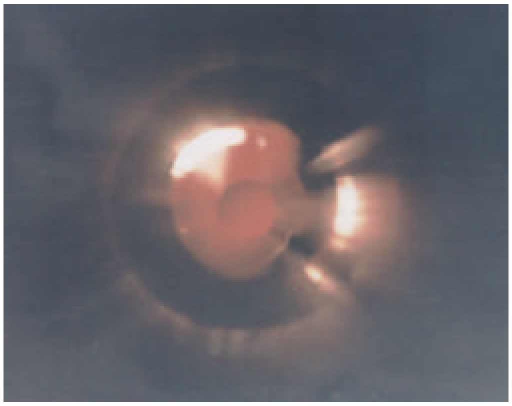
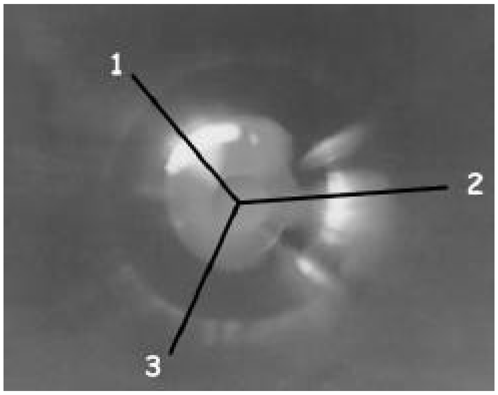


(The bottom of a passing UFO)

Picture is taken from
http://www.alienpropulsion.com/



Location #1 and #2 shows an energy pattern (on). #3 has no energy pattern (off). The energy is possibly used as thrust for steering the craft.

Synopsis of Unconventional Flying Objects: JSE Review

By: H.E. Puthoff

Institute for Advanced Studies at Austin, TX 78759

SUBJECT: Synopsis of Unconventional Flying Objects, by Paul Hill, Hampton Roads Publ. Co., Charlottesville, VA, 1995 (ISBN 1-57174-027-9) JSE Review by H. E. Puthoff, Ph.D., Institute for Advanced Studies at Austin, TX 78759

To the degree that the engineering characteristics of UFOs can be estimated by empirical observation, in my opinion the above-referenced, recently-published book by Paul Hill provides the most reliable, concise summary of engineering-type data available. [1] The data were compiled over decades of research by a Chief Scientist-Manager at NASA's Langley Research Center [2] who acted as an informal clearinghouse for UFO-related data. The strength of the compilation lies in its thoughtful separation of wheat from chaff, and the analysis of the former into coherent patterns, including detailed calculations. Perhaps surprising to the casually interested, under careful examination the observations, rather than defying the laws of physics as naive interpretation might suggest, instead appear to be solidly commensurate with them, as the following discussion shows.

One of the most consistently-observed characteristics of UFO flight is a ubiquitous pattern in which they tilt to perform all maneuvers. Specifically, they sit level to hover, tilt forward to move forward, tilt backward to stop, bank to turn, and descend by "falling-leaf" or "silver- dollar-wobble" motions. Detailed analysis by Hill shows that such motion is inconsistent with aerodynamic requirements, but totally consistent with some form of repulsive force-field propulsion. Not satisfied with paper analyses alone, Hill arranged to have various forms of jet-supported and rotor-supported circular flying platforms built and tested. Hill himself acted as test pilot in early, originally-classified, versions, and found the above motions the most economical for control purposes. Pictures of these platforms are included in the text.

In an effort to examine the force-field propulsion hypothesis yet further, Hill analyzed a number of cases involving near-field interactions with an apparent craft in which some form of force was in evidence. These include examples in which a person or vehicle was affected, tree branches were parted or broken, roof tiles were dislodged, objects were deflected, and ground or water were disturbed. Under close analysis the subtleties of these interactions combine to point unequivocally to a repulsive force field surrounding the craft, while discriminating against propulsion mechanisms involving jet action, pure electric or magnetic effects, or the emission of energetic particles or radiation (although the latter may accompany the propulsive mechanism as a secondary effect). Further detailed investigation indicates that the particular form of force field propulsion that satisfies observational constraints is what Hill labels a directed acceleration field; that is, a field that is, in general, gravitational-like in nature, and, in particular, gravity-canceling. [3] Such a field acts on all masses in its sphere of influence as does a gravitational field. Corollary to this conclusion is that observed accelerations ~100 g's relative to the environment could be sustained without on-board high-g forces.

