HONOLULU AUTHORITY for RAPID TRANSPORTATION

MINUTES

Board of Directors Meeting
November 17, 2011, 10:30 A.M.
Mission Memorial Annex Conference Room
550 South King Street, Honolulu, Hawaii

PRESENT:	Carrie Okinaga	Robert Bunda
	Ivan Lui-Kwan	Don Horner
	William "Buzz" Hong	Keslie Hui
	Wayne Yoshioka	Glenn Okimoto
	David Tanoue	
ALSO IN ATTENDANCE:	Toru Hamayasu	Councilmember Tom Berg
(Sign-In Sheet and Staff)	Gary Takeuchi	Councilmember Breene Harimoto
	Joyce Oliveira	Frank Genadio
	Wes Mott	Matt Robertson
	Pat Lee	Reid Yamashiro
	Nālani Dahl	William Spiegelberg
	Simon Zweighaft	Shannon Wood
	Joe Magaldi	Maurice Morita
	W. Zimmerman	
EXCUSED:	Damien Kim	

I. Call to Order by Chair

At 10:53 a.m., the meeting of the Board of Directors was called to order by Board Chair Carrie Okinaga.

II. Public Testimony

Ms. Okinaga called for public testimony. Frank Genadio read from his written testimony, which is attached hereto as Attachment A of these minutes. Councilmember Tom Berg submitted written testimony, which is attached hereto as Attachment B of these minutes. Councilmember Berg also provided oral remarks regarding Maglev technology and a supplemental EIS. Councilmember Breene Harimoto stated that any delays will be detrimental to the project, and further stated that there is a limited timeframe under which Honolulu can receive a FFGA.

Councilmember Harimoto stated that he has confidence in the HART Board, but did note that there is a great deal of misinformation regarding the project in the public. Board Member Don Horner thanked Councilmember Harimoto for his support, and stated that the Board is taking seriously the letter sent by Council Chair Martin and Councilmember Gabbard. Mr. Horner indicated that the Finance Committee and Project Oversight Committee will convene a joint meeting immediately after Thanksgiving to address concerns.

Russell Honma provided testimony on Maglev technology. Mr. Honma also stated that he believes the Core Systems contract can be changed and a supplemental EIS can be completed.

III. Approval of Minutes of November 3, 2011 Meeting

Ms. Okinaga called for the approval of the minutes of the November 3, 2011 Board Meeting. There being no objections, the minutes were unanimously approved.

IV. Report of Human Resources Committee

Human Resources Committee Chair Keslie Hui reported that the Human Resources Committee met on the morning of November 17, 2011 to consider the work plan for hiring a permanent Executive Director and to consider the job description for the Executive Director position. Mr. Hui reported that Gregg Moser, Principal at Krauthamer & Associates ("K&A"), the firm selected to provide executive search services, gave the committee a presentation on these topics.

Mr. Hui asked how many responses were provided to HART's Executive Search RFP. Deputy Project Officer Frank Doyle stated that two responses were received.

Ms. Okinaga stated that Interim Executive Director Toru Hamayasu has excused himself from the procurement process and any involvement with the search, as he may potentially be a candidate for the permanent Executive Director position. Mr. Hamayasu was excused from this portion of the meeting.

Mr. Moser introduced himself and provided a brief background on K&A. Mr. Hui asked Mr. Moser about international recruitment and the search schedule. Mr. Moser replied that the recruitment effort will be broad, with advertisements placed in various industry publications, with consideration given to both internal and external candidates. Mr. Moser urged the Board to act quickly, as some publications have deadlines.

Board Member Ivan Lui-Kwan asked how much the search process might cost. Mr. Hui replied that the process will cost approximately $150,000. Board Member William "Buzz" Hong asked how K&A performs background checks. Mr. Moser replied that K&A uses a third party to do extensive background checks, involving local, national, and international sources and encompassing criminal records, financial records, driver records, past divorces, past bankruptcies, any aliases, and more.

Mr. Horner asked how K&A intends to balance the desire to maintain an open search with the privacy interests of the candidates. Mr. Moser recommended keeping search records as confidential as possible to protect the privacy interests and current jobs of any applicants. Mr. Moser warned that publicly exposing the process will limit the pool and affect the quality of applicants.

Mr. Lui-Kwan asked whether an incoming Executive Director/CEO might want to bring in his or her own staff. Mr. Moser replied that the Board should discuss this further, and added that candidates typically do want to bring some people along with them.

Mr. Horner observed that the City Charter requires five years of fixed guideway experienced, and asked how difficult it might be to find someone who fulfills that requirement. Mr. Moser noted that the requirement will limit the pool, but also added that there are various individuals who may be qualified because of their experiences at ports, airports, state DOTs, etc. with people moving systems.

Ms. Okinaga and Mr. Hui asked Mr. Moser to discuss a potential salary for the Executive Director/CEO. Mr. Moser stated that Honolulu's capital program is one of the biggest in the country, and so HART must be as flexible as possible when looking at what the candidates might bring to the table. Mr. Moser advised the Board to look at the market rate and to try to be competitive, which may entail base salaries in the range of $150-200K, or possibly in the range of $300-400K.

Mr. Horner suggested that, although the Board has always looked at hiring an Executive Director/CEO for a long-term basis, the Board might consider hiring someone on a contract basis for the construction phase, and another person, perhaps a local, for the operational phase. Mr. Moser stated that this would have to be discussed with the candidates.

Ms. Okinaga moved that the Board adopt the recruitment plan, the advertisement, and the position description, as amended by the Human Resources Committee; that the Human Resources Committee be authorized to make further nonsubstantive amendments without requiring the reapproval of the Board; and that the Chair of the Human Resources Committee be named as the primary point of contact with K&A and staff on this matter. Mr. Horner amended the motion to require that the HR Chair be in communication with the Board Chair to the extent permitted by the Sunshine Law. The amendment was seconded by Mr. Lui-Kwan. The motion, as amended, was seconded by Mr. Hong. There being no objections, the motion, as amended, was approved unanimously. The recruitment plan and advertisement, as approved by the Board, are attached hereto as Attachment C of these minutes. The position description, as approved by the Board, is attached hereto as Attachment D of these minutes.

Following discussion of matters relating to the hiring of a permanent Executive Director/CEO, Mr. Hamayasu rejoined the meeting.

V. Report of Finance Committee

Mr. Horner reported that the Finance Committee met on November 17, 2011 to discuss and conduct a public hearing on the proposed FY2013 Operating and Capital Budgets. Mr. Horner further reported that the Finance Committee unanimously approved the proposed FY2013 Operating and Capital Budgets, which will be submitted to the Mayor and City Council before being returned to the full Board for approval. Mr. Horner also reported that the Finance Committee reviewed the Six Year Capital Program, and will continue their review at the committee's December meeting.

VI. Update on Core Systems Contract

A. Results of Third Party Review of Bonds

Mr. Lui-Kwan reminded the Board that he submitted a Disclosure of Conflict of Interest Form with the Ethics Commission, City Clerk, and City Council for matters relating to Ansaldo Honolulu JV.

Mr. Hamayasu reported that, per the request of the Board, Kobayashi, Sugita, & Goda ("KSG") was asked to provide an independent legal opinion to determine if the performance bond provided by Ansaldo satisfied the requirements set forth in the RFP, pre-bid documents and the contract. KSG concluded that the bonds provided by Ansaldo are in compliance with the requirements of the RFP, any pre-bid documents and the contract itself. Mr. Hamayasu reminded the Board that the finding of KSG is consistent with the conclusion of a separate Corporation Counsel review.

Mr. Hamayasu also reported that, due to issues which were reported by *Bloomberg Businessweek* and *The Wall Street Journal*, HART will conduct additional due diligence to investigate the reported events and their possible impacts to the joint venture's financial capacity. Mr. Hamayasu stated that if the results of this additional due diligence are positive, HART will execute the contract. Mr. Horner stated that the Finance and Project Oversight Committees will meet jointly on November 25 to focus on the financial capacity of the joint venture.

Mr. Hui asked what effect a credit downgrade of Finmeccanica would have on the joint venture's bonds. Mr. Hamayasu replied that the risk is not transferred to the surety, as it is the surety that issues the bonds. Joe Stewart of KSG clarified that the bonds are an independent obligation from the surety to HART.

Mr. Horner asked whether the bonds offered by Ansaldo Honolulu JV are standard construction bonds. Mr. Stewart replied that the bonds followed a form that was established by the state procurement office, which all Offerors were to use. Mr. Hui asked about the carrying cost of the bond. Mr. Hamayasu stated that the standard carrying cost, as established by FTA best practices, is 0.5% to 2%.

Mr. Hong stated that he has a level of comfort after hearing the third party review, and requested to get a satisfaction survey from Ansaldo's past and current customers and from Ansaldo's suppliers.

Ms. Okinaga noted that a significant amount of due diligence had been performed since the procurement was initiated in April 2009. Ms. Okinaga observed that the Board received letters of guarantee from Finmeccanica above and beyond the contractual safeguards, held eight discussions at Board meetings, and conducted a joint committee meeting to probe Ansaldo's finances. Mr. Horner noted that the procurement analysis was based on June 30 data, and stated that the due diligence at the November 25 meeting will focus on whether there have been any material changes since then.

B. Presentation on Scope of Core Systems Contract

Ms. Okinaga requested that the Presentation on Scope of Core Systems Contract be deferred until the next Board meeting. There were no objections to the request.

VII. Report of Interim Executive Director

Mr. Hamayasu distributed printed copies of his Interim Executive Director's Report, which is attached hereto as Attachment E of these minutes.

Mr. Hui asked how Honolulu might be affected by the $510M found in the FY2012 Transportation Appropriation Conference Report. Mr. Hamayasu stated that if the funds were to be divided equally amongst the top five recipients, Honolulu would only be about $20M short of the $125M projection in the financial plan. Mr. Hui also asked whether there is a fee to cancel contracts. Mr. Hamayasu stated that HART has the ability to terminate a contract for specific reasons without a fee, but noted that the contractors might be expected to file a claim.

VIII. Adjournment

Having no other pending business, Mr. Yoshioka moved that the meeting be adjourned. Mr. Hong seconded the motion. There being no objections, the meeting was adjourned by Ms. Okinaga at 12:19 p.m.

Respectfully Submitted,

Tyler Dos Santos-Tam
Board Administrator

Approved:

Carrie Okinaga
HART Board Chair

DEC - 1 2011
Date

[ATTACHMENT A]

To: **The Honolulu Authority for Rapid Transportation Board of Directors**
From: Frank Genadio
Subject: Testimony for the HART Board Meeting
Date/Time: November 17, 2011, at 10:30 a.m.

Honorable Ladies and Gentlemen. I am a rail supporter but have submitted testimony or testified in person a number of times at various venues on re-opening the rail competition with a change that could be most beneficial to the city. It now seems that some members of the City Council are thinking along the same lines. If they, however, are only thinking about a re-compete among the two remaining steel wheel on steel rail (SWSR) suppliers, they are being "short-sighted" and would be overlooking a better course of action.

So far, the city seems to have done a pretty good job of putting the project at risk without needing any help from rail opponents. The Federal Transit Administration—even though obviously aware that it received a flawed product—accepted an Environmental Impact Statement (EIS) that did not follow its own Notice of Intent (NOI). Let me restate it for the record: "The draft EIS would consider five distinct transit technologies: Light rail transit, rapid rail transit, rubber-tired guided vehicles, a magnetic levitation system, and a monorail system." It says nothing about having a (so-called) expert panel select a technology long before even the draft EIS was published. In fact, the city's Director of Transportation Services, in response to letters to those who commented on technology during the scoping process in 2006, stated that "Vehicle and system technologies will not be selected prior to the draft Environmental Impact Statement. Comments about issues related to vehicle and system technologies will be considered when specifications are developed." As you know, the draft EIS was released days before the 2008 vote on a steel wheels system—basically to a misinformed and misled public.

Furthermore, in 2007 the American Planning Association Hawaii Chapter (APAHI) issued a paper that stated "The Federal Transit Administration (FTA) prefers that cities not select a vendor and technology prior to preparation of the environmental impact statement (EIS). FTA does not want cities to tie their hands to one vendor and technology before the environmental impacts of that technology have been fully explored in an EIS." A former member of the City Council, Gary Okino, was a member of APAHI at that time—but had no problem accepting the panel recommendation and stating (in 2008) that he could have told us 25 years ago that steel wheels on steel rails is best. In 1983, I had a bulky dual-floppy desktop IBM computer that could not browse the Internet or send an e-mail; now I carry a Blackberry in my pocket.

Anyone who believes that the EIS covered anything other than SWSR either has not read it or cannot comprehend its contents. That single (NOI) statement above may be enough by itself for the anti-rail lawsuit to succeed.

I will reiterate that I want a rail system for O'ahu so am hoping that the lawsuit fails; therefore, I believe that the following course of action is doable. Allow me to propose a schedule that would not endanger the existing project. I will start with the assumption that it will take until the end of the (calendar) year for the mayor, the City Council, and HART to place a temporary halt on the project and initiate the new schedule, listed below point by point:

Step 1: Direct PB Americas and InfraConsult to re-accomplish the EIS to: add coverage of rubber tire on concrete, conventional monorail, and magnetic levitation (mag-lev) systems; include decibel noise measurements 50 feet perpendicular from the guideway; show overhead ("God's eye") views of the impact on the planned arterials of the guideway for each technology; add an alignment that deviates from the plan to follow a route that runs mauka of downtown Honolulu; and prepare cost estimates that not only include the full locally preferred alternative (i.e., the LPA, to the University of Hawaii campus in Manoa, into Waikiki, and out to West Kapolei) but also detail yearly (per mile?) operating and maintenance (O&M) costs for 30 years. The revised EIS will be delivered no later than March 30, 2012. If the current contracting team claims that it will not be able to meet the schedule, fire both companies with cause and hire a new team (and, yes, I believe such a team can be found, particularly when the long-term potential for earnings is explained by showing what the current team has made to date).

Step 2: Prepare a Request for Proposals (RFP) directed toward guideway construction-technology supplier teams that will submit bids for both versions of the 20-mile minimum operable segment (i.e., the MOS, with both mauka and makai alignments) and for the LPA extensions. Ansaldo should be advised that it will not have to pay the $150,000 penalty and will be allowed to compete—now that it has the proper licensing credentials. Kiewit Pacific should be advised that it can continue with its soil sampling work but not start any construction; it also should be encouraged to pursue teaming for the new contract. Construction teams will be allowed to team with more than one type of technology supplier. Considering the current economic environment, the city might see the following technology suppliers in a new—and open—competition: for SWSR—Ansaldo, Bombardier, Mitsubishi-Sumitomo, Alstom, and Siemens; for rubber tire on concrete—Translohr, Siemens, and Advanced Public Transport Systems (i.e., Phileas); for conventional monorail—Bombardier and Hitachi; and for mag-lev—Mitsubishi-Itochu, Hyundai-Rotem, Beijing Enterprises Holdings, and (possibly) American Maglev and General Atomics. A Request for Information should be sent to each of the above companies in the first week of January, along with an announcement that the RFP will be released by February 29, 2012, with bids expected by May 31st. (NOTE: Mitsubishi-Itochu responded to such a request initially; I do not know whether or not it would again respond if it believes that Mitsubishi-Sumitomo now has an "inside track" for an SWSR award. My presumption is that it would only if convinced—by HART—that a new competition would indeed be open [i.e., no guarantees for SWSR] and Sumitomo would be one of several bidders.)

