing operational analysis as a "backroom" activity, conducted by technical experts in (relative) isolation from the problem owner (e.g. the military Commander), PDS asserts the primacy of working intimately with problem owners.

PDS is based on the assumption that problem owners are best qualified to develop a solution. In some situations, generally involving technical issues governed by physical laws, problems can be "handed over" to analysts. However, the majority of problems, particularly those in the strategic planning domain, are not best served by this approach.

In PDS, problem owners and analysts have clearly defined roles. The problem owner provides the background, assumptions, options and goals of the problem, while the analyst structures the problem, assists the problem owner to uncover new information and helps the problem owner to achieve a better understanding of the situation and the consequences of any courses of action.

A PDS analyst uses approaches, techniques and tools that are designed for collaborative working. In general, PDS interventions involve groups of problem owners – PDS benefits from the presence of multiple perspectives. However, the techniques can also be used to assist an individual problem owner. Figure 2 illustrates a "typical"[3] PDS intervention.

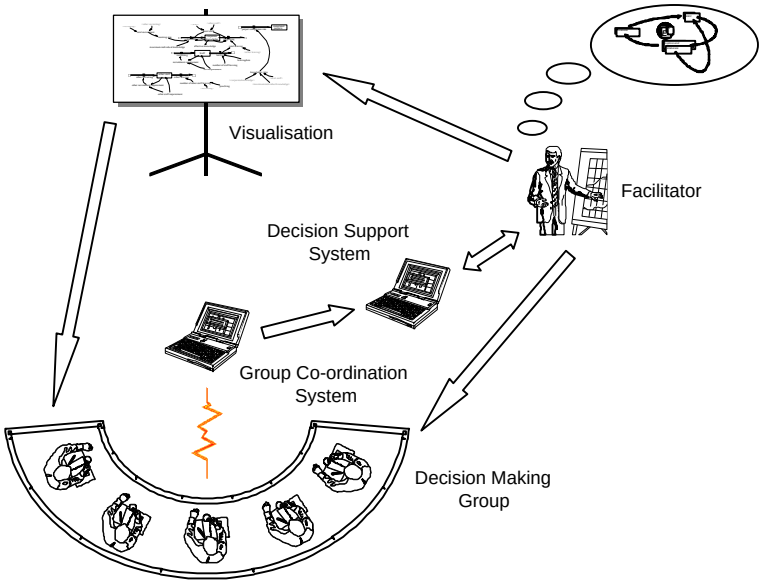


**Figure 2: An overview of Participative Decision Support**

In Figure 2, the problem owners are shown being supported by a plethora of decision support systems – including a wireless network. It is important to note that a PDS session can be as simple as an internal facilitator (e.g. an intelligence officer) with a flipchart. PDS is more of an approach to problem solving than a particular technique or tool. However, the use of appropriate tools can substantially enhance the effectiveness of a PDS session.

A PDS session begins by eliciting the views of the problem owners. Initially, this may be to arrive at a common view of the problem (e.g. a common reference frame). The responses of the problem owners are co-ordinated via a Group Co-ordination System. This may be a formal system, such as a distributed database, or a flipchart.

[3] One of the corollaries of the PDS assumptions is that interventions can never be reduced to a formulaic method. However, for the purposes of explanation, we can conveniently ignore such issues.

Once a number of response have been collated, it is necessary to synthesise and interpret these views. Decision support systems can be used to assist in this task. For example, a simple textual comparison system can be used to categorise large amounts of information into provisional categories. In an electronic brainstorming session, it is common to receive hundreds of ideas within a few minutes. Without some form of decision support, it becomes difficult to manage the complexity of the problem.

The results of the decision support system are interpreted by the facilitator and fed back to the problem owners. Visualisation tools are often employed to ease the task of communicating results to the problem owners. As PDS interventions happen in "real time", there is no opportunity for the facilitator to disappear and massage information into an easily digestible form. As a result, flexible visualisation tools are an essential part of developing an ongoing dialogue between the analysis and the problem owners.

