

Tactical Information for the Commander

It has been said that the wars of the late nineteenth century, such as the American Civil War and the Franco Prussian War, were wars of the railway, the telegraph, breech-loading small arms and tinned rations. The Second World War required worldwide mobility on land, at sea, and in the air, and it required total mobilization of population and industrial reserves, of seapower and air forces. *The Third World War was widely expected to be the first, and perhaps last, nuclear war. But more and more experts are coming to the conclusion that the Third World War will be essentially a war of electronics.*

A war of electronics. A war in which the use of electronics will make the critical difference. A war that no one wants, but for which everyone must be prepared. Especially the tactical commander.

Yet there is an overwhelming amount of information that the tactical commander must have to be effective. High-speed data links, airborne reconnaissance devices, satellite data, and tracking sensors all provide information. The need for rapid deployment of munitions and troops makes a quick understanding of this data critical.

Existing hard copy methods of presenting all this information cannot efficiently handle the volume of information available. Without computers to rapidly process, catalog, file, and format this information in a way that is meaningful to the commander, most of its value is lost.

Too much data will delay and confuse. So the computer system must be set up to present the pertinent information in a manner that makes its meaning readily apparent. It must be able to filter the vast quantities of data so that only relevant information is presented.

Today, SDC is developing a system to do just that: SDC's Tactical Information Display Environment (TIDE*). TIDE brings together SDC expertise in the areas of image processing, knowledge-based systems, and computer voice recognition to help the commander extract pertinent

information from the mass of data available. By means of a simple set of instructions, the commander can call up various perspectives of a battlefield, showing such important information as orders of battle and avenues of approach.¹

Each perspective includes various multi-colored symbols that depict such information as number, location, size, and identification of units. The commander can view all the symbols at the same time or, through the unique declutter feature, can fade some of the symbols to focus on others or drop some out altogether. Additional detailed information on any selected symbol can be displayed on an adjacent alphanumeric screen.

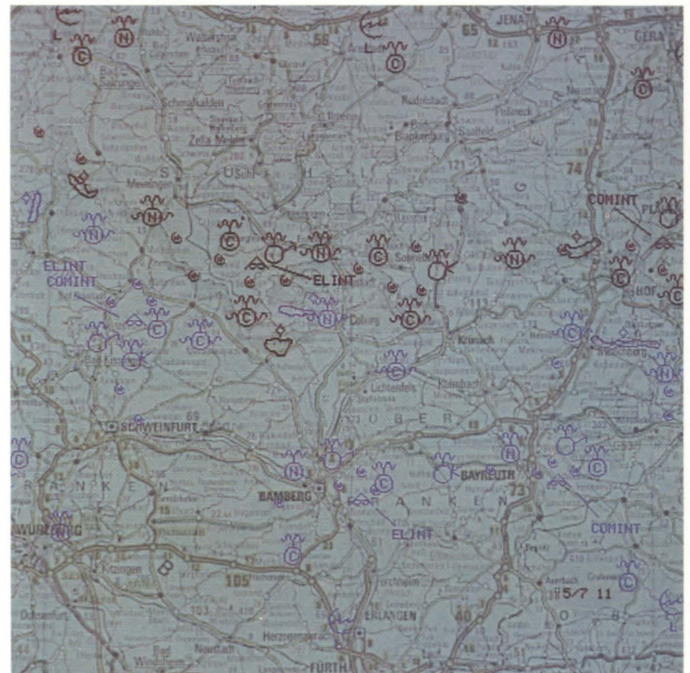
The perspectives may be overlaid on either a full-color map or Landsat imagery, which can be panned over or zoomed in on as required. Other imagery, such as Infrared (IR) or Side Looking Aperture Radar (SLAR) can be substituted. The system is also designed to assist in performing threat analysis and the detection of doctrinal maneuvers, as well as other predictive and decision-supporting applications.

Selected Perspectives The following displays are representative of those needed by the commander in a tactical environment.



Ground Order of Battle Perspective

The Ground Order of Battle Perspective represents a picture of the battlefield at a given time, showing opposing forces, the forward edge of the battle area (FEBA) or front line of troops (FLOT), and areas of responsibility for friendly units.



