ABSTRACT. Gluck and Ziller proved that Hopf vector fields on S^3 have minimum volume among all unit vector fields. Thinking of S^3 as a Lie group, Hopf vector fields are exactly those with unit length which are left or right invariant, and TS^3 is a trivial vector bundle with a connection induced by the adjoint representation. We prove the analogue of the stated result of Gluck and Ziller for the representation given by quaternionic multiplication. The resulting vector bundle over S^3, with the Sasaki metric, has as well no parallel unit sections. We provide an application of a double point calibration, proving that the submanifolds determined by the left and right invariant sections minimize volume in their homology classes.