THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

Define the Impact of Foreign "Metric" Ships on Material and Inventory Control in U.S. Shipyards

U.S. DEPARTMENT OF THE NAVY
CARDEROCK DIVISION,
NAVAL SURFACE WARFARE CENTER

in cooperation with
Newport News Shipbuilding
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“Define The Impact Of Foreign ‘Metric’ Ships {SI Metric Systeme} On Material And Inventory Control In U.S. Shipyards”

N8 -92-3 SP Panel 8 Industrial Engineering
Final Project Report
Via NSnet and The Internet

Submitted By
BMS & Associates Inc.
P.O. Box 2863
La Jolla, CA 92038
bmschram@cts.com

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Acknowledgment
To be part of hard copy report only.

Project Overview
This is the first NSRP Project report to be presented electronically, via NSNET as one of its discussion forums, with direct linkages to and from the Internet. This report will be defined via its major, categories and links listed below. The Project report will be comprised of a brief summary of the project, its benefits and its accomplishments. Followed by a brief discussion of conclusions and recommendations. The main body of the report will be the identification of various metrification relative resources, categorized emphasizing how information is exchanged, with their direct electronic linkages via the Internet. The application of this electronic medium, and such a forum within the NSRP’s NSNET, represents a significant strategic technology to
support the objective of leapfrogging with technology to gain a global share of the shipbuilding markets.

The fear of a negative impact to shipbuilding, material and inventory control due to converting to metrics was found to be quite minimal, once it was realized that the many complexities involved had various timely trade-offs as part of becoming globally competitive. The conversions have since realized to be part of the change to be global, to which U.S. shipbuilding is now committed to. A key requirement became how, what and where could we better define, use and communicate metric material and inventory control information.

The optimizing of this information transfer became the focus of this project. We early on saw the potential for the industry and NSRP to utilize electronic medium for its research and communications. Fortunately this project, has benefited with the speed of the recent electronic evolutions, and has been able to publish electronically. The accessible resources included range from shipyards, standards organizations, the NSRP Library, government agencies, academia, trade organizations, and shipbuilding vendors and suppliers. Thus any shipyard or resource can research, gather, learn, communicate and share with and from each other, in this electronic forum. Global commerce is now via the Internet, we are easily part of it with our NSNET Home Page, your Internet browser, various software tools, linkages, and e-mail.

Project Report Sections

- Project Approach and Activity Summary
- Project Report Table of Contents
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Project Approach and Activity Summary

This NSRP SP 8, Industrial Engineering project was initiated as the direct result of a panel meeting presentation, from the Caterpillar Corporation, on their experiences in entering the global marketplace and converting to the metric system. Concurrently NSRP Panel SP 6, Marine Industry Standards was well into and completing their NSRP Project #0399 A METRICATION OF U.S. SHIPBUILDING - THE CHALLENGES AND OPPORTUNITIES@. Funding, extensions and other delays have occurred with this SP 8 Project # N8 -92-3, such that this output format is the key benefit to the industry.

Industrial Engineering techniques were applied to gather analyze, categorize, coordinate and communicate, and drove this project throughout. The SP-8 Panel and Program Management were very supportive to find and develop new techniques and approaches with the NSRP projects and research. Now all NSRP projects' must have shipyard application as their only true measure of value. The outputting of this project via NSNET has is specifically to provide direct utilization of a shipyard to this project.

The project defined and conducted two sets of industry surveys the traditional way. These were met with common apathy, relative to subject matter and the harsh realities of local in house priorities. The medium was mailing, telephone, and faxing of data. Participation was poor.

The budget for this project was utilized to better gather and share information. The progress, requests, and communication on this project was shown by its being discussed and presented with the following NSRP Panels at their Panel Meetings: SP- 4 - Design to Production, SP- 5 Human Resources, SP-6 Standards, SP- 8 Industrial Engineering and SP - 9 - Training. The visits with specific government agencies, industries and institutions, provided us with the required global overview. We also found it most beneficial to attend various relative conferences and trade shows. The CALS EXPO was attended numerous times, and provides a basis for this report. CALS is defined later in the report. We would then document and share these visits with the SP-8 and other NSRP panels, NSRP project development activity, as well a scheduling various activities with staff at shipyards.
We tried to bring in concurrently, information relative to how other industries are progressing in the general area of global competition and specifically were there any real keys to metric conversion. The gendirections being taken, for inventory and material control became the main focus. The tools to better research and communicate then became our specific focus. Thus the objective being met to output this project electronically via NSNET, became its main objective.

The technical issues of metric conversion were never a real part of this particular project. The impact to material and inventory control is simply a matter of management and planning. Our finding was that to get into a position of global competitiveness, the access to information is a basic requirement. In shipbuilding there are a great many complex channels of information required to due business globally, that is really doing business metrically. These complexities range from CAD drawing conversions, to training, database conversions, to dual sets of tools, and parts bins for either standard or metric parts.