Step 3: Send a formal letter explaining the above course of action to U.S. Secretary of Transportation Ray LaHood, FTA Administrator Peter Rogoff, and U.S. Representative John Mica, Chairman of the House Transportation and Infrastructure Committee (with information copies to Hawaii's Congressional delegation). Advise them that a new guideway construction-technology supplier team winner will be announced by July 13th, and that a request for a Full Funding Grant Agreement will be submitted no later than July 31, 2012—for receipt of substantial funding in (federal) fiscal year 2013 (i.e., after October 1, 2012).

As I recently advised the mayor, the city's "it's too soon-it's too late" responses to the queries and suggestions (from those of us advocating for an open competition over the past six years) have been tiresome as well as insulting to our intelligence. If any of you believe that I and other rail supporters critical of the current project are ignorant of "the facts," and since the apparent strategy of the city administration is to ignore (rail) alternatives that would keep the project on track but potentially more acceptable to taxpayers as well as commuters (only bolstering anti-rail efforts), then please accept Councilman Tom Berg's invitation to participate in his December 6, 2011 panel discussion on rail—rather than send the "message" that the city's positions are indefensible against both project critics and rail opponents.

There really is a chance to still develop and implement the rail project efficiently and ethically. Please help in getting RAIL DONE RIGHT. Mahalo and Aloha.

Frank Genadio
92-1370 Kikaha Street
Kapolei, HI 96707
672-9170

[ATTACHMENT B]

CITY COUNCIL
CITY AND COUNTY OF HONOLULU
530 SOUTH KING STREET, ROOM 202
HONOLULU, HAWAII 96813-3065
TELEPHONE: (808) 768-5010 • FAX: (808) 768-5011

TOM BERG
COUNCILMEMBER
HONOLULU CITY COUNCIL • DISTRICT I
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November 16, 2011

Carrie Okinaga, Chair
HART Board of Director
1099 Alakea Street, Suite 1700
Honolulu, Hawaii 96813

Dear Chair Okinaga and Members of the HART Board,

Please do everything in your power to be looking out for the taxpayers. It is obvious there is a better way. Please see attachments that outline a better way is indeed achievable.

Aloha,

Tom Berg

TOM BERG
Councilmember – District 1
Ewa Beach, Kapolei, Waianae Coast

TB:ge

Attachments: (1) Resolution 248 – redo the rail award
(2) Resolution 258 – redo the EIS
(3) KGMB – confirmation

CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

No. 11-248

RESOLUTION

URGING THE MAYOR, THE CITY'S CHIEF PROCUREMENT OFFICER, AND THE HONOLULU AUTHORITY FOR RAPID TRANSPORTATION TO REVERSE THE AWARD TO ANSALDO HONOLULU OF THE "CORE SYSTEMS" CONTRACT FOR THE CITY'S RAIL PROJECT BY UPHOLDING THE PROTESTS OF THE OTHER OFFERORS OR BY CALLING FOR NEW BIDS FROM ALL THREE OFFERORS.

WHEREAS, the City has awarded a contract to Ansaldo Honolulu ("Ansaldo") to design, build, operate and maintain the City rail project's "core systems," which include 80 train cars and a system control center; and

WHEREAS, Ansaldo, a joint venture between AnsaldoBreda and Ansaldo STS, was awarded the contract over the submission of two other competitive proposals, one by Sumitomo Corporation of America ("Sumitomo"), and the other by Bombardier Transportation ("Bombardier"), of which the latter will potentially save the City hundreds of millions of dollars as reflected in the following table:

Project Phases	Ansaldo	Bombardier	Sumitomo
Design-Build Cost	$573,782,793	$697,263,592	$688,825,949
Intermediate Operations and Maintenance	$166,974,503	$86,550,393	$273,491,568
Full Operations and Maintenance	$339,056,303	$176,167,567	$240,438,085
Optional Operations and Maintenance	$317,573,494	$203,375,014	$250,694,496
Total	$1,397,387,093	$1,163,356,566	$1,453,450,098

and

WHEREAS, the evaluation of the proposals submitted by the three proposers was based on a variety of factors, including price, past experience, performance, and the proposers' management team; and

WHEREAS, Bombardier has more than 100,000 train vehicles in operation in 25 countries; and

WHEREAS, it has been reported that in other places AnsaldoBreda has had problems delivering train vehicles it had contracted to deliver in a timely manner and according to specifications, including the following examples:

RESOLUTION

(1) In 2003, AnsaldoBreda won a contract from the Los Angeles County Metropolitan Transportation Authority to deliver 50 light-rail vehicles by June of 2007 but delivered only 19 vehicles by January 2009, and even those vehicles were 5,000 to 6,000 pounds overweight; and

(2) Danish train company DSB has said that AnsaldoBreda was behind schedule in delivering 14 trains by 2009, delivering only eight trains, only three of which were operational and even those had problems;

and

WHEREAS, Bombardier's proposal also includes plans to: (1) assemble 65 train cars on Oahu, creating an estimated 150 full-time local jobs, most of which will become permanent local jobs maintaining the train cars; and (2) create training programs at the University of Hawaii and Leeward Community College to train residents for jobs with the train system; and

WHEREAS, Ansaldo will assemble all of its train cars on the mainland and will not provide local jobs or training programs similar to those that Bombardier proposes to provide; and

WHEREAS, the Council has raised a number of questions and concerns regarding the award of the core systems contract to Ansaldo including the following: (1) Ansaldo has had a spotty performance record with respect to the trains it has contracted to deliver to other train authorities; (2) the design and build portion of the contract was weighted as being seven times more important than the operations and maintenance portion which gave an advantage to Ansaldo, even though its operations and maintenance costs for the interim period and the optional extension far exceeded the same costs for Bombardier and was significantly higher than those costs for Sumitomo; (3) Ansaldo's design and build price dropped from $679.8 million in June 2010 to $574 million in February 2011, while its operations and maintenance price went up by about $100 million; (4) Bombardier's second best and final offer ("BAFO") was rejected because it allegedly included an inappropriate condition regarding a change in the indemnification clause, even though, according to Bombardier, it was not a condition but merely a request for clarification and despite the fact that the alleged condition was included in Bombardier's first BAFO without causing Bombardier's proposal to be rejected; and

RESOLUTION

WHEREAS, these problems and concerns with the procurement of the core systems and the award of the contract to Ansaldo have resulted in the following actions:

- Bombardier has filed legal action in Circuit Court seeking to invalidate a State agency's summary judgment throwing out Bombardier's appeal that it was unfairly and improperly disqualified. Bombardier has also requested the Federal Transit Administration to review whether the City has violated both State and Federal procurement laws by failing to conduct meaningful discussions with Bombardier about specific language in its proposal;

- A well-known group of rail opponents have filed suit in U.S. District Court seeking to invalidate the project's environmental impact statement ("EIS") and federal government approval. The plaintiffs accuse the City of violating federal environmental, historic preservation and transportation laws in preparing the EIS, claiming that City officials defined the requirements of the project so narrowly as to exclude all reasonable alternatives, including monorail, light rail and other technologies. An injunction is being sought that would require the City to prepare a new or supplemental EIS; and

- Two firms, both potential subcontractors for the project, have filed complaints with the State Contractors Licensing Board alleging that Ansaldo was not licensed as a contractor in Hawaii when it bid on the contract to design, build, operate and maintain the City's rail system—an apparent violation of state law;

and

WHEREAS, at the very least, these legal actions create serious doubts about the validity of the Ansaldo award, and in fact, may result in halting the project and requiring the City to prepare a new EIS that leads to a new request for proposals on the core systems contract; now, therefore,

BE IT RESOLVED by the Council of the City and County of Honolulu that it urges the Mayor, the City's Chief Procurement Officer, and the Honolulu Authority for Rapid Transportation to reverse the award to Ansaldo Honolulu of the "core systems" contract for the city's rail project by upholding the protests of the other offerors or by calling for new bids from all three offerors; and

BE IT FURTHER RESOLVED that the procurement process for this contract pick up where it left off, resuming the evaluation of all three offerors on a fair and equitable

basis; or barring that course of action, beginning at square one and calling for new bids based on criteria that best serve the interests of Honolulu residents and taxpayers, giving appropriate weighting to cost considerations in all phases of the contract, including design, building, operations and maintenance—and thereby yielding the creation of the greatest number of guaranteed jobs for the residents of Hawaii at the lowest cost; and

BE IT FURTHER RESOLVED that should the lawsuit in U.S. District Court result in an injunction and the requirement of the preparation of a new EIS that appropriately considers and evaluates all viable technologies and alternatives, including but not limited to magnetic levitation, monorail, rubber tire on concrete, managed lanes and bus rapid transit, the City is urged to issue a new Request for Proposals for the core systems contract based on factors including but not limited to: 1) Due diligence and investigation of past performance in other jurisdictions, 2) Criteria that appropriately considers low cost, jobs creation, and financial standing, and 3) Appropriate communications with all offerors in order to prevent and cure misunderstandings as they arise; and

BE IT FINALLY RESOLVED that copies of this Resolution be transmitted to the Mayor, the Director of Budget and Fiscal Services, and the Chair of the Honolulu Authority for Rapid Transportation Board of Directors.

INTRODUCED BY:

Tom Berg

DATE OF INTRODUCTION:

SEP 08 2011

Honolulu, Hawaii

Councilmembers

CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

No. 11-258

RESOLUTION

URGING THE MAYOR AND THE HONOLULU AUTHORITY FOR RAPID TRANSPORTATION TO PREPARE A NEW ENVIRONMENTAL IMPACT STATEMENT FOR THE CITY'S TRANSIT PROJECT.

WHEREAS, on March 15, 2007, with respect to the Honolulu High-Capacity Transit Corridor Project ("transit project"), the City and the Federal Transit Administration ("FTA") published a Notice of Intent ("NOI") to prepare a draft environmental impact statement ("DEIS") for high-capacity transit improvements in the Leeward corridor of Honolulu, Hawaii (Federal Register, Vol. 72, No. 50, Pages12254-12257); and

WHEREAS, the NOI states the following:

> "The draft EIS would consider five distinct transit technologies: Light rail transit, rapid rail transit, rubber-tired guided vehicles, a magnetic levitation system, and a monorail system." (Federal Register, Vol. 72, No. 50, Page 12256);

and

WHEREAS, on November 2, 2008, the city released the DEIS, which does not evaluate the five transit technologies noted in the NOI; and

WHEREAS, the failure to evaluate all five technology options in the DEIS as stated in the NOI conflicts with the intent of the federal notice and calls into question whether the DEIS is in compliance with the provisions of the National Environmental Protection Act; and

WHEREAS, on June 14, 2010, the city released the final environmental impact statement ("FEIS"), which likewise does not evaluate the five technology options and notes, "The system will use steel-wheel-on-steel-rail technology" (FEIS, p. S-1); and

WHEREAS, a well-known group of rail opponents have filed suit in U.S. District Court seeking to invalidate the transit project's environmental impact statement ("EIS") and federal government approval. The plaintiffs accuse the City of violating federal environmental, historic preservation and transportation laws in preparing the EIS, claiming that City officials defined the requirements of the transit project so narrowly as to exclude all reasonable alternatives, such as monorail, light rail and other technologies. An injunction is being sought that would require the City to prepare a new or supplemental EIS for the transit project; and

CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

No. 11-258

RESOLUTION

WHEREAS, Randy Roth, law professor and one of the lawsuit's plaintiffs, expressed optimism at the required Federal response to the lawsuit, noting that Federal attorneys failed to put forth any new information to defend the EIS and admitted lacking knowledge or information about nearly a dozen reasonable and prudent alternatives to the current system ("Honolulu Rail Opponents Have No Case, Feds Say," Honolulu Civil Beat, 8/14/2011); and

WHEREAS, the Council finds that there is a high likelihood that the lawsuit will succeed in requiring the City to prepare a new EIS, and that continuing to defend against the lawsuit will result in the expenditure of unjustifiable sums of taxpayer dollars; now, therefore,

BE IT RESOLVED by the Council of the City and County of Honolulu that it urges the Mayor and the Honolulu Authority for Rapid Transportation to prepare a new environmental impact statement for the City's transit project that fully assesses all reasonable alternatives for high-capacity transit; and

BE IT FINALLY RESOLVED that copies of this Resolution be transmitted to the Mayor and the Chair of the Honolulu Authority for Rapid Transportation Board of Directors.

INTRODUCED BY:

TOM BERG

DATE OF INTRODUCTION:

SEP 19 2011
Honolulu, Hawaii

Councilmembers

<< Back

Council Chair recommends for rail contract rebid

Posted. Nov 15, 2011 6:27 PM HST
Updated Nov 15, 2011 8 21 PM HST

By Tim Sakahara - bio | email

HONOLULU (HawaiiNewsNow) - There are growing concerns over the company picked to build Honolulu's rail cars.

The New York Times, Bloomberg and The Wall Street Journal are a few of the media outlets running stories about Finmeccanica Group's substantial financial losses. Finmeccanica is the parent company to Ansaldo Honolulu which was chosen to build Honolulu's rail cars.


Ernie Martin

Finmeccanica reported it would sell nearly $1.4 billion in assets, which happens to be the same amount as Honolulu's rail contract. The company's stock has also lost half of its value this year. It's also partially owned by the Italian government which is also restructuring in a financial crisis.


Giuseppe Orsi

"These are uncertain times and they call for extraordinary measures," said Giuseppe Orsi, Finmeccanica CEO, in a statement.

Add it up and the Italians are giving some in Hawaii heartburn.

"I think with this additional news it may be prudent for them to take a step back and do a more thorough review," said Ernie Martin, Honolulu City Council Chair.

Chair Martin is one that thinks starting the billion plus dollar contract over again could end up saving money.

"I think they should perhaps postpone and do a little bit more due diligence I would ask that of them," said Martin.

Losing bidder Sumitomo Corporation has repeatedly warned the city about Italy and Ansaldo's financial problems.

"The question remains why would the city continue down this path when it makes no economic sense to do so. There is no technical advantage in doing so. And of course the past history and so called inability for this company to meet its deadlines," said Gino Antoniello, Sumitomo Corporation Vice President. "Currently, and we stand by this, we believe the city will pay $700 million more in operations and maintenance costs for the project with Ansaldo than if they went with Sumitomo."

The city has offered Ansaldo the contract and is verifying the company's guarantee it will finish the job Ansaldo's spokesperson Carolyn Tanaka says the company's bid is solid. They have answered all the city's questions and will any further questions as well.

As to a rebid the council has no power over the procurement process. You'll recall voters approved the semi-autonomous board that is the Honolulu Authority for Rapid Transportation.

