Let (X,T) be a dynamical system with the marker property and set m to be its mean dimension. We prove that, for every integer $D > m$, there exists an equivariant continuous map $f : X \to ([0,1]^D)^{\mathbb{Z}}$ whose fibers contain at most $\lfloor D/(D-m) \rfloor$ points. In particular, f is an embedding when $D > 2m$. This matches the bound in the classical Hurewicz theorem for continuous maps into Euclidean cubes. The proof adapts the signal-analysis method of Gutman-Qiao-Tsukamoto to the finite-to-one setting and simplifies its analytic and geometric ingredients for $\mathbb{Z}$-actions. This is joint work with Yonatan Gutman.