

NASA asks \$12 million for Plum Brook expansion

By JOY OWENS

WASHINGTON—Expansion of existing facilities and construction of completely new ones to help keep the United States' space program in high gear are proposed in 1964 budget requests for the National Aeronautics and Space Administration's Plum Brook Station of Lewis Research Center.

Ohio 13th District Congressman Charles A. Mosher released details of the fund request to The Chronicle-Telegram this week.

The cost, as outlined by NASA officials, would total \$12,411,000 and would be divided this way among five major facilities:

SNAP-8 (System for Nuclear Auxiliary Power) assembly and spacecraft checkout building, \$5 million; propellant flow systems facility, \$1,316,000; addition to the existing spacecraft propulsion research facility, \$3,500,000; new engineering building, \$1,710,000 and an experiment assembly, test and storage building, \$885,000.

By comparison, 1963 fiscal year appropriations for major expenditures at Plum Brook totaled \$9,183,000 and were divided like this:

Space propulsion facility, \$5,500,000; lunar (moon flight) propulsion research facility, \$6,275,000; nuclear rocket dynamics and control facility, \$3,500,000; hydrogen heat transfer facility, \$2,400,000 and modernization and reconditioning of existing facilities, \$1,508,000.

EARLY THIS YEAR, specifically on Feb. 7, Congressman Mosher was notified by NASA officials at Plum Brook that responsibility for development of the Centaur launch vehicle had been transferred from the Marshall Space Flight Center at Huntsville, Ala., to the Lewis Research Center. At the same time, Lewis Lab's selection as prime developer of the M-1 rocket engine was reported.

NASA switched Centaur development sites, they said, because space agency experts believe dynamic testing of the Centaur in combination with the Atlas can be done to best ad-

vantage by altering the "E-Stand" at Plum Brook to permit such tests with a simulated payload.

The alteration will include addition of weather and wind protection, strengthening the members, removing existing space interferences, adding hydrogen, nitrogen and water propellant plumbing, and providing special scaffolding, a new data system, a hydraulic shaker and two cable suspension systems.

Cost of the E-Stand modifications is estimated at \$870,000. The money will be made available from NASA's general Operational Vehicle Support Project funds because of the change in development and test site from Huntsville to Cleveland.

Here are NASA's specific requests and recommendations concerning the five proposed projects for fiscal 1964:

(1) — **SNAP — 8 Assembly and Spacecraft Checkout Building:** At \$5 million, this is the headliner of the program. The facility itself will consist of a building for pre-flight testing and integration equipment for the SNAP-8 flight test vehicle.

Space must be provided to check out all subsystems, components and elements delivered from suppliers, then assemble and integrate them into a flight test vehicle, check the completed vehicle and package it for shipment to Cape Canaveral. Because SNAP-8 specifications are for vertical assembly, special high-ceiling areas and such special material handling equipment as high-lift cranes will be necessary.

THE PLUM BROOK nuclear reactor, described in detail on the science pages of last Saturday's Chronicle-Telegram, will play a major role in SNAP-8 research and already is protected by biological shielding and other special devices designed to reduce hazards from any possible malfunctions to a minimum.

Liquid metal systems, a white room, nuclear materials storage, cold soak equipment, instrument shops, health physics equipment and other "support" items will be provided to com-

plete the facility.

The building itself, according to present plans, will be 120 feet by 220 feet. It will include a partial basement for mechanical and electrical building services and space on the second floor for locker rooms and storage areas. Construction will be steel frame with metal siding, and the entire structure will be located adjacent to the present space propulsion facility.

The first of four flights of the SNAP-8 electric generating system is scheduled for sometime in 1967. The actual flights, of course, will be preceded by extensive ground tests and the so-called life test, requiring 90 days of a non-flight model in simulated space environment.

The testing phase is scheduled to begin late in 1965; that is the deadline currently facing Lewis Research Center and specifically Plum Brook Station personnel for having test and integration support facilities ready to go.

SNAP-8 will involve the handling and storage of radioactive materials, fissionable fuels and hazardous liquid metals such as mercury. Normal facilities simply are not suitable; special, complex facilities must be designed and the hazards of operating a nuclear reactor kept at a minimum.

A flight test of the SNAP-8 will be extremely expensive; cost of the Saturn B booster alone will be well over \$25 mil-

lion. According to NASA, the cost of all the SNAP-8 testing and integration facilities at Plum Brook will be a great deal less than the total cost of just one unsuccessful flight. Plum Brook's goal: Be able to conduct tests so thorough that the fantastic cost of a test flight failure can be avoided.

