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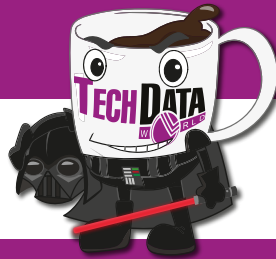
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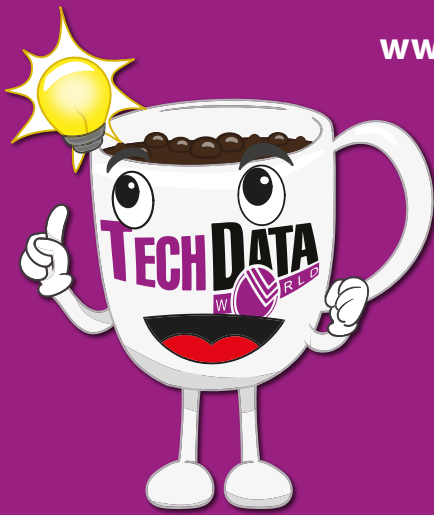
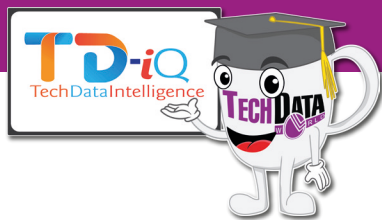**NEUTRAL UNBIASED PROJECT SUPPORT, ADVICE & GUIDANCE**
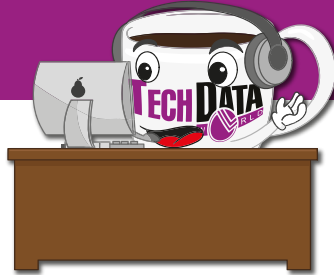
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QUARTERLY MAGAZINE

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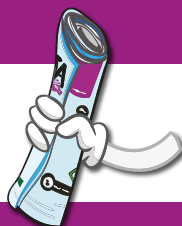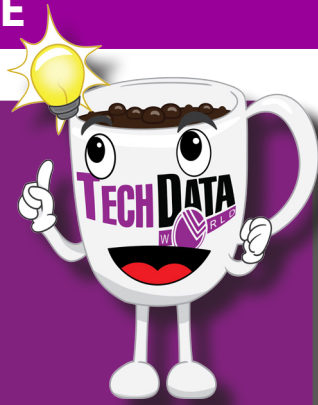
CONTACT US:

EDITOR@TECHDATAWORLD.COM

SUPPORT@TECHDATAWORLD.COM.

HTTP://WWW.TECHDATAWORLD.COM

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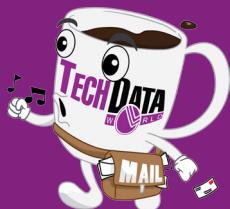
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ON THE COVER: your average TD manager doing his daily tasks!

Hello and welcome to this special UKCeB edition of the TDW Magazine.

We at TDW are delighted that the UKCeB has asked us here at TDW to produce a special edition of our magazine with excerpts of UKCeB and other interesting articles.

In this special edition you will find articles from Steve Shepherd, Carl Billson, Mike Day and Mel Millar (MoD).

Never heard of TDW? So what are we all about at TDW? Our focus is purely on the support, promotion, training, advice and guidance of the global tech data professional.

We provide neutral support to those who need to implement a tech data strategy right down to those who need to understand and use complex software systems, understand specification driven tech data approaches and much more.
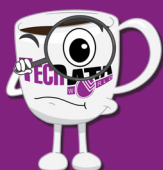
How do we do this?

Magazine - Our quarterly magazine has subscribers world-wide and is completely free of charge (online) or if you are MoD you can request a printed copy is sent to you each quarter. You can register for your copy on the TDW website (www.techdataworld.com)

Focused Events - We run a number of global events, both online and full conferences, our next event is TDUK - The UK's largest defence focused TD event on the 19 & 20 November. *The event is free of charge to MoD project teams and staff*. For more information you can go to www.techdocsuk.co.uk and the full and latest agenda is also online.

Training, Support and Recognition - TDW provides support to those who need to understand or use modern tech data philosophies, from those who want to attend short online courses to those who would like a full class-room lead structured training programme.

Neutral Advice and Guidance - in the world of TD there is a strong vendor presence and often (not always) the message and advice given is not necessarily unbiased nor the most appropriate - TDW provides a neutral and none-vendor, none-specification advisory service for those needing to work with TD

We hope you find the content of this special edition interesting and look forward to welcoming you as a full TDW subscriber.

All the best!

Mike Ingledew

WELCOME

About UKCeB - a Champion for Team Defence
Carl Billson, UKCeB Task Force Business Consultant

UKCeB is pleased to be invited to contribute to this and future TechDataWorld Newsletters with News items that we trust will be valuable to readers. Who are UKCeB and how do we connect to TechDocsWorld? This piece explains about UKCeB and provides news items for the quarter ahead.

Secure sharing of and collaboration using technical documents is a key concern for UKCeB members. UKCeB's priorities are around secure collaboration across Team Defence. Team Defence is a shorthand reference within UKCeB for organisations that collaborate securely across defence to achieve end-to-end delivery of materiel and services, including support through-life. Team Defence comprises users (e.g. MOD, allies, OGDs and contractors) and industry suppliers. UKCeB promotes a Team Defence perspective, one that recognises a changed landscape with increased breadth and depth of Industry involvement in defence (as well as other agencies).

UKCeB represents the UK (through ADS Group) at the international bodies ASD/AIA/ATA. In the UK this includes the UK Joint Technical Documents Working Group and the UK S1000D Sub Working Group.

Whilst, individual organisations have their own systems and processes for creating and managing documents, UKCeB looks at how documents can be securely shared across organisations being mindful of the need to protect based on such aspects as Intellectual Property Rights (IPR), security classification and regulations covering export controls (e.g. ITAR). The Defence Enterprise is complex and relies on secure information sharing for efficient and effective collaboration, often involving sensitive and valuable information, across diverse and geographically disparate organisations, some of whom operate as competitors at times as well, many being Small to Medium Enterprises (SMEs) that do not have significant ICT resources.

UKCeB represents the UK (through ADS Group) at the international bodies ASD/AIA/ATA[1] . In the UK this includes the UK Joint Technical Documents Working Group and the UK S1000D Sub Working Group.

Standards work is an important strand of activities and, for UK, UKCeB co-ordinates the identification, development, deployment and maintenance of a coherent set of standards to meet the needs of UK Defence. This is achieved through the Joint Information Standards Co-ordination Team (JISCOT), where MOD and Industry input into global standards is co-ordinated through bi-monthly teleconferences plus communications and web updates. This international community of approximately 40 members has around 15 UK representatives. There are channels for escalation of issues to the MOD/Industry Joint Information Group Programme Management Board (JIG PMB) and the Joint Supply Chain Management Steering Group (JSCM SG).

UKCeB supports and hosts international ASD Simplified Technical English (STE) Maintenance Group meetings as well as the UK STE Working Group, an organization with representatives from both the major UK aerospace industries and the UK Ministry of Defence (MOD).

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[1] AeroSpace and Defence Industries Associations of Europe (ASD) | Aerospace Industries Association (AIA)| Air Transport Association (ATA)

UKCeB members challenge themselves on a range of topics often linked closely with documentation such as: What (future) skill sets are needed, e.g. in handling sensitive information or collaborating effectively? How should we contract for information? What opportunities and threats are there from disruptive technologies such as the Gartner Nexus of Forces - Social, Mobile, Cloud and Big Data? What if sensitive information falls into the wrong hands and/or is not readily traceable? What difference will government-backed G-Cloud services make? Is the quality of data, on which decisions are made, up to the mark? What value accrues from enterprise-wide collaboration capabilities that use international standards and have wide interoperability? And, what do twenty-something Digital Natives make of working in the defence sector, e.g. are they constrained and is it holding its own as an attractive career proposition?

> *UKCeB hosts the UK Simplified Technical English (STE) Working Group, an organization with representatives from the major UK aerospace industries and of the UK Ministry of Defence and (advert alert!) provides STE courses.*

UKCeB is a unique, non-profit organisation (funded by Industry members) that facilitates engagement between Industry and the MOD (mainly), working together on enabling secure collaboration in order to release a range of benefits. There are two main groupings of UKCeB activities: Supply Chain and Support Engineering and Information. These sit under a mature governance including MOD and Industry reporting into the Defence Suppliers Forum Executive Group. UKCeB is aligned with the Trade Associations techUK and ADS Group.

The neutral, trusted forum provided by UKCeB enables diverse stakeholders to participate in activities aimed at improving the common good, for instance to adopt and implement standards and core capabilities such as Identity and Access Management, an enabling capability that can, for instance, simplify and assure access to information across organisations (e.g. single-sign-on). These core enablers have potential to unlock enterprise-wide opportunities and deliver huge savings.

