

THINKING ABOUT SUPPORT SOLUTIONS

INTRODUCTION

A common term for what it is that we ILS/IPS (or ILCS as we prefer) practitioners design, build and run is an optimized **support solution** for a product subset in use by a particular customer. But what is this thing we call a **support solution**? The term is widely used by practitioners and mentioned often in our standards and specifications, but often not defined. In this article, I offer some of my opinions and impressions of

- What our standards and specifications suggest it is
- What a support solution could be
- Some key concepts to help manage it across its life cycle
- New and evolving software enablers for support solution managers

I welcome your thoughts and inputs on this beast we are all trying to create, nurture and control... and describe!

About the Author – Pat Read has over 55 years experience in supporting equipment systems, both as a Canadian Army RCEME officer and as Pennant Canada's lead consultant. He has participated in international ILS/IPS standards committees (SAE and ISO:PLCS). He and his teams have modelled processes and developed policies/guidance for ILS/IPS and defence equipment management within the Canadian Department of National Defence. He recently retired from the role of Pennant Canada's Operations Manager and has now founded Team ILCS to continue to mentor and guide ILCS practitioners and managers.

NOTE: We will use the term **Integrated Life Cycle Support (ILCS)** in this article to represent more common ILS/IPS terminology and concepts. For more information on why we like the ILCS name/acronym, see <https://www.teamilcs.com/why-we-like-ilcs>

SUPPORT SOLUTION & ILCS FOUNDATIONAL DOCUMENTS

ILCS (ILS and IPS) serve as foundational frameworks in life cycle logistics and product support. They are governed by military standards, government guidance, industry specifications, and best practice manuals. Key references include US MIL-STD-1388-1A/2B, UK DEFSTAN 00-600 (and predecessor 00-60), the ASD S-series, SAE GEIA-STD-0007 & TA-STD-0017A, the ISO 10303 STEP-AP-239 PLCS, NATO ALP-10 ILS Guidance, and the US Warfighter Acquisition University (WAU, formerly DAU) IPS Guidebooks suite. These resources collectively address lifecycle support management, product/equipment support planning, and sustainment strategies, providing direction for creating, implementing, and managing support throughout the product lifecycle.

A systematic review of ILS and IPS documentation reveals that *support solution* is widely used but rarely defined within them. The table below summarizes our observations.

Agency	References	Support Solution Defined	Support Solution # Times Mentioned
SAE	SAE TASTD-0017A PSA	YES	33
ASD	S-Series Specifications https://www.s-series.org/	NO	3000L – 86 4000P – Nil 5000F – 2 6000T – 1 SX000i – 24 SX001G - 4
ISO	15288:2023 System Life Cycle Management	NO	Nil
SAE	SAE TA-STD-0017A Product Support Analysis	YES	0017A -
NATO	ALP-10 NATO Guidance for Integrated Lifecycle Support https://nso.nato.int/nso/nsdd/main/standards?search=ALP-10	ALP-10 - NO	AAP-10 EdDv1 – 47
US DoW	IPS Guidebook Suite (16 publications) Integrated Product Support Guidebook Suite www.waru.edu	NO	PSM Guide – 37 PBL Guide – 28 IPS Elements – 11 MIL-HNBK-502A – 2 CPC Guide – 1 PPP for PS – 1
MoD UK	Knowledge in Defence https://www.kid.mod.uk/maincontent/business/ils/index.htm (requires Defence Gateway account)	YES	Extensive use
DND Canada	A-LM-505-001/AG-001 ILS Guidance A-LM-505-001/AG-002 LSA Guidance Naval Materiel Supportability Engineering Manual (Draft)	ILS Guide – NO LSA Guide – NO NMSpEM - YES	ILS Guide – NO LSA Guide – NO NSpEM - Extensively

EXISTING DEFINITIONS

As can be seen, *support solution* – and optimizing/making it a cost-effective one – is a frequently used term across many references, with a few approved or draft definitions. These definitions include:

1. **SUPPORT SOLUTION:** *The integrated design and coherent support provided throughout the life cycle of a system that is realized in its integrated support system and the associated technical data. The support solution comprises the sum of the*

services, resources, and information required to effectively support the equipment throughout its in-service life. (SAE TASTD0017A)

2. *A Support Solution is the optimised design and provision of a series of interrelated pan-DLoD activities and resources required to sustain a capability through life, in accordance with extant MOD policy; to meet defined user requirements, for a defined period of time, in defined environments. (https://www.kid.mod.uk/maincontent/business/sse_21/content/sse_about.htm)*
3. *A support solution is the integrated design and realization of coherent support for a particular RCN equipment. The design of an equipment and its support is optimized to achieve affordable system readiness. The support solution is realized in a supportable equipment with its integrated support services and resources. The support solution matures by an iterative application of supportability engineering through the life cycle phases of an ILS program. (Draft DND NMSpEM)*

Where it is defined, **support solution** typically refers to **a comprehensive set of agreements, processes, resources, and activities** that sustain a product or system during its operational life. The WAU *Product Support Management Guidebook* describes a support solution as...

