The Power of Military Simulations in the Study of Military History

War gaming, in relation to the study of military history, is essentially the creation of an account of a historical event in simulation form. This begs the question: what specifically does a military simulation provide that a good history book, film or documentary does not?

While many are quite satisfied with reading a book or watching a film on a historical battle or campaign, a person who war games or simulates that same event is looking for something more. Specifically, he or she uses simulation to do a closer examination and analysis of all the aspects associated with the battle or campaign in question. Only a historical simulation frees the 'reader' from what James Dunnigan calls the 'linear' journey of a book or film in which it is impossible to realistically consider alternatives. In contrast, a military simulation is non-linear, much like the event itself. This means a person can wander through the event, changing variables if desired and still be in context. Anything less is little more than following someone else's historical understanding of a battle or campaign. Whether looking for alternative historical perspectives, looking for the future in the past, validating new techniques through historical models or simply wanting to do some professional development, there is no more powerful, practical and useful analytical device than a historical simulation.

It has to be said that many detractors of the use of military simulation to predict historical outcomes, start with emotionally based views: that "war should not and cannot be reduced to numerical analysis". The idea is that using a purely quantitative analysis somehow belittles the immense human cost of war. In actuality however, the opposite becomes true: anyone playing a realistic military simulation becomes only too aware of the human cost. Emotions aside, the only serious argument put forward by the detractors is that it is impossible to predict unforseen events, and this is why mathematical simulation or war gaming cannot predict an outcome. Logically this is true, but in practice it comes down to a matter of degree. The key words here should be 'cannot predict an outcome with certainty'. This is the key. Of course no one can ever predict an outcome with certainty, and we can only hope to assess the probability of a particular outcome.

There are however two areas where the detractors' main argument becomes particularly weak, or at least confused.

- There is a massive difference in using mathematical models to predict the future with many uncertain variables, and using mathematical models to predict a probable short term outcome due to changing one significant variable in the past.

  If the same data analysis, mathematics and computing power used by the professional military is applied to military history, then the probability of predicting a particular historical outcome for a given battle or campaign is much higher than forecasting a future battle. The reason for this is that many of the more unpredictable variables are fixed in the equations, or at least limited to a smaller range. These variables include: one side's more inaccurate intelligence, the weather, changes in political climate, production and manufacturing, receiving new weapons, mobilisation of resources, research and development of new weapons, sudden removal of key personnel (eg someone had an unforseen accident) and other sudden major developments. Many of these variables could not be easily predicted before the battle or campaign started, but become known or 'fixed' variables after the event (i.e. fixed by validated historical research). By changing one significant variable in the historical scenario, we can then examine the most probable alternative (short term) historical outcome: note the emphasis here is 'most probable' and not 'certain' outcome.

  For example, a war game played before Operation Barbarossa would have a massive numbers of unknowns relating to virtually every facet of the campaign. However a war game played today could contain every piece of available historical data to verify if the model (using all

historical command decisions) followed the historical events and timeline. By changing one variable, such as not delaying an advance on Moscow by Army Group Centre in August 1941, the most probable alternative outcome can be realistically examined.[1] It must be carefully noted here that the probability of predicting a particular outcome diminishes as a function of the length of time between the 'changed event or variable' and the 'predicted outcome'. Thus using our example above, if Army Group Centre had advanced on Moscow in August 1941, we can accurately predict the most likely outcome in October-November 1941, but less so an outcome in December 1941-January 1942. In other words: the probability that the Wehrmacht would have captured Moscow in the period September-November 1941 can be established with a high degree of certainty, but the probability that they could have held Moscow during the Soviet winter counter-offensive is less certain.

Purists in system theory (those who would usually support the use of military simulations) would maintain that changing one variable can change other variables in unpredictable ways. However the same purists have to look at the mathematics of the model, the variable to be changed and system theory in general, to admit we are talking about the "99 percent solution". That is the probability of the new outcome occurring. The proviso is that the historical research is done and carefully analysed. This is in fact the hard part (much more difficult than the simulation itself), and is what the bulk of this work contains.