Supply Chain Management
Joint Support Chain Management
Effective   Agile   Affordable Support
Team Defence Supportability Engineering

UKCeB activities span workshops, pilots (e.g. proof of concept), working groups, webinars, good practice recognition, educational visits and events such as the annual Defence Information Event on 9 & 10 April 2014 - see later for details. www.ukceb.org

EDUCATIONAL AND TOPICAL WEBINAR SERIES

2D/3D Graphics & Multimedia: Who needs Interchange Standards?

30 Oct 4PM CET - HOSTED by TDW - Guest speaker Ian Proudfoot - Antea

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DIGITAL REVOLUTION & TECHNICAL DATA

CARL BILLSON - THE UKCEB

CARL BILLSON IS INVOLVED WITH
COORDINATING UKCEB MEMBER ACTIVITIES
AROUND THE IMPACT & OPPORTUNITIES OF
THE DIGITAL REVOLUTION IN TEAM DEFENCE.
HERE, CARL OFFERS SOME THOUGHTS TO
FURTHER ENCOURAGE DEBATE ON THIS
IMPORTANT TOPIC AMONGST THE 'TECHDATA
COMMUNITY'.

Last time my car was serviced, by a mechanic friend while I was chief tea-maker, he needed some guidance on a mechanical problem. Typically in the past, he'd phone a mechanic mate. However, now there is plenty of help via the web. The YouTube video 'documentation' we needed to solve our problem was one of several on the topic, and was served up to his mobile phone right next to my ailing car.

The video was easy to find, quick to stream, free to watch (once you'd endured an advert, of course) and had credible and accurate information to provide the necessary insight to progress. Plenty of online forums, such as Pistonheads for car enthusiasts, provide help and guidance from peers and/or experts. This is an everyday instance of the 'Digital Revolution' in action and the high level of expectations we have on finding out about stuff.

This anecdote reminds us about our increasing familiarity with use of social tools and our ready access to information in an increasingly hyper-connected everyday world. Where and how is the Digital Revolution manifest in the highly regulated world where TechData applies? This article attempts to highlight some areas if digital disruption, as part of a wider debate about the Digital Revolution and TechData. It considers the Gartner nexus of forces and considers future ways of working and the expectations of 'Digital Natives' (the twenty-something age group in the workplace who have grown up with technology) and future 'millennials' coming to work in Aerospace & Defence (A&D).

THE NEXUS OF FORCES DESCRIBES THE CONVERGENCE AND MUTUAL REINFORCEMENT OF FOUR INTERDEPENDENT TRENDS: SOCIAL INTERACTION, MOBILITY, CLOUD, AND INFORMATION. THE FORCES COMBINE TO EMPOWER INDIVIDUALS AS THEY INTERACT WITH EACH OTHER AND THEIR INFORMATION THROUGH WELL-DESIGNED UBIQUITOUS TECHNOLOGY

Analysts Gartner contend that "The nexus of forces describes the convergence and mutual reinforcement of four interdependent trends: social interaction, mobility, cloud, and information. The forces combine to empower individuals as they interact with each other and their information through well-designed ubiquitous technology."

Exploring each trend or aspect discretely, it's clear that TechData is advancing with the opportunities and challenges of Digital. TechData suppliers are providing enhanced capabilities and users and practitioners starting to make the most of them. For instance, practitioners such as Aspect Ltd use social tools in their work i Integrated Logistics Support - including web-based conferencing, collaboration and chat that enables them to work easily across continents. Providers of tools and services such as PTC provide e-Collaboration capabilities in TechData, ones that include audit/traceability which is vital, for example, where you need to capture the reasoning around design change decisions.

Workforce mobility is supported via tablets and wearable devices like Google Glasses as they come available. Again, this gives flexibility and enhances productivity whilst ensuring that users reference and update 'one source' of data.

Cloud technology includes benefits of scalability and agility. Private cloud has the data fully under the enterprise's control and management which is a pre-requisite for many organisations in hosting TechData. However, vendors are offering a managed cloud Software as a Service (SaaS) in TechData which has significant appeal to Small to Medium Enterprises (SMEs), not least because it is relatively quick and easy to setup and manage without the need for in-house IT expertise.

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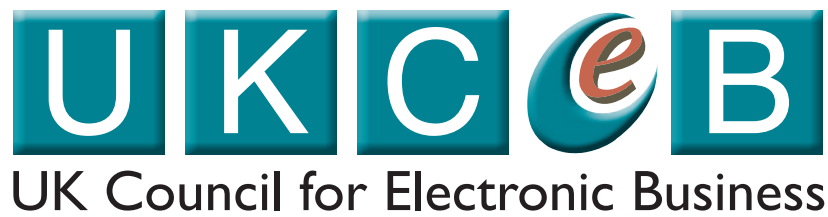
Information, as we all know, is growing exponentially. The trend for 'instrumented everything' and the Internet of Things, adds to the volume and frequency of data, much of it being real-time. Big Data or Enterprise Analytics tools and techniques are employed to uncover patterns that have predictive value and that may stimulate a search for causality. The 3 Vs of Information 'Volume, Velocity and Veracity' are the challenges managed within Big Data. For instance automated Health and Usage Monitoring Systems (HUMS) on equipments generate huge volumes of data that can be at real-time velocity. Whilst this data will be accurate, there are many systems (e.g. legacy and/or manual) where there are limitations on the veracity of the data. Cloud storage can help manage the volume.

In addition, greater use of meta data - or tags about the information being held - builds more 'intelligence' into systems - enabling users to 'slice and dice' in more varied ways to elicit answers to more sophisticated queries. Improved meta data about users - their profile of skills, certifications, specialist knowledge etc - can be valuable in finding the 'right people' in an organisation that match specified requirements.

The nexus of forces is about the "convergence and mutual reinforcement" of the above elements of social, mobility, cloud and information. In practice for instance, it enables a Mobile worker to access 'on the job' analyses of volumes of Information held on a Cloud and to share insights and collaborate on tasks using Enterprise Social Media.

This aligns with a trend in TechDocs: developing from discrete documents created for specific purposes, such as maintenance manuals, to a more integrated 'whole-life' Project Lifecycle Management (PLM) approach, summed up by PTC's Dave Hughes as "Re-use of the digital asset". The approach is one that seems to aim for a "360 degrees" perspective on assets, with the addition of time as the fourth dimension, tracking life-history changes and making use of identity markers such as bar codes and those with more intelligence such as RFID.

Ever greater demands of the Digital Revolution increase the need for robust Identity and Access Management. IdAM refers to an enabling capability that is vital to any work environment where the use of documents is tightly regulated, especially where information needs to be shared and worked upon collaboratively. The Identity part refers to ways of using electronic credentials that prove the identity of the person who can readily access information on a system, even when that system is hosted and managed by another trusted collaborating organisation. The Access Management part is concerned setting rules and permissions that cover aspects such as filtering which data is accessible, to whom, on what kind of a device (phone, tablet, laptop etc), sensitive to the device location, the time of day and anomalies in the pattern of enquiries, and imposing limits on what the user can do (e.g. view/edit/forward) with information. IdAM for Team Defence is an area of research and pragmatic activity within the UKCeB.

What of the expectation of users in the workplace, in particular Digital Natives? UKCeB coordinated a project during 2013 that brought together a dozen people working in different A&D organisations to gauge their views about working in A&D in 2020. They deliberately left security matters to one side. One element their study highlighted was the need for a commitment to training and trust to accommodate the challenges and to exploit the opportunities of 'digital disruption'.

An historical footnote - and where next?   In the early 1990s, the author was involved in creating a demonstrator of electronic paperwork for on-site maintenance on aircraft engines.   This software (an early 'app') ran on a rugged tablet and exchanged data with a host maintenance management system, allowing the engineer to view the job ticket; and, after completing the job, to upload associated data to update the database.   The 'app' included asset and maintenance history, digital images and CAD drawings as well as being a window on parts stock and availability, with a mechanism to order them.   It was clunky, rather expensive and somewhat slow compared to where we are now. There was little notion then of taking account of matters such as IdAM - nonetheless, it but pointed the way 20 years ago.

What can we expect and plan for in the future - including TechData? The Joint Information Group, via the UKCeB, supports joint MOD/Industry work on creating a User Requirements Document for Team Defence 2015 and beyond as well as helping align organisations as to their readiness for interoperable capabilities. Interesting trends identified here for the TechData community include the Project Lifecycle Management (PLM) approach with its perpetual re-use of the asset information as well as greater intelligence (and agency/autonomy) of assets leading to them generating data and automated interactions one with another and with host systems .