The analogy of Elliot Goldratt’s "A Theory of Constraints", as to Global and Local constraints applies with the shipbuilding approach to metric conversion. To compete globally, there are a great many major business processes which require timely change. The application and conversion to the SI International Metric Standard is a local process within the set of Global Processes. The global inventory and material control processes undergoing change, to compete globally, all have inherently committed to the required conversion to International Metric Standards.

The local processes required at various points of the overall processes all present opportunities to have a cost effective conversion. This project has attempted to provide a time proven Industrial Engineering approach by gathering, analyzing, categorizing and communicating. The following approach hierarchy relative to cost has been basic to this project.

ADOPT
ADAPT
DEVELOP

Project Key Metrification Definitions

Most of the technical aspects of the conversion to the SI metric system were excellently presented by Soik and Associates in the two SP-6 NSRP Projects: NSRP#0399 "Metrication Of U.S. Shipbuilding - The Challenges And The Opportunities", NSRP # 0437 "Metrication In U.S. Shipbuilding - Training Volume I Instructors Manual & Volume II Transparencies, Tests And Worksheets".

We found that that the most frequently asked question was for a working definition of soft and hard metrics. Below are two sets of definition gathered by the MARAD via their library at NMREC (National Maritime Resource and Educational Center) [http://nmrec.dot.gov](http://nmrec.dot.gov) NMREC is a fantastic resource for the whole industry to utilize.

Hard Metric and Soft Metric Definitions

1. From the American Society of Civil Engineers’ Committee on Metrification Home Page on December 12, 1997:

   “Know the difference between a ‘soft’ metric conversion and a ‘hard’ metric conversion. ‘Soft’ metric conversion is an exact conversion. ‘Hard’ metric conversion is ‘soft’ conversion taken to the next level that is converted values are rounded, rational equivalents. For example, a ‘soft’ conversion of 6” is 152.4 mm. A
‘hard’ conversion of 6” is 150mm. Remember, ‘hard’ metric conversions will accelerate the learning process and acceptability of the metric system.” The point of contact is Chris Stone and the e-mail address is: cstone@infi.net. Their Internet address is: http://www.pilot.infi.net/~cstone/comindex.htm.

3. From the Maritime Metric Practice Guide developed by the Maritime Administration’s Office of Ship Construction, dated December 1978:

- “Soft Conversion is the process of changing the inch-pound measurement language to equivalent metric units within acceptable measurement tolerances without changing the physical configuration. In other words, it is the same item both before and after conversion.”
- “Hard Conversion is the process of changing the inch-pound measurement language to non-equivalent metric units which necessitates physical configuration changes outside those permitted by established measurement tolerances. Although the term is in general use, it is technically incorrect when applied to specific items because no ‘conversion’ takes place; rather, a new metric item (requiring a new part identification) is created to replace the customary item.”

**CALS - DEFINITIONS**

Continuous Acquisition and Life-cycle Support. This is revised from: Computer-Aided Logisitics Support. CALS is a goverment sponsosed iniative withe the following :

**CALS STRATEGY**

**VISION:** Facilitate Enterprise Integration and promote an Electronic Commerce environment to enhance industrial competitiveness and economic growth through process improvement, information technology and international product data exchange technology.

**Objective:** For small to large businesses and government to be able to work real time in a digital environment from common data bases to Procure, Design, Develop, Manufacture, Distribute and Service Products.

**Project Conclusions and Recommendations**

**Executive Summary:**

The fact that the U.S. Shipbuilding Industry has continued to learn and grow globally can be partly attributed to their focusing of common goals and objectives via the NSRP. This project has hopefully demonstrated how important communication and sharing is to any industry that wants to be globally competitive.

Metrification and a commitment to its application , always have been treated with apathy with most U.S. industries. They felt that change for the sake of change is not good business. Yet, change as a part of overall processes changes provides for true integration of all levels of change into the final set of processes. Metric conversion in the U.S. Shipbuilding Industry is going through these subtle yet progressive changes. In doing such, the direct impact on material and inventory control will be quite minimal if any. The many levels and complexities of such changes can be best accomplished at local levels with lessons being learned from the outside. The initial and future utilization of the INTERNET and its ever growing tools and applications now are the medium which to learn and grow with the outside world.

The key Industrial Engineering techniques of analysis, categorization and communication provide the conduit for continuous improvement of the local and global processes. The utilization of the INTERNET to allow for the cost effective application of specific tasks as to **ADOPT - ADAPT - OR DEVELOP**, is the key to integration of changes.
The NSRP has been a wonderful tool for the industry, although too often underutilized and appreciated. The industry leadership is gradually learning that concurrent project communicating and sharing provides for leveraging of the research funds. There are many other organizations associated with U.S. Shipbuilding, which have been electronically linked in this report. They all in there own way provide key resources for the industry to utilize. These linkages with, suppliers, vendors, government agencies, standards organization and the like must now be continuously expanded upon and utilized. This is the key global process change for this industry to continue to grow and compete globally.

