



German FA on Its Way into the Future

by Brigadier General Jochen Schneider, General of the German Artillery

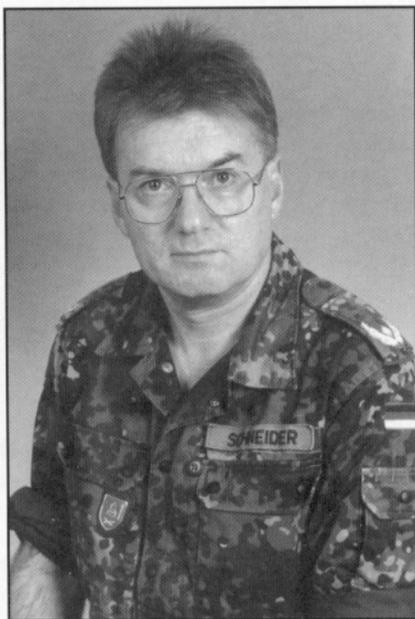
The demands of modern warfare are constantly changing. Those who can clearly identify the military requirements for future war and fulfill them will prevail. This is the process by which we're developing the German Field Artillery into one of the most advanced in the world.

In the future, the German Army will have to meet the critical challenge of territorial and alliance defense—namely, control the width and depth of large areas with few forces. To support this defense, the German Army has to achieve local superiority (despite global inferiority) to win decisively at the critical time and place. This requires highly effective reconnaissance and target acquisition capabilities; state-of-the-art information and command and control systems; and long-range weapons that can operate in large areas.

The "information battle" is of particular importance. We must have the lead in both time and data on the enemy. Winning the information battle will allow us to gain (or regain) our freedom of operations, implement our intentions and attrit the enemy deep with long-range weapon systems so our maneuver forces can win with as few losses as possible. Friendly forces must be able to use terrain; fight in depth; rapidly tailor combat organizations; operate with forces of varying strengths from different directions; engage the enemy simultaneously at the front, in the flanks and in the rear; and defeat him in a second strike.

Field Artillery is the backbone of target acquisition, surveillance and fighting with fires. These and other missions are the basis for its doctrine, equipment and structure as well as the definition of FA tasks and capabilities. The principles of joint and combined arms combat are fundamental and lead to the capabilities required of the modern Field Artillery, as outlined in the figure.

These capabilities only can be attained by employing the FA as an "advanced



system," as an integrated element of a modernized army. Based on the commander's guidance, the FA must be flexible enough to bring to bear its effectiveness (depending on access to target acquisition assets and weapons systems) for joint or allied operations, in addition to operations at its usual organizational assignment and command level.

But modern equipment is not enough to qualify an arm of service as "modern." The basis for a modern artillery is an integrated system that links command and control, reconnaissance and target acquisition, and target engagement. Integrated into an army-wide network, this FA system must be controlled and employed by commanders who master the art of independent and combined arms operations. These commanders must be capable of thinking creatively and acting independently and reliably within the alliance—in other words, thinking and acting in a modern way.

Command and Control. An FA system integrated into the army's system ensures well-balanced, real-time and

smooth operations with uniform command and control. Its backbone is the *ADLER* command, control and weapon employment system (*FüWES* in German parlance). *ADLER* is an artillery computer system that provides information on equipment, personnel and ammunition status, and situational awareness and processes operational data.

ADLER is the first system of its kind to be fielded in the German Army. It links all target acquisition and weapon systems with tactical operation centers (TOCs) and Field Artillery commanders. They now have target acquisition information constantly available to assess the combat situation. *ADLER* is a data processing asset for conducting fire support and controlling artillery target acquisition, including the analysis of results. It helps optimize and economize fire support.

ADLER links artillery subsystems with *HEROS*, the German army-wide command and control system. Using common interfaces, *ADLER* is interoperable with allied artillery automatic data processing (ADP) systems, such as the US' advanced FA tactical data system (AFATDS).

Integrating Field Artillery into one system, from the forward observer (FO) to the division artillery commander, provides force commanders at all levels comprehensively informed gunners. By the end of 1998, all artillery formations will have *ADLER*.

Target Acquisition. Since the fielding of the *CL289 Reconnaissance Drone* system in 1990, Field Artillery has had a high-speed, preprogrammed, unmanned system providing reconnaissance in depth. Currently, it's the only airborne reconnaissance system in the German Army. The system has a range of 400 kilometers and can transmit infrared (IR) sensor data in near real-time out to a range of 75 kilometers and take IR and black-and-white pictures, which are recovered after the drone lands. The drone battery interfaces via *ADLER*.

By 2001, improvements to the CL 289 will increase its range to 600 kilometers and its real-time data transmission to 125 kilometers. In addition to IR and optical sensors, the improved CL 289 will have synthetic aperture radar (SAR).