Your feedback is welcome, via this magazine and/or via UKCeB twitter @ukceb and the UKCeB Community on LinkedIn.

UK Council for Electronic Business

HOW UK MOD AND INDUSTRY WORK TOGETHER TO DEAL WITH TECHNICAL DOCUMENTATION ISSUES

Apologies for the long winded title but in reality this is what this brief article is about. Within the UK we have established joint working with the UK MOD under the umbrella of an organisation called the UKCEB. Its mission is to transform secure information sharing for through life collaboration in defence acquisition and support. Again another long winded statement meaning that it provides various forum to allow MOD and Industry to meet to discuss aspects of acquisition and support.

One of these groups is the **J**oint **T**echnical **D**ocumentation **W**orking **G**roup (JTDWG). The JTDWG provides a Community of Interest to support the MoD's strategy for technical documentation support solutions and the development of supporting pan-MoD Technical Documentation Policy and Advice and Guidance. The group provides a business focus on the strategic requirements to enable the delivery of coherent technical documentation solutions, supported by sub groups to focus on specific technical advice and research, specifications and standards. One of these sub groups is the UK group that deals with the S1000D specification.

The JTDWG meets quarterly face to face and via Webex monthly (to discuss S1000D changes). It is currently working to create more advice and guidance within the UKMOD and establish some "templates" for projects to use when contracting for technical documentation.

This work is important in the MOD changing landscape and for project teams that are struggling with how best to manage their technical documentation now and to do this in a manner that will meet future requirements for the wider MOD.
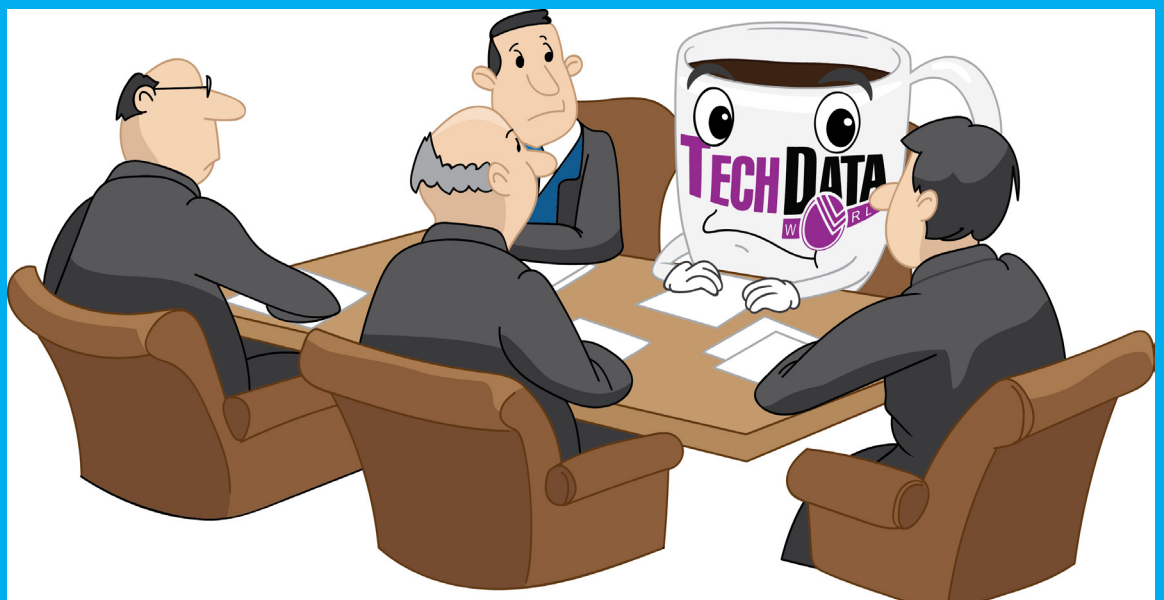
TO GET INVOLVED PLEASE CONTACT

MR M MILLAR

MIL: 9352 35395
CIV: +44 (0) 30 679 35395
DESIMOCSCP-TD@MOD.UK

MR T MALLOY

M: +44(0) 779 342 4648
T: +44 (0) 141 957 4394

THOMAS.MALLOY@BAESYSTEMS.COM

THE JTDWG MEETS QUARTERLY FACE-TO-FACE AND VIA WEBEX MONTHLY

THROUGH LIFE CYCLE INTEROPERABILITY

HOW THE UKCEB IS CO-ORDINATING THE UK TEAM DEFENCE'S SUPPORT TO THIS CRITICAL STRATEGIC LEVER FOR COMPETITIVENESS

STEVE SHEPHERD
CEO - UKCEB

'All players of the global aerospace value network will be able to share digital information securely throughout the life of the products and services' is a lot easier to say than to do but a drive for this through life-cycle interoperability of information is the vision of the European (ASD) Strategic Standardisation Group.

The Aerospace and Defence Industry is characterised by a small number of large prime contractors, a global marketplace, a large global supplier network shared among primes and other industries with an average supplier size of 20-50 employees, long product and service life cycles that far exceed the life of software, equipment and people, continuous innovation in products, processes and services for new capabilities and for regular technology upgrade programmes. In many cases this is also subject to rigorous certification requirements. The Industry has also seen the development of new service contract models that include electronic customer services, management of the in-service phase and feedback from service into the design phase. The business challenge from all of these imperatives across the complex lifecycle is the need to manage design, product and service information throughout the product lifecycle, including rigorous configuration management and the long term retention of information, where the data is 'created once and used many times'.

Moreover the A&D industry has to take into account the national security constraints, export control and intellectual property management related to digital information, in particular related to the supply chain.

Another challenge is to ensure the availability of interoperable IT services for the exchange and sharing of information. To face this challenge, the A&D Industries need a coherent standards based approach that allows the secure sharing of data and models, with partners and suppliers across a global support network, supported by collaborative efforts to ensure and validate the implementation of those standards by vendors.

Benefits - The benefits from a coherent standards based approach to address the business imperatives for through life interoperability apply to all players in the global value chain: prime contractors, collaborators, suppliers and customers. These benefits are delivered through significant reductions in cost and risk and from a faster route to market and to service delivery.

There are many elements to consider when assessing the value of these benefits. These include: increased accuracy of data that can be created once and used throughout the lifecycle, the ability to pass models and exchange information with confidence that all stakeholders use the same data, the ability to re-use models and data for technology enhancements, modifications and for new designs, the simplification of electronic trading where information about products, their condition, their location and quantity can be linked to user needs and to the payment process.

Additional cost and risk benefits also accrue from the ability to provide the right information to the right person at the right time to permit the best decisions to be made for design, supply and support.
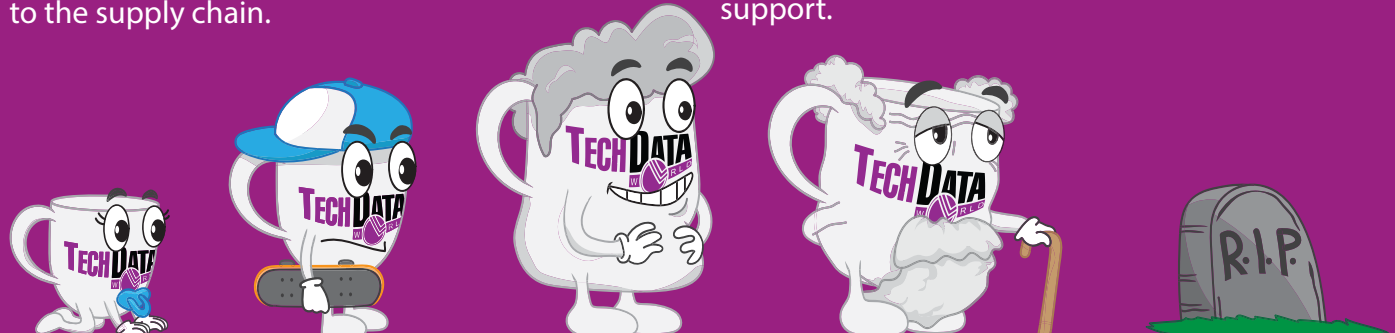
The ASD Strategic Standardisation Group's answer is to build the reference standard architecture needed to drive the Aerospace and Defence industry to successful interoperability, and to provide a sustainable framework for supporting and enhancing the deployment of the necessary standards-based solutions.

Once the proposed recommendations have been refined and shared with partners in the standardisation community (including standardisation associations, IT vendors, solution integrators, as well global trade associations from A&D and other sectors like automotive), the ASD SSG intends to collaborate with these partners and implement a set of actions as part of a global roadmap for convergence to the reference standard architecture.

