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Given an asymptotically controllable control system, we present existence results of two kind of interesting stabilizing feedbacks. First, a feedback is said to be Almost Globally Asymptotically Stabilizing (AGAS) if the associated closed-loop system stabilizes almost every point to the equilibrium (with Lyapunov stability). Using the notion of stratified semiconcave control-Lyapunov functions, we will explain how to prove that every asymptotically controllable system admits an AGAS feedback. Second, we will introduce the concept of smooth repulsive stabilizing (SRS) feedbacks, and give first existence results in the framework of locally controllable control systems (that is control systems which satisfy the Chow's condition) on smooth manifolds.