



Enhancing the **Science and Technology Manager** Career Field

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The Science and Technology Manager (STM) career field has come into its own in recent years. This fiscal year alone, two of the three required STM courses are new—and one of them is now the first-ever distance learning (DL) course in the field. A Jan. 2, 2013, memo from Assistant Secretary of Defense for Acquisition Katharina McFarland renamed the “Systems Planning, Research, Development and Engineering (SPRDE) Science and Technology Manager” career field as the “Science and Technology Manager” career field. And other major changes have occurred in the STM career field since an article by Dr. Marty Falk and Randy

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A team prepares a presentation as part of an exercise.

Photos by Erica Kobren, Defense Acquisition University



Zittel was published in the May-June 2009 edition of *Defense AT&L* magazine (see “Revamping the Science and Technology Management Career Field” at <http://www.dau.mil/publications/DefenseATL/DATLArchivecompletepdf/may-jun09.pdf>, pp. 64-67). There also have been changes in the Defense Acquisition Workforce Improvement Act (DAWIA) STM certification requirements—including curriculum revisions and knowledge sharing (now known as Workflow Learning) assets. In addition, a set of Acquisition Workforce Qualification Initiative (AWQI) standards focused on STM has been published for the workforce to continue its development beyond DAWIA certification.

STM DAWIA Certification Requirements

Like other DAWIA career fields, the STM career field has three certification levels, each composed of education, experience and training requirements. The criteria for attaining each certification level are managed by the STM Functional Integrated Product Team (FIPT), chaired by the Principal Director, Research Directorate, Office of the Assistant Secretary of Defense for Research and Engineering. However, each Component’s Defense Acquisition Career Manager (DACM) actually determines if the workforce member has met the criteria for certification. These certification criteria can be found on the Defense Acquisition University (DAU) iCatalog (<http://icatalog.dau.mil/>) page under the “Certification Standards” button. The education requirements are the same for all three DAWIA STM certification levels. The workforce member must have a “baccalaureate or graduate degree in a technical or scientific field such as, but not limited to, engineering, physics, chemistry, biology, psychology, mathematics, operations research, engineering management, or computer science.”

Each STM certification level also requires a certain amount of “technical experience related to science and technology management.” The amount of experience is 1, 2 and 4 years, respectively, for Levels I, II and III. Each DACM determines if the applicant’s experience is sufficient for the certification level.

The largest change in DAWIA STM certification in recent years is in the training requirements, with two of the three required STM courses new for Fiscal Year (FY) 2016. The new Level I course is the STM career field’s first-ever DL course known as STM 101, Introduction to Science and Technology Management. This 4-hour course replaces continuous learning module CLE 045 of the same name. According to its course description, STM 101 “is an introduction to the various technology management processes involved with developing and transitioning new technologies. It provides an overview of the role of science and technology in the systems acquisition life cycle. The course focuses on the processes, techniques, policies and best practices that will be employed to ensure we are investing in appropriate technologies and that those technologies are refined and matured to be ready for use in a timely fashion to provide our warfighters with the technological edge needed to accomplish their mission.”

The other new STM course, STM 304 (Leadership in Science and Technology Management), is required for Level III. This 3.5-day classroom course replaces STM 303, Advanced Science and Technology Management. Its development was led by a tenured professor from Georgetown University under contract through the Systems Engineering Research Center. The course description states, “Designed for senior DoD [Department of Defense] science and technology managers, STM 304 focuses on the application of leadership skills within DoD science and technology organizations. It emphasizes the principles of strategic planning, technology roadmap development and technology portfolio development prioritization and evaluation. The course challenges students to think critically in instructor-facilitated exercises to make sound recommendations on which technologies to pursue consistent with organizational core functions, customer requirements and technology opportunities.”



Left: A Technology Development Strategy (TDS) briefing. Center: A Technology Transition Agreement briefing. Right: TDS is briefed by another team.

