

U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

EXECUTIVE SUMMARY

1996 OLYMPIC AND PARALYMPIC GAMES

EVENT STUDY

May 1997



BOOZ-ALLEN & HAMILTON





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Prepared by:

Booz-Allen & Hamilton

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INTRODUCTION

The Atlanta metropolitan region is the location of one of the most ambitious intelligent transportation system (ITS) deployments in the United States. The system links eight regional agencies and includes a transportation management center (TMC), six traffic control centers (TCC), and a transit information center (TIC). In addition, regional Advanced Transportation Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), and Advanced Public Transportation Systems (APTS) were installed.

The 1996 Atlanta Olympic and Paralympic Games created a focus for the projects-the goal was to bring all of the new systems on-line in time for the games to provide a positive transportation experience. The games also served as a focus for implementation of a regional transportation demand management (TDM) program, an extension of the area's express high occupancy vehicle (HOV) lane system, and an extension of the Metropolitan Atlanta Rapid Transit Authority (MARTA) rail network.

The Event Study and the Case Study

Booz-Allen & Hamilton (BA&H) was commissioned in May 1996 by the Federal Highway Administration (FHWA) to undertake an independent high level review of the performance of the various ITS deployments and new infrastructure extensions, and to determine the technical, operational, and institutional lessons learned during the Olympic and Paralympic Games. This review is referred to as the Event Study.

A parallel study-the Atlanta Case Study, is reviewing the lessons learned from ITS deployments in Atlanta over a longer period of time. The Case Study covers the period from 1990 until just prior to the games when most components were brought on-line. The Case Study has a separate Final Report.

The Olympic and Paralympic Games

The Atlanta Olympic and Paralympic Games were the world's two largest sporting events in 1996, in terms of athlete and spectator attendance. The Atlanta Olympic Games were the largest summer Olympic Games ever held. A comparison of ticket sales indicates that the Atlanta Olympic Games attracted nearly as many paying spectators as the Los Angeles and Seoul (or Barcelona) Games combined. Average daily ticket sales were greater than 500,000 for the Atlanta Games (excluding tickets provided to the Olympic Family). This total also exceeds corresponding daily attendance at other major domestic sporting, political, and exhibition events which have been staged in Atlanta, by a factor of at least five. This is particularly significant since the Olympic Games lasted 17 days.

Perhaps the most significant aspect of the Atlanta Olympic Games was the location of the major sporting venues. Unlike the Los Angeles Games, most of the major sporting venues were located within the "Olympic Ring"-a 1.5 mile radius circle centered around downtown Atlanta. In addition to the major sporting venues, the Olympic Ring also contained the Olympic Village and the Centennial Olympic Park.

This combination of the size of the Olympic Games and concentration of games related activities in downtown Atlanta sets the context for our assessment of the Olympic Games transportation experience.

Travel Demand

Travel demand statistics were collected by the Georgia Department of Transportation (GDOT) and MARTA during the Olympic Games. This information covers freeway usage and transit ridership.

Freeways

Twenty-four-hour total daily traffic flows on the radials (I-75, I-85, and I-20) were down 4 to 6 percent. The I-750-85 connector 24-hour traffic flows were about the same, but with a different vehicle mix-more buses than usual. The I-285 perimeter recorded more travel than usual, up 4 to 11 percent-likely due to the restriction of trucks entering the downtown connector during the Games period. Commute peak periods were more spread out than normal weekdays and the peak flows were up to 30 percent less than on normal weekdays.

Transit

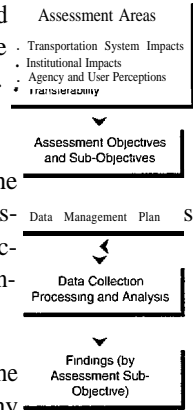
On an average weekday during the Olympic Games, MARTA Rail carried more than four times its normal daily ridership. On the busiest days, rail ridership was more than five times normal daily demand. It is known that many riders used MARTA rail without being counted at the faregate—ticket holders were allowed to pass through the opened handicapped entrance gates during heavy demand periods. There was no way of counting these ticket holders. Actual ridership levels were therefore higher.

