

## **The Implementation of a Competency Based Assessment System for Applicants for a Restrictive Licence for Cadastral Surveying**

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**Key words:** competency assessment, professional standards, restrictive licence

### **SUMMARY**

The Surveyors Board of Queensland has the responsibility for assessing the standards and regulating cadastral surveyors within the state. Recent legislative changes have required the Board to implement a competency based assessment scheme. This paper summarises the legislative framework and the theory of competency based assessment. It goes on to describe the development of competency standards for surveyors and the implementation of an assessment scheme. The move to a competency based assessment system was a substantial task undertaken by the Board and the paper discusses some useful lessons that may be learnt by other jurisdictions considering a similar move.

# The Implementation of a Competency Based Assessment System for Applicants for a Restrictive Licence for Cadastral Surveying

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## 1. HISTORICAL PERSPECTIVE

In Australia and New Zealand a restrictive licence for some types of surveys exists primarily as a protection for the public. For example a surveyor engaged to do a cadastral survey needs to balance the interests of their client, adjoining owners as well as the state. These last two groups are not party to the transaction for the surveying service so the mere application of the principle of *caveat emptor* is not sufficient. For other types of surveys that only involve a surveyor-client relationship the client is often not able to assess the worth of the service being offered as it requires knowledge of specialised technical material. In both these cases the interests of the public are served by having a public register of people who are suitably qualified to deliver the service.

Soon after Queensland separated from NSW in 1859 the *Real Property Act 1861* was created which required surveyors to be licensed to undertake cadastral surveys. A licensed surveyor had to hold a Certificate of Competency which was issued by the Surveyor General of Queensland. Subsequently the *Crown Land Alienation Act 1876* introduced a training period of two years during which the cadet surveyor underwent examinations, conducted surveys and drew field notes and plans of surveys. Over time these requirements were amended and added to, notably when the *Land Surveyors Act 1908* constituted the Surveyors Board, and resulted in the Article System for the registration of Licensed Surveyors that ran until 1964. The end of the article system meant that to become a licensed surveyor the student had to complete an undergraduate course in surveying. Then after a minimum of 18 months practical experience and the completion of prescribed projects the student could sit for practical and oral examinations. Later the system of registration was extended, resulting in categories that allowed for the registration of predominately technical staff (Surveying Associates), entry level surveyors (Surveying Graduates), surveyors with other specialisations (Mining Endorsement, Engineering Endorsement and Hydrographic Endorsement). Moreover the registration is not limited to natural persons with the legislation allowing for registration of corporations in some circumstances.

## 2. CURRENT LEGISLATIVE ENVIRONMENT

During the mid 1990s the Surveyors Board removed the requirement to perform the prescribed technical projects and replaced it with a system of Professional Training Agreements: that is, a two year period of structured training performed under a supervising Cadastral Surveyor and completion of a final Professional Assessment Project (PAP).

The proclamation of the *Surveyors Act 2003* modified the functions of the Board and the registration process. Amongst other things it obliged the Board to establish a competency framework for qualifying persons for registration and endorsement as well as allowing it to accredit entities for assessing the competency of persons under the competency frameworks.

With respect to the process of initial registration of surveyors there were three main changes implemented in the 2003 Act. Firstly the basis for registration was changed from the reliance on academic qualifications of the *Surveyors Act 1977* (s37 – 38A) to a dependence on assessing competency. This recognises that qualifications by themselves cannot adequately test an applicant's ability to operate as a professional surveyor ("Surveyors Bill Explanatory Notes," 2003). The 1977 Act recognised this partially by requiring that prior to registration a surveyor gain

*over a period of 2 years practical experience in surveying sufficient to satisfy the board of the person's capacity to maintain a high level of performance in all aspects (ethical, administrative and technical) of the practice of surveying;*

(s37 (1)(b)(i)(B)"Surveyors Act (Qld)," 1977).

Under the 1977 Act the Board accredited the surveying degrees offered by Queensland universities and then accepted that the successful completion of the course was in part sufficient evidence for initial registration. The 2003 Act recognises that other organisations or individuals have the ability to assess whether a person satisfies the competency framework. Furthermore, as there is more than one way to attain competency there are also multiple ways in which it can be adequately assessed. The 2003 Act recognises that each person or organisation (an entity) may develop its own assessment method (s43).

