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Abstract : Ground resonance studies of the HS 748 (unmodified) aircraft has been carried out for estimating fuselage, wing and tail plane vibration characteristics. Aircraft was supported on partially deflated tyres with landing gear in locked position. The natural frequencies and modeshapes have been extracted using Sine input, random excitation and impulse excitation. Also a modal analysis has been performed to estimate the aircraft modes. The results are vital inputs to the proposed modification viz, the attachment of rotodome. The results are compared with certain theoretical analysis.