

A U T O M O T I V E
O E M ' s

INCREASE Flexibility
SMOOTH Production
MEET Deliveries
SHRINK Inventory
REDUCE Lead time

[SLASH Cost]

**Optessa**

Optimal Intelligent Scheduling

Today's Assembly Lines

A COMPLEX PROBLEM

There is intense pressure to remain competitive, flexible and cost-effective in today's markets. Manufacturers constantly strive to increase market share while streamlining production and cutting costs. The automotive market is a perfect example. Customers now have extensive choice of models, colors, interiors, engines and trim levels. Additional options such as moon roofs, DVD players, in-car navigation, and satellite radios are being offered in an effort to increase market share. These choices have radically increased the complexity manufacturing plants have to handle.

"A vehicle assembly plant copes every day with a dizzying array of build configurations. Between color changes, different drivelines and dozens of optional features, there's enough mathematical equations to stump Isaac Newton."

- "Optessa Solves Production Hiccups"
Tom Murphy, Ward's AutoWorld Jan '08

A PROVEN SOLUTION

To address these challenges, some of the world's largest and most complex auto manufacturers use **Optessa MLS (Multi-line Sequencing & Scheduling)** to effectively optimize and balance auto assembly planning, sequencing and schedul-

ing, across all product lines and constraints. Optessa MLS has the key capability to model and schedule, in a single application of the system, multiple lines in a plant at different tiers. Enhanced usability enables mapping of the workflows of a typical assembly operation. Optessa MLS is built around a distributed architecture for scalability, load balancing, and rapid computation to solve large scheduling problems.

The Optessa MLS PLATFORM

SEQUENCING AND SCHEDULING

OPTESSA MLS employs modern optimization techniques which can rapidly generate "near optimal" solutions for the most complex problems. The output is a global optimal solution rather than just a local optimal solution. This is of great value when considering high-level constraints such as distributions and complex patterns. Users can quickly configure the length of any given scheduling run and choose from several different optimization techniques.

Optessa MLS is truly a 'light-touch' system. It can be seamlessly implemented in any environment in as little as twelve weeks.

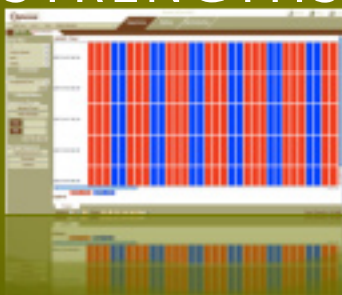
EXTENSIVE VISUALIZATION

Optessa MLS
Constraint Chart



The system is completely platform independent. The user interface runs in any standard web browser, making Optessa MLS the ultimate thin client.

Key Product STRENGTHS



- Near optimal solution: powerful algorithm evaluates > 1M solutions
- Evenly favorable solution across the entire planning window: no uneven lumps
- Reschedule capability maintains bias to original sequence: increased material stability
- Powerful representation model for all types of assembly lines
- Comprehensive set of rules and constraints handled: new types easily added
- Superior graphics to examine, analyze, and manipulate solution
- Web based architecture: application runs entirely on server
- Thin client: browser based with no add-ons
- "Light touch": can be dropped into place without affecting other systems

The Optessa ADVANTAGE

PROVEN BENEFITS

Optessa has enabled leading auto makers to address the challenges of increasingly tighter delivery schedules as they move towards a truly flexible and lean manufacturing environment.