Time will tell if Ansaldo gives HART heartburn as well.

"You would think common sense would prevail so we'll see," said Martin.

"We are aware of and will continue to monitor Ansaldo's financial situation. We are confident that the contract includes the right safeguards through performance and payment bonds. Those bonds will guarantee the core systems work will be completed," said Toru Hamayasu, HART Interim Executive Director and CEO.

The HART board is expected to address the issues at a board meeting this Thursday.

Also of Interest

Sandra Bullock And Keanu Reeves Are Apparently Dating!
6 days ago

New details in singer's alleged sex abuse case
10/1/2011

Keck's Exclusives: Another Hawaii Five-0 Death?
9/27/2011

The Ghost of Trapper Nelson Haunts Hobe Sound
2 weeks ago

MAGLEV 2011

Keynote Speech 3

Laurence E. Blow
MaglevTransport, Inc., USA

Status of Maglev Projects in the USA

Status of Maglev Projects in the USA

Laurence E. (Larry) Blow
MaglevTransport, Inc.
www.maglevtransport.com

Maglev 2011 Conference, Daejeon, Korea

October 10-13, 2011

Systems of Interest

- **High-speed maglev**
  - Intercity passengers
- **Low-speed maglev**
  - Urban passengers
- **Other systems**:
  - Emerging system in Colorado
  - Research project at Old Dominion Univ.
  - Innovative approaches

Summary

- High-speed maglev projects are awaiting funding or slowly drifting away; Colo. is new
- Low-speed technologies remain under study, but construction projects are elusive
- Innovative approaches are always active
- 2008 - 2011 has been a waiting game
  - U.S. Administration is negative toward maglev compared with conventional high-speed rail (using incremental upgrades)
- Near-term economic conditions are challenging

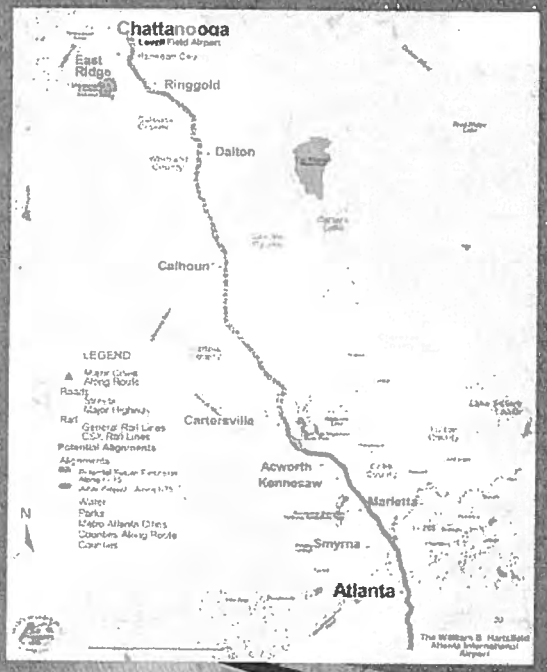
High-speed Maglevs

- **Transrapid (Germany)**
- **Superconducting Maglev (Japan)**

Transrapid

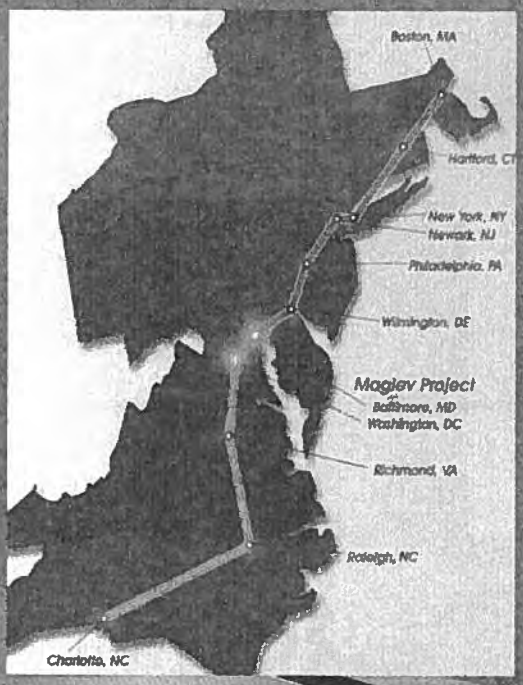
- Technology deployed in Shanghai in 2004
- Maglev Deployment Program (MDP):
  - Atlanta, GA – Chattanooga, TN
  - Baltimore, MD – Washington, DC
  - Las Vegas, NV – Anaheim, CA
  - Los Angeles, CA
  - Pittsburgh, PA
- Other project areas:
  - Chattanooga – Nashville, TN
  - Orange County, CA
- US$90M planned in 2008 never appeared
- Awaiting a go-ahead on any project

Atlanta - Chattanooga



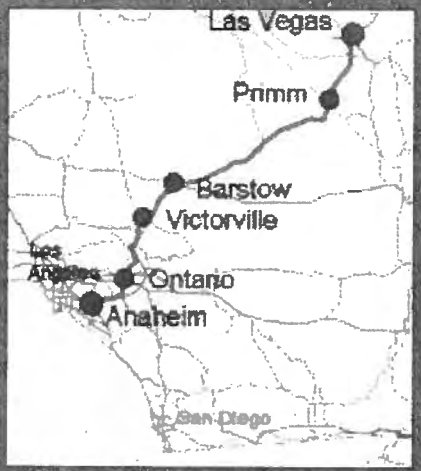
- MDP pre-construction planning in 2000-2002
- Tier I EIS begun in 2008
- GDOT/AECOM lead
- Tier II EIS funds awarded
- Technology selection to occur during Tier II EIS
- Significant new funding expected in 2012
- Active

Baltimore - Washington



- MDP pre-construction planning in 2000
- DEIS in 2003, draft FEIS submitted 2007
- MTA/KCI-PB team lead
- Opportunity for new federal funds in 2012
- Original study inactive

Las Vegas - Anaheim



- MDP pre-construction planning 1999-2003
- EIS work: 2003-2007
- CNSSTC, American Magline Group lead
- Owed US$45M from $90M funds...Awaiting contract
- Current plan:
  - IOS starts in either NV or CA
  - Tech transfer, construction funding agreements in place with Chinese, German and U.S. firms
- Active

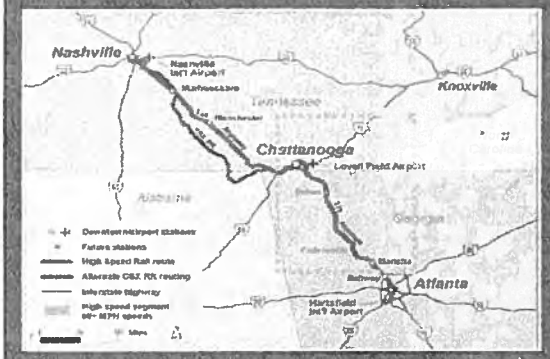
Southern California Association of Governments (SCAG), Los Angeles

- MDP planning in 2000
- Initial engineering, EIS work completed
- SCAG analysis in 2009: technology-neutral, "High-speed Regional Transport" project
- Duplicates CA HSR
- Not funded
- Pending

Pittsburgh, PA

- MDP planning in 2000
- DEIS, FEIS approved in 2007-09
- PennDOT, PAAC, Maglev Inc. lead
- Project oriented as industrial development vs. transport project
- July, 2011: MLI declared bankruptcy
- Inactive

Chattanooga - Nashville



- 2005: Statewide HSR feasibility study
- 2008: Maglev feasibility study completed
  - Feasibility confirmed
  - Costs in normal ranges
- 2010: Full A-C-N corridor established
- Active

Orangeline, Los Angeles

- Private initiative, begun by 13 cities in 2002
- Today, US$240M available under "Measure R" plus future federal funds
- Orangeline Development Authority (OLDA) lead
- Open to all systems, not just maglev
- Active

Superconducting Maglev (SCM)

- Central Japan Railway (JRC): SCM a "revolutionary concept," should be promoted internationally
- 2009: U.S.-Japan Maglev office formed to assess int'l markets
- CFS from 1997: Maglev in the Northeast Corridor has best performance and economics
- Keys to success: Public-private partnerships, financing and U.S. government approvals
- Active

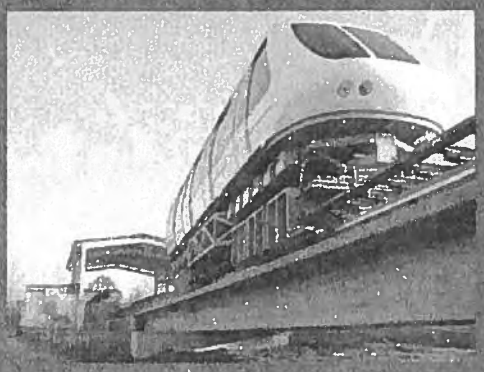
SC Maglev @ 500 km/h
Typhoon Roke,
September 21, 2011

Low-speed Maglevs

- **AMT**
- **General Atomics**
- **HSST/Linimo**
- **Maglev 2000**
- **MagneMotion**
- **Magplane**

American Maglev Technology

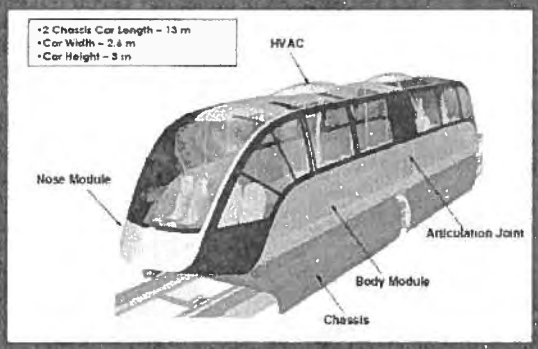
- EMS Suspension, LIM
- Cargo and passenger
- Undergoing full-scale tests on 600-m track
- Promoting projects in Brazil, Canada, India, Mexico, Puerto Rico, Spain and the U.S.
- Active



Test facility near Atlanta, GA

General Atomics Urban Maglev

- Halbach array (PM) suspension, LSM
- 4.5-mile (7.2-km) "CALU" campus shuttle:
  - Technical feasibility verified
  - Initial EIS completed
- Completed all federal technical objectives
- Ready for demonstration and deployment
- Active



Target speed: 100 mph/160+ km/h
Max. Acceleration: 1.6 m/sec^2 (.16 g)
Max. Gradient: 7% in CALU application

HSST / Linimo Urban Maglev

- Most mature system
- Operational in Nagoya since 2005
- EMS Suspension, LIM propulsion
- Analyzed for use in Colorado, Hawaii
- No U.S. projects
- Inactive

Federal Urban Maglev Goals
Top speed: 100 mph/160+ km/h
Max. Acceleration: 1.6 m/sec^2
Max. Braking: 3.6 m/sec^2
Max. Gradient: 10%
Max. Noise Level: 70 dBA

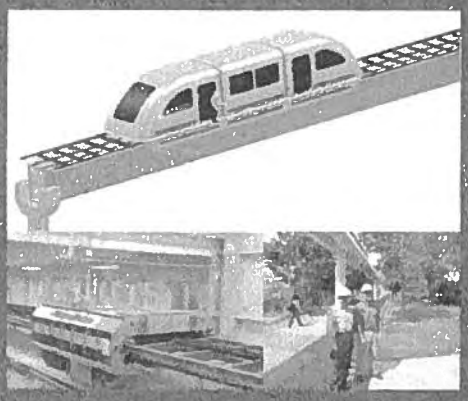
Maglev 2000

- 2nd generation system
  - HTS magnets
  - EDS suspension
  - LSM propulsion
  - High-speed electronic switching
- Florida MDP project
- Needs a full-scale testing facility
- Active

Vision: National Maglev Network
- Covers 28.8K miles/46.3K km
- Connects 174 metro areas
- Serves 230+ million people within 15 miles of a station

MagneMotion

- Permanent Magnet EMS
- High-efficiency, large-gap suspension
- FTA-supported since 2001
- Testing underway at full-scale 50-m test track in Devens, MA
- Nov., 2011: Begin tests on outdoor 75-m track at ODU, Norfolk VA
- Active



Target speeds:
Urban: 160 km/h (100 mph)
Intercity: 430 km/h (267 mph)

Magplane

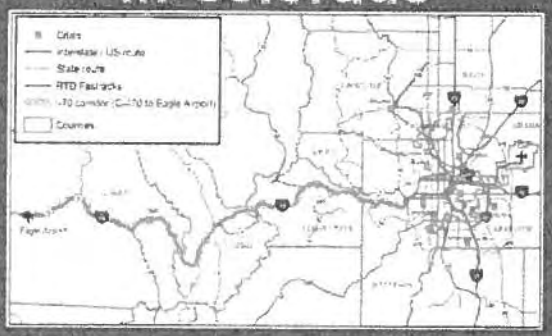
- Common track for single urban, intercity vehicles
- EDS PM suspension, LSM mounted in track
- Planned 19-mile (30-km) route for Beijing
- Mining application in construction, Inner Mongolia
- No U.S. projects
- Inactive

Top speed: 60 -300 mph
Banking: +/- 10^0
Passive or mechanical switching

Other Systems

- Emerging project in Colorado
- Research project at Old Dominion University
- Innovative approaches

"Advanced Guideway System" in Colorado



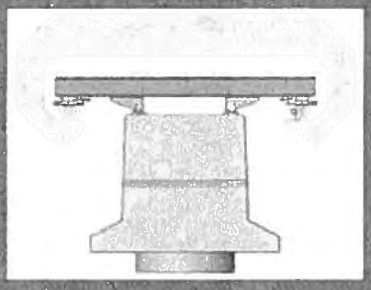
- US$2.3M, 18-month feasibility study for the I-70 Mountain Corridor (190km/120mi west of Denver)

  Purpose: Identify alignments, stations and technologies to implement an AGS system – "a high-speed monorail or maglev"

  Procurement expected in November, 2011

Old Dominion University

- Research opportunity following stalled AMT campus shuttle in 2003
- MagneMotion joint venture: multiple test vehicles at full speeds on existing guideway
- US$8M for hardware development & testing
- Active



Planned MM bogie and LSM stators mounted on ODU girder

Speed goal: 40 mph / 64 km/h

Innovative Approaches

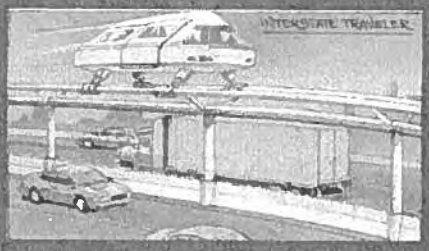
- Maglev subsystems can be adapted to conventional rail applications
  - Maglev 2000/MERRI, Fastransit, MagneMotion
  - Shapery Enterprises:

LSM propulsion technology can be used to propel conventional vehicles suspended by wheels, such as intercity rail, commuter rail, light rail and monorail systems.