(2) — **PROPELLANT FLOW SYSTEMS FACILITY:** This project, estimated to cost \$1,316,000, would enable Plum Brook scientists to check out the reliability and operating characteristics of propellant flow systems in the M-1 and Centaur size and class. It also would provide for the training of test and evaluation personnel because components for these highly complex systems undergo a great deal of in-house testing after they arrive at Lewis Research Center from various contractors.

The test array, according to plans presented in the fund request, would include a full-scale cryogenic (extreme, artificially-induced cold) propellant flow system. Planners expect to install the equipment in an existing . . . and currently vacant . . . test bay of the rocket systems hydraulics laboratory at the Plum Brook Station.

Almost \$1 million of the total estimated cost would be spent on liquid hydrogen flow equipment (\$750,000) and liquid oxygen flow equipment (\$250,000). There would be two liquid hydrogen containers, one of 24,000

gallons capacity to be used as a supply tank and a 30,000 gallon one for a receiver tank. A gaseous pressurizing system would be constructed to force propellants through the test equipment and to transfer from one tank to the other.

Also included would be burn-off facilities for gaseous hydrogen, an inerting system, vacuum jacketed piping, liquid level measuring devices and the necessary piping and instruments.

Plum Brook researchers would use all this to examine the effects of launch and space environments on individual parts and subsystems, then go on to study the interaction of parts and overall stability of the entire system. It adds up to another phase of testing and double-checking so necessary to spacecraft reliability.

(3) — **ADDITION TO THE SPACECRAFT PROPULSION RESEARCH FACILITY:** The requested expansion would provide the means to simulate space environment and would cost an estimated \$3,500,000.

The low temperatures of outer space will be simulated by cryogenically cooled panels lining the interior of the test chamber. A remote liquid nitrogen storage area and connecting pipe system will provide a continuous supply of coolant. For temperature changes that would be brought on in space by heat of the sun, various types of radiant heaters will be installed.

One of the major problems faced by spacecraft designers is producing a vehicle that can function properly after long exposure to space conditions. Many individual parts and subsystems are developed and tested in space simulation chambers, but assuring the reliability of a completely assembled vehicle is another matter.

To meet this challenge, the requested addition to the Plum Brook Spacecraft Propulsion Research laboratories not only would expose the vehicle to a simulated space environment, but also would permit a complete "functional" test. This would include space starting and operation of the rocket engines.

The proposed Plum Brook facility, when complete, would provide testing for space vehicles up to 50 feet long and 32 feet in diameter; thrust levels could be as much as 45,000 pounds with high-energy propellants and storable propellant rockets of up to 50,000 pounds thrust also could be tested.

That would enable Plum Brook to test all stages of the Project Apollo (moon flight) three-man spacecraft. And, in addition, even more advanced designs for deep-space vehicles could be tested at the Sandusky station.

(4) — **ENGINEERING BUILDING:** The request here is for \$1,710,000 to solve a more down-to-earth problem, that of an ordinary housing shortage.

By 1966, Plum Brook Station is expected to have a staff of 1,000 persons. Right now, there are just half that number. Projects already approved for construction, NASA officials say, will provide enough office space in the reactor and rocket areas for approximately 160 persons; offices for 130 more men and women will be available in the space propulsion facility.

But it's not enough. An analysis of future needs indicates permanent offices should be provided for 500 persons . . . an increase of 300, or just double what soon will be available on present contracts.

Currently, most of the office personnel are housed in trailers

and in temporary wooden structures built in 1941 that can be used for office space until completion of the new building. NASA officials say small expenditures must be made from time to time to keep these buildings in "minimum" condition for use, but they believe it is impractical to spend large amounts for any long-range "up-grading" and remodeling on the structures.

The requested engineering building would be in two sections. The first would contain three floors and a partial basement. It would house offices, and in all would be approximately 30,000 square feet or 13,000 square feet per floor.

The second section, connected, would include a 5,000 square feet auditorium and a one-floor cafeteria of about the same size.

The office area would house 300 persons in addition to containing conference rooms. The auditorium would seat approximately 500 persons and the cafeteria, approximately 250. At present, there is no suitable place on the Plum Brook grounds where technical meetings of more than 80 persons can be held.

(5) — **EXPERIMENT ASSEMBLY, TEST AND STORAGE FACILITY:** This request pinpoints another housing shortage, this time involving storage space for complex and technical materials rather than staff personnel facilities. Estimated cost to eliminate the problem is \$885,000.

Currently, there are no available facilities or space in the Plum Brook Station's reactor area to assemble, pre-test or store experiments.