Finally, the 2003 Act explicitly splits the roles of competency assessment and registration. Sections 36 and 38 state that an individual or corporation is eligible for registration if they have been assessed as having the relevant competency within the previous year. Later in s43 it states that either the Board or an accredited entity may assess competency. People who are registered in another jurisdiction that has a law that provides for competency assessment (eg other Australian States, Territories and New Zealand) are deemed to have that competency on the basis of their registration ("Surveyors Bill Explanatory Notes," 2003).

### 3. COMPETENCY ASSESSMENT

Competency in this context means a set of attributes, such as knowledge, values, skills and attitudes (Gonczi, 1999). There is a subtle distinction between someone who is *competent* and someone who has *competency*. A competent person has the ability to do a job whereas competency looks at other factors which affect whether the job is carried out effectively, efficiently and economically (Rutherford, 1996). It is acknowledged that professional competency has four components (Kennie & Green, 2001):

- Knowledge competence - the possession of appropriate technical knowledge
- Cognitive competence - the ability to solve technical problems using high level thinking
- Business competence - the ability to understand the wider business context within which the candidate is practising
- Ethical/Personal Behavioural competence - the possession of appropriate personal and professional values and behaviours and the ability to make sound judgements when confronted with ethical dilemmas.

A person who has competency understands the task within a context, is aware of their responsibilities to other groups and can apply skills and knowledge to new situations. Thus the assessment of competency should not focus solely on the appraisal of technical skills. The skills and knowledge that a person can bring to bear on a situation will change with time, so not only will competency be obtained but it will need to be maintained.

Competency-based assessment determines a person's current abilities against a given set of competencies or standards by matching evidence to those standards (Rutherford, 1995). In form this is no different from the traditional qualification based assessment where the course would set out learning objectives, evidence of achievement would be sought through assignments and examinations and this evidence would then be matched to the initial learning objectives. Where it differs is that the assessment is independent of the learning process rather than an integral part, the evidence is collected primarily from workplace performance rather than examinations and assignments, and it is not pre-determined by the course syllabus (Fletcher, 2000). This decoupling of instruction and assessment is one of the primary features of competency based assessment. In effect it says that how a person obtained the knowledge, values, skills and attitudes or how long it took them is irrelevant: what is important is that they can prove that they have them (Rutherford, 1996). However by unfettering the assessment process to allow for variety in when, how and by whom it is done it becomes necessary to create an assessment system that assures that the assessment is performed consistently, fairly and validly (Toop et al., 1994).

As the realm of acceptable evidence is widened it is important to have measures of the quality of evidence. Quality evidence must be authentic, valid, current and sufficient (Fletcher, 2000; Toop et al., 1994). Authentic evidence is that which is related directly to the person who is being assessed. The assessor needs to be satisfied that the person presenting the evidence did in fact produce the evidence individually, or if they were part of a team must be sure of which

sections of the evidence was their work. Valid evidence is that which is directly related to the competency that is being assessed. Current evidence is that which is related to the particular point in time the assessment is being made. The assessor needs to be satisfied that the person presenting the evidence would be capable or reproducing that evidence now if it was required. Sufficient evidence is that which is related to the quantity of the evidence. The assessor needs to be satisfied that there is enough evidence to be confident that this represents the typical performance of the person being assessed as well as that all the competencies have been demonstrated. The evidence links the person's current abilities to the standards and the standards reflect the required abilities for the role that needs to be fulfilled. It is understood that the provision of evidence like all assessment procedures will involve an element of compromise.

Competency standards provide guidance to the assessor and the candidate on three key aspects of competency: what needs to be achieved, how well it needs to be done and under what conditions or in what context (Fletcher, 2000) as well as giving a guide to acceptable evidence (Rutherford, 1996). The Competency Standards need to represent the industry or organisation as a whole rather than merely the perceived need of a small part (Rutherford, 1995) and as an assessor's own knowledge of an area influences standard setting for competency tests (Chang et al., 1996) it is preferable to have a heterogeneous group charged with setting the standards. The standards themselves can be developed in many ways through interviewing, survey and group techniques (Rutherford, 1995). Perhaps the most common way is to use functional analysis. Firstly the key reasons why society needs the role to be fulfilled are identified. The next step is to identify what tasks someone must do to satisfy these needs. Next these tasks are broken down into the crucial activities that are required to execute them and finally performance criteria that indicate that the activity has been executed successfully are identified. During this process care must be taken not to extend to the level of describing trivial activities (Gonczi, 1999; Hager et al., 1994) or to introduce an excessive degree of subjectivity.

