Conclusion

After rigorous testing and analysis of the preliminary design, a finalized transducer has been developed. It satisfies the design criteria and is an aesthetically pleasing device that also functions as an inexpensive and reliable teaching aid for high school physics courses. The transducer consists of an approximately 10” diameter hoop and a 2.5” effective beam length and operates with a natural frequency between 45 and 56 Hz and a damping ratio of 0.02. Although there is an error of 29% with 99% of the signal, the transducer still manages to produce a thrust – time curve that resembles the manufacturer’s specifications.

The transducer is easily manufactured from relatively cheap and readily available materials. It is also on the light and compact size while aesthetically pleasing in form. Its stability, durability, and repeatability may also be listed among its positive traits.

Although this transducer is capable of producing quality results, it is highly recommended that more time be committed to improving the specification numbers to make it more attractive to potential customers. Most notable of all is the error with 99% of the signal. A target error of less than 10% with 99% of the signal would likely be desirable as it compares well when surveying other transducers in existence.