

Target Analysis Planning System

—squeezing days into minutes

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“Jones, we’ve just received these spot reports from units in contact.”

Sitting at the Target Analysis Planning System (TAPS) keyboard in the Division Tactical Operations Center, Jones types these reports into the computer, along with radar, radio intercept, and aerial observations of enemy activity that arrived on a floppy disk from corps some moments earlier.

“It looks like we have 20 company-size targets in our sector, sir. They’re appearing on the screen now. Should we consider all weapons and delivery systems that can reach the area from their present locations?”

“Yes, Jones, but use our own organic artillery whenever possible—air sorties and corps artillery support are hard to come by. The G3 also said to avoid chemical contamination and nuclear weapons damage near the river crossing sites, and make sure we get at least 30 percent casualties against enemy artillery.”

“Yes, sir.”

Jones enters the command guidance into TAPS for consideration in the analysis. Five minutes (and a hundred thousand computations) later, the results flash onto the color monitor.

“Sir, the analysis is done. TAPS

recommends two three-kiloton artillery rounds against the armor units, 12 VX chemical projectiles against each artillery battery, and 16 conventional high explosive rounds for each motorized rifle company. That leaves only the command post and maintenance company out of our artillery range. TAPS says two F16 sorties, one with Snake-eye bombs against the command post, and one with MK116 GB chemical bombs for the maintenance unit, will work best.”

“Good, Jones. What’s the coverage on that maintenance company?”

“Forty-seven percent, severe incapacitations, sir.”

“Great, but we forgot to preclude civilian casualties in the town downwind of the target area. We’ll have to run that analysis over.”

“No, sir, TAPS already had that guidance in the permanent data base and we let it stand. This fire plan integrates the minimum number of nuclear, chemical, and conventional weapons to give us the greatest possible effects on the enemy. And it doesn’t violate any constraints.”

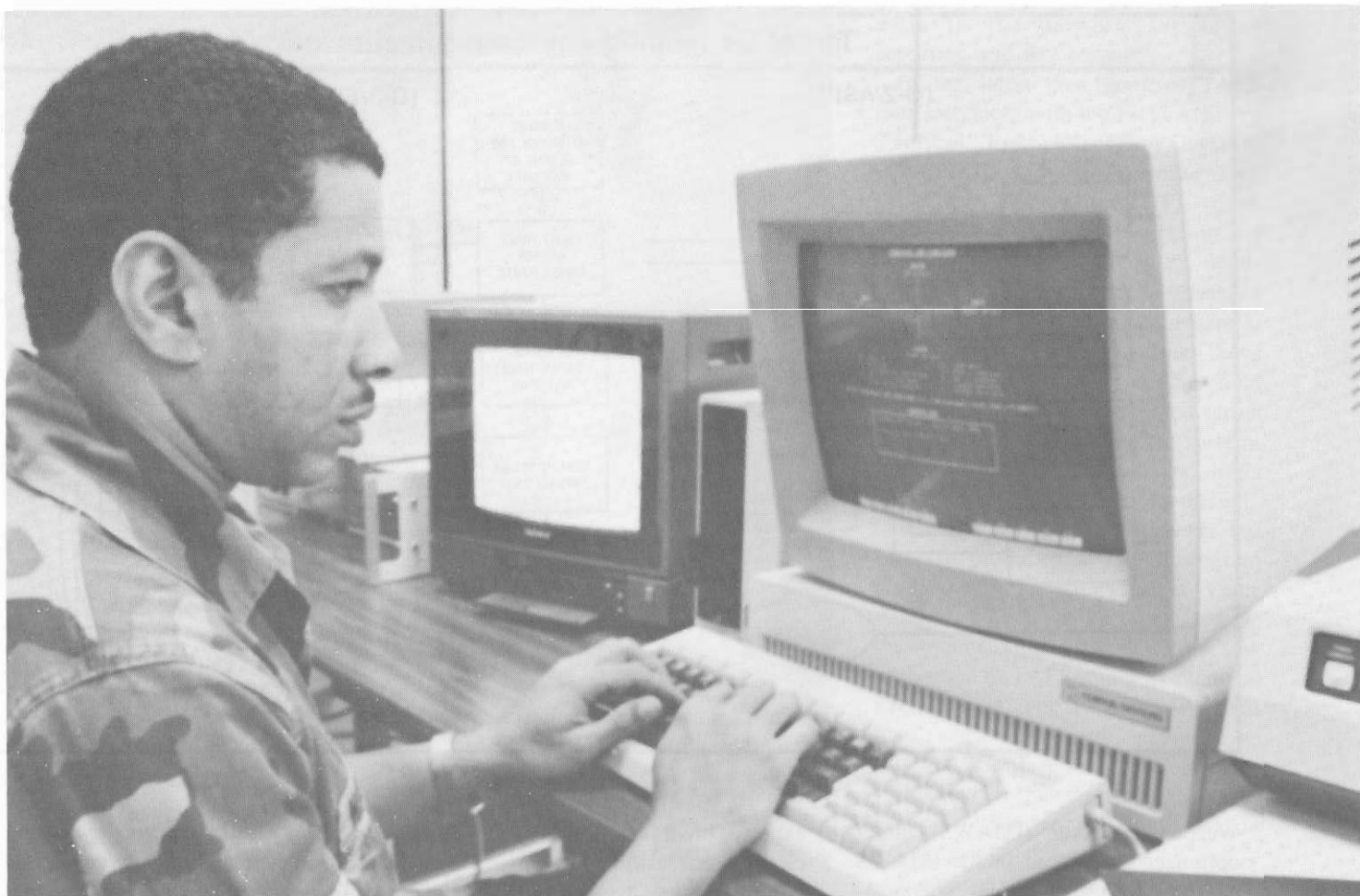
“Super job, Jones! This kind of analysis would have taken us days to do manually, and wouldn’t have optimized anything! Print that fire

