

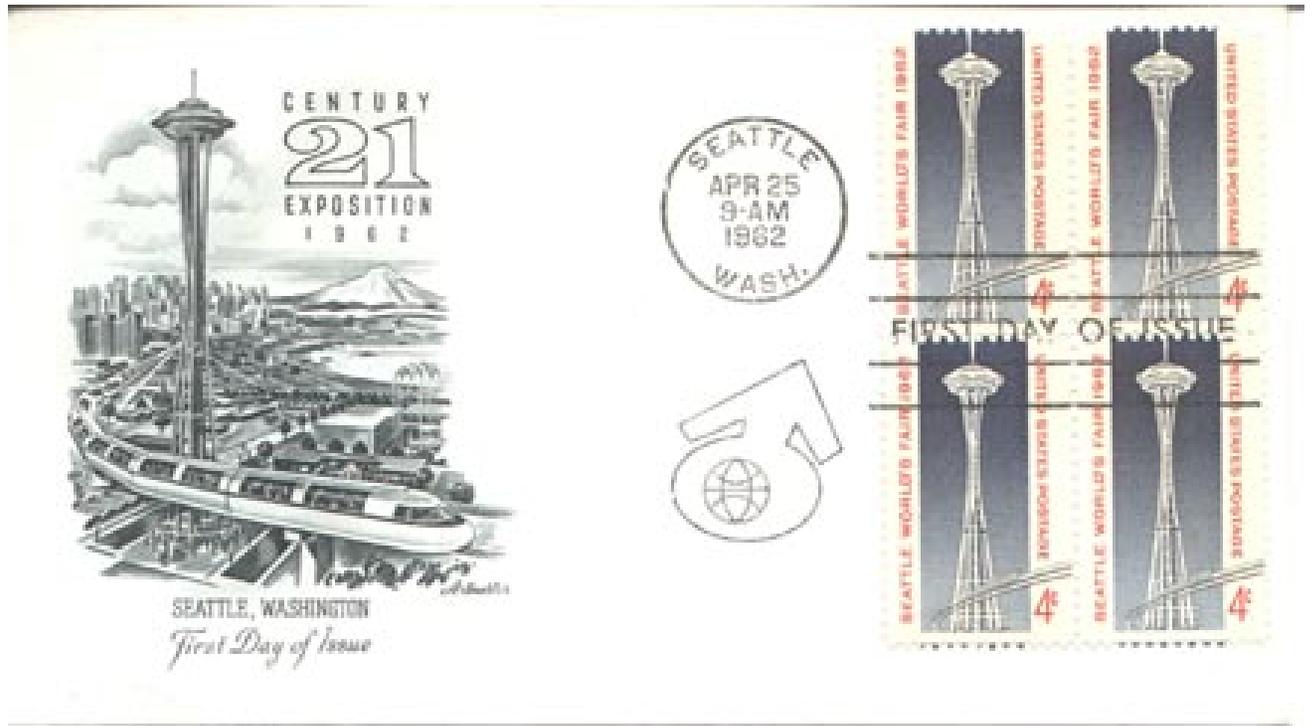
CHAPTER
10

Visions of the Future: Seattle's Monorail



The year 1957 brought shock and disbelief to the people of the United States as the Soviet Union announced the successful launch of its Sputnik satellite. In Seattle, business and civic leaders saw in this crisis of prestige and confidence in American superiority in technology and science an opportunity: host a major international exposition to promote a broader, more public appreciation of the value of scientific and technical research, innovation and accomplishment. As there had not been an international exposition in the United States since New York and San Francisco held simultaneous events in 1939-1940, the odds looked firmly stacked against Seattle, then a city located in the remote Northwestern parts of the country and not very well-known as the home of Boeing and the future home of Microsoft. Gaining essential financial support both from the Federal Government and the State of Washington, the event promoters successfully overcame numerous obstacles to attract more than forty international and eighty-five commercial, institutional and domestic participants and drew an attendance in excess of 10 million visits.

Above: The official logo for the Century 21 exposition was a futuristic symbol evoking the man-in-space theme which was the subject of a major competition between the United States and the Soviet Union.



Opposite Top: This U.S. Stamp commemorated the two symbols of the event: the Space Needle and the monorail.

