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Announce
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monitoring
report

A photograph of the interior of a bus. Several passengers are seated in blue patterned seats. A woman in a teal jacket is in the foreground on the left, holding a yellow handrail. A man in a teal suit is in the foreground on the right, also holding a yellow handrail. Other passengers are visible in the background. The text 'the Announce system' is overlaid in the center.

the
Announce
system

putting the
monitoring
report
into focus

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ANNOUNCE

Audible and Visual Next Stop Information on the 110 Service

Monitoring Report

Final Report v1.51

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Executive Summary

In March 2001 audible and visual next stop equipment was fitted to buses on the 110 service which operates between Hall Green and Leeds via Wakefield. The buses are equipped with speakers and passenger displays in both upper and lower saloons linked to the ticket machine and to a GPS navigation system to provide automated next stop information. Additionally an external facing speaker has been fitted to each bus to announce the service number and destination to intending passengers at bus stops.

Extensive pre scheme questionnaires were conducted which revealed that a large proportion of passengers (approximately 80%) viewed such a system as being potentially helpful. After the scheme was introduced a similar questionnaire was undertaken to evaluate the Announce system. Almost two thirds of passengers rated the on board audio and visual next stop announcements on the 110 service as helpful with nearly one half rating the boarding announcement as helpful.

The 110 service is Arriva Yorkshire's principal service and operates along the main A61 for much of its route and may be familiar to even relatively infrequent users. Passengers were therefore also asked how helpful they would find this system when travelling in an unfamiliar area. Almost all passengers (93%) stated they would find the next stop announcements helpful in such circumstances. The helpfulness of the system is summarised in the table below.

% Ranking it Very helpful or helpful	Boarding Announcement	Next Stop Announcements	Next Stop Visual Announcements
Pre Scheme	73	80	80
Post Scheme (110 Service)	44	60	62
Post Scheme (Unfamiliar area)	86	93	93

Focus groups consisting of passengers with sensory impairments were also favourable, with the system appearing to broadly satisfy their requirements for in vehicle information. The concise nature of the announcements and the clarity of the voice and visual displays were considered particularly good by these focus groups. A number of suggestions for further improvement were also made including the provision of real time information at the stop to complement the in vehicle information.

A separate focus group with drivers suggested they encountered few problems with the system. Driver distraction was not considered a major problem for regular drivers, with several drivers commenting the system reduced the need for them to inform passengers, who were not familiar with the route, when to alight the bus.

A reliability monitoring exercise indicated that the equipment did not always work during the pilot with a small number of mainly intermittent faults reported, but such issues should be overcome by a wider introduction of such systems.

This exercise also indicated that the external announcement was only audible for 77% of passenger boardings, largely due to the position of the boarding passenger in the queue or the vehicle already being at the stand prior to the arrival of the passenger.

During a three month period after the system was implemented there were thirteen complaints regarding the Announce system, including two from passengers complaining the Announce system was not working on their bus, and five letters of commendation. In the following 6 months only 1 complaint relating to the Announce system was received.

Analysis of patronage figures indicated that patronage on the 110 service had not declined as rapidly as on other services operated from the same depot. This analysis does not conclusively prove patronage generation or improved retention as a result of introducing Announce as it could not rule out other influences over the year, such as local rail strikes, abstraction resulting from the introduction of a new limited stop service, and the greater economic prosperity in Leeds. However when compared to other services the greater retention of elderly and disabled passengers on the 110 service and the greater increase in patronage on weekday evenings and Sundays, indicative of occasional usage rather than commuter journeys, suggests that the Announce system may have been a contributing factor.

Reductions in cost of the equipment can be achieved by integrating all functions into a single unit and from mass production. The manufacturers estimate that the Announce equipment can be produced for less than £1500 for a double deck bus and for about £1000 for a single deck vehicle. This equates to approximately 1% of the cost of a new bus, depending on vehicle type. Based on an average fare of 80p per journey approximately 300 additional passengers per annum are required to recover the cost of the investment over a 10 year period for a single deck vehicle. In the particular case of the bus service used for this project this would equate to an increase in patronage of approximately 0.2% per annum.

Arriva Yorkshire has been convinced by the benefits of Announce system during the pilot and believes that it has contributed to patronage growth and retention on the 110 service. This conviction has led them to invest in the Announce system for all new vehicles delivered in 2002.

It is likely that the benefits may be best realised if the Announce system were to be deployed on a wide scale basis rather than in limited numbers on specific corridors in order to elevate the information standards in public transport which can be a barrier to usage, and to give intending passengers the confidence that this facility would be available on their journey.

The greatest benefits of any wide scale introduction of such a system may be for improving the confidence of people who are less familiar with the service or area they travelling in, which in turn may assist in encouraging modal shift in favour of public transport.

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1. Introduction

- 1.1. The Announce project is a partnership formed between Arriva Yorkshire, the Department for Transport (DfT), the Disabled Passenger Transport Advisory Committee (DPTAC), Hanover Systems Ltd, Metro, and Wayfarer Transit Systems Ltd. The aim of the project is to introduce and evaluate the benefits of audible and visual next stop information on buses.
- 1.2. Vehicles operating the 110 service between Hall Green and Leeds via Wakefield have been equipped with speakers and passenger displays in both upper and lower saloons linked to the ticket machine and a GPS navigation system to provide automated next stop information. Additionally an external speaker has been fitted to announce the service number and destination to intending passengers at bus stops.
- 1.3. The monitoring programme carried out by Metro consisted of focus groups, passenger interviews, analysis of passenger complaints, mystery traveller surveys, feedback from driving and supervisory staff, and analysis of patronage. Quantitative techniques were used to analyse results from passenger interviews, mystery traveller surveys, complaints, and patronage. Feedback from focus groups consisting of people with sensory impairments and from driving staff was qualitative in nature.

2. Pre Scheme Monitoring – Focus Group

- 2.1. Halcrow conducted a focus group in April 2000 to determine the views of partially sighted and blind people towards audible passenger information at bus stops. The agenda included issues of audible information in general for bus travel. Findings relevant to this study are summarised below.
- 2.2. The Shipley and Baildon Blind Welfare Association has approximately 200 members, of whom only 10 people are aged below 60. There are a higher proportion of females than males due to the age profile. All 16 members of the focus group were over the age of 60, with half of them being regular bus users.
- 2.3. Only those with some degree of sight used buses without the assistance of a partner or a friend. This was due to difficulties in reaching their ultimate destination and not just because of difficulties in using public transport.
- 2.4. They did experience problems when at a stop by themselves in identifying buses. The main request from members was for audible information relating to the next service that departs from the stop. An alternative suggestion was for an announcement when the bus arrives at the stop to inform passengers of the service number and the principle locations on its route.
- 2.5. Once on a bus, members of the group stated that knowing when to get off was not a particular problem during daylight hours. This was because all those travelling alone had some degree of sight. However at night it was more of an issue, as their visual impairment becomes more of a hindrance to them.

3. Pre Scheme Monitoring – Passenger Survey

- 3.1. Passengers using the 110 service were interviewed to determine their satisfaction with different aspects of the 110 service and aspirations for improvements in information at different stages of their journey by bus.
- 3.2. A total of 475 interviews were carried out on Tuesday 18th, Wednesday 26th, Saturday 29th and Sunday 30th July 2000. A copy of the questionnaire is included in Appendix 1.
- 3.3. The age and gender of the sample is shown in Table 1. The ethnic origin of respondents was 95.2% White, 1.1% Black (Caribbean), 1.1% Indian, 0.9% Pakistani, 0.6% Chinese, 0.2% Asian (Other) and 0.9% Other. Forty-three (9.1%) respondents declared that they had a long-term illness, disability or infirmity, which made it more difficult for them to use local bus services.

Table 1. Age and gender breakdown of 110 service users.

Age	% of males	% of females	Total %
under 16	5.2	3.2	4.0
16 – 25	18.1	18.4	18.5
26 – 40	42.0	30.7	34.9
41 – 59	13.0	22.0	18.3
60+	20.2	22.2	21.5
N/A	1.5	3.5	2.8
All ages	41.1	58.9	100.0

- 3.4. The boarding and alighting points of the passengers surveyed are summarised in Figure 1. The most common destination was Wakefield (31.6%) followed by Leeds (17.3%), Outwood (11.2%), Kettlethorpe (10.9%), and Sandal (8.4%).
- 3.5. The boarding and alighting points of passengers were used to determine approximate journey lengths. The trip length distribution is shown in Table 2. The sample of passengers that were interviewed contained people travelling both short and long distances. The average trip length on the 110 service was approximately 4.2 miles.
- 3.6. The purpose of the trips is summarised in Table 3. The most common purpose for those surveyed was shopping followed by leisure and work.

Figure 1. Boarding and alighting points of passengers interviewed.

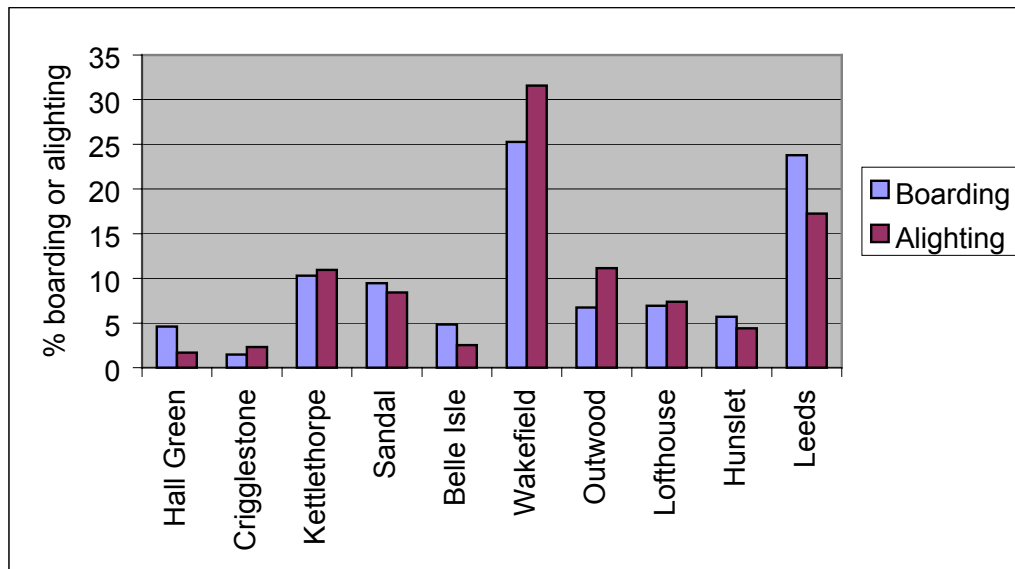


Table 2. Distribution of journey lengths for interviewed passengers.

Trip length	% of passengers
< 2 miles	26.3
2 to 5 miles	27.8
5 to 10 miles	40.0
>10 miles	2.9
n/a	3.0
Total	100.0

Table 3. Journey Purpose.

