INTRODUCTION TO MATRIX GAMES

BY

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ON
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INTRODUCTION

"We want to make games that are playable as well as realistic, and we want to understand why"

- Maj Tim Maout, UK

INTRODUCTION (CONTD)

- The matrix games concept was created in the USA by Chris Engle in 1992.
- Chris wanted to create a system by which it was possible for a player to "role-play" anything from a single person to an entire country.
- Chris felt that previous numbers-ridden game designs essentially missed the point (and anyway were too complicated and boring).
- What he wanted was a system that could take into account anything the players though was relevant, including intangible elements such as culture, beliefs, and perceptions of themselves.

INTRODUCTION (CONTD)

- Chris Engle took as his starting point the work of the philosopher Emmanuel Kant, then added George Hegel's idea that argument and counter-argument (thesis and antithesis) lead to a synthesis or consensus of ideas.

- Like all good ideas, the Matrix Game is very simple in concept, but has huge potential in that it can be adapted to fit any game setting.

- Wargames commonly used by professional wargamers usually address problems that are well understood, for instance tactical and operational problems for which established case studies contain relevant information.

INTRODUCTION

- However, wargaming situations that are future based and novel or for which we do not have real world examples on which to base adjudication, demand a more flexible approach.

- The matrix game approach provides the required flexibility.

- Focuses on describing outcomes through a process of discussion and debate of the effects of actions and decisions driven by the skills of the players and adjudicators.
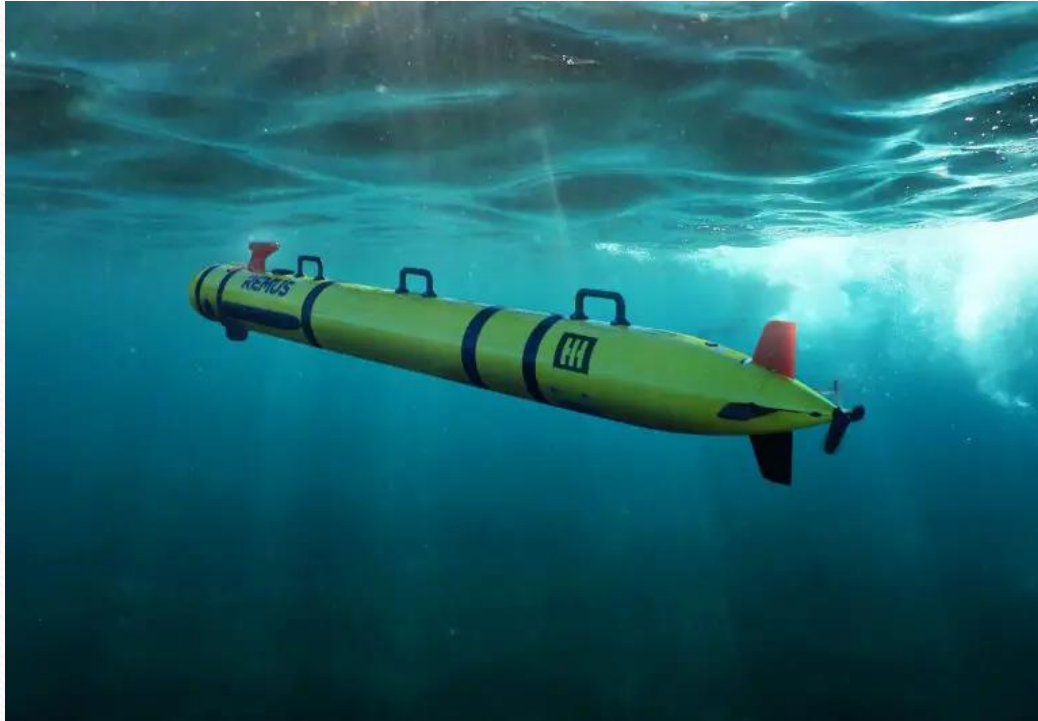
INTRODUCTION

- The matrix games approach to wargaming has experienced a sharp rise in use over the last couple of years.

- It has been applied in a wide ranging nature of situations during which its usefulness was successfully attested to.

INTRODUCTION (CONTD)

- For instance, various elements of the US DOD has used it for training, leadership development and analytical purposes.

- The Centre for Strategic Leadership of the USAWC uses matrix wargames as a tool for its Department of Distance Education program.

- They were used to help evaluate the ability of the students to apply at the strategic level the information they had learnt on the course.

INTRODUCTION (CONTD)

- The matrix wargames have also been used by the UK MOD for the assessment of programs for its unmanned underwater vehicle capability and the education of consultants about the MOD procurement systems.

INTRODUCTION (CONTD)

- The purpose of this lecture is to provide basic knowledge of the matrix game and its conduct to participants of AWCN Course 8/2024.

<u>AIM</u>

- The aim of this lecture is to discuss matrix games with participants of AWCN Course 8/2024.

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SCOPE

- Specific Terms Relating to Matrix Games.
- Academic Underpinning of Matrix Games.
- What are Matrix Games.
- How to Play a Matrix Game.
- Things to be Done in an Argument.
- Argument Assessment.
- Use of Dice.
- Turn Length (In Game).
- Game Length.
- End of Turn Consequence Management.
- Inter-Turn Negotiations.
- Secret Argument.
- Measure of Success

SPECIFIC TERMS RELATING TO MATRIX GAMES

- **Actors**.
  These are the primary roles in a matrix game. They can represent individuals, groups or complete nations. Eg, "Nigeria", "Nigerian Army", "President of Nigeria", etc.