Ridership on scheduled MARTA Bus services decreased by nearly 20 percent during the Olympic Games. As with MARTA Rail services, not all passengers were counted on MARTA Bus services. Actual ridership levels were therefore higher. The Olympic Games spectator bus shuttle system carried more than 1.5 times the ridership carried by MARTA Bus on an average weekday.

The implications of these travel demand statistics on the Event Study are important. Freeway and scheduled MARTA Bus travel demands during the Olympic Games were generally close to normal levels, albeit with modified travel patterns. This was not the case for MARTA Rail, which was subject to significantly higher levels of demand than normal.

Event Study Approach

The approach adopted for the Event Study is summarized in the exhibit. A high level assessment was conducted of the performance of a wide range of the ITS deployments, agency and user perceptions were gathered, and Data collection was restricted (by the and Paralympic Games period only.) inter-agency coordination observed. There was no opportunity to conduct any before-after type analysis.

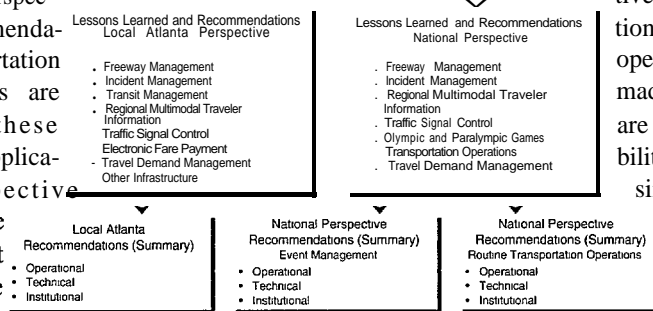


LESSONS LEARNED AND RECOMMENDATIONS

The Event Study focused on the Olympic and Paralympic Games. Lessons learned and recommendations are presented from a local Atlanta perspective. The latter relates to both event management, and routine transportation operations during the Olympic Games. Lessons learned and recommendations are presented from a local Atlanta perspective. The latter relates to both event management, and routine transportation operations during the Olympic Games.

Target Audience

Each recommendation identifies the agencies affected. As the lead agency of the recommendations with a local Atlanta perspective are targeted at GDOT. Recommendations for routine transportation operations are targeted at state and local agencies and event organizers. Recommendations with a national perspective (routine transportation operations) are predominantly targeted at FHWA and FTA, reflecting their respective roles as funding agencies.



Recommendations with a national perspective (event management) are predominantly targeted at affected state and local agencies and event organizers. Recommendations with a national perspective (routine transportation operations) are predominantly targeted at FHWA and FTA, reflecting their respective roles as funding agencies.

Lessons learned and recommendations are summarized in the following tables—covering technical, operational, and institutional areas. The technical area includes recommendations relating to systems, services, and plans. The institutional area includes recommendations that focus on inter-agency coordination, inter-agency operational barriers, team-building, and communications. The operational area includes development of operations planning and training.

Local Atlanta Perspective

Eighteen recommendations are identified from a local Atlanta perspective. Ten are related to incident management alone.

