

THE WHITE HOUSE
OFFICE OF DOMESTIC POLICY

CAROL H. RASCO
Assistant to the President for Domestic Policy

MAR 29 REC'D

To: Brian

Draft response for POTUS
and forward to CHR by: _____

Draft response for CHR by: _____

Please reply directly to the writer
(copy to CHR) by: _____

Please advise by: _____

Let's discuss: _____

For your information: ☒ _____

Reply using form code: _____

File: _____

Send copy to (original to CHR): _____

Schedule ? : ☐ Accept ☐ Pending ☐ Regret

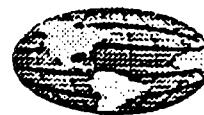
Designee to attend: _____

Remarks: _____

MAR 29 REC'D

ENVIRONMENTAL PROTECTION DESIGNS, INC.

Consultants & Innovators: Solutions for the Future



The Future Begins Now

March 6, 1992

To: All Of Our Elected Officials

This letter is about thinking. And common sense. And seeing past the next 10 minutes. It is also about fear, because I am scared to death about our, and especially, our children's future.

As we sit here waiting for the right thing to be done by the right others, the uninformed have built our present environmental problems for us. Gridlock at the nation's airports, failed transit systems and overwhelming numbers of personal autos have literally stymied transportation. Yet the same uninformed others are currently planning and building our future problems. Most certainly the result will be a doubling of air pollution in all of the 405 cities planning "new" airports, along with "light rail" weighing 100,000 lbs. stopping 33 times in every 10 miles, and costing passengers \$8 million per ten miles per year in wasted time.

When will anyone in leadership wake up? The future is already being designed and is currently being built with a 50 year commitment to the designs of the past as well as a guaranteed commitment to double our dependency on foreign oil and double our air pollution.

Does this sound too strong? Here are some facts:

- The "new" Denver airport will consume 1.3 billion gallons of JP4 diesel fuel yearly. That's twice Denver's auto consumption (note that JP4 diesel is 14 times as polluting as auto fuel). When I say the new airport will double the air problems I'm being very conservative!
- Our new light rail is a copy of what Buffalo, NY built. After spending 270 million of citizens' dollars, so few people used it that the income wouldn't even maintain it - but we're going to build the same thing here.

The EPA states that "there is no current concern over the pollution from the new Denver airport as it will blow east." We live on a globe, so we have a certain wisdom

(over)

P.O. Box 1931 Boulder CO 80306 (303) 939-9825

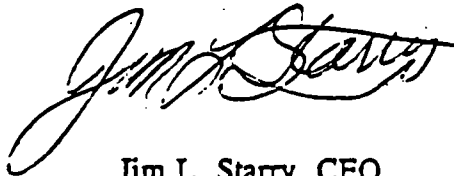
If pertinent patent or copyrighted information included, this constitutes a disclosure agreement between parties this date.

here, since we all live east of someone. 405 new U.S. airports will all be dumping air pollution on someone else but certainly not on us! Perhaps we can copy mass transit from the thirties which moves so slowly we can't get away from the speed of our indecision.

Denial time is over. The paradigm must be seen individually, politically, and nationally in order to avoid certain global destruction. Popular change won't take place right here, right now since most families don't have time to think about it. They're working two jobs to pay utilities bills, car payments and auto fuel costs while driving 100 miles round trip to work daily.

Don't you think it's time to get involved? Waiting for the wind to blow away the problem isn't the solution. It's time the new leaders of this nation told the truth - this is what you and each and every voter will inherit. My company has designed an airport which saves 200 million fuel dollars per year and a mass transit system with a 20-1 efficiency over current systems. I have *proven* solutions - will you see that they get used? or will you wait for the right other to do your job? Later is not a better time to tell the truth - it is later now - so let's tell the truth. You are a decision maker of global importance; recognizing it is the only guarantee of our collective future. I can support you with engineering solutions if you will support us with leadership.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim L. Starry". The signature is fluid and cursive, with the first name "Jim" being more prominent and the last name "Starry" written in a more compact, flowing style.

Jim L. Starry, CEO
Environmental Protection Designs, Inc.

Senate Chamber
State of Colorado
Denver

DAVID E. LEEDS
State Senator
P.O. Box 442
Louisville, Colorado 80027
Capitol: 866-4866
Home: 673-0282

COMMITTEES:
Member of:
Finance
Judiciary
Local Government

Senate President Ted Strickland
State Capitol
Denver, CO 80203

March 4, 1991

Dear Senator Strickland,

Whoever said that "Politics is the art of the possible" never encountered the kind of bureaucratic stone-walling and government buck-passing experienced by Jim Starry of Boulder, Colorado.

Mr. Starry, of Environmental Protection Designs, Inc., has proposed a new airport design... one which, were it constructed, would establish Denver as an international leader with respect to its creative architectural response to tough policy questions. His airport would annually save millions of dollars in wasted fuel, thus contributing to America's energy independence. It would significantly reduce airport-generated air pollution, always a major concern of Coloradans. It would relieve airport congestion, flight stacking and passenger delay. It is, in fact, a vision of the airport of the future... but provides a blueprint using technologies we possess today.

Various federal agencies -- including the EPA, FAA, NCAR and NOAA -- have reviewed Jim Starry's proposal. Each has referred him elsewhere. Mr. Starry's response from state and national elected officials has been similar. I pray we have not reached a point where citizens of uncommon insights or abilities are discouraged or thwarted by a system closed to new ideas.

I know you are quite busy. Nevertheless, I invite you to review the enclosed materials and consider Mr. Starry's timely recommendations. Jim Starry will follow up with a phone call in a few days to see what can be done at this point. I thank you for your consideration.

Best personal regards,

David

Senator David Leeds

CITY OF LOS ANGELES DEPARTMENT OF AIRPORTS
33516 Norm 25 Street, East Palmdale, California 93550-2158
(805) 266-7600 (805) 266-7604 Fax

City of Los Angeles Department of Airports
Tom Bradley, Mayor

Board of Airport Commissioners

Johnnie L. Cochran
President

Robert A. Chiles
Vice President

Samuel Greenlee
John Tenney
Gene Pizani

Clifton A. McGee
Executive Director

February 13, 1991

Mr. James L. Starry
Environmental Protection Designs, Inc.
Post Office Box 1931
Boulder, CO 80306

Dear Mr. Starry:

Thank you for taking your valuable time to visit Los Angeles International Airport and meet with Mr. John Graham and me to discuss futuristic ideas concerning airport construction.

Since that time, I have considered possible actions that would further your cause.

Air Force Plant 42 is developing a Blackbird (SR-71) Skypark right across from our humble office. It might be possible for you to put in a small (200') scale model of your idea concerning airport construction. Immediately we have to think of the cost of doing this, but you should know that there are sources of contributions that might help make this a reality; potential sources are the Business Industry Association (BIA), Supporters of Palmdale Regional Airport (SPRA), the Antelope Valley Board of Trade (AVBOT), Chambers of Commerce, and other local organizations. To accomplish this purpose, it would be necessary to obtain the permission of Air Force Plant 42 and the Los Angeles City Department of Airports to develop the site selected. It could be that we would have listening stations at different parts of the display to explain what the structure is that is being viewed and the reason for it being built in this manner and, of course, a message mentioning that they could support this opportunity by contributing to a certain fund.

It should be clearly stated that this is an airport of the future and not necessarily the plan for the new Palmdale Regional Airport.

There may be organizations here in the local area that would like to have you present your airport of the future at a noon luncheon-type meeting. Have you considered what you would ask as an honorarium to present your program? Please let me know so that we can pass this information to the Supporters of Palmdale Regional Airport.

Sincerely yours,



James E. Bort
Agricultural Land Developer



Aviation Department

Administrative Offices
Kansas City International Airport

City of Kansas City, Missouri
Heart of America

1 International Square
Kansas City, Missouri 64153

P.O. Box 20047
Kansas City, Missouri 64195

Area Code 816	
Aviation Administrator	243-5200
Accounting	243-5205
Data Processing	243-5206
Personnel	243-5210
Planning & Development	243-5207
Properties & Business	243-5203
FAX	243-5450

December 20, 1991

Mr. Jim Starry
Environmental Protection Designs, Inc.
P. O. Box 1931
Boulder, CO 80306

Dear Mr. Starry:

The Kansas City, Missouri Aviation Department reviewed the "Starport Airport Design" information you recently gave Mr. Herb Gile. The Starport design is a unique concept that merits further study. The energy and environmental consequences of this concept appear promising. The capital costs, the technological changes required for instrument landings, and the airside capacity associated with this concept are several issues however, that will require further analysis.

Enclosed is the gridmap of Kansas City International Airport (KCIA) you requested. If you need any additional information regarding KCIA, please contact the Aviation Department at any time.

Sincerely,

Sandy Komula
Airport Planner

SK/bg

Enclosure

cc: Herbert Gile, KCI Airport General Manager



ENVIRONMENT

BY FRANK EDWARD ALLEN

That Sick Feeling May Not Be From Flying

AIRPORTS could become the next focus of air-pollution debates.

At many big U.S. airports, research shows, levels of nitrogen oxides, carbon monoxide and hydrocarbons are at least 10 times higher than in the cities they serve. Emissions are produced by cars, buses and service vehicles, and by jet engines as planes idle at the gate, taxi and take off. Jet fuel burned while engines are idling produces about 14 times the pollution of gasoline.

Innovative remedies are being tested. In Sweden, jets cut their engines and get towed to and from runways by "super-tug" vehicles. Some Canadian airports use sensors and "deflectors" on intake vents to keep noxious exhaust fumes from being sucked into terminals.

Next-generation airports will be larger, so pollution could get worse. A prototype is Denver's 53-square-mile facility, which will have 100 gates and five 12,000-foot runways when it opens in 1994. Supporters say it will ease trans-continental congestion. But with air traffic likely to rise and ground operations spread over a much bigger area, critics worry about jet and vehicle emissions. State officials now expect air pollution to be twice as bad as originally calculated.

Jim L. Starry, an environmental engineer in Boulder, Colo., figures taxiing wastes hundreds of millions of gallons a year. If jets' wheels were redesigned to store energy from landings in electric generators, he says, planes could taxi using electricity and most of that fuel could be saved.

Changes in runways could save fuel, too. A 747 landing on a flat runway burns about 48 gallons when the pilot reverses the engines' thrust to slow the plane. Mr. Starry proposes that new airport runways be built on a 2% slope. By taking off "downhill" and landing "uphill," his research finds, planes would consume about 25% less fuel. The Federal Aviation Administration is evaluating his ideas.

Runway Inflation

Travel Is Off. Airlines Ailing, but Airports Just Keep Expanding

Boosterism and Bonds Fuel Projects Even as Estimates Of Need Are Scaled Back

Empty Gates. More Coming

By JONATHAN DAHL

Staff Reporter of THE WALL STREET JOURNAL

DENVER—This hardly looks like a place that needs a new airport. The one major airfield here served seven million fewer passengers in 1990 than in 1986. The second biggest airline serving Denver, Continental, is teetering in Chapter 11, and a whole corridor of gates is literally roped off for lack of use. And far from falling flat, the airport got a \$200 million face lift that was completed in 1987.

Yet city officials in Denver are planning to mothball the airport in two years, in favor of a brand new one. And it won't be just any airport. At a cost of \$2.4 billion, it will be the most expensive in history and will sprawl over 53 square miles, twice the size of Manhattan.

Across the U.S., the nation's airports are in the midst of a building binge that flies in the face of a plateauing demand for airline travel. The airline industry is reeling from record losses in 1990 that forced four of the nation's 12 major carriers to file for Chapter 11 bankruptcy-court protection. After years of double-digit gains, air traffic has been flat for three years, and analysts don't expect any big upturn for years.

King Flight

Yet cities from Pittsburgh to San Jose, Calif., are adding giant terminals and runways as if the roaring '80s were still around. Confident that a big rise in airline traffic is in the offing, they are raising millions to improve unused facilities. And they are lavishing money on things such as wood-paneled conference rooms, stainless-steel palm trees and tax abatements—at the same time that urban highways and bridges are crumbling.

All told, airports—owned by local and state governments—plan to pour as much as \$50 billion into construction in the next five years, double what they spent throughout the 1980s. Newark International Airport has started a \$2 billion expansion and renovation, though traffic has plunged 24% in five years and its biggest carrier is the hobbled Continental. Memphis plans a new \$177 million runway, despite a 23% decline in traffic since 1986. Atlanta breaks ground this fall on the nation's largest international terminal and is scoping out sites for a second airport. Never mind that Concourse C, which holds one-fifth of the airport's gates, has been empty for nine months, boarded up and patrolled by secu-

for Transportation Studies. "What's going on here?"

Guess Who Pays?

Travelers will get stuck paying for part of this—although they may not realize it. For the first time, most airports will soon charge every U.S. passenger a \$2 to \$12 tax for each round-trip, collecting upwards of \$1 billion a year solely to fund new construction. But the charges will be listed only in cryptic codes on tickets. As airports raise rental rates to cover bond payments, airlines also may pass on the costs to travelers in other special surcharges.

Thousands of bondholders also may be at risk. To finance the expansion, airports have floated a staggering \$30 billion in bonds, which typically cover 75% of con-

Smart Plans

Or Wishful Thinking?

Airports are on a building binge in the midst of a long-term travel slump. A sampling of some of the projects being planned:

TRAFFIC TRENDS			
AIRPORT	PROJECT	1987	1988-91
Denver	\$2.4 billion new airport	3%	-21%
Memphis	\$177 million runway expansion	-9	-23
Atlanta	\$300 million int'l terminal	-20	6
Pittsburgh	\$690 million new terminal	-6	-7
Newark	\$2 billion redevelopment	-1	-24

*Since peak year *1987-1990

Source: Airport authorities

struction costs. They are counting on a weak revenue source—landing and space-rental fees from often struggling airlines—to pay them off. If the airports are wrong, they may default or turn to a city or county to step in, and local taxes could go up to cover the obligations.

"What's going to happen when a weak carrier goes broke and can't pay the fees?" asks Theodore Harris, an aviation consultant in Virginia. "It's a prescription for disaster."

Already, the building craze is beginning to exact its toll. Memphis's airport has had to cut staff 12% in part because of soaring debt payments. In the last 10 months, the Standard & Poor's rating service has put the bond issues of five airports on its Credit Watch list (though it has since taken two off the list). And the expansion boom has proven a bust in cities abandoned by some

Please Turn to Page A8, Column 1

Continued From First Page

of their major carriers. Clearwater, Fla., for example, has a new terminal, a new baggage claim area—and no flights at all on some days earlier this year.

"You could shoot a cannonball through some of these places and not hit anyone," says Robert Young, an attorney fighting Denver's project. "We're building the ghost towns of tomorrow."

of aging or overcrowded airports. Some of the building binge is fueled by boosterism and easy money. The boom has happily raised by underwriting firms that profit on new bond issues. Many bond issues get glowing marks from bond-rating firms that sometimes don't update their public reviews of the increasingly bleak market for air travel. Cities, meanwhile, often see airports as a way to promote tourism, attract jobs and put their names on the map, all at the same time. They view multimillion-dollar expansions and renovations as the way to attract the airlines.

When Larry Hedrick, the airport director in Columbus, Ohio, asked the city to approve construction of five new gates a few years ago, he got a surprising mandate: "They said to build 10. They had a real positive attitude about the future here." So far, six of those gates have been completed: One isn't used, the other five operate at only about half of capacity, and Columbus has assumed \$15.5 million more of bond debt. But city officials say it's a good investment: They believe traffic will eventually pick up, and when it does, the gates will be ready.

Underlying the building boom is the questionable notion that the current slump is just a temporary, cyclical blip. By the time construction is completed, airports say there will be plenty of new customers—airlines—for the expanded operations, and that they will be healthy enough to pay for all the new services.

Not So Fast

Travel experts say that sanguine scenario is outdated. Air travel zoomed in the 1980s because discount carriers kept cropping up, and cheap fares were prevalent. Now monopoly routes and high prices are commonplace, and the chances of another PeopleExpress and \$9 fares are remote. Only a few mega-carriers dominate the skies. They aren't strong enough to set up major hub operations at more than a few sites. And they are particularly unlikely to set up at airports which a rival carrier already dominates.

Yet airport officials continue to offer bullish predictions of a surge in air travel to justify their expansion designs—and to sell bonds to pay for it all.

In raising funds for a new \$300 million terminal, Atlanta's major airport, Harts Field, forecasts a hefty 30% increase in passengers by the end of the decade. It predicts two major airlines will use it as a hub. Yet traffic is off 20% this year alone. The airport did have two hub tenants, Eastern and Delta. But it lost Eastern when the airline went out of business. That left Delta to amass 80% of the city's traffic. "No one can go in there with Delta so strong," says Alfred Checchi, co-chairman of Northwest Airlines, which rejected the idea of moving a hub there.

Runway Inflation: Airports Grow Even While Gate Needs Moderate

But once a forecast flops, airports are reluctant to adjust their predictions downward. When Pittsburgh's airport authority issued bonds in 1988 for a new terminal—which will cost more than half a billion dollars—investors were told to expect steady growth in passengers in each of the next 10 years. By 1990, though, traffic had fallen 5%. Yet when Pittsburgh put out a second bond offering last year to raise still more money for the terminal, it didn't adjust its forecasts. And this year? The passenger count is down once again, dropping 6%.

"Forecasting is more an art than science," explains Alan Stewart, an assistant director at the airport authority.

Finally, a Place to Contemplate

At \$690 million for 76 gates, the Pittsburgh terminal is running double the cost per gate of some airport projects. Amenities include arches that "bring to mind the great Edwardian rail stations," according to a brochure; \$2 million worth of sculptures, murals and "meditative gardens"; and a planned 60-foot-high ceiling in a main terminal room the size of two football fields.

"It's really great to have a vaulted ceiling—until you start paying the higher air-conditioning bills," says James Murphy, an aviation consultant in Alexandria, Va. "It's easy to get carried away."

Piling on too many plush features can work against luring airlines. Though they initially may be drawn by the fringe benefits, airlines don't like paying the accompanying higher rents. With its neon-streaked elevators and steel palm trees, the Las Vegas McCarran Airport has to charge airlines \$89 a square foot for baggage-claim space—one of the highest rates of any airport in the U.S. Several carriers even sued the airport briefly over the charges. In the end, passengers paid for much of the airport's revamping: Several carriers imposed a \$7.50 departure charge at Las Vegas for several years.

Airports insist they must take on risky expansions to hold on to the airlines they've got. Yet they are left at the mercy of a troubled airline when it belly-flops or reneges on the promise to set up a hub. "It's the price of deregulation," says John Duba, an administrator at Kansas City's Aviation Department. Before deregulation in 1978, the federal government dictated airline routes. Now it is more difficult to predict an airport's needs.

At the Door

Kansas City knows the hazards well—it got burned four times. Its airport was built in the 1970s to serve as a hub for TWA, which later pulled out and located at St. Louis. Then the airport opened its doors three times to airlines promising to build hubs. Braniff International Corp. set up a hub first, then went out of business. In came Eastern, which later dropped out and sold its space to the reorganized Braniff Inc. Then Braniff Inc. went belly-up in 1989.

That left the airport \$4 million in the hole for renovations and unpaid bills owed

by Braniff. These days about 180,000 square feet of space, or almost one-third of the airport, is vacant. Still, Kansas City International Airport is building a \$45 million additional runway. "O ye of little faith," the airport's Mr. Duba responds to those who doubt the wisdom of expanding. "If you don't build, then you won't be able to attract the airlines."

Some of the expansions are being forced by airlines that hoard unused gates. Lambert-St. Louis Airport plans to add eight more gates for \$45 million next year, even though its hub carrier, TWA, doesn't use many of its gates at full capacity. TWA holds 25-year leases on 52 of the airport's 78 gates and refuses to give any of them up. Competitors at the airport, meanwhile, are out of space and demanding more room.

"We asked TWA about its gates," says Donald Aubuchon, assistant airport director. "They said, 'no.'"

Wooling United

None of the risks seem to be making airport officials hesitate. And nowhere are they more eager to expand and to spend than in Denver.

To win United Airlines's support for the \$2.4 billion project—the first totally new airfield in the U.S. since 1974—the airport authority promised to assume more than \$40 million of United bond debt, finance the construction of the airline's private club for VIPs, and spend half a billion dollars on improvements that will benefit United, as well as Continental. But Denver may have lost sight of such obvious problems as location: The new site is an \$80 round-trip cab ride from downtown.

When the airport was proposed, Denver officials told the public a new airport was needed because of strong growth in air traffic. But that thinking turned out to be wrong. Federal experts had first projected that 54 million passengers a year would fly in and out of Denver by 1995. They later reduced the forecast by a third—but only a full year after Denver had issued bonds and started construction. Now local officials are pressing a different justification for the new airport: to cut airport travel delays. The current airfield, Denver Stapleton Airport, was notorious in the 1980s for flight delays because of bad weather and cramped conditions. But, with traffic down, delays fell more than 10% between 1988 and 1990. This year, delays ticked up slightly; still, seven other major airports have delay rates that are far worse—and aren't building entirely new airfields.

Undaunted, local promoters have mounted a major campaign to win support for their behemoth project. At the huge construction site, against a backdrop of newly laid concrete and freshly churned earth, the city has set up an observation stand—binoculars included—for visitors to take in the vast panorama of giant cranes and bulldozers toiling away.

And at the existing airport 18 miles to the west, electronic billboards rattle off an endless stream of glowing statistics: "66 million cubic yards of earth moved ... 2,000 people working at the site ... Under budget and ahead of schedule. ..."

Congress of the United States
House of Representatives
Washington, DC 20515

104 South Cascade Ave.
Suite 104
Boulder, Colorado 80501
Phone: 438-0055
Fax: 438-0044

September 3, 1991

Mr. James Busey
Administrator
Federal Aviation Administration
800 Independence Ave., S.W.
Washington, D.C. 20591

Dear Mr. Busey:

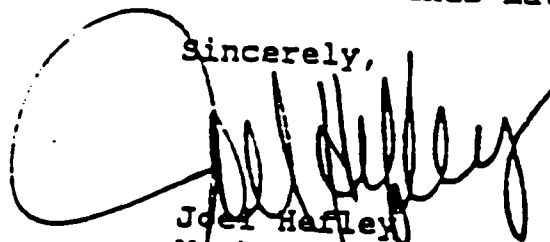
Enclosed please find a letter I received from Mr. James L. Starry of Boulder, Colo.

Mr. Starry claims to have invented a fuel-saving design for the new Denver airport. While I am not qualified to say whether or not his idea is a good one, he seems to be having trouble getting anyone at the FAA to review his proposal seriously.

Therefore I would ask that someone on your design team review and critique Mr. Starry's proposal, as per your usual procedures. Please forward a written synopsis of that critique to my office for forwarding to Mr. Starry.

I would appreciate your attention to this matter.

Sincerely,


Joel Harley
Member of Congress

JH:lh
Enclosure

*Will we take action in time
or will we wait until the airport is completed
and
we've made a fifty year commitment to a
mistake*

Sen. J. L. ...

Buffaloed in Buffalo

The people of Buffalo, N.Y., are bewildered. They woke up Monday to discover that their modern mass-transit system was dead in its tracks—flat broke, shut down. There is a lesson here for every significant city in America.

Only five years ago, Buffalo opened a \$600 million subway paid for almost entirely by federal and state dollars. The easy lure of federal grants has prompted dozens of cities such as Buffalo to build transit systems they can't afford to maintain.

The transit authority shut down the system in what Mayor James Griffin called a form of "brinksmanship" to force higher taxes. The authority turned down \$2 million in stopgap funding and an offer from County Executive Dennis Gorski to turn over management to a private firm. After a two-day shutdown, county officials cried uncle and imposed a real estate sales tax to support the system. Its long-term future, however, is dim.

Washington helped create Buffalo's mass-transit crisis when in the 1970s it began paying for 80% of the cost of new transit projects and up to half the cost of operating budgets. Combined with state funding, this made new systems "free" to cities. They began to mortgage their municipal futures by pushing white-elephant projects no city would have contemplated building with local tax money. Miami's train system ended up attracting 15% of the number of projected passengers; Buffalo's only a third. When federal subsidies declined in the 1980s, both cities were trapped into operating a network of bus lines that fed into truncated rail lines that no one wanted to use.

Mass transit today is still based on the theory that most commutes are from suburbs into downtown business districts. But the traditional suburb-to-center-city commute is now third in size among traffic flows. Twice as many people now commute from suburb to suburb.

Over 180,000 people now work in the transit-starved New Jersey Mea-

dowlands, across the river from New York City, yet local commuter services still operate on the assumption that people will always work in Manhattan. Traditional public transit can't hope to keep up with this dynamic growth and movement of jobs. In Buffalo, for instance, the subway serves neither the football stadium nor the main campus of the state university, which is the area's largest employer.

Still, Congress persists in funding projects that rely on discredited transit models. Just last week, the House approved \$2 billion in federal funding to extend Washington, D.C.'s Metro subway. Lawmakers justified rolling this pork barrel further by calling the system "America's Subway," though it's unclear how much a tourist from Des Moines will use the new suburban lines. They also won't help many commuters. More people work at Tysons Corner in suburban Virginia than in downtown Denver, yet no Metro station is planned there. Metro has so far cost \$7 billion just to build.

There are alternatives to the present transit mess. Denver has contracted out many bus routes to private firms, allowing route changes politicians had long blocked. Mexican immigrant Alfredo Santos is suing the city of Houston to allow him to use jitneys to transport poor people who are badly served by local bus routes. Other cities have deregulated taxis, making them affordable for short trips. Private toll roads that allow commuters to use pre-paid, bar-coded stickers to speed through collection points are being built in Texas, California and Virginia.

It's time to admit that conventional theories of mass transit no longer fit the fast-changing American economy. No bureaucrat can guess where new jobs and economic growth will create transit needs. Any attempt to do so will, as in Buffalo, lead to systems that are inflexible, outdated the day they open, and certain to keep the local community on a financial treadmill that never ends.

HANK BROWN
COLORADO

United States Senate

WASHINGTON, DC 20510-0604

May 31, 1991

Mr. Jim L. Starry
Environmental Protection Designs,
Inc.
Post Office Box 1931
Boulder, Colorado 80306

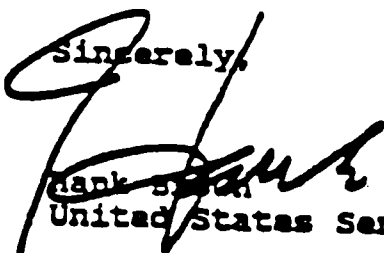
Dear Mr. Starry:

Many thanks for your letter regarding your proposal for a new airport design. I am pleased to see that your design addresses one of Colorado's most pressing problems---air pollution.

To express interest in your idea, I have written to the Federal Aviation Administration to inquire if architectural designs that emphasize fuel-efficiency and pollution reduction were considered for the new Denver airport.

Again, thank you for taking the time to contact me. Hopefully, your environmental designs will have additional applications to help cities address such problems.

Sincerely,


Hank Brown
United States Senator

HB/jac

COMMITTEES
BUDGET
FOREIGN RELATIONS
JUDICIARY



ENVIRONMENTAL PROTECTION DESIGNS, INC.

Consultants & Innovators: Solutions for the Future

The Future Begins Now

Jim L. Starry

P.O. Box 1931

Boulder, CO 80306

(303) 939-9825

You can't do it the same and expect different Results. There are 405 more new airports designated for our country in the near future. Your lack of voice makes the choice for doubling your air pollution. Here is a solution of another way!

COLORADO DAILY

WEEKEND, AUGUST 8-12, 1991

18

Boulder resident has a better airport idea

When Colorado Governor Roy Romer belatedly figured out that Denver's new airport was a \$2.2-billion white elephant, he turned to United Airlines. He should have called Jim Starry — and if he is not completely brain dead, he still will.

Starry is a Boulder engineer who has designed a more efficient airport. Saying it that way, however, does not come close to conveying the dimensions of his accomplishment. What he is doing is reinventing the airport — not just Denver's airport, but the concept of the passenger airport in the age of jet travel — and if his ideas were adopted they just might turn things around for the Denver project.

At the core of Starry's concept is a simple change in airport design: At the typical airport, jets take off and land on flat runways placed a substantial distance from the passenger terminal. Starry proposes to build runways that run uphill at a 2-percent grade, and then place the terminal under the high end of the runway. The terminal's roof, in fact, would be the high end of the runway.

The advantage of doing this is that it saves jet fuel when planes are taking off and landing. It also saves fuel by largely eliminating the need for taxiing. And the savings are pretty spectacular.

A 747 landing on a flat runway will burn 330 pounds (48 gallons) of fuel when the pilot turns on the thrust levers to slow down the plane. The figure of a 727 is 251 pounds (37 gallons). However, the thrust levers of a commercial jet aircraft landing on an uphill runway with a 2 percent grade that is 200 feet will consume 25 percent less fuel than those of an aircraft that lands on a flat



By Paul Danish

Multiply those savings by 700 landings a day (the traffic volume at Stapleton a couple years ago), 365 days a year, and the savings from landing on uphill runways come out to 25 million gallons of fuel a year.

By the same token, a jet that takes off on a runway running downhill also uses less fuel to get off the ground than one taking off from a flat runway — 20 to 40 percent less, depending on the type of jet. Starry calculates that the annual savings for jets taking off from an airport like Denver's (if 700 flights a day left it) could come to 8.2 million gallons of fuel if it were built to his design.

The real savings, however, would come from the elimination of taxiing. Jets at Stapleton currently burn a staggering 56.7 million gallons of fuel a year just taxiing between the terminal and the end of the runways. Starry figures that his airport design would eliminate 80 percent of that.

The bottom line is that the design would save about 55 million gallons of jet fuel. At 65 cents a gallon, that would save the airlines using the airport about \$36 million a year.

That alone would probably change the economics of the Denver airport significantly. The Denver airport is in financial trouble because it is being built with bonds that are to be paid off with taxes on aviation fuel, take-off and landing fees, and surtaxes on tickets. The additional taxes and fees increase the cost of operating out of the airport.

In the highly competitive airline industry, that means any airline running a hub operation out of Denver — i.e., Continental and United — would be at a competitive disadvantage compared to an airline running its flights through another city.

Airlines faced with having to use the new airport would therefore move as many of their connecting flights as possible elsewhere and limit their Denver operations to flights originating and ending in Denver. This would reduce the total amount of air traffic through Denver, forcing the city to raise fuel taxes, landing fees, and ticket surcharges on the airlines. (Airlines even higher to cover the bond payments

which would make Denver operations even less competitive.

Romer's way out of the dilemma was to get United Airlines to set up a maintenance base in Denver, which would bring a large number of additional flights into the city, but would also allow the State of Colorado and the City of Denver — under the guise of encouraging economic development — to slip United enough dough to keep its Denver hub operations competitive.

Starry's way out is better. Instead of having to compensate the airline for using an inherently high-cost facility, he would build a facility that would give all airlines using it a competitive edge.

The City of Denver and the State of Colorado have proposed giving United something like \$300 million to bring its maintenance operation to Denver and bail out the airport project. United's reaction was to start shopping around for another site, which probably tells you something about how profoundly uneconomical operations from Denver International will be.

Starry has been trying for years to get the airheads who foisted the airport project on Denver to pay attention to his ideas. Their response has been to write him nice letters telling him how creative he is and to continue to march lockstep into a financial buzz-saw of their own creation.

My guess is that Denver International will turn out to be a economic turkey with or without United. Denver should consider scrapping its cloth foot terminal design and building a terminal along the lines Starry suggested. Denver citizens would still be stuck having to pay \$80.00 in fares to get to and from the monolith to Romer and Pena's

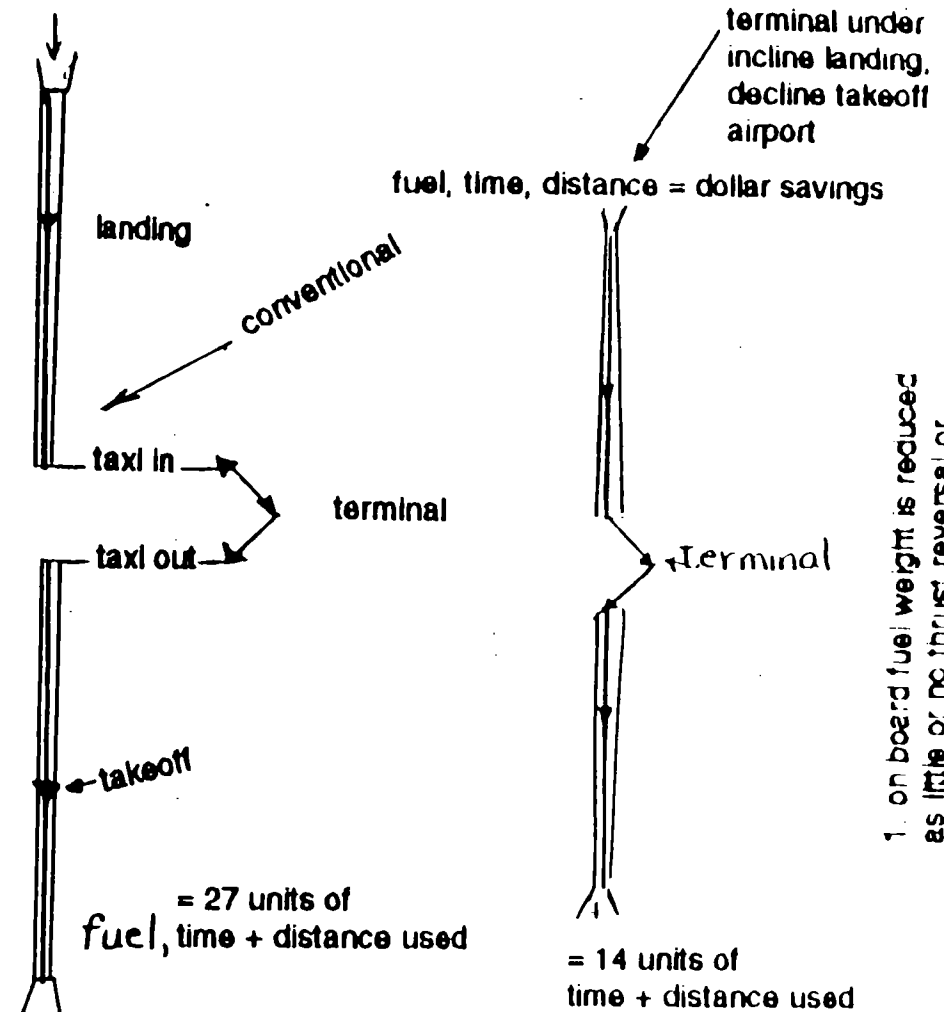
taxi is done by wheel motors
eliminating all taxi fuel waste

reacceleration is done by
electric wheel motors using
energy reclaimed from braking
during landing

results

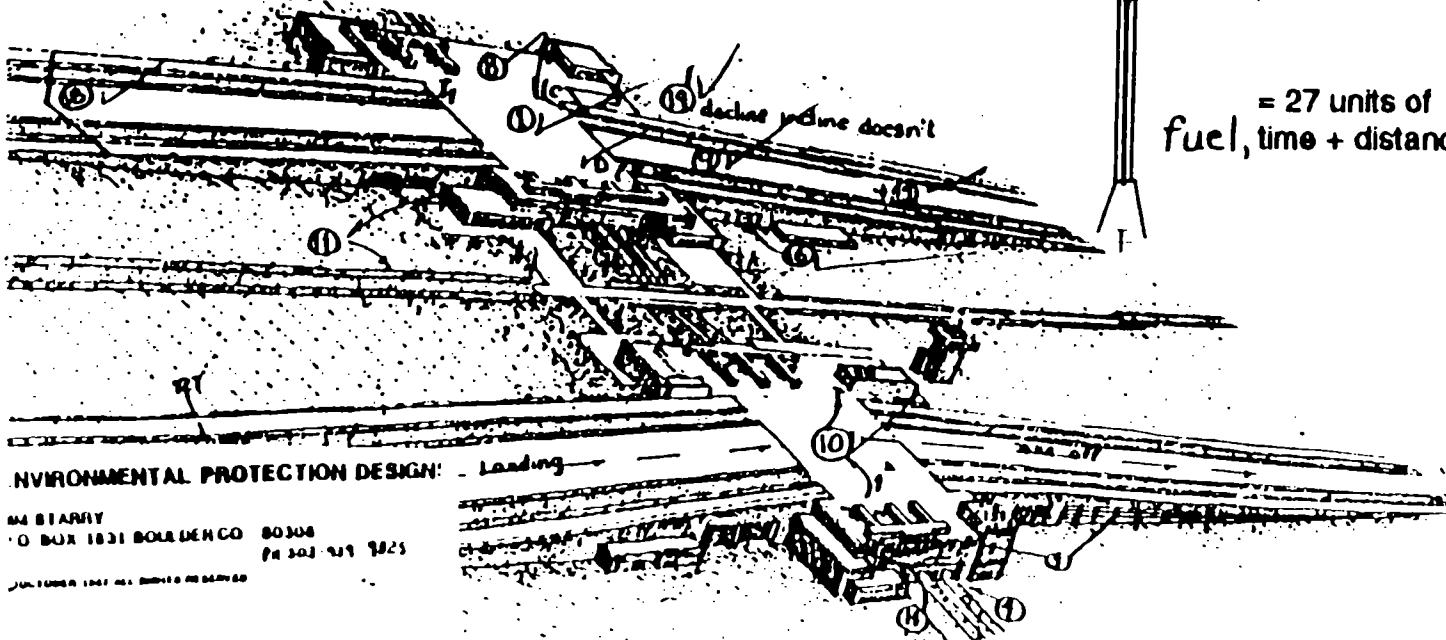
1. eliminating thrust reversal and taxi engine use; virtually eliminates all terminal aircraft related noise
2. fuel cost per landing - takeoff is greatly reduced along with its related pollution and time waste
3. diagram indicating distance reduction which relates directly to time, distance and fuel waste may be seen in Fig. III

ended



1. on board fuel weight is reduced
as little or no thrust reversal or
taxi fuel is needed

1. aircraft decelerates more rapidly on incline
2. aircraft reaccelerates more rapidly on decline
3. taxi distances 1/5 of that used at conventional airport



Holder & St.Clair

ATTORNEYS AT LAW

AREA CODE (303)

449-2882

444-9375

FACSIMILE 449-2133

SCOTT A. ST. CLAIR

MICHAEL D. HOLDER

MICHAEL J. WOODFORD

2299 PEARL STREET

SUITE 100

BOULDER, COLORADO 80302

February 25, 1992

Dear interested party:

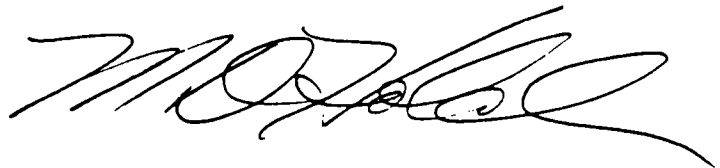
This letter is included with information forwarded to you by our client, Jim L. Starry. Because Mr. Starry's schedule makes him difficult to reach, he has designated this office as his agent to negotiate royalty and speaking agreements, except for scheduling.