In addition to managing the PDS session, the facilitator adds a crucial ingredient to the proceedings – a process model. This process model is a framework for problem solving. It provides a structure to the activities of the problem owners and ensures that these activities move towards a desired solution. Without a process model, a PDS session is no more than a tradition meeting – and about as effective in solving problems!

There is no definitive PDS process model – the authors have found a number of structured group process techniques to be effective in a variety of circumstances. However, there is a "meta-process" for PDS that has been found to provide a powerful context for more specific techniques, such as Confrontation Analysis.

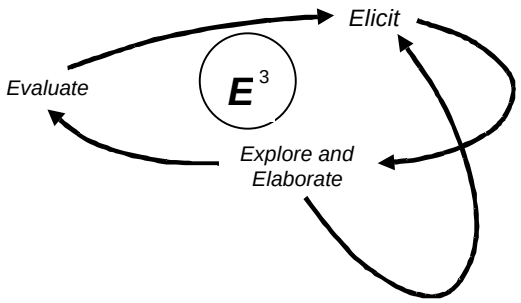


**Figure 3: The $E^3$ cycle**

The $E^3$ cycle, shown in Figure 3, constitutes a framework for PDS. Information about a problem is *elicited* from the problem owners. Using the PDS concept, the problem owners explore their assumptions about the problem, leading to a new understanding of the problem and, potentially, new options for resolving the situation. Exploration of the issues surrounding the problem often highlights omissions in the elicited information, leading to a further round of elicitation.

At various points in the intervention, it is important to "take stock" of progress. This may involve, for example, an evaluation of strategies developed in a strategic planning session, or an assessment of risks uncovered during a risk management workshop. This evaluation phase often results in the identification of number of different perspectives across the group. Differences in perspective are often due to differences in *understanding* and can act as a catalyst for eliciting hidden assumptions. In this way, the $E^3$ process continually refines the group's understanding of their problem and the ramifications of potential actions, leading to more robust planning.

Although PDS approaches are powerful when used to support co-located problem solving teams, they are even more essential when deployed in distributed environments. The formal data elicitation, collection, integration, analysis and presentation facilities provided by PDS systems allow structured group problem solving to occur over widely distributed teams.

The authors feel that the PDS approach, as distinct from “back-room” model-building followed by presentation of results, is essential for the development of a Command and Control (C2) system for confrontations that will be used by Commanders in peace support operations (PSOs).

## 4. Confrontation Analysis Tool Set (CATS)

The UK's Defence Evaluation and Research Agency has been conducting research into the use of Confrontation Analysis as a C2 tool for PSOs. One of the key conclusions of this research has been the need for effective drama-theoretic decision support tools. These tools are needed to support:

- PDS interventions at Command HQs;
- continuous C2 activities across multiple levels of command;
- efficient and comprehensive documentation to aid planning and assist in the dissemination of "lessons learned";
- role-playing and war-gaming activities;
- further research and development of Drama Theory in a military planning context.

In response to these demands, the authors, along with a number of colleagues, have instigated the CATS (Confrontation Analysis Tool Set) programme to begin researching and developing a prototype suite of Drama Theoretic tools. This programme is divided into three phases.

Phase 1 involves development of two integrated tools – Confrontation Analyst and SimStage. Confrontation Analyst is a Confrontation Analysis system, tailored to the needs of a PDS environment. It makes use of a distributed database model to support Conflict Analysis in a distributed environment. This facility is intended to allow the tool to form the core of a C2 system for PSOs.

SimStage is an Immersive Briefing system that uses the documentation facilities of Confrontation Analyst to automatically generate a role-playing environment. This environment can be used to explore the potential scenarios that may arise from a given situation and to develop robust strategies in the light of these scenarios. In addition, SimStage can be used to understand the pressures placed on other parties and, as a result, anticipate their response to various actions. It is anticipated that SimStage will initially be used in the commercial strategic planning arena, due to the accessibility of appropriate problems, but it should have equal application in military planning.

