# REACH112

REsponding to All Citizens Needing Help

## Project Evaluation

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STATEMENT OF ORIGINALITY

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1. Summary

REACH112 is a project of implementation of an innovative telecoms solution based on the European standard of Total Conversation. This implementation is designed to make telephony accessible to all those people who have difficulty with voice phones. This is at least 3.5 million people across the EU. REACH was set up in five countries with over 7,500 registered users. In REACH112 users are able to call each other (in video, voice and text mode), reach voice phone users through relay services and make calls directly and through relay to emergency service centres. The service has been developed on all platforms: videophones, textphones, PC, Mac, notebooks, tablets and smartphones, as well as simple web browser plug-ins.

Evaluating a project such as REACH112 is a complex operation requiring multiple methodologies and interaction with all 20 partners in six countries. The extent of the work has been considerable covering actions to recruit and train users throughout the value chain (to the specification of the Description of Work), to deliver appropriate telecoms technology (for registration, communication, tracking and monitoring) and evaluation of users engagement against the targets set and of the performance of the system. This analysis of progress collates extended data and offers evaluation of the programme as a whole. It is required to integrate the progress across all previous deliverables and to offer a way forward for future development in Europe.

The project can be examined in respect of the objectives originally set in the Description of Work but it also has to be considered in social terms, as it constitutes such an extensive set of goals with a diverse population in variable economic circumstances.

Data supplied by partners has been analysed and is presented country by country but also as an integrated application of a new telecoms infrastructure.

In terms of the global objectives for access as set in the original contract, the project can be seen to have achieved these – users can call each other, can reach relay services and can have access to emergency services. In terms of the study of process in implementing a new form of telecommunication and maintaining it in a marginalised community, the project has learned a great deal.
Analysis of usage of the project service required examination of almost one million consumer data records, for Total Conversation calls. Almost 125,000 relay calls were made and analysed. Cost analysis was carried out in the context of a project worth over 8 million euros.

Targets set for traffic volumes in person to person, person to relay and person to emergency services have been shown to be over-optimistic in some countries but are under-estimates in other areas. The difficulty of predicting such an intervention two years in advance of its realisation is apparent. It is also clear that different national pilots have worked in different ways experiencing different problems. The results tell us clearly that such an initiative has to be embedded both in the aspirations of the community and in the social policies of that region or country.

We have collected data of self-analysis by partners, relating to the policy changes in each country, data from individual interviews, from structured user trials and from focus groups of all users – Deaf, hard of hearing, relay agents and emergency service call takers. We have also collected and analysed case studies. Data collected from users says clearly that the developments are welcomed, life-changing and liberating. There is very little question in the minds of Deaf end users that these services are required. Other users such as relay agents and emergency service call takers have been positive about the developments and have embraced the training needed in order to provide the service.

A cost benefit analysis was carried out although there are some difficulties in both identifying the precise costs and measuring the benefits quantitatively. On the basis of this analysis, it can be seen that the costs of running such a service per person and per month, are not inordinately high and within the usual costs of mobile phone contracts. As more users join, the per-person cost reduces although there is less effect in the provision of relay service.

Taken as a whole the project has been met with great enthusiasm. It has overcome major obstacles. It has evolved with the technological environment and has produced solutions which enthuse and encourage the inclusion of this group of people who have hitherto been set aside from the telecoms revolution.

The programme evaluation is the basis for the exploitation of the concept across Europe and points in the direction of next generation telephony services and explicitly, next generation emergency service provision.

Deliverable D7.1 v1.6b
1. The Starting Point

“REACH112 aims to make the telephony system more inclusive for people with disabilities and more valuable to all people by enabling new communication modalities. REACH112 envisages the implementation of a universal IP-based Total Conversation (TC) service for user interaction and contact with Emergency Services. The end users are mainstream users of telecommunications (the general public) but REACH112 has a special focus on those who are currently disabled by the form of this access. REACH112 addresses this primarily by enabling other modes of communication in parallel with speech. In REACH112, the aim is to create a multi-country pilot of Total Conversation for person to person (P2P) interaction and for contact with emergency services (ES) directly by disabled users and also through relay services. Put very simply, REACH112 offers a new telephone service which supports video, voice and text. REACH112 also addresses interoperability issues with emergency services ensuring they are accessible to disabled users.” (Final proposal to EC, September 2008)

The goal was set by the EC tender and the partner response was comprehensive and direct: Five pilots of TC encompassing all element of the value chain to demonstrate P2P interaction, P2Relay transactions and P2emergency services (through relay and directly).

2. The REACH112 context

In this workpackage (WP7) the whole of this pilot programme is assessed. All elements of the objectives are meant to have been realised; all elements of the value chain from disabled end users to service providers to emergency service agents are meant to be involved. The pilots are implemented (WP6).

This deliverable is meant to provide the basis for the measurement of this engagement and to provide indicators of its success. It is wide ranging; it sits alongside WP6 and provides the data collection and analysis which determines the success of the pilot. In effect, WP7 provides the material to allow funders to determine the success of the project as a whole.

Programme assessment with this complexity is a large undertaking and the following sections set out the approach to this. We have taken a bigger picture perspective here in order to understand how the evaluation takes place and the components of change which are to be monitored and on which our reports are to be based.

The project was sited in five countries.
There have been significant changes to the software and hardware available (as well as to the economic climate) during the project time frame. While in July 2009, the project had mostly fixed line videophones to work with, by July 2012, the most common and effective platform for the end user was a tablet or a smartphone. The rise of the iPhone and iPad and the ubiquity of the Android operating system has created mobility in users to an extent which could have been discussed at the start but would not have been thought to have created such an impact. Software had to be adapted and implemented on windows (for notebooks, netbooks and standalone PCs), for web browsers, and for an evolving Android operating system and the vagaries of built in cameras. The fact that the technical product now feels stable and is useable on all platforms is a testimony to the background development which has continued through the period. More detail on the implementation in each country can be found in Deliverable D6.2.

The economic climate however, has not been manageable in this period. Partners have had to leave the project and significantly, the scope for exploitation was significantly reduced and central government funding for the longer term sustainability of Total Conversation all but disappeared. This was particularly damaging to the PSAP involvement since their governance is managed by public authorities. In the UK, the participating PSAPs lost 25% of their staff in the time period.

In France, the involvement of government meant that the sequence for development of the project was changed and the time scale for implementation of a Total Conversation solution was altered – in effect, delaying it considerably (whilst apparently positively funding it in future).

3. Progress on Objectives and Targets

The work of the project has been guided by the contracted description of work. There were six agreed objectives (Table 3.1)
<table>
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<tr>
<th>Objective</th>
<th>The piloted solution should address the following aspects:</th>
<th>Societal/technological issue</th>
<th>Expected Impacts</th>
<th>Means to sustain impact/dissem/use plan</th>
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<tbody>
<tr>
<td>OBJ1 Validate the technical and operational deployability of Total Conversation and RealTime Text services</td>
<td>Deployment/validation of the service setup of Total Conversation</td>
<td>Creation of user base to allow person to person calling</td>
<td>Improved quality of life, ease in workplace.</td>
<td>Show to mainstream user to create interest. Exploitation plan WP8</td>
</tr>
<tr>
<td>OBJ2 Validated technical and operational deployability of TC in calls via Relay services</td>
<td>Create or validate existing relay services for TC terminals</td>
<td>Relay services integrate users in society</td>
<td>Open access to satisfy equality goals.</td>
<td>Governmental support of relay services; models for commercial sponsorship</td>
</tr>
<tr>
<td>OBJ3 Validate deployability of access to 112 emergency services</td>
<td>TC technology link to Emergency Services systems. Technical and operational adjustments.</td>
<td>Vital Premier service aspiration for marginalised community</td>
<td>Change in access to emergency</td>
<td>Governmental support</td>
</tr>
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<td>OBJ4 Validate efficiency, usability and user satisfaction of TC for person-to-person and Emergency calls.</td>
<td>Validate Total conversation and emergency services in pilot trials and evaluate user experience.</td>
<td>Major telecoms change to be assessed by community</td>
<td>Raised expectations and evidence of satisfaction; likely requirement for sustainability</td>
<td>User perception of value to lead to paid for service</td>
</tr>
<tr>
<td>OBJ5 Validate sustainability and replicability</td>
<td>Validate sustainability of the deployment across the EU of interoperable total conversation emergency services accessible to all.</td>
<td>Need to change governmental perceptions and to use existing funding mechanisms</td>
<td>Raised awareness of need; commitment from public services to support</td>
<td>Use of existing public and commercial support to ensure continuation</td>
</tr>
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<td>OBJ6 Validate accessible methods for distributing emergency alerts to groups of users.</td>
<td>Validate an accessible Emergency Alert system by sign language and text to a selected group.</td>
<td>Multi-cast emergency notification usually delivered through television; alternatives to be explored for TC</td>
<td>One solution of alerting trialled.</td>
<td>Suggested developments for other countries.</td>
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The status of these objectives is as follows

Obj 1: This has been achieved and the ‘blueprint’ for service development is set out in Deliverable D3.2; user engagement with the service is detailed in D6.2 and also in D7.1 (this paper).

Obj 2: this has been achieved in all pilots. See Deliverables D4.2 and D 6.2.

Obj 3: This has been achieved in Sweden although only for the duration of the pilot. In France and the UK, the service was tested and detailed plans formed for a universal service. In the UK this is already available through text. In the Netherlands, emergency service access was possible directly through text during the project. A significant number of emergency service calls were reported (probably proportionate to the numbers of users and the time scale of the pilot). However, the major lesson learned here was of the complexity of the emergency service operation and the difficulty in creating innovation when resilience is seen to be at stake.

Obj 4: User aspirations were measured by qualitative data collection in Sweden, France and the UK. Not surprisingly, the overwhelming response was of the appropriateness and timeliness of the initiative. Questions and complaints mostly centred on the uncertain future of the service, particularly the connection to emergency.

Obj 5: Despite energetic promotion in each pilot, none of the services created specifically for REACH112 continue in operation immediately at the end of the project. In Sweden, all person to person services continue to function; already existing relay services continue to function for all aspects but only a limited hours service for emergency. In the UK, all created person to person services continue to run; there is a continuing 24 hour text relay service which encompasses contact with emergency services; funding is sought for the sign language relay service. In the Netherlands, current development for further Total Conversation access to the emergency service has been suspended. Relay services for video and text will be implemented and emergency access will most probably done through the relay service. In France, REACH112 has been overtaken by a government programme which runs to a different timescale, although the achievement of REACH112 included demonstrated call taking by Deaf staff as well as relay operation. In Spain, the text relay component continues to function as does the person to person text service although in both cases with very low volume.

Exploitation and confirmed sustainability remains an issue in all pilots.
Obj 6: although a sign language fire service safety campaign was demonstrated at the start of the project, this was a website demonstration and does not generate the immediacy of emergency announcements. Total Conversation as a technology is not designed for one to many (thousands) communication and since the majority of users have devices which are often switched off, the search for a broadcast mode solution turns out to be premature and was not a priority of the emergency services partners.

Data on these objectives is embedded in the following chapters where both quantitative and qualitative data is reported.
The remainder of this document considers the impact of the programme as a whole and examines its potential for future implementation.

To the extent that the project has attempted all that it envisaged and that reports have been supplied as planned, it has been successful. However, we need to learn more from the great extent of data collected.
4. Impact Evaluation and Project Evaluation

The data collection in WP7 had to provide a picture of the progress of each pilot, demonstrate the inter-operability (ie the European aspect to the work) and to provide evidence of the success.

1. The specified project objectives

We will refer to the objectives as necessary in considering the programme which has been implemented but it will become obvious quickly that the objectives are high level and much of the concern of the users relates to the implementation itself.

We have briefly analysed the completion of the objectives and indicated the progress. However, the main part of this report concerns achievements at the personal, service and policy levels and it is these which we pursue in greatest detail.
5. Analysis of Total Conversation Traffic

Network-level data has been provided from TC servers in each pilot. These are linked to the registration of users and the management of the connections. The approach assumes that the control of the TC server is in the hands of the technical partner in that pilot. All data was presented in the form of monthly reports from partners.

We could make no assumptions on the availability of voice data which is normally recorded by the telecoms operator or the voice component of a relayed emergency call, which may or may not be accessible to REACH112 partners.

The purpose of the data collection was mainly to aggregate the traffic information and to demonstrate trends and progress over the period of the pilot. These are monitored against the targets in Appendix 7 of the DoW for each partner but also allow more detailed analysis of the pattern of growth over the whole project.

In order to make sense of the data recording of call flows, we need to refer to the architecture diagram of their services as set out in D3.2 and D6.2.

Only in this way is it possible to understand the cultural, social and technical differences which affect the nature of the user-service provider relation. It has been clear from preliminary discussions that partners record and store data differently and may have access to more or less depth in the data. Certain data may be un-analysable due to personal data protection conditions in each Member State; this is mentioned in the Ethics section of the Code of Practice (D6.0).

1. Analysis of Data

The data points were collected according to an agreed specification (Appendix 1) and this was clarified in a subsequent document – what is a call? (Appendix 2).

2. Traffic Analysis

It is important to recognise here that we are in uncharted waters in terms of what might be expected of call patterns. We are not aware of any studies of Total Conversation use, nor of videophone use in a large scale roll-out like this. We should see these figures as a baseline.
but one which may be informative when we consider the different stages of development of the different markets.

The analysis presented here examines each pilot in turn and then makes comparison across the pilots.

3. Sweden

This is the most mature market place of all the pilots where there has been a network of videophone users for at least ten years and where a video relay service has existed also for nearly the same time. This is reflected in the stability of the overall monthly call figures.

Figure 5.1: Headline Figures – TC calls in Sweden

Figure 5.1 shows overall a high volume of calls and two peaks in call attempts in September and November which is hardly reflected in the successful call figures. The percentage of successful calls seems low – ie the number of people who continued to interact with the other person after 10 seconds. In the last month of the pilot, this ‘success rate’ was 50%.

The target total number of calls was 350,000 and this was comfortably exceeded for attempted calls (672,587) but slightly underachieved for the more stringent call measure of ‘over 10 seconds’ (292,436)
Figure 5.2 shows the calls per user which give a better indication of extent of use. These seem to reflect the maturity of the market with a high level of use.

*Figure 5-2 TC calls made by users each month in Sweden*

The figures are relatively stable with users making around 20 calls per month (range 13 to 24) on average. It seems likely that there are wide variations between users. The peak in September and November is probably a distortion from a large number of test calls which would be of shorter duration.

The numbers of registered users is of importance to the targets for REACH112 (Figure 5.3). The target number of users was 3,000 and by the end of the pilot, had reached a plateau of 97.43% of the target. This may represent saturation of the market for this product but there are also other providers of Total Conversation registration in Sweden; this may not be the absolute ceiling.
An important component of REACH112 concerns the numbers of relay calls made. These are a sub-set of the total calls made. The data (Figure 5.4) shows increases in calls to relay in certain months and an up-tick in the last month which shows a 37% increase on the previous month’s calls and a 47% increase on the average of the previous three months.
The target number of relay calls for the pilot was 175,000 and the achieved number was 50,301 – 29%.

In terms of the extent of use, we can see (Figure 5.5) that users made around 4 calls per month with an uptick in the final month.
Calls to another person were usually much longer than calls to relay (Figure 5.6), perhaps illustrating a more social use of Total Conversation and certainly person to person calls were more than relay calls by a ratio of 5 to 1.

Figure 5.-5 Average number of relay calls per active user Sweden

Figure 5.-6 Duration of relay and p2p calls (seconds) Sweden
The number of calls made to emergency services was less than the target (30 as compared to the target of over 300) although the task of dealing with emergency call centres has proved to be very complex. It is also the case that if there are only 1,000 active users, then the number of actual emergencies in a single year will be very low. If the majority of endpoints are fixed, then the scope for emergency use will be further reduced.

A total of 5,904 videomail messages were left during the pilot – although this service was not available to all users through the duration of the pilot.

A total of 243 transnational calls were made.

We have also considered the time of day when calls were made. This can be seen in Figures 5.7 and 5.8. These distributions look identical although there is some slight variation in numbers. There are curious drops in calls between 13.00 and 14.00 and between 18.00 and 19.00.

*Figure 5.7: Call distribution for January 2012*
Average duration of the calls tends to be consistent throughout the day while it peaks early in the morning perhaps reflecting the fact that people may be up early in the morning (Figure 5.9).

*Figure 5.9: Average duration of calls by time of day (minutes) Sweden*
Overall the pattern seems to support the view that Total Conversation services are well established and that the growth is levelling out. Developments are most likely to be in offering new services and certainly in the provision of direct access to 112.

4. UK

In the UK, the Total Conversation network did not exist at the start of the project and there was no TC relay service until the beginning of the pilot. The user base had to be grown from almost zero during the project. The development is then of some importance in understanding how a community accepts new technology and how it uses it.

*Figure 5.10 Headline figures TC calls in UK*

![Figure 5.10 Headline figures TC calls in UK](image)

Figure 5.10 shows volume of calls with three peaks in call attempts in July, November and February which is reflected by the successful call figures. The percentage of successful calls is relatively high—ie the number of people who continued to interact with the other person after 10 seconds. In the last month of the pilot, this ‘success rate’ was 77%.

The target total number of calls was 115,000 and this was not achieved for attempted calls (49,127) nor successful calls - “over 10 seconds’ (40,268). This reflects an over-estimate of
the take-up and subsequent use by members of this community. In reality, since there was no service at the start, it was hard to be accurate in projections of call volume.

Figure 5.11 shows the calls per user which give a better indication of extent of use. These seem to reflect the maturity of the market with a high level of use.

*Figure 5.11 TC calls made by users each month UK*

![Graph showing calls and successful calls over time with May-Jun data highlighted in blue and Jul-Aug data in red.](image)

The figures start at a higher level with the early adopters making many more calls and this appears to reduce to around 12-15 per month for calls over 10 seconds in duration. There is a wide variation among users.

The numbers of registered users is of importance to the targets for REACH112 (Figure 5.12). The target number of users of 1,200 was easily surpassed by the end of the pilot, 445 over target. This figure continues to grow after the end of the project as the Total Conversation service continues to be offered. Major growth is seen among those who are Deaf sign language users as predicted (from 371 to 1024 May 2011 to May 2012) and also among those who have a physical disability (70 to 241). The proportion of those who are undeclared (many of whom will be hearing people, drops from 23% at the start to 11% in May 2012.

*Figure 5.12 Characteristics of Registered Users UK*

![Pie charts showing user characteristics for May 2011 and May 2012 with a clear increase in Deaf signers and a decrease in undeclared.](image)
As in other pilots, the numbers who become regular users of the TC service is rather less than the numbers who register in the first place (Figure 5.13). This almost certainly reflects the lack of familiarity with the remote communication medium. This aspect will be discussed later.

