ARON-RCS

THE FUTURE OF RAIL FREIGHT

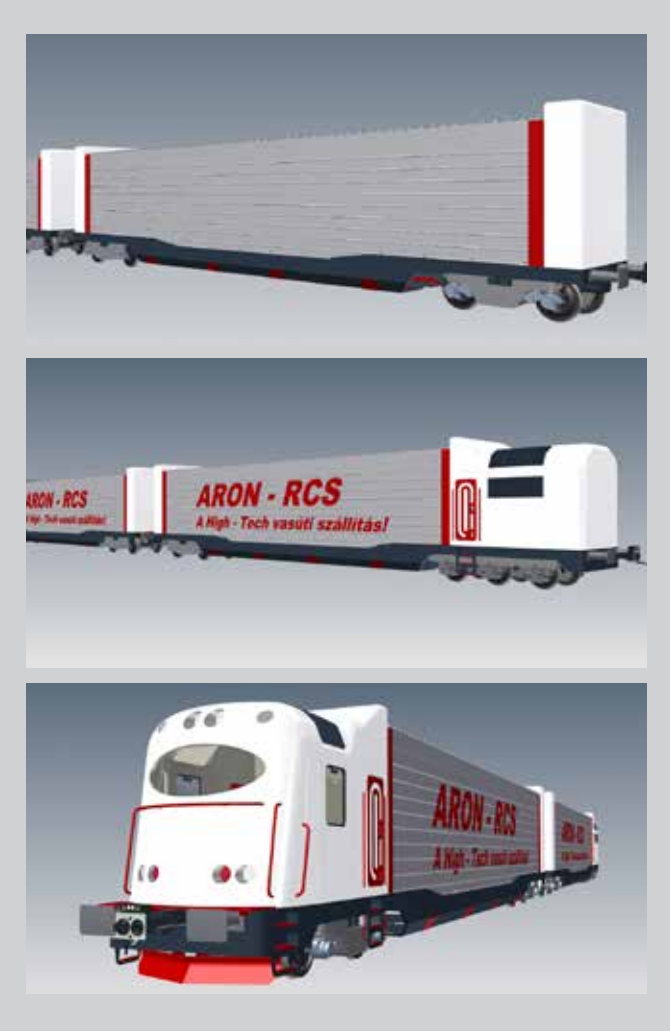
A RAIL INNOVATION BOUND TO TAKE OFF

ARON Rail Cargo System is a freight transport and logistics resource that results from a research and development project carried out by professionals with decades of experience in rail traction, freight haulage and vehicle development. ARON-RCS serves as a link...

- between freight operators and premium clients,
- interconnecting upmarket freight forwarders with the world's leading haulage companies,
- empowering rail freight operators to attain market leadership.

ARON-RCS may generate extra revenues to an extent and at a speed believed beyond possibility. It has the potential to take off in a big way, establishing over the longer term a striking competitive edge for rail and intermodal freight.

ARON-RCS Clients receive ownership of a 21st-century technology bound to multiply their revenues as it secures their haulage partners a significant competitive advantage through flexible and innovative services.



The ARON freight train was designed to increase volumes forwarded by rail in unaccompanied containers, swap bodies and semitrailers. The outstanding asset of ARON Rail Cargo System: it will serve stations, sidings and logistics locations efficiently and speedily without the need for any shunting and loading infrastructure. This vehicle system operates autonomously anywhere within the rail network – no more engines or shunting operations needed. Freight capacity can be quickly and easily adjusted to current haulage assignments, a task facilitated by the train's smart control and load/cargo handling system.

The ARON-RCS on-board twin loading device loads and stacks containers and trailers just about anywhere, even underneath the catenary of electrified tracks. This feature greatly enhances system efficiency and the range of loads that can be profitably hauled on rail. Based on our model calculations, the economically viable range with ARON-RCS operations is roughly 100 to -1500 km within a national or continental rail network and 500 to -3500 km on an intercontinental scale, including an optional automated change-of-gauge feature. ARON-RCS trains can be delivered for gauges ranging from 1000 to 1676 mm.