Phase 2 of the CATS programme will involve the extension of the tools to provide a complete, although rudimentary, C2 concept for PSOs. This will draw on the results of Phase 1 trials. This should result in the production of a simple technology demonstrator.

Phase 3 of the programme will develop a robust C2 system prototype that can be used in the field. This is in contrast to the Phase 2 prototype which is no more than a technology demonstrator. This phase is dependent on the success of the Phase 2 activities in obtaining the necessary funding.

We will now describe Confrontation Analyst and SimStage in more detail, though we should emphasis that this work is at an early stage, and the specifications we describe may well change in future.

## 5. Confrontation Analyst

Confrontation Analyst is intended to represent the core of CATS. Developed in Interprise® Delphi 4, running on the Microsoft® Windows platform, it will provide a comprehensive Confrontation Analysis support system.

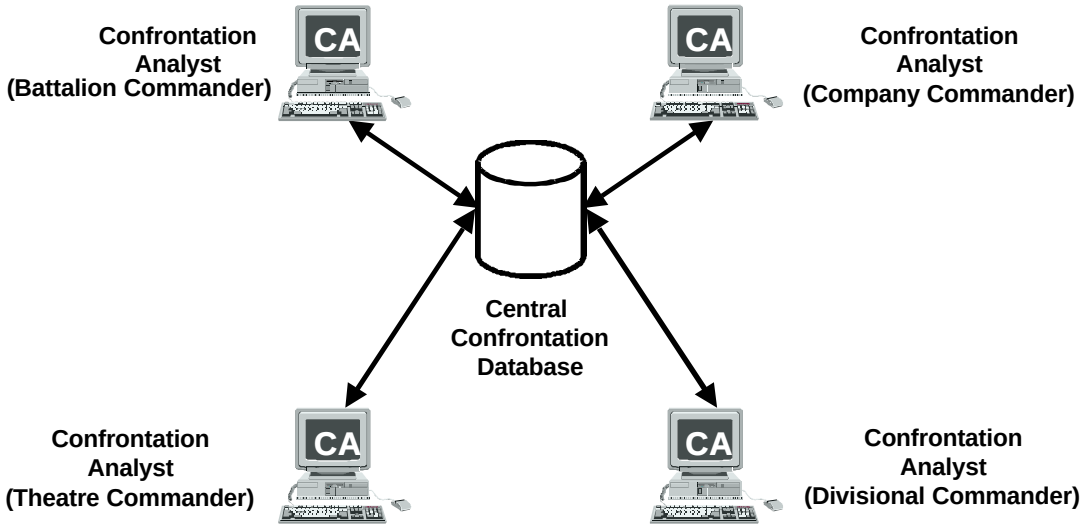


**Figure 4: Confrontation Analyst architecture**

Figure 4 provides an overview of the projected Confrontation Analyst architecture. All the data for a given drama is held on a central database. Multiple Confrontation Analyst users can connect to this database, retrieve information provided by other users and update their own information (which others can, in turn, access via the central storage).

In many cases, the Confrontation Analyst installation will consist of a single version of the software with a "central" database stored on the local machine. In this case, Confrontation Analyst will appear as a regular standalone application. However, Confrontation Analyst is being designed to support distributed C2 operations and is considerably more powerful when deployed in this mode.

Distributed analysis is critical to the successful on-going analysis of *linked confrontations*. Confrontations are linked when changes in the assumptions underlying one may cause changes in other confrontations. The confrontations at different levels of command are often linked in PSOs. For example, negotiated local agreements may provide leverage for achieving agreement at national level – and vice versa.

In a distributed Confrontation Analyst installation, users manage their own conflicts directly, but can also link parts of their analysis to confrontations being managed by other users – e.g., subordinate or superior Commanders. When the assumptions underlying a given confrontation are altered, any confrontations linked to the altered confrontation are automatically marked for attention by the appropriate confrontation owner. When users start a new Confrontation Analyst

session, they are informed of any confrontation that may have evolved due to changes in a linked confrontation.

