Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

Arthur T. Leahy
Chief Executive Officer
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metro.net

August 17, 2010

Honorable Chair Deborah A. P. Hersman
National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington, D.C. 20594

Subject: Safety Recommendation R-10-25 in the investigation of the June 22, 2009 Washington Metropolitan Area Transit Authority accident

Dear Ms. Hersman,

The Los Angeles County Metropolitan Transportation Authority (LACMTA) appreciates the recommendation from the National Transportation Safety Board to "Work with Alstom Signaling Inc. to establish periodic inspection and maintenance procedures to examine all General Railway Signal Company audio frequency track circuit modules to identify and remove from service any modules that exhibit pulse-type parasitic oscillation. (R-10-25)". We are pleased to provide you this response as requested in your letter dated August 10, 2010. We have divided our response into the following categories:

- General
- Testing of Existing Track Circuits
- Periodic Inspection and Maintenance Procedures
- Additional Steps

General

LACMTA is aware of the developments and recommendations from the Washington Metropolitan Area Transit Authority (WMATA) accident, and is constantly seeking information and guidance on the status of "Generation 2" track circuits supplied by Alstom. Although Alstom has supplied these track circuits to LACMTA, they are not identical to those that were provided to WMATA. As you may be aware, LACMTA has some 56 Generation 2 track circuits in a 3.5 mile segment of our Red Line.

Testing of Existing Track Circuits

Alstom has conducted on-site testing at LACMTA on a number of our track circuits. We have received a letter from Alstom dated July 29, 2010 (Attachment 1), confirming that their inspection of LACMTA track circuits revealed no immediate cause for concern. This letter also confirms that Alstom is working on possible modifications to Generation 2 track

circuits and will advise LACMTA if and when they are complete. Alstom has also informed us in a follow-up email that they will be conducting enhanced testing of LACMTA's Audio Frequency Track Circuits in the near future.

Periodic Inspection and Maintenance Procedures

With regard to the specific recommendation made to the LACMTA regarding establishing periodic inspection and maintenance procedures, Alstom has informed us in an e-mail response dated August 13, 2010 (Attachment 2), that they plan on providing us two test procedures – one will be an enhanced adjustment and test procedure and another will be a newly developed test procedure to specifically test for the existence of parasitic oscillations in Audio Frequency Track Circuits. Upon receipt of these procedures, LACMTA will incorporate them into our maintenance practices.

While we await receipt of the above procedures, LACMTA has contacted Alstom (Attachment 3) asking whether a procedure developed by WMATA (Procedure No. T163) is applicable to LACMTA. Given the fact that LACMTA's Generation 2 track circuits are not identical to WMATA's, LACMTA believes that Alstom should provide confirmation as to whether or not we should adopt this procedure as we do not wish to risk harm to the integrity of our train control system.

Additional Steps

LACMTA has taken additional steps by contacting our other train control equipment manufacturers for our light rail lines to determine whether the anomalies found in the GRS/Alstom equipment could be exhibited in their equipment. We have received responses from these other vendors that conclude (Attachment 4) based on their analysis of their design and the failure in the WMATA incident, their equipment is not prone to a similar type of failure that was the cause of the WMATA incident.

And finally, LACMTA has implemented the recommended track circuit monitoring system on all our rail lines at the rail control center. The system monitors our track circuits for "flickering" and possible false unoccupied track circuits and generates a real-time alarm upon detection of such occurrences. We are currently testing and refining the software algorithms to ensure the system does not generate false failures.

LACMTA believes that our efforts described above will mitigate the concerns arising from the WMATA accident and are responsive to NTSB's recommendation R-10-25.

Sincerely,

Arthur T. Leahy
Chief Executive Officer

cc: Hon. Christopher A. Hart, NTSB
Hon. Robert L. Sumwalt, NTSB
Hon. Mark R. Rosekind, NTSB
Hon. Earl. F. Weener, NTSB
P. Taylor
L. Mitchell
M. Harris-Gifford
V. Khawani

ATTACHMENT 1

ALSTOM

TRANSPORT
NORTH AMERICA
Signaling

July 29, 2010

Aderemi Omotayo
Signaling
Los Angeles County MTA
284 S. Santa Fe Ave
Los Angeles, CA 90012

Dear Mr. Omotayo,

On July 27, 2010 the National Transportation Safety Board ("NTSB") held a public hearing to consider the final report of the investigation into the June 22, 2009 collision of two Washington Metropolitan Area Transit Authority ("WMATA") trains near the Fort Totten station. The NTSB found that pulse-type parasitic oscillation in the Generation 2 GRS audio frequency track circuit modules at the accident location was one of the factors contributing to the collision. These track circuit modules are an early Generation 2 design and were installed during the 1970s.

