

Design of a Modular Cloud Chamber with an Internal Clock Mechanism
(Technical Report)

Motorcycles and Electrification
(Sociotechnical Research Paper)

An Undergraduate Thesis Portfolio
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Preface

Innovation and invention are often represented as the creation of entirely new technologies which have never been seen before. However, many technologies we use every day were created by altering an old technology and using it differently. How may old technologies be used in new systems?

The goal of the technical research problem was to determine if a cloud chamber and a clock could be combined. A cloud chamber is a device that creates a cloud of supersaturated vapor which allows subatomic particles to be seen traveling through it with the naked eye. If achieved, this device would be the first of its kind and made up of existing technologies. A cooling surface was selected (a rolled ice cream maker) and a cloud chamber enclosure was designed to fit on it. A reservoir to hold isopropyl alcohol was contained in the enclosure. An analog clock was designed to fit within the enclosure, with power transmitted from the outside using extended driveshafts. Although the clock functioned as designed, the cloud chamber did not work. Future research would benefit from a larger temperature gradient within the chamber.

Participant social groups in the United States disagree about how best to distinguish and utilize classes of electrified two-wheeled vehicles. In this competition, electric bicycles are experiencing more support and growth than electric motorcycles. This was established by reviewing regulatory requirements, state policies, arguments by supporters, and concerns by critics. Acceptance of electric motorcycles is hindered by a niche market and greenwashing by the industry. Electric bicycles benefit from bicycle infrastructure and are favored by policies which limit automobiles. The main obstacle for widespread adoption is safety.