Opposite Bottom:

The monorail in Wuppertal, Germany features cars which are suspended from steel box beams straddling a river. When first proposed in 1894, critics thought the system and its proponents were “satanically inspired”. The trains travel at the relatively slow speed of 16.5 mph but provide an essential service to the river valley communities, carrying more than 45,000 passengers per day.

Below: The monorail at Disneyland in Anaheim, California was first introduced as a ride in the Tomorrowland section of the park.

Right: The Disney Monorail achieved sufficient public interest to be featured on a lunchbox in the early 1960's. .



The Century 21 Exposition, also known as the Seattle World's Fair, was held in 1962 on an urban site which encompassed several existing facilities including a sports stadium and a Civic Auditorium. One of the enduring legacies of the event – the Space Needle – which recently underwent a major refurbishment and has attracted over 1 million visitors annually since its opening during the exposition, was actually the second idea for a major “attention-getter” for the event. The first, in concept, was the idea of a monorail. The Century 21 organizers envisioned a sleek, efficient transportation system linking the downtown with the fair grounds, providing a highly marketable image of a modern system to promote their event.

In fact, monorails were not a new idea, but had been successfully operated for many years in several locations both internationally and domestically. Wuppertal, Germany justifiably lays claim to having one of the oldest monorails with a system in operation since 1901; the 13.5km. trip takes approximately 35 minutes and serves 19 stations. Discussions are currently underway concerning refurbishment plans and the needs for improvements to serve future needs. Disney's original Magic Kingdom facility in Anaheim, California, featured a monorail which was inaugurated on June 14, 1959 nearly three years before the Seattle World's Fair opened in 1962; Disney's monorail was initially limited to a short ride within the park boundaries but was extended in 1961 to link the amusement park with the nearby Disneyland Hotel, a distance of over two and one-half miles.



