Hydraulics Concept and Mission

The original plan was for *Extreme H2O* to have a hydraulic mainsheet, outhaul and Cunningham with electric winches in the forward cockpit. This called for a substantial 24vdc hydraulic pump for the mainsheet and a separate stand-alone electric motors for each winch. The motor weight alone of these systems was over 350 lbs not including the heavy wire weight and large 24 volt battery bank.

It was apparent that these two systems were extremely heavy and an inefficient use of our 300vdc x 28.8 Kwh battery supply. Instead we selected two pumps driven by 3 phase AC motors that receive their power directly from the hybrid battery bank after the DC power is converted to 3 phase AC power using a small Variable Frequency Drive (VFD).

The result is that the following functions are run via hydraulics:

- Mainsheet 1.3m throw can be pumped down < 15 seconds
- Outhaul
- Cunningham
- Mast rotation
- 2 Harken 990.3 winches with 2.4m/sec line speed (great for top down furling)
- 2 Harken 60.2 winches
- 2 mast head runners (eliminating the need for separate winches)

This system saved weight and allowed for faster mainsheet trimming and higher lines speeds on the winches. In addition, all three helm stations can control main trim and mast rotation.