The key defining characteristics of a competency-based assessment scheme are that the scheme assesses more than just technical skills, separates the training and education function from the assessment function, and assesses against an explicit set of standards using primarily workplace-sourced evidence of flexible form.

## **4. SYSTEM DEVELOPMENT**

### **4.1 Initial Framework Development**

The Surveyors Board invited the bodies that represented areas of surveying practice to nominate participants who along with two sitting Board members, and an independent chair formed what was to become the Competency Frameworks Working Group (CFWG). The CFWG-delivered Board competency framework consists of nine documents, one for each level of registration or endorsement and an overview document. Each framework document is divided into a number of Units of Competency (Units) which are major segments of the

overall competency, typically representing a major function or task of surveyors. Each unit is further subdivided into Elements of Competency (Elements) which are observable functions or activities. Each element has an indicative list of actions that may be necessary to perform if the element is to be successfully completed. These are the Performance Criteria (Descriptors). The framework was adopted and published in October 2005 (Campbell, 2006).

The most telling feature of the initial framework was the omission of a requirement to hold a tertiary degree in surveying. The CFWG maintained that though tertiary study is the typical method for attaining surveying knowledge it is possible for people to obtain a similar level of knowledge by other means. It may take longer and require more personal initiative, but the skills, knowledge and experience that a person has was the critical issue for registration rather than how they obtained them (Campbell, 2006).

## 4.2 Initial Assessment Regime

The initial assessment regime required an applicant to produce a portfolio of evidence based on their past experience that had been authenticated by a surveyor registered in Queensland. After the assessment of that evidence the applicant was required to undergo an interview of 1-2 hours duration with the assessor in which the evidence was further discussed.

## 4.3 The 2007 Changes

The framework and preferred assessment regime provided to the Board was further examined and trialled in 2006. This initial assessment identified some potential risks associated with the proposed system. For example the process the CFWG adopted considered the framework and its assessment separately. The question of assessment was handled globally rather than being addressed at a unit and element level and as a result the applicant's ability to provide objective evidence for any given element was never assessed. Furthermore some substantial omissions were identified, such as a lack of an element that referred to competence in cadastral reinstatement for the cadastral endorsement, that showed that the framework was deficient. Finally the CFWG gave guidelines as to what it saw as an acceptable assessment process but it did not take this to an operational level. It was a concept for an assessment process rather than the process itself. As a result the Board instigated a review of assessment regime in general and the competency framework in particular.

The primary amendment was the alteration of the majority of the descriptors from the affective domain to the behavioural and cognitive domains. In short this meant requiring the applicant to provide evidence that they can apply knowledge or understanding rather than merely assert that they 'understood' or 'knew' what was required. For example, rather than *recognise and understand potential risks and liabilities* applicants are asked to *identify and manage potential risks and liabilities*. Other changes were made to the original documents to correct elements whose definition was imprecise and areas where the existing framework was too specialised. For instance, an element entitled "Establish Primary Geodetic Control Datums" was deleted. While this is an activity that surveyors have done in the past it is clearly

unreasonable to ask every graduate to demonstrate that they have done this at some stage in their career.

The review used the curricula of the two established tertiary surveying courses as a guide in identifying the omissions in the framework. It was reasoned that the Board through its accreditation of the two Queensland surveying courses had had a *de facto* competency framework for graduate registration that accepted that the universities have established expertise in assessment. Furthermore they have trusted that the scope and depth of the courses cover what is required for a competent surveyor.