One exercise asks teams to, within a given scenario, create a technology development roadmap. There are two other exercises in which the teams, given a portfolio of technology projects, must evaluate and prioritize them based on a set of objectives. In the capstone exercise, the teams are given three large technology portfolios for which they must develop a strategy for evaluating the projects in each portfolio and then recommend which projects to continue funding, given an overall 20 percent reduction in funding.

The Level II STM classroom course also underwent a makeover that was more cosmetic than a revision. The STM 303 course was made the Level II course and renamed STM 203, Intermediate Science and Technology Management. It replaced STM 202 of the same name but is 3.5 days long, 1 day longer than STM 202. The course's three threaded exercises remain intact. Student teams take a series of technology development projects through project initiation, project execution and project transition. Teams select among competing projects with the goal of transitioning technologies to a program of record. The fourth exercise now has students conduct a mock conference panel based on technology challenges they wrote about in their pre-course papers. The course "provides Science and Technology professionals with an understanding of the procedures and mechanisms that can be used to develop and transition new technologies into the DoD's warfighting systems. It provides students with the opportunity to apply critical skills in areas such as technology evaluation, budgeting, schedule management, contracting strategies, transition agreements, risk/opportunity management, intellectual property, and technology verification."

In addition to changes for the three primary STM training courses, two new required continuous learning modules

(CLMs) have been added to the two existing required CLMs, CLE 021

(Technology Readiness Assessments, for Level II) and CLM 014 (IPT Management and Leadership, for Level III). CLE 068 (Intellectual Property and Data Rights) is a 5-hour CLM required for STM Level I since FY 2013. "This module provides fundamental information about intellectual property and the effective management of rights in technical data and computer software and their contribution to programmatic success. The module addresses concepts and legal guidance related to intellectual property, focusing on the rights in technical data and computer software that are the concerns of the Government and of our defense contractors." The other new CLM, CLE 069 (Technology Transfer), takes about 3.5 hours to complete and was required for Level III, starting in FY 2015. "This continuous learning module enables students to apply the principles of technology transfer to the technologies they are developing with the end goal of increasing the rate of technology transfer."

Besides the STM-focused training, workforce members are still required to take a few courses in other functional areas to become STM-certified. For Level I, members must complete the 25-hour DL course ACQ 101 (Fundamentals of Systems Acquisition Management) and the 35-hour DL course ENG 101 (Fundamentals of Systems Engineering). For Level II, members must complete the 35-hour DL course ACQ 202 (Intermediate Systems Acquisition, Part A). STM Level III contains Unique Position Training Standards for Science and Technology Managers with primary management responsibilities for Budget Activity (BA) 3 projects such as, but not limited to, Advanced Technology Demonstrations, Joint Capability Technology Demonstrations, and Future Naval Capabilities Programs. People in these types of positions may be required to take up to four other Program Management courses and up to four other CLMs identified in the STM Level III career field certification standards.

The STM FIPT also has developed a list of courses to supplement required DAWIA STM training. These CLM, DL, and/or classroom courses are listed under the Core Plus Development Guide section of each certification level. Some of these courses are closely related to the STM and Engineering functional areas while others are from functional areas in which a Science and Technology Manager may most closely interact, such as Program Management, Test and Evaluation, and Business, Cost Estimating, and Financial Management. The workforce member and his or her supervisor should consider these Core Plus courses when preparing the member's annual Individual Development Plan (IDP).

STM Workflow Learning Assets

To support STM workforce members outside the training environment, DAU has developed some Web-based Workflow Learning assets. These include the STM Functional Gateway, managed by the DAU STM Foundational Learning Director, the STM Community of Practice (CoP) on DAU's Acquisition Community Connection (ACC) site, and several STM-related articles on the DAU ACQuipedia site.

