Obsolescence Management in Long Term Projects

WORLD CODIFICATION FORUM
2017

Stuart Kelly
Introductions

Stuart Kelly

- Ex Head of Obsolescence Management Policy, UK MOD
  - Ensuring proactive OM implemented as part of the Defence acquisition process
  - Advice & Guidance to >200 projects

- Currently Managing Director of Through Life Support Limited
  - Providing Advice & Guidance, Tools and Training to Improve OM Capability

- President International Institute of Obsolescence Management

- Committee member looking after IEC62402:20007

- Visiting Fellow at Cranfield university
• We provide all the support required to set up, deliver and implement a **Proactive Obsolescence Management framework** comprising of:
  
  – Policy
  – Plans
  – Processes
  – Tools
  – Contractual guidance
  – Comprehensive training programs.
Training

• **Obsolescence Management Training Courses**
  – One Day Awareness
  – Three Day Practitioner
What is Obsolescence?
Obsolescence is not....
What is Obsolescence?

“The transition from availability from the original manufacturer to unavailability”

IEC 62402:2007

Obsolete -

“no longer in production by the original manufacturer to the original specification”

New Version IEC 62402
A part has failed, needs to be replaced ..... 

An NSN needs to be procured.
### NMCRL
NATO Master Catalogue of References for Logistics

<table>
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<tr>
<th>NCAGE</th>
<th>Reference Number</th>
<th>RNCC</th>
<th>RNVC</th>
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<td>99886-C1</td>
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<tr>
<td>K9988</td>
<td>LC-6677442</td>
<td>5</td>
<td>2</td>
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NSN Analysis

- Project X - >10,000 NSN’s

![Pie chart showing NSN Analysis]

- Obscure Status:
  - No Match: 3%
  - Obsolete: 15%
  - Sole Source: 43%
  - Unknown: 15%
  - Two or More: 24%
  - No Match: 3%

NSN Analysis Management Services and Support
NSN Analysis

• Typical Sample – 100 NSN’s

OBsolescence Status

- Obsolete
- Sole Source
- Two or More

Projected Availability

- Obsolete
- End of Life
- 1-4 years
- < 7 years
- > 7 years

OBSOLESCENCE MANAGEMENT SERVICES AND SUPPORT
Analysis

- Case Study - Radar System

OBSOLESCENCE STATUS

- Obsolete: 44%
- Sole Source: 40%
- Two or More: 9%
- Unknown: 3%
- No Match: 4%
- No Match: 4%
Part Replacement

• Part is no longer available from supplier

• Supplier either:
  – Has no alternative
  – Is not available

• An investigation / resolution needs to be implemented
  – Time
  – Money
  – Possible downtime
What drives obsolescence?
1980 - A World Without…..

- Personal Computers
- Laptops
- Microsoft Windows, Apple Mac
- Mobile phones
- Internet / Broadband
- Satellite TV
- DVDs
- Genetics, cloning,
- PDAs, iPods, Digital Cameras, Plasma TVs……
- Rapid Change
Mobile Phones
A difference of only 40 years

- **Apollo 11 Guidance Computer**
  - Memory 2K with 32K of storage
  - Processor Speed 1.024 MHz

- **User Interface**
  - Switches, Relays and Blinking Lights

- **Cost**
  - $$$$$Millions

- **iPhone 7**
  - Memory 256GB
  - Processor speed c2.6GHz
  - 12MP HD Camera

- **User Interface**
  - 5.5-inch (diagonal) widescreen Multi-Touch display

- **Cost**
  - £700
The Problem for Defence

Declining Military Market Share of Semiconductors

• 1970’s
  – 35% share of a $4.2 billion market

• By 1980’s
  – 7% share of a $24 billion market

• By 1990’s
  – 0.7% of a $150 billion market

• By 2000’s
  – < 0.3% of a $316 billion market
Semiconductor revenues by end market

- Data Processing: 33.3%
- Wireless Communications: 23.5%
- Automotive Electronics: 7.9%
- Industrial Electronics: 9.9%
- Military / Aerospace: 1.0%
- Consumer Electronics: 18.0%

Source – Application Market Forecast Tool (AMFT)
Electronics market is driven by consumer products.
Life from **A** to **B**

- **Average lifecycles: electronic components**
  - Linear/interfaces: 8 years
  - Logic families: 6 years
  - Displays: 3 years
  - Gate arrays: 2 years
  - Microprocessors: 2 years
  - Programmable logic devices: 1 year
  - Memory families: 9 months
  - Overall average: 3.25 years
Legislation causes obsolescence

RoHS

- Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Directive
- e.g. Lead, which is used in soldering on the vast majority of electronic circuit boards.

REACH

- Registration, Evaluation, Authorisation and Restriction of Chemical Substances.
- Restricts the use of substances that are used in parts.
- Affects both parts and processes.
Obsolescence will not go away.....
Obsolescence will not go away.....

