Monorail

History & Technology

Of Successful Technology
First Monorail at Cheshunt England in 1825

The one Horsepower Monorail shows the efficiency of steel wheels on steel rails!

1821 patent of Henry Palmer and put into service in 1825 in a brick yard. Designed to carry bricks. For the grand opening they attached a carriage making monorail history by also carrying people.

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Palmers Electrified version 1887

Built on the grounds of the Enos Electric Company in Greenville New Jersey, called the Enos Electric Railway. Build out of light steel construction.
Wuppertal 1901 to Present – Car 1971
New cars again slated for 2023
Technology of Wuppertal

A single rail – Truly a monorail (4 wheels / vehicle)

Steel wheels-Double flanged

Car body hangs from trucks

Double car bodies articulated with walk through

Almost level walk-in, cars swing slightly

Station platform elevation lower than Alweg

Elementary signal system-driver controlled
Japan in an all-out effort to improve its transportation infrastructure - presented their first monorail. It is a modernized version of Wuppertal's System. Feeling they could cut costs, they used rubber tire components.
Pre 1953 Alweg System

Seattle, Designed for the Worlds Fair moving 8 million passengers in ½ year is a beloved Icon. This Alweg technology purchased by Bombardier is now the US’s most prolific design. Besides Seattle, Las Vegas, Disney - US & France, Japan has the most, Kuala Lumpur & Russia now build.

Jacksonville, one of the US’s largest cities as to land mass, has quietly built a smaller version of the above and is constantly examining ways to improve mobility for their residents and visitors.
Technology of Alweg System

Rubber tires run on single beam – 5 track surfaces
Each truck has 4 carrying wheels, 4 guide wheels & 2 stabilizing wheels
Sharp curves require short cars
Trains have many short cars
Some trains are walk through
Car body rides on articulated trucks
Car floors above trucks cause high elevation of platforms
One system automated others driver controlled
Alweg Design - 10 wheels per truck
= 20 Per car and 5 running surfaces

1 - Supporting wheels
2 – Nose – suspended motors
3 – Guide and stabilizing wheels
4 – Safety wheels
5 – Solid rubber roller
6 – Spring-powered brake cylinder
7 – Disc brake
8 – Rocker suspension
9 – Track beam
Comparison of Monorails: Las Vegas Alweg (Truck Like) Side Support Wheels, Versus Self Steering Rail Trucks

5 track surfaces to 2 tracks: Alweg has 2 to 4 carrying, 4 guide & 2 stabilizing wheels to rail’s 4 wheels
1958 First four-track vehicle

Monorail SAFEGE 1958

Funded by Michelin Tire of France, the above prototype system was built.

This technology was purchased and has been used in both Japan & Germany.
SAFEGE Using 8 Wheels Per Truck With Four Running Surfaces

1 – Beamway (Duct) concrete or metal
2 – Running Surface vertical & horizontal
3 – Traction motor, reduction gear, differential
4 – Guide wheels 4 wheels side
5 – Running wheels 4 top
6 – Pneumatic dampers and automatic leveling
7 – Roll Damper
8 – Safety cable
9 – Brakes
Technology of SAFEGE

Duct in form of Inverted U with open space beneath
Four running surfaces on inner flanges and side walls
Two trucks per car, rubber tires
Four carrying wheels and four guide wheels
Car body hangs from trucks
Car body floor well below level of duct
Station platform elevation lower than Alweg
SAFEGE modified Shonan Japan 1970

Since the train runs in the air, visibility out of the car windows is spectacular.

The view is directed downward: showing scenery, pedestrians, shopping displays and traffic congestion that is avoided by this trip.

SAFEGE modified Dortmund H–Bahn 1973

An old carrier from 1982 and wheel information from our associates and webmaster from www.swedetrack.com
SAFEGE modified by Siemens now some 20 years on the open market
Westinghouse Airport System - No Monorail (Serving 50+% of Market)

1 – Spring, height leveler system
2 – Vehicle position indicator receivers
3 – Transmitter for position of car
4 – Metal disc in case any of the 4 guide tires loses air - to keep vehicle from hitting side wall
5 – Universal gear case connected to reduction gear and traction motor
6 – Center I beam to force position of vehicle
7 – Rubber tire to guide vehicle
8 – Power collectors
Sky Train - STC100 & 150
Urban High Speed Monorail

www.skytraincorp.com
Superior Transit Concepts: Features
low Cost, Weight, and Electronic Regeneration

STC provides: A NEW LEVEL OF UNINTERRUPTED TRANSPORTATION USING ONLY 4% OF GROUND SPACE

STC100 designed for high speed & high capacity transportation – A % increase in average speed allows reducing the same % of the Fleet saving million$!

STC150 Designed for Safety to scan cargo, automating our port operations – Reducing client work in process reducing overall port costs
OUR Superior Transit Concept
SOAR300© is DESIGNED FOR
LOW COST; STRUCTURE &
ENERGY CONSUMPTION

For SOAR300 System

For STC100; STC150 & Systems below

LEFT NEW DESIGN IN GREEN; SAVES EXTRA MATERIAL
Cost of Structures*

The left structure uses about 60% less material and labor.

Structure for:  
SOAR300

Structure for:  
STC100; STC150

* SIMPLIFIED FOR CLARITY
Construction Top is Wuppertal circa 1900
Below is Siemens expansion circa 2000
S.E.T. Patented Steerable ‘Wheel-Motors’
For Trams and Light Rail Applications

• The permanent magnet synchronous motor is part of the wheel and provides a high efficiency (97+%), light weight, compact assembly.

