it was carried by a helicopter. Or was this part of the actual spacecraft?"

Titov was not inclined to enlighten Glenn or the press:

"We'll not comment to details as far as the outside appearance of the ship is concerned," he said. "Well, whether it is retrorockets or some other thing, you know that our retrorockets have operated splendidly, the landing system has operated splendidly and that's why there's no need to come into detail as far as this picture is concerned."

Titov's visit was the occasion for another attempt by this country to get a Russian representative to visit Cape Canaveral, an object which has become something of a fixation among those who lead the nation's civilian space effort. The Russians, on the other hand, continue to regard the invitations with considerable suspicion. They sometimes accept the invitations, but they never show up.

Titov, upon his arrival in New York, declined on the grounds that he did not feel there was anything worth seeing there. He later explained that he would not visit military installations, and this was followed by an official Soviet explanation that said the invitation was turned down for "obvious reasons." Somewhere along the way, a Soviet official told the State Department that the invitation was suspect because it was regarded as an attempt by this country to maneuver the Soviets into a position where we could invoke the reciprocity principle that generally applies to East-West traffic. The Soviets were assured that the U.S. was not conspiring to embarrass them into a return invitation, but the decision to stay away from the Cape has held fast. Titov, at one of his press conferences in Washington, said of the invitation: "I think we have not yet reached the level of conditions that will allow us to see military rockets. We must have disarmament."

Prospects Cooperation

The Soviet performance at the COSPAR meeting is regarded by American space officials as fairly standard, and it has not caused this country to re-evaluate the prospects for developing joint space efforts. The cooperation proposals put forth by Kennedy were deliberately drafted with a view to undertakings that do not involve lifting security on what seems to be a subject most sensitive to the Soviets—their rocket boosters. Preliminary talks on joint efforts involving weather and communication satellites were reported to have been fruitful, although concrete programs remain to be worked out. In addition, Soviet and American delegates held a day-long informal meeting on medical problems of space travel, particularly the "sea-sickness" symptoms that troubled Titov.

In terms of admiration and goodwill in international relations—for whatever they are worth—the United States emerged well in the lead from the COSPAR meeting. The Soviet space achievements—especially Titov's unmatched all-day orbit—are proof of technological ability of a high order, but Soviet secretiveness, in contrast to the American policy of inviting the world to watch, has created the suspicion that Russia's space establishment may be afflicted by embarrassing deficiencies. A number of foreign delegates to the conference commented to the effect that they considered Titov's unresponsiveness rather puzzling for the representative of a nation that claims to lead the world in the space arts. This reaction is a source of pure delight for those American officials who have been boosting international space cooperation and an open civilian program as a means of making friends for the United States.—D. S. GREENBERG

Research Contracting: Study Says U.S. Cannot Be "Sophisticated Buyer" with Present Pay Scale

Since 1950, annual federal expenditures for research and development have risen from $1.1 billion to a projected $12.4 billion for the forthcoming fiscal year. Currently, more than 80 percent of this is paid to nongovernmental organizations.

These vast sums, and their rapid growth, have inevitably aroused the interest of Congress, which on several occasions has criticized the government's heavy reliance on outside contractors, especially among the so-called nonprofit institutions. Last year the House Appropriations Committee charged that the government is incurring unnecessary costs and undermining its own research capabilities by assigning most of its research and development work to outside contractors, who generally offer pay and working conditions that put government laboratories in a poor competitive position. The Committee emphasized its concern by recommending a cut in an appropriation for one of the government's outside contractors, the Aerospace Corporation, on the grounds that the firm's salaries "are excessive, that its overhead costs are too high, and that it plans to employ too large a staff." Since the Appropriations Committee is in a position to command respectful attention, the Administration took note.

Last week, the Administration replied to the criticism with a report titled "Government Contracting for Research and Development." Its general conclusions were that the present policies for allocating research are basically sound, but that the government's control over its research and development purchases is seriously handicapped by salary scales which make it difficult to develop and keep competent science and engineering administrators. One result is the flourishing of the nonprofit firms, a good number of which exist solely on government business that they carry on with personnel to whom they pay salaries considerably above the civil service scale. This outflanking of the federal pay system is a publicly acknowledged operation, but while it nettles Congress, the prospect of a substantial increase in the upper range of federal salaries is even more nettlesome. In its recommendations for raising federal salaries, the Administration originally sought increases for the top-level appointive posts, but since this would put many of these salaries above the $22,500-a-year salaries of senators and representatives, congressional reception was cool. The Administration paid court to congressional feelings by noting that it might be a good idea also to raise the salaries of congressmen, but such a move is unlikely to gain any support in an election year, and the appointive level was excluded from the federal pay bill now before congress. The emphasis in this bill is on raising substantially the salaries along the upper ranges of the civil service scale to make government service more attractive for career personnel, especially scientists and engineers.

The disparities between government and nongovernment pay scales have been the subject of a number of studies, all of which conclude that the

government is going into the market under a serious handicap.

