CALS

NATO

Managing Defence Systems in The Information Age

A NEW WAY OF WORKING

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A NEW WAY OF WORKING

- June 1999 -

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We are all very familiar with computers in our daily activities and we are all experiencing the impact of innovative information technology on the way we work. In the past it was often the lack of information that inhibited us. Today the amount of information each of us handles is dramatically and continually increasing, and now "information overload" makes our work extremely challenging. At NATO, both sides of the government industry boundary for acquisition and material support are experiencing a formidable challenge in gaining access and control of the right information amongst the ocean of possibilities.

The impact of the IT revolution is affecting everyone within NATO. NATO is being challenged with acquiring, securing and managing defence system information in a rapidly changing world, where the Alliance is involved and operating in a fast moving evolutionary environment.

Moreover, the ability to share and exchange information effectively is rapidly becoming the key enabler in the battle to cut costs, reduce time and increase quality on Defence System programmes. Consistent and reliable information about our Defence Systems, their performance, their design and their maintenance, is a "must" within the Acquisition community, especially in multi-national programs. The ability to share and access Defence System data throughout the entire supply chain, from the factory to the foxhole, is a pre-requisite for co-operative logistics.

NATO is taking this challenge seriously. Interoperability within the Alliance is of the utmost importance. Accordingly, this guide is aimed at Program and In Service Support Managers at all stages of a Defence System life cycle. Its purpose is to raise awareness and understanding of the opportunities for improvement in Defence System acquisition and support through the use of a life cycle approach to Information Management.

Vision of the Future

People working together to add value throughout the life cycle, sharing information enabled by electronic business in a new environment

NATO Information Vision

The right information, at the right time, for the right purpose, to the right user, with the lowest possible cost, with the highest possible quality, actuality and security, and abiding to current laws and regulations

Originally stated by PeO Jonasson

A new way of working

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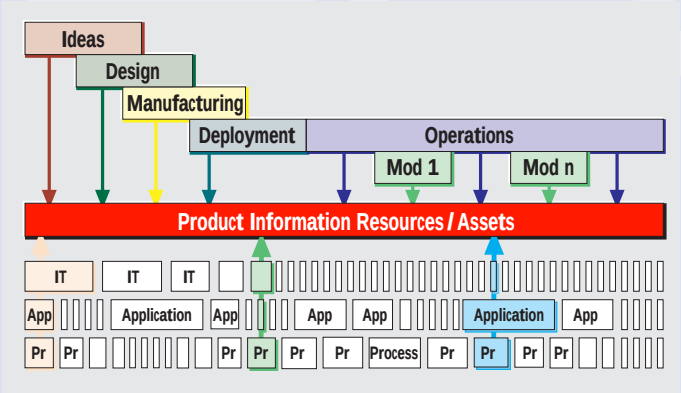
Preface

The changing society.

Whether we like it or not the world is going digital. This, more than anything previously experienced, has and continues to have a significant impact on the way we work. In many sectors of the commercial world, immediate, global access to Digital Information is taken for granted. Shared access to digital data is becoming "business as usual". The Information Age is here.

What is the effect for NATO?

The NATO Alliance is facing a huge agenda for change. Changes in membership, role, resources and technology are transforming the environment for acquisition and logistics activities. From a Defence System viewpoint Acquisition and Logistic Support are becoming one single integrated process, sharing a pool of life cycle data. This will focus the need to share and exchange information across boundaries: between departments within organizations, between Government and Industry and between partners in the Alliance.



A Defence System's life is very long. Organizations, work processes, IT systems and software applications may change many times during the life of a single Defence System. In this context the core set of information needed to define, design, build, test, support and dispose of the System is a crucial, valuable and durable asset.

Chapter 1 **What is this guide about?**

This guide will help project and logistic managers, and their staff, understand the impact of the Information Technology (IT) revolution on the acquisition and support of Defence Systems over the entire life cycle.

It is our goal to demonstrate that change is not limited to technology. It affects people, processes and information. In this context, this brochure is designed to explain new ways of thinking about the business process; the associated working environment and the important role information plays.

This guide focuses on the application of supporting technologies that will enable many improvements and benefits to be realized in your organisation. It cannot tell you how to do your job. Only you know that. It will help you appreciate the scale of the changes the digital revolution is bringing and it provides some ideas and tools to help you respond more effectively.

Historically, the people and processes related to defence systems have constantly undergone change. With the advent of technology, the speed and magnitude of these changes are accelerating. The increased complexity of today's modern defense systems makes technical information management of paramount importance. Even when people and processes change, technical information stays remarkably consistent.

This brochure explains how a professional approach to managing information helps stabilize the business environment. This is accomplished by recognizing and treating information as a valuable asset, like all other assets within the program. Sensible information handling, from a through life perspective not only makes sense, it saves time and money and supports better decision-making.

So for now, don't worry about the terminology, we'll explain it later. The important thing to recognize is that we are talking about something that will change the way information is managed throughout the life of the equipment. We believe that taking the steps we are talking about, proper information management concepts will be established as one of the critical enablers for future improvements. This will also act as a catalyst to enhance co-operation throughout the alliance.

This guide explains the concept of Through Life Information Management for a Defence System, as one essential component of the new ways of working that the Information Age will bring.

We all know that having the right tool for the job, and using it correctly, is the secret of success. This book introduces how this can be achieved by treating your information as a valuable asset in order to help you perform your daily business **faster**, **cheaper** and **better**.

We have tried to include something about everything you need to know to get started. We also introduce some of the main concepts you might hear about, such as Product Data Models, Shared Data Bases, and Electronic Commerce

It is not plain sailing. There are still plenty of 'difficult bits', particularly with respect to standards, security and the human element. But, with the way the world is changing, you can be sure that the effort has to be made.

A guide this size cannot give all of the answers. However, the aim is to show where they can be found. If you want to know more, or need any help, you will find useful contact addresses and suggested further reading in the back.

Chapter 2 **What is Information Management?**

What is all the fuss about?

Information Management is nothing new. We have managed huge amounts of information for generations. The new challenge is dealing with the sheer magnitude of information available, and all the different forms and ways information is stored. This is clearly a byproduct of the advances made in computer technology and the impact this has had on our daily way of working. Who hasn't looked for information on a computer, or used the wrong version of a file, not because the correct version wasn't there, but because we didn't know how to find it.