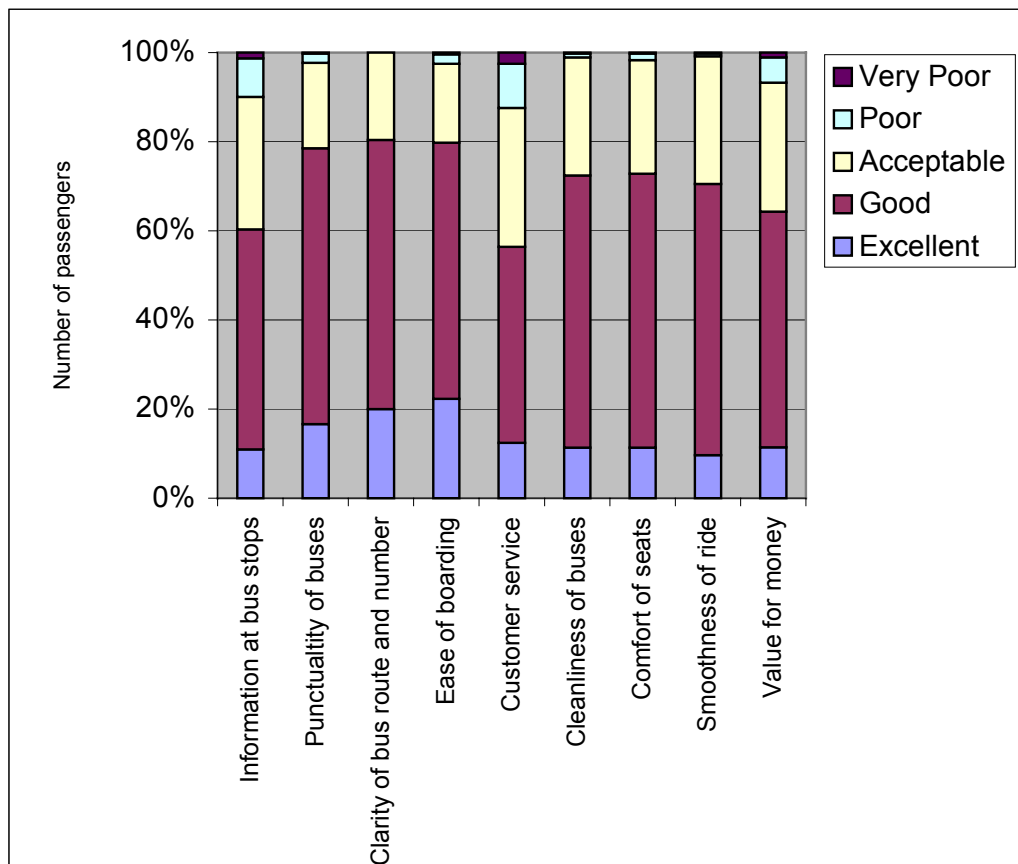
Purpose of journey	% of respondents
Work/business	25.7
Education/Training	5.1
Shopping	38.5
Leisure/social	26.4
Other	4.3
Total	100.0

- 3.7. A car was available for the journey surveyed for 26% of respondents. 31% of infrequent users had a car available for the journey, compared to 25% of people who used the service more than 3 days per week.
- 3.8. Almost half of those interviewed used the service more than 3 days per week. The frequency of use of the service by those interviewed is shown in Table 4.

Table 4. Frequency of use of the 110 service.

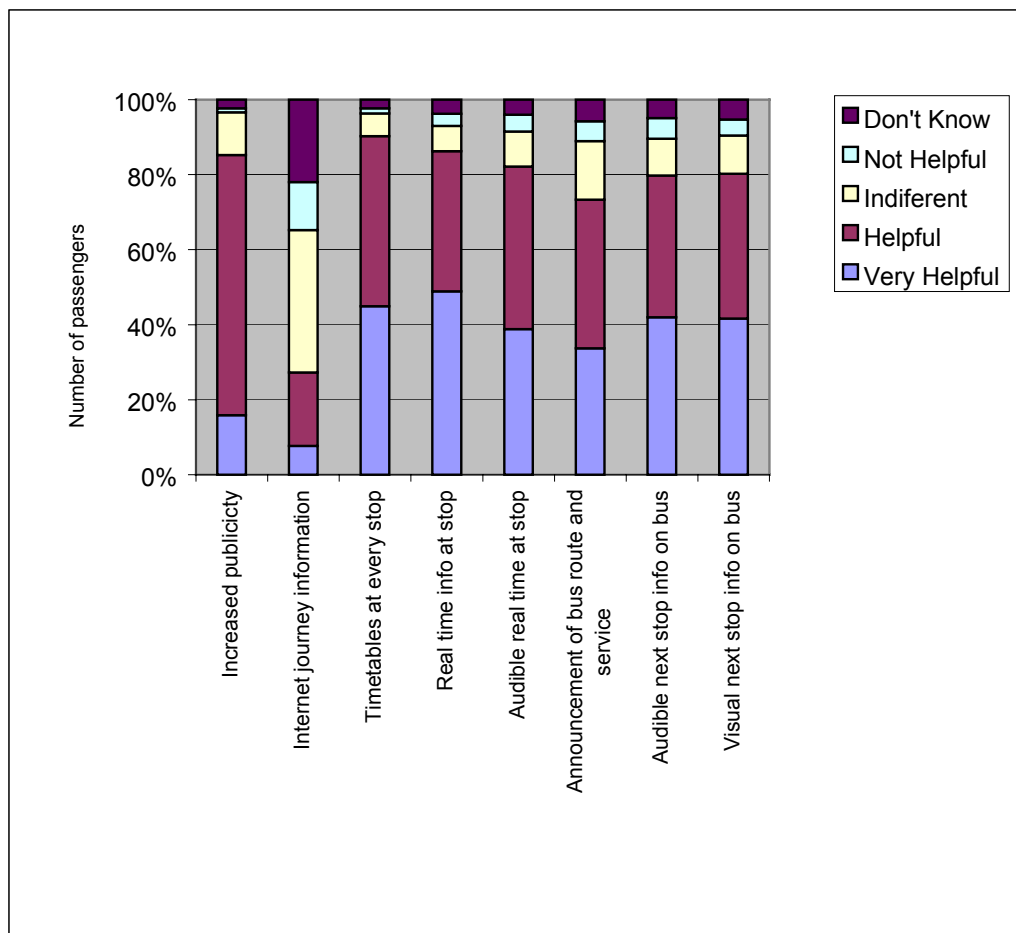
Frequency of use	% of respondents
More than 3 days per week	49.7
2-3 days per week	25.3
Once a week	8.8
2-3 days per month	2.5
Once a month	2.1
Infrequently	10.3
N/A	1.3

Figure 2. Passenger ratings of different aspects of the 110 service.



- 3.9. Passengers were asked to rate nine different aspects of the 110 service. The results are shown in Figure 2. Passengers generally rated the service highly with 60 to 80% rating most aspects as either excellent or good. The three aspects that received the highest rating were punctuality, clarity of bus number and route, and ease of boarding (despite these vehicles not being low floor). The two aspects that fared worst were information at bus stops and friendliness and helpfulness of drivers.
- 3.10. Users were asked to rate different potential improvements to passenger information at different stages of the journey in terms of how useful they felt they would be. The results are shown in Figure 3.

Figure 3. Usefulness of potential improvements to passenger information



- 3.11. The two improvements requested most often were paper timetables at every bus stop and real time passenger displays at bus stops, with 90% and 86% respectively of respondents citing this as very helpful or helpful.
- 3.12. Audible announcement of the service number and destination was rated as either very helpful or helpful by 73% of respondents. Audible

and visual next stop information on the bus was rated as helpful or very helpful by 80% of respondents.

- 3.13. Improved internet based journey information was deemed of use by only 27% of passengers. Of those with internet access (27% of the total interviewed) only 58% stated that improved internet based information would be of use.
- 3.14. When asked if improved information would encourage them to use bus services more often, 60.1% replied that it would, 28.3% said that it would not, and the remainder did not know.
- 3.15. The usefulness of improvement to different types of information may be expected to vary between regular users (more than 3 days per week) and infrequent users (less than once per month). The results for these two groups of passengers are shown in Table 5. Infrequent users rate improvements in some aspects of information marginally lower than do regular users, particularly for real time information at stops.
- 3.16. The needs of passengers who have a long term illness, disability or infirmity which makes it more difficult to use local bus services has been analysed separately. This group contains a similar male/female ratio (62.8% female) as the total sample, but the age range differs with the 46-59 age group predominating (41.5%), followed by the 26-45 (29.3%) and the 60+ age group (26.8%).
- 3.17. The information needs of this group are broadly similar to the sample as a whole except for a reduced usefulness of internet based information (Table 5).

Table 5. Rating of information enhancements as very helpful or helpful by regular users, infrequent users, and those with disabilities.

Information type	% Regular users	% Infrequent users	% people with a disability
Increased publicity	86.4	79.2	83.7
Internet journey information	28.6	31.3	14.0
Timetables at every stop	90.1	87.0	82.5
Real time info at stops	89.8	75.0	83.7
Audible real time at stops	84.6	68.8	83.7
Announcement of bus route and service	77.9	64.6	74.4
Audible next stop info on bus	79.4	72.9	83.7
Visual next stop info on bus	81.2	72.3	85.7

3.18. Analysis of this group showed fewer journeys to work (Table 6) than the sample as a whole and fewer people travelling more than 3 times per week, but a higher proportion of weekly users (Table 7).

Table 6. Purpose of journey for passengers with a disability.

Purpose of journey	% of respondents
Work/business	11.6
Education/Training	2.3
Shopping	46.5
Leisure/social	34.9
Other	4.7

Table 7. Frequency of use of the 110 service by passengers with a disability.

Frequency of use	% of respondents
More than 3 days per week	37.2
2-3 days per week	27.9
Once a week	18.6
2-3 days per month	2.3
Once a month	0.0
Infrequently	11.6

3.19. Responses to the open-ended question on suggestions for improvements to bus service information are detailed in Table 8.

3.20. Although the low number of responses received makes it difficult to draw firm conclusions, there was some interest in longer opening hours for information centres, and the wider availability of area wide bus maps and fares information.

Table 8. Additional suggestions for improved bus service information.

Number	Response
5	Higher service frequency especially evenings and Sunday
2	Cheaper fares
2	Fares information more widely available
2	Improvements in information are a waste of public money
2	More limited stop services
2	Longer opening hours for Metroline and travel centres
2	More area wide bus route maps
1	Bus route information at every stop
1	Consultation with public before changing timetables
1	Improved information for interchange opportunities
1	Information on bus delays
1	More accessible buses (low floor)

4. Pre Scheme Conclusions

- 4.1. Passengers generally rated the service highly with 60 to 80% rating most aspects as either excellent or good. The three aspects that received the highest rating were punctuality, clarity of bus number and route and ease of boarding (despite these vehicles not being low floor). The two aspects that fared worst were information at bus stops and friendliness and helpfulness of drivers.
- 4.2. A range of potential improvements to aspects of information relating to different stages of the journey were rated as very helpful or helpful by regular as well as infrequent users and also by passengers with a disability which made it more difficult for them to use local bus services.
- 4.3. The two improvements requested most often were paper timetables at every bus stop and real time passenger displays at bus stops, with 90% and 86% respectively of respondents citing this as very helpful or helpful.
- 4.4. Audible announcement of the service number and destination was rated as either very helpful or helpful by 73% of respondents. Audible and visual next stop information on the bus was rated as helpful or very helpful by 80% of respondents.