One of the consequences of the above identification of field propulsion type by Hill is his conclusion, supported by detailed calculation, computer simulation and wind-tunnel studies, that supersonic flight through the atmosphere without sonic booms is easily engineered. Manipulation of the acceleration-type force field would, even at supersonic speeds, result in a constant-pressure, compression-free zone without shockwave in which the vehicle is surrounded by a subsonic flow-pattern of streamlines, and subsonic velocity ratios. An additional benefit of such field control is that drops of moisture, rain, dust, insects, or other low-velocity objects would follow streamline paths around the craft rather than impact it.

Another puzzle resolved by Hill's analysis is that craft observed to travel continuously at Mach 4 or 5 do not appear to generate temperatures sufficiently high to be destructive to known materials. In other words, UFOs appear to prevent high aerodynamic heating rates, rather than permitting a heating problem, then surviving it with heat- resistant materials as is the case of the Shuttle whose surface temperatures can reach 1300 degrees C. The resolution of this potential problem is shown by Hill to derive from the fact that the force-field control that results in the prevention of shockwave drag as discussed above is also effective in preventing aerodynamic heating. In effect the airflow approaches, then springs away from the craft, depositing no energy in the process.

A further example of the type of correlation that emerges from Hill's analytical approach is provided by an analysis of the economy of various flight-path profiles. It is shown that high-angle, high- acceleration departures on ballistic-arc trajectories with high-speed coast segments are more efficient than, for example, intermediate-level, horizontal-path trips, both in terms of required impulse-per-unit-mass and time-of-flight parameters. This he correlates with the observation that UFO departures are of the dramatically high-angle, high-acceleration type.

Also of interest is Hill's analysis of the spectra and intensity of an apparent plasma sheath surrounding such craft, the details of which correlate with what one would expect in terms of it being a secondary effect associated with the propulsion system, for example, a blue shift and intensity increase during a "power-up" phase, and the opposite during hover or landing maneuvers. An additional fine point that emerges from this analysis is resolution of the paradox that observation on a direct line-of-sight to a near part of the craft can reveal a metallic-like structure while the attempt to observe the outline of the craft, necessarily by an oblique line-of-sight, results in an indistinct blur. Analysis shows this to be a reasonable outcome of an expected re- absorption of reflected light by the surrounding plasma in the longer- length path associated with the more oblique view.

Another typical nugget of information is found in Hill's discussion of the results of the analysis of a possible UFO artifact, the famous Ubatuba magnesium fragments claimed to have originated from an exploded unidentified craft near Ubatuba, Brazil. Laboratory analysis of the samples found the magnesium to be not only of exceptional purity, and anomalous in its trace composition of other elements, but 6.7% denser than ordinary pure magnesium, a figure well beyond the experimental error of the measurement. Hill's calculation shows that this observation can be accounted for by assuming that the sample contained only the pure isotope Mg26, rather than the naturally-occurring distribution among isotopes Mg24, Mg25 and Mg26. Since the only isotope separation on a significant scale in terrestrial manufacture is that of uranium, such a result must be considered at least anomalous, and possibly as evidence for extraterrestrial manufacture.

Additional calculations concerning the parameters of interstellar travel (including relativistic effects), and the energetics of such travel, have been performed and are included in tabular and graphical form. The wealth of material in these sections, along with discussion of the broad implications of this material, reveal the dedication and thoroughness of Hill's approach to his self-assigned task.

In the final analysis, one must conclude that Hill has assembled as good a case as can be made on the basis of presently available data that the observation of some "unconventional flying objects" is compatible with the presence of engineered platforms weighing in at something around 30 tons, which are capable of 100-g accelerations and 9000-mph speeds in the atmosphere. Perhaps more important for the technical reader, however, is Hill's supporting argumentation, based on solid analysis, that these platforms, although exhibiting the application of physics and engineering principles clearly beyond our present-day capabilities, do not appear to defy these principles in any fundamental way.

1. The book also comes highly recommended in a Frontispiece by Apollo 14 astronaut Edgar Mitchell, and in a Foreword by retired McDonnell Douglas R&D manager Robert M. Wood. [Back]

2. Ass't Chief, Pilotless Aircraft Research Div.; Assoc. Chief, Applied Materials and Physics Div. Retired from NASA in 1970. [Back]

3.Recent examples of the discussion of the technical aspects of candidate field propulsion mechanisms of this type are given in M. Alcubierre, "The warp drive: hyper-fast travel within general relativity," Class. and Quantum Grav., vol. 11, p. L73 (1994), and in H. Puthoff, "SETI, the velocity-of-light limitation, and the Alcubierre warp drive: An integrating overview," Phys. Essays vol. 9, No. 1, p. 156 (March 1996).