STABILIZE MATERIAL FLOWS (“Heijunka”)

Solve for all rules and constraints (plant, supplier and sales)
Smooth all options, features and sub-assemblies, down to hourly level
Maintain integrity of base sequence when rescheduling

SMOOTH WORK LOAD

Evenly favorable solution quality across horizon
Smooth total tact time across all bins
Smooth idleness or overtime

REDUCE OTD TIME & INCREASE CUSTOMER SATISFACTION

Solve the more complex problem arising from smaller planning windows
Meet delivery dates

REDUCE FINISHED GOODS INVENTORIES

At dealers and in pipeline
Reduced in plant WIP buffers

Additional CAPABILITIES

The power of Optessa comes from the application of a general, flexible, and powerful approach to production planning, scheduling, and execution:

REAL TIME EXECUTION

Optessa MLS with Real Time Sequencing (MLS-RTS) combines with the power of the MLS Platform to enable real-time automated re-sequencing of in-plant and out-of-plant scheduling and sequencing, giving manufacturers the power to respond, re-sequence, and refocus their operations in real time.

Optessa MLS-RTS capabilities enable the optimized schedules to be automatically re-sequenced within the scheduling month, week, day, or even hour, based on pre-defined triggers or manually as ad-hoc needs arise.

Optessa MLS-RTS can be seamlessly integrated with plant level systems:

Manufacturing Execution Systems (MES)
Line control systems
Directly integrated with the Programmable Logic Controllers (PLCs) controlling ASRS or other storage buffers

IMPROVE FIFO CONFORMANCE OF FINAL OFF SEQUENCE

IMPROVE EFFECTIVENESS OF PLANNING AND PRODUCTION CONTROL FUNCTIONS

Reduce scheduling/rescheduling effort (by ~90%)
Eliminate manual errors
Permit Production Controller to focus on managing scheduling process and coordination

REDUCE CAP-EX

Use forecast and planning data when planning new vehicle / feature introduction

REDUCE COSTS

“Proper sequencing and scheduling is the critical link between an order and its execution. But the competitive environment and increasing product variety have made the problem very complex. The problem represents the balance between demand, capacity and the supply chain. Optessa technology has been proven in the largest and most reputed global manufacturing corporations. The system can solve the extremely complex sequencing and scheduling problems faced by high volume manufacturers.”

- Vasu Netrakanti, CEO, Optessa Inc.

PLANNING

Optessa MLS with Multi-Line Planner (MLS-MLP) adds the powerful component for planning, selection and allocation at the global level. Optessa MLP can optimally select from order pools to satisfy:

Material, plant, and labor constraints: plant capacities, in-house capacities, critical supplier capacities
Regional and dealer allocation rules
Order priorities: fixed, fleet, forecast orders

Optessa MLP can handle very large problems: 1000s of rules, millions of orders



COMPANY PROFILE

Optessa Inc. is the emerging leader in Sequencing and Scheduling Technology with considerable experience in applying cutting edge optimization advances to solve real world problems. Optessa's extensive experience with Business Processes and their modeling for software applications has helped establish a proven track record of developing and implementing algorithmic solutions to complex manufacturing problems in diverse industries. Optessa has a proven track record of executing complex projects, on time and within budget. Optessa has multiple locations in North America.

Assembly line: For high-volume lines that require very complex sequencing rules with large numbers of interdependencies, Optessa is proven at many levels in automotive plants, from planning to assembly- and feeder-line scheduling to sequencing out of the buffer between paint shop and final build.

"The devil's in the industry detail for scheduling"
Julie Fraser,
Manufacturing Business Technology Jan '08

THE BEST IN THE BUSINESS

Optessa's customers include some of the largest global brand manufacturing companies in the world. To learn more about how Optessa can help you today, please visit:

www.optessa.com
email: info@optessa.com

OPTESSA OPTIMIZATION

- Fast, Flexible and Scalable
- Patent pending technology that can support a wide range of constraints across all tiers of manufacturing
- Combines modern combinatorial optimization methods with classic LP / IP optimization
- Delivers near optimal solutions to complex sequencing and scheduling problems
- Offers a range of standard constraint types that can be used to enforce a variety of rules and constraints
- Always delivers a solution
- Solves problems previously considered to be intractable
- Proven in diverse manufacturing environments, ranging from cars to ATVs and power equipment to parts production
- Easy integration with existing systems

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