Conclusions and Recommendations:

- To compete globally you must be able to due business with the SI International metric standards at all levels.
- The speed of technical change is toward doing business electronically: to do such, this industry must change its processes in a timely and cost effective manner. The industrial engineering techniques to be cost effective require continuous analysis of change and implementation via its analysis to: adopt, adapt or develop.
- U.S. shipbuilding leadership can no longer isolate themselves locally if they wish to effectively compete globally.
- Competition means no free lunch, thus old barriers of communications with suppliers and vendors must change to be globally competitive. This also applies to those many government agencies, which are also changing. All business entities have limited resources and for all to prosper in the future many key businesses processes are changing, the future of business integration will be via standards of electronic communications.
- We strongly recommend the establishment of stronger relationships with vendors and suppliers.
- We recommend that conversion to the metrics system be the focused subject matter for all industry training programs on change and culture change. To often training subject matter has no real tie to their business. Metric conversion should be the focus tool to train and show how to bring about change with all levels of subject matter and to all levels of your organization. Change must occur within engineering, purchasing, material control, planning, ships production, ship repair, and is integrated with all outside support organizations.
- Each shipyard should via NSNET download and apply the metrication training so well set forth in the NSRP Panel SP -6, Report 0399 “Metrication of US Shipbuilding - The Challenges and Opportunities.” This report as well as its companion NSRP # 0437 “Metrication in U.S. Shipbuilding - Training, Volume I Instructors Manual, Volume II Transparencies, Tests & Worksheets.” Also listed with UMTRI is the video for the shipbuilding industry. All of which would be part of the above noted focused subject matter management programs.
- The scope of the ever expanding and improving technical communication, information exchange and processing will continuously require timely and effective efforts as to when to: adopt, adapt or develop. Change management and project management becomes critical strategies for growth.
- NSRP projects must have more focus on the continuous concurrent progress communications via this electronic forum.
- NSRP projects should all be required to conduct application surveys via the Internet.
- The NSRP should define on the INTERNET a clearinghouse site so that anyone can list, reference, search and know who, what and where things are happening. We currently have limited funds and many groups doing projects with similar objectives and potential application for many groups. A clearinghouse of past, current, active and future related activities would be inexpensive and provide unlimited benefits to all. Again we could apply: adopt, adapt or develop.
- The NSRP panels should each have a fixed budget for attendance at relative conferences or trade shows. These would be then reported, reviewed with their specific reference, contact and information shared via the INTERNET and its linkages within thirty days of attendance.

Project Benefits:

- The sharing of a project status and activity among various NSRP panels.
- The integration of various outside organizations and research into a project and directly to the NSRP
panels and shipyards.

- The open communication with shipyards and the many other support groups, vendors, suppliers, government agencies and standards organizations.
- The output being the direct utilization of the electronic medium of the Internet, its tools, perspective and scope of resources all at ones desktop.

**Project Key Linkages**

**Key Linkages:**

Listed below are selected key Linkages, which we have found to be most valuable and relative to this NSRP Project. Please take the time to visit each site. Once at each please search for topics relating to metrication, standards, and other Links. Use the tools such as bookmarks and e-mail to gather, categorize and store your information.

**Metric Supplier Directories:**

**U.S. Metric Association**, 10245 Andasol Ave., Northridge CA 91325-1504 Tel. 818-368-7443
[http://lamar.colstate.edu/~hillger/](http://lamar.colstate.edu/~hillger/). We recommend that each and every shipyard purchase their AMETRIC VENDOR LIST@ Consisting of companies that produce metric -systems-based industrial parts, components, products, and building and construction materials. This list is very comprehensive and is frequently updated. Its use is basic to objectives of limiting the impact of metrication, since its lists those who now supply metric parts.

**The Association for Manufacturing Technology,** 7901 Westpark Drive, McLean, VA Tel 703-893-2900 [http://www.mfgtech.org](http://www.mfgtech.org) We recommend their ADomestic Suppliers of Metric Materials

**Standards Organizations:**

- **American Society of Civil Engineers - Committee on Metrication** –
  [http://www.pilot.infi.net/~cstone/comindex.htm](http://www.pilot.infi.net/~cstone/comindex.htm) The basic SI Systems International internet site. The best for most definitions. Please visit and bookmark this site as well as its linkages to other Metric sites.

- **ASTM** - American Society for Testing and Materials - Committee F-25 on Ships and Marine Technology

  - SHIIP Vision. [http://www.niiip.org](http://www.niiip.org). The shipbuilding information infrastructure, provided by the NIIIP consortium, will deliver this information to the shipbuilder in a consistent and comprehensible format. The open, standards-based infrastructure deployed by NIIIP will be built on existing and emerging standards including the Object Management Group, STEP and Workflow Management Coalition organizations. The SHIIP project will develop and deploy a new shipbuilding methodology that addressed both people and organizational issues. New shipbuilding processes will be developed, documented and validated by a broad-based team of shipbuilders. New organizational paradigms, such as a team-based approach to shipbuilding, will be investigated, deployed and measured for effectiveness. The SHIIP project is intended to be a deployment project; consequently, the SHIIP information infrastructure will avoid high-risk services. It will utilize services, which have been demonstrated in working prototypes, most notably through the NIIIP consortium demonstrations. The purpose of this project is to identify and resolve those technical issues that will be encountered in transforming the prototype to a production-grade system. These issues include salability, robustness, and the ability of the information infrastructure to utilize legacy applications and data stores.

