

Close Formation

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The S.20 Mercury pulls away from its launcher aircraft, the S.21 Maia, at the start of the pair's 1938 nonstop flight.

The decade that followed Charles Lindbergh's 1927 nonstop flight across the northern Atlantic saw little progress toward commercialization of that route. Deutsche Lufthansa operated a mail route in the calmer south Atlantic, using a ship stationed midway between Africa and South America to recover mail-laden flying boats, refuel them, and catapult them on their way. The British thought they had a better idea.

An Imperial Airways technical general manager named Robert H. Mayo came up with the notion of mounting a small, fast, heavily loaded airplane atop a larger aircraft that would loft it to its cruising altitude, then return to base. Short Brothers was Britain's preeminent designer of waterborne aircraft and the builder of the Empire-class flying boats that connected the farthest reaches of the Royal realm; one such large, four-engine aircraft would be modified to make the S.21 Maia—the launcher half. To provide the launchee, Short Brothers proposed its S.20 Mercury, a small but fleet four-engine floatplane that would have a crew of two and carry about 1,000 pounds of mail. The joined aircraft formed a "composite" that provided eight engines for takeoff (see "Hitchhikers," June/July 2012). The small S.20 was powered by four Napier Rapier VI engines of 16 cylinders total, mounted in a unique arrangement: Two rows of four sat atop two more rows of four in a kind of mirror image described as an "H-block." The opposing pairs of four-cylinders drove a common crankshaft that was geared to the central propeller shaft.

Ordinarily, a heavily loaded airplane would be equipped with a constant-speed propeller to provide a lower, or flatter, propeller pitch on takeoff, allowing for great power and thrust, with the pitch gradually increasing for better efficiency as the airplane nears cruise. But the S.20 Mercury's wooden props were fixed at cruise pitch, thereby saving weight and avoiding the complexity of the variable-speed type. Interestingly, the big S.21 Maia would do more of the work on takeoff, but once in cruise, the S.20's wings would provide more than half the combined lift, which helped ensure safe separation.

The S.20 was mounted rigidly, fastened at the centerline on a pylon arrangement, and held in place by hooks and at each float by supporting pylons. When it was time for separation, the pilots of both aircraft announced readiness and pulled a lever disengaging their hooks and allowing a spring-loaded automatic hook to release the upward-pulling S.20. After a successful series of tests, on July 21, 1938—just 75 years ago—the combined S.20–S.21 launched the first nonstop east-to-west commercial flight ever made, linking Foynes, Ireland, and Montreal, Quebec.

Only one example of this duo was built, and with gains in engine and airframe performance, the concept was abandoned until World War II, when the Luftwaffe combined two aircraft in a similar fashion, with a fighter atop an unmanned bomber loaded with explosives. The fighter would separate near the goal and the bomber would hit the target and explode.

The idea survives today in the form of the Burt Rutan-designed SpaceShipOne, which is carried aloft beneath the White Knight launcher; that composite won the Ansari X Prize for first commercial craft reaching space. Orbital Sciences matches a Lockheed L-1011 to its Pegasus booster to loft small satellites into orbit. In both cases, the payload drops, whereas in the Short Brothers' case, it rose to the occasion.