Now imagine how it would be to look for a certain piece of crucial technical information in the documentation of a C-5 Galaxy. The paper version of the information is more than what would fit inside the aircraft! The F-16 fighter aircraft requires more than 3500 Manuals! The USS Vincennes has 23.5 tons of paper above deck, more weight than weapons! And even more seriously, 5-9% of fatal accidents in the Military can be traced back to documentation errors!

To add to the complexity, this documentation is constantly changing. So, that's why Information Management is of such importance, and why information should be treated as a valuable asset. Product Information will of cause live and be used throughout a systems lifecycle, which is why Information Management must have a Through Life perspective. Currently available techniques and technologies, and those that will be available in the future, will enable far better information management, and even facilitate business to be **faster**, **better** and **cheaper**.

In addition to Product Information, we are also talking about project and corporate information. All these groups of information are important, but from a Defense System support point of view, we are concentrating on Product Information.

Adopting techniques which enable the best return from new technologies will help organizations achieve best international practice, improve competitiveness and efficiency. This is particularly true when customers and companies join to form extended enterprises.

The right tool: .. **The right tools to help you with your information management should be chosen with care.**

What techniques and technologies?

You have probably already heard of them: the Internet, Synthetic Environments, Concurrent Engineering, Shared Data Environment, Business Process Re-engineering, CAD / CAM, Virtual Reality, Electronic Commerce and more. These make up the new environment. However, they will fail without the correct information, available at the right time, and in the right format. It is therefore extremely important that we establish viable standards and rules, for the new environment, that will allow us all to speak the same language.

What we are talking about is a set of 'best practices' for preparing the information age. These enable effective collaborative operations between organisations, departmental functions and individual team members. Supporting the way people do business, by exploiting computer-based information communication and control, will:

- Bring benefits by allow information to be created once and used many times throughout all the stages of a product's life-cycle, from concept to disposal, and across all participating parties.

The techniques and technologies

- *The Internet, World Wide Web*
- *Synthetic Environments (SE)*
- *Systems Engineering*
- *Requirements Management*
- *Product Data Management (PDM)*
- *Concurrent Engineering (CE)*
- *Shared Data Environment (SDE)*
- *Business Process Re-engineering (BPRe)*
- *Computer Aided Design and Computer Aided Manufacture (CAD/CAM)*
- *Virtual Reality (VR)*
- *Electronic commerce (e-commerce)*

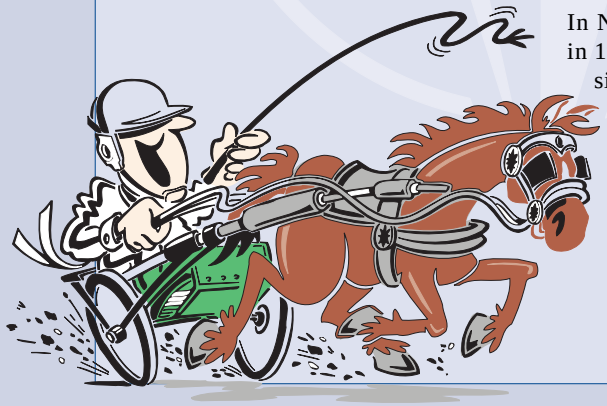
Chapter 3 **Where did it come from?**

The beginning

The concept of through life information management and the emphasis on the value of information comes from the Continuous Acquisition and Life Cycle Support (CALS) initiative (previously called Computer Aided Logistics Support). CALS began in the United States defence sector as the Department of Defense's (DoD) CALS strategy. In 1984, the US DoD recognized that computer-based technology was an important government and industrial strategy bolstering the support, sharing and exchange of information. Properly applied, it could be used to tackle increasingly complex procurements and the logistics support needed to keep the armed services supplied with reliable weapon systems, worldwide.

The DoD also wished to reduce the extended development times for new complex weapon systems and to reduce the cost of in-service support. A cost that can continue for 30 to 40 years and even longer after product delivery, possibly dwarfing the cost of initial production.

The original US CALS program formally began in 1988. It proposed that the exchange of technical information between government, weapon systems suppliers and their subcontractors, for the life cycle of the system, should be undertaken and controlled electronically. The initiative quickly spread to the civil sector because many business processes and underlying concepts are not specific to defense.



In NATO the initiative took form in 1994 when the first MoU was signed and the NATO CALS Office was established. The Conference of Armaments Directors (CNAD) issued the NATO CALS Policy in 1994, which is still the fundamental base for the NATO initiative.

Where next: ..... **From early beginnings in the defence sector electronic working is spreading throughout industry**

The NATO CALS Management Board (NCMB) was organized under the CNAD umbrella, and consists of one representative from each participating country. In addition a number of observers, both from the NATO organisation and from partnership for peace (PfP) nations, are active in the Board.

At the May 1999 meeting, the Conference of National Armaments Directors (CNAD) confirmed its support for an early transition to a secure digital environment of NATO's acquisition and logistic business processes as soon as practical. CNAD also invited member nations to encourage multinational acquisition programs, in which they participate, to develop plans for managing their defense system information on a through-life basis.

In other words, NATO will go digital.

The 1999 NATO CALS MoU Nations are:

Belgium, Denmark, France, Germany, Italy, The Netherlands, Norway, Spain, Turkey, UK, US

Active Observers

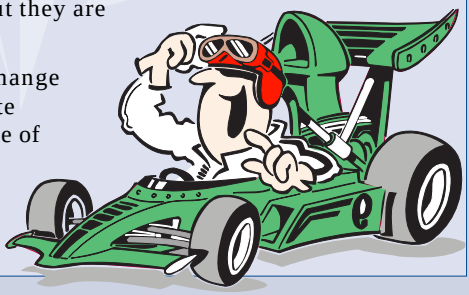
Portugal, Sweden, Finland, Poland, Bulgaria, Hungary, NAMSA, European Union,

In addition, an Industrial organization was established to match the NATO initiative. The NATO CALS Industry Group (NICG) and their Executive Group (NICG Exec.) was formed under the NATO Industry Advisory Group (NIAG).