- **National Maritime Resource and Educational Center:**(NMREC): They have been and should be the key resource for the industry. They are set up to serve the shipbuilding industry with updated, data and technology. Please note the links available on NMREC Home Page (They are the words "USCG" and "NAVSEÁ" actually on the umbrella logo) - they should provide one with direct linkages of industry value.
The Regional ECRC Program. [http://www.ecrc.ctc.com/](http://www.ecrc.ctc.com/). The ECRC, Electronic Commerce Regional Center, is a nationwide network funded through NIST. They provide industry with task specific training, research as to how and what to do to convert to electronic commerce. They spoke at a combined SP-5 & 9 Panel meeting, as well as attending SP-6 & 8 Panel meetings. They have been utilized by most shipyards, MARAD, UMTRI and other shipbuilding related organizations at the national level. They were most cooperative with this specific project and to the industry as a whole. The CALS EXPO was where we first met with them. The costs of their program for outreach and training had been funded for participating companies by NIST.


The Association for Manufacturing Technology.

[http://www.mfgtech.org/](http://www.mfgtech.org/) The purpose of this 200-page directory is to help buyers locate some of the finest manufacturing machinery and equipment in the world. The member products directory is widely used by industry executives, market researchers, financial analysts, and manufacturing engineers worldwide. The Product Listing Section groups manufacturers under each specific product in the listings. These are keyed to a detailed Product Identification Section. An electronic searchable version of this directory is now available on this web site.

American Society of Civil Engineers. Committee on Metrication. [http://www.pilot.infi.net/~cstone/comindex.htm](http://www.pilot.infi.net/~cstone/comindex.htm). Systeme International. The ASCE Committee on Metrication is implementing the policy statement set forth by the ASCE Board of Directors in response to the issue and rationale for conversion from the English unit system of measurement to the SI (System International) system of measurement. The American Society of Civil Engineers Committee on Metrication – Chairperson, Maria Grazia Bruschi, P.E., C.A.M.S, e-mail at 74367.105@compuserve.com. Co-Chairperson, Chris Stone, P.E., C.M.S., e-mail at cstone@infi.net.


National and International Standards:

Society of Automotive Engineers. [http://www.sae.org/PRODSERV/](http://www.sae.org/PRODSERV/). This group has a vast amount of documented detailed experience, data and contacts. They as we know have made the conversion!!

International Organization for Standardization. ISO [http://www.iso.ch/welcome.html](http://www.iso.ch/welcome.html). This body is the leader for doing global business. A must site to visit and work with.

The U.S. Coast Guard. The Home Page has extensive links available. The USCG are the defining body for marine standards enforcement and activity. They are very open and supportive and participative with the various international standards organizations. They have also hosted and participated with various NSRP Panel meetings and projects.

[http://www.uscg.mil/hq/g-m/nmc/standards/index.htm](http://www.uscg.mil/hq/g-m/nmc/standards/index.htm)

TC8 Ships and Marine Technology. [http://www.iso.ch/meme/TC8.html](http://www.iso.ch/meme/TC8.html). Standardization of design, construction, structural elements, outfitting parts, equipment, methods and technology, and marine environmental matters, used in shipbuilding and the operation of ships, comprising sea-going ships, vessels for inland navigation, offshore structures, ship-to-shore interface and all other marine structures subject to IMO requirements. AG Advisory Group.


The Society of Naval Architects and Marine Engineers. [http://www.sname.org](http://www.sname.org). The NSRP
is a part of SNAME.

- NIST - Metric Program (National Institute of Standards and Technology)

**Codes and Standards:**

- AASHTO Metrication Clearinghouse Newsletters.

[http://tti.tamu.edu/metric/newsltr/banner.html](http://tti.tamu.edu/metric/newsltr/banner.html)

**Metric Units, Standards, Practices:**

- SI Jakub Associates. 43 Westbrook Road, West Hartford, CT 06107-3467. Tel: 860-521-7924. E-mail [sijakub@aol.com](mailto:sijakub@aol.com). [http://www.webcreations.com/metric](http://www.webcreations.com/metric). Looking for help with the metric system? SIJ Associates has provided metrication services to corporations, state and federal government agencies, and small businesses for over 15 years.

**Specific Resource Linkages**

**Government Agencies & Information:**

- AASHTO Metrication (American Association of State Highway and Transportation Officials)
  Web: [http://tti.tamu.edu/metric/index.html](http://tti.tamu.edu/metric/index.html)

- Alabama Metric Conversion (Alabama Department of Transportation)
  Web: [http://www.dot.state.al.us/Boards_Committees/metrication/index.htm](http://www.dot.state.al.us/Boards_Committees/metrication/index.htm)

- Caltrans Metric Program
  Web: [http://www.dot.ca.gov/hq/oppd/metric/metricprg.html](http://www.dot.ca.gov/hq/oppd/metric/metricprg.html)
  E-mail: jchampa@trmx3.dot.ca.gov

- Federal Metric Legislation
  Web: [http://www.pilot.infi.net/~cstone/asceref9.htm](http://www.pilot.infi.net/~cstone/asceref9.htm)

