Wargames in a Digital Age

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Wargaming is an applied tradition of interactive modeling and simulation dating back to the early 19th century or, if one counts more abstract martial pastimes like Chess and Go, all the way to antiquity. Why a panel about games (tabletop as well as computer) that spotlight war—surely the most inhumane of organized human endeavor—at a digital humanities conference?

First, we assume that wargaming as both a descriptive or predictive tool as well as a recreational pastime transcends specific technologies of implementation. For example, when a tabletop wargamer moves troops across the battlefield to attack an enemy, they are enacting a specific procedure that is defined against a larger complex of procedures and systems which collectively aspire to represent historical reality within a range of probable (or possible) outcomes. The abstraction of combat, movement, supply, morale, and other basic military considerations into algorithmic process or a numerically expressed spectrum of outcomes—randomized by die rolls within the parameters of a situation—makes the genre a rich source for anyone interested in the formal and procedural representation of dynamic, often ambiguous, literally contested experience.

Second, we are concerned finally not with wargames for their own sake, but as exemplars of simulation as a mode of knowledge representation. As a genre, wargames offer some of the most complex and nuanced simulations in any medium. A typical tabletop game might have many dozens of pages of rules, defining procedures and interactions for hundreds or even thousands of discrete components (unit tokens) across as much as twenty square feet of map space. This places them at the formal and physical extremes of ludic complexity. Almost from the outset of the personal computer revolution, meanwhile, wargames (as distinct from games with superficial militaristic themes) became a major software genre. Popular tabletop wargames were rapidly translated to the screen by companies such as SSI, with crude artificial intelligence crafting opposing moves. Other games dispensed with the conventions of their manual predecessors and (much like flight simulators) sought to recreate an intense real-time first-person experience. Harpoon (1989) placed a generation of early armchair enthusiasts in the Combat Information Center of a modern naval frigate, with countless variables in weapon and detection systems to master.

We believe that the digital humanities, which have already embraced certain traditions of modeling, might have something to learn from an exploration of this particular genre of simulation, which has proved influential in both professional military and political settings as well as the realm of popular hobby and recreation. (We also find it suggestive that several long-time members of the digital humanities community were "teenage grognards," suggesting that the games were of a piece with other elements of a particular generational path to computing.)

Kriegsspiel as Tool for Thought

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Kriegsspiel of course is German for (literally) "war game." In 1824, the Prussian staff officer Georg von Reisswitz formally introduced the game (versions of which had been kicking around in his family for years) to his fellow officers. "This is not a game! This is training for war!" one general is said to have exclaimed (Perla 26). It was quickly adopted, and became the foundation for the German institutionalization of wargaming

which persisted through World War II. The von Reisswitz Kriegsspiel was played by laying wooden or metal blocks across maps to mark troop dispositions (Figure 1). Games were conducted on actual topographical maps, often terrain anticipated as the site of future operations (for example, the 1914 Schlieffen plan was subject to extensive rehearsal as a Kriegsspiel). By the middle of the 19th century the "game" had evolved two major variants, so-called "rigid" and "free" Kriegsspiel. The latter attempted to replace the elaborate rules and calculations with a human umpire making decisions about combat, intelligence, and other outcomes on the battlefield.

In this paper, we take the twin traditions of rigid and free Kriegsspiel as our point of departure for thinking about simulation gaming in terms of what Howard Rheingold, in the context of computing, once called "tools for thought." Indeed, the fork in Kriegsspiel's development history anticipates much about both manual and computer simulation design. Dungeons and Dragons, the progenitor of all tabletop role-playing systems, grew from a set of medieval wargaming rules called Chainmail. The original developers (Gary Gygax and Dave Arneson) added the magic and monsters, but they also replaced much of the game's rules apparatus with an umpire dubbed "dungeon master" whose job it was to adjudicate the outcomes of various actions, sometimes with the help of tables and dice, but just as often "freestyle," relying on judgment and instinct. Wargaming itself has largely remained divided along the same fault between rigid and free systems, with the former attracting hobbyists who buy pre-packaged games (several thousand have been published) to try their hand at Gettysburg or Waterloo and the latter the domain of professional consultants who stage elaborate role playing exercises of the sort originally conducted at thinktanks like RAND but are today as likely to assist a board in planning a corporate merger as a military staff in planning a mission.

