

WHITE PAPER

VARGO[®]: Pioneering the Waveless Movement



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Thru Put



Reduce
Capital
Investments
Tap
Capacity

CIFE[®]
Automated Wave Planning
Starts Here

The CIFE logo consists of the letters "CIFE" in a bold, sans-serif font. The letter "I" is replaced by a 3D cube with yellow, red, and white faces. Below the logo, the text "Automated Wave Planning Starts Here" is written in a smaller font.

Fastest
Order
Cycle Time

Minimize
WMS
Functional

Adaptive



Pioneering the Waveless Movement

By Daniel C. Perry

Our history of waveless and continuous flow processing is well documented from the features provided in deployed and proposed systems by VARGO® engineers⁽¹⁾. In fact, the history establishes VARGO® as the originators and subject matter experts in the increasingly popular terminology of “waveless” technology. From VARGO® documentation, the first usage of the term “continuous flow” was used in the deployment of a system to L.L.Bean in 2004. That term was also used in a number of proposals during that same year, including proposals to O’Reilly Auto Parts, Walgreens and Amazon Technologies. The term “waveless” was first used by VARGO® (ADS) on its website in 2005.

In 2006, VARGO® acquired ADS Specialists, Inc., including its software and engineering staff. A number


of ADS proposals used the terminology “waveless” and “continuous flow,” including the American Eagle Outfitters, Inc., proposal. That proposed “waveless” system was commissioned in 2006 and has been operational ever since. The meaning of ADS’s terms “waveless” and “continuous flow” is identical to the definition that VARGO® uses today, namely: “the creation of a constant continuous flow of material without wave transitions.”

Continuous Flow

In VARGO® terminology, a “continuous flow system” is one where there is a constant flow of material. Continuous flow distribution operations have existed for many years. VARGO® engineers⁽²⁾ first continuous flow system was implemented in 1976 and commissioned in 1977. At that time, the responsible engineers were employees of Clay Bernard Systems International of Tulsa, Okla. It was named “WICS” and was installed in Warner Robbins AFB building 640.

Continuous flow systems are relatively simple to construct when the delivery of goods is equivalent to “ship alones”—where no order item consolidation is necessary to deliver the product. In systems without order item consolidation, the continuous flow is achieved merely by allowing new work to be incorporated continually in the work stream, throttled only by output production. The new work is seamlessly included, allowing new items to be retrieved during the retrieval of the existing items.

In the WICS system, incorporation of new work is allowed as long as it does not impact the required delivery of existing work. The WICS system requires the completion of all work within a 30-minute period from the time of the receipt of the order. “The on-line (real-time) nature of the system has eliminated the need to ‘batch pick’ warehouse orders.” Zientara, M. (1979, February 12). Warehouse Plans to Save Taxpayers \$6 Million. *Computer World*, p. 98.



- Feb. 2005—ADS was granted an order for a total of eight HAWK smart picking carts to BlishMize, a major hardware supply retailer, for use in their main distribution center. The projected increase in productivity is in the order of 30 percent over their current paper-based piece picking operation. These carts are equipped with a put-to-light system and a set of wireless PDA units.
- Jan. 2005—ADS was present at the ProMat 2005 show and conference at the McCormick Place South in Chicago, Ill., from Jan. 10-13. Booth 3860.
- Nov. 2004—ADS completed the installation of two projects commissioned by a major U.S. mail-order retailer for the design and implementation of two optimization modules for their main distribution center. In both cases, the installed modules retrofitted their operation with a low-cost capital investment. One of the modules was designed to control their Crisplant conveyor in order to produce a “waveless” operation that resulted in an increase of 30 percent utilization of their tray conveyor. The second module was installed in their carton replenishment area, increasing their throughput in over 20 percent using their existing equipment.
- May 2004—Levi Strauss & Co., awarded a contract to ADS to eliminate the low productivity periods during wave transitions at all of their distribution centers in the United States.
- April 2004—ADS was awarded a contract by a major U.S. mail-order retailer to optimize their Crisplant-based sorter operation by using ADS Adaptive Technology. The expected increase in sorter capacity utilization is estimated to be over 30 percent based on their current operating conditions.