Prior to accepting any speaking or consultation arrangements, it will be necessary to enter into a written agreement for the protection of any proprietary or intellectual property rights.

Please be reassured that, while Mr. Starry is interested in protecting his ideas, he is anxious that they be utilized for the betterment of the environment we all share. To that end you will find him pleasantly negotiable on all material terms.

Should you desire to engage the services of our client, please feel free to contact me.

Yours very truly,

A handwritten signature in black ink, appearing to read "MDH", with a long, sweeping horizontal line extending to the right.

Michael D. Holder

MDH:mam

1992

Greeting; interested party:

Too often, proposals for improving air quality ignore their economic and political factors. We have submitted patent applications for remarkably simple techniques for reducing aircraft fuel consumption with its attendant pollution.

Our techniques utilize existing technology and modern ground traffic control techniques. They do not affect aircraft flight paths, and permit reduced costs for the construction of airports.

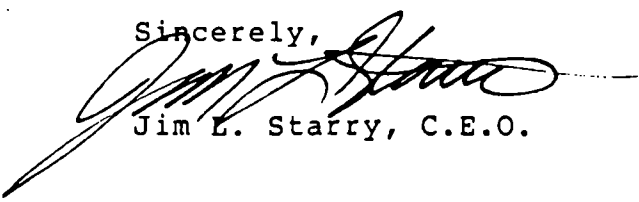
Our research models project the savings of billions of dollars annually in the cost of aviation, and significant improvement in air quality around metropolitan airports.

The Kansas City International Airport Planning Department has already indicated that our ideas merit further study. Our representatives have been invited to address the United States Air Force Academy, Department of Civil Engineering, as part of their Distinguished Speakers Program.

Our representative would be pleased to meet with you or your advisors for consultation, as a speaker, or as a part of a panel discussion. Any information which we may disclose will, of course, remain proprietary insofar as commercial application may occur. Fees for presentations and discussions are \$100.00 per hour or \$1,000.00 for three (3) consecutive days together with ordinary and necessary expenses for food, travel, and accommodations. No charge, other than for expenses is made for services rendered to accredited educational institutions, including public secondary schools.

Should you have further questions or any comments, please contact us at (303) 939-9825.

Sincerely,


Jim L. Starry, C.E.O.

Read and understood by: _____

Date _____

Please return to the above address.
Your comments are greatly appreciated.

USA TODAY

99 W. Hawthorne Avenue, Valley Stream, NY 11580

(516) 568-9191

Sept. 15, 1989

Mr. Jim Starry
Box 1931
Boulder, Colorado 80306

Dear Jim:

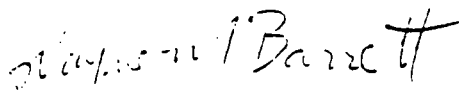
Upon discussing your airport design ideas with my editor, we've decided that it would be best to scrap the short newsletter story in favor of having you write a lengthier version for nationwide publication in USA TODAY Magazine.

What we have in mind is an article of approximately 2,500 words with a due date of Oct. 15, 1989. Please let us know whether you would be interested and if the deadline is feasible.

We are enclosing a recent sample issue and a list of our authors in case you are not already familiar with the magazine. Please note the many executives from various public policy groups who have written for us.

We look forward to hearing from you and to welcoming you to the pages of USA TODAY Magazine.

Sincerely,



Wayne M. Barrett
Associate Editor

P.S. - It is not necessary to send me the backup materials that we discussed by phone. Please give me a call if you want to do the story so we can discuss particulars. And remember, we are flexible about our deadlines.

I began to engineer a new airport design while on flight 384 returning from a vacation in England. I had been in numerous airports in Italy, France, and the United States in recent years and became aware that airports all over the world have been constructed essentially from the same mold. Yes, there may be differences in the looks of the terminals or ground transportation. But, all in all, the runways are flat and the terminals are located huge distances from runways, parking, and other facilities. Better transportation within the airport is considered the answer when, in fact, the airport itself needs to be redesigned. This process has taken place over the past 50 years without notice.

The Wright brothers were where it all began in this country. A take-off was considered exceptional. When World War One occurred, it thrust aviation forward. We had moved quickly to dual engine, dual wing aircraft with great pressure being placed on the new industry for greater distance capability. By the time the war ended, aviation had moved so rapidly because of defense spending that aviation was alive in a new form. The air force was a new branch of the military and commercial air travel was beginning, but were there any changes in airport design? Flat runways were used, the only addition being the visual flight control tower.

Time passed and quietly air transportation and air mail began taking over as the means of long distance travel and communication. The number of flights grew along with the numbers of airports.

As the Second World War became inevitable, so did the advancement of aircraft design. Larger engines were introduced. The war came to an end and we were capable of building aircraft that could carry huge loads with their multiple engines. Runways became longer and longer to accommodate larger and larger aircraft until the B36 with its multiples of 36 cylinder engines was common place, and it dwarfed the Kitty Hawk plane of the past.

But still airport design had been held static without any design improvements with the exception that the visual control tower now contained radar, also an advancement resulting from the Second World War.

In 1957, I graduated from high school with 1,700 hours of aircraft training. Amazement was what I felt as I watched jets crease the sky above my midwestern home town. While taking flying lessons, I saw the landing strips as a section of smooth surface on which to park my aircraft. Tricycle landing gear was just being introduced which eliminated what was called the tail dragger landings of the past. You could actually see the runway as your plane touched down. But still an airport was only longer runways with a longer taxi to the terminal.

With the passage of the next 30 years, airports that were designed to handle 350 flights per day were now handling 700. And presently Denver's new airport is being designed to handle 2,000 flights daily. That's a landing or takeoff every 20 seconds.

While major cities throughout the U. S. are still looking for 50 square miles of unpopulated land -- close to downtown -- for new airport construction, the airport design has not changed from the Wright brothers first landings.

As these multiple flights and long time consuming trips to the airport continue to increase, a new war is forming all over the U. S. "Air is not supposed to be seen, it is to be breathed." This war has, in part, been initiated without anyone noticing. A hugh airport today consumes nearly 300 million gallons of fuel, nearly half the amount of fuel used in city autos, according to the Colorado Department of Health. And aircraft are not using catalytic converters to protect what we breathe. So airports are creating nearly half of our air pollution without anyone being aware of this problem.

As airport complexes have increased in size and congestion, more of the passengers' time and energies are consumed in getting to and from the departure/arrival gates. Busy periods of travel are almost always plagued with delays in traffic both in the air and on the ground. This guarantees even more time and fuel waste in the future. The EPA states that their only concern, " is a potential hot spot between the parking area and the terminal." A 747 wastes over 500 gallons of fuel during taxi -- that's enough to operate your car for a year. One thousand such taxis and take offs consume 1 million gallons, enough fuel to operate 200,000 cars for a day.

That's why the new Denver airport will create three times more aircraft-related pollution as it handles 2,000 planes daily instead of 700. Is this controlling air pollution? It reminds me of my favorite mouse and cheese story. In a maze, the mouse eventually learns which tunnel to go to for cheese. However, if the cheese is removed, the mouse will eventually stop going to that tunnel while man, who created the maze, will seemingly go to the same tunnel forever.

[New York Times Picture]

In the past two years, I have proposed a new airport design which saves \$200 million in fuel annually at an airport the size of Denver's new International Airport. While saving fuel, this new design would also reduce passenger walking and time waste by 80% while reducing aircraft taxi distance and fuel misuse for the airlines by 48%. You and I would have cleaner air as the thousands of gallons of fuel saved per day would not be turned into noise and air pollution.

I now find that the mouse and I have a lot in common. After having written fifty or so letters to the EPA, airlines, state and federal agencies, I find that the maze keeps getting larger, yet I keep looking in the same places for cheese that is nowhere in sight.

Picture an airport where there are four main entrances instead of one. These eight lane entrances enter east/west and north/south under the runway's. Serving the city's four

quadrants. The airport is joined with the highway system. This eliminates the need for construction of a large mouse trap around the airport as it is in most cities currently. These main eight lane highways make it easy to drop off air freight, passengers, and air mail directly to the departing aircraft.

What if the runways were not flat! What if the forward speed of the aircraft was converted into stored energy to be used later on takeoff? That would mean a thousand gallons of energy would not be wasted every time a 747 landed anywhere. At the same time, the airplane landed up an incline -- thrust reversals wouldn't be needed to slow the aircraft.

The terminal could be under the runways which would eliminate most of the passengers' 1/2 mile treks to the departing gates. Two hundred passengers on 700 flights now walk 70,000 miles daily at many major airports. If each person earns an average of \$10 per hour, that's \$1.5 million in time waste daily. You see, if the runways were raised so that aircraft landing were slowed by going up a 1% or 2% incline and aircraft taking off would take off down the same decline, the result would be twenty layers of parking, restaurants, shopping; underneath the incline maybe even a world convention center could be situated in the resulting space under the parallel runways. If we tunnelled under the dome, we could have traffic enter and leave the airport from four directions. Much better than circling the new airport to enter one entrance while waiting in long lines called "Gridlock" by Time magazine, Sept 88. We don't need another mouse trap.

Surely we have the engineering capability to construct a twenty story building to hold up aircraft so that passengers can board directly from below. This system would virtually eliminate the aircraft taxi time and fuel waste associated. The plane needs only taxi a hundred yards while coasting to a stop on top of the dome rather than revving engines again and again to start forward motion after having revved the thrust reversers to slow down.

If Denver's now landing 705 flights daily at Stapleton -- an airport that was designed many decades ago to land 350 -- how many aircraft were the engineers for the new airport designing for the "new" airport. 2,000 flights daily by the year 2000 -- that means if 500 gallons were saved during each landing -- eliminating taxiing would eliminate the 20 planes waiting in line for take off and that surely would save another 250 gallons per flight. Taking off down hill would allow the aircraft to accelerate more easily when their engines are most inefficient, saving another 250 gallons.

A passenger will disembark at the appropriate airline exit and park directly below their departing gate which is under the main runway. From the parking area, luggage would take one elevator to be directly loaded on to the departing flight while passengers take another elevator after being security checked. Travelers can then move through the entire airport freely.

As your glass enclosed elevator moves up through the twenty floors of shopping, restaurants, hotels and even a world convention center. That means that every airport need is met. Because convention facilities are all within the airport, it is no longer necessary to go all over the city creating more pollution and wasting time to complete business transactions because business is transacted at the airport. The income from the retail and commercial establishments situated under the runways creates a substantial income to pay for construction. The fuel savings pays the interest on the construction loans within 12 years. After initial payback, the fuel savings could be distributed to end world hunger and house the homeless. We would be creating abundance from not wasting fuel that at present is only creating pollution.

The possibilities are exciting. If new light weight electric motors are installed in aircraft wheels, it will allow wheels to be pre-rotated before touch down. This eliminates the damaging structural shock to the aircraft's chassis every time an airplane lands. These same wheel motors are then turned into generators to slow down the aircraft while charging batteries to be used in taxiing while jet engines do little more than belch black smoke. These motor generators combined with an incline in the runway will totally eliminate the need for the noisy thrust reversing of engines that easily consume 500 gallons of fuel for each landing. This would also reduce airport terminal noise as the electric wheel motors would propel aircraft and also assist reacceleration of the aircraft on takeoff. Having saved 250 gallons of fuel by eliminating taxiing and 500 by not using thrust reversal, an aircraft taking off down an incline will save another 250 gallons. That totals over 1,000 gallons of

fuel not being turned into air pollution, noise, time waste and lost profits for us all. It's like taking 200,000 autos off the road in each city for each 1,000 flights daily.

The only reason runways have become 20,000 feet in length is to allow a safe distance to stop the aircraft. At present, every landing is at risk on an icy runway. With the runway over the terminal, the escaping terminal heat would be used to melt ice and snow off runways. The runways could also be shorter as the incline would serve the effect of lengthening the runway. thrust reversal flaps and brakes would be used only in emergencies and would have much greater effect on a dry landing surface. It would be near impossible for an aircraft to crash into the terminal that's located under the inclined runway.

How do we create something different by using the answers of the past which have created the problems of the present? Denver is beginning to choke on air pollution. And a great part of that pollution, whether anyone admits it or not, is aircraft emissions. (The EPA has indicated to me that there's currently no particular concern with aircraft emissions as a polluting entity; they are interested only in controlling the amount of aircraft pollution which might affect passengers in the area between the airport parking and the terminal).

It's very simple: Denver's new airport will support three times the number of flights that currently land and take off at Stapleton. Three times the number of flights means three times the amount of aircraft-generated pollution, impurities that you can see, smell, and

even taste. When a gallon of gasoline is burned, no matter where it's burned, the residual pollution is ours forever. The only way to lower it is to reduce the amount of fuel consumed: if we don't burn the fuel now, we won't have to clean it up later.

The question is, do we really want to reduce pollution? One way it can be done is with a new airport design based upon a system as simple as gravity and conservation of momentum and a straight line. We have the opportunity to build a less polluting airport, one which will make the future clearer and cleaner. Instead, Denver intent on copying Atlanta's airport, a design which may have been innovative when it was designed in the early seventies, but which is now as antiquated as Kitty Hawk.

Some points need to be made in order to refute reasons why "experts" say my new airport design isn't practical:

- The EPA says that Stapleton provides only one percent of Denver's pollution. So a less polluting airport design isn't needed. Yet, all of the automobiles in Denver use about 665 million gallons of fuel annually, and the current annual fuel consumption of aircraft at Stapleton, according to McDonald Douglas and Boeing Aircraft, is 300 million gallons per year. How can 300 million gallons constitute only one percent of Denver's air pollution when a little over twice that, the amount created by cars and trucks, makes up about 70% of the brown cloud, according to the Colorado Air Quality Control Division.

- The FAA says that it is against their regulations to have an inclined runway. Explain to me, then, why Telluride Airport is built on a 4% incline. And Telluride is one of a number of airport facilities across the U.S. with such a configuration. The airport design I have created consists of a flat runway rising to an incline which employs gravity to assist in braking the plane upon landing or in accelerating the plane upon takeoff. Gravity, therefore, replaces huge quantities of fuel currently used in maneuvering airplanes on the ground.
- The psychological effect on pilots landing on inclined runways is another point brought up by the FAA who says that pilots might become disoriented as they land. However, a pilot landing today on a flat runway of 18,000 feet has no perception beyond about the first 5,000 feet because of what's called the vanishing point. In other words, a pilot cannot discern that there is another 13,000 feet of runway out in front of him. On a rising runway, the point of the pilot's vision is lengthened, giving him a very accurate view of how much runway is left. If you stand at the end of Telluride's runway, you see completely from one end to the other because of its incline. That creates more safety. The psychological effects being spoken about may exist only in the eyes of someone who has not looked at an inclined runway. It seems that no one's looking.

It seems that none of the agencies I've contacted have a division or the personnel whose job it is to look at solutions, a new tunnel which would help the mouse on his way.

We have gridlock at most of the nation's airports. Sometimes at major airports there are over 20 planes sitting on the runway waiting in line to take off while enormous amounts of fuel are washed into our atmosphere. The air is thick and brown with pollution. This isn't progress; it's suffocation. We can't continue to use the methods of the past to solve the problems of the future. Instead of criticizing an airport design which looks at today's problems and suggests tomorrow's solutions, we should take these ideas and begin to make a difference for tomorrow. The future begins now. It's a powerful choice: Denver can be a leader, creating a proactive solution to a huge national problem, air pollution -- or it can remain just another city, plodding along, treating critical problems with bandaidd solutions.

This mouse would like to create new choices that would guarantee a reduction in pollution right now while helping to lessen atmospheric destruction in the future. No agency has refuted the possibility of the enormous fuel savings of my airport design, only that its physical arrangement conflicts with current accepted aviation design rules. There is only one permanent rule: there are no rules that don't change with time -- pollution now dictates it's time to work quickly to change the rules of the past. The war against pollution and atmospheric deterioration is the only war in history in which we all must participate and if we all participate, we win. We simply cannot create the world's largest and last antiquated airport because if we do, we'll be stuck with it for the next 50 years. Now is the

time for change. How exciting to have the United States lead the way again with Denver as the gateway. What a great reply to the opening of eastern Europe: cleaner air, more personal freedom, and less atmospheric destruction would be an exciting beginning to this new era. there are solutions and this mouse would like to see them used now.

###

ASPEN ENVIRONMENTAL SERVICES

2513 W. 105th Court • Westminster, Colorado 80234 • (303) 466-0857

January 3, 1992

Mr. James Starry
Environmental Products Design
P.O. Box 1931
Boulder, CO 80306

Dear Jim,

I was pleased to learn that you are commanding a more receptive ear to your airport design from airport developers and governors whose citizens may be adversely affected if the generation of airborne contaminants is not minimized in the construction of new airports.

The attached report documents the level of airborne contaminants at the following four (4) airports:

- * La Guardia International Airport, Queens, New York
- * Stapleton International Airport, Denver, Colorado
- * Pittsburgh International Airport, Pittsburgh, PA
- * Seattle International Airport, Seattle, WA

Based on these data, the following conclusions can be drawn:

- * The level of airborne contaminants at most large airports is 10 to 40 times higher than comparable contaminant levels in a non-smoking office environment
- * Due to the large volume of air that is being recirculated in airports, environmental tobacco smoke is present in non-smoking area. Therefore, tobacco smoking should be banned.
- * Outdoors, ambient particulate and hydrocarbon levels from airplane operations and vehicular traffic are 5 to 15 times higher than the city centers that these airports serve.
- * The generation of pollutants from airplane operations needs to be minimized to the maximum extent possible.

(over)

* Where innovative airport designs can reduce the generation of pollutants and also save energy as well, they need to be seriously considered and need to be implemented to the maximum extent possible.

Sincerely,

Gerald C. Rappe
Gerald C. Rappe, Sc.D.
President

Table 1

Air Quality Assessment
La Guardia International Airport
Queens, New York
April 22, 1990

<u>Location</u>	Particle Counts/CF	
	<u>>0.3um</u>	<u>>0.5um</u>
Continental counter	1,428,450	217,360
	1,396,900	212,510
	1,295,890	195,420
	1,379,180	220,090
	1,405,390	221,570
Rental Car Bus Stop	3,884,270	867,360
	4,191,720	979,710
	4,278,220	1,006,530
	4,302,140	1,019,870

Table 2

Indoor Air Quality Survey
Stapleton International Airport
Denver, CO
February 27, 1990

<u>Location</u>	<u>Particle Counts/CF</u>	
	<u>>0.3um</u>	<u>>0.5um</u>
United Airlines	346,170	31,850
Red Carpet Club	341,170	31,440
Non-smoking Lounge	345,750	31,640
	343,390	31,020
	379,820	34,230
	408,660	36,800
Reception Desk	1,421,250	143,290
	1,363,110	135,090
	1,496,660	152,970
	1,581,250	164,460
	1,659,140	172,120
	1,642,970	168,270
Bar - No smokers	788,110	76,810
	763,940	73,420
	672,510	62,300

Table 3

Indoor Air Quality Survey
Pittsburgh International Airport
Pittsburgh, PA
September 8, 1991

<u>Location</u>	<u>Particle Counts/CF</u>		
	<u>>0.3um</u>	<u>>0.5um</u>	
USA Check-in Counter	1,417,520	153,720	8:22:09
	1,531,350	164,380	8:23:14
	1,401,900	149,230	8:24:19
Gate 30 Non-smoking Area	2,769,950	273,150	9:34:05
	2,818,430	279,960	9:35:10
	3,027,000	305,480	9:36:15
	3,048,820	300,190	9:37:20
	2,927,210	284,710	9:38:25
	2,899,330	281,210	9:39:25
	3,093,250	303,180	9:40:35
	3,261,400	329,090	9:41:40
Gate 30 Fresh Air Supply	3,559,210	379,240	9:42:45
	3,360,640	396,460	9:45:17
	3,290,670	340,560	9:46:22
	3,514,950	382,740	9:47:27
	3,332,580	352,400	9:48:32
	3,231,600	336,710	9:49:37

Table 4

Indoor Air Quality Survey
Seattle International Airport
Seattle, WA
March 30, 1990

<u>Location</u>	<u>>0.3um</u>	<u>>0.5um</u>
Continental Gate C-10	1,838,580	268,050
Non-smoking Area	1,848,280	271,720
	1,826,810	277,190
	1,828,710	275,490
	1,874,290	282,230
	1,900,610	277,550
	1,866,520	275,930
	1,849,640	266,830
C Concourse Lounge	7,925,100	4,611,450
Smoking Area	7,643,180	3,587,620
	6,804,450	3,085,120
	8,687,900	5,679,340
	8,776,820	5,821,270
	8,605,680	5,510,830
	8,443,880	5,128,530
	8,826,290	5,997,010
	8,615,680	5,554,070
	8,522,369	5,387,080
	8,002,000	4,350,150

Patent Application of
Jim L. Starry
for
STARPORT AIRPORT DESIGN

Background - Field of Invention

This invention relates to aviation equipment and, in particular, to aircraft takeoff and landing efficiency. Noise and fuel waste reduction are accomplished by reducing distances traveled while increasing safety.

Background - Discussion of Prior Art

Enhancing flight safety and fuel savings is currently considered one of the major trends in current aviation, particularly while a larger dependency on foreign oil could be devastating to our economy, and improved flight safety will allow us to maintain our lead in commercial aviation.

As it was pointed out at the 7th Aeronavigational Conference held in Montreal, none of the existing landing systems (ILS) will be able to meet future requirements imposed upon landing systems.

The most obvious feature of the Starport is the use of incline/decline runways to assist in takeoffs and landings. Patent #4,799,828 uses this concept, but in a curved configuration which would be destructive to the landing gear turning at high speeds. This patent makes no use of the space under the runway as in my terminal design which conserves distance travelled, thus

saving fuel and time. In the Starport, takeoffs and landings are accomplished in a path most nearly equal to a straight line, which has the most efficiency

Patent #4,709,363 (Launch and Ascent System) makes the point in the abstract of not using on-board fuel to attain launch velocity. This is pertinent as weight at rest consumes the largest increment of fuel per rate of change of velocity. Aircraft turbine engines are the most inefficient at speeds below 70 miles per hour because of minimal ingesting of combustion oxygen. Thus the Starport's use of a decline to accelerate and incline to decelerate is changing kinetic energy to potential energy without use of on-board fuel. The Starport launch system does not create any center seeking force as in a circular or helical system, and thus imposes no strain or damage on landing gears which were designed for force impact along a straight line. The gravity launch assist, coupled with the use of wheel motor/generators are used to change already existing kinetic energy to potential energy creating huge fuel savings that annually exceed \$300,000,000 per major airport.

Patent #4,441,671 (Takeoff Ramps for Aircraft): the forward velocity is decreased during launch. Rockets or air burning engines consume fuel to accelerate the aircraft in order to be lofted, but lofting decelerates the aircraft.

The standard airport terminal illustrates the problem of passenger movement at any terminal throughout the U.S. and the world. When aircraft had a wingspan of under 50 feet the amount of walking to several departing aircraft waiting outside was about 130 feet. Patent #3,981,464 indicates that passengers walk the length of the fuselage or three times that distance. Currently passengers walk 70,000 miles daily at an airport as large as Denver's Stapleton. Wingspans of 205 feet x 13 gates approximately equal 1/2 mile. 140,000 daily passengers at 1/2 mile each = 70,000 miles daily at a facility supposedly designed to save people's time. At 3 mph that equals 23,000 wasted hours daily or at \$10 per hour it equals about 84 million dollars of time wasted per year. This patent shows that a new airport design is necessary that will address all problems of current terminal design. Since a visual control tower was added to the wind sock controlled airport of the '30s and

radar was added to the control tower of the Second World War, no major improvements have been designed or used. Longer runways, taxi ways combined with long treks to your parked car are not the answer. Beltways cannot safely exceed the walking speed of the slowest walking person.

Patent #3,771,747 looks at the possibility of reducing the need for longer and longer runways. The misconception that a jet or turbine engine increases power while its motion is restricted is the fallacy. A turbine only uses approximately 6% of full power at taxi speed because turbine power output is directly related to air intake. The increase of combustible air is what allows the jet turbine its increase in power; therefore, the more rapidly the jet is accelerated to over 100 mph, the shorter the runway that is needed. The use of air jets is unlikely as a 747 weighs almost a million pounds on takeoff. The Starport's incline landing and decline takeoff redirects the landing force to be reused as takeoff in two ways: 1) the decline will accelerate the aircraft before the engines are started, and 2) electric motor generators in the landing wheels will drive the aircraft to more fuel and time efficient liftoff while reducing noise by 50%.

Patent #3,729,153 has reduced the distance travelled during taxi by some small percentage; noise will obviously be reduced by the same amount due to less engine operation. However, FAA demands 4,300 feet of separation between the runway and terminal structure. The obvious improvement is to then place facilities such as restaurants, parking, ticketing, shopping, convention centers, for example, under the runway. This eliminates taxiing since the terminal is under the elevated runway.

Since each of the patents preceding mine have explained the inefficiencies of current airports, I will only allude to the incapability of major airports to be expandable, mostly because of major highways circling the airport. The Starport is constructed with the express purpose of being part of the cities' transportation systems, allowing underground multi-directional roadways to enter the facility from all four directions.

Patent #3,680,499 indicates the need for tubular structures within the concrete runway to administer high capacity air heat and vacuum. The Starport airport system with runways arching over the terminal utilizes direct conduction of terminal heat to eliminate snow and ice from the runways. Secondly, auto exhaust is channelled and cleaned while depositing heat into the runway by convection (78%) and conduction (12%). The arched runways of the Starport system also diminish the need for runway expansion joints as the inclined and declined surfaces stress concrete away from the center equally and constant terminal temperature holds expansion to a minimum.

Structure testing has shown that vehicle overpasses will be adequate for arched runways where the runway surface creates the roof of the terminal. On one side the incline slows landing aircraft, while on the other side, the decline accelerates the aircraft on takeoff, leaving flaps, brakes, and thrust reversal for emergency use only. This reduces noise and air pollution by more than 50%.

Patent #3,558,085: this airport layout would not be allowed as the FAA will not allow runways directed toward the terminal (a missed approach being the most obvious reason). The Starport system of either a conical dome/multi-runway system or the parallel landing strips of major airlines divided by commuter aircraft runways which double as missed approach or emergency runways, eliminate virtually all taxi time, fuel waste and noise.

Having the landing strip on the roof appears to associate my patent with #3,556,441; however, in this patent the planes are taken by elevator from the roof to the takeoff runway, wasting time and immense energy. The Starport system, however, changes the forward momentum of the landing aircraft into a rise in elevation; departing aircraft take advantage of the same amount of decline to reaccelerate the aircraft again on takeoff. New commercial aircraft are approaching one million pounds. An elevator to move this weight, although not impossible, would be inefficient. Fuel costs have risen 10-1 in the last 40 years and there is no guarantee that the future will not see the same increase. The Starport system saves \$1000 in fuel per flight. The new Denver airport will fly 2000 planes daily by 1995 - that's a savings of

\$2,000,000 daily or over \$300 million yearly. That is enough to pay for a 3 billion dollar airport in 20 years. Reducing pollution while saving time and distance travelled is what the Starport system proves it can do.

Patent #3,554,470 has runways located with taxi ways no more than a left or right turn to the proper terminal. However, again, shortening taxi distances does nothing for fuel savings during thrust reversal or regaining takeoff velocity. Having the terminal under the incline/decline runway eliminates the possibility of aircraft impacting a vertical terminal from two directions. Although Patent #3,554,470 shows parallel runways with slotted terminal buildings to allow aircraft wing access, there is again only 1 of the three problems of aircraft runway and terminal design handled - fuel waste, pollution, and noise are left unconsidered.

Patent #3,481,566 proposes underground runways and covered airport to solve some of the problems currently causing immense fuel waste and gridlock by providing all-weather operations and noise suppression, but creates the new problem of aircraft impacting underground walls.

Objects and Advantages

The object of this invention is to redesign the airport terminal and landing and takeoff systems for the purpose of saving fuel, reducing noise and pollution, saving passenger time and frustration, and increasing safety. The advantages of the Starport over conventional airports are:

- (a) The incline/decline runways use gravity to assist in takeoff (increasing velocity) and landing (providing braking) of aircraft.
- (b) The use of wheel motor/generators provides safer, more comfortable landings as the wheels are pre-rotated before touchdown. The generators then store the energy of the landing to be used in taxiing and takeoff assistance. This eliminates the noise of thrust reversal on landing and revving of engines for taxiing while saving thousands of gallons of fuel and reducing pollution.
- (c) Locating the terminal and its attendant services under the runways provides fast, convenient service for passengers. There are no long

treks from parking to the terminal since parking for each airline is under the airline's specific gate.

(d) There is no maze of highways around the airport rendering it impossible to expand. All highways go directly under the runways and terminal for easy access to parking. Airport expansion can take place in any direction over the highways.

(e) Heat from the terminal and car exhaust from the highways is used to aid in snow and ice removal from the runways, increasing safety.

Description of Reference Numerals in Drawing

1 Dome structure is architecturally strongest. Bottom connection makes airport an isolated structure not affected by surface expansion. Loads stretch surface so expansion joints aren't needed.

2 Multiple floors under runway structure decrease construction cost per square foot (gives 20 usable floors). Multi-use floors are alternated with parking. Enormous commercial area under runways will ensure rapid payback of construction costs.

3 Windows for light and heat absorption double as runway delineation lights.

4 Under terminal: continuous, non-stopping mass transit operates under terminal in conjunction with 8-lane north-south, east-west entrances.

5 Continued airport expansion possible - not permitted with airports designed with existing above ground auto entrances. Since traffic enters under terminal, major circling airport roads don't restrict airport expansion.

6 Runway-controlled rate of rise. Aircraft maintains level flight and runway rises to meet aircraft. Wheel motor generators pre-rotate to assist in landing, eliminating shock and wheel destruction.

The airport can be constructed at 50% less than conventional airport
since none of highways are disturbed and minimal cost
covers cost of Runways above

[illegible]

These developments should result in a total savings of 600 positions at the post level.

test is conducted using 250 gallons of fuel per day
with testing parameters like

பெரிய அளவுக்குள்ளேயே இருக்கிறார்கள். இதைப் பற்றி நான் சொன்னால் எல்லாருமே கவலைப்படும். இதைப் பற்றி நான் சொன்னால் எல்லாருமே கவலைப்படும். இதைப் பற்றி நான் சொன்னால் எல்லாருமே கவலைப்படும்.

[illegible]

training would allow students to study

each major airport has its own runway and terminal

the first of these is the fact that the

parking, airport facilities, restaurants, convenience stores and
are located between pathways and a 6 ft removal called by
horizontal final driveway only

(A)

...the ... of the ...

[illegible]

ENVIRONMENTAL PROTECTION BOARD

1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

7 Side by side runways allow multiple landings divided by appropriate FRA separation (4,300 ft.). Plane A has left incline as B touches down while C has taxied out while A taxis in, leaving B 11,000 feet of unobstructed runway - process is reversed when B taxis to the right. Then D starts decline as C lifts off.

8 Incline landing eliminates time waste associated with long taxi distances as terminal is directly under runways.

9 Decline allows quicker takeoffs, eliminating delay.

10 Aircraft proceed in a straight line - landing and taking off with the shortest taxi deviation.

11 Commuter airlines land between majors, shortening passenger transfer time and reducing fuel waste.

12 Aircraft wheels have motor-generators that slow all aircraft on landing and accelerate them on takeoff. Jet noise is eliminated on touch-down. During takeoff aircraft is reaccelerated without engines until forward velocity makes engines burn efficiently. Taxi is accomplished on wheel motors eliminating terminal noise until just before liftoff.

13 Heated fuel storage. Heated fuel transfers heat to wing tanks for deicing.

14 Parking directly under departing gate - elevator transports passengers from parking to departing aircraft directly above. Parking under terminal eliminates shuttles from parking to terminal. Elevator tubes are an integral part of the structure under the runways.

15 Electric wheel motor-generators assist in aircraft deceleration during aborted flight conditions.

16 Aircraft repair facilities located under runway.

17 Aircraft delineation lines determine where different size aircraft set down - light planes closer in; heavy, fast planes use more of incline.

18 Triangular depression in runway automatically centers aircraft on runway while trapping and directing rain and snow melt to evaporator holding tanks. Deicing agents are kept from entering ground water.

19 Incline/decline runway systems allow the full length of the runway to be visible to arriving and departing aircraft.

20 Underground 8-lane highways (north/south, east/west) for specific airlines. Heat from autos removes snow and ice from runways.

Summary

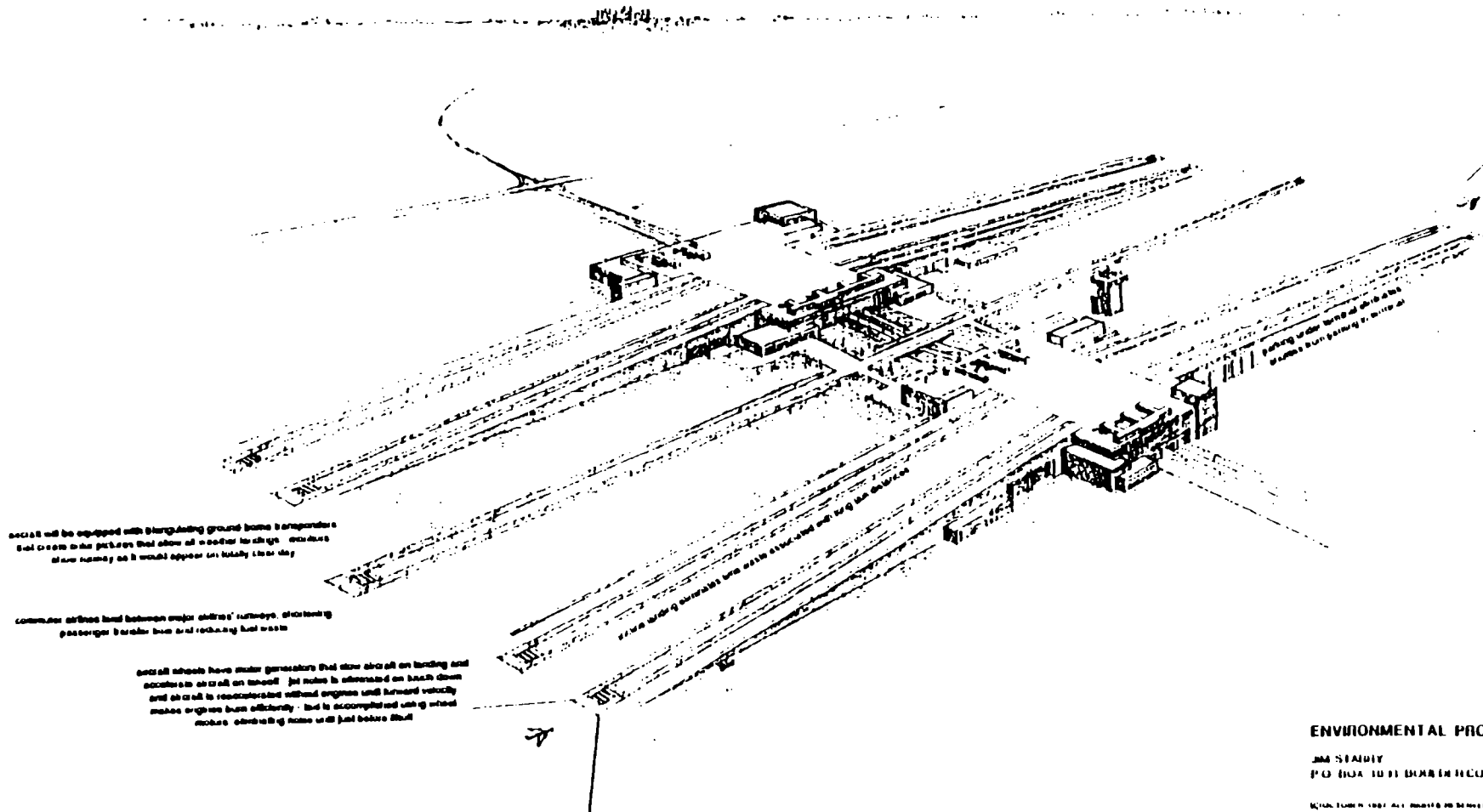
The Starport is a truly new and complete airport design. It improves the efficiency and safety of aircraft landings and takeoffs. It saves thousands of gallons of fuel per flight, resulting in more economical operations and 50% less pollution. It is much more efficient for passengers arriving and departing the airport.

