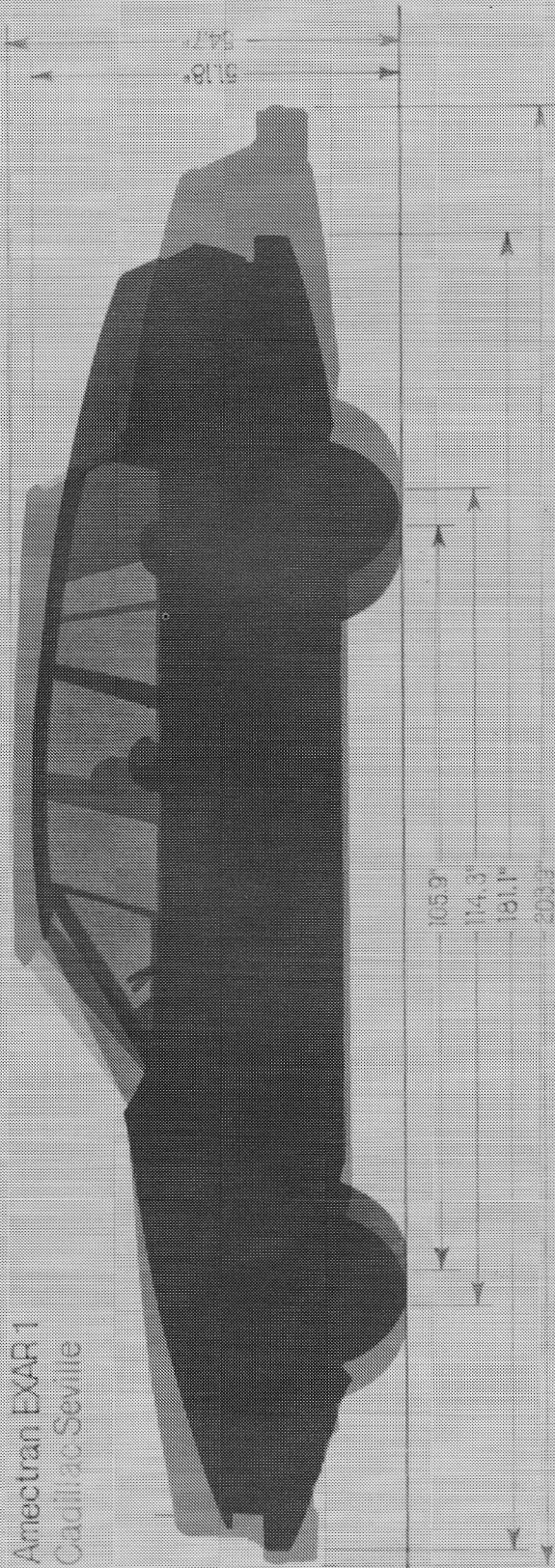


Ametran EXAR 1
Cadillac Seville



THE EXAR-1

2.1 Company

Public Petroleum Ltd. ("the company"), incorporated in early 1988 under the British Columbia Company's Act, wishes to establish the first production scale dedicated electric automobile plant in North America, and to subsequently sell licenses to establish other similar plants throughout the world. To that end, the company has made payments to obtain certain rights to the EXAR-1 electronically powered automobile and the Licensing Agreement has been signed with the inventor, Edmond X. Ramirez Sr.

The EXAR-1, is the name of the production ready prototype produced by "Amectran" Corp., controlled by the inventor, Mr. Edmond X. Ramirez Sr. Canadian Electric Automobiles is one possible name for the new company that will be formed by Public Petroleum Ltd. for the purposes of financing, manufacturing and marketing of this vehicle.

2.2 History of the EXAR-1

The EXAR-1's inventor, Mr Edmond X. Ramirez Sr. was inspired by the potential benefits of an electric passenger car, and first began working on the predecessor of the EXAR-1 in 1973 in Texas. The first prototype was called the "Yellow Car" which was

produced in 1975, and was followed by the "S/T" in 1977. The creation of the EXAR-1, and the performance goals and accessories as planned in 1973, are described in a brochure produced at the time:

"On a fund-raising and information-gathering tour of Europe in early 1977 he (Ed Ramirez) changed his mind, however, realizing that the Yellow Car, which he had designed himself was not right for the market. He immediately began to seek a more suitable body, and quickly commissioned Pietro Frua, one of Italy's premier auto body designers, to modify a body which he previously had designed for BMW. The German auto manufacturer had decided the body was too racy for the companies conservative box-like image and had elected not to produce the car."

