

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

by J. Edward Anderson, first ATRA President.

## 1987 – The Twelfth Year.

The February 1987 issue of the ATRA Newsletter summarized a vigorous discussion of PRT that featured the January 13 annual meeting, and the ATRA officers called for a “Sharper Focus for ATRA,” which urged the Board’s approval for a 1987-88 program that would give a high priority to PRT. Many members felt that PRT was being unwisely neglected. The criticisms leveled during the 1970s at PRT’s technical feasibility and economic viability should be re-examined, they thought. Some members felt that foreign investment in PRT over the previous 10-15 years showed that PRT would probably never become a sensible solution to urban transportation problems. Other members, however, doubted that these programs had showed PRT to be faulty in concept or potential benefits. Members disagreed on what, if anything, was “proven” about PRT in past R&D programs. It was felt that ATRA could perform a service by capturing and organizing information about what had been learned thus far about PRT. It was agreed that it would be of great benefit to urban transportation if PRT were proven to be feasible. The discussion led the ATRA Board to agree to focus strongly on PRT during the coming two years, without endorsing a specific technical approach.

Tom Floyd, the ATRA President, appointed Bill Wilde to chair a special committee to assemble data and opinions about the present status of R&D on PRT systems. This committee was to provide a reliable update of PRT activity and to secure a better set of data on past R&D projects on PRT, drawing on as many sources as possible for both opinion and data.

The Transportation Research Board Committee on new transport systems, also held on January 13 promised to give the PRT concept a “Fair Test.” They recommended that at its 1988 meeting TRB sponsor a full session on PRT. This conclusion was the result of a presentation by ATRA President Tom Floyd, in which he stressed the following theses:

- 1) Conventional transit is – sadly – not working well.
- 2) Conventional solutions proposed were not proving to be sufficient answers.
- 3) PRT offers the best R&D option for coping with what actual and potential riders really want and need in today’s “spread city” and the best chance of coping profitably or with minimum subsidies.
- 4) PRT concepts being offered today and the technology on which they are based justify renewed confidence.

The 1987 Newsletter discussed a paper by Dr. Jerry Kieffer, ATRA Treasurer, entitled “A Sharper Focus for Advanced Transit,” published in the winter 1986 issue of the *Journal of Advanced Transportation*. Dr. Kieffer noted that there was a problem of perception: Planners, policy makers, and transportation professionals had the impression that no advanced system could be developed that would be cost-effective in response to the needs of people in medium

and low-density areas of cities. He argued for two steps: 1) A broadly based approach for an objective reappraisal of current mobility challenges, and 2) an effective validation process such as supplied by the old National Advisory Committee for Aeronautics (NACA), which led to remarkable developments in the fledgling aviation industry after 1915. Kieffer recommended that the Secretary of Transportation seek to bring the mission of UMTA back to what Congress had in mind when they voted to form UMTA in 1964. Its charter then was a close approximation to that of the NACA.

The Newsletter gave the ATRA-endorsed definition of PRT:

- 1) Small vehicles, sized for a maximum of about 3 or 4 seated-only riders;
- 2) An exclusive guideway that, compared to conventional transit, is relatively light, low-cost, visually acceptable, and fast to install;
- 3) Off-line stations with no-wait or minimum-wait passenger boarding;
- 4) Automatic control of the vehicles;
  
- 5) Nonstop, demand-responsive service;
- 6) Closely-spaced stations, preferably within one-quarter mile maximum walking distance;
- 7) A capability to charge for the use of the vehicle rather than for each rider; and
- 8) A capability to carry goods as well as passengers.

Note: The first four of these features define PRT. The remaining four become both possible and desirable if the system possesses the first four features.

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My PRT work in 1987. Negotiations had been underway with Boston University, via its Financial Vice President Charles Smith, on the future of my budding PRT system. In early 1987 he made an offer to form a new company in which Boston University would own 75% and Taxi 2000 25%. We would transfer our rights to our technology to BU for a period of five years, and that I would be appointed Chief Consulting Engineer to the new company once funding had been obtained. Smith gave no information about who would be charged with advancing the engineering, because I suspected they wanted to gain control over my technology before they even addressed that question. Turning over all my work to an unknown entity would entail a degree of recklessness that I was not willing to accept. In a memo to my Board of Directors I commented that there were too many unknowns in the offer, that without knowing who would take the leadership it was too risky, that it was like marrying before a period of engagement, and that it should be considered a first shot with a great deal of negotiating required.