The use of incline/decline runways assist takeoffs and landings, thus reducing runway length and eliminating lengthy taxiing. The use of wheel motor/generators on the aircraft serve as quiet propulsion for taxiing and assistance on takeoff to reach an efficient speed for jet engines to take over. This results in great fuel savings, with resulting noise and pollution reduction.

Visibility for pilots is greatly improved by the incline/decline system. The full length of the runway is easily seen during landings and takeoffs.

Placing the terminal with all its attendant services (ticketing, baggage handling, parking, restaurants, shops, convention centers, as so forth) under the runways provides fast, convenient access for passengers. There are no

UPHILL LANDING, DOWNHILL TAKEOFF AIRPORT with facilities under terminal



ENVIRONMENTAL PROTECTION DESIGNS

JAM STADT
P.O. BOX 1011 BARRINGTON, ILL. 60015
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long treks to the gates as you park under the area used by the airline on which you are booked and take an elevator to the counters. Major highways serve the Starport under the structure and thus are no impediment to future expansion of the airport. The heat generated by the terminal and highways serve to melt snow and ice on the runways, increasing safety.

The Starport design also has potential application as a military base inasmuch as the runway is engineered to withstand loads of millions of pounds. Combat aircraft could be elevated up to the surface for immediate takeoff.

Claims: I claim:

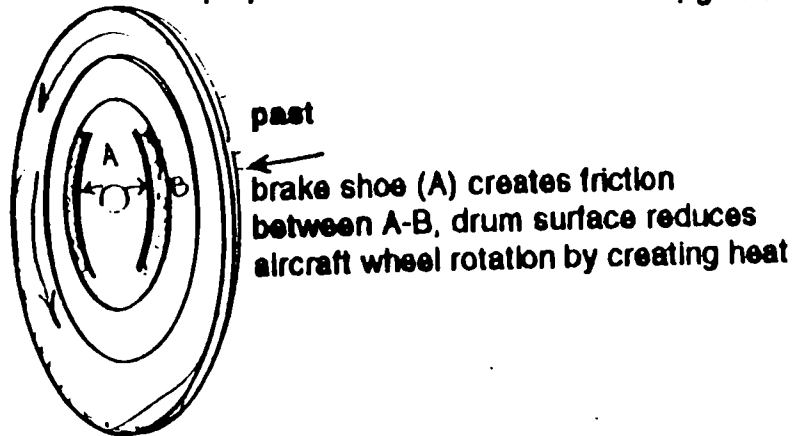
1. A method of landing and taking off aircraft comprising the use of gravity to assist in such landings and takeoffs by means of inclined and declined runways which are an integral part of the terminal and related service buildings located beneath them.
2. The assistance of the aircraft of claim 1 furthered by means of wheel motor/generators to decelerate said aircraft on landing and accelerate said aircraft on takeoff.
3. The wheel motor/generators of claim 2 providing power for taxiing of said aircraft on the ground.

STARPORT AIRPORT DESIGN

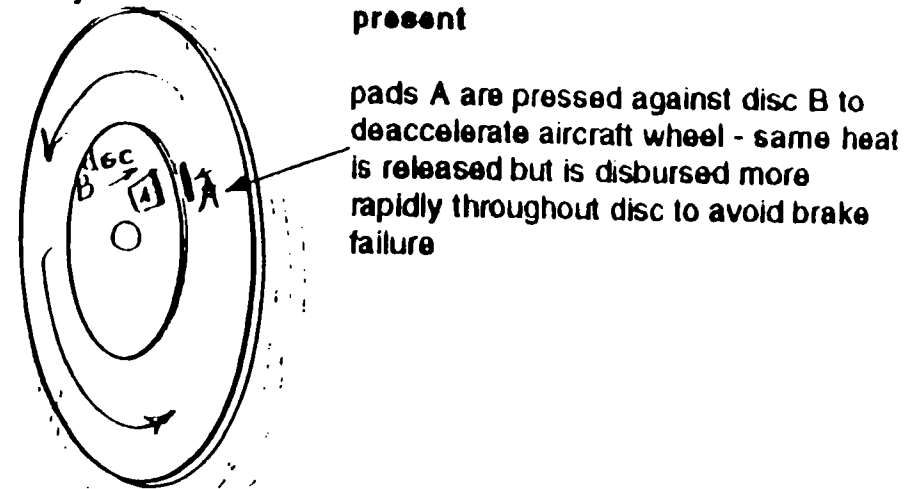
Abstract: The Starport system of incline/decline runways will shorten landing distance while reducing fuel waste and, consequently, reducing terminal noise and pollution. Safety will be accomplished by heated runways for snow and ice removal, and pre-rotation of landing wheels, eliminating initial touchdown shocks and noise. Wheel motors act as generators to decelerate aircraft while storing energy for assist in takeoff. Locating the terminal and all services (including incoming and departing traffic and parking) under the runways results in time savings and convenience for passengers.

Fig. 1 sheet 1 of 3

proposed wheel brake-accelerator, generator-motor system



present



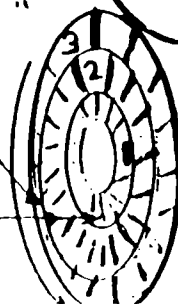
future

pads are replaced by magnets/electro-magnets to deaccelerate wheel rotation during aircraft landings eliminating brake heating

expanded view



stacked disc divides load



vertical armature (1) with multiple permanent or electro-magnets fixed to axle while field is fixed to wheel rotation

clutch function takes place when no current exists between armature and field

transmission application

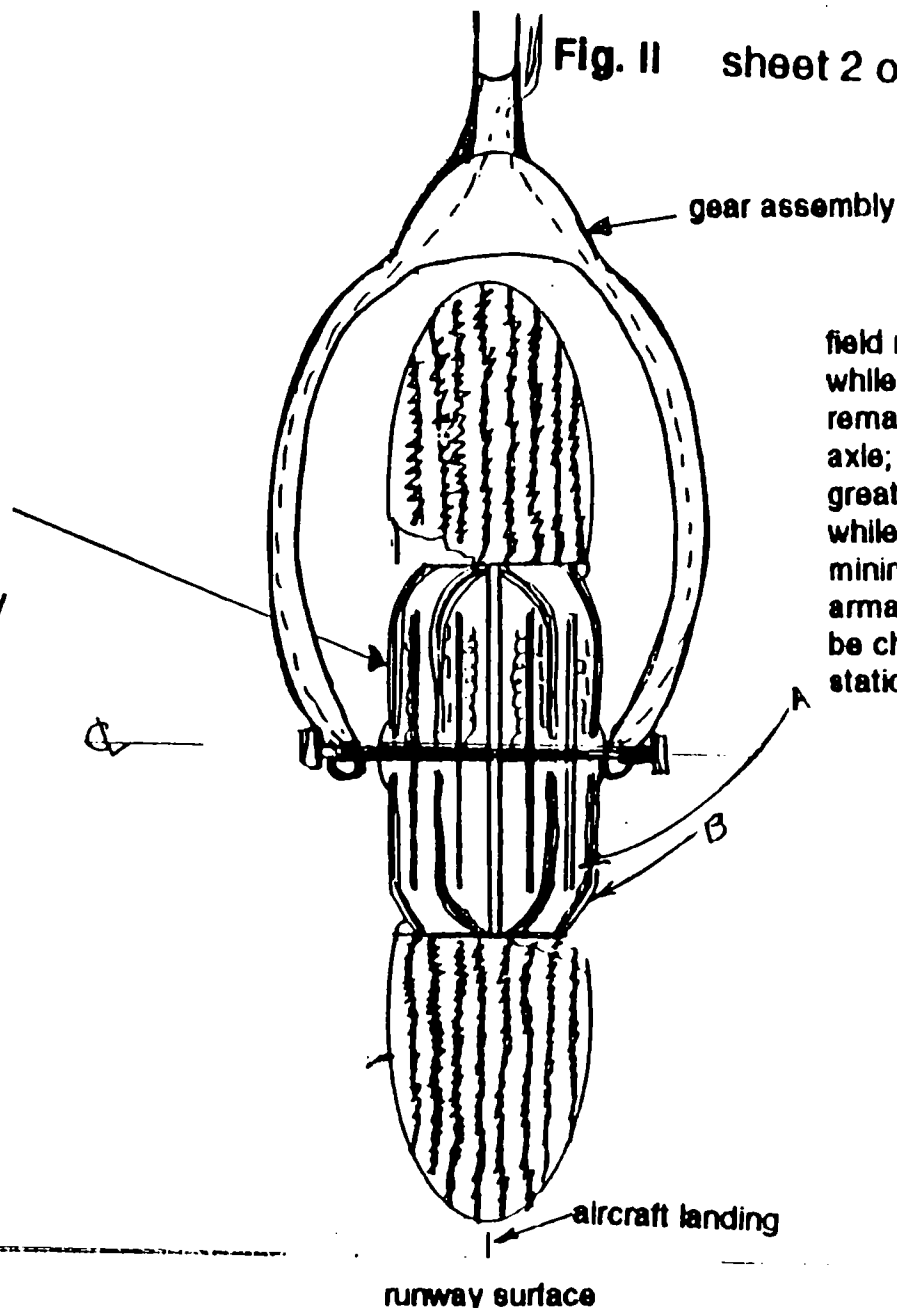
- 3 armature rings create:
- (1) center (high velocity - low torque)
 - (2) middle (medium velocity - medium torque)
 - (3) outer (low velocity - high torque)
 - (4) all used together to create extreme braking or taxi power

may all be used together to start aircraft roll-out during taxi - Braking

Fig. II sheet 2 of 3

wheel cutaway to expose
magnetic braking
discs A, field B

braking without the related
heat will allow deacceleration
of very large, heavy aircraft
such as the SR 71 which weighs
close to a million pounds without
the use of thrust reversal; thrust
reversal is the use of energy to
stop aircraft motion; I am using
aircraft motion to generate energy
that is stored, not wasted, for
later use during noiseless taxi
and takeoff.



field rotates with wheel
while discs or armatures
remain stationary with
axle; this design allows
greatest field density
while keeping weight
minimized; field and
armature location may
be changed - one
stationary, one rotates

an electric control
center will:

1. pre-rotate wheel to
ground speed prior to
landing
2. note deacceleration
toward terminal during
shortened taxi
3. be a ground speed
indicator for liftoff
indicator

1. as aircraft approaches runway tire is pre-rotated before touchdown
results A. eliminates aircraft tire wear & minimizes shock to landing gear
2. as load is transferred from wing lift to wheel load, shocks are compressed
results A. with motor-generator begin phase change to create braking
3. after complete braking wheel motors will again be used for taxi & takeoff

Fig. III sheet 3 of 3

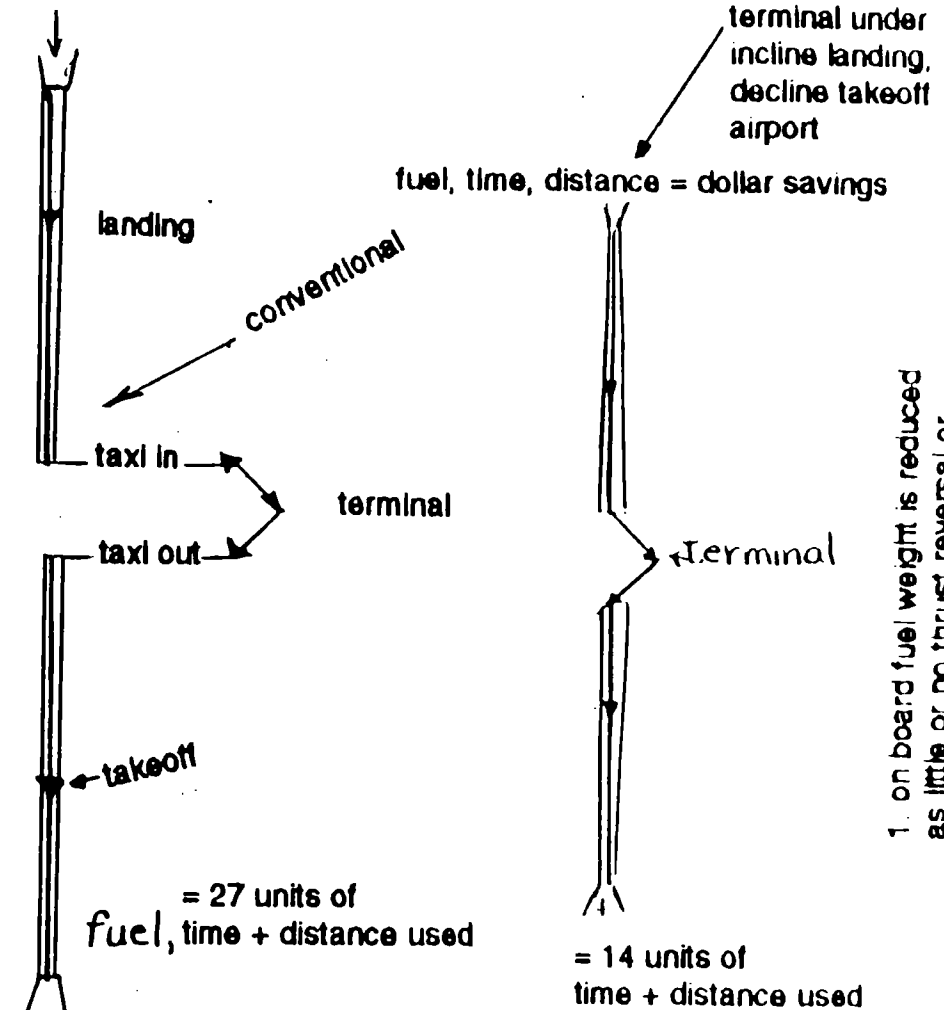
2. taxi is done by wheel motors eliminating all taxi fuel waste

3. reacceleration is done by electric wheel motors using energy reclaimed from braking during landing

results

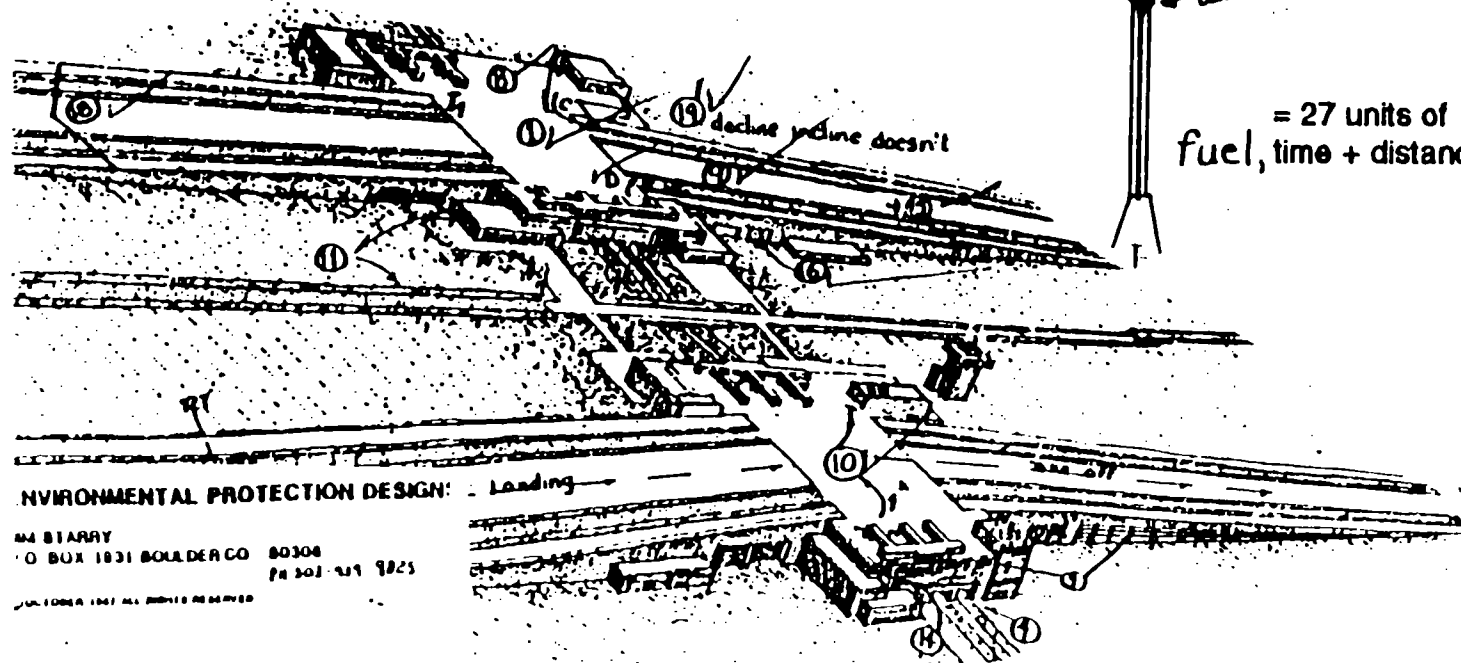
1. eliminating thrust reversal and taxi engine use; virtually eliminates all terminal aircraft related noise
2. fuel cost per landing - takeoff is greatly reduced along with its related pollution and time waste
3. diagram indicating distance reduction which relates directly to time, distance and fuel waste may be seen in Fig. III

order



1. on board fuel weight is reduced as little or no thrust reversal or taxi fuel is needed

1. aircraft deaccelerates more rapidly on incline
2. aircraft reaccelerates more rapidly on decline
3. taxi distances 1/5 of that used at conventional airport



ENVIRONMENTAL PROTECTION DESIGNS, INC.

Consultants & Innovators: Solutions for the Future



Oct. 1987

The Future Begins Now

April 9, 1987

Ad Hoc Committee on Transportation
City of Boulder
c/o City Council
Boulder, CO 80302

RE: The StarTran System of Mass Transit.

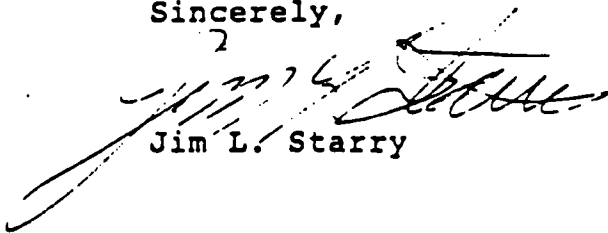
Dear Sirs/Madams:

I appreciate the opportunity to present for your consideration my concept of a forward-thinking, environmentally sensitive, energy efficient system for urban mass transit --- the **StarTran System**. I am enclosing a copy of a brief conceptual description of the **StarTran System** for your review prior to the next meeting of your Committee (April 15) at which time I will be making a short presentation.

Your Committee has been given a significant task of assessing the needs and potential solutions to Boulder's current and future transportation concerns. I believe that you will see the **StarTran System** is responsive to most of these concerns and is technically, politically, and economically feasible for implementation before the end of this century.

I hope you share with me my excitement about the type of future the **StarTran System** offers to progressive, responsible communities such as Boulder. I welcome your comments and ideas.

Sincerely,


Jim L. Starry

Enclosure

P.O. Box 1931 Boulder CO 80306 (303) 939-9825

If pertinent patent or copyrighted information included, this constitutes a disclosure agreement between parties this data.

THE StarTran SYSTEM OF MASS TRANSIT

Created by

**Jim L. Starry
P. O. Box 1931
Boulder, Colorado 80302
(303) 939-9825**

© April, 1987

THE StarTran SYSTEM OF MASS TRANSIT

What is the ultimate intent of a mass transit system? What means of moving people and freight will allow us to enjoy the best possible quality of life? Which existing conditions do we wish to keep and which do we wish to change? What methodology can be put into play in order to create a mass transit solution which will be viable for the next 100 years?

Boulder's mass transit profile has evolved from pedestrian and horse traffic to include bicycles, street cars, trains, automobiles, buses, vans, trucks and couriers. We are currently "making do" with a system developed through the trial and error method of meeting immediate necessity, not with a cogent, forward-thinking master plan.

I. The Problems and Solution

existing problems

There are a multitude of problems inherent in our existing mass transit system:

- o Traffic congestion -- For example, there are two northbound traffic lanes on Broadway, and when an RTD bus in the right lane stops to pick up one passenger, fifty percent of the northbound traffic is cut off as cars wait for the bus to start up again.
- o Pollution - NO_x, particulates and carbon monoxide are created by an internal combustion engine and are particular pollution sources of concern to Colorado.
- o Inefficiency of carriers -- Often a 60-passenger carrier carries only one or two passengers per trip.
- o Unnecessary pedestrian/vehicular contact -- 4000 pound vehicles encounter 150 pound pedestrians.
- o A time-consuming mass transit configuration -- For example, at the intersection of Broadway and Canyon, there are four phases in the vehicular traffic flow pattern (two straight and two left-turn segments) and an additional two pedestrian phases in the traffic flow sequence. This makes a total of six different elements of traffic control.

proposed
solution:
The
StarTran
System

StarTran is a mass transit system which will replace our traditional vehicular transit system with one featuring an arrangement of passenger and freight modules propelled by an electrically-fueled main carrier vehicle and operated in a fixed corridor. The series of passenger modules are propelled by a main carrier vehicle which never stops and which moves along existing transportation corridors parallel to automobile traffic. Keeping the main carrier in constant motion conserves the energy which would otherwise be used to start and stop. This is a key component of the StarTran concept and is based upon the principle of conservation of momentum; that is, the energy source remains in constant motion and is not subject to acceleration or deceleration forces. As the StarTran carrier passes a station, the passenger or freight module leaves the rear of the StarTran carrier and proceeds up the ramp to the terminal; at the same time, the waiting modules begins to accelerate down the other side of the ramp to connect with the StarTran carrier.

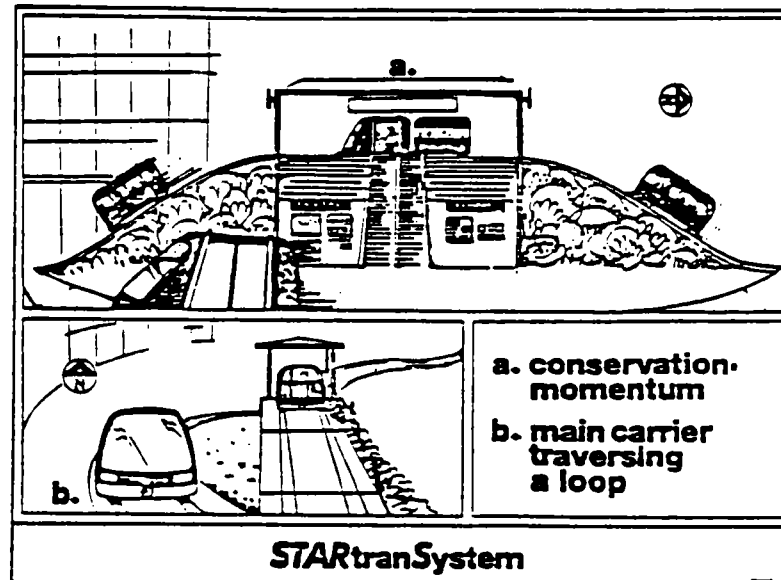
II. Description of the StarTran System

basic concept The design of the system is very simple. A loop of StarTran corridors spans the city, following its major arteries. These corridors consist of precast concrete sections of roadway on which the system moves. The rubber tires of the StarTran vehicles fit into grooves or channels, and an electric contact is imbedded between these channels.

An electrically guided/solar-charged main carrier circumnavigates the entire route once every twenty minutes. The main carrier never stops, and by remaining in motion it is much more fuel efficient than current modes of transit which stop, start and idle. Where traditional traffic lanes intersect with the transit system, the latter is elevated.

Passengers and freight are transported in small modular cars. Each car has only one specific location in the City, where it loads and unloads. These cars wait at a raised ramp terminal for the punctual arrival of the main carrier. Passengers enter from the parking area or street into a car module. There is no need to construct special

stations for waiting passengers as the car modules serve this purpose. Passengers will wait in warmth, safety and comfort for the arrival of the main carrier.



The main StarTran carrier picks up individual modules as it passes each terminal ramp. As the main carrier approaches the turnoff to the raised terminal, the modular car begins its descent to the main corridor where it will attach itself to the carrier by means of an electromagnetic coupler. After a new modular car is attached to the carrier, passengers in that car will move to the car bound for their chosen destination terminal. As the carrier passes the appropriate exit terminal ramp, the individual car is released from the front or rear of the StarTran carrier and will be propelled up the ramp, stopping at the top. Passengers then disembark, without stopping the entire system to do so. The car will remain at the station to fill with passengers and, as the carrier makes its next circuit, the car will disembark and connect to the StarTran main carrier.

alternative concept

As a preliminary alternative to the system of ramps, these same modular cars can rest on side tracks, accelerating by means of solar energy to attach to the main carrier. As the StarTranSystem is further implemented, elevated ramps can be added to further conserve energy.

**rights-
of-way**

In the past, streets were expanded to accommodate more traffic by acquiring rights-of-way from private property holders. Not only did the property owners lose part of their land, but in many cases residential property was devalued as heavier street traffic occurred. Currently, Boulder's solution to too much traffic is to close the street and divert traffic elsewhere.

In contrast, StarTran manages traffic patterns. Initially, one lane of traffic is dedicated to the mass transit corridors and one lane of traffic is designated for automobiles. As StarTran gains acceptance, inner city vehicular traffic lanes will be eliminated entirely. StarTran will use existing rights-of-way which are already in place: rail beds, streets, and medians along interstate highways. Where StarTran and other traffic meet, StarTran goes over, using currently existing overpasses where available.

**pedestrians
and
bicyclists**

Pedestrians and bicyclists will have their own right-of-way network. In the initial phase of StarTran, pedestrians and bicyclists will not come in contact with the carrier because of special underpasses and overpasses built to the needs of the bicyclist and the pedestrian. As StarTran is fully actualized, vehicular traffic lanes will eventually give way to bikeways and walkways. By removing vehicular thoroughfares, there will be more open space, landscaped areas and medians, with pedestrians and bicyclists enjoying quiet freedom of movement, totally segregated from the flow of StarTran traffic.

construction

Construction of StarTran will be simple and cost-effective. The track will be made of precast, steel reinforced concrete sections. Parts will be interchangeable and reusable. Pieces can be changed, moved and improved in a time-effective and cost-effective manner.

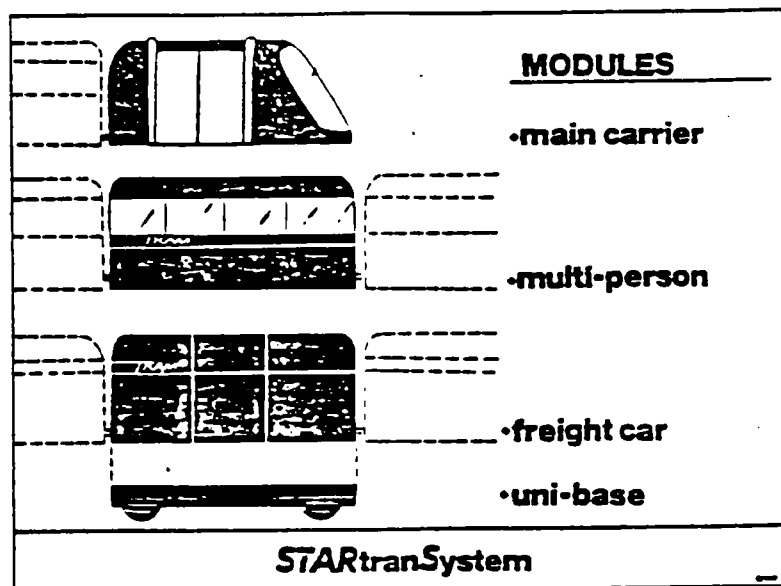
The main carrier will be driven by electric motors augmented by solar cells and storage batteries. Computers will direct the system's carrier for efficiency and safety. The passenger modules will transfer kinetic energy into potential energy to be used to self-start at a later time. Onboard solar cells and external charging units which are built into the track will be integrated into each module.

**rush
hour**

To accommodate rush hour demands, StarTran merely adds more modules for specific origins and destinations. After the rush hours, these extra modules will be withdrawn from the system.

**commercial
uses**

In addition to its mass transit implications, StarTran also offers commercial possibilities. Postal deliveries could be made by the system at night. Commerical freight transfer could occur during off-hours. Retail stores and restaurants could be built under the exit ramps along with parking for passengers and customers. Lease income from commercial establishments would help to defray the cost of construction and maintenance of the StarTran System.

**advantages**

A 1982 public opinion reserach study of RTD passengers made by the Denver Consulting Group lists the top reasons for an unfavorable impression of RTD. They are poor bus service, routing problems, and buses not running on time.

An RTD official recently stated that a primary cause for mechanical problems requiring repair of buses is constant starting and stopping. Because StarTran's carrier never stops, this consideration is eliminated.

StarTran is an extremely time-efficient mass transit system. Consider this: starting at the intersection of Broadway and Baseline, travel north to Iris Avenue, east to 30th Street, south to Baseline, and west to Broadway again. It is a seven mile circuit. Compare the time it takes each vehicle to make the circuit once and the average calculated miles per hour each travels.

	<u>RTD Bus</u>	<u>Automobile</u>	<u>StarTran</u>
Time	1 hr. 52 min.*	31 min.	15 min.
Speed	3.5 mph.	14 mph.	28 mph.

*According to RTD schedule, using four bus routes in order to make above circuit.

StarTran is eight times more time-efficient than an RTD bus and twice as efficient as a personal automobile.

StarTran is energy efficient. Electric motors efficiently move carriers along the system, are continuous and never stop. Carriers are powered primarily by kinetic and potential energy -- literally "free" energy sources.

Star Tran is environmentally and aesthetically desirable: using non-polluting energy sources, travelling along landscaped corridors, limiting interaction between vehicular traffic and pedestrians and bicyclists, and running quietly through neighborhoods.

III. Future Applications and Expansions

personal vehicles

As StarTran is proven to be a viable alternative to the family car, it will be advantageous to drive personal cars made to StarTran specifications and which can be used on StarTran. The number of people driving gasoline powered vehicles will be greatly reduced, and, thus, pollution and congestion will diminish. The small, electric battery cars will be used around the perimeter of the city with no conventional starting or overheating problems. When parked at the off ramps, these cars can be recharged by bumper contacts at each parking meter.

carrier never stops and restarts. The time spent by passengers waiting will be greatly reduced because the time it takes to make a loop around the city will never change. Passengers will wait inside cars, warm and safe.

StarTran is the first mass transit system which:

- o moves continuously;
- o uses energy more effectively than existing systems;
- o is a mail pickup and delivery carrier;
- o creates commercial and retail space;
- o is non-polluting;
- o increases Boulder's open space;
- o uses personal vehicles as part of the mass transit system;
- o separates vehicular traffic from pedestrian traffic;
- o gives the passenger a climate-controlled module to wait in;
- o employs the concept of modular construction; and
- o is more time and fuel efficient than your personal vehicle.

Boulder needs to develop a realistic transportation plan for the future. One which doesn't employ the approach of trying to improve an inefficient, cumbersome system. Rather, Boulder must put its efforts into creating something new, viable and effective: something which will enhance Boulder's future and add to its economic base as well as its stature among progressive municipalities. StarTran is this system.

**interstate
travel**

Imagine an interstate transit system which didn't have to stop the entire train to load and unload large numbers of passengers and freight. Personal cars can be carried on flatbed modules on StarTran to outlying areas.

Your Buick will be driven on to a flatcar waiting on a ramp. When the main train passes the intra-city terminal in your city, this flatcar will accelerate down the decline and attach to the rear of a cross country train. When the flatbed arrives in, say, San Francisco, it will proceed up an incline so that you may drive off.

IV. Conclusions**economic
implications**

When Boulder's StarTran System is in place, it will contribute to the economic base of Boulder. With more pedestrian area and greater open space, Boulder will become a showcase for efficient mass transit and a higher quality of life. Tourism will increase. And Boulder could become the research facility for expanding the use of the StarTran System and a possible future nationalized interstate transit system.

management

RTD might be responsible for managing and staffing StarTran. Public Service of Colorado can oversee development of the electric system for the carrier and the charging system for the cars. The railroad industry can construct StarTran corridors, oversee freight hauling, and maintain the system's physical layout. The automobile industry can make components for the system.

**other
benefits**

StarTran holds other benefits for the future. Its defense implications are important. As acceptance of StarTran increases nation-wide: oil imports will drop, foreign car sales will drop, our balance of trade will be stabilized and probably reversed, and we will not be vulnerable to dependence on foreign oil.

summary

StarTran is a master plan which incorporates existing factors -- individual vehicles, multi-person carriers, freight haulers, and pedestrian traffic -- with future requirements of a non-polluting, safe, time-effective system of mass transit. StarTran guarantees efficiency and dependability. Unlike the RTD bus system, our

RTD

Imagine a light rail system operating on a track laid from Stapleton International Airport to the Denver Federal Center. The full run is 13 miles, and it encompasses 20 stops. For illustration purposes, we will consider stops spaced equally along the route. Let us consider two modes of transport, the first being a conventional light rail system, and the second is a modular system that moves people, vehicles, and cargo between a moving carrier and fixed stations.

Look at one carrier:	MAC	MAC + modular
carrier style	1 LRV	1 carrier + shuttle modules
peak load	120 people	120 people
average load	64 people	64 people
wt. of unit(s) (avg load)	89,219 lbs	89,219 & 500-10,000 lbs
operating speed (carrier)	50 mph	50 mph (or faster)
time between stations	75 seconds	47 1/4 seconds (or less)
typical ride (1/2 run, 6.5 miles)	14 min 44 secs	7 min 58 secs (or faster)

TIME

Perhaps one of the biggest reasons mass transit systems fail, is that using one to get from point A to point B can take an inordinate amount of time. A modular system permits a user to spend less time in transit, be concerned with logistics only upon entry to the system, and get a useable chunk of time while travelling. To illustrate this point, let us consider the above system, which might be considered to handle 20,000 riders per day. On this simple system, which would not begin to take advantage of modularity's inherent advantages¹, we can see that a modular system spares each rider about six minutes and forty six seconds per trip. The modular approach produces over 8 billion person-seconds per day! That is 820,000 person hours each year, or at \$10 per hour, a social savings of over \$8,000,000!

ENERGY

Taking a quick look at energy savings is appropriate. If we both systems run on electricity, we can imagine the drive system will run at about 77% efficiency² and the dynamic brakes will produce electricity at 25% efficiency³. If we take a simplistic look at energy considerations and disregard friction factors for the moment, we see that in one run, energy ($E = 1/2MV^2$) is used as follows:

	MAC	MAC + modular
# of acceleration cycles	20	1 + 20
mass of accelerating body	40,370kg	40,370 + 2260kg
# of deceleration cycles	20	1 + 20
Energy used to accelerate	~73 kWh	~4 kWh + ~4.1 kWh (3.3 w/ 95% drive)
Energy saved while decelerating	~14 kWh	~.7 kWh + ~.8 kWh (2.1 w/ 10 meter ramp)
Energy consumed each run	~59 kWh	~6.8 - 4.5 kWh

If 200 such runs are made each day, the modular system saves 4 million kilowatt-hours per year, enough to power 60,000 efficient light bulbs around the clock. One year of operation keeps six million pounds of CO₂ out of the air, and saves the taxpayer \$200,000 in utility bills. This comparison is of two small scale mass transit systems. For a more realistic sense of what is possible, multiply by five or a hundred. If the main carrier runs in a loop, the system's energy use halves.

OTHER CONSIDERATIONS

- The maintenance costs associated with repeatedly starting and stopping heavy equipment ought to roughly correlate with the energy consumed while accelerating and decelerating the trains. This suggests that maintenance bills might be 90% lower with a modular system.
- Because the system is modular, it can easily be adjusted to meet needs as they arise. Passenger capacity can be augmented during rush hours. Business and freight units can replace passenger modules during off hours and at night.
- The modular system can be modular in terms of track construction as well, meaning a quick assembly and disassembly of standardized parts.
- In consideration of CO₂ output, the conventional light rail system is ten times lighter on the planet than is the equivalent car use, and the modular system is one hundred times gentler. CO₂ output correlates well with other combustion byproducts including CO, NO₂, O₃, SO₂, NO, and particulates.