In addition to linking to *existing* confrontations, a user may propose a new confrontation and request that another user manages the confrontation. This is important, for example, when a Commander and his staff recognise that the actions of a character in their own confrontation depend on a sub-confrontation "within" that character. They may decide that the sub-confrontation is beyond their sphere of expertise and delegate the management of that confrontation to a subordinate commander.

Confrontation Analyst will deliver a request or directive to the appropriate user and, if accepted, will provide the user with some background to the confrontation (i.e., the confrontation that prompted it) and automatically link it to this confrontation. The proposer is also informed that the confrontation is now being managed by the suggested user.

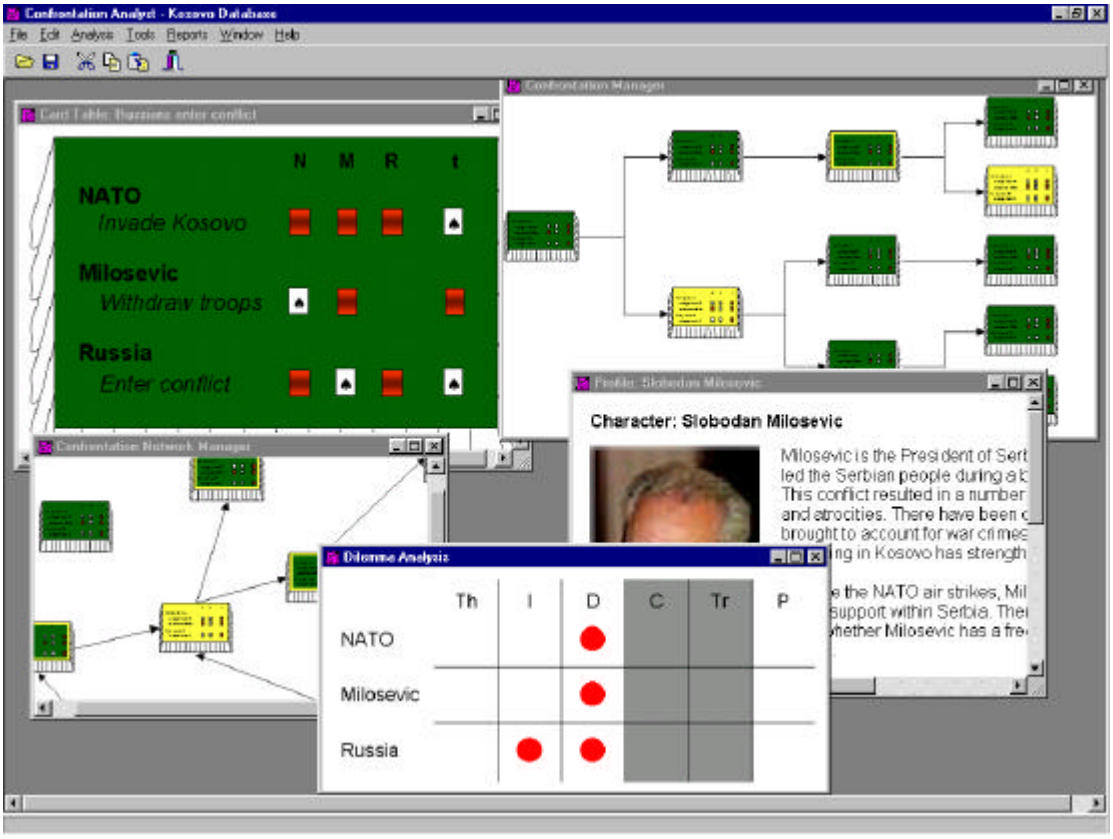


**Figure 5: An example from a Confrontation Analyst session**

Figure 5 illustrates part of a Confrontation Analyst session. In a distributed environment, users would log in to Confrontation Analyst at the start of every session, using a unique password. This would ensure that they only changed their own confrontations and would help to maintain the integrity of the analysis.