UKCeB - UKCeB is a non-profit Membership Group funded by Industry membership that brings together MOD and Industry, from global ICT providers, to Tier 1 platform integrators that also embraces their supply chain with many bring Small to Medium Enterprises. UKCeB enjoys good working relationships with 'sister' associations, notably techUK and the ADS Group, who cover a much wider remit. A key differentiator is UKCeB's focus on finding common solutions to common key operational information issues such as secure information sharing across Team Defence and through-life.

UKCeB approach – In the UKCeB we are particularly focused on the explosion in the volume of data flowing through the life-cycle. As illustrated in FIG1, data and models are generated and exploited from early requirements identification up to product disposal.
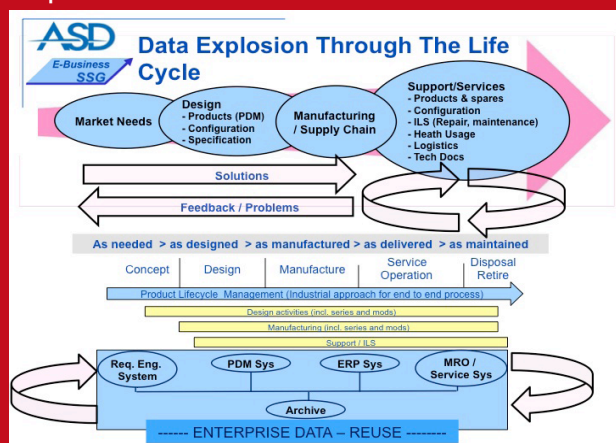

FIG 1

The complexity arises from the combination of the diversity of business activities, applications and data repositories used along the life-cycle, the need to co-ordinate and synchronise heterogeneous product views and from the sheer volume of data such as that required to enable business decisions to be made in support the services now offered as part of incentivised contracting models.

UK Team Defence's involvement in the drive for interoperability for services and support is co-ordinated by the UKCeB Joint Information Standards Co-ordination Group (JISCOT). This ensures that the UK MOD and Industry is correctly represented in European and Global Specification development and maintenance.

The coherent suite of Integrated Logistic Support Specifications (FIG 2) covers the full scope of ILS information sharing needs across the lifecycle and is making giant strides towards completion but it is recognised that it will be some time before they all mature to a consistent level and can be fully exploited.
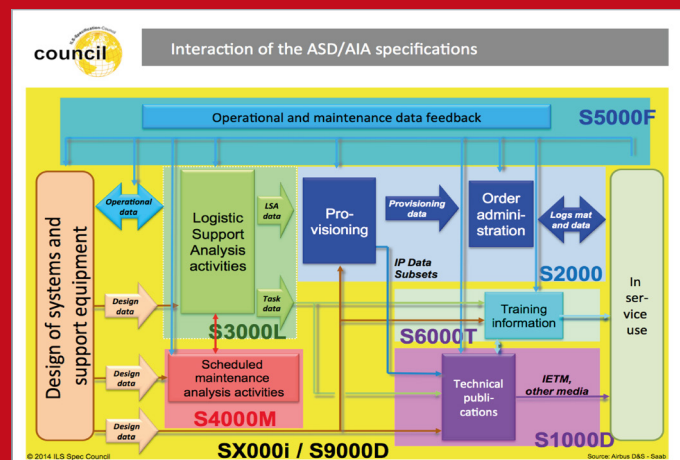

FIG 2

The UK supports the development and exploitation of all these specifications but particularly recognises the need for a common underpinning data model to enable secure information sharing.

To this end a new UK group (the UK Data Modelling and Exchange Working Group) is just being established. There is a lot more to do but the opportunities are enormous!

If you are interested in participating in this work please contact Steve Shepherd

steve.shepherd@ukceb.org

BRINGING IT ALL TOGETHER
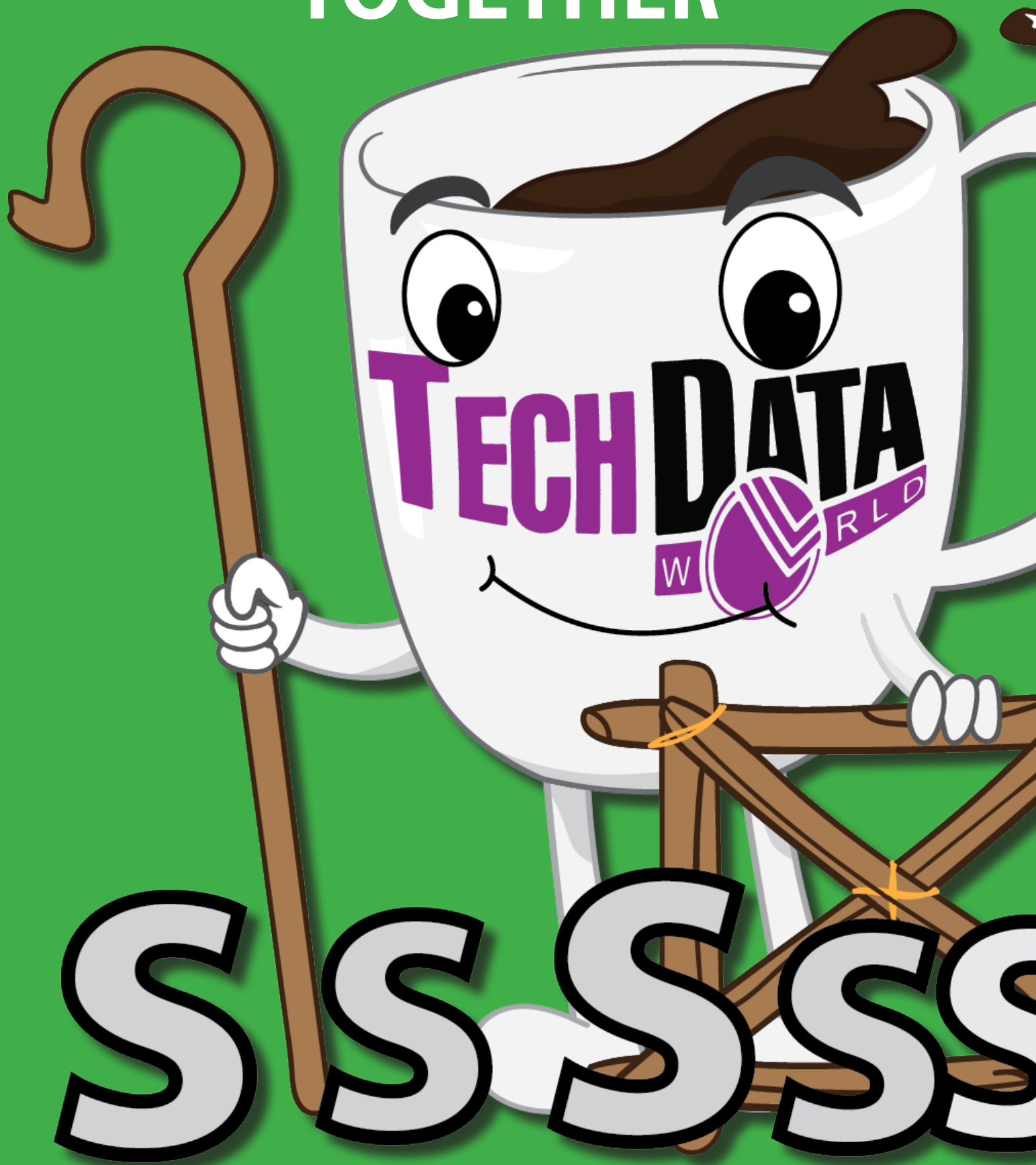
WITH THE S-SERIES SPECIFICATIONS
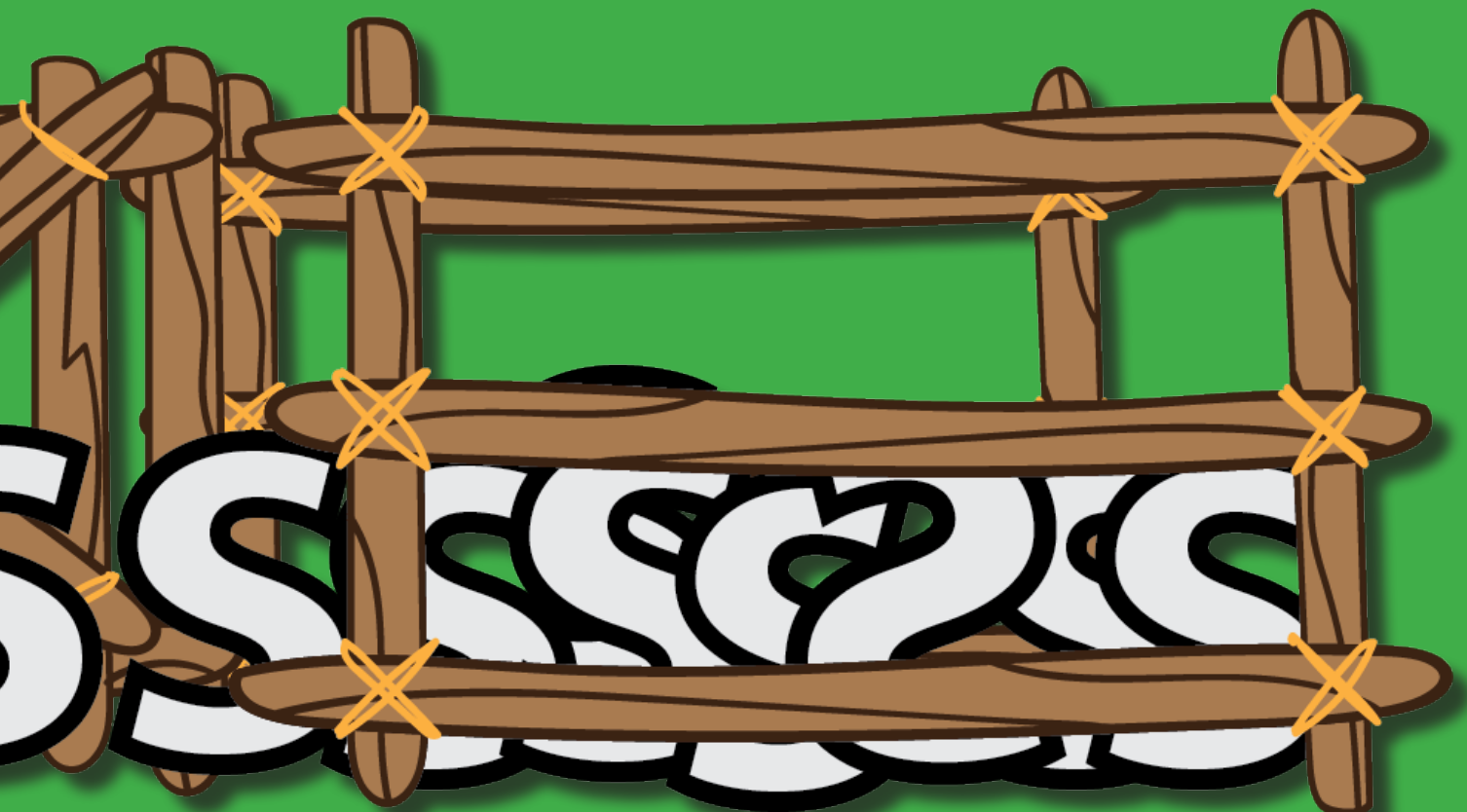
DR. MIKE DAY FBCS