¹Modularity permits automatic cargo transfers between moving trains, mixed cargo use, and defacto adjustability of load capacity. 20-50mph for a fully loaded car requires 1.22 E7 Joules of Energy. Divide this by the 1.58 Joules used by the two 189 kWh motors in 42 seconds, and we find an efficiency of 77%.

³A wild guess.



ENVIRONMENTAL PROTECTION DESIGNS, INC.
Consultants & Innovators: Solutions for the Future

The Future Begins Now

Jim L. Starry

P.O. Box 1831 Boulder, CO 80306 (303) 939-9825



RECYCLED PAPER



CAN WE LIVE WITH
DOUBLE
AIR POLLUTION?

Did you know that most of the new airports being designed will **double** the air pollution in major cities over the next fifty years?

There *is* a solution.

A radical and simple runway design using uphill landing and downhill take-off will save 300 million gallons of fuel per location each year.

- That's 300 million gallons *not* being burned and turned into polluting exhaust.
- JP4 diesel fuel used in jet aircraft pollutes **14 times** more than auto fuel—300 million gallons equals a **huge** pollution reduction!

When other forms of transportation are looking for cleaner solutions, why should we have to live with antiquated airports fouling the air around our cities?

We don't—but we must act **now**!

Contact Jim L. Starry, Environmental Engineer

ENVIRONMENTAL PROTECTION DESIGNS, INC.
P.O. Box 1931 Boulder CO 80306 (303) 939-9825



The Future Begins Now

We are increasingly becoming aware of the magnitude of our pollution problems here in Denver and the possible detrimental effect these problems will have on our economic growth if we do not find solutions for them in the very near future. Wouldn't it be wonderful if we could say to potential investors and new businesses, "Denver is the only city in the country, perhaps the world, to show significant improvements in its air quality and we are committed to continuing this trend into the future." This could be true, but not if we continue to address our pollution problems with solutions of the past.

I recently had the opportunity to participate in a meeting of the Colorado Environment 2000 committee and made a presentation of an alternative design for Denver's new airport. I am encouraged to see groups such as this being organized and I have found in them an appreciative and interested audience for my ideas. But no one seems to be in charge of going on from there. No one wants to take the responsibility for actually implementing a new solution for our pollution problems. We must somehow break this barrier of "it's never been done before."

I am greatly concerned with the direction that we are headed in our war against pollution. We have the opportunity now to take a new direction in the design of a major pollution producing facility but we continue to look only to the designs of the past - a copy of the same airport that has been built over and over across the country. Why must we follow this same direction? There are other and better solutions.

Presently, Denver's Stapleton Airport consumes 300 million gallons of fuel annually. If the new airport flies three times as many planes (as is expected), this fuel consumption will be tripled, and with it, the pollution created by burning these 900 million gallons of fuel will also be tripled. How can we be so concerned about the air quality in Denver and not take this into account? All of the automobiles in the Denver area, according to Colorado Health Department statistics, burn about 665 million gallons of fuel each year. We are greatly concerned about the pollution resulting from this source, but we are ignoring the vast amount of pollution emanating from our airport.

It is time to move forward from the old, standard designs. We must keep in mind that whatever type of airport we build, we'll be stuck with it for the next 50 years!

An airport utilizing the concept of an underground terminal with inclined runways above it would consume 1/3 the amount of fuel presently used for landings and takeoffs. This system could prevent the doubling of Denver's pollution which is certain to occur if we build the traditional, antiquated airport.

I have been asked what my credentials are for designing a totally new airport system and I ask, how can you have credentials for solutions that haven't been used yet? My background includes 1700 hours in aircraft and engine mechanics, 15-20 years of looking for new solutions for present day problems, and numerous working inventions, including an emissions control device that is presently operating on my car. This device is now being studied for possible use on RTD diesel buses.

However, I feel that my best credentials consist of the willingness to search for new solutions rather than just copy what has been done in the past. Obviously, the systems we are now using (airports, mass transit, emissions control) were not designed for the huge volume of traffic we now have - they have just been increased in size while still retaining their original designs. The "experts" who challenge my credentials are the same experts who continue to design and re-design the same old systems that have put us in our present predicament of having to clean up 50+ years worth of toxic materials in our air, our water, and our soil.

If we are to have any hope of keeping our air breathable and our water drinkable and our land unspoiled, we must look at these problems in light of today's conditions and what we expect tomorrow's conditions to be. Solutions for the future cannot be copied from the past - the future begins now.

Jim L. Starry

Additional Note: Inasmuch as I have spent the last 2-1/2 years and \$38,000 of my own personal funds on research, prototypes and making presentations to The Perez Group, Bill Smith of the Stapleton Airport Facility and numerous other agencies including the EPA and FAA, my request is for 1% of the fuel savings and a consulting fee so that I may continue to work on these projects. All systems are patent applied for and copyrighted.

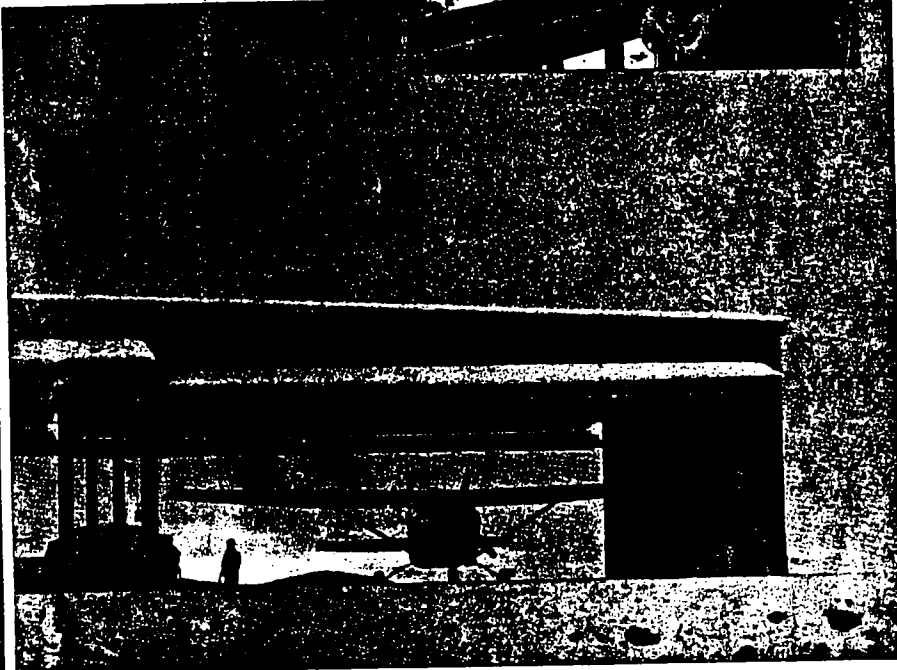
THE SUNDAY DENVER POST

November 22, 1992

Voice of the Rocky Mountain Empire

Ear
\$10

REACHING NEW HEIGHTS



Airports link world, peaks

Urbanites moving to Rockies retreats

Stuck in New Jersey traffic, Art Pulis decided life was passing him by.

Now he jets over crowds on commercial flights from Colorado's San Juan Mountains.

"I wanted out of the fast-paced city environment and into the relaxed small-town environment," Pulis said from his house near Durango, where he soaks in his hot tub after conducting banking seminars around the country.

This is the long-distance lifestyle becoming possible thanks to the federal government, which is spending millions to upgrade mountain airports.

Growing numbers of upscale professionals live in the Rockies without sacrificing urban careers. They tend to be specialists — doctors, lawyers, consultants, media correspondents — who can afford to commute beyond traditional suburbs. They often control when and how much they work.

They join a larger group of Colorado newcomers, the semiretired, who cut back or quit city jobs as they "downshift" in mountain retreats, while still flying frequently to cities.

Fax machines, phones and laptop computers are valuable for managing



NEW LINKS: Flying to Colorado's mountains is easy today, thanks to federal upgrading of mountain airports. The multiplying air links allow commuters such as CBS sports announcer Vern Lundquist, top, to live in upscale resorts such as Steamboat while working across the nation, as above.

Photos by Shaun Stanley
The Denver Post

FAA overhauling mountain strips

By Bruce Finley
Denver Post Staff Writer

STEAMBOAT SPRINGS — Not long ago, Bob Adams Fleid was a sleepy mountain airstrip where deer nibbled grass at the tarmac's edge and three small planes a day buzzed over the mountains from Denver.

Now up to a dozen 48-seat commuter craft arrive daily on a longer, resurfaced runway. Tax-financed work has begun on a \$1.3 million terminal, while a \$95,000 electric fence blocks deer.

The federal government is upgrading mountain airports as never before. Multiplying air links are drawing mountain towns into a national network, hastening the shift from ranching and mining to recreation.

Over the past five years, the Federal Aviation Administration has spent about \$85 million in western Colorado. Two dozen mountain airport projects worth \$23.5 million are in progress. And the FAA is considering projects that would cost \$62.7 million by 1997, documents show.

The unprecedented overhaul eventually may include more navigational

'I came up from Dallas-Fort Worth, and down there we couldn't get money. I've never seen such spending that they're doing at ski resort airports. They're pushing for mountain airports.'

DOZEN A DAY: Airports such as Steamboat's Bob Adams Field, built on a deer migration route, have been transformed from sleepy airstrips to booming airports with up to a dozen commuter flights a day. A new electric fence blocks the deer.

Rockies air traffic may soon catch up with mid-sized cities'

beacons, costing \$200,000 each, and a \$1.5 million radar system covering what pilots call a dangerous "black hole" in radar coverage west of Vail. Plans anticipate air traffic as busy as midsize cities'.

"I came up from Dallas-Fort Worth, and down there we couldn't get money," said Tom Schuessler, manager of the Yampa Valley Regional Airport, built on a wheat field near Hayden, 23 miles west of Steamboat. "I've never seen such spending that they're doing at ski resort airports. They're pushing for mountain airports."

Direct flights already bring tourists and owners from major U.S. cities to the scenic Aspen-Crested Butte, Colo.

ride each reported increases of more than 25 percent since 1987. Aspen's Sardy Field had a 13 percent increase, with 217,088 passengers last year.

"If the FAA hadn't funded these projects, there would be no way in hell we'd see these airplane passenger loads," said Durango airport manager Ron Dent.

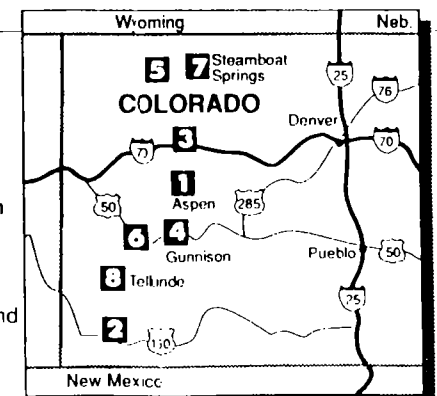
Resort officials have perfected the art of lobbying the FAA for tax dollars.

In Vail's case, resort and Eagle County officials traveled frequently to Washington, D.C. Former President Gerald Ford, a Vail resident, and U.S. Sen. Tim Wirth, D-Colo., arranged meetings with FAA Administrator Allan McArtor, formerly an administrator at the Air Force Academy north of Colorado Springs, said Ken

ing, according to the Colorado Tourism Board. A study of Pitkin, Summit and Eagle counties found that summer retail sales increased by 9 percent last year, compared with 2.7 percent statewide.

Compared with 2.9 percent state-wide, Vail had almost as many summer visitors on busy days last year as during ski season, though skiers still spend more than twice as much money, said Mike Shimkonis, Vail Associates spokesman. Steamboat had more hunters than ever this year. And Telluride's conferences draw an international crowd.

Taxpayer-financed improvements at mountain airports are bringing more people to airports in the Colorado Rockies. This is hastening the economic transition from ranching and mining to recreation.



The Denver Post / Bruce Gault

Steamboat Springs, Montrose, Telluride and Vail. Vail also has international flights from Mexico City. Resort officials want to start the same direct service in summer that has bolstered ski business in winter.

Nowhere in the nation have so many airports grown so fast in such a small area, FAA officials say.

The building of bigger and better mountain airports in Colorado took off one Sunday in 1986 when Ralph Welton, board chairman for Crested Butte Mountain Resort Inc., was brainstorming ways to make money. Welton was listing ideas on his blackboard when he realized that people from across the country would ski if they had quick, easy access to the slopes.

So Crested Butte offered American Airlines a cash guarantee to cover potential losses. By year's end, American was flying directly from Dallas to Gunnison, bypassing Stapleton Airport in Denver. In 1987, the FAA granted Gunnison \$1.3 million for a bigger runway.

"Air travel is a necessity if you're going to be competitive," Welton said.

Today resort executives across the Rockies spout this creed. And upgrading mountain airports is akin to an arms race.

Even less-developed mountain towns such as Pagosa Springs are receiving FAA grants to acquire land for jet-quality runways.

In Fairplay, commissioners have requested FAA money for the \$8 million Central Colorado Regional Airport. The 12,000-foot-long runway on a windswept mesa would be the highest U.S. airport at 9,500 feet, possibly with a Wild West facade featuring gunslingers.

The most FAA money this year went to: ■ Montrose County Airport (the larger of two airports serving Telluride). \$7.3 million to improve runways.

■ Aspen-Pitkin County Airport (Aspen). \$2.8 million for safety equipment, acquiring land for expansion, lights, security, snow removal equipment and an electric deer fence.

■ Gunnison County Airport (Crested Butte). \$2.6 million for expanded runways, safety vehicles and a security system.

■ Eagle County Airport (Vail, Beaver Creek). \$2.1 million for snow removal and safety equipment, storage facilities and an environmental study to prepare for expansion.

■ Durango-La Plata County Airport (Purgatory). \$1.9 million for buildings, security system and taxiway guidance signs.

■ Yampa Valley Regional Airport (the larger of two airports serving Steamboat Springs). \$1.7 million for pavement and lighting on taxiways and safety equipment.

"The mountains are just a place in demand in this country," said Alan Wiechmann, FAA district manager in Denver.

Indeed, mountain air passengers are multiplying.

Eagle County Airport reported 28,930 riders last year, up 232 percent from 8,693 in 1989. Airports serving Crested Butte, Steamboat Springs, Montrose and Telluride

ers, vice president of Vail Associates Inc. McArtor later became senior vice president of aeronautics for Federal Express.

"In addition to having the political clout to open up the doors, we had our business partners (airlines) in line," said Myers, who earlier orchestrated expansion of the Yampa Valley Regional Airport.

The FAA likely will spend another \$10 million to lengthen a runway and build a new terminal at Eagle County Airport, said county Commissioner Dick Gustafson.

Today, the only major ski areas without direct air access are Winter Park, owned by Denver, and the Summit County resorts of Copper Mountain, Keystone, Arapahoe Basin and Breckenridge.

Just north of Winter Park, a Grand County committee received a \$57,000 FAA grant this year to plan improvements and eventual lengthening of a runway to 8,800 feet, either in Kremmling or Granby.

Summit County resort officials are pushing for the Central Colorado Regional Airport. Breckenridge Ski Corp. President Pete Gutman helped arrange a \$500,000 guarantee that enticed American Airlines to commit to use the proposed runway, about 23 miles from Breckenridge over Hoots Pass.

"The airlines indicated to us that they were not willing to play unless the communities shared some of their risk," Gutman said.

Resorts with direct flights have a big advantage over Summit County resorts that rely on increasingly congested Interstate 70, he said. Skiers "are going there instead of coming here. We don't want to lose market share."

About 15 percent of Colorado's 1.5 million out-of-state skiers now fly directly to resorts, never stopping in Denver. Only 5 percent flew directly in 1985. Several road-dependent resorts have closed. And the extra half-hour drive from the new Denver International Airport gives an additional incentive to fly direct.

Public demand for flights is the only criterion for FAA money. Whether airports serve skiers or locals "is not an issue," said Stan Lou, FAA director of airport improvement programs.

The airport improvements will have sweeping effects on mountain life. They accelerate change like that prompted by the building of the interstate highway system after World War II.

Already, national chains such as Wal-Mart and McDonald's have moved in. And several small manufacturers are considering moving to Montrose and Durango. One of the fastest-growing construction firms, TIC (The Industrial Co.), is based in Steamboat.

"Without the air link, it'd be very difficult for us to grow the way we've been growing," said TIC Vice President Gary Bennett. TIC spends about \$1 million a year on air travel.

Resort marketers also are trying to capitalize on better airports, aggressively promoting summer activities such as mountain biking, golfing, crafts fairs and cultural events. Summer activities include

As the average skiers age, they start to prefer fair-weather pursuits such as putting, peddling and poking around shops to cutting through mogul fields, resort analysts say.

As a result, Mexican airlines TAESA and two U.S. carriers will fly directly to the Eagle County Airport next summer, Shim-Konis said. Crested Butte's Welton said he's negotiating for summer direct flights to Gunnison. Durango and Montrose also plan to increase flights.

Ultimately, the multiplying air links are helping to turn mountain resorts into elite national suburbs, analysts say.

Some experts say this could have negative social effects. "What's wrong is we are pricing middle-income, much less low-income people, out of some of our most wonderful valleys," said University of Colorado professor Charles Wilkinson, author of several books about the West.

Urban professionals dissatisfied with city life already are spending more time in mountain retreats, said Ford Frick, a Denver-based consultant to several resorts.

"If it wasn't for the fax machine, I couldn't be out here as much as I am," said Welton, who spends only three months a year at home near Atlanta.

Building is booming, especially of single-family houses.

Steamboat issued 295 building permits last year, up 44 percent from 204 in 1989. The average selling price of a house increased by 12 percent since 1990, reaching \$115,000. In the Crested Butte area, property values increased by up to 50 percent this year, Welton said.

And out-of-state residents are buying more mountain land. Even in less-developed areas such as Fairplay, out-of-staters accounted for 36 percent of sales, said Linda Nelson of Nelson Realty in Fairplay. Total transactions and the number of building permits issued in Park County doubled this year, records in Fairplay show.

But some Colorado natives are wondering whether multiplying air links really help locals.

Just west of Vail, trailer park residents in Gypsum (pop. 1,809) complain that jets from the Eagle County Airport disrupt television reception.

And in the Steamboat area, county tax revenues have proved insufficient to support rapid growth.

Providing enough hospital beds to cope with a major airplane crash costs more than a small mountain community can afford, let alone furnishing better schools, water and power services that newcomers demand, said Routt County Commissioner Randy Taylor.

Upgrading airports has unleashed fiscal demands "that take a couple years to catch up with," Taylor said. "And it's not creating any enterprise or money that sticks here. We become an affluent recreational area where new people can do business using telecommunications. . . . It ends up being snobbish. It'll end up being like Aspen, where the billionaires are running the millionaires out."

"Maybe the feds ought to quit being so free with giving away money, pay off the national debt, and thereby slow down all

	1986	1990	1991	PRE SKI SEASON '92	% change '86-'91
1 Aspen	191,000	215,591	217,088	191,753	13.5%
2 Durango	98,372	97,316	96,278	82,983	-2.1%
3 Eagle	288 (1989)	8,693	28,930	32,048	9945% ('90-'91: 232.7%)
4 Gunnison	28,000	46,561	48,938	49,584	74.7%
5 Hayden	1,922	46,217	60,309	53,696	3037% ('90-'91: 30.4%)
6 Montrose	20,000	25,800	26,000	20,000	30%
7 Steamboat	34,929	47,567	50,315	44,754	44%
8 Telluride	4,000	12,700	22,079	31,392	451% ('90-'91: 73.8%)

Source: FAA and airport records

The Denver Post

Eagle County destined to bring in more flights

Regional facility to get additional federal funds

Eagle County Regional Airport in the heart of the Rockies has become an international facility destined to bring in more and more flights, politicians and resort executives say.

"This is going to be the major airport for this part of the country," predicted county Commissioner Richard Gustafson.

Over the past decade, the airport has won more than \$20 million in improvement money from the Federal Aviation Administration. Plans call for \$14.5 million more in federal tax money to pay for a new terminal and a longer runway, among other projects.

Passenger loads topped 28,000 last year, up from 8,693 in 1990. More than 50,000 passengers are expected this year, say county and Vail Associates officials, who have been courting contacts in Washington.

Vail Associates chairman George Gillett and his wife, Rose, contributed \$1,000 each to the 1988 campaign of Sen. Frank Lautenberg, D-N.J., who heads the Senate Appropriations Transportation Subcommittee, according to Federal Election Commission records.

Like many politicians, Lautenberg has a condominium in Vail.

"A lot of them vacation here a lot," said Gustafson, who teamed with Kent Myers, Vail Associates vice president, on several lobbying trips to the nation's capital.

In August, the two met with top FAA officials along with executives from Delta, American and United airlines, plus county engineers.

Former President Gerald Ford, who lives in Vail, U.S. Sen. Tim Wirth and his fellow members of Colorado's congressional delegation had set up meetings for the group.

FAA officials were receptive, Gustafson said. "Once you get their support, then they make a commitment to you. I think they're all convinced now that the vision is there. And they've definitely not their



Gillett



Lautenberg

at the airport.

At the meeting, county commissioners asked for an extra \$300,000 to finish erecting an airport equipment building, said Jack Lewis, assistant county manager. FAA officials "made a substantial kick in there to make sure we would have a full building."

A few Gypsum residents complain about noise. And Gypsum town council members voted to turn off the water they supply to the airport if the county doesn't keep promises to pay for it.

But commissioners and resort officials say these problems will be resolved.

Hence this month's battle for the Vail-Beaver Creek Jet Center

The jet center, which includes the existing terminal and rights to operate the airport, was up for grabs as a result of Gillett's declaration of bankruptcy in August. It was one of Gillett's personal assets.

Bidding at a Nov. 9 auction pitted Vail Associates against a pack of competitors.

A new Denver group known as Fixed Base Operators Inc., led by investor Jeff Ross, won the jet center by assuming \$5 million of debts accrued under Gillett and paying \$1.5 million cash.

"If it had not been for the very significant federal support," Ross said, "the value of that enterprise to us, and to Eagle County and to Vail, would have been significantly lessened."

MOUNTAIN AIRPORTS REACH NEW HEIGHTS

Airlines jumping to keep up with seat demand

COMMUTE from Page 1A

business from afar. But airports are crucial.

"I've got to have good, reliable air transportation," said Pulis, 49, who usually double-books flights in case of storms.

At airports in Gunnison, Steamboat Springs and Durango, the number of long-distance commuters has grown from a few to dozens, airport and airlines officials say. Time was when only the ultrarich of Aspen, Vail and Telluride came and went so often.

"Last summer, we had a waiting list for seats," said Ron Dent, Durango airport manager. "We're just hoping the carriers can keep up."

One pioneer in long-distance commuting is CBS sports announcer Vern Lundquist, who studies National Football League rosters at his kitchen table in Steamboat before flying to stadiums across the country to deliver play-by-play commentary.

Federal Express packages of pregame materials arrive Wednesdays. Lundquist recently ordered a fax machine and laptop computer with modem to give him instant access to network data on sports stars. He memorizes tidbits, talking by phone with his producers, then heads for the stadiums.

"Without the airport, this wouldn't be possible," he said from the deck of his 6,700-square-foot mansion. "Now it's all gold. Summer it's all green. Winter, it'll be all white." Fridays, he drives a few miles to growing Bob Adams Field for Continental Express flights to Denver, or he drives to Hayden for direct flights to major U.S. cities.

At home, Lundquist is surrounded by books in his library. He keeps a collection of autographed photos of sporting events in his office and a rack of classical compact discs in the living room. Workmen recently lugged in a heavy dining-room table from an estate sale in New York. The place has a feeling of permanence not found in vacation condominiums.

Until 1984, Lundquist lived in Colleyville, a suburb north of Dallas, announcing for the Dallas Cowboys, avoiding rush-hour congestion whenever he could.

"You never get the openness, the sense of majesty and beauty that you get here," he said. "I never walked out into the street in Colleyville and said, 'Wow,' which I am prone to do here."



Rave though they do about the beauty of the mountains, long-distance commuters say new hardships rival highway gridlock for annoyance. Bewilderment sets in after flying too much. One executive described waking up in dark hotel rooms, not knowing where he is, then groping for a telephone book to get his bearings.

"I can remember taking 26 hours to get home from Chicago," said TIC (The Industrial Co.) executive Peggy Barry. She left California because of the traffic and lives

Denver," she said. Sometimes she calls her daughter to come to Stapleton Airport to visit with her; sometimes she prepares company reports on her laptop computer.

Even Steamboat has drawbacks, Barry said. "It's expensive. And it's really hard to raise kids. It's hard to get affordable clothes." She said she welcomed the arrival of McDonald's and Wal-mart, which many mountain natives opposed despite the boost to the economy.

Lundquist agreed that more suburban

thing as simple as buying a pair of socks is not that easy.

At the same time, city people in the mountains are concerned about losing what drew them in the first place.

"All you need is one movie star moving in, and all of a sudden you've got lots of people with laptop computers and porcini mushrooms," said Carol Russo, 50, who left San Francisco's financial district this summer for a log cabin near Fairplay that she calls "the new American dream home." She said she still backs the planned Central Colorado Regional Airport.



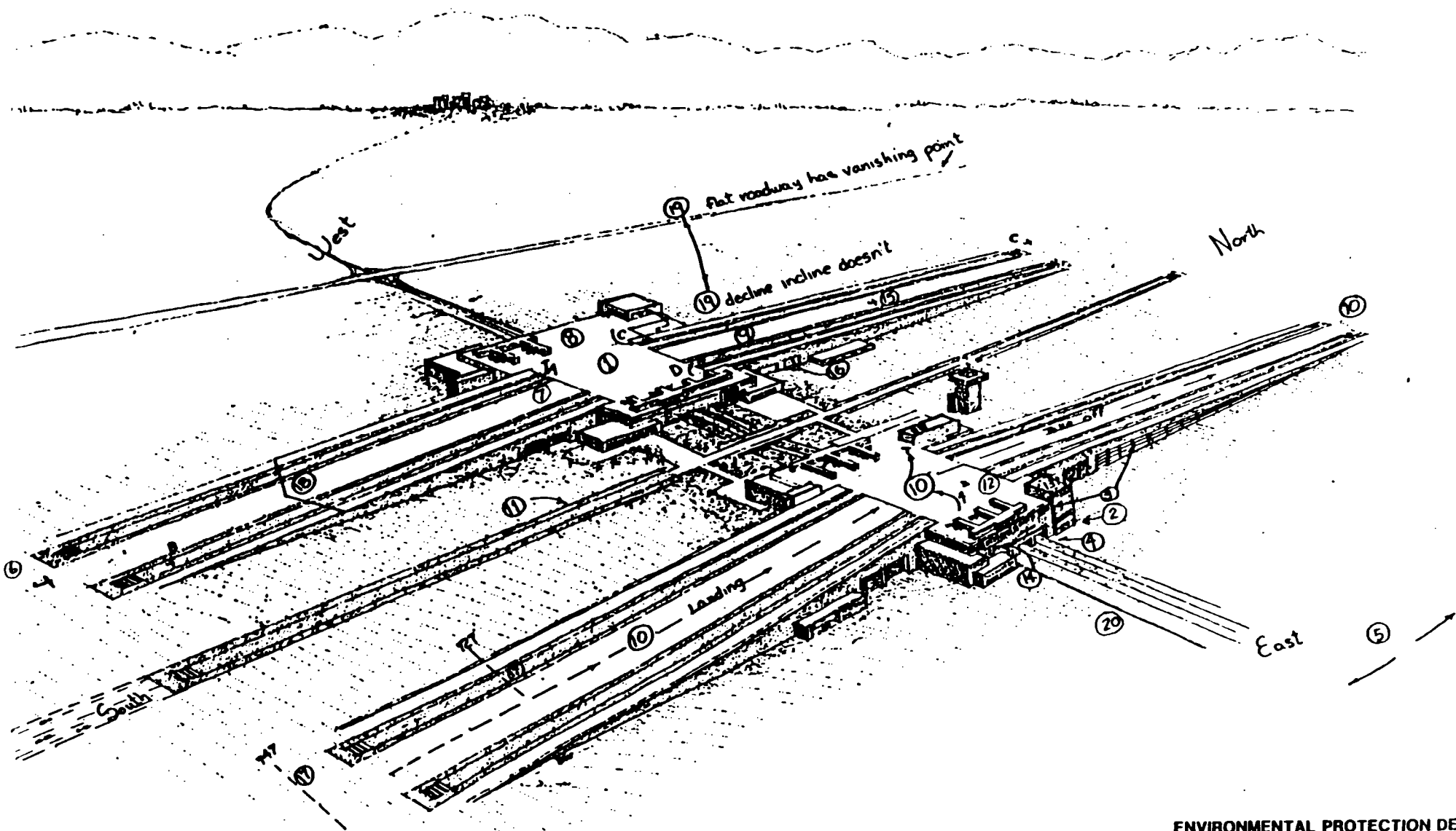
The Denver Post / Shaun Stanley
AMERICAN DREAM? TIC Construction executive Peggy Barry, left, says she got tired of the traffic in California. Above, Lundquist at his Steamboat home with his dog, Max.

Remote, historic mountain towns give a feeling of authenticity, connectedness and pleasure that newcomers cherish.

"I wanted freedom," said Pulis. Steamboat seems real, said Lundquist. "Ours is a little more of a working Western town. It gives you a sense of a real life. We don't live in a gingerbread village."

Friends from elsewhere regularly visit to ski. And they invariably conclude that they, too, want to live in the mountains.

— Bruce Finley



ENVIRONMENTAL PROTECTION DESIGNS

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Description of Reference Numerals in Drawing

- 1 Dome structure is architecturally strongest. Bottom connection makes airport an isolated structure not affected by surface expansion. Loads stretch surface so expansion joints aren't needed.
- 2 Multiple floors under runway structure decrease construction cost per square foot (gives 20 usable floors). Multi-use floors are alternated with parking. Enormous commercial area under runways will ensure rapid payback of construction costs.
- 3 Windows for light and heat absorption double as runway delineation lights.
- 4 Under terminal: continuous, non-stopping mass transit operates under terminal in conjunction with 8-lane north-south, east-west entrances.
- 5 Continued airport expansion possible - not permitted with airports designed with existing above ground auto entrances. Since traffic enters under terminal, major circling airport roads don't restrict airport expansion.
- 6 Runway-controlled rate of rise. Aircraft maintains level flight and runway rises to meet aircraft. Wheel motor generators pre-rotate to assist in landing, eliminating shock and wheel destruction.
- 7 Side by side runways allow multiple landings divided by appropriate FAA separation (4,300 ft.). Plane A has left incline as B touches down while C has taxied out while A taxis in, leaving B 11,000 feet of unobstructed runway - process is reversed when B taxis to the right. Then D starts decline as C lifts off.
- 8 Incline landing eliminates time waste associated with long taxi distances as terminal is directly under runways.
- 9 Decline allows quicker takeoffs, eliminating delay.
- 10 Aircraft proceed in a straight line - landing and taking off with the shortest taxi deviation.
- 11 Commuter airlines land between majors, shortening passenger transfer time and reducing fuel waste.
- 12 Aircraft wheels have motor-generators that slow all aircraft on landing and accelerate them on takeoff. Jet noise is eliminated on touch-down. During takeoff aircraft is reaccelerated without engines until forward velocity makes engines burn efficiently. Taxi is accomplished on wheel motors eliminating terminal noise until just before liftoff.
- 13 Heated fuel storage. Heated fuel transfers heat to wing tanks for deicing.
- 14 Parking directly under departing gate - elevator transports passengers from parking to departing aircraft directly above. Parking under terminal eliminates shuttles from parking to terminal. Elevator tubes are an integral part of the structure under the runways.
- 15 Electric wheel motor-generators assist in aircraft deceleration during aborted flight conditions.
- 16 Aircraft repair facilities located under runway.
- 17 Aircraft delineation lines determine where different size aircraft set down - light planes closer in; heavy, fast planes use more of incline.
- 18 Triangular depression in runway automatically centers aircraft on runway while trapping and directing rain and snow melt to evaporator holding tanks. Deicing agents are kept from entering ground water.
- 19 Incline/decline runway systems allow the full length of the runway to be visible to arriving and departing aircraft.
- 20 Underground 8-lane highways (north/south, east/west) for specific airlines. Heat from autos removes snow and ice from runways.

Lorena Bobbitt's Ladies • How We Starve Africans • Clinton's Trollope

THE AMERICAN SPECTATOR®

DECEMBER 1993

A MONTHLY REVIEW EDITED BY R. EMMETT TYRRELL, JR.

Peña's Plane Stupidity

Michael Fumento on the Denver Airport Debacle



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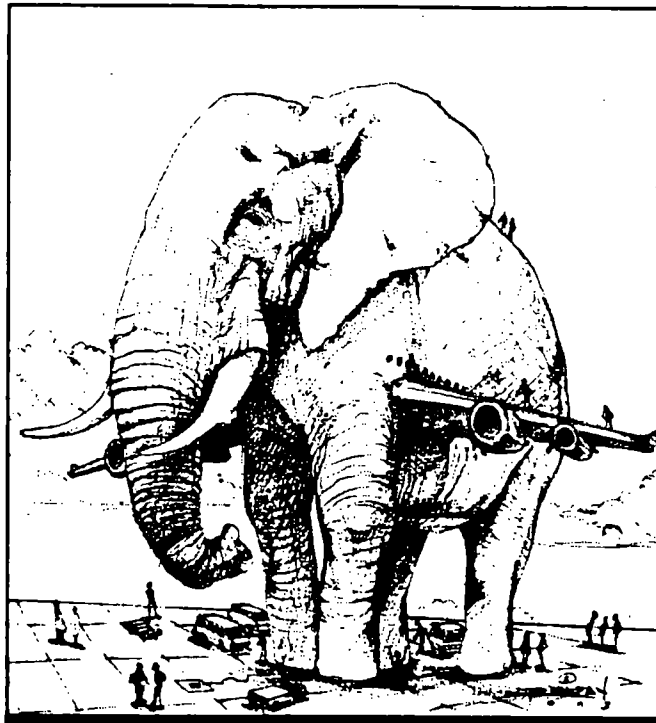
Federico's Folly

Secretary of Transportation Federico Peña got his job by wasting \$10 billion on the biggest public works disaster of modern times—an airport worse in every way than the one it replaced.

There is greatest practical benefit in making a few failures early in life." When Thomas Henry Huxley wrote that in *On Medical Education*, presumably he meant that mistakes were a learning experience. But in that strange twilight between politics and reality, sometimes mistakes themselves can be a benefit. Consider Secretary of Transportation Federico Peña's monumental mistake: the soon-to-be-completed Denver International Airport.

Both Peña and President Clinton cited Peña's efforts—as mayor of Denver from 1983 to 1991—to build the airport as a factor in Peña's appointment to the Department of Transportation. In his speech nominating Peña, Clinton said, "His legacy includes the new Denver International Airport, which I believe will be the largest in this country by a good ways." When Peña was picked to be the "cluster coordinator" for transportation issues during the transition period, a statement from the transition team declared that Peña had been involved in many projects to improve Denver's infrastructure, "including the construction of Denver International Airport, the world's largest [sic], to be finished in 1993."

Michael Fumento covers national issues for Investor's Business Daily and is author of The Myth of Heterosexual AIDS, republished this fall in an updated paperback edition by Regnery Gateway.



Peña's explanation was that "Denver's investments paid off. I believe that's the reason for [my] being asked to do this."

But Denver's investments have not paid off, at least not for the city. While Peña promised to make Denver great, the city finds itself merely a great debtor, its jewels sewn into a massive tent-like structure on the windswept plains east of the city. Occupying a parcel of land twice the size of Manhattan, Denver International is the nation's largest public works project. Some have called it the

nation's largest white elephant. Others have called it Federico's Folly.

At first billed as "the world's second-largest airport," it has steadily shrunk in size even as its budget has ballooned—from the \$1.7 billion Denverites voted for to an actual cost of at least \$10 billion. It appears that it will be worse in almost every practical way than the perfectly serviceable airport it is replacing. And the man responsible for it is now responsible for billions in federal transportation expenditures. As a reporter for Denver's *Rocky Mountain News* put it, "Clinton essentially said: Do what you did in Denver on a national scale."

Certainly Peña can't take all the credit for the airport. It was supported by both Denver newspapers as well as the governor and the entire Colorado congressional delegation. But it isn't for nothing that the route from the interstate to the airport will be named Peña

Boulevard. No blood test is necessary; Denver International is his baby.

And certainly the airport isn't the only reason Peña is in the cabinet. It has been widely suggested that Clinton—having met environmentalist resistance to appointing Hispanic Rep. Bill Richardson (D-N.M.) to the Interior Department position and instead appointing a very green but nonetheless white Bruce Babbitt—felt compelled to appoint a secretary of *transportación*. But if Peña couldn't have made it without the pedigree, he couldn't have made it without the airport, either. The Texas-born Peña, 46, has always had a knack for taking advantage of a situation. Although he benefits politically from his Hispanic surname, he is far from being of humble birth. True, his parents made their living from cotton—but not picking it, brokering it.

The Nightmare Before Christmas

Other than the overwhelming support he received from the city's Hispanic population, Peña probably owes his getting elected mayor to a Christmas Eve blizzard—the worst in sixty-nine years—that dumped almost three feet of snow on some parts of the city and tied the area up for days, making the incumbent look inept. But when a few years later a blizzard dumped a considerably smaller amount, again the city became snarled, this time because Peña had the novel idea of sending heavy city trucks out to simply pack down the snow by driving over it. All it did was create ruts, which then froze in place. Fortunately for him, it was not an election year.

