

History of the Advanced Transit Association (ATRA) Year by Year

by J. Edward Anderson, first ATRA President.

1993 – The Eighteenth Year.

At the ATRA Board of Directors Meeting on January 12, 1993, reports from various ATRA members indicated that the Chicago RTA is considering whether to proceed with Phase II (the test phase) of its three-phase PRT Evaluation Program and, if so, whether it should participate in testing the Taxi 2000 or the Intamin PRT concept. While the RTA plans to help fund the test phase, it made clear at the outset that the bulk of the money would have to come from other sources. Given the dearth of venture capital for advanced transit development in the past two decades, progress toward Phase II has been very slow. Now, apparently, Intamin has signaled its financial readiness, and members reported that Raytheon Company is actively considering advising the RTA that it will provide adequate resources for testing the Taxi 2000 concept.

ATRA Board member Roy Moore briefed the meeting on the status of PRT consideration in the City of SeaTac. SeaTac is a busy commercial, traffic-congested area, with a small resident population. Office buildings, hotel/motel operators, and other interests are seeking low-cost, non-road-bound transit for internal circulation and to provide quick, direct means for people to move between these facilities and the airport. A consultant group that studied SeaTac's transportation requirements concluded that, if PRT existed as a tested mode, it would be the mode of choice to serve as the area's internal circulator. This conclusion is backed up by the unanimous vote of a 17-person Steering Committee. Further public and private funding is being sought to finance testing and then a working demonstration of PRT in the SeaTac area.

ATRA member Dr. Martin Bernard briefed the Board Meeting on the National Station Car Consortium progress. He reported that eight transit organizations have pledged to set up electric-powered station car demonstrations, each involving at least 50 vehicles.

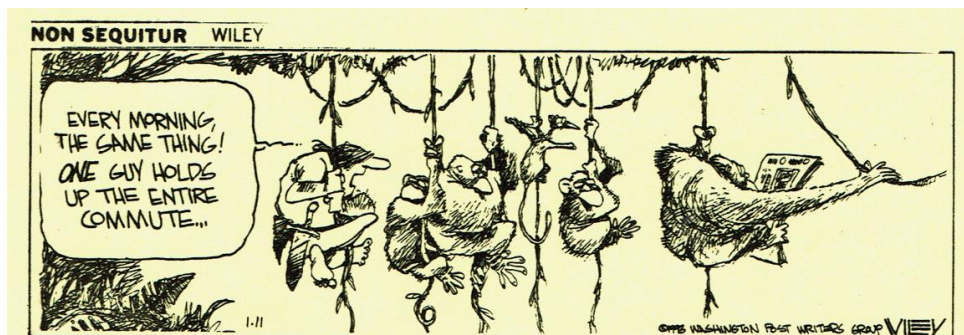
Jerry Kieffer reported on the PRT question/answer project and said that the committee planned to present a progress report at the automated people mover conference to be held in Las Colinas in Irving, Texas, on March 18-20, 1993. He explained that beyond the brief paper planned for Las Colinas, the committee would produce its own lengthier publication on the subject.

The ATRA UPDATE for June 4, 1993 reported that the Chicago RTA Board of Directors, upon recommendation of its staff, selected the Raytheon/Taxi 2000 PRT system for their Phase II program and recommended awarding Raytheon a contract not to exceed \$18 million to continue the work. They declared that this decision was a major milestone in the efforts over several decades to apply new technology concepts to the difficult challenge of how to expand cost and service-effective non-road-bound transit in the traffic-congested, transit starved suburban and other medium/lower density parts of the world's metropolitan areas. RTA Chairman

Gayle Franzen said, "PRT will not be the absolute answer to suburban congestion, but we believe it can be part of the solution. We recognize that PRT is an experiment, and we recognize that it is a risk, but it is our public responsibility to explore new technologies and we believe it is a necessary risk. If actions like this had been taken years ago, we might not be confronted with some of the current crises we face today."

In April 1993, the RTA chose the Chicago suburb of Rosemont for the Phase III PRT demonstration.

In a memorandum to ATRA members in November 1993, Jerry Kieffer, as ATRA Secretary/Treasurer wrote that because the Chicago RTA and Raytheon were proceeding with a PRT demonstration, some ATRA members were asking whether there was still a need for ATRA. He promised that the issue would be on the agenda at ATRA's Annual Meeting in January 1994, and distributed the following cartoon with his memo – always a joker!



BACK PERSONAL RAPID TRANSIT !

YOU CAN TRAVEL SWIFTLY, VINE TO VINE, NON-STOP, ORIGIN TO DESTINATION.

