

# World News & Sports

Supplement

\$375,000 proves it:

## Frisbee definitely not a war toy says US military

By MIKE QUINN  
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In June of 1969, U.S. Navy Project NOO164-49-C-0662 began. The Naval Ammunition Depot in Crance, Inc., and the Government and Aeronautics Products Division of Honeywell Inc. of Hopkins, Minn., began their research on an "aerodynamic analysis of the self-suspended flare."

About \$375,000 later the two groups had run exhaustive tests, using: a subsonic wind tunnel, a CDC 6600 computer terminal, a Honeywell computer network teletype computer terminal, several cameras, a semi-automatic motion analyzer, consultation from Massachusetts Institute of Technology and Notre Dame University, and a test facility at Hurricane Mesa in Utah.

The team determined that a Frisbee could not be used as military hardware. That's right. A Frisbee—the round plastic toy that costs \$1.59 at the corner store, put out by Wham-O Manufacturing Co. of San Gabriel, Calif.

"Wham-O's feelings were mixed about this program," a company spokesman, Goldy Norton, said. "Primarily, the Frisbee is a fun thing. We weren't overly thrilled with the idea of its being used as a weapon. Very honestly, from the company's standpoint, our primary market is the 16-to-30-year-old age group. This would be called the anti-war generation. If the Frisbee were adopted as an article of war, it wouldn't help us any."

But the Pentagon, which did not notify the company of its plans, was not to be denied. A Navy spokesman said it now costs about \$50 for each intermediate-length parachuted from an airplane. The Navy was looking for for a cheaper, more efficient way. Flares are used to illuminate battlefield areas at night and have a peace time application in such missions as search and rescue.

So, in Crance, Inc., the Frisbee testing began and eventually resulted in a 207-page report. (It may be purchased for 3 dollars from the National Technical Information Service, Springfield, VA. 22151. Ask for publication ad 740117).

The objective of the research, according to the report, was "...to develop an air-launched flare concept which would utilize gyroscopic stabilization of the case of a disk-shaped flare to retard the descent of the flare sufficiently to provide intermediate-term illumination (without the parasitic weight and volume of conventional parachute flares)".

The testing of the Frisbee, as well as clay pigeons and other circular objects, was divided into three general areas. The actual research was done between June, 1969, and June, 1970, and the report was published last year.

In an "acknowledgement-disclaimer" at the beginning of the report, it is noted: "It is recognized that the name 'Frisbee' is a copyrighted trademark of the Wham-O Corp. Therefore, the more precise and legally correct way to describe the domed, cupped con-

figurations studied herein would be the terms 'Frisbee-like configuration,' etc. However, in the interest of brevity and clarity, especially on figures, this report will define the word 'Frisbee' to mean 'Frisbee-like configuration.' Therefore, 'solid Frisbee' would refer to a Frisbee-like configuration whose top is domed similarly to the 'Frisbee' but whose bottom surface is filled in flush, etc."

The first approach that was tried placed an aluminum Frisbee in a wind tunnel. It was held in place by a piece of metal. "The results of the tests correlated fairly well with each other and with preliminary estimates and with some available discus data," the report noted. In other words, not much happened.

Next, the researchers tried a spring-mounted Frisbee, but they found that the spring introduced unwanted test results such as wobbling and swaying. For that matter, the solid mounting did not bring very good results.

Then, the project was moved to Utah, but not before the researchers ran a program through a computer. According to their calculations, if a Frisbee were launched at a speed of 50 feet per second from a 2,000-foot cliff, it would be airborne for a little more than 20 seconds and would travel forward about 1,000 feet.

In one of its best moments the report noted: "Satisfaction of the precessional criteria represents simultaneous satisfaction of a relatively precarious simultaneous conditional equilibrium condition or coming close enough that the error from equilibrium causes and acceptably slow divergence from a straight flight." In other words, it is desirable to have a large, relatively light disk spun at a high speed and traveling at a low speed through the air.

At Hurricane Mesa the tests were not to be just throwing a Frisbee off a cliff. The Denver Research Institute designed and constructed a special Frisbee launcher that was to be used in planes if the project succeeded.

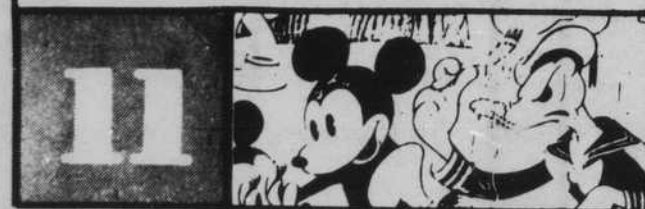
On hand also were a tracking camera to follow the flight, a data camera recording box, a panoramic motion picture camera and timing devices. Along the Mesa floor were 5-foot, red-and-white striped tracking poles.

As the report noted, "The results of the Hurricane Mesa tests were somewhat spectacular and unexpected." What happened was that the circular objects tended to take off like a jet plane when fired from the launcher. Their path was erratic and could not be controlled.

The report also noted: "While not successful in producing quantitative data, not too much had been expected, and these tests were valuable because they did provide qualitative validation of the math models and insight into the dynamic criteria, revealed problems in flare design, gave experience in field testing and data collection, and led to experience in data reduction."

In other words, the project was scrapped—but everyone had a good time while it was on.

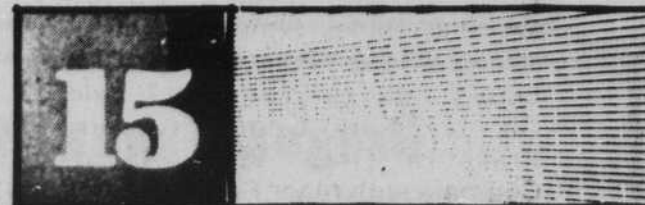
*In this issue. . .*



Walt Disney's empire is celebrating the 50th anniversary of its creation. To celebrate, clip this portrait of the famous Disney creatures, animated and for real.



The Mideast war can be viewed from many perspectives—among them the story of the land upon which the battles are being fought. University student Ron Eber is your guide.



They have changed New York's skyline for sure. But the other effects of the new World Trade Center towers haven't been assessed yet. Hold your breath and look up along with the man who designed them.



The Minnesota Vikings continued in their winning ways Sunday, staying at the top of the NFL's Central Division. The scoreboard lists all the league results.