I assume that most readers will be from a technical documentation background and that they are probably familiar to some degree with S1000D (the Specification for Technical Publications utilising a Common Source Database) which is one of the S-Series family. This article describes each of them at a high level and shows how they fit together to form a complete suite of Integrated Logistic Support (ILS) specifications.

The diagram in Figure 1, which shows the key ILS disciplines and how they relate, has existed in one form or another since the late 1980s. The important new developments are in operational and maintenance feedback and in an underlying data model that brings everything together.
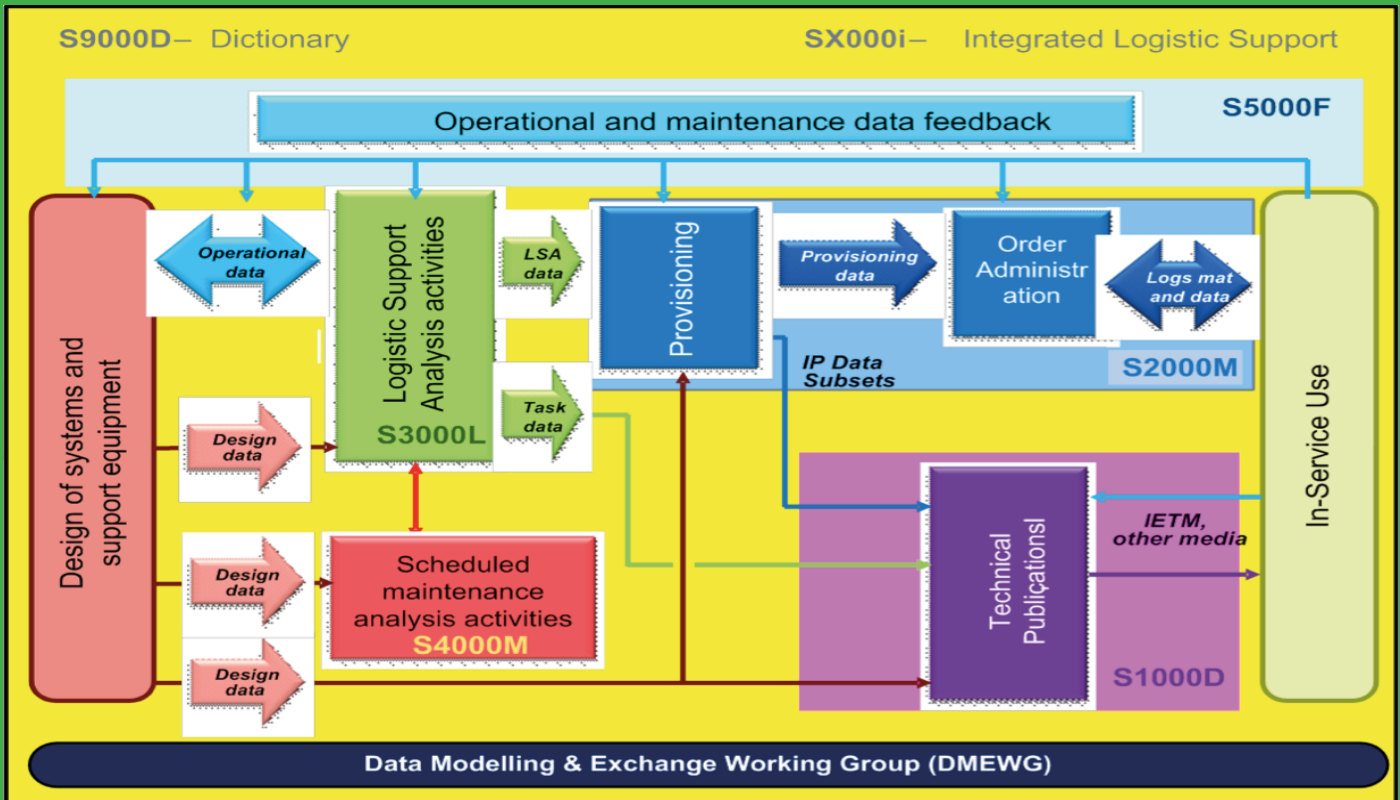

FIGURE 1 - S-SERIES SPECIFICATIONS INTEGRATION

WHO IS RESPONSIBLE FOR CREATING AND MAINTAINING THE S-SERIES?

The specifications are created and managed by the organisations that follow:

- The Aerospace And Defence Industries Association of Europe (ASD)
- The Aerospace Industries of America (AIA)
- Airlines for America (A4A), formerly ATA
- International MoDs and DoD

ASD and AIA are involved in the complete set of S-Series, whereas A4A is only concerned with S1000D (as they have their own specifications that cover the rest of the S-Series). The disadvantage of this is that an organisation that produces civil and military products will have to support two sets of specifications.

Each S-Series specification has a Steering Committee and Working Groups with their voting membership defined by one industry and one military representative from each member nation, while S1000D is bolstered by members from the A4A community. Active workers within the working groups include invited subject matter experts and workers from software vendor organisations.
UK industry members are selected from the UK Council for Electronic Business (UKCeB) community, and in some cases there are UKCeB groups established which provide input to the international specification through the nominated UK Ministry of Defence (UK MoD) and industry representatives.

THE ILS PROCESSES

The historic view of the ILS process is one which integrates in concert the logistic disciplines in order to deliver a hardware system that is more reliable, requires less support and costs less to develop and implement. It comes with a logistic model that provides information to support the product from conception to disposal. It does this by essentially applying life cycle engineering (LCE) and life cycle costing (LCC) principles, and it typically delivers information and the results of analyses for maintenance planning, supply support, support and test equipment, personnel requirements, training needs, the delivery of technical information and logistic needs for packaging, handling, storage and transportation.