As the above suggests, wargames are also both predictive and retrospective in orientation. On the one hand, hobbyist games are often marketed promising insight into the past, tempting a player into believing that with sufficient study and canniness he or she might out-general Napoleon and rewrite history (Dunnigan). In this sense, wargames align with certain strains of academic counter-factual history (Ferguson, et al.). Yet Kriegsspiel was attractive to professional planners precisely because of its predictive value: an accurate formal model of some battlefield dilemma would presumably allow commanders to rehearse their tactics and continually alter the parameters of the situation to arrive at solutions to the military problem. Often, in fact these dual orientations were pursued in tandem, with a historical outcome from a game serving as the control case for subsequent prediction: if a game can restage Midway according to the trajectory of actual events, then in principle outcomes from its hypothetical situations might be equally trusted.

There is yet another way of thinking about wargames though, one that does not assume naïve faith in their capacity as either predictors or descriptors of real-world phenomena. One great virtue of tabletop games is that, by their nature, their rules systems are absolutely transparent. Everything the players need to play the game must be in the box, and the quantitative model underpinning the game system is thereby materially exposed for inspection and analysis. Many gamers collect and compare dozens of different games on the same subject to see how different designers have chosen to model and interpret events. The hobby is filled with vigorous discussions about designers' intents, as well as house rules and variants, because part of what comes packaged with the game is the game system. (Indeed, the term "game designer" originated at SPI, one of the hobby's premier wargame publishers.) As one wargame enthusiast shrewdly observes, "What wins a wargame is but a dim reflection of what wins a battle, or a war. Sometimes, what wins a wargame doesn't reflect reality at all" (Thompson). In this view, the game engine is a procedural instrument for producing an outcome whose value lies in its potential for provoking counter-factual analysis. A wargame--either manual or computer--may permit Napoleon to win at Waterloo: the salient question is not whether the game was "right" but in the questions it exposes about whether Napoleon really could have done so (and if so, how). This viewpoint actually comports with that of professional wargame facilitators,

who assert that the ultimate value of their games is *not* predictive in any simple sense, but rather as "part of a process persuading people that there are other ways to think about problems" (Herman 59). A modern boardroom wargame, in other words, provides a safe space in which participants can explore solutions that would not have been ventured in a more conventional setting.

After establishing this background through examples, the paper will propose a new Kriegsspiel implementation that modulates between rigid and free design parameters in order to expose—deliberately—the workings of the game engine as a tool for the kind of thinking Thompson suggests. The key counter-factual analysis is access to the game's internal systems, and analysis of their function as systems for procedural representation, what Kirschenbaum has elsewhere called *procedural granularity*. Our Kriegsspiel model will thus permit play of the game in its various historical incarnations, while simultaneously exposing and even directing user attention to various game systems. At the same time, our model draws inspiration from von Reisswitz's attempt to simulate the "fog of war." This term, which was coined by that most influential of all modern military theorists, Carl von Clauswitz, aptly describes the gaps in situational awareness experienced by soldiers and commanders on the battlefield. We note, however, that it also corresponds to the more modern game theoretic notion of "imperfect information" and to the general idea that successful simulation—both as analytical exercise and as imaginative activity—depends largely on what is not "filled in" by the game environment. We believe, indeed, that by building these kinds of environments, we can come to a better understanding of how this important dynamic works in interactive environments more generally. The kind of Kriegsspiel we propose is finally a tool not for thinking about war, but for thinking about representation and design.

Figure 1. A game of Kriegsspiel played using a modern set

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What Does It Feel Like When They Put you Back in the Box? : Representation and Mathematics in Tactical Simulations

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Simulation is a key method for analyzing situations and events as well as for presenting them to the public. Although this panel focuses on the simulation of military events (Arnhem), the same principles apply to computer-based simulations as well as personal "role-playing" games, and to simulations of other types, such as financial simulations (1830), medical simulations (ER; see also Halloran et al, 2009), or political situations (Origins of World War II).

In broad terms (Frasca 2001; Kirschenbaum 2003), a simulation is a narrative generator, a system containing in potential a large number of possible sequences of events. At the same time, to be practical, a simulation must quantize the infinite variety of potential narrative reality to a small set of event categories, a set small enough to be tractable and manipulable to the players. A simple example of this is the playing field or map itself. In a typical tactical simulation, the map will be "discretized" into a regular array of hexagonal regions, typically assumed to uniform in composition ("forest hexes"), possibly with edge effects such as rivers or walls. Another example is the with edge effects such as rivers or walls. Another example is the playing piece itself, which can range from a simple wooden counter (as in Risk or Diplomacy) to a bewildering array of symbols representing high level abstract properties of a multi-person combat unit (Arnhem), or even a detailed schematic of individual functional capacities (Star Fleet Battles).

