



Flick Ramming System

I. Company Overview

Curtiss-Wright Antriebstechnik GmbH (CWAT) was formed on January 1st, 1999 as a subsidiary of Curtiss-Wright Flight Systems through a strategic acquisition. CWAT is a business unit that specializes in the development of individual drive systems for industrial and defense applications. **Our know-how is focused on digital electromechanical drives including the power and signal electronics, software development and the system integration of electrohydraulic drives and hydro-pneumatic suspension systems.**

In Europe, CWAT is the recognized technology leader with additional markets in Asia, South Africa; and in North America. In addition to the many prototype flick ramming systems for a variety of artillery systems, we manufacture the drive systems for different defense programs which are currently in full scale production:

- G6 Howitzer South Africa
- Fortress Gun- Switzerland

Our unique capabilities allows us to provide the U.S. Army flick ramming systems which meet the varied requirements of the Medium Armored Vehicles (MAV) program and any other future combat vehicles. CWAT can support the Army's desire to field the MAV program by March 31, 2001.

Curtiss-Wright continues to actively market our aiming and stabilization systems, hydropneumatic suspensions as well as flick ramming systems to the major U.S. and European defense vehicle and turret manufacturers. We are seeking to form strategic alliances with the U. S. prime contractors that are competing for the U.S. Army MAV program. **However, many of the U. S. prime contractors are vertically integrated and currently provide drive and stabilization systems to the U.S. Army's current armored fleet.** Curtiss-Wright welcomes the opportunity to brief the MAV decision makers and show the merits of our technology and proven track record. We believe this would be very beneficial to the Army so they could see the latest state-of-the-art aiming and stabilization technology, which is available now for the MAV program and in the future. **Because of the vertical integration described above and in order for the Army to realize the benefits of this technology, Curtiss-Wright recommends that the flick rammer requirements in the Request For Proposal be changed to reflect the current state of technology.**

II. Company Capabilities

CWAT acts as a strategic partner to the various prime system integrators of industrial, naval and defense systems, developing and supplying electromechanical and electrohydraulic drive systems as well as hydropneumatic suspension systems. Our very competitive engineering know how is applied to create customer specific production solutions, preferably within strategic partnerships with market leaders.

Our core capabilities and competencies allow us to focus on:

- Electromechanical servo drive systems for 24 / 48 V DC battery supply and 110 to 560 V AC triple phase power supply
- Control systems engineering, electronic hardware and software
- Highly dynamic electrohydraulic drive systems
- Hydropneumatic suspension systems for wheeled and tracked vehicles

All of our designs meet or exceed the relevant MIL-STD's, such as EMI/EMC, environmental conditions, human engineering, configuration management, reliability and maintainability prediction, safety and risk analysis, software quality, etc.

Of course as a standard practice CWAT provides complete supportability/maintainability of all fielded product. For current customers we perform all maintenance/repairs above operator checks and services.

III. CWAT Benefits

-General Aspects

Our electrohydraulic flick ramming systems are recognized in the artillery industry as both modern and state-of-the-art system. CWAT's development of semi-and fully automatic loading systems meets the industry's need for more reliable and cost effective weapon systems. CWAT have equipped different howitzer prototype systems, which are currently in full-scale production. All flick-ramming systems are demonstrating a high performance rate of fire. The systems have shown **high reliability and operational availability, which translates into lower cost of ownership.**

-Flick rammers

The CWAT designed systems have been developed specifically for ramming of artillery ammunition. They are installed in conjunction with:

- Field Howitzers
- Self-Propelled Howitzers
- Fortress Guns

Flick Rammers guarantee a consistent depth of artillery munitions over a wide range of elevations. CWAT flick rammers are suited for retrofitting because of their compact design concept and simple controls.

Depending on the space available on the gun and the loading mode desired, flick rammers can be installed in both horizontal and vertical type of loading arms.

Through the use of flow control system for speed setting rather than the more conventional pressure type, CWAT Flick Rammers provide outstanding advantages like:

- Low system pressure
- Proven reliability
- Low power consumption
- Simple retrofitting
- Compact designs
- High capacity reserves

IV. Product Capabilities

-In production – capable of modifications to meet all OEM's needs.

CWAT is currently in full-scale production for four different flick-ramming systems and components for prototype systems. CWAT utilizes a modular design concept use standard components that are in stock, therefore, new prototypes could be delivered in relatively short time to meet the 's March 31, 2001 FUE schedule.

-CWAT Flick Rammer Installed Base:

Prototypes (155 mm gun)

- BOFORS-One prototype delivered
 - Self propelled howitzer, flick-ramming system for projectile and cartridges

- LIW-Denel-Three prototypes delivered
 - Self propelled howitzer, flick-ramming system for projectile

- SW Thun-One prototype system delivered
 - Bison fortress gun, flick ramming system for projectile

- SW Thun -Three prototype system delivered
 - M109, flick ramming system for projectile

- Confidential customer -One prototype system delivered
 - Flick ramming system for projectile

- KIA K9 -Three prototype system delivered
 - Self propelled howitzer, flick-ramming system for projectile and cartridges

Full Scale Production

- LIW-Denel-Self – propelled howitzer, flick ramming system for projectile and turret drive system

-Production: approx. 366 pcs.

- SW Thun-Bison fortress gun, flick ramming system for projectile

-Production: approx. 20 pcs.

- KIA K9 - Self propelled howitzer, flick ramming system for projectile and cartridges

-Production: approx. 300 pcs.

Power, Space and Weight Requirements:

The CWAT Flick Rammer is designed utilizing a modular concept. The units can be designed for different performance requirements. The range of the pressure supply is between 100 and 200 bars.

The pressure amplifiers are also in the program with a possible ratio up to 1:3. Our standard voltage supply is 24V DC.

Point of contacts:

In addition to the Points of Contact listed below, please use our home page for additional information: www.cwat.ch

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