5. Announce Post Scheme Monitoring

5.1 The Announce system was fitted to buses in the 110 fleet in March 2001. The Announce monitoring scheme encompasses several areas of research to evaluate the effectiveness, reliability and accuracy of the system.

5.2 The research includes;

- interviews with passengers using the 110 service to determine passenger views on the quality of the service and feedback on the usefulness of the audible and visual information;
- analysis of complaints and customer feedback received by Metro and Arriva Yorkshire. Both organisations operate computerised systems for recording and monitoring complaints and comments received;
- the views of blind, partially sighted and deaf people as determined by two focus groups to discuss their experience of the system and to suggest possible improvements;
- reliability of the system as evaluated by 'mystery traveller journeys';
- patronage analysis on the 110 service;
- the views and experiences of driving staff and supervisors at Arriva to provide an additional dimension to the feedback; and
- the views and experiences of the bus operator, Arriva Yorkshire.

6. Post Scheme Passenger Survey

6.1 Face to face interviews were conducted on the 110 service to determine their satisfaction with different aspects of the service. A copy of the questionnaire is included in Appendix 2. In addition the questionnaire focused on the Announce system and included the following aspects:

- the helpfulness of the announcements and visual displays on the 110;
- the helpfulness of the system if the passenger was unfamiliar with the area;
- possible improvements to the audible and visual announcements; and
- the clarity of the audible displays and visual announcements.

6.2 In total 551 interviews were conducted between Tuesday 22nd June and Sunday 1st July 2001. The age and gender of the sample is shown in Table 9, which generally conforms to the distribution in the pre scheme monitoring. The ethnic origin of respondents was 96.9% White, 1.1% Asian (Other), 0.4% Black (Caribbean), 0.4% Indian, 0.4% Pakistani, 0.2% Black (African), 0.2% Black (Other), 0.2% Chinese and 0.2% Other.

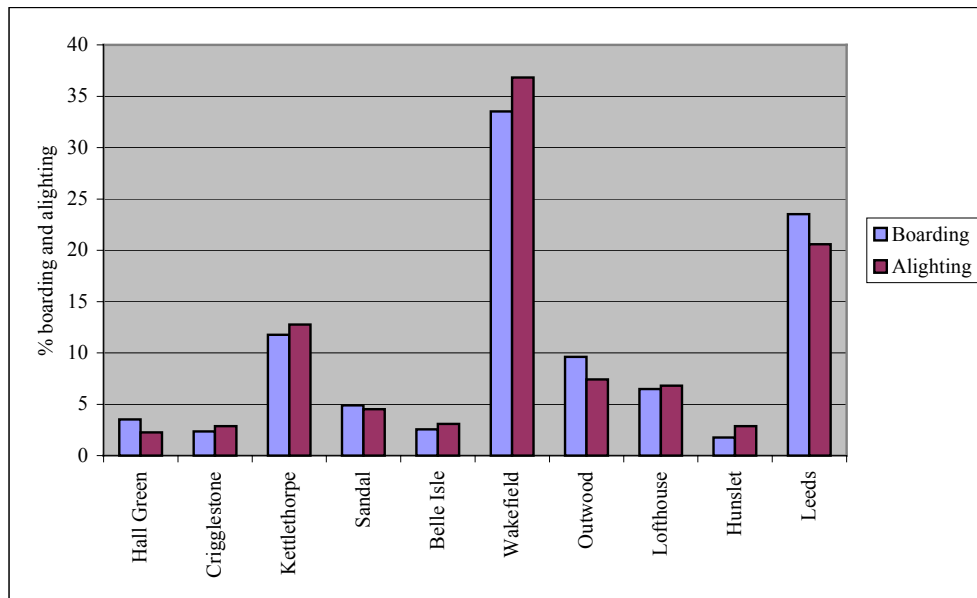
Table 9. Age distribution of the respondents.

Age	% of males	% of females	Total %
Under 16	1.5	1.6	1.5
16-25	24.3	20.2	21.9
26-45	39.5	32.3	35.2
46-60	16.6	22.5	20.1
60+	16.6	21.5	19.6
N/A	1.5	1.9	1.7
All ages	40.0	60.0	100

6.3 Some 26 (4.8%) respondents had some form of disability, of which 4 respondents stated they had a hearing impairment and 2 passengers had visual impairments.

6.4 The boarding and alighting points of the passengers surveyed are summarised in Figure 4. The predominant destination was Wakefield (32%), followed by Leeds (23%), Kettlethorpe (11%), Outwood (9%) and Lofthouse (6%).

Figure 4. Boarding and alighting points of passengers interviewed.



6.5 The boarding and alighting points of passengers were used to determine approximate journey lengths. The trip length distribution is shown in Table 10. The sample of passengers interviewed contained people travelling both short and long distances. The average trip length of approximately 5.8 miles is marginally further than the pre scheme monitoring where an average trip length of 4.2 miles was recorded. This may reflect the slightly higher proportion of interviewees travelling to Leeds in the after survey.

Table 10. Distribution of journey lengths of respondents.

Trip Length	Percent
< 2 miles	14.3
2 to 5 miles	25.4
5 to 10 miles	45.7
> 10 miles	3.4
N/A	11.1
Total	100.0

6.6 The trip purpose of respondents is summarised in Table 11. The predominant journey purpose for those surveyed was leisure (35%), with shopping (32%), and work related journeys (25%) also cited frequently. This differs slightly to the pre scheme monitoring where shopping (39%) was the predominant trip purpose.

Table 11. Journey purpose of respondents.

Purpose of journey	% of respondents
Leisure/social	35.2
Shopping	32.2
Work/ business	25.3
Education/Training	4.6
Other	2.7
Total	100.0

6.7 The number of respondents using the service 3 or more days per week was 38% compared to 49% in the pre scheme report, which was largely compensated by the increased number of people using the service on a weekly basis (Table 12).

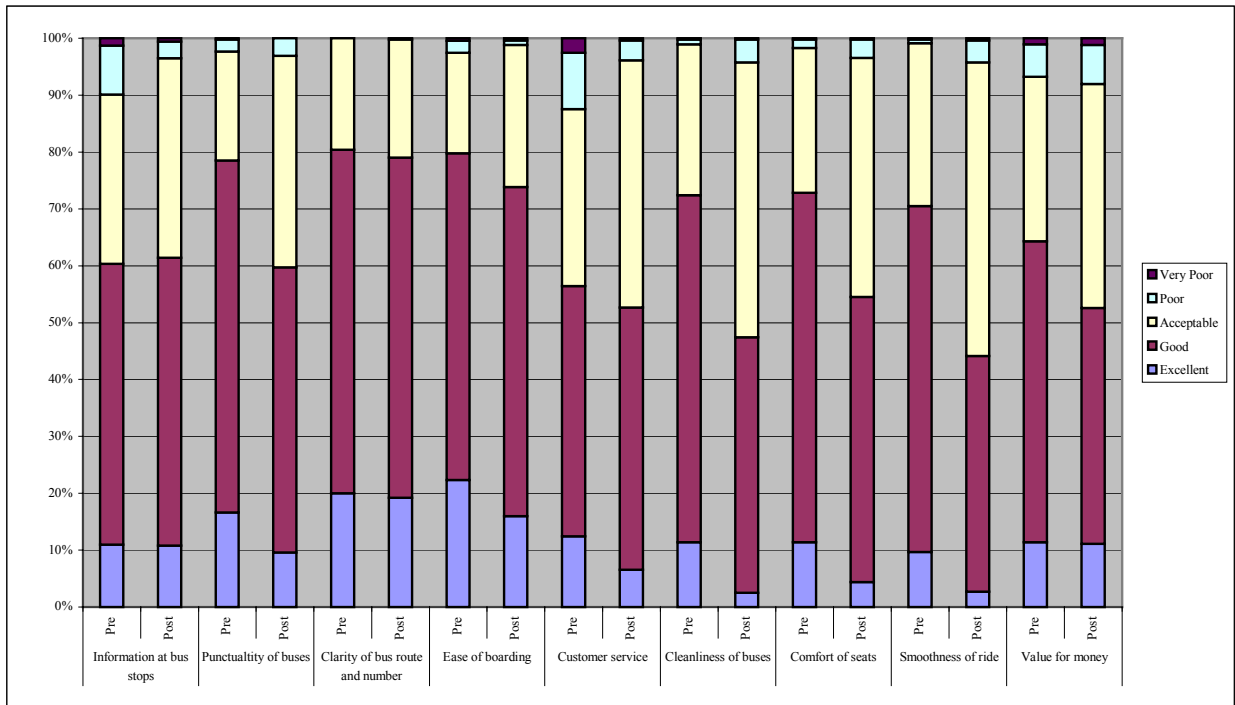
6.8 Some 27% of respondents stated they had a car available for the journey in question. Analysis of infrequent and frequent users indicates there is no difference between the different categories, both with 28% car availability.

Table 12. Frequency of use of the 110 service.

Frequency of use	% of respondents
More than 3 days per week	38.1
2-3 days per week	26.3
Once a week	20.2
2-3 days per month	3.8
Once a month	2.3
Infrequently	7.0
N/A	2.3
Total	100.0

6.9 Passengers were asked to rate nine different aspects of the 110 service. The results are shown in Figure 5. Passengers generally rated the service highly. In comparison to the pre scheme survey the proportion of passengers rating the punctuality of services either excellent or good has decreased, from 79% to 60%, similar changes have occurred for the cleanliness of the buses, comfort of the seats and smoothness of the ride. There has been a decrease in the proportion of passengers rating customer service as either poor or very poor from 12% to 4%.

Figure 5. Passenger ratings of the 110 service Pre and Post Implementation.



6.10 Passengers were asked to rate the audible and visual announcements from two different perspectives. Firstly, they rated the system on the 110 and secondly, they rated the usefulness of the system if they were travelling in an unfamiliar area. The results have been summarised in Table 13 and graphically in Figure 6.

6.11 The results indicate the majority of passengers find the information helpful or they are indifferent. Only a small proportion of passengers thought the information provided was not helpful.

6.12 Some 44% of passengers on the 110 service rated the boarding announcement either very helpful or helpful. In comparison a greater proportion of passengers rated the next stop audio announcements (60%) and visual displays (62%) on the 110 service as either very helpful or helpful. This increased to over 90% when passengers viewed the system from the point of view of them travelling in an unfamiliar area or on an unfamiliar service.