These two CALS organisations have enjoyed excellent cooperation.

The CALS concepts are being applied from consumer goods, aircraft, and petrochemical plants to building and maintaining a road network. Companies around the world are now taking them up. They may not all call it CALS but they are doing it all the same.

Anyone needing to share and exchange information throughout the complete product life cycle can take advantage of these techniques.



The journey's begun: **.. With the civil sector onboard the new working is being felt just about everywhere**

Chapter 4 **Do we need CALS any more?**

Is CALS out of the picture? Do we still support CALS? These are two of the most frequently asked questions. The answer to the first question is No. Even though some nations have transitioned beyond the initial aims of CALS, they still continue to apply the basic concepts. For those nations who've just have begun the journey, CALS is extremely important. And in NATO, CALS is recognized as an important contributor to the way ahead.

CALS!!

What's that?

Isn't CALS dead and buried?

Have we had any useful results?

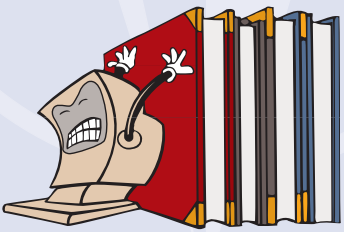
The answer to the second question is Yes, NATO will continue to support CALS effort into the foreseeable future. The fact is that we today have CALS tools and guides available for use. We are applying these to NATO processes, and are supporting the development of international CALS standards for information management. In all of this, we will make sure that the transition to the digital environment for the future will be smooth.

Some other important questions have also been raised. Do we really have any useful results from CALS? Have we saved any money, time, and resources? Where is the CALS-system that everyone talks about? Actually, we have realized tremendous success from CALS. CALS has created a vibrant, enthusiastic, global community that has a deep understanding of some very tough issues. These range from Digital Information Management, applicable Information Systems, associated Information Resources, and the need for reengineered Business Processes capable of shaping our future business enterprise. Along with this, CALS-people have started the huge migration and change from more than 600-years usage of paper based information. The good news is, our monetary benefits (estimated profits) can be counted in $billions worldwide. However, one hard lesson for all of us is that it takes 3-4 times longer than expected to change the way people work, and we have been less that successful in our task of educating top-level executives in understanding the huge potentials we have available.

What we have learned from CALS

We have learned a lot of things from CALS. We know that the industrial world is a dynamic environment requiring processes that are extremely flexible. It is almost impossible to envision an organization remaining competitive over time without any changes occurring to its business or resources. It is also equally impossible to envision Information Technology as stable over time. New computers and software are developed based on market requirements, and the ability of organizations to absorb these new technologies. We need to ensure that this type of flexibility is built into the business environment. We have also discovered that when information is treated as a resource, we can cover this gap. CALS has given us a **new focus on information**; we are now treating it as a precious resource for the future. The information we are addressing is:

- **Stable information**, which has a conceptually stable structure but where instantiations change all the time. Here product and geographical information fit perfectly.
- **Dynamic information**, which could be sensor-data, experiences, and process-based information. In this realm, organizations have numerous types of structures, which need to be considered.



Treat information as an asset.. **Use what is available today, be open to the possibilities of tomorrow.**

Chapter 5 Who's doing it?

Will you be in good company?

Yes, many organisations are realizing the benefits of the intelligent handling of information in order to give them flexibility, and a competitive edge. This is a good place for you to start. You will find yourself in good company on the journey and you can be sure your competitors and fellow organisations have already started.

CALS is international and covers both the private and public sectors. Some of the largest companies and defense institutions in the world are embracing its principles, as well as some of the smallest. In fact, smaller organizations can often adapt faster because they have less to change.

Several major projects have adopted CALS in order to hit their ambitious cost, timescale and performance targets.

Why are they doing it?

Because they have seen the way things are moving and don't want to be left behind. The world is changing: we can and must do things differently. You must be prepared to provide your customers with better products, delivered faster, at a lower price and more efficiently because your competitor is. They have realized that by making it possible for functions and organisations to work together, there is a real business multiplier effect. Said differently, it provides time, quality, cost and flexibility advantages.

Any enterprise, small, medium or large, wanting to design, build, deliver and support products in a better way should consider taking the plunge.

Does it make business sense?

In a word, YES. It is being increasingly recognised worldwide as a means of getting and keeping the competitive edge. You can be sure that if you don't do it. Your partners and competitors will.

The decision to adopt new techniques should always be based on a business case, not technology driven. Technology is only an enabler. Organizations that have applied the approach successfully have started by identifying one or two key business drivers and focused on these. The two most common drivers tend to be customer satisfaction and business performance.

The reasons are to:

- Achieve customer satisfaction
- Optimise programmes
- Meet cost, time and performance targets
- Establish efficient global operations
- Maintain competitive edge
- Reduce time to market
- Enable better partnerships

"CALS provides the framework for the most challenging but most rewarding of business improvements-where changes happen to a combination of process, technology, people and organisations"

Professor Norman Schofield

All over the world

From its US beginnings the concept has spread much further. Japan and Sweden in particular have made great strides, and many others are showing a lot of interest. International conferences and exhibitions such as CALS Expo International, CALS Europe and UK APLS, are well-attended annual events for sharing experiences and achievements.

Famous names

Some of the best-known worldwide companies have made sure they are not left behind. They have found that their projects can benefit greatly from electronic working and they are now bringing these techniques into their supply chains.

Who are these organisations and what are they doing? Here are some specific examples of their achievements:

British Aerospace, UK

British Aerospace has created Integrated Product Teams throughout the Eurofighter project in a major change programme. Their investment in Product Data Management (PDM) systems, to manage information throughout the life of a project, has already resulted in significant improvements to project costs and time-scales.

Hägglunds Vehicles, Sweden

Hägglunds Vehicles has developed an internal information handling concept that enables them full freedom in supporting multiple customers from the same information collection, without having duplications or redundant information. Hägglunds Vehicles considers its information as one of the most important resources they have, and treats it accordingly.

