Ultracold Fermi gases with tunable interactions provide a versatile test bed for studying quantum many-body phenomena; unlocking new ways to study condensed matter physics in an environment free of defects. We study the dynamics in a two-component strongly interacting Fermi gas following a quench of the inter-atomic interactions. In a first study, we measure the time dependent formation of pairs and their Bose-Einstein condensate after a quench of the interactions across the normal to the superfluid phase transition. We find that the short range correlations evolve far more rapidly than the long-range correlations needed to form a Bose-Einstein condensate. Finally, we perform a quench of the interactions within the superfluid phase, which excites oscillations of the superfluid order parameter, commonly known as the Higgs mode. Using two-photon Bragg spectroscopy, we directly observe the amplitude oscillations and obtain measurements of the pairing gap and damping rate as a function of temperature. Our data show good agreement with time-dependent BCS theory.