Electronic Order of Battle Perspective

The Electronic Order of Battle Perspective shows the types and locations of enemy and friendly jammers, transmitters, and sensors, and the bases with airborne electronic intelligence (ELINT) and communications intelligence (COMINT) capabilities.

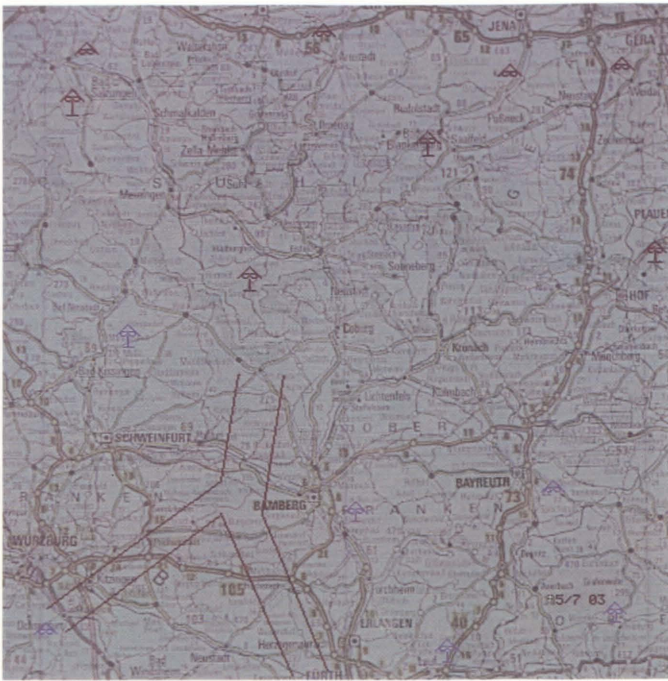
*Trademark of System Development Corporation

¹These perspectives were developed in accordance with the information needs of the Corps Commander, determined by a recent study by U.S. Army personnel of the Combined Arms Combat Developments Activity at

Fort Leavenworth, Kansas. The study was distributed to Army agencies for consideration and use by the U.S. Army Training and Doctrine Command at Fort Monroe, Virginia.



Air Defense Order of Battle Perspective
 The Air Defense Order of Battle Perspective depicts the placement and type of air defense artillery for friendly and enemy forces.



Air Order of Battle Perspective
 The Air Order of Battle Perspective shows the location of friendly and enemy airbases, heliports, and air corridors.



Mobility Perspective
 The Mobility Perspective shows specific problem areas in existing transportation routes (roads, railroads, waterways) and the time span of the problem.

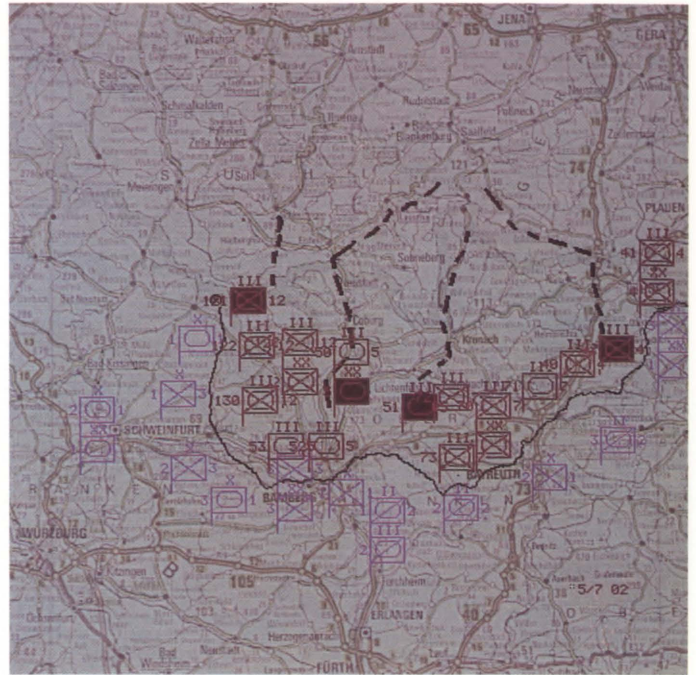


Trafficability Perspective
 The Trafficability Perspective reflects potential for moving forces on a broad scale. It is not confined to normal transportation routes and it includes terrain and soil characteristics for large areas and nuclear, biological, and chemical (NBC) contaminated areas.