The most contentious part of the review was the inclusion of a tertiary education requirement in the competency framework. Some members of the CFWG had maintained that the Parliament had intended a literature definition of competency, that is knowledge, values, skills and attitudes, be used in the competency framework. This assertion overlooked that the *Surveyors Act 2003* specifically defines competency as the “*qualifications, skills, knowledge and experience*” for registration as a surveyor. This definition is unusual in competency literature as it specifically mentions qualifications. The *Surveyors Act 1977*, *Surveyors Regulation 1992* and legislation made subsequent to the *2003 Act* like the *Legal Profession Act 2004*, all clearly refer to university degrees as qualifications. The literal meaning of qualifications includes *but is not limited to* university degrees. One of the reasons that the articles system was abandoned in 1964 was that a student was restricted by the knowledge and abilities of their master surveyor. Since the phasing out of the articles system the continual challenge for professionals has been to come to terms with the exponential growth in technical knowledge (Anderson, 1991; Williamson et al., 1994). The move to tertiary education for surveyors allowed students to receive consistent, comprehensive instruction on the foundation and theory of all areas of surveying practice. The Board considered that it was entirely within keeping with the intention and expression of the *Surveyors Act* to allow the possession of a university qualification to be a prerequisite for some forms of registration.

The inclusion of the tertiary study requirement was desirable for a number of reasons. The Board was concerned that the competency based approach limited its capacity to describe three important non-technical characteristics required for professional surveyors as it has been found that over the course of their study tertiary students in professional pre-service programs become less dogmatic, more able to tolerate complexity and more open to rationality as a means of solving problems (Anderson, 1991). It relieved the Board from the complex and onerous task of establishing an assessment process equivalent to that provided by the Universities without their resources and trained staff. Furthermore the Surveyors Boards of Australia and New Zealand have had a mutual recognition system in place for over 100 years, allowing persons registered in one jurisdiction to become registered in another. The Committee of Reciprocating Surveyors Boards of Australia and New Zealand (CRSBANZ) resolved at their meetings in 1970 and 1992 that a four year degree was to be the minimum educational requirement. The absence of a tertiary requirement may have put that agreement in jeopardy. The change provided consistency with other professional registration legislation that was made after the *Surveyors Act 2003* (Simmons, 2006) and it did not place an

impediment to registration, as tertiary education in surveying is readily available in part-time and distance modes.

The large amount of documentary evidence required of an applicant was greatly reduced by the subsequent mapping of the two Queensland surveying tertiary qualifications against the competency framework. This 'pre-approval' of evidence reduced the size of the application and the complexity of the assessment task for the Board.

Whilst a principle of a competency-based assessment scheme is that the applicant has the flexibility to select whatever evidence they feel shows they have the necessary competencies, it allows the applicant to only select evidence that shows them in the best light. The survey that resulted in a professional indemnity claim or the survey plan with multiple errors is unlikely to be put forward as evidence. The practice of surveying relies on practitioners being able to perform critical tasks with reliability. The demonstration that an applicant has been able to perform a task once is of minimal usefulness to an assessor. The assessment scheme was enhanced to include an element of observation where the applicant does not have the ability to filter out undesirable results.

#### **4.4 The Final System**

The assessment process developed by the Board is an attempt to minimize some of the traditional weaknesses in the competency assessment approach. A typical assessment process consists of three stages. The first is a documentary evidence stage; the second is the retention of the Professional Assessment Project (PAP) and last is a panel interview.

##### **4.4.1 Documentary Evidence**

In the first stage the applicant supplies the assessor with a properly authenticated portfolio of evidence that addresses each of the elements. In this evidence the applicant details what qualifications, skills, knowledge and experience they have which they believe is sufficient to meet the standard set by the framework. This written assertion is supported by materials such as plans and is authenticated by a third party. It is important to note that the authentication merely states that the applicant actually did the work or produced the material that they are relying on. The authentication does not state whether the work was of a sufficient standard or not. That is the task of the assessor.

While the process leaves the selection of evidence to the discretion of the applicant, the format that evidence is presented in is limited. The applicant can address each element individually with a written paragraph between 100 and 300 words in length signed and dated by an authenticating party. In the paragraph the applicant describes a task or project they have completed which they think is sufficient evidence that they have attained the element. Applicants are encouraged to choose projects that are sufficient to cover the entire element rather than just one or two descriptors. The narrative should refer to documentary material they have included that explains the task further or shows the result of the action.