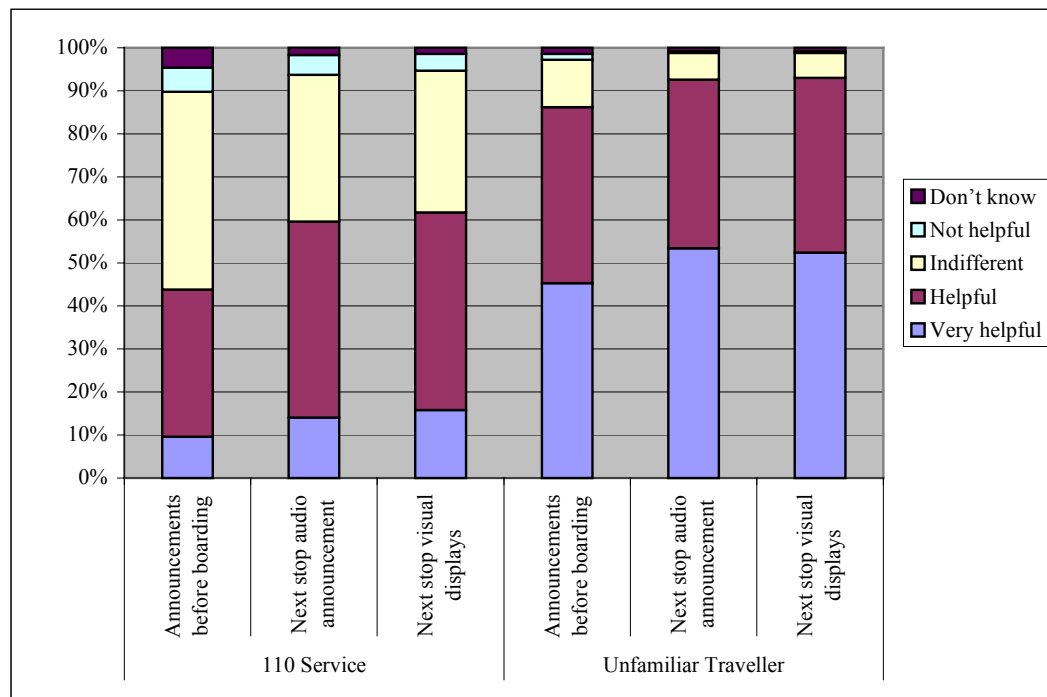
6.13 In the pre scheme questionnaire, some 73% of passengers stated they would find the boarding announcements either helpful or very helpful, compared to the post scheme questionnaire where 86% of unfamiliar travellers and 44% for the 110 service rated it very helpful or helpful. In the pre scheme monitoring 80% of passengers stated the next stop

audible announcements would be helpful or very helpful, compared to 93% for the unfamiliar traveller and 60% on the 110. For the next stop visual displays 80% of passengers in the pre scheme report stated the system would be helpful or very helpful, after implementation 93% viewed it helpful or very helpful for an unfamiliar traveller and 62% for the 110 service.

Table 13. Passenger ratings of the 110 audible and visual announcements.

Passenger Response	Part of system	Very helpful	Helpful	Indifferent	Not helpful	Don't know
110 SERVICE	Announcements before boarding	9.6	34.2	46.0	5.6	4.6
	Next stop audio announcement	14.1	45.5	34.1	4.6	1.7
	Next stop visual displays	15.8	45.9	33.0	3.9	1.4
UNFAMILIAR AREA	Announcements before boarding	45.3	40.9	11.0	1.4	1.4
	Next stop audio announcement	53.4	39.2	6.2	0.4	0.8
	Next stop visual displays	52.4	40.6	5.8	0.4	0.8

Figure 6. Passenger ratings of the 110 audible and visual announcements.



6.14 The smaller proportion of passengers rating the system very helpful or helpful for the 110 service probably reflects the familiarity passengers have with the service.

6.15 The usefulness of the different elements of the Announce system by regular, infrequent users and people with disabilities was analysed. The details are shown in Table 14 below.

Table 14. Rating of Announce elements as very helpful or helpful by regular users, infrequent users, and those with disabilities on the 110 service.

Announce element	% Regular users	% Infrequent users	% people with a disability
Announcements before boarding	43.9	47.8	42.3
Next stop audio announcement	58.3	68.1	50.0
Next stop visual displays	59.8	75.4	57.7

6.16 Infrequent users of the 110 service felt the greatest benefit, particularly for the on board next stop announcements and visual displays. Infrequent users were defined as people using the 110 service less than once per week compared to frequent users who were defined as using the service at least once per week.

6.17 Almost three quarters of passengers stated the boarding announcements were at the correct volume. Some 13% of passengers stated the system was too quiet and 11% stated it was too loud.

6.17 When considering the next stop announcements 67% stated the system had the correct volume. A further 13% stated the system was too quiet and 18% stated the system was too loud. The results are summarised in Table 15.

Table 15. Passenger assessment of audible announcements.

	Very loud	Loud	OK	Quiet	Very quiet
Boarding announcement	2.3	11.2	72.4	12.5	1.6
Next stop announcement	1.8	18	66.5	12.5	1.2

6.18 The majority of respondents (94.6%) stated the audio announcements were clear and understandable. A further 4% stated they were not and 1.4% did not know. In addition 98.6% of respondents stated the visual displays were easy to read.

6.19 Passengers were asked to state ways of improving the system the results are summarised in Table 16. Eight respondents stated the system should work consistently on all buses. The other reasons are disparate.

Table 16. Improvements to the 110 service audio and visual equipment.

Response	Number of responses
Should work consistently on all buses	8
Not as many announcements	7
Don't know	6
System Annoying	5
Decrease volume	4
Increase volume	3
Larger visual display	3
Make boarding announcements clearer	2
System not necessary	2
Have soft music	1
Some stop names need correcting	1
Announcements should be more detailed	1
Should be visual only	1
Not visible from the lower deck	1
Difficult to read when the sun shines on the visual display	1

7. Post Scheme Survey Conclusions

- 7.1 Passengers generally rated the service highly although there had been a reduction in the number of passengers rating the service as excellent or good, in relation to the punctuality of the buses, cleanliness of the buses, and the comfort of the seats and the smoothness of the ride. There had been a small decrease in the number of passengers viewing the customer service as very poor or poor.
- 7.2 When considering the audible and visual announcements on the 110 service 44% and 62% of passengers rated the system as very helpful or helpful for the boarding announcement and on bus next stop information respectively. From the perspective of an unfamiliar traveller 86% and 93% rated the system very helpful or helpful.
- 7.3 Passengers generally viewed the clarity of the audible and visual announcements as acceptable.

8. Complaints Received by ARRIVA and Metro.

8.1 This section of the monitoring report encompasses a review of the complaints received by ARRIVA regarding the 110 service. Table 17 summarises the complaints and commendations, once the Announce system had been installed, compared to a similar period the year before.

Table 17. Complaints & Commendations received for the 110 service – for April to June 2000 and 2001.

Period	April to June	2000 (Pre Scheme)	2001 (Post Scheme)
NOT STOPPING		2	8
RELIABILITY		4	2
NO SHOW		0	0
SERVICE LEVEL		0	1
STAFF ATTITUDE		11	7
STAFF ACTIONS		0	1
DRIVING STANDARDS		0	3
FARE RELATED		0	3
VEHICLE RELATED		0	1
ACCIDENTS		0	0
OTHER		0	0
Total general complaints (excluding announce)		17	26
ANNOUNCE			
	Nuisance - full visual/hearing	NA	11
	Nuisance - impaired hearing	NA	-
	Nuisance - impaired visual	NA	-
	Not working properly - full visual/hearing	NA	-
	Not working properly - impaired hearing	NA	-
	Not working properly - impaired visual	NA	2
	Sub Total	NA	13
COMMENDATIONS			
	Customer - full visual/hearing	NA	1
	Customer - impaired hearing	NA	-
	Customer - impaired visual	NA	2
	Interest Group	NA	2
	Sub Total	NA	5

8.2 The number of general complaints increased from 17 to 26, during the April to June period 2001 compared to 2000, representing a 53% increase. Notable successes include a reduction in complaints concerning unhelpful drivers, decreasing from 11 in 2000 to 7 in 2001. This may in part be due to the Announce system, where passengers require less information from the driver instead relying on the audible

and visual announcements, and from greater driver awareness and training resulting from the introduction of the system.

- 8.3 To put the number of complaints into perspective this represents one complaint per 5300 passenger miles for the 110 service in the post survey period compared to a depot average of one complaint per 3100 passenger miles.
- 8.4 The Announce system generated 13 complaints and 5 commendations during the 3 month period. The majority of complaints focused on the nuisance of the system, all of the eleven such complaints received were from passengers with no visual or hearing impairments. Two complaints from passengers with visual impairments were in relation to the Announce system not working properly. In the following 6 month period (July to December 2001) a further 1 complaint was received regarding the Announce system.
- 8.5 The Announce system has received several commendations. One commendation was from a passenger with no visual and hearing impairments and two from passengers with visual impairments. Two interest groups commended the scheme.

9. Disability Discrimination Act Focus Groups.

- 9.1 Halcrow conducted two focus groups with representatives of deaf and visually impaired people in Leeds to gain their views on the audible and visual next stop passenger information. In total 18 members of the Leeds Society for the Deaf and Blind and of the Leeds Centre for the Blind and Partially Sighted People were present at the focus groups. Two interpreters were present at each meeting. The first focus group was held in June 2001 immediately following the implementation, and the second in July 2002 following minor improvements to the system.
- 9.2 Two members of the group had previous experience of using the 110 service. Table 18 shows a breakdown of the participants' previous experience of the 110 service. Prior to the commencement of the focus group all the participants were given an opportunity to ride on the 110 service.

Table 18. Usage of the 110 service by focus group participants.

	Regular	Occasional	Once
Partially Sighted or Blind	1	1	7
Registered Deaf	0	0	9

- 9.3 The following issues and conclusions were made in relation to the external boarding announcement:
- there was a delay in the announcement reported by the first focus group. Following improvements in the timing, this comment was not made in the second focus group;
 - the announcement was too quiet and difficult to hear against the background traffic noise in several locations; one participant suggested the possibility of additional external speakers on the side of the bus to improve the clarity of the information provided;
 - several members commented that it was necessary to stop every bus to determine the route and destination via the announcement. A better solution would be to announce the service number and destination at the bus stop 2-300 metres prior to the bus arriving at the stop;
 - the information provided was generally regarded as sufficient although in some instances it may be necessary to announce which route a service is taking i.e. the 110 route via etc; and

- the group considered it to be useful for all passengers.

9.4 The following comments were made regarding the internal next stop announcements:

- the group considered the announcements useful for first time and regularly users;
- almost all of the blind participants considered the announcements could be louder, in particular downstairs where the noise of the engine was considered a major problem;
- the speakers are required on both sides of the bus as the group considered specific areas for disabled passengers impractical as the seats are usually occupied by other passengers;
- the potential for linking the announcements to an induction loop system was raised;
- the information provided is generally sufficient, but the naming of some stops may be misleading.

9.5 The following comments were made regarding the next stop visual displays:

- the displays were considered to be very useful and improved the confidence in using public transport;
- the group thought an additional visual display behind the stairwell would be beneficial, especially as the hand rails and other passengers sometimes obscure the view. Also a display in the boarding/alighting area was considered useful by one participant;
- in comparison to other visual displays the system was considered to be very good. However one participant commented that the displays were too small, too narrow, scrolled too fast. One comment was also made as to whether the contrast of the display could be improved;
- the group reported few difficulties in relating the stop name on the visual display to the bus stop;
- several participants commented that the system would be more useful if it had a scrolling list of bus stops with the current stop at the top of the list. Also adding bus stop identity number and a route map were considered as desirable;

- some members of the group thought that adding date, time and interchange information would be beneficial.

9.6 The main conclusions of the group in relation to the audio next stop information are as follows:

- all the participants agreed it is a good idea in principle;
- the announcements could be louder;
- the systems provided additional information and should be introduced on all services;
- the internal announcements were considered to be more important than the external announcement; and
- information systems that reduce the stress of the journey improves the travel opportunities and quality of life for blind passengers.