Alstom is taking this opportunity to inform Los Angeles County MTA that Alstom has supplied Los Angeles County MTA with Generation 2 and 3 audio frequency track circuit modules.

Generation 2 Track Circuits

Generation 2 audio frequency track modules were uniquely designed for each customer and the Los Angeles County MTA track circuit design is not identical to that provided to WMATA. The NTSB investigation found that four specific conditions existed in the track circuit involved in the accident at Fort Totten on the day of the collision:

1) generation and/or existence of pulse-type parasitic oscillations emanating from the transmitter power amplifier;

2) an unintended electrical path between the transmitter module and the receiver module;

3) pulses occurring at a rate that mimicked the intended carrier frequency ; and

4) the receiver module was susceptible to the pulse-type parasitic oscillation (i.e., the level of the pulse-type parasitic oscillation was of sufficient amplitude to be recognized by the receiver).

ALSTOM Signaling Inc
1025 John Street
West Henrietta, NY 14586
Tel.: (585) 783-2000

Mailing Address
PO Box 20000
Rochester, NY 14602-0000

The alignment of these four factors is rare, as evidenced by the fact that during the decades these Generation 2 systems have been in operation, pulse-type parasitic oscillation was never previously identified.

Despite the rarity of this phenomenon, safety is fundamental to Alstom's business and we are committed to taking any reasonable steps to maximize the safe operation of our equipment. Accordingly, Alstom has conducted on-site testing of a number of track circuits at all customers known to currently use Generation 2 modules, including Los Angeles County MTA. That testing found no evidence of the type of conditions reported at WMATA.

Nonetheless, Alstom has developed a detailed test procedure and purchased new test equipment in order to conduct further testing and to document the condition of all remaining Generation 2 modules at Los Angeles County MTA. Testing at Los Angeles County MTA is complete.

Alstom will continue to work with Los Angeles County MTA throughout this process and will provide Los Angeles County MTA with all necessary information and recommendations if any track circuit requires further investigation or temporary mitigation.

In addition to these testing activities, Alstom has also developed certain changes to the Generation 2 track circuit equipment for the purpose of eliminating the possibility of pulse-type parasitic oscillation and any potential path for such an errant signal, and ensuring the receiver module is not susceptible to such a signal. The changes involve modifications to certain printed circuit boards in the transmitter/receiver module. Alstom is in the process of conducting laboratory and on-site testing to confirm the changes will achieve the desired result. Once we have finalized those changes, we will meet with Los Angeles County MTA to discuss the testing and the implementation of these changes.

Generation 3 Track Circuits

The Generation 3 audio frequency track circuit modules were developed in the 1990s and reflect significant design developments; including:

1) a complete redesign of the module housing which holds the track circuit electrical components;

2) the addition of certain filters;

3) various circuit changes.

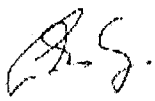
ALSTOM

Alstom has performed testing of Generation 3 audio frequency track circuit modules, and has found no evidence of pulse type parasitic oscillation with any Generation 3 modules.

Alstom must continue to advise its customers of the dangers and unpredictability of mixing manufacturers' equipment that has not been specifically designed to function together. Alstom has in the past specifically warned its customers to avoid such mixing without a rigorous assessment of the compatibility of the equipment and a detailed safety analysis. The audio frequency track circuit equipment provided by Alstom is part of a fully integrated system, designed and tested by Alstom only in operation with compatible products. Absent a thorough safety analysis and express written permission by Alstom, non-Alstom equipment should not be mixed within an Alstom track circuit.

Alstom remains committed to its customers and the public at large to ensure our equipment is safe. We will continue to communicate with Los Angeles County MTA regarding the results of our on-going testing.

Sincerely,



Ian de Souza
President & CEO

ATTACHMENT 2

From: neal.illenberg@transport.alstom.com [mailto:neal.illenberg@transport.alstom.com]
Sent: Friday, August 13, 2010 6:47 AM
To: Clark, Alan
Cc: Harris-Gifford, Michael; McGrevey, John; Omotayo, Aderemi; patrick.mckenna@transport.alstom.com
Subject: Re: ATC MODULES

Alan

As a follow up to the letter that Alstom has provided to Los Angeles County Metropolitan Transportation Authority and your e mail to me I am providing the following additional information to you.