Figure 5.13 Registered users and active users in UK

An important component of REACH112 concerns the numbers of relay calls made. These are a sub-set of the total calls made. The data (Figure 5.14) shows increases in calls to relay in certain months and an up-tick in the last month which shows a 37% increase on the previous month’s calls and a 47% increase on the average of the previous three months. Users report satisfaction with the relay service and for many the advantage of Total Conversation is the availability of relay services. Chapters 11 to 13 provide the user perspectives and experiences.
which may provide further explanation of the patterns and particularly the valuation of the relay component.

*Figure 5.14: Calls to the relay service UK*

The target number of relay calls for the pilot was 14,400 and the achieved number was 15,113 which is 5% over target. Given the low starting point, the amount of relay calls increased nearly four fold in the time period of the pilot.

In terms of the extent of use, we can see (Figure 5.15) that users gradually made more calls to relay as the extent of the service increased and the coverage in terms of interpreters expanded. Relay calls peaked at nearly seven calls per user.
An interesting aspect to consider is the total length of relay calls (Figure 5.16) as this is often used as a cost driver or planning statistic.

**Figure 5.15: average number of relay calls per active user UK**

**Figure 5.16: Relay call minutes per user UK**
In the UK, an average figure which is often quoted for planning purposes is 30 minutes per month. In the REACH112 service this amount would have contained the overall use – although one must remember the service was only in operation during working hours.

Calls to another person were usually longer than calls to relay and this gap widened through the pilot. It perhaps indicates an increase in social use of Total Conversation.

*Figure 5.17: Duration of relay and p2p calls (seconds) UK*

The number of calls made to emergency services was low because of the complications in providing training to relay agents to the required level and thereby the service provision was in text form which users were not likely to use in large numbers. We will look at this further in the case study section.

A total of 8,673 videomail messages were left during the pilot. This was considered by partners to be a standard service to be offered in a telecoms network.

An estimated 50 transnational calls were made although this was reported to be problematic by users.

The pattern of use was similar to what one might expect in terms of the time of day (Figure 5.18). We compare two months in latter part of the pilot. Not surprisingly, peak use is in the early afternoon 13.00 to 15.00.
This is an entirely predictable pattern and one which corresponds to what we know of the pattern of contact with Local Council contact services. Peak times tend to be while the children are at school. This is an important finding in regard to the planning of relay services and in the arrangement of capacity.

5. France

In France, the development of REACH112 has been in parallel with Governmental initiatives in regard to emergency services and in the gradual expansion of video conferencing.
Figure 5.19 shows volume of calls with three peaks in call attempts in November, January and March. However, the overall trend seems to be flat which would be consistent with a mature market. The percentage of successful calls is relatively stable also – ie the number of people who continued to interact with the other person after 10 seconds. In the last month of the pilot, this ‘success rate’ was 61%.

The target total number of calls was 140,000 and this was achieved for attempted calls (270,264,) and successful calls - “over 10 seconds’ (154,850). This seems to be in keeping with the stability of this TC service.

Figure 5.20 shows the calls per user which give a better indication of extent of use. The trend seems to be slightly downwards, although the predominant aspect is the neutral growth.
The rate of calls for each individual user seems high in comparison to the other pilots, perhaps indicating the use of the system in work.

The numbers of registered users is of importance to the targets for REACH112 (Figure 5.21). The target number of users of 1,500 was easily surpassed by the end of the pilot, 344 over target. However, it seems only a small number were fully processed as REACH112 users – the monthly report only lists active REACH112 users in the range 10 to 33 each month. We have no data on the characteristics of the users in these calls – Deaf signers, hard of hearing etc although there are details in Appendix 5 of the respondents to the French survey of potential users of REACH112.

As in other pilots, the numbers who become regular users of the TC service is rather less than the numbers who register in the first place. This almost certainly reflects the lack of familiarity with the remote communication medium. This aspect will be discussed later.
An important component of REACH112 concerns the numbers of relay calls made. These are a sub-set of the total calls made. The data (Figure 5.22) shows a flat demand with even a slight downward trend in use of relay.

*Figure 5.22: Calls to the relay service (France)*
The target number of relay calls for the pilot was 70,000 and the achieved number was 52,381 ie 75%. There may have been a reduction in accessible hours for the relay service over the time period of the pilot.

In terms of the extent of use, we can see (Figure 5.23) that users made less calls to the relay service over time. There appears to be a downward trend in relation to take-up of the relay service.

*Figure 5.23: average number of relay calls per active user (France)*

An important aspect to consider is the total length of relay calls as this can be used as a cost driver or planning statistic (Figure 5.24). The data shows an unexplained spike in March 2012 but otherwise the use of relay is either flat or reducing from a high point at the start of the pilot.
The amount of use of relay seems to be higher than one would expect although the lower end of the range makes it closer to the average use in other countries.

Calls to another person were usually longer than calls to relay (inmost countries). However this was not always the case in France, where at times the average length of relay calls seem to be more than the length of P2P calls (Figure 5.25).
The number of test calls made to emergency services is reported as high in comparison to other pilots (i.e., several thousand). The number of real calls in this time period was 8 (although another two are reported in June 2012).

There was no videomail service during this pilot.

No transnational call data was reported here although some information may be found in D6.2.

The pattern of use was similar to what one might expect in terms of the time of day. We compared two months in latter part of the pilot. Peak use seems to be in the afternoon 14.00 to 16.00 (Figure 5.27).
6. The Netherlands

In the Netherlands, the development of REACH112 has been in parallel with an initiative in regard to providing access to emergency services through Real Time Text. The data which follows deals only with RTT. The trend is clearly downward here with more than a third fewer calls attempted at the end of the pilot. The trend in successful calls is less marked and rests around 1500 calls per month.
The percentage of successful calls is increasing – i.e., the number of people who continued to interact with the other person after 10 seconds. In the last month of the pilot, this ‘success rate’ was 52%.

The target total number of calls was 90,000 but this was not reached for attempted calls (37,401) nor for successful calls - ‘over 10 seconds’ (17,730). Given that estimates on this were made almost two years prior to the pilot period, it is not surprising that estimates do not match exactly the achieved figures.

Figure 5.29 shows the calls per user which give a better indication of extent of use. The trend seems to be slightly downwards.
The numbers of registered users is of importance to the targets for REACH112 (Figure 5.30). The target number of users of 1,000 met at the start of the pilot (1021). What is interesting is the number of people that registered during the project (up to 3000 registrants at the end of the project) but at the same time people abandoning the service. At the end of the project there were around 1300 registered users. The main reasons for abandoning the service were the costs (€6.00 per month for the real time text service) and not using the service. In The Netherlands there has been no active registration whether the user was deaf or hard of hearing. The numbers of active users who have made a call can be shown.
It is not clear if these were fully processed as REACH112 users but it provides a baseline to understand the traffic volumes. It is consistent with the finding that on average only 25-30% of registered users are active.

**Figure 5.30**  P2P and Relay calls by active users in the Netherlands
Relay calls are an important sub-set of Total Conversation activity. These are a sub-set of the total calls made. The relay service was continuously available to users but seen/perceived as poor in quality (an external provider not a partner in the project) and perhaps as a result the numbers of calls made by users is quite low (per month). However, the general level of activity is low and the difference between P2P calls and relay calls does not appear to be significant.

*Figure 5.31: Calls to the relay service (The Netherlands)*

The target number of relay calls for the pilot was 6,000 and the achieved number was 8,676 ie 45% over target.

An interesting aspect to consider is the total length of relay calls. The use of relay by Dutch users is quite a low figure but as indicated this may relate more to the status of the relay service than the actual needs of the users. There is an upward trend with active users taking up an increasing amount of relay minutes over the pilot.
Calls to another person were longer than calls to relay. This is consistent with results from other pilots.

*Figure 5.33: Duration of relay and p2p calls (seconds)*
The number of calls made to emergency services is reported as 34 although there were many more test calls made.

There was no videomail service during this pilot.

Transnational calls were only possible through a gateway developed by the Swedish partner. The number of calls is not reported.

7. Spain

The developments in Spain were hampered by difficulties in the first year and the withdrawal of a key partner. The decision was taken to look for an RTT solution rather than a full TC implementation due to broadband capacities. More detail on the Spanish situation is provided as a detailed case description in Appendix 8.

Figure 5.34 Headline figures RTT calls in Spain

Figure 5.35 shows volume of calls with three peaks in call attempts in May, October and March. This does not match the successful call figures – this might imply a significant increase in the amount of testing in the period. The percentage of successful calls seems to
vary – ie the number of people who continued to interact with the other person after 10 seconds. In the last month of the pilot, this ‘success rate’ was 67%.

The target total number of calls was 20,000 and this was not achieved for attempted calls (3,884) nor successful calls – ‘over 10 seconds’ (1,678). This reflects a major over-estimate of the take-up and subsequent use by members of this community – however, as indicated above there were significant problems in achieving the user goals in this pilot.

Figure 5.36 shows the calls per user which give a better indication of extent of use. There seems to be very little use of the service apart from two spikes in the data.

Figure 5.35 TC calls made by users each month (Spain)

The numbers of registered users is of importance to the targets for REACH112 (Figure 5.37). The target number of users of 250 was almost reached (239 users) although the same number of active users were reported at the end of the pilot as at the beginning (59). No breakdown of the characteristics of the users is given.

An important component of REACH112 concerns the numbers of relay calls made. These are a sub-set of the total calls made. However, in this pilot there are virtually no relay calls – in only one month, does the reported figure reach double digits (10) in March 2012. The target number of relay calls for the pilot was 10,000 and the achieved number was reported as 69.
Comparison of the durations of the P2P calls and the relay calls confirms the limited use of the system and the likelihood that these were test calls rather than socially motivated or trans-action focused.

The number of test calls made to emergency services is 496.

No transnational calls were made.

8. Transnational comparisons

Three pilots (Sweden, France and the UK) have attempted to provide a full Total Conversation service and have demonstrated all elements of the value chain. Two pilots provided a text only service. We will consider these separately.
1. **Sweden, France and UK**

There is a noticeable difference in the number of attempted calls, with volumes reported from France being much higher than the other two pilots. The UK figure is likely to be less as it is a very new market. (Figure 5.38).

*Figure 5-37: Attempted calls in three pilots*

However, this relation reverses when we consider the percentage of attempted calls which resulted in a call of 10 seconds or longer (Figure 5.39).
Figure 5.38: calls longer than 10 seconds

This indicates a higher rate of calls in Sweden and France where the user terminated early or where the call did not connect or where there were test calls, where no information was passed.

In terms of attempted calls per user, we find Sweden and UK quite similar but France reports many more calls per user.
When we consider only the calls which resulted in a ten second or longer call, then the numbers in Sweden drop below the UK, while France still has, it seems a much higher number of calls per user.

**Figure 5-39: Attempted calls per user**

**Figure 5-40: Calls over 10 seconds per user**
There is no obvious explanation for these in the provided data. We might have expected Sweden as the mature market to have the highest number of calls per user.

At the same time, the percentage of registered users who are active is highest in Sweden (37% taking the April 2012 figure), next in France (31%) and lowest in the UK (16%). It is possible that with a lower number of users to call in the UK, people who register do not find enough other people to call in the directory.

Differences also appear in the use of relay service although there appears to be some convergence towards around 6 calls to relay service on average per month for each user (Figure 5.42).

*Figure 5.41: Relay calls per user*

In terms of planning the service provision and allocating to individual users, French users take up the most number of relay minutes per month. There is also an unexplained spike in the data where the number of relay minutes has risen enormously. We might claim that in the final month the average use of relay and the extent of relay minutes has converged in all three countries.
Taking all of these together and considering the European dimension we struggle to make a single story from this data. It may be that different charging mechanisms in each country may create the differences (in the UK all calls and service use were free to end users).

9. **Comparing The Netherlands and Spain**

The rationale for the comparison here is the fact that Real Time Text services were the focus and the likely user take-up would be different from the provision of a sign language or video service. However, both pilots had to survive in very difficult local circumstances and these make their situations different from one another and to a large degree different from the other pilots.

Details of the workings of the pilots is presented in D6.2 and will not be repeated in detail here.

The Netherlands began with a user base of text users and a functioning product while Spain had to start to develop the software and users at the same time. Obviously there was different trajectory. Comparing the call volumes or numbers of users is not especially helpful in this case. However, we can consider the user behaviour in regard to extent of use.
Successful user calls over the period of the pilot averages around 3 in Spain while the figure in Netherlands is over 20. To a large extent this coincides with the numbers of users available and the likely purpose of the calls. If there is a reason to call a friend then calls may be made; if there are insufficient friends or there are alternative means of communication such as text messaging or email, then the user is more likely to us the RTT functionality only for trials.

This can also be seen in the duration of person to person calls where in the Netherlands this is in the region of 500 seconds on average while in Spain the average is around 125 seconds.

The circumstances in the pilots is quite different.

10. Traffic Conclusions

The figures submitted and the consequent analysis shows an active network of users in each pilot. In summary, we can see major progress in the period of the pilot

• Nearly 7,500 registered end users
• over 970,000 Total Conversation calls
• over 124,000 relay calls were made
• that is, more than 100,000 hearing people were impacted as well as Deaf and hard of hearing people
• Significant progress was made in access to emergency – in training, in awareness, in protocols – over 70 real calls processed

Perhaps the most significant aspect is the notion that many more (by a factor of 12) hearing people were engaged in the implementation, through the relay service than deaf or hard of hearing people. The multiplier effect is significant. When this statistic is offered to the hearing community, it is often brushed aside as a project effect and not a change in behaviour. Of course, that is the point, REACH112 has connected Deaf and hard of hearing people to society without having to change the behaviour of the majority in any major way. From a Deaf person’s point of view this is a huge step towards inclusion for which there is little resistance
from the society. The difficulty comes when there are costs to be assigned to this and at that point, a balancing has to be made which provides to the majority gains in efficiency.

The target of course in the end, is to allow all of society access to Total Conversation and at that point the traffic analysis will absorb the use by Deaf people and the likelihood is that those visible costs at present will be part of the engagement of society as a whole. At that point we can believe that the project has achieved its major breakthrough.

6. User Trials & Progress

As well as considering overall traffic in the network we considered data from structured trials carried out by partners. There is initial work on this in WP4 and WP5 but the data reported here came mainly from the pilot phase. The intention was to show how user experience and network effectiveness changed and improved during the period of the pilot. Therefore this section is designed to complement the earlier reported trials.

This data was collected in Sweden, France and in the UK. It bridges the quantitative and qualitative divide providing some metrics on the effectiveness of the communication on the technical aspects of the implementation and the users’ subjective response to the provision. In the UK, there were specific tasks to be carried out; in France, structured tasks and games led to qualitative interviewing and observation; in Sweden a more general post-hoc analysis was carried out.

The reports from UK, France and Sweden are extensive and are presented in the appendices to this document.

1. Findings from User trials

Since TC is meant to be a life-changing service development for users, it is appropriate to collect data on its effectiveness from a user’s perspective.

There were three component trial designs but there were then several suggested experiments relating to the user, endpoint, type of connection:
1. person to person

2. person to relay service

3. person to emergency service

These are trials of Total Conversation – these are not duplicates of existing textphone services (although the French data provides an extended analysis of a text relay). Triallists were Deaf, hard-of-hearing or deafened individuals. As indicated above, the UK data is based on these structured planned studies, the French component derives from planned “experiments” the responses to which were then analysed from a qualitative perspective while the Swedish analysis is post hoc examination of the calls and support provided to users.

The implementation of Total Conversation bring challenges to the users and to the support staff. Users have to learn a new way of communicating and have to understand physically how to use the equipment or software. Not surprisingly, then, the data collected in the UK in May 2011 and July 2011 at the start of the pilot shows many problems for the users and also some problems with the implementation. A great deal was learned from this and new versions of software and a greater degree of intervention from field workers (workshops, clinics and home visits) created a much more confident user group by the time of the second trial in April 2012. At this point most of the earlier issues had been solved and user satisfaction was very high. Users maintained that communication was easy and reliable; relay agents maintained that they could easily follow the signing of the Deaf caller. Typically ratings of success, video quality, ease of understanding were in the high 80% and 90%.

Reports of internal unstructured trials by Action on Hearing Loss were less positive (although there was no second stage follow up later in the pilot which would have allowed the analysis of change in the use). Some of the issues appear to be because of the need for more training and limited support (something also reported extensively in the French pilot). There appeared also to be problems with the broadband services used and this has also been indicated in the Swedish pilot. The sampled users were staff of AoHL and their daily communication pattern was already established – making myFriend an addition. Most were users of the text component of myFriend. Their comments (which will be discussed in greater detail in Chapter 11) reflect the need to understand a different system from web-based products – the points indicated below would be covered in the training and support.

Every time I answer the link goes but still says I’m in call I have to call back and then there are some fiddling around before we can speak. It’s not easy to call via the interpreter on our home
These comments were similar in tone to the points made in the CDS structured trials in May 2011. However, the comments are useful in shaping the training and support needed. The difficulties also lead to better software versions as problems are resolved.

French user trials built from simulations to designated-time emergency service calls (ie two two-hour slots per week for sign relay but later expanded with 24 hour access to text relay). Appendix 5 provides a description of the arrangements of the French set of trials which led to the finalised framework for relay services and emergency call taking. Appendix 6 provides an analysis of some of the data generated by these trials. The analysis examines the requirements for relay work in terms of visual presence and reflects upon the need in regard to emergency call taking. A second study deals with text protocols and the specific cultural approach of Deaf people in presenting their own description of the emergency. The purpose in these trials was to create the framework for the implementation of REACH112 relay and emergency services. In doing so, the work identifies many of the problems to tackle.

It was reported that many of these sorts of early difficulties had been overcome in the Swedish situation and the primary new aspect which their analysis examined was the possibility to call 112 through a relay agent.

However, in all cases, there remain issues in regard to bandwidth and user endpoint failures; there may also be issues concerning use of the Smartphone and mobile/wifi software, since the management of that service and ultimately the allowable bandwidth, is not within the control of REACH112. The service offered is clearly “over the top” of a network designed for quite different purposes.

In both Sweden and the UK, there are issues in regard to corporate networks where SIP traffic may be blocked and installation of software such as that for Total Conversation is not allowed. Solutions are relatively easy to set up but there are cost implications.

User reactions and ratings were positive throughout but especially as the full service was available. Users particularly liked the ease of use of relay (which was new to all of them in the UK and to some extent in France – ie some users were already registered in an existing relay facility). The primary issue for most has been that the service might stop if there is no funding available and this question of sustainability of a demonstrably successful pilot is very
prominent in the reported user reactions. These aspects of user aspirations feedback are dealt with in greater detail in Chapters 10 and 11.