- **Players**.
  Players are those playing the role and carrying out the actions of "actors". They can be one or several players operating as a team representing an actor.

- **Arguments**
  The expression of an actor's actions for the turn in the game. They are made up of "something the actor wants to happen"., "what measurable effect will that have" and "a number of reason why or how".

- **Serious Games**
  Those whose aims are serious educational or training purposes.

ACADEMIC UNDERPINNING OF MATRIX GAMES

- ▪ **<u>Crowdsourcing</u>**
- • Groups can be better at estimation than individuals, due to a diversity of opinion, decentralization of expertise, independence of thought, and aggregation of the result.
- ▪ **<u>Role Play and Prediction</u>**.
- • Role play can be a more effective basis for the prediction of decisions based on conflict resolution, than expert opinion.

ACADEMIC UNDERPINNING OF MATRIX GAMES

- **Role Play and Prediction (Contd)**.
- Hypothesis is that experts will predict what should happen, but that role play predicts what will happen.
- This is because when predicting outcomes in conflict, it is necessary to make predictions in a chain through the action, reaction and counter-action cycle.
- Ensure player roles fit the characters and subjects. Eg Putin and Trump.

WHAT ARE MATRIX GAMES?

The Nine-Dash Line
A Matrix Game about Incidents in the South China Sea
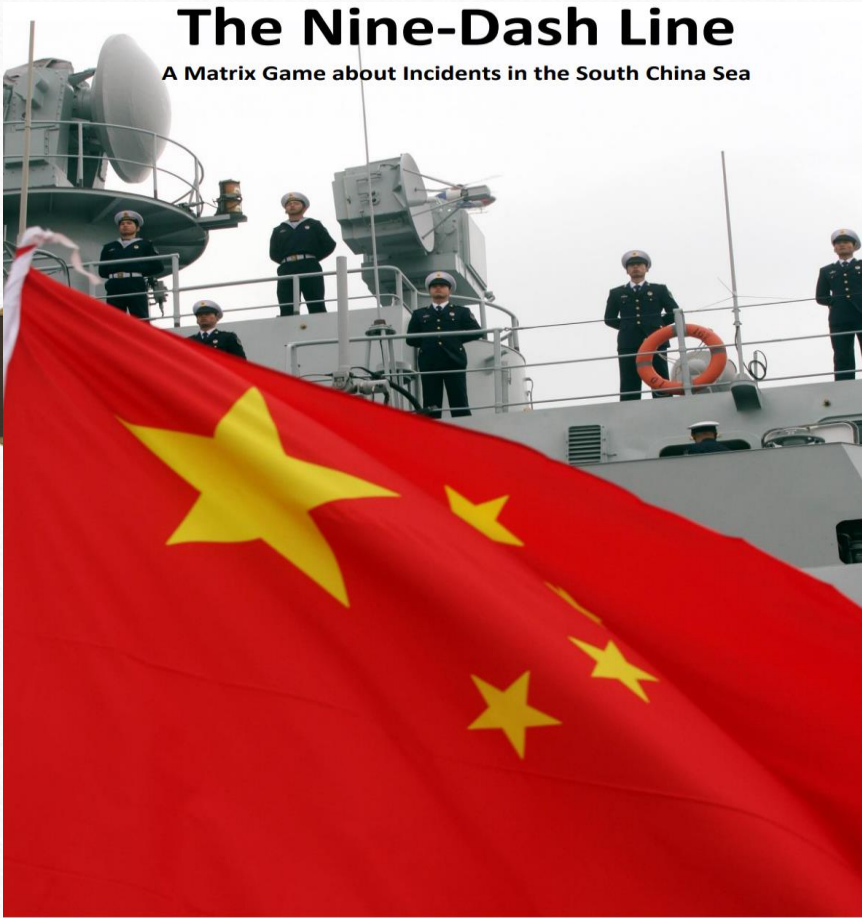
- **Matrix games are well suited for complex conflicts and issues involving multiple actors and stakeholders, varying interests and agendas, and a broad range of diplomatic, political, military, social and economic dimensions.**

- The game system crowdsources ideas and insight from participants, thereby fostering greater analytical insight.

- In a matrix game, there are few pre-set rules limiting what players or cells can do.

WHAT ARE MATRIX GAMES?