Fortuity also marked Peña's administration. Besides the airport, Clinton credited his nomination to the U.S. Conference of Mayors' having given Peña its City Livability Award for reducing its Clean Air Act violation days from "150 a year in the 1970s to 3 in 1990." But while violation days for Denver did drop from 125 in 1972 to three by the time Peña left office, they had already steadily declined to 31 the year *before* he was elected. Denver's air is cleaner for the same reason the air above every major U.S. city is cleaner: requirements of the 1970 Clean Air Act dramatically reduced automobile emissions.

Peña's tenure was marked by expensive megaprojects, ranging from hosting a Grand Prix to building a convention center and a baseball stadium. Far from attracting new bookings, as promised, the convention center has seen a tremendous drop in bookings since it opened, a decline that set in long before any talk of gay boycotts. The Grand Prix was a flop. For two years it tied downtown traffic in knots, for which Denver had the privilege of handing over \$2.5 million in tax revenues to the promoter. The baseball stadium is still under construction. Peña said the common theme of these projects was to help pull America's 23rd largest city out of an economic slump and to make it one of the country's most spectacular. As he exhorted in a newspaper commentary, "Denver is poised for greatness. As the alliance forged by the

broad coalition of airport supporters continues its work on advancing Denver into the future, there is no end to what we can accomplish, or how high we can fly."

Critics say, however, that the common theme was for Peña to soak the citizens by handing over city funds to businesses, especially contractors, that took advantage of Denverites' self-consciousness about being a "cow town," and worries over a temporary job bust at the end of an oil boom. Chief among those critics is *Rocky Mountain News* columnist Gene Amole, who has inveighed incessantly (some say obsessively) against the new airport. Commented Amole in a 1989 column, "The way the whole thing is shaking out is that big government, big business, big labor, big developers and the big media are one side, and the little guys who actually live in this town are on the other."

Flight Delay Fibbery

Peña's airport plan began in 1985, when after months of secret discussions he announced that instead of expanding Stapleton International, the current airport, the city would build a new one. He gave two reasons. First, flight delays, especially in bad weather, were allegedly becoming intolerable at Stapleton, costing it business as a hub. Peña said Stapleton was "an

embarrassing bottleneck, both in our national transportation system and our ability to have an efficiently run airport to build a strong, stable economy." Second, Federal Aviation Administration (FAA) projections indicated that if passenger use of Stapleton continued to escalate as it had in the first part of the 1980s, and if Stapleton didn't expand, then early in the twenty-first century the airport would no longer be able to handle the traffic.

Yet Stapleton was in the process of expanding. Even after Peña began his airport campaign, Stapleton built a new runway, a new concourse, and a new commuter terminal.

Moreover, Stapleton's flight-delay record in recent years has been among the best in the nation. According to the Federal Aviation Administration, in the year the airport was submitted to a referendum, 1989, Stapleton had 27 flight operations per thousand delayed fifteen minutes or more. By comparison, Atlanta's Hartsfield International, which has only one hub, had 25, New York's JFK had 76, Chicago O'Hare 88, Newark 98, and LaGuardia 115. Two years earlier, in a 1987 report, the city itself boasted that "Denver ranks below most other major U.S. airports in number of delays per thousand flights. In fact, the national average for delays went *up* in 1986. Denver's average went *down*."

Instead of looking at the actual data, however, the city cited a five-year-old 1984 FAA projection. The problem with the projection was that it couldn't have taken into account that Stapleton added a new runway in 1986. While not full-length, it freed up the longer runways to handle more large jets, and

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significantly eased congestion. Critics have contended that this runway could have been made longer, but that Peña, having already decided to go with the new airport, prevented it. Airport officials say that existing structures prevented it from being made any longer, though one could argue that compared to the billions of dollars the new airport would cost, relocating those facilities would have been a bargain.

Further, yet another runway was planned for Stapleton, to be built on the adjoining Rocky Mountain Arsenal, which would have increased capacity and decreased delays even further. Peña blocked its construction, along with that of terminal improvements. He initially said it was because the money should be devoted to a new airport. Later, though, city officials said it was because the Arsenal land was too polluted. Denver International critic Michael Boyd, president of Aviation Systems Research Corporation, a Colorado consulting company, responds that this doesn't ring very true. "Now they are going to put a park there," he says.

The main cause of the delays Stapleton does have is that, during winter bad weather, airport officials will sometimes shut down one runway for fear of interfering with planes on another nearby runway. (Inclement weather has closed the airport as a whole only three times in its history.) Ironically, due to an FAA error in applying sea-level standards to a mile-high airport, the runways at the new airport have also been built

too close together to comply with regulations for full flexibility in simultaneous take-offs and landings. To resolve the problem, the airport will use "quick-scan" radar to efficiently keep track of flights. This type of radar, though relatively new, was already in use when the building of Denver International began. Although the distance between the new airport runways is still greater than that between Stapleton's, this system would also have helped smooth out operations at Stapleton. Said Boyd, "It would have given Stapleton the same capacity that the new airport is supposed to have."

In selling the airport idea to Congress, Peña said that eliminating the alleged delays at Stapleton would save the airline industry \$120 million a year in operating costs. But according to Aviation Systems Research Corporation figures, with emplanement figures going up an estimated \$9.50 per person, at 15 million passengers in 1994 the increased cost to save that \$120 million will be \$142.5 million.

Where Have All the Passengers Gone?

In the early 1980s, as a result of deregulation and lower fares, the airline business boomed and hubs did especially well. Stapleton's traffic reached a record-high 34.7 million passengers, and the FAA predicted a steady increase in Denver traffic to 72 million by the end of the century, with Denver becoming the nation's second-busiest airport.

But the FAA didn't realize that the sudden burst in airline ridership was essentially a one-time explosion, and it failed to look at the trends in airport hubbing. Long before the first shovel of dirt was dug at the new airport site, it was becoming clear that the superhub concept was in danger. The same deregulation that led to vastly increased ridership led to decentralization of hubs. In 1978, when the airlines were deregulated, there were only four hubs. By 1990 there were thirty-five, many of which had lower landing fees than Stapleton's and were siphoning off business.

An Aviation Systems study warned that the "political focus" on building superfluous hubs was threatening to make "airport building the S&L scandal of the 1990s." It noted that there is excess potential hub capacity already, including Kansas City, Dayton, and Atlanta, and that the big dollars are going to megaprojects like Denver's, while "small cities must literally beg to get an instrument landing system" budgeted to their airports. Denver International, said the report, was characteristic of the fact that "America is planning new airports

for the 1980s, not the 21st century."

Also contributing to the decline was the folding in 1986 of Frontier Airlines, one of the three airlines using Stapleton as a hub. Backers of the new airport have never even claimed that they could get an airline to take Frontier's place as a third hub. By 1990, usage of Stapleton had

dropped about 20 percent below its high point. While Stapleton traffic began picking up slowly in 1991 and increased an additional 9 percent last year, it is still operating at only half its capacity. And most likely, building the new airport will end up *reducing* air traffic through Denver.

To sustain themselves, airports need to charge fees to the airlines, which are worked into the cost of airline tickets. The current rate at Stapleton equates to a little less than \$6.00, and originally Denver International proponents claimed it would be no higher at the new airport. Now the number airport analysts are tossing around is \$15.50, which is based on a steady increase in passengers over those currently using Stapleton. The magic number is \$20, since the new airport's contracts with both United and Continental allow them to terminate or renegotiate at that point. Presumably they would do the latter, and extract even greater concessions from the airport at an even greater cost. Some critics of the new airport claim that the \$20 mark is almost inevitable, and may even be exceeded. When airport officials negotiated gate leases with American Airlines, they insisted on upping the \$20 threshold to \$25.

Aside from affecting airlines' abilities to terminate or renegotiate their contracts, the higher fees could encourage passengers to route their trips through other cities, leading to a "death spiral": higher fees resulting in fewer passengers

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resulting in higher fees, and so on. About 55 percent of Stapleton's passengers are classified as connecting, and to connecting passengers one airport is usually as good as another. Thus, independent of air traffic trends, the new airport could be slicing its own throat.

But passengers originating out of Denver will be the real sufferers. Consider the cost of flying round-trip for a three-day weekend to Los Angeles, currently available at the best rates for about \$200. The new airport has already raised that cost by \$3, will probably raise it by another \$15 or more in airline fees, and by \$18 in parking costs or \$60 in cab fare. (More on the increased parking and cab fares later.) For the vacationer who parks, the airport has increased the cost of his trip by 18 percent over the original ticket price; for someone taking a cab it has increased 40 percent. Such increases can have a tremendous effect on such an elastic commodity as leisure airline travel.

Noted a spokesman for the Air Transport Association in Washington, "The marketplace is very sensitive to increased ticket costs." He said, "We see business loss for every dollar that fares increase." Indeed, the cut-rate Southwest Airlines, which specializes in relatively short hops, has said it will not use the new airport because the per-passenger costs are too high. (It should be noted, however, that Southwest is not currently flying out of Stapleton, either.)

In December 1990, Continental filed for bankruptcy protection, putting in doubt whether it would ever operate out of a new airport—although more recently it said it is fairly confident of pulling out of the red. In February 1991, the FAA released new traffic projections for the new airport, saying that by 2000 it would be the nation's fifth-busiest, rather than the second-busiest, with 44 million passengers a year rather than the 72 million it had earlier predicted. At about the same time, citing the Persian Gulf War and the ailing airline industry, Peña scaled back the new airport from 94 gates to 85. It now stands at 88, twenty fewer than Stapleton has. Denver International will open with five jet runways, compared to the six at Stapleton. As airport officials admit, the lower number of gates is because even many of the Stapleton gates were no longer needed for lack of air traffic. They do point out that many of the new gates are wider than those at Stapleton, giving them great flexibility.

Thus, even as the airport budget ballooned, the size shrank, leading Gene Amole to dub it "The Incredible Shrinking Airport." Still billed as the second-largest airport in the world, in fact it had become the second-largest in Denver. (And the claim of second-largest was never much more than an ego stroke. It is not based on passenger capacity or flights handled, but on *acreage*, as the airport's few structures and runways are surrounded by a vast expanse of land for which the city paid dearly. This is like putting a

refrigerator into an otherwise empty convention center and calling it the world's largest kitchen.)

The bottom line is that last year Stapleton produced revenues of about \$164 million, while Denver International will need at least \$340 million to break even. If it doesn't, it won't be able to pay off its bond obligations. When pressed on this possibility, Aviation Director George Doughty said flatly, "If the airport revenues are inadequate, the bonds will not be repaid." This sounds like an easy out for the city, but it could devastate its ability to sell bonds in the future. The bondholders don't seem particularly worried, since the bonds are currently selling above their face value. But at least one bond-rating agency, Kemper Securities, Inc., rates the bonds at lower BBB, one rank above junk.

The economics of the new airport are so bad that even if it were completed it would be fiscally smarter to just let it rot and to continue to use Stapleton, using Stapleton profits to pay off the bonds. The idea of the public demanding a switch back to Stapleton is one that city officials seem to fear—they

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are allowing Continental to close up its maintenance facility and transfer 1,500 jobs out of state rather than to continue to let it operate by ferrying planes from Denver International to Stapleton. Asked why an airport built "in order to create jobs" would prompt such a thing, Continental corporate

affairs spokesman Dave Messing said, "It was felt it would be a foot in the door to the possible resurrection of passenger service at Stapleton."

Reading Peña's Lips

Peña adamantly opposed submitting the airport to a referendum, as did Gov. Roy Romer in 1988 when he threatened to "roll over" and "crush" any attempt to let the people decide on the project. But influential state politicians threatened to start a petition drive and city council members threatened to block the project if no referendum were held, and Peña and Romer backed down.

Business interests behind the airport managed to raise four times as much money as the opposition and the referendum—worded to begin, "In order to create more jobs . . ."—passed handily. Responding to a lawsuit, the Greater Denver Corporation, an arm of the local Chamber of Commerce, later released a list of political contributors to the airport for which it had served as a funnel. The greatest contributors by far were the area utilities, with US West Communications giving \$400,000 and the electric utility, Public Service Company, kicking in \$300,000. As their ability to make such heavy political contributions indicates, the Colorado legislature allows both utilities to use their monopoly status to reap exceptionally large profits, and both saw the new airport as a cash cow. City council member Dave Doering, a strong supporter of the new airport, nevertheless argued in 1990 that

the city was entering into a "sweetheart deal for the utilities," in which Public Service would remove high voltage lines at a cost to the utility of about \$16-20 million, but in exchange would gain up to \$170 million over the next twenty years. He favored either generating power on-site on land adjacent to airport land or at least having the city own the utility equipment at the airport rather than "permanently lock the airport into a higher tariff." He lost. Sweetheart deal or no, Denver's power usage is estimated to increase by a third from 1991 to 1994, almost exclusively due to the new airport. As for US West, it has already netted a \$24 million dollar fiber-optics wiring contract from the airport, and there could be plenty more where that came from.

One owner of land adjacent to the airport site that stood to make a fortune selling to hotels and other businesses contributed \$95,000 to Greater Denver. This was the infamous Silverado Savings & Loan, co-directed by George Bush's son Neil.

A more direct beneficiary was MDC Holdings, a major contributor not only to Greater Denver but to Peña's mayoral campaign. The state attorney general found in an investigation that MDC had sold the city 100 acres for the airport. He also found that "MDC Holdings and its officials committed numerous criminal violations" in raising political funds for the airport by "extorting" subcontractors to raise contributions, but that the company could not be prosecuted because the statute of limitations had expired. MDC contributed big amounts to the 1987 mayoral campaigns of both Peña and his Republican opponent. The Greater Denver Corporation also got a direct piece of the action when the city, without going through the bidding process, gave it \$325,000 to promote the airport.

The most effective tool for ensuring a healthy margin of victory for the airport was simply lying to the electorate as to what it was getting and what it was going to be paying for it. The referendum stated that the price of the airport would be \$1.7 billion. But shortly after the vote, an investigation by a *Rocky Mountain News* reporter showed that the city had actually hidden \$281 million in construction costs for an automated baggage system, and that the city knew about this before the vote but simply left it off the claimed price tag. Other costs that the city should have known about were also left out of calculations. Both United and Continental conducted independent evaluations and estimated that the actual amount that would be needed would be \$2.7 billion. Aviation Director George Doughty scoffed at the projections, saying the only way it would cost that much was "if you gold-plate the terminal building." Alas, the city's official figure is now \$2.7 billion with no gold plate in the terminal to show for it. Doughty resigned last year.

But the mushrooming from \$1.7 billion to \$2.7 billion

wasn't the worst of it. It turned out those figures included only design, construction, and construction management. It did not include such "incidental" items as the purchase of the land itself or capitalized interest on the bond debt. Though the city has upped its figure only to \$3 billion, the actual amount budgeted to be expended by opening day is now about \$4.4 billion. Further, City Auditor Bob Crider's annual report includes \$5.6 billion in bond interest, hardly an incidental cost. All of which pushes costs to about \$10 billion, or almost six times what voters were told the project would cost.

And even that figure could rise. The airport has now fallen behind schedule. Earlier this year, the official opening date was moved from October to December. As this article goes to press, the date has been pushed back even further—to March 9, at the earliest. Meanwhile, starting in January, the city will be paying \$500,000 a day in interest on outstanding bonds on the airport.

Peña presented the costs as practically irrelevant, since Denverites weren't going to have to pay. In commentaries printed in both local newspapers he wrote, "The airport is user-funded. Denver taxpayers will not be required to support its construction or operation." But although Coloradans would end up paying little

*As a reporter for Denver's
Rocky Mountain News put it, "Clinton
essentially said: Do what you did
in Denver on a national scale."*

for the airport in direct taxes, they would be clobbered by other costs.

Part of Peña's free lunch scheme was to wrest a \$501-million commitment from the federal government in 1990. The local papers celebrated his coup in getting the whole country to pay for Denver's airport. There was only a hint that Denverites might have to pay back that money through a surcharge on passengers, and Peña quickly squelched it. "Right now, we don't intend to impose a surcharge because there is no need for it. Today we do not contemplate it. It's a possibility but I don't want to speculate on hypothetical circumstances," he said. Two years later, the hypothetical circumstances kicked in, with Denverites and those changing planes at Stapleton paying a \$3 head tax, which will probably remain in effect for the next three decades.

Thus, far from not costing Denverites more, the new airport began costing them more a year before the structure was even scheduled to open. The \$3 doesn't count against the maximum of \$20 per passenger allowed in the contracts with United and Continental, and makes Denver International even less competitive.

As the Crow Flies

Coloradans will pay most dearly for the airport—trip after trip, year after year—in the time and the money it will take to use it. City Hall had told voters that the new airport was to be 18 miles from the center of downtown. But when

someone actually measured the distance, they found it would be a 24.5-mile trip. The city responded that the 18 miles was "as the crow flies." With a certain degree of chutzpah, Peña said that before the referendum he had made it no secret that the distance was "between 23 and 24 miles," yet even for some time after the *News* exposé the city continued to use the 18-mile figure in press releases, fact sheets, and reports on the airport. Finally, it began using a figure of 23 miles.

By contrast, Stapleton is 5.5 miles from downtown. The 24.5-mile distance will make the downtown-to-airport distance the second most remote in the nation, with only Washington's Dulles beating out Denver International, by six-tenths of a mile. And Dulles, near a major population center in Northern Virginia, is more convenient for some users; Denver International is farther away from virtually everybody. Moreover, Washingtonians have the option of using close-in National Airport, three miles from downtown, and many of them do use it rather than trekking out to Dulles. Indeed, every city that has an airport more than 18 miles driving distance from downtown has a second full-service airport less than 11 miles from the city center.

At current Denver cab rates—\$1.20 to \$1.40 a mile—the fare to the airport will be \$68 to \$79 per round trip, including a 15 percent tip. Denverites who try to save cab fare will face another unpleasant surprise. In its need to raise about three times as much money for operational costs as Stapleton needs, the city will probably be charging \$10 a day with no cheaper rates for satellite parking. That compares to \$4.00 currently for satellite parking at Stapleton.

Peña shouldn't have said that Denver taxpayers wouldn't pay for the airport, but rather that they wouldn't pay for it through the tax system. Yet even that would not have been entirely correct. The city had to forgive \$40 million of United Airlines' bond debt as a lease concession, meaning \$40 million less coming into its coffers. Then, the state was forced to kick in \$5 million in tax funds for roads connecting to the new airport, with another \$5 million coming from local governments. This despite Peña's earlier claim that the roads to the airport would already be paid for. A study commissioned by a local group opposing the airport also reported that, "The remote location of DIA will result each year in approximately 800 million more automobile miles driven, six to 10 more lives lost in traffic accidents

and tons of exhaust fumes added to Denver's brown cloud."

As to what will become of the land on which Stapleton sits, no one knows. In its original bond prospectus, the city said that even after clean-up costs it expected to get \$100 million for Stapleton. But there is no market price for old airports and the city has no idea to whom it will sell it, especially with Lowry Air Force base scheduled to shut down in 1994 and become another large tract of unused land. The city has since lowered its expectations to \$75 million for Stapleton, and Denver officials are saying it would probably take millions of dollars of infrastructure investment and inducements to attract users. It will be a daunting project. Stapleton is six times the size of Denver's entire downtown.

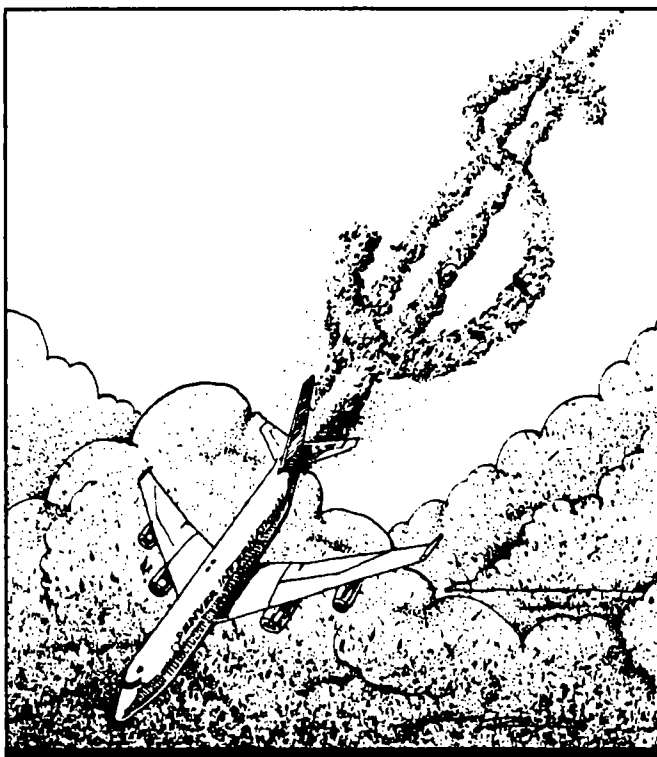
It is not a foregone conclusion that Denver International will be a flop. While nothing can possibly make it more convenient and less expensive than Stapleton, unforeseen shifts in airport use patterns may allow it to run at a profit. But unforeseen fortuities will not change the fact that Coloradans were continually and apparently intentionally misled.

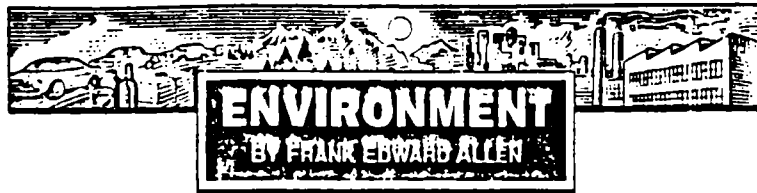
Late in 1989, by which time it was becoming clear that what Denverites had voted for and what they were going to get were two different animals, some began to demand a second vote. Peña refused, saying it was "not required and would serve no point." An April 1991 poll showed 51 percent would vote against the airport if the issue were on the ballot then, although 70 percent said that since the building had begun, it should be carried through. Peña needn't have been a physics expert to know that

such a huge force once set in motion would be virtually unstoppable, no matter what the consequences.

So far, Peña too has been an unstoppable force. In any profit-making business in the world he would have been dumped unceremoniously from his job. But in the world of politics, having already risen to his Peter Principle level of incompetence in a medium-sized city, he found himself yanked right up near the top leadership post in the nation.

Nevertheless, there are those, such as Aviation Systems' Boyd, who argues that Peña's ability to sell a dog like Denver International is what made him such an ideal choice for the Clinton administration. Said Boyd, "It was built on promises that were never kept, and statistics that were totally inaccurate, and it will cost an enormous amount of money." □





That Sick Feeling May Not Be From Flying

AIRPORTS could become the next focus of air-pollution debates.

At many big U.S. airports, research shows, levels of nitrogen oxides, carbon monoxide and hydrocarbons are at least 10 times higher than in the cities they serve. Emissions are produced by cars, buses and service vehicles, and by jet engines as planes idle at the gate, taxi and take off. Jet fuel burned while engines are idling produces about 14 times the pollution of gasoline.

Innovative remedies are being tested. In Sweden, jets cut their engines and get towed to and from runways by "super-tug" vehicles. Some Canadian airports use sensors and "deflectors" on intake vents to keep noxious exhaust fumes from being sucked into terminals.

Next-generation airports will be larger, so pollution could get worse. A prototype is Denver's 53-square-mile facility, which will have 100 gates and five 12,000-foot runways when it opens in 1994. Supporters say it will ease trans-continental congestion. But with air traffic likely to rise and ground operations spread over a much bigger area, critics worry about jet and vehicle emissions. State officials now expect air pollution to be twice as bad as originally calculated.

Jim L. Starry, an environmental engineer in Boulder, Colo., figures taxiing wastes hundreds of millions of gallons a year. If jets' wheels were redesigned to store energy from landings in electric generators, he says, planes could taxi using electricity and most of that fuel could be saved.

Changes in runways could save fuel, too. A 747 landing on a flat runway burns about 48 gallons when the pilot reverses the engines' thrust to slow the plane. Mr. Starry proposes that new airport runways be built on a 2% slope. By taking off "downhill" and landing "uphill," his research finds, planes would consume about 25% less fuel. The Federal Aviation Administration is evaluating his ideas.

Boulder resident has a better airport idea

When Colorado Governor Roy Romer belatedly figured out that Denver's new airport was a \$2.2-billion white elephant, he turned to United Airlines. He should have called Jim Starry — and if he is not completely brain dead, he still will.

Starry is a Boulder engineer who has designed a more efficient airport. Saying it that way, however, does not come close to conveying the dimensions of his accomplishment. What he is done is reinvent the airport — not just Denver's airport, but the concept of the passenger airport in the age of jet travel — and if his ideas were adopted they just might turn things around for the Denver project.

At the core of Starry's concept is a simple change in airport design: At the typical airport, jets take off and land on flat runways placed a substantial distance from the passenger terminal. Starry proposes to build runways that run uphill at a 2-percent grade, and then place the terminal under the high end of the runway. The terminal's roof, in fact, would be the high end of the runway.

The advantage of doing this is that it saves jet fuel when planes are taking off and landing. It also saves fuel by largely eliminating the need for taxiing. And the savings are pretty spectacular.

A 747 landing on a flat runway will burn 330 pounds (48 gallons) of fuel when the pilot turns on the thrust reversers to slow down the plane. The figures of a 727 are 250 pounds (or 37 gallons). However, the thrust reversers of a commercial jet aircraft landing on an uphill runway with a 2 percent grade that rises 200 feet will consume 25 percent less fuel than those of an aircraft that lands on a flat runway.

Danish Plan



By Paul Danish

Multiply those savings by 700 landings a day (the traffic volume at Stapleton a couple years ago), 365 days a year, and the savings from landing on uphill runways come out to 2.3 million gallons of fuel a year.

By the same token, a jet that takes off on a runway running downhill also uses less fuel to get off the ground than one taking off from a flat runway — 20 to 40 percent less, depending on the type of jet. Starry calculates that the annual savings for jets taking off from an airport like Denver's (if 700 flights a day left it) could come to 8.2 million gallons of fuel if it were built to his design.

The real savings, however, would come from the elimination of taxiing. Jets at Stapleton currently burn a staggering 56.7 million gallons of fuel a year just taxiing between the terminal and the end of the runways. Starry figures that his airport design would eliminate 80 percent of that.

The bottom line is that the design would save about 55 million gallons of jet fuel. At 65 cents a gallon, that would save the airlines using the airport about \$36 million a year.

That alone would probably change the economics of the Denver airport significantly. The Denver airport is in financial trouble because it is being built with bonds that are to be paid off with taxes on aviation fuel, take-off and landing fees, and surtaxes on tickets. The additional taxes and fees increase the cost of operating out of the airport.

In the highly competitive airline industry, that means any airline running a hub operation out of Denver — i.e., Continental and United — would be at a competitive disadvantage compared to an airline running its flights through another city.

Airlines faced with having to use the new airport would therefore move as many of their connecting flights as possible elsewhere and limit their Denver operations to flights originating and ending in Denver. This would reduce the total amount of air traffic through Denver, forcing the city to raise fuel taxes, landing fees, and ticket surcharges on the remaining flights even higher to meet its bond payments,

which would make Denver operations even less competitive.

Romer's way out of the dilemma was to get United Airlines to set up a maintenance base in Denver, which would bring a large number of additional flights into the city, but would also allow the State of Colorado and the City of Denver — under the guise of encouraging economic development — to slip United enough dough to keep its Denver hub operations competitive.

Starry's way out is better. Instead of having to compensate the airline for using an intrinsically high-cost facility, he would build a facility that would give all airlines using it a competitive edge.

The City of Denver and the State of Colorado have proposed giving United something like \$300 million to bring its maintenance operation to Denver and bail out the airport project. United's reaction was to start shopping around for another site, which probably tells you something about how profoundly uneconomical operations from Denver International will be.

Starry has been trying for years to get the airheads who foisted the airport project on Denver to pay attention to his ideas. Their response has been to write him nice letters telling him how creative he is and to continue to march lockstep into a financial buzz-saw of their own creation.

My guess is that Denver International will turn out to be a economic turkey with or without United. Denver should consider scrapping its cloth roof terminal design and building a terminal along the lines Starry suggested. Denver citizens would still be stuck having to pay \$80 cab fares to get to and from the monument to Romer and Pena's stupidity, but at least it might pay its own way.

Science Newsfront

Edited by DAWN STOVER

PO BOX 1431
Boulder CO 80302
Jim Starry
303.989 9825

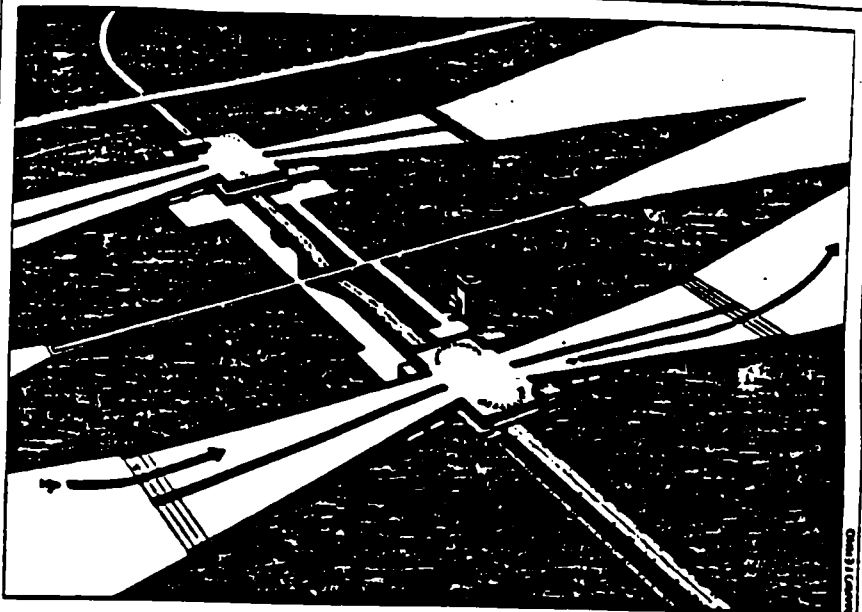
Airport of the future

While aircraft have evolved from primitive biplanes to sleek jets, runways have changed little since the Wright brothers took flight. Now, finally, a licensed pilot named Jim L. Starry, who heads Environmental Protection Designs in Boulder, Colo., has reinvented the runway. His airport design, called Starport, could reduce energy use, air pollution, and noise.

Starry's simple design takes advantage of gravity: From the top of a 20-story terminal, planes roll down a sloping runway to gather speed for takeoff. On landing, they slow down by rolling uphill to the terminal, like an 18-wheeler barreling up a ramp for runaway trucks. "No one has done anything to make the runway control the aircraft," Starry complains. In Starport, the runways are slightly concave, to help planes stay centered, and are wide where the planes touch down, but narrow as they approach the rooftop gates. Passengers reach the gates by taking elevators from parking areas, shops, and restaurants in the terminal's lower levels.

Because the Starport runways would not be steep enough to bring planes to a complete stop, Starry has designed 800-pound brake-accelerator wheels that would not only slow planes on landing, but would also generate electricity as the wheels spin. The stored electricity could be used for taxiing. "From the moment you touch down, you could turn off the turbine," says Starry.

A 747 landing on a flat runway currently burns about 48 gallons of fuel when the pilot reverses the engines' thrust. Starry claims his redesigned wheels and runways could reduce the amount of fuel required for landings by about 25 percent—saving as much as 300 million gallons annually at an airport the size of Denver's new facility, which will open in late 1994 with 84 gates. The reduced fuel consumption would also improve air quality. (The diesel fuel burned while a jet's engines are idling is about 14 times more polluting



In this fuel-saving airport design, called Starport, planes land on inclined runways and coast to gates at the top of 20-story terminals. Planes get extra power for takeoff by rolling down the sloped runways.

than gasoline.) Noise pollution would decrease too, because on takeoff planes could coast 10,000 feet before switching to full thrust.

A Starport would require less land than conventional designs like Denver's new 53-square-mile airport, and Starry claims a Starport could be built using "off-the-shelf" highway overpasses. But although airport planners are reviewing his concept, none has yet been willing to build and test a Starport prototype.

Black hole?

Earth has an escape velocity of 25,000 mph. That means an object such as a rocket must attain at least that speed to escape the clutches of Earth's gravity and head out into space. The more massive a planet, the greater the force of its gravitational attraction and the

higher its escape velocity. So the escape velocity of giant Jupiter, which has a gravitational force 350 times that of Earth, is about 133,000 mph.

Now imagine that somewhere in the universe exist objects so massive that their escape velocities exceed 186,000 miles per sec-

ond—the speed of light in a vacuum. But nothing can travel faster than light. Therefore, from such objects, there is no escape, not even for light. And with no telltale light emissions, such objects would be undetectable by direct observation.

On the basis of both theory and indirect observations, astrophysicists have long speculated that such objects, called black holes, do in fact exist. They are the remnants of collapsed stars so condensed that their gravitational pull is immense.

New NASA's Hubble Space Telescope has garnered the best evidence yet for the presence of a black hole. It is the finest image ever of a disc of dust and cool gas—about 300 light-years across—that is being sucked into the nucleus of a galaxy in the Virgo Cluster, 45 million light-years from Earth. The nucleus, astronomers think, is the den of a black hole ten million times more massive than our sun.

"This is the first case," says Dr. Holland Ford, a Hubble scientist at Johns Hopkins University in Baltimore, "where we can follow the disc's gas in an orderly way down to the immediate environment of the black hole."

A co-investigator, Dr. Walter Jaffe of Leiden Observatory in The Netherlands, says: "We haven't seen a black hole itself. But it's as close to a black hole as we've ever seen before." —Arthur Fisher



A disc of dust and gas is being sucked into what may be a black hole.

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ROBERT HARRY FORSTROM
CONSTRUCTION MANAGEMENT CONSULTANT
POST OFFICE BOX
GLEN COVE, NEW YORK 11542
TELEPHONE (516) 671-3699
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ATTN: Mr. Mike Holder

Date: 1/18/93 Time: 10:20:17

Page 1

February 18, 1993

Mr. James L. Starry
Environmental Protection Designs, Inc.
P.O. Box 1931
Boulder, CO 80306

Subject: Adaptation of the Starport airport design concept for
use as a runway for a proposed National Aerospace Plane
spaceport facility at Calverton, Long Island.

Reference: CMC0057

Dear Mr. Starry,

I am interested in reviewing your Starport airport design as a
possible design solution for a proposed NASP spaceport terminal to be
located on an environmentally-sensitive land area at Calverton, Long
Island.

Currently, I am the planning and scheduling engineer for the Aviation
Design Division of the Port Authority of New York and New Jersey that
performs engineering design for Newark International, Kennedy
International and Lagoonia Airports. In addition, I am working on the
Environmental Master Plan for these airports.

I have previously worked planning and scheduling and project management
assignments on military airbase facilities for the F-5 and F-16 in Saudi
Arabia and the Shuttle Launch Facility at Vandenberg Air Force Base.
The NASP Facility proposal is an independent initiative of mine.

The idea is to formalize your Starport concept as an environmentally
advanced spaceport terminal facility for the future NASP. The proposed NASP
Facilities are to be located on Long Island and at Moscow and Peking.
I have worked with the firm Frank, Gottgen, Cox Architects on other
endeavors and they can be retained to present the alternative design solutions
for the facilities. I am in a position to introduce these solutions
to the pertinent people at the Port Authority.

I look forward to discussing realization of your design concepts
as a future NASP Spaceport Facility.

Sincerely yours,

Robert Forstrom

Robert Forstrom

cc: Frank



Leslie E. Blattner, President

April 2, 1993

Mr. Mike Holder
Via Fax

Dear Mike,

This note is the result of a telephone conversation today with Jim Starry. We are
an aviation consulting firm with ties into the FAA, DOT, CIA, State Department,
etc. Our product is books, articles and advice on many segments of the aviation
industry. One such specialty is airports. For example, we are currently consulting
for Dr. Philip A. Kennedy, an economist and economic consultant in Washington.
Kennedy is working with foreign governments on programs of economic
development. In our book, *America's Airports in The 1990's*, we discuss the
economic value of airports to communities and regions. Kennedy saw the book
and called us to advise him on airport expansion and development in Mongolia.
At present we are investigating Mongolia's aviation infrastructure.

Of particular interest is Jim's ideas on the airport construction. An airport that
is environmentally safe, and requires 1/3 of the land is an appealing project, and
are seeking more information. Please send us the promotion package mentioned
this morning in my discussion with Jim.

At Jim's request, I placed a copy of our airport book in the mail. We look forward
to further discussions on airport construction, and hope this is the start of a
rewarding relationship for all concerned.

Regards,

Les Blattner

DAN SCHAEFER
6TH DISTRICT, COLORADO

THE CONGRESS BUILDING
WASHINGTON, DC 20543
(202) 225-7807

801 NORTH HURON STREET, 4TH
ENGLEWOOD, COLORADO 80110
(303) 762-8990



Congress of the United States
House of Representatives
Washington, D.C.
October 25, 1991

ENERGY AND COMMERCE
COMMITTEE

SUBCOMMITTEES
TELECOMMUNICATIONS AND
TRANSPORT

TRANSPORTATION AND
HAZARDOUS MATERIALS

HANK BROWN
COLORADO

COMMITTEES
BUDGET
FOREIGN RELATIONS
JUDICIARY

United States Senate
WASHINGTON, DC 20510-0604

May 31, 1991

Mr. Jim L. Starry
Environmental Protection Designs
P.O. Box 1931
Boulder, Colorado 80306

Dear Mr. Starry:

Thank you for providing me with information about your proposals for environmentally sensitive airport development. I appreciated hearing from you.