[Popular Mechanics - August 1964]

Major de Seversky's

Ion - Propelled Aircraft

An ion - generated wind will lift and propel this

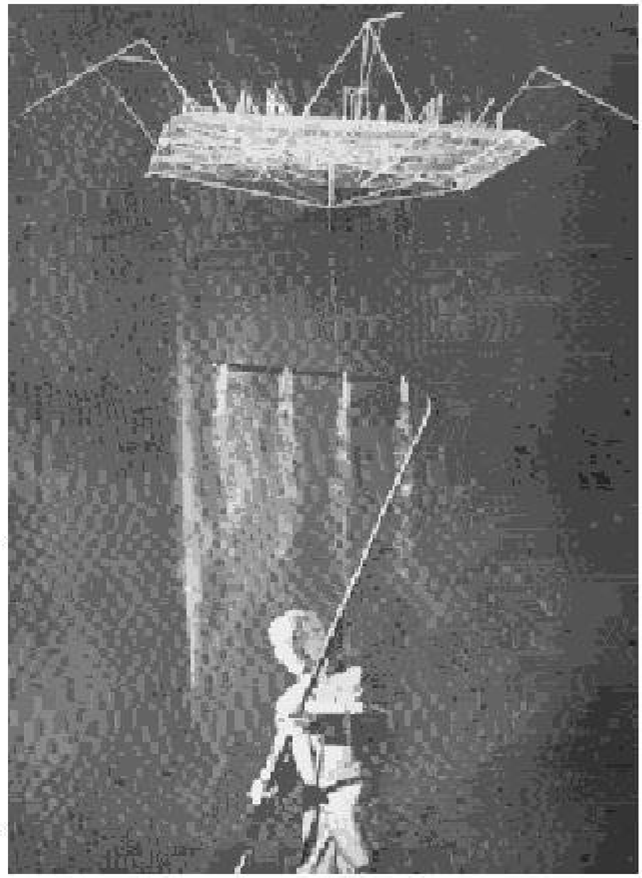
incredible magic carpet of the future

By Hans Fantel

The Ionocraft, patented by Major Alexander P. de Seversky, is propelled by the emission of ions. It may eventually be used as a TV relay station or missle destroyer. The downward flow of smoke shows the powerful electrostatic down draft created by the vehicle.

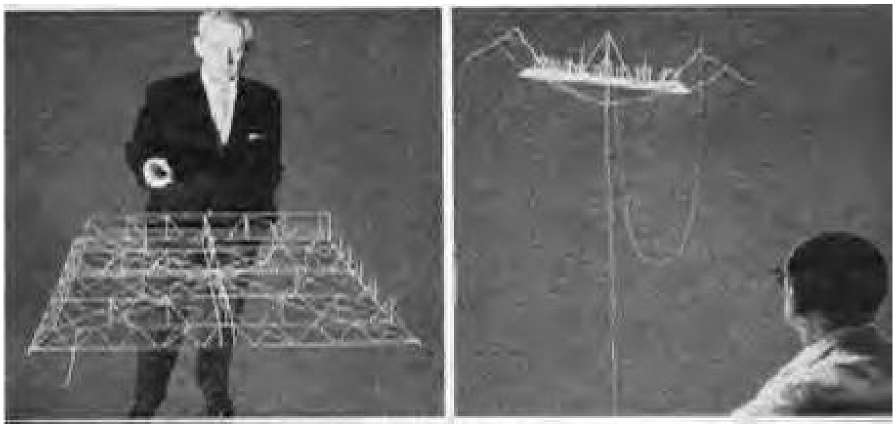
1296 square inches, 2 oz. weight
constructed of about $5.00 worth of
balsa wood and aluminum wire
consumes 90 watts of electricity
(30,000 volts X .003 amps)

Power-to-weight ratios IonoCraft .96 hp/lb
Piper Cub .065 hp/lb helicopter .1 hp/lb



IT WAS DOWNRIGHT SPOOKY. Without a sound, the peculiar, spiky contraption rose straight up, hovered awhile, climbed higher. Then it did a few graceful turns, stopped again, and just sat there silently in midair.