It is obvious that to address the entire framework with just individual elements would make for a large document. In reality most surveying projects involve a large range of skills that are described across many elements. To reflect this and to minimize the size of the applications applicants are encouraged to use career episode reports (CER). A CER can be a description of any project or period of work that can address several elements, or several descriptors in one element or even several descriptors from several elements. The CER will focus on personal contributions and responsibilities, problems faced, solutions found, judgements made and the results and impact of these. In an adjacent column the applicant must explicitly relate the activities being described to the competency framework descriptors and elements. Any documentary evidence supplied by the applicant must be clearly referenced within the CER. Once again it must be authenticated by a third party.

Both the previous evidence types require a person to take responsibility for confirming that the applicant has done what they have purport to have done. It is preferable that all evidence is authenticated by a registered surveyor but if that is not possible then it is acceptable to use someone who has knowledge of the specific element and membership of a professional body that has a disciplinary mechanism. As a last resort work can be authenticated by someone who has personal knowledge of the work being reported and is willing to sign a Solemn Declaration under the *Oaths Act 1867-1988*.

Each application will require an executive summary laying out what evidence is presented for each element and where that evidence can be found in the supporting material. The summary will list each element in a table with adjoining columns showing what evidence is provided and a space for the assessor to make comments.

The length of time that evidence will remain viable will depend on the element for which it is presented. This decision is left to the discretion of the assessor; however any evidence should use the techniques and instruments that are typical for the time of assessment. The judgement of the evidence's validity and sufficiency are left to knowledge and experience of the assessor. Each element is scored on a scale of 0-4. Once all the evidence has been assessed the result of the whole assessment will be made based on the scores awarded to each of the elements. It should be noted that all elements are not equal in significance and the final outcome should take in to account the relative merits of each score and their importance. For example it is advantageous for cadastral surveyors to be able to *apply project management techniques to property development* but it is vital that they can *assess all relevant evidence and draw appropriate conclusions about the location of boundaries*. If the assessor decides that the evidence is not adequate they will provide the applicant with feedback and a short period to rectify the shortfall.

#### 4.4.2 Professional Assessment Project

The PAP is an opportunity for the applicant to display their competencies while being observed by the assessor. The project should embrace work undertaken in the normal course of business of the firm or authority in which the applicant is employed. The applicant will be assessed by an external assessor appointed by the Board and an assistant assessor who will

ordinarily be their work supervisor. The PAP allows the Board, through the external assessor, to assess the applicant's performance and competency in all aspects (ethical/professional, administrative and technical) of the practice of surveying. The applicant must first receive approval from the Board's Chief Examiner before the PAP can be commenced. No approval will be given for projects that have already commenced. The Board requires some technical content within the project but not necessarily as demanding as that in the documentary evidence. If an applicant is applying for multiple endorsements it is necessary for them to complete more than one PAP or one project that covers the technical content of each endorsement. Both the assessor and assistant assessor will assess the competency of the applicant by observing their performance on the project and conduct such oral or practical examinations as they deem necessary.

#### 4.4.3 Panel interview

The final stage of the assessment process is a formal interview. Generally this applicant interview will be with the Board's Chief Examiner and the Registration Convenor and will assess technical detail as well as professional and ethical standards. The assessment is left to the professional judgment of the panel.

#### 4.4.4 Appeals

In the case of an applicant who feels that they have been incorrectly assessed there is an appeals mechanism. All appeals must be made in writing to be considered. In the first instance the appeal is directed to the assessor. It must state the specific grounds for the appeal. If the applicant still feels aggrieved then they may appeal to the Chief Examiner. The final option for appeal is to the full Board.

## 5. DISCUSSION

The move to competency based assessment system was a substantial task undertaken by the Surveyors Board of Queensland but there are some useful lessons that may be learnt by other jurisdictions considering a similar move.

Competency assessment literature stresses the importance of consulting widely on the competency standards (Chang et al., 1996; Rutherford, 1996). Aside from the legislative obligation it had, the Board saw the importance of the taking a co-operative approach. The formation of the CFWG was widely representative of the surveying industry but it critically omitted representation from young surveyors who were going to be assessed by the system. This oversight and the decision to start with published, but outdated, standards created by Institution of Surveyors Australia (1996) led to some glaring lapses, like the omission of references to GPS in the first framework. In the intervening years the technology had moved from a fringe to a central technology.