The main thrust of the user trials was that problems had been overcome and there was a functioning and effective Total Conversation service which had adapted to the changes in technologies ie adapted to tablets and Smartphones.
7. Cost-Benefit Analysis for REACH112

In order to evaluate the cost utility of REACH112 and to offer a judgement of value for money, we need to examine costs and benefit measures. The cost side comes from the expenditure recorded by each partner. Assessing the benefits is less easy as the benefit is harder to quantify. For example, determining the improvement in quality of daily life as a result of feeling more secure because of using the Total Conversation client.

However, we can go some way towards determining the benefits by asking people ie by interviews with participants in REACH112 and then comparing these responses to the responses of people who did not take part in the REACH112 pilot. We have done this in two Total Conversation pilots (UK and Sweden) and two non-pilot countries (Finland and Ireland).

As part of that we need to establish the comparability of the participants. We should be aware that this comparison has to be qualified by the relatively small number of people sampled in order to determine benefits – ideally this number should have been over 50 (instead of only 10 in each location). The small sample sizes do prevent any concrete conclusions on the positive effects of the programme as a whole; in purely statistical terms, we cannot conclude that there was a positive impact, but we can draw suggestive inference from the data.

We then examine the effects of REACH112 in the pilot areas compared with the outcomes in the non-pilot areas. Finally we consider the financial costs of that provision and try to construct measures of the cost utility by comparing effects with the cost outlay.

If we assume we are considering the activities which occur in WP6 as the primary focus for expenditure and we make an adjustment for the administrative and non-implementation costs and activities, then Table 7.1 shows the estimated spending amounts for REACH112 and the partners involved in the delivery. We need also to make adjustment for the period of this focus – ie the pilot which is only 12 months of the 15 months allocated to the work package.
In each pilot, there are fixed costs and variable costs. The fixed costs are set up and maintenance costs that are necessary expenditures for Total Conversation implementation and would have to be spent regardless of the number of users who registered. The variable costs are the additional outlay when another person registers for the service. In the absence of precise details regarding the fixed and variable elements of expenditure, the calculations used here necessarily divide the total outlay between the number of registered users to give the average total cost per individual. Consequently, this per person cost of each pilot represents their share of the variable costs and their share of the fixed costs – thus it should not be interpreted as the additional cost of providing the service for one more user. The additional cost of providing the programme for one more user will be considerably lower as there are only the additional variable costs to be born – the fixed costs have already been incurred at the outset.

Moreover, in each case, the number of users who benefit from a Total Conversation service is not precisely measured. For example, it is difficult to quantify the number of hearing users who have engaged with the programme through the relay service. The reality is that 12 times the number of hearing people (as Deaf people) participate in the programme as receivers of calls and interactants with the Deaf people. Their benefits are difficult to measure and we did not interview any of those people. However, we do need to make an estimate of their participation and as a result we have used an estimate based on the relative proportion of relay minutes compared to total minutes and we have weighted the number of relay calls (ie hearing people reached) by this proportion to give an estimate of the number of hearing people who benefit. These are added to the numbers of registered users in order to give an estimate of the number of beneficiaries.

Table 7.1  Estimated cost on pilot provision based on human resource (May 2011-April 2012)

<table>
<thead>
<tr>
<th>Person-Months per task</th>
<th>Sweden</th>
<th>UK</th>
<th>Sweden</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>REACH112</td>
<td>OMNITOR</td>
<td>SOS</td>
<td>CDS</td>
<td>AUPIX</td>
</tr>
<tr>
<td>WP6: Service Deployment - Pilot</td>
<td>14</td>
<td>16</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>Adjusted Total in euros</td>
<td>76384</td>
<td>91674</td>
<td>103133</td>
<td>69312</td>
</tr>
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</table>
Thus the total costs are divided by the estimated number of people benefitting from the programme. Table 7.2 and Table 7.3 shows the monthly estimate on this. The costs are the full costs – ie not just the 50% of the EC contribution.

Table 7.2 Monthly estimate cost per beneficiary UK (euros)

<table>
<thead>
<tr>
<th>Monthly</th>
<th>UK</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
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<th>Jan-12</th>
<th>Feb-12</th>
<th>Mar-12</th>
<th>Apr-12</th>
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<tbody>
<tr>
<td>cost per month</td>
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<td>2035</td>
<td>1</td>
<td>2035</td>
<td>1</td>
<td>2035</td>
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<td>2035</td>
<td>1</td>
<td>2035</td>
<td>1</td>
</tr>
<tr>
<td>registered</td>
<td></td>
<td>692</td>
<td>787</td>
<td>898</td>
<td>1013</td>
<td>1085</td>
<td>1286</td>
<td>1339</td>
<td>1416</td>
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<td>1581</td>
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<td></td>
<td>538</td>
<td>610</td>
<td>1072</td>
<td>626</td>
<td>758</td>
<td>509</td>
<td>1344</td>
<td>1079</td>
<td>1356</td>
<td>1994</td>
<td>1983</td>
<td>1545</td>
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<td>relay calls</td>
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<td>0.25</td>
<td>0.23</td>
<td>0.38</td>
<td>0.24</td>
<td>0.28</td>
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<td>0.40</td>
<td>0.43</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>%relay/total</td>
<td></td>
<td>132</td>
<td>139</td>
<td>407</td>
<td>149</td>
<td>209</td>
<td>92</td>
<td>517</td>
<td>380</td>
<td>447</td>
<td>806</td>
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<td>494</td>
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<tr>
<td>Estimates of</td>
<td></td>
<td>25</td>
<td>22</td>
<td>16</td>
<td>18</td>
<td>16</td>
<td>11</td>
<td>12</td>
<td>11</td>
<td>9</td>
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<tr>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>cost euros</td>
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</tr>
</tbody>
</table>

We can see that this shows a gradual reduction in cost as the number of beneficiaries increases. It is important to note also that the UK figures include the cost of maintaining the infrastructure, recruiting, training and supporting the users (field work), managing the relay service 9-5pm (ie recruiting relay agents, training, and paying them on an hourly basis) as well as training and supporting the emergency service staff. This is as close to total estimate we can have of the cost of managing the whole service (in the absence of the precise cost claim).
**Table 7-3 Monthly estimate cost per beneficiary Sweden (euros)**

<table>
<thead>
<tr>
<th></th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per month</td>
<td>1400</td>
<td>1400</td>
<td>1400</td>
<td>1400</td>
<td>1400</td>
<td>1400</td>
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<td>1400</td>
<td>1400</td>
<td>1400</td>
<td>1400</td>
</tr>
<tr>
<td>Registered users</td>
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<td>2519</td>
<td>2558</td>
<td>2613</td>
<td>2647</td>
<td>2801</td>
<td>2906</td>
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<td>2905</td>
<td>2925</td>
<td>2922</td>
<td>2923</td>
</tr>
<tr>
<td>Relay calls</td>
<td>4562</td>
<td>4437</td>
<td>4018</td>
<td>4688</td>
<td>3516</td>
<td>4890</td>
<td>3943</td>
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<td>3604</td>
<td>3339</td>
<td>3848</td>
<td>5278</td>
</tr>
<tr>
<td>%relay/total</td>
<td>0.11</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.09</td>
<td>0.14</td>
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<td>Est-hearing per</td>
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<td>434</td>
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<td>330</td>
<td>285</td>
<td>425</td>
<td>677</td>
</tr>
<tr>
<td>Beneficiary cost</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Figures for Sweden include all of the above except for the daily cost of relay which comes from Central Government. However, the calculation does include the cost of setting up and maintaining an out of hours service for emergency calls for 11 months. Costs in Sweden look lower partly because of larger call volumes and numbers of users and partly because of the reduced cost of the relay service.

Although the costs now seem very low, the points to remember are that the start-up and initial maintenance costs are higher and that whether a particular programme is viewed as “value for money” requires some form of value judgement.
1. **UK & Ireland**

1. **Characteristics**

In order to prepare this analysis, 10 Deaf people were interviewed in Dublin and 10 users in Bristol.

Their broad characteristics are shown and while not identical nor a perfect match, they are sufficiently similar for the comparison to be made.

*Table 7.4 Characteristics Dublin*

<table>
<thead>
<tr>
<th>Employment</th>
<th>Gender</th>
<th>Marital status</th>
<th>Age estimate yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Parent</td>
<td>F</td>
<td>M</td>
<td>40+</td>
</tr>
<tr>
<td>Employed</td>
<td>F</td>
<td>S</td>
<td>50+</td>
</tr>
<tr>
<td>Employed</td>
<td>F</td>
<td>M</td>
<td>50+</td>
</tr>
<tr>
<td>Student</td>
<td>F</td>
<td>S</td>
<td>30+</td>
</tr>
<tr>
<td>Unemployed</td>
<td>F</td>
<td>M</td>
<td>30+</td>
</tr>
<tr>
<td>Employed</td>
<td>F</td>
<td>M</td>
<td>40+</td>
</tr>
<tr>
<td>Retired</td>
<td>F</td>
<td>S</td>
<td>70+</td>
</tr>
<tr>
<td>Employed</td>
<td>M</td>
<td>M</td>
<td>40+</td>
</tr>
<tr>
<td>Employed</td>
<td>M</td>
<td>M</td>
<td>60+</td>
</tr>
<tr>
<td>Retired</td>
<td>M</td>
<td>S</td>
<td>70+</td>
</tr>
</tbody>
</table>

Gender = male female; marital = married or partner/ single
It is worth pointing out some of the contextual differences between the UK and Ireland.

British Sign Language and Irish Sign Language are not mutually intelligible having very different linguistic roots. Despite the shared written language of English, Deaf people in Ireland using ISL are not readily understood by British Deaf people.

The UK being considerably larger in population has had more extensive services for a longer time. Text relay (24 hours) has been in operation for over 20 years. This has an interface to Real Time Text through Action on Hearing loss who supply “talk by text” software. Emergency service access is disallowed in this service and users are instructed that there is no support for this. Nevertheless, it is occasionally used. There is also a gateway at Aupix which allows TC users access to all textphone services. After some negotiation, protocols were agreed to allow TC users to access emergency services through BT’s text relay. There is also a national e-SMS service which has been supported by the UK national regulator and which allows a mobile phone user to connect to an operator who uses a script to query the problem and pass the user to the appropriate PSAP.

Table 7-5 Characteristics Bristol

<table>
<thead>
<tr>
<th>Employment</th>
<th>Gender</th>
<th>Marital status</th>
<th>Age yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployed</td>
<td>F</td>
<td>M</td>
<td>56</td>
</tr>
<tr>
<td>Unemployed</td>
<td>F</td>
<td>S</td>
<td>58</td>
</tr>
<tr>
<td>Employed</td>
<td>F</td>
<td>M</td>
<td>35</td>
</tr>
<tr>
<td>Employed</td>
<td>F</td>
<td>S</td>
<td>36</td>
</tr>
<tr>
<td>Employed</td>
<td>F</td>
<td>M</td>
<td>45</td>
</tr>
<tr>
<td>Employed</td>
<td>F</td>
<td>M</td>
<td>73</td>
</tr>
<tr>
<td>Retired</td>
<td>F</td>
<td>m</td>
<td>60</td>
</tr>
<tr>
<td>Employed</td>
<td>M</td>
<td>M</td>
<td>60</td>
</tr>
<tr>
<td>Carer</td>
<td>M</td>
<td>M</td>
<td>61</td>
</tr>
<tr>
<td>Employed</td>
<td>M</td>
<td>S</td>
<td>33</td>
</tr>
</tbody>
</table>
There is a corresponding 24 hour text relay service in Ireland which is available to textphone users. There are offerings of relay service for Irish Sign language but these appear not to be widespread. There has also been a pilot e-SMS service running in Ireland from January to July 2012.

The use of textphones has greatly declined in the Deaf community after it became widespread in the 1980s and 1990s. Most sign language users do not use textphones any longer. Most distance communication is done through mobile phone texting, even though text is not readily understood by nearly half of the Deaf community.

2. **REACH112 Effects UK- Ireland**

Deaf people were asked a series of questions concerning their daily communication and the extent to which they used Total Conversation.

Although there are some differences, the overall pattern suggests that the functionality of Total Conversation and relay services have not yet been fully absorbed by people in the Bristol sample.

In both groups everyone used sign language with other Deaf people and some tried to speak when with hearing people. In both groups there was no use of fax but a few used textphones sometimes. Few used communication programmes on the computer but half of the Dublin group used email everyday (few in Bristol did). The Bristol group used Total Conversation nearly every day.

They varied in their extent of communication with hearing members of the family but only a quarter of the Bristol TC users thought of using TC or the relay service to talk to hearing members of the family. It seems clear that this has not yet entered into their thinking about daily communication (although it can be clearly argued that communication (or not) with the family members has been long established and what ever the arrangements (or not) for this, they are not likely to change immediately on the advance of technology).

However, when asked how they made appointments with a doctor, for example, half said they used Total Conversation relay.

In terms of feeling isolated when with hearing people, the two groups feel similarly isolated. That is there is not at this stage an improved sense of inclusion, although again one might consider that confidence in interaction with hearing people will take time to build up. The
majority in both groups do not feel they can cope with an emergency at home. The groups in Dublin are more like to say they can get help when out on their own and more likely to say they can contact hearing people when they want. This is counter-intuitive (given that the Bristol group have access to Total Conversation services) but suggests that the TC users have not yet progressed to the point where they think of that service for their daily contacts. Part of the problem is clearly the fact that computer installed TC is problematic because the equipment is often switched off. It is probably for this reason that SMS communication is well established as mobile phones are always on and there are alerts each time there is an incoming SMS. We know from research work carried out on the community at the start of the SMS revolution that similar patterns of slowly increasing use were noted.

In general discussion, the range of uses of TC relay was set out more clearly by the users – health services (most common), making calls to services like Internet providers and Insurance. However, even with these recognised uses, one person qualified this use of relay as “only if my (hearing) partner is not available” implying the continued dependence on hearing people and the hearing media.

We then asked two parallel questions one about the situations where help was needed and the people could not do this by themselves and a second where they were able to use a relay service.

Once I had a problem with a boiler overflow. It happened on Friday late afternoon so I went over to a hearing person who lives nearby and asked for help

I thought someone (a stranger) was in my house. I went outside to ask for help but no one came by as it was 11pm at night. I contacted 18000 (the emergency text relay number) for police but the information was wrong because English is my second language. Therefore the call to police was not effective and it took up more time and delayed in dealing with the problem.

Not a problem really, as I have a daughter and also grand-daughter who lives nearby and they will always come here if I have a serious situation of any kind.

Once I had a car breakdown on the motorway and I had to wait until I saw a police car, which I waved for help. The policeman called (on phone) and then went off. I was on my own waiting. An hour passed and nothing happened. Then the same policeman saw me and came and realised that the problem had not been sorted out; so he called for help again.

The experiences of people in Dublin were very similar.

It happened once when I crashed into another car in front of me. I became “paralysed”- frozen. The other driver came and I told him “I am deaf” and he then drove off. I got stuck as the front
bonnet of the car was badly damaged with smoke coming out. I drove on without any help – no way to make contact with emergency. Until I realised I was unable to drive any further so I stopped and texted my husband.

One cold snowy morning, I took rubbish outside and saw a woman on the ground. I panicked and fetched my husband to help. It was early morning at 6.30am so we were unable to ask a neighbour. But one neighbour did come out and I asked the person to call emergency. It did happen another time and this time I texted my mother and she called an ambulance.

In each one of these examples, Deaf people make the best out of a bad situation. Without access to emergency, they have to rely on being able to find a hearing person who will understand them or take time to try to find out what the problem is. It introduces huge delay into an emergency situation.

Asked about the use of TC relay service, the Bristol users mentioned

- I had a car accident. I contacted the insurance company through the relay and call was successful without any difficulties. I was able to use my own language.
- I was able to call the phone company to sort out the options for my broadband package.
- An emergency appointment, I had to speak to the doctor directly and explain my symptoms. This could only have been done through the relay.

Despite the apparent progress here, the adoption of Total Conversation is only at the beginning stage. The benefits are as yet hard to quantify from this data.

2. **Sweden – Finland**

Data was also collected from Finland where there is no TC service and from Sweden, where we believe the service to be well established. The questions used were identical to those in UK and Ireland.
### Table 7.6 Characteristics Finland

<table>
<thead>
<tr>
<th>Employment</th>
<th>Gender</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>f</td>
<td>30</td>
</tr>
<tr>
<td>Employed</td>
<td>f</td>
<td>42</td>
</tr>
<tr>
<td>Employed</td>
<td>f</td>
<td>48</td>
</tr>
<tr>
<td>Employed</td>
<td>f</td>
<td>53</td>
</tr>
<tr>
<td>Employed</td>
<td>m</td>
<td>31</td>
</tr>
<tr>
<td>Employed</td>
<td>m</td>
<td>38</td>
</tr>
<tr>
<td>Employed</td>
<td>m</td>
<td>41</td>
</tr>
<tr>
<td>Part-time</td>
<td>m</td>
<td>63</td>
</tr>
<tr>
<td>Retired</td>
<td>m</td>
<td>63</td>
</tr>
<tr>
<td>Retired</td>
<td>m</td>
<td>64</td>
</tr>
</tbody>
</table>

### Table 7.7 Characteristics Sweden

<table>
<thead>
<tr>
<th>Employment</th>
<th>Gender</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>f</td>
<td>34</td>
</tr>
<tr>
<td>Employed</td>
<td>f</td>
<td>37</td>
</tr>
<tr>
<td>Employed</td>
<td>f</td>
<td>42</td>
</tr>
<tr>
<td>Retired</td>
<td>f</td>
<td>65</td>
</tr>
<tr>
<td>Retired</td>
<td>f</td>
<td>71</td>
</tr>
<tr>
<td>Employed</td>
<td>m</td>
<td>28</td>
</tr>
<tr>
<td>Employed</td>
<td>m</td>
<td>41</td>
</tr>
<tr>
<td>Employed</td>
<td>m</td>
<td>42</td>
</tr>
<tr>
<td>Employed</td>
<td>m</td>
<td>44</td>
</tr>
<tr>
<td>Retired</td>
<td>m</td>
<td>72</td>
</tr>
</tbody>
</table>
1. Characteristics

The demographics of the two groups are very similar and this does allow comparison of use of telecommunications. The differences in the two countries is considerable in terms of access through telecommunications.

**Textphone**

In general very few Deaf people still use textphones, especially analogue versions. In Finland the textphone has been surviving for longer. The relay services can also be accessed by IP telephony, computer software, and/or mobile devices for IP-text and when using text relay services.

**Fax**

The fax machine has been “dead” for 15 years ever since Internet entered the homes. Both of the Swedish and Finnish users were surprised by the question on “Fax”; it had not been in people’s minds for a very long time.

**TC/Videophone**

In Sweden there are about 3,000 to 4,500 TC/SIP-videophone users in total who use their devices at home, at work and who are also regular users of VRS.