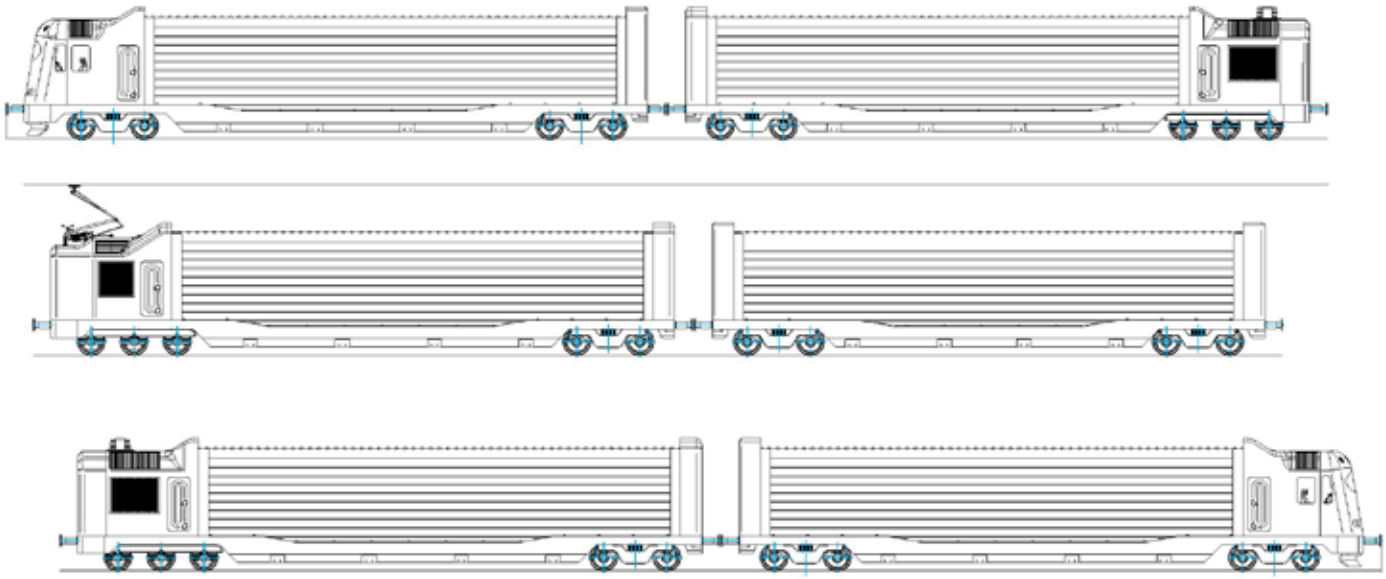
MULTIPLE UNIT FREIGHT TRAIN

ARON-RCS trains are composed of modules that can closely match client requirements. A base unit consists of a powered twin carriage, several of which can be joined to form trainsets with e.g. 6 to 8 units or any convenient length. Two or more such multiple unit trains can be coupled quickly and conveniently as required by the orientation of traffic flow. The entire vehicle system consists of three basic types of powered and hauled carriages that can be combined to EMU/DMU train compositions, suiting any operative and haulage requirements.

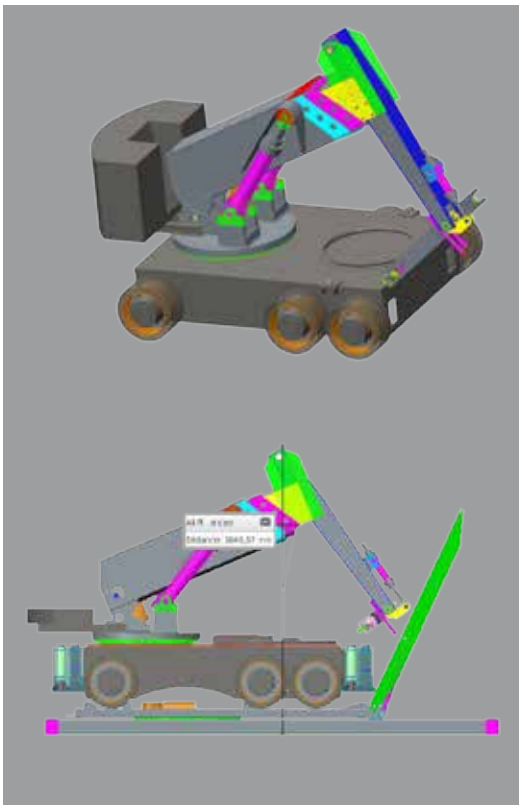
• Electric traction with overhead collection – for electrified networks, with an optional "last mile" function to extend reach to non-electrified sidings and decrease exposure to infrastructure disturbances.
• Battery powered electric traction for operation without local emissions on non-electrified network sections and sidings.
• Electric traction from diesel power pack for non-electrified networks. A diesel power section incorporates several motors in view of efficient operation with low breakdown susceptibility.