Enemy Probable Course of Action Perspective

The Enemy Probable Course of Action Perspective shows the opposing forces and the best estimate of enemy objectives and their probable push toward those objectives.



Significant Movement of Enemy Units Perspective

The Significant Movement of Enemy Units Perspective highlights enemy units which have made significant movement within a given time span, showing their current location and movement from their previous position.



NBC Perspective

The NBC Perspective shows the location of enemy and friendly units with nuclear, biological, or chemical warfare capability and types, locations, times, and areas of contamination for NBC events.



Communications Perspective

The Communications Perspective highlights friendly and enemy units that are experiencing communications difficulties.

The Demonstration System The Tactical Information Display Environment is currently available as a demonstration system designed for the user to build on, to create a system that meets his special needs. The purpose of the demonstration system is to prove the embodied concepts and to demonstrate the potential of the system if the techniques were further developed and fine-tuned to meet the very specific and unique needs of the commander. The demonstration system, while currently aimed at an Army tactical application, is equally adaptable to other branches of the services.

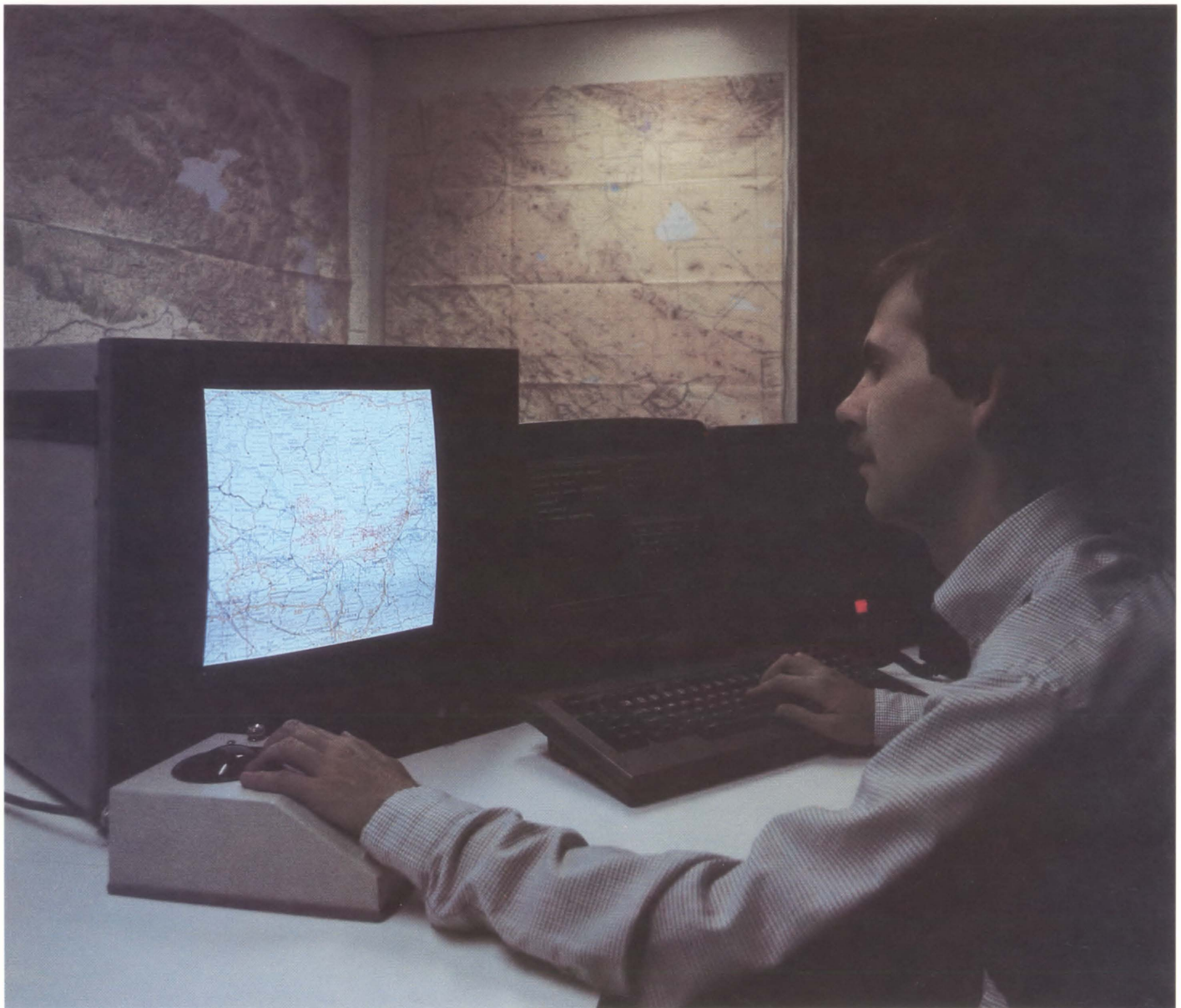
Too often systems are designed and developed by those who do not use them. Here is the unusual opportunity to build on a strong foundation to create a system that does what the user wants. A chance to develop a system with maximum potential—at your development site to meet your needs.

