



Washington Metropolitan Area Transit Authority

Railcar Programs Progress Update



Presented to: The Board of Directors;

Customer Service, Operations and Safety Committee

By

**Planning • Development • Engineering • Construction
Chief Engineer-Vehicles**



March 31, 2005



I. Purpose

- To update the Board of Directors, **Customer Service, Operations and Safety Committee** with an update on the work underway to improve the reliability of the 2000/3000, 5000 and 6000 series railcars that represent 63% of the WMATA fleet.



II. Introduction

The three ongoing railcar programs discussed in this presentation are:

- 5000 series, manufactured by CAF; the last car of the 192 cars we purchased started passenger operations in June 2004.
- 6000 series, manufactured by ALSTOM; the first car of the 184 cars we purchased is scheduled for passenger operations in the Fall of this year and the last one in the Fall of 2007. First cars will arrive in Summer 2005 for testing and conditional acceptance.
- 2000/3000 series cars manufactured by Breda in the 1980's, major rehabilitation program by ALSTOM underway to extend their useful life for another 20 years; from the 364 cars included in this program, 106 have already been rehabilitated and are in service; completion for the contract is targeted for early 2007.



II. Introduction

- WMATA RAILCAR FLEET PROFILE

Railcar Manufacturer	Assigned Cars Nos.	Production Dates	Fleet Size # of Railcars	% of Total Fleet
Rohr	1000-1299	1974-1978	296	26%
Breda	2000-2075	1983-1984	76	41%
Breda	3000-3291	1984-1988	288	
Breda	4000-4099	1992-1994	100	
CAF	5000-5191	2001-2004	192	17%
Alstom	6000-6183	2005-2007	(184)*	16%
Total			952 (1136)*	100%

*184 railcars are presently in production, successful completion of this order will increase the 4 WMATA fleet size to 1,136 railcars.



III. Background

- ALSTOM is presently WMATA's biggest contractor with well over 700 million dollars invested in these programs. The successful completion of these programs is necessary for WMATA to perform its core mission of providing safe and reliable transit services to the Washington Metropolitan Region.
- ALSTOM is the manufacturer for the new 6000 series cars and the contractor responsible for the 2000/3000 series rehabilitation program. ALSTOM is also the supplier of the Automatic Train Control (ATC) subsystem for the 5000 series cars, manufactured by CAF.
- ALSTOM is providing the same ATC to the 2000/3000 series rehabilitation, the 5000 series railcars and the 6000 series railcars. WMATA is experiencing ATC problems on all of the programs including the "*loss of speed commands*," "*door opening*," and inconsistent "*programmed station stopping*."
- WMATA recently met with ALSTOM senior management and requested an assessment which was subsequently received and accepted.
- WMATA's current focus is on ensuring that ALSTOM meets deliverables and devotes the necessary resources to WMATA railcar programs.



