

Tactical Data Link Common Core Curriculum Improving Coalition Interoperability

Tactical Data Link (TDL) Interoperability; without it, we are combat ineffective. Aircraft with inoperable Link 16 systems are grounded, ships and ground units that clutter or otherwise confuse the tactical picture are immediately removed from the interface. Resolving TDL related problems and getting back into the game is a platform imperative. Why, because if you are not a player in the link, you are not a player in the war. The inability to accurately report platform location and sensor-based information infers that the unit cannot contribute to the Common Tactical Picture and is a potential candidate for a blue-on-blue engagement.

Training operators to different standards may have an operational impact.

TDL interoperability is the focus of dozens of committees, working groups, meetings, documents, software, and hardware. Tens of millions of dollars, pounds, and euros are invested by countries with the goal of achieving interoperability. Unfortunately, no matter how much time, effort, or money we throw at the problem, the problem will always exist. As long as nations develop systems based on different interpretations or levels of message standard implementation, coalition interoperability will have an operational impact. At the end of the day, the system that is delivered must be employed in a manner that mitigates the interoperability issues, making the operator the most critical piece of the interoperability puzzle. If the operators from different nations are trained to different levels using different standards, how can we be confident that the Multi-TDL Network (MTN) will be well planned, well executed, and that it satisfies mission essential Information Exchange Requirements (IER)?

Training to a Common Standard

Consider the following; there are more than 30 MIDS Nations at varying stages of acquisition, development, integration, and operation. There are thousands of MIDS Terminals, countless platform types, and a myriad of personnel (pilots, operators, planners, maintenance crews, etc.) that require training. Now consider the daunting task of developing training programs that can satisfy the wide and disparate requirements of each. It seems unlikely that any country or organization could develop an effective training standard that would be agreeable to all. The development of an effective common training standard entails the **determination of mutual training requirements and completely disregarding the differences.**

Developing training materials that only address common requirements allows the training to be focused.

Common Core Curriculum Explained

The term Common Core Curriculum (C³) describes a process of analysis performed on a Community of Interest (COI), the results of which are used to define a set of Core Learning Objectives that apply to the entire COI. **By defining COI commonalities, training materials can be developed that are suitable to a wider audience.** By removing the unique requirements of different COI members, no time is wasted teaching information that is of no use to other COI members.

Moreover, this allows COI members with unique training requirements to acquire focused training to meet their needs. In essence, COI members with unique requirements are merely a smaller COI upon which the C³ process may be applied.

JTIDS / MIDS Network Designers require a multitude of complex and technical skills, all of which can be mapped to a common set of references (Network Design COI). Performing the Network Design task requires specialized software (e.g. Joint Network Design Aide (JNDA), Tactical Network Design Station (TNDS), etc.). Training Network Designers how to use these tools would be a system specific COI within the Network Design COI.

Communities of Interest

“A COI consists of collaborative groups of users who must have a shared vocabulary to exchange information in pursuit of their shared goals, interests, missions, or business processes. This group includes end users, program managers, application developers, subject matter experts . . .”¹ If we extrapolate this definition into a TDL training paradigm, the definition might read; A Tactical Data Link Community of Interest is a group of individuals engaged in the use of a common Tactical Data Link (e.g. Link 16) in pursuit of a common mission, goal, or task (e.g. Network Design). This commonality requires a shared vocabulary in order to develop a mutual understanding of the technology, tactics, techniques, and procedures required to satisfy mission essential IERs.

Multi-TDL Network Planning, JTIDS / MIDS Network Design, and Operational Network Management are examples of a TDL COI.

Common Core Curriculum Users

Numerous organizations around the world have embraced the concept of a Common Core Curriculum. The three most notable users of the Common Core Curriculum are EUROCONTROL, EU Border Guards, and the U.S. Public School System.

EUROCONTROL

The single European Sky legislation of 2004 noted that the airspace over Europe was one of the world’s largest and most congested air traffic control environments. Realizing that the patchwork of national ATC licensing and training schemes across Europe required harmonization in order to ensure safety; an Air Traffic Controllers C³ was adopted. A C³ program was developed for the training of Air Traffic Controllers, Electronics Maintenance, and Safety personnel in order to ensure that cross-border coordination could be conducted in a reliable and safe manner.²

¹ U.S. Department of Defense, “Data Sharing in a Net-Centric Department of Defense”, Dec. 2004.

² Commission of the European Communities, “Directive of European Parliament on Community Air Traffic Controller License”, 2004.

