

TITLE: *The Tank Battle*

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MEDIA: *2' by 3' chart*

PURPOSE: *Graphically analyze and display an instrumented force-on-force tank battle. The chart portrays each combatant, each engagement, over time and distance.*

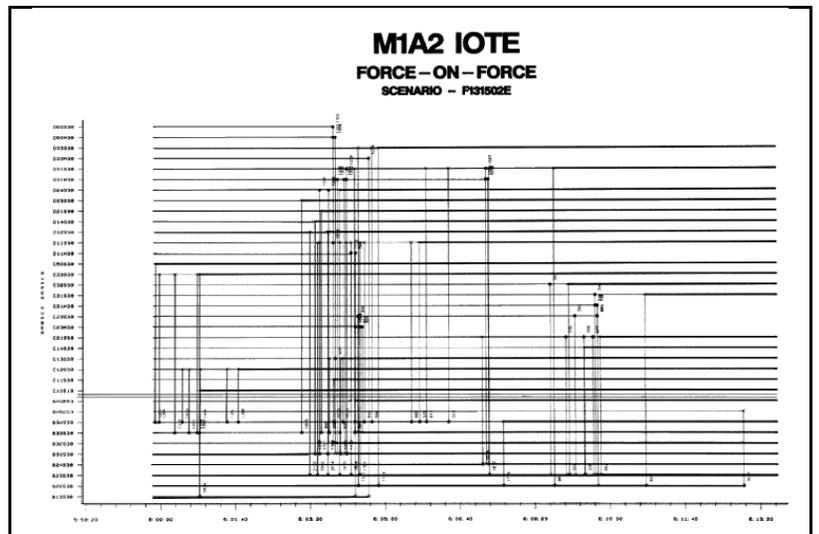
DATA: *Data input to the analysis comes from Realtime Casualty Assessment (RTCA) instrumentation and realtime positioning instrumentation.*

TOOLS:

1. *Computer software was SAS/BASE, SAS/GRAPH, and SAS/ANNOTATE.*
2. *Computer hardware tools included a 486/66MHZ/16MB personnel computer and a drum plotter.*

USE: *The tank battle chart facilitates visualization and understanding of the actual field events. Instrumentation generates gigabytes of data. This data exists on magnetic tapes and on stacks and stacks of printouts. The data volume without graphic display made analysis very difficult.*

SPECIAL USE: *Assists the Army study causes of fratricide. These instances are immediately apparent on the chart.*