“A single EOL notice can include dozens of discontinued parts. IHS research reveals that 500,000 parts were discontinued in 2014”

Source – IHS – Technology
In an ideal world...

- User Requirement
- Supply of Part

Years

Reality...

In an ideal world...

- User Requirement
- Supply of Part

OBsolescence Risk

Years
What Goes Obsolete?

Electronic Components

Mechanical Parts

Software

Test Equipment

Materials

Processes

Tools

Skills

OBSOLESCENCE MANAGEMENT SERVICES AND SUPPORT
What is the Impact of Obsolescence?
The Royal Navy’s Merlin Mk1 helicopters will undergo £1.15 billion in upgrades from original manufacturer AgustaWestland and Lockheed Martin UK.

Quote from MOD:
• “While improved capabilities will flow from these upgrades, the primary goal is to resolve electronics obsolescence issues in the current Mk1 variant, and reduce through life support and operating costs.....”
Case Study – Electro Mechanical

Two Solutions Identified

• Supplier 1 - Kraus and Naimer:
  – Potential cost implications of:
    • £85 for switch .....+.....£75,000 for embodiment

• Supplier 2 - NSF Controls:
  – Potential cost implications of:
    • £480 (MOQ 3) for switch .....+.....£2,000 for embodiment

Cost for original switch - <£50
Obsolescence in long life projects is inevitable.

It is now impacting on equipment even before entering service.

It can happen quickly, could cost lots of unplanned money to sort and directly affect equipment availability.

The only way to mitigate the risk is by managing obsolescence.
What is Obsolescence Management?
Obsolescence Management

- Understand the parts in your project.
- Understand the current, and future obsolescence risk.
- Put steps in place to mitigate known risk.
- Reduce the impact of obsolescence on your:
  a) Capability
  b) Cost
Obsolescence Management Policy
UK MOD Obsolescence Management Policy

- JSP 886 Volume 7 Part 8.13 /Defence Logistics Framework

- Projects shall develop and implement a proactive Obsolescence Management strategy in accordance with IEC 62402:2007, and shall include:
  - Ensure OM risk is included in Design
  - A risk assessment shall be carried out to determine the risk to the system from obsolescence.
  - The risk assessment shall be periodically re-evaluated
  - Performance of the Obsolescence Management Plan must be measured.
At Initial Gate
Requirement to consider obsolescence risk must be incorporated in contractual documentation.

At Main Gate
A fully compliant OMP with JSP must be in place.
Surface Ship Sonar Timeline

Over 70% of the electronic parts are obsolete before the first system is installed!

% of Electronic Parts Unavailable

Source – Obsolescence Driven Design Refresh Planning for Sustainment Dominated Systems – Dr Peter Sandborn
Obsolescence Status
vs
Obsolescence Risk
Obsolescence Status
Obsolescence Status

• First step in Obsolescence Management is to understand the current obsolescence status of a part:
  – Is it currently procurable from the original manufacturer?

• How to achieve Obsolescence Status of a Bill of Material (BOM)
  – Obsolescence Monitoring Tool
  – Manual Monitoring
Obsolescence Monitoring Tool
Award Winning proactive Obsolescence Management capability

Currently supports

- 6,700 systems
- 450,000 assemblies
- >50 million parts
  - Each part is on a Bill of Material
Projects Supported Include

- MILSAT COM
- ICBM
- IRSP
- RG-33 MRAP
- T6-A
- AWACS
- F-15 A/B/C/D63/D70/E/SE
- MC-130H/P
- ARH-70
- V-22
- T-38
- C-5
- A-10
- B-52
- AC-130H/U
- CH-47
- HH-60G
### Obsolescence Status

- **The current status of a part in terms of availability**

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obsolete</td>
<td>No more active manufacturers remain.</td>
</tr>
<tr>
<td>Sole Source</td>
<td>There is one active manufacturer.</td>
</tr>
<tr>
<td>Two or More</td>
<td>There are two or more active manufacturers.</td>
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</table>