- GSA Metric Design Guide
  Web: [http://www.gsa.gov/pbs/pc/tc_files/metric.htm](http://www.gsa.gov/pbs/pc/tc_files/metric.htm)

- Metric Conversion Act of 1975 (Full Text)
  Web: [http://www.fatty.law.cornell.edu/uscode/15/205a.html](http://www.fatty.law.cornell.edu/uscode/15/205a.html)
· Montana Metrics (Montana Department of Transportation)
Web: http://www.mdt.mt.gov/metric/mtmetric.htm
E-mail: u4689@long.mdt.mt.gov
Phone: (406) 444-6207

· Naval Inventory Control Point
Web: http://www.code05.icpmech.navy.mil/points.htm
E-mail: john_stokes@icpmech.navy.mil
Phone: (717) 790-6843
Fax: (717) 790-5946

· NIBS Construction Metrication Council (National Institute of Building Sciences)
Web: http://www.nibs.org/cmc1.htm

· NIST Metric Program (National Institute of Standards & Technology)
Web: http://ts.nist.gov/ts/

· Texas Metric Workshop (Texas Department of Transportation)
Web: http://www.dot.state.tx.us/insdtdot/orgchart/rtt/fdoqtrly/tq10-1/question.htm

· Utah Metric Conversion Guide (Utah Department of Transportation)
Web: http://www.sr.ex.state.ut.us/cgi-bin/folioisa.dll/metric_g.nfo?

· Veterans Affairs Metrication (United States Department of Veterans Affairs)
Web: http://www.va.gov/facmgt/standard/metr_idx.htm

· Washington State Metrication (Washington State Department of Transportation)
Web: http://www.wsdot.wa.gov/metrics/

Professional Organizations:
· American Petroleum Institute
Web: http://www.api.org/
Email: pr@api.org
Phone: (202) 682-8000

· ANMC (American National Metric Council)
Email: anmcmetric@aol.com
Phone: (301) 718-6508
Fax: (301) 656-0989

- ASCE Metrication Committee (American Society of Civil Engineers)
  Web: [http://www.pilot.infi.net/~cstone/comindex.htm](http://www.pilot.infi.net/~cstone/comindex.htm)
  Email: 74367.105@compuserve.com

- ASMENET (American Society of Mechanical Engineers)
  Web: [http://www.asme.org/](http://www.asme.org/)
  Phone: (800) 843-2763
  Fax: (973) 882-1717

- ATSSA Metrication Policy (American Traffic Safety Services Association)
  Web: [http://www.atssa.com/CTCDM.htm](http://www.atssa.com/CTCDM.htm)

- AWWA Metrication Policy (American Water Works Association)
  Web: [http://www.awwa.org/govtaff/metripol.htm](http://www.awwa.org/govtaff/metripol.htm)

- Business and Design Forum 2001
  Email: webmaster@bdf2001.com
  Phone: (714) 229-8579 (Chad) or (702) 876-2685 (Hal)

- CALS Expo USA 1997
  Web: [http://www.adpansia.org/21stcentury/default.htm](http://www.adpansia.org/21stcentury/default.htm)

- IEEE Standards (Institute of Electrical & Electronics Engineers)
  Web: [http://www.standards.iee.org/](http://www.standards.iee.org/)

- ITE Metrication Policy (Institute of Transportation Engineers)
  Web: [http://www.ite.org/metricv.htm](http://www.ite.org/metricv.htm)

- MINA (Metric Importers of North America)
  Web: [http://www.m-i-n-a.org/](http://www.m-i-n-a.org/)

- U.S. Metric Association
Web: http://lamar.colostate.edu/~hillger/

Phone: (818) 363-5606
Fax: (818) 368-7443

Industry Publications:

· AASHTO Metrication Clearinghouse Newsletter
  Web: http://tti.tamu.edu/metric/newsltr/banner.html
  Email: anne@ttiadmin.tamu.edu
  Phone: (505) 661-0434
  Fax: (505) 661-1707

· Marine Digest
  Web: http://www.marinedigest.com/
  Email: marinedigest@marinedigest.com
  Phone: (206) 682-3607
  Fax: (206) 682-4023

· Marine Log
  Web: http://www.marinelog.com/
  Email: nblenkey@infohouse.com
  Phone: (212) 620-7200
  Fax: (212) 633-1175

**Metric Vendors:**

· Bossard International, Inc.
  Web: http://www.bossardusa.com/
  Phone: (603) 433-5900

· Maryland Metrics
  Web: http://www.mdmetric.com/
  Email: sales@mdmetric.com
Phone: (800) 638-1830
Fax: (800) 872-9329

- Metric Blue
  Web: http://www.metricblue.com/
  Phone: (800) 451-2539

- Suburban Bolt & Supply Company
  Web: http://www.suburbanbolt.com/
    • ILS - Marine Parts Information Network - 1-800-233-3414
    • Metric Marine - T: 415-492-9202 F: 415-492-9206

Organizations:

- American Petroleum Institute
  Web: http://www.api.org/
  Email: pr@api.org
  Phone: (202) 682-8000

