



Northrop Corporation

WINGLESS VEHICLE—Artist's concept shows National Aeronautics and Space Administration's M-2 lifting body vehicle designed and fabricated by Northrop Corporation landing at NASA Flight Research Center, Edwards, Calif. The M-2 will be dropped from a B-52 and glide to a landing.

INVENTION

Space Ferry Patented

A "lifting body," or wingless spacecraft, may carry astronauts back to earth from space

► **THE BASIC** design of the space ferry U.S. astronauts could some day use to return to earth from orbit was patented by the U.S. Patent Office.

The design is for what is called a "lifting body." This is a flying craft in a category half way between a ballistic spacecraft, such as the Gemini capsules, and a glider.

One version of the flight vehicle just patented was successfully test flown last July by National Aeronautics and Space Administration pilot Milton O. Thompson. The wingless M2-F2 capsule was dropped at 45,000 feet from a B-52 bomber flying about 450 miles an hour.

The M2-F2 was maneuvered through two 90-degree turns as it plunged earthward, then was glided to a safe landing at 200 miles an hour. The test proved that this lifting body is controllable and can land at low speeds. Next tests will be to determine whether or not the vehicle can withstand the searing heat generated upon reentry into earth's atmosphere.

The flight craft that was granted patent 3,276,722 looks more like a motorboat than a conventional plane. To provide a lifting shape, its upper sur-

face is flatter than the bottom. It has two vertical fins, one on each side of the trailing end of the craft.

The M2-F2 is 22 feet long and nearly 10 feet wide at its tail fins. It weighs 5,000 pounds empty and has internal tanks that could carry some 4,000 pounds of fuel in a powered version.

Lifting bodies, such as the M2-F2, are designed to attain lift from the body shape alone, eliminating the need for wings. The basic lifting body is a half-cone altered by blunting the nose and adding tail fins. Lift results from more air pressure on the bottom of the craft than on the top.

Another shape being tested by NASA is the HL-10, which is wider, stands higher and has three fins. Both lifting bodies were constructed by Norair Division of the Northrop Corp., under a NASA contract.

The original idea of lifting bodies was conceived in 1957 by Dr. Alfred J. Eggers Jr., now NASA Deputy Associate Administrator for Advanced Research and Technology. Dr. Eggers, Clarence A. Syvertson, George G. Edwards and George C. Kenyon, all also of NASA, assigned patent rights to the Government through NASA.

PUBLIC HEALTH

Fluoridation Lessens Disease in Adults

► **ANTIFLUORIDATIONISTS**, a Harvard professor said, not only "have little concern for the preservation of children's teeth," but "are contributing to the ill health of all of us, young and old alike."

Dr. D. Mark Hegsted, professor of nutrition at Harvard's School of Public Health, said an adequate intake of fluoride can keep bones healthy and prevent soft tissues from calcifying.

Studies on about 1,000 adults in North Dakota over a 45-year period yielded some interesting data, he reported at the American Dietetic Association meeting in Boston.

Evidence that calcium deficiency causes osteoporosis, a disease of the elderly in which bone becomes porous and soft, is tenuous, he said. But the North Dakota studies suggested that fluoride deficiency may play a part: the prevalence of osteoporosis was about twice as great in women living in the low fluoride area as in the high fluoride area.

The studies showed that the number of calcified aortas, which indicate severe hardening of the arteries, was greatly reduced among men who consumed high fluoride levels.



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