Innovative Approaches (cont'd)

- Personal Rapid Transit, Group Rapid Transit concepts w/ maglev technologies

Fastransit



Interstate Traveler

SkyTran

Summary

- High-speed maglev projects are awaiting funding or slowly drifting away; Colo. is new
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Maglev

JR-Maglev at Yamanashi, Japan test track in November 2005

Transrapid 09 at the Emsland test facility in Germany

Maglev (derived from magnetic levitation), is a system of transportation that uses magnetic levitation to suspend, guide and propel vehicles from magnets rather than using mechanical methods, such as friction-reliant wheels, axles and bearings. Maglev transport is a means of flying a vehicle or object along a guideway by using magnets to create both lift and thrust, only a few inches above the guideway surface. High-speed maglev vehicles are lifted off their guideway and thus move more smoothly, quietly and require less maintenance than wheeled mass transit systems – regardless of speed. This non-reliance on friction also means that acceleration and deceleration can far surpass that of existing forms of transport. The power needed for levitation is not a particularly large percentage of the overall energy consumption; most of the power used is needed to overcome air resistance (drag), as with any other high-speed form of transport.

The highest recorded speed of a Maglev train is 581 km/h (361 mph), achieved in Japan by the CJR's MLX01 superconducting maglev in 2003,[1] 6 km/h (3.7 mph) faster than the conventional TGV wheel-rail speed record.

Differences in construction costs can affect chances for profitability. Maglev advocates claim that, at very high speeds, the wear and tear from friction along with the concentrated pounding from wheels on rails accelerate equipment deterioration and prevent mechanically-based train systems from achieving a maglev-based train system's high level of performance and low levels of maintenance;.[2] Indeed, it was concerns

about maintenance and safety that convinced Chinese authorities to announce a slowing down of all new high-speed trains to 300 km/h (190 mph). There is a good reason why the rest of the world's fast trains limit their operations to similar top speeds[3] and why the Central Japan Railway (CJR) is planning to build its newest Shinkansen (Chuo) line using maglev technology.

There are presently only two commercial maglev transport systems in operation, with two others under construction. In April 2004, Shanghai began commercial operations of the high-speed Transrapid system. Beginning March 2005, the Japanese began operation of the HSST "Linimo" line in time for the 2005 World Expo. In its first three months, the Linimo line carried over 10 million passengers. The Koreans and the Chinese are both building low speed maglev lines of their own design, one in Beijing and the other at Seoul's Incheon Airport. High reliability and extremely low maintenance are hallmarks of maglev transport lines.

First patents

High-speed transportation patents were granted to various inventors throughout the world. Early United States patents for a linear motor propelled train were awarded to the inventor, Alfred Zehden (German). The inventor was awarded U.S. Patent 782,312 (21 June 1907) and U.S. Patent RE12,700 (21 August 1907).[5] In 1907, another early electromagnetic *transportation system* was developed by F. S. Smith.[6] A series of German patents for magnetic levitation trains propelled by linear motors were awarded to Hermann Kemper between 1937 and 1941.[7] An early modern type of maglev train was described in U.S. Patent 3,158,765, *Magnetic system of transportation*, by G. R. Greenfly (25 August 1959). The first use of "maglev" in a United States patent was in "*Magnetic levitation guidance system*"[8] by Canadian Patents and Development Limited.

Development

In the late 1940s, Professor Eric Laithwaite of Imperial College in London developed the first full-size working model of the linear induction motor. He became professor of heavy electrical engineering at Imperial College in 1964, where he continued his successful development of the linear motor.[9] As the linear motor does not require physical contact between the vehicle and guideway, it became a common fixture on many advanced transportation systems being developed in the 1960s and 70s. Laithwaite himself joined development of one such project, the Tracked Hovercraft, although funding for this project was cancelled in 1973.[10]

The linear motor was naturally suited to use with maglev systems as well. In the early 1970s, Laithwaite discovered a new arrangement of magnets, magnetic river, that allowed a single linear motor to produce both lift as well as forward thrust, allowing a maglev system to be built with a single set of magnets. Working at the British Rail Research Division in Derby, along with teams at several civil engineering firms, the "traverse-flux" system was developed into a working system.

The first commercial maglev people mover was simply called "MAGLEV" and officially opened in 1984 near Birmingham, England. It operated on an elevated 600-metre (2,000 ft) section of monorail track between Birmingham International Airport and Birmingham International railway station, running at speeds up to 42 km/h (26 mph); the system was eventually closed in 1995 due to reliability problems.[11]

New York, United States 1968

In 1961, when he was delayed during rush hour traffic on the Throgs Neck Bridge, James Powell, a researcher at Brookhaven National Laboratory (BNL), thought of using magnetically levitated transportation to solve the traffic problem.[12] Powell and BNL colleague Gordon Danby jointly worked out a MagLev concept using static magnets mounted on a moving vehicle to induce electrodynamic lifting and stabilizing forces in specially shaped loops on a guideway.[13][14]

Hamburg, Germany 1979

Transrapid 05 was the first maglev train with longstator propulsion licensed for passenger transportation. In 1979, a 908 m track was opened in Hamburg for the first International Transportation Exhibition (IVA 79). There was so much interest that operations had to be extended three months after the exhibition finished, having carried more than 50,000 passengers. It was reassembled in Kassel in 1980.

Birmingham, United Kingdom 1984–1995

The Birmingham International maglev shuttle.

The world's first commercial automated maglev system was a low-speed maglev shuttle that ran from the airport terminal of Birmingham International Airport to the nearby Birmingham International railway station between 1984–1995.[15] The length of the track was 600 metres (2,000 ft), and trains "flew" at an altitude of 15 millimetres (0.59 in), levitated by electromagnets, and propelled with linear induction motors.[16] It was in operation for nearly eleven years, but obsolescence problems with the electronic systems made it unreliable in its later years. One of the original cars is now on display at Railworld in Peterborough, together with the RTV31 hover train vehicle.

Several favorable conditions existed when the link was built:

- The British Rail Research vehicle was 3 tons and extension to the 8 ton vehicle was easy.
- Electrical power was easily available.
- The airport and rail buildings were suitable for terminal platforms.
- Only one crossing over a public road was required and no steep gradients were involved.
- Land was owned by the railway or airport.
- Local industries and councils were supportive.
- Some government finance was provided and because of sharing work, the cost per organization was not high.

After the original system closed in 1995, the original guideway lay dormant.[17] The guideway was reused in 2003 when the replacement cable-hauled AirRail Link Cable Liner people mover was opened.[18][19]

Japan 1985–

JNR ML500 at Miyazaki, Japan test track on 21 December 1979. 517 km/h (321 mph). Guinness World Records authorization at that time.

In Japan, there are two independently developed Maglev trains. One is HSST by Japan Airlines and the other, which is more well-known, is JR-Maglev by Japan Railways Group.

The development of the latter started in 1969, and Miyazaki test track had regularly hit 517 km/h (321 mph) by 1979 but, after an accident that destroyed the train, a new design was decided upon. In Okazaki, Japan (1987), the JR-Maglev took a test ride at the Okazaki exhibition. Tests through the 1980s continued in Miyazaki before transferring a far larger and elaborate test track, 20 km (12 mi) long, in Yamanashi in 1997.

Development of HSST started in 1974, based on technologies introduced from Germany. In Tsukuba, Japan (1985), the HSST-03 (Linimo) wins popularity in spite of being 30 km/h (19 mph) at the Tsukuba World Exposition. In Saitama, Japan (1988), the HSST-04-1 was revealed at the Saitama exhibition performed in Kumagaya. Its fastest recorded speed was 30 km/h (19 mph).[20]

Vancouver, Canada, and Hamburg, Germany 1986–1988

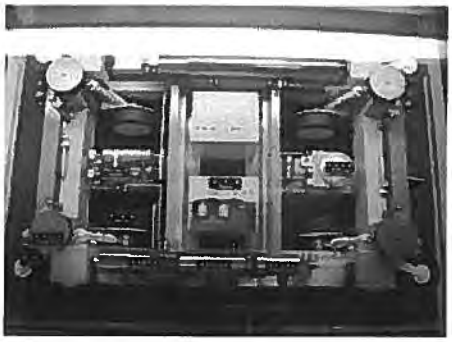
In Vancouver, Canada (1986), the JR-Maglev was exhibited at Expo 86. Guests could ride the train along a short section of track at the fairgrounds. In Hamburg, Germany (1988), the TR-07 in international traffic exhibition (IVA88) performed Hamburg.

Berlin, Germany 1989–1991

In West Berlin, the M-Bahn was built in the late 1980s. It was a driverless maglev system with a 1.6 km (0.99 mi) track connecting three stations. Testing in passenger traffic started in August 1989, and regular operation started in July 1991. Although the line largely followed a new elevated alignment, it terminated at the U-Bahn station Gleisdreieck, where it took over a platform that was then no longer in use; it was from a line that formerly ran to East Berlin. After the fall of the Berlin Wall, plans were set in motion to reconnect this line (today's U2). Deconstruction of the M-Bahn line began only two months after regular service began that was called Pundai project and was completed in February 1992.

Technology

Overview



MLX01 maglev train Superconducting magnet Bogie

The term "maglev" refers not only to the vehicles, but to the railway system as well, specifically designed for magnetic levitation and propulsion. All operational implementations of maglev technology have had minimal overlap with wheeled train technology and have not been compatible with conventional rail tracks. Because they cannot share existing infrastructure, these maglev systems must be designed as complete transportation systems. The Applied Levitation SPM Maglev system is inter-operable with steel rail tracks and would permit maglev vehicles and conventional trains to operate at the same time on the same right of way. MAN in Germany also designed a maglev system that worked with conventional rails, but it was never fully developed.[21]

See also JR-Maglev#Fundamental technology elements, Transrapid#Technology, Magnetic levitation

There are two particularly notable types of maglev technology:

- For electromagnetic suspension (EMS), electronically controlled electromagnets in the train attract it to a magnetically conductive (usually steel) track.
- Electrodynamic suspension (EDS) uses permanent magnets which create a magnetic field that induces currents in nearby metallic conductors when there is relative movement which pushes the train away from the rail.

Another experimental technology, which was designed, proven mathematically, peer reviewed, and patented, but is yet to be built, is the magnetodynamic suspension (MDS), which uses the attractive magnetic force of a permanent magnet array near a steel track to lift the train and hold it in place. Other technologies such as repulsive permanent magnets and superconducting magnets have seen some research.

Electromagnetic suspension

Main article: Electromagnetic suspension

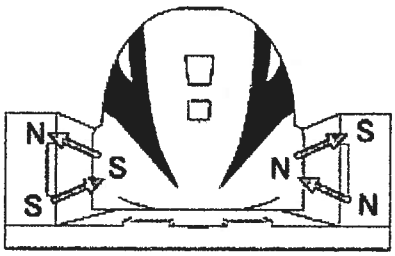
In current electromagnetic suspension (EMS) systems, the train levitates above a steel rail while electromagnets, attached to the train, are oriented toward the rail from below. The system is typically arranged on a series of C-shaped arms, with the upper portion of the arm attached to the vehicle, and the lower inside edge containing the magnets. The rail is situated between the upper and lower edges.

Magnetic attraction varies inversely with the cube of distance, so minor changes in distance between the magnets and the rail produce greatly varying forces. These changes in force are dynamically unstable – if there is a slight divergence from the optimum position, the tendency will be to exacerbate this, and complex systems of feedback control are required to maintain a train at a constant distance from the track, (approximately 15 millimeters (0.59 in)).[22][23]

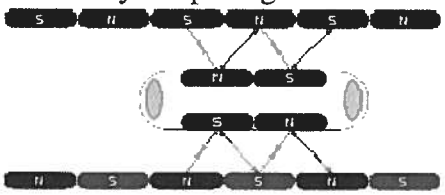
The major advantage to suspended maglev systems is that they work at all speeds, unlike electrodynamic systems which only work at a minimum speed of about 30 km/h (19 mph). This eliminates the need for a separate low-speed suspension system, and can simplify the track layout as a result. On the downside, the dynamic instability of the system demands high tolerances of the track, which can offset, or eliminate this advantage. Laithwaite, highly skeptical of the concept, was concerned that in order to make a track with the required tolerances, the gap between the magnets and rail would have to be increased to the point where the magnets would be unreasonably large.[21] In practice, this problem was addressed through increased performance of the feedback systems, which allow the system to run with close tolerances.

Electrodynamic suspension

Main article: electrodynamic suspension



JR-Maglev EDS suspension is due to the magnetic fields induced either side of the vehicle by the passage of the vehicle's superconducting magnets.



EDS Maglev Propulsion via propulsion coils.

In electrodynamic suspension (EDS), both the rail and the train exert a magnetic field, and the train is levitated by the repulsive force between these magnetic fields. The magnetic field in the train is produced by either superconducting magnets (as in JR-Maglev) or by an array of permanent magnets (as in Inductrack). The repulsive force in the track is created by an induced magnetic field in wires or other conducting strips in the track. A major advantage of the repulsive maglev systems is that they are naturally stable—minor *narrowing* in distance between the track and the magnets creates strong forces to repel the magnets back to their original position, while a slight increase in distance greatly reduces the force and again returns the vehicle to the right separation.[21] No feedback control is needed.

Repulsive systems have a major downside as well. At slow speeds, the current induced in these coils and the resultant magnetic flux is not large enough to support the weight of the train. For this reason the train must have wheels or some other form of landing gear to support the train until it reaches a speed that can sustain levitation. Since a train may stop at any location, due to equipment problems for instance, the entire track must be able to support both low-speed and high-speed operation. Another downside is that the repulsive system naturally creates a field in the track in front and to the rear of the lift magnets, which act against the magnets and create a form of drag. This is generally only a concern at low speeds, at higher speeds the effect does not have time to build to its full potential and other forms of drag dominate.[21]

The drag force can be used to the electrodynamic system's advantage, however, as it creates a varying force in the rails that can be used as a reactionary system to drive the train, without the need for a separate reaction plate, as in most linear motor systems. Laithwaite led development of such "traverse-flux" systems at his Imperial College laboratory.[21] Alternatively, propulsion coils on the guideway are used to

exert a force on the magnets in the train and make the train move forward. The propulsion coils that exert a force on the train are effectively a linear motor: an alternating current flowing through the coils generates a continuously varying magnetic field that moves forward along the track. The frequency of the alternating current is synchronized to match the speed of the train. The offset between the field exerted by magnets on the train and the applied field creates a force moving the train forward.

Pros and cons of different technologies

Each implementation of the magnetic levitation principle for train-type travel involves advantages and disadvantages.