As you know, Alstom conducted tests on all LACMTA Audio Frequency Track Circuits of the type used on WMATA April 13th through 15th 2010. The results of that testing indicated no abnormal operation. Alstom is working on a formal report regarding that testing, and the formal report will be provided to LACMTA in the near future.

Alstom would like to conduct enhanced testing of all Audio Frequency Track Circuits on LACMTA. This enhanced testing would be the same as the testing currently being conducted on other systems using similar Audio Frequency Track Circuits of the type used on WMATA. LACMTA will be contacted in the near future to discuss the schedule for this testing.

With respect to ongoing adjustment and preventative maintenance procedures, Alstom's original guidance should continue to be followed. However, in response to the NTSB's investigation and the discovery of burst parasitic oscillations, Alstom is now working on enhancements to its adjustment and test procedures which will provide additional verification of the equipment's safe operation. In addition Alstom has developed a test procedure to test for the existence of parasitic oscillations in Audio Frequency Track Circuits. Both of these procedures should be provided to you in the near future.

If you have any questions in regard to this information please contact me at 585-279-2105 (Office) or 585-202-4645 (Cell).

Neal Illenberg
Site Safety Officer

8/16/2010

ATTACHMENT 3

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
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213.922.2000 Tel
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Metro

August 10, 2010

Ian de Souza, CEO
Alstom Signaling inc.
PO Box 20600
Rochester, NY 14602-0600

Dear Mr. de Souza:

Re: Status of Metro Generation 2 Track Circuits

Thank you for your letter dated July 29, 2010 regarding the status of Metro's Generation 2 track circuits. Please inform us as soon as any additional information or recommendations come to light.

With respect to these track circuits, we are aware that WMATA have developed a procedure (#T163, attached). What is Alstom's recommendation with respect to this procedure and Metro's Generation 2 track circuits?

Please contact myself or Mr. Aderemi Omotayo, Manager of Wayside Signals regarding this matter.

Respectfully yours,

M. S. Harris-Gifford

Michael Harris-Gifford
Interim Executive Officer, Rail Wayside Systems

Cc: A. Omotayo, J. McGrevey, V. Khawani

ATTACHMENT 4

GE Transportation

Tom Shanahan
Sr. Project Manager
Intelligent Control Systems

2712 S. Dillingham Rd.
Grain Valley, MO 64029

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http://www.getransportation.com/

October 22, 2009

Mr. John McGrevey
Senior Engineer (Signal), Transit Systems Engineering
Metropolitan Transportation Authority
One Gateway Plaza
Mail Stop: 20-2-4
Los Angeles, CA 90012-2952

REF: NTSB Urgent Safety Recommendations

Dear Mr. McGrevey,

On September 22, 2009, the FTA issued a letter ("FTA letter") to transit agencies nationwide, publishing initial findings of the safety investigation into the June 22, 2009 transit accident in Washington, DC. These findings appear to indicate that a coupling between a co-located transmitter and receiver contributed to the failure under investigation and more specifically identifies a "parasitic oscillation" that may inhibit the detection of trains.

In response to the FTA letter, GE Transportation Systems Global Signaling, LLC ("GE Transportation") is reviewing product design and safety measures specifically as they relate to the possibility of a failure to detect a train associated with the use of the audio frequency track circuit equipment.

The design and implementation of the GE Transportation audio frequency track circuit equipment differs from the unit associated with the accident, most notably through the incorporation of separate chassis for the transmitter and the receiver, eliminating the direct connection between the two units thought to have been a contributing factor in the malfunction that led to the accident. Additionally, the GE Transportation-recommended installation practices utilize separate power supplies for the transmitter and receiver, and suggest installation on separate racks.

GE Transportation is also conducting supplemental analysis and testing to determine if parasitic oscillation vulnerabilities exist. These activities include a detailed review of the safety documentation completed during product design, with specific emphasis on failure mechanisms and the mitigation strategies for each. In addition to the safety review, GE Transportation will be conducting tests that specifically target proper and improper operational conditions conducive to parasitic oscillations. GE Transportation is currently targeting December 15, 2009 for the preliminary release of findings.

We at GE Transportation pride ourselves on our safety record. Our audio frequency track circuit equipment has been produced, delivered and installed for over 10 years without a single reported failure resulting in an unsafe condition.