I was very fortunate to have Dick Daly working with me as a Board Member and he began right away to draft a counter offer. As Marketing Manager of the Raytheon Equipment Division, much of his work was in negotiating contracts, whereas my professional work was all in engineering. Dick mentioned to me that Raytheon had hired a new Senior Vice President of En-

ergy, Dr. George Sarney, who came from General Electric. Dick met with Sarney for 45 minutes on December 17, 1986 and said that Sarney passed the 20-minute test. (Stuart Watson had commented several times that if a person didn't get the advantages of PRT in 20 minutes, he never would.) Sarney asked for more information, and they agreed to meet again on December 23<sup>rd</sup>. At that second meeting the two of them met for three hours. A problem was that Raytheon owned United Engineers and Constructors, a firm like Davy McKee, and Sarney needed to make room for them. So, we had some negotiating to do. I was going again from a dismal situation into a hopefully promising one.

I forwarded the counter offer Dick developed to Charles Smith on January 30, 1987 in the form of a five-page letter. Charles Smith wrote back on February 13<sup>th</sup> stating that "this counter offer is somewhat unrealistic if not patently absurd." He ended his letter saying "I wish you well in your endeavors to build Taxi 2000 Corporation, but I cannot believe, in my wildest dreams, that you will be able to do so based on the position you and your fellow directors have taken." So, Smith, I had to assume with Silber's permission, turned us down flat – with no indication of any interest in further negotiation. At almost the same time, the University of Minnesota Patent Office gave me an account of \$10,000 against which I could bill for company expenses.

Now, with the possibility of a budding relationship with Raytheon, I spent as much of my free time as possible working on the engineering of my PRT system, at that time mainly on the network simulation program. I knew that my former colleague at the Raytheon Missile Systems Division, Ira Smith, was now working at Arthur D. Little on a military program, and I called him, suggesting we have lunch. I found that he was very much interested in joining me in his free time, and soon he was converting all my planning documentation into a form used in military engineering. Then Dick Daly became aware that Dick Radnor, the lead control engineer at the Equipment Division, was retiring and suggested that we chat. I explained what we were doing and he quickly agreed to join me. George Anagnostopoulos likewise wanted to help, so he joined my team.

On February 5, 1987, I got a call from Jim Graham at John Deere saying that they were interested again in teaming with us. He said that they would start designing the vehicle for our PRT system at their Tech Center and that he would go to two or three Deere factories to discuss manufacturing PRT components. Graham said that they were interested in both our vehicle body and chassis and wanted to integrate all the parts. He wanted to discuss how much Deere would invest and how much external capital would be needed. Deere engineers wanted to go through my simulations. He looked for a go-ahead the next week at which time they would invite Dick Daly and me out to their headquarters in Moline, Illinois, for business and technical discussions. The next day Jim called to say that he had obtained permission to work on a contract with us and that they were working on a letter of intent. He expected a start date of May 1<sup>st</sup>! Dick and I flew out to Deere on February 15<sup>th</sup> and then flew to Chicago to meet with Chicago Bridge & Iron and to meet with Dr. Larry Johnson at Argonne National Laboratory, as they had been gaining interest in involvement with us. The University of Illinois at Chicago Circle was considered as a good place for a demonstration. One of the key professors there, Dick Michael, had been interested in PRT for a decade. At the same time, we were hearing from a Honolulu businessman, Lu

Lopez, who for several years had been working to interest Honolulu in Taxi 2000. On February 12<sup>th</sup>, Lu called to set up a meeting at the University of Hawaii in early March. He planned to have the Hawaii National Energy Institute sponsor a seminar at which I would explain our PRT system.

One of the Argonne people suggested that we power our system from batteries at way-side. They had been involved with a program to develop back-up municipal battery power systems to store excess power at night. I had not seriously considered such a possibility, but now I investigated. After checking with several battery companies, I found a company called Keystone Battery Corporation in Winchester, Massachusetts. I called the president and found that he had been an engineering professor at Boston University. He gave me information on the cost and lifetime of their 48-volt industrial batteries, from which I found that if the difference between the fee for power during the busiest times of day to the fee at night was more than six cents per kW-hr we would save money if we ran our system all day on batteries and charged them at night. Commonwealth Edison in the Chicago Loop told me that they charged 12 cents per kW-hr during the busy periods and only four cents at night. To save building a new power plant they said that during the nights they transmitted electric power to pump-storage plants on the southeast side of Lake Michigan to pump water up hill, and then during the rush periods they run it downhill through generators and back to Chicago. The distance was about 180 miles.