EU Border Guards

Recognizing that the principles of integrated border management are the same throughout the EU, a C³ for EU Border Guards was developed with the support of more than 40 experts from 21 countries. Training border guards based on a C³ ensures that high-quality measurable standards are used by all EU members.³

U.S. Public School System

The public school systems in 49 U.S. States and territories have adopted a C³ for their students in Kindergarten through 12th grade.⁴ The C³ for Mathematics and English Language Arts was created by a voluntary partnership of 48 states with the goal of raising the educational bar for U.S. students. The Thomas B. Fordham Institute released a 370-page study that finds the C³ was clearly superior to the existing English standards of 37 states and the existing math standards of 39 states.⁵

Training Needs Analysis

Training can be described as the development of knowledge and/or skills that result in improved performance. A Training Needs Analysis (TNA) looks at each identifiable aspect of an organization, job, or task so that the required knowledge, skills, or attitudes may be specified and the appropriate training developed.⁶

Common Core Curriculum Development

The development of a C³ requires a comprehensive TNA for every identifiable component that the C³ will support. For a TDL C³, course developers perform a TNA for each link (e.g. Link 16). Each link is then broken down into core competencies. Core competencies can best be defined as a specific and unique skill-set required for the performance of critical tasks (e.g. JTIDS / MIDS Network Design). A TNA is performed on each core competency in order to identify the enabling competencies that represent the basic skills required to effectively perform the core competency (e.g. Network Design C³ contains 127 enabling competencies). Finally, since skill acquisition cannot occur without knowledge, the course developer must identify the required learning objectives for each enabling competency.

C³ development requires a TNA be performed for each identifiable job, task, or skill (e.g. Network Designer).

³ "Common Training Standards for the EU Border Guard Services", News Releases, 2008, Frontex, 12 May. 2011, http://www.frontex.europa.eu/newsroom/news_releases/art33.html.

⁴ "Forty-Nine States and Territories Join Common Core Standards Initiative", News, 2009, Common Core Standards Initiative, 25 May 2011, www.corestandards.org/news.

⁵ Finn and Petrilli, "The Common Core Curriculum", *National Review Online*, July 2010, 12 May. 2011.

⁶ Training Needs Analysis, "Training Needs Analysis", 23 March 2011, Wikipedia, 22 May. 2011, http://en.wikipedia.org/wiki/Training_needs_analysis.

TDL Common Core Curriculum Development Obstacles

Creating training courses that follow C³ development principles ensures that **students know what they are required to learn and instructors know what they are required to teach**. The underlying principles of C³ development are relatively straightforward. The primary obstacle to their development is not their complexity; it is profit and motivation. The reality is that the TDL Training market is relatively small and very niche. While there are several companies that develop and deliver varying levels of TDL training, training is normally designed to either meet specific contractual requirements (e.g. training that supports the installation of a specific system), or as a business development enterprise used to highlight specific products or services. **Course development is frequently more about what is best for the company than what is best for the student**. Lacking a contractual mandate to develop training to a specific standard requires the course developer to absorb significant development costs and the associated risk.

Profit and motivation are the primary obstacles to the development of a TDL C³.

Capabilities-based training acquisition delivers knowledge while minimizing costs.

Paradigm Shift for TDL Training Acquisition

Looking for TDL Training? What is the most effective process to find and acquire the required training? With the exception of emergent training requirements, organizations with recurring TDL Training requirements will usually know the available training resources and the available courses. Students need only select the course title from a list and request the training. What could be easier? But how do we know that the training that is required will actually be delivered? Typically, when a course is purchased, it is the title and a short course description that is used to determine if the course will meet the training requirement. This is no different than acquiring a system based on the contents of a company brochure. This “Buying the Box” mentality used to apply to the system acquisition process. In the past when military forces had a requirement (e.g. Link 16 Beyond Line-of-Sight capability), they might look to see if a system exists that meets all or most of the requirements (e.g. Joint Range Extension (JRE) Gateway). Workaround’s are then developed to accommodate any requirements that are not satisfied. This process is both viable and effective when a requirement must be satisfied quickly or within certain budget restrictions. In the long-term; however, this process ends up being less efficient and more expensive. Instead of “Box-Based Solutions”, the U.S. Department of Defense (DoD) has shifted to “Capabilities-Based Acquisition”. Capabilities-based acquisition is a new way of doing business that has significantly affected how DoD defines requirements and acquisition processes, enabling decision-makers to invest limited resources in the most efficient way possible. The Navy’s Mission Capability Packages is an example of how this concept is affecting current acquisition efforts. Ultimately, the focus of capabilities-based acquisition is to deliver the right capability whilst minimizing costs.⁷

⁷ Charles and Turner, “Capabilities based acquisition...from theory to reality”, CHIPS, Summer, 2004, 13 May. 2011, http://findarticles.com/p/articles/mi_m00BA/is_3_22/ai_n6338494.

