The trouble with technical data

Just a few weeks ago, everything seemed to be under control. Officials of the International Society for Optical Engineering (SPIE), based in Bellingham, Wash., were confident that their annual technical symposium in Arlington, Va., would come off without a hitch. Then the Department of Defense (DOD) stepped in, and the society faced a situation reminiscent of a DOD action in 1982 that forced the cancellation of more than 100 scientific and technical papers at a SPIE meeting in San Diego (SN: 9/4/82, p. 148).

Earlier this month, Defense Department reviewers, responsible for ensuring that researchers working under DOD contracts don't inadvertently reveal classified information, discovered that 43 scheduled papers reported technical data that would, in their view, threaten national security if disclosed at an open meeting. In many cases, the authors had failed to follow DOD-mandated procedures for clearing their papers for presentation at such a meeting.

All of the disputed papers came from two of the conference's eight programs: "adaptive optics" and "synthetic aperture optical systems." Most of the researchers involved in these sessions worked at companies holding DOD contracts or at government laboratories. Initially, it looked as though these two programs would have to be canceled completely.

Complicating the situation were problems with a scheduled classified meeting that one of the program chairmen had independently organized. Although SPIE helps publicize this type of meeting, the society itself is not directly involved. In this case, DOD's requirements for holding such a meeting were not met in time.

To salvage at least part of the proceedings, DOD and SPIE officials negotiated a compromise — an experimental arrangement that allowed presentation of about two dozen of the papers, including some of the previously classified but now "sanitized" (edited) papers. This arrangement took the form of special "export-controlled" sessions open only to U.S. citizens and to foreign visitors who could get proper authorization from their embassies to attend. DOD personnel were present to ensure that all participants were screened and that they signed a form pledging not to disclose any information they heard.

How well did the experiment work during last week's conference? "Fine," says SPIE's R. Barry Johnson, who is responsible for organizing the society's meetings. "DOD did a superhuman job trying to clear so many of these papers in record time and to implement this [new] system, which we didn't even know existed."

At the SPIE meeting, Frank Sobieszczyk of DOD's research and advanced technology office told participants, "The Department of Defense sees a compelling requirement to improve control of unclassified technology with military or space application. The objective is to safeguard such technology in a reasonable and rational manner without adversely affecting business competition, technologial innovation and economic growth."

DOD's authority to do this, says Sobieszczyk, is provided by new regulations promulgated under the 1984 Defense Authorization Act. This allows the Secretary of Defense to withhold from public disclosure any sensitive technical data that DOD controls and that would require an export license under the Export Administration Act. One vehicle for implementing this policy is the introduction of "export-controlled" sessions at meetings.

But the new arrangement raises a host of questions. SPIE, which normally publishes papers presented at its meetings, for example, isn't sure what to do about the papers presented in the restricted sessions. "What do you do about the printer?" asks Johnson. "What happens in case one of our clerical people inadvertently sends it to the Rumanian embassy? What does a library do with export-controlled documents?"

Some technical societies have already, on their own, decided to hold restricted meetings. Last October, for instance, the American Astronautical Society held a meeting on "Space Propulsion for the 1990s," which included a "secret" session on the Strategic Defense Initiative. In January, the Society of Manufacturing Engineers restricted to U.S. citizens an entire conference on composite materials.

Concerns about the increasing frequency of such "voluntary" restrictions prompted the American Association for the Advancement of Science and the National Academy of Sciences to bring together representatives from a wide range of professional groups to discuss the problem. By coincidence, this meeting occurred just a few days before the SPIE conference. The Academy has also started to study the effects of information controls on industry to complement its earlier report on university difficulties (SN: 10/9/82, p. 229).

In the case of fundamental research, the argument over DOD controls on sensitive but unclassified information has been to some extent resolved, largely in favor of the universities that do this type of research (SN: 9/22/84, p. 183). The situation is different in applied research, where the distinction between basic science and military application or product is much fuzzier. "Anybody who's doing this type of research now," says Johnson, "has to understand that if they're going to give a presentation anywhere, they have to get it cleared...even though the research wasn't funded by the government." —*I. Peterson*

Dirty tricks: Plant defense backfires

A significant amount of crop damage caused by leaf-eating insects may actually be triggered by a chemical that plants manufacture when stressed by toxic air pollutants. New research shows that this chemical defense against stress makes plants tastier to insects. Adding insult to injury, insects dining on these crops may even go ahead and assimilate the plant's defense for their own use in detoxifying insecticides—both natural and synthetic.

"The plant's caught in sort of a catch-22 situation," explains John Chiment, a researcher with the Boyce Thompson Institute for Plant Research at Cornell University in Ithaca, N.Y. In trying to defend itself against pollution it becomes not only a preferred meal to predators, he says, but also a contributor to its predators' vigor.

Research by Chiment and his colleagues has shown that many plants, including soybeans, radishes, pinto beans and cowpeas, produce glutathione as a defense against assault by toxic air pollutants and certain other stresses such as drought and salt (SN: 11/10/84, p. 298). The chemical contributes to the plant's antioxidant defense system by acting "as a general-purpose sponge to sop up anything that's going to be very oxidative," he says. Oxidative chemicals either carry an extra electron or are one short. To stabilize their structure, they steal an electron from a neighboring molecule, or donate one to it —a reaction that is quite destructive, particularly to the molecules of a healthy cell.

The group's studies showed that glutathione did a good job of protecting soybean plants from sulfur dioxide and ozone. But their tests also showed that glutathione-enriched leaves from pollution-stressed soybeans attracted Mexican bean beetles, a pest that normally shuns this plant. Since most plants and animals use glutathione as an antioxidant defense, the researchers suspect the insects tapped the plant's glutathione reserves for use in their own detoxification of whatever natural pesticide normally deters the beetle from this plant.

Chiment points out that in cells there is another glutathione-related system, involving sulfur, that may contribute to the breakdown of additional compounds, including pesticides and herbicides.

All this raises concern, he says, that undesired plants may be more immune to herbicides during periods of stress. Similarly, it suggests the effectiveness of certain pesticides may be countered during periods of plant stress if pests can successfully tap the plants' glutathione reserves for their own defense. Finally, Chiment encourages growers to focus their stress-tolerance breeding programs on mechanisms that may not involve glutathione. —*J. Raloff*