



Soar Modelling of Confrontational Analysis

Tony Kalus

Intelligent Agents Group

School of Computer Science and Mathematics

University of Portsmouth

England UK



Confrontational Analysis

- What is it?
- A brief history.
- A bit more detail.
- Why do it?
- Current status.
- Results so far.



What Is It?

- An approach to modelling situations involving multiple parties with conflicting objectives, with applications to OOTW.
 - Based on the idea that missions are on a continuum with war at one end, Peace Operations at the other.
 - Peace Operations are characterised by increased emphasis on the psychological aspects of confronting non-compliant parties, as opposed to fighting them. Collaboration with NGOs becomes important an important factor in confrontation.



A Brief History

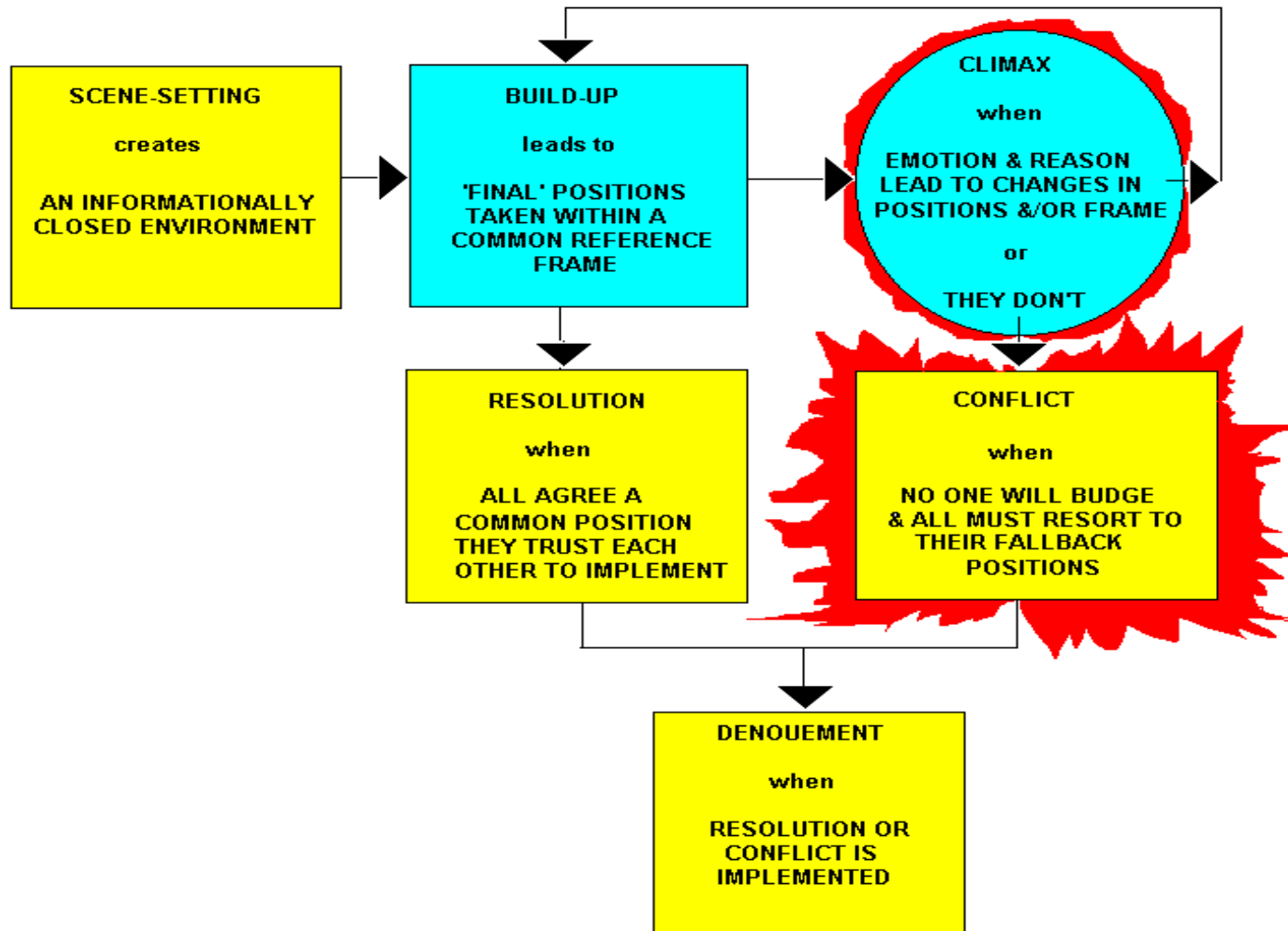
- Game Theory – von Neumann & Morgenstern – 1950's (USA)
 - Zero-sum games, used for Cold War & economic analyses.
 - BUT, very narrow definitions of 'best' and 'rational'.
- Drama Theory – Nigel Howard, Jim Bryant, *et al.* - early 1990's (UK)
 - Attempt to extend game-theory to include an understanding of irrationality, emotion, and players' reframing of the situation. Seeks to expose 'dilemmas' in a confrontation rather than 'solutions'.



