

Structured Information Management for Large Defence Projects



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Engineering Corporate Knowledge

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Overview: Assembling corporate information into products

- ◆ **Documentation management issues for large defence/industry projects**
- ◆ **What is structured information management and why does the world need it?**
- ◆ **Tenix's implementation project**
 - **What we got**
 - **80% reduction in number of documents managed**
 - **98% reduction in documents delivered**
 - **further 50-70% reduction in text down the line**
 - **How we got it**

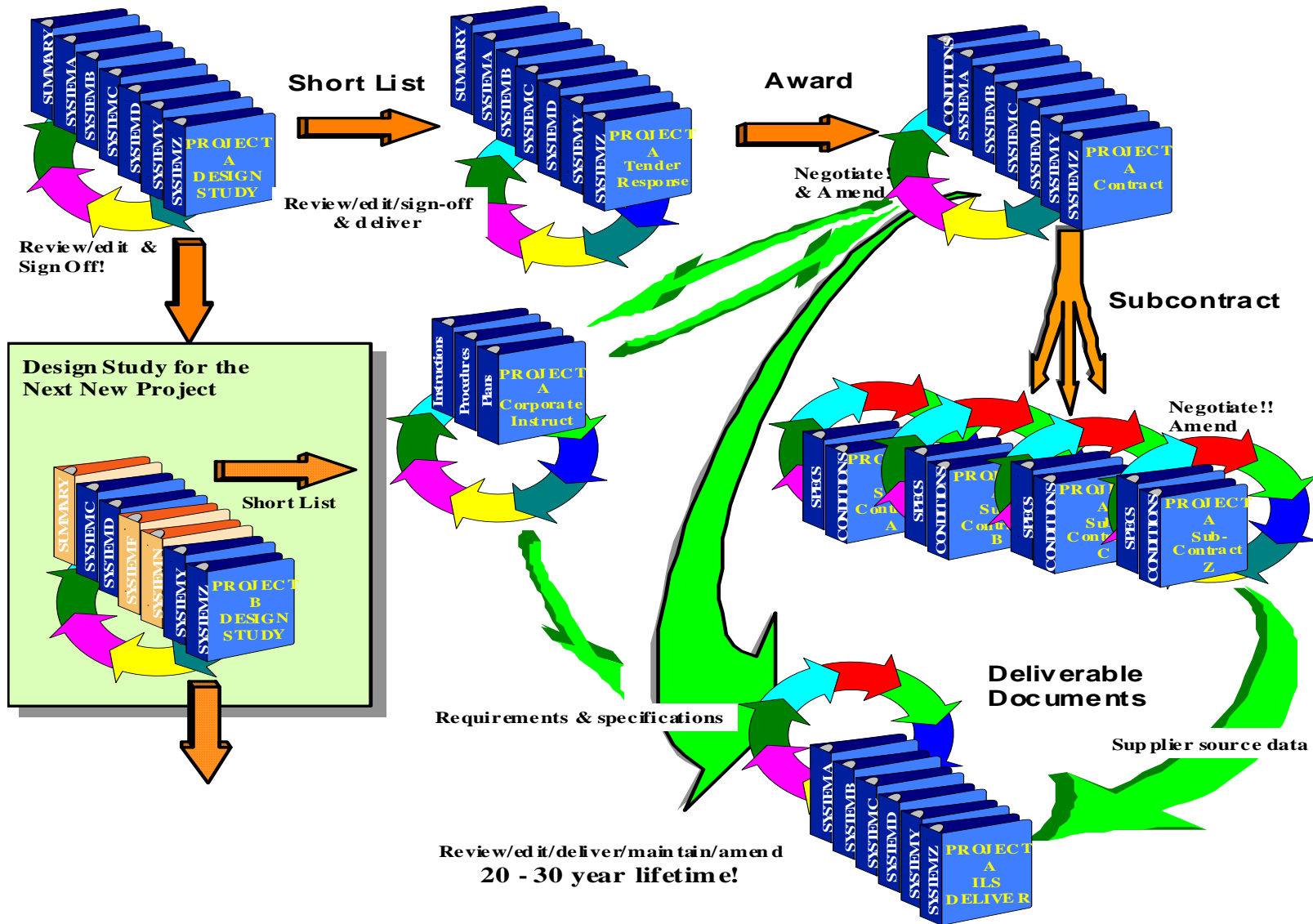


Background: ANZAC Ship Project

- ◆ **Project to design, build & support 10 frigates**
 - 1989 \$A 5 BN
- ◆ **Tenix a privately owned company**
- ◆ **Fixed price contract including support**
- ◆ **I have filled document production and content management roles from the time the contract was signed covering the entire project cycle**



