

# FLIP (Floating Instrument Platform)

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<http://www.floatermagazine.com/issue01/Flip/>



Sinks in FLIP. Photo courtesy Scripps Institution of Oceanography

"Every trip aboard conventional ships reminds the oceanographer of the value of a stable platform from which to perform experiments at sea. A ship's natural motions not only make ocean measurements difficult to obtain with accuracy, but it reduces the effectiveness of personnel and equipment. This driving ocean force, among the most powerful in nature, dissipates rapidly just beneath the ocean surface. Even during severe sea storms rolling over several thousand square miles, a layer of relative calm lies a few hundred feet below the unruly waves. This region has become the domain of submarines during the past half century."<sup>1</sup>

In 1962, there was need for such a stable research platform for the US Navy SUBROC program. Thus, the *Floating Instrument Platform* (FLIP) "whose great length lies mainly in the untroubled waters beneath the waves" was created, offering the opportunity to its scientific crew of for more accurate ocean measurements. FLIP was conceived and developed by the *Marine Physical Laboratory* (MPL), *Scripps Institution of Oceanography*. It was originally built as an acoustics research platform and since its first launch it has been used to support a variety of oceanographic research projects including geophysics, meteorology etc. FLIP is a 355 feet (108 meters) long spar buoy designed to partially flood and "flip". FLIP has no engines or other means of propulsion. It is towed to its operating area at open sea, floating in horizontal position, then its ballast tanks are flooded and it tilts to an upright position, becoming a stable research platform that drifts freely or is anchored.

"All the living and working areas are in the top part of FLIP. Most of the bottom is empty compartments. When these are filled with air, FLIP floats in its horizontal position. When they are filled with seawater (which is heavier than air) the lower 300 feet of FLIP sink under the water and the lighter end rises. Twenty-eight minutes later, FLIP stands vertically, and its working areas have risen as much as five storeys into the air. During the flip, everyone stands on the outside decks. As FLIP flips, these decks slowly become bulkheads. (This is the name sailors' use for walls.) The crew step onto decks that were,

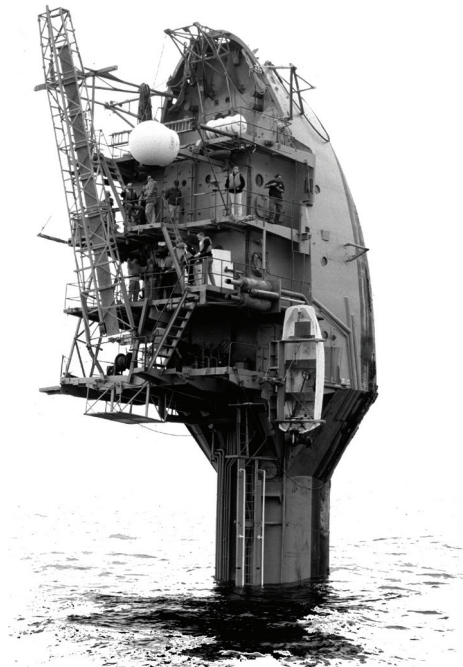
only moments before, bulkheads. Inside, decks have become bulkheads; bulkheads have become decks or overheads (ceilings). Some of FLIP's furnishings are built so they can rotate to a new position as FLIP flips. Other equipment must be unbolted and moved. Some things, like tables in the galley (kitchen) and sinks in the washroom, are built twice so one is always in the correct position ... Doors in the floor, portholes in the ceiling, tables bolted sideways to walls, stairs leading to nowhere! What kind of a research lab is this?"<sup>2</sup>

Despite this versatile condition -a reversed space that floats in open sea- FLIP maintains a structural stability. A paradoxical one: It capsizes in order to be stable. Space is structured so that the scientists can operate both in the platform's vertical and horizontal position and this dual function results from the need to research stably. The reversal is no sign of upheaval but the floatation mechanism suggested by FLIP.

## Notes

<sup>1</sup> *Floating instrument platform - FLIP*, [http://www.mpl.ucsd.edu/resources/flip\\_intro.html](http://www.mpl.ucsd.edu/resources/flip_intro.html) (July 15, 2008)

<sup>2</sup> Nan Criqui, *Flipping for science*, <http://sio.ucsd.edu/voyager/flip/flip3.html> (July 15, 2008)



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