TRAIN COMPOSITION VARIANTS

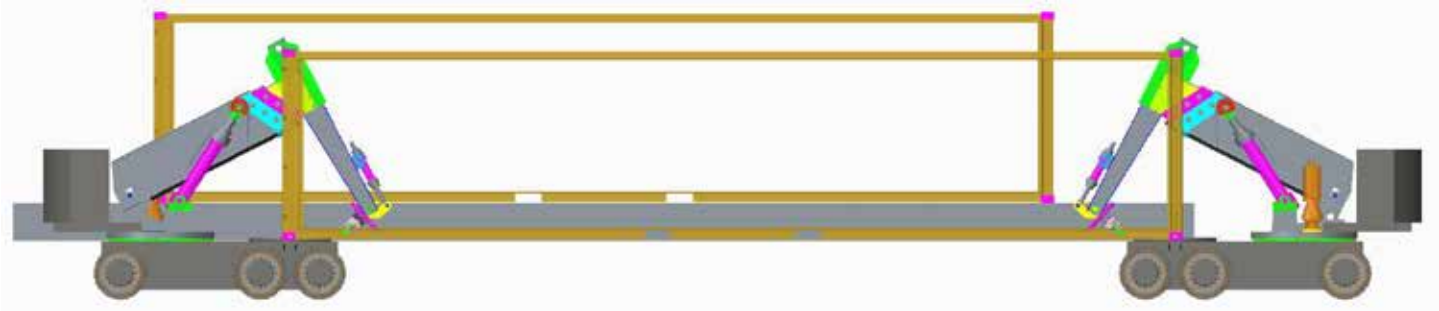
An advantage of ARON trains is that they combine up-to-date vehicle technology with the flexibility of traditional freight trains in terms of capacity. As loads are primarily hauled in standard containers and swap bodies there is no need for special carriage superstructures that often force freight forwarders to rely on one-way traffic inducing light runs. ARON trains are much more likely to attract return cargo as they can even carry mass commodities.
Just a few example compositions:



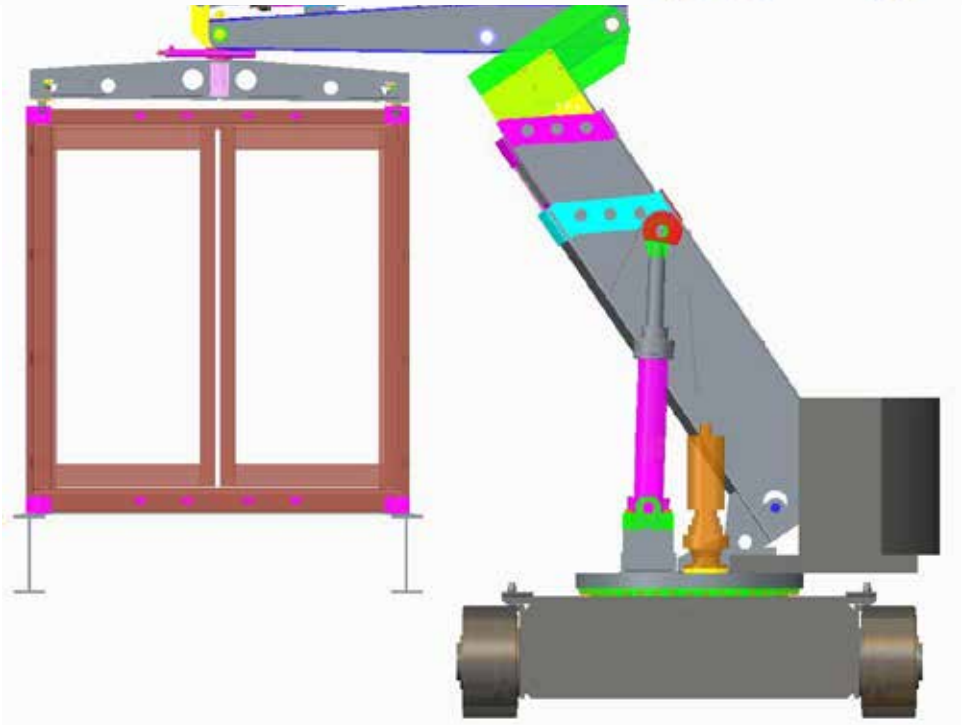
ARON-RCS LOADING SYSTEM



The twin loading device "riding" the train is an essential part of the ARON-RCS system. Presently no such mobile device operates that loads and unloads standard containers, swaps bodies, and even non-cranable road semitrailers. The required device must speedily crane swap containers on-site as well as being carried on-board, descend from the train and remount, without requiring any particular infrastructure elements. To fulfil this seemingly 'impossible' set of requirements it was necessary to develop a special purpose device which implements a radically different approach. By adapting and mobilising an existing stationary crane we designed an agile twin loading device that represents a viable compromise between the device's own properties and the weights and dimensions to be hoisted. Both identical loaders function in a perfectly synchronised manner, commanded by the train's wireless control system. They are hydraulically propelled, powered either by a diesel aggregate or by capacitors. The electric variant operates virtually noiselessly, without emissions, and its storage batteries are being charged under way on the train. The loading devices can operate fully automatically as they are able to identify containers, loading or unloading them without the operator's active intervention.



Container transport position



Container hoisting position

ARON-RCS RAIL OPERATIONS

ARON Rail Cargo System operates with regular timetables and traffic nodes well known in many countries from passenger transport. In fact it renders freight transport a whole lot more compatible with passenger transport. Ensuing from the existing and expected traffic flows, nodes are designated within the rail networks where multiple unit freight trains are separated and coupled according to cargo itineraries. A traffic node may also (or uniquely) serve as an intermodal junction where loads are exchanged with trucks – or even ships, or cargo aircraft. This corresponds with the complementary roles of buses and trains within an integrated regular timetable system for passengers. ARON Rail Cargo System puts everything in place for speedy loading and haulage flows within such traffic nodes, thus trains are only required to stop during the actual time required for the automated coupling and loading activities. Only loads that have actually arrived to the node's loading area are being forwarded, those that for any reason miss a given train will be picked up by the next train. That way rail freight transport becomes much faster, more reliable and more efficient given that the idle periods of system resources are greatly reduced compared with existing systems. Logistics or industrial sidings are a particular form of traffic node. Sidings may and should be directly served by the train wherever the timetable and itinerary situation reasonably allows for that. Low average speed is amongst the most severe competitive disadvantages of rail and intermodal freight. Road trucks are able to run up to 800-900 kilometres within 24 hours, freight trains average at one third of that distance at best. Of course average speed is determined much more by the technological time requirements of railbound modalities than by the actual speed of trains. To become more competitive rail and intermodal freight should be able to match, if not undercut, road average speed. Unfortunately traditional rail technology offers very limited room for any improvement. This changes radically with the advent of ARON Rail Cargo System, thus implementing the necessary shift in technology. The crucial factor, however, is the level of carriage charge which is a direct function of the efficiency issues outlined in the next section.