- ANMC (American National Metric Council)
  Email: anmcmetric@aol.com
  Phone: (301) 718-6508
  Fax: (301) 656-0989

- ASMENET (American Society of Mechanical Engineers)
  Web: http://www.asme.org/
  Publication Database: http://www.asme.org/catalog/index.html
  Phone: (800) 843-2763
  Fax: (973) 882-1717

- Business and Design Forum 2001
  Email: webmaster@bdf2001.com
  Phone: (714) 229-8579 (Chad) or (702) 876-2685 (Hal)
• CALS Expo USA 1997

Web: http://www.adpansia.org/21stcentury/default.htm

• Naval Inventory Control Point

Web: http://www.code05.icpmech.navy.mil/points.htm
Email: john_stokes@icpmech.navy.mil
Phone: (717) 790-6843
Fax: (717) 790-5946

• U.S. Metric Association

Web: http://lamar.colostate.edu/~hillger/
Phone: (818) 363-5606
Fax: (818) 368-7443

• EC in Action

Web: http://www.ecinaction.com/

Cals Expo 1996 – Literature Project File

**CALS EXPO ‘96**

OFFICIAL PROGRAM GUIDE - OCT. 28-31, 1996

407-322-7000

jmk@magicnet.net

http://calsexpo.ecrc.gmu.edu

Listing of conference presentations and exhibitors

**ec.com MAGAZINE**

The magazine for electronic commerce

**FEDERAL COMPUTER WEEK MAGAZINE**

The magazine for federal computing interface

**SMALL BUSINESS FORUM - CALS EXPO 96 FOLDER**
Outline of presentations

**CALS RIC FLYER**
317-306-3035

[TAWW@PO3.NAWC-AD-INDY.navy.mil](mailto:TAWW@PO3.NAWC-AD-INDY.navy.mil)

An activity our industry can learn from directly

**NAVY CALS FYLER**
An activity our industry can learn from directly

**NAVAL SEA LOGISTICS CENTER**
717-790-3705


Programs brochure

**ECRC - ELECTRONIC COMMERCE RESOURCE CENTER**
510-267-7432

[allen@ctc.com](mailto:allen@ctc.com)

[http://www.ecrc.ctc.com](http://www.ecrc.ctc.com)

Brochure of services

**US ARMY LOGISTICS INTEGRATION AGENCY**
703-617-4481

[aschmack@alexandria.army.mil](mailto:aschmack@alexandria.army.mil)


Pocket guide for implementing CALS in the acquisition process

**ARCC - ACQUISTITION REFORM COMMUNICATIONS CENTER - FLYER**
888-747-2722

[hayessi@acq.osd.mil](mailto:hayessi@acq.osd.mil)


An activity central to EC and reform which we can learn from

**ANSRS - AUTOMATED NONSTANDARD REQUITIONING SYSTEM**
717-790-7417
Information pamphlet -navy supply systems command

NATIONAL SECURITY INDUSTRIAL ASSOCIATION
202-775-1440

1996 annual report & directory expo technical sponsor

**PARTNET - BROCHURE**

801-581-1118

[http://www.part.net](http://www.part.net)

john.creer@part.net

Software VDI vendor

**SPEC - 2000M INTEGRATED MATERIAL MANAGEMENT**

44 (0) 1332 347123

Brochure from an European industry aerospace association

**ADVANCED PROCUREMENT & LOGISTICS SYSTEMS**

+44 (0) 181 8933986

technapp@cix.compulink.co.uk

[Http://www.techapps.co.uk](http://www.techapps.co.uk)

Brochure for London conference April >97

**DLSC -DEFENSE LOGISTICS SERVICE CENTER**

DSN 932-4725

616-961-4725

[http://www.dlcs.dla.mil](http://www.dlcs.dla.mil)

DLA - defense logistics agency manual

**LLYOD LAMONT DESIGN, INC**

FLYER

703-925-0660

Service provider

**US - ARMY EC SUPPORTING ENHANCED SYSTEM ACQUISITION MANAGEMENT**

Presentation
DOD - EC INFORMATION CENTER

http://www.acq.osd.mil/ec
EC-EDI -certified value added network (van) list

CALS INTERNATIONAL

MAJOR TASK COMMITTEE
Headed by Frank Brake - Newport News

ISO DRAW
408-260-3450

http://www.isodraw.com
CALS software

JLSC - JOINT LOGISTICS SYSTEMS CENTER

DSN 785-0336
513-255-0336

http://www.jlsc.wpafb.af.mil
Full brochure depot maintenance material & ammunition mgt.