The STM Functional Gateway (<https://dap.dau.mil/career/stm/Pages/Default.aspx>) is where workforce members can access more than just DAWIA certification requirements and course descriptions. They also can ask a professor a question that will be routed to a DAU STM faculty member. The professor has 72 business hours to post a response. The STM

methodologies section contains information about various types of business arrangements that the STM profession may use to conduct research with other government agencies, universities and industry, including contracts, grants, cooperative agreements, other transaction authorities, and technology investment agreements. A Science and Technology Manager recommended reading list and some STM-related reports can be found in the publications section of the site. Another section called "Articles & Other Items of Interest" includes articles and presentations that provide a wealth of knowledge from STM professionals across the community. The site also has a section with links to sites about various technology transition and technology transfer programs within the DoD. There also is a section for best practices, lessons learned and tools that STM professionals should find handy. Finally, there is a section containing links to the various DoD agencies that conduct scientific research and technology development, a section on STM-related training, and a "Q&A" forum that allows individuals to ask questions and receive replies from DAU faculty or other workforce members.

Someone who wants to participate in the STM CoP by contributing articles, presentations or other information first needs to register his or her Common Access Card to obtain an ACC account. This is done via the "Request an Account" link in the top left of the ACC home page (<https://acc.dau.mil/CommunityBrowser.aspx>). After obtaining an ACC account, the individual can then register to become a member of the STM



Membership not only allows an individual to contribute to the CoP but also keeps the member informed of changes to the CoP via links e-mailed to the member when something is added to or moved within it.

Functional Gateway also contains a link to the DAU Mission Assistance page that provides information about requesting acquisition workshops, consulting services, team training, and one-on-one leadership development for program executive officers and program managers. On the right side of the STM Functional Gateway are links to STM-related policies, regulations, guidance and law, plus the ACC STM CoP and STM-related ACQuipedia articles.

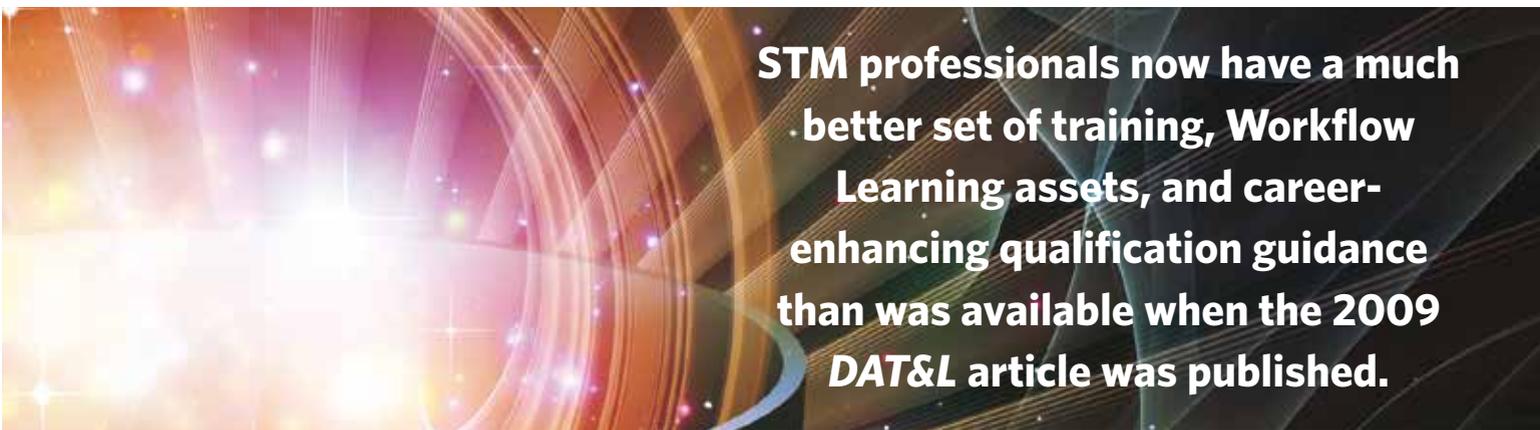
The ACC STM CoP (<https://acc.dau.mil/CommunityBrowser.aspx?id=17988&lang=en-US>) contains a vast array of information for STM professionals. There are links to DoD and Service-level directives, instructions and guidance. The contracting

CoP by logging into the ACC site, selecting the STM CoP, then selecting that page's "Become a Member" link in the top left corner. Membership not only allows an individual to contribute to the CoP but also keeps the member informed of changes to the CoP via links e-mailed to the member when something is added to or moved within it.