Troop trials of the *KZO Unmanned Aerial Vehicle (UAV)* for target location are scheduled to start in 1998, leading to operational deployment of the system after 2001. The KZO is a reusable, pre-programmed and remotely piloted aerial vehicle that is designed to reconnoiter targets in the open or concealed, stationary or moving. It flies out to a depth of about 60 kilometers with an endurance of about 3.5 hours any time of the day under most weather conditions. The IR forward-looking infrared (FLIR) sensor data are transmitted in real-time, interpreted without delay and available via ADLER.

The *Cobra* counterbattery radar, a joint development by Germany, France and the United Kingdom, is still undergoing trilateral troop trials. Using state-of-the-art radar technology, this system tracks up to 40 trajectories in two minutes and determines the firing positions. With a maximum range of 40 kilometers with a 90-degree sector coverage, *Cobra* is the first radar that differentiates between guns and rocket launchers. The *Cobra* targeting data transmitted via ADLER initiates immediate engagement using the most suitable weapon systems.



The CL 289 Reconnaissance Drone system has a range of 400 kilometers and can transmit infrared (IR) sensor data in near real-time out to a range of 75 kilometers and take IR and black-and-white pictures.

Fighting with Fires. Tube artillery, with its self-propelled howitzers and a core of FO teams in armored vehicles, is the backbone of fire support. Until recently, preparing firing positions and ammunition resupply constrained operations. Global positioning system (GPS) technology facilitates semiautonomous operations, even in regions with insufficient geodetic data. Vehicle navigational systems that allow the guns to operate semiautonomously coupled with the fielding of the *Multi* logistical truck will improve the operational tempo and availability of cannon fires.

Multi is a 14-ton multipurpose resupply vehicle with a paletized loading system; the German Field Artillery will start fielding its *Multi* for ammunition resupply in 1999.

The coordinated introduction of the *Leopard IA5*, a tank modified for FOs, for the first time provides FOs the same night-vision capability and performance characteristics as their armored maneuver forces. This guarantees fire support under all operational conditions.

The artillery will leap ahead with the fielding of the *Panzerhaubitze (PzH) 2000* starting in July 1998. The 52-caliber tube has improved accuracy and a range of 30 kilometers (40 kilometers firing base-bleed rounds). The howitzer has an on-board ballistic computer and a combat load of 60 rounds. The howitzer can stop, fire and redeploy in less than two minutes. Its rate of fire is 10 rounds in the first minute (up to 20 rounds in less than three minutes) followed by the howitzer's conducting an immediate survivability move.

General:

- Employ advanced command and control and fire direction assets.
- Access reliable, efficient and deep reconnaissance and target acquisition.
- Contribute to the force commander's determination of the combat situation.
- Create main fire efforts and shift them over long distances.
- Lay barriers deep in enemy territory.
- Independently control areas and coverage with fires.
- Engage targets highly accurately in both close and deep combat.
- Find, identify and engage high-value targets.
- Simultaneously support both close and deep operations.

Close Operations:

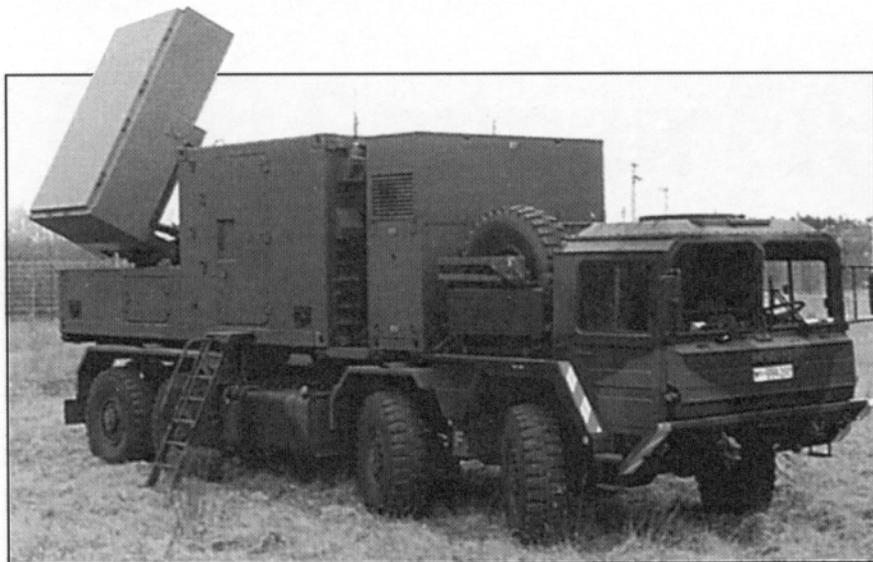
- Employ high-volume, accurate firepower using armored, mobile and responsive assets.
- Employ enough forward observers with the necessary equipment.
- Fire intelligent munitions.