Documentation cycle for a large project (prime contractor's view)



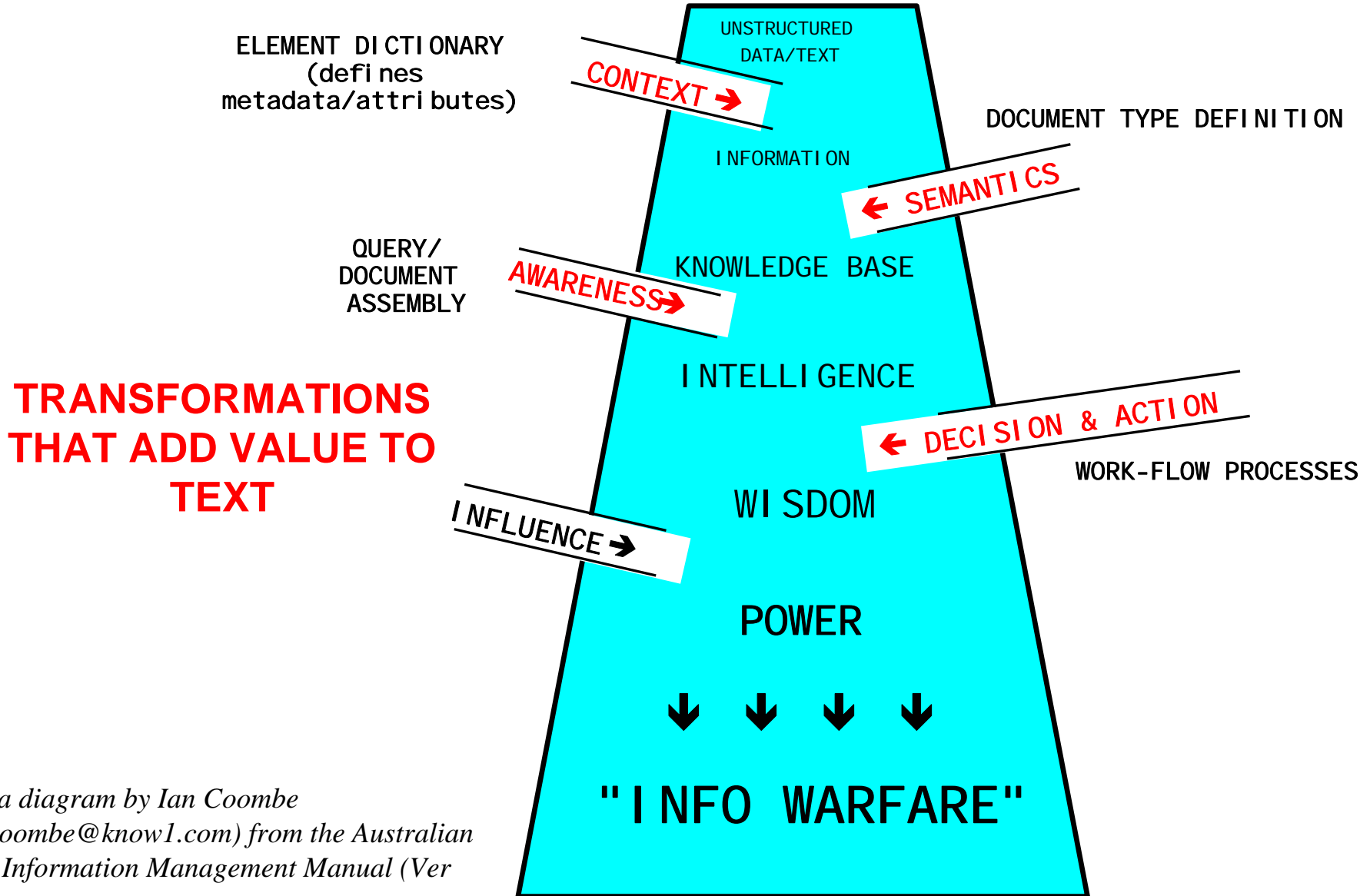


Documentation system goals

- ◆ Most corporate knowledge is recorded in documents not data
- ◆ Product goals
 - **Correct and up-to-date**
 - **Consistent and legible**
 - **Available to who needs it, when needed**
- ◆ Process goals
 - ***Faster*** (minimise cycle time)
 - ***Better*** (improve/assure quality)
 - ***Cheaper*** (reduce labour)
- ◆ Automation can help