I am aware, based on the correspondence you provided, that Senator Hank Brown and Representative Joel Hefley have already contacted the Federal Aviation Administration on your behalf. After having had a member of my staff consult with their offices, I have been informed that the progress of these inquiries is ongoing.

As one who was intimately involved in reauthorizing the Clean Air Act, I am acutely aware of the importance of responsible and efficient pollution reduction efforts. In this context, your designs would seem to be an appropriate strategy worthy of further consideration.

Again, thank you for getting in touch. Please feel free to let me know of your additional comments on this or any other matter.

Best regards.

Sincerely,

DAN SCHAEFER
Member of Congress

DS/tdt

PRINTED ON RECYCLED PAPER

Mr. Jim L. Starry
Environmental Protection Designs,
Inc.
Post Office Box 1931
Boulder, Colorado 80306

Dear Mr. Starry:

Many thanks for your letter regarding your proposal for a new airport design. I am pleased to see that your design addresses one of Colorado's most pressing problems----air pollution.

To express interest in your idea, I have written to the Federal Aviation Administration to inquire if architectural designs that emphasize fuel-efficiency and pollution reduction were considered for the new Denver airport.

Again, thank you for taking the time to contact me. Hopefully, your environmental designs will have additional applications to help cities address such problems.

Sincerely,

Hank Brown
United States Senator

HB/jac



DEPARTMENT OF THE AIR FORCE

THE DEPARTMENT OF CIVIL ENGINEERING
UNITED STATES AIR FORCE ACADEMY, CO 80840-4701

14 January 1992

Mr. Jim L. Starry
Environmental Protection Designs, Inc.
P.O. Box 1931
Boulder CO 80306

Dear Mr. Starry.

I would like to invite you to be a speaker in our Department of Civil Engineering Distinguished Speakers Program. This program brings in top practitioners in the field of civil engineering to present talks on topics of interest to both the faculty and cadets. Your innovative ideas on a new airport design concept would be extremely interesting to us, especially as it relates to our teaching Civ Engr 310, "Air Base Design and Performance", which is taken by all Air Force Academy cadets.

I understand Captain Rich Cosgrove, our Course Director for Civ Engr 310, has already discussed the possibility of your coming to the Academy with you. You indicated February would be good for you; however our speaker schedule is fairly busy this month, and March may be better for us. In any case, please contact Rich or Major Ken Knox (our Speakers Program coordinator) at (719) 472-3150 and we'll work with your schedule. I sincerely hope you will be able to join us -- your insights into innovation in engineering will be of great interest to me, the faculty, and our students.

Sincerely,

DAVID O. SWINT, Colonel, USAF
Professor and Head



Senate Chamber
State of Colorado
Denver

DAVID E. LEEDS
State Senator
P.O. Box 442
Louisville, Colorado 80027
Capitol: 866-4866
Home: 673-0282

Senate President Ted Strickland
State Capitol
Denver, CO 80203

COMMITTEES
Member of:
Finance
Judiciary
Local Government

March 4, 1991

Dear Senator Strickland,

Whoever said that "Politics is the art of the possible" never encountered the kind of bureaucratic stone-walling and government buck-passing experienced by Jim Starry of Boulder, Colorado.

Mr. Starry, of Environmental Protection Designs, Inc., has proposed a new airport design... one which, were it constructed, would establish Denver as an international leader with respect to its creative architectural response to tough policy questions. His airport would annually save millions of dollars in wasted fuel, thus contributing to America's energy independence. It would significantly reduce airport-generated air pollution, always a major concern of Coloradans. It would relieve airport congestion, flight stacking and passenger delay. It is, in fact, a vision of the airport of the future... but provides a blueprint using technologies we possess today.

Various federal agencies -- including the EPA, FAA, NCAR and NOAA -- have reviewed Jim Starry's proposal. Each has referred him elsewhere. Mr. Starry's response from state and national elected officials has been similar. I pray we have not reached a point where citizens of uncommon insights or abilities are discouraged or thwarted by a system closed to new ideas.

I know you are quite busy. Nevertheless, I invite you to review the enclosed materials and consider Mr. Starry's timely recommendations. Jim Starry will follow up with a phone call in a few days to see what can be done at this point. I thank you for your consideration.

Best personal regards,

Senator David Leeds

October 4, 1993

Mr. T.H. Howard, Chief Engineer
Power Train Operations
PO Box 2053, Ford Motor Company
Dearborn, MI 48121

Dear Mr. Howard:

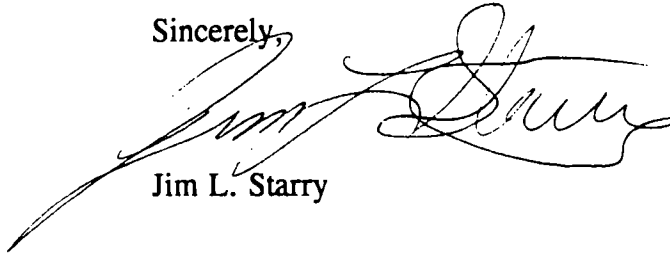
On the advice of a former employee of Ford Motor Company, I am writing this letter to you in the hopes that, with your interest in developing products giving greater fuel efficiency while reducing emissions, an association with you through the testing and marketing phases would allow my device to reach the marketplace sooner.

I have developed an auto emissions control device which cleans the air while you drive your automobile; in other words, the air coming out of the tail pipe is cleaner than that entering the carburetor. This device increases fuel efficiency between 22-28% without breaking the 2nd law of thermodynamics since I am only using a greater percentage of the wasted energy now hidden in exhaust gasses. The device pre-processes auto emissions while extracting power. This system could be retrofitted to existing autos and later, manufactured on new ones. It has been in use on my personal car for a year and a half.

The enclosed packet documents that as Environmental Protection Designs I have spent the last six years designing over half of the new Denver International Airport without compensation. I have been told by numerous agencies that my designs are genius, but so far have not been able to find an avenue that would bring them into public use. This information packet should also give you an idea of the simple environmental solutions possible in many areas. You may authenticate my capability as a designer by contacting either Dr. John Firor or Dr. Michael Glantz, both of whom can be reached at (303) 497-1000.

I have been told by numerous government agencies that distribution is not their job: "Take it to private industry." Ford Motor Company is an international organization interested in producing the finest environmentally sound automobile and has reputation for integrity; I would be happy to develop an association with you.

Sincerely,

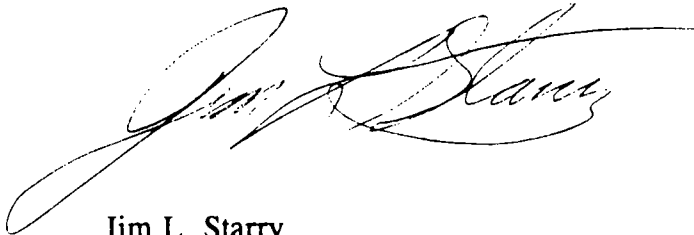

Jim L. Starry

April 30, 1993

I would like to add this packet to the information I have sent to you in previous mailings, dated April 21, 1992, June 12, 1992 and September 8, 1992. We are now experiencing in Denver the inevitable consequences of poor planning and rushing into a huge construction project without properly considering the consequences of our actions. The new airport, not too surprisingly, is now being criticized (months before it is even open) as being poorly conceived: runways too close together; constricted access which will result in traffic nightmares; remote location resulting in millions of unnecessary miles traveled by individual autos; lack of mass transportation to and from the city, and so forth.

Your interest and involvement in airport planning and construction prompts me to send this information for your consideration in the hope that it may cause some concern about duplicating errors already made. New airports need to be planned for use over the *next* 50 years, not just copied from those that have been in use during the past 50 years.

Thank you for your attention.

A handwritten signature in cursive script, appearing to read "Jim L. Starry". The signature is fluid and extends across the width of the text block below it.

Jim L. Starry
Environmental Protection Designs, Inc.
Boulder, Colorado USA

April 21, 1992

Dear «salutation»

The purpose of this letter is to bring to your attention a matter of importance of which you may already be aware. Environmental issues are among those considered by Americans to be as worthy of concern as economic and geopolitical concerns. Many feel that there is some direct connection between the major issues of our time, but through an inability or unwillingness to address those relationships, much of the public discussion is emotional or hypothetical in nature. Consequently, many well intentioned people fail to consider solutions which are economically and politically feasible as well as effective in resolving environmental concerns.

We have developed techniques, for which patent applications are now pending, for reducing aircraft fuel consumption and its attendant air pollution while cutting the costs of airport property acquisition and construction by the simultaneous use of gravity and the application of modern ground traffic control techniques.

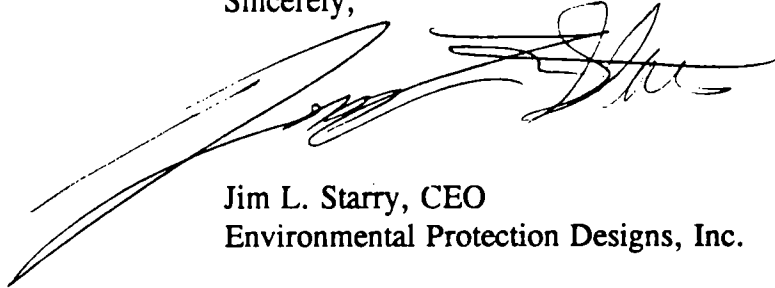
Our research models project the savings of millions of dollars annually by the innovative use of presently existing technology, while measurably improving air quality in and around metropolitan areas.

Our representative would be pleased to meet with you or your advisors to discuss these matters in further detail in an appropriate setting. We have no objection to the use of our ideas and models for political or commercial purposes, as long as it is understood and agreed that all information disclosed by us remain proprietary intellectual property, for which reasonable compensation may be sought in the event of its actual utilization. Additionally, financial responsibility dictates that our consultation fees not be so high

as to discourage discussion, but not so depleting that our participation adversely affects our research and development efforts. Consequently, presentation and consultation fees are currently set at \$100.00 per hour or \$1,000.00 for three (3) consecutive days of consultation, plus ordinary and necessary expenses for food, travel, and accommodations. No charge, other than for expenses, is made for presentation and consultation services for accredited educational institutions, including public secondary schools.

Should you have further questions or any comments, please contact us at the address on this letterhead.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jim L. Starry', is written over a large, stylized, and somewhat abstract graphic element that resembles a signature or a large 'S'.

Jim L. Starry, CEO
Environmental Protection Designs, Inc.

ECO-MALL

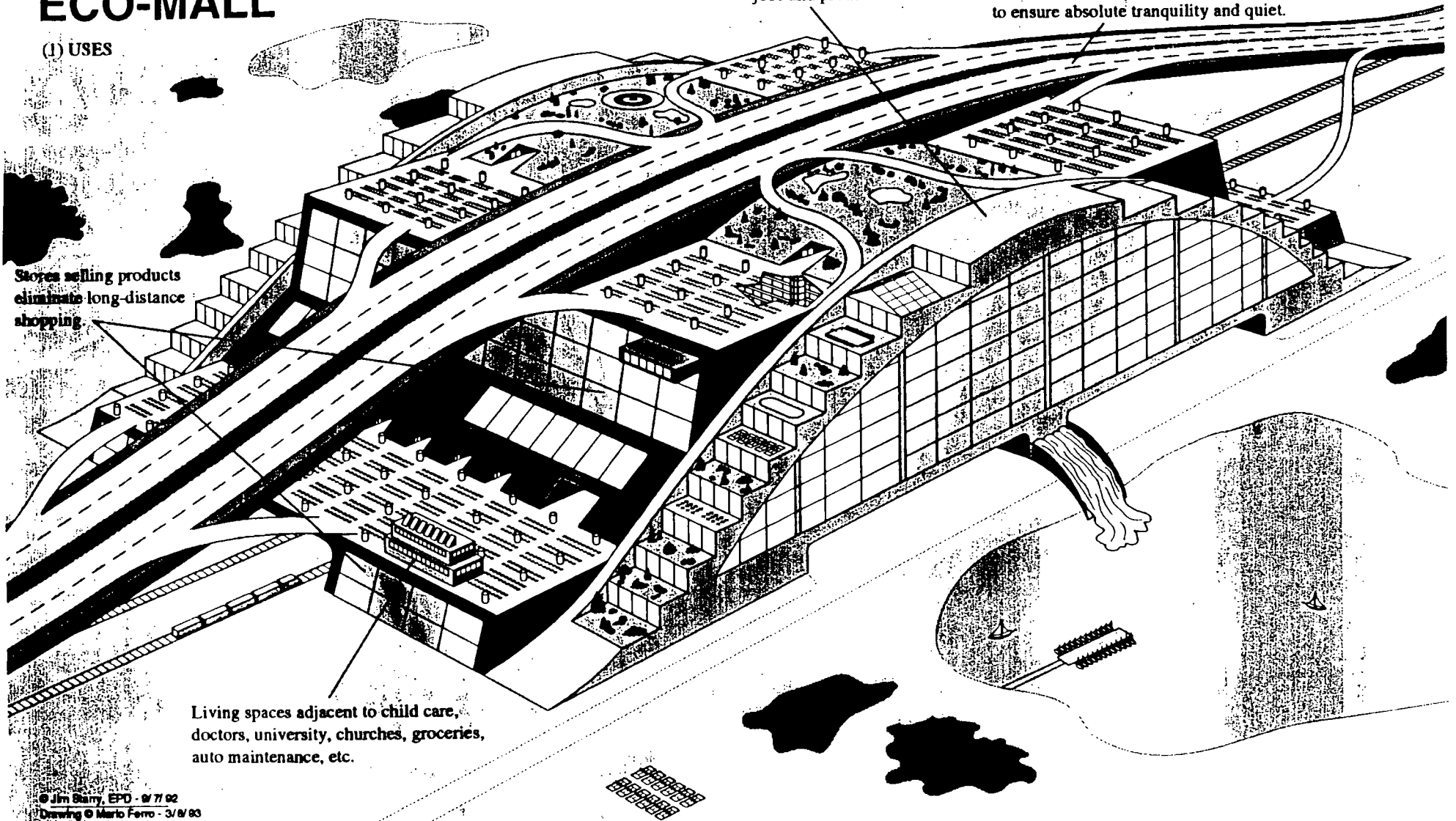
(1) USES

Stores selling products
eliminate long-distance
shopping.

Factory - producing
jobs and products.

Amount of driving in and out would minimize
road use and be closed at night and early hours
to ensure absolute tranquility and quiet.

Living spaces adjacent to child care,
doctors, university, churches, groceries,
auto maintenance, etc.



ECO-MALL

(2) ECOLOGICAL
SYSTEM

Pure cycle water supply
(no outside water source necessary)

Roof doubles as parking, water collection-
watershed, while enhancing privacy.

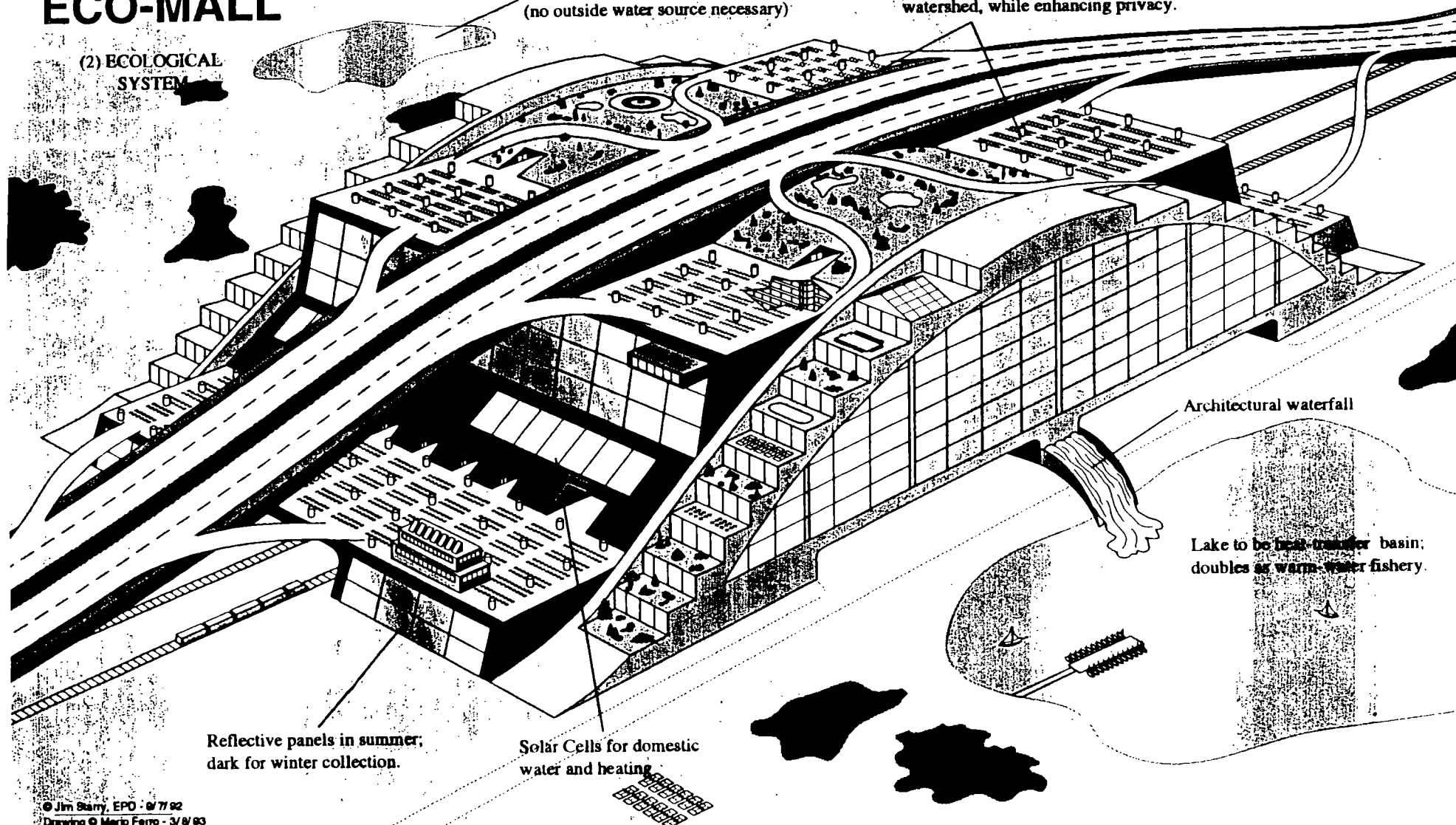
Architectural waterfall

Lake to be heat-transfer basin;
doubles as warm-water fishery.

Reflective panels in summer,
dark for winter collection.

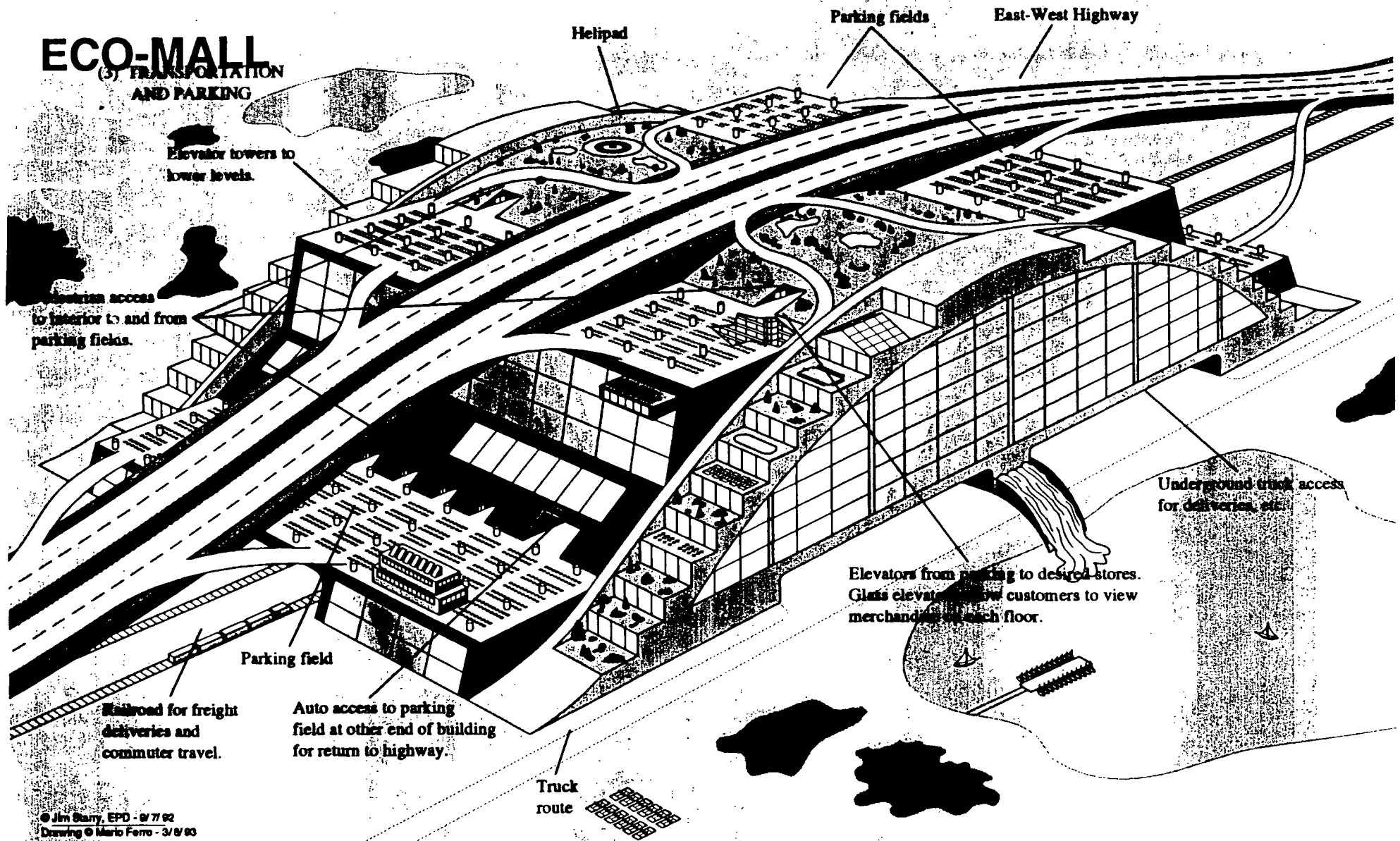
Solar Cells for domestic
water and heating

© Jim Barry, EPO - 8/77/92
Drawing © Mario Ferro - 3/8/93



ECO-MALL

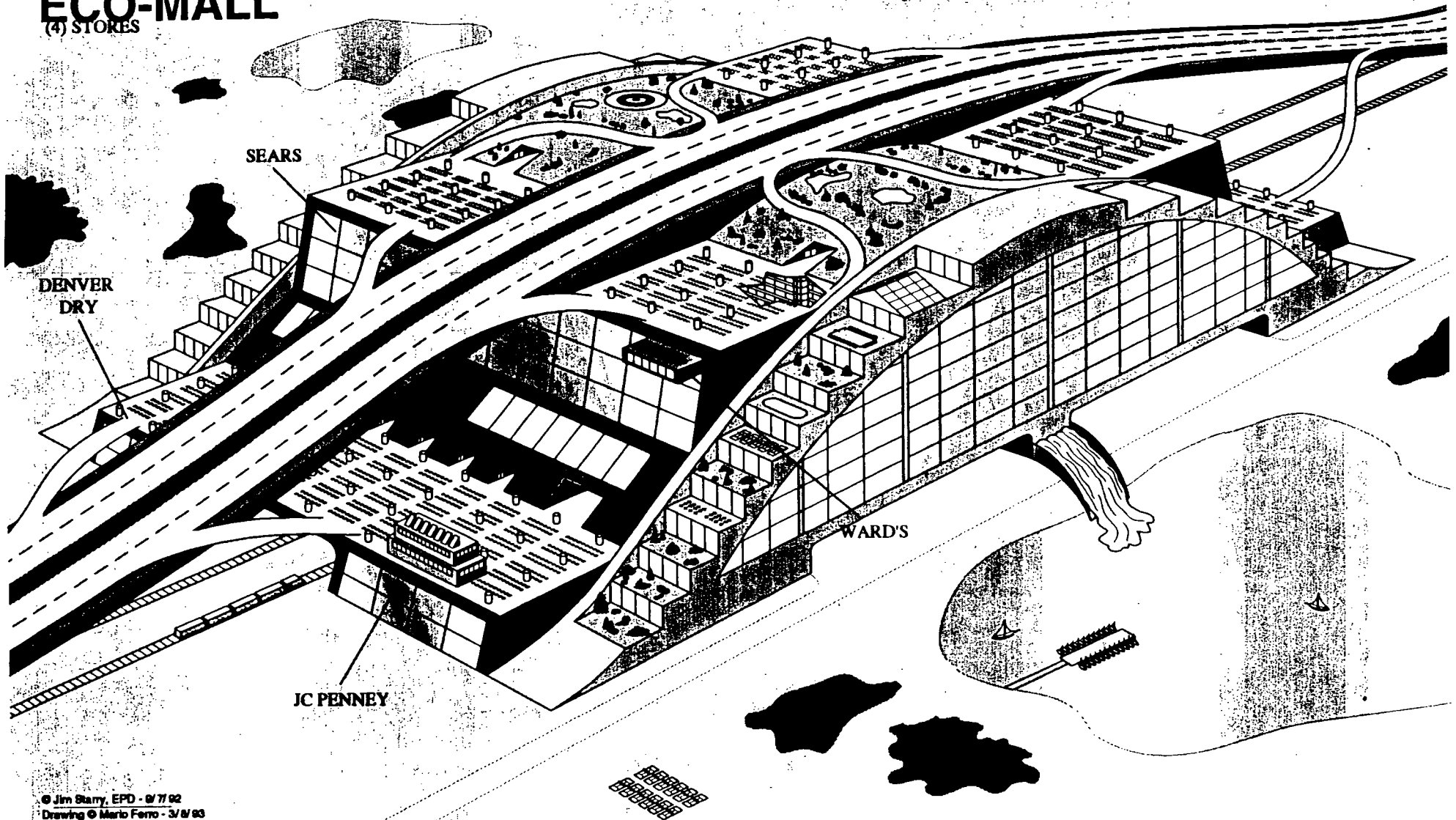
(3) TRANSPORTATION
AND PARKING



ECO-MALL

(4) STORES

- * Stores produce income while defraying construction costs and allowing energy re-use. Schools are on premises and offer on-site job training.



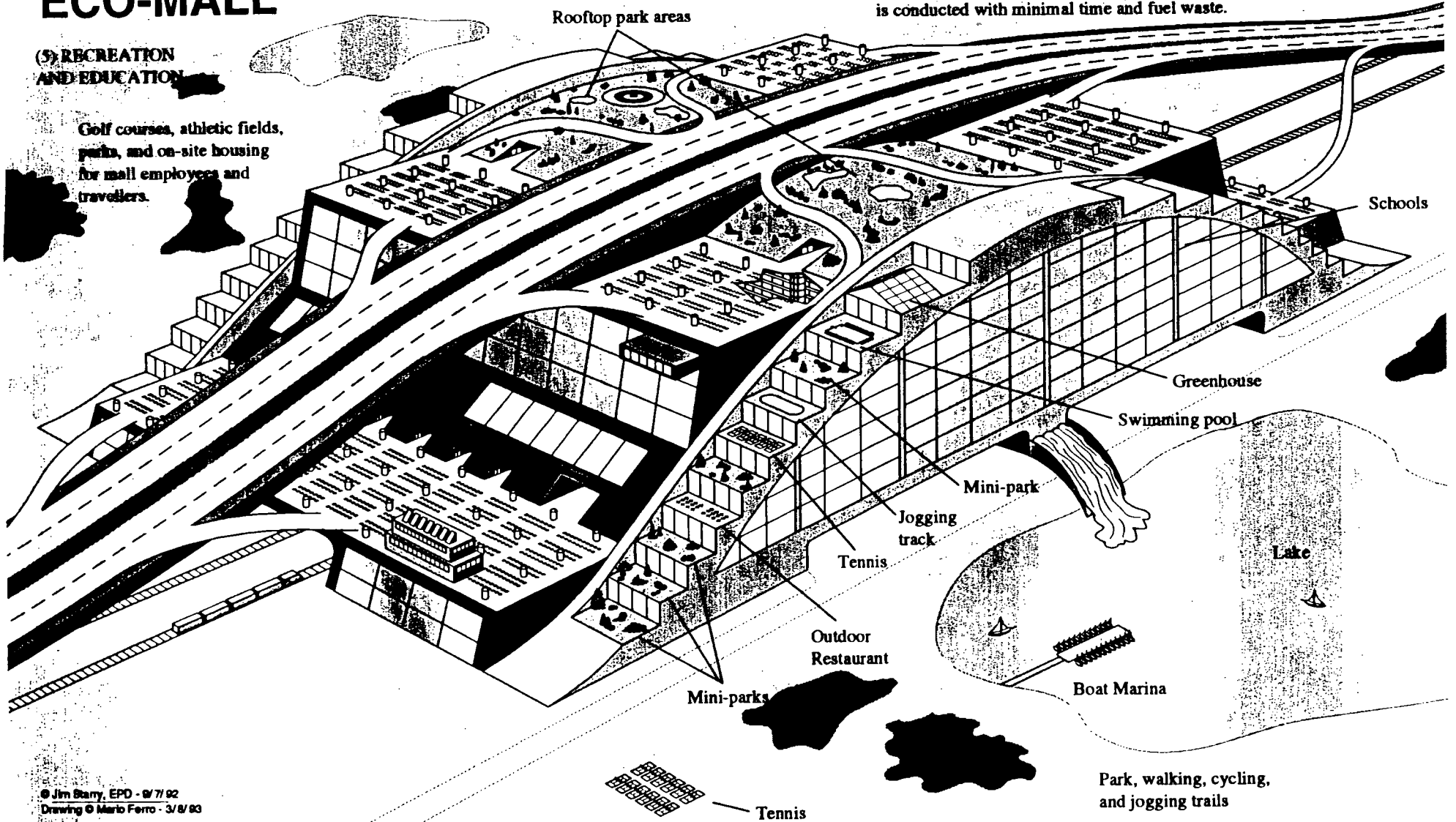
© Jim Starry, EPD - 6/7/92
Drawing © Mario Ferro - 3/8/93

ECO-MALL

(5) RECREATION AND EDUCATION

Golf courses, athletic fields,
parks, and on-site housing
for mall employees and
travellers.

Recreation, exercise, education and social interaction
is conducted with minimal time and fuel waste.



© Jim Barry, EPD - 9/7/92
Drawing © Mario Ferro - 3/8/93



CAN WE LIVE WITH
DOUBLE
AIR POLLUTION?

Did you know that most of the new airports being designed will **double** the air pollution in major cities over the next fifty years?

There *is* a solution.

A radical and simple runway design using uphill landing and downhill take-off will save 300 million gallons of fuel per location each year.

- That's 300 million gallons **not** being burned and turned into polluting exhaust.
- JP4 diesel fuel used in jet aircraft pollutes **14 times** more than auto fuel—300 million gallons equals a **huge** pollution reduction!

When other forms of transportation are looking for cleaner solutions, why should we have to live with antiquated airports fouling the air around our cities?

We don't—but we must act **now**!

Contact Jim L. Starry, Environmental Engineer

ENVIRONMENTAL PROTECTION DESIGNS, INC.
P.O. Box 1931 Boulder CO 80306 (303) 939-9825



The Future Begins Now

We are increasingly becoming aware of the magnitude of our pollution problems here in Denver and the possible detrimental effect these problems will have on our economic growth if we do not find solutions for them in the very near future. Wouldn't it be wonderful if we could say to potential investors and new businesses, "Denver is the only city in the country, perhaps the world, to show significant improvements in its air quality and we are committed to continuing this trend into the future." This could be true, but not if we continue to address our pollution problems with solutions of the past.

I recently had the opportunity to participate in a meeting of the Colorado Environment 2000 committee and made a presentation of an alternative design for Denver's new airport. I am encouraged to see groups such as this being organized and I have found in them an appreciative and interested audience for my ideas. But no one seems to be in charge of going on from there. No one wants to take the responsibility for actually implementing a new solution for our pollution problems. We must somehow break this barrier of "it's never been done before."

I am greatly concerned with the direction that we are headed in our war against pollution. We have the opportunity now to take a new direction in the design of a major pollution producing facility but we continue to look only to the designs of the past - a copy of the same airport that has been built over and over across the country. Why must we follow this same direction? There are other and better solutions.

Presently, Denver's Stapleton Airport consumes 300 million gallons of fuel annually. If the new airport flies three times as many planes (as is expected), this fuel consumption will be tripled, and with it, the pollution created by burning these 900 million gallons of fuel will also be tripled. How can we be so concerned about the air quality in Denver and not take this into account? All of the automobiles in the Denver area, according to Colorado Health Department statistics, burn about 665 million gallons of fuel each year. We are greatly concerned about the pollution resulting from this source, but we are ignoring the vast amount of pollution emanating from our airport.

It is time to move forward from the old, standard designs. We must keep in mind that whatever type of airport we build, we'll be stuck with it for the next 50 years!

An airport utilizing the concept of an underground terminal with inclined runways above it would consume 1/3 the amount of fuel presently used for landings and takeoffs. This system could prevent the doubling of Denver's pollution which is certain to occur if we build the traditional, antiquated airport.

I have been asked what my credentials are for designing a totally new airport system and I ask, how can you have credentials for solutions that haven't been used yet? My background includes 1700 hours in aircraft and engine mechanics, 15-20 years of looking for new solutions for present day problems, and numerous working inventions, including an emissions control device that is presently operating on my car. This device is now being studied for possible use on RTD diesel buses.

However, I feel that my best credentials consist of the willingness to search for new solutions rather than just copy what has been done in the past. Obviously, the systems we are now using (airports, mass transit, emissions control) were not designed for the huge volume of traffic we now have - they have just been increased in size while still retaining their original designs. The "experts" who challenge my credentials are the same experts who continue to design and re-design the same old systems that have put us in our present predicament of having to clean up 50+ years worth of toxic materials in our air, our water, and our soil.

If we are to have any hope of keeping our air breathable and our water drinkable and our land unspoiled, we must look at these problems in light of today's conditions and what we expect tomorrow's conditions to be. Solutions for the future cannot be copied from the past - the future begins now.

Jim L. Starry

Additional Note: Inasmuch as I have spent the last 2-1/2 years and \$38,000 of my own personal funds on research, prototypes and making presentations to The Perez Group, Bill Smith of the Stapleton Airport Facility and numerous other agencies including the EPA and FAA, my request is for 1% of the fuel savings and a consulting fee so that I may continue to work on these projects. All systems are patent applied for and copyrighted.

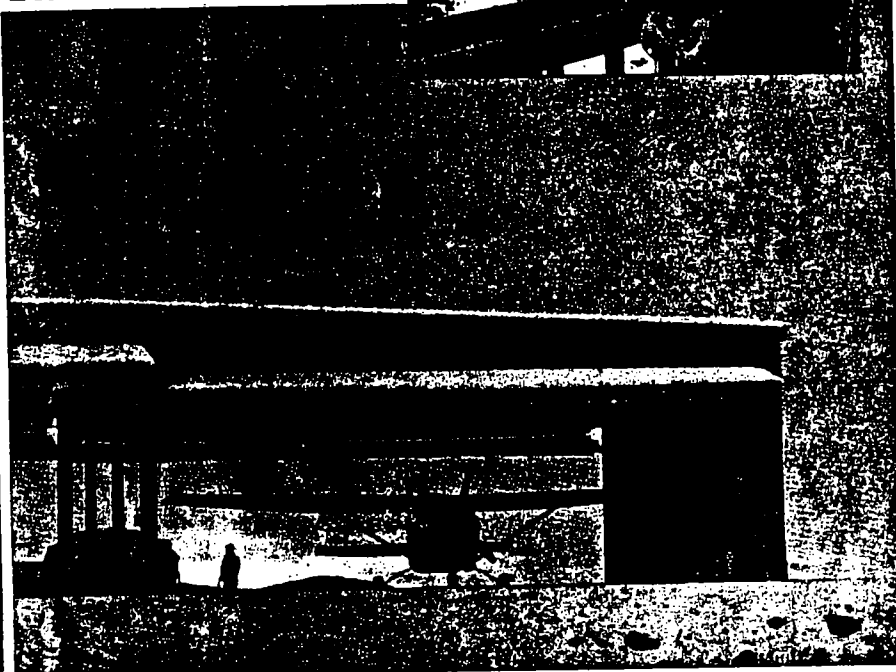
THE SUNDAY DENVER POST

November 22, 1992

Voice of the Rocky Mountain Empire

Ea
\$10

REACHING NEW HEIGHTS



Airports link world, peaks

Urbanites moving to Rockies retreats

Stuck in New Jersey traffic, Art Pulis decided life was passing him by.