IV. 5000 Series Railcars

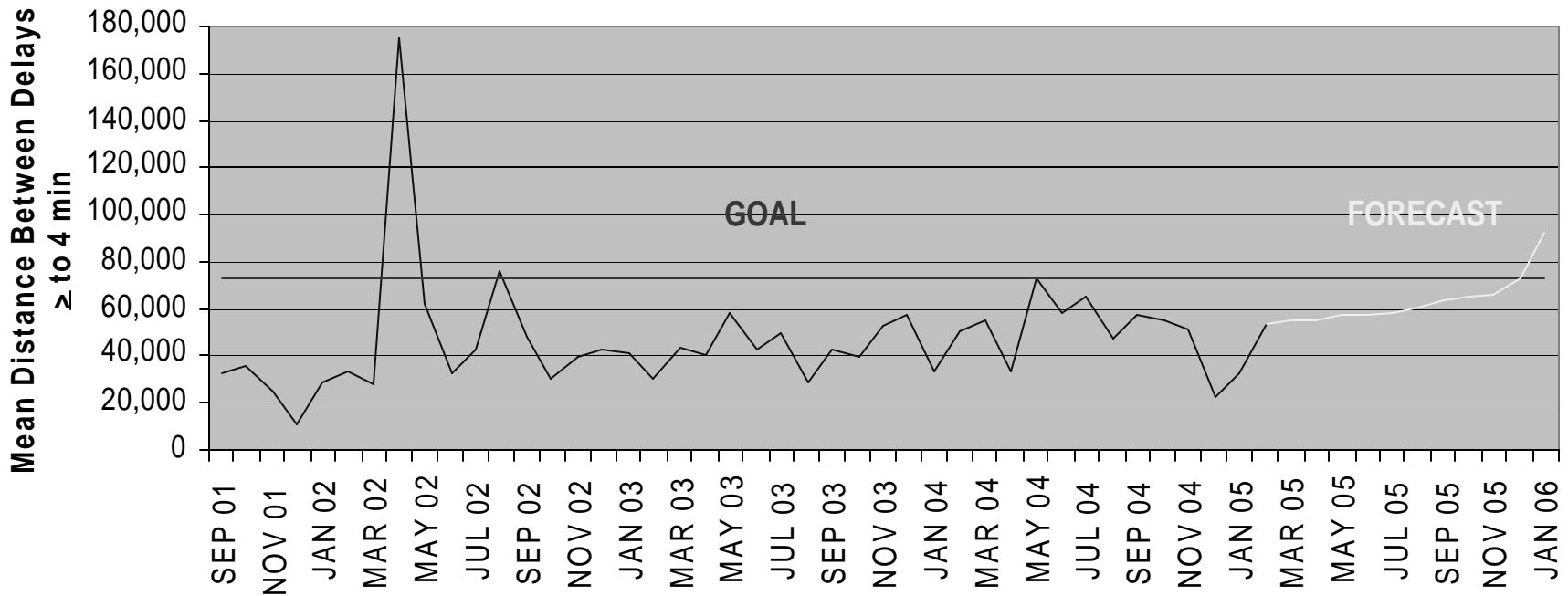
A recent assessment completed by ALSTOM forecasts that by the end of the year (CY 2005) these cars will meet/exceed the WMATA performance goals (see next page):

- Program Schedule:
 - 192 cars, manufactured by CAF. Last two cars were conditionally accepted June 2004. Due to the expedited delivery schedule for the Branch Avenue extension, CAF delivered railcars which required numerous modifications after delivery.
- Budget:
 - Total program budget is \$383M, 92% has been expended to date. Still withholding monies for spare parts, reliability, and final completion.
- Engineering/Technical:
 - 151 modifications have been completed; 17 more are currently underway
 - Work is currently ongoing to make improvements to the receiver coil interface boards, ATO software, and door rollers, which will improve the performance of the railcars because these issues have resulted in reduced overall railcar reliability.
- Reliability:
 - Test program covers 12 systems. The reliability testing occurs during a nine month period after the cars are in final configuration; based on preliminary testing to date, five of the 12 appear to meet reliability goals.
- Safety & Quality:
 - Safety certification is complete.