plan and I’ll take it to the boss for approval.”

A microcomputer based system, TAPS optimizes weapons employment and related targeting operations. It was developed as an interim Advanced Field Artillery Tactical Data System (AFATDS) by BDM Corporation under contract to the Defense Nuclear Agency. TAPS is now operational down to division level at V Corps and VII Corps in Europe, the 9th Infantry Division (9ID) at Fort Lewis, Washington, and is used in advanced officer instruction at the Chemical and Field Artillery Schools. TAPS is also being installed in the Pacific Command.

The addition of Chemical School-directed requirements into TAPS software, and the US Army Nuclear and Chemical Agency (USANCA) validation of these methodologies going on now, have attracted keen interest from the chemical community. It is now very likely that TAPS software will also be incorporated into the Automated Nuclear, Biological, and Chemical Information System (ANBACIS) currently under development to manage NBC defense operations.

TAPS employs a 20-megabyte hard disk as its main data repository. Video



SGT George T. Medlock selects area and time of interest to enter new target data analysis in TAPS.

disks containing approximately 100,000 maps and photographs each are installed on a video disk player to provide a visual frame of reference. Computer-generated color graphics are superimposed on the full color video disk map displays to reflect unit locations, targets, NBC hazards, and other operational information.

The chemical staff selects areas of interest using a jump function, which changes map displays and associated battlefield information. Zoom in and zoom out keys control map scales.

Once an area and scale have been selected, the master data files are automatically searched for battlefield features relevant to the time and area of interest. These features may include descriptions of critical fixed facilities, known or likely enemy locations, friendly units, damage

preclusion areas, fire support coordination measures, and 35mm photographs of the area.