Similarly, the relationship of events to each other is controlled by game rules describing the set of permissible actions and their (possibly probabilistic) outcomes. For example, "ships" are not typically permitted to move through "forest"; "cavalry" usually moves faster than "artillery," and the effect of "encountering" enemy artillery may result in the elimination of a counter, its enforced movement ("retreat"), or other effects.

In this paper, we analyze the mathematical basis for these representations, stripping them both of their narrative aspects (the association of any particular hex with the Argonne forest, for example) as well as their technological aspects (whether the region is represented by colored cardboard, pixels, or an abstract name). We focus particularly on the differences between quantifed and non-quantified representations as well as between probabilistic and deterministic representations. We also discuss some of the aspects of the unrepresented–and therefore illegal–aspects of reality. In some cases, these can be seen as aspects of increasing realism by disallowing activities that could not physically take place in our hypothetical universe, but can also be seen as limiting the choices for a creative player, or even of enforcing some sort of political correctness upon the game universe itself by outlawing possible but distasteful alternatives. We suggest both that the narratives generated as well as our analysis of simulated narratives can be enhanced by an understanding of the abstract structure of the representations, and that this may eventually enhance our ability to understand non-simulated narratives such as those generated by counterfactual historians.

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The Benefits and Limits of Computerisation in Conflict Simulation

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Ever since the development of 'Kriegspiel' nearly two centuries ago, military professionals and enthusiasts have used simulation and gaming techniques to model real military conflicts.[1] This phenomenon builds on the theoretical similarity between war and games, in that both are dialectical strategic contests between opposing wills, each struggling to prevail.[2] Hence, Clausewitz said that 'In the whole range of human activities, war most closely resembles a game of cards'.[3]

The growing potential of computers has naturally transformed the field of conflict simulation. Military training now employs networked computer arrays running real time first person models of entire conflict environments, and millions of enthusiasts use similar first person simulations of air combat, ground fighting and the like.[4] However, what is interesting is the persistence of traditional manual simulation techniques alongside this computerised mainstream. Just as military forces continue to use real field exercises, so many enthusiasts continue to employ pre-computer age techniques such as maps and counters in their modelling of conflict. Indeed, such 'manual' wargames are now being published at a faster rate than ever before, and there are still far more manual than computer simulations in existence, especially of historical conflicts.[5]

I have been playing and designing conflict simulations for over three decades, and I use both manual and computerised versions routinely as instructional aids and research tools in the War Studies Department at KCL, including through an MA course in which students design their own simulations of conflicts of their choice.[6] In this paper, I will explore the benefits and limits of computerisation in conflict simulation, and explain why my own forthcoming book Simulating War focuses so heavily on manual simulation techniques despite the ongoing computer revolution.

The paper will have two central themes. One is the complex and double-edged nature of 'accessibility' in the simulation field. Computer simulations tend to be more accessible to users, but harder to programme and design, so they are best suited to expert-led situations in which a few highly capable individuals devote considerable effort to creating a model which can be learnt and used 'as is' by masses of less qualified people. Manual simulations, by contrast, tend to be less accessible to users because they need to master lengthy rules to be able to operate the model at all, but in the process the users are required to engage much more directly with the designer's ideas and assumptions, and it is a short step from being able to play a manual simulation to being able to tweak the rules or even to design entirely new systems to give a better reflection of one's own understanding of the underlying military reality. Hence, manual simulations are much more accessible from a design perspective, since one does not need to be a computer programmer to create new systems, and since using other people's systems conveys a much better understanding of design techniques.

Many recent computer simulations have sought to soften their expert-led character by incorporating provision for simple modification and scenario generation by users themselves.[7] However, this flexibility rarely extends to changing the fundamental systems, and it is actually manual simulation design which has become radically more accessible and democratised in the computer age, thanks to the ease with which individuals can now design full colour maps and counters and sell or give away digitised copies of their rules and graphics online without any physical production or distribution costs.[8] Since I believe that designing simulations for oneself is a far better way of gaining insight into the dynamics of a real conflict than is simply playing someone else's computer game on that subject, I see the much greater design accessibility of manual simulations as a major reason for their continued production and relevance, with computer graphics and online distribution playing a key role, but without the rules themselves having to be coded into computer software.