In Finland there is a smaller pilot with 50 videophone users and VRS, but the quality is very poor so that the users have mostly given up the pilot.

**Relay services**

Both Finland and Sweden have 24/7 text relay services.

In Sweden the generic Relay services have been in use for many years and are very popular among the deaf users. The opening hours are 07.00-22.00 on weekdays and 09.00 to 17.00 at weekends.

Finland does not have any VRS at all.

**112 for non-voice users**
The national emergency number 112 is available by textphone, SMS and via relay services for users in Sweden who cannot use 112 through a voice phone.

In Finland, 112 is the national emergency number. But for people with hearing loss there are 15 separate regional numbers! And the information is not available on the web due to risk of misuse. The information has to be ordered from the Finnish Association of the Deaf or the authority responsible for the ES. Not all deaf people have the number in their mobile phone.

112 access in the Swedish Pilot

In the Swedish Pilot users registered by Omnitor also were able to call 112 with TC for a period of 11 months.

3. *REACH112 Effects Sweden-Finland*

The data in Sweden confirms what has been proposed throughout that Swedish users are more familiar with the Total Conversation concept, not as new technology, but as a daily empowering tool.

Users in Sweden very rarely use textphones, while four out of ten Finnish respondents say they use a textphone. Both groups use computers (email and video communications) and texting on mobile phones, extensively. In contacting a group of people, both groups make extensive use of text and email, with seven of the Swedish group also saying they would use TC. Seven of the Swedish group had Deaf family members while only 3 of the Finnish group had. This is a difference which could be of significance in terms of use of Total Conversation if these family networks all have access to TC. In contacting hearing family members only 3 of the Swedish group mentioned that they would use TC. There was almost no use of text relay in the Swedish group and four of the Finnish group used their text relay but this seems to be a service in decline for this community. In making appointments, seven of the Finnish group said they would ask a hearing person to telephone for them; only one of the Swedish group used a hearing person in this way and most mentioned the use of TC.

Seven out of ten of the Swedish group said they were confident of managing an emergency at home; in contrast, none of the Finnish group thought they were able to manage an emergency.
Although the groups were similar in the feeling of isolation in hearing company, nevertheless, the Swedish groups seemed much more confident when out on their own, in contacting hearing people and taking part in work meetings. It is not possible to say this is as a result of the provision of TC, but it is consistent with its enabling effects.

In the sections with more open questions there are also interesting emerging points. As we have seen, Deaf people experience significant problems in case of emergency. In Finland, there were some serious issues

Yes, I got stroke and lost my sight and balance and could hardly move where I lay on the floor. I couldn’t find my mobile phone and was stuck on the floor for 3 days (over the weekend) until my co-worker suspected that something was wrong. An ambulance took me to hospital. I thought I would die during that weekend

I am dependent on my neighbours. If they are not there….. (I was in need of ambulance once, my neighbour had to call for one.)

There are also interesting cases reported by the Swedish group.

Last year I got chest pain and called care by VRS, they asked me to come to the Emergency Room. But there the interpreter never showed up. I had trouble communicating with the doctors and nurse, gestures, paper and pen. It ended up that I got wrong medicine (as I already am under heart medicine treatment), my heart doctor sorted things up the next day.

It seemed like the VRS service functioned but the onsite interpreting was problematic.

Another Swedish participant reported two different experiences which are indicative of the communication problems which could be improved with extended Total Conversation services.

My son disappeared in downtown and I had to ask someone to call him with loudspeaker. It took some time as I am not very good at writing. I showed his picture and used body language.

Something similar when I was driving, the driver in front of me was skidding with his car and drove off road. I stopped and ran to check the driver, he was unconscious. I had to stop another car and forced the driver to get out. The guy was shocked and did not act rational, I showed by body language that he should try to speak with the hurt driver and see if he was OK. I even had to slap the guy so that he could move on and start talking with the hurt driver. I really did want to sort things out but could not speak by myself, the situation was odd, but I was the one who was talking control of the situation. Eventually an ambulance arrived.
In other circumstances relay services function up to a point but may then become the means to solve the problems. One Swedish participant reported:

A few years ago my father got severely ill and I was glad to be able to use VRS to quickly call for an ambulance. (Unfortunately due to the VRS operator’s location the PSAP call and eventually 2nd stage PSAP (ambulance) was in wrong city, but we sorted that out even if it took some time). Otherwise I use my TC daily for my phone calls, both to deaf and hearing people.

For another participant, sign language relay services are the only option and vital to continued independence.

As I am retired and at home a lot, I use relay services several times a week for doing my errands and making phone calls. Otherwise I would have to rely on daughter-in-law to make calls for me. I moved to Sweden from Bulgaria 30 yrs ago and have been working as dressmaker, I am uneducated in Swedish writing and communicates in sign language. Basic writing only when I have to, making phone calls using Text relay is no option.

Similarly, one user lost his independence and felt extremely upset by it.

The latest situation was when my TC device broke in middle of a call with care. I have been ill and had problem with my lungs. The call was important, I had to SMS my hard-of-hearing brother and ask him to call the care for me and to make a doctor’s appointment. That was humiliating and time consuming.....

Another participant points to an important comparison of sign language relay services and text relay, with the obvious implication that resources for sign relay probably need to be extended.

I use VRS for anything, but my wife does the most calls. But if there are bank issues with several numbers I prefer to use text relay services to be sure that the numbers are correct and in the right order as I am deaf with Usher. For doctors appointments I use text relay to avoid the queue at VRS and text relay also is open 24/7.

The situations described are disturbing and indicate the hidden problem. Hearing policy makers rarely learn of these issues as Deaf people, by and large, just have to grin and bear it. There has never been an effective lobby which lead to an understanding of these experiences.
1. **Cost Utility**

In trying now to attach benefits to costs we need to understand a little more of the comparison between the four groups.

Participants were asked to say how frequently they would use particular means to contact other Deaf people (Table 7.8). We see clear support for the trend that is being predicted. Deaf people in Sweden are more likely to use the technology to reach other Deaf people. This does not just apply to the use of Total Conversation but other distance communication means are more prominent in the Swedish group.

**Table 7.8 Average extent of use of this means (lower scores mean more use 1=used everyday)**

<table>
<thead>
<tr>
<th>Contacting Deaf people by</th>
<th>Computer software</th>
<th>Text messaging</th>
<th>e-mail</th>
<th>Total Conversation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>1.5</td>
<td>1.2</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Finland</td>
<td>1.40</td>
<td>1.10</td>
<td>1.38</td>
<td>Not used</td>
</tr>
<tr>
<td>UK</td>
<td>2.17</td>
<td>1.14</td>
<td>1.83</td>
<td>1.17</td>
</tr>
<tr>
<td>Ireland</td>
<td>2.56</td>
<td>1.40</td>
<td>2.10</td>
<td>Not used</td>
</tr>
</tbody>
</table>

To make an appointment, in the past required Deaf people to travel to the venue first and to negotiate a time and then to return at a later date. We asked how the person would make an appointment now (Table 7.9). The vast majority of the Swedish group use Total Conversation in order to set up appointments, and significantly only one of the Swedish group would now ask a hearing person. Although UK participants are likely to use Total Conversation, more than half would still ask a hearing person. This is consistent with the view that adoption of Total Conversation has some way to go in order to be the means of choice.
Table 7.9  How do you make an appointment (numbers out of ten using this means)

<table>
<thead>
<tr>
<th>Making an appointment by</th>
<th>Telephone</th>
<th>Text messaging</th>
<th>e-mail</th>
<th>Total Conversation</th>
<th>Ask a hearing person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Finland</td>
<td>6</td>
<td>1</td>
<td>3</td>
<td>Not used</td>
<td>6</td>
</tr>
<tr>
<td>UK</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Ireland</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>Not used</td>
<td>7</td>
</tr>
</tbody>
</table>

Perhaps the most significant benefit alongside this independence and self-reliance is the extent of confidence in management of problems. We looked at this question directly asking people if they felt they could manage emergencies at home. Nine out of ten of the Swedish respondents are more confident in managing an emergency at home, than the average for Finnish respondents.

*Figure 7.1  Swedish users are more confident than non-TC users in emergency*

A similar pattern emerges in the comparison in the UK and Ireland although the effect is less to a large extent because of the points explained above.
We are finally left with the question of “whether it is all worth it?”

There is a clear trend for Swedish respondents to feel more independent and to be more confident in emergency. We see a greater reliance on Total Conversation and relay services. We see clear demands to increase the provision and to make sure that it remains active at all times for emergency.

The stories of emergency situations without access to such services are upsetting.

If we consider the cost of providing these services at present according to the figures in Tables 7.1 and 7.2, then most observers, we believe, would consider these to be cost effective.

At this moment, we cannot fully quantify change in quality of life and do not have the quantitative measurements which would ideally show this beyond doubt in such a relatively short time period of the pilot. However, all of the data point in the same direction – Total Conversation services greatly help users to become more independent. If this is the case, they are less of a drain on public services, are more likely to be effective in employment and, as a result, are more likely to become net contributors to society.
8. Partner assessment of progress in REACH112

No single partner in the project was able to span all elements of the scope of the Total Conversation vision and local conditions have created particular environments which are more or less supportive of the EC goal. Partners have taken on components of the workplan (which was planned to lead to the goal as set by the EC) but with different tools, perceptions, assumptions, understandings and capabilities in realising the overall goal. While the management plan (D1.2) and the existence of an agreed workplan (Description of Work) and indeed, contract (Annex 1 v 7.03), are meant to produce the desired result, the multiplicity of circumstance, motivation and capacity among partners acts against this focused outcome. The programme evaluation has to understand and take into account the diversity of purpose and expertise of the pilot agents.

Such interacting effects are common in a programme of this sort. However, since it impacts on the public and has a very large scale and is attempting to anticipate a major implementation across Europe, we are committed to understanding the dynamic of such an undertaking. We can do this within the framework of the ‘theory of change’ held by each partner.

1. Theory of Change

Inevitably a complex project produces a wide range of different views in the participants. The fact that the pilots are national or local, tends to work against a unified set of perceptions.

In order to understand intended progress towards a social goal when many agencies are involved, it is vital to be able to set out the aspirations, expectations and understandings of those agencies as they move separately and together towards the intended goal.

From this we need to know about the assumptions which the agencies and individuals have which contribute and often determine their way of working. The changes which are required in order to reach the outcome, are often technical, technological, economic, psychological and social and usually imply some sort of policy-led, policy-driven or some policy outcome.

The changes, which become the impact, may be top-down or bottom-up. That is, they may require changes to systems first and then gradual take-up by individuals or they may begin with individuals and groups making alterations which demand change at higher and higher
levels of the social system.

We approached this description in two ways:

- the first aspect was to seek a description of each partner and then an indication of their purpose within the pilot implementation; and then to examine their progress in each of the objectives of the project.

- The second was to identify the impact markers for social change and ultimately for sustainability and to try to determine whether these could be met and/or were achieved during the time of the project.

The data was collected from a circulated self-evaluation document. Not all partners were able to participate in the time available – nearly all returned the first set of questions but less than half were able to complete the second returns. This is indicative of the pressures for completion of the activities as set out.

1. How partners viewed their involvement in REACH112

The original tender for this project required representation of the value chain in each of at least four pilots. This led to the central core of the partnership having to create a profile of participation which met the requirements of the tender. This was perhaps not the most effective means of construction of a consortium and led to gaps in the in-country profile.

If we consider the participation in terms of their place in the chain of activity related to access to telecommunications, we can see that although most components have a representative, no single pilot was able to field representatives in all.
Table 8.1 Distribution of Partners by self description

<table>
<thead>
<tr>
<th>Representation of users</th>
<th>ISP/mobile</th>
<th>Software/hardware</th>
<th>Relay services</th>
<th>Emergency services</th>
<th>TC infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaf/HoH/disabled (2)</td>
<td>Broadband providers</td>
<td>Handset suppliers (1)</td>
<td>Sign relay (1)</td>
<td>Police (3)</td>
<td>TC process (3)</td>
</tr>
<tr>
<td>Interpreter associations (0)</td>
<td>Mobile operators (1 – also fixed line))</td>
<td>Systems for emergency (1)</td>
<td>Speech relay (0)</td>
<td>Fire (1)</td>
<td></td>
</tr>
<tr>
<td>Emergency service associations (1)</td>
<td></td>
<td>Text relay (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management/evaluation (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This led to some frustration as components of the delivery chain could not be managed in each pilot.

An alternative view by pilot can be adapted from the original presented in the DoW confirms the overall complementarity but also the gaps in each case.
Table 8.2: Contributing partners for pilots

<table>
<thead>
<tr>
<th>Service</th>
<th>Spain</th>
<th>France</th>
<th>UK</th>
<th>NL</th>
<th>Sweden</th>
<th>Transnational</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC Call Distributing system</td>
<td>SIS</td>
<td>Ivés</td>
<td>AuPix</td>
<td></td>
<td>Omnitor</td>
<td></td>
</tr>
<tr>
<td>TC Call routing by destination number</td>
<td>SIS</td>
<td>Ivés</td>
<td>AuPix</td>
<td>4CT</td>
<td>Omnitor</td>
<td></td>
</tr>
<tr>
<td>TC User Endpoint</td>
<td>France Telecom</td>
<td>AuPix</td>
<td></td>
<td></td>
<td>Omnitor</td>
<td></td>
</tr>
<tr>
<td>Text Only Endpoint</td>
<td>SIS</td>
<td>RNID</td>
<td>AnnieS</td>
<td>Nokia</td>
<td>Nokia</td>
<td></td>
</tr>
<tr>
<td>TC Relay Agent Station</td>
<td>SIS</td>
<td>Ivés</td>
<td>AuPix</td>
<td></td>
<td>Omnitor</td>
<td></td>
</tr>
<tr>
<td>TC PSAP Station</td>
<td>SIS</td>
<td>Ivés</td>
<td>AuPix</td>
<td></td>
<td>Omnitor</td>
<td></td>
</tr>
<tr>
<td>Text relay access to PSAP</td>
<td>SIS</td>
<td>KLPD</td>
<td>SOS Alarm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC or Text-Only to Legacy Text Gateway</td>
<td>SIS</td>
<td>4CT</td>
<td>Omnitor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International TC Interfaces</td>
<td>France Telecom</td>
<td>AuPix</td>
<td>4CT</td>
<td>Omnitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSAP operators</td>
<td>AXEGA</td>
<td>CHUG</td>
<td>A S P</td>
<td>AFRS</td>
<td>KLPD</td>
<td>SOS Alarm</td>
</tr>
<tr>
<td>Relay Operators</td>
<td>SIS</td>
<td>Websourd</td>
<td></td>
<td>KLPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency association</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EENA</td>
<td></td>
</tr>
<tr>
<td>Deaf/Hoh organisation</td>
<td>WebSourd</td>
<td>RNID</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management/evaluation</td>
<td></td>
<td>CDS</td>
<td></td>
<td></td>
<td>IES</td>
<td></td>
</tr>
</tbody>
</table>

As part of the programme evaluation we asked partners to describe their current activities and their rationale for involvement in REACH112.

In the first case, we were interested in their ongoing extent of involvement with the user groups. Not surprisingly perhaps, few of the partners had direct, daily engagement with end users. This is likely to have the direct effect that the partners are not themselves users of the system of Total Conversation and would certainly have no dependence on its ultimate adoption and promotion. To some extent this creates a tension between the particular care for
users and the management of the daily problems in use among some partners and the general strategic or policy commitment to improve the lot of the users.

Another aspect is the focus for many, on the technical implementation and engineering of the system. The original specification of the project, pushed the consortium to a greater focus on the technical implementation and ‘proving’ of Total Conversation with less emphasis on users and the potential risk factors in discontinuing the pilot service at the end and the impact of the unfavourable political and economic climate.

The technical implementation however, did not extend to the emergency service centres, except in the case of Spain, but even this aspect was not prominent in technical discussions. There was a general sense that the software and hardware in the PSAPs was protected and could not be altered to suit the needs of REACH112.

The examination of rationale tended to confirm the above comments although the description presented of their organisational goals also highlighted quite different aspirations and significantly, quite different planes of operation. On the one hand, there were statements of business practice and priorities and on the other, there were equality aims and social justice as key missions of the organisations. The first group operate in a commercial world of economics while the other work with user needs and are driven by a social agenda. Management of a diverse consortium with this vertical structure turns out to be complex and difficult.

The likely differences open up even more clearly when we asked about the specific rationale for engagement with the REACH112 initiative.

There were global social goals expressed:

- Improvement of accessibility
- provide a platform of equality and inclusion
- Create new way of providing access for all

But also more business or service centric:

- faster turn round; IP development
- opportunity to continue and expand its services
- service is always seeking to improve its operations
- providing technology solutions for many years … one of the biggest challenges was to
make them accessible

And even less self-motivated, because of organisational considerations

- we were requested by the Ministry to take part
- corporate priorities and legacy work from previous projects

One of the issues for larger organisations is that the person who agrees to take part may not be the person who eventually manages their component of the project; leading to a dissociation from the original motivation and potentially moving from the more social goal towards the corporate goal.

This diversity leads to competing priorities and requires a considerable period of time and tight management in order to bring together the partners. It is difficult.

2. Progress towards the goals

At the point of the first request for self-evaluation (January 2012), all respondents were clear that their own participation and the project as a whole, was proceeding along its intended path and would reach its global goals. They were very positive.

At the same time partners in Spain were reporting that the user and traffic targets would not be met; responses from the Netherlands also indicated that relay numbers would not be reached. Nearly all respondents had become clear that emergency call targets would not be met. This was to a large extent countered by a great deal of test activity, training and adjustment of process in emergency call centres. However, it was clear that the task of integrating the REACH112 provision with emergency call centre software and procedures was going to be a much longer term process. In the case of Spain, an integrated system had been built but without sufficient users.

Targets for numbers of registered users had been or would be met and it was generally believed that P2P numbers would also be met.