*As the drive is direct to the rim of the wheel, eliminating the need for gearboxes and transmissions, the above efficiency is for tractive effort at the wheel against electrical output.

• Since the ‘Wheel-Motor’ is a permanent magnet, synchronous motor, the speed/rotation can be precisely controlled down to zero rpm. This enables the ‘Wheel-Motor’ to act as a service brake and to regenerate energy when braking and reducing speed. (Programmed speed increases savings)

*The ‘Wheel-Motor’ may be used in conjunction with the S.E.T. steering system in which the speed of each independent ‘Wheel-Motor’ can be controlled to enable the inside wheels to travel at a proportionately slower speed, thus considerably reducing track wear and wheel noise.
Hybrid Systems: The next Generation

Continental is also working on a future hybrid concept which is more compact and delivers higher efficiency due to the use of integrated electronics. In this advanced concept the electronics are directly arranged on the circumference of the electric machine to be mounted as single component. Main advantages of these constructions are:

- Optimized for packaging
- Costs savings due to simpler integration and assembly
- Better output due to higher efficiency

Performance of the shown machine: 480 Nm at 1200 rpm this equals 85 miles per hour
Technology of Sky Train STC100/150: 4
Steel wheels per truck - two tracks

Whole system uses modern light rail technology – shares spare parts supply, maintenance skills and shop facilities
Duct in form of inverted “U” with inner flanges
Two rails – one on each flange with open space between
Tapered wheels self steering – no other guidance necessary
Bodies can be detached and replaced, “patents are pending”
Vehicle can operate on standard shop tracks
Any size cars according to required service
Capacity from single cars up to full subway
Car body floor well below level of duct
Station platform elevation lower than Alweg
SOAR300 also CREATES a Corridor to move electricity, water, hydrogen or ammonia for fuel, secure fiber optic cables for communication, education, TV, & cell phones

Again: Since generally the structure is the greatest cost of any system (60% to 80%) our design is low cost & faster to erect due to horizontals being hung on the steel verticals as shown in the simulation. There is low pollution or disturbance of the existing environment during construction.

Remember: America was transformed and prospered by the construction of the Railroads, this model still works; connecting population centers and work sites causes a peaceful migration of residents to work centers, increasing access to goods & services, while increasing living standards and harmony.
The SOAR300: New System Technology Profile; Left Europe's “Eureka” & Right is our Future “Utopia”

The Eureka is being considered for Colorado, US.

We are patented in the US and have internationally patent pending designs, are pursuing a stock sale and grants for further accomplishment.
Visual Appearance of Technology

- Elevated Rail
- Westinghouse – Airport
- Alweg - Disney
- SAFEGE or Sky Train

NOT MONORAILS

MONORAILS
System Cross Sections

Alweg - Disney

Elevated Rail

SAFEGE & Sky Train

Westinghouse – Airport
Monorail Popularity with the Public

Beginning  Pessimistic  Optimistic

Busway  LRT  Monorail

In a ten year period of time*

*Klages Pinellas Florida study
The Rewards and Benefits of Sky Train

The Sky Train System:
* High speed, high capacity transit service, no imposed speed limits
* Swings on curves for passenger comfort allowing greater speed
* Suspended overhead passes above all traffic and land uses
* Operates above congestion allowing fast unimpeded service
* Designed to continue operating in high winds
* Safety: Vehicles are locked in the supporting structure
* Descends to ground level if necessary
* Can climb twice the rate of the maximum suggested for highways
* Uses light rail components performance-tested in existing services
* Preferred electric operation ensures good Air Quality
* Components mostly standard off the shelf = low cost due to competitive bidding
* One (1) Sky Train OSLR transports the equivalent of nine (9) or more Bus lanes
* Uses less power than rubber tired systems
* Can be totally automated at low cost, the same as any subway
* Can also be used for heavy freight

The Sky Train Car designs:
* Cars 10ft to 13 1/3ft (3.0m to 4m) wide, 40ft (12.2) long for high capacity and comfort
* From single cars up to full length trains offer transportation capacities equaling modern subways
* Cars and stations can be air conditioned for comfort in hot climates
* Level walk-in offers double passenger loading rates compared with up and down steps
* Wide-door, level entry for handicapped, wheelchairs and bicycles
* Wide-door, level walk-in for accessing baggage trolleys and containers

A suspended Monoduct provides:
* A modular constructed duct offering low overall cost and assembly time
* The track, signaling and power supply are installed safely inside the duct
* Traction components inside are protected against adverse environmental and climatic conditions
* Operation continues despite high winds, snow, freezing rain, flooding, fallen trees etc.
* Powered trucks move inside the ducts, as a sound barrier affording acoustic isolation
* Ducts are inaccessible to trespassers or saboteurs, ensuring safe operation
* Does not occupy right of way on the ground, no children playing on tracks
* Supporting columns occupy minimal land, minimizing property condemnation
* No tracks in the streets diminishing highway capacity, nor trains causing accidents, injuries and deaths
* Does not require right of way fences, nor crash and isolation barriers
* Has no grade crossings - no delaying road traffic, accident risks, pollution from automobiles idling
* Ecologically friendly, no weeds needing chemical spraying
* Has no place for trash to accumulate on tracks, ditches, gutters or fenced areas
* Does not need drainage systems or retention ponds
* Minimal environmental impact, e.g. sight, noise, lubricants, dust and dirt, wild life, plant life, wet lands, lakes and rivers
* Simplicity insures easier Regulatory and Legal Approvals