The acquisition of training products and services should be acquired with a mindset similar to that of system acquisition. At the end of the day, the requirements are very similar; **deliver the right capability at the best possible price.** Instead of purchasing courses based on a brief course description, organizations should look behind the curtain, reviewing learning objectives, the Instructional System Design (ISD) process, as well as the pedagogical strategies and techniques (e.g. active learning, cooperative learning, hands-on training, etc.). Better yet, organizations with recurring training requirement should create a Training Requirements Specification (TRS) which documents the knowledge and skills that must be delivered, and the standard to which the objectives must be met. The TRS is then submitted to potential training providers. If the training does not currently exist, it can be created. **The training should be molded to fit the requirements of the customer, not the other way around.**

Tactical Data Link Common Core Curriculum – Development

The purpose of a TDL C³ is to ensure that operators from different nations can interoperate at an identifiable level. It has been argued, with some credibility, that you will never get nations to agree on a common training standard, and no nation will allow another nation to dictate the standard to which they must train. It cannot be argued that there are no global commonalities within the world of TDLs (e.g. Link 16). The fact that TDLs are developed and implemented in accordance with internationally agreed standards means that training materials developed directly from these references will be applicable to everyone. By defining a common global training requirement, training materials can be developed that are deliverable to a much wider audience than ever before. If every network planner, designer, and manager receives training developed from common training standard (not necessarily by the same training provider), their ability to interoperate will be improved. **Improving the training development and acquisition paradigm means that everyone in the training development, acquisition, and delivery loop will be better served.** The course developer can create materials that are applicable to a much wider audience. The purchasing agent can source materials developed to the standard from a list of known providers that follow C³ development principles. The students will know what they are expected to learn and the instructors will know what they are expected to teach. All of which should increase the standard of training while increasing competition and driving down cost.

The TDL C³ ensures that coalition operators can interoperate at an identifiable level

A TDL C³ will improve quality, increase competition, and reduce costs.

Tactical Data Link Common Core Curriculum – Justification

In his keynote address at the 2010 International Data Link Symposium, Brigadier General Brundidge (U.S. EUCOM J6) challenged the International Data Link Society to identify the top ten issues that would face the Data Link Community in the future.⁸ In December of the same year; the IDLSoc published the IDLSoc List of Top 10 Data Link Issues. Not surprisingly, training was at the top of the list. The list noted “There is an absence of certified and validated training from basic to TAC/OP level agreed by the major Data Links nations and organizations”.⁹

During the 14th NATO Tactical Data Link Symposium (NTDLS), the IDLSoc Chairman (Mr. Roy Johansson) held a workshop to discuss the List of Top 10 Data Link Issues. The aim of the workshop was to identify 3-5 major issues from the list and to make realistic proposals as to possible solutions. The recommendation presented by the IDLSoc Chairman was to “Define a minimum common standard of training (i.e. minimum knowledge/skill level) for each DL and each identifiable skill set (e.g. network design)). By identifying specific global commonalities that can be addressed in formalized training courses, and training to that standard, international interoperability will be improved amongst services and nations that implement this standard”.¹⁰

TDL training is the number one issue facing the TDL community for the future.

As the keynote speaker at the 14th NTDLS, Major Michael Barker (Supreme Headquarters Allied Powers Europe (SHAPE)) noted that there is a requirement for standardized TDL training within NATO, and that TDL training is one of the three biggest challenges for nations that are acquiring a TDL capability.¹¹

Clearly there is an impetus for greater access to high-quality TDL training with a commonality that supports international interoperability. The problem is not the desire from the operational community. The problem is who will develop the standard, how do we attain international consensus, and the biggest obstacle, who will pay for it?

NATO Interface Control Officer Program

The NATO Interface Control Officer (NICO) Program is a **rigorous four-week hands-on operator certification program** designed to train operators how to plan, design, and manage Link 16 and Multi-TDL Networks that support coalition operations. The program, which embodies the principles of C³ development, is **100% reference-based**, and satisfies **hundreds of learning objectives** which are validated through intensive testing and practical evaluations.¹²

⁸ U.S. European Commands, “Achieving ONE Network...ONE Team. A EUCOM/J6 Perspective”, Brundidge, 8 Sep. 2010.

⁹ International Data Link Society, “International Data Link Society List of Top 10 Data Link Issues”, Dec. 2010.

¹⁰ NATO Tactical Data Link Symposium, “Debrief from Workshop A”, Johansson, 2 Apr. 2011.

¹¹ NATO Tactical Data Link Symposium, “Interoperability from a NATO / SHAPE Perspective”, Barker, 30 Mar. 2011.

¹² NATO Tactical Data Link Symposium, “Improved Interoperability through Common Training Standards”, Pierson, 30 Mar. 2011.

As of April 2011, the NICO Program has nearly 100 graduates from 11 nations and organizations.