In addition to the STM CoP Workflow Learning asset, there are several STM-related articles posted on the DAU ACQuipedia site (<https://dap.dau.mil/acquipedia/Pages/Default.aspx>). This site, which mimics the popular *Wikipedia*, includes more than 350 articles about various acquisition topics that annually are certified as current. Two ACQuipedia articles of particular

relation to STM professionals are “Technology Readiness Assessment (TRA)” and “Independent Research and Development (IR&D).” The TRA article was created in 2005 but has been updated numerous times over the years, including the

book accessed from the eWorkbook menu at the top of the page. An *AWQI eWorkbook User Guide*, also available at the site, explains how to use it. The STM competencies, competency elements, outcomes (products) and



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TRA Guidance published in 2011 and requirement to discuss technology maturity in section 10 of the Capability Development Document from the 2015 *Joint Capabilities Integration and Development System Manual*. The IR&D article was created in 2013 in response to changes in industry IR&D reporting requirements that went into effect in January 2012. Besides describing what IR&D is and the industry reporting requirements, the article provides a link to the Defense Innovation Marketplace site that serves as the one-stop shop for both industry and DoD IR&D-related matters. Users can recommend changes to each of the articles by clicking the “Suggest Change” link by each article section heading. If there is a topic of interest that is not covered in the ACQuipedia, users can request that an article be written by selecting the “Suggest an ACQuipedia Article” button in the bottom left of the ACQuipedia home page.

AWQI STM Qualification Guide

Under the auspices of the Assistant Secretary of Defense for Acquisition and in support of Better Buying Power, selected members of the DAU faculty in 2013 began working with subject-matter experts in the acquisition community to develop qualification standards for workforce members in all acquisition career fields under the Acquisition Workforce Qualification Initiative (AWQI). These qualification standards trace to the acquisition competencies established by the acquisition functional leaders. Each functional area’s competencies, including those for the STM career field, were translated into measurable on-the-job products (also called outcomes) and the corresponding tasks (referred to as standards) that were required to produce those outcomes. In 2015, these competencies, outcomes and standards were compiled into a tool called the *AWQI eWorkbook*.

Qualification standards for the STM career field can be obtained from the AWQI site (www.dau.mil/awqi) by downloading the Microsoft Excel-based *AWQI eWork-*

book accessed from the eWorkbook menu at the bottom of the eWorkbook Excel file. There are seven STM competencies divided into 52 competency elements with 68 total outcomes. The seven STM competency focus areas are: core communications skills, audience-focused communications, technical contributions, scientific and technical contributions, strategic planning, portfolio development and technology program management. STM workforce members should use these standards to enhance their professional development by incorporating related training and developmental opportunities into their annual Individual Development Plans.

The AWQI standards provide a structured way for STM professionals to continue to grow, improve acquisition outcomes and help prepare them for lateral or higher positions after obtaining their DAWIA certification level required for their coded position. Science and technology organizations also can use the standards to mitigate skill gaps by leveraging developmental opportunities or targeting strategic hiring, according to the AWQI site.

Conclusion

As described in this article, STM professionals now have a much better set of training, Workflow Learning assets, and career-enhancing qualification guidance than was available when the 2009 *DAT&L* article was published. Members of the STM career field are encouraged to take advantage of these assets to better themselves sooner rather than later, as 18 percent of the 3,600-strong career field is eligible to retire as of FY 2015, 20 percent within 5 years, and 33 percent within 10 years. Learn all you can from the veterans (get a mentor if you can), get your required DAWIA training, participate in the ACC STM CoP, and use the AWQI STM qualification standards to guide your career growth. 

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