

## Study Readies Retrofit Light Switch for Market Development

Effortless Advantage, Inc. is a Rochester, NY based entrepreneurial technology firm seeking to bring advanced energy and cost saving technologies to common and existing building infrastructures. Effortless Advantage recognizes that minimizing production costs and material waste while maximizing product life and performance is essential to sustainable market success. With this in mind, Effortless Advantage works to develop simple, energy saving designs that can be retrofitted for everyday applications with minimal effort by end users.

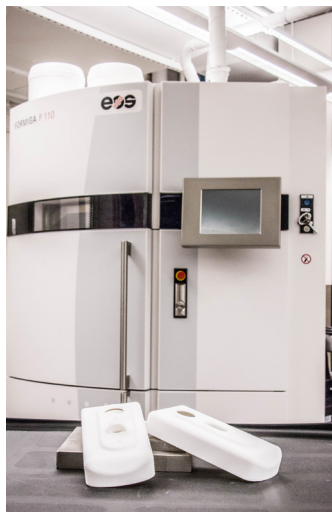
### Client Challenge

The Effortless Advantage design team consulted researchers at the Center of Excellence in Advanced & Sustainable Manufacturing (COE-ASM) to improve the design of its patented SNAP Switch. The SNAP Switch is an automated control module that fits over conventional wall switch units in any setting, designed to shut off light switches via mechanical actuation after a user-determined period of time. The SNAP Switch can also be fitted with a motion sensor to automatically deactivate lights depending on room occupancy. By simply taking the place of a conventional light switch plate, the design eliminates the need for electrical rewiring and allows for implementation into current switch systems in both commercial and residential settings, saving the end user time, energy, and money.

The prototype design originally proposed by Effortless Advantage performed its intended function, but contained a high part count, of which several parts required complex and costly production processes. Effortless Advantage sought assistance from the COE-ASM for three critical aspects of the SNAP Switch: further development of functionality, reduction of component complexity, and achievement of a cost effective and market focused design.

### COE-ASM Work Performed

COE-ASM assisted the Effortless Advantage team in making some valuable design changes in the name of aesthetics, ease of fabrication, assembly, and use. COE-ASM leveraged student expertise from the highly ranked RIT School of Design to develop multiple design concepts that improved the look, feel, and usability of the product concept. A new housing design was selected, and prototypes fabricated with 3D printing. The design of the electrical circuitry and internal mechanical components were also updated to match the new housing concept as well as improve function and manufacturability. The revised design incorporated commercially available single-cell batteries and included a feature to allow the SNAP switch to be manually turned off, aligning with user intuition on how to use the switch.



### CLIENT CHALLENGE

- Effortless Advantage sought to improve the design of its patented SNAP Switch used to shut off light switches via mechanical actuation after a user-determined period of time.

### COE-ASM WORK PERFORMED

- Developed multiple design concepts that improved the look, feel, and usability of the product concept.
- Fabricated prototypes with 3D printing.
- Selected new housing design.
- Updated the design of the electrical circuitry and internal mechanical components.
- Incorporated commercially available single-cell batteries and a feature to allow the SNAP switch to be manually turned off.

### RESULTS

- The design changes reduced material use and manufacturing cost.
- Failure modes and effects analysis (FMEA) improved part life and consistency of function, thereby extending the useful life of the SNAP Switch.

## TESTIMONIAL

“What we ended up doing, is creating a better, more market ready design”

- Mike Mahle,  
President, Effortless Advantage

## Results

The suggested design changes lowered part count and design complexity, thus reducing material use and manufacturing cost. Failure modes and effects analysis (FMEA) also revealed that the simplified, self-contained design improved part life and consistency of function, thereby extending the useful life of the SNAP Switch as a whole. With these changes, COE-ASM helped the Effortless Advantage team take their product from an innovative idea and a bench prototype to a simple, cost-effective, and sustainable design, much closer to production readiness.

Effortless Advantage turned to COE-ASM with a working prototype and the intention to make their design simpler, more efficient, and more economically feasible. "What we ended up doing," according to Effortless Advantage President Mike Mahle, "is creating a better, more market ready design."

## The Center of Excellence in Advance & Sustainable Manufacturing (COE-ASM)

is a specialized applied research and development center dedicated to helping emerging and existing NYS manufacturers to enhance productivity and become more competitive through innovation and technology in sustainable products and processes. COE-ASM is located at the Golisano Institute for Sustainability and is a New York State Center of Excellence, a NYSTAR partnership.



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