

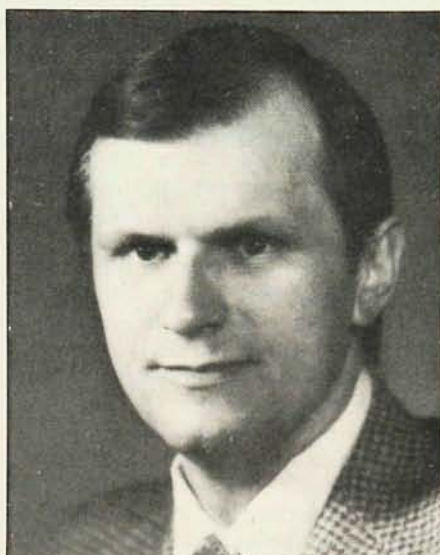
state & society

DOD signals interest in more innovative research

Basic research is receiving renewed interest and attention in the Department of Defense. One of the first positive steps taken in that direction is the creation of a research office reporting directly to the Deputy Under Secretary of Defense for Research and Advanced Technology. Nominated to head that office, as Assistant for Research to the Deputy Undersecretary, is physicist George Gamota.

We recently interviewed Gamota in his Pentagon office, where he discussed his plans for the new office, the impact on the research program of the recent Office of Science and Technology panel report on DOD basic research (PHYSICS TODAY, October 1978, page 93) as well as the Defense Science Board panel report on DOD-supported university research (PHYSICS TODAY, February 1978, page 77), and briefly reviewed the DOD in-house laboratory research program.

Gamota received his PhD in physics from the University of Michigan in 1966. From 1968 to 1975 he was a research scientist at Bell Laboratories in Murray Hill, N. J., where he did basic research in low-temperature physics, especially superfluid helium. In 1974 he organized a science advisory council for his local congressman (PHYSICS TODAY, January 1976, page 101), and during the following year he worked for the President of Bell Labs on



GAMOTA

the Governor's Commission to Evaluate the Capital Needs of New Jersey. Since January 1976 he has served as Staff Specialist for Research in the Office of the Director of Electronics and Physical Science in DOD.

Significance of appointment. DOD has not had a senior official with broad oversight over the basic research program since 1973. Gamota thus perceives the creation of his new position as being im-

portant in three respects. First of all, it reflects a definite commitment by DOD to the idea that White House Science Adviser Frank Press and the Defense Science Board have been promoting—that basic research is important not only for the NSF but also for the mission agencies, and that the mission agencies should look at support of basic research as an important and necessary part of their mission and fund it appropriately.

Secondly, DOD recognizes that basic research provides numerous future technological options that are relevant to national security. Gamota observed that most of DOD's current development programs are based on basic research done 15 to 25 years ago. He noted that many DOD administrators believe that the basic research being done now or that has been done over the past ten years will provide fewer technological options than research done 20 years ago.

Thirdly, the creation of the new post should signal to the research community that DOD recognizes a decrease in innovative ideas and is now more willing to support revolutionary new high-risk ideas—"the kind that provided the highest payoff in the past," according to Gamota.

Gamota explained that in his new po-

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International group to reallocate radio spectrum

On 24 September representatives from over 150 nations will meet in Geneva for a ten-week World Administrative Radio Conference. There the delegates will attempt to reach an international accord on frequency allocations for various "services." Run by the International Telecommunications Union, the last WARC of general scope was held 20 years ago. Applications of radio technology as disparate as radio astronomy and taxi-dispatch radios are at stake.

The current table of allocations, drawn up in 1959 and modified at seven specialized radio-frequency conferences since then, comprises about 40 different services, or categories of use, including such services as aeronautical radio navigation,

broadcasting, port operations, radio location and time-signal service.

In preparation for the conference, the Federal Communications Commission and the National Telecommunications and Information Administration have submitted recommendations to the US Department of State. The FCC has, for the past several years, been gathering information on government uses of the radio spectrum, and the Interdepartment Radio Advisory Committee, a branch of NTIA, has been doing the same for government uses. From the reports of these two groups the US delegation to WARC has put together a set of proposals for reallocating wavelengths. Glen Robinson, a University of Virginia law professor,

will head the US delegation, which will include representatives of most of the interest groups involved. A final list of about 60 delegates will be released some time this spring.

The principal guideline by which the US delegation will operate at the conference next fall is that the fewer changes that need to be made in the current table of allocations the better, and in this regard the US is more conservative than many other countries. However, the delegation will go to Geneva with a number of proposals for changing the International Radio Regulations, the rulebook governing the electromagnetic spectrum between 10 kHz and 27 GHz. New allocations will be suggested for the sensors

used in the LANDSAT and SEASAT satellites, for example, and some short-wave bands would be reallocated in another US proposal, which would give more bands to maritime mobile transmitters and international broadcasting, such as Voice of America and Radio Free Europe broadcasts. This proposal is expected to meet with some resistance from the third-world nations, which will have a majority at the one-nation, one-vote conference. Many developing countries still use these short-wave bands for domestic services, and so will resist any infringement, according to Samuel Probst, chairman of the Interdepartment Radio Advisory Committee. In addition, he said, the current drive among third-world nations to de-Westernize the international news media is in direct conflict with the US plans.