Key vision: Documentation transforms data and text into knowledge and power



After a diagram by Ian Coombe (ian.coombe@know1.com) from the Australian Army Information Management Manual (Ver 2.0)



Key vision (2)

- ◆ Unstructured data or text has no meaning to a computer
- ◆ Document structure encodes **context** and **semantics**
- ◆ Content management helps with **awareness** and speeds **decision and action** = knowledge management



Structure text, don't format it

- ◆ Focus on document structure and content, not paper format
- ◆ Author documents with a **defined** and **controlled** structural logic.
 - Unique labels
 - Consistent rules
 - Authors create text and structure, not formats
 - Computer systems, not authors, provide formats
 - Computer systems can process structured documents to add value like databases add value to tabular data.



Use markup languages to encode structure not formats

- ◆ **Tools to engineer documentary knowledge**
 - **Input material: knowledge expressed in text**
 - **Eng. standards: SGML (ISO 8879 - 1986), XML, etc.**
 - Requires development of document designs (DTDs)
 - Output format specifications
 - **Text processing (machine) tools produce/maintain structured text according to engineering standard**
 - Parsers
 - Editors
 - Formatters/publishers
 - Processing languages
 - Content managers/databases



**Tenix's history with
structured
information
management**



Trial solutions for maintenance documents

- ◆ **WordPerfect merge tables for maintenance cards (1992-2000)**
 - Merge tables provided “structure” from the outset
 - **Produced more than 20 different outputs from “single source”**
 - **Delivered data files and electronic documents to Client’s Oracle-based ANZAC Maintenance + Planning System (AMPS)**
 - **Validated data used for AMPS relational links automatically**
 - Information was structured but content not controlled
 - Versioning, release, applicability, effectivity all manual
 - Data delivery capability at risk from obsolete host application



Trial solutions

- ◆ **Tenix explored several alternatives to replace WordPerfect**
 - **SGML for equipment overhaul specifications (1994→)**
 - **Relational database solution for amphibious landing ship maintenance routines (1996-1997)**
 - **MS-based reworks of WordPerfect technology**
- ◆ **They weren't good enough**



The proper answer

- ◆ **Provide structured authoring and content management**
 - **Implement concept of structured documents**
 - **Semantic markup (SGML, XML)**
 - **Hyperlinks (live links that turn information into knowledge) - HTML, SGML, XML)**
 - **Manage documents (container status & versioning)**
 - **Manage content (the contained knowledge elements)**
- ◆ **ANZAC maintenance routines a good prototype for many corporate needs**
- ◆ **Help transform: Data → Knowledge → Power**



1998 3 Stage SGML R&D Project

Tenix funded a year-long R&D program to evaluate structured authoring technologies

- 1. Develop preliminary requirements & survey technology**
 - SAIC/SDSC evaluation -
<http://www.sdsc.edu/DOCT/Publications/b4-1/b4-1.html>
 - Allette Systems provided advice & assistance in developing internal business case to proceed
- 2. Develop detailed SOR and draft contract**
 - Initially preferred suppliers helped analyse requirements
 - **Ensured we expressed our requirements in suppliers language**
- 3. Two rounds of bidding against RFQ (not RFT)**
 - CSIRO Mathematical & Information Sciences' Text Information Management reviewed process and technical evaluation



What we decided we needed:

- ◆ Hold data in non-proprietary format (SGML/XML)
- ◆ **Validate critical data against master sources**
- ◆ Manage applicability to configuration items
- ◆ Link document effectivity to engineering change orders
- ◆ Maintain client-specific languages
- ◆ Register and link to source documents
- ◆ **Link deliverable text elements to source documents**
- ◆ Manage workflow processes
- ◆ Manage and reuse content objects (e.g., graphics)
- ◆ Manage and reuse document components (e.g., text)
- ◆ **Data conversion from WordPerfect to SGML**
- ◆ **Produce required deliverables**
(unique requirements)



R&D review of document mgmt applications

- ◆ **Architectural considerations:**
 - Repository (relational vs object vs structured)
 - Extensibility (DIY?)
 - Supportability (DIY?)
- ◆ **Other considerations:**
 - ***RISK* minimisation**
 - Licensing and implementation cost
 - Support and maintenance cost



Final short list:

- ◆ **Short list choice between two generic SGML content management systems**
 - low risk 2nd generation US vs developmental 4th generation local
 - dependence on overseas IP vs local support and IP
 - overseas cost components vs 100% \$A



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What did we get?