The unique design of the EXAR-1 generated interest, and in September, 1980, officials of the City of Berkley held a parade in Mr. Ramirez's honor and announced that they were working to arrange financing to build a plant to manufacture the EXAR-1 in Berkley under the U.S Federal Government UDAG (Urban Development Action Grants) quantities of the EXAR-1 was not realized, culminating in January 1981 when President Reagan discontinued this program. Controversy also loomed amid rumors of possible securities violations and trumped up performance questioned by competitors. Newspapers, with the exception of the Fort Worth Star Telegram, never reported the fact, Ramirez was cleared of "any

wrongdoing" after a six year investigation. False charges like these led the Amectran Corporation into bankruptcy, but Ramirez acquired the corporate assets when it was discovered that Amectran owed him personally \$750,000 of the company's \$756,000 debt. During this proceeding, the authorities insisted that the EXAR-1 must be tested, claiming that even the U.S. Department of Energy could not get their \$16,000,000 electric car to perform as well as the EXAR-1 claims; however, even though the EXAR-1 was an over-weight (by 54%) production ready prototype, it passed all the tests outlined by Dr. Carl Clark of the Department of Transportation, who was responsible for the test procedure. As a result of these successful tests Amectran and Ramirez were given a clean bill of health.

The prototype car has been sitting in a garage since 1981. The controversial and talented inventor simply retired the project to wait and work for a more opportune moment. He has now turned control of this project over to Public Petroleum Ltd., and maintains an arms length position with that company in which he is not a shareholder.

It could be said that the EXAR-1 was simply ahead of its time, and it has taken almost eight years for Ed Ramirez's vision of electric vehicles to find a financing program to produce the EXAR-1.

2.3 Description of the EXAR-1

A picture of EXAR-1 is presented in Exhibit 2.1

The body of the EXAR-1, designed by Pietro Frua, was lengthened slightly, to accommodate

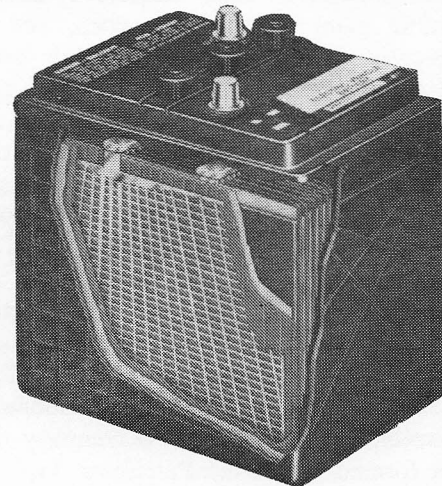
GE's Tucker called the body design "Super," adding that "kids are going to buy it and convert it to gasoline."

the required larger chassis and the electric propulsion system. The body design is clearly Italian, both elegant and expensive looking. It

has a classic styling and sporty air that rivals the best of Ferrari and Lamborghini.

The 15 foot, one inch body is only inches shorter than the 1989 Cadillac Seville. It is 69 inches wide and 51 inches high. The distance between ground and chassis is six inches, a clearance considered typical for five-passenger automobiles. By comparison, the General Motors' Buick Century has a clearance of approximately the same six inches. The total predicted weight of the EXAR-1 is 3,200 lbs., with the batteries comprising 1,200 lbs. of the total.

The battery propulsion system for the vehicle consists of 24 - 6 volt lead-acid batteries. The battery system, computer monitored controller, motor and transmission of readily available parts, comprise the drive train.



2.4 Status of the EXAR-1

The EXAR-1 is an operating, production ready prototype made of heavy steel which was completed in 1979. The body design, produced by recognized Italian designer Pietro Frua, was the last before his death in 1981. The design is very elegant in the Lamborghini style, with a wide, low wedge-shaped body. The absence of a radiator permits a very low front hood, and gives the car a very appealing "close to the ground" look. The purpose of

the prototype is to provide the original design for volume production, as molds will be made directly from the prototype.

The power train of the EXAR-1 is an operating system built and designed in 1973. While it was the leading edge of technology at that time, current improvements in technology, which the company already has, will improve the production model even further. The EXAR-1 will be modified to incorporate these various updated changes with little difficulty.

2.5 Unique Features

1. The EXAR-1 has a unique design associated with high priced, imported sport cars.

2. The EXAR-1 is unique because it is the first electric passenger car targeted to be mass produced as a real product. It is not an internal combustion vehicle retro-fitted with a battery operated power train.

3. The planned production version of the EXAR-1 will have an Acrylic-Kevlar reinforced body for greater life, corrosion resistance, reduction in weight, economy of manufacture, and low cost replacement parts.

"The EXAR-1's most significant aspect is that it pays for itself..."

4. The EXAR-1 is environmentally safe. As an electrically powered vehicle, it has no exhaust fumes to deteriorate the earth's atmosphere, while providing little noise pollution.

5. The operating cost of an electric vehicle is less than that of a gasoline operated car in Canada due to inexpensive electrical energy with gasoline prices close to world levels. The same is true in some areas of the United States. The EXAR-1 is expected to offer

energy savings where the electricity required to travel 100 miles could cost between \$1 - \$2.00 per hundred miles of travel, a gasoline car would spend \$9-11.00 per hundred miles of travel, a significant saving of up to 400% over that of internal combustion engines.

6. The EXAR-1's most significant aspect is that it pays for itself, at a savings of some \$0.30 per mile over that of similar gasoline car. The EXAR-1 will save enough over approximately 50,000 miles to pay for itself.