The overall tone was optimistic which implied the coming together of the partnership and greater understanding of what was required to reach the goals.
3. The factors which changed as a result of involvement – the impact

To try to make this more concrete, we can examine the outcome factors which might be relevant for a project like REACH112. These are the areas of impact which the pilot should be aiming for. These outcomes as shown in tables below were reported on by the five pilots.
**Table 8-3 IMPACT: Individual and Family**  
*Outcome Areas and Sample Outcome Statements for REACH112*

<table>
<thead>
<tr>
<th>Outcome Area</th>
<th>Sample Outcome Statements</th>
<th>Partner reports</th>
</tr>
</thead>
</table>
| Changes in attitudes, e.g. perceptions and beliefs | * realisation of “reach” – when others are not physically present  
* Improved sense of security as other people can be reached through TC  
* confidence in interacting with hearing/mainstream through relay service | All agree this impact has been achieved. The use of the TC system has increased and users confidence has improved greatly. |
| Changes in knowledge | * understanding of Internet, telecommunications | In Sweden, Spain and the Netherlands, this was said to have occurred; but France and UK believed only that it may occur as a result of the project |
| Changes in awareness | * improved empathy with others because of immediacy of contact | Sweden believed this to have happened, UK & Spain said it may occur. |
| Changes in skills | * new protocols for interaction in text, video and voice | Sweden and Netherlands reported positively on this; both France and UK said it was ongoing. |
| Changes in behaviour | * more daily contact with others; more contact with society | Sweden and Netherlands agree this has happened; UK and France point to individual variations in progress on this. |
| Changes in health | * easier consultation  
* creation of micro-health support networks, so better prevention and post-operative care | Sweden sees this as having been achieved, France partially achieved and UK, Spain said it may occur. |
| Changes in family stability | * better contacts with family members through TC – directly for disabled users | Sweden, Netherlands and France believed this to be happening although still ongoing in France. UK. Spain considered it a likely outcome. |
| Changes in financial status | * no grounds for rejection of employability  
* no grounds for redundancy on account of increasing hearing loss | This was thought to apply for all although it was pointed out that no specific evidence existed. It was thought that REACH112 might enhance the use of anti-discrimination employment laws. |
Some of these aspects are shared as the impact moves outward from the point of application; there are also group and agency specific impacts.

Table 8-4 IMPACT: Population Level
Outcome Areas and Sample Outcome Statements for REACH112

<table>
<thead>
<tr>
<th>Outcome Area</th>
<th>Sample Outcome Statements</th>
<th>Partner Reports</th>
</tr>
</thead>
</table>
| Changes in health             | * easier network creation for interaction on health issues  
                                | * access through relay services to health care – Doctor, dentist, pharmacist         | Only Sweden felt that the first point would be achieved. The French response mentioned the possibility of incorrect information being exchanged. However, all agreed that the second was achieved or would be achieved in the project. |
| Changes in education          | * use of relay services in mainstream education facilities – increases choice and flexibility; increases involvement in non-curricular activities | Both Sweden and the UK felt that this was achievable although one partner raised a question about the availability of appropriate endpoints in schools. |
| Changes in social conditions  | * contactable by mainstream groups, commercial agencies, allows social integration and lifestyle improvement | In Sweden and the UK this was achieved. The situation in the Netherlands seemed to be that hearing calling Deaf people through relay was disallowed by the service provider. |
| Changes in economic conditions| * co-operative actions on employment – supporting entrepreneurship  
                                | * use of relay connects individuals and groups to mainstream                         | This was happening in Sweden and France and was expected to be an outcome in the UK. The second point was agreed for Sweden and France. |
| Changes in safety             | * establishes position in a community, offers a means to get help and to provide help to others  
                                | * 112 access                                                                       | All pilots considered this to be a direct outcome and the ultimate goal of the project was to provide 112 access. |
| Changes in own community involvement | *easier to set up Deaf, Hard of hearing groups, promote cultural events                | Only Sweden thought that this was an outcome of the project.                      |

As well as outcomes measured at the individual and group level, there are higher level outcomes which we can examine in REACH112, through this data set.
Table 8.5 INFLUENCE:
Outcome Areas and Sample Outcome Statements
<table>
<thead>
<tr>
<th>Broad Outcome Areas</th>
<th>Sample Outcome Statements</th>
<th>Partner Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in visibility of issue</td>
<td>* dissemination leads to local media coverage and engagement with the development * continuing media promotion – establishment in public information services</td>
<td>Only the UK thought that this had not yet been achieved. Sweden and the Netherlands considered that this second point had been achieved.</td>
</tr>
<tr>
<td>Changes in community norms</td>
<td>* mainstream community accepts equivalence through TC use</td>
<td>Both France and UK felt there was more work to be done on this before acceptance was reached. Sweden and the Netherlands felt that this had already occurred.</td>
</tr>
<tr>
<td>Changes in partnerships</td>
<td>* Partners increase formal interagency agreements and/or other collaborative protocols.</td>
<td>Sweden and the Netherlands felt there had been this increase but neither France nor UK agreed for their pilot.</td>
</tr>
<tr>
<td>Change in public will</td>
<td>* support for TC endpoints; publicly accessible endpoints in public sites</td>
<td>In Sweden, there are installations of public TC endpoints. This seems to be the case also in the Netherlands although it was not elaborated on. Neither UK nor France suggest this. However, in all cases because of the rise of smartphone applications, the need for fixed terminals has declined. In the UK REACH112 has supplied endpoints to public locations but these are not yet considered as a standard provision and they are set up to support relay only (VRI).</td>
</tr>
<tr>
<td>Change in political will</td>
<td>* incorporation of TC into public service – council sites, equipping of care workers</td>
<td>As above, all partners reported this as beginning to happen.</td>
</tr>
<tr>
<td>Change in policies</td>
<td>* designation of TC as valid enabling service to disabled users; corresponding funding</td>
<td>No policy change had yet been detected in the UK although Swedish public bodies were able to procure TC endpoints and services. France and the Netherlands felt this was also possible.</td>
</tr>
<tr>
<td>Specific policy changes</td>
<td>* legalisation of TC, of relay service, of 112 access; training</td>
<td>Neither in France nor in the UK was there a change of policy in a legal sense. Both Sweden and the Netherlands said that this had occurred. In the UK there was increasing provision for relay. Spain said relay was legalised</td>
</tr>
</tbody>
</table>
The above factors are all expected direct outcomes, but as REACH112 gathers momentum it begins to provide leverage, an effect beyond its immediate application.

<table>
<thead>
<tr>
<th>Change in regulations</th>
<th>* incorporation of TC in regulatory framework – operator training</th>
<th>Similarly, Sweden and the Netherlands said that TC had become part of the regulatory framework – not yet in France or the UK. Spain thought it was going to be an outcome.</th>
</tr>
</thead>
</table>
| Changes in service practice(s) | * TC reception in public agencies  
* staff that directly interact with TC service consumers increase their knowledge of the cultural backgrounds and experiences of their consumer populations.  
* service providers increase their linguistic competence.  
* service providers change the hours of service delivery to better match the availability of consumers. | The Swedish partner felt that these changes in service practice had been achieved and that “Mainstream users are getting more and more familiar with relay calls (they know how to handle those calls, and to speak normal “direct” to the user).” This progress was not claimed in the other pilots. |
| Change in business practice(s) | * TC access possible to local business: support to relay service from business to support contact:  
* employers mandate TC functionality in workplace | Both Sweden and the Netherlands indicated that there had been this change in business practices with mandatory TC functionality in the workplace. |
This set of returns from partners is complex. At one level of analysis, it emphasises the different stages of development in each pilot (much as we have already pointed out) but the rate of change and the focal point of change seems to vary from country to country. We are not able to see the development as moving through particular phases. Changes in attitude are the most interesting but changes in funding and political change are very much a sign of the times. Sweden with a longer history of Total Conversation had service agreements and practices in place prior to the financial crises of 2008. All of the other partners had suffered from the difficulties in the economic climate.

**Table 8-6 LEVERAGE: Outcome Areas for REACH112 and Sample Outcome Statements**

<table>
<thead>
<tr>
<th>Outcome Areas</th>
<th>Sample Outcome Statements</th>
<th>Partner Reports</th>
</tr>
</thead>
</table>
| Changes in public funds        | * Public funds redistributed toward REACH112 priorities  
                                | * New funding methods (pooled, matched, blended) increase monetary resources to support access in REACH112  
                                | * Public funding practices (mechanisms, formulae) change to adapt to a different landscape created by REACH112 | As before, Sweden indicates that all these points in this section are achieved.  
                                |                                                                                          | The other partners did not report these advances to the same degree (Spain, the Netherlands) or not at all (France, UK). |
| Changes in philanthropy        | * on agenda for charitable giving                                                           | In Sweden and Spain.                                                            |
| Changes in resource planning   | * areas, equipment identified with TC activity                                              | In Sweden and possibly in Spain.                                                |
| Changes in private investment  | * investment in endpoint development, software, networks                                    | In Sweden, Spain and the Netherlands.                                           |
| Changes in business models     | * new business plans to allow for TC                                                       | Progress in Spain, Sweden and the Netherlands.                                  |
4. Reflecting on Change and Impact

There is no doubt that it is hard to bring people to analyse critically and report on what they do.

“Some stakeholders may react in frustration to the theory of change development process because they view it as “taking time to think” which takes time away from “doing the work.” However, the thinking involved in building a theory of change does not in any way preclude doing the work. As mentioned earlier, it is almost impossible to determine whether progress has occurred in a community change initiative if you have not explicitly identified the steps to progress.” (page 43, ORS, 2004)

For most, the task at hand was to deliver to users and not to take time to reflect and report. At the same time, there is an understanding that cooperative action requires the sharing of goals and practices. The extent to which partner could take the time to share with one another the assumptions and expectations of the project was limited by the drive to complete their practical tasks.

Nevertheless, the details provided above give us considerable insight into the beliefs and self-monitoring of the different pilots. While the later sections of this report will consider what the users thought of REACH112, this section tells us more about the impact beyond the individual level and give clear insight into the partners’ thinking on impact.

Partners expressed positive views on the project aims and likely outcomes even though their perspectives were derived from very different business and social contexts.

Respondents from Sweden clearly believed that major social, political and policy change had been made and that users had made considerable strides in reaching a state of inclusion. The Netherlands, to a lesser extent, and based on a smaller user base and a changing political climate, presented their analysis very positively. The situation in both the UK and France was similar in that neither had yet seen engagement by public funding bodies and had not yet experienced the desired policy changes. In France, there was clear hope that a new governmental initiative would take the project on from where REACH112 left off. In the UK progress was mired in consultations by the regulator and delays at government level. These findings tell us a great deal about sustainability for Total Conversation and the uneven development across Europe.

The impact on an individual level is clearly visible to partners and there is progress in the so-
cietal level. The areas of influence and leverage remain somewhat problematic for most pilots, although Sweden seems to be much more advanced.

We will return to this theme after an examination of user reactions.
9. User engagement, experiences and views

The major part of the work in REACH112 has been carried out in Work package 6 where the full-scale pilot was underway. The deliverables in WP6 describe the technical implementation but do not deal with the user response. In this section and the following section of this report, we consider how users reacted, how they engaged with the systems and will highlight some of the issues in withdrawing the service at the end of the pilot.

In this part of the project evaluation, we are most concerned with users. There were several approaches to the data collection:

(a) examination of directly collected experiences and feedback from users (data from France, Sweden and the UK)

(b) focus group sampling on user (end users, relay agents and emergency service personnel) satisfaction and engagement with the project – data is analysed here from France, Sweden and the UK. This will be reported in Chapter 10.

(c) case studies of individual users and of critical incidents (data from Spain, Sweden, France and the UK). This will be reported in Chapter 11.

The overall aim of the studies to be carried out at different times through the period of the pilot, were to determine user engagement, user success in TC calls and user satisfaction with the service.

1. Direct user feedback - data collection

All partners were expected to have an online facility to support users and a facility for users to leave messages and comments. Some users were interviewed and the data analysed. Data was reported from Sweden, France and the UK.

The report from France in this area was extensive and helpful covering a wide range of the issues and mirroring to a large degree, the experience of users. As a starting point here, we will use the French report in full.
The vast majority of cases and interviews which were collected by partners were positive and enthusiastic. This was most obvious in the countries where the service was new.

2. **Creating a new service**

Although users in the past, could and did use web based video services to talk to each other in sign language, there was no perception of ownership of such services, no support and no sense in which this online video service advanced the cause of equality. It was by and large, another work-around by Deaf people where a system set up by and for, hearing people could be adapted for Deaf use. Only with the creation of the REACH112 Total Conversation service was there a system driven by Deaf people, supported by Deaf people and which was trying to be responsive to Deaf comments and feedback.

As in much of this report, the central part of the contrast is between the mature market of Sweden and the full implementation of Total Conversation in UK and France. Where the issues arise in regard to text we will incorporate the reactions we have from the Netherlands and from Spain. The context in each pilot is different.

We begin with the extensive report from France – much of what is reported here applies exactly to the UK and to other partners. Data presented here from user feedback re-appears in case studies and in the focus group responses.

3. **In France**

[This detailed report ie the following section, has been prepared by WebSourd (Sophie Dalle-Nazebi).]

1. **Introduction**

The feelings and the views of users are crucial elements in evaluation of the REACH112 project. They guided the development of interfaces as well as considerations by the call operators on the procedure for handling calls. As described in the previous section, various methods for collecting the opinions and suggestions of users were proposed during the different phases of testing and experimentation of Total Conversation calls. They also concerned call takers on the platform for emergency calls. However, we focus here on the users initiating the calls. The practices and experiences of call talkers are discussed in the section on the *Focus*
Group and are also mentioned in the Case Studies. We present here a synthesis of the feedback from users:

- emails with information about the different tests, and invitations to make calls
- test calls from person to person
- test calls to 112
- international calls
- calls in the context of games at distance
- interviews at the end of the experimental period of real emergency calls.

The feedback was collected:

- using feedback forms associated with each type of test call, with a space for free expression at the end of each document;
- during spontaneous exchanges by email in French and sometimes in French Sign Language (LSF);
- during discussions followed by email in French;
- during interviews in LSF (30) face to face or at distance.

A copy of all of these exchanges was saved and analyzed. Here we are interested only in the free expressions of individuals participating in the tests. (Data from the parts of questionnaires with closed or more formal answers and the findings of the focus group involving the first users are not repeated here. They allowed monitoring of technical and ergonomic data during the project, and have been included in the analysis of the practices of call takers, described in the section on the Focus Group.) Here we present the topics that were discussed spontaneously and individually by 87 users in 189 responses, which ranged from short emails expressing feelings after a call, to more detailed messages or more interactive exchanges in writing or using LSF during interviews. The names used in the citations are fictitious to protect the anonymity of users. These responses help us to better understand the criteria and measure of appreciation of these calls. A closer look at some of the real-life situations described is presented in the Case studies section.

2. **Conditions of use and interest in the project**

Total conversation: practices, objects and new procedures
The utilisation of calls in Total Conversation was not obvious to all users. In particular, we
can highlight three major causes of difficulties. The first is due to a lack of familiarity with
the Internet. The second concerns communication habits that are difficult to reverse, espe-

cially in stressful situations. These two aspects show that access to emergency services via Total
Conversation requires it to become an everyday means of communication, not only for use in
emergency situations. The third is fear of the unknown, whether for some this is Total Con-
versation or for others calls to emergency services or for experiments. This problem shows the
importance of instructional video, collective demonstrations and also involvement in an asso-
ciative network that can serve as a relay.

Lack of mastery of the Internet is manifested by a certain apprehension about computers and
the absence of points of reference in handling a computer or simply in surfing the internet.
Nevertheless, while most people know how to turn on a console and connect to the Internet, it
is sometimes not easy to identify the nature of the difficulties encountered by users, especially
at a distance. Their motivation is obviously the main driver, although a degree of panic is a
sign of lack of confidence.

CHRISTINE, 55 years - "I'm sorry. From the beginning I warned you: I can’t connect from my
PC despite the instructions! What must I do? I’ve missed everything! But I’ve been very busy
(…) and I couldn’t really follow this experiment and especially look for reasons for the negative
results of my computer; the password, like the login, aren’t working and despite many tries
nothing was successful!
There’re no results for the search "http://reach112.elision-services.com. That’s what the site
told me!
REACH112 - No, one shouldn’t put that in the search space. It must be put directly in the site
addresses space. See in this picture; put http://reach112.elision-services.com in the place of
"http://www.google..."
CHRISTINE - That’s it: it worked! I’m saving the installation. I’ll use it tomorrow. Thank you so much for everything! “

ELODIE, 56 - "Whew, I fumbled for the installation but I finally succeeded. I found the operator very good: calm, clear, patient. The call was quickly made. (...) And phew I got there ... "

Difficulties may be related to the user’s unfamiliarity with using the audio function on the terminal or not previously having the opportunity to communicate orally via Internet. Total Conversation communications therefore require some unusual settings.

GEORGES, 52 - "Getting started was a bit laborious. I had to test two microphones on the PC before finding one that worked. (...) I ran the test, first in text because I realized belatedly that the on/off button on the mic had slipped to off. In short, my PC was not ready for an emergency call. Using a microphone on my PC is not usual at home. (...) Here’s my opinion:

1. emergency calls must be made from terminals on which one phones regularly;
2. voice communication with return by text is effective.”

Similarly, some users are not accustomed to using text communication at distance. The test calls can then be an occasion for unexpected self-help, however, providing that users play the game all the way and interact with the call takers.

GERARD, 45 - "I wrote on a piece of paper and then I showed it to the screen. It is not practical to type on an American style keyboard.”

However, and not surprisingly, the difficulties in using computers and the Internet overwhelmingly concern older people and especially people who have become deaf late in life. The latter are strongly attached to the traditional landline, even though they may be apprehensive, even anxious about calls, with some uncertainty about the quality of what is heard and understood.

MARIE, 64 - "I manage to understand fairly well on the phone (depending on type of phone and on the willingness of the person who replies to speak clearly). (...) I see that it’s a bit complicated because I’m not very good at using certain features of the computer. I communicate a lot by email, but the computer still complicated for certain operations ... “
CLAIRE, 67 - "After getting over the apprehension about the call, all went well. I was just very surprised at the speed and ease of action. I'm so apprehensive when I pick up the phone, I thought I would have the same worries and yet it went very well.”

This population is also hampered by mobile phones; the keys are too small and the characters difficult to see. Contacts using SMS also upset their communication practices. These users typically tend to write complete sentences without mistakes and with punctuation; a behavior found in the calls via real time text. They also need several test calls to discover the different features of the device and in particular that it is possible to speak and then receive text back.

MADELEINE, 62 - "I speak by typing! I must resign myself to typing! But I cannot help to say hello and explain! I delete when it’s not well written, so I’m not top speed!"

Late deafened users are interested in Total Conversation because it allows them to obtain written feedback after speaking, and to see their interlocutor. However, they find it difficult to abandon their tool of reference, especially in an emergency, which is the regular phone.

MADELEINE, 62 - "We dream of a landline, in which we could speak and where we would have the answer in writing!

In the light of the various tests and testimonies, it is clear that videophones, resembling a phone with a screen, and more intuitive to use, are more suitable for elderly people. We still need to facilitate the acquisition of this material for them and their families, so as to facilitate everyday contacts using this media (in France, financial aid only applies to the individuals with a disability and not their family or acquaintances).

CHRISTIAN, 55 and his mother, 80 - "These tests were carried out at my mother’s home to take the case of an elderly person who is not used to computers or to using a keyboard. Although we explained that this was a test, talking to ‘112’ to simulate an emergency call stressed her, but she was very aware of the effectiveness of the system. (...) When communicating with her between my elision [PC software] and Oplink [Videophone], it goes very well and it gives her confidence for use in an emergency. (...) She replies with audio and reads the answers. She has taken to it very well. It’s an excellent tool, much awaited."