TREE STATIONS, FOR YOUR JUMP-OFFS AND LANDINGS, ARE OFF THE MAIN LINE, SO NO STOPS TO PICK UP OTHER APES.

YOU CAN TRAVEL ALONE, IF YOU WISH, OR WITH APES OF YOUR OWN CHOICE. YOU DON'T HAVE TO TRAVEL WITH STRANGE APES.

Michael A. Powells, Jr. (1929-1993), first Chairman of ATRA, died December 23, 1993 as the result of a fall down the stairway in his home in Evanston, Illinois. Mike had been a vital force in leading ATRA through its difficult early years and will be sorely missed.

My work on PRT during 1993.

The briefing of Dennis Picard, President of Raytheon, occurred on January 14, 1993. Of course, only Raytheon employees could attend. Larry Jack called me the next day to tell me: “Picard said to the team: you have done a good job. Many people attending said that they had not often seen Picard so positive.” Picard committed \$20,000,000 of company money to the project! Wow! A day later Roy Moore called to tell me that a PRT project at the SeaTac Airport was all but assured.

On the 20th of January I learned that Mark Hillier, RTA staff head of the PRT project, had just returned from a trip to Sweden. He was still keeping Intamin in the loop notwithstanding the briefing in which I showed him why they couldn’t achieve less than about 28-second headway, while their specification called for a maximum of 5 seconds. Hillier said that a final decision would be made in March or April. About a year later he died in his sleep while on a visit to Raytheon. He was a relatively young man.

Raytheon’s proposal to the RTA was dated January 19, 1993. The Raytheon management renamed the system “PRT 2000” and acknowledged that the key concepts came from Taxi 2000 Corporation. Raytheon insisted on worldwide exclusivity while I had given Liz and Roy that right to the State of Washington. Dick Daly now had the unwelcome task of negotiating to get them to back off. Liz and Roy had the option of getting a percentage of nothing or a smaller role in something – a tradeoff that required a lot of negotiating, but Dick was eventually successful.

I had been invited back to Amsterdam by the Poots for meetings on March 8-11, 1993. This time, with our involvement with Raytheon, three of their marketing personnel, Brad Schupp, Richard Tauber and Don Kendall joined me. They, through Raytheon channels, had checked up on the Poots and because Peter Poot had gotten in trouble with authorities became biased against them. Notwithstanding, on the 8th and 9th, we had a detailed discussion about cooperation between Raytheon/Taxi 2000 and Chipshol/Taxi 2000 Europe, and had a tour of the Schiphol Airport area. On the 9th we gave presentations to the Ministry of Transport at the Chipshol offices. On the 10th, I gave a presentation to the press at De Meerse, Hoofddorp, and also to public transport authorities. As could be expected some of the transportation engineers were strongly opposed to a new and better way of solving transportation problems, but their objections were easy to refute. On March 11, we held a summary meeting and then left for home.

When I returned to Boston, I learned that the RTA staff was still asking questions and was not prepared yet to make a recommendation to its Board of Directors. So, we still had much to do. In the meantime, we were getting calls and visits from several locations interested in applications. The most prominent of them were Georgia Tech, the Science City in Japan north of Tokyo and Army Fort Belvoir, which was to be converted into a large private-development project. The word we got from a professor at Georgia Tech was that “the climate for PRT was very favorable.” Kevin Whitby, son of one of my mechanical professor colleagues at the University of Minnesota, had spent some time at Science City and, because it was designed around automobile transportation, the situation was becoming extremely congested. Kevin had interested about a half dozen Japanese colleagues in Taxi 2000. We were still also having conversations with Al Higashi at

Hughes and he told me that TRW, a well-known aerospace firm, was interested in PRT, but to sell it they needed a 100-mph version. I had from the beginning of my design in 1981 realized that the same idea could be applied to high-speed intercity transportation, but that that had to be a next phase.

Chicagoland

Chicago Tribune Friday, April 16, 1993

RTA's personal rapid transit system

The Regional Transportation Authority approved Rosemont on Thursday as a site for an experimental personal rapid transit system. Two competing contract teams will produce cost estimates within 90 days, and if the project is deemed feasible, the RTA will vote to proceed with it.

- **Purpose:** To reduce suburban congestion by providing a convenient alternative to automobile transportation within a suburb.
- **Cars:** Individual cars would seat no more than five people each.
- **Rails:** Lightweight guideways would not require much space or land.
- **Stations:** Stops located off the main line would mean no backups and no waiting.
- **Navigation:** Riders would request a station and the route would be programmed by computer; the car would travel nonstop to the requested station.
- **Implementation:** The RTA board will be considering the proposals this summer, and if one is approved, the system would be operational in 4-5 years.