A Brief History

- Confrontational (and Co-operation) Analysis– Howard, *et al*, - late 1990's-
 - Extension and application of Drama Theory to OOTW especially Peace Operations.
 - In the context of Drama Theory, a confrontation is resolved only when there are no remaining dilemmas.

Some More Detail.





The Six Dilemmas

- Central to Drama Theory is the idea of six dilemmas:
 - Threat,
 - Deterrence,
 - Inducement,
 - Positioning.
- These arise when players' positions conflict.
- Eliminating them brings players to a common position.



The Six Dilemmas

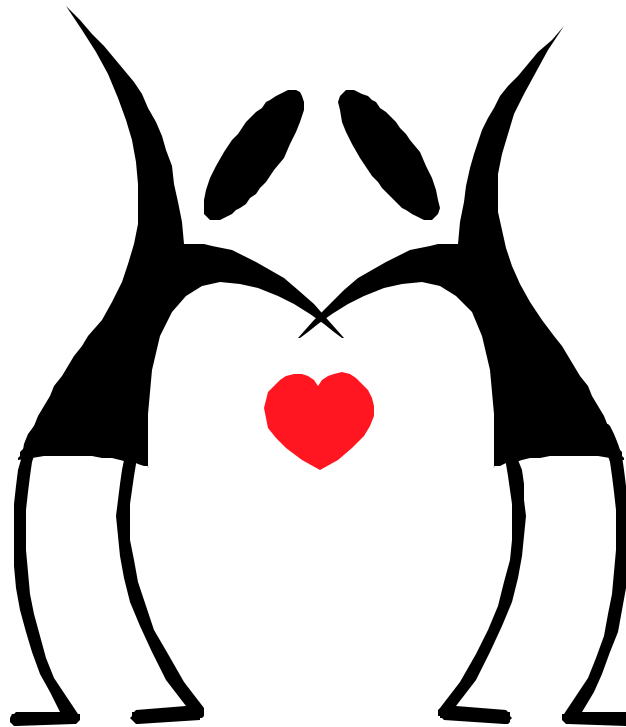
- When all players have the same position, there are two further dilemmas:
 - Co-operation,
 - Trust.

(These are duals of each other).



Resolution Of The Dilemmas

- Resolution of these dilemmas leads to





Resolution Of The Dilemmas

- However, this is the weakest part of the theory. Resolution methods include:
 - Genuine preference changes,
 - Rational argument in the common interest,
 - Changing the set of available options,
 - Displays of irrationality,
 - Demonstrations of emotion,
 - Deceit.



Why Do It?

- To see if there is anything in it.
- To clarify the theory.
- To help develop the theory.
- Creation of a MAS test-bed.
- Fun!



Current Status

- A MAS with communication infrastructure.
- Can decide which dilemma is present.
- Working on the conflict resolution part (most difficult – most ill-defined in the theory).



Official Outcomes:

- Decide on the value (or otherwise) of CA.
- If OK then
 - Use as a 'what-if' system for CA and training.
 - Extend the theory, e.g. how realistic is 'an informationally closed environment'?



Unofficial Outcomes:

- ✓ A MAS with comms infrastructure,
- ✓ Ability to experiment with KQML, ACL.
- A 'STEAM-like' add-on for negotiation, etc.,
- A test-bed for negotiation, co-operation, conflict, etc. theories.