9.7 The main conclusions of the group in relation to the visual next stop displays are as follows:

- all the participants agreed the system was a good idea and would be useful on all services and would possibly encourage public transport usage;
- further information could usefully be included on the display including a list of the next few stops; and
- bus drivers can sometimes be unfamiliar with the routes and all the stops on a particular route and it can be difficult to understand drivers who were not always patient, therefore the introduction of the Announce system would be very helpful, but not a substitute for helpful and friendly drivers.

9.8 Participants were asked to comment on different methods or suggest their own approach of improving information provision for blind and deaf people. General comments are as follows:

- real time information and visual displays at bus stops would be very useful;
- there should be an improvement in communication and an increase in publicity of service changes, re-sitting of bus stops, night time services etc.

- there should be stricter enforcement of illegal parking at bus stops; and
- mobile handsets were considered to be very useful, particularly by the deaf community who regularly use text messaging as a means of communicating.

9.9 Participants thought a manually operated system could be used on the bus service if the system failed and the reliability of the system was commented on by some participants.

9.10 The system was considered to be excellent in general but with room for some further fine-tuning and should be extended to all services in the area.

10. Patronage Analysis

- 10.1 An initial analysis of patronage changes was carried out after 6 months of operation of the Announce system. Further analysis was carried out after 12 months of operation.
- 10.2 An analysis of patronage was conducted for April to September 2001 compared to the same period in the previous year. Four different services were analysed for comparison purposes, as it was not possible to compare the performance of the 110 service with the depot as a whole due to changes in services operated from the depot during the study period.
- 10.3 Services used for comparison include a high frequency local cross-town service (101/102), a high frequency route branded interurban service (126/127), and a service linking villages on the outskirts of Wakefield to the city centre (195/6/7).

Table 19. Percentage change in patronage figures for Arriva Yorkshire services for April 2001 to September 2001 compared to the previous year.

Service	All passengers (%)
101/102	-1.27
110	+3.36
126/127	-3.10
195/6/7	-3.71

- 10.4 The 110 service had shown an increase in patronage while other service groups operated by the same depot had shown a significant decrease. Further analysis has been carried out to examine any association of the patronage increase on the 110 service and the introduction of the Announce system.
- 10.5 Although the route had been selected based on a number of criteria including both urban and interurban sections and no significant planned service changes, other factors may have contributed to changes in patronage. These include the higher economic prosperity experienced by Leeds, difficulties with local rail services due in part to redevelopment of Leeds City Station and staff shortages resulting in a temporary transfer of some passengers to bus, and the introduction of a limited stop service, X41, between Barnsley and Leeds via Wakefield in January 2001.

- 10.6 In order to further investigate patronage changes the following analyses were carried out:
- Analysis of peak and off peak weekday and weekend patronage.
 - Analysis of changes in patronage for local urban Wakefield traffic as determined by the Hall Green to Wakefield section and inter-urban flows from the Wakefield to Leeds section of route;
- 10.7 Changes in peak and off peak patronage for Monday to Friday and on Saturdays and Sundays over the same period were determined and are shown in Table 20.

Table 20. Change in peak and off peak weekday patronage, total weekday and weekend patronage on the 110 and other services for April – September 2001 compared to 2000.

Time band	% change in patronage for each service			
	101/102	110	126/7	195-7
Saturdays	-3.98	+1.80	-4.00	-3.99
Sundays	+8.32	+13.46	+2.23	+2.58
Weekday total	-1.03	+3.32	-3.14	-3.69
Weekday am peak (0400 - 0929)	-1.74	+3.43	-7.30	+4.10
Weekday inter-peak (0930 – 1459)	-0.61	+1.35	-2.24	-6.69
Weekday pm peak (1500 - 1759)	-2.30	+4.53	-1.99	-5.93
Weekday evening (1800 – 2359)	+1.50	+8.73	-2.45	+0.11

- 10.8 Patronage increase was greatest on Sundays and on weekday evenings on the 110 service suggesting a greater increase in occasional compared to regular commuter trips over this period. It should be remembered however that the absolute numbers of passengers travelling at this time is much lower.
- 10.9 The 110 service showed consistently stronger growth in all time bands compared to other services.

10.10 Patronage on the local Wakefield to Hall Green section and the interurban Wakefield to Leeds section of the 110 route was analysed. This is summarised in Table 21.

Table 21. Change in patronage for April - September 2001 compared to 2000 for urban and interurban sections of the 110 route.

110 service patronage – passengers boarding	% Change
Leeds to Wakefield	+5.92%
Wakefield to Hall Green	-1.12%
Hall Green To Wakefield	+3.55%
Wakefield to Leeds	+3.00%

10.11 Analysis of patronage on the Hall Green to Wakefield sections and the Wakefield to Leeds section of the 110 service indicate that patronage increased mainly on the interurban sections of route. These figures suggest an increase in cross Wakefield journeys and an increase in journeys to and from Leeds.

10.12 The availability of other services for the Wakefield to Hall Green sections of route may have diluted the growth effect on the 110 service for passengers boarding between Wakefield and Hall Green. However the decrease in patronage of 1.12% on this section is less than on some comparable town services.

10.13 A further analysis was carried out after a full year of operation of the Announce system. Patronage analysis for the same groups of services was carried out for the period April 2001 to March 2002 compared to the previous year. This is shown graphically on a month by month basis in Figure 7 and broken down by different categories of passengers in Table 22.

10.14 Although an initial increase in patronage was observed on the 110 service the annual figures show a slight decrease in patronage but markedly less than for other services. Reasons for monthly fluctuations include holidays and Bank Holidays falling on different dates, and the effects of local rail strikes.

10.15 Passenger retention was significantly greater on the 110 service compared to other principle services operating from the same depot.

Figure 7. Monthly patronage for the 110 service and other services relative to the previous year.

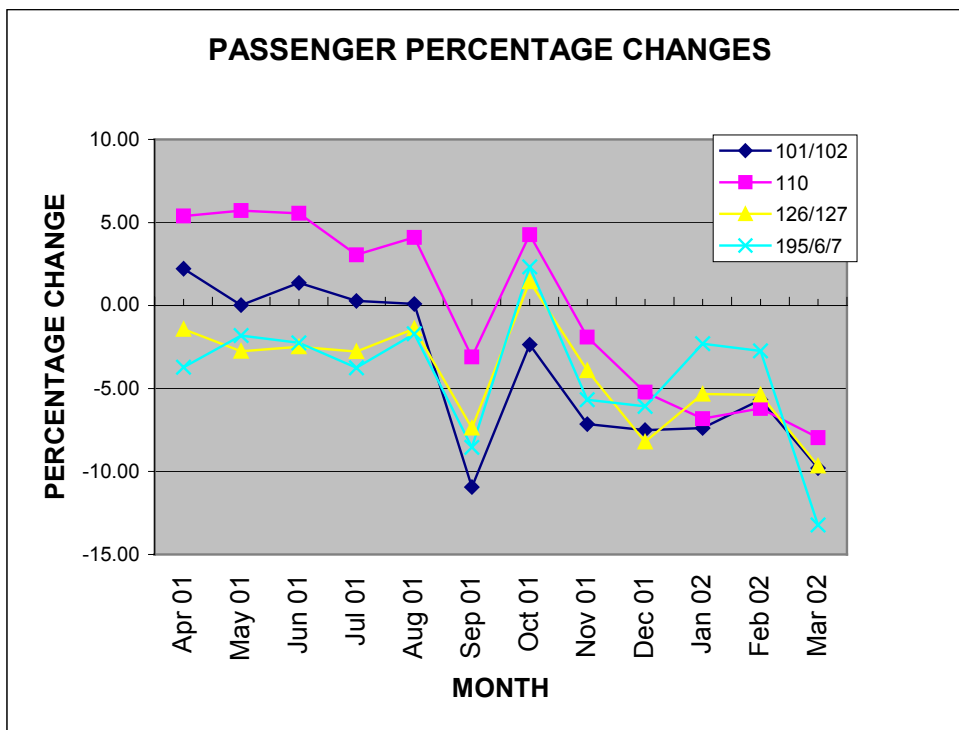


Table 22. Percentage annual change in patronage figures for Arriva Yorkshire services for April 2001 to March 2002 compared to the previous year.

Service	All passengers (%)	Elderly and disabled (%)	Children (%)	Adults (%)	Passes (%)
101/102	-4.01	-3.44	-4.43	-4.24	+21.70
110	-0.46	-0.75	-3.98	+0.66	+21.99
126/127	-3.24	-5.08	-1.71	-3.39	+34.94
195/6/7	-4.23	-4.75	-1.82	-6.00	+33.00

10.16 Passenger retention was significantly greater on the 110 service compared to other principle services operating from the same depot.

- 10.17 There was a general trend to a significant growth in the use of passes including adult and child day tickets, but less so on the 110 service. Pass usage on bus may also be recorded less accurately in comparison to cash fares resulting in the total patronage figures being slightly underestimated.
- 10.18 A more detailed analysis of the data suggested a greater increase in use of weekly or longer tickets on the 110 service particularly in the off peak compared to other services, and a smaller increase in the use of day tickets when compared with other services. This is consistent with an increase commuter journeys and occasional travel on this route by regular public transport users.
- 10.19 The increase in adult journeys compared to other services may be a result of other factors including the economic prosperity of Leeds and rail disruption and therefore cannot be solely attributed to the Announce system. It is not possible to disaggregate the causes of this increase.
- 10.20 In contrast the greater retention of elderly and disabled passengers on this route may be less likely to be due such factors, especially as this class of fare is not available in the weekday morning peak.
- 10.21 The introduction of a new limited stop service, X41, between Barnsley, Wakefield and Leeds in January 2001 may have resulted in passenger abstraction from the 110 service, thus reducing the potential increase in patronage on the 110 service. This may have increased following the introduction of some additional journeys in September 2001 resulting in a half hourly daytime service. This service only operates between Leeds and Wakefield on weekdays. Although these two services link Wakefield and Leeds they do not use the same stops in either city and follow a slightly different route. The level of abstraction is less than 2-3% based on an analysis of journeys from Leeds towards Wakefield.
- 10.22 This analysis does not conclusively prove patronage generation or improved retention as a result of introducing Announce as it could not rule out other influences over the year, such as local rail strikes, abstraction resulting from the introduction of a new limited stop service, and the greater economic prosperity in Leeds. However when compared to other services the greater retention of elderly and disabled passengers on the 110 service and the greater increase in patronage on weekday evenings and Sundays indicative of occasional travellers suggest the Announce system may have been a contributing factor.

11. Reliability of Audible and Visual Next Stop Announcements

- 11.1 To test the reliability and accuracy of the audible and visual equipment a number of reliability surveys were conducted between 15th May 2001 and 2nd July 2001. The surveys were conducted on seven different occasions, and at different times of the day, in total 53 'mystery traveller' journeys were conducted. Four of the 'mystery traveller' surveys have been removed from the analysis, as the vehicles operating the service were not a part of the 110 fleet equipped with the audible and visual equipment. A copy of the survey form is included in Appendix 3 of this report.
- 11.2 During the surveys all the 110 fleet were boarded at least once, however, the buses were never boarded more than once on the same day. The service was boarded at several locations on the route. Table 23 indicates the number of times each fleet number in the 110 service was boarded.