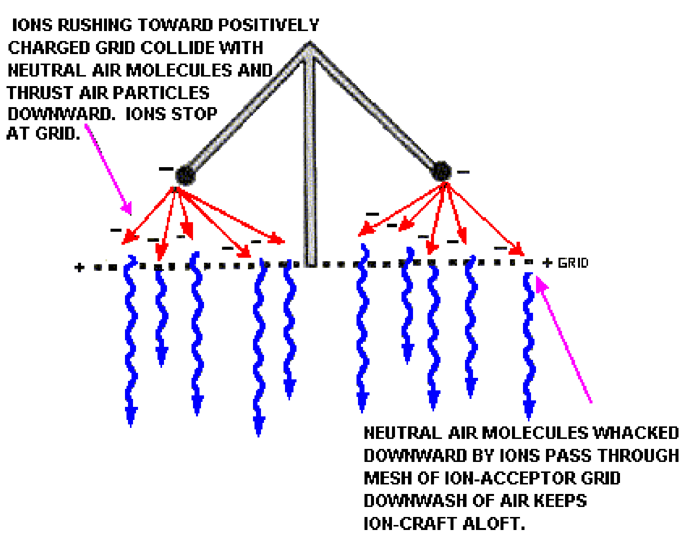
It seemed like levitation - some trick to overcome gravity. I could not shake off the feeling that i was attending a kind of spiritual seance, or maybe a Buck Rogers show, instead of an engineering demonstration. The eerie scene took place in the big barn like laboratory of Electron-Atom Inc., research firm in Long Island City, New York, devoted to the development of a new kind of flying machine. I had been invited to watch a scale model being put through its paces by remote control. What we saw was by far the oddest aircraft since the Wright Brothers' motorized kite. It had no prop. No jet. No wings. In fact, it had no moving parts at all looking somewhat like an old-fashioned bedspring, the rectangular rig is the nearest thing to a magic carpet. It needs no runway, takes off vertically and is expected to climb as high as 60 miles. It can crawl through the air like a snail, or go faster than a jet. Nobody yet knows the speed limit.



After a while, I closed my mouth. But David Yorysh, one of the project engineers, noticed my puzzlement.
"Any questions?" he grinned.
"Yes. What holds it up?"
"Ions," said Yorysh, as he launched into an explanation of a wholly new flight concept.
The magic carpet, called the Ionocraft, flies on pure electricity. It depends specifically on the fundamental principle of electricity that electric current always flows from negative to positive, and it uses two basic pieces of equipment to take advantage of this principle - tall metal spikes that are installed above an open wire-mesh grid. High negative voltage is shot from the spikes toward the positively charged wire grid, just like negative and positive poles on an ordinary battery. As the negative charge leaves the spike arms, it peppers the surrounding air like buckshot, putting a negative charge on some of the air particles. Such negatively charged air particles are called ions, and these are attracted downward by the positively charged grid.

"Okay," I said. "But I still don't see what holds it up."

"I'm getting to that," Yorysh assured me as he spelled out the rest of the Ionocraft principle. In their mad rush from the ion emitter to the main grid, the ions bump into neutral air molecules-air particles without electric charge. The terrific wallop in these collisions hurls a mass of neutral air down-ward along with ions. When they reach that air grid, the ions being negative are trapped by positive charge on the grid. but the grid has no attraction for the neutral air particles that got bumped along. So the air flows right through the open grid mesh, making a downdraft beneath the Ionocraft. The contraption rides on this shaft of air, getting lift just like a helicopter - by sucking air down from the top.



"Aerodynamically, it works just like a chopper," Yorysh summed it up.

"But instead of using a rotor and blades, we create the downward air flow electrically by means of ionic discharge. the ions act on the air like a man treading water. They just push down."

The engineers working on Ionocraft are the first to admit that their present rig is still a long way from any kind of practical aircraft. the model we saw measures only 1296 square inches and consists of about $5 worth of balsa wood and aluminum wire. But the principle holds an important promise for the future of aviation. The problem now is improving efficiency - getting enough lift from a given grid area and a given amount of energy, Present models cannot yet lift their own electric generators. they get power through a feeder cable, dangling down like an umbilical cord. Ionocraft engineers tend to be close- mouthed on performance figures. But they will tell you that at present it takes 90 watts (30,000 volts at 3 milliamperes) to fly a two ounce model. translated into ordinary power-to-weight ratios, this works out to roughly .96 hp. per pound, as compared with a typical .1 hp per pound of helicopter or .065 hp for a pound Piper Cub.