These issues of take-up and thus of support for users, is crucial. They are key conditions for everyone for access to emergency services. It is especially wrong to believe that due to lack of success in mastering these new technologies, users will use technologies that are seemingly simpler, offering inferior modes of access (for example, via SMS to the emergency services). Several testimonials show that some users uncompromisingly want optimal interaction that
respects their choice of communication mode, and that in cases of failure or impossibility,
they without hesitation return to “ad hoc” solutions that they are accustomed to, which if not
faster, they have full control of; to call a relative or a neighbor, to call a blind person (without
hearing the reply), to go to the hospital.

MADELEINE, 62 - "Personally, at age 62, with my hearing aid and my implant, I would prefer to call
for help with my phone and talk, and explain that I do not understand everything, rather than using
a sms! “

Reactions in an emergency and the media used

Force of habit was the second difficulty encountered by testers who were less accustomed to
Total Conversation. Thus, even in a fictitious situation call, the users were literally lost. Some
people said that they were unable to participate because they had no phone, when they were
already equipped with a Total Conversation tool that they had already had the opportunity to
test. In their imagination, emergencies were associated with a phone. Others had tried to call
112 by SMS, by email (to the address for technical assistance) or via a relay center. None of
these calls had worked, leaving the user frustrated and perplexed.

The detailed account of these call attempts also shows that deaf users do not usually interact
with emergency services. They try to send a warning message as a whole, providing all the
information they think necessary to be rescued. Not only do they need to become familiar
with the use of Internet technology and accustomed to the new terminals, they also need to
find ways of interacting with the emergency call operators. It turns out that this reflex reaction
of immediately giving a full set of information before initiating a discussion to clarify needs
and organize relief is omnipresent in this population, and currently still present in calls to 114
(SMS). Emergency call takers may need to adapt because users do not understand that this
first mass of information will not be used by the operators.

These examples of confusion during the first test calls show the importance of these experi-
ments but also the need to support users who were asked to report their difficulties, advised
and then invited to repeat the experiment. The anxiety of a first attempt that went unanswered,
where it was "impossible to understand what was happening," can be followed by a real intro-
duction to the "many questions by the emergency doctor" and interactions specific to an
emergency situation:

"The experience was interestingly, despite many typos on my part. Without doubt the excite-
ment of the game" (DENIS, 64).
These contacts can also reminded users of the existence of emergency service access, especially during the experimental phase of real calls. Panic associated with emergencies explains why users did not systematically use this access.

If the tools of Total Conversation are to become part of the daily lives of users, then reflexes and references must also be modified. The announcement of two numbers, one in limited modes (114), the other in Total Conversation (112), available on an experimental basis for a few months, did not promote a sustainable change in reaction. Attention should be paid to this during the stage of the formal introduction of emergency calls in Total Conversation.

Managing the stress of the unknown

Users already using Total Conversation on a daily basis can also be confronted by a certain apprehension about the unknown. Many of them took part in order to see for themselves how the emergency service worked and to experiment without going through a real situation. Some needed to make test calls; others found the films sufficient. However, other users were not able to do it, daunted even by the context of experimentation, or fearing to unintentionally solicit real help. This latter concern was shared by many testers, at the same time both appreciating their ability to trigger emergency help and dreading to see help turn up for real.

CHRISTIAN, 55 - "Although I said that this was a test, my mother was afraid to make a real call; apart from this little apprehension it went well."

Users who did not take the initiative and did not dare to make test calls would have liked a collective attempt during one of the meetings, as had been organized with some of them during the phase of simulations. The establishment of a large associative network for this type of collective demonstration and experimentation needs to be considered when the system is deployed on a large scale.

3. **The tool in its context**

The work environment or lifestyle of users is also an important factor to consider. Some users wishing to benefit from access to emergency calls from their workplace were faced with difficulties in installation, as they did not have administrator access to their computer terminal. This accessibility then implies the involvement of the employee’s hierarchy and the mobilization of technical services. However, these parties were not necessarily well informed about this project. In parallel, many deaf employees have testified to the lack of accessibility of fire
alarms, the importance of which appears to be minimized in many companies. Another obstacle to the use of Total Conversation in the workplace is the frequent installation of firewalls preventing the use of video. We find here issues of information on security issues, both in the private sector as well as in the public sector.

PASCAL, 58 - "Thank you for your new request, but I still cannot connect to 112. According to the IT department of my company, problems with firewalls block all use. So I have never been able to make the test call that you kindly invited me to make."

In relation to these issues of work location/venue, but in a domestic context, we also unexpectedly encountered financial and aesthetic issues. Emergency calls in Total Conversation gain in efficiency if the equipment is ready to use (videophone or computer switched on) and readily accessible (located in one of the main rooms of the home). These are the criteria put forward by the users themselves. Some of them, however, turned their equipment off at night to reduce energy costs or wished to restrict its use. Others put forward aesthetic issues concerning the choice of materials used and, consequently, in the modes of communication accepted or rejected. In the present case, the living room seems to be the best place for emergency calls; a videophone would look nicer than a computer, but a videophone without a computer keyboard added. Thus, the equipment must enable ergonomic written communications without the user having to buy and add a keyboard; it will thus be used only for calls using LSF, or abandoned if the emergency services cannot systematically handle in this language. Other users wanted greater investment in portable devices (mobile phones or tablets), presented as ornaments or paraphernalia worn daily or carried in their handbag. These considerations, which could well be judged as secondary, appear to be important in the domestic organisation of accessibility of emergency services.

4. Playing to learn, learning the game

In order to support users in their adoption of Total Conversation in a lighthearted manner, a collective game involving many calls was proposed in two time slots of 2 hours with fifteen volunteers per session.

VIRGINIA 59 - "The game is great! I'd play again! For REACH112 in emergencies, it will be great and practical, after the distance learning game."

The principle is simple. The aim of the game is to identify the thief among the players. Play-
ers receive two descriptions as clues and the telephone numbers of two other players. Participants must call one another to get the other clues (and other phone numbers) and observe or question the other person to find out if he/she’s the thief. This game creates many cross-calls. It allows both to test the robustness of the network and to explore the features of the system: a recorded message when the person is absent or busy, calling the answering device, the multimodality of exchanges ... By bringing together users who do not necessarily use LSF, the game shows that the combination of a range of different media allows sign language users and non-sign language users, or people with different levels of mastery of LSF or of written French, to collaborate and interact successfully in the same game. It also allows them to discover the world of the telephone (notably characterised by the impossibility of knowing whether the other person is present or available) and to engage in experimental calls in an accompanied and playful manner. Indeed, a resource person is indeed available via email, chat or Total Conversation during the entire period of the game.

**ADELAIDE, 42** - "I discovered that with Elision one can also communicate via text, without switching to the speed typing mode [relay center] that I’m used to"

**MADELEINE, 62** - "I realized that I hadn’t completely mastered the technique. I didn’t understand how to make communications.”

This way of experimenting with the application using a game implies, nevertheless, that everyone participating is already initiated into this type of call, or needs to be particularly motivated or encouraged by friends who play themselves. Indeed, in addition to discovering the tools used to call and Total Conversation itself, there is added an initiation into the principles of playing games at distance. For most participants, this novelty was almost greater than that of the media used. This was a driver for some users, but also limited the number of willing participants. It seems that such a device can only be offered on a larger scale on condition that the recruitment of players is made in part through a network of acquaintances.

### 5. Issues raised by users

Without attempting to cover everything, we present here a selection of views concerning the emergency service. These returns were collected after the test calls to 112, by people who had experimented with communication via text, voice - return text or LSF.

**Motivation was strong**

**ANDRÉ, 40** - "I wanted to participate in the experiments because I want us to achieve these goals for emergencies of REACH112. I want to empower you to make a difference. That's why
it's important to experiment. To reach these objectives, because currently, for accessibility we are rather stuck. This is why I participated, to upgrade your emergency service. (...) But you know that's the life of deaf people, to be anxious and always have problems with these obstacles. (...) We must be militant when faced with these situations. It’s is not fair. Yes. We must act, demand to have access, on equal terms with hearing people. This is the goal. (...) I want there to be common goals, equality. This is why I participate in experiments, I encourage all that, for this equal accessibility to others. That's what I want.”

VIRGINIA, 59 - "I've already been in an emergency situation. That's why I had the idea to present a real life situation, to try it out during an emergency call to 112. As if it was true. Phew! It went well! Super! Uh, yes, I was a little confused at the beginning of the communication, the first time. (...) The real experiences made me afraid, there was something missing. I needed to be able to call, it was missing! I was stuck! Of course, I called my son when he was there. But imagine if he's not there. That's great! Also, calling my neighbours bothers me! If I’m afraid, they are there. But it bothers me to have to; it’s as if I owe something. No, I prefer to be autonomous, free! That's it. I feel that it makes me free. It feels good, it's great. Well, that's it.”

There was a huge desire to address the issues, share experiences and to take forward solutions.

Testing a device ready for use; participation in the development of a needed service

The opportunity to test a service before its actual opening to the public was welcomed by many users. It is an experiment that reassures them. However, there were many who were afraid of eliciting the emergency services for real. This fear was well founded: rescue teams actually went on site on two occasions during the phase of false emergency calls. Some users, however, were glad to note that this turn of events was possible, because it showed that the application was operational.

BILLY, 40 - "The fact that I'm testing Reach 112; I still doubt that the operator and I are really in the test phase. It was not until I asked for confirmation from the operator that it was only a test that I was reassured that the ambulance would not turn up at my place for nothing.”

VALENTINE, 44 - "I gave the wrong address because during the last test call, the police actually came to my house!"

Many users wanted to point out that this service corresponded well with their expectations, and it was essential to carry on with it.

ADELAIDE, 42 - "It’s reassuring to be able to call for help when you're deaf."

STEPHANIE, 43 years - "Thank you to the operator of this evening, and thanks to everyone for these tests! I appreciated them and I think REACH112 is really an important project. “
JOSEPHINE, 39 - "I want to be at par with others, with the hearing customers. I want to be a full citizen, I want to be equal with hearing people, that’s normal. If there’s a problem or something else, such as a fire, I’m not going to sit around and wait. One must react; one must have the best rescue responses, react quickly. I think it’s not bad that the number 112 is being adapted to the deaf."

Speed was an essential criterion.

It is not surprising that speed is a very important criterion for evaluating these calls. It concerns both time to pick-up by the operator, and also the speed of exchange of information.

FRANCOIS, 45 - "I am very pleased, a fast service."

CATHERINE, 52 - "Great to have someone pick-up immediately and respond in writing directly."

ANNE, 56 - "OK I just did it ... Me talking and the person on the line "in writing." It went well ... Maybe a little too much waiting at the end. Otherwise, the questions and answers nearly instantaneous."

Users also take into account the speed of sending a call; in this way they evaluate the most suitable material. They also emphasize the need to have an intuitive or everyday use.

CLAIRE, 67 - "For my part, I’m surprised, as for other test calls at the ease to get in contact. It’s a very good thing."

TRISTAN, 33 - "No technical problem with Elision REACH 112 [computer software] but the use of Oplink [Videophone] is necessary for rapid contact and to facilitate use."

The core trio: a highly professional attitude, quality of communication and advice

As might be expected, users emphasise the importance of the quality, both technical and linguistic, of the communication with operators. Apart from the technical problems that some users encountered, especially low speed of Internet connection, the quality of communication was appreciated.

CLAUDE, 42 - "Fluid exchanges and clear answers. J"

GEORGES, 52 - "It works very well. I find myself very comfortable and confident with the text on the PC in an emergency context. Very accurate, no misunderstanding possible; great."
ANNE, 56 - "My opinion. Almost immediate response of 112. Good listener, relevant questions and the person on the screen had good arguments to reassure me ... For me, this distance experimentation and from home, is a +."

However, they also expect safety/health advice. It is probably worth mentioning that, for the users, this is obvious and is wanted, whereas the operators had received clear instructions to only act as the bridge between users and the local emergency services. From the point of view of users, their professional role not only requires the ability to ask the right questions, but also to provide important elements for first aid and survival.

SORAYA, 31 - "Very good advice from the person who took my call: several recommendations from him such as to get out of the building, wait for the firemen etc ... this is information that can be reassuring for people who are panicking."

TRISTAN, 33 - "As a rescuer and trainer for the First Aid and Emergency Socio-Psychological Civil Protection Service, basic training in listening and in managing a conversation involving psychological distress is strongly recommended for operators, as it is for call takers of ‘SOS friendship’ and ‘SOS suicide’ etc."

CHRISTIAN, 55 - "The exchanges are clear and precise and highlight the things which we do not think about without being placed in the situation. These observations are valid for the entourage of people with disabilities and therefore to be recommended (..."

GUY, 59 - "The dialogue went perfectly fine, with relevant questions and helpful suggestions.”

Numerous users have emphasised the professional attitude of the operators. It is important to note that while this aspect was explicitly pointed out by users of the video (with or without LSF), it is generally associated with the quality of communication and advice. Users want to deal with an operator who is "confident in his role," that is to say who has "very good self control", who efficiently conducts the interactions, and thus be able to provide relief (PHILIPPE, 38).


CÉDRIC, 32 - "Overall the agent was calm. He was flexible knowing that I cut him off to go and vomit. He managed, he was calm, organised, addressing the various points one after another."
6. **Determining together the of role of emergency call operators**

It is important to note that users have actively contributed to establishing the job description of emergency call takers (called “operators” in this section), and how it is interpreted; through the scenarios they have participated in, via the diversity of their calls and the heterogeneity of their levels and style of expression (either in French or LSF). They were co-actors in the development of the operators’ role by their behaviour and reactions during test calls, as well as through the feedback and comments they made and that have been considered in the analysis and when proposing modifications to professional practices on the platform (the centre receiving emergency calls and contacting the appropriate local emergency service). Without attempting completeness, we present here the contribution of users, which is complementary to our observations on the interactions of operators described in the section on the **Focus Group** and in some **case studies**. The comments reported here, often uncompromising, took place in a context of continuing operator training, and allowed us to follow the significant evolution in users’ impressions. Such consideration of the views and experience of callers should be integrated into every stage of the switch of the emergency call centre, from the present SMS and fax service, to Total Conversation.

7. **Adapting communication mode to the user**

The operators were initially trained to handle calls made in SMS and to interact with deaf people who might have a poor level of written French and/or French influenced by the expressions used in LSF. They did not, however, necessarily have the reflex to adjust the way in which they replied to the level of expression of the caller. Users participating in tests stressed...
the importance of this adaptation to the manner of expression of their interlocutor; many deaf people are able to use complete sentences or to understand simple sentences.

CLAUDE, 42 - "Feeling about the operators: Not at ease with the first test. The operator uses "pi" LSF. I can understand. So it works. But what would happen with a deafened person? Would they understand? Examples: "steals laptop only?", "Your operator who? ". (...) For the second test done, the operator used correct French with short and simple sentences. I think this is a good thing (...)"

STEPHANIE, 43 - "Another point: as for the previous test, one should try to make sentences as questions, instead of just saying "Fall?" "Prosthesis?" It's too "dry" otherwise. In reality, when you talk to a person face to face, even in an emergency context, one exchanges sentences, not "single words" I think. It's important for the quality of the dialogue."

Attention was also drawn to the need to respect the caller’s choice of communication mode, which implies both that the operator shows no judgment or disappointment, and secondly that a switchover is technically possible between the operators. We note that users uncompromisingly consider this to be an entitlement, a posture found later concerning the demand for access in LSF 24h/24.

BILLY, 40 - "I decided to play an oral deaf, I fell on a deaf operator who looked to me a little... (how shall we say, a little annoyed or disappointed in short... ), since I wanted to speak using a headset with micro. Some advice I give to the professional operators, they must adapt to the choice of mode of communication of each deaf or hearing impaired person, and avoid showing any sign of disappointment if the mode of communication chosen by a client that is not that preferred by the operator, but a reassuring attitude, asking him to wait a bit for a hearing person to replace him, with a smile."

Adapting to the communication mode of the caller also assumes being able to combine all the possible diverse communication methods and master the technical parameters. Thus, the operators have yet to fully master and integrate the existence and terms of multimodal interactions involving voice, users able to speak and receive text, or conversely to express themselves in text and hear the replies. This diversity of situations was not immediately integrated. The sound settings remain an area requiring further development, both on the side of the operators and at the level of technical support to users.

CHRISTIAN, 55 and his mother 80 - "Unaccustomed to using a keyboard (elderly person). In this case it is essential that the operator has a good audio signal. The operator did not hear well, this was due to the stress of the caller, who did not articulate enough nor speak clearly in front of the Oplink [Videophone]. Maybe an external microphone could improve the exchange. The operator, after having identified the caller, should ask them to calm down and take the time to
speak so as to be better understood. Callers (hard of hearing) do not always have the habit of
writing on a keyboard, so do not count on it.”

8. **The conditions for communication by video**

Questions about the suitability of the platform to receive emergency calls with communications in Total Conversation, also concern the conditions of use of video. Many users, “speakers” or not of LSF, reported poor lighting on the operators side or against the light phenomena.

**FABRICE, 39** - "Test ok for the first theme, but the background bothers me because there’s a reflection of a tree under a brighter sun than here ... so try to put the camera in front of a wall that’s as neutral as possible and paler. Try to anticipate that the light must be higher in order to be more comfortable because there’s a fairly large amount of shadow in my opinion.”

**JULIETTE, 35** - "I tried a test call in the afternoon but the LSF operator was not present, only the hearing operator, therefore by text-text. I saw that the room for the operator was too well lit or bright, such that I could not see his face. This has to be visible, with a curtain if the operator’s room has a window.”

These users also requested that the "lack of light and horrible background wall" be avoided (SOFIANE, 38) including ensuring that there is a "neutral background" (HENRY, 35 years), preferably gray rather than white so that visually impaired deaf people can clearly see what the operators are saying in LSF. Similarly, it should be possible to display communications in real-time text in clear characters on a dark background (GILLES, 28 years). Efforts must therefore be continued to improve accessibility for the visually impaired deaf. Finally, video can be used by any user, regardless of mode of communication. Thus, the camera should always be correctly positioned to allow good visibility. Some users communicating through text could have been bothered to see only the door of the room or only the top of the head of the operator.

**MELANIE, 43** - "When I type text, I do not see the operator on the video, that’s positioned too high. It bothers me a bit due to a lack of comfort and need to be reassured.”