	Lesson Learned	Recommendation
Technical	Traffic surveillance devices and field patrols were intentionally concentrated on freeways inside the I-285 Perimeter during the games, but this may not be the most optimal deployment plan for post-games operations.	GDOT should review its GDOT Highway Emergency Response Operator (HERO) deployment plans, and assess the need and location of additional field devices such as closed circuit television (CCTV) cameras and changeable message signs (CMS) as part of a post-Olympics operation plan.
	The ATMS does not currently possess the ability to monitor operator performance. Their Impact on incident management, the impact of the system, and improvements gained from future enhancements of the system cannot be measured at present.	GDOT should enhance the ATMS software to allow tracking of operator performance.
	In general, the ATMS was well received in terms of its capabilities and user friendliness. One area identified as needing enhancement was icon placing. Icon placing is time consuming even for a skilled operator.	GDOT should review the icon placement process of the incident management system (IMS) to determine if hardware or software changes can further improve speed.
	There were clear Indications during the games that ITS technologies offered the potential to enhance transit management. But, it is noted that the APTS components require more time to be fully deployed and undergo shakedown, before they can be fully assessed.	FHWA and FTA, in conjunction with local agencies, should assess the performance of the APTS components after a comprehensive shakedown period.
	The games period only allowed a preliminary investigation of the role of ATIS components.	FHWA and FTA, in conjunction with local agencies, should assess the ATIS components after a comprehensive shakedown period.
	The role of the Nations Bank, First Union, Wachovia/VISA smartcard as a transit fare medium was limited, by virtue of the free access to MARTA public transit facilities available to spectators with a valid venue ticket. In addition, existing MARTA fare card offered discounts not available with the use of the smartcard.	If the smartcard is considered for full-scale implementation, FHWA and FTA, in conjunction with MARTA and GDOT, should assess the potential role of smartcards alongside other fare payment media during normal travel conditions.
	Little is known regarding the long term impacts of the Commute Connections Network (CCN) program and the extent to which the Atlanta ITS deployments can facilitate these.	ARC, in conjunction with local agencies, should assess the long term impacts of expanding the CCN program.
	While public attitudes towards high occupancy vehicle (HOV) lanes were positive, the impact of the HOV lanes during the games was neutral.	GDOT and ARC should consider ways in which the post games use of the HOV lanes can be enhanced.
	Little is known about the overall impact of the North Line Extension on travel patterns in the Atlanta metropolitan area.	MARTA and ARC should assess the long term impacts of the North Line Extension.
Operational	While there were indications during the games period of improving trends in Incident clearance times, the data collection duration was insufficient to fully assess the impact of incident management operations	GDOT should commence an ongoing analysis of incident clearance times
	Overall, the performance of the GDOT HEROs was impressive. But, working on freeways next to traffic lanes is an unforgiving environment for those who do not remain alert-even for well trained HERO crews.	Because of the risks inherent in incident management activities, GDOT HERO operations should incorporate additional training emphasizing ongoing sensitivity to these factors.
	At the present time, no quantitative means exist to determine the optimum deployment of GDOT HEROs.	GDOT should implement measures to monitor HERO performance.
	The IMS was an effective tool at the locations where it was available during the games. It will be more a powerful tool when its coverage is complete.	GDOT, in conjunction with other local agencies should complete the library of response plans and the associated training of operators.
Institutional	During some level II or higher Incidents, TMC operators implemented response plans manually-even though the IMS can generate appropriate response plans automatically for these incidents.	GDOT should review procedures for terminating level II and higher incidents when they are moved to the shoulder.
	There were examples of inter-agency coordination observed during the games. But, without a new inter-agency approach to handling major freeway incidents, involving office and field based staff, the full benefit of the ATMS will not be achieved.	FHWA, FTA, GDOT, Atlanta Regional Commission (ARC), the City of Atlanta, MARTA, and other local agencies should pursue and implement an integrated, multi-agency approach to incident management operations.
	Loss of accessibility to the IMS can adversely affect credibility of the TMC among operators at the MARTA TIC.	GDOT, in conjunction with other local agencies, should facilitate periodic team communications by creating a bulletin board or similar system.
	The potential exists for even greater exchange of traffic information between TMC and MARTA, and between MARTA and the TCCs, when the TCCs become fully operational.	GDOT and MARTA, in conjunction with other local agencies, should explore ways in which transit operations information can be used for freeway and surface street management.
	Even when the ATMS is fully functional, it may be unable to achieve its full potential without agreements between GDOT and other transportation and incident management agencies.	In conjunction with other local agencies GDOT should develop agreements for control of non-GDOT signals.