But Ionocraft designers are hard at work upping efficiency. One possible power - boosting technique is to pulse the power in short high energy bursts rather than apply steady voltage. They are also trying out various grid patterns and ion emitter layouts to minimize energy loss through turbulence in the downdraft. Despite such unresolved problems, the development crew almost bristles with optimism, and the most optimistic of all is the Ionocraft's inventor Major Alexander P. de Seversky. No crackpot, Major de Seversky is a practical visionary who in many areas has been far in front of his field.

"We hope to fly a model with self-contained power, perhaps by the end of the year," he told me, confidently. "Ultimately, the ionic drive will prove more efficient than either propeller or jet as a method of aircraft propulsion.

"It will achieve lift at less expenditure of energy and fuel than existing form of aircraft. In fact, it will prove the most efficient method of converting electricity into motion."

Coming from a man of de Seversky's background, such a statement has an almost prophetic ring. A leading aircraft designer and ace flyer for the past 50 years, de Seversky's idea's have often been ahead of their time - sometimes to the embarrassment of other aviation experts. Losing his right leg during his first flying mission in World War I didn't deter him from downing 13 enemy aircraft in later flights. After coming to the United States from Russia, de Seversky developed bombsights and course computers during the 1920s that were the forerunners of today's inertial guidance systems.

Worked with Billy Mitchell

Later he pioneered the design of the cantilever-skin stressed wing that is now in general use. He was consultant to General Billy Mitchell in the historic airplane-verses battleship tactical experiments of the 1920s, and as a special consultant to the U.S. Chiefs of Staff helped formulate basic air strategy in World War II. He also contributed to the designs of the P-35 and P-43 which led to the development of the P-47 Thunderbolt, one of America's most effective wartime fighter planes. Now a trim and sprightly man of 70, he still likes to take out experimental jet planes for a spin.

"The idea hit me as I was working on an electric air-cleaning device which I had invented," the major recalled. "That gadget was designed to fight air pollution by electrically charging the particles in industrial smoke and then trapping them on a liquid electrode with the opposite charge." De Seversky noticed an air flow developing between the two electrodes, caused by ionization process previous explained. "To an old flyer like me," said the major, "anything that stirs up a wind is a flying machine. So I began to develop the idea." The major seemed concerned that the Ionocraft might be mistaken for a kind of space vehicle. "This is not a spacecraft," he explained emphatically to forestall any misunderstanding. "It's an airplane, designed to operate within the atmosphere. But it will be able to do things no present type aircraft can accomplish."

Pointing out the potential advantage of Ionocraft over conventional planes or helicopters, de Seversky ticks of a whole string of radical notions:

High-altitude flight. Helicopters whirl their blades in utter frustration at altitudes where the air gets thin. Beyond 20,000 feet, they get almost no lift. By contrast, experts calculate that Ionocraft can kick up (rather kick down) enough air to stay aloft at 300,000 feet.

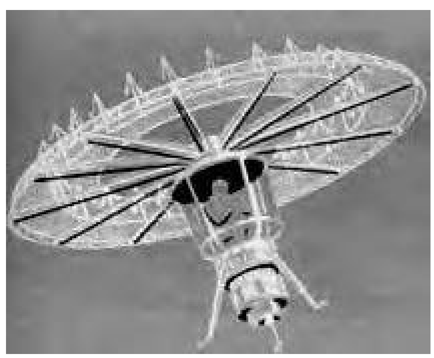
Unlimited size. The bigger it gets the better it flies. Efficiency increases with grid area. Distributing airflow around the grid edge becomes proportionately less important in larger craft. the reason: Grid area increases faster than circumference with growing size. "We'll be able to build them as big as a city block" claimed de Seversky.

High speed. No practical speed limit has been determined. The ions themselves flash from emitter to grid impart to the very high-velocity impulse. Aerodynamic drag would be the chief speed-limiting factor. But, streamlining of the grid edge and careful contouring of the craft, could minimize air drag.

Safety. No moving parts in propulsion and no wear, means less chance of failure, simpler maintenance.

Steering with Voltage

Steering control is accomplished by applying different voltages to various parts of the craft. The part with the high voltage gets more lift, hence tilts up. The form of the Ionocraft does not matter. Any shape will fly, but de Seversky assumes that round models in the form of a flying saucer will be the most easily manuverable. By a simple joystick control, the pilot can lift any edge of the craft, producing pitch and roll as if the Ionocraft had elevators and ailerons. He can put the craft into any flight attitude-noise up or down, or banking to either side. Like the tilt of a helicopter rotor, this inclination pushes the craft forward, rearward, or sideways.