Operators were requested to take into account the fact that they could be seen by their interlocutor, whatever the mode of communication used.
9. **What video shows, implicit messages**

Being able to see operators has been a subject of comments by the users and a ongoing topic of work to find an optimal professional posture, engaging the authority and credibility of the operators and on which the smooth functioning of sending help depends. During test calls (aimed at fine tuning the organisation of work positions, interacting with users and modalities of coordination between operators) users have commented on the implicit messages conveyed by the behaviour of their interlocutor, their expression and their work environment, all three clearly visible via the camera.

❖ **Overload and management of multiple tasks**

The fluidity of speech in LSF by operators, or their hesitations, informs users about their level of confidence and their ability to manage various activities simultaneously, or not.

*CYAN, 48* - "Lovely little call taker but looking a little overwhelmed..."

While users do not see everything that happens on the platform, they observe that the operator communicates with other people and may, or not, be having problems in the management of their call.

*STEPHANIE, 43* - "The operator seemed bothered by having to use two headsets (one for exchanges with me, the other to communicate with the EAS) and he seemed distracted (_BUSY_), during these manipulations of headsets there was a sense of confusion (and pauses in the exchanges... I was alone with my pain (_BUSY_)). At one point he made me a sign ("hello") of the hand, he seemed not to have heard what I told him. In fact, I think, it was not the right headset. Another operator, in a previous test, wrote to me: "From now on could you write instead of talk?" I understood he could not hear me during a call to the EAS. Once the test call to the EAS had finished, the operator calmly put back on the first headset and indicated to me that I could speak again."

Thus the camera gives a view of the operators trying to find the most appropriate work postures and their efforts at coordination. In doing so, it contributes to undermining their role as operators. Aware that this was a phase of testing and training, users remained supportive, providing advice and pointing out the good practices observed. It also appears that by making visible the trials and errors of the operators, the feelings of loneliness, communication interruptions and the anxiety evoked by the users were somewhat mitigated. Indeed, the video makes it possible to understand the causes.
The effect of activity on the platform; clarification of roles, explanation of context

The fact remains that all is not visible to users and it is thus necessary to explain what is going on or who the people are who the operator can be seen talking to. Otherwise, callers are left with assumptions about the operation of the platform, assumptions that can redistribute roles and skills. Some are harmless; others undermine the credibility of agents.

HENRI, 35 - "In front one person, and another interprets, better to explain beforehand"

CHRISTIAN, 55 - "The exchanges are fast, in contrast, I have the impression that from a medical standpoint, the operator seems not to be well enough trained: according to my answers, he seemed to refer to a person beside him, a doctor I suppose."

These assumptions concern in particular the role and skills of level 2 operators who are neither doctors nor interpreters, but operators managing relations with the local services and capable of relaying requests for clarification from a doctor or information regarding the sending of rescue services. A poor distribution of roles between the two agents, or intrusive management and disorganized interactions between the different actors is highly confusing for users.

JULIETTE, 35 - "Me too, I’d like to know ... often when I called, the person is making fun of me, because someone is trying to tell him what?" Wait, wait," she says to someone, "ha yes, for example..." They interact with each other...! It's embarrassing... It's embarrassing... I prefer... that the person... makes a sign, quickly understands what is being said, then asks the other person and tells me what they say. But things must be said clearly! And avoid interference about who said what to whom, because she is interacting with the doctor. And me, I didn’t understand anything, it was confusing."

A visible (dis)engagement in the action

The credibility of the centre taking emergency calls is highly dependent on the first visual contact with an operator. If available and clearly ready to act, operators gain in authority and the user feels confident. If instead, their attitude is too relaxed, they begin by explaining that they must lower a blind or reposition a camera, then, the user does not feel that he is going to get help quickly. The video provides implicit messages that operators must take into account.

BILLY, 40 - "When I saw an operator at the end of the line, I saw that this operator was not yet ready to listen to me as he needs to adjust the equipment."

Face to face positioning and the importance of interpersonal relationship

Deliverable D7.1 v1.6b
Since the camera creates a visual link, it unavoidably brings into play the body language of the interlocutors, the operators have to take into account not only the impact their way of expressing themselves can have, but also the attention, or lack of attention, to the user that they show during more relaxed phases of the interaction. From the point of view of users, even if the emergency instructions are transmitted, the operators have to find a relational posture that veers neither towards compassion and affectation, nor towards cold distancing.

VALENTINE, 44 - "The scenario chosen was of a grandfather stricken by a heart attack. I had already waited 10 minutes, then called again to get an operator. If the situation had been real, my grandfather would have already died! He told me to put him on his side and that's all. I do not know whether that would have reassured me in a real situation, but here I found there was a lack of caring."

The aspect of presence permitted by the camera reassures users and also allows operators to remain engaged with the emergency and its possible evolution. However, the camera also imposes continuity in the interpersonal relationship, which operators have to learn to manage. Indeed, what should one do in the more informal moments while the operator is waiting for the opinion of a doctor or confirmation that an emergency vehicle has been sent?

SYLVIE, 29 - "Hardware ok, LSF level ok, level of welcome nul: lack of confidence: She lacked confidence to respond with assurance and clarity. We communicated in a sensitive context. We needed to talk, chat to create a link. But no, she said nothing, we watched one another in silence ... and to tell me "wait, wait", "wait he’s phoning." I was stressed (...). The situation was sensitive for me. One had to manage things with psychology. And no ... Because she told me, "Wait the firefighters are coming." I was shocked, "No!"

SOFIANE, 33 - Reply: the operator was better than last time, with more commitment in his relationship with the caller, a better more professional attitude. But the positioning with the operator side by side with the hearing person means that they cannot hold the visual link with the caller (...) Any ideas (...) one is that instead of saying "wait" very often, she should keep up a conversation with questions about the situation (even if it will not help the doctor in the long run) to maintain the link with the caller."

SOFIANE, 33 - "Reply: high performing operator with a very good relationship, who knew how to converse to make me wait (while the medical service took 10 minutes to reply)."

In this way users have contributed to identifying the interpersonal relational practices that must be implemented so as to reduce stress and provide conditions for efficient rescue. Over time, the operators gradually developed a well adapted professional attitude.
The subtleties of communication by text

The opinions and comments of users also dwelt heavily on the modalities of interaction using text in general and by text Real Time Text in particular. This feedback concerned communication situations that did not resort to video. The essential information that emerges from all of these comments is that text-only communication in an emergency situation is extremely delicate and requires the deployment of real skills to reduce stress and to maintain the link with the user. What particularly characterises this form of communication is the lack of contextual information: all implicit information concerning the professionalism of the operators, their involvement in the rescue effort, indications of their attentiveness and presence, have to be stated explicitly. If not they are decoded by other means, without the operators necessarily having any consciousness of this. In contrast to the situation with video, they have the opposite feeling, one of being released from this bond of presence, and escape the constraints of having to manage it. For users on the contrary, the operators have to create the relationship of presence in a single text message. Consciously or not, on their side they mobilize different indices to represent their interlocutor.

❖ **Speed Writing = speed of rescue: effect on anxiety**

For users, speed writing is above all a sign of commitment to the interaction and to the emergency. The quality of the messages also reveals the involvement of the person in the exchange and in the relationship. These signs of reactivity considerably reassured users. Conversely, curt words or terse messages and slow speed in writing were factors of anxiety.

**BRIGITTE, 30** - "Yes the communication was too slow for an emergency. The sentences of the interlocutor were nowhere near complete, but I guessed the meaning."

**STEPHANIE, 43** - "The messages were too short, and too, not interactive enough during this test. They also appeared on the screen relatively slowly. In a real emergency situation, for example, if I was nervous, that I would be a bit destabilising for me."

**CATHERINE, 52** - "Reactions sometimes quite slow, like when asking where exactly was the river, this precise question came very late, or, as if they didn’t know what to say straight away? Conversation a little disorganised, but it’s only an impression."

**GEORGES, 52** - "The communication was easy, clear, but not fast enough. This can increase stress in a situation of great urgency (...)

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Deliverable D7.1 v1.6b
**VIVIANE, 60** - "The two communications appeared too slow. Meanwhile, I have a close relative (my brother, my friend) perhaps dying ... and who needs my immediate help: cardiac massage, to be put out of danger from cars, to cover him with a blanket, to stimulate so he remains conscious...). I guess that in a real case, I'd be super stressed."

### 4. Benefits of Total Conversation

Responses on the whole were very positive

**GEORGES, 52** - "Total Conversation, a telecommunications technology combining different multimedia modes: voice, video, text etc. is obviously appropriate. At every test I have done with REACH112, the feeling of its aptness was immediate and intense."

End users were positive about Real-time text

**BERNARD, 32** - "Some doubts about the first aid to be given to the injured person; (corrected sentence beginning 3 or 4 times). The zip code search from the city name and department seemed a bit long."

**CHRISTIAN, 55** - "When writing: above all, keep on writing even if typos or spelling: it’s the rapid exchange and content that matter. (...) This is just a note to encourage operators to focus on the content and speed of exchanges."

❖ **The effect of faults: impairs clarity, gives an impression of panic**

The task is complex for operators, who seem to have no choice but to be particularly proficient in typing. Indeed, if corrections are seen as problematic, typos or spelling mistakes also blur the clarity of messages. If they are too frequent, they give, even with correction, the appearance of panic. Users then have the feeling that their interlocutor does not master the situation. They may also have the impression that their problem is particularly serious or difficult to deal with.

**AGNES, 36** - "The typos were a bit annoying; the vocabulary needs to be clear and unambiguous. It also shows that the person who answers is calm and reassuring. OK (a bit too fast: a few typos, take your time!)"

❖ **Managing pauses; explaining the context**
Off camera, the operators have the feeling of being released from the watch and their connection with the user. They may think that they can manage several activities and interactions simultaneously, more easily than in a communication by LSF or in the presence of a camera. Feedback from users shows instead that these situations are much more worrying to them than when they can see what the operators were doing, via a camera. Thus, during these interactions by text, operators should be especially careful to maintain the connection with the user on the one hand, and to announce any pauses in the communication on the other. Staying connected a text communication depends on the exchange of messages. In the absence of contact, periods of "emptiness" are interpreted as technical cut-offs in the communication. They are particularly stressful.

MARTIN, 30 - "During a wait with a third party (eg with a doctor) nothing tells us that something is going on."

NATHALIE, 33 - "Were you been bothered by anything? If yes, by what? By the hiatus after giving the details. We do not know (or only later) that the operator was busy alerting the rescue services."

KEVIN, 37 - "Return of the answer acceptable, but not always very fast in text insofar as it is an emergency. (...) Not very responsive I find, sometimes waiting and this could be worrisome for someone shocked."

STEPHANIE, 43 - "In general try to write a little more, reformulate (there are gaps, and for example, as a caller I wonder what’s going on, what’s being said? This makes waiting for the next sentences / questions a little long). In a real call situation it might help the caller to stay calm."

CYAN, 48 - "Problem for text ... What I wrote was displayed out of place, sometimes broken up by the 112 text. When using the text–text method, there are sometimes long "blanks" where one wonders what to do..."

GEORGES, 52 - "The operator is slow at typing and is absent for quite long times, I wondered at one point if the connection had been cut."

The fact that these operators also deal with calls by SMS may explain why they are less sensitive than users to the consequence of these "gaps". Indeed, they are used to response times that are much longer and find exchanges in Real Time Text extremely fast. While they too use timely responses as indicators of presence and urgency, their time scales are different from those of users.

❖ The need for indicators of active listening
Operators must invent ways to make manifest their presence and their commitment to the text relationship with users. They have no real suggestions, if only to maintain contact and make visible or explicit as much of what they are doing as is possible.

SYLVIA, 30 - "About a 7 min conversation ... Personal feeling: you feel alone all the same with text... despite the speed of typing by the operator..."

ALAIN, 36 - "Good overall conduct; Attention, text in real time, so you can see the spelling mistakes by the operators! (...) Since I have only visual feedback, I would like to see written keywords in return for what I say = elements on which the diagnosis is based. This textual return would be evidence of active listening."

It is important that methods of managing interactions with users, using all the various modes of communication possible (with or without video, in French or LSF etc.), are part of the training and evaluation of operators. This would be complementary to work that has been done on the content of exchanges and the syntax used in French written by deaf people with a poor command of this language.

I. **Real-time text acclaimed**

Users who experimented with test calls to 112 in Real Time Text have pointed out the speed and responsiveness this means of communication allows, and also to the significant reduction in stress permitted by the feeling of being in direct contact with the operator.

CLAUDE, 42 - "RTT mode much appreciated: keeps the link with the operator, more reassuring, more efficient / fast (even if I was not in a situation of extreme urgency)"

DANIEL, 62 - "I think real-time text is far superior to SMS and fax as it’s much faster. Indeed, with text in real time, you can interrupt a drawn out explanation by the caller when there is misunderstanding and say that the details are irrelevant."

These advantages of RTT were confirmed by a panel of ten testers who had the opportunity to compare calls to 112 in Real Time Text and to 114 by SMS. They were asked to play the same scenarios in these two calls, which were handled by the same platform and the same team of operators. Preference is clearly for RTT to the detriment of SMS. This is also the point of view of the operators on the platform. However, the development of RTT on mobile phones remains to be done; the tests mentioned here were made with a prototype cell phone that is not currently available on the market. Furthermore, the possibility to make roaming calls (call mobility) remains a strong demand of users, as we discuss later.
**FABRICE, 39** - "When you call 114, you really have to reconsider the system, because from the sending of the SMS of distress and terminating the communication I counted 50 minutes... For an emergency call, for example, trying to save a child from drowning, the overly long delay with this system is detrimental to the survival of the child, without forgetting that I specified the town of Thonon located on Lake Geneva, opposite Switzerland... the call centre asked me if I was on the French or Swiss side... lol (...) the only advantage I can think of for emergency calls by SMS, is receiving an SMS back saying that the emergency services have received my SMS. (...) As this is my 2nd week of testing, I say loud and clear that services via SMS are not at all adapted for survival in cases such as drowning or a heart attack... because as you know, you can save a person who has suffered an infarct only in the first 5 minutes, likewise for drowning... 50 minutes or 20 minutes, it's too late... the only viable solution in my eyes is REACH112 with the famous RTT...”

**CLAUDE, 42** - "RTT is more reassuring than SMS: real contact with the emergency call service, faster exchanges, efficient. By SMS: first SMS received ok, with reply in 30-40 sec, but after that poor reactivity to guide me: what to do? I had to wait 5-7 min to perform the first-first aid. Not reassuring in an emergency. RTT: technically it worked well. In terms of use: lack of practice on the use of a physical keyboard and mobile phone. Normally, I do not use it every day. In short, a call to 112 with RTT is not bad! and much better than SMS. »

2. **Video is useful, even without LSF**

It is important to mention that many users discovered and emphasised the advantage of adding video, regardless of the mode of communication used. Firstly, in text communications, it allows to compensate for the lack of compassionate signals and frequent "gaps" related to the operator performing several activities and interactions at the same time. Video allows users to fill these breaks in information with the contextual elements that can be seen.

**BRIGITTE, 30** - "There were sometimes blanks, but thanks to the video, I saw her call and also look for something (maybe in the computer)"

In addition, video allows an injury or a level of risk (in the case of violence between people) to be more readily assessed than with text alone. It would be particularly useful to show the safety positions that need to be adopted or emergency first aid measures to perform. More generally, it is the possibility to give a human dimension and improve the quality of the interpersonal relationship that is highlighted by users, who say that being able to see their interlocutor reassures them. This is especially true for older people.

**CHRISTIAN, 55** - "Already, when communicating with my mother we always use the video; it’s much more convivial and reassuring.”
3. **Text is complementary to speech or LSF**

In the same way, text communication can assist exchanges in LSF. Text is better for communicating an address, a name or the name of a drug.

> **JULIETTE, 35** - "And the names, for example names of medicines, they must write them straight away, don’t start to try to spell them out, it becomes gibberish furthermore the image was dark, no no, no spelling. One must write the names first and sign the need to look at the text. It's easier."

Text communication is also useful to resolve ambiguities about the LSF signs used or in the case of misunderstandings with the operator. Finally, some ‘speakers’ of LSF think the occasional or continued use of text may help them to calm down when under great stress and focus on the information they want to convey.

> **ÉLODIE, 56** - "If it was a real test case, I don’t know if I will be able to sign calmly. I think that I'd perhaps find it easier to type calmly."

4. **A demand for round-the-clock access in LSF**

If users, whatever the mode of communication, appreciate the multimodality offered by Total Conversation, those who practice LSF, nonetheless, ask to have permanent access in this language. During the experimental phases of false and then real calls to 112, this was not the case. Indeed, the limited number of agents handling emergency calls on the Grenoble platform did not permit LSF calls 24/24 hours. When no operator capable of receiving a call in LSF was present or available, then calls in this language were switched to an operator communicating by text. Users wishing to call emergency services in LSF were obliged to go through text instead. This procedure nevertheless ensured uninterrupted access to emergency services. For the majority of LSF users this arrangement is only really acceptable for roaming calls. The surprise of many LSF users, who did not even imagine that accessibility in LSF 24h/24 was not possible, should be stressed. They were affronted to have to adapt to the skills of the operators, when the system had been developed specifically to give them

5. **User aspirations**

Users were very clear on the need to continue:
**GILBERT, 28** "Beyond doubt, I say that the overall assessment of REACH112 is good. I hope it will open doors and continue. It will depend; this accessibility will depend on the availability of funds [from government], as well as authorization, agreements, depending on the evaluation. I feel it will be good, that there will be a wider deployment."

**ISABELLE, 46** "REACH112 is good. I want to use it to call emergency [services]. I discovered that it was easy to communicate. It’s clear. We must continue REACH112. I want this to go on. It’s good. It is clear! It's easy! “

**CHRISTIAN, 55** "With my mother, we could no longer do without the real-time text communication service."

**BERTILLE, 60** "It is better the 112 [than calling by SMS], I prefer the 112, because we see each other. It's obvious. It’s evident. We see each other. Yes, I need that. It’s to be safe, it’s more securing and more reassuring."

Without a great deal of elaboration, we feel it is important to repeat here the wish-list spontaneously expressed by users on the developments and improvements of services offered or the ways in which emergency calls are handled.

- Enable mobile calls in Total Conversation
- Having a doctor online, more rapidly and more often
- Inform local players
- Involve deaf ushers in the training of operators
- Integrating the different terminals used by users
- Have access to a relay centre service for full access

Provide access in LSF.

This was a source of great distress and sometimes real anger.

**ANDRÉ, 40** - "You cannot force deaf users who do not want to use written French. (...) I would like to add the reason for my choice of 24h/24h in LSF. Already, most deaf people have difficulty expressing themselves in French. So, let's say it was a real emergency, it will be even worse, even a complete block. This is why it is advisable to have the presence of LSF operators to provide reassurance. A disgruntled experimental user."

**PERRINE, 44** - "The employee did not know how to use LSF well enough; I was really “shocked”. So I'm forced to adapt to text-to-text (conversation 15min), loss of time for an emergency call.