7. The useful life of the EXAR-1 is obvious because of the materials and motor system.

2.6 Performance Specifications

Final performance specifications for the production model EXAR-1 have been determined at a top speed 75 to 80 miles per hour and cruising speed of 55 - 62 miles per hour, although various alternative options have been considered. At this time, the trade-offs to achieve a higher performance are, while available, not conducive to the target market.

The prototype EXAR-1 design will be updated slightly to meet all CMVSS standards for vehicles of this type. At that time the latest powertrain and electronic components available will be included.

2.7 New Logos and Name Change

As previously outlined the EXAR-1 will undergo slight design and electronic changes in order to provide the latest in current technology and appearance. The EXAR-1's design was completed in 1976 and the prototype came off the line in 1979. While the design was so futuristically conceived as to be currently one of the most attractive cars planned for future production the addition of new ground effects material will greatly enhance the operation and appearance of the EXAR-1. While these changes only represent minor engineering effort they allow the EXAR-1 to remain in the

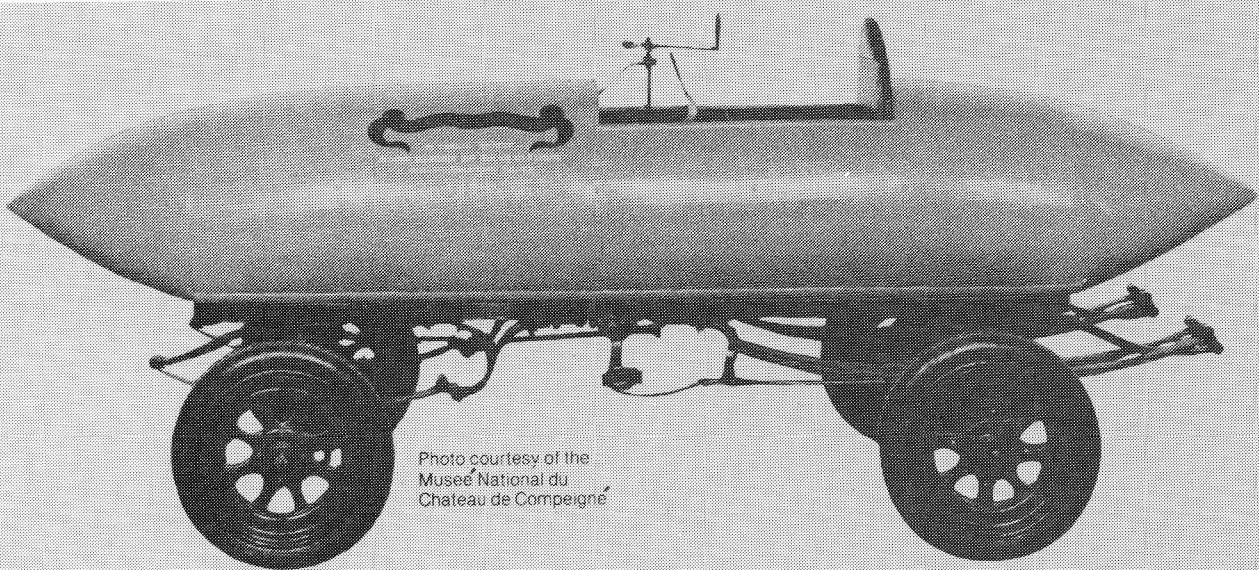


Photo courtesy of the
Musée National du
Chateau de Compeigne

JENATZY'S "LA JAMAIS CONTENTE"

The world's speed record holder in 1899, a bullet-shaped electric race car. A speed of 68.8 mph (110 km/hr) captured the record, yet the racer had a top speed, unofficially, of 75 mph (121 km/hr). "La Jamais Contente" means "The Never Satisfied."

forefront of future hightech development and appearance. As can be seen by the enclosed exhibits and any study of the electric automobile market there are no planned currently operational vehicles of the quality, styling, or engineering advances offered by the EXAR-1. Exhibits throughout this report show that the EXAR-1 developed engineering advances between 1973-1975 that the automobile industry has recently begun to adopt. In order for the EXAR-1 to maintain its lead in both technology and image the acronym EXAR-1 should be revised to something with more dynamic and dramatic exposure.

The name Amectran an acronym for American Ecological Transportation was conceived in the 1970's while the energy crisis was of tantamount importance. However in today's societal conscience we find that ecology and economy play a more important role. The cover of this report indicates an approach which is both dramatic and dynamic. The study to develop this new approach has been a minor one, however, a full study is currently planned in order to augment and finalize a name which

will put the "image" of the EXAR-1 into the 1990's. While many people would remember Amectran and the EXAR-1, the implied negative impact could construe the technology as old as the project. To eliminate this type of confusion, new logos and a new name approach have begun to take shape.