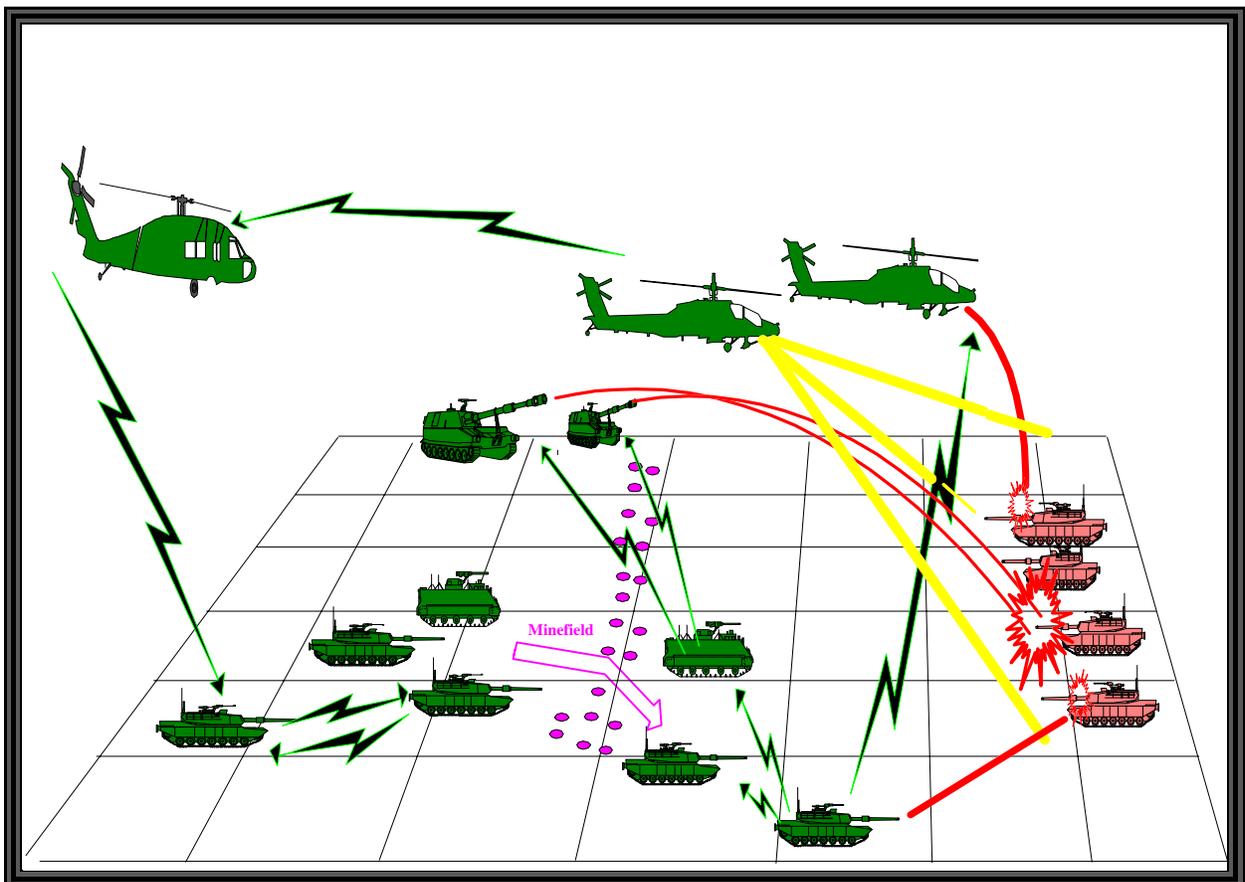
PRESENTATION: *Presentation includes 3 video segments.*

1. *TEXCOM the US Army's testing agent.*
2. *The M1A2 Abrams main battle tank in live fire and instrumented battle.*
3. *The instrumented tank battle from inside the tank.*

The Tank Battle of the 21st Century at TEXCOM

What does SAS have to do with tank battles? In the 21st century? Read on and I'll connect these concepts. We will talk about military weapon systems for the future, the mission of US Army testing, the battlefield of the 21st century, and how SAS/GRAPH/ANNOTATE was used to display a tank battle over time.

The battlefield of the 21st century will be a digital environment, in which the tank will receive information from satellite and ground based sensors which will be extensively shared. This will enable tanks to engage at greater ranges, within the limits of the tank's weapon systems. We will see more extensive sharing of targets and information through technology.



*The Test and Experimentation Command (TEXCOM) at Fort Hood, Texas plays an important role in moving the US Army onto the battlefield of the 21st century. Please watch the video of the TEXCOM mission. ***9 minutes of the TEXCOM command briefing***. With the high costs of weapon systems, operational testing is essential. In an operational test, the weapon system is given to representative soldiers to use in a combat environment. The resulting effects are then analyzed. Something can look wonderful on the drawing board but show serious flaws and oversights when it is given to soldiers to use in a simulated combat environment. TEXCOM takes pride in its role as consumer advocate for the US soldier. As an example, TEXCOM conducted extensive testing of the Abrams M1A2 tank with its sophisticated electronics designed to fight on battlefield of the 21st century.*

*The US Army Abrams M1A2 main battle tank in combat is the subject of the SAS graphic. Please watch this video of the Abrams tank in live fire and in instrumented testing. The laser instrumentation promotes realism and provides data for analysis. This will be described in more detail later. ***3 minutes of Abrams M1A2 video***. This vehicle can move at 45 miles per hour and fire its main gun on the move. At about \$7 million per tank, the Abrams thermal imaging allowed it to see at night and through the smoke of the Kuwait oil fires. This tank can digitally share battlefield targets.*