- There is a complete difference in 'failure of intelligence' and 'failure of a military simulation to predict an outcome'. The two are often confused. A dramatic failure of one side's intelligence will always result in unforseen events regardless of how the outcome of a battle or campaign is predicted. In addition, very inaccurate intelligence is one of the unpredictable variables effectively eliminated by research in historical scenarios.

  A classic example of this is the use of the atomic bomb on Japan in 1945. Up to 5th August 1945, the Japanese military planners (including officers conducting war games in the Japanese High Command) assessed that they could put up a stout defence and inflict very heavy casualties on any force invading the Japanese home islands. They would have put all their available intelligence information into their model, and this information only changed after the atomic bomb was used. On 6th August 1945, the Japanese's worst fears were fully realised at Hiroshima. It has been put to me that this sequence of events is as an example of why mathematical simulation, or war gaming, cannot predict an outcome due to an unforseen event: specifically the failure of Japan's war planners in July-August 1945 to factor in the atomic bomb! However this is <u>not</u> a failure of the Japanese war planners or their military simulation, but of intelligence. An even greater failure of Japanese intelligence was their failure to foresee the Soviet declaration of war and invasion of Manchukuo (Manchuria) on 9th August 1945. Obviously no prediction will be accurate if the data going into the predictive model is wrong or incomplete.

  Much more interesting than the Japanese High Command's position in July-August 1945 is that of the US at this time. The US did a similar war game assessment of a full scale invasion of the Japanese home islands using all the data available to them from the Pacific War. These operations (part of Operation Downfall) were codenamed Operation Olympic and Coronet, and were scheduled for 1st November 1945 and 1st March 1946. US planners assessed that these operations would cost the US approximately 80 000 killed and 290 000 wounded.[2] The

[1] Refer to Part VII 3. - 'Complete Computer Simulation of Operation Barbarossa: 22nd June to 31st December 1941-Historical and Current Results of War Gaming Operation Barbarossa' for a discussion of some of the current results of war gaming Operation Barbarossa.

[2] J.F. Dunnigan, A.A. Nofi, The Pacific War Encyclopedia, Checkmark Books-Facts on File Inc, New York, 1998, pp. 317-320. Operation Olympic involved the invasion of Kyushu, and it was estimated the US would sustain around 31 000 killed and 94 000 wounded. Operation Coronet involved the invasion of Honshu, and it was estimated the US would sustain around 49 000 killed and 196 000 wounded.

US of course had an alternative to invasion in their war game analysis: the atomic bomb was successfully tested in July 1945, and they also knew the Soviets would be attacking the largest remaining Japanese army in Manchukuo in August 1945. In other words the US model simply had more accurate intelligence while the level of military simulation (war gaming) used was almost the same. Today, more sophisticated military simulations still indicate the US would have sustained at least 200 000 casualties (killed, wounded and missing) by invading Japan in late 1945.

Ironically, it is only when Operation Downfall is 'war gamed' by the student of the Pacific War, that the magnitude of the task facing the Allies in August 1945 really becomes apparent. Far from somehow belittling the human cost of war, such a war game only serves to illustrate the difficult moral decision facing President Truman in July-August 1945.

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If military history is the "professional officer's laboratory of war", then the historical simulation is a critical means for experimentation.[3] No other medium of historical study allows one to manipulate almost any element of a battle, campaign or war, and then test the outcome with the same expectation of historical accuracy. By manipulating the key elements and operational decisions of a historical battle or campaign through simulation, a person gains a better understanding of how all aspects of the battle or campaign interacted. Moreover, it provides a unique opportunity to explore alternative strategies and tactics. Many war gamers do not 'game' at all. They simply study and manipulate the simulation by themselves. However there are always at least two sides in a military conflict, with each attempting to impose its will on the other. With both sides exercising free will, the number of 'what ifs?' to explore grows considerably. By comparison, when was the last time you explored the 'what if?' aspect of a historical battle through a book or a film?

For understanding and applying the historical lessons of war, or exploring realistic 'what if?' scenarios in military history as derived from a quantitative historical analysis, the historical military simulation will continue to be the most powerful tool available.

[3] The Evolution of Modern Warfare: Book of Readings, Department of the Army, US Army Command and General Staff College (USACGSC), C610, Fort Leavenworth, April 1991, Preface.