This developmental system can also be used to carry out experiments on the man-machine interface and to

further refine the perspectives and declutter techniques.

The demonstration system is built around SDC's Image Processing Laboratory. The keyboard/trackball interface is enhanced with a computer voice recognition capability that complements the function keys. Linked to this is SDC's proprietary knowledge-based software package which is used as the intelligent interface to a state-of-the-art relational data base management system. The demonstration data base contains intelligence data and information such as types and locations of units, sensors, airfields, air corridors, obstacles to mobility, incidents, and communications nodes. It also includes the friendly/enemy boundaries.

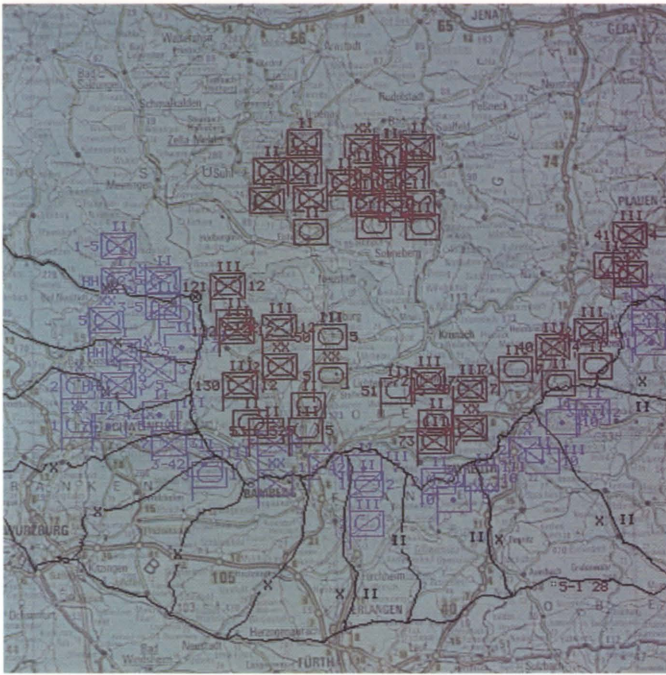
The demonstration system will show you some selected capabilities of the Tactical Information Display Environment. Using a developmental system, you can design a prototype for the fielded system to present critical information to the tactical commander where he needs it most.



TIDE Demonstration System

The demonstration system uses standard display screens, but different size monitors can be substituted.

Declutter Feature The following displays show three methods of decluttering.



Cluttered Ground Order of Battle Perspective

This Ground Order of Battle Perspective has many overlapping symbols. It is difficult to detect the number, identification, size, and location of units in many areas.



Ground Order of Battle Perspective Decluttered by Echelon Elimination

This Ground Order of Battle Perspective drops the symbols for all enemy units of battalion or lower size. The number, identification, size, and location of the remaining units are discernable.