The programs cornerstone development principle is; if personnel from Link 16 / Multi-TDL capable nations are trained to a common standard, interoperability will be increased. The program was developed to support the unique requirements of Data Link Management Centre's (DLMC) and Joint Interface Control Officer (JICO) Cell's, with a core competency focus of Link 16 / Multi-TDL Network Planning, JTIDS / MIDS Network Design, JTIDS / MIDS Frequency Management, OPTASK Link, and Operational Network (OPNET) Management.¹³ The NICO Program has received international recognition, graduating students from 11 NATO nations / organizations and has received a Q-Rating from the United Kingdom.

The success and recognition of the NICO Program is largely due to the clear and concise learning objectives that support attainment of specific competencies (skills). The NICO Program was designed using the tenets listed in figure 1.¹⁴

Goal: NICO Program training materials shall be designed to be essential, rigorous, clear and specific, coherent, and internationally benchmarked.

Essertial: NICO Program learning objectives shall be reasonable in scope while defining the knowledge and skills students must attain in order to be able to immediately perform DLMC related tasks.

Rigorous: NICO Program learning objectives shall include high-level cognitive demands by asking students to demcnstrate deep conceptual understanding through the application of knowledge and skills to variable situations. High-level cognitive demands include reasoning, justification, synthesis, analysis, and problem-solving.

Clearand Specific: NICO Program learning objectives shall provide sufficient guidance and clarity so that they are teachable, learnable, and measurable. Quality standards will be precise and will provide sufficient detail in order to convey the level of performance expected without being overly prescriptive.

Teachable and Learnable: The NICO Program standard shall provide sufficient guidance for the design of curricula and instructional materials. The program shall be reasonable in scope, instructionally manageable, and promote dept of understanding. The program shall not prescribe pedagogical methodology. The program shall instead encourage instructor innovation in the delivery of the materials.

Measureable: Knowledge and skills attainment will be observable and verifiable.

Coherent: The standards will support progressive learning that is meaningful and appropriate.

Internationally Benchmarked: The NICO training standard shall use continuous engagement with DLMCs and other international TDL organizations in order to ensure that the program embodies the highest know standards of performance and the most effective / efficient methods of delivery.

Figure-1

Summary

Clearly, there is a need for greater access to higher quality TDL training. The statements from military and industry leaders demonstrate that the status quo is inadequate to meet both current and future needs. The question is not whether or not training is available? The question should be; what is the quality of the training, what learning objectives are satisfied, and what Instructional System Design process was used to create the training materials? One important consideration that is often overlooked is what are the motives of the delivery organization?

The potential benefits of a TDL C³ are clear, but who will pay for their development?

¹³ "NICO Program Description", Network Centric Solutions, 25 May. 2011, www.network-centric.com/NICO.

¹⁴ Adapted from "Common Core State Standards Initiative Standards-Setting Criteria", Sep. 2009, anon, 25 May. 2011, www.corestandards.org/assets/Criteria.pdf.

Attending a training course developed by a company that offers products and services related to the training might not be the best option. Instead of focusing on knowledge development, the training may instead be focused on business development. Attending a training course developed to satisfy a C³ developed in conjunction with a comprehensive COI TNA, whose goal is to teach COI commonalities, verified through rigorous testing and/or practical evaluations is more likely to deliver the quantifiable skills required by the COI.

If we assume that there is at least a tacit mandate for a TDL C³, and if we further assume that a TDL C³ will improve coalition interoperability, the one remaining question is how can an internationally agreed upon TDL C³ be developed and who will pay for it? Having attended countless conferences, meeting, and workshops to discuss training, it seems clear that waiting for an explicit mandate may indeed be a fruitless endeavor. Can it be argued that absent an internationally agreed upon TDL training standard as a guide for program development, an independently developed training program created using the tenets of TDL C³, can improve coalition TDL interoperability? The NICO program is the only internationally recognized TDL training program other than the U.S. Joint Interface Control Officer (JICO) program. Neither was created using an internationally agreed standard; however, both were developed with an underlying goal of improving interoperability and operator knowledge. In just two years, the NICO Program has graduated nearly 100 graduates from 11 nations and/or NATO organizations, with 6 nations in the process of acquiring the training. Further, the program's commitment to continuously engaging DLMCs, NICO graduates, and their chains-of-command ensures that the materials are current, relevant, and of a quality demanded by the operational community.

About the Author

Patrick Pierson is a retired USN Joint Interface Control Officer and the Managing Director of NCS; a Tactical Data Link (TDL) training and software development company. Patrick has developed more than 50 TDL training courses which are delivered to nearly 1000 students annually. For more information about NCS, go to www.network-centric.com, or email director@network-centric.com.

NCS is the world's leading provider of TDL training with more than 50 TDL Training Courses.
