

## ROCKETS AND MISSILES

# Atomic Plant for Space

THE TOM THUMB atomic power plant recently developed to supply 3,000 watts of electricity for satellite instruments will never make a trip into space.

Although unchallenged as a major advance in nuclear power engineering, the SNAP II power plant is much too heavy for existing rockets to boost into orbit, and appears to be too heavy even for future rockets.

SNAP II's reactor, about the size of a five-gallon milk can, weighs 220 pounds. Its football-size turbine-driven electric generator weighs 30 pounds. Quotations for shielding weights, however, have run from about 400 to 800 pounds, depending upon whether instruments or man must be protected. This gives a total weight of 650 to 1,050 pounds that would have to be boosted into orbit, in addition to the instrument payload.

Adequate power for satellite instruments—even a 3,000-watt load—can be obtained through lighter solar cell-battery combinations, but a National Aeronautics and Space Administration scientist said the atomic power plant would become more feasible if it could be made lighter, or if its power output could be increased.

SNAP II's chief purpose was to demonstrate the concept. A follow-up improvement that will accentuate lightness of weight is now on drawing boards.

SNAP II's reactor was built and tested

for the Atomic Energy Commission by Atomics International, Canoga Park, Calif., and the turbine-generator was tested using an electrical source of heat. The AEC said the first test of actual electric power generation using the reactor as the heat source is slated for next summer.

AEC's Chairman John A. McCone said about \$6,500,000 has been spent on the SNAP II project, but that individual reactors would cost about \$400,000 once they go into production.

The units are expected to last about a year in service—the fast-running turbine-generator being the weak link. The reactor itself is good for about six years.

SNAP II's core is a fissionable charge of enriched uranium mixed with zirconium hydride that acts as a moderator. Liquid sodium picks up heat in the reactor and transfers it in a heat exchanger to liquid mercury. The mercury vaporizes at 675 degrees Fahrenheit, making a mercuric "steam" that drives the turbine-generator at the rate of 40,000 revolutions a minute. Upon condensing, the liquid mercury then lubricates the turbine-generator bearings on its way back to the heat exchanger.

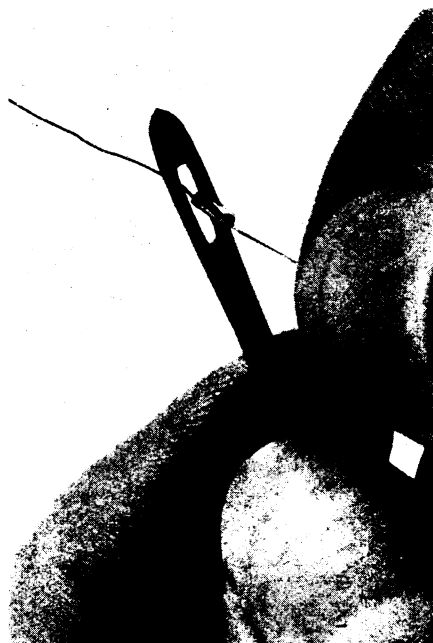
The reactor is rated at 50,000 thermal watts, but the turbine-generator is only six percent efficient. Total electric power output, therefore, drops to 3,000 watts.

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sibility for testing had been entirely voluntary on the part of the manufacturer and commercial user of the additive.

Now the burden of proof rests on the manufacturer who must submit specific tests to FDA scientists. These tests must prove that the additive is safe, relative to the proposed method and quantity of its intended use.

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**NEEDLE LAMP** — *An incandescent lamp, believed the smallest mass-produced in the world, that can pass through a needle's eye is expected to open new frontiers in microminiature transistor circuitry.*

## PUBLIC HEALTH

# Additive Revision Due

THE NEXT session of Congress is expected to amend a law to allow continued use of some coal tar colors now judged legally unsafe for human consumption.

At the present time, the Food and Drug Administration has been asked to grant a hearing by manufacturers who use any of 17 coal tar colors recently labeled harmful, under the terms of the 1938 Food, Drug and Cosmetic Act.

Tests indicated that the colors, aniline dyes, cause sickness when fed in large amounts to laboratory animals. According to the law, which FDA itself recognizes is "unrealistic," if the ingredient tested, although fed to the animals in huge portions, could cause sickness, then not one milligram could be used in a product that would be consumed by humans.

The scientific community appears to agree that such substances, other than those known to cause cancer in test animals, can be added in small amounts to products that will eventually be ingested by man, even when it is proved that large amounts are harmful to animals.

The 17 coal tar colors under question now are used mainly in the manufacture of lipsticks, candies, soft drinks and canned cherries. They can also be purchased for coloring foods in the home.

FDA has issued an order that manufacturers must stop using these colors beginning next year. However, an amendment to the law governing this order passed the Senate during the last session. There is a possibility that the amendment will pass the House at the beginning of the next session, before the hearings requested by manufacturers begin.

The FDA, recognizing the inadequacy of the present law, is backing legislation that will help remove the inadequacies of the now 21-year-old law.

FDA has asked Congress to amend the law to allow that Governmental agency to determine what amount of each coal tar color can safely be added to a particular consumer item. This does not mean the 17 colors will automatically be approved. The manufacturers who wish to use the colors would have to submit results of animal tests to FDA scientists.

FDA, in turn, would examine the data and pass judgment on the safety of particular amounts of each color. In effect, the amended law would be similar to the food additives law which makes the pre-testing of food additives a legal requirement.

Previous to the food additives law, which became law on March 5, 1959, the respon-

## AERONAUTICS

## Hydro Skis for Jets Improve Ditches at Sea

DITCHING a jet transport at sea will go much more smoothly if the plane is equipped with hydro-skis. If not, the plane should be ditched with its landing gear retracted.

After tests using models, William C. Thompson of the National Aeronautics and Space Administration's Langley Research Center, Langley Field, Va., reported small hydro-skis loaded to 2,500 pounds per square foot gave best ditching results. Little damage occurred to the plane even when ditched in waves four feet high, he said. The model made no apparent oscillation about any axis and gradually settled into the water as it slowed down.

Tests showed that ditching with the main landing gear retracted "will likely result in most of the fuselage bottom being torn away and the airplane sinking within a very short time." But even this was found preferable for safety reasons to ditching with the landing gear down.

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