Thanks in advance.

Sincerely,

Tom Shanahan

Tom Shanahan
Sr. Project Manager
GE Transportation Systems Global Signaling, LLC.

GE Transportation

Tom Shanahan
Sr. Project Manager
Intelligent Control Systems

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http://www.getransportation.com/

December 17, 2009

Mr. John McGrevey
Senior Engineer (Signal), Transit Systems Engineering
Metropolitan Transportation Authority
One Gateway Plaza
Mail Stop: 20-2-4
Los Angeles, CA 90012-2952

REF: NTSB Urgent Safety Recommendations; Follow-Up to GE Letter dated October 22, 2009

Dear Mr. McGrevey,

On September 22, 2009, the FTA issued a letter ("FTA letter") to transit agencies nationwide, publishing initial findings of the safety investigation into the June 22, 2009 transit accident in Washington, DC. These findings appear to indicate that a coupling between a co-located transmitter and receiver contributed to the failure under investigation and more specifically identifies a "parasitic oscillation" that may inhibit the detection of trains.

In a letter to you dated October 22, 2009, I stated that we here at GE Transportation were conducting supplemental analysis and testing to determine if parasitic oscillation vulnerabilities exist as detailed in the safety investigation letter issued by the FTA in September 2009. Attached is a letter with the findings from that analysis.

Please feel free to contact me if you have any questions or concerns.

Sincerely,

Tom Shanahan

Tom Shanahan
Sr. Project Manager
GE Transportation Systems Global Signaling, LLC.

Attached: Letter "NTSB Response_Herinckx 121609.pdf"

GE Transportation

Derald Herinckx
Global Wayside Products Leader

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December 16, 2009

REF: NTSB Urgent Safety Recommendations

On September 22, 2009, the FTA issued a letter ("FTA letter") to transit agencies nationwide, publishing initial findings of the safety investigation into the June 22, 2009 transit accident in Washington, DC. These findings appear to indicate that a coupling between a co-located transmitter and receiver contributed to the failure under investigation and more specifically identifies a "parasitic oscillation" that may inhibit the detection of trains.

In response to the FTA letter, GE Transportation Systems Global Signaling, LLC ("GE Transportation") has analyzed the possibility of parasitic oscillations in our Audio Frequency Track Circuit (AFTC) Transmitter Module, and have determined the types of oscillations seen at WMATA are not possible due to the design of our Transmitter Module. Circuit analysis has also found no other plausible source of parasitic oscillation in the system when installed in accordance with the GE Transportation AFTC installation manual.

GE Transportation has also performed laboratory testing to determine if harmonics from AFTC transmitters (alone or combined with cab signal generators) could produce signals within the susceptibility range of non-associated AFTC receivers. This testing confirmed that in a rare set of conditions (a specific AFTC transmitter frequency and cab signal frequency with maximum transmitter output and the non-associated receiver set to maximum sensitivity - extreme settings outside normal set-up practices) harmonics from an AFTC transmitter could produce a signal within the band-pass of its adjacent AFTC receiver. This scenario is mitigated by the use of a modulation rotation scheme during the system design process. This modulation rotation scheme prevents an AFTC transmitter from sharing the same modulation as its adjacent AFTC receiver and therefore negates the possibility that this signal could cause an occupied track block to falsely indicate non-occupied. Modulation rotation is specified in the GE Transportation AFTC installation manual.

GE Transportation also recommends our AFTC product be installed using our Impedance Bond. GE Transportation cannot guarantee that use of a non-GE Transportation Impedance bond will not cause unforeseen issues. The GE Transportation Impedance bond is specified in the AFTC installation manual.

We at GE Transportation pride ourselves on our safety record. Our Audio Frequency Track Circuit equipment has been produced, delivered and installed for over 10 years without a single reported failure resulting in an unsafe condition.

Thanks in advance.

Sincerely,

Derald Herinckx
Global Wayside Products Leader
GE Transportation Systems Global Signaling, LLC.