IV. 5000 Series Railcars

FOR THE PERIOD SEP 2001 THRU JAN 2006





V. 2000/3000 Series Railcars

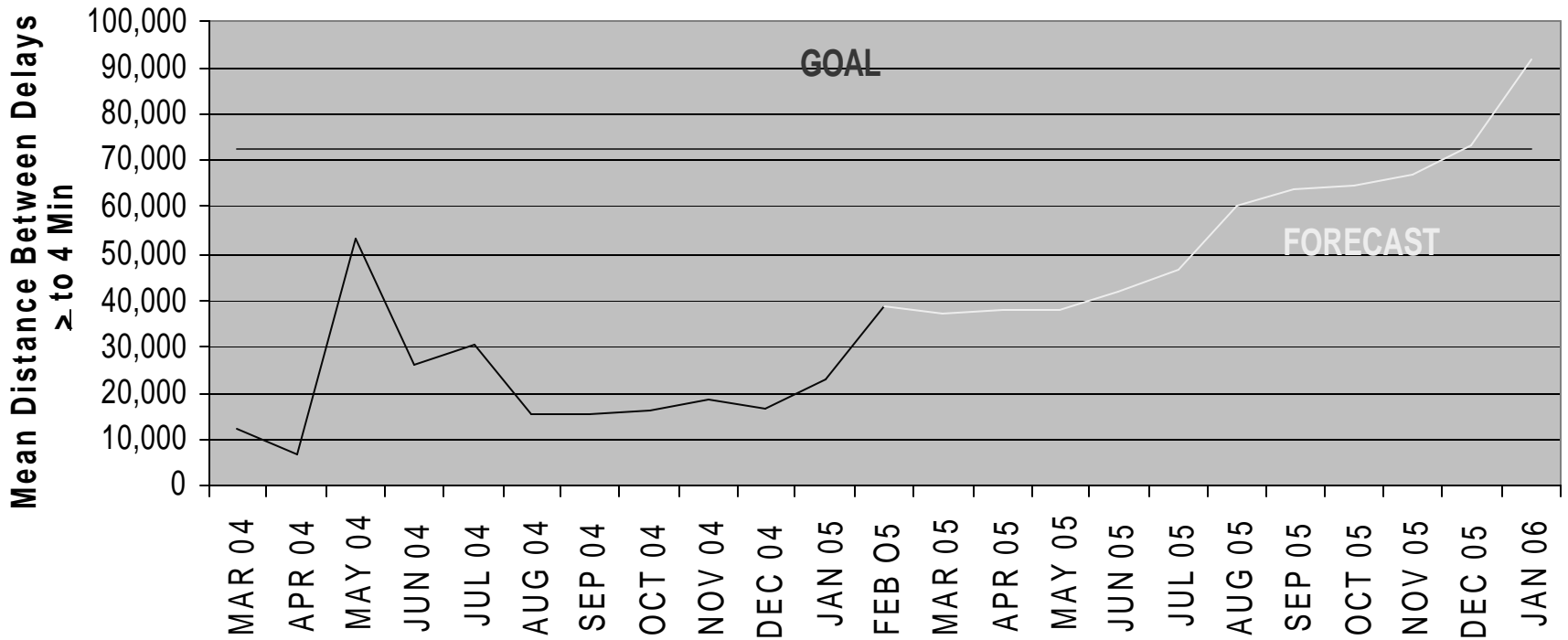
This major rehabilitation program, one of the largest in the country, has experienced major delays which is typical for programs of this type during the engineering phase. However, as the program advances into the major production phase, the delivery schedule becomes more stable.

- **Program Schedule:**
364 cars, being rehabilitated by ALSTOM (76) 2000 series and (288) 3000 series. Contract completion is presently targeted for early 2007, representing a 12-month delay; 106 cars have been rebuilt with a 36 car float being maintained.
- **Budget:**
Total program budget is \$382M; 43% has been expended to date; still withholding monies for warranty, reliability, and final completion.
- **Engineering/Technical:**
Systems impacting “Mean Distance Between Delays” (MDBD): Automatic Train Control (i.e. loss of speed commands and station overruns), friction brakes, ATC relay interface boards, and Auxiliary Power Supply. Current implementation of modifications for the receiver coil interface boards, ATO software, and door rollers will improve the performance of the railcars because these issues have reduced overall reliability.
- **Reliability:**
Car reliability has generally been low; however, car performance has increased during the past two months due to improved door performance (see graph on next page).
- **Safety & Quality**
ALSTOM Suppliers continue to experience quality issues which are being closely monitored.



V. 2000/3000 Series Railcars

FOR THE PERIOD MAR 2004 THRU JAN 2006





VI. 6000 Series Railcars

The ALSTOM 184 New Car Program is on schedule with the first prototype to be accepted for testing this Summer.

- Program Schedule:
Contract completion scheduled for late 2007; currently on schedule. This schedule reflects a shorter “burn in” period. The program reflects lessons learned from the 5000 series and includes a more realistic period for engineering and testing before delivery.
- Budget:
Total program budget is \$378M; 16% has been expended to date.
- Engineering/Technical:
33 carshells have been produced in Barcelona, Spain with 14 cars presently in production in Hornell, New York.
- Reliability:
Service date for the first cars is targeted for November/December 2005. Automatic Train Control issues under resolution for the 2000K/3000K and 5000K program cars are being monitored closely.
- Safety & Quality
Safety certification elements are 65% resolved.