Deep Operations:

- Execute accurate fires to engage area and point targets of all types.
- Access discriminating target acquisition assets.
- Fire intelligent munitions.



Multi is a 14-ton multipurpose resupply vehicle with a paletized loading system; the German Field Artillery will start fielding its *Multi* for ammunition resupply in 1999.



The *Cobra* counterbattery radar, a joint development by Germany, France and the United Kingdom, is still undergoing trilateral troop trials. Using state-of-the-art radar technology, this system tracks up to 40 trajectories in two minutes and determines the firing positions.

The PzH 2000 requires a driver, gunner and vehicle commander; two ammunition loaders are included in the crew for manual operations, as necessary in combat. The five-man crew operates in an open compartment inside the turret and accesses a variety of capabilities, such as automatic gun laying and relaying, automatic ammunition flow, inductive fuze setting, etc., with a number of backup systems.

With the fielding of the terminally guided *Smart* ammunition in 1999, Field Artillery will be able to engage hard targets precisely. *Smart* is a sensor-fuzed "smart" ammunition. At an altitude of about 600 meters above the target, the shell ejects two submunitions that detect and identify the target by scanning a circular area during a controlled descent and fire a top-attack penetrator that kills the target kinetically. The submunitions engage only preprogrammed targets, such as main battle tanks at depth, attriting the enemy's armored force before the close battle.

In another significant development, the modular propelling charge system (*MTLS*) for 155-mm howitzers will be available in 1998. Ease of handling and safety of operations as well as steady muzzle velocity capabilities are the main characteristics of the system.

Finally, starting in the year 2000, we'll add time and multi-function fuzes with inductive settings to the latest state-of-the-art cannon ammunition family. They will reduce response times, improve safety and enhance the precision of fires on the targets.

The medium artillery rocket system (*MARS*), the US-made multiple-launch



Shown here is the medium artillery rocket system (*MARS*), the US-made multiple-launch rocket system (*MLRS*).

rocket system (*MLRS*), remains the hard-hitting weapon for fighting with fires in depth. Designed as an autonomous area engagement weapon, it destroys semi-hard targets and blocks wide areas using the fielded bomblet and mines munitions. After being disassembled into two sections by the crew, the launcher is transportable in two C-160D Transall cargo airplanes.

MARS has the potential for significant improvements with developments of an improved launcher and new munitions that can achieve ranges of more than 60 kilometers with precision. Improving *MARS* capabilities currently is being studied.

The futuristic *Taifun* army attack drone (*KDH*) is a largely autonomous weapon for engaging key targets in depth. After programming, it approaches the target area, recognizes the targets and engages them independently. It has a tandem-shaped charge warhead with limited fragmentation effects on board and attacks the targets from the top.

Its penetration is 170 kilometers with an endurance of almost four hours. Stationary and moving high-value targets at all degrees of protection are engaged with high accuracy. Development of the *Taifun* is scheduled to begin in 1998.

The *TRIFOM* fiber optical system (*LWL-FK*) is being developed that has a maximum speed of 700 kilometers per hour and can top-attack targets out to 60 kilometers. The system features maximum suppression of collateral damage and secure target discrimination by the operator. The *TRIFOM* system is in the predefinition phase and various warheads are being tested.

Conclusion. As a result of current and future procurement efforts, the German Field Artillery will make a quantum leap to join the international "top of the tops." However, because of budget constraints, we won't be able to field the most modern systems to all artillery formations. In the long run, battalions with modernized equipment and battalions with other systems will be employed side-by-side. As they change units, commanders and other battalion leaders will be brought up-to-date on the latest equipment using simulation and simulator-supported training at all levels of command.

With its advanced technology target acquisition, command and control, and weapons and munitions programs, the German Field Artillery operations and tactics will comply with the latest in operational thinking. The German artillery system doctrine will evolve continuously as a significant contributor to the army's operational principles.



Brigadier General Jochen Schneider is General of the German Artillery and Commander of the Artillery School at Idar-Oberstein in Germany. In his previous assignment, he commanded the 32d Mechanized Infantry Brigade, Schwanevewe. Among other assignments, he was the Chief of the Army Personnel Branch, part of the Federal Ministry of Defense in Bonn; G1 of the III German Army Corps in Koblenz; Commander of Mountain Rocket Artillery Battalion 82 in Landsberg; and G3 of the 7th Mechanized Infantry Brigade at Hamburg. He commanded two batteries: Multiple Rocket Launcher (110-mm) and Escort Battery (*Atomic*). General Schneider is a graduate of the Federal Armed Forces Command and Staff College at Hamburg.