Sources: RTA, Wilbur Smith Associates, news reports Chicago Tribune

Rosemont gets nod for PRT

By Gary Washburn
Transportation writer

The future would come first to Rosemont under a decision Thursday to select the northwest suburb for an experimental "Buck Rogers" public transportation system featuring small, automated, elevated cars carrying as little as one passenger each.

By a 9-3 vote, the Regional Transportation Authority board chose Rosemont over three competitors for the hotly pursued "personal rapid transit" (PRT) project.

The Rosemont proposal won out over bids by Schaumburg, Deerfield and Lisle to host a pilot version of the PRT. And though the competitors were disappointed, they said the concept would show up in their towns once it had proven its success.

Supporters of the concept believe the PRT holds one possible solution to suburban traffic gridlock, and they contend similar lines could sprout throughout suburbia if the Rosemont test is successful.

With site selection completed, two contracting teams now will produce cost estimates within

See PRT, pg. 6

By this time the RTA had reduced the number of potential Chicago suburbs for the first PRT application from six to four, and then to Rosemont. The main factor in the final decision was the sensitivity of the ridership to the fare. Because the potential riders in Rosemont would be mostly businessmen traveling between hotels and offices, the ridership studies performed by Wilbur Smith showed that the sensitivity there would be the least.

In early May 1993 Richard Tauber informed me that Walter Stowell wanted to send the two of us to South Africa to visit planners in Johannesburg, Durban and Cape Town who had expressed interest in Taxi 2000. This was exciting for me because I had never been to any place in Africa. We arrived



in London on Saturday, May 22nd in time for breakfast and then a visit to the British Museum. The picture above shows Tauber and me on a London street.

We flew overnight to Johannesburg, and arrived on Sunday morning with all day to look around. Our meetings were on Monday and Tuesday at which I gave my usual presentation. In Johannesburg, we met a local Raytheon representative, and enjoyed a good meal including pickled crocodile and ostrich soup.

We flew to Durban on Wednesday morning and stayed overnight for meetings on Thursday. Durban is a resort town with beautiful beaches. Here we had a good meeting with the local transit authority. From there we flew to Cape Town where we met local transit officials. The weather was beautiful and I thought Cape Town is one of the most beautiful cities I have visited.

I had barely gotten home when I learned that the RTA Board had met on June 3rd and voted in favor of the Raytheon/Taxi 2000 team over Intamin. In the agreement, we had negotiated with Raytheon, upon the initiation of the project Raytheon would give us a check for \$1,000,000 for exclusive use of our technology, so now we could more than cover our debts. A Boston Globe article says that I used mathematical models to develop a switch. There were no ways mathematical models could have helped. I needed to develop a new switch configuration and that requires three-dimensional holistic thinking, not mathematics. Developing my PRT system, however, has required a great deal of mathematics on paper and via computer simulations.

Letters of support and congratulations came in from many places. It was obvious that people looked forward to a better way of moving around town. The most important letter is shown on the next page.

Negotiations with Raytheon went on heavily during July, and then Cindy and I took off for Colorado for my family reunion in Glenwood Springs, which was held over the weekend of July 30-August 2. When Cindy and I got home from the family reunion, I faced a flurry of activity in our contract negotiations with Raytheon, watching the contract negotiations between Raytheon and the RTA, and attending to technical matters. I asked for and received an un-paid leave of absence from Boston University for the fall semester of 1993 and later had it extended for the whole academic year.

On the evening of September 30, 1993, the RTA and Raytheon signed their contract for the hardware development of the Taxi 2000 system. Now \$40,000,000 was committed to the program and work began on October 1. In our agreement with Raytheon, for the sum of \$1,000,000 they received worldwide, exclusive rights to my technology. They were now in charge of seeing that the dream of real PRT be realized.

UNIVERSITY OF MINNESOTA

Office of the President

202 Morrill Hall
100 Church Street S.E.
Minneapolis, MN 55455-0110
612-626-1616
Fax: 612-625-3875

June 25, 1993

Professor J. Edward Anderson
Taxi 2000 Corporation
40 Salem Street
Lynnfield, Massachusetts 01940

Dear Professor Anderson:

I am writing to offer you both my personal congratulations and the congratulations of the University of Minnesota on the announcement that Chicago and Raytheon are proceeding with the development of your PRT system. Tony Potami has, over the past several years, kept me informed of continuing efforts by Taxi 2000, the University, and others to commercialize this technology. There have been many advances and setbacks over that period, but the decision by the Chicago RTA is a major breakthrough. We anticipate now that the Taxi 2000 system is on its way to commercial development and application!