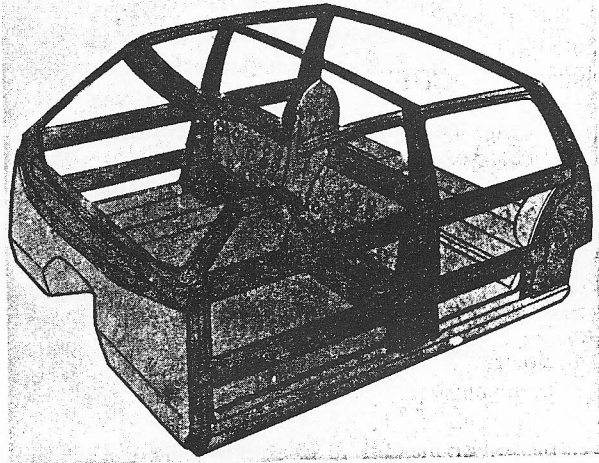
2.8.1 Government Involvement

During the last fourteen years there have been three United States Federal Government Departments involved with the EXAR-1.

These departments have been 1) The Department of Commerce, through its Science, Technology and Commercialization department 2) The United States Department of Transportation, through its innovators and inventors department, and 3) The Booker T. Washington Foundation, through the auspices of the Department of Commerce for investigation of the commercialization aspects of the EXAR-1.

The United States Department of Agriculture also spent a considerable amount of time in-

investigating the EXAR-1 for the possibility of extending loan guarantees in order to set up factories in green areas with their support. These factories were intended to bring new jobs and economic aide to depressed farm areas.



2.8.2 Department of Transportation

Amectran has made several appearances before officials of the DOT. Because of the uniqueness of the EXAR-1, a new seminar activity was begun under the title of "Innovators Seminar". Amectran was asked to be the "first" participant in this program. The invitation was extended because of the vast number of innovations and advanced ideas which Amectran proposed to use with the EXAR-1. A concept of production which fell in line with the Secretary of Transportation's goal of reinventing the automobile. The proposed manufacturing techniques, safety factors, air bags as standard equipment, and many features of the EXAR-1 made this the perfect springboard for approaching that reinvention and realignment of priorities necessary in the automobile industry.

You will find in the Exhibits an excerpt from hearings of the Senate Committee on Commerce, Science and Transportation and on Department of Transportation, Secretary Brock Adams proposal to investigate automobiles like the Amectran EXAR-1, March the twenty-third 1979. Secretary Adams closing comment when

asked directly about the EXAR-1 was "Yes, I think that is a good vehicle. We should pursue it." As can be seen by the testimony before the senate of the United States by the Secretary of Transportation, the operational characteristics of the EXAR-1 were verified before that senate committee, as to its top speed of over 75 miles an hour with a hundred mile range, acceleration from 0 to 60 in twelve seconds, operational characteristics using lead acid batteries. Secretary of Transportation, Brock Adams was asked by Senator Howard Cannon if the Department of Transportation planned to provide any support to help investigate the effort, Secretary Adams' response was that he was familiar with the project and that he would recommend that it be pursued.

In 1980 Dr. Carl Clark, Director of the Innovations Department of the Department of Transportation of the United States Federal Government, was asked to supervise and design the test for the EXAR-1 to determine whether it met the specifications as advertised by Amectran Corporation. Two tests under federal supervision were conducted with prototypes provided by Amectran Corporation. Under the section Appendices sub-section Tests you will find an exact copy of the federal testing report on Amectran's prototype. As can be seen by the report the early version of the EXAR-1 had more than successfully exceeded any other electric automobiles range using standard lead acid batteries. Analysis of the deficiencies which caused distance reduction and operation were recommended within that report. Redesign of the body as recommended on page 4 and 5 of that report was carried out by Pietro Frua who designed the body for the EXAR-1. The chassis losses and inertial losses as outlined in that report were modified somewhat in order to meet required operational characteristics as well as style and comfort. Of the three major categories of improvement, i.e., 1) aerodynamic losses, 2) tire losses and 3) powertrain losses, the projected improvements on the production ready prototype were reduced in order to maintain comfort and styling requirements. The second test as conducted under the supervision

of the federal government using the guidelines as set forth by Dr. Carl Clark, of the Department of Transportation the EXAR-1 fulfilled all of the criteria outlined by this testing procedure and in some cases far exceeded governmental requirements while in all cases exceeded the testing requirements. The second test on Amectran's prototype was conducted in July of 1980 at the Ontario Motor Speedway in California under the strict supervision of the federal government. Dr. Carl Clark recommended to the federal government that the results of the second test be locked under Federal Court order so that the results of the test could not be used by competitors or others interested in advancing their technology to the status of the Amectran Corporation. The Federal Court of the United States of America decided that this recommendation was the only way to protect Amectran and the EXAR-1 against those that might use the information to augment or enhance their own research. The danger for Amectran would be in the exposure of years of research to competitors who could more readily advance that research for production.

“I am satisfied that Mr. Ramirez and Amectran have a significant design, with a credible production and marketing plan.”

“As an individual, may I recommend that you and/or Secretary Adams consider awarding a contract to Amectran . . . ”

These are quotes from a U.S. Department of Transportation Government Memorandum intended for Secretary of Transportation Brock Adams, OMBE, Department of Commerce, Booker T. Washington Foundation and Technology Commercialization DOC from Dr. Carl C. Clark, Inventor Contact for the DOT.