According to the Bureau of the Budget, a holder of a bachelor's degree looking for his first job can expect an average starting salary of $5954 from the government, compared with $6881 from contractors doing business with the government. After 20 years, the government employee would receive $11,608, compared with $13,608 for his nongovernmental counterpart.

The disparities become greater with higher educational attainment. Five years after college graduation, the government scientist or engineer with a Ph.D. can expect to receive $8606, while his nongovernmental equivalent is getting $11,564. As their careers proceed, the gap grows even larger, accelerating the curious process of employees' leaving the government to work for private contractors who draw a large part or all of their business from the government, while the government laments that it cannot hold onto its highly talented employees.

The answer offered by the Administration is to make federal employment more attractive, while recognizing it is in the government's interest to have a diversity of institutions available to carry on its research activities. The guiding rule, the Administration states, "should be to assign the job where it can be done most effectively and efficiently, with due regard to the strengthening of institutional resources as well as to the immediate execution of projects."

The Administration notes, in its research contracting study, that principally because of its intention to continue relying on outside contractors, it is essential that steps be taken to upgrade the quality of the government's own science establishment. "No matter how heavily the government relies on private contracting, it should never lose a strong internal competence in research and development. By maintaining such competence," the report continues, "it can be sure of being able to make the difficult but extraordinarily important program decisions which rest on scientific and technical judgments."

The improvement of salary scales is cited as the most urgent objective, but opportunities for professional satisfaction are also cited as particularly important for attracting and retaining personnel. To accomplish this, the report recommends that each federal agency should attempt to give its own research facilities assignments "to attract and hold first-class men." In addition, it is suggested that federal agencies look to their own science and engineering personnel for some of the "technical advice and participation in broad program and management decisions" that are now contracted to outside organizations.

Finally, the Administration's study suggests the creation of "a new kind of government research and development establishment, which might be called a Government Institute." These institutes would incorporate the "more positive attributes of the non-profit corporation." This idea is not spelled out in any detail, but is offered as a promising line for further study if congressional unhappiness with the nonprofit setup should grow.

At the heart of congressional concern is the inevitable difficulty of managing $12.4 billion worth of research. The remedy nearest at hand is the pay reform bill, which will make it easier for the federal government to be what the report called "a sophisticated buyer" of research and development. The bill incorporating the pay increases is now before the House Post Office and Civil Service Committee; the treatment it receives will tell a lot about Congress's sophistication in spending.—D.S.G.

Announcements

Written articles in the natural sciences and their engineering and technological applications (exclusive of medicine) are eligible for the 1962 **AAAS-Westinghouse Science Writing Awards,** provided through a grant from the Westinghouse Educational Foundation. The two $1000 prizes, one each for newspaper and magazine writing, will be presented on the basis of initiative, originality, scientific accuracy, clarity of interpretation, and value in promoting a better understanding of science by the lay public. Entries may be either single articles or a series, and must have appeared in United States publications (other than trade journals or professional scientific magazines) between 1 October 1961 and 30 September 1962. Entries may be nominated by persons other than the author; entrants may submit as many as three separate articles in each category.

Judges for the 1962 awards are Allan V. Astin, director, National Bureau of Standards; Walter Barlow, president, Opinion Research Corporation; Osborn Elliott, editor, *Newsweek*; Earl English, dean, University of Missouri School of Journalism; Felix R. McKnight, executive editor, Dallas *Times Herald*; and Morris Meister, president, Bronx Community College.

Citations will be presented the newspaper and magazine in which the winning articles appeared. Honorable mention or other special recognition will be made at the discretion of the judges. The presentations will take place at the annual dinner of the National Association of Science Writers, to be held on 27 December during the AAAS annual meeting in Philadelphia. Deadline for submissions: *10 October*. (AAAS-Westinghouse Awards, 1515 Massachusetts Ave., NW, Washington 5, D.C.)

Nine over-age U.S. warships will be converted through the Alliance for Progress program for use in supplying **electrical power to South American coastal cities.** Six of the vessels will go to Ecuador to hook into existing power systems; Colombia will get three to ease the load on equipment supplying power to the city of Barranquilla.

No charge will be made for the ships, which would otherwise be sold as scrap for about $46,000 each, but recipient governments will pay conversion costs of approximately $175,000 each. Capital cost will be about $46 per kilowatt of capacity (3600 to 4000 kilowatts), as contrasted with shore-plant construction cost of $211 per kilowatt.

A **Committee on Agricultural Science** has been formed which will continually evaluate the U.S. Department of Agriculture's research program and propose means of increasing the emphasis and effectiveness of basic research. The 16-man committee is headed by W. M. Myers of the University of Minnesota.

Meeting Notes

A national conference on **engineering technology in missile and spaceborne computers** will be held on 30 and 31 October in Anaheim, Calif. Primary emphasis will be on working equipment and techniques, but papers describing