- **Local Part Number**
  - Mfr A p/n A
  - Mfr B p/n B
  - Mfr C p/n C
<table>
<thead>
<tr>
<th>Local P/N</th>
<th>PN Type</th>
<th>Local PN</th>
<th>Availability in years</th>
<th>Description</th>
<th>Manufacturer</th>
<th>MFG PN</th>
<th>MFG PN Status</th>
<th>EOL Dates</th>
<th>Has Alternate</th>
<th>Star Rated for Best Replacement Match</th>
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<tr>
<td></td>
<td>Electrical</td>
<td>90054.33D4TRH</td>
<td>&lt;1 year [LOT situation]</td>
<td>ESD Suppressor</td>
<td>Cooper Bussmann</td>
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<td>4/19/2013</td>
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<td>EOL</td>
<td>2308A-3DCGS</td>
<td>&lt;1 year [LOT situation]</td>
<td>IC, Cmos, Clock Buffer, 3.3V</td>
<td>Integrated Dev Tech</td>
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<td>Two or More</td>
<td>5902-78002002EX</td>
<td>5-7 years</td>
<td>IC, Bipolar, Quad Differential Line Receiver</td>
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<td>Microseas Inc</td>
<td>01050101EX</td>
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<tr>
<td>Obsolete</td>
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<td>0500701ZX</td>
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<td>Electrical</td>
<td>8500701ZX</td>
<td>5-7 years</td>
<td>Op Amp</td>
<td>Electrog</td>
<td>0500701ZX</td>
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<td>4/10/2014</td>
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<td>950554451HFLF</td>
<td>Discontinued</td>
<td>4/5/2013</td>
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</table>
Status of a BOM

- Obsolete: 34%
- Sole Source: 35%
- Two or More: 22%
- Unmatched: 9%

OBSOLESCENCE MANAGEMENT SERVICES AND SUPPORT
Obsolescence Risk
Understanding Risk

• Probability & Impact

– **Probability** of becoming obsolete and turning into an obsolescence issue.

– Operational **impact** of the obsolescence issue on the system’s function and performance. It represents the potential loss of a system availability or capability.
Obsolescence Risk

**OBsolescence Management Risk Assessment Process – High Level View**

**Probability**
- Obsolescence Status
- Predicted YTEOL

**Impact**
- Inventory Levels
- Supply Chain Inventory
- Failure/Consumption rates
- Number of items in the system
- Number of suppliers
- Number of users
- Ease of replacement
- Safety Critical?
- Mission Critical?

**Risk Assessment Process**

**Risk Assessment Result**
- High Risk
- Medium Risk
- Low Risk
• Obsolescence Risk Analysis.
Obsolescence Management
Risk

Mitigation of Obsolescence Concerns:
- Perform Risk Assessment
- Design Considerations
- Technology Transparency
- Obsolescence Monitoring
- Planned System Upgrade
- Risk Mitigation Buy
- Die Banking
- Authorized continuing manufacturer

Resolution of Obsolescence Issues:
- Existing Stock
- Reclamation
- Equivalent
- Alternative
- Aftermarket
- Emulation
- Minor Redesign
- Major Redesign
- Last Time Buy

Flow:
1. Perform Risk Assessment
2. Risk Level
   - Low Risk - Reactive Approach
   - Medium or High Risk - Proactive Approach
Understanding Risk

- All assessments and decisions made MUST be recorded in an **Obsolescence Risk Register**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part No.</th>
<th>Manufacturer</th>
<th>Status</th>
<th>Period required</th>
<th>Risk level</th>
<th>No. of manufacturers</th>
<th>YTEOL</th>
<th>Impact</th>
<th>Consumption Rate</th>
<th>Stock Availability</th>
<th>Mitigation Strategy Selected</th>
<th>Resolution Approach</th>
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<td>1</td>
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<td>N/A</td>
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<td>3</td>
<td>25252</td>
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<td>3</td>
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<td>5</td>
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<td>BAE</td>
<td>In Production</td>
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<td>Medium</td>
<td>1</td>
<td>4</td>
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<td>Medium</td>
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<td>6</td>
<td>20552</td>
<td>Honeywell</td>
<td>In Production</td>
<td>5 years</td>
<td>Low</td>
<td>3</td>
<td>5</td>
<td>Low</td>
<td>Low</td>
<td>100</td>
<td>Reactive</td>
<td>N/A</td>
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<td>737855</td>
<td>Texas Inst</td>
<td>In Production</td>
<td>5 years</td>
<td>Low</td>
<td>3</td>
<td>7</td>
<td>Medium</td>
<td>Medium</td>
<td>100</td>
<td>Reactive</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**OBSOLESCENCE MANAGEMENT SERVICES AND SUPPORT**
Status Reporting – Multiple Levels

• Obsolescence Risk Reporting for each sub system
Impact Assessment

Obsolescence Health Projection

- High Risk
- Medium Risk
- Low Risk
Reduce Through Life Costs by Design Refresh Planning
Risk Assessment

• A good risk assessment is at the heart of a good Obsolescence Management Plan

• Obsolescence Risk Register is at the heart of a good risk assessment – all decisions must be recorded.

• Decisions must be regularly reviewed.
Contracting for Obsolescence Management
Experience of Reviewing Project OM Plans

• We have seen many ‘good’ Obsolescence Management Plans.

• We have seen many ‘not so good’ Obsolescence Management Plans.

• Major reason for ‘not so good’?
  – The requirement for the contractor to manage the obsolescence risk and to resolve the issues that occur – not clearly defined.
Contracting for OM

Contracting a Supplier to perform OM
• What are you actually transferring?