The US Crusader Programme

The Crusader program develops the next generation Self-Propelled Howitzer and accompanying Resupply Vehicle for the United States Army. The government specified their requirements for a Contractor Integrated Technical Information System (CITIS) contract. The goal of the CITIS is to contain and provide near real-time access to all contractor-generated data and Government-Furnished Information (GFI), including engineering, support and management data, in a geographically dispersed industry / government team environment.

UK MOD

The UK MOD has clearly expressed that digital information management is an important enabler required for reaching their goal of Smart Procurement. It has resulted in serious time and money investments needed to find suitable Information handling solutions. This is being done in cooperation with key players in the UK defense Industry.

Global: ..... Electronic business is truly international-allowing the virtual enterprise to exist across great distances.

Chapter 6 The main elements

People

This is about sharing information and working better together in much closer relationships than realized before. They can be within an individual organisation where the various functions must develop close working relationships. For example, between engineers involved in design, manufacturing and product support, who need to use information created during the earlier stages of the product's life. Alternatively, they can be in different organizations employing close, partnering-style relationships across extended enterprises.

There are several individual elements that make this environment possible.

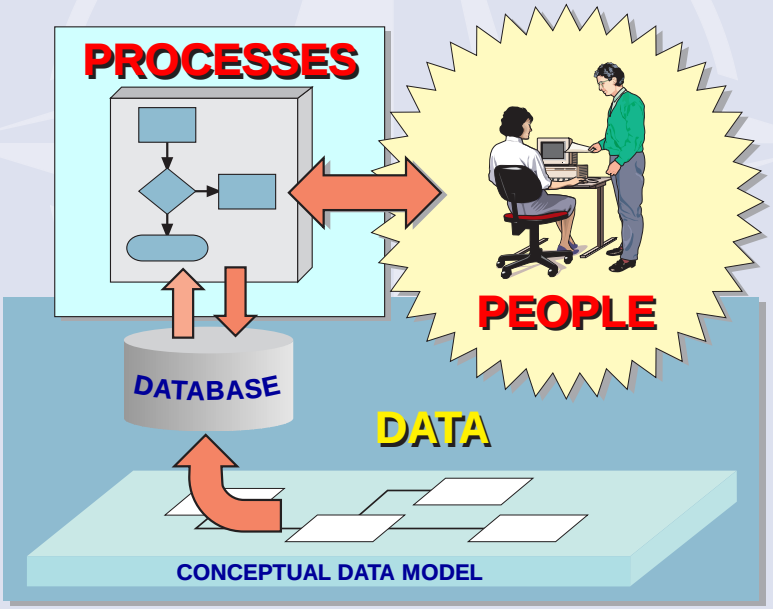
Processes

It is nice to know what you do, and how you do it! Of cause, - but it is not that simple when the organization is big and the number of involved parties are many. It is not only nice, it is a necessity in today's fast changing world. In this constantly changing environment it is of the outmost importance to have a well-defined set of business processes. These processes then have to be **understood** and **agreed** by all affected parties. That is one of the reasons why the NATO CALS community has produced the NATO CALS Through Life Business Model. It represents a set of generic process descriptions aimed for Defense System programs. Know what and how things are going to be done is also the key to identify which information is needed in acquisition and support.

Information

The key concept is 'create or capture information once and use it many times'. This can be made possible through a single, digital, source of information. Frequently data is held in many locations and on different systems. It covers technical and business information gathered from a variety of organisations, including databases held by sub-contractors and suppliers. Any authorized person can find and use this information which will grow throughout the product's life.

A significant part of the database is product information. Usually managed by a process called Product Data Management (PDM). It contains information gathered throughout a product's life cycle, right down to an individual component. This covers the design, development, prototype, manufacture, maintenance and disposal phases of the lifecycle. Its flexibility allows the incorporation of product updates as and when they happen. Many organisations integrate the PDM with an Enterprise Resource Planning (ERP) system that holds all financial, management and other business information.



Going live:..... **From paper exchange through electronic transfer sites to the CALS aim of sharing complete product information.**

Working together

Agreements are needed for the sharing of information. One way this is being done with contractors is through a Contractor Integrated Technical Information Service (CITIS). A CITIS is a mechanism or a service that allows a complete, controlled, electronically shared data environment to be used. This service (CITIS) is usually confirmed in a contract, which describes all the tools, rules and requirements necessary to operate when using shared digital information.

First things first

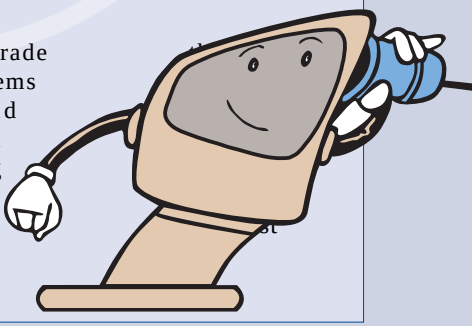
The integration of PDM and Computer Aided Design and Manufacture (CAD/CAM) allows for the storage of all product information. Even when a product is little more than a gleam in the designer's eye, you can begin storing information about it and continue throughout the design and development stages. The resulting database will allow you to test the products' likely performance, manufacturability, testability and supportability. Possible incompatibilities and misfits will have been ironed out in the electronic world. The information generated from this database can take many forms, including CAD models, drawings, reports and specifications.

What you see is what you get

CAD/CAM systems offer real benefits, particularly the new 3D systems. Sharing the design helps both supplier and customer (in particular the eventual user) to ensure that the product will be fit for its intended purpose. It also aids integration. This is especially important when parts are manufactured at different physical locations, by different suppliers, for eventual assembly elsewhere.

Getting it together

Electronic Commerce allows businesses to trade electronic communications and computer systems Electronic Data Interchange, e-mail, and a whole range of other technologies. Although nothing new here as companies have been using Commerce for decades, the telephone for not everyone is taking full advantage of these initiatives.



