

NMAB Officer Defines Scope of Materials Studies

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My job as a senior program officer for the National Materials Advisory Board (NMAB) is to conduct studies for government agencies relating to materials. In the past two years, I have run studies on what features could be added to U.S. paper money to make it easier to use by people with visual impairments; on how well the FAA's Explosive Detection Program matches their goals and objectives; on what operational or implementation issues might have an impact on whether new technologies for screening airline passengers for weapons and explosives will be deployed in U.S. airports; and on the state of the field of optical sciences and engineering and what research in that field will have the greatest impact on national needs in the next 20–25 years. Upcoming studies include identifying what is needed for fibers for ceramic composites to be used at high temperatures, and identifying opportunities to make semiconductor processing more environmentally friendly. With the great variety of topics we address, NMAB officers cannot afford to be experts in a narrow field!

The most challenging part of my job occurs when someone has decided to fund us to study a topic, and I am assigned to conduct the study. Where do I start? The first thing is to understand what question(s) the sponsor wants answered. For example, is it an overview of a field? Then the sponsor will most likely want to know things like: What are the growing areas of that field? Where are areas in which a breakthrough in technology would open up new fields of interest? If it is a program review, the sponsor may want to know whether the appropriate goals and objectives for the program have been identified. Do the individual projects of the program address the overall program goals? Is the program organization such that the overall program goals can be reached? Other sponsors may want an answer to a very specific question—what should we do about X?

As in most projects, the initial step sets the tone for the rest of the effort. The initial identification of the appropriate questions and scope is often the critical part of the study process. An overly narrow scope is not of interest to a wide audience and may make it difficult to find people to serve on the committee. An overly broad scope may make it difficult to pin down exactly how the committee can answer its charge



As a senior program officer for the National Materials Advisory Board, Sandra Hyland conducts materials-related studies for government agencies.

and can lead to frustration on the part of both the sponsor and the committee members. (Not to mention the staff!) NMAB staff officers need to be able to consult with a wide variety of people in a wide variety of fields to quickly identify the key issues and questions for each study.

As an example of how one study was defined, we were asked by the FAA to review its explosives detection program, to ensure that the program was in line with the FAA's overall effort in aviation security. Initially, I had to understand both the problems with aviation security (focusing on the terrorist threat and the vulnerabilities of the current security system) and the efforts being made to strengthen the system. The study could have been narrowly defined as an assessment of the mapping between the requirements from FAA headquarters to develop systems that would automatically detect explosives in baggage and the program at the FAA's Technical Center to foster development of technologies for explosives detection. However, I chose to include several other elements into the study scope, including some assessment

of what the requirements should be, and the integration of the human operator into the current security system and the resolution of false alarms. With these topics included in the study, the committee can more fully assess what technologies may ultimately improve the aviation security system rather than simply validate or disapprove a program.

Once the scope of the study is defined and the sponsor agrees to the statement of task for the committee, I begin to identify what types of people (by field of specialization) would be able to answer the questions. Following that, I call everyone I know and try to identify people in each field of specialization. Typical places I find people include our National Academy of Sciences and National Academy of Engineering membership; the American Men and Women of Science database; and, literature searches in the appropriate journals. Eventually I end up with a list of as many as 60–70 people, to find around 12 people who have a specialty that fits into the needs of the committee and who are willing to serve for free. (While we cover expenses for travel, hotels, meals, and such, for the committee members to attend meetings, that is probably minimal compared to the time and effort that most committee members devote to these studies.)

Once the committee is formed, the visible part of the National Research Council study process begins—meetings, briefing sessions, and report writing. My involvement in this part of the report production process is to keep the focus of the committee on its statement of task and the timetable for producing the report, along with organizing meetings and inviting speakers. With a properly focused statement of task and a properly chosen and motivated committee, this part of the process becomes more administrative for the staff officer.

My background in integrated circuit and photovoltaic processing never prepared me for the demands of my current job—quickly studying a new topic and understanding it well enough to identify key issues and direct a group of experts to write a report addressing those issues. But looking back at my experience in academia, at a government laboratory, and in a manufacturing line, this job pulls together the people, organizational, and study skills I learned in those various positions in ways I never imagined would be necessary! □

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