The Task?

The Responsibility?

The Risk?
Cascade down the SC

What is the difference?

- Contract your supplier to manage obsolescence

The Task?
Cascade down the SC

What is the difference?

- Contract your supplier the task - but add targets & performance measurement
- Reward good performance
Cascade down the SC

What is the difference?

- Risk is fully cascaded to Supplier
- Supplier Pays for all Resolutions and Mitigations
- Proper Availability / Capability Contracting
Who Pays? - Options

**Obsolescence Risk**

- **Customer** has full risk
- **Supplier** has full risk
- **Customer** pays for all mitigations and resolutions
- **Supplier** pays for all mitigations and resolutions

OBSOLESCENCE MANAGEMENT SERVICES AND SUPPORT
Measure OM Performance
OM Performance

• How well is the Obsolescence Management capability performing?

• Are you realising the expected benefits from your OM programme?

• "If you can't measure it, you can't improve it."

Peter Drucker
Return on Investment
Fictitious Example over a 3 Year Period

• Expressing as **Return on Investment (ROI)**
  – Management language

\[
\text{ROI} = \frac{\text{Return - Investment}}{\text{Investment}} = \frac{\text{Cost Avoidance - Investment}}{\text{Investment}}
\]

\[
\text{ROI} = \frac{2,645,400 - 300,000}{300,000} = 7.8
\]

(This could be incentivised)
Obsolescence Cost Prediction
• Projects need to mitigate and resolve obsolescence, so projects need to forecast a budget for this.
• Move away from ‘unplanned money’.
OM Cost Modelling / Prediction

- Predictive Cost Modelling
  - Assessing likely cost implications due to Obsolescence in the future

- Customers need to forecast a budget for resolving obsolescence.

- Supplier’s may need to understand cost for bids / contracts

- Requires the use of several sets of data for calculation
OM Cost Prediction

- How much money will you need to plan / forecast / budget for, to resolve and mitigate obsolescence in the next 5 years?

- TLS have developed a cost prediction methodology
  - Used to provide cost predictions for major long life projects
Obsolescence Management Plan
Obsolescence Management Plan (OMP)

“description of the strategies for the identification and mitigation of the effects of obsolescence through all stages of the life of a product”

IEC 62402:2007
OM Plan - Aim

- A document that outlines specific processes, resources and tools that will be used to manage the obsolescence risk to a **project or product**.

- A more detailed, lengthy document.

- Details the day to day activities of the OM organisation.

- Part of the first design review
Obsolescence Management is normal within Long Term Support Contracts
Case Study - Contracting

New Contract Notice

Requirement: 30 specialist airside runway de-icer trailer sprayers

Additional deliverables of the project will include the production of:

- Reliability and maintainability case.
- Equipment Safety Case.
- Environmental management plan.
- Obsolescence Management Plan
Case Study - Contracting

Core Services to include, but not be limited to:

- Legislative Compliances
- Safety and Environmental Factor
- **Obsolescence Management**
- Reliability
- Maintainability
- Equipment Capability
- Configuration Management
- Project Management and Technical Meetings
- Capability Improvements

- New Contract Notice
- Post Design Services for Mastiff, Wolfhound, Ridgback
Are there any Obsolescence Management Standards?
Obsolescence Management – Application Guide
Countries Adopted IEC62402

- Korea
- Poland
- France
- Belgium
- Germany
- Italy
- Sweden
- Ireland
- Netherlands
- Denmark
- Australia
- UK
- Spain
Obsolescence Management Standards

DMSMS:

Diminishing Manufacturing Sources & Material Shortages

SD-22

- A Guidebook of Best Practices and Tools for Implementing a Proactive DMSMS Management Program

TechAmerica GEIA-STD-0016

- Standard for Preparing a DMSMS Management Plan
For professionals worldwide who are dedicated to furthering their knowledge and understanding of the Obsolescence Management discipline and who wish to network with a wide group of companies from a global membership.
IIOM Chapters

• Current Chapters
  – IIOM UK
  – IIOM Germany

• Planned Chapters for 2017
  – IIOM Benelux
  – IIOM US

• Planned Chapters for 2018
  – IIOM Brazil
  – IIOM Italy
  – IIOM India
• Training arm of TLS

• Planning to be IIOM ‘Endorsed Trainer’

• Will deliver ...
  – IIOM Certificate
  – IIOM Diploma
Summary

• Obsolescence Risk is **inevitable** in Long Life Systems

• **Implement proactive Obsolescence Management** processes to analysis, understand and mitigate **obsolescence risk**.
  
  – Maintain Capability
  – Extend Operational Life
  – Reduce through life costs

• **Measure** Cost Avoidance and Return on Investment to justify OM capability.

• Use Cost Prediction processes to understand costs
Questions

www.throughlifesupport.com

www.avcom-dmsms.com