The top left window in Figure 5 contains the current card table. This is the main analysis area as it allows the user to model a particular confrontation. It is from this area, for example, that the user may wish to:

- examine the assumptions underlying the confrontation;
- move to a new confrontation by changing a number of assumptions;
- conduct a dilemma analysis (see window at bottom of Figure 5);
- specify that this confrontation is dependent on another confrontation (i.e. create a linkage between existing confrontations);
- propose an additional confrontation, to be managed by someone else, and linked to the current confrontation.

There are two confrontation management areas shown in Figure 5. In the first area (showing a *tree* of confrontations) the user may study the evolution of a confrontation. The tree represents the possible sequence of outcomes arising from given confrontation, with parallel branches of the tree representing possible alternative futures.

A Confrontation Analysis proceeds by examining how one confrontation leads to another, generally through the process of dilemma elimination. From each confrontation, there may be a number of alternative "next steps". For example, there may be a number of ways to resolve a dilemma. Alternatively, there may be a number of potential dilemmas that could be resolved at a given point. The sequence of steps taken to move from a confrontation to a resolution represents the resolution strategy. These strategies are the outcome of the Confrontation Analysis process and the Confrontation Manager provides users with the facilities to develop, alter and monitor resolution strategies.

In the Confrontation Manager the user is warned about potential changes to a confrontation's assumptions resulting from changes to a linked confrontation. Card tables shaded with a yellow "baize" alert users to these potential changes. In addition, confrontations that are linked to others, but do not have to be updated, are shown with a yellow border. These visual warnings help to maintain the consistency of the analyses. Figure 5 shows examples of these warnings.

It is important to stress that a user may be analysing multiple "confrontation trees" in the course of a drama. For example, NATO is in a physical confrontation with the Serbs, while being in a separate (but related) confrontation with the international community. Both confrontations would have their own "trees" as they will unfold in different ways. Confrontation Analyst would treat this example as two linked confrontations.

The other type of confrontation management facility offered by Confrontation Analyst is confrontation network management. This allows users to explore the *entire* set of confrontations on the database, and the linkages between these confrontations. In addition to linking and unlinking confrontations, the Confrontation Network Manager illustrates the complexity of certain situations and highlights the command team that is influencing any given confrontation. This information can be used to monitor certain situations and apply closer co-ordination between Commanders, when necessary.

Without the Confrontation Network Manager, it becomes difficult to manage complex confrontations. Indirect, but critical, confrontations can be missed during a crisis. In addition,

lower level commanders may begin to lose some of the context of their roles when higher level confrontations are changing on a regular basis. This is especially true if their efforts are in support of multiple confrontations, or if senior commanders become embroiled in new related confrontations. The Confrontation Network Manager allows commanders to monitor their negotiations in the light of complex, changing circumstances.

One of the most important aspects of Confrontation Analyst is comprehensive documentation facilities. All elements of the confrontation can be documented, including the links between the various confrontations. Documentation can be accessed from every appropriate point in Confrontation Analyst making it easy to provide, and retrieve, this information. The following areas can be documented:

- confrontations (including overviews, cards, positions, threats, preferences, dilemmas and strategies);
- characters (including profiles, background, values and, projects);
- links between preceding and succeeding confrontations;
- links between linked confrontations;
- information about the various Commanders (i.e. Confrontation Analyst users).

Confrontation Analyst can use the documented information, along with the formal structure of the confrontations, to produce a number of printed planning summaries and orders, status reports and briefing packs. These can be tailored to various levels of detail and exported to standard word-processing packages. One of the strengths of Confrontation Analyst's documentation facilities will be the ability to automatically generate role-playing (or war-gaming) scripts for SimStage – the Immersive Briefing system described in the next section. Taken together, these modules provide a sophisticated mission planning and rehearsal system for C2 in PSOs.