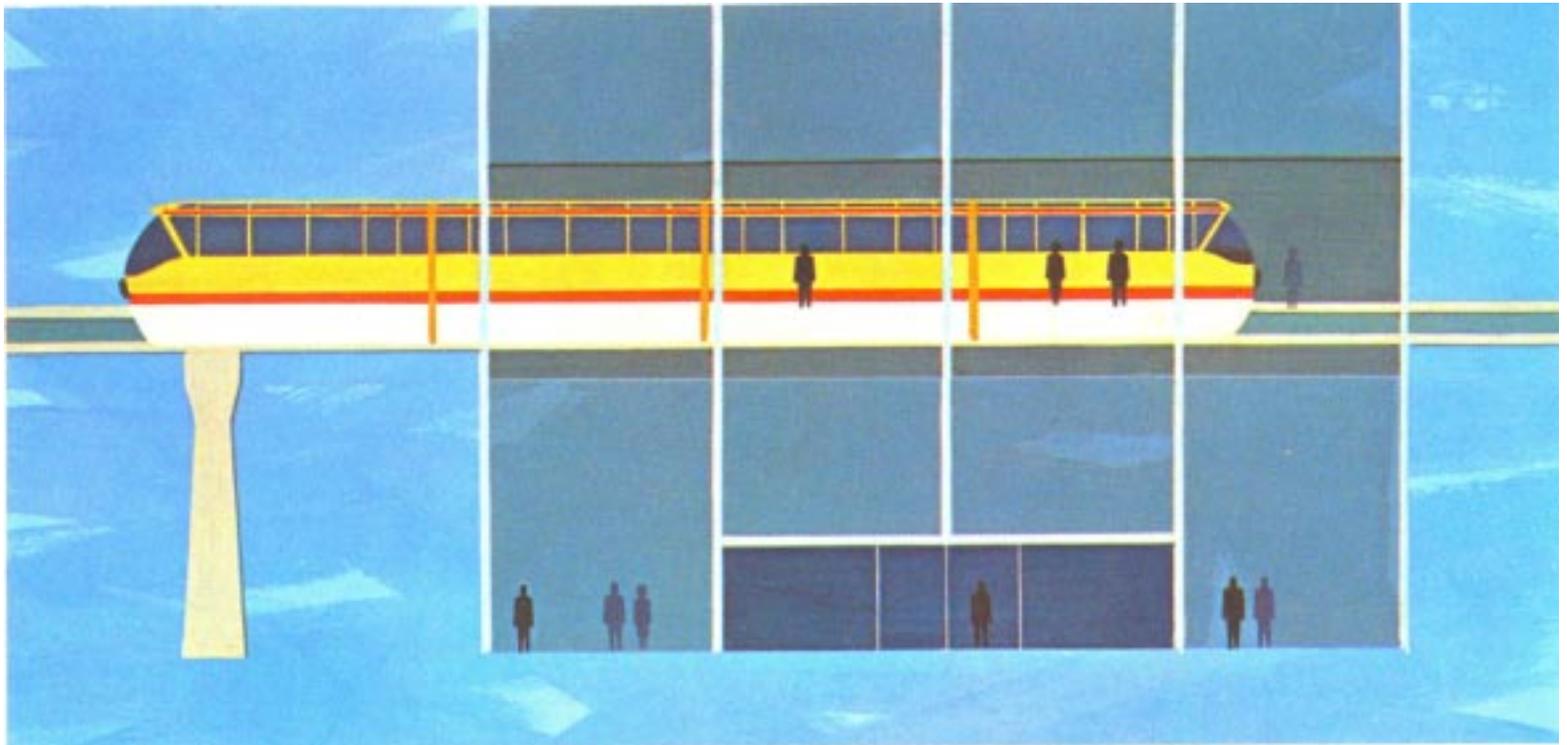
Thus, while not an absolute first, Seattle's plans for a monorail were motivated by several complementary themes and ideas which were unique in the history of rail transportation. The first of these ideas was that the monorail had very significant potential international and domestic appeal as a solution to the traffic problems which were beginning to be experienced in major cities throughout the world. While Seattle was hardly a high profile example of a downtown which was suffering from the problems of traffic congestion, there were concerns that a modern metropolis which was to be the site of a technologically-themed World's Fair should demonstrate a practical solution to the universal problem of urban transport rather than be a victim of it in the eyes of the world. On a very practical level, the organizers were concerned that the descent of thousands of out-of-town visitors on the site would place the city's streets and limited highways under siege. The monorail solution proposed for Seattle had another feature which made the traffic and transportation benefits all the more attractive: by using an elevated guideway winding between buildings and erected in the center of streets, the system would not disrupt the existing urban fabric.

Once the vision for the monorail had become part of the Century 21 development program, a search began to find an organization with the requisite experience and technology to manufacture, install and operate the system. Although attempts were made to interest Boeing and subsequently Lockheed in the project, the difficulties of applying experience and technology in manufacturing airplanes to an urban rail system led these companies to decide not to run the risk of failure with this not-so-new, but definitely unfamiliar product. In the end, the Century 21 organizers found Alweg, the Swedish firm that Disney had engaged some years prior to develop the monorail system for California's Magic Kingdom theme park. Alweg had proven its ability to manufacture, erect and operate a monorail system in the demanding setting of Disneyland, transporting thousands of visitors to and from the park on a daily basis in a safe, reliable and entertaining fashion. Furthermore, Alweg saw the chance to demonstrate its system in an urban setting as a major opportunity to market their monorail to cities throughout the United States.

Right: The Alweg trains are supported on “Y”-shaped columns which occupy only 4 feet of space. This limited intrusion on existing roads and streets allowed planners to avoid the disruption which a light rail or subway system would have caused.

Center: The trains, operating on rubber tires, run relatively quietly above street level and make it feasible for passengers to enter and exit to office buildings or retail stores.

Bottom: The monorail has the capacity to handle the equivalent of 16 lanes of automobile traffic on a freeway.





Top: A cutaway view of the trains shows the internal transport systems and the rubber tires which propel, guide and stabilize the cars.

Center Left: The “Y-shaped support columns for weight and logistical reasons were formed in place and lifted into the foundation shafts by crane.



Center Right: The prefabricated “rails” were easily lifted into place.



Below: The assembled track, ready for final fit-out with electrical systems.