Technology	*Pros*	*Cons*
EMS[24][25] (Electromagnetic suspension)	Magnetic fields inside and outside the vehicle are less than EDS; proven, commercially available technology that can attain very high speeds (500 km/h (310 mph)); no wheels or secondary propulsion system needed.	The separation between the vehicle and the guideway must be constantly monitored and corrected by computer systems to avoid collision due to the unstable nature of electromagnetic attraction; due to the system's inherent instability and the required constant corrections by outside systems, vibration issues may occur.
EDS[26][27] (Electrodynamic suspension)	Onboard magnets and large margin between rail and train enable highest recorded train speeds (581 km/h (361 mph)) and heavy load capacity; has demonstrated (December 2005) successful operations using high-temperature superconductors in its onboard magnets, cooled with inexpensive liquid nitrogen.	Strong magnetic fields onboard the train would make the train inaccessible to passengers with pacemakers or magnetic data storage media such as hard drives and credit cards, necessitating the use of magnetic shielding; limitations on guideway inductivity limit the maximum speed of the vehicle; vehicle must be wheeled for travel at low speeds.
Inductrack System[28][29] (Permanent Magnet EDS)	Failsafe Suspension—no power required to activate magnets; Magnetic field is localized below the car; can generate enough force at low speeds (around 5 km/h	Requires either wheels or track segments that move for when the vehicle is stopped. New technology that is still under development (as of 2008) and as

	(3.1 mph)) to levitate maglev train; in case of power failure cars slow down on their own safely; Halbach arrays of permanent magnets may prove more cost-effective than electromagnets.	yet has no commercial version or full scale system prototype.

Neither Inductrack nor the Superconducting EDS are able to levitate vehicles at a standstill, although Inductrack provides levitation down to a much lower speed; wheels are required for these systems. EMS systems are wheel-less.

The German Transrapid, Japanese HSST (Linimo), and Korean Rotem EMS maglevs levitate at a standstill, with electricity extracted from guideway using power rails for the latter two, and wirelessly for Transrapid. If guideway power is lost on the move, the Transrapid is still able to generate levitation down to 10 km/h (6.2 mph) speed, using the power from onboard batteries. This is not the case with the HSST and Rotem systems.

Propulsion

An EDS system can provide both levitation and propulsion using an onboard linear motor. EMS systems can only levitate the train using the magnets onboard, not propel it forward. As such, vehicles need some other technology for propulsion. A linear motor (propulsion coils) mounted in the track is one solution. Over long distances where the cost of propulsion coils could be prohibitive, a propeller or jet engine could be used.

Stability

Earnshaw's theorem shows that any combination of static magnets cannot be in a stable equilibrium.[30] However, the various levitation systems achieve stable levitation by violating the assumptions of Earnshaw's theorem. Earnshaw's theorem assumes that the magnets are static and unchanging in field strength and that the relative permeability is constant and greater than unity everywhere. EMS systems rely on active electronic stabilization. Such systems constantly measure the bearing distance and adjust the electromagnet current accordingly. All EDS systems are moving systems (no EDS system can levitate the train unless it is in motion).

Because Maglev vehicles essentially fly, stabilisation of pitch, roll and yaw is required by magnetic technology. In addition to rotation, surge (forward and backward motions), sway (sideways motion) or heave (up and down motions) can be problematic with some technologies.

If superconducting magnets are used on a train above a track made out of a permanent magnet, then the train would be locked in to its lateral position on the

track. It can move linearly along the track, but not off the track. This is due to the Meissner effect.

Guidance

Some systems use Null Current systems (also sometimes called Null Flux systems);[31] these use a coil which is wound so that it enters two opposing, alternating fields, so that the average flux in the loop is zero. When the vehicle is in the straight ahead position, no current flows, but if it moves off-line this creates a changing flux that generates a field that pushes it back into line. However, some systems use coils that try to remain as much as possible in the null flux point between repulsive magnets, as this reduces eddy current losses.

Evacuated tubes

Main article: Vactrain

Some systems (notably the swissmetro system) propose the use of vactrains—maglev train technology used in evacuated (airless) tubes, which removes air drag. This has the potential to increase speed and efficiency greatly, as most of the energy for conventional Maglev trains is lost in air drag.[32]

One potential risk for passengers of trains operating in evacuated tubes is that they could be exposed to the risk of cabin depressurization unless tunnel safety monitoring systems can repressurize the tube in the event of a train malfunction or accident. The RAND Corporation has designed a vacuum tube train that could, in theory, cross the Atlantic or the USA in ~21 minutes.[33]

Power and energy usage

Energy for maglev trains is used to accelerate the train, and may be regained when the train slows down ("regenerative braking"). It is also used to make the train levitate and to stabilise the movement of the train. The main part of the energy is needed to force the train through the air ("air drag"). Also some energy is used for air conditioning, heating, lighting and other miscellaneous systems.The maglev trains are powered on electromagnetism.

At very low speeds the percentage of power (energy per time) used for levitation can be significant. Also for very short distances the energy used for acceleration might be considerable. But the power used to overcome air drag increases with the cube of the velocity, and hence dominates at high speed (note: the energy needed per mile increases by the square of the velocity and the time decreases linearly.).

Comparison with conventional trains

Major comparative differences exist between the two technologies. First of all, maglevs are not trains and are more similar to wingless aircraft than wheel-less trains.

Maglev transport is non-contact, electric powered and controlled flight. It does not rely on the wheels, bearings and axles common to mechanical friction-reliant rail systems. Differences also lie in maintenance requirements and the reliability of electronic versus mechanically based systems, all-weather operations, backward-compatibility, rolling resistance, weight, noise, design constraints, and control systems.[34]

- **Maintenance Requirements Of Electronic Versus Mechanical Systems**: Maglev trains currently in operation have demonstrated the need for nearly insignificant guideway maintenance. Their electronic vehicle maintenance is minimal and more closely aligned with aircraft maintenance schedules based on hours of operation, rather than on speed or distance traveled. Traditional rail is subject to the wear and tear of miles of friction on mechanical systems and increases exponentially with speed, unlike maglev systems. This basic difference reveals the huge cost advantage of maglev over rail and also directly affects system reliability, availability and sustainability.[34]

- **All-Weather Operations**: While maglev advocates claim trains currently in operation are not stopped, slowed, or have their schedules affected by snow, ice, severe cold, rain or high winds, they have not been operated in the wide range of conditions that traditional friction-based rail systems have operated. Also, maglev vehicles accelerate and decelerate faster than mechanical systems regardless of the slickness of the guideway or the slope of the grade because they are non-contact systems.[34]

- **Backwards Compatibility**: Maglev trains currently in operation are not compatible with conventional track, and therefore require all new infrastructure for their entire route, but this is not a negative if high levels of reliability and low operational costs are the goal. By contrast conventional high speed trains such as the TGV are able to run at reduced speeds on existing rail infrastructure, thus reducing expenditure where new infrastructure would be particularly expensive (such as the final approaches to city terminals), or on extensions where traffic does not justify new infrastructure. However, this "shared track approach" ignores mechanical rail's high maintenance requirements, costs and disruptions to travel from periodic maintenance on these existing lines. It is claimed by maglev advocates that the use of a completely separate maglev infrastructure more than pays for itself with dramatically higher levels of all-weather operational reliability and almost insignificant maintenance costs, but these claims have yet to be proven in an operational setting as intense as many traditional rail operations, and ignore the difference in maglev and traditional rail initial construction costs. So, maglev advocates would argue against rail backward compatibility and its concomitant high maintenance needs and costs.

- **Efficiency**: Due to the lack of physical contact between the track and the vehicle, maglev trains experience no rolling resistance, leaving only air resistance and electromagnetic drag, potentially improving power efficiency.[35]

- **Weight**: The weight of the electromagnets in many EMS and EDS designs seems like a major design issue to the uninitiated. A strong magnetic field is required to levitate a maglev vehicle. For the Transrapid, this is between 1 and 2 kilowatts per ton.[36] Another path for levitation is the use of superconductor magnets to reduce the energy consumption of the electromagnets, and the cost of maintaining the field. However, a 50-ton Transrapid maglev vehicle can lift an additional 20 tons, for a total of 70 tones, which consumes between 70 and 140 kW. Most energy use for the TRI is for propulsion and overcoming the friction of air resistance at speeds over 100 mph.

- **Noise**: Because the major source of noise of a maglev train comes from displaced air, maglev trains produce less noise than a conventional train at equivalent speeds. However, the psychoacoustic profile of the maglev may reduce this benefit: a study concluded that maglev noise should be rated like road traffic while conventional trains have a 5–10 dB "bonus" as they are found less annoying at the same loudness level.[37][38][39]

- **Design Comparisons**: Braking and overhead wire wear have caused problems for the Fastech 360 railed Shinkansen. Maglev would eliminate these issues. Magnet reliability at higher temperatures is a countervailing comparative disadvantage (see suspension types), but new alloys and manufacturing techniques have resulted in magnets that maintain their levitational force at higher temperatures.

- **Control Systems**: There are no signaling systems for high or low speed maglev systems. There is no need since all these systems are computer controlled. Besides, at the extremely high speeds of these systems, no human operator could react fast enough to slow down or stop in time. This is also why these systems require dedicated rights of way and are usually proposed to be elevated several meters above ground level. Two maglev system microwave towers are in contact with an EMS vehicle consist at all times for two-way communication between the vehicle and the central command centre's main operations computer. There are no need for train whistles or horns, either.

Comparison with aircraft

For many systems, it is possible to define a lift-to-drag ratio. For maglev systems these ratios can exceed that of aircraft (for example Inductrack can approach 200:1 at high speed, far higher than any aircraft). This can make maglev more efficient per kilometre. However, at high cruising speeds, aerodynamic drag is much larger than lift-induced drag. Jet transport aircraft take advantage of low air density at high altitudes to significantly reduce drag during cruise, hence despite their lift-to-drag ratio disadvantage, they can travel more efficiently at high speeds than maglev trains that operate at sea level (this has been proposed to be fixed by the vactrain concept).

While aircraft are theoretically more flexible, commercial air routes are not. High-speed maglevs are designed to be trip-time competitive with flights of 800

kilometers/500 miles or less. Additionally, while maglevs can service several cities in between such routes and be on time in all weather conditions, airlines cannot come close to such reliability or performance.

Because maglev vehicles are powered by electricity and do not carry fuel, maglev fares are less susceptible to the volatile price swings created by oil markets. Travelling via maglev also offers a significant safety margin over air travel since maglevs are designed not to crash into other maglevs or leave their guideways.[40][41][42] Aircraft fuel is a significant danger during takeoff and landing accidents. Also, electric trains emit little direct carbon dioxide emissions, especially when powered by nuclear or renewable sources, but more than aircraft if powered by fossil fuels.[*citation needed*]

Economics

The Shanghai maglev demonstration line cost US$1.2 billion to build.[43] This total includes infrastructure capital costs such as right-of-way clearing, extensive pile driving, on-site guideway manufacturing, in-situ pier construction every 25 meters, a maintenance facility and vehicle yard, several switches, two stations, operations and control systems, power feed system, cables and inverters, and operational training. Ridership is not a primary focus of this demonstration line, since the Longyang Road station is on the eastern outskirts of Shanghai. Once the line is extended to South Shanghai Train station and Hongqiao Airport station, ridership will be ample enough for the SMT to not only cover operation and maintenance costs, which it already does with its demonstration leg, but it will be able to generate significant revenue.

When the SMT in Shanghai begins to extend its line to South Shanghai Train Station, its goal is to limit the cost of future construction to approximately US$18 million per kilometer. They are confident about this since the German government, in 2006, put $125 million into guideway cost reduction development, which resulted in an all-concrete modular guideway design that is faster to build, has an 80-year life cycle, and is more than 30% less costly than what was used in Shanghai. In addition, new construction techniques were also developed that now put maglev at price parity with new high-speed rail construction, or even less.[44]

The United States Federal Railroad Administration 2003 Draft Environmental Impact Statement for a proposed Baltimore-Washington Maglev project gives an estimated 2008 capital costs of US$4.361 billion for 39.1 miles (62.9 km), or US$111.5 million per mile (US$69.3 million per kilometer). The Maryland Transit Administration (MTA) conducted their own Environmental Impact Statement, and put the pricetag at US$4.9 billion for construction, and $53 million a year for operations.[45]

The proposed Chuo Shinkansen maglev in Japan is estimated to cost approximately US$82 billion to build, with a route blasting long tunnels through mountains. A Tokaido maglev route replacing current Shinkansen would cost some 1/10 the cost,

as no new tunnel blasting would be needed, but noise pollution issues would make it infeasible.[citation needed]

The only low-speed maglev (100 km/h (62 mph)) currently operational, the Japanese Linimo HSST, cost approximately US$100 million/km to build.[46] Besides offering improved operation and maintenance costs over other transit systems, these low-speed maglevs provide ultra-high levels of operational reliability and introduce little noise and zero air pollution into dense urban settings.

As maglev systems are deployed around the world, experts[47] expect construction costs to drop as new construction methods are innovated along with economies of scale.

Records

The highest recorded speed of a Maglev train is 581 km/h (361 mph), achieved in Japan by the CJR's MLX01 superconducting maglev in 2003,[1] 6 km/h (3.7 mph) faster than the conventional TGV wheel-rail speed record. However, the operational and performance differences between these two very different technologies is far greater than a mere 6 km/h (3.7 mph) of speed. For example, the TGV record was achieved accelerating down a 72.4 km (45.0 mi) slight incline, requiring 13 minutes. It then took another 77.25 km (48.00 mi) for the TGV to stop, requiring a total distance of 149.65 km (92.99 mi) for the test.[48] The MLX01 record, however, was achieved on the 18.4 km (11.4 mi) Yamanashi test track – 1/8 the distance needed for the TGV test. While it is claimed high-speed maglevs can actually operate commercially at these speeds while wheel-rail trains cannot, and do so without the burden and expense of extensive maintenance, no maglev or wheel-rail commercial operation has actually been attempted at these speeds over 500 kph.

History

- 1971 - West Germany - Prinzipfahrzeug - 90 km/h (56 mph)
- 1971 - West Germany - TR-02 (TSST) - 164 km/h (102 mph)
- 1972 - Japan - ML100 – 60 km/h (37 mph) - (manned)
- 1973 - West Germany - TR04 - 250 km/h (160 mph) (manned)
- 1974 - West Germany - EET-01 - 230 km/h (140 mph) (unmanned)
- 1975 - West Germany - Komet - 401 km/h (249 mph) (by steam rocket propulsion, unmanned)
- 1978 - Japan - HSST-01 - 308 km/h (191 mph) (by supporting rockets propulsion, made in Nissan, unmanned)
- 1978 - Japan - HSST-02 - 110 km/h (68 mph) (manned)
- 1979-12-12 - Japan-ML-500R - 504 km/h (313 mph) (unmanned) It succeeds in operation over 500 km/h for the first time in the world.
- 1979-12-21 - Japan - ML-500R - 517 km/h (321 mph) (unmanned)
- 1987 - West Germany - TR-06 - 406 km/h (252 mph) (manned)
- 1987 - Japan - MLU001 - 401 km/h (249 mph) (manned)

- 1988 - West Germany - TR-06 - 413 km/h (257 mph) (manned)
- 1989 - West Germany - TR-07 - 436 km/h (271 mph) (manned)
- 1993 - Germany - TR-07 - 450 km/h (280 mph) (manned)
- 1994 - Japan - MLU002N - 431 km/h (268 mph) (unmanned)
- 1997 - Japan - MLX01 - 531 km/h (330 mph) (manned)
- 1997 - Japan - MLX01 - 550 km/h (340 mph) (unmanned)
- 1999 - Japan - MLX01 - 548 km/h (341 mph) (unmanned)
- 1999 - Japan - MLX01 - 552 km/h (343 mph) (manned/five formation). Guinness authorization.
- 2003 - China - Transrapid SMT (built in Germany) - 501 km/h (311 mph) (manned/three formation)
- 2003 - Japan - MLX01 - 581 km/h (361 mph) (manned/three formation). Guinness authorization.[49]

Existing maglev systems

Testing tracks

San Diego, USA

General Atomics has a 120-meter test facility in San Diego, which is being used as the basis of Union Pacific's 8 km (5.0 mi) freight shuttle in Los Angeles. The technology is "passive" (or "permanent"), using permanent magnets in a halbach array for lift, and requiring no electromagnets for either levitation or propulsion. General Atomics has received US$90 million in research funding from the federal government. They are also looking to apply their technology to high-speed passenger services.[50]

[edit] Emsland, Germany

Transrapid at the Emsland test facility
Main article: Emsland test facility

Transrapid, a German maglev company, has a test track in Emsland with a total length of 31.5 km (19.6 mi). The single track line runs between Dörpen and Lathen with turning loops at each end. The trains regularly run at up to 420 km/h (260 mph). The construction of the test facility began in 1980 and finished in 1984.