Confrontation Analyst will provide a variety of facilities beyond those mentioned in this paper. The design and the development of the system is focused on the needs of C2 in confrontations. Further research in this area is continually placing new demands on the projected tool set.

## 6. SimStage

SimStage is a Web-based interactive role-playing system based around the concepts of Drama Theory. One of the key ideas behind the SimStage concept is to immerse participants in the drama to such an extent that the simulation reality becomes psychologically real to them – without the use of sophisticated virtual reality technology. The greater the level of immersion, the greater the quality of the role-playing, leading to more detailed insights. Early experiments with the Immersive Briefing concept (see Howard, 1999) have corroborated this hypothesis.

The SimStage system uses a Confrontation Analyst database to create a detailed role-playing environment based around a given drama. Participants in the role-playing exercise are provided with a login name and password with which to access a SimStage drama. After logging into the system, participants select one of their current roles. Note that a participant may simultaneously be involved in multiple dramas, but may only play one role in each drama; for example, a participant could not be playing President Clinton in one area of the Kosovo conflict while simultaneously playing Slobodan Milosevic in another area. This would detract from the single perspective needed when playing a role and, as a result, is prohibited by the system.

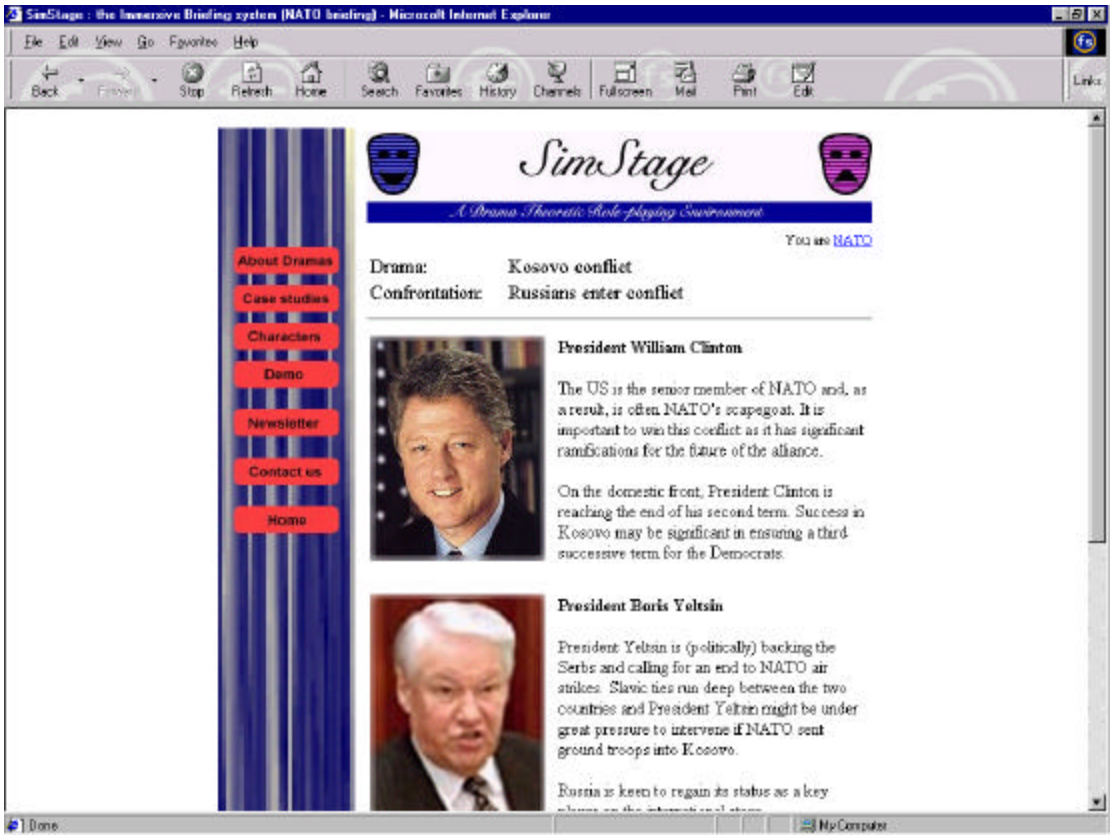


**Figure 6: Extract from SimStage briefing**

On selecting a role, participants are presented with an interactive briefing screen and a communication system. The briefing screen enables the participant to brief herself on various aspect of the conflict - as seen by her character. This information is organised according to the elements of Drama Theory, as discussed earlier in the paper.