Ground Order of Battle Perspective Decluttered by Echelon Fading

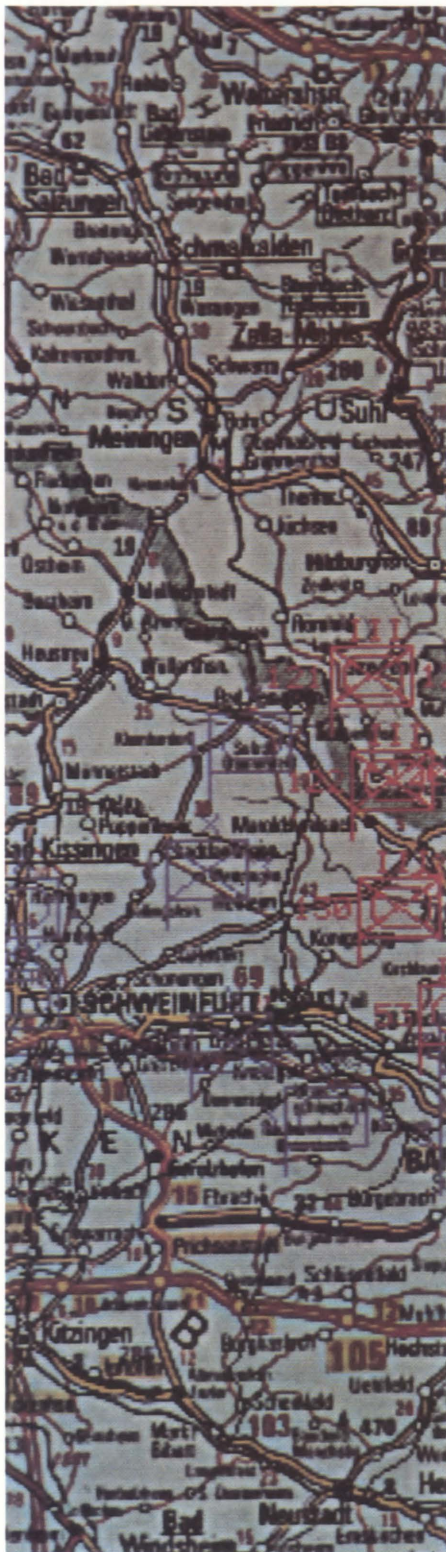
This Ground Order of Battle Perspective has faded symbols for units of battalion or lower size. The intensity of the fade is variable, so symbols can be brightened or faded as desired. The numbers, identification, size, and location of the units are readily discernable.



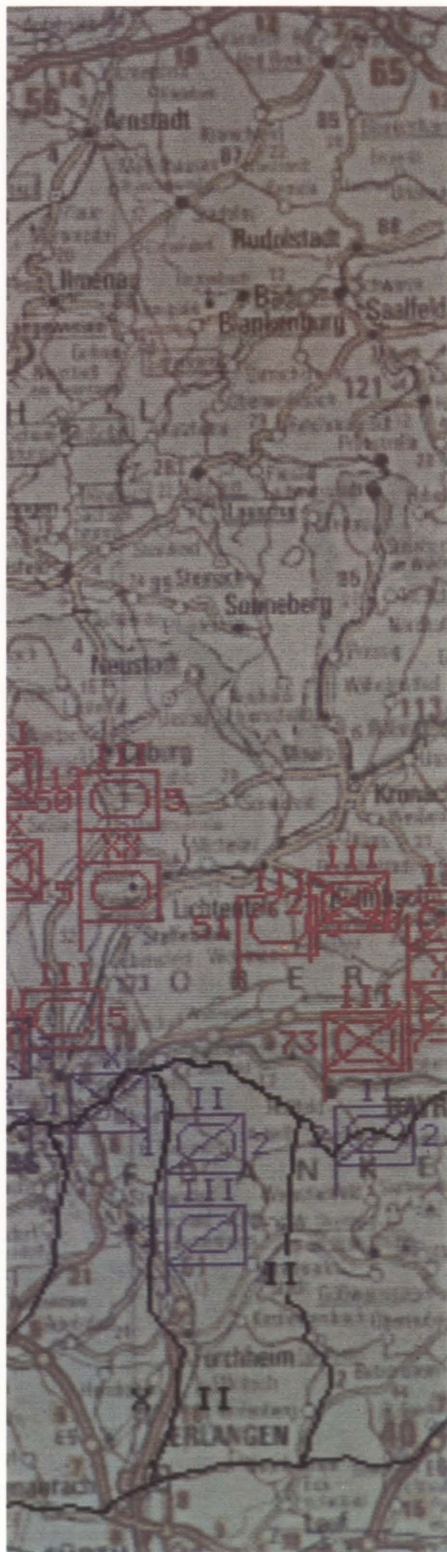
Ground Order of Battle Perspective Decluttered by Unit Type Selection

This Ground Order of Battle Perspective shows only the Armor units. The system is capable of displaying one type of unit and all combinations of types of units.