Alweg's monorail system did, in fact, owe, in part, its success to techniques of fabrication and structure which were pioneered in the aircraft industry. The train cabins were formed of aluminum, thus providing a lightweight, yet sturdy structure. The transport, power and braking equipment employed by the trains is adapted from other types of rail transit vehicles. The basic system is composed of an elevated reinforced concrete "rail" which, in turn, supports the electric trains which operate on four rubber tires - two of which ride directly on the rail and two of which are mounted horizontally providing stability and guidance. Running at twenty-five feet above the street at a top speed of 70 miles per hour, each train is 122 feet long, 10 feet 3 inches wide, 14 feet high and weighs over 100,000 lbs. Each train has two cars and can accommodate up to 450 passengers, both seated and standing; complete sets of controls are provided in both ends of the trains, thereby avoiding the need to turn the train around to reverse the direction of travel. Each train is powered by eight 100 horse power electric motors; the 700 volts of D.C. power required to run the trains is delivered by contact rails located on the sides of the concrete beams.

As with the decision to build the Space Needle - which was basically designed and built in a brief thirteen months - the Alweg monorail team had little time to spare in making the transition from dream to reality and the system was erected in about ten months. The track system design lent itself, in part, to off-site prefabrication which allowed the builders to utilize a site in nearby Tacoma, Washington to cast the pre-stressed concrete rails and then truck them to Seattle for installation. The rails themselves were three feet wide and five feet deep with a hollow center core to reduce weight; they ranged in length from seventy-six to ninety feet and weighed up to sixty tons. The vertical supports for the rails were cast on site and then erected by cranes into foundation shafts which extended twenty five feet into the ground; the relatively slim diameter of the shafts, at 4 1/2 feet, minimized the interference with existing utilities.

During the six months of operation of Century 21, the monorail, which originated its services in downtown Seattle, about one mile from the exposition site, carried more than a million riders per month for a total of 7.1 million riders; to put it another way, nearly 75% of the visits to the event, which totaled over 10 million, were accomplished via the monorail.

In the all-important category of cost, the monorail was also a winning proposition. When compared with other mass transit solutions, the monorail which cost between \$2.5 and \$3.5 million dollars per mile was estimated, in 1962, to be roughly one-third the cost of other systems such as subways. In today's dollars, assuming the relatively modest inflation rate of 3% over forty years, this would be approximately \$X million dollars per mile, still a relative bargain when compared to recent estimates to extend the existing Bay Area Rapid Transit System to San Jose, California at a cost of approximately \$x billion per mile.



Below: A group of young passengers enjoys the view and the vicarious thrill of driving the monorail from the driver's seat.