*Let's talk about "The Tank Battle of the 21st Century at TEXCOM". *** slides & hard copy mounted *** This graphic was produced by SAS/GRAPH/ANNOTATE. It shows a tank battle over time. The time scale is at the bottom of the graph. TEXCOM instrumented battles rarely last more than 30 minutes and more often are 5 minutes of intense combat. The horizontal GREEN line divides the BLUE (friendly) forces and the RED (enemy) forces. The horizontal BLACK line shows "killed" vehicles. The RED vertical lines are enemy firings. The BLUE vertical lines are friendly firings. These graphics even show fratricide (FRIENDLY killing FRIENDLY)! One graph clearly shows what happened in the tank battle. This data would otherwise exist only as megabytes of digital data or as stacks of printouts. As you view the photographic images attached, remember the actual size of the graphic is 2' by 3'. Check out the examples at figures 1 and 2. See if you can find the case of fratricide.*

The graphic was produced on an HP7576 plotter. A 486/16Mb RAM/66Mhz PC ran SAS 6.02. To understand the output graphic, one must also understand the input data and how it was collected.

*The tank battle data was collected using a unique instrumentation system designed and built for especially for TEXCOM. Each armed player vehicle carries laser transmitters and receivers. Each also carries a small computer loaded with engagement probability of kill tables. Each engagement is scored by the type of weapon system against the target over the engagement distance. If a player vehicle is assessed as destroyed by instrumentation, a smoke marker is set off and the player is digitally removed from the battle. At the conclusion of the battle, the engagement data is available for automatic reduction and display. Earlier we saw video footage from outside the tank. Let's now take a look at an instrumented engagement from inside the tank. Note the flashes of light are the guns firing and the smoke shows that a player vehicle is destroyed. *** 2 minute video of battle from inside a tank***.*

We have talked about the battlefield of the 21st century, the Abrams M1A2 tanks, and TEXCOM. We have also seen how SAS/GRAPH/ANNOTATE was used to build battle attrition timeline charts "The Tank Battle of the 21st Century at TEXCOM".

Figure #1

The Tank Battle

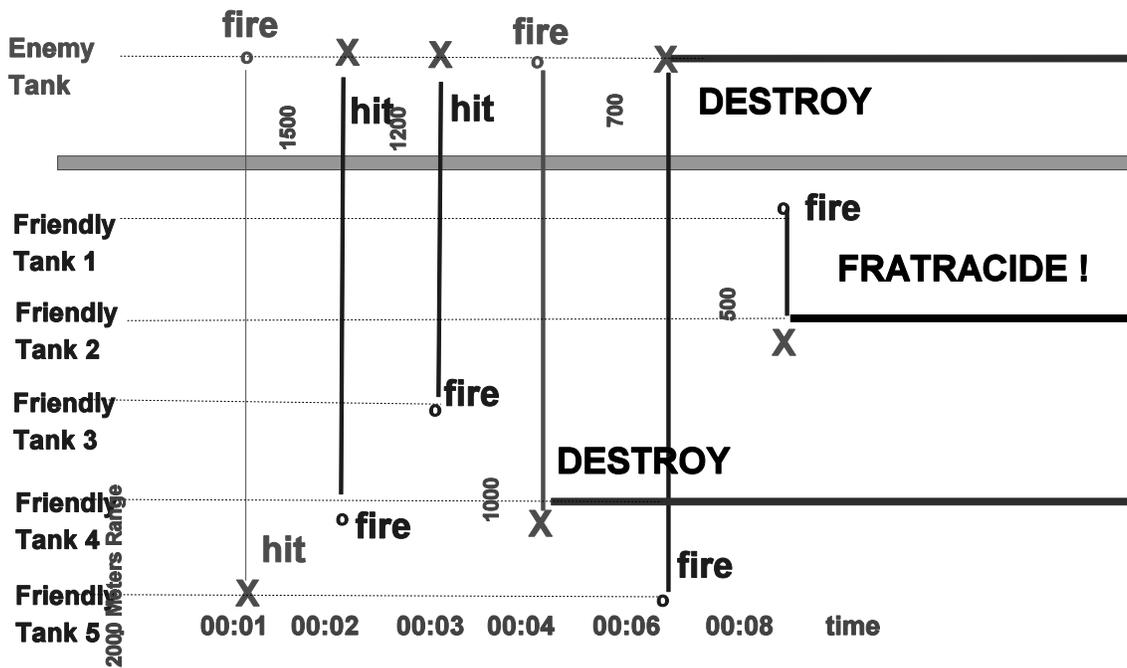


Figure #2