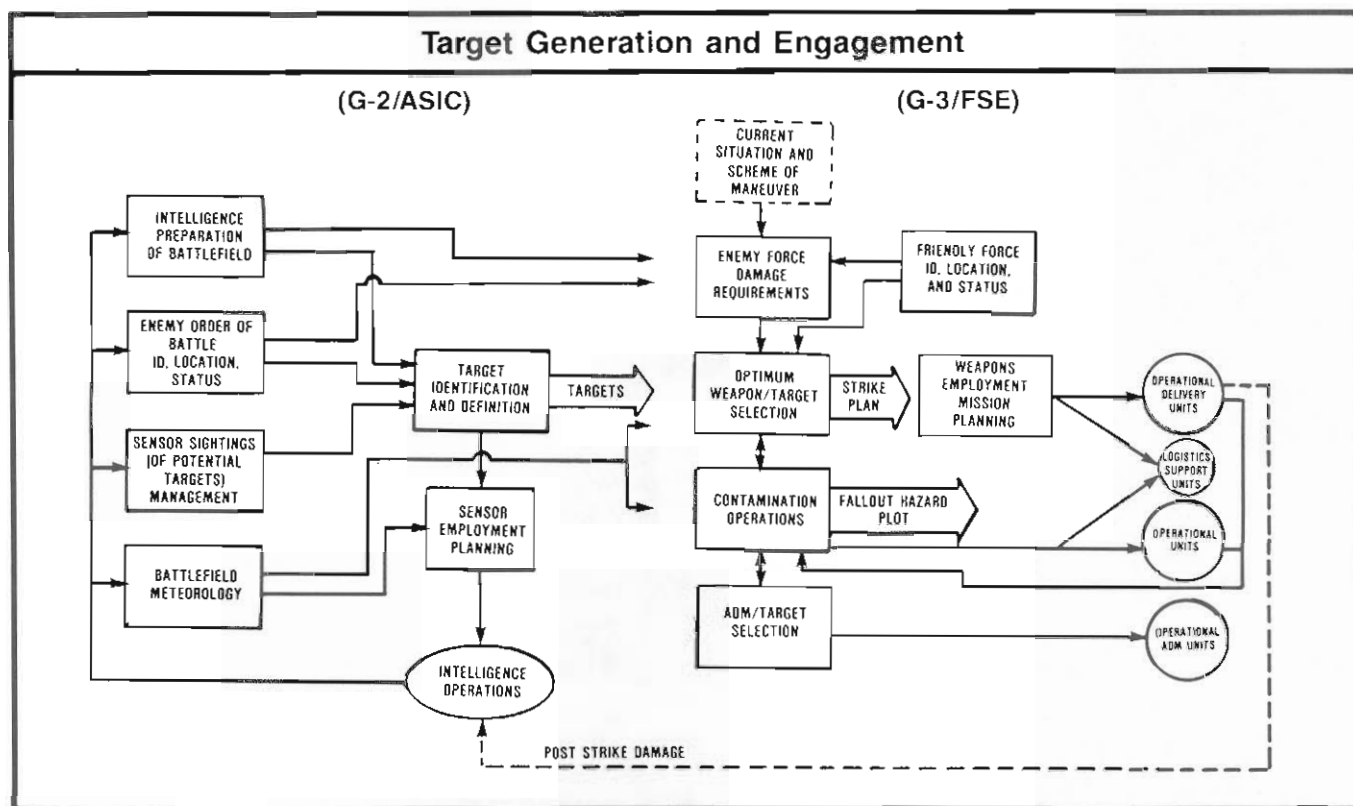
The photographs amplify map displays, providing a visual appreciation of contour and vegetation once available to the chemical staff only by personal reconnaissance. Photos prerecorded on the video disks show high speed avenues of approach, airfields, bridges, nuclear power plants, chemical weapons storage facilities, and other points of interest. Technical data on key features is available from the computer on command and each feature is photographed from several directions to give a more detailed view of the terrain.

Traditional Intelligence Preparation of the Battlefield (IPB) through templating and analysis of raw combat

information is also available using the TAPS IPB and target data inventory functions.

Enemy sightings and automated intelligence collection products are purged to eliminate duplicate reports. Truly independent sightings in the time and space window of interest are then fused and evaluated. All tactically realistic groups of sightings are compared with the full spectrum of Soviet tables of organization and equipment based on unit size and target location errors. Then, the best possible identifications of the various groupings and target radii are determined.

These targets are structured in the description format required for the Integrated Multiple Aimpoint*



Weapons Selector (IMAWS) target optimizer and stored in the IMAWS data base for use in nuclear, chemical, conventional, or combined target analyses.

The IMAWS program uses a many-on-many optimization as opposed to the sequential selection of one-on-many calculations normally employed in automated targeting systems. TAPS computes the results that can be obtained against every enemy target by every available weapon system in every possible combination. The result? An integrated fire plan which provides the commander with the very best possible employment of his scarce weapons resources.