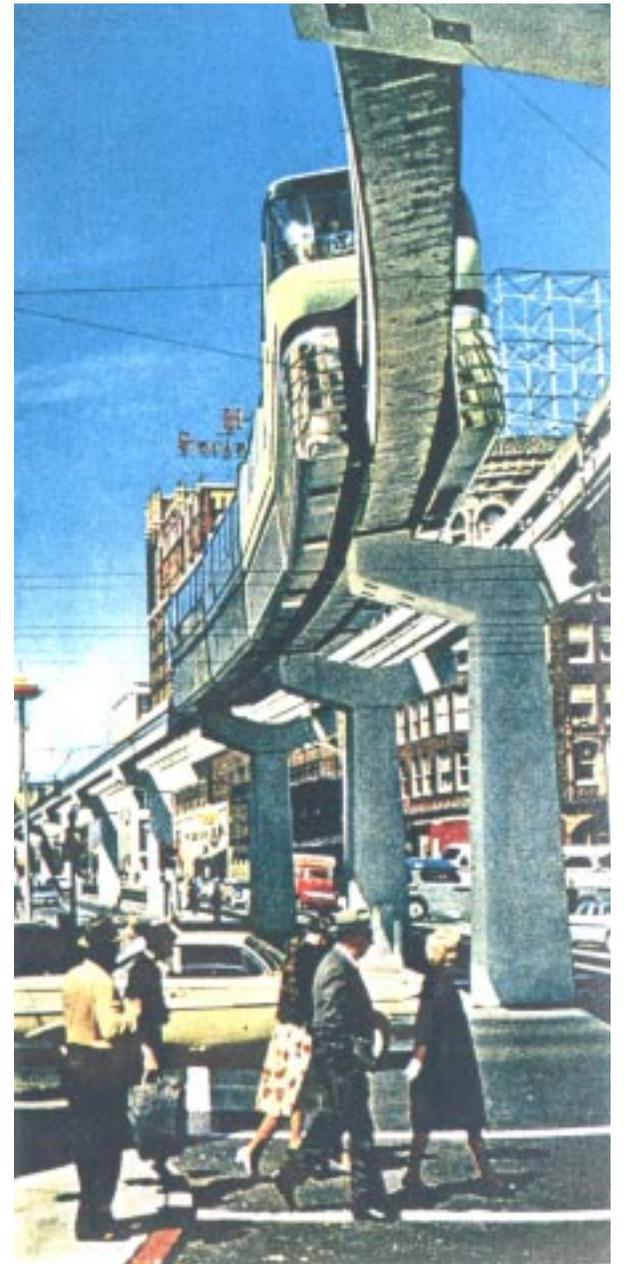
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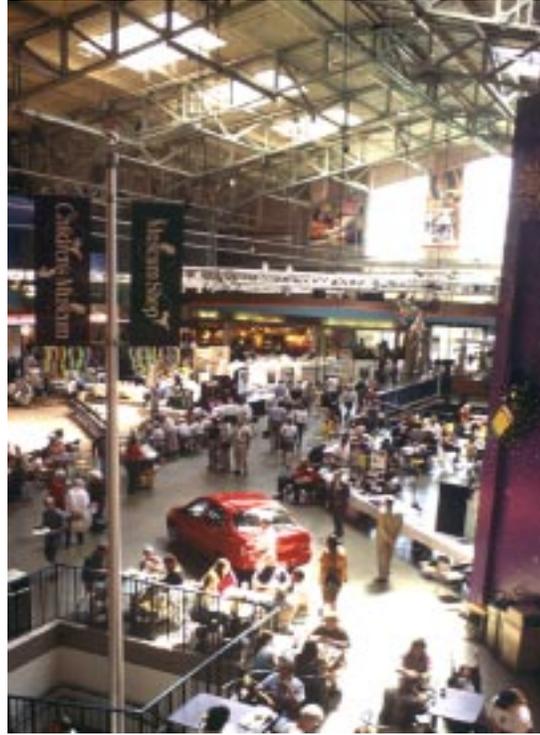
Top Left: The sleek, modern trains confirmed Century 21's message of a bright future, fulfilling the promise of technological innovation.

Top Right: Pedestrians and vehicular traffic in downtown Seattle seem unaware of the trains gliding overhead.

Bottom Left: Passengers enjoy the ride from the Century 21 grounds towards downtown with the Space Needle looming in the background.

Bottom Right: The monorail station at Century 21 was a hub of activity and, in itself, a modernistic entry point into the world of the future.





Top Left: The 605ft.-high Space Needle has become symbol of the City of Seattle and continues to draw over one million visitors every year.

Top Center: The Food Circus facility has been transformed into an active restaurant and community center, serving both tourists and residents alike.

Top Right: The Experience Music Project, designed by world-renowned architect Frank Gehry and financed by Microsoft co-founder Paul Allen, opened in June of 2000. In this photograph, the EMP is juxtaposed against the children's amusement park.

Bottom Left: The U.S. Pavilion became the Pacific Science Center which recently added a new IMAX Theater and an Exhibit Gallery.

Bottom Right: The monorail route passes through the new EMP.

With the success of the monorail operation during Century 21 and the favorable reaction of the public to this innovative form of transportation, it was only logical that the system was retained and operations were continued. Fortunately, the option for Century 21 to retain the system had been contemplated in the original contract. Alweg sold the system, free and clear, to Century 21 on September 17, 1962 for \$4.5 million. In the original contract, Century 21 also had the option of obliging Alweg to remove the system after April 21, 1963 if they were so notified by December 19, 1962. Through subsequent negotiations and transfers of responsibility, the system was eventually sold in 1965 to the City of Seattle for \$600,000. In the years after the transition, from a key transportation system for a major event, there have been numerous changes on the site of Century 21 which have helped to maintain a viable entertainment and cultural destination. The overall site has been transformed into the Seattle Center, which comprises a number of facilities including the well-known Space Needle and the Pacific Science Center, formerly the U.S. Pavilion during the exposition. But it hasn't always been roses: in 1988, based on community concerns over the aging facilities, the City hired Walt Disney Imagineering to conjure up a new vision for the Center. Alas, the plans were not implemented due to the high costs and uncertainties about financing. In 1990, another wave of improvements – amounting to \$186 million – were debated; yet attendance at the variety of facilities, including, by now a small amusement park, continued apace, with annual visitors in the neighborhood of 8 million.