As a result of the testing conducted under federal government supervision, there is no doubt that the EXAR-1 meets the specifications for operation as indicated by Amectran Corporation. The operational characteristics as proposed for the production of the EXAR-1 and the acceptability by the public are discussed in the Marketing section of this report

as well as surveys which are included in the Appendices.

2.8.3 Department of Commerce

The Department of Commerce (DOC) under its Science, Technology, Commercialization section began its contact with Amectran Corporation in 1974. Ms. Margaret Matta was the project officer in charge of Amectran within that department of the government. The DOC worked for a number of months with Amectran Corporation to establish contacts with the office of Minority Business Enterprise and certain other minority vested groups to promote the EXAR-1. Over a period of years the Department of Commerce has recommended the EXAR-1 project to other government agencies as well as cities and states interested in energy, pollution and jobs beneficial programs for their communities. Members associated with the DOC also provided contacts with the Department of Agriculture, who later decided to provide loan guarantees to the Amectran Corporation for production of electric automobiles in agriculturally depressed areas.

Margaret Matta the project officer working with Amectran Corporation from the Department of Commerce had provided over a period of years numbers of contacts to advance the electric automobile project.

Since the project had received some strong opposition and funding to that point had not become a reality, the decision was made

to assign the Booker T. Washington Foundation to investigate the possibilities of the commercialization of the EXAR-1 and to further, through its mandate, investigate whether or not the company was valid and its management and operation consistent with good business practices. The attached exhibits from the Department of Commerce indicate the validity as investigated by the Department of Com-

merce and the Booker T. Washington Foundation of both the EXAR-1 and Amectran Corporation.

The Department of Commerce found it difficult to understand with a project as good as the Amectran Corporation's EXAR-1, why it would have difficulty in being funded and why it was meeting with such strong resistance for the money to be provided to put the EXAR-1 in production. After extensive investigation it was determined that while the project was not only valid and an exceptional program, that those people who had come in contact with the program, in the majority, were unable to provide the financing themselves, nor did they have the contacts that they claimed to have. In other instances those people in a position to provide financing necessary to produce the EXAR-1 left Amectran Corporation no choice but to refuse their offers.

As an example officials from American Motors offered a proposition to Amectran Corporation which would provide little profit and exclusive control of Amectran's distribution, by way of conditions within the agreement as indicated by American Motors. Further, American Motors insisted that Amectran sign a disclosure agreement which would allow their engineers to investigate the EXAR-1 in detail and after a six month period would allow American Motors to either use or sale any information derived from that investigation. Amectran refused not only this offer but several other offers which were not in their best interest. It has been determined that Amectran suffers from the plight of most companies who offer new technology and that is, that it is difficult to find someone who will be first to provide the financing necessary to put the product into production.

2.8.4 Booker T. Washington Foundation

The Booker T. Washington Foundation was contracted by the Department of Commerce to investigate the Science and Technological projects which were being presented to the Department of Commerce. The director of this

operation was Elliott C. Small Jr. It was his responsibility and that of his staff to evaluate these programs and to determine which of these projects should be supported. Within a



short period of time Amectran Corporation's EXAR-1 became the priority of the Booker T. Washington Foundation and efforts provided by Mr. Small through the Booker T. Washington Foundation and the Department of Commerce began to take form in the shape of governmental guarantees through the Department of Agriculture, the Department of Transportation, the Department of Commerce and several city and state agencies interested in providing industrialization for job opportunities within their communities.

The Department of Commerce was so impressed with the Amectran project that they had a front page article printed in Access Magazine, which is the official Department of Commerce magazine. (see Appendices - Articles - Access)

Unfortunately for the Amectran Corporation, President Reagan discontinued all Urban Development Action Grant Programs (UDAG)

and Economic Development Programs (EDA). With these programs discontinued funding projects for the EXAR-1 ended.

After two years of investigation by the Foundation, the Amectran project stood as their number one recommendation to the Department of Commerce, Department of Transportation, and Department of Agriculture. Since the Amectran Corporation would not accept grants, in that if they did so, any inventions and innovations developed with such funding would become public domain, and therefore would not be protected by the Grandfather Clause, Amectran refused to accept any governmental grants.

2.9 History of Testing

Of all of the electric automobiles researched during the preparation of this report it is obvious that two important factors were relative to test conducted by Amectran Corporation 1) of all of the electric automobiles in this category the Amectran EXAR-1 is the only automobile which was built from the ground up to be a production electric car. All other cars in this category have simply been gasoline powered automobiles which have been converted to electricity. 2) All of the other so called electric automobiles lacked continuity in their testing of parts as relating to their reliability aspect necessary for mass production. Amectran has numbers of tapes of hundreds of hours of testing and re-testing ideas and materials relating to the EXAR-1. It has tested dual

motors through a single drive shaft, chain drives, motors on all four wheels and even cryogenic cooling among dozens of other related tests. Torque converters, specially designed motors and controllers, battery liquids and special batteries have been the bulwark of R&D which has gone into the fifteen years this project has existed.

