The microwave spectra of N₂O-SO₂ and N₂O-N₂O-SO₂ have been measured. The dimer lines are split due to a tunneling motion in the complex. The rotational constants of the higher frequency components of the doublets are A = 6126.9781(15) MHz, B = 1494.537(37) MHz and C = 1435.474(36) MHz, and those for the lower frequency components are A = 5500 MHz (fixed), B = 1463.484(23) MHz and C = 1420.953(23) MHz. The dipole moment has been measured, and the rotational constants for four isotopomers in addition to the normal species have allowed an inertial fit of the structure of the complex. The data indicate that the SO₂ straddles the N₂O asymmetrically (C₁ symmetry) with the sulfur closer to the oxygen end of N₂O. The trimer rotational constants are A = 1369.1014(11) MHz, B = 1115.5816(11) MHz and C = 730.5790(4) MHz. The dipole moment and the spectra of four isotopomers in addition to the normal species have been measured. The N₂O molecules have a structure that is intermediate between crossed and T-shaped; the SO₂ straddles one N₂O and has one S-O bond aligned roughly parallel with the second N₂O. The structures of the dimer and trimer will be compared, and the success of semi-empirical and ab initio calculations at predicting the N₂O-SO₂ and N₂O-N₂O-SO₂ structures will also be explored.