The key ILS disciplines are:

- Logistic support analysis – covered by **S3000L**
- Initial provisioning and order administration – covered by **S2000M**
- Delivery of technical information (technical publications) – covered by **S1000D**
- Scheduled maintenance analysis covered by **S4000P**
- -Training and training needs analysis – to be covered by **S6000T**
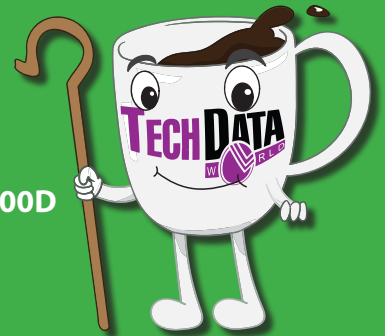
To support these disciplines it is essential that in-service data is gathered to provide input for analyses. This is provided by the new specification S5000F.

LOGISTIC SUPPORT ANALYSIS (LSA)

LSA is at the core of the ILS system and can be considered established and mature, as it has been a contracted deliverable for military applications for the US Department of Defense (US DoD) and European Ministries of Defence since the 1980s.

The format for those deliverables was a table dump from the relational database structure given by MIL-STD-1388 2B. Although cancelled by US DoD some time ago, it still is widely used to support many contracts, and the US DoD estimates that over 86% of its ILS data conforms to MIL-STD-1388-2B (source: US Army Materiel Command – Logistics Product Data Training, 42nd ETM conference, 2008). In 2007, Specification GEIA-STD-0007 was developed in the USA to fill the gap left by the cancelled military standard and essentially converted the relational model of 1388 into an XML structure.

ASD and AIA have developed the International Specification for Logistic Support Analysis – LSA (S3000L) as the international standard for the delivery of LSA data. While S3000L describes the traditional LSA processes, it took a big step forward in providing a Unified Modelling Language (UML) data model.

In summary, although the LSA processes are very well understood and established, the S3000L delivery format is relatively young. Its uptake has been hindered by both the lack of new military projects and the availability of support for S3000L within COTS software. However, it is anticipated that a major new project that is in the pipeline will be the first to use the complete suite of S-Series specifications.

INITIAL PROVISIONING AND ORDER ADMINISTRATION

The International Specification for Materiel Management – Integrated Data Processing (S2000M) covers the materiel management processes in support of land, sea and air military applications. It is widely used in Europe by the major large projects (for example Eurofighter Typhoon and A400M). For smaller projects, Chapter 5 of the specification provides S2000M 'light'. S2000M exchanges data using messages of which there are various types defined. One of these messages is the CSNIPD which is used to automatically create S1000D illustrated parts data.

The next release of S2000M will contain a UML data model and the exchange messages will be in the eXtensible Mark-up Language (XML) format.

DELIVERY OF TECHNICAL INFORMATION

I have used the term technical information rather than technical publications to reflect a growing change where publications are increasingly being delivered as information rather than page oriented deliverables in paper or electronic formats. Indeed, S1000D's Common Source Database (CSDB) is a query-able logistic database in its own right. When projects deliver HTML or PDF versions, all the knowledge that is stored in its content-specific mark-up is lost.

The reader will know that S1000D is now very well-established and is rapidly becoming the single worldwide specification for technical publications for land, sea and air for military and civil projects.

SCHEDULED MAINTENANCE ANALYSIS

S4000P is the International Specification for Developing and Continuously Improving Preventative Maintenance. It was recently renamed from S4000M and it is aligned to A4A's MSG-3. S4000P analyses provide a structured, traceable and complete determination of the preventative maintenance task requirements for a given product.

"THE HISTORIC VIEW OF THE ILS PROCESS IS ONE WHICH INTEGRATES IN CONCERT THE LOGISTIC DISCIPLINES IN ORDER TO DELIVER A HARDWARE SYSTEM THAT IS MORE RELIABLE, REQUIRES LESS SUPPORT AND COSTS LESS TO DEVELOP AND IMPLEMENT"
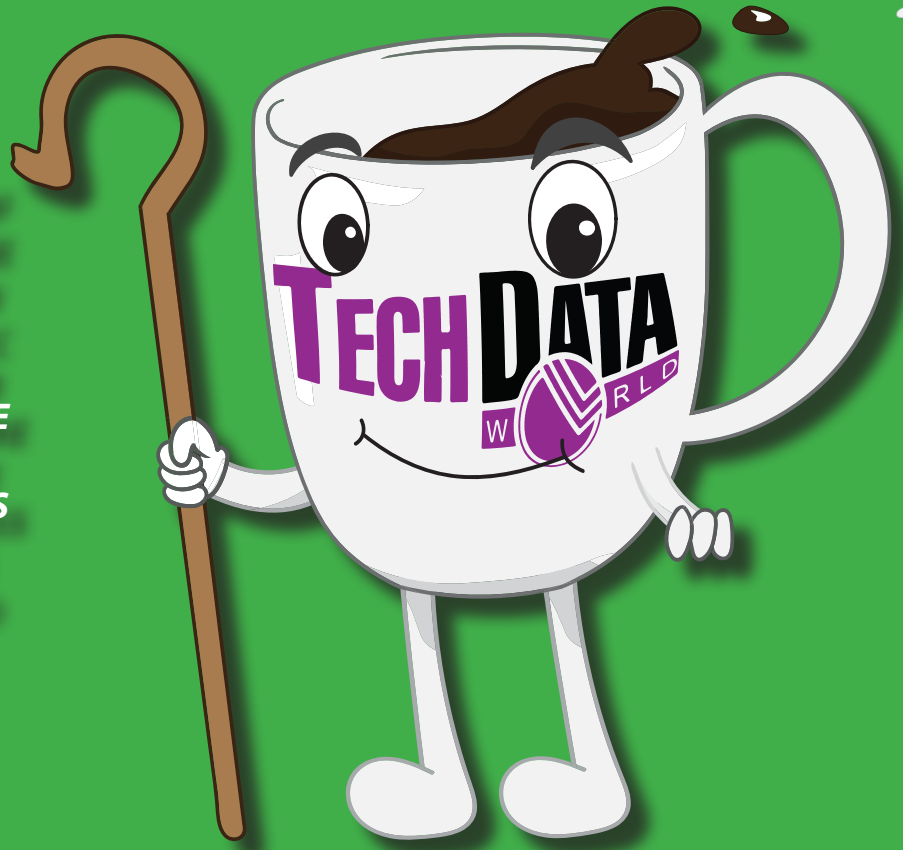
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OPERATIONAL AND MAINTENANCE DATA FEEDBACK

The launch of the International Specification for Operational and Maintenance Data Feedback (S5000F) represents a bold step for the S-Series as feedback is needed for a much wider domain than ILS. Feedback from in-service is used to improve engineering designs to create a more reliable product. This is shown in the infinity diagram which is reproduced by permission of PTC in Figure 2.
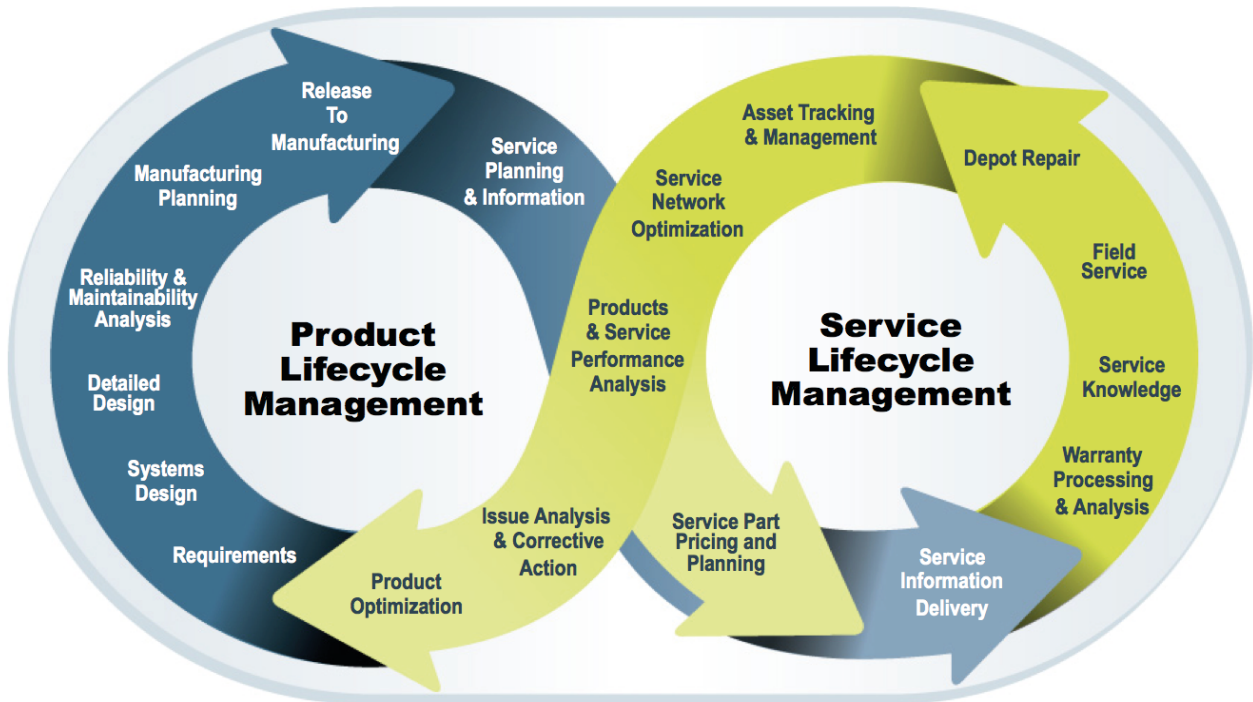

FIGURE 2 - THE FLOW OF INFORMATION FROM DESIGN INTO SERVICE AND BACK (SOURCE PTC)

Operational in-service data includes where the product and/or assembly has been geographically, what missions or flights it has undertaken, what it has been installed in, how it performed, what repairs have been applied to it, what life it has consumed etc. Standard formats are being defined in the new international specification for operational and maintenance data feedback (S5000F). Traditionally feedback provided from operators has been in proprietary forms. S5000F will standardise this by providing information in a data-model-driven XML format.