Table 23. Number of trips conducted on the 110 fleet.

Fleet Number	Frequency	Percent
517*	1	1.9
604*	1	1.9
607*	1	1.9
624	3	5.7
625	3	5.7
626	3	5.7
627	4	7.5
628	4	7.5
629	3	5.7
630	3	5.7
631	4	7.5
632	2	3.8
633	1	1.9
634	4	7.5
635	4	7.5
636	3	5.7
637	2	3.8
638	2	3.8
639	2	3.8
640	2	3.8
-*	1	1.9
Total	53	100.0

* = Not part of 110 fleet

- 11.3 Table 24 summarises the main results from the survey work in relation to the external announcement.

Table 24. Reliability and accuracy of the external announcements.

	Yes	No	Not Working	Total
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
Able to hear boarding announcements clearly	19 (38.8)	13 (26.5)	17 (34.7)	49 (100.0)
Timing of the boarding announcement correct	4 (8.2)	28 (57.1)	17 (34.7)	49 (100.0)
Boarding Announcements correct	19 (52.8)	0 (0.0)	17 (47.2)	36 (100.0)

11.4 The following conclusions can be drawn from the external announcement system:

- the external announcements are only audible for 39% of journeys, this mainly reflects the large number of boardings that were conducted at Leeds central bus station where the announcements are not always audible due to the enclosed waiting environment;
- the timing of the audible announcements was only considered acceptable for 8% of boardings and was generally when a large number of passengers boarded the bus; and
- for the 19 boarding announcements that were audible the information conveyed was correct for 100% of the boardings.

11.5 The results of the internal audible announcements are displayed in Table 25.

Table 25. Reliability and accuracy of the internal announcements.

	Yes	No	Not Working	Total
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
Able to hear audio announcements clearly	30 (61.2)	3 (6.1)	16 (32.7)	49 (100.0)
Were the audio announcements too loud	0 (0.0)	33 (67.3)	16 (32.7)	49 (100.0)
Was the timing of the audio announcements correct	31 (63.3)	2 (4.1)	16 (32.7)	49 (100.0)
Were the audio announcements correct	33 (67.3)	0 (0.0)	16 (32.7)	49 (100.0)

- 11.6 The audible announcements were not working for 33% of the boardings. Analysis of the audible announcements when the system was working revealed;
- the audible announcements were clearly audible for 91% of journeys;
 - for the trips where the announcements were not audible, the surveyor was seating in the upper deck for 2 trips and the lower deck for 1 trip. The bus ranged from being full to relatively empty in terms of passenger numbers. Generally the noise of the engine and other traffic were the main reasons;
 - the audible announcements were never considered to be too loud;
 - the timing of the announcements was correct on 94% of all journeys, where the timing was considered to be not correct the surveyors noted the system was a bit late; and
 - the information relayed on the audible announcements was correct for all the trips where the system was working.
- 11.7 The results of the reliability and accuracy of the visual displays are summarised in Table 26.

Table 26. Reliability and accuracy of the visual displays.

	Yes	No	Not Working	Total
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
Able to read visual displays	33 (67.3)	0 (0.0)	16 (32.7)	49 (100.0)
Was the timing of the visual announcements correct	30 (61.2)	3 (6.1)	16 (32.7)	49 (100.0)
Were the visual displays correct	33 (67.3)	0 (0.0)	16 (32.7)	49 (100.0)
Did the audible announcements and visual displays correlate	32 (65.3)	1 (2.0)	16 (32.7)	49 (100.0)

- 11.8 The visual displays were working for 67% of all trips. Analysis of the displays when they were not working indicates the audible announcements were not functioning either.
- 11.9 Analysis of the visual displays when they were operational indicates;
- the visual displays were clearly visible for all the journeys;

- the timing of the visual displays was correct for 91% of all trips. Where the timing of the system was not ideal the surveyors generally noted the display was a bit late displaying the next stop for the service;
- the information on the display was correct for all the trips;
- the audible and visual displays correlated for 97% of all trips. On the one occasion the system did not correlate the surveyor noted the audible announcements were working intermittently.

11.10 Surveyors provided additional comments regarding their trips. The main results are summarised in Table 27.

Table 27. Surveyor comments regarding the 110 service audible and visual announcements.

	Frequency	Percent
Not working	16	29.1
Boarding announcements late	16	29.1
Audio announcements quiet	8	14.5
Next stop announcements late	6	10.9
Not 110 fleet	4	7.3
No boarding announcement	2	3.6
Boarding announcement working intermittently	1	1.8
Visual displays late	1	1.8
Working upstairs not downstairs	1	1.8

11.11 The majority of comments focused on the whole system not working (29%) and the delay associated with the boarding announcements (29%). The audio announcements being quiet (15%) and the next stop announcements being late (11%) were also cited frequently.

11.12 A number of technical difficulties existed during this evaluation, including;

- an intermittent GPS signal on the vehicle which has since been overcome by fitting an active rather than passive antenna;
- ticket machines used on the 110 occasional did not have the correct software to operate the system;
- a number of units were found to have fuses missing for the Announce circuits.

11.13 These will have contributed to the high numbers of trips on which the system was not working. It must be remembered that this is a pilot system and some technical challenges were expected.

11.14 A further evaluation was carried out in June 2002 to determine the longer term reliability of this equipment following the rectification of the faults which were discovered earlier in the year. During the intervening period the external audible announcement had been shortened due to the problems identified in the previous surveys.

11.15 A total of 47 trips were monitored using the same methodology as before. Table 28 indicates the number of times each fleet number in the 110 service was boarded.

Table 28. Number of trips conducted on the 110 fleet – survey 2.

Fleet Number	Frequency	Percent
624	4	8.5
625	3	6.4
626	3	6.4
627	2	4.3
628	1	2.1
629	4	8.5
630	4	8.5
631	4	8.5
632	3	6.4
633	1	2.1
634	2	4.3
635	2	4.3
636	4	8.5
637	1	2.1
638	2	4.3
639	3	6.4
640	3	6.4
641	1	2.1
Total	47	100.0

11.16 Table 29 summarises the main results from the survey work in relation to the external announcement.

11.17 There had been an improvement in the number of trips on which the external announcement was not working from 35% to 17%.

11.18 Half of the instances where the external announcement was not working was due to a general system fault and half due to a specific failure of the external announcement. Whilst the reliability had improved this failure rate still needs to be addressed in order to provide a reliable system for widespread usage.

Table 29. Reliability and accuracy of the external announcements - survey 2.

	Yes	No	Not Working	Total
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
Able to hear boarding announcements clearly	30 (63.8)	9 (19.2)	8 (17.0)	47 (100.0)
Timing of the boarding announcement correct	39 (83.0)	0 (0.0)	8 (17.0)	47 (100.0)
Boarding Announcements correct	39 (83.0)	0 (0.0)	84 (17.0)	47 (100.0)

11.19 The timing of the external announcement was judged to have been improved since the first survey was conducted, as a result of shortening the message.

11.20 When the system was operational a boarding announcement was heard on 77% of trips. Of the 9 occasions when the system was working but the announcement was not heard on boarding, 6 were due to boarding at the end of a long queue or when the bus was already on the stand prior to the mystery traveller arriving at the stop, 2 were due to the dwell time at the stop being so short (with effectively only one passenger boarding) that the announcement did not commence until the traveller had boarded the bus, and 1 occasion was due to a loud radio playing in the vicinity obscuring the announcement.

11.21 The results of the internal audible announcements are displayed in Table 30.

Table 30. Reliability and accuracy of the internal announcements - survey 2.

	Yes	No	Not Working	Total
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
Able to hear audio announcements clearly	43 (91.5)	0 (0.0)	4 (8.5)	47 (100.0)
Were the audio announcements too loud	1 (2.1)	42 (89.4)	4 (8.5)	47 (100.0)
Was the timing of the audio announcements correct	43 (91.5)	0 (0.0)	4 (8.5)	47 (100.0)
Were the audio announcements correct	43 (91.5)	0 (0.0)	4 (8.5)	47 (100.0)

11.22 The internal audible announcements were not working for 8.5% of the boardings compared to 33% in the previous study. The faults on 2 of the 4 journeys surveyed were intermittent, the system on one vehicle started working correctly later in the same journey, and on a second vehicle on the following trip. Investigation of the faults on the remaining 2 journeys by Arriva staff at a later date showed both these systems to be working. When the same vehicle was surveyed later in the month it was also found to be working.

11.23 The volume on one vehicle was considered to be slightly loud by the mystery traveller.

11.24 The results of the reliability and accuracy of the visual displays are summarised in Table 31.

Table 31. Reliability and accuracy of the visual displays – survey 2.

	Yes	No	Not Working	Total
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
Able to read visual displays	43 (91.5)	0 (0.0)	4 (8.5)	47 (100.0)
Was the timing of the visual announcements correct	43 (91.5)	0 (0.0)	4 (8.5)	47 (100.0)
Were the visual displays correct	43 (91.5)	0 (0.0)	4 (8.5)	47 (100.0)
Did the audible announcements and visual displays correlate	43 (91.5)	0 (0.0)	4 (8.5)	47 (100.0)

11.25 The visual displays were working for 91.5% of all trips. Analysis of the displays when they were not working indicates the audible announcements were generally not functioning either.

11.26 When the system works it is generally accurate and provides useful information. Whereas the majority of faults reported in the first study required intervention to repair, the faults reported in this study were largely intermittent and the system operated correctly either later in the same or on subsequent journeys. Although an improvement in reliability has been made in the intervening months further work is required to identify the precise reasons for the continuing intermittent failures.

12. Driver Focus Groups

- 12.1 In order to gain the views and concerns of driver's three mini focus groups were conducted with staff (which included four regular drivers and four occasional drivers), unions, and management representatives in the summer of 2001.
- 12.2 They concluded the system is a good idea in principle especially for infrequent users. The drivers commented that it reduces the need for them to inform passengers of the alighting point and the destination of the service. Several drivers commented that passengers who normally asked the driver to let them know when they reach place X, were able to use the Announce system, reducing the need of the driver to remember to make very occasional announcements for such passengers. This reduces the burden upon the driver and facilitates greater concentration on driving the bus.
- 12.3 Drivers commented that the announcements were intelligible and the displays easy to read. One driver suggested that flashing displays should be avoided in case they induced an epileptic fit. The place names chosen were generally fine with a few exceptions:
- To Leeds Pawson Street should also announce Robin Hood school;
 - To Kettlethorpe the high school should be renamed Kettlethorpe Road;
 - Kettlethorpe workings men club should be Hental Lane school/College Annex; and
 - On leaving Leeds bus station the next stop Black Bull St was announced too soon (immediately on exiting the bus station).
- 12.4 When considering the boarding announcement all the drivers reported it to be too slow, taking up to 15 seconds to complete. This often means the vehicle has already left the stop before the boarding announcement finishes. In an effort to minimise the delay several drivers questioned the need to announce the stop name again when the bus stopped. One driver questioned if the external announcement could be switched off if no passengers boarded the bus. In addition, one suggestion was to limit the next stop announcement to main stops only but the visual display to show all stops.
- 12.5 Drivers suggested specific tourist information and attractions may be useful on the service, although they admitted there is a danger of having too many announcements.
- 12.6 In relation to the reliability of the system several drivers reported it to be not working on a number of occasions. This ranged from not working at all to intermittent operation of the audio announcements.