**National
Perspective-
Event
Management**

Thirteen recommendations are made with a national perspective for event management.

Technical

Lesson Learned	Recommendation	
While different agencies provide information on various services, sometimes the public cannot determine easily which agency to call for specific type of information.	Local agencies and event organizers should jointly develop a "transportation information one-stop shopping" type telephone information line with automatic transfers to appropriate agencies-not just to the event organizer. This is particularly important for successful organization of major special events like the Olympic Games.	
Many components were either not fully operational or non-operational during the games. Most operational components were undergoing shakedown during the first week of the Olympic Games.	FHWA, FTA, and local agencies should develop contingency plans for ITS deployments associated with event management, to ensure alternate means exist to provide event management services when an immovable deadline cannot be met.	
During the games, no single agency was responsible for the integrated operation of pedestrian and bus movements.	Major event organizers and local agencies should plan for large numbers of pedestrians using traffic lanes.	
Management of venue transportation operations is a challenging "front-line" role-frequently involving coping with unexpected events, and requires good communications with spectators and staff.	Event organizers and local highway and transit agencies should consider how the management of venue transportation operations can support special events.	
Rail ridership was higher than forecast during the Olympic Games.	Local agencies, and event organizers should develop forecasts for event travel demands which include a range for each mode (low, medium, and high). Operational plans have to be drawn up for the range with the highest occurrence probability. Contingency plans must be drawn up to meet extreme levels.	
Forecasting is an inexact science. It depends on the interpretation of outputs as much as the outputs themselves. Understanding the sensitivity of the forecasts to the assumptions on which they are based is essential.	Local agencies and event organizers should analyze the forecasts and assumptions developed prior to operations planning.	
Operational	<p>GDOT successfully implemented specific traffic management measures in support of its objective to facilitate smooth and safe traffic flow on critical sections of the freeway system during the Olympic Games</p>	Local agencies and event organizers should implement special traffic management measures where appropriate, well in advance, to support the overall objectives of event management
Where centralized control of traffic signals is not available, field signal operations teams can be very effective in making quick changes to signal timing plans to meet event flow needs. This will, however, require reasonably accurate traffic demand forecasts	In the absence of centralized traffic signal control, local agencies should develop a quick response action plan to respond to real-time traffic flow needs during major events.	
The media can play a valuable role in dissemination of traveler information, and can strongly influence public perceptions-often adversely.	During major events local highway and transit agencies and event organizers should disseminate timely and accurate transportation information through a combination of media sources and ATIS technologies to achieve widespread coverage	
During major events, the traveling public can be persuaded to use transit in large numbers and adopt austere driving practices through a variety of measures	Local agencies and event organizers should develop a coordinated TDM approach for major events. This will mitigate congestion and reduce operational expenditures for the public and the agencies.	
During the Atlanta Olympic Games, it was clear that the needs of the trucking and rail freight industry could be accommodated through prior planning and inter-agency cooperation.	Local agencies and event organizers should develop a coordinated approach to freight fleet management for major events-such plans have a high potential to be successful.	
Institutional	<p>In Atlanta, Olympic Spectator Transportation System (OSTS) operations control was split between Atlanta Committee for Organizing the Games (ACOG) and MARTA. Conflict developed because ACOG wanted decision-making control of OSTS for cost reasons while MARTA required significant decision input to operate OSTS effectively.</p>	Special event transit operations should be managed under a single organizational umbrella (where feasible)-preferably by local agencies that are familiar with the existing conditions.
Inter-agency coordination was carefully planned and rehearsed prior to the games-notable exception was the cancellation of a multi-agency planning exercise on use of ITS deployments.	Local agencies including Departments of Transportation (DOTs), public transit operators, and event organizers should participate in multi-agency planning exercises on the use of ITS deployments prior to commencement of major events.	