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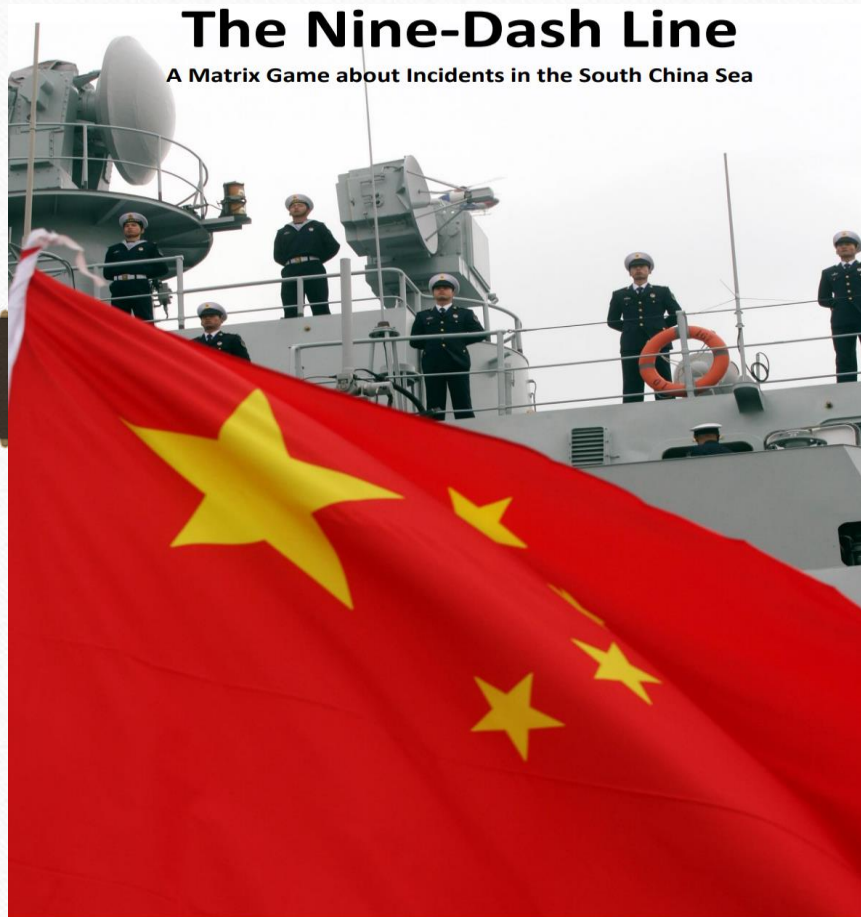
- Players or cells are free to undertake any plausible action during their turn.

- The chances of success or failure, as well as the effects of the action/event, are largely determined through structured arguments, and discussions in an open adjudication format in front of an adjudicating judge.

- This process allows for imaginative game dynamics that are lively and open-ended, and yet also grounded in reality

WHAT ARE MATRIX GAMES?
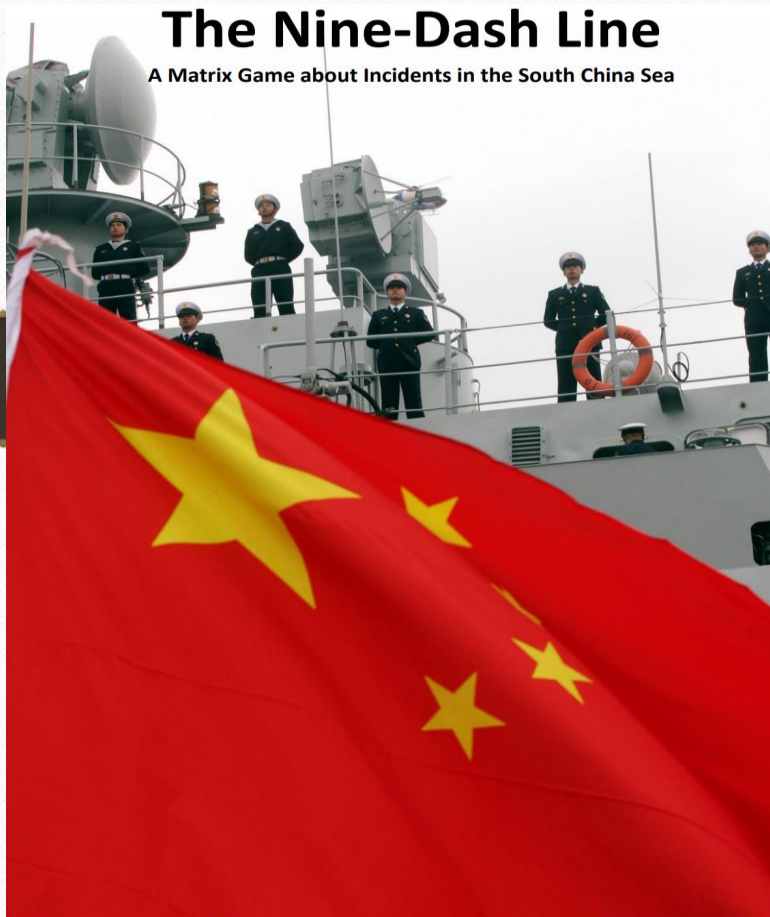
- In a matrix game, you use words to describe why something should happen.

- The facilitator or the players or both decide how likely it is, and you might roll a dice to see if it happens. Though, in the face of a compelling argument, you might not need to.

- The games themselves are not intended to be fiercely competitive, with obvious winners and losers.