On two occasions Amectran has had to prove to state and federal governments that the EXAR-1 is a real electric automobile capable of performing as Amectran indicated. The initial test which was done on an early Amectran prototype known as the yellow car proved that the operational characteristics, which no other electric car has been able to achieve with lead acid batteries, even to date, were a reality. The range of one-hundred miles at fifty-five miles an hour with acceleration from 0 to 55 in some 12 seconds and acceleration from 0 to 30 in 6 seconds (this test proved that the EXAR-1 operated at a 50% better performance than the governments sixteen million dollar project with General Electric, Chrysler, Globe Union and Jet Propulsion Laboratories) with the exception of specially designed or high priced batteries, which would be available to the EXAR-1, no car, to date, has achieved the operational characteristics of the EXAR-1.



This was so significantly important as to cause the Department of Transportation to offer to protect that valuable test data from exposure to possible competitors. As previously mentioned this type of information was considered valuable enough for protection by court order. However, the Federal Court of the United States of America has provided within guidelines prescribed to protect the EXAR-1 data which indicates that all of the range, i.e., one-hundred miles at fifty-five miles an hour; zero to fifty-five in twelve seconds; coast down characteristics (from sixty miles an hour to zero) in excess of ten thousand feet; acceleration from zero to thirty in less than six seconds (while all of these operations were achieved with the use of lead acid batteries). The Amectran EXAR-1 was tested at a weight of 4915 lbs, it is estimated that the production weight of this vehicle will be some 3200 lbs, this will be achieved by the use of lighter materials in the production automobile. Since the EXAR-1 production ready prototype is made of heavy gauge steel and much heavier support systems, the extra 1700 lbs will be reduced by using the Acrylic/Kevlar body parts which are, of course, much lighter, the replacement of heavy steel bumpers with energy absorbing Lexan and the elimination of heavy steel support systems required for use

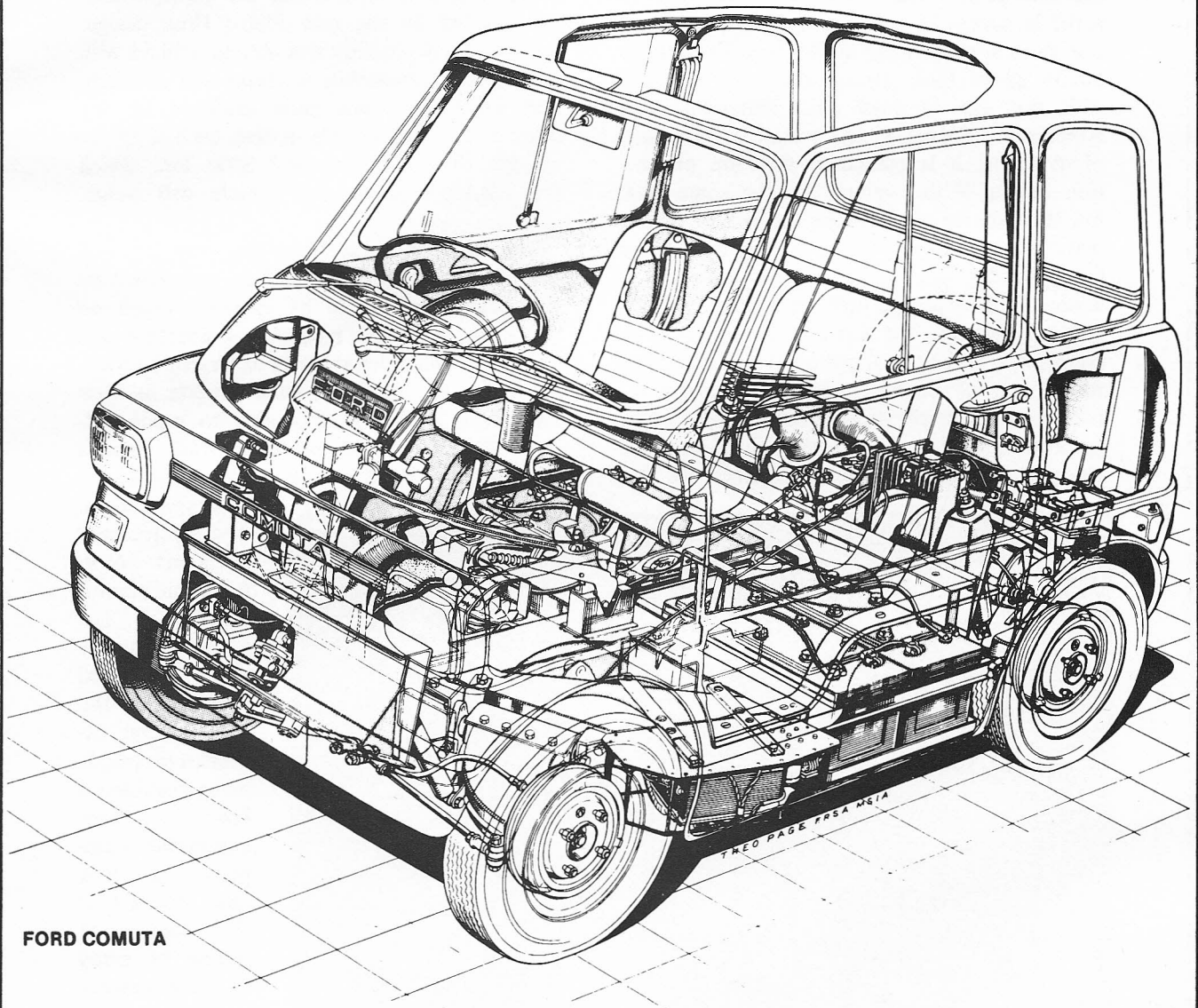
in making molds from the production ready prototype. Since all of the floorboards, battery containment compartments and luggage compartments are made of heavy weight steel, the replacement by energy absorbent, fire proof, materials made of acrylic or other polycarbonate and plastic products will reduce the weight considerably. Through several years of dealing with companies like Goodyear, who have perfected better tires to reduce rolling resistance, with General Electric to produce a more efficient and effective motor, and through the design efforts in optimizing the aerodynamics as provided by the new Pietro Frua design, Amectran Corporation was able to achieve with a 4915 lbs., automobile a range and acceleration which have not been achieved by any other electric automobile to date, even at lighter weights than the proposed 3200 lbs., which the EXAR-1 production vehicle will weigh.