TRAINING AND TRAINING NEEDS ANALYSIS

The International specification for Training (S6000T), which is under development and not yet issued, will cover the requirements for training and the implementation of training needs analyses. The delivery of training packages is the responsibility of S1000D with its Sharable Content Object Reference Model (SCORM) learning data modules.

THE KEY TO IT ALL – THE COMMON AND SPECIFIC DATA MODULES

At the core of the S-Series is a Common Data Model (CDM) (see Figure 3) which is being developed by the Data Modelling and Exchange Working Group (DMEWG). The DMEWG draws resource and subject matter experts from each of the S-Series Steering Committees. The CDM is created in the Unified Modelling language and defines the classes, attributes and relationships brought together in diagrams (called Units of Functionality (UoF)) that apply to two or more of the S-Series specifications.

Each S-Series specification will have a Specific Data Model that will contain model elements that are only used by it. The Specific Models will reuse and specialise the model elements that they need from the common model. S1000D at the moment is the exception, as it is not yet clear if a data model is needed – most data is an input to S1000D and S1000D is not expected to provide source data to other S-Series specifications. S1000D has its own schemas for the delivery of its information.
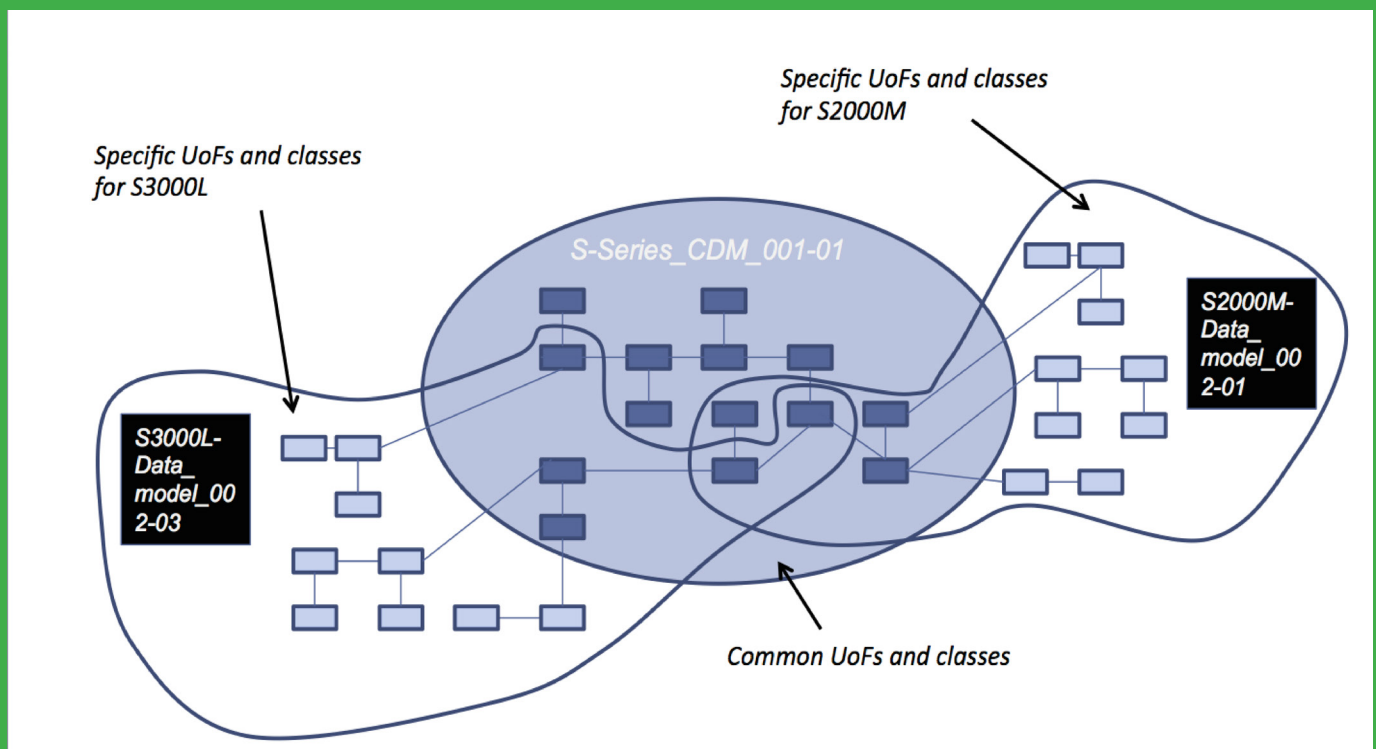

FIGURE 3 - THE COMMON AND SPECIFIC DATA MODELS (ONLY S3000L AND S2000M ARE SHOWN)

"EACH S-SERIES SPECIFICATION WILL HAVE A SPECIFIC DATA MODEL THAT WILL CONTAIN MODEL ELEMENTS THAT ARE ONLY USED BY IT."

DATA EXCHANGES (DEX)

The Common and Specific models are used as the basis for data exchange between the specifications in the form of Data Exchanges (DEX). If you imagine the process of selecting certain model elements that you need to exchange and using these to define an XML representation, you will have a good picture of how a DEX is defined.

There will be project-specific DEX and standard S-Series DEX where the latter will be the result of DMEWG and S-Series modeller's analysis of the data exchange needs to and from each of the S-Series. There are working groups being established within the S-Series communities to define the so-called 'X' specifications; for example, there is a team responsible for the definition of the input requirements for S1000D in a specification called S1000X.

S1000D primarily accepts input data from the other specifications. We can expect DEXs to cover:

- **S3000L to S1000D**: candidate items (BoM) and the task list from the LSA which is used to define the data module requirements, and source data from the LSA task descriptions to populate the text of a data module;

- **S2000M to S1000D**: CSNIPD DEX which automatically creates illustrated parts data modules;

- **S4000P to S1000D**: Scheduled maintenance data to define data module requirements and create data modules;

- **S6000T to S1000D**: Training needs data to create the SCORM training data modules;

- **S5000F to S1000D**: in-service data that provides the requirements (via design) to technical publications (for example Service Bulletins and Technical Variances);

- **S1000D to S2000M**: the illustrations to support the Initial Provisioning process.

While Figure 1 suggests a point-to-point data transfer between the different S-Series specifications, a more modern view of the model-based exchange approach is given in Figure 4, which shows how it can deliver a common language to transfer data between the different disciplines. It is accepted, of course, that the S-Series model would have to be adapted and extended to be able to be used in this way for any organisation (and the images of the specifications will be that organisation's core ILS data system(s)).
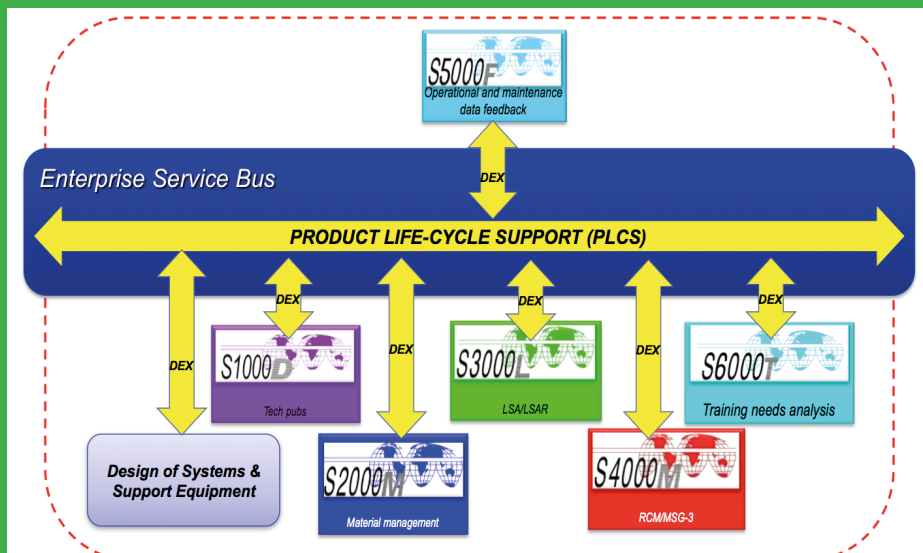

FIGURE 4 - USING THE S-SERIES DATA MODEL ON AN ENTERPRISE SERVICE BUS

TO USE PLCS OR TO USE BESPOKE SCHEMAS?