AnsaldoSTS

Ansaldo STS USA

Charles Weissman,
Supervising Engineer
Los Angeles County Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012-2952

RE: Request for Assistance In Connection With National Transportation Safety Board ("NTSB") "Urgent Safety Recommendation" Dated July 13, 2009 ("NTSB Recommendation")

Dear Mr. Weissman:

On July 13, 2009, the NTSB issued an "Urgent Safety Recommendation" to U.S. transit operators based on preliminary findings made in the course of the NTSB's investigation of the June 22, 2009 accident between two trains operated by the Washington Metropolitan Area Transit Authority in Washington D.C. ("WMATA"). While acknowledging that no determination of probable cause had been reached, the NTSB stated in its Recommendation that "WMATA's train control system failed to prevent this collision" and that "the accident has shown that the train control system is susceptible to a single point failure because it did not fail safe and stop the following train when detection was lost." Based on these early findings, the NTSB made the following "urgent" safety recommendation:

> Advise all rail transit operators that have train control systems capable of monitoring train movements to determine whether their systems have adequate safety redundancy if losses in train detection occur. If a system is susceptible to single point failures, urge and verify that corrective action is taken to add redundancy by evaluating track occupancy data on a real-time basis to automatically generate alerts and speed restrictions to prevent train collisions. (R-09-7) (Urgent)

Updates provided by the NTSB subsequent to the issuance of the NTSB Recommendation, particularly the Fourth Update dated July 29, 2009, indicate that the focus of the investigation is on the performance of the track circuit electronic equipment in the Fort Totten Station relay room supplied in the mid-1970's by a manufacturer other than ASTS USA. (While impedance bonds supplied by ASTS USA were in use at the time of the accident and have been mentioned in NTSB updates, there has been no finding reported that the bonds were in any way defective or unfit for their intended purpose.)

The purpose of this letter is to assist the Metro in responding to concerns and instructions expressed in the NTSB Recommendation.

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Direction and coordination of
Finmeccanica S.p.A.

The ASTS USA AF Track Circuit System

The NTSB Recommendation asks, among other things, that transport operators determine if the train control system in use on their property "is susceptible to single point failures." ASTS USA is confident that the audio frequency track circuit system used by the Metro is not susceptible to single point failures, and that no redundant monitoring of track circuit occupancy data is required for their safe operation.

Audio Frequency track circuits supplied by ASTS USA were designed specifically to protect against all credible single point failures, as well as subsequent failures in combination with non-revealing initial failures. In order to ensure that all credible failures of the track circuits result in a safe state, the AF-400 through AF-800 series track circuits employ Class I vital hardware (intrinsically fail-safe) as defined in Section 17.3.3.E.1 of the AREMA C&S Manual. The AF-900 series track circuit achieves the same level of safety but employs Class II safety circuits as defined in Section 17.3.3.E.2 of the AREMA C&S Manual (hardware is continuously monitored by microprocessor to ensure safety).

The application of Class I and Class II hardware is a proven method for ensuring safety in the presence of all credible failures. Using this method, ASTS USA has deployed more than 14,000 audio frequency track circuits that have accumulated more than 1.3 billion hours of safe field operation.

Although not required for safe operation, ASTS USA can provide a method for redundant real-time monitoring of track circuit data. Initially developed and deployed as a part of the Copenhagen Metro system, this method, which we call "Sequential Occupancy Release", uses an ASTS USA vital microprocessor controller to monitor the sequence of the occupancy data in order to vitally detect and mitigate any track circuit anomalies. It should be noted that over the operational history of the Copenhagen Metro, which entered revenue service in 2001, this feature has never been called upon to maintain safe operation of the system.

We trust that the foregoing information is in response to your request. If you would like additional information, please do not hesitate to call me.

Very truly yours,

Jeremy S. Hill,
Vice President and Chief Operating Officer

AnsaldoSTS

Ansaldo STS USA

October 14, 2009

John McGrevey
Senior Engineer
Los Angeles County Metropolitan Transit Authority
One Gateway Plaza
Los Angeles, CA 90012-2952

RE: Request for Assistance In Connection With National Transportation Safety Board ("NTSB") "Safety Recommendation" Dated September 22, 2009: Audio Frequency Track Circuits (Digital).