TAPS analysis automatically includes troop safety, damage preclusion, and weapons priorities established in command guidance.

Chemical target analyses are based on the NUSSE II cloud transport and deposition model. Each round in a volley is projected individually using a Monte Carlo routine to predict

expected munitions impact and agent cloud generation patterns. Dose computations are compiled and individual target element dose response curves are used to predict average effects over the entire target. These effects are then compared with the effects and coverages desired by the commander as well as the results obtainable with other available systems to determine the optimum method of attack.

(Since the TAPS user can modify dose response curves, agent concentrations of interest, target protective postures, and munitions characteristics, the chemical target analysis program is a truly open-ended methodology. This ensures that TAPS will continue to be a viable targeting aid as binary munitions, new threat protective equipment, and new employment doctrine are developed that alter the parameters of chemical target analysis.)

The primary IMAWS output is an optimum strike plan that gives

delivery unit, weapon system, warhead type and quantity, aimpoint, and time of attack for each target to be engaged. When nuclear weapons are recommended by TAPS, the time of attack will include separation times between nuclear weapons based on aircraft safety and weapons fratricide (preinitiation) considerations.

Details of the analysis are then displayed on the map.

Using the NUSSE II cloud transport model, downwind hazard prediction graphics (based on FM 3-10) can be generated over actual map sheets to any available scale using current weather conditions that would influence agent movement. These predictions may then be printed for use in preparing CHEMWARN messages.

The operator may enter his own graphics whenever the computer outputs do not satisfy command requirements, or modify the computer-generated hazards by entering new upper air wind data or local



TAPS display of VX chemical downwind vapor hazard envelopes from targets A, B, and C. Numbered blocks indicate other enemy units selected for attack with conventional weapons.

micrometeorological readings.

The Atmospheric Sciences Laboratory at White Sands, New Mexico, is now developing the Integrated Meteorological System (IMETS) and the Remote Meteorological Package (RMP) to provide local micromet data in friendly unit areas and up to 150 kilometers into enemy-held territory. This proves particularly valuable in target analysis as accurate data is normally unavailable and target area conditions are important in predicting hazards from our own weapons.

If a fallout-producing burst is included in a nuclear attack, or there has been an enemy surface detonation, a fallout prediction and the appropriate NATO NBC message can be prepared automatically using the contamination operations (CONOPS) module. CONOPS also will accept

actual contamination measurements and construct corresponding isodose rate plots and NBC 5 messages. Both the fallout predictions and contamination overlays are displayed superimposed on the map and may be recalculated when wind changes occur or new data is reported.

As with all other TAPS programs, analysts can modify the computer results on the screen with a cursor. An analyst may also request nonstandard isodose contours, as required.

As an aid to operations planning, a large number of contingency strike plans may be produced and stored for possible use at a later time. These plans normally employ the same weapons systems and same target sets in different situations based on anticipated contingencies. TAPS also keeps track of ammunition status, preclusion areas, weapons requests, contamination, and other factors. When the system is linked to other TAPS users in a network, chemical staffs can pass any TAPS input or output products automatically to other

units in the network for faster reporting and fire planning.

In the latest development, TAPS now interfaces with the Field Artillery Tactical Fire Direction System (TACFIRE) and the Enhanced Tactical Users Terminal (ETUT), which provides tactical exploitation of national signal and imagery intelligence systems, and automated intelligence collection management at Corps level. These data links have been tested in Europe and offer field commanders a fully automated target development and engagement system, giving soldiers on the gun line direct access to satellite target information.

The 9ID fire support element has recently produced a TAPS program modification allowing Target Value Analysis (TVA) to be conducted on the system. This software adds a new dimension to TAPS utility in chemical fire planning. The TVA software was presented during the annual Fire Support Conference at Fort Sill, Oklahoma, in November 1986 and is now available on a floppy disk to TAPS users.

Extension of TAPS software in response to specific Chemical School requirements, compilation of TAPS binary weapons data files, and development of casualty assessment data for threat chemical munitions will expand the utility of TAPS and ensure its applicability to real world problems for years to come. ●●●

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