AT&T SERVICES

800-746-7846

http://www.att.com/easycommerce
Brochures

INTRODUCTION TO DOD - ELECTRONIC COMMERCE

800-334-3414
703-696-0411

dodedi@acq.osd.mil

http://www.acq.osd.mil/ec/
Version 2 - handbook for business - defense acquisition reform

INTERNET + INTRANET

212-447-6400

info@internetcommerce.com
Flyer - this is the future

MICRO-FRAME TECNOLOGIES, INC
800-235-4142

Brochures with demo diskette

UNICE ++
VARIOUS CALS FOREIGN COUNTERPARTS
322 2376511
main@unice.be

Information flyers

DATA CONVERSION LABORATORY
718-357-8700
office@dclab.com

Service company

CALS/CE REPORT
713-690-7644
calsrpt@infoassets.com

Use for contacts

ELECTRONIC COMMERCE MONITOR
703-525-9700
monitor@bmainc.com

Useful publication

SOFTWARE
212-880-6430
joe@sq.com
http://www.softquad.com

Software vendor=s data sheets
IGES/PDES
803-760-3327
uspro@scra.org
January 27, 1997 workshop -step is major

ASME ECRC WORKSHOP
800-843-2763
infocentral@asme.org
Via satellite Dec. 11, 1996

VIRTUAL ENTERPROSE SYSTEMS, INC
EDI - on CD-rom service evaluation

DLSC - DEFENSE LOGISTICS SERVICE CENTER
717-790-1480
Catherine_M_Carpinello@nslc.fmso.navy.com
Their overview video of their services

OPEN ARCHITECTURAL RETRIEVAL SYSTEM
OARS - Naval Sea logistics system flyer

DLA - FLYER
215-737-8352
Automated systems for cataloguing and ordering textiles - learn from models

JTAV - NAVY
703-428-1081
Joint total asset visibility - program flyer

CDMD-OA -NSLC PACIFIC
510-246-5980
http://www.cmdc.navy.mil
Flyer on software configuration data managers database - open architecture

NAVAL AVIATION SYSTEMS TEAM
800-367-4886
dtc@indy.navy.mil
http://147.159.7.231
DTC - DMS technology center

EDI - NEWS SHOW ISSUE
EDI - PUBLICATION
BMS 11-24-97 duplicate information

Cals Expo:

Item/Company/Product/Service/Comments

- INTEGRATED DATA ENVIRONMENT HANDBOOK +
205-955-8707
http://www.laiso.redstone.army.mil

ARMY - AMC
(LAISO)
IDE - IMPLEMENTATION

Plan good model to review

- NATO SYMPOSIUM ON EC CODIFICATION
616-961-4847
gwilliams@dls.dla.mil

SAN DIEGO, CA
MAY 1997

Want to attend

Shipyards must attend

- DOING BUSINESS WITH NASA
202-358-2088
800-2NASA95
http://www.hq.nasa.gov/office/codek

A collection of their handouts for small business

Reference of how they do business
· TRW - SMALL BUSINESS - SUB-CONTRACT PROCUREMENT

310-814-0321

Jan.Korn@trw.com

Various manuals - key contacts, policy manual

Good samples of how to work with vendors / ec

· VICOM - MULTI-MEDIA

403-452-4082

http://www.vicom.ca

Software for integrating with various platforms

· SUPPLY TECH, INC

313-998-4000

schmenk_k@supplytech.com

Full service ec based distributor

To work with on this project's survey very positive towards shipbuilding

· BRITISH AEROSPACE

+44-1252-373-232

A good example of global activity and industry competence

· HUGHES TECHNICAL SERVICE S COMPANY

310-335-6370

520-663-6439

"Aims" - advance integrated maintenance support system

Another good model for industry review

Metrization, machinery associations

· "MEARS" A PAPERLESS ECP REVIEW PROCESS

205-842-0867

http://www.mears.redstone.army.mil

Diskettes - us army cals project

Great model - will forward to SP-4/6 & purchase. Management.

Future project !!
· “NIIIP” – NATIONAL INDUSTRIAL INFORMATION INFRASTRUCTURE PROTOCOLS

203-978-2946

director@niiip.org

Virtual enterprise computing - manufacturing in the 21st century - consortium for collaborative computing

Standards for industries - shipbuilding must get on board via – ecrc

ECRC & DLA

· MANAGEMENT TECHNOLOGY - VARIOUS SOFTWARE

304-367-1699

richman@mantech-wva.com

Man tech international corp.

Key player with the DLA - defense logistics agency

Again good models for review -

· COMPUTER ASSISTED TECHNOLOGY TRANSFER - A NATIONAL REINVENTION LABORATORY

405-736-5966

jsteil@po6.tinker.af.mil

http://catt.bus.okstate.edu/

Another fully applied and cals developed software/study

Good sample including local governments

· KBSI - KNOWLEDGE BASED SYSTEMS, INC

409-206-5274

products@kbsi.com

http://www.kbsi.com

Software and project expertise - various modeling tools

· "ONE SMART SHIP"

301-227-5314

THE YORKTOWN

Reprint of the study project with cals
· ELECTRONIC PURCHASING INFORMATION CORPORATION – “EPIC”
  212-613-3400
AN AFFILIATE OF THE THOMAS PUBLISHING COMPANY “CONNECT US”
There “connect us” product is applicable to all global networks future project

· “DOC DEPOT” ELECTRONIC DOCUMENT WAREHOUSING SOLUTION. PRODUCT
  BRIEF
  813-572-3254
  greg_bell@atk.com

ALLIANT TECH SYSTEMS - PRESENTATION GIVEN AT CALS EXPO
Good model to review
Future project