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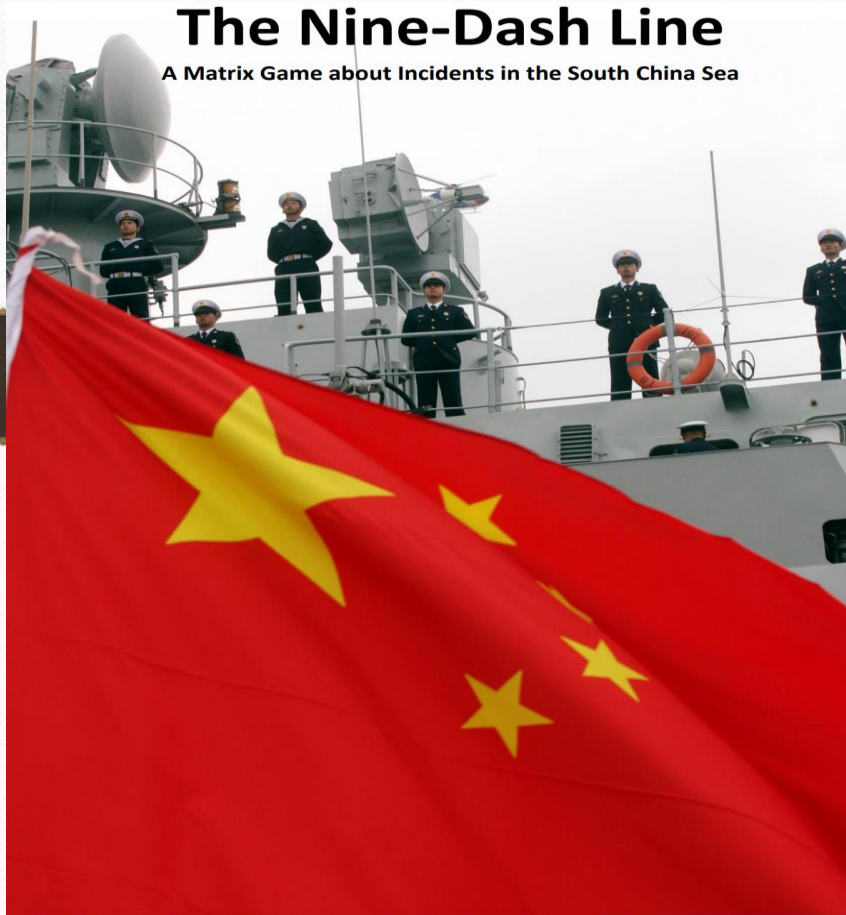
- The games work with the players working to generate a credible narrative.

- After the game, this narrative is examined, from which players gain insight and understanding of the situation that was being portrayed.

- The individual players roles will probably have objectives that will place them in conflict with other players, which they may attain at the end of the game.

HOW TO PLAY A MATRIX GAMES

- Before a game commences, every player/actor is given a brief which contains their roles, objectives, set up, etc.

- Players must read themselves into these before they commence the wargame and role playing.

- Player actions in most matrix games are resolved by the facilitator using a structured sequence of logical arguments from the players.

- Each player, in turn, will take an action in the form of an argument, much like making a legal argument.

HOW TO PLAY A MATRIX GAMES

- In a Matrix Game, actions are resolved by a structured sequence of logical "arguments".

- Each player takes turns to make an argument, with successful arguments advancing the game, and the player's position.

- There are a number of ways you can do this and each has their own strengths and weaknesses, some of the most popular are:
- The "Three Reasons" system.
- The "Pros and Cons" system.
- The "simple narrative" system.

HOW TO PLAY A MATRIX GAMES
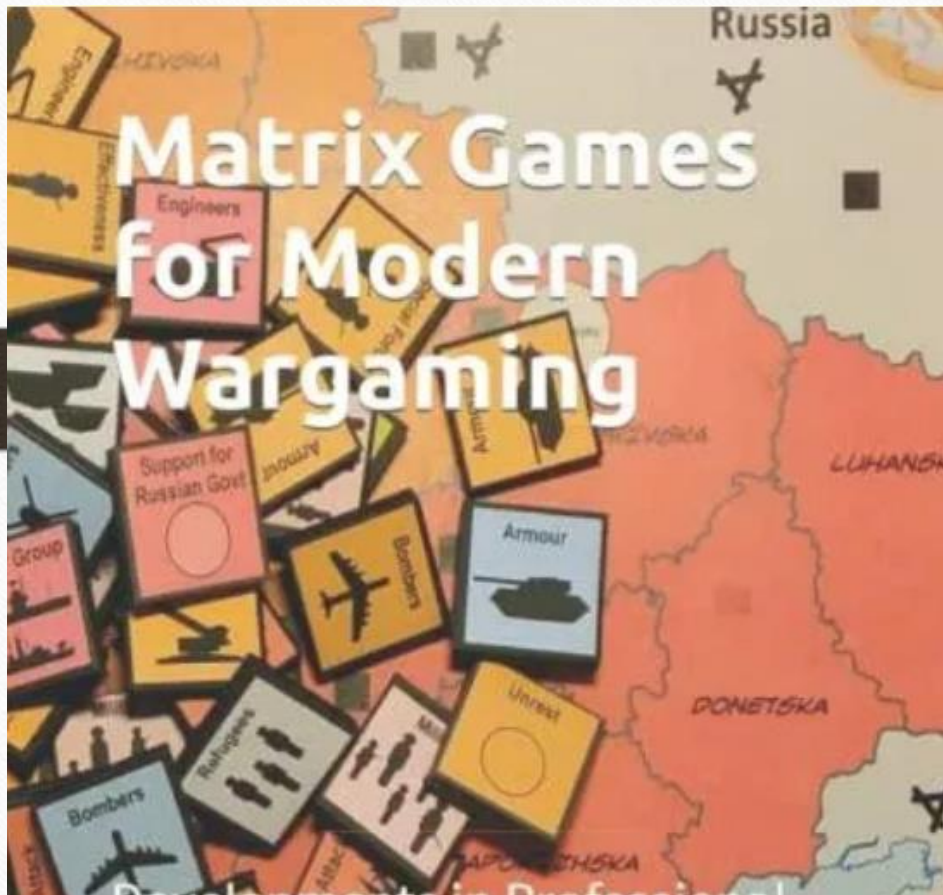
The "Three Reasons" System

In this system each argument is broken down into:
- Something That Happens.
- Three Reasons Why or How.