The second key theme of this paper will be that the relative advantages of manual and computer simulation vary greatly depending on the type of conflict being modelled and the perspective which users are intended to adopt. Broadly speaking, the more fast-moving and physically calculable the conflict environment, and the more that users are intended to experience the perspective of a single real individual, the more that computers have to offer. Hence, although it is possible to simulate aerial dogfights using maps, counters and dozens of pages of highly complex and time-consuming rules, the fast-paced 3D manoeuvres are obviously much better captured by real-time computer simulations from the perspective of the individual cockpits, and this is exactly what I use in my own teaching about air combat.[9] Even when simulations are intended to model entire battles, computers can employ AI routines to mimic the limited perspectives of an individual commander, by masking the full picture in a way which manual simulations find harder because their users must run the whole system rather than just playing individual roles within it.[10]

The trouble with computers is that their unparalleled number-crunching abilities tend to encourage the dangerous belief that accurate simulation is primarily a matter of adding more and more parameters and increasingly detailed data. Manual simulation designers, by contrast, must perforce focus on identifying and modelling the really significant dynamics in that particular conflict, since their games would otherwise be completely unplayable.[11] This pushes them more towards an output-based, top-down design approach, whereas computer programmers tend to prefer more input-based, bottom-up techniques. The differences can be striking. For instance, networked first person computer simulations of infantry combat tend to produce grossly ahistorical casualty rates despite highly precise and detailed modelling of terrain and weaponry, because the individual participants behave far more boldly than they would if the bullets were real. Manual simulations find it much easier to model this suppressive effect of fire, by simply prohibiting users from moving troops who are pinned down in this way.[12] Since it is very common indeed for conflicts to be affected at least as much by such psychological dynamics as by more calculable physical parameters, manual simulations can often identify and capture the 'big picture' at least as effectively as do apparently more detailed computer models.[13]

The central message of this paper will be that 'simulation' and even 'digitisation' are not necessarily synonymous with 'computerisation', as so many today seem to believe. Military professionals and enthusiasts have been producing 'digitised' mathematical models of conflict since long before the computer age, and such manual simulations continue to flourish alongside their computerised counterparts. The biggest challenge they face is that computer simulations now have much greater mass market appeal and a much more professional image within defence and academia. However, without the broad accessibility and top-down focus of manual simulation design, computerised conflict simulation would become an unduly arcane and detail-obsessed science. Manual and computer simulations of conflict will hence remain complementary endeavours for many years to come.

Notes

1. See P.Perla, *The Art of Wargaming*, (Annapolis: Naval Institute Press, 1990) and J.Dunnigan, *The Complete*

Wargames Handbook (New York: William Morrow, 2nd ed., 1992).

2. See T.Cornell & T.Allen (eds.), *War and Games*, (Rochester NY: Boydell, 2002), which includes a chapter by myself.
3. C. von Clausewitz, *On War*, edited and translated by M.Howard & P.Paret, (Princeton: Princeton University Press, 1976), p.86.
4. The similarity between the genres has become so great that virtually the same games are often employed by military professionals and civilian enthusiasts, as with the commercial game *Armed Assault* (Bohemia Interactive, 2007), whose military variant *VBS2* is widely used as a training aid and has now even been released back to the public by the UK Ministry of Defence as a recruitment device!
5. See the flood of new manual game announcements on `www.consimworld.com`, and compare this with the survey 30 years ago in N.Palmer, *The Comprehensive Guide to Board Wargaming*, (London: Arthur Barker, 1977) and with the new computer game announcements on `www.wargamer.com`.
6. See my course website at `http://www.kcl.ac.uk/schools/sspp/ws/people/academic/professors/sabin/conflictsimulation.html`, and my book Lost Battles: Reconstructing the Great Clashes of the Ancient World, (London: Hambledon Continuum, 2007).
7. See, for example, *Armed Assault* (Bohemia Interactive, 2007), and Norm Koger, *The Operational Art of War III*, (Matrix Games, 2006).
8. See, for instance, `www.wargamedownloads.com` and `http://cyberboard.brainiac.com/`.
9. Compare, for example, J.D.Webster's manual game *Achtung – Spitfire!*, (Phoenixville PA: Clash of Arms, 1995), with the PC game *Battle of Britain II: Wings of Victory*, (G2 Games, 2005).
10. See, for instance, the PC games *Take Command: Second Manassas*, (Paradox Interactive, 2006), and *Airborne Assault: Conquest of the Aegean*, (Panther Games, 2006).
11. The classic example of such an unplayable monster is Richard Berg's *Campaign for North Africa*, (New York: Simulations Publications Incorporated, 1979).
12. This is well illustrated in Phil Barker, *War Games Rules, 1925-1950*, (Wargames Research Group, 1988).
13. See my book *Lost Battles*, (London: Hambledon Continuum, 2007), and the manual simulation which I co-authored with my former MA student Garrett Mills on *Roma Invicta? Hannibal in Italy, 218-216 BC*, (Society of Ancients, 2008). I use both of these in my teaching on ancient warfare, and I use similar manual simulations in my classes on the operational and strategic aspects of modern warfare.