Dick Daly invited me to go with him to Raytheon headquarters in Lexington, Massachusetts, on February 12<sup>th</sup> to visit for my first time with Raytheon Vice President George Sarney. This meeting started a long series of breakfast meetings I had with George Sarney and Dick Daly in the lunch room at Raytheon headquarters. On February 19<sup>th</sup>, Dick had a long talk with Sarney at which time Sarney said that he wanted to get a skunk works going to detail all that was needed to build a PRT test track, and he wanted to start warming up Raytheon management. Raytheon had a venture-capital fund that he believed he could tap into. He wanted Raytheon to become the core company developing our PRT system, and he wanted to do it in small, palatable steps. He wanted Raytheon Ventures to take a minority position in Taxi 2000, which would be like buying an option to buy Taxi2000 Corporation, and he wanted to do this quietly so as not to besmirch the Raytheon name if things went sour – always a concern! Sarney arranged for me and others working with me to have office space at United Engineers & Constructors in downtown Boston. UEC was wholly owned by Raytheon. Our first use of that space occurred on the afternoon of March 24<sup>th</sup> and we worked out of that office for over a year.

The week of March 9, 1987, was spring break at Boston University so I flew to Chicago to visit with Bob Perry, President of Davy McKee. Jim Graham came in from Moline to join in our discussions. He said again that Deere was close to a letter of intent with us, but that he had to satisfy some doubters. Those doubters eventually carried the day, and Deere faded away. From Davy McKee I walked to the Chicago Transit Authority office in Merchandise Mart to meet with my old friend Dr. Darwin Stewart, now Director of Planning at the CTA. He had arranged for me to give a presentation to his staff on March 10<sup>th</sup>, following which he asked me to layout a PRT system that could take people from the two major commuter rail stations to jobs along North Michigan Avenue. I obtained the necessary data from the commuter rail authority

called METRA and found that the flows of passengers could be handled with four 12-berth stations, one on each of the four sides of each of the Northwestern and Union stations. The next day I met with Dr. Larry Johnson at Argonne National Laboratory. ANL was seriously thinking of placing a test PRT system on their 1500-acre site about 25 miles southwest of the Chicago Loop. Following that meeting I met with professors at the University of Illinois at Chicago Circle as we had been discussing placing a first demonstration system there.

The main problem was that we had granted Davy McKee the exclusive right to the site engineering work, but for Dr. Sarney to get fully involved he needed to find room for United Engineers & Constructors to do the same kind of work. Finally, Davy McKee gave in. Another problem was the debt Taxi 2000 had accumulated both due to expenditures during Roger Staehle's term as CEO and the patent costs we owed the University of Minnesota. All of this amounted to almost \$1 million, which to some potential investors was an insurmountable barrier.

A concern of one of the Raytheon managers was that we needed the backing of an operating division. The backing of Dr. Sarney, even as a Senior Vice President was argued to be insufficient. Dick Daly was the Marketing Manager of the Equipment Division. He had talked briefly about Taxi 2000 with Walter Stowell, the Equipment Division's General Manager and Senior Vice President. On October 8<sup>th</sup>, Daly and Sarney had lunch with Stowell and reported to me that it went very well. Daly said that Stowell was enthusiastic and that the bulk of the discussion was on how they would do it. The plan was to prepare a presentation to then President of Raytheon Gene Shelly, which was scheduled for the afternoon of October 19, 1987. Stowell commented that the Taxi 2000 project should not be set up as a separate company but as a project in the Equipment Division, which had about 2000 engineers. He felt that Taxi 2000 could be developed year by year as funds would be approved. He realized that engineering studies were needed and estimated the need for between 20 and 30 engineers. Stowell said that he would take responsibility and that I would fit in as either Consulting Scientist or project leader. Stowell wanted the project to be as he said a "dedicated group," which would be like Lockheed's skunk works. They enthusiastically planned for the October 19<sup>th</sup> meeting with Gene Shelly.

