NASA's War Against Secrecy

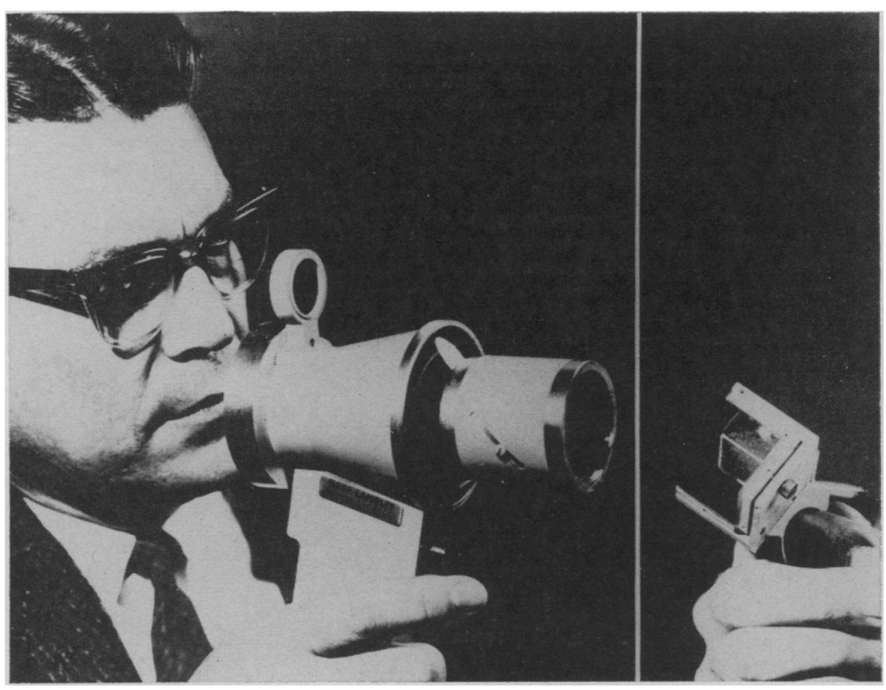
The new discoveries and inventions produced as by-products of the race to the moon are made known by NASA's "Tell-the-World" department—By Jonathan Eberhart

➤ THEY MUST be good for something. They are the work of thousands of dedicated scientists and engineers; they fill laboratories, offices and warehouses; they are costing the Federal Government billions of dollars a year. What are they?

Secrets. Secrets of the Space Age. Not the deep, dark, FBI-guarded secrets about which many, including members of Congress, have raised the cry of "overclassification," but unintentional secrets that the Government would be only too glad to make public if only it knew how.

Since Vanguard I, America's first satellite, was orbited on Jan. 31, 1958, space research has expanded many thousands of times, not only in terms of men and money, but also of results. Revolutionary new ways of doing everything from sealing holes to launching rockets to cooking breakfast have all been developed as "spin-off"—or fringe benefits.

But how do you spread the word? Telling one person or even an entire industry, about a single idea is simple. But when inventions, discoveries and reports come thundering along at a rate of thousands per week the problem is considerable. It is so considerable, in fact, that the National Aeronautics and Space Administration alone is spending almost five million dollars a year trying to make the information flow out to industry at large as rapidly as it flows in from space researchers.



NASA

LIGHT CONVERSATION—Communications over a beam of light is possible with this instrument, which was developed by National Aeronautics and Space Administration scientist Numa E. Thomas at Langley Research Center, Hampton, Va. A beam of light from the pistol-like device bounces off the three-cornered reflector at right and returns to its source where it is "decoded" into speech again. The invention was made available to industry via a NASA technical publication.

NASA Kept Busy

NASA has a dozen research centers to keep track of, along with hundreds of subcontractors and various other Government agencies engaged in joint programs. Teams of special agents called Technology Utilization Officers are planted throughout NASA with fine-toothed combs to screen every little tidbit of data for useful items.

Wait a minute. Why go to all this trouble? It will not get us to the moon any more quickly, and industry has gotten along pretty well without all this Government advice.

Well, going to the moon is an expensive business. Twenty billion dollars worth, in fact. That is too much money for a basic research project. It has to pay its own way, or at least pick up part of the tab. One good way to do this is to help industry get out of the moon race at least part of what it puts in—namely, new technology. Any savings or technological shortcuts ultimately filter down into the nation's economy, so the more that filters, the better the Government likes it.

In addition, NASA welcomes the chance to show Congress (where the money is) that, as far as the moon is concerned, getting there is half the fun. There are more than a few voices in Washington saying that simply getting to the moon is a rather narrow, or even frivolous goal. The Technology Utilization Program represents little "side bets" being paid off along the way.

NASA Administrator James E. Webb has said that from the time NASA was created, an open spread of information has been directed by both Congress and the President, for the purpose of "strengthening the bridge between technical research and marketable end use."