Now he jets over crowds on commercial flights from Colorado's San Juan Mountains.

"I wanted out of the fast-paced city environment and into the relaxed small-town environment," Pulis said from his house near Durango, where he soaks in his hot tub after conducting banking seminars around the country.

This is the long-distance lifestyle becoming possible thanks to the federal government, which is spending millions to upgrade mountain airports.

Growing numbers of upscale professionals live in the Rockies without sacrificing urban careers. They tend to be specialists — doctors, lawyers, consultants, media correspondents — who can afford to commute beyond traditional suburbs. They often control when and how much they work.

They join a larger group of Colorado newcomers, the semiretired, who cut back or quit city jobs as they "down-shift" in mountain retreats, while still flying frequently to cities.

Fax machines, phones and laptop computers are valuable for managing



NEW LINKS: Flying to Colorado's mountains is easy today, thanks to federal upgrading of mountain airports. The multiplying air links allow commuters such as CBS sports announcer Vern Lundquist, top, to live in upscale resorts such as Steamboat while working across the nation, as above.

Photos by Shaun Stanley
The Denver Post

FAA overhauling mountain strips

By Bruce Finley
Denver Post Staff Writer

STEAMBOAT SPRINGS — Not long ago, Bob Adams Field was a sleepy mountain airstrip where deer nibbled grass at the tarmac's edge and three small planes a day buzzed over the mountains from Denver.

Now up to a dozen 48-seat commuter craft arrive daily on a longer, resurfaced runway. Tax-financed work has begun on a \$1.3 million terminal, while a \$95,000 electric fence blocks deer.

The federal government is upgrading mountain airports as never before. Multiplying air links are drawing mountain towns into a national network, hastening the shift from ranching and mining to recreation.

Over the past five years, the Federal Aviation Administration has spent about \$65 million in western Colorado. Two dozen mountain airport projects worth \$23.5 million are in progress. And the FAA is considering projects that would cost \$62.7 million by 1997, documents show.

The unprecedented overhaul eventually may include more navigational

Please see COMMUTE on 7A

Please see AIRPORTS on 8A

'I came up from Dallas-Fort Worth, and down there we couldn't get money. I've never seen such spending that they're doing at ski resort airports. They're pushing for mountain airports.'

DOZEN A DAY: Airports such as Steamboat's Bob Adams Field, built on a deer migration route, have been transformed from sleepy airstrips to booming airports with up to a dozen commuter flights a day. A new electric fence blocks the deer.

The Denver Post / Shaun Stanley



Rockies air traffic may soon catch up with midsized cities'

beacons, costing \$200,000 each, and a \$1.5 million radar system covering what pilots call a dangerous "black hole" in radar coverage west of Vail. Plans anticipate air traffic as busy as mid-sized cities.

"I came up from Dallas-Fort Worth, and down there we couldn't get money," said Tom Schuessler, manager of the Yampa Valley Regional Airport, built on a wheat field near Hayden, 23 miles west of Steamboat. "I've never seen such spending that they're doing at ski resort airports. They're pushing for mountain airports."

Direct flights already bring tourists and owners from major U.S. cities to the scenic Aspen, Crested Butte, Du-

ride each reported increases of more than 25 percent since 1987. Aspen's Sardy Field had a 13 percent increase, with 217,088 passengers last year.

"If the FAA hadn't funded these projects, there would be no way in hell we'd see these airplane passenger loads," said Durango airport manager Ron Dent.

Resort officials have perfected the art of lobbying the FAA for tax dollars.

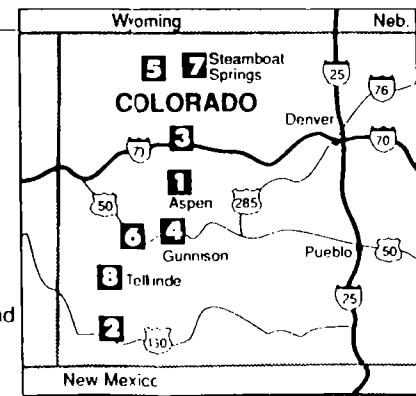
In Vail's case, resort and Eagle County officials traveled frequently to Washington, D.C. Former President Gerald Ford, a Vail resident, and U.S. Sen. Tim Wirth, D-Colo., arranged meetings with FAA Administrator Allan McArdle, formerly an administrator at the Air Force Academy north of Colorado Springs, said K&S.

ing, according to the Colorado Tourism Board. A study of Pitkin, Summit and Eagle counties found that summer retail sales increased by 9 percent last year, compared with 2.7 percent statewide.

Vail had almost as many summer visitors on busy days last year as during ski season, though skiers still spend more than twice as much money, said Mike Shim-Konis, Vail Associates spokesman. Steamboat had more hunters than ever this year. And Telluride's conferences draw an international crowd.

BOOMING MOUNTAIN AIRPORTS

Taxpayer-financed improvements at mountain airports are bringing more people to airports in the Colorado Rockies. This is hastening the economic transition from ranching and mining to recreation.



The Denver Post / Bruce Galt

Steamboat Springs, Montrose, Telluride and Vail. Vail also has international flights from Mexico City. Resort officials want to start the same direct service in summer that has bolstered ski business in winter.

Nowhere in the nation have so many airports grown so fast in such a small area, FAA officials say.

The building of bigger and better mountain airports in Colorado took off one Sunday in 1986 when Ralph Welton, board chairman for Crested Butte Mountain Resort Inc., was brainstorming ways to make money. Welton was listing ideas on his blackboard when he realized that people from across the country would ski if they had quick, easy access to the slopes.

So Crested Butte offered American Airlines a cash guarantee to cover potential losses. By year's end, American was flying directly from Dallas to Gunnison, bypassing Stapleton Airport in Denver. In 1987, the FAA granted Gunnison \$1.3 million for a bigger runway.

"Air travel is a necessity if you're going to be competitive," Welton said.

Today resort executives across the Rockies spout this creed. And upgrading mountain airports is akin to an arms race.

Even less-developed mountain towns such as Pagosa Springs are receiving FAA grants to acquire land for jet-quality runways.

In Fairplay, commissioners have requested FAA money for the \$8 million Central Colorado Regional Airport. The 12,000-foot-long runway on a windswept mesa would be the highest U.S. airport at 9,500 feet, possibly with a Wild West facade featuring gunslingers.

The most FAA money this year went to: ■ Montrose County Airport (the larger of two airports serving Telluride) \$7.3 million to improve runways.

■ Aspen-Pitkin County Airport (Aspen). \$2.8 million for safety equipment, acquiring land for expansion, lights, security, snow removal equipment and an electric deer fence.

■ Gunnison County Airport (Crested Butte). \$2.6 million for expanded runways, safety vehicles and a security system.

■ Eagle County Airport (Vail, Beaver Creek). \$2.1 million for snow removal and safety equipment, storage facilities and an environmental study to prepare for expansion.

■ Durango-La Plata County Airport (Purgatory). \$1.9 million for buildings, security system and taxiway guidance signs.

■ Yampa Valley Regional Airport (the larger of two airports serving Steamboat Springs). \$1.7 million for pavement and lighting on taxiways and safety equipment.

"The mountains are just a place in demand in this country," said Alan Wiechmann, FAA district manager in Denver. Indeed, mountain air passengers are multiplying.

Eagle County Airport reported 28,930 riders last year, up 232 percent from 8,693 in 1989. Airports serving Crested Butte, Steamboat Springs, Montrose and Telluride

ers, vice president of Vail Associates Inc. McArtor later became senior vice president of aeronautics for Federal Express.

"In addition to having the political clout to open up the doors, we had our business partners (airlines) in line," said Myers, who earlier orchestrated expansion of the Yampa Valley Regional Airport.

The FAA likely will spend another \$10 million to lengthen a runway and build a new terminal at Eagle County Airport, said county Commissioner Dick Gustafson.

Today, the only major ski areas without direct air access are Winter Park, owned by Denver, and the Summit County resorts of Copper Mountain, Keystone, Arapahoe Basin and Breckenridge.

Just north of Winter Park, a Grand County committee received a \$57,000 FAA grant this year to plan improvements and eventual lengthening of a runway to 8,800 feet, either in Kremmling or Granby.

Summit County resort officials are pushing for the Central Colorado Regional Airport. Breckenridge Ski Corp. President Pete Gutman helped arrange a \$500,000 guarantee that enticed American Airlines to commit to use the proposed runway, about 23 miles from Breckenridge over Hoosier Pass.

"The airlines indicated to us that they were not willing to play unless the communities shared some of their risk," Gutman said.

Resorts with direct flights have a big advantage over Summit County resorts that rely on increasingly congested Interstate 70, he said. Skiers "are going there instead of coming here. We don't want to lose market share."

About 15 percent of Colorado's 1.5 million out-of-state skiers now fly directly to resorts, never stopping in Denver. Only 5 percent flew directly in 1985. Several road-dependent resorts have closed. And the extra half-hour drive from the new Denver International Airport gives an additional incentive to fly direct.

Public demand for flights is the only criterion for FAA money. Whether airports serve skiers or locals "is not an issue," said Stan Lou, FAA director of airport improvement programs.

The airport improvements will have sweeping effects on mountain life. They accelerate change like that prompted by the building of the interstate highway system after World War II.

Already, national chains such as Walmart and McDonald's have moved in. And several small manufacturers are considering moving to Montrose and Durango. One of the fastest-growing construction firms, TIC (The Industrial Co.), is based in Steamboat.

"Without the air link, it'd be very difficult for us to grow the way we've been growing," said TIC Vice President Gary Bennett. TIC spends about \$1 million a year on air travel.

Resort marketers also are trying to capitalize on better airports, aggressively promoting summer activities such as mountain biking, golfing, crafts fairs and cultural events. Summer business is booming

As the average skiers age, they start to prefer fair-weather pursuits such as putting, peddling and poking around shops to cutting through mogul fields, resort analysts say.

As a result, Mexican airlines TAESA and two U.S. carriers will fly directly to the Eagle County Airport next summer, Shim-Konis said. Crested Butte's Welton said he's negotiating for summer direct flights to Gunnison. Durango and Montrose also plan to increase flights.

Ultimately, the multiplying air links are helping to turn mountain resorts into elite national suburbs, analysts say.

Some experts say this could have negative social effects. "What's wrong is we are pricing middle-income, much less low-income people, out of some of our most wonderful valleys," said University of Colorado professor Charles Wilkinson, author of several books about the West.

Urban professionals dissatisfied with city life already are spending more time in mountain retreats, said Ford Frick, a Denver-based consultant to several resorts.

"If it wasn't for the fax machine, I couldn't be out here as much as I am," said Welton, who spends only three months a year at home near Atlanta.

Building is booming, especially of single-family houses.

Steamboat issued 295 building permits last year, up 44 percent from 204 in 1989. The average selling price of a house increased by 12 percent since 1990, reaching \$115,000. In the Crested Butte area, property values increased by up to 50 percent this year, Welton said.

And out-of-state residents are buying more mountain land. Even in less-developed areas such as Fairplay, out-of-staters accounted for 36 percent of sales, said Linda Nelson of Nelson Realty in Fairplay. Total transactions and the number of building permits issued in Park County doubled this year, records in Fairplay show.

But some Colorado natives are wondering whether multiplying air links really help locals.

Just west of Vail, trailer park residents in Gypsum (pop. 1,809) complain that jets from the Eagle County Airport disrupt television reception.

And in the Steamboat area, county tax revenues have proved insufficient to support rapid growth.

Providing enough hospital beds to cope with a major airplane crash costs more than a small mountain community can afford, let alone furnishing better schools, water and power services that newcomers demand, said Routt County Commissioner Randy Taylor.

Upgrading airports has unleashed fiscal demands "that take a couple years to catch up with," Taylor said. "And it's not creating any enterprise or money that sticks here. We become an affluent recreational area where new people can do business using telecommunications. . . . It ends up being snobbish. It'll end up being like Aspen, where the billionaires are running the millionaires out."

"Maybe the feds ought to quit being so free with giving away money, pay off the national debt, and thereby slow down all

	1986	1990	1991	Pre Ski Season '92	%change '86-'91
1 Aspen	191,000	215,591	217,088	191,753	13.5%
2 Durango	98,372	97,316	96,278	82,983	-2.1%
3 Eagle	288 (1989)	8,693	28,930	32,048	9945% ('90-'91: 232.7%)
4 Gunnison	28,000	46,561	48,938	49,584	74.7%
5 Hayden	1,922	46,217	60,309	53,696	3037% ('90-'91: 30.4%)
6 Montrose	20,000	25,800	26,000	20,000	30%
7 Steamboat	34,929	47,567	50,315	44,754	44%
8 Telluride	4,000	12,700	22,079	31,392	451% ('90-'91: 73.8%)

Source: FAA and airport records

The Denver Post

Eagle County destined to bring in more flights

Regional facility to get additional federal funds

Eagle County Regional Airport in the heart of the Rockies has become an international facility destined to bring in more and more flights, politicians and resort executives say.

"This is going to be the major airport for this part of the country," predicted county Commissioner Richard Gustafson.

Over the past decade, the airport has won more than \$20 million in improvement money from the Federal Aviation Administration. Plans call for \$14.5 million more in federal tax money to pay for a new terminal and a longer runway, among other projects.

Passenger loads topped 28,000 last year, up from 8,693 in 1990. More than 50,000 passengers are expected this year, say county and Vail Associates officials, who have been courting contacts in Washington.

Vail Associates chairman George Gillett and his wife, Rose, contributed \$1,000 each to the 1988 campaign of Sen. Frank Lautenberg, D-N.J., who heads the Senate Appropriations Transportation Subcommittee, according to Federal Election Commission records.

Like many politicians, Lautenberg has a condominium in Vail.

"A lot of them vacation here a lot," said Gustafson, who teamed with Kent Myers, Vail Associates vice president, on several lobbying trips to the nation's capital.

In August, the two met with top FAA officials along with executives from Delta, American and United airlines, plus county engineers.

Former President Gerald Ford, who lives in Vail, U.S. Sen. Tim Wirth and his fellow members of Colorado's congressional delegation had set up meetings for the group.

FAA officials were receptive, Gustafson said. "Once you get their support, then they make a commitment to you. I think they're all convinced now that the vision is there. And they've definitely put their



Gillett



Lautenberg

at the airport.

At the meeting, county commissioners asked for an extra \$300,000 to finish erecting an airport equipment building, said Jack Lewis, assistant county manager. FAA officials "made a substantial kick in there to make sure we would have a full building."

A few Gypsum residents complain about noise. And Gypsum town council members voted to turn off the water they supply to the airport if the county doesn't keep promises to pay for it.

But commissioners and resort officials say these problems will be resolved.

Hence this month's battle for the Vail-Beaver Creek Jet Center

The jet center, which includes the existing terminal and rights to operate the airport, was up for grabs as a result of Gillett's declaration of bankruptcy in August. It was one of Gillett's personal assets.

Bidding at a Nov. 9 auction pitted Vail Associates against a pack of competitors.

A new Denver group known as Fixed Base Operators Inc., led by investor Jeff Ross, won the jet center by assuming \$5 million of debts accrued under Gillett and paying \$1.5 million cash.

"If it had not been for the very significant federal support," Ross said, "the value of that enterprise to us, and to Eagle County and to Vail, would have been significantly lessened."

MOUNTAIN AIRPORTS REACH NEW HEIGHTS

Airlines jumping to keep up with seat demand

COMMUTE from Page 1A

business from afar. But airports are crucial.

"I've got to have good, reliable air transportation," said Pulis, 49, who usually double-books flights in case of storms.

At airports in Gunnison, Steamboat Springs and Durango, the number of long-distance commuters has grown from a few to dozens, airport and airlines officials say. Time was when only the ultra-rich of Aspen, Vail and Telluride came and went so often.

"Last summer, we had a waiting list for seats," said Ron Dent, Durango airport manager. "We're just hoping the carriers can keep up."

One pioneer in long-distance commuting is CBS sports announcer Vern Lundquist, who studies National Football League rosters at his kitchen table in Steamboat before flying to stadiums across the country to deliver play-by-play commentary.

Federal Express packages of pregame materials arrive Wednesdays. Lundquist recently ordered a fax machine and laptop computer with modem to give him instant access to network data on sports stars. He memorizes tidbits, talking by phone with his producers, then heads for the stadiums.

"Without the airport, this wouldn't be possible," he said from the deck of his 6,700-square-foot mansion. "Now it's all gold. Summer it's all green. Winter, it'll be all white." Fridays, he drives a few miles to growing Bob Adams Field for Continental Express flights to Denver, or he drives to Hayden for direct flights to major U.S. cities.

At home, Lundquist is surrounded by books in his library. He keeps a collection of autographed photos from sporting events in his office and a rack of classical compact discs in the living room. Workmen recently lugged in a heavy dining-room table from an estate sale in New York. The place has a feeling of permanence not found in vacation condominiums.

Until 1984, Lundquist lived in Colleyville, a suburb north of Dallas, announcing for the Dallas Cowboys, avoiding rush-hour congestion whenever he could.

"You never get the openness, the sense of majesty and beauty that you get here," he said. "I never walked out into the street in Colleyville and said, 'Wow,' which I am prone to do now."



Rave though they do about the beauty of the mountains, long-distance commuters say new hardships rival highway gridlock for annoyance. Bewilderment sets in after waking up in dark hotel rooms, not knowing where he is, then groping for a telephone book to get his bearings.

"I can remember taking 26 hours to get home from Chicago," said TIC (The Industrial Co.) executive Peggy Barry. She left California because of the traffic and lives

Denver," she said. Sometimes she calls her daughter to come to Stapleton Airport to visit with her; sometimes she prepares company reports on her laptop computer.

Even Steamboat has drawbacks, Barry said. "It's expensive. And it's really hard to raise kids. It's hard to get affordable clothes." She said she welcomed the arrival of McDonald's and Walmart, which many mountain natives opposed despite the boost to the economy.

thing as simple as buying a pair of socks is not that easy."

At the same time, city people in the mountains are concerned about losing what drew them in the first place.

"All you need is one movie star moving in, and all of a sudden you've got lots of people with laptop computers and porcini mushrooms," said Carol Russo, 50, who left San Francisco's financial district this summer for a log cabin near Fairplay that she calls "the new American dream home." She said she still backs the planned Central Colorado Regional Airport.



The Denver Post • Shaun Stanley

AMERICAN DREAM? TIC Construction executive Peggy Barry, left, says she got tired of the traffic in California. Above, Lundquist at his Steamboat home with his dog, Max.

Remote, historic mountain towns give a feeling of authenticity, connectedness and pleasure that newcomers cherish.

"I wanted freedom," said Pulis. Steamboat seems real, said Lundquist.

"Ours is a little more of a working Western town. It gives you a sense of a real life. We don't live in a gingerbread village."

Friends from elsewhere regularly visit to ski. And they invariably conclude that they, too, want to live in the mountains.

— Bruce Finley

Description of Reference Numerals in Drawing

- 1 Dome structure is architecturally strongest. Bottom connection makes airport an isolated structure not affected by surface expansion. Loads stretch surface so expansion joints aren't needed.
- 2 Multiple floors under runway structure decrease construction cost per square foot (gives 20 usable floors). Multi-use floors are alternated with parking. Enormous commercial area under runways will ensure rapid payback of construction costs.
- 3 Windows for light and heat absorption double as runway delineation lights.
- 4 Under terminal: continuous, non-stopping mass transit operates under terminal in conjunction with 8-lane north-south, east-west entrances.
- 5 Continued airport expansion possible - not permitted with airports designed with existing above ground auto entrances. Since traffic enters under terminal, major circling airport roads don't restrict airport expansion.
- 6 Runway-controlled rate of rise. Aircraft maintains level flight and runway rises to meet aircraft. Wheel motor generators pre-rotate to assist in landing, eliminating shock and wheel destruction.
- 7 Side by side runways allow multiple landings divided by appropriate FAA separation (4,300 ft.). Plane A has left incline as B touches down while C has taxied out while A taxis in, leaving B 11,000 feet of unobstructed runway - process is reversed when B taxis to the right. Then D starts decline as C lifts off.
- 8 Incline landing eliminates time waste associated with long taxi distances as terminal is directly under runways.
- 9 Decline allows quicker takeoffs, eliminating delay.
- 10 Aircraft proceed in a straight line - landing and taking off with the shortest taxi deviation.
- 11 Commuter airlines land between majors, shortening passenger transfer time and reducing fuel waste.
- 12 Aircraft wheels have motor-generators that slow all aircraft on landing and accelerate them on takeoff. Jet noise is eliminated on touch-down. During takeoff aircraft is reaccelerated without engines until forward velocity makes engines burn efficiently. Taxi is accomplished on wheel motors eliminating terminal noise until just before liftoff.
- 13 Heated fuel storage. Heated fuel transfers heat to wing tanks for deicing.
- 14 Parking directly under departing gate - elevator transports passengers from parking to departing aircraft directly above. Parking under terminal eliminates shuttles from parking to terminal. Elevator tubes are an integral part of the structure under the runways.
- 15 Electric wheel motor-generators assist in aircraft deceleration during aborted flight conditions.
- 16 Aircraft repair facilities located under runway.
- 17 Aircraft delineation lines determine where different size aircraft set down - light planes closer in; heavy, fast planes use more of incline.
- 18 Triangular depression in runway automatically centers aircraft on runway while trapping and directing rain and snow melt to evaporator holding tanks. Deicing agents are kept from entering ground water.
- 19 Incline/decline runway systems allow the full length of the runway to be visible to arriving and departing aircraft.
- 20 Underground 8-lane highways (north/south, east/west) for specific airlines. Heat from autos removes snow and ice from runways.

Lorena Bobbitt's Ladies • How We Starve Africans • Clinton's Trollope

THE AMERICAN SPECTATOR®

DECEMBER 1993

A MONTHLY REVIEW EDITED BY R. EMMETT TYRRELL, JR.

Peña's Plane Stupidity

Michael Fumento on the Denver Airport Debacle



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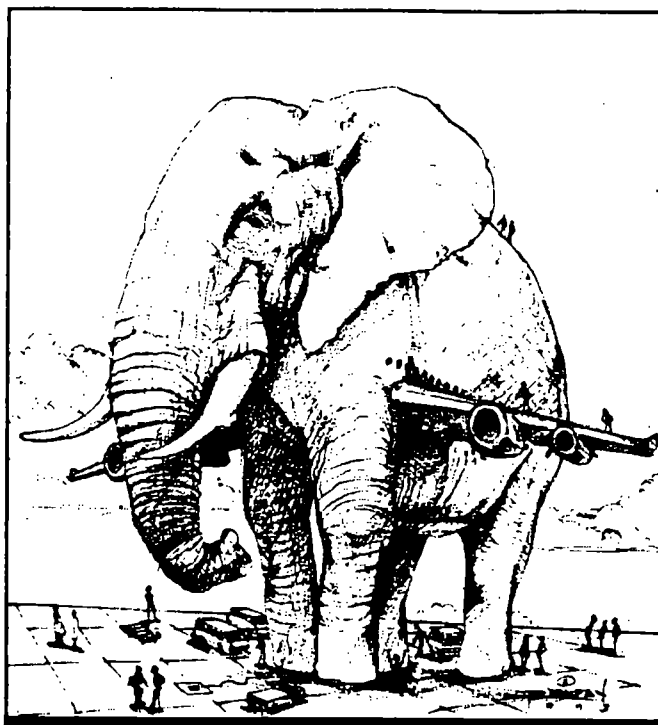
Federico's Folly

Secretary of Transportation Federico Peña got his job by wasting \$10 billion on the biggest public works disaster of modern times—an airport worse in every way than the one it replaced.

There is greatest practical benefit in making a few failures early in life." When Thomas Henry Huxley wrote that in *On Medical Education*, presumably he meant that mistakes were a learning experience. But in that strange twilight between politics and reality, sometimes mistakes themselves can be a benefit. Consider Secretary of Transportation Federico Peña's monumental mistake: the soon-to-be-completed Denver International Airport.

Both Peña and President Clinton cited Peña's efforts—as mayor of Denver from 1983 to 1991—to build the airport as a factor in Peña's appointment to the Department of Transportation. In his speech nominating Peña, Clinton said, "His legacy includes the new Denver International Airport, which I believe will be the largest in this country by a good ways." When Peña was picked to be the "cluster coordinator" for transportation issues during the transition period, a statement from the transition team declared that Peña had been involved in many projects to improve Denver's infrastructure, "including the construction of Denver International Airport, the world's largest [sic], to be finished in 1993."

Michael Fumento covers national issues for Investor's Business Daily and is author of The Myth of Heterosexual AIDS, republished this fall in an updated paperback edition by Regnery Gateway.



Peña's explanation was that "Denver's investments paid off. I believe that's the reason for [my] being asked to do this."

But Denver's investments have not paid off, at least not for the city. While Peña promised to make Denver great, the city finds itself merely a great debtor, its jewels sewn into a massive tent-like structure on the windswept plains east of the city. Occupying a parcel of land twice the size of Manhattan, Denver International is the nation's largest public works project. Some have called it the

nation's largest white elephant. Others have called it Federico's Folly.

At first billed as "the world's second-largest airport," it has steadily shrunk in size even as its budget has ballooned—from the \$1.7 billion Denverites voted for to an actual cost of at least \$10 billion. It appears that it will be worse in almost every practical way than the perfectly serviceable airport it is replacing. And the man responsible for it is now responsible for billions in federal transportation expenditures. As a reporter for Denver's *Rocky Mountain News* put it, "Clinton essentially said: Do what you did in Denver on a national scale."

Certainly Peña can't take all the credit for the airport. It was supported by both Denver newspapers as well as the governor and the entire Colorado congressional delegation. But it isn't for nothing that the route from the interstate to the airport will be named Peña

Boulevard. No blood test is necessary; Denver International is his baby.

And certainly the airport isn't the only reason Peña is in the cabinet. It has been widely suggested that Clinton—having met environmentalist resistance to appointing Hispanic Rep. Bill Richardson (D-N.M.) to the Interior Department position and instead appointing a very green but nonetheless white Bruce Babbitt—felt compelled to appoint a secretary of *transportación*. But if Peña couldn't have made it without the pedigree, he couldn't have made it without the airport, either. The Texas-born Peña, 46, has always had a knack for taking advantage of a situation. Although he benefits politically from his Hispanic surname, he is far from being of humble birth. True, his parents made their living from cotton—but not picking it, brokering it.

The Nightmare Before Christmas

Other than the overwhelming support he received from the city's Hispanic population, Peña probably owes his getting elected mayor to a Christmas

Eve blizzard—the worst in sixty-nine years—that dumped almost three feet of snow on some parts of the city and tied the area up for days, making the incumbent look inept. But when a few years later a blizzard dumped a considerably smaller amount, again the city

became snarled, this time because Peña had the novel idea of sending heavy city trucks out to simply pack down the snow by driving over it. All it did was create ruts, which then froze into place. Fortunately for him, it was not an election year.

Fortuity also marked Peña's administration. Besides the airport, Clinton credited his nomination to the U.S. Conference of Mayors' having given Peña its City Livability Award for reducing its Clean Air Act violation days from "150 a year in the 1970s to 3 in 1990." But while violation days for Denver did drop from 125 in 1972 to three by the time Peña left office, they had already steadily declined to 31 the year *before* he was elected. Denver's air is cleaner for the same reason the air above every major U.S. city is cleaner: requirements of the 1970 Clean Air Act dramatically reduced automobile emissions.

Peña's tenure was marked by expensive megaprojects, ranging from hosting a Grand Prix to building a convention center and a baseball stadium. Far from attracting new bookings, as promised, the convention center has seen a tremendous drop in bookings since it opened, a decline that set in long before any talk of gay boycotts. The Grand Prix was a flop. For two years it tied downtown traffic in knots, for which Denver had the privilege of handing over \$2.5 million in tax revenues to the promoter. The baseball stadium is still under construction. Peña said the common theme of these projects was to help pull America's 23rd largest city out of an economic slump and to make it one of the country's most spectacular. As he exhorted in a newspaper commentary, "Denver is poised for greatness. As the alliance forged by the

broad coalition of airport supporters continues its work on advancing Denver into the future, there is no end to what we can accomplish, or how high we can fly."

Critics say, however, that the common theme was for Peña to soak the citizens by handing over city funds to businesses, especially contractors, that took advantage of Denverites' self-consciousness about being a "cow town," and worries over a temporary job bust at the end of an oil boom. Chief among those critics is *Rocky Mountain News* columnist Gene Amole, who has inveighed incessantly (some say obsessively) against the new airport. Commented Amole in a 1989 column, "The way the whole thing is shaking out is that big government, big business, big labor, big developers and the big media are one side, and the little guys who actually live in this town are on the other."

Flight Delay Fibbery

Peña's airport plan began in 1985, when after months of secret discussions he announced that instead of expanding Stapleton International, the current airport, the city would build a new one. He gave two reasons. First, flight delays, especially in bad weather, were allegedly becoming intolerable at Stapleton, costing it business as a hub. Peña said Stapleton was "an

embarrassing bottleneck, both in our national transportation system and our ability to have an efficiently run airport to build a strong, stable economy." Second, Federal Aviation Administration (FAA) projections indicated that if passenger use of Stapleton continued to escalate as it had in the first part of the 1980s, and if Stapleton didn't expand, then early in the twenty-first century the airport would no longer be able to handle the traffic.

Yet Stapleton was in the process of expanding. Even after Peña began his airport campaign, Stapleton built a new runway, a new concourse, and a new commuter terminal.

Moreover, Stapleton's flight-delay record in recent years has been among the best in the nation. According to the Federal Aviation Administration, in the year the airport was submitted to a referendum, 1989, Stapleton had 27 flight operations per thousand delayed fifteen minutes or more. By comparison, Atlanta's Hartsfield International, which has only one hub, had 25, New York's JFK had 76, Chicago O'Hare 88, Newark 98, and LaGuardia 115. Two years earlier, in a 1987 report, the city itself boasted that "Denver ranks below most other major U.S. airports in number of delays per thousand flights. In fact, the national average for delays went *up* in 1986. Denver's average went *down*."

Instead of looking at the actual data, however, the city cited a five-year-old 1984 FAA projection. The problem with the projection was that it couldn't have taken into account that Stapleton added a new runway in 1986. While not full-length, it freed up the longer runways to handle more large jets, and

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significantly eased congestion. Critics have contended that this runway could have been made longer, but that Peña, having already decided to go with the new airport, prevented it. Airport officials say that existing structures prevented it from being made any longer, though one could argue that compared to the billions of dollars the new airport would cost, relocating those facilities would have been a bargain.

Further, yet another runway was planned for Stapleton, to be built on the adjoining Rocky Mountain Arsenal, which would have increased capacity and decreased delays even further. Peña blocked its construction, along with that of terminal improvements. He initially said it was because the money should be devoted to a new airport. Later, though, city officials said it was because the Arsenal land was too polluted. Denver International critic Michael Boyd, president of Aviation Systems Research Corporation, a Colorado consulting company, responds that this doesn't ring very true. "Now they are going to put a park there," he says.

The main cause of the delays Stapleton does have is that, during winter bad weather, airport officials will sometimes shut down one runway for fear of interfering with planes on another nearby runway. (Inclement weather has closed the airport as a whole only three times in its history.) Ironically, due to an FAA error in applying sea-level standards to a mile-high airport, the runways at the new airport have also been built

too close together to comply with regulations for full flexibility in simultaneous take-offs and landings. To resolve the problem, the airport will use "quick-scan" radar to efficiently keep track of flights. This type of radar, though relatively new, was already in use when the building of Denver International began. Although the distance between the new airport runways is still greater than that between Stapleton's, this system would also have helped smooth out operations at Stapleton. Said Boyd, "It would have given Stapleton the same capacity that the new airport is supposed to have."

In selling the airport idea to Congress, Peña said that eliminating the alleged delays at Stapleton would save the airline industry \$120 million a year in operating costs. But according to Aviation Systems Research Corporation figures, with emplanement figures going up an estimated \$9.50 per person, at 15 million passengers in 1994 the increased cost to save that \$120 million will be \$142.5 million.

Where Have All the Passengers Gone?

In the early 1980s, as a result of deregulation and lower fares, the airline business boomed and hubs did especially well. Stapleton's traffic reached a record-high 34.7 million passengers, and the FAA predicted a steady increase in Denver traffic to 72 million by the end of the century, with Denver becoming the nation's second-busiest airport.

But the FAA didn't realize that the sudden burst in airline ridership was essentially a one-time explosion, and it failed to look at the trends in airport hubbing. Long before the first shovel of dirt was dug at the new airport site, it was becoming clear that the superhub concept was in danger. The same deregulation that led to vastly increased ridership led to decentralization of hubs. In 1978, when the airlines were deregulated, there were only four hubs. By 1990 there were thirty-five, many of which had lower landing fees than Stapleton's and were siphoning off business.

An Aviation Systems study warned that the "political focus" on building superfluous hubs was threatening to make "airport building the S&L scandal of the 1990s." It noted that there is excess potential hub capacity already, including Kansas City, Dayton, and Atlanta, and that the big dollars are going to megaprojects like Denver's, while "small cities must literally beg to get an instrument landing system" budgeted to their airports. Denver International, said the report, was characteristic of the fact that "America is planning new airports

for the 1980s, not the 21st century."

Also contributing to the decline was the folding in 1986 of Frontier Airlines, one of the three airlines using Stapleton as a hub. Backers of the new airport have never even claimed that they could get an airline to take Frontier's place as a third hub. By 1990, usage of Stapleton had

dropped about 20 percent below its high point. While Stapleton traffic began picking up slowly in 1991 and increased an additional 9 percent last year, it is still operating at only half its capacity. And most likely, building the new airport will end up *reducing* air traffic through Denver.

To sustain themselves, airports need to charge fees to the airlines, which are worked into the cost of airline tickets. The current rate at Stapleton equates to a little less than \$6.00, and originally Denver International proponents claimed it would be no higher at the new airport. Now the number airport analysts are tossing around is \$15.50, which is based on a steady increase in passengers over those currently using Stapleton. The magic number is \$20, since the new airport's contracts with both United and Continental allow them to terminate or renegotiate at that point. Presumably they would do the latter, and extract even greater concessions from the airport at an even greater cost. Some critics of the new airport claim that the \$20 mark is almost inevitable, and may even be exceeded. When airport officials negotiated gate leases with American Airlines, they insisted on upping the \$20 threshold to \$25.

Aside from affecting airlines' abilities to terminate or renegotiate their contracts, the higher fees could encourage passengers to route their trips through other cities, leading to a "death spiral": higher fees resulting in fewer passengers

"The way the whole thing is shaking out is that big government, big business, big labor, big developers and the big media are one side, and the little guys who actually live in this town are on the other."

resulting in higher fees, and so on. About 55 percent of Stapleton's passengers are classified as connecting, and to connecting passengers one airport is usually as good as another. Thus, independent of air traffic trends, the new airport could be slicing its own throat.

But passengers originating out of Denver will be the real sufferers. Consider the cost of flying round-trip for a three-day weekend to Los Angeles, currently available at the best rates for about \$200. The new airport has already raised that cost by \$3, will probably raise it by another \$15 or more in airline fees, and by \$18 in parking costs or \$60 in cab fare. (More on the increased parking and cab fares later.) For the vacationer who parks, the airport has increased the cost of his trip by 18 percent over the original ticket price; for someone taking a cab it has increased 40 percent. Such increases can have a tremendous effect on such an elastic commodity as leisure airline travel.

Noted a spokesman for the Air Transport Association in Washington, "The marketplace is very sensitive to increased ticket costs." He said, "We see business loss for every dollar that fares increase." Indeed, the cut-rate Southwest Airlines, which specializes in relatively short hops, has said it will not use the new airport because the per-passenger costs are too high. (It should be noted, however, that Southwest is not currently flying out of Stapleton, either.)

In December 1990, Continental filed for bankruptcy protection, putting in doubt whether it would ever operate out of a new airport—although more recently it said it is fairly confident of pulling out of the red. In February 1991, the FAA released new traffic projections for the new airport, saying that by 2000 it would be the nation's fifth-busiest, rather than the second-busiest, with 44 million passengers a year rather than the 72 million it had earlier predicted. At about the same time, citing the Persian Gulf War and the ailing airline industry, Peña scaled back the new airport from 94 gates to 85. It now stands at 88, twenty fewer than Stapleton has. Denver International will open with five jet runways, compared to the six at Stapleton. As airport officials admit, the lower number of gates is because even many of the Stapleton gates were no longer needed for lack of air traffic. They do point out that many of the new gates are wider than those at Stapleton, giving them great flexibility.

Thus, even as the airport budget ballooned, the size shrank, leading Gene Amole to dub it "The Incredible Shrinking Airport." Still billed as the second-largest airport in the world, in fact it had become the second-largest in Denver. (And the claim of second-largest was never much more than an ego stroke. It is not based on passenger capacity or flights handled, but on *acreage*, as the airport's few structures and runways are surrounded by a vast expanse of land for which the city paid dearly. This is like putting a

refrigerator into an otherwise empty convention center and calling it the world's largest kitchen.)