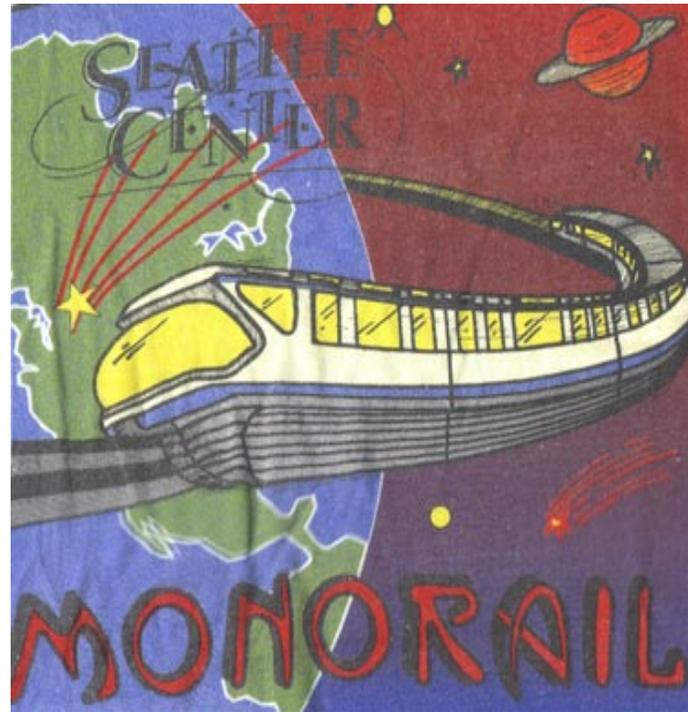
By 1995, the monorail had run up over 1.3 million miles and was carrying over 2.2 million riders per year, quietly generating an annual profit for the City of over \$400,000. And then, in November of 1997, local government officials were caught by surprise when the efforts of a local taxi driver, Dick Falkenbury, to promote extensions of the monorail system were rewarded by a 55% favorable vote by citizens of Seattle in support of a plan to spend \$1 billion to extend the routes from 1 to 40 miles and provide service into the neighborhoods surrounding the downtown. In an unusual twist, the Monorail

Initiative also decreed that City Council members must have started the project within a year or lose their salaries. Unfortunately, the will of the voters was subsequently thwarted by the City Council as funding the expansion was found to be unrealistic. However, at present hope remains alive in Seattle as a new initiative, passed in 2000, has resulted in the authorization of \$6 million in funding to explore new options for the new system and the monorail option will be included as a primary element to be studied. Even if some extension of the system is found to be viable, given the time requirements to plan, design and build the facilities, it is unlikely that in today's project development environment requiring many years of study, permitting and funding, Seattle's expanded system could be in operation in under ten years. Thus, it would be fifty years since the inauguration of Century 21 until Seattle has another day to celebrate its "new" monorail.

After the Century 21 event, monorails came to be almost a standard feature of world's fairs, with installations in Montreal '67, Vancouver '86, and Brisbane '88 to name a few. The remarkable thing is that the monorail systems implemented in subsequent events were for the most part dismantled and removed either shortly after or within a few years of the conclusion of the event; in most cases, these systems were confined to routes within the exposition grounds and did not provide service to and from the surrounding communities. Thus, Seattle's success may, in part, lie in the fact that the monorail was more than a ride within the exposition, providing transportation service to and from the site.

In retrospect, the saga of the Seattle monorail raises a more interesting question: why didn't other cities in the United States or abroad see the potential and develop monorail systems of their own?

Right and Below: A T-shirt, front and back, from 1990 expresses the sentiment that the Seattle monorail was an innovation years ahead of its time.



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