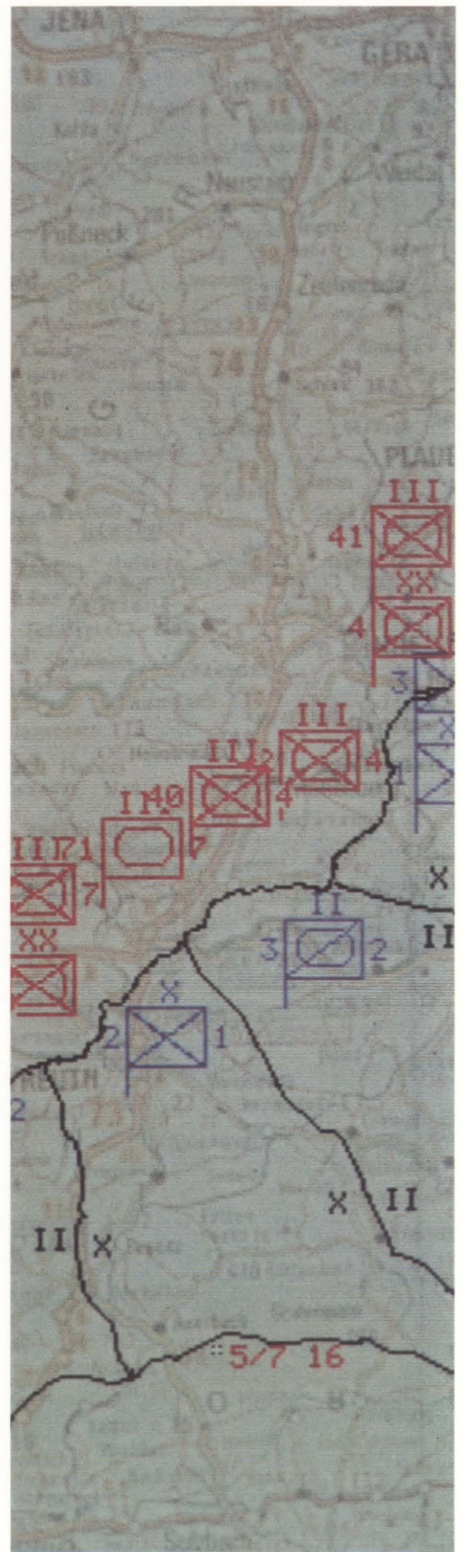
Contrast Selection Feature The following displays illustrate the TIDE System contrast selection feature. With this feature, the operator can brighten and fade the map (or imagery) background to select the desired balance between the background and the graphics overlay.



Map Background Dominance
In this display, the map is readily visible and the symbols are barely visible.

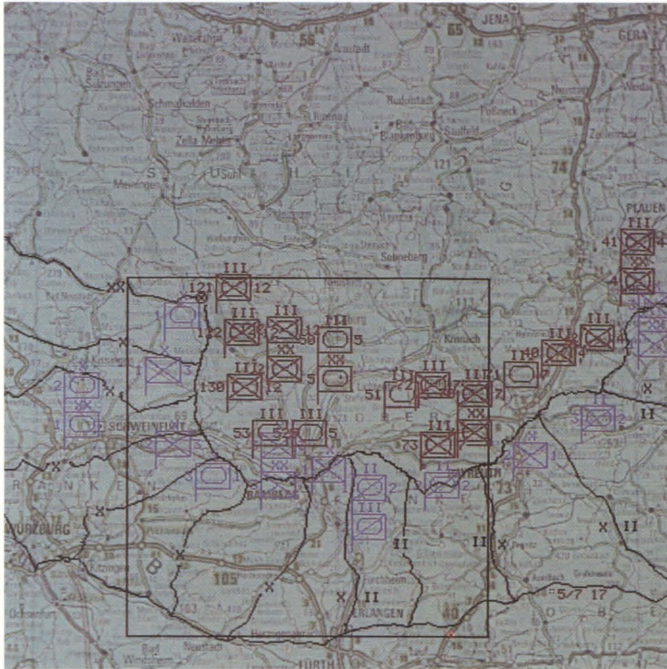


Optimum Contrast of Map and Overlay
In this display, the map and the symbols are readily visible.