ARON-RCS LOGISTICS

Before working out the ARON Rail Cargo System, it became obvious from an economic point of view that: the envisaged alternative must clearly perform better than traditional systems both in time and space and in terms of costs. To that end we had to identify the hidden properties of current container and piggyback block train systems which are responsible for uncompetitive cost levels: terminal costs, technology requirements of block trains linked to shunting and change-over of tractive units, and in the case of intermodal transport, the considerable costs of lengthy road pre- and oncarriage as well as the sole use of a small number of large, stationary terminals.

These are the opportunities identified by ARON-RCS researchers when asked to define the requirements that face a 21st-century rail freight resource:

- A high-speed vehicle system with an enhanced driving dynamics in view of reasonable progress and improved compatibility with passenger trains.
- A vehicle system that eliminates shunting manoeuvres.
- A system that maintains – in a modern fashion – the good possibilities of organisation of conventional rail carriages in view of traffic flow, offering at the same time an even greater flexibility than traditional systems.
- Looking at kinds of commodities, vehicle construction is indifferent: swap containers can be adapted to match various needs. Standard containers and trailers should be forwarded in order to avoid light runs.
- The system should carry those standard containers, swap bodies and piggyback resources that are presently in use, at the same time remaining open to future enhanced operations with the permanently developing container resources.
- The vehicle system should carry a loading device of its own to greatly increase the number of possible intermodal nodes given that the system is able to handle loads autonomously. It should not require any particular infrastructure, and should load automatically without human interference. In the opinion of researchers, only a high-tech solution would do!
- Train units should make use of automation along with the ability to adapt to current short and medium-term capacity needs.
- New or fledging market participants should be able to operate a small capacity – say, a train composed of 4 to 6 units – which can be expanded as required.
- The vehicle system should be composed of modules constructed from up-to-date standard components and technology, to be kept as simple and maintenance friendly as possible. Components should be procured mostly from renowned manufacturers to keep assembly times, operation and maintenance needs at a reasonable level.

SUMMARY

This technical innovation is composed of a number of elements of varying sophistication, arranged and operated in a revolutionary way. ARON Rail Cargo System consistently adapts for cargo purposes the distributed propulsion (traction) technology already tried and tested in a passenger EMU/DMU environment, resulting in a highly economic, flexible, high-performance, low-maintenance modular freight vehicle which operates without separate engines and shunting facilities. The system's on-board twin loading device offers a breakthrough: it doesn't require any special infrastructure and can load swap containers as well as semitrailers just about anywhere. Regardless of the train composition, the propulsion system's smart construction safeguards economical train operation. The train's user-friendly control, telecommunication and load/cargo handling system brings an entirely new quality of service and work environment to the world of rail freight. A whole range of convenient and simple technical and IT applications turn this vehicle and logistics system into a true competitor of road freight, in terms of both speed and outlay. Favourable system parameters make sure ARON-RCS considerably

benefits the environment and society at large, in addition to coinciding with international endeavours for modal shift and climate protection amongst others.

In our view this innovation opens a wide area for economic and technical development. Introduction and dissemination of ARON Rail Cargo System will relieve the strain upon road systems as well as increasing the rate of use of rail systems with their cost structure of high overhead and low output-related costs, implying that resources should run at peak for best efficiency. Optimal use of the abilities of electric traction results in a better energy balance of the freight sector. All in all, ARON-RCS affords considerable benefits to national economies thanks to lower freight charges and the maximum use of environmentally friendly rail services.

The mission of ARON Rail Cargo System is to provide solutions to some of the most severe challenges of our period in terms of society, economy and the environment. Our answers for handling freight transport-related problems do offer short- and long-term advantages to operators and forwarders by elevating to a much higher level the capabilities of intermodal freight transport. This highly efficient solution is likely to provide operators with growth opportunities and better profitability, opening up a sphere for sustainable progress and development.

ARON RCS

AUTONOM RAPID ON-KRANE
NEW RAIL CARGO SYSTEM

ARON RCS

AUTONOM RAPID ON-KRANE
NEW RAIL CARGO SYSTEM

Élő Mini-Világ Környezetvédelmi Alapítvány

H-2381 Táborfalva, Arany János út 76.
Tel: +3620-535-98-13
e-mail: major.andrea@aron-rcs.com

A járműrendszer mintaoltalommal rendelkezik