

Computers in Industry

Special Issue - Call for Papers

Grand Challenges for Discrete Event Logistics Systems

Discrete Event Logistics Systems (DELS) are networks of resources through which material flows. Each node of the network corresponds to some resource (or set of resources) by which the materials are either converted in some way (refined, shaped, assembled, disassembled, etc.), moved (transported within one facility or between facilities), or simply held for some period of time (as work-in-process or stored in a warehouse). Material handling and transportation are key components of DELS. DELS are “discrete” in part because they move material in discrete quantities, and in part because their behavior can be characterized effectively in terms of events happening at discrete points of time, i.e., the start or end of some conversion, transport, or storage process. A DEL system may take the form of a single warehouse, a portion of a factory, a complete factory, or a global supply network.

Methods from computer science, information systems, industrial engineering, and operations research must be used together to address critical issues in architecting, configuring, planning, managing, and controlling DELS. There is an ongoing trend also in computer science towards more business-related application domains. In this setting, the main slogan of the “Gesellschaft für Informatik (GI)”, the German Chapter of the ACM, 2007 annual meeting was “Computer Science meets Logistics”.

DELS have been the subject of a large body of analytic research. A huge variety of specific modeling tools exists that generally require application by tool experts to answer narrowly-defined logistics questions. It has proven difficult to integrate these models into information systems like Enterprise Resource Planning (ERP) systems, Advanced Planning and Scheduling (APS) systems, or Manufacturing Execution Systems (MES), because of the lack of conceptual alignment between the modeling tools produced by researchers and the information systems deployed in practice with which they should be integrated.

This difficulty is magnified enormously by four factors: (1) the scale and scope of global supply networks, such as those developed to support airplane, automobile or telecommunications systems manufacturing, and service systems, which may involve literally thousands of individual enterprises; (2) the dynamics of these networks, which are constantly changing as firms enter and leave, products change, markets change, etc.; (3) the broad range of information and communication systems deployed; and (4) the very high density of real-time decision making. Today, there is little base of theory or methodology for addressing decision problems of this scope, scale, and complexity.

This Special Issue on *Grand Challenges for Discrete Event Logistics Systems* aims to publish research in modeling, analyzing, and designing discrete event logistics systems and the corresponding decision support systems.

In particular we seek original contributions on the following topics among others:

- Careful analysis of the successes and the failures of the past, including case studies and lessons learned,

- Applications of new technologies from knowledge management, e.g., semantic web, or modeling tools, like UML for software or SysML, for systems, that significantly enhance DELS research and development,
- Theories and technologies that are significant impact DELS modeling and analysis with regard to risk, uncertainty, and knowledge gaps,
- Opportunities for advancing the state of DELS knowledge and capability by “virtual organizations”,
- Design of generic vs. purpose-built decision-making algorithms,
- Approaches to resolving the conflicts between domain- and instance-specific characteristics of a real-world DELS and the desire to deploy generic optimization techniques,
- Centralized vs. completely decentralized DELS network governance and its impact on information systems and decision support algorithms,
- Impact of automation degree for decision-making in DELS on information systems architecture and the development and deployment of decision support algorithms,
- Decision-making by humans vs. fully automated decision-making and its impact on information system architecture and decision support system research.

This special issue of Computers in Industry is intended for revised and substantially extended versions of selected papers presented at the Dagstuhl seminar 10102 titled “Grand Challenges for Discrete Event Logistics Systems”, but we explicitly encourage other researchers to submit their papers to this Special Issue as well.

Please submit your paper by email to all the four Guest Editors as a PDF or MS Word file following the instructions for authors on the CiI website:

http://www.elsevier.com/wps/find/journaldescription.cws_home/505646/authorinstructions.

Please do not use CiI’s online submission system.

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Important Dates:

Submission deadline:	June 1st, 2010
Completion of first-round reviews:	September 1st, 2010
Revised papers:	November 1st, 2010
Target of the second (last) round of reviews:	December, 31th, 2010
Target for sending the accepted manuscripts to the publisher:	February 1st, 2011