Occasionally the fare stages were set incorrectly at terminus points by the system and there is no manual override.

- 12.7 A number of adverse passenger comments had been made to some drivers regarding the system. It was commented that 90% of passengers were regular users and may not benefit from the system. Drivers stated the system was more suitable to a tourist services. However, drivers appreciated and recognised the benefits of such a system to irregular users or passengers with visual or hearing impairments.
- 12.8 The announcements were found to be distracting by a number of drivers, predominately the occasional drivers. The majority of regular 110 service drivers were able to adjust to the announcements and switch off to a certain extent. Horizontal scrolling of the visual displays was considered to be fine. One driver preferred passengers to ask him to announce their alighting stop where required rather than use the automated system. Some drivers were able to mentally switch off to the sound of the audible announcements but occasionally mistook a passenger saying “next stop” with the automated announcement.
- 12.9 The automatic setting of fare stages was generally welcomed, however it was commented that the speed of ticket issue had reduced, and the number of module failures had increased.
- 12.10 Whilst overall the scheme was thought to be a good idea there were practical issues with the audio aspects. Drivers thought a reduction in the number of announcements made would be beneficial. A minority of drivers queried the justification of the capital investment in the Announce system when there are other more pressing concerns the resources could have addressed.
- 12.11 One driver asked why the scheme had not been advertised more actively particularly to people with disabilities. The driver cited a blind friend who was unaware of the scheme other than through himself.

13. A bus company perspective

The following perspective of the Announce system and potential customer and operator benefits has been provided by Arriva Yorkshire Ltd.

13.1 Surprisingly, the project has now been in place almost two years and is now firmly embedded in the culture of the Company. The early days were characterized by operational and organizational challenges on innovative technology. We have learnt a great deal and the technology has now moved on. So what are our views?

- a) The technology is now robust and developing into flat screen applications that promise another step forward in reliability and passenger information.
- b) The journey experience and professional image has been significantly enhanced by Announce. The bus interior feels more “cared for “ and the system feels like it should always have been there as an integral part of a bus journey.
- c) Given high passenger volumes on the trial service, the system has received remarkably little complaint and, in statistical terms, the number of dissenters is zero.
- d) There has been very little negative feedback from drivers and a positive appreciation of automatic staging.
- e) The quality of journey data (every stop is a stage) has improved and has greatly assisted with customer comments. There is also some evidence that the accuracy of fares being charged has also improved.
- f) Unforeseen benefits have accrued, unrelated to disability issues. There has been growth in evening and weekend patronage, which may be linked to greater confidence in the product and the intended stopping place among occasional travellers. This could be particularly relevant on dark nights in the winter, where it is not always easy to know where to alight. Also, simple directions can be given to visitors – “get off when the bus announces ‘xyz’ stop and I will be waiting”. This is easy information to impart, and has proved beneficial through personal experience.

13.2 Announce, after initial testing, has shown itself to be a robust technology that brings substantial passenger benefits to those with or without disability. All new vehicles purchased by Arriva Yorkshire in 2002 have been factory fitted with either conventional Announce or

TFT Flat Screen technology Announce (for a route that has a significant proportion of customers in the leisure market).

- 13.3 This is a significant investment by Arriva Yorkshire and is a concrete representation of our confidence in the technology and it's ability to bring passenger benefits and growth.

14. Costs of wide scale deployment of the Announce system

- 14.1 The suppliers Hanover Systems have provided the following estimates of costs of large-scale manufacture and installation.

Production quantity costs estimates

- 14.2 The original system cost for the 110 vehicles was about £4000 per vehicle. Hanover Systems have now produced a "Mark II" that integrates and improves two of the units (see below). This new system has a reduced cost for double deck vehicles of about £2600 in small quantities. In quantities of 3500 per annum, this could reduce to £1850.
- 14.3 For single deck vehicles this equates to £1975 in small quantities and £1425 in quantities of 3500 per annum.
- 14.4 Given guarantees of quantity, a "Mark III" Announce system could be produced which integrates all functions into a single unit. The estimate of the 3,500 per annum quantity price for such a unit is £1450 for double deck vehicles and £1025 for single deck vehicles.
- 14.5 All prices exclude fitting, which can vary by vehicle type due to the difficulty of fitting such systems especially retrospectively. Estimates for the cost of fitting are £450 per double deck vehicle and £350 per single deck vehicle. These costs may vary by £100 either way for different types of vehicle.

Integration with "Bus Stopping" function

- 14.6 An input could be taken from the "Bus Stopping" bell push mechanism to the Announce system. The message "Next Stop Outward Church" for example would change to "Stopping at Outwood Church". This can be implemented with a simple software update (and wiring addition) as the Announce system has spare 24V digital inputs. This would not affect the cost projections given above and may enable the existing Bus Stopping sign to be dispensed with reducing costs by a further £100-£150 per vehicle
- 14.7 However the provision of a Bus Stopping sign is currently a legal requirement, and the provision of scrolling text display as above may fall short of these requirements.

System Development

- 14.8 Recognising the need for improvement and with Arriva purchasing new vehicles for the 110 route we have produced an "Announce II" system that is being installed in these new vehicles. We will also be upgrading the equipment fitted to the existing vehicles when they are transferred

to a new route. The functionality of the new version is the same but it integrates hardware, reduces costs, and should be easier to support.

- 14.9 Initial tests performed using this system on the new vehicles indicate a much faster response of announcements at stops. For example the "At Stop" announcement is generally complete before the doors have fully opened.
- 14.10 We have included software in the new system to prevent the external announcement if the doors close before the announcement is made (for example as might happen if a single passenger alights quickly) - however we not been able to open and close the doors quick enough for this to occur! This should resolve the external announcement timing problem exhibited by the current system.

Integration with RTPI Systems

- 14.11 The possibility exists for vehicles fitted with the Announce II system to be integrated with an RTPI system at minimal cost. For example a GPRS module can be fitted allowing reporting of AVL status at 30second intervals using UDP data packets. The cost of such a module, cable, internal antenna, and fitting is less than £250 per vehicle. Recent competition amongst telecom operators has resulted in running costs being drastically reduced.
- 14.12 A low-cost hands-free driver/depot voice communications capability and emergency alert can also be added to such a system.
- 14.13 An increasing number of buses are being equipped with real time passenger information systems. An extension of these systems to provide next stop displays and announcements is also possible and may reduce costs further.

Maintenance

- 14.14 Maintenance costs fall into two areas:
 - a) Ongoing system maintenance to support route changes, for example: change of voice files due to stop name changes; new voice files and stop location additions due to new stops; location updates due to stop location changes.
 - b) Exchange & repair due to hardware failures.
- 14.15 Under item a) Hanover will normally provide the tools and training to enable a suitably qualified representative of the bus operator's staff to perform system configuration updates and changes. In this respect it is no different to the work an operator has to do to maintain fare files and schedules.

14.16 Under item b) Hanover provides a two year return to factory warranty for this type of equipment. For the third and subsequent years we estimate a return to factory maintenance charge will be in the region of 7.5% of the purchase price per annum.

15. Cost Benefit Analysis

- 15.1 Based on the above costs the estimated increase in patronage required to recover the whole life cost has been calculated. This is summarised in Table 32.
- 15.2 The figures have been based on the above costs for double and single deck vehicles including installation costs and an annual maintenance cost equivalent to 7.5% of the initial capital cost using a 6% discount rate.
- 15.3 Based on an average fare of 80p per journey between 701 and 425 additional passengers per annum are required to recover the cost of the investment over a 10 year period for a double deck vehicle. For a single deck vehicle this reduces to between 534 and 306 passengers per annum. This depends on the economies of scale achieved by large scale manufacture.
- 15.4 In the particular case of the bus service used for this project this would equate to an increase in patronage of approximately 0.2% per annum, assuming that economies of scale can be realised.

Table 32. Total cost over a 10-year period per bus and annual patronage required to recover costs.

Announce Version	Capital cost	Total cost over 10 years	Additional annual patronage per bus
Double Deck Vehicles			
Mark 1 pilot scheme	£4000	£6108	1037
Mark 2 small numbers	£2600	£4128	701
Mark 2 bulk	£1850	£3067	521
Mark 3	£1450	£2501	425
Single Deck Vehicles			
Mark 2 small numbers	£1975	£3144	534
Mark 2 bulk	£1425	£2366	402
Mark 3	£1025	£1800	306

16. Conclusions

- 16.1 The Announce system has been well received by all groups including passengers, people with sensory impairments, driving staff and the bus company.
- 16.2 Table 33 summarises the pre and post scheme passenger questionnaires in terms of the helpfulness of the information.

Table 33. Percentage of passengers rating the system very helpful or helpful.

% Ranking it Very helpful or helpful	Boarding Audio Announcement	Internal Next Stop Audio Announcements	Internal Next Stop Visual Display
Pre Scheme	73	80	80
Post Scheme All users (110 Service)	44	60	62
Post Scheme Infrequent users (110 service)	48	68	75
Post Scheme (Unfamiliar Service)	86	93	93

- 16.3 The analysis showed that infrequent travellers benefited more from the system than frequent travellers. Having experienced the system 93% of passengers in the post scheme survey stated that they would find the system useful when travelling on an unfamiliar service. The Announce system may therefore give people the confidence to use public transport for occasional journeys in less familiar areas rather than increasing commuter journeys or regular trips. By inference this may also contribute to a wider use of public transport by infrequent or non-users.
- 16.4 The surveys were conducted during the summer where the long hours of daylight provide for easier determination of the alighting stop by passengers. The benefits of the Announce system may be greater in the dark winter evenings to provide confirmation of the alighting stop to all passengers.
- 16.5 An analysis of passenger complaints showed that the number of complaints regarding the 110 service has increased immediately following the installation of the Announce system with 13 complaints received in the 3 month period following its introduction. These included two complaints from passengers with visual or hearing impairments who complained that the Announce system was not

working on the bus they had recently travelled on. Five commendations were also received in this period. Only one further complaint was received in the following 6 months.

- 16.6 The following conclusions can be drawn from the DDA focus group:
- both visual and hearing impaired passengers considered it to be an excellent idea;
 - areas where the system performed well include the clarity of the voice used for the internal announcements, the concise nature of the information conveyed on the announcements and displays, and the clarity of the visual display; and
 - areas for improvement include, the timing of the external announcement, the volume of the internal announcements, additional visual displays, additional internal and external speakers, and improved reliability.
- 16.7 A number of technical difficulties had been experienced at the beginning of this study resulting in equipment not working on a number of occasions. However as a result of remedial action only a few intermittent faults have recently been experienced.
- 16.8 General conclusions from the mystery traveller surveys are detailed below:
- the external announcement is only audible for 77% of boardings, largely due to position of the boarding passenger in the queue or the vehicle already being at the stand prior to the arrival of the passenger;
 - the next stop announcements and visual displays were working for approximately 92% of passenger boardings;
 - when working the next stop announcements are clearly audible; and
 - when working the next stop visual displays were correct for all the trips.
- 16.9 Analysis of patronage figures indicated that patronage on the 110 service had not declined as rapidly as on other services operated from the same depot. This analysis does not conclusively prove patronage generation or improved retention as a result of introducing Announce as it could not rule out other influences over the year, such as local rail strikes, abstraction resulting from the introduction of a new limited stop service, and the greater economic prosperity in Leeds.
- 16.10 However when compared to other services the greater retention of elderly and disabled passengers on the 110 service and the greater increase in patronage on weekday evenings and Sundays, characteristic of occasional journeys, suggest that the Announce system may have been a contributing factor.

