

## ULTRACAPACITORS IN AUTOMATIC STORAGE AND RETRIEVAL APPLICATIONS



### AUTOMATIC STORAGE AND RETRIEVAL MARKET TRENDS

The Automatic Storage and Retrieval System (ASRS) market is projected to be worth over \$8 billion by 2022, with major growth being driven by cold-storage and e-commerce fulfillment.<sup>1</sup> E-commerce is seeing pressures for shortened delivery times, reduced overall cost, and increased efficiencies. As customers are becoming educated about e-commerce, they are looking at the overall price, including shipping cost and delivery times, instead of the initial product cost alone.<sup>2</sup> Cold-storage applications are also seeing increased pressures for optimization in the fulfillment center. Automated storage and retrieval systems can address these market demands and bring additional value like reduced energy use, more efficient inventory tracking, and decreased injury to operators.

### AUTOMATIC STORAGE AND RETRIEVAL MARKET CHALLENGES

Challenges remain in deploying ASRS solutions. The high capital costs required to deploy these systems mean the risk of downtime due to equipment failure or malfunction can have significant effects on system return on investment. There are also costs to maintaining and updating the systems.<sup>3</sup> These challenges can be addressed by using ultracapacitor power sources to limit component failures and maintenance in ASRS systems.

### ULTRACAPACITORS UNIQUELY SOLVE ASRS CHALLENGES

The use of ultracapacitors as a power source in shuttles and 3-D shuttles reduces system failures and maintenance requirements due to power source failures. With almost limitless charge/discharge cycles, your shuttle may be replaced before the ultracapacitor pack. An ultracapacitor charges in seconds, resulting in less overall downtime and lower initial cost. Ultracapacitor cells can operate at extremely low temperatures without any degradation to performance, they are environmentally friendly, and they do not have shipping restrictions. Shuttles and 3-D shuttles can charge opportunistically without the need for major rerouting and downtime, reducing the need for designated charging areas that can take up valuable floor space. Ultracapacitors can also provide peak power when used in conjunction with traditional power sources, allowing for a smaller main power source. Ultracapacitors also provide increased overall safety.

<sup>1</sup> Markets and Markets, 2015 "Automated Storage and Retrieval Systems Market – Global Forecast to 2022"

<sup>2</sup> Material Handling & Logistics, 2017, "MHL Roadmap 2.0 Draft", <http://mhlroadmap.org/>

<sup>3</sup> Markets and Markets, 2015 "Automated Storage and Retrieval Systems Market – Global Forecast to 2022"

## ADVANTAGES OF ULTRACAPACITORS FOR ASRS APPLICATIONS

- **Fast Charge/Discharge**
- **Wide Operating Temperature (-40°C to 85°C)**
- **Maintenance-Free (No scheduled downtime)**
- **Design Flexibility**
- **Environmentally Friendly**
- **No Shipping Restrictions**

## ULTRACAPACITORS VERSES LITHIUM-ION BATTERY TECHNOLOGIES

Lithium-ion batteries used in consumer electronics and industrial applications have many limitations. Unlike lithium-ion batteries, ultracapacitors do not have the inherent flammability issues associated with self-heating, and do not require special controls to prevent catastrophic failures. Lithium-ion batteries create energy using a chemical reaction, which takes time, whereas ultracapacitors store the energy in the form of electrons, meaning they can be charged in seconds.

The average lifetime of a lithium-ion battery is 1000 cycles or less depending on use, with an expected total lifetime of three years.<sup>4</sup> Ultracapacitors in ASRS shuttle systems can run continuously for 10 plus years without needing maintenance. An ultracapacitor-based power source can charge and discharge almost limitlessly and last for the lifetime of the shuttle.

## TECATE GROUP POWERBURST ULTRACAPACITORS AND SERVICES

The Tecate Group is a global manufacturer and supplier of electronic components and assemblies. From its corporate headquarters in San Diego, California, as well as from manufacturing and stocking locations in Asia and Europe, the Tecate Group supplies high-quality ultracapacitors, capacitors, and electronic assemblies to customers worldwide. Tecate serves a wide range of markets, including the robotics and material-handling equipment, data storage, smart grid, military/aerospace, industrial, medical, and telecommunications industries.



<sup>4</sup> Wikipedia, 2017, "Lithium-ion Battery", [https://en.wikipedia.org/wiki/Lithium-ion\\_battery](https://en.wikipedia.org/wiki/Lithium-ion_battery)