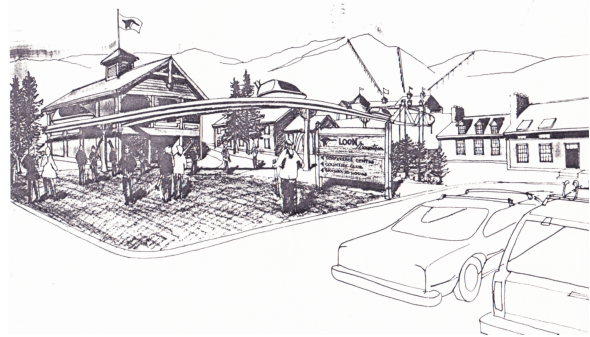
Daly, Sarney, and Stowell were all at the October 19, 1987, meeting, which was held in the afternoon, but Sarney came in late because he had a meeting with the Raytheon Chairman Tom Phillips at the same time. As luck would have it, that was the day the stock market crashed. Someone brought in a note during the meeting stating that Raytheon stock had just dropped by 50%. Even before that note, though, the meeting did not go well. Daly reported to me that evening that Shelly was obnoxious and had not read the briefing book he had been given in advance. He said that PRT was not the right kind of business for Raytheon and accused Daly of a conflict of interest. Nonetheless Walter Stowell strongly supported the Taxi 2000 program. While Shelly attacked both Daly and PRT, Stowell defended. When Sarney arrived and got the essence of the discussion, he said that the PRT program was a good match for Raytheon, but Shelly did not back down. After the note about the stock market crash came the meeting was essentially over. Shelly could think of nothing else. Dick commented to me later that Shelly would be retiring in two years, that the defense business looked sour, but that there was no long-range vision. By 1987 the Reagan Administration military build-up was winding down, and Daly, as a Market-

ing Director, knew it. This was the nature of PRT development – one day euphoria and a week later the bubble burst. Some could see the enormous potential of PRT while others could see nothing. Later, when asked why Raytheon had not entered the PRT business, we used the fact of the stock market crash during the meeting as the reason. So, there was a small silver lining in an otherwise terrible meeting.

Nonetheless, in mid-November 1987 George Sarney called Dick Daly to tell him that he had just been at a two-day corporate meeting at which Walter Stowell told him that he would support our Taxi 2000 efforts. They knew that Gene Shelly would be retiring in two years and that the future was likely to look brighter after that.

During the fall of 1987, my good friend, George Anagnostopoulos of the Volpe National Transportation Systems Center in Cambridge, Mass., spent a considerable amount of his free time working with me to up-date the cost estimate on Taxi 2000. He had been involved with several cost estimates on automated guideway transit systems, so was well equipped to make the estimate. He even got an estimate on the guideway cost from a Boston-Area firm. The upshot was that the cost estimate was so low that we did not think it believable, so we arbitrarily increased it by 40% and that was the figure we gave an ATRA PRT Committee for a study they planned to initiate during the spring of 1988.

George informed me that he and a colleague had been working with the Loon Mountain Ski Resort in New Hampshire because they had a strong need for a people mover. Taxi 2000 was among the systems in which they were interested. Arrangements were made and George Sarney, Dick Daly, and I drove up to Lincoln, New Hampshire, on Saturday, November 21<sup>st</sup> for a meeting with Phil Gravink, President and General Manager of the Loon Mountain Recreation Corporation (LMRC) and seven members of his staff.



Gravink gave us many reasons why Loon Mountain would be a good site for a first real people-moving demonstration of Taxi 2000. They thought first of a half-mile system that would connect a parking lot with a hotel and a ski-lift loading point, such as the one illustrated here. This site would provide us a great winter-weather test, the Loon Mountain staff was familiar with people-moving systems and they could do much of the site engineering. Gravink envisioned that our system could be expanded to serve a three-mile-long valley then under intense development. With an application like this in mind, fund raising would be easier. An agreement between Taxi 2000 and LMRC was negotiated by Daly and Sarney and was presented a week later. United Engineers & Constructors, who as mentioned reported to Dr. Sarney, would apply their considerable talents to the design and construction of the guideway and stations, and the Raytheon Equipment Division would supply the chassis and control system. Taxi 2000, under my direction and with George A's assistance, would be the over-all project manager.

On December 23<sup>rd</sup>, I drove up to LMRC and received a detailed tour of the site, giving us enough information to develop a preliminary layout of the guideway, stations, maintenance facil-

ity, and electrical hook-up. Since the development plans for the site were still in flux, LMRC had time to consider a new transit system. Out of this information in cooperation with UE&C and the Raytheon Equipment Division, we developed a plan for this project in considerable detail.