

## RACKRACER – VERSATILE AND FLEXIBLE RACK FEEDER FOR CONTAINER RACKS

### Fraunhofer Institute for Material Flow and Logistics IML

Joseph-von-Fraunhofer-Straße 2–4  
44227 Dortmund  
Germany

#### Contact

Dipl.-Ing. Guido Follert  
Phone +49 231 9743-253  
guido.follert@iml.fraunhofer.de

Dipl.-Ing. Winfried Schroer  
Phone +49 231 9743-158  
winfried.schroer@iml.fraunhofer.de

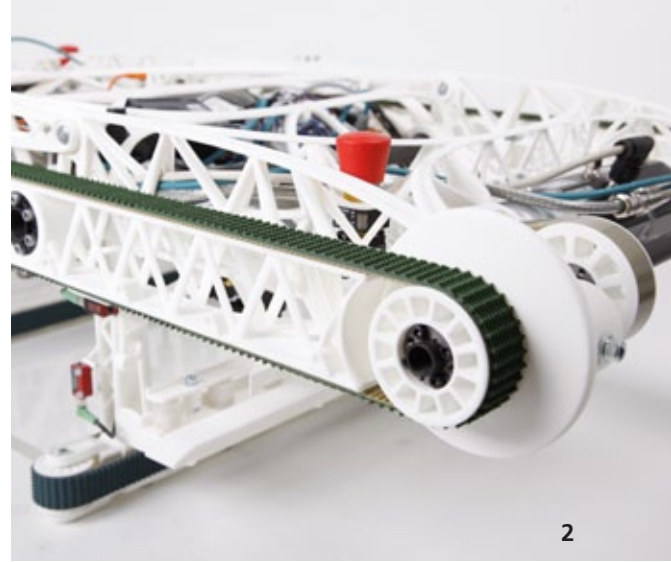
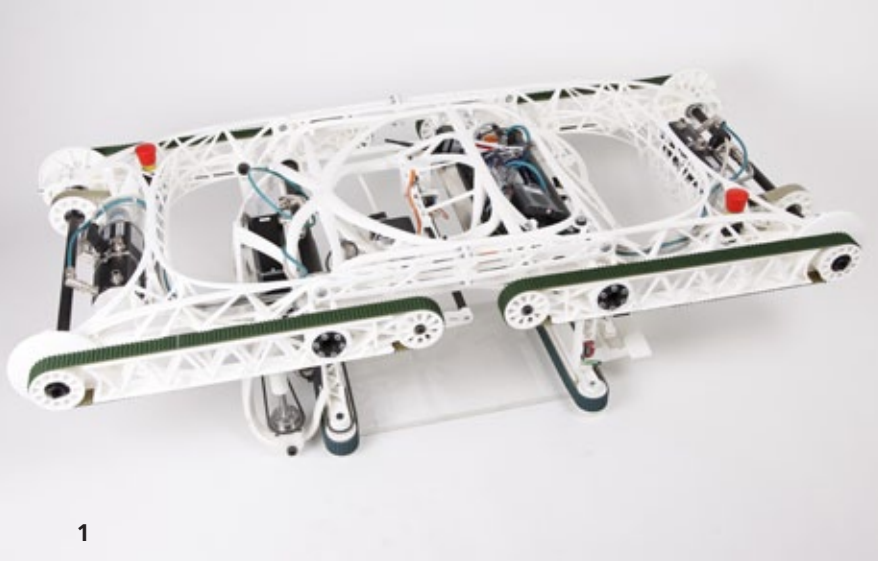
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#### The Idea

An automated shuttle warehouse without a lift or other expensive customization seemed to be impossible – until now. The Fraunhofer Institute for Material Flow and Logistics presents an innovative solution to this problem: the “Rack Racer”. The new climbing shuttle moves autonomously in horizontal and diagonal directions – without a lift or additional rails. This process is enabled by so-called “crawler elements” which support themselves on specific climbing or supporting spots. By using this technique the shuttle has the ability to store items or take them out of stock autonomously at any position inside the rack. Inside the rack motions towards the storage location can be conducted without indirect routes. This makes the “Rack Racer” a genuine revolution in intralogistics and a reasonable alternative to existing solutions, such as stacker cranes or shuttle-lift-systems.

#### Range of Application

The “Rack Racer” has a completely innovative engineering design for versatile applications in automated racking systems. Besides the ideal direct movement inside the rack there are further advantages such as the enclosure of all functionalities in one device, together with an accumulator battery for stand-alone internal power supply. Flexible moving of several single “Rack Racers” inside one rack is enabled by radio-controlled operation and surveillance. Furthermore the vehicles can directly enter and leave the lowest shelf. A better space utilization is realized by tunnels, which enable a lateral spreading in multi-lane warehouses. Taken as a whole, the “Rack Race”-system is eminently suitable for scalable, adaptable warehouses with average performance.



1 3D printed RackRacer – additive manufactured transportation vehicle

2 Detailed view of crawler elements

The pictures on the front page show a functional prototype inside a container rack at the Fraunhofer IML.

### Transformation ability

For logistics providers and manufacturing firms, the adaptability of storage technology plays a major role related to the continuous improvement of their processes. They must use innovative technologies, which are primarily easy to adapt to varying requirements and secondly realize a high performance in combination with low costs. Regarding these technical criteria, there is a current trend to abandon heavy and inflexible warehouse technology to more compartmentalized and multifunctional vehicles. These vehicles can fulfill tasks of in-plant transportation and rack operation with high flexibility.

### Evolution of Requirements

The relevance of small load carrier and cardboard box items in logistics has increased. Reasons for this change are dissection of commodity flow caused by the increasing e-commerce, return transactions, and lean concepts for assembly in combination with initiatives for reducing inventory and order quantity. Technical answers are new solutions in automation for commissioning, packing and shipping for e.g. reducing physical strain. With the "RackRacer" the technical evolution to automation of storage and transport of small carriers extends in the area, where nowadays only manual systems are able to compete economically.

#### RackRacer – Technical specifications

Tare:	52kg
Nominal carrying capacity:	25kg
Material to be conveyed:	small load carrier
Measurements of material to be conveyed (w/l/h):	600mm 400mm 220mm
Speed:	1,0 m/s
Speed on a gradient:	1,0 m/s
Electricity supply:	lithium ion accumulator