“...the package of product support arrangements, resources, and tasks—across all Integrated Product Support Elements—tailored to satisfy specific Warfighter outcomes and operational requirements.”

This suggests the term encompasses maintenance, supply chain, training, and technical documentation, configured/contracted for the unique needs of each program. The WAU guidebook further emphasizes that a support solution should be cost-effective, interoperable, flexible, and responsive to changing mission needs in-service.

UK ILS Guidance also uses it to define **Support Solution Maturity** gates throughout the life cycle and uses the concept of a **Support Solution Envelope** as an investment package descriptor.

OTHER USES

Other standards and references may offer contextual descriptions of *support solution* rather than explicit definitions, embedding the term within broader support planning discourse.

IMPLICATIONS FOR PRACTITIONERS

Practitioners may encounter differences in how *support solution* is used and defined across documentation. Consistency in terminology would improve stakeholder communication

and the alignment of support activities with strategic objectives. However, inconsistency or vague definitions can lead to confusion, especially in joint or international projects. It is recommended that practitioners reference authoritative standards and guidebooks—such as those from WAU—to clarify and communicate the specific meaning and scope of a *support solution* term for their context.

A POSSIBLE SUPPORT SOLUTION MODEL

As one of the contributors to the Canadian DND NMSpEM, I'd like to use some its concepts to offer up a deeper description of what a *support solution* could be, for debate and discussion, all to hopefully contribute to a wider and more common understanding of the term across the worldwide ILCS communities.

A lot of the content in this model was developed in the context of Canada embracing performance-based contracting for in-service support, building off the Australian Defence Organization's ASDEFCON (Support) ¹ and US DoD Performance Based Logistics ² approaches.



When we look at a *support solution* as it will exist during the lengthy in-service phase (decades of use and support of a set of products by/for a specific customer), we can see the customer-specific *support solution* composed of three main components:

¹ See <https://www.defence.gov.au/business-industry/procurement/contracting-templates/asdefcon-suite/support>

² See <https://www.dau.edu/tools/dod-performance-based-logistics-pbl-guidebook>

1. **Supportable Assets** (the subset of products operated as a fleet by the customer), delivering the required capability, desirably with the minimum support demand possible, sometimes referred to as **mission equipment**
2. A range of **Support Services** needed to sustain these assets in use by the owner/operator, provided by a mix of internal and external **support providers**
3. Several **Support Resources** required or produced by these support providers to enable delivery of the required support services by designated providers.

A *support solution* is founded upon a dynamic set of external contracts and internal support arrangements, with often 100s of different agencies within the customer defense department, industry and even allied forces) all contributing over the full life cycle.

SUPPORT SOLUTION COMPONENTS

Let's look a little deeper into these three components of a *support solution*.

Supportable Assets

Once designed and built, mission equipment has inherent supportability characteristics (such as reliability, maintainability and durability) that will affect its arising support demand during operation and support within the in-service life cycle stage. These supportability characteristics influence the design of the associated support system.

In pre-existing designs, the equipment selection brings with it the equipment's pre-defined support characteristics, which affect the resulting anticipated support demand in the specific-to-customer use and support. The more complex the equipment, the greater the need to identify and influence the characteristics that are inherent in the design to understand and reduce the support demand.

The *support solution* strives to create or select equipment that is not only capable of fulfilling the required operational functions, but which can be supported with minimal support demands. By including design-for-supportability criteria within the equipment design or selection criteria, the support demands of the equipment can be reduced and made more affordable.