The program as NASA runs it has two parts, of which the Technology Utilization Division (TUD) is the eager-beaver half. While the TUD sends out a constant paper stream of Tech Briefs, Tech Notes, Tech Reports, Tech Translations, Tech Handbooks and Tech Surveys, the Scientific and Technical Information Division (STID) provides a computer-indexed library of research for any industry or Government agency that wants to do its own looking.

Almost a quarter of a million documents are on file with STID, and the number is growing at about 100,000 yearly. Besides NASA's own research centers and domestic contractors, some 40 foreign countries add to the stacks of information. Actually, "stacks" is not the proper term, since almost the entire library exists primarily on magnetic tape and microfilm. To keep up with the inflow, STID issues new indexes and lists of abstracts about every two weeks, often themselves printed by computer. Enough microfilmed reports, about 1,000, can be fit in a shoebox to equal 14 feet of conventional printed material.

Obviously all 200,000-plus documents will not contain useful data

as far as nonspace industry is concerned, but industry is ingenious when it is looking for an idea, and remarkable applications of off-beat inventions are not uncommon.

Consider, for example, a sensor developed to detect the tiny impact of micrometeorites on spacecraft and capable of recording the force of a single grain of salt falling one centimeter. Medical researchers looking for new vaccines found that the sensor could be used to monitor bird embryos without damage to the egg. It can detect life after as little as four days of incubation and can readily note changes in heart rate or intensity resulting from chemicals experimentally introduced into the egg.

Research Used

A paint company in Michigan seized on a NASA Tech Brief mentioning a spacecraft coating that was highly resistant to ultraviolet rays and to electron bombardment while serving as a thermal-control coating. Using NASA's preliminary research, the company took off on its own and now has an alkali silicate paint with a number of commercial uses, which in the future may include application as a protective coating for automobile tailpipes and mufflers.

The same paint has also found use as a lining for steel calcining kettles.

Many beer breweries are now using a simpler, less costly, more efficient kind of butterfly valve made possible by a NASA subcontractor's development of a new precision-casting method.

Sending men to the moon is such a prodigious task that if a great deal of technical spinoff is not produced, it may be an indication that the radical new techniques required to do the job within reasonable limits of time and money are not being developed. The Saturn V booster, for example, standing 50 feet higher than the Statue of Liberty and weighing more than 25 fully loaded Boeing 707 jetliners, has produced a wealth of new developments simply through solutions to the problems of putting it together.

Holding the huge sections of the rocket in place for precision welding, for example, was almost impossible using conventional methods. An entirely new kind of clamp had to be designed, and so well was it done, that it has since been adopted by several leading manufacturers of large, precision metal structures.

An "electrodynamic" hammer that knocks out dents with brief but intense electric charges instead of pounding has won what almost amounts to acclaim from different industries.

Most NASA Tech Briefs contain the statement that "NASA encourages commercial use of this innovation. No patent action is contemplated by NASA." Some items are patented by NASA, but even they are all available for royalty-free use.

There are no doubt an incalculable number of scientific advances that could be brought about if scientists only knew which information to reach for in the vast sea of software (the engineer's term for printed matter—documents, plans, etc.). The Technology Utilization Program is an effort to bring selected new information before the people who would most benefit from knowing it.

• *Science News, 89:492 June 18, 1966*

MILITARY SCIENCE

Silent Turbine Designed For Use at Front Lines

➤ A TURBINE providing 3,000 watts of power so quietly that it could be used in combat near the front lines is being tested by the U.S. Army at Ft. Belvoir, Va.

The turbine works on the Rankine system, by heating a closed container of mercury, and is completely inaudible at about 100 yards. Production units should weigh less than 200 pounds.

The test model will run on any liquid hydrocarbon fuel, including gasoline and JP-4, a kerosene-based jet and rocket fuel. Other silent power sources being tested include a reciprocating steam engine.

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NBS

MAGIC—Paul Meissner, an engineer at the National Bureau of Standards, uses a light pen at MAGIC (Machine for Automatic Graphics Interface to a Computer) to connect an added symbol to a schematic drawing obtained from the machine's memory.

TECHNOLOGY

Computer Holds Pictorial Data in Its Memory

➤ DRAWINGS, maps, plans or schematic diagrams can be created, erased, changed or added to and then stored in the memory of a machine designed to facilitate man's communications with computers.

Pictorial material "drawn" on a screen is recorded and remembered by MAGIC (Machine for Automatic Graphics Interface to a Computer), a research tool developed at the National Bureau of Standards in work supported by NBS and the National Aeronautics and Space Administrations. With the help of computer operations, material can be edited while it is being designed and completed drawings can be retrieved for additional processing or output at a later time.

The basic principle of MAGIC is that a curve can be represented as a series of points along a connected path on the screen's display area. Each point can be described in terms of the values of its Cartesian coordinates and numbers corresponding to its display characteristics. Thus a curve can be described by three parallel lists of numbers giving successive values for two coordinates and the display characteristics.

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