Our choice: SIM

- ◆ **RMIT's Structured Information Manager**
 - **Academic excellence + interesting client list → world-wide state of the art repository technology**
 - **A very credible implementation team**
 - **Acceptable risk mitigation**
 - **Fixed price (but no ownership of bespoke IP)**
 - **Two stage implementation (80:20 rule)**



What did we get?

- ◆ XML-based content repository server
- ◆ Web and access security admin server
- ◆ Integral Application Construction Environment (ACE)
- ◆ Tenix's document & content management extensions
- ◆ **No third-party software anywhere!**



BIG wins from SIM Release 1

◆ **Delivered class documents 20/10/2000**

- Total doc management requirement as at Ship 5 delivery:
- 10,000 routines → 1,800 = >

80% reduction in docs

- Ship 5 delivery requirement:
- 40 new routines not 2000! =

98% reduction in delivery

◆ *And we weren't too bad to start with*



How did we do it?

- ◆ **How was the reduction achieved?**
 - **Item applicability to configuration items**
 - **Side-by-side edit navy specific language (RAN, RNZN)**
 - **Effectivity link to specific Engineering Change**



Other release 1 benefits

- ◆ **Low cost deployment**
 - Own PC with Web or intranet access
 - Default web browser (only tool needed to administer SIM or review & annotate documents)
 - SGML/XML compliant editor to draft/edit procedure text
 - **No IS support required**
- ◆ **Data validation on Check In/Check Out**
- ◆ **Source data management**
 - Source registry
 - Source repository
 - 2-way links with SGML comments



More release 1 benefits

- ◆ **Workflow management system**
 - All functions performed over intranet web
 - **With slight mod to SIM implementation, participants could work anywhere in the world (World Wide Web)**
- ◆ **Minimal author training (no prior experience)**
 - Workflow role(s)
 - Document structure rules
 - Data/text entry
 - Authors see but have no control over print formats

One day of formal training

One week to full productivity



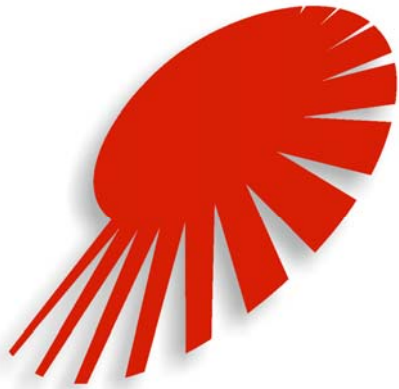
SIM Release 2 - early in the new year

- ◆ **Component reuse**
 - Auto detection of similar elements
 - Inheritance, detailed tracking of changes at element level
- ◆ **50% - 70% more reduction in volume of text to author/manage**
- ◆ **Ensures consistency of text usage**



SIM Release 2 - early in the new year (2)

- ◆ **Document and component versioning**
 - **SIM 1 retains doc versions in repository**
 - **SIM 2 will control versions down to individual elements**
 - **Secure/traceable version/release control**
 - **Auditable change management**
- ◆ **Annotated links, changes & elements**
- ◆ **Additional toolkit**



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Project success factors



Strategies that worked (1)

- ◆ **End-users (doco people) managed project**
- ◆ **Used appropriate outside consultants (including suppliers) to help understanding & check work**
- ◆ **If you don't know more about technology than suppliers do RFQ not RFT**
- ◆ **Specify what you need, not how to achieve it**
- ◆ **Check supplier financials and market position**
- ◆ **If developer is overseas use reputable local integrator as supplier, not the developer**



Strategies that worked (2)

- ◆ **Negotiate from a commercially realistic draft contract**
 - The biggest risk may be to not start the project
- ◆ **Manage risk above all else**
 - Negotiate fixed price
 - Solve potential show-stoppers first
 - Prove major concepts early
 - Know your priorities and apply the 80:20 rule
- ◆ **Phase work so each phase scores a win**