JR-Maglev, Japan

Main article: JR-Maglev

Japan has a demonstration line in Yamanashi prefecture where test trains JR-Maglev MLX01 have reached 581 km/h (361 mph), slightly faster than any wheeled trains. (The current TGV speed record is 574.8 km/h (357.2 mph).)

These trains use superconducting magnets which allow for a larger gap, and repulsive-type electrodynamic suspension (EDS). In comparison Transrapid uses conventional electromagnets and attractive-type electromagnetic suspension (EMS). These "Superconducting Maglev Shinkansen", developed by the Central Japan Railway Company (JR Central) and Kawasaki Heavy Industries, are currently the fastest trains in the world, achieving a record speed of 581 km/h (361 mph) on 2 December 2003.[1][51]

FTA's UMTD program

In the US, the Federal Transit Administration (FTA) Urban Maglev Technology Demonstration program has funded the design of several low-speed urban maglev demonstration projects. It has assessed HSST for the Maryland Department of Transportation and maglev technology for the Colorado Department of Transportation. The FTA has also funded work by General Atomics at California University of Pennsylvania to demonstrate new maglev designs, the MagneMotion M3 and of the Maglev2000 of Florida superconducting EDS system. Other US urban maglev demonstration projects of note are the LEVX in Washington State and the Massachusetts-based Magplane.

Southwest Jiaotong University, China

On 31 December 2000, the first crewed high-temperature superconducting maglev was tested successfully at Southwest Jiaotong University, Chengdu, China. This system is based on the principle that bulk high-temperature superconductors can be levitated or suspended stably above or below a permanent magnet. The load was over 530 kg (1,200 lb) and the levitation gap over 20 mm (0.79 in). The system uses liquid nitrogen, which is very cheap, to cool the superconductor.[52]

Operational systems servicing the public

Linimo (Tobu Kyuryo Line, Japan)

Linimo train approaching Banpaku Kinen Koen, towards Fujigaoka Station in March 2005

Main article: Linimo

The commercial automated "Urban Maglev" system commenced operation in March 2005 in Aichi, Japan. This is the nine-station 9 km (5.6 mi) long Tobu-kyuryo Line, otherwise known as the Linimo. The line has a minimum operating radius of 75 m (246 ft) and a maximum gradient of 6%. The linear-motor magnetic-levitated train has a top speed of 100 km/h (62 mph). More than 10 million passengers used this "urban maglev" line in its first three months of operation. At 100 km/h (62 mph), this urban transit technology is sufficiently fast enough for frequent stops, has little or no noise impact on surrounding communities, can fit into tight turn radii rights of way, and will operate reliably during most inclement weather conditions. The trains were designed by the Chubu HSST Development Corporation, which also operates a test track in Nagoya.[53]

Shanghai Maglev Train

A maglev train coming out of the Pudong International Airport.

Main article: Shanghai Maglev Train

In January 2001, the Chinese signed an agreement with the German maglev consortium Transrapid to build an EMS high-speed maglev line to link Pudong International Airport with Longyang Road Metro station on the eastern edge of Shanghai. This Shanghai Maglev Train demonstration line, or Initial Operating Segment (IOS), has been in commercial operations since April 2004 and now

operates 115 (up from 110 daily trips in 2010) daily trips that traverse the 30 km (19 mi) between the two stations in just 7 minutes, achieving a top speed of 431 km/h (268 mph), averaging 266 km/h (165 mph). On a 12 November 2003 system commissioning test run, the Shanghai maglev achieved a speed of 501 km/h (311 mph), which is its designed top cruising speed for longer intercity routes. Unlike the old Birmingham maglev technology, the Shanghai maglev is extremely fast and comes with on time – to the second – reliability of greater than 99.97%.(7-minute real time video of the maglev reaching 431 k/hr in only 3 minutes)

Plans to extend the line to South Shanghai Train Station and Honqiao Airport on the western edge of Shanghai are presently on hold, awaiting government approval.

Daejeon, South Korea

A maglev train in Daejeon.

The first maglev utilizing electromagnetic suspension opened to public was HML-03, which was made by Hyundai Heavy Industries, for Daejeon Expo in 1993 after five years of research and manufacturing two prototypes; HML-01 and HML-02.[54][55][56] Research for urban maglev using electromagnetic suspension began in 1994 by the government.[56] The first urban maglev opened to public was UTM-02 in Daejeon on 21 April 2008 after 14 years of development and building one prototype; UTM-01. The urban maglev runs on a 1 km (0.62 mi) track between Expo Park and National Science Museum.[57][58] Meanwhile UTM-02 remarked an innovation by conducting the world's first ever maglev simulation.[59][60] However UTM-02 is still the second prototype of a final model. The final UTM model of Rotem's urban maglev, UTM-03, is scheduled to debut at the end of 2012 in Incheon's Yeongjong island where Incheon International Airport is located.[61]

Under construction

Old Dominion University

Track of less than a mile in length has been constructed at Old Dominion University in Norfolk, Virginia, USA. Although the system was initially built by AMT, problems caused the company to abandon the project and turn it over to the University.[62][63] This system uses a "smart train, dumb track" design in which most of the sensors, magnets, and computation reside on the train rather than the track.[64] This system will cost less to build per mile than existing systems. The US$14 million

originally planned did not allow for completion. The system is currently not operational, but research has proved useful. In October 2006, the research team performed an unscheduled test of the car that went smoothly. The whole system, unfortunately, was removed from the power grid for nearby construction.[65] In February 2009, the team was able to retest the sled, or bogie, and was again successful despite power outages on campus. Further testing is planned, increasing both speed and distance. Meanwhile, ODU has partnered with a Massachusetts-based company to test another maglev train on its campus. MagneMotion Inc. is expected to bring its prototype maglev vehicle, which is about the size of a van, to the campus to test in early 2010.[66]

Some urban legends regarding the completion of the Maglev have started to accumulate on the campus. The most prominent one is that of the three engineering students or more commonly known as the "Great Three". The legend goes, three engineering students, each belonging to their respected discipline (Mechanical,Chemical and Electrical) will have an epiphany. This epiphany is said to reveal the secret to the completion of the Maglev. Though skeptics are great in number, many students hold true that this prophecy will one day come true.

AMT Test Track – Powder Springs, Georgia

The same principle is involved in the construction of a second prototype system in Powder Springs, Georgia, USA, by American Maglev Technology, Inc.

Applied Levitation/Fastransit Test Track – Santa Barbara, California

Applied Levitation, Inc. has built a levitating prototype on a short indoor track, and is now planning a quarter-mile outdoor track, with switches, in or near Santa Barbara.

Beijing S1 Line

The Beijing municipal government is building China's first low-speed maglev line using technology developed by Defense Technology University. This is the 10.2 km (6.3 mi) long S1-West commuter rail line, which, together with seven other conventional lines, saw construction begin on 28 Feb. 2011. The top speed will be 105 km/h (65 mph). It is scheduled to be completed in two years.[67]

Proposed systems

Main article: List of maglev train proposals

Many maglev systems have been proposed in various nations of North America, Asia, and Europe.[68] Many are still in the early planning stages, or even mere speculation, as with the transatlantic tunnel. But a few of the following examples have progressed beyond that point.

Australia

Sydney-Illawarra Maglev Proposal

There is a current proposal for a Maglev route between Sydney and Wollongong.[69]

The proposal came to prominence in the mid-1990s. The Sydney – Wollongong commuter corridor is the largest in Australia, with upwards of 20,000 people commuting from the Illawarra to Sydney for work each day. Current trains crawl along the dated Illawarra line, between the cliff face of the Illawarra escarpment and the Pacific Ocean, with travel times about two hours between Wollongong Station and Central. The proposed Maglev would cut travel times to 20 minutes.

Melbourne Maglev Proposal

The proposed Melbourne Maglev connecting the city of Geelong through Metropolitan Melbourne's outer suburban growth corridors, Tullamarine and Avalon domestic in and international terminals in under 20 mins and on to Frankston, Victoria in under 30 minutes.

In late 2008, a proposal was put forward to the Government of Victoria to build a privately funded and operated Maglev line to service the Greater Melbourne metropolitan area in response to the Eddington Transport Report which neglected to investigate above ground transport options.[70][71] The Maglev would service a population of over 4 million and the proposal was costed at A$8 billion.

However despite relentless road congestion and the highest roadspace per capita Australia, the government quickly dismissed the proposal in favour of road expansion including an A$8.5 billion road tunnel, $6 billion extension of the Eastlink to the Western Ring Road and a $700 million Frankston Bypass.

United Kingdom

Main article: UK Ultraspeed

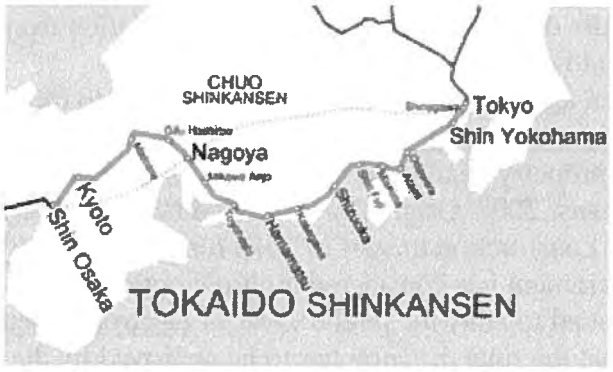
London – Glasgow: A maglev line was recently[*when?*] proposed in the United Kingdom from London to Glasgow with several route options through the Midlands, Northwest and Northeast of England and was reported to be under favourable consideration by the government.[72] But the technology was rejected for future planning in the Government White Paper *Delivering a Sustainable Railway* published on 24 July 2007.[73] Another high speed link is being planned between Glasgow and Edinburgh but there is no settled technology for it.[74][75][76]

Iran

Iran and a German company have reached an agreement on using maglev trains to link the cities of Tehran and Mashhad. The agreement was signed at the Mashhad International Fair site between Iranian Ministry of Roads and Transportation and the German company. Maglev trains can reduce the 900 km (560 mi) travel time between Tehran and Mashhad to about 2.5 hours.[77] Munich-based Schlegel Consulting Engineers said they had signed the contract with the Iranian ministry of transport and the governor of Mashad. "We have been mandated to lead a German consortium in this project," a spokesman said. "We are in a preparatory phase." The next step will be assemble a consortium, a process that is expected to take place "in the coming months," the spokesman said. The project could be worth between 10 billion and 12 billion euros, the Schlegel spokesman said. Siemens and ThyssenKrupp, the developers of a high-speed maglev train, called the Transrapid, both said they were unaware of the proposal. The Schlegel spokesman said Siemens and ThyssenKrupp were currently "not involved." in the consortium[78]

Japan

Tokyo – Nagoya – Osaka



Proposed Chūō Shinkansen route (thin broken orange line) and existing Tōkaidō Shinkansen route (bold solid orange line).

The plan for the Chuo Shinkansen bullet train system was finalized based on the Law for Construction of Countrywide Shinkansen. The Linear Chuo Shinkansen Project aims to realize this plan using the Superconductive Magnetically Levitated Train,

which connects Tokyo and Osaka by way of Nagoya, the capital city of Aichi, in approximately one hour at a speed of 500 km/h (310 mph).[79] In April 2007, JR Central President Masayuki Matsumoto said that JR Central aims to begin commercial maglev service between Tokyo and Nagoya in the year 2025 with the full track between Tokyo and Osaka finalized in 2045.[80][81]

Venezuela

Caracas – La Guaira
A maglev train (TELMAGV) has been proposed to connect the capital city Caracas to the main port town of La Guaira and Simón Bolívar International Airport. No budget has been allocated, pending definition of the route, although a route of six to nine kilometers (three to six miles) has been suggested. The proposal envisages that, initially, a full-sized prototype train would be built with about 1 km (0.62 mi) of test track.

In proposing a maglev system, its improved life and performance over mechanical engines were cited as important factors, as well as improving comfort, safety, economics and environmental impact over conventional rail.[82]

China

Shanghai – Hangzhou
China is planning to extend the existing Shanghai Maglev Train,[83] initially by some 35 kilometers to Shanghai Hongqiao Airport and then 200 kilometers to the city of Hangzhou (Shanghai-Hangzhou Maglev Train). If built, this would be the first inter-city maglev rail line in commercial service.

The project has been controversial and repeatedly delayed. In May 2007 the project was suspended by officials, reportedly due to public concerns about radiation from the maglev system.[84] In January and February 2008 hundreds of residents demonstrated in downtown Shanghai against the line being built too close to their homes, citing concerns about sickness due to exposure to the strong magnetic field, noise, pollution and devaluation of property near to the lines.[85][86] Final approval to build the line was granted on 18 August 2008. Originally scheduled to be ready by Expo 2010,[87] current plans call for construction to start in 2010 for completion by 2014. The Shanghai municipal government has considered multiple options, including building the line underground to allay the public's fear of electromagnetic pollution. This same report states that the final decision has to be approved by the National Development and Reform Commission.[88]

The Shanghai municipal government may also build a factory in Nanhui district to produce low-speed maglev trains for urban use.[89]

India

Mumbai – Delhi
A maglev line project was presented to the Indian railway minister (Mamta Banerjee) by an American company. A line was proposed to serve between the cities of Mumbai and Delhi, the Prime Minister Manmohan Singh said that if the line project is successful the Indian government would build lines between other cities and also between Mumbai Central and Chhatrapati Shivaji International Airport.[90]

The State of Maharashtra has also approved a feasibility study for a Maglev train between Mumbai (the commercial capital of India as well as the State government capital) and Nagpur (the second State capital) about 1,000 km (620 mi) away. It plans to connect the regions of Mumbai and Pune with Nagpur via less developed hinterland (via Ahmednagar, Beed, Latur, Nanded and Yavatmal).[91]

Puerto Rico

San Juan – Caguas: A 16.7-mile (26.8 km) maglev project has been proposed linking Tren Urbano's Cupey Station in San Juan with two proposed stations to be built in the city of Caguas, south of San Juan. The maglev line would run along Highway PR-52, connecting both cities. According to American Maglev Technology (AMT), which is the company in charge of the construction of this train, the cost of the project is approximately US$380 million.[92][93][94]

United States

Union Pacific Freight Conveyor: Plans are under way by American rail road operator Union Pacific to build a 7.9 km (4.9 mi) container shuttle between the ports of Los Angeles and Long Beach, with UP's Intermodal Container Transfer Facility. The system would be based on "passive" technology, especially well suited to freight transfer as no power is needed on-board, simply a chassis which glides to its destination. The system is being designed by General Atomics.[50]

California-Nevada Interstate Maglev: High-speed maglev lines between major cities of southern California and Las Vegas are also being studied via the California-Nevada Interstate Maglev Project.[95] This plan was originally supposed to be part of an I-5 or I-15 expansion plan, but the federal government has ruled it must be separated from interstate public work projects.