Direct access: **.... With electronic communication it can be like you're in the same room.**

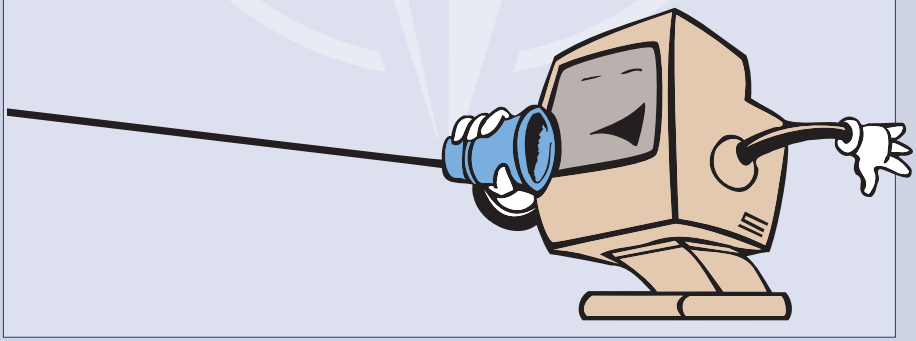
Concurrent Engineering uses 'get-it-right-the-first-time' methods and parallel working to deliver better, cheaper products more quickly. Design and manufacturing timescale, and hence time to market, are reduced because many activities are carried out at the same time. Your equipment is also more likely to meet the requirement because advances in technology have not overtaken it.

Hand in hand

Breaking down barriers in the approach to equipment design, development, procurement and management must be extended to the supporting organizations. The mechanism for achievement is the Integrated Project Team (IPT). This concept brings together customers, equipment and supply managers, engineers, designers, finance and contract staff from across all participating organisations. This leads to shared and fully understood goals.

World Wide Web - connecting people

One of the most significant advances in recent years is the development of the Internet. This is something that could not have been foreseen just a few years ago. Companies (especially small and medium sized) more and more value it as a way of exchanging vital commercial documents such as orders and invoices. It has made Electronic Commerce affordable for every business. The development of the Internet as an information source, and as a market place is currently experiencing a growth that is second to nothing in the human civilization. We have just seen the start of something that is rapidly changing our future



Chapter 7 **What's in it for me?**

This is all very well but...

Why should I get into this? I've got a business to run! Why introduce more risk and cost? The simple answer is that potential benefits are enormous, whether for the enterprise as a whole, a business unit, or an individual project.

All companies want to deliver high quality, competitively priced products and services to the market place as fast and as inexpensively as possible. They also want to provide effective and economical support. This is how you win and keep customers. Electronic integration is a key ingredient to making that a reality.

Cost and timesavings are possible in design, manufacturing, and throughout the operational support of the system. There are big savings to be had, particularly during the in-service phase. Savings of 50 per cent on the time to introduce a product have been documented. There have also been examples of significant reductions in manufacturing and assembly times, together with improved quality, less rework and lower support costs. They also allow for the added attractions of smaller stockholding and less waste in manufacture. All this can be achieved by:

- introducing more efficient ways of working;
- using information technology to support the creation, sharing and exchange of complex design and technical information between designers, production engineers, sub-contractors and operational users and maintainers.

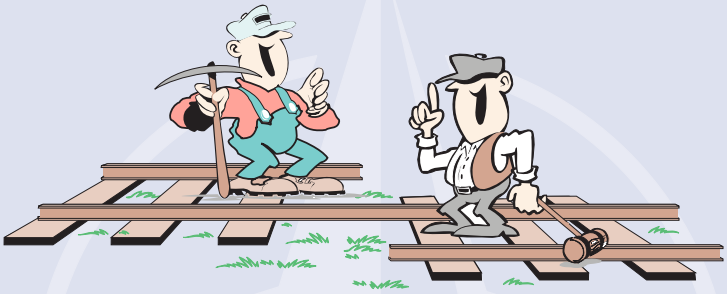
... I've got a project to manage

That's why you should be thinking very hard about what all this means to you. There is much to gain (just imagine what bringing in a project on time and within budget could mean for your organisation and your personal development). This means understanding the requirements and managing the implementation of the changes.

What we are talking about are shorter time scales, improved quality, and lower cost. This is music to every manager's ears. For the Government project manager and anyone dealing with them, the direction is clear. Government procurement instructions should require all new projects to have a strategy for Through Life Information Management-it should no longer be a case of "shall I or shan't I?" but more "how do I?"

Well...all right

That's the spirit, stay focused on the benefits. Having a project team formed from both supplier and customer staff means less conflict and less "not invented here" syndrome. They are more likely to be working together to a shared (and understood) aim.



Reducing paper will save both time and money, as will electronic working which means less need for visits to supplier or customer premises. Taking advantage of this synergistic interaction between all team players will yield better decisions.

What you could get

- Competitively priced products and services
- Reduced lead time
- Reduced whole life cost
- Lower support costs
- Improved operational efficiency
- The right information at the right time
- Better customer / supplier relationships
- Streamlined stock holding
- Better decisions
- People with enhanced skills and understanding

In harmony: ..... **Working together encourages shared goals and understanding.**

Chapter 8 What is it going to cost?

It all depends

It really does. It depends on where you are starting from, your size and where you want to go. Perhaps the most important question you need to ask is what is the cost of not going ahead. The answer could be your business or your project. And most importantly, all investment should be justified with a sound business case, where a Life Cycle perspective should be the base.

From little acorns

If you are a multi-national manufacturer and supplier of complex industrial products, the investment might run into hundreds of millions of dollars. There are several examples of organizations that have invested on this scale. The main costs come from new hardware and software development, training and communications programmes, and new accommodation for the integrated project teams.

But that's them, for you it could mean a much smaller investment. Some organisations have started working differently with just a modem, a fax machine, a laptop and a couple of mobile 'phones. That could be all it takes to get you on the right road.

Whatever the size, those who have done it obviously thought it was worth the effort. Perhaps they have had a good hard look at the benefits we have already outlined. Remember it does not come free - personal commitment is essential.

What's the cost? . Not negligible.
But the price of not meeting the challenge could be your business.

Chapter 9 So how do I go about it?

So far so good

You have already started by reading this book. You must be interested to have got this far. Next, you need to consider some of the suggested further reading or by contacting the addresses given at the end. These include organisations dedicated to furthering your understanding of the principles.

The vision thing

In practical terms you have to start asking yourself some hard questions about your current operations, your organization, your products and systems, about your customers and suppliers, the industry you are in and your competitors. Most importantly you need a vision about where you want to go. But it doesn't have to be done in one 'big bang' approach. Small fixes and 'quick wins' could be obtained using readily available commercial products and a bit of logical thinking.

