The designation HRV-1 translates as Hydrofoil Research Vehicle One and is based on a modified 1960 Lake LA-4A amphibian. The "A" model of the LA-4 series has 2 ft added to each wing-tip (38 ft span) and the additional wing area provides a 50 lb increase in payload (2,450 lb gross), plus improved climb-out, glide, etc., characteristics. This LA-4A is unique in that it is the first aircraft to have been flown with a single hydro-ski and, more recently, with a single hydrofoil.

The research programme was carried out over a four-and-a-half-year period by David B. Thurston and his Thurston Aircraft Corporation, Sanford, Maine, under the auspices of the US Naval Air Systems Command, and with E. H. Handler as NASC technical director. The programme provides a low-cost aircraft with which to test a hydro-ski/foil installation in a scaled-down configuration, yet one that is adequate to obtain operational results of full-scale operation of open-ocean seaplanes, along with correct cavitation numbers and required high Froude numbers. The long-term intention would be to improve the sea-state capabilities of HU-16 air-sea rescue aircraft or possible future anti-submarine development aircraft.

Edo, the float specialists, initially developed a Grunberg hydrofoil which was evaluated by the Navy on a Grumman JRF-5G at the Patuxent River Naval Air Test Center during 1964. This craft was equipped with a large hydrofoil at the centre of gravity plus two bow hydro-skis, which unfortunately provided a large weight and drag penalty. A second-generation seaplane hydrofoil configuration design study was then initiated by Edo, this calling for a small, single foil positioned under the hull. A so-called supercavitating, penetrating hydrofoil, it carries a cavity or blister of air on its upper surface. Lift is obtained almost entirely from the hydrodynamic impact against the inclined lower surface. The penetrating foil has dihedral and provides lift even though partially submerged. The advantage of the supercavitating and penetrating combination is that it allows high-speed operation. A 1/4-scale model of this foil was tested in the Stevens Institute Towing Basin and, although the results at first seemed promising, they later proved inconclusive. It was then that the Thurston HRV-1 came into being.

In order to obtain a full evaluation comparison, the HRV-1 was first tested on a series of different hydro-skis and struts mounted at various extensions; then the programme was extended to include a series of foils. The hydro-ski is basically