Beginning with an introduction to topological structures in electromagnetics, we will provide several examples of photonic topological insulators in metallic and dielectric media. We will discuss numerical methods for characterizing them in both inverse space and real space, and we will present several kinds of interface modes based on complementary impedance surfaces, spin and valley type structures, Zak phase structures, and antiphase boundaries. We will also discuss chiral modes in both two and three dimensions. We will then introduce several antenna applications including phase-locked propagation based on Dirac points, reflectionless radiation, and generation of orbital angular momentum modes. We will conclude with a discussion of recent research in nonlinear and plasma-based topological structures.