Part of the business

Your overall business strategy or project plan should include the eventual migration to a fully electronic working environment, but not from a purely technical perspective. Remember that technology is only an enabler. Those who have had early success have started by identifying one or two key business drivers and set about improving these. Early successes establish the credibility needed to move on.

Implementing change is a business issue, and it has to be driven from the top by people who really understand and are committed. But beware, major business improvement programmes always take longer to implement than envisioned. So, when considering how long it is going to take, don't expect an overnight solution. It is about changing the way we do things, not just about new technology, and that takes time.

A lesson learned from successful business improvement programmes is the importance of planning, and of communicating your objectives to all those involved. Foremost, you must first secure support for your new vision through consultation.

Manage change

How do you start? Establishing where you want to be (the vision) is a good place. Making sure you have a good understanding of your business or project objectives. Knowing what the new way of working could do for you is vital. You will need an implementation strategy and a clear set of goals and objectives.

You will also need an idea of the up-front costs (software and hardware, accommodation costs, training and recruitment) and the benefits you expect. You need to know that the investment in time, money and effort is going to be worthwhile.

Someone, ideally in line management, is going to have to make it all happen. They will need a clear role, objectives, responsibilities and authority. Depending on the size of the change, they will require a dedicated support team and a properly structured and phased plan with key milestones. Continual commitment and leadership must accompany this from the top of the organisation.

Golden rules

- Remember it is a business issue
- Top level commitment to change
- Take it one step at a time
- Consult widely
- Fit Information Managment concepts to the organisation- not the other way round
- Find and promote ‘quick wins’

Getting the measure

Knowing how far you have come is a key ingredient, so you had better be prepared to measure performance.

Where to?You need a clear idea where you want to be.

Benchmarking against best-practice organisations will help you set realistic business oriented targets. Benchmarking is now an established practice.

Don't worry, help is readily available from a number of organisations. You will find some useful ideas at the end of this guide.

Getting there

- Establish a business / project strategy which includes a clearly-defined Through Life Information Management vision
- Establish commitment and leadership
- Identify costs and benefits to assess the return on investment
- Establish who will manage and execute the implementation
- Produce a structured phased plan
- Monitor performance through meaningful targets

Where to? ..... You need a clear idea where you want to be.

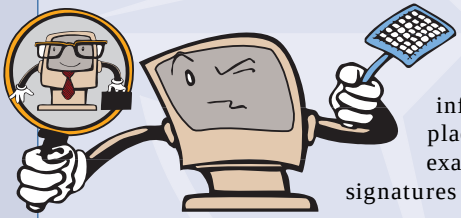
Chapter 10 The difficult bits

Tell it like it is

Take a deep breath-no one is saying it's going to be easy. There are no overnight fixes and there are obstacles to overcome. New ways of working require new ways of thinking. While openness is the key, understandability, security, intellectual property matters and standards are also of great concern to many businesses.

Security

The whole approach is based on sharing digital information. If you are putting all your product information in one database, and are granting direct access to outside suppliers and customers, you will have genuine concerns about who is dipping into your information. Some of it could have national security implications. Much will be commercially sensitive.



There will always be things you will not want any outsiders to see and still less to have the ability to influence. Security systems can be put in place to prevent unwanted access, for example, procedures, firewalls, electronic signatures and cryptography.

The security classification of information needs to be carefully considered at the beginning of each project, particularly when dealing with government projects. Don't get too esoteric about it, a pragmatic approach is needed.

You should review policy relating to the security of your information to take account of the risks associated with the new ways of working. You need to assess the level of risk involved, from both accidental and malicious damage, and balance this against the necessary precautions.

New ways of working call for a new approach to safeguarding and releasing information to others. Many are finding that this new approach is more than worth the effort in improved business processes and increased profitability.

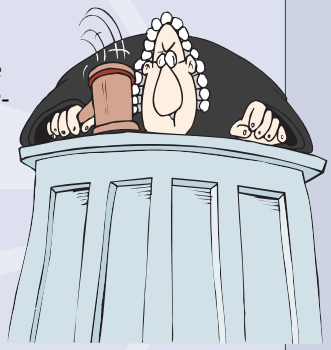
Unwelcome visitors:..... **There are many ways to ensure you only share with those you want.**

Keeping it safe

- Identify threats, risks and security requirement
- Select appropriate security measures
- Establish responsibilities to manage, and control, security issues

"It's mine." "No, it's mine."

Though there are Intellectual Property problems in this information intensive environment, they can be overcome by using appropriate contract conditions and confidentiality agreements. Shared database systems will need proper access controls and audit trails. However, when and where this is done properly, distinct advantages over paper-based systems are realized.



Intellectual Property Rights (IPR) issues include such things as labeling and marking information by electronic tagging to make clear who owns what, and under what terms and conditions it is being released. In many areas the necessary methods of protection are already being used satisfactorily in the electronic marketplace.

All together now

If all participants are to communicate properly, they need to speak a common electronic language. Ideally, this means that neutral standards are essential for the storage and exchange of information. Some internationally recognised standards already exist. They are regulated by organizations like the International Standards Organisation (ISO). Other standards are still being developed.

The rapid increase of Internet and web technologies has made common communication standards widely and cheaply available. They are being exploited to satisfy many of the data exchange requirements.

You can find out more about the standards currently in existence by contacting some of the addresses at the back of this book.

Keep control: **.... Rules and controls are needed to keep the database content ordered and access regulated**

Chapter 11 **More difficult bits**

The challenge of change

Moving to the new environment means change. Change more than anything affects people. People need to be prepared for the effects of change. Key to this is good communication and careful management of people's expectations. These are two essential ingredients to changing their attitudes and behavior. The vision is the creation of a "new way of doing things" and a new "culture".

People will want to know how they will be affected. Are their jobs safe? Will they be able to cope? Do they have to learn new skills and behavior? Can they contribute to the change process?

Organizational changes can mean that the familiar working and career patterns are threatened. Being part of a multi-disciplinary, cross organizational team may mean members having to cope with new reporting structures. The disappearance of a familiar career path can be worrying for some.

"We've always done it like that"

Resistance is inevitable, so all these issues need careful handling. The success of your change programme (and hence the future of your business) could depend on getting these things right.