From the many investigations thus far, had the EXAR-1 not performed as prescribed by Amectran Corporation its inventor would no doubt be in prison today. In presenting this project to the Department of Transportation, the group of engineers, each experts in their own field, Amectran was able to garner offers for grants and research from various departments within the Department of

Transportation. The unique and advanced technological innovations for automobiles as were proposed for use in the EXAR-1 far exceeded proposals being considered for any automobile company at that time. Because of the successful testing of many of these innovations by Amectran we



find that a number are currently being used and are being proposed for new internal combustion engine automobiles. Further, it should be noted that within the electric automobile community not one of these companies have offered anything new or innovative to advance electric automobiles in a practical or commercial sense.



FORD COMUTA

AUTOMOTIVE DEVELOPMENT

HEARING
BEFORE THE
COMMITTEE ON COMMERCE, SCIENCE,
AND TRANSPORTATION
UNITED STATES SENATE
NINETY-SIXTH CONGRESS
FIRST SESSION
ON
GOVERNMENT/INDUSTRY ROLES IN
FUTURE AUTOMOTIVE DEVELOPMENT

MARCH 23, 1979

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ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

SYNOPSIS—THE WORLD'S FIRST MARKETABLE ELECTRIC AUTOMOBILE

85 mph 0 to 60 in 12 seconds 100 mile range
seats five priced under \$6,000

INTRODUCTION

Amectran began its operations some five and one-half years ago after performing a great deal of preliminary research and market surveys to determine the marketability of an electric automobile and the size, style and operating characteristics necessary for public acceptance. In order to bring Amectran into production the company began construction of prototype automobiles and testing under these criteria.

The result has been the development of the most advanced and only truly marketable electric automobile available. Government personnel have ridden in the car and all have come back with glowing reports. The car seats five, has a top speed of over 75 mph, has a 100 mile range between charges, accelerates from 0 to 60 in 12 seconds, has a body like that of a regular gasoline powered automobile, and can sell for under \$6,000. Pietro Frua, designer of BMW and Rolls Royce, will deliver the new body style by early 1979, which will include safety features such as airbags, collision protection, etc. It is the only real electric car that is marketable today.

BACKGROUND

Some two and one-half years ago, a female impersonator named Jerry Dean Michaels (alias Liz Carmichael) appeared in Dallas, Texas selling an automobile which did not exist. After bilking the public of some \$4.5 million, she disappeared. Amectran became the victim of misidentification and was forced to seek protection under the Federal Chapter XI Bankruptcy Act in order to prevent the State of Texas from liquidating the company. The Federal Court Judge, the Honorable Dean M. Gandy, after an investigation of Amectran's plight, allowed the company to remain in business, stayed the State's allegations and charges, and allowed Amectran to open its doors once again. Because of the circumstances, the Federal Court allowed Amectran to sell stock in order to raise the funds necessary to build, test, and prove Amectran's electric automobile. As a result, Amectran raised approximately \$209,000.00 while in Chapter XI. Because of these circumstances, Amectran has over 200 stockholders which have converted over a million and one-half dollars into a stock position in Amectran with the issuance of some fifteen (15) percent of the one million shares of outstanding Amectran stock to these stockholders.

INVESTMENT PROPOSAL

Amectran's most immediate financial requirement is \$100,000 for completion and delivery of the production prototype being assembled in Italy. The following charts show the prototype costs and finances required for Amectran to have a public offering to raise capital for production. Also shown is the current distribution of shares of stock in Amectran.

