The $^2E'' \tilde{A}$ state of NO$_3$ is doubly degenerate and is therefore subject to Jahn-Teller (JT) distortion. In the $\tilde{A}$ state there are two JT active modes, $\nu_3$ and $\nu_4$ ($e'$ stretch and in-plane bend respectively). Theoretical work has predicted that the JT effect in the $\tilde{A}$ state should be quite strong and approach the static case ($D \geq 1$) where the molecule is permanently distorted to a lower symmetry geometry.$^{abc}$ A moderate resolution spectrum of the $\tilde{A}$ state showed a feature that we tentatively assigned as the $3\,^1S_0$ band based on position and band contour.$^d$ Using high resolution cavity ringdown spectroscopy we have now obtained a rotationally resolved spectrum of this band. The analysis of this band has been commenced using an oblate symmetric top Hamiltonian with spin-rotation terms. This analysis supports the assignment of this band to the $a''_1$ vibronic component of the $3\,^1S_0$ band. So far, the spectrum shows no evidence of a large geometric distortion of the molecule. Some lines appear to be split, as was previously observed in the $4\,^1S_0$ and $4\,^2S_0$ bands,$^e$ and the possible sources of this splitting are being investigated.

$^a$J.F. Stanton, 66th OSU International Symposium on Molecular Spectroscopy, The Ohio State University, Columbus Ohio, 2011, TJ-03
$^d$T.J. Codd, M.W. Chen, T.A. Miller, 66th OSU International Symposium on Molecular Spectroscopy, The Ohio State University, Columbus Ohio, 2011, TD-06
$^e$M.W. Chen, T.J. Codd, G. Just, T.A. Miller, OSU International Symposium on Molecular Spectroscopy, The Ohio State University, Columbus Ohio, 2011, TD-07