In most cases, larger experiments will be shipped unassembled because they contain much fragile equipment and many instruments which cannot be shipped safely by common carrier after being assembled.

For this reason, both assembly and pre-testing must be done in the reactor area before radiation. The pre-testing is almost as important, in a researcher's view, as assembly because any design faults, "mismatches" or shipping dam-

age to individual components could be detected before an experiment goes into the reactor. It all prevents costly delays that otherwise tie up the reactor itself unnecessarily.

The requested project would provide a new mill-type building with a ground floor area of approximately 10,500 square feet. A mezzanine floor of approximately 4,000 square feet and a partial basement are included.

The building would be located in the reactor area, with easy access to the reactor building itself. A utility tunnel would be provided between the experiment building and the reactor facility for both routing and storage purposes.

A high bay crane is included in the proposal, for unloading and handling large experiments. A pool area, with the necessary circulation and water purification equipment would be provided at one end of the building; this would allow simulation of actual underwater environment required by the reactor operations. Instrument calibration and electronic testing areas, plus special areas for assembly shops also are included on the plans.

Stuttering in tots normal

Stuttering, a condition which affects approximately seven of every 1,000 school children in the United States, does not indicate any physical abnormality, according to Dr. Wendell Johnson of the University of Iowa.

Dr. Johnson says understanding on the part of parents is a major need of the child who stutters. Of primary importance, he believes, is that parents recognize repetitious speech for what it is: An entirely normal condition with two to four-year-olds.

The doctor explains parents should take special care not to indicate any concern when a very young child stutters. Apprehension expressed by the parents often leads a child to believe he is doing something wrong or abnormal, and this psychological problem can lead to chronic stuttering.

Astronomers give MIT the needle for blocking telescopic eye in space

(PTNS) — Those 400,000 million hair thin copper needles that you can't see 2,000 miles above the earth are doing fine, thank you.

The U.S. Air Force, which asked Massachusetts Institute of Technology to put up the earth's new copper halo, reported this week it already has grown to a length of 300 miles of its eventual 40,000 miles, is 10 miles thick and 10 miles from top to bottom.

First contact with the orbiting needles was made by radar Sunday. Eventually, MIT scientists plan a series of tests of the halo's value as a radio antenna. Each needle makes a single rotation of the earth every 106 minutes.

An Air Force rocket carried the 400,000

million needles to an altitude of 2,000 miles in a launch whose date was not revealed, then tossed them out in ejector capsules.

If all goes well . . . and some famed international astronomers hope it won't . . . the copper needles will form a 40,000-mile-long antenna around the earth within a month.

The astronomers don't object so much to this test launch of the needles as they do to a proposed Air Force needle-antenna much broader than the current one. That would provide a virtually unjammable antenna for radio communications on a single band.

But, insist astronomers, it also would interfere with telescopic scanning of the universe.

Budget Lists Major Plum Brook Funds

A \$12,411,000 construction and expansion program for Plum Brook Station of the National Aeronautics and Space Administration has been approved for 1963, Congressman Charles A. Mosher, announced today.

Largest item in this year's budget is \$5 million for a new building to assemble and check out Snap-8 space craft at Plum Brook. This is a new NASA nuclear propulsion system for outer space probes.

Additions to the Plum Brook rocket stand will cost \$3,500,000 while a new engineering building is listed at \$1,710,000. A new propulsion flow systems building rates \$1,316,000 while an addition to a building for assembling and

pre-testing of space craft and components will cost \$885,000.

An additional \$13,424,000 will be expended this year at the Lewis Research Center of NASA adjoining Cleveland Hopkins Airport, under which Plum Brook Station operates.

In announcing the figures, Congressman Mosher expressed "shocked disappointment" at the fact that three new projects for the 13th District were not included in the budget.

The Sheffield Lake beach erosion project, Huron Harbor deepening project, and the Fremont flood control project were omitted. The projects were all authorized during the last session of Congress.

THE CHRONICLE-TELEGRAM

Friday, January 18, 1963

Elyria, Ohio

Mosher will ask Congress for funds for three projects

By JACK BIRCHILL
CT State Editor

WASHINGTON — Rep. Charles A. Mosher, R-13th, will ask Congress to appropriate funds for three new public works projects in this district despite President Kennedy's exclusion of the projects in the federal budget.

Mosher, who would not comment on the huge federal budget or where he thought fund cuts could be made, told the Chronicle-Telegram the three projects, at Sheffield Lake, Fremont and Huron, would have benefits larger than their cost in the long run.

Only one new start on a public works project in Ohio was authorized by the President, and that was a survey on a flood control project in the district of Rep. Michael Kirwan of Youngstown, a Democrat who heads the House Appropriations Public Works Subcommittee.