STOCK DISTRIBUTION

Use of funds and owner	Amount paid	Percent of ownership
Research and development (Edmond X. Ramirez)	\$800,000	51
Research, development and operations (235 stockholders)	1,000,000	15
Development of production prototype (European investors)	400,000	3
Amount invested to date: (approximate)	2,200,000

a breakthrough that avoids that trap. Otherwise we will have to stop driving as much.

The CHAIRMAN. DOE during the past 2 or 3 years has sponsored and funded research and development at a level of over \$300 million devoted to three alternative technologies, namely, the gas turbine engine, the Stirling engine, and the electric vehicles, as we heard the Secretary testify to this morning.

What basic technology do you believe is being neglected and what other engine research would you advocate under your proposal for the future?

Secretary ADAMS. First, they had a joint program on the Stirling with Ford, and the industry—and I can understand their reasons—said they are not going to do this anymore. It has no short term payoff. It has no profits. So that is now being done only by the Government. I think that some production versions of the electrical vehicle—I have driven a number of these—run well. It will go up to 55 miles an hour; it can be built with a body that will carry it. But the batteries are the problem. They are so heavy and they have to be replaced during the life of the car. You get no saving on it. And they create such a weight problem that if anything happens you have to have them haul it away with a chain. They can't even lift it up.

So I don't feel that that is moving enough. Now, later this month, Mr. Chairman, DOT will bring out a large experimental vehicle. We build total vehicles, not just engines. We have got the 53-mile-per-gallon vehicle. We ask that a vehicle give us safety, low emissions and a new engine.

I am not critical; we have a memorandum of understanding with DOE, but I don't think there is enough basic research. For example, the ceramic parts are brittle and they will break. Ceramics are a necessity for a gas turbine. So somehow we have got to make that work better. You can't mold the graphites and use them in a present process. No one knows how to really do that. You want that done.

These are the kinds of things that I think should be researched. I do not neglect alternative fuels, but I believe when the Congress reviews this year the cost of building a coal gasification plant, bringing it on line, you are going to find that its cost is enormous.

And I am concerned about how you are going to get protection against the worldwide cartel if it decides to increase productivity a large amount. Because of its lower costs, if it feels that there is any kind of a threat it may drop its price and your investment is gone.

So you are going to have to protect marketing as well as construction for a coal gasification plant.

The CHAIRMAN. In many instances the most striking technological breakthroughs are made by small entrepreneurs outside of conventional technology. It came to my attention that one of these kinds of companies is developing an electric car that seats five, has a top speed of over 75 miles per hour, a 100-mile range, and accelerates from zero to 60 in 12 seconds. And it can sell at nominal production volume for under \$6,000.

I may say, it is a pretty darned good-looking automobile [demonstrating] the way it is designed here. The car is designed to provide

long life, low rolling resistance, with high energy efficiency and an innovative control system using a microprocessor.

Now, reports are that the prototypes actually achieve the performance specifications that I have mentioned, using lead acid batteries. Have you personally heard of this effort? Or has your Department evaluated its design and does it plan to provide any support to help investigate this effort?

Secretary ADAMS. Yes, sir. We are familiar with that. We have recommended that it be pursued. Because the purchasing of those kinds of vehicles is within the DOE, we have recommended that they bring in these vehicles for testing. You will have to inquire directly of them, but it is my understanding, that in the testing of an electric vehicle, the key component where you get variations is in its actual range under test conditions over a period of time. I would certainly support the purchase of a number of these so that they can be tested and tried.

I do believe that innovation and a pool of small entrepreneurs having an opportunity is desirable. We have set up an office in our department to work with DOE in evaluating these vehicles. We try to get them to a prototype stage where they can run and people can really see them. So, Mr. Chairman, I think that is a good vehicle, and we should pursue it.

The CHAIRMAN. It seems to me that of course the problem there is the battery, the size of the battery and how quickly you can charge it and how long it will last. But there have been some tremendous developments made recently in batteries, not necessarily in batteries that would service this application, but some used in the defense industries, for example, that have been very greatly reduced in size and their life has been extended on the magnitude of the order of 10.

So this sort of thing, it seems to me, would be certainly a worthwhile matter to fully investigate and see if perhaps some kind of a crash effort in that particular phase might be helpful.

We all know that the goals of the Clean Air Act and the fuel economy program are sometimes in conflict. Do you feel that EPA and DOT have generally been able to compromise on an optimum middle ground?

Secretary ADAMS. Yes. In establishing the fuel economy standards, I did not hold hearings on them in 1977 by myself. I invited the EPA people and the DOE people, and all three of us held the hearing, so the fuel economy standards were developed by all three agencies sitting in the hearing at the same moment. One of the problems, as you will remember, is that the emission standard was being set by Congress while we were in this process of this.

So we had to back into the EPA standard that was established, and we worked our fuel economy standards out of that. We took into account what the industry and everyone else said to us in the comment period, and all three agencies established that curve that goes to 1985 in conjunction with the Congress and the EPA standard that was set.

The CHAIRMAN. You heard my discussion with Secretary Schlesinger this morning, and you heard his cautionary note. I am a little concerned now. I would certainly hate to see a situation occur where we encouraged the automobile manufacturers to go to die-