For Example:
- In a Peninsular War campaign, Wellington might argue:
- I shall fortify the town, and I am able to do this because:

- I have a ready source of trained manpower.
- I have an experienced Engineer in command.
- The British Government has recently sent me the money with which to pay for the work.

HOW TO PLAY A MATRIX GAMES

The "Three Reasons" System

- The arguments themselves are judged by the Facilitator/Umpire based on inherent likelihood, historical precedence, personal experience, and his own judgement (and quite often the other player's judgement).

- A chance of success arrived at (percentage dice thrown to see if the result was achieved, use of any combination of dice or random number generator, – or the Umpire decides based on military judgement and the justice of the circumstances).

HOW TO PLAY A MATRIX GAMES
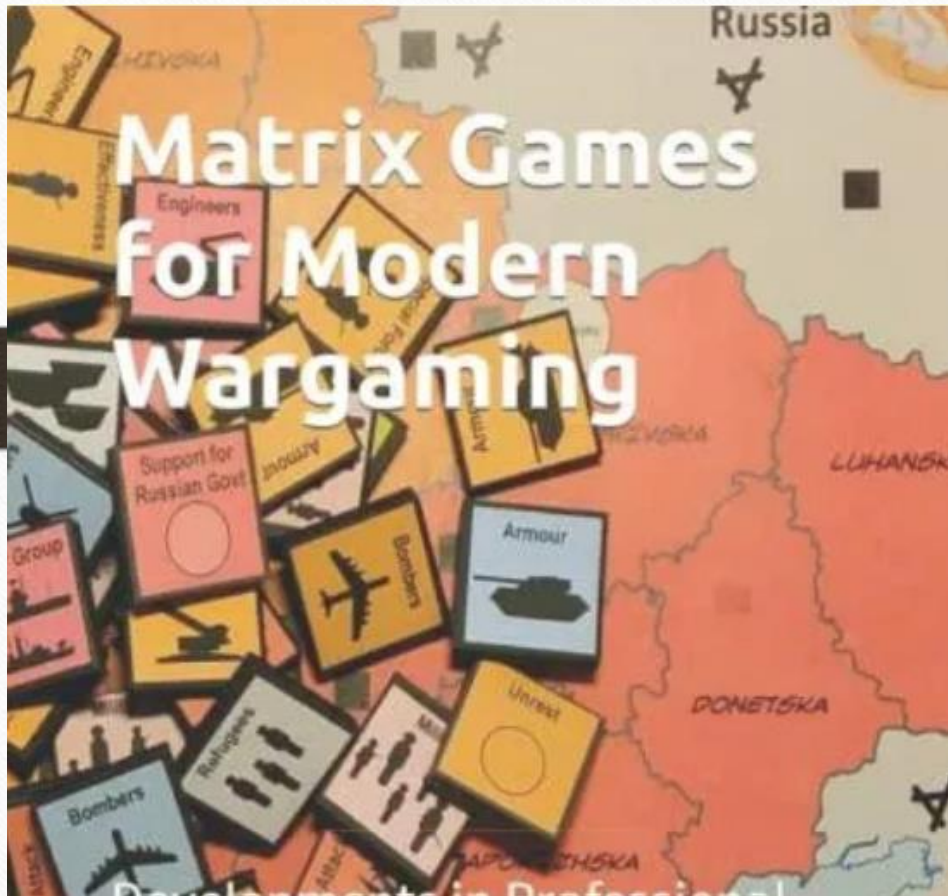
The "Pros and Cons" System
- In this system each argument is broken down into:
- Something That Happens.
- A Number of Reasons Why it Might Happen.
- A Number of Reasons Why it Might NOT Happen.

For Example:
- In a Peninsular War campaign, Wellington might argue: I shall fortify the town, and I am able to do this because:
- I have a ready source of trained manpower.
- I have an experienced Engineer in command.
- The British Government has recently sent me the money with which to pay for the work .
- The weather is fine so they can work uninterrupted.