Figure 4 brings us to the question 'will Product Life Cycle Support be used to exchange information or as the basis of the ESB approach?'. The goal of S-Series is to implement DEX using ISO 10303 AP239 PLCS for exchange and in the long-term this has not changed. However, for various reasons, the DMEWG is developing an initial set of bespoke ASD/AIA schemas to perform exchanges. The advantage of this is that it allows smaller organisations that do not have a business case to develop a PLCS based solution to use the simpler ASD/AIA schemas. Larger organisations, if they so choose, can implement the PLCS solution and there will be full compatibility between both methods.

A FEW WORDS ON ANCILLARY AND SUPPORTING SPECIFICATIONS

In addition to the S-Series specifications discussed above and the X specifications, there are also supporting guidance and implementation documents in development whose numbers are being assigned at the time of writing. These include the ILS handbook (which provides guidance on how to implement all of the S-Series), documentation on the Common Data Model and the model itself, a UML implementation guide, and an S-Series data dictionary (S9000D).
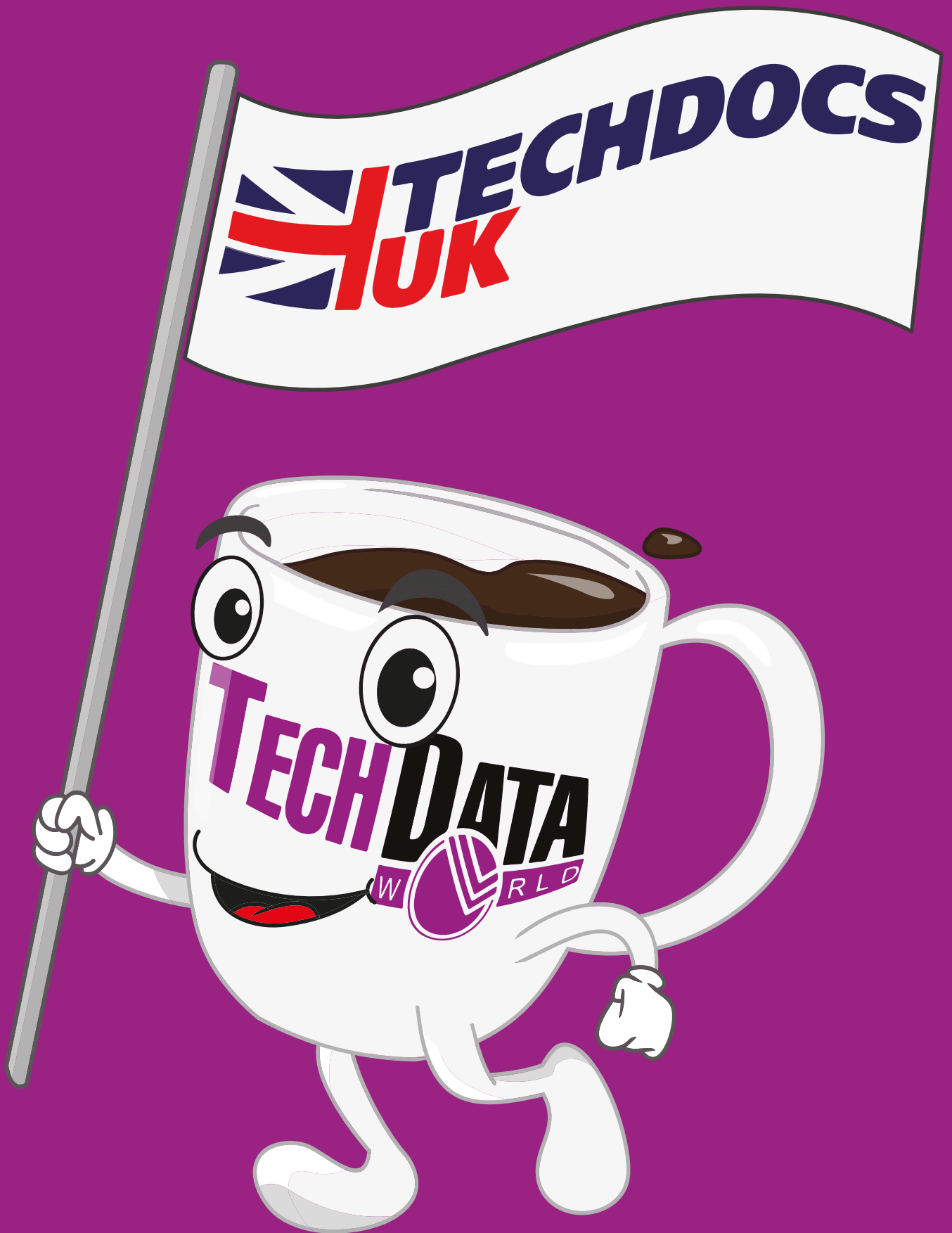
CONCLUSION – SO WHAT DOES THIS MEAN FOR YOUR PROJECT?

Of course, you can use any of the S-Series specifications in isolation, or indeed select only the ones you need; some projects will use different specifications for certain components. The advantage that you get by using the S-Series is that you have full integration of information between the disciplines, and there will be less bespoke point-to-point data exchanges between internal and external customers. I am sure that we will start to see COTS software that delivers a repository based on the S-Series data model, which will offer further standardisation across industry and customers. For me, one of the biggest benefits comes through the standardisation of in-service data feedback into the design process, which in turn will improve the technical data we deliver.

Mike has been active in the Integrated Logistic Support specification community since the early 1990s where he has provided a lead consultancy role for several major projects. In 1995 he became secretary of the AECMA S1000D Technical Publications Specification Maintenance Group, a position he retained during its transition into the S1000D Steering Committee and beyond until November 2010. During this time S1000D saw a transition from a defence aerospace only specification into the major specification for technical data for land, sea and air, civil and defence applications. In 2011 he became a member of the S-Series Data Modelling and Exchange Working Group (DMEWG) and will be the Chair of UK DMEWG which forms in November 2014. He holds a Ph.D. in the field of Natural Language Understanding and is a Fellow of the British Computer Society.
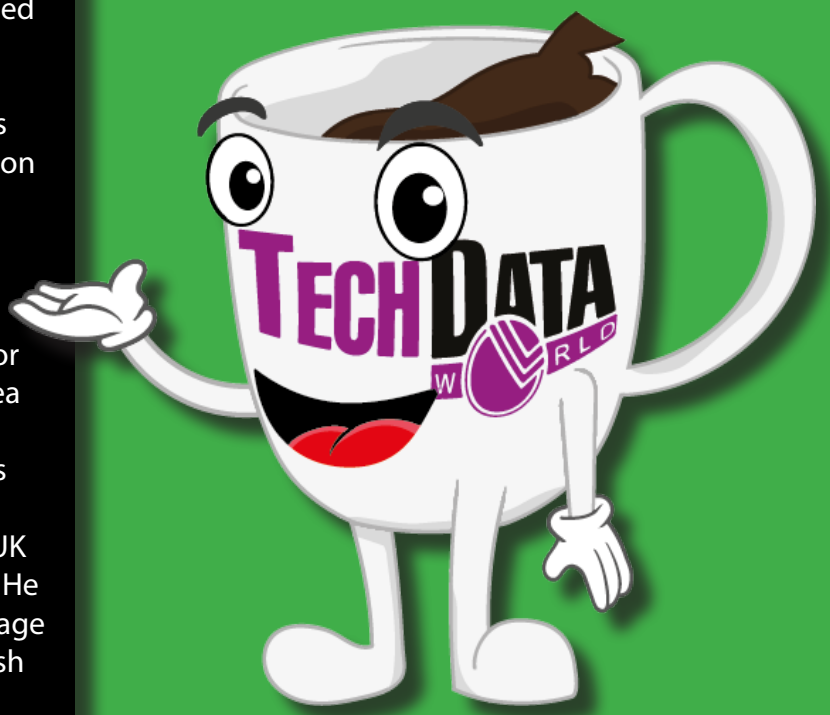
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