J.F. Bruno, the technical director of de Seversky's staff, spoke of a passenger gondola in future models, suspended from gimbals below the main grid so that it remains level regardless of how the main deck is tilted. Locations below the main grid also shields passengers from high energy flow. But, even if the passengers somehow got into the ion stream, it wouldn't electrocute them unless they got "grounded" to the main grid. "It would be just like birds sitting on a wire," said Yorysh, the man in charge of electronic design. Until patents for Ionocraft were firmly nailed, de Seversky kept his ideas carefully under raps. That's another reason no full-scale prototype has yet been built. But even present scale models set the imagination buzzing.

Manned craft are envisioned for:
Commuter transport, With no size limit, you can pack trainloads of people into this VTOL craft, relieve traffic congestion around urban centers. The type of craft used as long-distance transport possibly at supersonic speeds-would not need big airports with long run ways.
Airborne traffic monitors. Hovering above bridges and major intersections, or patrolling above highways, one-man Ionocraft would provide a panoramic view of traffic conditions, radio information to ground

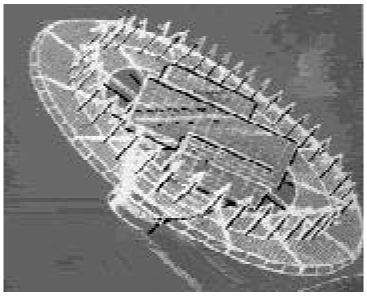
traffic-control centers.

Grid Is Hard to Hit

Military reconnaissance and rescue. Without moving parts, the Ionocraft is less vulnerable to small-arms fire than helicopters. the open grid makes a poor target. Most bullets would whizz right through it. Even if the grid is hit, the electric charge would be maintained despite the damage to some portions. Unlike a copter with shattered blades, the Ionocraft would not crash.

Weather observation. While satellites like Tiros look down on the atmosphere from outer space. Ionocraft could sail right into the weather-making air layers, providing valuable supplemental information. Being steerable, Ionocraft would not drift with the wind like weather balloons, but could hold a position over crucial areas, making local forecasts more reliable.

Skyborne antenna, kept aloft indefinitely in a fixed position by ground based energy supply. Ionocraft could also act as a skyborne antenna, extending the range of defense radar. "It would be like raising the DEW-line 60 miles up into the air," suggested de Seversky, "adding 15 to 25 minutes warning time against missiles."



Anti-missile machine. Always alert to military tactics, de Seversky believes that Ionocraft could be used as missile interceptors. Normally the craft would hover at high altitudes, scanning the horizon for a 700-mile range. As soon as it spotted and identified a hostile missiles through an infrared detection system, the Ionocraft would hurl itself at the enemy rocket on a collision course and blow it out of the air.

When practical craft are built, their designers expect to have a choice of several power supply systems now under development for NASA's space program. Some of these include:
Gas-turbine generators. Several firms, notably General Electric and Allis-Chalmers, have come up with compact, light weight, kerosene-fueled turbines, originally intended as power sources for spacecraft. These may be used to generate electricity aboard Ionocraft.
Fuel cells. these are chemical reactors producing electricity like a storage battery, but drawing their chemicals from external supply tanks. NASA is currently testing fuel cells converting hydrogen and oxygen to electricity, with drinking water as a byproduct.
Solar cells, directly convert sunlight to electricity-the present energy source of most satellites. When high-efficiency solar cells are available, they may keep Ionocraft aloft for indefinite periods.

Power from Boiling Mercury

Sunflower - a code name for another project aimed at deriving electric power directly from sunlight. It employs an umbrella-like reflector that focuses the sun's heat to boil mercury, which expands through a turbine and drives an electric generator. (Solar-power supplies would be back-stopped by other kinds of power generators to take over whenever no sunlight is available.)
Microwave radiation. Concentrated beams of high-frequency radio waves may transfer energy from ground stations to the Ionocraft if the craft is to be used as a hovering platform in a fixed position. Raytheon has pioneered this type of energy transmission through its Amplitron tube and has recaptured as much as 72 percent of the radiated energy at the receiver site. High-power laser beams may be similarly used for

transmission. Experimental hardware has already been produced for each of these off-beat power-supply systems.

None of the men working on the Ionocraft will be pinned down to any production timetable. "It's a pretty wild project," admitted technical director Bruno, a veteran 20 years in the missile business. "But that's what they said when we started working on rockets." Major de Seversky, whose own career goes back to the beginnings of aviation, views his invention in historical perspective: "We are exploring an entirely new principle of flight. We're just at the spot where the Wright Brothers were in 1903. We are just beginning to see the possibilities."