As an example, Figure 6 shows the "Russians enter conflict" confrontation, from the "Kosovo conflict" drama, as seen by "NATO" (or the person playing the "NATO" character).

All the briefing material can be updated as the confrontation progresses. In addition to having access to written material, the role-players can use an interactive card table to review the current situation. This table is linked to other information in the Immersive Briefing script so that it can be used to quickly review the situation faced by the current character.

After reviewing the character's understanding of the confrontation, and its projects, players can begin negotiating with the other characters. All negotiations are conducted through the SimStage communication system. Two forms of communication are possible. Asynchronous communication (similar to e-mail) is the main communication format. It allows communications to be developed off-line and sent to other characters to be retrieved when they next "get into character". Alternatively, if participants are "in character" (or logged on) at the same time, they can make use of a simultaneous "chat" facility.

During these communications, participants try to convince, or coerce, the other characters into adopting the participant's own position. This can be achieved using dilemma resolution strategies to guide the negotiation process. These strategies are available via the briefing screen. It is

important to note that the dilemma resolution strategies are not detailed prescriptive courses of action. They are merely general guidelines that help to resolve certain dilemmas. For example, if they face a Deterrence Dilemma, one way to eliminate it is to make your fallback position less palatable to the other players. Players who choose this route will have to use their own initiative to think up courses of action that will have this effect.

All communications between a participant and the other characters are recorded, and the complete history is available to the participants via the communication system. In communicating with other characters, only character names are used by the participants. Rather than send a message to "John Smith", a participant would communicate with "President Clinton". The system implements its own e-mail facilities to maintain the "deception". In general, participants will have no information concerning the identity of their follow participants – only the characters.

Every change to the briefing data is recorded, allowing the sequence of events to be replayed on resolution (or breakdown) of a confrontation. This information allows analysts to conduct a forensic analysis of key events and compare different performances of the same drama. In this way, it is possible to build up a detailed picture of the possible paths a conflict may take, allowing commanders to design robust negotiation and military strategies.

The Immersive Briefing approach has been tested in a number of situations, including a commercial dispute. Experiments were conducted with standard e-mail technology, but outcomes were effective enough to strongly encourage further development of the SimStage system.

On completion of the SimStage prototype, the authors intend to deploy in it a number of UK companies to assist with developing competitive strategy. Results from these tests will be used to plan the deployment of SimStage within political and military environments. In a military environment, it is anticipated that the SimStage system would provide a mission planning and rehearsal system for PSOs. As part of a wider drama-theoretic C2 system for PSOs, it would also allow distributed Commanders to collaborate in the design, testing, critique and rehearsal of missions. In fact, the SimStage system could provide the basis for integrated, continuously evolving:

- intelligence gathering;
- intelligence analysis;
- mission planning;
- mission rehearsal.

The process of playing a character identifies critical holes in the available intelligence, leading to clearly focused intelligence gathering exercises. Once received, new information would instantly be integrated into the ongoing planning activities, leading to up-to-the-minute, adaptive planning.

## 7. Summary

Confrontation Analysis seems to be the appropriate basis for a C2 system for PSOs, given that a PSO campaign can be seen as a linked sequence of confrontations. Appropriate analytical software will, however, be required if this system is to become a reality. Confrontation Analyst and SimStage represent the first stage of a suite of Confrontation Analysis tools being developed towards this aim.

## 8. References

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