VII. Assessment & Look Ahead

- **5000 Series:**

The railcars were required for the Branch Avenue extension which expedited the schedule and resulted in the early railcar reliability being low. Railcar reliability is improving and CAF forecasts meeting/exceeding performance goals by the end of the year. Doors and ATC remain major problem areas. Significant improvement anticipated pending implementation of the redesigned receiver coil interface board in early April/May 2005. Provided ALSTOM implements the proposed ATC corrective actions and devotes the necessary resources, CAF is expected to meet the reliability requirements beginning at the end of year.

- **2000/3000 Series:**

Senior ALSTOM corporate management has pledged the necessary resources to resolve the ATC and other engineering concerns. Provided ALSTOM implements the proposed corrective actions and devotes the necessary resources, ALSTOM is expected to meet the reliability requirements beginning at the end of this calendar year.

- **6000 Series:**

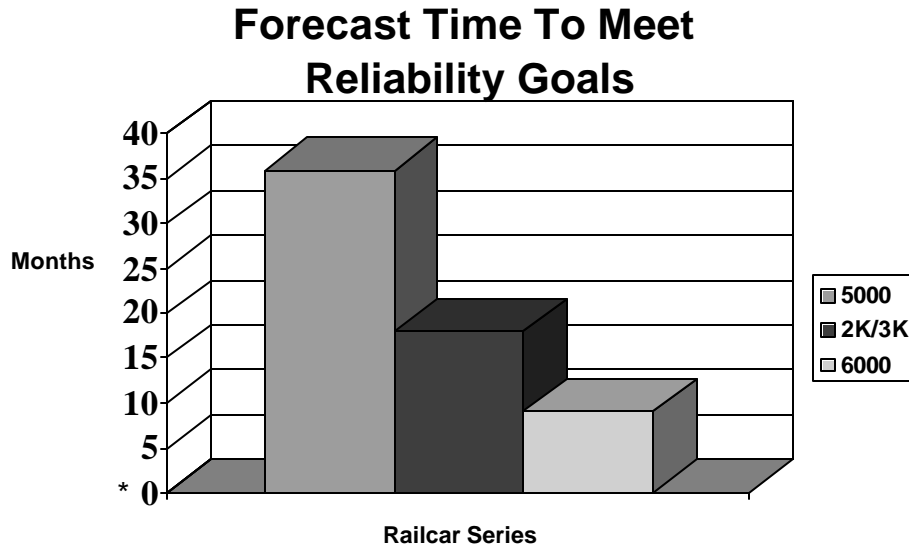
Design and production targets are presently being met. Manufacturer is using similar systems as 5000 series and Breda rehabilitation, which capitalizes on service-proven systems. ALSTOM forecasts that the railcars should meet performance goals much earlier in the delivery cycle.



VII. Assessment & Look Ahead (Continued)

- **Reliability Goals:**

With each new railcar program the time to meet the reliability goals continues to shorten due to incorporating lessons learned from earlier programs.



**Beginning of reliability testing period*

- **Overall:**

By the end of the calendar year, the three ongoing railcar procurements should attain 72,600 MDBD, subject to successful performance by ALSTOM. This should lead to overall railcar fleet improved performance. The average fleet wide MDBD is forecasted to improve from the current 41,700 today to a minimum of 56,000 MDBD by the end of the calendar year.



VIII. Next Steps

- Continue to work closely with ALSTOM to assure its continued commitment to WMATA; conduct frequent partnering workshops with ALSTOM and its major suppliers.
- Strengthen WMATA vehicle engineering capabilities, especially with computer/software engineers and field engineering expertise to faster resolve open technical issues at the production plants.
- Establish an “expert advisory panel” consistent with WMATA’s existing practice for large construction projects to assist in faster resolving major engineering, safety, quality, reliability and contractual issues.
- In upcoming Board meetings, request approval for contractual modifications to implement various changes to be funded out of the contract award amounts already approved by the Board.
- Brief the Board again in September 2005.