Kirwan is the man Mosher will

have to convince the three projects in this area are worthy of inclusion in the budget. The last Congress authorized the projects, and it was up to this Congress to appropriate the money necessary to get them going.

Public works money

Some public works money will be coming into the district, Mosher said, but this is for projects already underway. He listed these as \$80,000 for operation and maintenance of the Huron harbor; \$4,100,000 for construction already begun at the Lorain harbor and \$1,400,000 for operation and maintenance of the harbor; \$1,531,000 for construction already under way at Sandusky harbor; \$100,000 for operation and maintenance and \$370,000 for rehabilitation; \$200,000 for rehabilitation of the west pier at Vermilion.

Mosher said the biggest disappointment to him was the loss of the Huron harbor project, which would have poured \$8,557,-

000 of federal money into the district.

The two other projects dropped from the federal budget were the \$4.3 million Sandusky River basin flood control project and the Sheffield Lake beach erosion project which would have cost \$100,300 in federal funds.

Mosher called the exclusion from the budget of the three projects a "shocking disappointment" and said it would be difficult to get Congress to approve the projects.

"Some people say it is impossible to get the money for the projects," the congressman said.

Another Ohio Republican congressman, William Harsha Jr., Portsmouth, also said he was disappointed when Kennedy did not include the proposed dams along the Scioto River in Central and Southern Ohio.

"This administration has shown absolutely no interest in the welfare of the citizens of Ohio. That's

why I'm not surprised at the absence of funds for the Scioto program," Harsha said.

A federal public works project is approved by Congress in one session and then funds must be appropriated by other sessions during the life of the project.

"The projects in this district were supported by evidence and testimony," Mosher said.

Mosher also said it was a difficult question to answer when asked about where economies should be made in federal spending. He said he had not yet formed an opinion about the record budget introduced by Kennedy, but insisted the public works projects in the 13th Congressional District were not of the "pork barrel" variety.

The three communities where the public works projects were turned down will have to support his efforts before the subcommittees, Mosher said, if he is to be successful.

\$25.8 million OKd for Lewis

WASHINGTON—The Bureau of the Budget yesterday approved a \$25,835,000 appropriation for the National Aeronautics and Space Administration's Lewis Research Center in fiscal 1964, to be divided almost equally between Lewis' Cleveland and Sandusky installations.

The total includes \$12,411,000 for new construction at the Plum Brook facility at Sandusky and \$13,424,000 for the Cleveland laboratories.

Congressman Charles A. Mosher and Lewis Public Relations Officer Harry McDevitt both described the fund approval as just a tentative listing. Neither would elaborate on the major construction plans at Plum Brook until those plans are detailed in Congressional budget allocation hearings that will begin in the near future. Congress will consider these specific requests as part of an overall \$5.7 billion NASA budget for fiscal 1964. Recommendation for the allocation to Lewis was made by NASA boss James E. Webb.

The fund authorization came just one week after NASA announced the assignment of three major space exploration projects to Lewis and the beginning of a "talent hunt" that officials hope will result in bringing 400 new scientists and engineers to Lewis by April 1.

The three programs include development and testing of the giant Centaur rocket, given crash priority by the White House; Agena second-stage rocket and the M-1 rocket engine. All are to be integral developments of this nation's moon flight and planetary probes.

Last year, Congress authorized, but did not specifically allocate, \$40 million for new construction at Plum Brook alone; the present

\$12,411,000 is part of that \$40 million.

Currently, the Sandusky installation employs 600 engineers and scientists; 200 more are to be added within the next year. Congressman Mosher said the 200 men and women probably will represent approximately half of the new force now being recruited from all sections of the United States for the expanded Lewis program.

New construction

New construction at Plum Brook, if the \$12,411,000 appropriation received final approval in Congress, will include:

Propulsion flow system facilities, \$1,316,000; new engineering building, \$1,710,000; additions to existing rocket test stands, \$4,500,000; additions to present build-

ings for the assembly and pre-testing of spacecraft and components, \$885,000 and a new building for the assembly and check-out of the SNAP-8 nuclear propulsion system, \$5,000,000.

Thus, the nuclear rocket system and related test stands are expected to receive approximately \$8,500,000, the grant's share of the overall Plum Brook funding. Present-day chemical rockets, used to propel satellites and manned spacecraft in earth orbital flights, lack the power needed for lunar and deep-space probes. Nuclear propulsion and stand-by solar propulsion systems are under development, with the former top-rated as the power-pack for future long-range space flights, according to NASA officials.

'Nuisance' question ruling asked in teacher's case