You will need to determine your current core skills and identify the new skills that will be required. Next you need a plan to close any gap between the two by retraining and / or recruiting. Staff may need to be relocated. They will certainly have to be prepared for working in new ways and new teams.

Training and coaching

Training is a vital element in understanding change. Proper allowance for appropriate training should be made to cover awareness, technical skills, assessment and development of competencies, change and new ways of working.

Considerable effort should be taken to help those who will be working as part of an Integrated Project Team to become members of multidisciplinary groups. You will need to establish awareness and training programmes and internal support groups.

What about me?: **. One of the hardest jobs will be to overcome the genuine staff fears and concerns - "Can I cope? Is my job at risk?"**

Implementation and the training that goes with it should not be treated as a one-off event but part of a continuous process. Training, coaching and counseling will have to be provided throughout the change programme and beyond. Your aim should be continuous business improvement, and that includes improving your staff (and yourself - no escape here!).

Measuring results

All organizations which have successfully implemented these changes have had effective follow-up programmes which monitored the results and took further training action where necessary.

Communication

People will want to know what is going on and it's up to you to tell them. You will need to tackle fears and worries head-on. Newsletters, briefings, Intranets and multi-media, face-to-face meetings, presentations, road shows, video and interest groups are some of the techniques you will need to consider. You will already have a company communications network, use it and improve it as necessary. Remember, check to see that the messages are getting through and that they are consistent and understood. The team leader has a crucial role in communications, motivation and project control.

People matters

- There will be an increase in 'white-collar' skills
- Greater requirement for a multi-skilled workforce
- Change programmes require investment in training awareness campaigns
- Business improvement programmes require new skills and attitudes to leadership
- Creation of skilled team leaders is essential
- Communication up, down and sideways
- Successful business improvement will lead to a new working culture.

"To move forward in the Defense Sector requires a shared vision and common understanding"

Denis Lidstone Director of the Joint CALS Task Force UK

Chapter 12 The future environment

Where is it all leading?

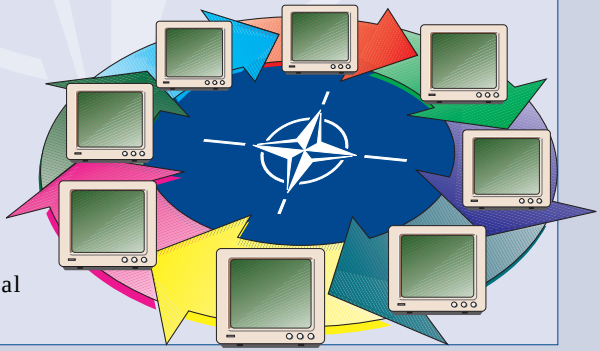
So you have settled the questions of security and protocols, your staff is on your side, the technology and software is in place. So what does it all feel like, this brave now world?

Perhaps the most noticeable consequence is that everything is a lot faster. Product design and manufacture, decision making, design modifications have all speeded up. Information is shared across any distance, allowing teams to solve problems and respond to requests faster than ever before. The key is that they know they are all working from the same information. Your business can move faster with more accuracy, and that is a real business multiplier.

Improvements in electronic communications allow work to be carried out at any location in the world, or any group of locations. Single integrated project teams spanning disciplines, companies and nations can make and support products better and faster. A continuous flow of accurate and up-to-the-minute information is crucial to the process and duplication (and therefore waste) must be avoided.

Many will find themselves working in 'Virtual Teams', brought together from around the world, to perform certain tasks. These virtual enterprises will use specific expertise. Some will exist only in the initial project stages; others for the whole lifetime of the project. The data will reside in a number of linked databases but remain accessible to authorized people wherever they are located.

As we integrate people, processes and technology, new ways of working will become commonplace. The key stakeholders will be integrated through shared information throughout the project life-from concept to disposal



Future way of working

- Electronic interaction between all participants
- Design optimization for build and support costs
- Product database enhanced / maintained for life of project
- All information captured electronically-once
- Appropriate skills / resources at each phase of the project life cycle
- Continuous awareness and training for teams
- Common approach for supply chain management, procurement and in-service support
- Project optimization for performance, through life costs and in-service support

Who benefits?

Where are the benefits most likely to be felt?

People

A positive team culture enables customer and supplier to benefit from shared knowledge and experience, bringing a cooperative approach to problem solving. Technical and team-building training brings motivated and empowered staff. Close working with people from other organisations means they can share skills and experience, learning from one another.

Process

All activities are integrated using common source information allowing concurrent working. Early involvement of the suppliers and manufacturers will make full use of concurrent engineering and optimize through-life support

Information

Electronic sharing / exchange of information brings significant timesavings. 3D modeling and PDM offers many opportunities for improving the design process and reducing its cost. Technology makes it possible to employ methods that speed up manufacture and reduce stockholdings. Design changes can easily be incorporated into technical publications in electronic form. Support of the in-service product becomes faster, cheaper and betters through rapid access to accurate information.

Imagination-the only limit

That's what has been said, and it is true. In the future environment many things are possible. A whole world of opportunity is opening up and we can all find ways to exploit it. Will all this change the way you do business? Will it make new business possible?

Well, not that long ago a supermarket was simply a place you would visit to buy groceries. Thanks to electronic commerce you can now order on-line for delivery to your door, using a supermarket-provided credit card and bank account. You collect loyalty points for use in a range of linked businesses (petrol from the supermarket filling station). And, of course your spending patterns and preferences are being analysed for future planning. Where could your business go? Makes you think, doesn't it?

What Feeling

How you experience the new environment depends on your place in the enterprise, but there is something in it for everyone. All participants, customer, prime and sub-contractors, all suppliers and the eventual user, share an electronic database that is maintained and grown throughout the life of a project (perhaps 30 or 40 years). Here are a few view points:

Purchaser

The customer feels "in control", his confidence boosted because he can see directly how his project is doing using real-time information. And he avoids surprises through evaluation and analysis of the evolving project via participation in the integrated project teams.