Dear Mr. McGrevey:

On September 22, 2009, the National Transportation Safety Board ("NTSB") issued a "Safety Recommendation" based on its ongoing investigation of the June 29, 2009 collision between two trains operated by the Washington Metropolitan Area transit Authority ("WMATA"). The NTSB issued separate Safety Recommendation bulletins to WMATA; Alstom Signaling, the supplier of the track circuit equipment that is the focus of the investigation; the Federal Transit Administration ("FTA"), the governmental agency charged with regulating the safety of U.S. mass transit systems; and, the Federal Railroad Administration ("FRA"), the governmental agency charged with regulating the safety of U.S. railroads. Links to the Safety Recommendations are as follows:

http://www.ntsb.gov/recs/letters/2009/r09_15_16.pdf

http://www.ntsb.gov/recs/letters/2009/r09_17_18_19.pdf

http://www.ntsb.gov/recs/letters/2009/r09_20_21_22.pdf

http://www.ntsb.gov/recs/letters/2009/r09_23.pdf

The NTSB's basic finding underlying the Safety Recommendation was that "the track circuit at the accident site lost detection of train 214 when it stopped at the location

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Direction and coordination of:
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where the collision occurred." The NTSB's findings and conclusions regarding the track circuit in question were stated as follows:

> The investigation of this accident has raised concerns about the susceptibility of this audio frequency track circuit design to errant signals. Extensive postaccident [sic] testing conducted during the NTSB's investigation determined that an unintended signal path was created between track circuit modules that resulted in the associated track relay remaining energized even though train 214, the stopped accident train, was occupying the track circuit. Testing found that a spurious high-frequency modulated signal was being created by parasitic oscillation from the power output transistors in the track circuit module transmitter. This spurious signal propagated through the power transistor heat sink, through the metal rack structure, and through a shared power source into the associated module receiver, thus establishing an unintended signal path. The spurious signal mimicked a valid track circuit signal. The peak amplitude of the spurious signal appeared at the correct time interval and was large enough to be sensed by the module receiver as a valid track circuit signal, which energized the track relay. This combination—of an alternate signal path between track circuit modules and a spurious signal capable of exploiting that path—bypassed the rails, and the ability of the track circuit to detect the train was lost. (footnotes omitted)

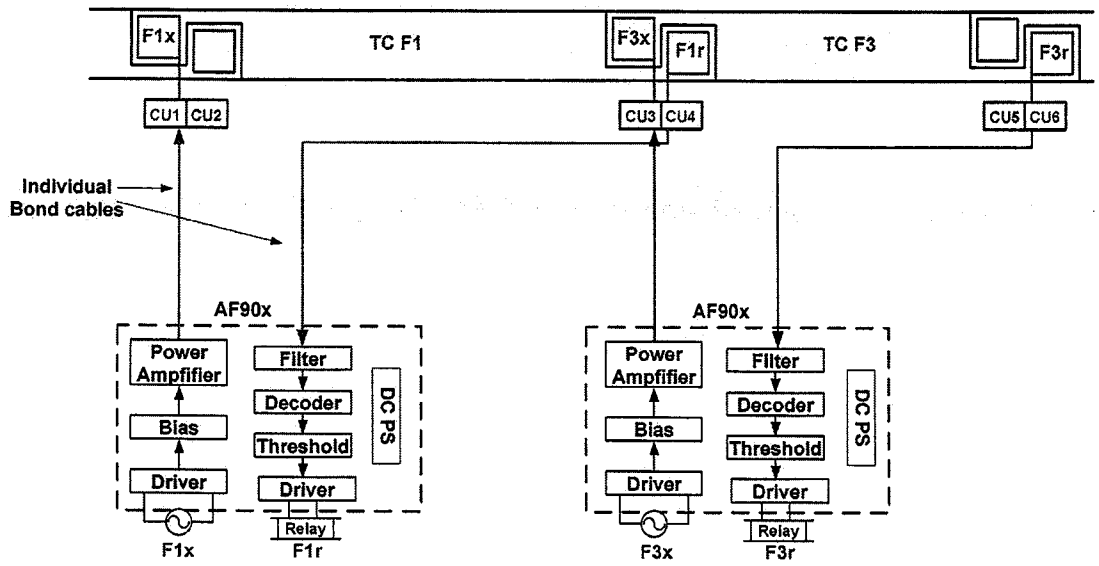
Based on the foregoing findings and conclusions, the NTSB directed the FTA to take the following actions:

> Advise all rail transit operators that use audio frequency track circuits in their train control systems that postaccident [sic] testing following the June 22, 2009, collision between two rail transit trains near the Fort Totten station in Washington, D.C., identified that a spurious signal generated in a track circuit module transmitter by parasitic oscillation propagated from the transmitter through a metal rack to an adjacent track circuit module receiver, and through a shared power source, thus establishing an unintended signal path. The spurious signal mimicked a valid track circuit signal, bypassed the rails, and was sensed by the module receiver so that the ability of the track circuit to detect the train was lost. (R-09-17) (Urgent)
>
> Advise all rail transit operators that use audio frequency track circuits in their train control systems to examine track circuits that may be susceptible to parasitic oscillation and spurious signals capable of exploiting unintended signal paths and eliminate those adverse conditions that could affect the safe performance of their train control systems. This work should be conducted in coordination with their signal and train control equipment manufacturers. (R-09-18) (Urgent)