HOW TO PLAY A MATRIX GAMES
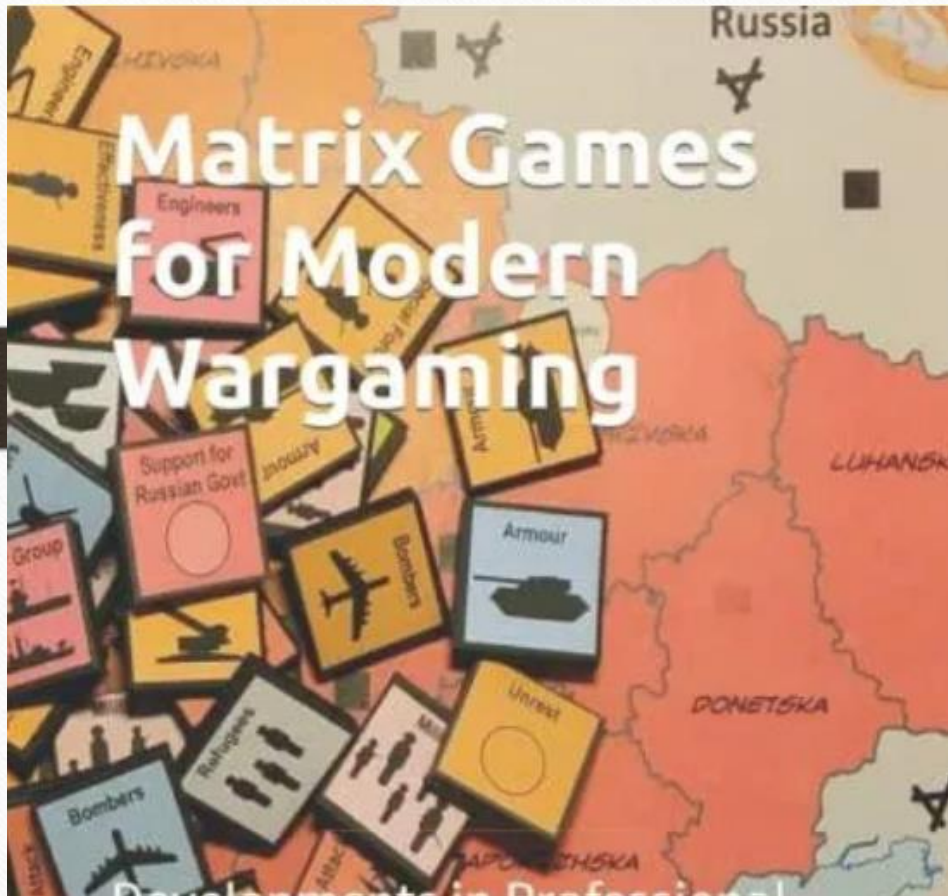
The "Pros and Cons" System

This represents 4 x Pros - so at this point the other players are invited to point out Cons:

- The best source of trained manpower is the British regular troops, but these are on the frontier guarding the approaches. The Portuguese troops are less well trained or led so the first reason is weak.
- The weather is hot and there is little access to fresh water so there is a high chance of disease.
- This represents 2 x Cons (or 1 x Con and cancels out 1 x Pro) - so at this point there is a net result of +2 Pros.

HOW TO PLAY A MATRIX GAMES

The "Simple Narrative" System

- In this system an argument simply consists of a narrative that advances the player's position in the game.
- The players states what happens next in the evolving story that is the current situation.
- The chances of success or failure and exactly what those results look like are judged by a Facilitator/Umpire or, more usually, by another player taking it in turns.
- The advantage of this system is that it is extremely simple and accessible to players of all ages and abilities.
- The disadvantage is that it lacks structure and, if you get the players to assign the chance of success, you could get inconsistent and arbitrary results.

THINGS TO BE DONE IN AN ARGUMENT

- Any reasonable argument is allowed in a matrix game if it is relevant to the scenario.
- The only criteria for judgement is the likelihood of the event taking place.
- It is also possible for players to negotiate among themselves. But this is possible only in between turns.
- **Players only get to do one action in a turn.**

THINGS TO BE DONE IN AN ARGUMENT

- Part of the insight to be in the game is in deciding what the **highest priority** of the players/actors are.

- The action could be large, but it should be a single action.

- *So players must decide which actions they want to do first.* The ones that will have the most impact, either immediately or in the future.

ARGUMENT ASSESSMENT

- The object of the game is to generate a credible narrative from the course of the game from which insights into the situation can be gained.
- Sensible arguments should succeed automatically unless challenged by the other players.
- Once an argument has succeeded, the situation remains that way until another argument changes it.

ARGUMENT ASSESSMENT

- Arguments which build upon previous successful arguments are given an automatic bonus because they are contributing to the unfolding narrative.

- Two successive arguments that are in direct opposition ("This happens" – "No, it doesn't") make for a poor narrative and is discouraged, because they represent a logical inconsistency and cannot both be true.

- The earlier argument has already happened, so it is impossible for it not to have happened.

ARGUMENT ASSESSMENT

- When resolving arguments that have a chance of failure, the ways of working out if the argument will succeed are as follows:
- **Traditional Dice**. The use of two six-sided dice with a score of 7+ required to succeed. A plus one dice modifier is added for a Pro and a minus 1 dice modifier for a Con.

ARGUMENT ASSESSMENT

- **Consensus**. Having a discussion among the players until there is a general consensus as to whether the arguments succeeds or fails. This might take a long time with no guarantee of success. An alternative could be to reach a consensus on the probability of an argument succeeding and afterwards throw a dice.

ARGUMENT ASSESSMENT

- **Ask the Expert**. Only used for technical subjects like cyber where an expert panel decides on the success of an argument or the success probability.
- **Weighted Probability**. Same as the traditional dice.
- **Estimative Probability**.
- Alternatively to weighted probability, players or teams are asked to assess the chances of success and these can be aggregated. This provides insight into how participants rate the chances of success of particular COAs.

ARGUMENT ASSESSMENT

- A set of estimative probability cards during which players or teams simply select the card from their hand that in their view best represents the probability of an action's success.

- The scores on the cards are then aggregated together, and percentage dice are used to determine success or failure.