Graduate surveyors have been put under greater obligation to prove that they have the required competency and have had to become much more active in their own development. However they have been rewarded for that effort by a greater flexibility in how they can

prove their abilities. Students who have studied part time or commence their degrees with advanced practical experience can have that experience recognised. There is no reason why, providing that they have been acting with responsibility commensurate with their knowledge, that the completion of their registration assessment can't coincide with the completion of their tertiary qualification. Likewise surveyors who migrate from other jurisdictions have a greater ability to have their experience validated.

For the first time in the history of regulated surveying in Queensland a graduate can ascertain for themselves what experience and knowledge they must obtain before they can achieve the registration status they desire. The far more explicit standards described in the competency has allowed companies to structure staff development programs and tie the attainment of competency to their human resource policies.

The desire to have objective evidence of an applicant's competency is valuable but the reality is the competency of a professional surveyor cannot be reduced to the sum of technical tasks. Since the evidence of technical proficiency is easier for the applicant to obtain and easier for the assessor to evaluate it may lead to an assessment that is heavily weighted towards the observable technical skills and neglects the role of factual and procedural knowledge. There is a danger that an overemphasis on the common work processes means that the system assesses competence rather than competency. The challenge is to find valid techniques for applicants to show that they see that professional practice is not purely a technical activity but it has a critical and ethical dimension. We see no scope for assessment that will take out the professional judgement of the assessors. However with the exercise of professional judgment comes the risk of inconsistent assessments. There will always be systemic risks using amateur assessors on a small volume of assessments but the Board has attempted to diminish the risk by ensuring that the assessors have all received training in the assessment procedures and, more importantly, have had their understanding assessed.

The Board has allowed applicants that were involved in existing Professional Training Agreements to complete the agreements and obtain their registration under the previous system. Notwithstanding that commitment, a more rigorous final panel interview has been implemented over the last three years. This interview has shown up some deficiencies in the previous system. In this old system the supervising surveyor provided the training and the bulk of the assessment. It is clear that in some circumstances the training and assessment have focussed on those areas that the supervising surveyor has been familiar with rather than on the full scope of surveying practice. In other circumstances the supervising surveyor has had difficulty in maintaining an objective eye on the capabilities of the graduate being assessed. The new system has been designed to alleviate this problem by providing the applicant with three different, independent assessors for the three stages of the assessment.

Throughout the introduction of the system, extensive and well attended professional development for graduates and supervising surveyors has been provided. However the number of graduates who have applied for assessment under the new scheme has been small. This is not a surprising situation as there was a spike in the number of applicants to the old

system before it was closed off. Of the documentary evidence submissions received to date the majority have passed after minor requests for additional evidence have been fulfilled. In general terms, where applications have been unsuccessful it has been because the material that has been provided has not been of adequate depth or scope to cover the framework rather than the work described being of poor quality. The primary failings have been a lack of documentation provided to support the claims of the CERs or a tendency to provide an academic discourse on the element rather than a description of when that quality has displayed by the applicant. These errors have been most apparent in submissions from applicants who have not attended any of the professional development events.

## CONCLUSION

The experience in Queensland has shown that it is possible to design and implement a competency based scheme to assess the qualifications, skills, knowledge and experience required to be a registered surveyor. However the exercise has also shown that the careful attention must be paid to the design of the system if some of the endemic risks associated with competency assessment are to be avoided. While it may be true that what matters is what an applicant can do and what they know not how they obtained the skill and knowledge, the complexity of the tasks that registered surveyors are required to perform make it riskier to assess without some form of pre-qualification. For instance the Bachelor of Spatial Science from the University of Southern Queensland covers about 60% of the elements in the Board's competency framework for registration as a surveyor, and involves some 100 pieces of assessment that require 50 hours of evaluation. For the Board to provide an equivalent level of assessment for a candidate is beyond their ability in financial and human resources.

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## BIOGRAPHICAL NOTES

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### **Jim Liddle, B.App.Sc (Surv), Cert Eng Surv, Reg Surv (Cad, Cons, Eng)**

Jim has been the director of a small Brisbane based consulting surveying practice for over twenty years. This follows some decades of undertaking a variety of cadastral and engineering surveying work throughout Queensland. He has been the Chief Examiner for Surveyors Board of Queensland since 2004 and has held executive roles in IEMS and ISAQ, and is a member of ACSQ.

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