Advise all rail transit operators that use audio frequency track circuits in their train control systems to develop a program to periodically determine that electronic components in their train control systems are performing within design tolerances. (R-09-19)

ASTS USA has furnished Los Angeles County Metropolitan Transit Authority with our model AF-900 digital audio frequency track circuit. Following receipt of the latest Safety Recommendation, in anticipation of your request, we conducted a thorough review of our product history and yet another review our AF track circuit designs to make certain that the failure mode in the Alstom track circuit as described in the NTSB Safety Recommendation cannot occur in the ASTS USA track circuits. Based on this review, we can say with certainty that we are not aware of any instance where an ASTS USA AF track circuit has been found to be susceptible to parasitic oscillation and spurious signals. Indeed, the specific failure mode manifested by the Alstom track circuit at WMATA is precluded by the design architecture of the AF-900 series digital track circuit.

As indicated in the NTSB Safety recommendation, in the Alstom track circuit at WMATA, a large signal transmitter source was directly paralleled to the receiver input. As shown in the diagram below, the AF 90x design does not have a transmitter paralleled to a receiver. Thus the failure mode experienced at WMATA cannot occur .



With regard to the NTSB's direction to perform periodic inspections of electronic components, please refer to the service manual for guidance. Of course should you have any questions on this or any other matter, you are encouraged to contact your ASTS USA Account Executive.

We trust that the foregoing information is responsive to your request. If you would like additional information, please do not hesitate to call me.

Very truly yours,

Jeremy S. Hill,
Vice President and Chief Operating Officer

From: Corbo, Mark [mark.corbo@safetran.com]
Sent: Friday, September 25, 2009 3:37 PM
To: McGrevey, John
Subject: RE: WMATA - NTSB Recommendations

John-

We obviously are just beginning to look at this as well. Our recommendations so far, are to follow our installation and calibration processes as defined in the PSO II manual. Our processes and design take into account component tolerances.
In addition we have a foreign signal test: Essentially you shut off (Via power) the transmitter. The associated receiver should have no AD voltage. If it does there is a foreign signal present.
Also by design we insure our electronics are isolated from the case/rack.

I have include a copy of our latest manual. We will keep you informed of additional developments.

MARK

Mark Corbo
Chief Engineer, Crossings
909-286-4880- Cell
909-532-5526- Office

-----Original Message-----
From: McGrevey, John [mailto:McGreveyJ@metro.net]
Sent: Tuesday, September 22, 2009 5:30 PM
To: Pat McKenna (Alstom); Tom Stone (US&S); Corbo, Mark; Tom.Shanahan@ge.com
Cc: Aveiro, Filipe; Clark, Alan; Harris-Gifford, Michael; Omotayo, Aderemi
Subject: WMATA - NTSB Recommendations
Importance: High

Gents,

As you may be aware, the NTSB has apparently identified a situation with regard to the June 2009 WMATA collision, whereby a spurious frequency was able to bypass a stationary train and reach the receiver module of an audio frequency track circuit, effectively causing said train to "disappear" from the system. I have attached for your information copies of NTSB's recommendations.

In connection with this, I have been directed by Metro's DEO for Wayside Systems to contact yourselves directly in regard to these recommendations, in particular:

Examine track circuits within your system that may be susceptible to parasitic oscillation and spurious signals capable of exploiting unintended signal paths, and eliminate those adverse conditions that could affect the safe performance of your train control system.

This work should be conducted in coordination with your signal and train control equipment manufacturer(s).

Develop a program to periodically determine that electronic components in your train control system are performing within design tolerances.

Metro does not carry out in-house repair/servicing of its audio frequency track circuit equipment and as such, does not possess the capability to examine this equipment to the level apparently being recommended - accordingly, we would look to yourselves for guidance as to what action we should be taking in respect of the above recommendations. Could I therefore ask for the assistance of your respective companies in determining what action(s) we should be taking on these issues? If this lies outwith your own particular fields of expertise, please forward this request to the appropriate part of your respective organisations.

Please contact me if you need any further info/clarification.