Almost Certainly Not	Probably Not	Chances About Even	Probable	Almost Certain
10%	**30%**	**50%**	**70%**	**90%**
Chance of Success	Chance of Success	Chance of Success	Chance of Success	Chance of Success

ARGUMENT ASSESSMENT

- **Diceless Adjudication**.
- Should the umpired, consensus and expert methods be inappropriate for the game and situation, a form of voting system could be used:
- Show of Hand.
- Agree, Disagree, and I'm Not Sure.

I agree

I'm not sure

I don't agree

USE OF DICE

- Dice are only used when there is a risk of failure established in the arguments and counter arguments.

- If there are no counter arguments or there is overall support for the argument, it succeeds.

- If there is a risk of failure, however, this risk is realized through the use of a dice.

- Where players are uncomfortable with the use of the dice, all they need to do is to come up with an argument that everyone agrees has no chance of failure.

TURN LENGTH (IN GAME)
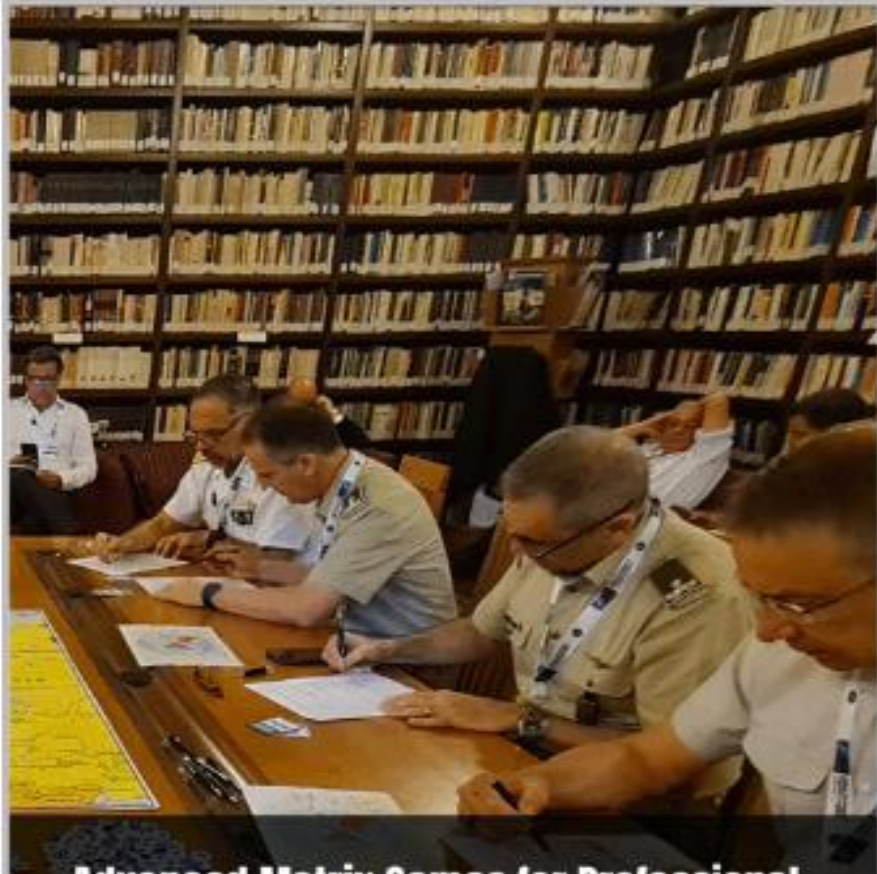
- The time allowed in arguments for a turn needs to be appropriate to the scenario, though may not be precisely defined.
- Time allotted for a turn must be realistic taking into consideration the quantum of action that will take place in real life for such actions.
- For instance for a cyber scenario, time may be needed for recce, some code writing or acquisition of applications before the actual attack taking place in a subsequent turn.

TURN LENGTH (IN GAME)
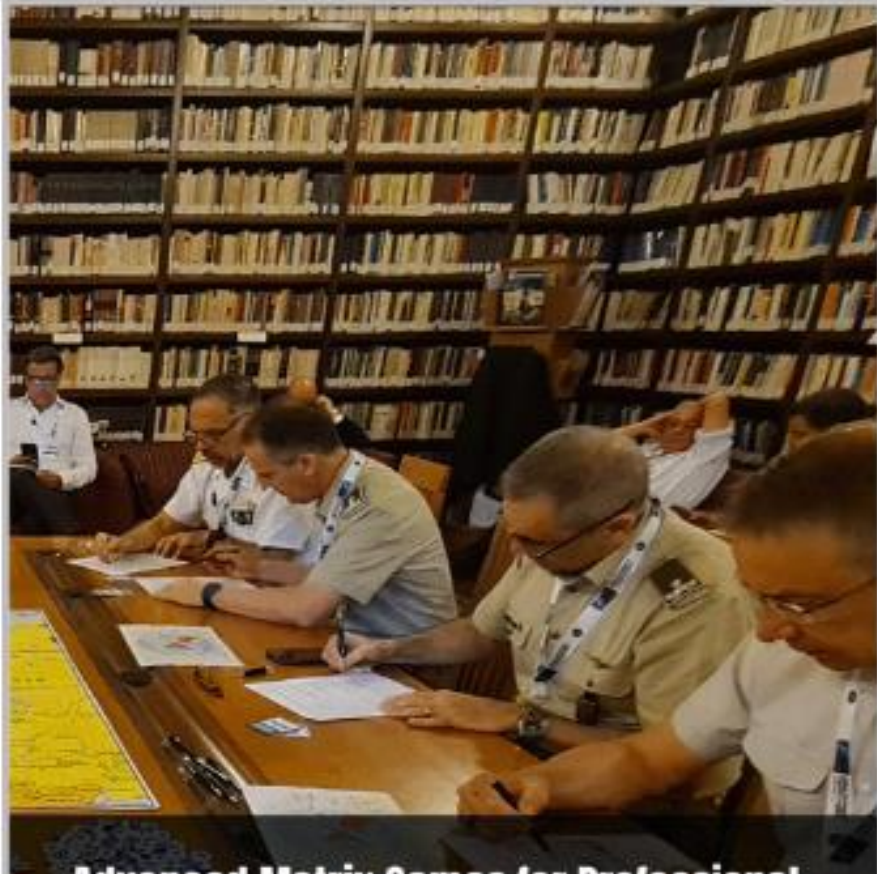
- Timescales must not get unrealistically compressed.
- Players can of course argue for long term projects, as a matrix game provides the players to do things beyond the limits of normal games.
- Must ensure that the arguments succeed for it to pass.