Your singular efforts and commitment over an extended period of time deserve most of the credit for this event. I hope that you feel a great amount of pride and satisfaction in the results of your efforts. We at the University take satisfaction in our support for and participation in an endeavor that may prove to be one of the most successful and far reaching technology transfers from a university.

Sincerely,



Nils Hasselmo
President

At almost the same time a terribly unfortunate event occurred: Walter Stowell, Senior Vice President and General Manager of the Equipment Division with its 2000 engineers suddenly retired to his home in Vermont. I heard that it was due to a nasty meeting with Dennis Picard. I never met Picard, but from comments of several engineers he was an extremely hard-nosed task master. Stowell was a brilliant and very decent man, a marvelous person to head a large division. Not only that, but he knew me through briefings and had insisted that I be involved in the details. Picard appointed Dale Reis to take Stowell's place. I may have shaken his hand once but never had any detailed meeting with him. Also, over Stowell's head, Picard appointed Ang Fergione to head the engineering work on the PRT contract instead of Steve Gluck, giving Steve a fancy title. It made him head of marketing for PRT. Fergione had held a top position in the Raytheon Micro-processor Division and now came in to head a project he knew absolutely nothing about. This kind of thing happens not only in the political scene. At about this time Steve commented to me "We can do it better than you can!" Wow! That is the epitome of "Not Invented Here," an attitude that has destroyed many engineering projects – in one year with mostly radar engineers they could do a better job, they thought!

The work at Raytheon was to be done at the Equipment Division Headquarters in Marlborough, Massachusetts. My first task was to give a two-week course to the Raytheon engineering team assigned to the project. This was done during the second and fourth week of October, but unfortunately many of the engineers assigned to the project came later, with no background on PRT whatsoever. So now Raytheon had assigned a team of radar engineers with only the briefest exposure to PRT to complete the engineering work on the test system in barely over one year. Moreover, I learned that all my papers were stored in a locked file, and that hardly anyone could read them – all Raytheon wanted was access to the Chicago RTA.

I have mentioned that Cindy and I flew to Amsterdam where I gave a paper at a conference on Transportation Safety in Delft. That event occupied the last week of November. Just before that, Harvard Professor Charles Harris and I teamed to teach a two-and-a-half-day course on PRT planning in Chicago. Notwithstanding the \$695 fee, the attendance was excellent. Gayle Franzen came and gave an opening greeting on behalf of the RTA. But, unfortunately, these events kept me away during the critical start-up period.

I was told sometime in December, that the team planned to do a trade-off study of the truss guideway with a 30-inch-diameter pipe as the basis for a guideway. Charlie Rainier, a structural engineer with Raytheon Engineers and Constructors (REC) had previously had studied my guideway and had become enthusiastic about it. He wanted me to participate in the trade study. But I was kept away with so many other tasks and trips that I had too little time for the guideway – in retrospect I should have spent all my time on it. But I learned later that the reason for the 30-inch-diameter pipe was that Raytheon owned a division in Idaho that made it for the oil and gas industry. Moreover, I learned about nine months later that the pipe was recommended by the Chief Engineer of REC who reported directly to a Senior Vice President, and both Fergione and Gluck feared, Gluck told me, that if they didn't opt for the pipe that that Senior VP would hear about it and overrule them. Now imagine starting with a 30-inch pipe as a basis for a guideway. Running surfaces would have to be mounted on top of it.

Then Fergione simply didn't like the idea of a vertical chassis – he preferred an ordinary auto chassis with no understanding of the reasons for the vertical chassis, and that led to a guideway more than six feet wide. The purpose of the vertical chassis that I had specified was based on analysis that showed that a minimum-weight guideway would be narrower than it was deep. That impressed no one. These engineers, having mostly worked on military projects, had no time for optimization. This was the environment in which I found myself.

To top this, they assigned my student George Matisse to work with them on a trade study between linear induction and rotary motors, giving me no time to assist. The Raytheon engineers found that Force Engineering, the world's best manufacturer of linear induction motors, was a small company. They had hoped to deal with a General Electric. They went with rotary motors, and then found that on a rainy day they could not get enough traction on the steel running surfaces. So, being aware that on aircraft carrier decks the Navy applies a type of sandpaper called epoxied carborundum (certainly a fancier name). This gave them adequate wet-weather traction, but later, too late to make a change, one of the engineers told me that they found that on a dry day, if the emergency brakes had to be applied the vehicle would stop at 0.8 times gravity, which is sufficient to throw passengers thru the windshield, and RTA lawyers insisted that there be no seat belts. The solution to that? They didn't have any. They just didn't talk about it.



Me in the office of Chiphol Forward in Amsterdam.