Waveless Operation

The first fully waveless facility installed by VARGO®⁽³⁾ was constructed in North Hampton, UK. It was commissioned in 1999. ⁽⁴⁾

Levi Strauss owns that facility and still operates it for European distribution. Multi-unit, multi-SKU outbound cartons are filled using a Crisplant tilt tray sorter. Each individual outbound carton is an “order” to the fulfillment system. As an order (carton) is completed, a new order is inserted into the “batch.” Units necessary to fill all orders are extracted from an ASRS consisting of 17 Daifuku mini-load cranes and a small “near-immediate need” conveyance loop. The Warehouse Execution System (WES) provided by VARGO® engineers controls the selection and extraction of the required inventory to fill the orders. Residual units not required for the current batch are then re-directed back into the ASRS until needed. The WES directs where in the ASRS arriving containers (receipt goods as well as residual cases) should be held. There is no waving concept used in the system.

While this system is 100 percent waveless, it utilizes automated equipment to “pick” as necessary to complete individual orders. Using automated equipment to pick is a much simpler solution than a waveless solution that utilizes people to pick.

The first waveless driven system with a WES that manages people picking was commissioned by VARGO®⁽⁵⁾ in 2006 in Ottawa, Kan. This system uses VARGO®’s COFE® (Continuous Order Fulfillment Enterprise) WES to provide a continuous flow outbound fulfillment process. COFE® is coupled to a Manhattan Associates Warehouse Management System (WMS) that manages inbound processing and delivery of orders to COFE®. The WMS automatically releases new orders to COFE® as they are received from the company’s e-commerce website. COFE® automatically prioritizes and optimizes the release of orders for fulfillment.

This system, like all truly waveless systems, releases new work (orders) into the current pick batch based on both priority and optimization criteria. The new work is released into the existing batch as existing orders in the batch have been completely picked and processing resources are available. WES-managed pick workers are directed automatically as necessary to completely pick orders in

the current pick batch. This waveless picking operation is coupled with waveless sorting to individual orders, completing orders continuously.

“At the new facility, AEO has been able to reduce both direct and indirect labor costs...The system processes orders without waves,” said Steve Lyman, then AEO’s vice president of distribution, as quoted in *MultiChannel Merchant*, April 2, 2008 ⁽⁶⁾

More Recent Waveless Solutions

In 2014, the most recent deployment of a waveless operation occurred when American Eagle Outfitters, Inc., constructed a new facility in Hazle Township, Pa. The operation hit its initial peak season just three months after the facility opened with an entirely new staff, and the system produced nearly a 100-percent capacity limited only by the theoretical capacity of the sortation MHE for the entire workday. There are no waves, no peaks and valleys of production—just a constant flow of work.

No Waiting for Waves

DC Velocity featured the American Eagle system in its February 2015 issue:



“The fulfillment process is designed so that items can be selected for e-commerce and store orders simultaneously. Based on its success using the COFE® system at its Kansas DC, AE chose to implement it in the Hazle picking operation as well. AE uses a waveless process, meaning that orders are not grouped into waves as is common in pick operations. Instead, customer orders are entered into worker pick lists on the fly as they are received at the facility—a capability that promotes both fulfillment flexibility and processing speed. ⁽⁷⁾”

Contact VARGO® to learn more about the history of our waveless distribution systems and how other VARGO® clients are reshaping the industry and providing a true lean order fulfillment solution with newer generations of our waveless/continuous processing solution.

Footnotes

- 1 *VARGO® Engineers – The VARGO® engineers are engineers currently employed by VARGO® who have been creating advanced distribution system designs driven by real-time WES functionality over many years in key roles for other organizations. The core team has been employed by VARGO® and an acquired organization for more than 16 years.*
- 2 *CBSI, Bill Angel, Jay Boonyasopon, Keith Carter, Jon Collins, Ron Henderson, Dan Perry, Conrad Schutting. Dan Perry was Chief Engineer at CBSI.*
- 3 *CASI, Bob Elving, Arturo Hino Hosa, Jose Oliva, Dan Perry, Hays Pinthapataya, Robert Surtees, Gary Yee. Dan Perry was Chief Engineer at CASI.*
- 4 *<http://www.ajbuildingslibrary.co.uk/projects/display/id/2689>*
- 5 *VARGO®, Bob Elving, Jose Oliva, Dan Perry, Hays Pinthapataya, Gary Yee. Dan Perry is Senior System Design Engineer at VARGO®.*
- 6 *http://multichannelmerchant.com/opsandfulfillment_warehouse/american-eagle-outfitters-on-cutting-labor-expenses-02042008/*
- 7 *Maloney, D. (2015, January 26). Fashion Forward. DC Velocity, pp 59-63.*