In-service user and support staff

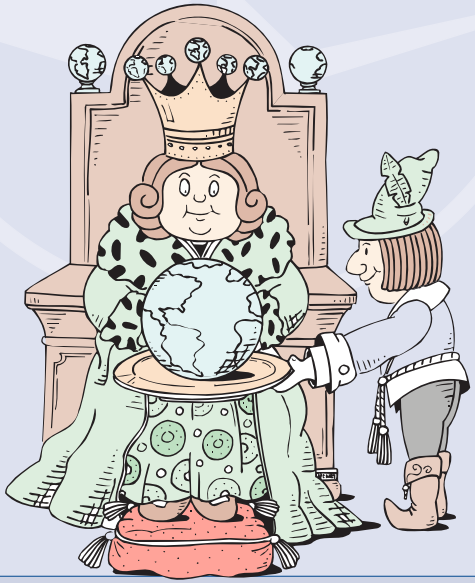
Users and maintenance staff will no longer feel cut off from advice during in-service operations. They can have direct on-line access to all the supporting information needed to help them with the job in hand. This might include technical documentation and spares availability (so there's an end to grease-stained manuals). Electronic feedback of 'in-service' logistics information gives a clear picture of what's been done, helping to monitor and improve performance.

Prime contractors

Prime contractors manage the evolution of products against an electronic representation of the requirements. Communication with the customer and sub contractors / suppliers will be interactive using shared information for documents and product configuration. The necessary infrastructure, technology coupled with his responsibility for the evolving information will create the best opportunity to delivering on time and to budget.

Sub contractors/suppliers

Sub contractors and suppliers will be an integral part of the whole project team (integrated project team). They will interact electronically with the prime and have direct access to evolving information held within the PDM. This will help them perform to their contract - e.g. data for numerically controlled machines, specifications for their detailed design, electronic orders and payments.



A new world: **.... The future environment will be a very different place- opening a world of opportunity for those prepared to meet the challenge.**

Chapter 13 **In conclusion**

Is that all?

Just about- but it was only a brief overview; you have more to learn before you are ready. That's why we have included details of guides and organisations that can tell you more.

Something for everyone

Yes, it all looks complicated, but the principles are straightforward. The key to getting started is to select what is appropriate to you and build it into your business plans. Much of the technology is available now, so don't worry about it. The real challenge is to believe in it and manage it. It doesn't matter where you sit, company, business unit, project, or your size, small, medium, large. There's something here for everyone.

There is no need to feel alone. Somewhere everything in this book is already being done. But no one organisation is doing it all, not yet anyway. That means there is a lot of experience out there and many organisations who can and are prepared to help. You will probably have experts within your own organization, use them.

It is worth the effort because it offers ways to improve what you do, leading to improved efficiency, benefits and business opportunities. Our only advice is, don't hang about. Things are changing fast and the sooner you start the better.

Just do it, ... **Implement the solution that is available today, you cannot afford to wait.**

Chapter 14 **Where can I get help?**

There are many organisations that would be happy to provide advice and guidance:

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Fax: +32 2 701 66 20
e-mail: tack.w@js.mil.be

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Defence Command Denmark
Industrial and Standardization Branch
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Denmark
Tel: +45 45 67 45 67
Fax: +45 45 67 33 09
e-mail: mam3@post6.tele.dk

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Fax: + 33 1 45 52 53 87

EMA/DIV.OL
14 rue Saint Dominique 75007 Paris
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Bundesministerium der Verteidigung
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53003 Bonn
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Fax: + 49 228 12 51 59

Bundesamt für Wehrtechnik und Beschaffung
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Ministerio de Defensa
Paseo de la Castellana 109
28016 Madrid
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Tel + 34 915565390
Fax + 34 913955118

Turkey

M.S.B.
Teknik Hizmet Daire Bsk.ligi
ANKARA
Tel:00 90 312 402 5268
Fax: 00 90 312 417 54 88

Gnkur. Loj.Bsk.ligi
OBS S.
ANKARA
Tel: 00 90 312 402 1806
Fax: 00 90 312 418 1438
e-mail: j4obs@tsk.mil.tr

United Kingdom

UK CALS Industry Council
UKCIC Secretariat
Victoria House, Desborough Street,
High Wycombe,
Buckinghamshire HP11 2NF
Tel: 01494 601066
Fax: 01494 459540
e-mail: executivequkcic.org
Web address: http//~ww.ukcic.org

Ministry of Defence, UK CALS Office
Defence Procurement Agency
MOD Abbey Wood, #68
Walnut2b
Bristol, BS34 8JH
Tel: 0117 913 1797
Fax: 0117 913 1923
e-mail: cals@dpa.mod.uk

United States

Office of the Deputy Under Secretary of Defense for Logistics Reinvention and Modernization
(Skyline II Blgd.)
5203 Leesburg Pike, Suite1609
Falls Church VA 22041-3401
Tel: +1 703 681 3450
Fax: +1 703 681 1493

Useful reading

The NATO CALS Office has developed several useful products that explain further the details of introducing CALS. The main products are:

- NATO CALS Concept of Operations
- NATO CALS Through Life Business Model
- NATO CALS Data Model
- NATO CALS Handbook

All these are available on the NATO CALS Homepage:
http://www.cals.nato.be

The UKCIC has produced CALS Executive and Implementation Guides which give much more detail about the concepts and getting started. The UKCIC web site is also an excellent way of viewing a lot of recent material. It can be found at http://www.ukcic.org

The definitive guides to MOD CALS working are the Defence Procurement Management Guide (DPMG/MULT/005) and the Chief of Defense Procurement Instructions CDPI/MULT/005). In the latest issue they are both in the Acquisition Management System (AMS). They are all available from MOD.

MOD UK has produced a guidance document for CITIS-UK, the networking service that allows a complete electronic shared data environment. It is available from the MOD UK CALS Office on +44 117 913 1785.

Mr Jarl Magnusson, Director Information Policy Management Swedish Defence Material Administration, has produced a Handbook / Guide for Information Policy. This is an up to date useful guides giving good advice on Policy, goals and plans. Email: jamag@fmv.se

The US has a vast number of references concerning these topics. A good place to start is the US initiative for Reinventing the Logistics for the 21st Century. http://www.acq.osd.mil/log/lro/

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June 1999

North Atlantic Treaty Organisation

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