

CeiliX Vehicles

A Novel and Multi-Purpose Overhead Locomotion Technology,
Enabling Omnidirectional Vehicles to Operate on a Ceiling



Introduction

The CeiliX vehicles are a novel overhead locomotion technology that offers unprecedented mobility and scalability. The technology allows multiple, omnidirectional vehicles suspended on a ceiling structure to operate freely next to each other. The technology is protected by 11 patents. Space Applications Services NV/SA has the exclusive distribution rights for the Space and Health Care sector, while CeiliX AG & Technology GmbH focuses on terrestrial applications (industrial robots, automated warehouses, production industry, port operation, etc.)

CeiliX vs. Conventional Technologies:

Cranes allow reaching every point in their workspace. However, operations are highly constrained and do not allow for any vertical interruption (like a pillar). Also, the number and mobility of parallel-operating cranes are highly constrained by their kinematics.

In contrast, **overhead conveyors** allow multiple transport units to operate close to each other. However, conveyors follow a predefined track and thus are also limited in mobility.

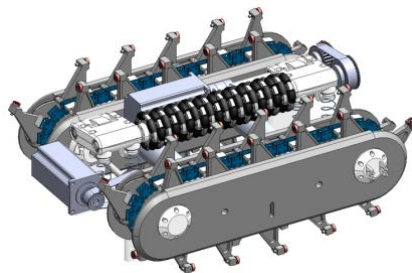
The **CeiliX Vehicles** combine all benefits of traditional overhead operation systems while minimizing constraints on motion and workspace.



Locomotion Mechanism

CeiliX's locomotion system uses a caterpillar-like mechanism that is modified to mechanically attach under a dedicated ceiling structure. This novel locomotion technology enables a vehicle to traverse the ceiling structure in all directions (omnidirectional) and hence can reach every point in the workspace.

The locomotion system uses a Form-fit connection to interact with the ceiling structure. By design, this connection allows for high load capacity (up to tons range) combined with a great level of safety.



CeiliX Vehicles exist in passive and active versions. The active one relies on Omni-wheels to enable side motion, which combined with the track motion, allows for omnidirectional motions. Active CeiliX Vehicles can be battery-powered or draw power directly from power lines embedded in the ceiling structure.

Applications

- Automation
- Intralogistics
- Crane Applications
- In-House inspections
- Health Care
- Space Applications

SERVICES AVAILABLE

- Installation on site
- Scaling and customisation of vehicle design and ceiling structure design
- Operators training
- Maintenance

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ABOUT SPACE APPLICATIONS SERVICES

Space Applications Services NV/SA is an independent Belgian company founded in 1987. Aerospace Applications North America is our Partner company in Houston, USA.

Our aim is to research and develop innovative systems, solutions and products and provide services to the aerospace and security markets and related industries. Our activities cover manned and unmanned spacecraft, launch/re-entry vehicles, control centres, robotics and a wide range of information systems.

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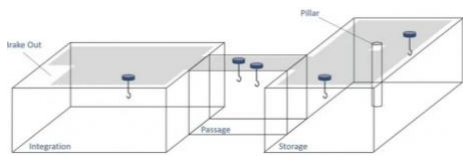
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Ceiling Structure

A specific ceiling structure supports the overhead locomotion of CeiliX Vehicles. It is built based on sets of tiles. Each tile supports parallel aligned profiles that allow for mechanical interactions with the CeiliX locomotion system.

The tile-based CeiliX ceiling structure fits to arbitrary building geometries, allows interconnecting separate work areas and getting around vertical obstacles such as pillars, pipes, or cable tracks.



The ceiling structure can be provided as a Self-Standing Frame or a Building Retro-fitted Structure.

Scalable & Extendable

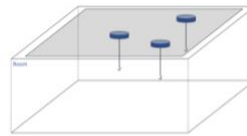
The CeiliX overhead operation technology enables unprecedented scalability as the system allows for

changing/extending the ceiling structure as deemed required, as well as adapting the number and type of vehicles deployed depending on actual needs.

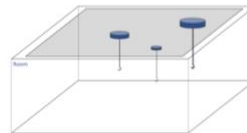
CeiliX Features

- Omnidirectional Mobility
- Multiple Vehicles Applications
- High Payload Capacity
- Cooperative Operations
- Scalable and Extendable
- Save and Reliable by Design
- Power Supply

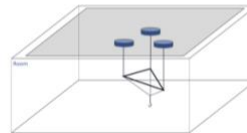
Multi-Vehicle Application



Heterogenic Vehicle Usage



Cooperative Operations (increased payload)



Ceiling Frame with passive CeiliX Vehicle



Ceiling Frame with active M-size CeiliX Vehicle



Ceiling Frame with active S-size CeiliX Vehicle



CeiliX Vehicles Specifications

Vehicle Type	Small	Medium	Large	Extra- Large
Dimensions	70x40x21.5 cm 28x16x8 in	70x50x21.5 cm 28x20x8 in	90x60x30 cm 35x24x12 in	110x60x30 cm 43x24x12 in
Mass	50 kg 110 lbs	100 kg 220 lbs	150 kg 330 lbs	180 kg 397 lbs
Load capacity	400 Kg 882 lbs	800 Kg 1766 lbs	1200 Kg 2645 lbs	1600 kg 3527 lbs
Velocity (single axis)	3 m/s 9.8 ft/s		1 m/s * 3.3 ft/s	
Peak Power	2 kW	3kW	10kW	10kW
Human Rated	Yes	Yes	No	No

* EU law for crane operations >1.2T load

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