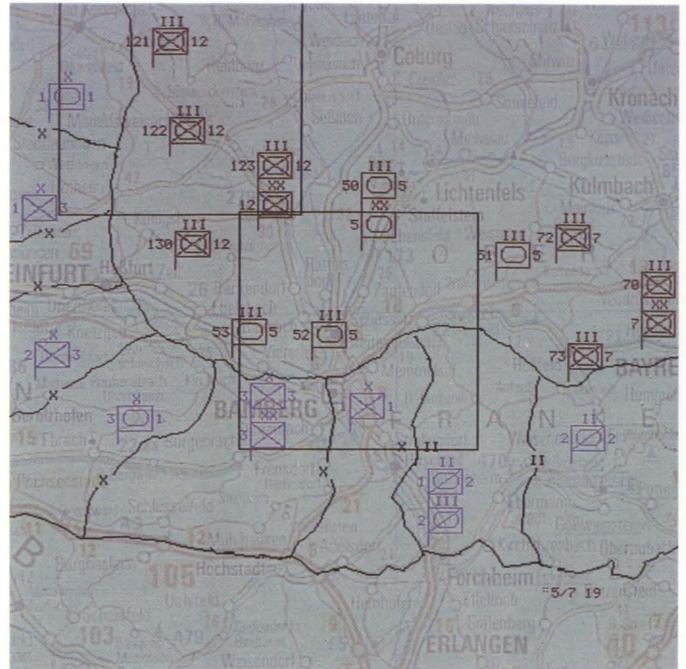
Overlay Dominance
In this display, the symbols are readily visible and the map is barely visible.

Pan and Zoom Features The following displays illustrate the pan and zoom features of the TIDE System. With these features, the user can readily change the size and position of his "window" on the total area of coverage.



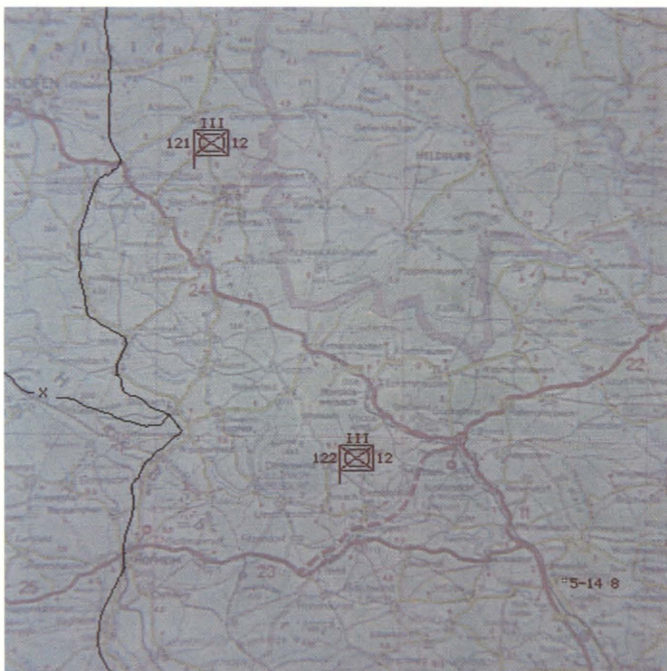
Zoomed-Out Display

This display shows the initial view before panning or zooming. The size of the window represents the total area of coverage (320km x 320km).



One Stage of Zoom-In Display

This display shows a reduced area of coverage after one stage of zooming-in. The size of the window represents 160km x 160km.



Two Stages of Zoom-In Display

These two displays show areas of coverage after two stages of zooming-in. The window size (80km x 80km) is the same in both displays, but the translation from one to the other is accomplished using the panning feature.