Since the federal government decision, private groups from Nevada have proposed a line running from Las Vegas to Los Angeles with stops in Primm, Nevada; Baker, California; and points throughout San Bernardino County into Los Angeles. Southern California politicians have not been receptive to these proposals; many are concerned that a high speed rail line out of state would drive out dollars that would be spent in state "on a rail" to Nevada.

Baltimore – Washington D.C. Maglev: A 64 km (40 mi) project has been proposed linking Camden Yards in Baltimore and Baltimore-Washington International (BWI) Airport to Union Station in Washington, D.C.[96] It is said to be in demand for the area due to its current traffic/congestion problems.

The Pennsylvania Project: The Pennsylvania High-Speed Maglev Project corridor extends from the Pittsburgh International Airport to Greensburg, with intermediate stops in Downtown Pittsburgh and Monroeville. This initial project will serve a population of approximately 2.4 million people in the Pittsburgh metropolitan area. The Baltimore proposal is competing with the Pittsburgh proposal for a US$90 million federal grant. The purpose of the project is to see if the maglev system can function properly in a U.S. city environment.[97]

San Diego-Imperial County airport: In 2006 San Diego commissioned a study for a maglev line to a proposed airport located in Imperial County. SANDAG says that the concept would be an "airports without terminals", allowing passengers to check in at a terminal in San Diego ("satellite terminals") and take the maglev to Imperial airport and board the airplane there as if they went directly through the terminal in the Imperial location. In addition, the maglev would have the potential to carry high priority freight. Further studies have been requested although no funding has yet been agreed.[98]

Atlanta – Chattanooga: The proposed maglev route would run from Hartsfield-Jackson Atlanta International Airport, run through Atlanta, continue to the northern suburbs of Atlanta, and possibly even extend to Chattanooga, Tennessee. If built, the maglev line would rival Atlanta's current subway system, the Metropolitan Atlanta Rapid Transit Authority (MARTA), the rail system of which includes a major branch running from downtown Atlanta to Hartsfield-Jackson airport.[99]

Germany

On 25 September 2007, Bavaria announced it would build a high-speed maglev-rail service from the city of Munich to its airport. The Bavarian government signed contracts with Deutsche Bahn and Transrapid with Siemens and ThyssenKrupp for the 1.85 billion euro project.[100]

On 27 March 2008, the German Transport minister announced the project had been cancelled due to rising costs associated with constructing the track. A new estimate put the project between 3.2 and 3.4 billion euros.[101]

Switzerland

SwissRapide: The SwissRapide AG together with the SwissRapide Consortium is planning and developing the first Maglev monorail system for intercity traffic between major cities in the country. The SwissRapide Express is an innovative solution for the coming transportation challenges in Switzerland. As pioneer for large

infrastructure projects, SwissRapide is to be financed to 100% by private investors. In the long-term, the SwissRapide Express is to connect the major cities north of the Alps between Geneva and St. Gallen, including Lucerne and Basel. The first projects currently in planning are Berne – Zurich, Lausanne – Geneva as well as Zurich – Winterthur. The first line (Lausanne – Geneva or Zurich – Winterthur) could go into service as early as 2020.[102][103]

Swissmetro: An earlier project, Swissmetro, has previously attempted to provide a solution for the transportation challenges in the country. The Swissmetro AG had the technically challenging vision of constructing an underground Maglev rail system, which would have been in a partial vacuum in order to reduce air friction at high speeds. As with SwissRapide, Swissmetro envisioned connecting the major cities in Switzerland with one another. In 2011, Swissmetro AG was dissolved and the IPRs from the organisation were passed onto the EPFL in Lausanne.[104]

Indonesia

There are plans to build a 683 km (424 mi) long maglev rail service between Jakarta and Surabaya. This maglev will have 7 stations including Semarang.

Significant incidents

There have been two incidents involving fires. The Japanese test train in Miyazaki, MLU002, was completely consumed in a fire in 1991.[105] As a result of the fire, political opposition in Japan claimed maglev was a waste of public money.

On 11 August 2006, a fire broke out on the commercial Shanghai Transrapid shortly after arriving at the Longyang terminal. People were quickly evacuated without incident before the vehicle was moved down line about 1 kilometer to avoid smoke filling the station. NAMTI officials toured the SMT maintenance facility in November 2010 and learned that the cause of the battery fire was "thermal runaway" in one of the battery trays. As a result of these findings, SMT secured a new battery vendor, installed new temperature sensors and insulators, and redesigned the battery trays to prevent a re-occurrence of the event. SMT officials confirm that the system has performed flawlessly since making the changes.

On 22 September 2006, a Transrapid train collided with a maintenance vehicle on a test/publicity run in Lathen (Lower Saxony / north-western Germany).[106][107] Twenty-three people were killed and ten were injured; these were the first fatalities resulting from an accident on a Maglev system. The accident was caused by human error; charges were brought against three Transrapid employees after a year-long investigation.[108]

[ATTACHMENT C]

KRAUTHAMER
& ASSOCIATES, INC.

Honolulu Authority for Rapid Transportation
Recruitment Plan

November 14-November 17, 2011

- Gregg Moser, Krauthamer & Associates (K&A), will meet individually with selected HART staff, the Board of Directors, selected members of the City Council and the Mayor of Honolulu and key stakeholders (R. Morton, J. Magaldi) to discuss the recruitment of HART's CEO.
    - This discussion will focus on the qualities and attributes of a CEO and the environment that HART exists within as well as the local cultural, social, economic, environmental/sustainability and political sensitivities that the incoming CEO must be attuned to.
    - Gregg Moser will meet with interim CEO.
- Gregg Moser will meet with HART's Board of Directors and Human Resources Committee to discuss ideas, thoughts and concerns regarding the upcoming recruitment.
    - The Recruitment Plan will be reviewed, discussed and revised as necessary.
    - The recruitment timeline will be reviewed, discussed, and amended as necessary.
    - The draft position description will be reviewed.
    - Advertising will be discussed (See attached).
    - Salary and relocation compensation to be discussed.
    - Opportunity for search confidentiality and interview process to be discussed.
- The recruitment plan, job description and advertisement were approved by the Board with minor modifications.

November 21-November 22, 2011

- The position description and advertisement were revised by K&A to incorporate minor changes proposed by Board.
- K&A sent to the Human Resources Committee Chair and Board chair the revised advertisement for review and approval.
- K&A obtained pricing information for advertising.

November 23, 2011, November 28-29, 2011

- K&A sent to Human Resources Committee Chair and Board Chair:
    - the revised draft position description and recruitment plan for review and approval.
- Advertising is submitted and will begin to appear and run for (30 or 60) days.

December 1, 2011 - January 27, 2012

- K&A's active recruitment of potential candidates begins.
- K&A will begin to conduct industry specific research targeting candidates with skills specific to the attributes outlined in the position description.
- K&A will identify, recruit, interview, and screen candidates for recommendation to the HART (Board or Human Resources Committee) based upon the feedback obtained during K&A's initial visit to Honolulu and feedback obtained from interviews with various stakeholders.
- K&A will communicate with the Human Resources Committee continuously regarding its progress as well as provide the committee with feedback that it is receiving from leaders in the transit industry regarding their level of interest in the position.
- K&A will provide the Human Resources Committee with data about the compensation ranges of potential candidates interested in the position.
- K&A will discuss with and obtain input from the Human Resources Committee in order to prepare a series of interview questions for in-person interviews of selected candidates by HART's Board of Directors.
- K&A to discuss with and obtain input from the Human Resources Committee a procedure for evaluating candidates in order to prepare and develop an evaluation matrix for ranking up to 12 potential candidates presented by K&A.
- K&A to work with the Human Resources Committee to develop an interview process and schedule for those candidates selected to meet in-person with the HART Board.
- On-going conferences calls with (individual Board members, Human Resources Committee or the Board of Directors) for K&A to update the Board on the progress of the search.

February 1-February 2, 2012

- K&A to present a list of up to 12 candidates to the HART Board for review and discussion.
- K&A and HART Board identify up to 6 candidates*** for in-person interviews.
    - ***K&A recommends revising the scope of services to identify up to 4 candidates for in-person interviews.
- Initial references conducted on those candidates selected for in-person interviews.
- K&A inform selected candidates that they have been invited for in-person interviews.
- K&A work with HART staff and candidates to plan a schedule for the interviews and coordinate logistics for the interviews.

February 15-February 17, 2012

- The final candidates arrive in Honolulu for in-person interviews.
- Suggestions:
    - HART's Board will conduct in-person interviews of candidates.
    - Each candidate is given a tour of Honolulu, the corridor and HART.

- Each candidate has in-formal meetings/meals with individuals/small groups of Board members (no more than 2 Board members at each meeting at a time).

February 16, 2012

- Board meets to review feedback from in-person interviews/meetings and select which candidate they would like to extend an offer.

February 16-29, 2012

- Final background check conducted and references completed for each candidate.
- Negotiation of a contract is finalized and agreed to including start date.

March 1, 2012

- Selected candidate and contract is voted on and approved by Board.
- Board officially announces HART's President/CEO to the public.

To Be Determined

- Start Date

Honolulu Authority for Rapid Transportation (HART)
Chief Executive Officer

The Honolulu Authority for Rapid Transportation (HART), located in Honolulu, HI is searching for a highly energetic, hardworking, transparent, visionary and strategic CEO to lead the authority as it builds one of the world's premier automated fixed guideway systems estimated at $5.2 billion. Currently, HART is in the preliminary engineering phase of the project development with advance utility relocation and property acquisition underway. The Project is scheduled to be completed by 2019. Candidates will have a successfully demonstrated track record of managing significant and complex capital projects, budgets, and operations; experience with transit oriented development; supervising large diverse workplaces, staff, contractors and consultants; and communicating a vision at the local, state and national level to successfully partner with the Federal Transit Administration and guide the authority through an FTA New Starts development process. The CEO will work closely with the Board of Directors, City and County of Honolulu, the State of Hawaii, employees, contractors, citizens, communities and other stakeholders to complete its capital program on time and on budget. Candidates should possess excellent leadership, interpersonal communication, and negotiating skills, and be a collaborator and consensus builder who can manage many activities and interests at the same time. Candidates must demonstrate an ability to be sensitive and responsive to the diverse cultural, political, environmental, social, economic interests of the Honolulu community.

Interested candidates should have a minimum of 5 years of executive leadership experience in a complex operating environment and at least 5 years of fixed guideway system experience. Strong consideration will be given to experience successfully overseeing complex public transportation capital programs. For additional information or to submit a resume, please contact Gregg Moser at Krauthamer & Associates via email: gmoser@krauthamerinc.com by January 5, 2012. HART is an equal opportunity employer.

[ATTACHMENT D]

KRAUTHAMER
& ASSOCIATES, INC.

DRAFT POSITION DESCRIPTION

POSITION TITLE: Executive Director/CEO

REPORTING TO: Board of Directors

LOCATION: Honolulu, HI

THE COMPANY: Honolulu Authority for Rapid Transportation

The Honolulu Authority for Rapid Transportation (HART or the Authority) is a semi-autonomous agency of the City and County of Honolulu, Hawaii created by a voter-approved amendment to City and County charter to develop, operate, maintain and expand a fixed guideway transit system for the City and County of Honolulu. HART is currently developing and designing the Honolulu-High Capacity Transit Corridor Project (HHCTCP). This project is a 20+ mile long fully automated light rail system that will have 21 stations, a maintenance and storage facility, three park-and-ride lots and one park-and-ride structure. The HHCTCP has been broken into 4 different sections and will open in three phases between 2015 and 2019.

HART will operate a total fleet of 80 rail cars with 68 cars in operation during peak hours by 2024. Each train will consist of two railcars with a 318 person capacity.

BOARD OF DIRECTORS:

HART is governed by a ten-member Board of Directors nine of which are voting members and one a non-voting member. The Board is responsible for setting policy for the authority as well as any other duties or functions assigned to it by ordinance. Three of the 10 members are ex-officio members whose terms are not limited in duration. Two are voting members. They are the state director of transportation and the city director of transportation services. The third ex-officio member, the director of the department of planning and permitting, is a non-voting member. The remaining seven members are appointed, three by the Mayor of Honolulu, three by the City Council and one selected by the appointed voting members in a majority vote.

Of the three members appointed by the Mayor one of the three appointees serves a five year term, one serves a four year term and one serves a three year term. The same is true for those members appointed by the City Council.

HISTORY:

Honolulu has been planning for a mass transit line to connect Honolulu's urban transit center with the outlying areas for nearly 40 years with several attempts in the past. In 2005, funding for a rail line was approved and signed into law by the Governor of Hawaii. A month after the law passed, the Honolulu City Council authorized a one-half percent GET increase which provides funds to be set aside specifically for the construction and operation of a mass transit system.

HHCTCP:

The first section is the West O'ahu/Farrington Highway section which extends from East Kapolei to Pearl Highlands and will consist of six stations. This section will have an elevated structure to cross the H-1 Freeway. To date the design/build contract has been awarded and limited Notices to Proceed for preliminary engineering

have been issued. Additionally the design/build contract for the maintenance and storage facility has been awarded.

The second section extends from Pearl Highlands to Aloha Stadium along Kamehameha Highway with two stations, a park-and-ride facility and a transit center planned. The Kamehameha Highway Guideway design/build contract has been awarded. This section is scheduled to open on December 2015.

The third section extends from Aloha Stadium to Middle Street Transit Center Station. There are 4 stations planned in this section. This section is scheduled to open on October 2017. The final section extends from the Middle Street Transit Center to Ala Moana Center with eight stations planned. This section is scheduled to open March 2019.

SCOPE AND RESPONSIBILITIES:

The Executive Director shall serve as HART's Chief Executive Officer (CEO) and is responsible for administering all of the affairs of HART and for running the day-to-day operations of the agency. The CEO will receive policy direction from the Board and will make recommendations to the Board on budgets, policies, plans, rules and performance measures. The CEO will plan, direct, and supervise the activities of all HART staff, contractors and consultants through a management structure. The CEO will also serve as the chief procurement officer for the agency in accordance with state law and is responsible for executing all contracts and agreements of the Authority. Additionally, the CEO will represent the Authority to state and federal bodies and to other external stakeholders, organizations and community interests. The CEO will work with the Board Chair to plan Board meeting agendas and make reports to the Board and the community regularly.