The bottom line is that last year Stapleton produced revenues of about \$164 million, while Denver International will need at least \$340 million to break even. If it doesn't, it won't be able to pay off its bond obligations. When pressed on this possibility, Aviation Director George Doughty said flatly, "If the airport revenues are inadequate, the bonds will not be repaid." This sounds like an easy out for the city, but it could devastate its ability to sell bonds in the future. The bondholders don't seem particularly worried, since the bonds are currently selling above their face value. But at least one bond-rating agency, Kemper Securities, Inc., rates the bonds at lower BBB, one rank above junk.

The economics of the new airport are so bad that even if it were completed it would be fiscally smarter to just let it rot and to continue to use Stapleton, using Stapleton profits to pay off the bonds. The idea of the public demanding a switch back to Stapleton is one that city officials seem to fear—they

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are allowing Continental to close up its maintenance facility and transfer 1,500 jobs out of state rather than to continue to let it operate by ferrying planes from Denver International to Stapleton. Asked why an airport built "in order to create jobs" would prompt such a thing, Continental corporate

affairs spokesman Dave Messing said, "It was felt it would be a foot in the door to the possible resurrection of passenger service at Stapleton."

Reading Peña's Lips

Peña adamantly opposed submitting the airport to a referendum, as did Gov. Roy Romer in 1988 when he threatened to "roll over" and "crush" any attempt to let the people decide on the project. But influential state politicians threatened to start a petition drive and city council members threatened to block the project if no referendum were held, and Peña and Romer backed down.

Business interests behind the airport managed to raise four times as much money as the opposition and the referendum—worded to begin, "In order to create more jobs . . ."—passed handily. Responding to a lawsuit, the Greater Denver Corporation, an arm of the local Chamber of Commerce, later released a list of political contributors to the airport for which it had served as a funnel. The greatest contributors by far were the area utilities, with US West Communications giving \$400,000 and the electric utility, Public Service Company, kicking in \$300,000. As their ability to make such heavy political contributions indicates, the Colorado legislature allows both utilities to use their monopoly status to reap exceptionally large profits, and both saw the new airport as a cash cow. City council member Dave Doering, a strong supporter of the new airport, nevertheless argued in 1990 that

the city was entering into a "sweetheart deal for the utilities," in which Public Service would remove high voltage lines at a cost to the utility of about \$16-20 million, but in exchange would gain up to \$170 million over the next twenty years. He favored either generating power on-site on land adjacent to airport land or at least having the city own the utility equipment at the airport rather than "permanently lock the airport into a higher tariff." He lost. Sweetheart deal or no, Denver's power usage is estimated to increase by a third from 1991 to 1994, almost exclusively due to the new airport. As for US West, it has already netted a \$24 million dollar fiber-optics wiring contract from the airport, and there could be plenty more where that came from.

One owner of land adjacent to the airport site that stood to make a fortune selling to hotels and other businesses contributed \$95,000 to Greater Denver. This was the infamous Silverado Savings & Loan, co-directed by George Bush's son Neil.

A more direct beneficiary was MDC Holdings, a major contributor not only to Greater Denver but to Peña's mayoral campaign. The state attorney general found in an investigation that MDC had sold the city 100 acres for the airport. He also found that "MDC Holdings and its officials committed numerous criminal violations" in raising political funds for the airport by "extorting" sub-contractors to raise contributions, but that the company could not be prosecuted because the statute of limitations had expired. MDC contributed big amounts to the 1987 mayoral campaigns of both Peña and his Republican opponent. The Greater Denver Corporation also got a direct piece of the action when the city, without going through the bidding process, gave it \$325,000 to promote the airport.

The most effective tool for ensuring a healthy margin of victory for the airport was simply lying to the electorate as to what it was getting and what it was going to be paying for it. The referendum stated that the price of the airport would be \$1.7 billion. But shortly after the vote, an investigation by a *Rocky Mountain News* reporter showed that the city had actually hidden \$281 million in construction costs for an automated baggage system, and that the city knew about this before the vote but simply left it off the claimed price tag. Other costs that the city should have known about were also left out of calculations. Both United and Continental conducted independent evaluations and estimated that the actual amount that would be needed would be \$2.7 billion. Aviation Director George Doughty scoffed at the projections, saying the only way it would cost that much was "if you gold-plate the terminal building." Alas, the city's official figure is now \$2.7 billion with no gold plate in the terminal to show for it. Doughty resigned last year.

But the mushrooming from \$1.7 billion to \$2.7 billion

wasn't the worst of it. It turned out those figures included only design, construction, and construction management. It did not include such "incidental" items as the purchase of the land itself or capitalized interest on the bond debt. Though the city has upped its figure only to \$3 billion, the actual amount budgeted to be expended by opening day is now about \$4.4 billion. Further, City Auditor Bob Crider's annual report includes \$5.6 billion in bond interest, hardly an incidental cost. All of which pushes costs to about \$10 billion, or almost six times what voters were told the project would cost.

And even that figure could rise. The airport has now fallen behind schedule. Earlier this year, the official opening date was moved from October to December. As this article goes to press, the date has been pushed back even further—to March 9, at the earliest. Meanwhile, starting in January, the city will be paying \$500,000 a day in interest on outstanding bonds on the airport.

Peña presented the costs as practically irrelevant, since Denverites weren't going to have to pay. In commentaries printed in both local newspapers he wrote, "The airport is user-funded. Denver taxpayers will not be required to support its construction or operation." But although Coloradans would end up paying little

for the airport in direct taxes, they would be clobbered by other costs.

Part of Peña's free lunch scheme was to wrest a \$501-million commitment from the federal government in 1990. The local papers celebrated his coup in getting the whole country to pay for Denver's airport. There was only a hint that Denverites might have to pay back that money through a surcharge on passengers, and Peña quickly squelched it. "Right now, we don't intend to impose a surcharge because there is no need for it. Today we do not contemplate it. It's a possibility but I don't want to speculate on hypothetical circumstances," he said. Two years later, the hypothetical circumstances kicked in, with Denverites and those changing planes at Stapleton paying a \$3 head tax, which will probably remain in effect for the next three decades.

Thus, far from not costing Denverites more, the new airport began costing them more a year before the structure was even scheduled to open. The \$3 doesn't count against the maximum of \$20 per passenger allowed in the contracts with United and Continental, and makes Denver International even less competitive.

As the Crow Flies

Coloradans will pay most dearly for the airport—trip after trip, year after year—in the time and the money it will take to use it. City Hall had told voters that the new airport was to be 18 miles from the center of downtown. But when

*As a reporter for Denver's
Rocky Mountain News put it, "Clinton
essentially said: Do what you did
in Denver on a national scale."*

someone actually measured the distance, they found it would be a 24.5-mile trip. The city responded that the 18 miles was "as the crow flies." With a certain degree of chutzpah, Peña said that before the referendum he had made it no secret that the distance was "between 23 and 24 miles," yet even for some time after the *News* exposé the city continued to use the 18-mile figure in press releases, fact sheets, and reports on the airport. Finally, it began using a figure of 23 miles.

By contrast, Stapleton is 5.5 miles from downtown. The 24.5-mile distance will make the downtown-to-airport distance the second most remote in the nation, with only Washington's Dulles beating out Denver International, by six-tenths of a mile. And Dulles, near a major population center in Northern Virginia, is more convenient for some users; Denver International is farther away from virtually everybody. Moreover, Washingtonians have the option of using close-in National Airport, three miles from downtown, and many of them do use it rather than trekking out to Dulles. Indeed, every city that has an airport more than 18 miles driving distance from downtown has a second full-service airport less than 11 miles from the city center.

At current Denver cab rates—\$1.20 to \$1.40 a mile—the fare to the airport will be \$68 to \$79 per round trip, including a 15 percent tip. Denverites who try to save cab fare will face another unpleasant surprise. In its need to raise about three times as much money for operational costs as Stapleton needs, the city will probably be charging \$10 a day with no cheaper rates for satellite parking. That compares to \$4.00 currently for satellite parking at Stapleton.

Peña shouldn't have said that Denver taxpayers wouldn't pay for the airport, but rather that they wouldn't pay for it through the tax system. Yet even that would not have been entirely correct. The city had to forgive \$40 million of United Airlines' bond debt as a lease concession, meaning \$40 million less coming into its coffers. Then, the state was forced to kick in \$5 million in tax funds for roads connecting to the new airport, with another \$5 million coming from local governments. This despite Peña's earlier claim that the roads to the airport would already be paid for. A study commissioned by a local group opposing the airport also reported that, "The remote location of DIA will result each year in approximately 800 million more automobile miles driven, six to 10 more lives lost in traffic accidents

and tons of exhaust fumes added to Denver's brown cloud."

As to what will become of the land on which Stapleton sits, no one knows. In its original bond prospectus, the city said that even after clean-up costs it expected to get \$100 million for Stapleton. But there is no market price for old airports and the city has no idea to whom it will sell it, especially with Lowry Air Force base scheduled to shut down in 1994 and become another large tract of unused land. The city has since lowered its expectations to \$75 million for Stapleton, and Denver officials are saying it would probably take millions of dollars of infrastructure investment and inducements to attract users. It will be a daunting project. Stapleton is six times the size of Denver's entire downtown.

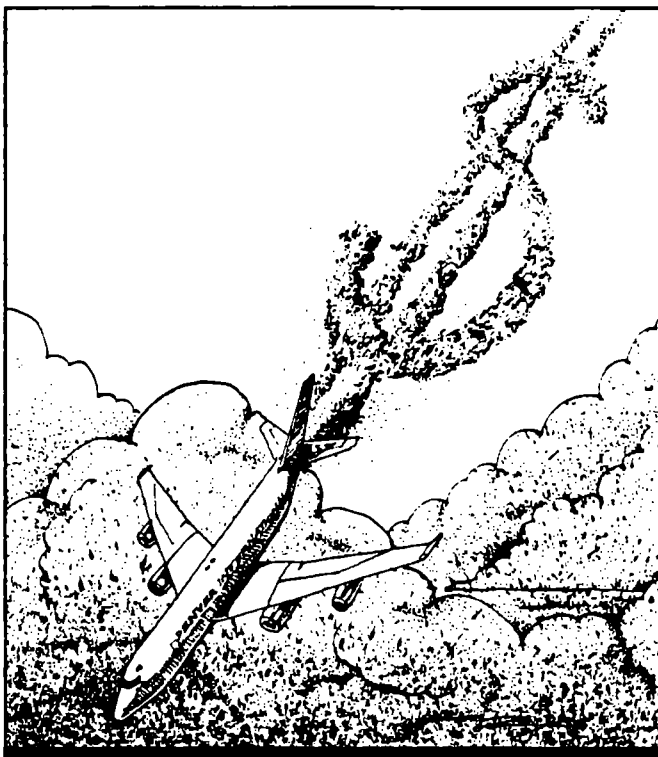
It is not a foregone conclusion that Denver International will be a flop. While nothing can possibly make it more convenient and less expensive than Stapleton, unforeseen shifts in airport use patterns may allow it to run at a profit. But unforeseen fortuities will not change the fact that Coloradans were continually and apparently intentionally misled.

Late in 1989, by which time it was becoming clear that what Denverites had voted for and what they were going to get were two different animals, some began to demand a second vote. Peña refused, saying it was "not required and would serve no point." An April 1991 poll showed 51 percent would vote against the airport if the issue were on the ballot then, although 70 percent said that since the building had begun, it should be carried through. Peña needn't have been a physics expert to know that

such a huge force once set in motion would be virtually unstoppable, no matter what the consequences.

So far, Peña too has been an unstoppable force. In any profit-making business in the world he would have been dumped unceremoniously from his job. But in the world of politics, having already risen to his Peter Principle level of incompetence in a medium-sized city, he found himself yanked right up near the top leadership post in the nation.

Nevertheless, there are those, such as Aviation Systems' Boyd, who argues that Peña's ability to sell a dog like Denver International is what made him such an ideal choice for the Clinton administration. Said Boyd, "It was built on promises that were never kept, and statistics that were totally inaccurate, and it will cost an enormous amount of money." □





That Sick Feeling May Not Be From Flying

AIRPORTS could become the next focus of air-pollution debates.

At many big U.S. airports, research shows, levels of nitrogen oxides, carbon monoxide and hydrocarbons are at least 10 times higher than in the cities they serve. Emissions are produced by cars, buses and service vehicles, and by jet engines as planes idle at the gate, taxi and take off. Jet fuel burned while engines are idling produces about 14 times the pollution of gasoline.

Innovative remedies are being tested. In Sweden, jets cut their engines and get towed to and from runways by "super-tug" vehicles. Some Canadian airports use sensors and "deflectors" on intake vents to keep noxious exhaust fumes from being sucked into terminals.

Next-generation airports will be larger, so pollution could get worse. A prototype is Denver's 53-square-mile facility, which will have 100 gates and five 12,000-foot runways when it opens in 1994. Supporters say it will ease transcontinental congestion. But with air traffic likely to rise and ground operations spread over a much bigger area, critics worry about jet and vehicle emissions. State officials now expect air pollution to be twice as bad as originally calculated.

Jim L. Starry, an environmental engineer in Boulder, Colo., figures taxiing wastes hundreds of millions of gallons a year. If jets' wheels were redesigned to store energy from landings in electric generators, he says, planes could taxi using electricity and most of that fuel could be saved.

Changes in runways could save fuel, too. A 747 landing on a flat runway burns about 48 gallons when the pilot reverses the engines' thrust to slow the plane. Mr. Starry proposes that new airport runways be built on a 2% slope. By taking off "downhill" and landing "uphill," his research finds, planes would consume about 25% less fuel. The Federal Aviation Administration is evaluating his ideas.

Boulder resident has a better airport idea

When Colorado Governor Roy Romer belatedly figured out that Denver's new airport was a \$2.2-billion white elephant, he turned to United Airlines. He should have called Jim Starry — and if he is not completely brain dead, he still will.

Starry is a Boulder engineer who has designed a more efficient airport. Saying it that way, however, does not come close to conveying the dimensions of his accomplishment. What he is done is reinvent the airport — not just Denver's airport, but the concept of the passenger airport in the age of jet travel — and if his ideas were adopted they just might turn things around for the Denver project.

At the core of Starry's concept is a simple change in airport design: At the typical airport, jets take off and land on flat runways placed a substantial distance from the passenger terminal. Starry proposes to build runways that run uphill at a 2-percent grade, and then place the terminal under the high end of the runway. The terminal's roof, in fact, would be the high end of the runway.

The advantage of doing this is that it saves jet fuel when planes are taking off and landing. It also saves fuel by largely eliminating the need for taxiing. And the savings are pretty spectacular.

A 747 landing on a flat runway will burn 330 pounds (48 gallons) of fuel when the pilot turns on the thrust reversers to slow down the plane. The figures of a 727 are 250 pounds (or 37 gallons). However, the thrust reversers of a commercial jet aircraft landing on an uphill runway with a 2 percent grade that rises 200 feet will consume 25 percent less fuel than those of an aircraft that lands on a flat runway.

Danish Plan



By Paul Danish

Multiply those savings by 700 landings a day (the traffic volume at Stapleton a couple years ago), 365 days a year, and the savings from landing on uphill runways come out to 2.3 million gallons of fuel a year.

By the same token, a jet that takes off on a runway running downhill also uses less fuel to get off the ground than one taking off from a flat runway — 20 to 40 percent less, depending on the type of jet. Starry calculates that the annual savings for jets taking off from an airport like Denver's (if 700 flights a day left it) could come to 8.2 million gallons of fuel if it were built to his design.

The real savings, however, would come from the elimination of taxiing. Jets at Stapleton currently burn a staggering 56.7 million gallons of fuel a year just taxiing between the terminal and the end of the runways. Starry figures that his airport design would eliminate 80 percent of that.

The bottom line is that the design would save about 55 million gallons of jet fuel. At 65 cents a gallon, that would save the airlines using the airport about \$36 million a year.

That alone would probably change the economics of the Denver airport significantly. The Denver airport is in financial trouble because it is being built with bonds that are to be paid off with taxes on aviation fuel, take-off and landing fees, and surtaxes on tickets. The additional taxes and fees increase the cost of operating out of the airport.

In the highly competitive airline industry, that means any airline running a hub operation out of Denver — i.e., Continental and United — would be at a competitive disadvantage compared to an airline running its flights through another city.

Airlines faced with having to use the new airport would therefore move as many of their connecting flights as possible elsewhere and limit their Denver operations to flights originating and ending in Denver. This would reduce the total amount of air traffic through Denver, forcing the city to raise fuel taxes, landing fees, and ticket surcharges on the remaining flights even higher to meet its bond payments,

which would make Denver operations even less competitive.

Romer's way out of the dilemma was to get United Airlines to set up a maintenance base in Denver, which would bring a large number of additional flights into the city, but would also allow the State of Colorado and the City of Denver — under the guise of encouraging economic development — to slip United enough dough to keep its Denver hub operations competitive.

Starry's way out is better. Instead of having to compensate the airline for using an intrinsically high-cost facility, he would build a facility that would give all airlines using it a competitive edge.

The City of Denver and the State of Colorado have proposed giving United something like \$300 million to bring its maintenance operation to Denver and bail out the airport project. United's reaction was to start shopping around for another site, which probably tells you something about how profoundly uneconomical operations from Denver International will be.

Starry has been trying for years to get the airheads who foisted the airport project on Denver to pay attention to his ideas. Their response has been to write him nice letters telling him how creative he is and to continue to march lockstep into a financial buzz-saw of their own creation.

My guess is that Denver International will turn out to be a economic turkey with or without United. Denver should consider scrapping its cloth roof terminal design and building a terminal along the lines Starry suggested. Denver citizens would still be stuck having to pay \$80 cab fares to get to and from the monument to Romer and Pena's stupidity, but at least it might pay its own way.

Science Newsfront

Edited by DAWN STOVER

PO BOX 1431
Boulder CO 80501
Jim Starry
303.989 9825

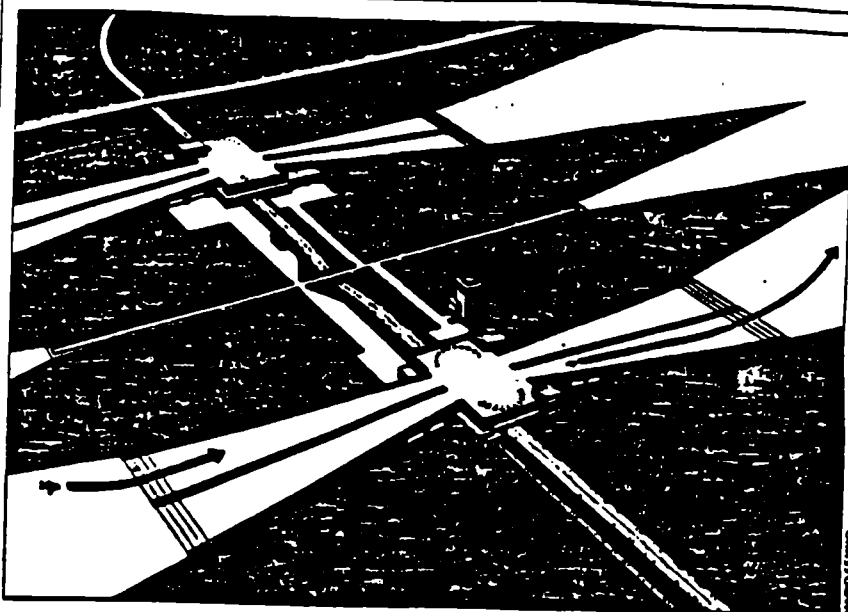
Airport of the future

While aircraft have evolved from primitive biplanes to sleek jets, runways have changed little since the Wright brothers took flight. Now, finally, a licensed pilot named Jim L. Starry, who heads Environmental Protection Designs in Boulder, Colo., has reinvented the runway. His airport design, called Starport, could reduce energy use, air pollution, and noise.

Starry's simple design takes advantage of gravity: From the top of a 20-story terminal, planes roll down a sloping runway to gather speed for takeoff. On landing, they slow down by rolling uphill to the terminal, like an 18-wheeler barreling up a ramp for runaway trucks. "No one has done anything to make the runway control the aircraft," Starry complains. In Starport, the runways are slightly concave, to help planes stay centered, and are wide where the planes touch down, but narrow as they approach the rooftop gates. Passengers reach the gates by taking elevators from parking areas, shops, and restaurants in the terminal's lower levels.

Because the Starport runways would not be steep enough to bring planes to a complete stop, Starry has designed 800-pound brake-accelerator wheels that would not only slow planes on landing, but would also generate electricity as the wheels spin. The stored electricity could be used for taxiing. "From the moment you touch down, you could turn off the turbine," says Starry.

A 747 landing on a flat runway currently burns about 48 gallons of fuel when the pilot reverses the engines' thrust. Starry claims his redesigned wheels and runways could reduce the amount of fuel required for landings by about 25 percent—saving as much as 300 million gallons annually at an airport the size of Denver's new facility, which will open in late 1994 with 84 gates. The reduced fuel consumption would also improve air quality. (The diesel fuel burned while a jet's engines are idling is about 14 times more polluting



In this fuel-saving airport design, called Starport, planes land on inclined runways and coast to gates at the top of 20-story terminals. Planes get extra power for takeoff by rolling down the sloped runways.

than gasoline.) Noise pollution would decrease too, because on takeoff planes could coast 10,000 feet before switching to full thrust.

A Starport would require less land than conventional designs like Denver's new 53-square-mile airport, and Starry claims a Starport could be built using "off-the-shelf" highway overpasses. But although airport planners are reviewing his concept, none has yet been willing to build and test a Starport prototype.

Black hole?

Earth has an escape velocity of 25,000 mph. That means an object such as a rocket must attain at least that speed to escape the clutches of Earth's gravity and head out into space. The more massive a planet, the greater the force of its gravitational attraction and the

higher its escape velocity. So the escape velocity of giant Jupiter, which has a gravitational force 350 times that of Earth, is about 133,000 mph.

Now imagine that somewhere in the universe exist objects so massive that their escape velocities exceed 186,000 miles per sec-

ond—the speed of light in a vacuum. But nothing can travel faster than light. Therefore, from such objects, there is no escape, not even for light. And with no telltale light emissions, such objects would be undetectable by direct observation.

On the basis of both theory and indirect observations, astrophysicists have long speculated that such objects, called black holes, do in fact exist. They are the remnants of collapsed stars so condensed that their gravitational pull is immense.

Now NASA's Hubble Space Telescope has garnered the best evidence yet for the presence of a black hole. It is the finest image ever of a disc of dust and cool gas—about 300 light-years across—that is being sucked into the nucleus of a galaxy in the Virgo Cluster, 45 million light-years from Earth. The nucleus, astronomers think, is the den of a black hole ten million times more massive than our sun.

"This is the first case," says Dr. Holland Ford, a Hubble scientist at Johns Hopkins University in Baltimore, "where we can follow the disc's gas in an orderly way down to the immediate environment of the black hole."

A co-investigator, Dr. Walter Jaffe of Leiden Observatory in The Netherlands, says: "We haven't seen a black hole itself. But it's as close to a black hole as we've ever seen before." —Arthur Fisher



A disc of dust and gas is being sucked into what may be a black hole.

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ROBERT HARRY FORSTROM
CONSTRUCTION MANAGEMENT CONSULTANT
POST OFFICE BOX
GLEN COVE, NEW YORK 11542
TELEPHONE (516) 671-3699
FACSIMILE (516) 674-0275

Mr. Mike Holder

Date: Time: 14:20:17

Page 1

February 18, 1993

Mr. James L. Starry
Environmental Protection Designs, Inc.
P.O. Box 1931
Boulder, CO 80306

Subject: Adaptation of the Starport airport design concept for
use as a runway for a proposed National Aerospace Plane
spaceport facility at Calverton, Long Island.

Reference: CMC0057

Dear Mr. Starry,

I am interested in reviewing your Starport airport design as a
possible design solution for a proposed NASP spaceport terminal to be
located on an environmentally-sensitive land area at Calverton, Long
Island.

Currently, I am the planning and scheduling engineer for the Aviation
Design Division of the Port Authority of New York and New Jersey that
performs engineering design for Newark International, Kennedy
International and Lagoonia Airports. In addition, I am working on the
Environmental Master Plan for these airports.

I have previously worked planning and scheduling and project management
assignments on military airbase facilities for the F-5 and F-16 in Saudi
Arabia and the Shuttle Launch Facility at Vandenberg Air Force Base.
The NASP Facility proposal is an independent initiative of mine.

The idea is to formalize your Starport concept as an environmentally
advanced spaceport terminal facility for the future NASP. The proposed NASP
Facilities are to be located on Long Island and at Moscow and Peking.
I have worked with the firm Franke, Gottgen, Cox Architects on other
endeavors and they can be retained to present the alternative design solutions
for the facilities. I am in a position to introduce these solutions
to the pertinent people at the Port Authority.

I look forward to discussing realization of your design concepts
as a future NASP Spaceport Facility.

Sincerely yours,

Robert Forstrom

Robert Forstrom

cc: Franke



Leslie E. Blattner, President

April 2, 1993

Mr. Mike Holder
Via Fax

Dear Mike,

This note is the result of a telephone conversation today with Jim Starry. We are
an aviation consulting firm with ties into the FAA, DOT, CIA, State Department,
etc. Our product is books, articles and advice on many segments of the aviation
industry. One such specialty is airports. For example, we are currently consulting
for Dr. Philip A. Kennedy, an economist and economic consultant in Washington.
Kennedy is working with foreign governments on programs of economic
development. In our book, America's Airports In The 1990's, we discuss the
economic value of airports to communities and regions. Kennedy saw the book
and called us to advise him on airport expansion and development in Mongolia.
At present we are investigating Mongolia's aviation infrastructure.

Of particular interest is Jim's ideas on the airport construction. An airport that is
environmentally safe, and requires 1/3 of the land is an appealing project, and
are seeking more information. Please send us the promotion package mentioned
this morning in my discussion with Jim.

At Jim's request, I placed a copy of our airport book in the mail. We look forward
to further discussions on airport construction, and hope this is the start of a
rewarding relationship for all concerned.

Regards,

Les Blattner

DAN SCHAEFER
6TH DISTRICT, COLORADO

107 CONGRESS BUILDING
WASHINGTON, D.C. 20545
(202) 225-7882

345 SOUTH HURON STREET, 4TH
FLOOR, BOULDER, COLORADO 80302
(303) 442-8800



Congress of the United States
House of Representatives
Washington, D.C.
October 25, 1991

ENERGY AND COMMERCE
COMMITTEE

WORKING COMMITTEES
TELECOMMUNICATIONS AND
FINANCE

TRANSPORTATION AND
HAZARDOUS MATERIALS

HANK BROWN
COLORADO

COMMITTEES
BUDGET
FOREIGN RELATIONS
JUDICIARY

United States Senate
WASHINGTON, DC 20510-0804

May 31, 1991

Mr. Jim L. Starry
Environmental Protection Designs
P.O. Box 1931
Boulder, Colorado 80306

Dear Mr. Starry:

Thank you for providing me with information about your proposals for environmentally sensitive airport development. I appreciated hearing from you.

I am aware, based on the correspondence you provided, that Senator Hank Brown and Representative Joel Hefley have already contacted the Federal Aviation Administration on your behalf. After having had a member of my staff consult with their offices, I have been informed that the progress of these inquiries is ongoing.

As one who was intimately involved in reauthorizing the Clean Air Act, I am acutely aware of the importance of responsible and efficient pollution reduction efforts. In this context, your designs would seem to be an appropriate strategy worthy of further consideration.

Again, thank you for getting in touch. Please feel free to let me know of your additional comments on this or any other matter.

Best regards.

Sincerely,

DAN SCHAEFER
Member of Congress

DS/tdt

PRINTED ON RECYCLED PAPER

Mr. Jim L. Starry
Environmental Protection Designs,
Inc.
Post Office Box 1931
Boulder, Colorado 80306

Dear Mr. Starry:

Many thanks for your letter regarding your proposal for a new airport design. I am pleased to see that your design addresses one of Colorado's most pressing problems----air pollution.

To express interest in your idea, I have written to the Federal Aviation Administration to inquire if architectural designs that emphasize fuel-efficiency and pollution reduction were considered for the new Denver airport.

Again, thank you for taking the time to contact me. Hopefully, your environmental designs will have additional applications to help cities address such problems.

Sincerely,

Hank Brown
United States Senator

HB/jac



DEPARTMENT OF THE AIR FORCE

THE DEPARTMENT OF CIVIL ENGINEERING
UNITED STATES AIR FORCE ACADEMY CO 80840-5701

14 January 1992

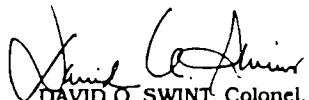
Mr. Jim L. Starry
Environmental Protection Designs, Inc.
P.O. Box 1931
Boulder CO 80306

Dear Mr. Starry,

I would like to invite you to be a speaker in our Department of Civil Engineering Distinguished Speakers Program. This program brings in top practitioners in the field of civil engineering to present talks on topics of interest to both the faculty and cadets. Your innovative ideas on a new airport design concept would be extremely interesting to us, especially as it relates to our teaching Civ Engr 310, "Air Base Design and Performance", which is taken by all Air Force Academy cadets.

I understand Captain Rich Cosgrove, our Course Director for Civ Engr 310, has already discussed the possibility of your coming to the Academy with you. You indicated February would be good for you; however our speaker schedule is fairly busy this month, and March may be better for us. In any case, please contact Rich or Major Ken Knox (our Speakers Program coordinator) at (719) 472-3150 and we'll work with your schedule. I sincerely hope you will be able to join us -- your insights into innovation in engineering will be of great interest to me, the faculty, and our students.

Sincerely,


DAVID O. SWINT, Colonel, USAF
Professor and Head


Senate Chamber
State of Colorado
Denver

DAVID E. LEEDS
State Senator
P.O. Box 442
Louisville, Colorado 80027
Capitol: 866-4866
Home: 673-0282

Senate President Ted Strickland
State Capitol
Denver, CO 80203

COMMITTEES
Member of:
Finance
Judiciary
Local Government

March 4, 1991

Dear Senator Strickland,

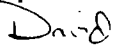
Whoever said that "Politics is the art of the possible" never encountered the kind of bureaucratic stone-walling and government buck-passing experienced by Jim Starry of Boulder, Colorado.

Mr. Starry, of Environmental Protection Designs, Inc., has proposed a new airport design... one which, were it constructed, would establish Denver as an international leader with respect to its creative architectural response to tough policy questions. His airport would annually save millions of dollars in wasted fuel, thus contributing to America's energy independence. It would significantly reduce airport-generated air pollution, always a major concern of Coloradans. It would relieve airport congestion, flight stacking and passenger delay. It is, in fact, a vision of the airport of the future... but provides a blueprint using technologies we possess today.

Various federal agencies -- including the EPA, FAA, NCAR and NOAA -- have reviewed Jim Starry's proposal. Each has referred him elsewhere. Mr. Starry's response from state and national elected officials has been similar. I pray we have not reached a point where citizens of uncommon insights or abilities are discouraged or thwarted by a system closed to new ideas.

I know you are quite busy. Nevertheless, I invite you to review the enclosed materials and consider Mr. Starry's timely recommendations. Jim Starry will follow up with a phone call in a few days to see what can be done at this point. I thank you for your consideration.

Best personal regards,


Senator David Leeds

October 4, 1993

Mr. T.H. Howard, Chief Engineer
Power Train Operations
PO Box 2053, Ford Motor Company
Dearborn, MI 48121

Dear Mr. Howard:

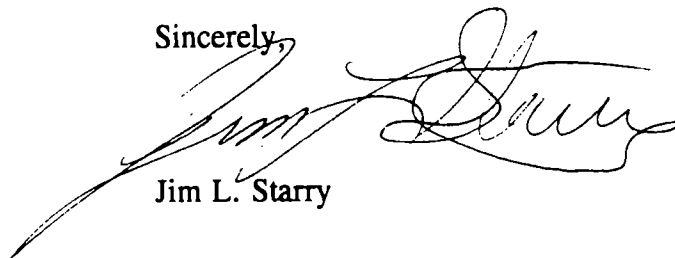
On the advice of a former employee of Ford Motor Company, I am writing this letter to you in the hopes that, with your interest in developing products giving greater fuel efficiency while reducing emissions, an association with you through the testing and marketing phases would allow my device to reach the marketplace sooner.

I have developed an auto emissions control device which cleans the air while you drive your automobile; in other words, the air coming out of the tail pipe is cleaner than that entering the carburetor. This device increases fuel efficiency between 22-28% without breaking the 2nd law of thermodynamics since I am only using a greater percentage of the wasted energy now hidden in exhaust gasses. The device pre-processes auto emissions while extracting power. This system could be retrofitted to existing autos and later, manufactured on new ones. It has been in use on my personal car for a year and a half.

The enclosed packet documents that as Environmental Protection Designs I have spent the last six years designing over half of the new Denver International Airport without compensation. I have been told by numerous agencies that my designs are genius, but so far have not been able to find an avenue that would bring them into public use. This information packet should also give you an idea of the simple environmental solutions possible in many areas. You may authenticate my capability as a designer by contacting either Dr. John Firor or Dr. Michael Glantz, both of whom can be reached at (303) 497-1000.

I have been told by numerous government agencies that distribution is not their job: "Take it to private industry." Ford Motor Company is an international organization interested in producing the finest environmentally sound automobile and has reputation for integrity; I would be happy to develop an association with you.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim L. Starry", with a long, sweeping underline that extends to the left.

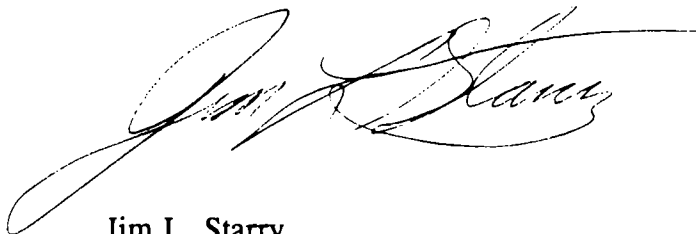
Jim L. Starry

April 30, 1993

I would like to add this packet to the information I have sent to you in previous mailings, dated April 21, 1992, June 12, 1992 and September 8, 1992. We are now experiencing in Denver the inevitable consequences of poor planning and rushing into a huge construction project without properly considering the consequences of our actions. The new airport, not too surprisingly, is now being criticized (months before it is even open) as being poorly conceived: runways too close together; constricted access which will result in traffic nightmares; remote location resulting in millions of unnecessary miles traveled by individual autos; lack of mass transportation to and from the city, and so forth.

Your interest and involvement in airport planning and construction prompts me to send this information for your consideration in the hope that it may cause some concern about duplicating errors already made. New airports need to be planned for use over the *next* 50 years, not just copied from those that have been in use during the past 50 years.

Thank you for your attention.

A handwritten signature in cursive script, appearing to read "Jim L. Starry". The signature is fluid and extends across the width of the text block below it.

Jim L. Starry
Environmental Protection Designs, Inc.
Boulder, Colorado USA

April 21, 1992

Dear «salutation»

The purpose of this letter is to bring to your attention a matter of importance of which you may already be aware. Environmental issues are among those considered by Americans to be as worthy of concern as economic and geopolitical concerns. Many feel that there is some direct connection between the major issues of our time, but through an inability or unwillingness to address those relationships, much of the public discussion is emotional or hypothetical in nature. Consequently, many well intentioned people fail to consider solutions which are economically and politically feasible as well as effective in resolving environmental concerns.

We have developed techniques, for which patent applications are now pending, for reducing aircraft fuel consumption and its attendant air pollution while cutting the costs of airport property acquisition and construction by the simultaneous use of gravity and the application of modern ground traffic control techniques.

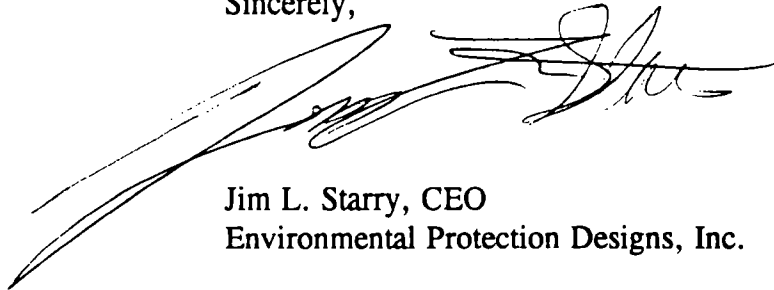
Our research models project the savings of millions of dollars annually by the innovative use of presently existing technology, while measurably improving air quality in and around metropolitan areas.

Our representative would be pleased to meet with you or your advisors to discuss these matters in further detail in an appropriate setting. We have no objection to the use of our ideas and models for political or commercial purposes, as long as it is understood and agreed that all information disclosed by us remain proprietary intellectual property, for which reasonable compensation may be sought in the event of its actual utilization. Additionally, financial responsibility dictates that our consultation fees not be so high

as to discourage discussion, but not so depleting that our participation adversely affects our research and development efforts. Consequently, presentation and consultation fees are currently set at \$100.00 per hour or \$1,000.00 for three (3) consecutive days of consultation, plus ordinary and necessary expenses for food, travel, and accommodations. No charge, other than for expenses, is made for presentation and consultation services for accredited educational institutions, including public secondary schools.

Should you have further questions or any comments, please contact us at the address on this letterhead.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jim L. Starry', is written over a horizontal line. The signature is fluid and cursive, with a long, sweeping underline that extends to the left and then curves back under the name.

Jim L. Starry, CEO
Environmental Protection Designs, Inc.