Radio astronomy. Because discussions over how to divide up the short-wave spectrum are likely to dominate the Geneva conference, Bernard Burke of MIT is afraid that the needs of radio astronomers will become "lost in the shuffle." Burke notes that the US went to the 1959 WARC "without any clear position on radio astronomy," and as chairman of the National Academy of Sciences Committee on Radio Frequencies, he is determined not to let that happen this year.

The International Radio Consultative Committee (CCIR) is the technical arm of the International Telecommunications Union. A special meeting of CCIR was held last November in preparation for WARC. Out of that technical conference came several recommendations for radio astronomy.

In the way of allocations, radio astronomers are requesting protection for the spectral lines of some key molecules and 2% wide bands at approximately octave intervals within the range of 2 MHz to 300 GHz to use for observing broad-band emissions. But perhaps more important to the radio astronomers is the issue of protecting the observatories' extremely sensitive receivers from more subtle forms of interference. Spurious, harmonic and band-edge emissions from other radio sources often cause problems for the radio observatories. Five years ago, for example, the National Radio Astronomy Observatory in Green Bank, West Virginia, reported interference from the ATS-6 television broadcast satellite, which was creating noise outside its normal operating band (see *PHYSICS TODAY*, September 1974, page 77).

Burke said that CORF is therefore trying to have put down as law—or at least formally stated as a goal—at the September meeting a set of interference limits. The US delegation is reluctant to accept those limits, partly, according to Burke, because Congress has refused to fund an FCC study of interference levels that are harmful to radio astronomy, and so lacks an impartial study of the problem. And partly, he said, because the US

does not even have domestic rules to enforce interference limits, and so can hardly defend them at the international conference. Probst defends the government's position, saying that if the CORF levels were mandated by law, they would have a "horrendous economic impact." The US delegation will propose a tightening of the tolerances for frequency instabilities and spurious emissions, though not to the rigid standards the radio astronomers desire.

A small group of radio astronomers, those involved in the search for extraterrestrial intelligence, had also asked the US delegation to propose reallocating the region from 1.40 to 1.72 GHz to the search for interstellar radio signals. That region is now used for air traffic control, navigational satellites, meteorological aids and fixed service microwave links. This request was the source of some controversy since it would have deprived NASA of some satellite bands. The FCC's solution to the disagreement is to propose a "bear-in-mind" footnote to the tables asking users in that region of the spectrum to consider SETI's use of those bands. Dissatisfied, the SETI researchers have turned to their colleagues in less industrialized countries for support. Because these countries have less use for the radio bands, they are more willing to protect them for SETI use, according to Frank Drake, director of the National Astronomy and Ionosphere Center at Cornell. Drake said that a significant number of less developed nations have informally committed themselves to the SETI cause.

New services can be added to the already-crowded spectrum in one of three ways: An existing service can be given fewer bands or eliminated from the tables entirely; the new service can share a band with an existing service, provided they operate in different geographic areas, or the usable spectrum can be expanded. In 1971, the table of allocations was extended from 40 GHz to 275 GHz, and several bands in that region were allocated to space science. The US will propose at WARC allocating many unassigned bands in that region to terrestrial services and expanding the tables up to 300 GHz.

Because the allocations set down in September might remain unchanged until 1999, a good deal of foresight is necessary in order to predict the needs that will develop as a result of improving technologies over the next two decades. And once a frequency is allocated to a given service, a country must register its specific intended use for that frequency with the International Frequency Registration Board in Geneva. This registration process occurs on a first-come, first-served basis; that is, the first country to register a frequency use essentially closes that frequency to any other use that would interfere with the registered one. This creates something of a "technology race"

for those frequencies that are not now widely used (such as those above 40 GHz).

Although the regulations hold all of the weight of an international treaty, every nation retains the right to allocate the spectrum for its own domestic uses any way it wishes, with the restriction that it cannot cause interference with a system abiding by the international rules and cannot stop any interference such systems may cause their signals. During the two to three years after WARC ends the FCC and IRAC will jointly decide how the spectrum will be used in the US. —MEJ

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sition he will have responsibility for the policy, guidance and review of DOD's basic-research program and for budgetary reviews. The offices of scientific research for each of the military services will continue to have responsibility over their day-to-day operations and their selection of manpower for both in-house and contract work. Gamota told us that he would like to revive the Defense Committee on Research, an internal advisory group that has been dormant since 1972. The Committee's purpose would be to strengthen the base of support of the research program, provide better coordination among the various DOD components supporting basic research and other federal agencies, and provide a visible focus for the invigorated DOD research program.

OSTP and DSB panel reports. Because of the creation of the new office, Gamota feels that it will be easier to implement many of the recommendations in the OSTP and Defense Science Board panel reports. (Gamota was the executive secretary of the DSB panel, which suggested ways of reestablishing research relationships between the universities and DOD.)

"The DSB report was a tremendous catalyst for initiating two long-overdue actions," noted Gamota. "One was to reverse the funding erosion of the past ten years; the other was to focus upon a valuable asset to DOD—the academic research community." Gamota noted that in 1978 Congress put its stamp of approval on DOD's effort to strengthen the research program and increase support of academic researchers. "The specific language to that effect appears in the final defense appropriation bill."

The report of the OSTP panel (which dealt with broad matters of policy) had already provided the ingredients for a strengthened, focused and stable research program. Gamota believes that a definitive policy statement will be made on DOD commitment and need to support basic research. Then the report's recommendations will be implemented in a series of actions that will include the