The ideal candidate will have a proven track record of successfully managing a complex and diverse organization, preferably in the public arena, that provides the highest quality of service to its customers and stakeholders. Additionally, this individual will have outstanding advocacy skills, business skills as well as strong financial management, communication, strategic planning, public relations, community relations, governmental relations, and interpersonal skills. Candidates should have experience working in diverse community's that have varying political, cultural, social, and economic atmosphere where there is a strong commitment to sustainability and the environment. Additionally, the ideal candidate will have experience working with local, state, federal employees and agency's.

Knowledge of and working experience with the Federal Transit Administration and the FTA's New Start project development process and the associated requirements for project management and grant administration and experience managing capital construction projects will be a plus. Additionally, experience successfully managing a large, complex organization with large capital intensive projects that are governed by relevant local, state and federal laws especially in today's financially strained environment will be a major asset.

The staff and Board of Directors are dedicated to working together to ensure the success of HART as it continues to design, build and prepares to operate one of the world's newest fully automated rail systems. The new CEO will be integral to the continued planning and design of HART's system as it strives to construct a high quality rail system that will serve its customers, including persons from the city and County of Honolulu, residents of the State of Hawaii, visitors and other stakeholders.

Powers, Duties and Functions of the Executive Director:

As defined in the revised Charter of the City and County of Honolulu Section 17-104, the Executive Director shall:

a) Administer all affairs of the authority, including rules, regulations and standards adopted by the board.
b) Have at least five years of fixed guideway system experience.
c) Sign all necessary contracts for the authority, unless otherwise provided by this article.

d) Recommend to the board the creation or abolishment of positions.
e) Enforce the collection of fares, tolls, rentals, rates, charges, and other fees.
f) Prepare payrolls and pension rolls.
g) Maintain proper accounts in such manner as to show the true and complete financial status of the authority and the results of management and operation thereof.
h) Prepare annual operating and capital budgets.
i) Prepare and maintain a six-year capital program.
j) Prescribe rules and regulations as are necessary for the organization and internal management of the authority.
k) Recommend rules and regulations for adoption by the board.
l) Request, and accept appropriations from the city, and request and accept grants, loans and gifts from other persons and entities.
m) Administer programs promoting appropriate developments near transit stations, including compilation of city incentive programs.
n) Review development projects having significant impact on the operation of the fixed guideway system.
o) Plan, administer and coordinate programs and projects of the fixed guideway system that are proposed to be funded, wholly or partially, under federal or state law and required to be transmitted to the Oahu metropolitan planning organization.
p) Attend all meetings of the Board unless excused.
q) In addition to the general powers under this section, other general or specific powers may be conferred upon the executive director by ordinance, so long as the powers are consistent with the article of this Charter.

SKILLS AND ABILITIES:

The ideal candidate will have a demonstrated background and outstanding abilities as grouped in the following areas:

BOARD INTERACTION

- Develop a strong collaborative working relationship with an engaged 10-member Board of Directors; assist the Board in its policy-making duties by providing relevant information; assist the Board in short and long-term planning objectives; furnish information to include options and potential consequences; enable the Board and its Committees to make informed decisions;

- Manage the resources of the Authority consistent with the Board's policies in order to achieve efficient and effective design, development, construction and future operation and maintenance of the system in order to provide clean, courteous, timely, dependable, and cost-effective service;

- Implement Board policy via actionable management plans and provide strategic direction to senior management that will enable the effective execution of these plans; and

- Communicate regularly with the Board of Directors about internal operations, reports and external stakeholder communications and invite and encourage Board member participation in community events and senior staff meetings as appropriate.

EXTERNAL RELATIONSHIPS

- Work effectively and persuasively with elected officials, local, state and federal agencies, the U.S. House of Representatives, the U.S. Senate, U.S. DOT/FTA, Transportation Security Administration (TSA), the governments of City and County of Honolulu and State of Hawaii and the local business community, organized labor, public constituencies, NGOs, the press and other stakeholders;

- Represent and speak on behalf of the Authority to partner organizations and external stakeholders by making presentations and attending meetings, forums and events including meetings of local, state and federal governmental units;

- Interact and communicate regularly with employees, passengers, the public, elected officials, the press and passionate and committed stakeholders to provide transparency and insight into the Authority's implementation of its capital program and policies and the Authority's current and future status and to assure maximum cooperation in building best possible fixed guideway transportation system for the City and County of Honolulu;

- Communicate with local, national and international stakeholders continually to identify their transportation needs in order to advise the Board on areas for improvement and potential development;

- Maintain on-going communication with the State of Hawaii's Department of Transportation regarding the alignment of the fixed guideway system as it relates to grade crossings and capital intensive construction phases;

- Source, attract, negotiate agreements and work with business enterprises and concessionaires to increase revenue with the addition of services and amenities for customers and staff;

- Continually examine the Authority's performance as it relates to safety and operations so that the design, construction and future operation provides a safe, enjoyable and reliable service to all stakeholders;

- Work with commercial and residential real estate developers and other businesses interested in real estate development and transit oriented development to negotiate agreements that maximize ridership and generate the highest return on investment, as appropriate;

- Maintain an on-going commitment to customer service; and

- Continually examine the Authority's technology needs and capabilities, identifying opportunities for improvement and advancement to provide a high level of customer service to employees, passengers and stakeholders.

INTERNAL RELATIONSHIPS

- Provide strategic vision and guidance to ensure successful succession and employee development plans across all functions of the Authority. This includes identifying current opportunities in succession planning and providing the leadership to establish effective succession plans and employee development plans. Provide leadership, and encourage employees to take initiative and develop within the organization;

- Empower senior management and employees to lead their departments and functions effectively and efficiently; encourage senior management and employees to work together and across all functions of the organization; provide an environment where managers from each department are encouraged to work together and present directly to executive leadership;

- Coach, train, and motivate staff; manage employee relations; manage the workflow and prioritization of projects and measure the performance of the agency and direct staff and take appropriate corrective action when necessary; review the work of staff and make effective suggestions and recommendation; recommend and implement corrective actions, discipline and termination procedures as appropriate/necessary; and

GENERAL MANAGEMENT

- Implement the HART business strategy adopted by its Board and in accordance with HART's mission to achieve the vision for the HHCTCP through the successful accomplishment of HART's goals;

- Manage a capital oriented organization with an emphasis on financial management, safety, security, and public awareness as to the impacts that construction will have on residents, visitors, the environment and other stakeholders;

- Have strong financial management and leadership skills and successfully manage large and complex budgets; identify areas for cost reduction and increased efficiencies and communicate those recommendations and creative solutions effectively to the Board and management, resulting in an organization that is run efficiently and cost effectively;

- Have proven leadership skills which include being:

    - A unifier and team builder,
    - A problem solver and visionary, and
    - A mentor and motivator;

- Responsibly manage the Authority's assets in order to optimize all funding sources allocated to HART;

- Advocate for sustainable development and economic growth for the region and increased revenue for local businesses and government;

- Ensure that effective cost-control measures are in place at all levels of the Authority;

- Manage multiple agendas and interests simultaneously;

- Ensure that processes, policies and practices are interpreted and applied consistently and effectively and that the Authority is accountable and compliant with all current and applicable City, state and federal and agency policies;

- Attend and/or participate in professional group meetings and maintain awareness of new trends and developments impacting the agency's business activities;

- Develop an understanding, appreciation, sensitivity and commitment to the social, economic, political and environmental needs of HART and the unique region it serves; and

- Oversee and/or develop effective marketing plans, such as plans to promote and attract ridership and increase the business of the Authority and to drive ancillary revenue opportunities.

PERSONAL ATTRIBUTES:

The candidate should possess the attributes as grouped in the following areas:

PERSONAL QUALITIES

- Highly professional, hardworking, mature, honest, even tempered, trusting, confident and personable individual.
- A leader with a high level of intelligence, persuasiveness, creativity, and vision.
- High energy level, with maturity, gravitas, integrity and ethics above reproach.

- Innovative, compassionate, transparent leader who is inclusive in his/her decision making process and willing to delegate responsibility when appropriate.
- Excellent interpersonal communication, presentation and writing skills.
- Professional and executive presence to stand on behalf of the organization as the leader and champion of the Authority.
- Results oriented individual with a dedication to accuracy, efficiency and on-time delivery with quality and an appropriate sense of urgency at the forefront of all decisions.
- An executive who is accountable and adaptable and who provides realistic and strategic solutions to problems and is comfortable mediating difficult situations.
- Strategic leader, open-minded communicator and critical thinker who is unwilling to let challenges prevent success, but rather looks at challenges as opportunities for success.
- Professional judgment including practical approach, appropriate risk taking and political savvy to lead the Authority through its next phase of growth.
- A team player, who is culturally sensitive to the diversity of the community and its social norms and who is committed to safety, diversity, sustainability, reliability, equity, equality, fiscal responsibility and public service.

INTERPERSONAL SKILLS

- Proven ability to effectively build alliances, listen to, communicate, interact and work with the Board of Directors, senior management, employees, contractors, organized labor, business partners, the community, and customers.
- Verifiable track record of developing strong relationships with customers and increasing management and Authority interactions with customers.
- Demonstrated effectiveness at creating strong proactive partnerships between government and business by working with, listening to, communicating, educating and gaining support from elected officials at the local, state and national level to identify, negotiate and solve complex and challenging issues.
- Demonstrated track record of providing vision and leadership to employees, the community and other stakeholders within a growing organization.
- Demonstrated ability to unify teams, communities and people during complicated times.

INTERACTION IN MANAGEMENT SITUATIONS

- Strong mentor and teacher who is approachable, open-minded and treats all employees with respect and dignity.
- Executive leader who embraces diversity and inclusion, has the ability to attract talent, promotes an environment of healthy debate and encourages the staff and team to challenge the norm.
- Proactive leader who listens and encourages, mentors and motivates employees and teams to think critically, strategically and creatively while developing solutions to problems that will provide vision and success for the authority.
- Effective manager who listens and encourages employees, teams and stakeholders to challenge ideas in order to develop the most effective solutions.
- Strong manager and leader with team building skills and excellent problem solving and conflict resolution skills.
- Excellent operational skills including creating tools to train and develop staff thereby increasing productivity and the Authority's performance.
- Experience challenging the status quo and the "tenured" nature of the executive team, while creating a sense of teamwork.

CREATIVITY

- Creative approach to problem solving with a proven track record of implementing innovative initiatives in complex organizations similar in size, scope and operations to a capital intensive transportation authority such as HART.
- Executive with proven record of navigating, negotiating, marketing, and implementing large complex capital projects with funding from both public and private partners.
- Experience utilizing a diverse slate of financing options including public and private financing alternatives (tax revenue, bond revenue, loans, grants, etc.) and experience working with relevant financial advisors in order to obtain the necessary funding to complete a significant capital project.
- Proven ability to leverage technology to increase bottom-line results and increase efficiencies and reduce waste.

BUSINESS ACUMEN

- Experience managing a large organization that is undertaking significant capital construction projects.
- Experience managing a large multi-million or multi-billion dollar complex project (construction or expansion) such as fixed guideway transit, bridges, highways/roadways, railways, terminals, etcetera, while working with local, state and national stakeholders and agencies, consultants and related vendors to ensure that phases of the HHCTCP are completed safely, on-time and within budget.
- Success managing and providing executive level guidance to a highly educated, experienced and technical workforce, thereby empowering management to implement and execute their departmental plans effectively.
- Extensive experience planning and implementing new projects and initiatives to build a more effective, sustainable and sound organization.
- Experience developing and implementing metrics used to evaluate individual and company performance, budgets, cost effectiveness, returns on investments to increase the bottom line and operational performance.
- A leader who has a strong financial orientation and who can recognize inefficiencies and areas of potential cost reduction.
- Demonstrated track record of success during varying economic and business cycles.

EXPERIENCE REQUIRED:

The successful candidate will have at least 5 years executive transportation management experience in a multi-modal transportation system or other public or private entity, agency, department or authority of equivalent complexity, with at least five years of fixed guideway system experience. A Bachelor's degree is required and preference will give given to an advanced degree in a relevant discipline.

[ATTACHMENT E]

Honolulu Authority for Rapid Transportation
Interim Executive Director & CEO's Report
November 17, 2011

Construction Activities

- Contractor Kiewit/Kobayashi has completed half of the soil borings at the Maintenance and Storage Facility site. Soil and water samples from one of the borings were sent to a lab for potential contamination, and results showed the contamination was below harmful levels. The contractor and HART's safety and environmental team are working with the state Department of Health on mitigating the issue at that boring location.

- With APEC completed, Archaeological Inventory Survey work will resume in the City Center area. HART staff recently updated the Oahu Island Burial Council (OIBC), one of several stakeholders, on the status of the survey work. Four of 232 trenches have been completed.

- The burial consultation protocol for iwi kupuna has been submitted to the Federal Transit Administration (FTA) for its review and approval in accordance with the Programmatic Agreement. The protocol, which was drafted with the input of numerous stakeholders, lays out the procedure on the treatment of any cultural and historical findings, including iwi, related to the AIS work.

General Update:

- We received our latest quarterly GET installment, which came in at $46.4 million or 6 percent more than we had anticipated in our financial plan. We have collected a total of $761 million to date (since January 2007), which is $18 million more than our forecast. So far we have spent $280 million in GET revenue and $64 million in federal funds has been received and expended.

- Federal support for this project remains strong. The FY2012 Transportation Appropriation Conference Report was filed a few nights ago. The bill set a side a total of $510 million for "preliminary engineering, final design, and construction of projects that receive a Full Funding Grant Agreement during calendar year 2012". Honolulu is said to be one of the top five projects to receive a substantial portion of this appropriation.

- Right-of-way acquisitions continue with another accepted offer and an additional successful relocation. To date, HART has made 19 offers, of which 15 have been accepted and four are pending.

- HART's planning staff continues to meet with The Outdoor Circle to provide project updates as it relates to tree removal and relocation. Our staff recently conducted a site visit for The Outdoor Circle along the Kamehameha Highway Guideway alignment. The project has an arborist on contract working with the construction contractor on the tree removal and relocation process and The Outdoor Circle has requested that they be allowed to accompany the arborist in surveying trees affected by the City Center AIS work.

- HART continues to expand its ethnic radio outreach, adding two bi-monthly radio programs to its lineup. We kicked off one of those regular appearances on KNDI radio, which serves the Filipino community, featuring HART Board Chair Carrie Okinaga and two members of HART's public involvement team. These appearances provide an excellent opportunity to provide accurate information about the project and to connect with an important segment of our community.

- HART's public involvement staff participated in several presentations and events during the last two weeks, including a community meeting for Kakaako residents regarding the archaeological survey work and six neighborhood board meetings. In addition, several project updates were conducted, including a presentation for senior citizens and Kapolei business and community leaders.