· DEFENSE PERSONNEL SUPPORT CENTER, ANNUAL REPORT
  800-523-0705
  http://www.dpse.dla.mil
One of many great outputs from the dla - defense logistics agency

· “POWER PUBS” ATA COMPLIANT DATABASE PUBLISHING SYSTEM
  619-476-9335
  619-476-9209

SYSTEMS ENGINEERING SOLUTIONS, INC

· ARMY ACQUISITION REFORM POLICY MEMO 10-24- 96
  BASIC MEMO STATING REFORM AND LISTING KEY REFERENCES

· PDI -CALS CENTRUM
  THE NETHER LANDS
  +31-30-602-1551
  calsnl@euronet.nl
  Global participation flyer

· ASP ARMY ACQUISITION REFORM PROJECT PRESENTATION
  "ELECTRONIC COMMERCE- SUPPORTING ENHANCED SYSTEM ACQUISITION
  MANAGEMENT
Good paper
· J-CALS WORKFLOW TEMPLATE DEVELOPMENT PROCESS - PRESENTATION

http://www.laiso.redstone.army.mil

Basic systems from jcals - a must primer

Industry must follow and train to JCALS info

· AGILITY FORUM

PRODUCTS AND SERVICES

800-923-2445

http://www.agility.forum.org

An excellent industry resource if utilized

To meet with they have an annual show in San Diego. Some past industry work is unfinished!!

· “LINK ONE” PUBLISHING

800-90LINK1

SOFTWARE INTEGRATING PACKAGE

· AVIATION WEEK PLUS

213-480-5229

http://www.awgnet.com

AVIATION WEEK PUBLICATION WITH CONCURRENT EXPO HANDOUTS

· ARMY CALS IMPLEMENTATION PLAN

703-617-4718/4618

sbarth@alexandria-emh1.army.mil

acip@pentagon-hqdadss.army.mil

DISKETTE - LOGISTICS INTEGRATION AGENCY

Another great way to learn from example with contacts

· “CALS EXPO 96

CD-ROM OF THE PROGRAM

Great reference

· NIIP

203-978-2946

director@niip.org
Repeat document

· “NGM” - NEXT GENERATION MANUFACTURING

1-800-646-7765

A flyer on this ongoing consortium of various quality organizations

Great forum to learn with and from shipyards must get involved

Future project type

· “JUMP START” AN EDI TUTORIAL AND REFERENCE GUIDE

CD-ROM THE TOOLS NA PACKAGING OF THE FUTURE

WILL BE INVOLVED DIRECTLY WITH METRICATION

Good reference base

· “MEARS"

205-842-0867

carlisl@immcmsl.redstone.army.mil

DISKETTES OF ECP PROGRAM AS WELL AS CONTACTS

A great standard format for the industry and its vendors to apply

Future project they will present to NSRP panels

· "RESOURCE MATCHING PROGRAM" !

714-660-1960

jbushnel@bxadoc.gov

THE BUREAU OF EXPORT ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

Money and support !!!!

· "PAPERLESS PM"

PROJECT FLYER

810-574-5924/5

schenkd@cc.tacom.army.mil

ANOTHER JOINT PROJECT VIA THE ARMY, CALS AND OTHERS UTILIZING THE LATEST TECHNOLOGIES

This is again great share-ware
Future project

· “MIDDLE EAST DIVERSIFICATION AND DEFENSE MARKET ASSESSMENT” JULY 1996

202-482-4695
orji@bmpcoe.org
jisbell@bxa.doc.gov

COMPREHENSIVE GUIDE FOR ENTRY INTO OVERSEAS MARKETS - U.S. DEPT. OF COMMERCE

· CALS APEC 97

CONFERENCE ANNOUNCEMENT

KOREA EXHIBITION CENTER - SEOUL KOREA

82-2-756-5872-4

DECEMBER 8-10, 1997

THE INTERNATIONAL CONFERENCE AND EXHIBITION ON CALS IN THE PACIFIC RIM

· “NAVY CALS”

BROCHURE

703-602-0068
digeronimo_rose@hq.navsea.navy.mil

DETAILS THE OVERALL CALS NAVY ACTIVITY

· “SOLDIER SUPPORT NETWORK” – TACOM

http://www-ssn.ria.army.mil

ANOTHER ARMY PROGRAM - TANK AUTOMOTIVE AND ARMAMENTS COMMAND

This work can be reviewed and bench marked for industry applications

If you have any questions or comments e-mail the webmaster at gobiecki@rohan.sdsu.edu

This is the end of this NSRP Report.

Respectfully Submitted to SNAME NSRP Ship Production Committee- Research Panel SP-8, "INDUSTRIAL ENGINEERING.

BMS & Associates, INC
Additional copies of this report can be obtained from the National Shipbuilding Research and Documentation Center:

http://www.nsnet.com/docctr/

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The University of Michigan
Transportation Research Institute
Marine Systems Division
2901 Baxter Road
Ann Arbor, MI  48109-2150

Phone: 734-763-2465
Fax: 734-936-1081
E-mail: Doc.Center@umich.edu