Support Services

Support Services are required to keep equipment capable and ready throughout the in-service life cycle phase. There is a range of support services that may be delivered by industry or defense department support providers. These services may include:

- **Equipment Management Support Services** to manage the equipment and its overall *support solution*. These services are usually centred on the system acquisition and in-service management teams within defense departments, with support from industry. Equipment management services provide centralized support to the equipment fleet (such as delegation of roles, contract

management, parts replenishment, technical advice and reviews, etc). They should take an integrated view of the *support solution* and monitor its performance;

- **Engineering Support Services** to analyze system performance and to engineer changes to address problems and issues raised. These engineering services may address system engineering, design engineering, supportability engineering, software engineering, and configuration management activities.
- **Maintenance Support Services** to maintain and restore the equipment and other materiel items to be capable and ready to fulfill their functions.
- **Supply Support Services** to obtain, store and distribute materiel associated with the equipment
- **Training Support Services** to deliver necessary operator and technician training, and to maintain training packages and training aids.
- **Information Management Support Services** to hold, maintain, transform and share data related to the defense system. This includes master data defining the *support solution*. It also includes transaction data related to use of the equipment and to the conduct of its support.

Support Resources

Support resources are required to prepare for or execute the support services. These resources need to be identified, provided and maintained. The support resources can include:

- **Personnel** to provide both the capacity and necessary skillsets to perform the support services – within all support providers;
- **Technical Data and Publications** to define the equipment and its support, and to provide guidance to support providers;
- **Spare Parts** to replace components worn or damaged and rendered unserviceable to restore the equipment and other support items to being capable and ready;
- **Special Tools and Equipment** to enable the completion of maintenance;
- **Training Packages and Training Aids** to enable the delivery of training; and
- **Facilities and Infrastructure** (including information management infrastructure) needed to support equipment and the delivery of support services.

CREATING AND MANAGING A SUPPORT SOLUTION

So, with this understanding of what a customer-specific *support solution* needs to include, how is it created and managed across the solution's decades-long life cycle? At a high level, the *support solution* needs to be:

- **Structured in external contracts and internal arrangements** with an evolving set of often 100s of different agencies contributing to the support solution over the life cycle
- **Achieved in an ILCS program of work** executed by these providers across the life cycle
- **Enabled by Supportability Engineering (Product Support Analysis)** to inform decisions on and design of elements of the *support solution*
- **Delivered by often a mix of support providers** – which do change across the life cycle – that can include agencies within the customer (Defense Departments or similar users of complex equipment fleets); within supporting industry providers; and even within allied forces’ support organizations.
- **Based on well-defined divisions of responsibility** between each provider contributing to the solution

SOFTWARE ENABLERS FOR SUPPORT SOLUTION MANAGERS

For managers of *support solutions*, there can be a fundamental shift of the primary software enablers:

- **From LSAR** (Logistic Support Analysis Record) enablers, which are centred on the support characteristics of each configuration of each equipment
- **To MBPS (Model-Based Product Support)** enablers that model the overall *support solution*. These provide fleet-wide cumulative perspectives of how the equipment is being used and of the expected performance of the *support solution*
- **To ERP/MMS (Enterprise Resource Planning/Maintenance Management Systems)** enablers that use MPBS and LSAR expected values and master data to execute support transactions. More importantly, they provide feedback data on actual operation and support for the equipment fleet, which serves to identify variances from expected values and areas for *support solution* improvement.

A wide range of other software enablers will be used across numerous stakeholders within each *support solution* (and within interfaces to other system engineering/program management enablers).

CONCLUSION

Support solution is a key term/concept in ILS, IPS, and WAU product support management literature, which is widely used but not standardized across our communities of practice. Its definition and frequency of use vary as shown.

This paper is intended to provide my perceptions of what a *support solution* is and how it can be defined, described and explained. Feedback is expected and welcomed, and our discussion can help align the perceptions and use of this fundamental concept within ILS/IPS/ILCS communities worldwide.

REFERENCES

Primary references used to prepare this paper include:

- ISO 10303: Industrial automation systems and integration—Product data representation and exchange STEP239 Product Life Cycle Support
- ASD/AIA S-Series Specifications
- SAE TA-STD-0017A Product Support Analysis
- NATO Allied Logistics Publication (ALP) 10 NATO Guidance for Integrated Lifecycle Support
- WAU Product Support Management Guidebook Set
- Pennant/DND work on ILS Guidance
- MIL-STD-1388-1A: Logistics Support Analysis
- MIL-STD-1388-2B: : Logistics Support Analysis Record
- DEF STAN 00-600: Integrated Logistic Support Requirements for MOD Projects
- SAE GEIA-STD-0007: Logistics Product Data