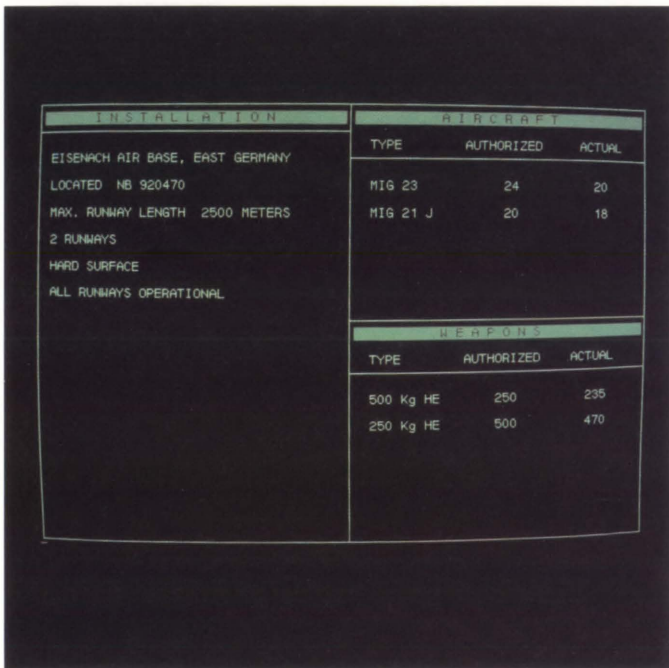


Detailed Information Feature The following displays illustrate the TIDE System detailed information feature. With this feature, the operator can display additional information for any selected symbol on an adjacent alphanumeric screen.



Air Order of Battle Perspective with Additional Information Indicator

The operator has selected an air base symbol for additional information. (The black cross illustrates the selection indicator.)



Alphanumeric Display
Additional information about the selected symbol (Eisenach Air Base) is presented.

SDC—A Pioneer in C³I Crucial to the development of the Tactical Information Display Environment have been the contributions of a multidisciplinary staff of SDC professionals experienced in all aspects of C³I systems design and development. For more than 25 years, SDC has designed, developed, and implemented large, computer-based command and control systems. As a result, SDC has acquired an extensive background in the system development process and the following related areas:

- Requirements analysis
- Operational employment planning
- System specification
- System engineering and integration
- Simulation modeling
- Information science skills
- Design engineering and fabrication
- Computer program design and production
- Personnel subsystems planning
- Operational and technical control procedures
- System training
- System installation and testing

Some of the principal command, control, communications, intelligence, and weapons systems that have provided SDC with its broad experience bases relevant to C³I applications are:

AUTODIN II	J-TIDS	SPADATS
AUTOVON	MAGIS	SPADEF
AWACS	NADGE	TAC STP
BADGE	NIKE-X	TACFIRE
BETA	OASIS	TACS/TADS
BUIC	PATRIC	TAFIIS
COBRA DANE	SACCS	TAOC-85
COBRA JUDY	SAFEGUARD	TIPI
ECCCS	SAGE	TOS
FIRESCOPE	SAM-D	TSISC
GAMO	SCARSII	WWMCCS
GEADGE	SEAOR-62	407L
IAIPS	SEEK DAWN	427M
JASWOC	SEEK VIEW	

SDC Capability System Development Corporation is a pioneering information management company, with capabilities embracing all aspects of computer-based information management and data base-handling systems. Command, control, communications and intelligence applications make up one of the company's key technology and business areas.

SDC is involved in a wide range of commercial and government systems activities. These include: system analysis and management; software development, integration, and implementation; evaluation; testing; facility management; real-time simulation; training; hardware procurement; technical assistance; research; proprietary software products; and engineering development.

SDC maintains a variety of ongoing research and development programs to advance the state-of-the-art in computer systems technology; to investigate new and more effective solutions to information management prob-

lems facing business and government; and to improve the use of computer resources.

SDC, a Burroughs company, employs more than 4,000 people worldwide and has annual sales exceeding \$200 million. Headquartered in Santa Monica, California, the company has major facilities in 25 cities in the U.S. and throughout the world. Two-thirds of SDC's employees are professionals with special training or advanced degrees in systems-related fields.

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