- 16.11 The Announce system has proved to be successful in increasing passenger information and reducing passenger uncertainty. The helpfulness of the information appears to satisfy consumer requirements and passengers with a hearing or visual impairment. Remedial work is required to improve the reliability of the equipment and the external boarding announcement has been re-examined. The driver focus group revealed no major concerns and there have been very few written complaints.
- 16.12 Reductions in cost of the equipment can be achieved by integrating all functions into a single unit and from mass production. The manufacturers estimate that the Announce equipment can be produced for less than £1500 for a double deck bus and for about £1000 for a single deck vehicle.
- 16.13 This equates to approximately 1% of the cost of a new bus, depending on vehicle type. Based on an average fare of 80p per journey approximately 300 additional passengers per annum are required to recover the cost of the investment over a 10 year period for a single deck vehicle. In the particular case of the bus service used for this project this would equate to an increase in patronage of approximately 0.2% per annum.
- 16.14 A Mark II Announce system has been developed by Hanover Systems and included in a number of new build vehicles. A number of improvements have been made based on the feedback from the pilot scheme. The difficulties experienced in retro fitting the equipment to existing vehicles have been overcome by including the system in new build vehicles.
- 16.15 Difficulties with retro fitting the Announce system resulted in the external speaker having to be placed on the inside of the vehicle in the door well. The installation of the Announce system during the building of the vehicles allowed this speaker to be placed externally improving the audibility and reducing the distraction of this announcement being heard inside the vehicle. The external announcement also commences sooner due to redesign of the system and placement of the door sensor in a position to trigger the announcement prior to the doors fully opening.
- 16.16 Additional speakers have been included inside the vehicle and placed on both sides of the saloon rather than on one side as in the original pilot. Flat panel TFT screens have been included on some new vehicles to allow the display of additional information including linear route maps.
- 16.17 Arriva Yorkshire have been convinced by the benefits of Announce system during the pilot and believe it has contributed to patronage growth and retention on the 110 service. This conviction has

convinced them to invest in the Announce system for all new vehicles delivered in 2002 including a number with flat panel screens.

- 16.18 It is likely that the benefits may be best realised if the Announce system were to be deployed on a wide scale basis rather than in limited numbers on specific corridors in order to elevate the information standards in public transport which can be a barrier to usage, and to give intending passengers the confidence that this facility would be available on their journey.
- 16.19 The greatest benefits of any wide scale introduction of such a system may be for improving the confidence of people who are less familiar with the service or area they travelling in, which in turn may assist in encouraging modal shift in favour of public transport.

Appendix 1

Pre Scheme Questionnaire

110 Service User Survey

Date.....Time.....

Hello, I am carrying out a short survey of passengers who use this service. The results will help Metro and Arriva to improve the service and level of passenger information. Could you spare 5 minutes to answer a few questions please?

1. Where did you get on this bus?

- | | | | |
|---------------------------------------|---|---|--------------------------------------|
| <input type="checkbox"/> 1 Hall Green | <input type="checkbox"/> 2 Crigglestone | <input type="checkbox"/> 3 Kettlethorpe | <input type="checkbox"/> 4 Sandal |
| <input type="checkbox"/> 5 Belle Isle | <input type="checkbox"/> 6 Wakefield | <input type="checkbox"/> 7 Outwood | <input type="checkbox"/> 8 Lofthouse |
| <input type="checkbox"/> 9 Hunslet | <input type="checkbox"/> 10 Leeds | <input type="checkbox"/> 11 Other..... | |

2. Where are you going to get off?

- | | | | |
|---------------------------------------|---|---|--------------------------------------|
| <input type="checkbox"/> 1 Hall Green | <input type="checkbox"/> 2 Crigglestone | <input type="checkbox"/> 3 Kettlethorpe | <input type="checkbox"/> 4 Sandal |
| <input type="checkbox"/> 5 Belle Isle | <input type="checkbox"/> 6 Wakefield | <input type="checkbox"/> 7 Outwood | <input type="checkbox"/> 8 Lofthouse |
| <input type="checkbox"/> 9 Hunslet | <input type="checkbox"/> 10 Leeds | <input type="checkbox"/> 11 Other..... | |

3. Which of the following best describes the purpose of your journey today?

- | | | |
|---|--|-------------------------------------|
| <input type="checkbox"/> 1 Work/Business | <input type="checkbox"/> 2 Education/Training | <input type="checkbox"/> 3 Shopping |
| <input type="checkbox"/> 4 Leisure/social | <input type="checkbox"/> 5 Other e.g. doctors..... | |

4. Could you have made this journey by car?

- | | | |
|--------------------------------|-------------------------------|---------------------------------------|
| <input type="checkbox"/> 1 Yes | <input type="checkbox"/> 2 No | <input type="checkbox"/> 3 Don't know |
|--------------------------------|-------------------------------|---------------------------------------|

5. How often do you use the 110 service?

- | | |
|--|---|
| <input type="checkbox"/> 1 More than 3 days per week | <input type="checkbox"/> 4 2-3 days a month |
| <input type="checkbox"/> 2 2-3 days per week | <input type="checkbox"/> 5 once a month |
| <input type="checkbox"/> 3 once a week | <input type="checkbox"/> 6 infrequently |

6. How do you rate the following aspects of the 110 service?

	<i>Excellent</i>	<i>Good</i>	<i>Acceptable</i>	<i>Poor</i>	<i>Very Poor</i>
a) Information at the bus stops	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
b) Punctuality of buses	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
c) Clarity of bus number and route	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
d) Ease of boarding the bus	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
e) Friendliness and helpfulness of drivers	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
f) Cleanliness of buses	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
g) Comfort of seats	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
h) Smoothness of ride	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
i) Value for money	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

The following questions relate your use of local bus services in general.

7. When travelling by bus how useful would you find some of the following possible improvements?

When planning your journey

a) Increased publicity of services

Very helpful	Helpful	Indifferent	Not helpful	Don't know
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

b) Improved internet based journey information

<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------

At the bus stop

c) Printed timetable information at every bus stop

<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------

d) Up to the minute displays showing when the next bus will come

<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------

e) Up to the minute audible information of when the next bus will arrive

<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------

When the bus arrives at the bus stop

f) Audible announcement of the service number and destination

<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------

When on the bus

g) Audible announcements of the next bus stop

<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------

h) A visual display showing the next bus stop

<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------

8. Would better information encourage you to use buses more often?

Yes No Don't know

9. Do you have access to the internet?

Yes No Don't know

10. What other improvements to information on bus services would you find useful?

.....

Gender Male Female

Age Under 16 16-25 26-45 46-60 60+

Which of the following best describes your ethnic origin?

Black (Caribbean) Black (African) Black (Other) Indian
 Pakistani Bangladeshi Chinese Asian (Other)
 White Other

Do you have any long term illness, disability or infirmity which makes it more difficult to use local bus services?

Yes No Don't know

Thank you for completing this survey.

Appendix 2

Post Scheme Questionnaire

110 Service User Survey

Date.....Time.....

Hello, I am carrying out a short survey of passengers who use this service. This survey is designed to assess passenger views of the service and the audible and visual passenger information. The results will help decide whether similar passenger information is provided on other services in the future. Could you spare 5 minutes to answer a few questions please?

1. Where did you get on this bus?

- 1 Hall Green 2 Crigglestone 3 Kettlethorpe 4 Sandal
- 5 Belle Isle 6 Wakefield 7 Outwood 8 Lofthouse
- 9 Hunslet 10 Leeds 11 Other.....

2. Where are you going to get off?

- 1 Hall Green 2 Crigglestone 3 Kettlethorpe 4 Sandal
- 5 Belle Isle 6 Wakefield 7 Outwood 8 Lofthouse
- 9 Hunslet 10 Leeds 11 Other.....

3. Which one of the following best describes the purpose of your journey today?

- 1 Work/Business 2 Education/Training 3 Shopping
- 4 Leisure/social 5 Other e.g. doctors.....

4. Could you have made this journey by car?

- 1 Yes 2 No 3 Don't know

5. How often do you use the 110 service?

- 1 More than 3 days per week 4 2-3 days a month
- 2 2-3 days per week 5 once a month
- 3 once a week 6 infrequently

6. How do you rate the following aspects of the 110 service?

	<i>Excellent</i>	<i>Good</i>	<i>Acceptable</i>	<i>Poor</i>	<i>Very Poor</i>
a) Information at the bus stops	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
b) Punctuality of buses	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
c) Clarity of bus number and route	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
d) Ease of boarding the bus	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
e) Friendliness and helpfulness of drivers	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
f) Cleanliness of buses	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
g) Comfort of seats	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
h) Smoothness of ride	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
i) Value for money	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

7. When travelling on the 110 service how helpful do you find;

- a) The announcements before boarding the bus
- b) The next stop audio announcement
- c) The next stop visual displays

Very helpful	Helpful	Indifferent	Not helpful	Don't know
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

8. How do you think the visual and audible announcements could be improved?

.....

.....

9. If you were travelling by bus in an unfamiliar area how helpful would you find;

- a) The announcements before boarding the bus
- b) The next stop audio announcement
- c) The next stop visual displays

<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

10. Is the boarding announcement;

Very loud Loud OK Quiet Very Quiet

11. Is the next stop announcement;

Very loud Loud OK Quiet Very Quiet

12. Are the audible announcements clear and understandable?

Yes No Don't know

13. Is the next stop display easy to read?

Yes No Don't know

Only ask question 14 if the answer to question 12 or 13 is 'NO'

14. How can they be improved?

.....

.....

Do you have any disability, which makes it difficult to use local bus services?

Yes No Don't know

If yes is this a: Hearing Visual Other

Gender Male Female

Age Under 16 16-25 26-45 46-60 60+

Which of the following best describes your ethnic origin?

Black (Caribbean) Black (African) Black (Other) Indian

Pakistani Bangladeshi Chinese Asian (Other)

White Other

Thank you for completing this survey.

Appendix 3

Reliability and Accuracy Survey Sheet

110 Bus Service: Reliability and Accuracy of Audio and Visual Equipment Surveys 2001

Date.....

	Trip Number 1	Trip Number 2	Trip Number 3
Boarding Bus Stop			
Boarding Time			
Fleet Number			
Able to hear announcement when boarding			
Was the timing of the boarding announcement OK			
Was the boarding announcement correct			
How full or empty was the bus			
Lower or Upper Deck			
Seating Position			
Able to hear Audio announcements			
Were the Audio Announcements too loud			
Was the timing of the audio announcements OK			
Were the Audio Announcements Correct			
Able to read Visual Displays			
Was the timing of the visual displays OK			
Were the Visual Displays Correct			
Was the information on the audio announcements and visual displays the same			