**National
Perspective-
Routine
Transportation
Operations**

Six recommendations are made with a national perspective for routine transportation operations.

Technical

Operationa

Institutiona

Lesson Learned	Recommendation
<p>Selecting an optimal mix of field devices and safety service patrol resources requires judgment to balance the desired functionality and budget. Consideration must also be given to factors such as system integration, operations and maintenance.</p>	<p>FHWA and FTA should coordinate the development of guidance for the deployment of field devices and safety service patrol resources to support individual agencies' decision-making processes.</p>
<p>Selecting an optimal mix of traveler Information systems (traditional and ATIS) requires judgment to balance the functionality desired with the budget. Consideration must also be given to factors such as system integration, operations, and maintenance.</p>	<p>FHWA and FTA should coordinate the development of guidance for deployment of traveler information systems to support individual agencies' decision-making processes.</p>
<p>Agencies planning ITS deployments would benefit from understanding the training requirements for such systems, including duration and type of training</p>	<p>FHWA and FTA should coordinate the development of guidance for ITS operational training requirements to support state and local deployments.</p>
<p>The Atlanta regional ATMS currently does not possess the capability to automatically monitor the effectiveness of incident management. Similarly, the ATMS cannot be used to automatically evaluate the performance of the GDOT HEROs, or measure their impact on incidents.</p>	<p>Local agencies should design ITS deployments to automatically monitor improvements in incident management (or other services as appropriate).</p>
<p>Relationships between agencies improved with the planning and implementation of the ATMS system, and staff were enthusiastic about its capabilities. However it was apparent that the full benefit of the system will not be realized without more inter-agency coordination, involving office and field based operations staff.</p>	<p>Local agencies should ensure that the design of ITS deployments takes into account the requirements of all agencies wishing to actively participate, while leaving the option for additional agencies to come on board at a later stage. Agency needs must be considered during the conceptual design stage.</p>
<p>Incident management, and general transportation operations, can be enhanced by shared use of technology, such as radio reports from bus operators and observation of traffic conditions using CCTV cameras.</p>	<p>FHWA and FTA should jointly promote the concept of shared use of technology and information between highway and transit agencies.</p>

ACCOMPLISHMENTS

The components assessed as part of the Event Study were developed over a period of years by eight local agencies in conjunction with the Atlanta Regional Commission (the local Metro Political Planning Organization), FHWA, and FTA. This represents a major accomplishment, in terms of the components themselves, and the degree of inter-agency coordination commitment required to achieve it. Components include a range of ITS deployments, transportation network enhancements, freeway service patrols, and travel demand management measures. In addition to this legacy, the Olympic Transportation System provided transportation services for an estimated 25 million passengers during the 17-day period of the Olympic Games.

CONCLUSIONS

The Olympic and Paralympic Games presented a unique opportunity to assess the performance of one of the most comprehensive ITS deployments in the United States. The lessons learned and recommendations provide insights which should be of interest to those with an ongoing involvement in the Atlanta ITS deployment, other cities and states contemplating new or expanded ITS deployments, and cities which are hosts for upcoming events such as the 2002 Winter Olympic Games in Salt Lake City, Utah. The primary conclusions can be characterized as follows:

- ITS technologies can have a positive impact on incident management and offer the potential for future improvement in the area of traffic and transit management, and traveler information
- New federal guidelines are needed to support the decision-making process for selecting field devices, traveler information systems, and training
- There is an ongoing need for assessment of ITS technologies in Atlanta-where possible future deployment should be designed to facilitate performance monitoring
- Training needs should be addressed at an early stage to ensure they are adequately met before an event-achievable goals should be set for ITS deployments in connection with a major event
- Inter-agency coordination is a prerequisite for ITS deployments which cross institutional boundaries-adequate time must be provided for agencies to develop working relationships.

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