GAME LENGTH

- Matrix games are intended to be fast and have low overheads.
- Target time of not more than 30 minutes for a turn.
- It is desirable that each game has a reasonable number of turns to allow for action, reaction, and counter-action to take place.
- In real life games, 6 turns are the recommended minimum.

END OF TURN CONSEQUENCE MANAGEMENT

- At the end of each cycle of player arguments, the Facilitator goes over those successful and failed arguments that have generated new **established facts** in the game.
- Some of the arguments when considered as a whole, may have generated additional or even unintended consequences that may arise.
- The **law of unintended consequences** arguments could also be made at the end of a turn to widen the players' understanding of the consequences of their actions.

INTER-TURN NEGOTIATIONS

- Actual arguments of the matrix game are about actions that take place in the course of the game.
- However, actors represented by the players may want to engage in face to face negotiations with each other in an effort to strike a deal.
- In such circumstances, this is done in between turns, in a quiet corner of the room to try a little influence in real life.
- An analysis will normally be made of these off-table negotiations and the reasons the players felt they were successful or failed., so as to get important insights

SECRET ARGUMENTS
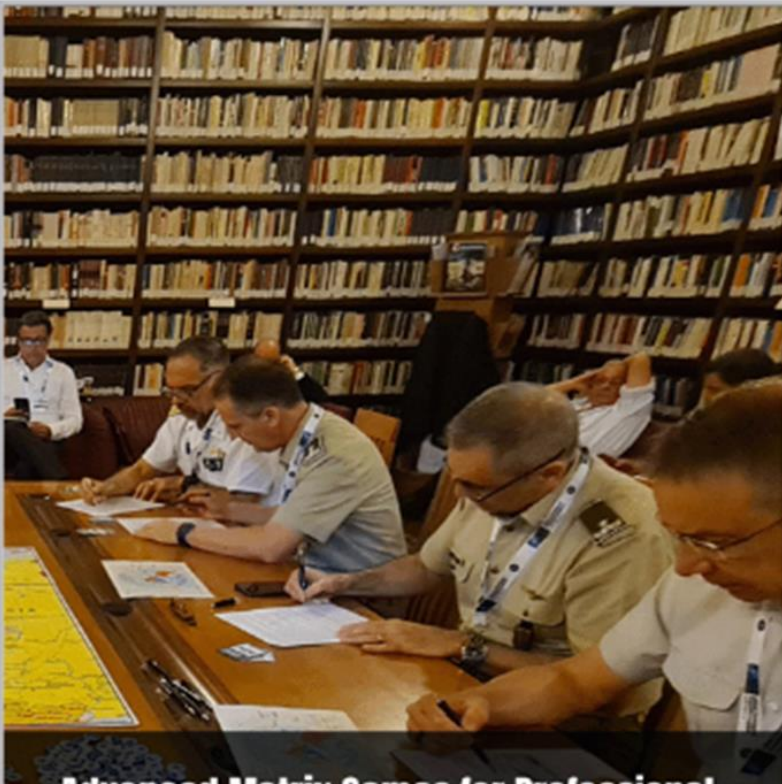
- There may be some cases when players want to hide from other players what they want to argue about.
- In this case, they write down their argument on a piece of paper and present it to the facilitator, announcing to the other players that they are making a secret argument.
- The secret argument remains hidden until events in the game cause it to be revealed.
- **Secret arguments should only be for misdirection – something you conceal when you are sure that an opposing actor will try to take or attack later in the game.**

MEASURE OF SUCCESS

- In many arguments, success or failure may not be a simple Yes, or No proposition.
- A sliding scale of success or failure in terms of numbers or the quality of the outcome, is usually represented by the score on the dice.
- For instance if a 7+ was needed to succeed and a double six (12) was rolled, this can indicate an especially notable success.
- Conversely, if a double-one (2) was rolled, this could represent a disastrous failure.

PLAYERS

- Matrix games are best played with an even number of players as it is the action and counter-action running through the game that generates the insights
- The game works best with 6-8 players and a facilitator.

CONCLUSION

THANK YOU FOR YOUR RAPT ATTENTION

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INTERACTIVE SESSION