*Do you have any advice or comments?*
That employees have a good level in LSF, typing text is only useful to give details of location, because in a real emergency, there is no time to type properly ... and in case of fire, not obvious.

Some users had not foreseen this situation and had not installed the equipment to be able to communicate by text efficiently.

ROMUALD, 41 - "For technical reasons I was unable to use the Oplink [Videophone] to enter the text. We do not have a keyboard."

BERTILLE, 60 - "[The operator was rather overwhelmed! Because he saw that I did not speak out loud. In addition, I had not connected the keyboard to Oplink [Videophone]. I just typed directly on Oplink. It didn't work. Finally, I preferred to cut-off and try again later. And I found myself, with a keyboard plugged into the device, with another operator who is really a mute, but I guess he knows sign language."

A criterion put forward by the most understanding and considerate users, is the time saving of LSF communication compared to written communication. Expressing themselves orally, or in LSF, would also be more reassuring. However, it is not certain that even people who are fluent in French would be able to find the right words in an emergency, in a language that is for them a second language.

THEO, 18 - "I was ill at ease to have in front of me a person not knowing how to sign (all the same, she said hello). But later it was cool writing, but it’s longer."

PATRICE, 40 - "Yes, the operator who told me he had only my address is not perfect, and also the relay person he works with did not know LSF very well, so they communicate by text. This method is too slow in my opinion ... if communication is flawless, it will be much faster and consequently more reassuring ... This is my first time for emergency use and I am completely satisfied, even if there are things to improve; because this is in LSF at midnight ... I feel more comfortable..."

MELANIE, 43 - "It's much more comfortable to express oneself in LSF (second test) than in writing (first test). It's faster and more reassuring."

GERARD, 45 - "The 112 correspondent (she’s kind and patient) did not practice sign language and I typed text chat. This would be long to explain in writing."

BERTILLE, 60 - "In text ... communication not reassuring. Problem with text display: the operator was a little lost. I’m unnerved by their lack of understanding of LSF with Oplink [Videophone]."
Many users evoked the well known difficulties of many deaf French. Some talked about their own experiences with emergency calls by SMS to 114, or in the past via a relative. In this way we obtained the testimony of a mother answering questions from 114 by searching the internet for guidance to the meaning of words used by the operator. Users seek to demonstrate that the problem is complex. Callers master French in their everyday interactions, but did not know medical terms or do not know how to describe and make their situation understood. They report that their hearing children, when phoning on their behalf, could face the same difficulties. It is important to note that, for the various reasons mentioned above some users stopped experiments in the middle because the operator accepted only text. They thought that their contribution should be limited to a technical test, to verify that the contact was possible. These users, as well as others who did not participate in the false 112 calls, say they will not use the service if it is not available in LSF. They would go back to their habitual methods: travel by car or solicitation of third parties; considering that the speed and their confidence in the information provided through these means are better or equivalent to accessibility in an inadequate mode.

CORENTIN, 44 - "Yes, but that day it’s text-text, so no test. A try”

6. Wishes expressed

Without further development, we feel it is important to repeat here the “wish-list” spontaneously expressed by users, concerning the future development and improvement of the service offered and the ways of handling emergency calls.

1. Possibility of Roaming calls in Total Conversation

Regardless of their mode of communication, many users stress the importance of roaming emergency calls in Total Conversation. During REACH112 experiments, only a small panel of testers was able to make false emergency calls by Real Time Text and / or video from a mobile phone, as this prototype is not yet available on the French market. In addition, weak signal/reception or changes in flux during connections still limit the prospects of roaming LSF calls from a mobile phone. Despite the disappointment mentioned above, all do not complain and many LSF ‘speakers’ accept written messages so as to have roaming access. Its necessity is explained not only by the diversity of accidents that can take place away from home (typically, road accidents or falls outside the home) but also by emergencies in which they must leave home (fire, flood, gas leak, violence etc.). The importance of being able to stay close to

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the victim while calling for help, is often emphasised, as well as the advantage of using a device that can be worn.

DAVID, 35 - "My remarks: Oplink [Videophone] is more reassuring as communication is direct. But the victim is out on the street. I have to go to and fro (...). But what about an emergency away from Oplink? SMS is also reassuring; in another way, because I am closer to the victim. I can call anywhere in the coverage limit in France. Reactive enough."

ADELAIDE, 42 - "Scenario 48 (a fall by a relative on the stairs): 10mn in text. Some distance between my PC that is in my home and the supposed location of the accident which is at the bottom of the building. I was too far from the injured to apply emergency advice while reading, or else I had to go back and forth between the two, it’s not practical. There should be a device like a smart phone, to be on site and follow the advice in real time. It was a test, so there was no anxiety, but if it had been true, the rescuer might worry about a thing that seems important: that someone should stay beside the victim and reassure them, not leave them alone."

ANTOINE, 50 - "Yes, for example, my baby doesn’t move any more on the bed in the bedroom and I'm in the living room to call the emergency services (...). How can I attend to him quickly when I am making a long communication (eg 15 minutes) with this rescue service! I think it necessary to bring him to the call! It’s not easy with some distance between me and him! Not like a hearing person who calls directly by voice phone (...). It’s easier (...) for him to look after his health!"

The availability of a portable terminal and the ability to call in case of falls or accidents are decisive criteria for the deaf-blind. They are especially concerned by this type of emergency and would of course be more reassured and speedily rescued using a terminal that is in their bag. Some of these users already use a Braille reading device enabling them to communicate via SMS. These technologies, however, remain largely unknown and are not taken into account by the 114 service, nor have they been tested during the REACH112 project. It appears that even in such an ambitious project, it is necessary to explicitly and financially support efforts at providing accessibility for a minority. Moreover, it is complex to implement because it requires a diversity of expertise as well as taking into account wide variations in use. For this reason too, particular attention to the access problems of deaf-blind would have truly led to accessibility for all. This is one of the outcomes of development efforts made during this project, which would be interesting to address in future applications.

While the development of the system may take root in highly specific cases, in contrast service sustainability must rely on its adoption by the largest possible number. Many users raise this issue by evoking the advantages of mobile communications in Total Conversation for hearing workers, tourists or foreigners, and in general for the majority of mobile phone users.
GEORGES, 52 - "A standoff has been reached for mobile phones. Now in the 21st century, the phone is essentially mobile. Also, 112 is often described as the "emergency number for mobiles". There are over 60 million mobile phones in France. If Apple had remained with the Ipod, its market capitalization would not have reached 600 billion. Without seeking such heights, it is perfectly acceptable to aspire the social advancement of deaf people; especially those who work or go about their business like everyone else.”

MAURICE, 64 - "Don’t forget the hearing public. This system of RTT would allow foreigners (holidaymakers or others) with a poor command of French to communicate with 112. A foreigner with a sufficient knowledge of French so as to express themselves but with difficulties to understand spoken French will be helped by writing. By expanding to a maximum the target population one promotes profitability and especially with 112, one treats a deaf person in the same way as a hearing person. I think it would be necessary for a telecommunications company to offer RTT on a laptop so that more people see the value of the protocol that you offer. In any case, thank you for this test.”

2. **Assimilate the diversity in types of terminals**

The diversity of terminals allowing Total Conversation calls is an important issue to consider. In fact, a multiplicity in user profiles requires a range of specific terminals. For some, it is the very condition for their access to emergency calls (like the deaf-blind), for others it is a facilitator, as for the deafened elderly. As mentioned above, the latter would like to use a terminal resembling a landline that can receive text. Other users raise the question of compatibility with notepad computers and especially with the wide range of tablets now available. Finally, the need for compatibility with applications developed for Mac is highlighted by many users, indicating that more and more deaf people are equipped with Macs. This is in fact a problem that was encountered in the experiments and which led to efforts in development by the French pilot.

3. **Involve deaf ushers in the training of operators**

The equipment used, as well as daily communication practices of the deaf-blind and partially sighted deaf, are not well known. One of the characteristics of this population, often suffering from Usher’s syndrome, is precisely the diversity of situations and practices, as well as their evolution over time. Regarding the partially sighted deaf, the components to put into service and reflexes to be acquired at the emergency calls platform are not very complicated. Two affected users suggested that people with this syndrome should themselves be involved in the training of operators. This idea seems pertinent from several points of view. Firstly they would be particularly well suited to show how to take into account their specificities from a
practical point of view, in distance interactions. Secondly, this intervention during training would alert operators to the condition and how to deal with it. Finally, physically meeting the people involved gives flesh to categories of users who may be rather abstract; one may know their specific needs in theory, but fail to take account of them into practice. This contribution could help the operators to understand this group, a minority, but one with a high need for accessibility.

4. **Inform rescuers**

Many users expressed concern that rescuers dispatched to the site would perhaps not be aware of their deafness. This may have practical consequences, such as attempts by the rescuers to use an intercom.

*BASTIEN, 38* - "However, the arrival of the police was signaled, but problem, no interpreter: then I had to "talk" by writing notes with the police. Maybe the police should be made aware before the official launch of REACH112?"

*ANDRÉ, 40* - "Inform the police and doctors of our deafness"

Deaf LSF speakers are particularly concerned about the possibility of communicating with doctors or the police arriving on the spot. Indeed, they have experienced misunderstandings and incomplete information, especially with the police. Therefore, they would like the local emergency teams to receive information on how to communicate with deaf people, and possibly a basic training in LSF. Most users as a rule consider that people from the rescue services should be informed of their deafness.

5. **Have a doctor online, more rapidly and more often**

Many deaf users want to call emergencies to assess the severity of their condition or for advice, before receiving any assistance on site. They do not want rescue services to be systematically sent. On the contrary, they want to be involved in this decision and in all cases be informed of the reasons for the decision taken. They demonstrate a certain apprehension about the rescuers coming. An important factor is the inability of the majority of them to call for other less urgent forms of assistance, such as SOS doctor, SOS suicide, the child abuse helpline, the battered women helpline or 115 (the social welfare emergency number).

*BILLY, 40* - "I need to go to the hospital to see a psychologist or psychiatrist the next day or in the following days, and I wanted to have a discussion with the physician via 112 to reassure myself."

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They therefore have no recourse other than emergency calls to get the opinion and advice of a doctor. This also probably explains why some users are frustrated with their 112 calls. When they wanted the advice of a doctor, they obtained only a summary of a discussion conducted between the operator and a doctor, or just the conclusion to this discussion, and this only after a long wait.

**BILLY, 40** - "I found it rather long to get through to the right doctor (we had to go from one doctor to another 2 times), so that to get complete and reassuring information one had to wait 20 mn. Is this normal?"

It would be appropriate to allow the users to connect with a doctor via the relay center and/or for the operator to convey in more detail the advice given by the doctor. Finally, an arrangement needs to be found to reduce the waiting time to contact a doctor.

6. **Need for parallel access to a relay centre for full access**

The existence or absence of access to the full diversity of telephone services has varying effects on the relation between users and emergency services. A prime example demonstrates the impact of the definition itself of an emergency. Imagine you're locked yourself in; the lock no longer functions. If you have no way of calling a locksmith, you find yourself in a difficult situation and could legitimately seek help from 112. Yet this circumstance is not officially listed as being an emergency. Help will not come. The service is not authorized to send a locksmith on site.

**DAVID, 35** - "[Test Call] I'm looking for a locksmith to come out but 112 is not entitled to call numbers other than 17, 18, 15 and 112. But the 112 operator called the fire department for a list. It did not work because they do not have a list. I had to manage to find another way to get hold of a locksmith ..."

This situation, was actually reported by a family of deaf people and could only be resolved through the intervention of neighbours solicited by small papers pushed under the door, and who then and with some difficulty, obtained the help of the police. If this family had possessed access to a relay centre, it could have independently and much more quickly have reached a locksmith. On several occasions the users involved in testing emphasized this type of difficulty.

**GEORGES, 52** - "In the call in which I stated that there was a big vicious dog in front of my home, with the children about to come home from school; he asked me to make sure they did not enter the house before the capture of the dog. It was relevant. But in reality, I was in trouble.
In this case, the hearing population would make a call to the school, something that I cannot do.”

Some users use relay centres to communicate better with a doctor who has come out in the context of an emergency. The importance of being able to use the services of relay centre has also been reported by users. It allowed them to make further calls after having contacted emergency services in response to an accident, a health problem or an aggression. It concerns for example calls to solicit the help of others to look after or collect a child during the parent’s transfer to hospital. These calls may also involve the family, for consolation or to inform them of the current event. It can also be calls of a more administrative nature made by a deaf relative (including in particular a spouse), in order to inform an employer of the absence of the patient, or ask an insurer to organize repatriation if the accident took place on vacation or whilst travelling. Accounts of deaf people accompanying a relative in this type of ordeal can be particularly drawn out, seeking for example assurance via the intermediary of a hearing relative contacted by SMS ... Relay centre services were also mentioned as being necessary to provide assistance to a family member or friend when requesting, for example, the intervention of a carer for an elderly person on his return from hospital; to contact the parents of a friend who has just had a skiing accident; to contact neighbours on vacation who have been victims of a fire or a burglary; or to be contacted by a hearing family member who needs help, etc.. These services allow users to act in autonomy and to avoid the need to seek 112 for events that are not emergencies.

**SORAYA, 31** - "Need for a truck to remove the car blocking the entrance to my garage"

Finally, users talk about the importance of the generalization of Total Conversation calls to allow direct calls between deaf people, to make arrangements, to exchange news, or to obtain and provide comfort.

7. **Ensure access for all to all emergency numbers**

**GEORGES, 52** - "The numbers 15, 17, 18, 112, 114 and the other 4 (Child Abuse...) must all be taken into account"

Accessibility to 112 is a first decisive step, but it does not address the issue of access to all emergency numbers. Some users question us about the complementariness of 112 with other call numbers and the importance of also having access to SOS doctor, SOS suicide, the child abuse helpline etc. as well as "green" phone numbers (which are toll free numbers in France) for obtaining health information (on AIDS, Cancer, etc.). Some users include in this list, tele-
phone access to insurance companies and banks. Finally, attached to the notion of accessibility for all users, some users raise more technical questions on compatibility and installation.

SAMUEL, 30 - "For my part, they must design the system that is compatible regardless of the browser, and avoids the need to be installed, which is a waste of time and presents a risk of bugs because of user rights that are in force on the pc or mac or depending on the configuration of the pc / mac."

8. **Provide accessibility for emergency services staff**

A final aspect was mentioned concerning the professional status of the operators. It refers both to the issue of deploying relay centre services and to the issue of accessibility for all. It concerns telephone accessibility for deaf staff and therefore the autonomy of the deaf operators working on the platform for emergency calls. Questions of career and professional development were also singled out.

SYLVIE, 29 - "It is not a very motivating position to have to say "wait my colleague is phoning". I watched her ... This is a situation of accessibility, but here we are still faced with a lack of accessibility! She cannot be autonomous in her work? Her colleague must phone? She cannot call herself? I found that surprising; that really made me ask questions."

GEORGES, 52 - "The employment situation of deaf operators is a major concern. It is essential that they can perform their work in complete autonomy, and with the same career opportunities as hearing operators. The deaf operators should have the same capacities to act (...) as their hearing colleagues."

9. **Sustain the progress made by the project**

Finally, the project has been very convincing and many users expect the continuation of the service, integrated with the 114 service, with the wide dissemination of a single number (112 or 114) accessible to all (deaf and hearing), from the whole range of their everyday communication tools. The unavoidable need for accessibility to emergency services in LSF 24/24 hours was repeatedly highlighted as well as the interest of Real-Time Text for the hearing public.

MAURICE, 64 - "Transposed onto a mobile phone, the system would be very useful not only to the deaf but also to all those who are not proficient in French (foreigners; tourists etc.)."
7. **Responses among the other partners**

Many of the key issues reported above are repeated in the reports of other pilots. However, certain other issues emerged.

An interesting observation from one user was unfamiliar with the videomail. When she logged on:

> …saw along list of messages. That surprised me. I could see people talking to me; also could see what they are doing, which are not nice.

This was a very common issue as end users were unfamiliar with the concept of leaving a video message for the person whom they wanted to call. Typically, users received the instructions to leave a message but continued to stare at the screen or start to talk to someone else in the room, as they somehow expected the person to answer the call. The person who checked their video mail, then found themselves looking at their friend who was staring at the screen and looking puzzled. It seems clear that there is a need to explain and support people to use video mail appropriately.

The detail provided above is similar to the responses and feedback from other partners and so it is not the intention here to extend this section further. Many of the issues appear again the next chapters and in any case can be seen in the appendices.
10. Focus Groups

A focus group consists of a small group of individuals brought together to interact around a specific set of topics. These can be objects (eg user endpoints, software) or services (P2P calling, P2Relay calling, P2 emergency services). Ideally the focus groups are run by a member of that community – Deaf group by a deaf sign language user, hard of hearing by a hard of hearing person, and the other user groups as specified in B1.1.2.1 in the DoW.

Ideally a focus group was to be convened for each group of users who have been targeted and it should be run twice. One early in the pilot phase (month 26-27) and once towards the end (month 33-34). Specific guidance on focus group management and data analysis was set out in D7.0. However, it was not possible for second focus groups to be run because of the very short time available at the end of the pilots and before the project as a whole was completed.

There were focus groups for all users during the pilot – ie for relay operators, and for call takers as well as for end users.

1. End Users

In almost all cases, end users were highly enthusiastic about the Total Conversation offerings.

"I am an immigrant, the first 3 years in Sweden I was living with my cousin. She tried to help me to make voice calls but we had huge communication problems and it didn't feel good letting her take care of my authority/social issues. Eventually I got my own apartment. When I got my TC last summer I was so excited! Now I didn't have to ask my neighbour to make calls for me. I feel afraid and un-secure using VRS but am still happy to be independent!"

In Sweden it was already established as a workplace tool.

"I got TC at work very recently, we are two deaf network technicians at work, both have TC in smartphones. We were about to pull cables through ceilings. Thanks to TC we could sync the movements and stop in time if the cable were stuck or running out. That was really funny, communicate and work in that way!"

In the UK, it was likely to make a huge difference to people's lives.
.. it will become for us a way to feel equal to hearing people, which would help us to move on to other things.

In France, Deaf people seemed clear that a Deaf (signing) call taker was to be preferred to a hearing relay agent as the intermediary in the emergency call.

There is a good deal of evidence in the UK and France that users are unfamiliar with the concept of using video telecommunications. One of the UK participants had a role in explaining and supporting other users who had learning difficulties.

I also teach them to how to use it with their family and friends. Told them to call their hearing family, which surprised and puzzled them. They ask “how?”; I told them via interpreter. Most of them do not have any equipment. Only one person has and understood. But the rest of them are not comfortable using language. I have to teach them and encourage them to learn to get the information. To get them to feel equal in society. I have to keep encouraging them to use it over time.

Another person did not yet fully understand the concept of telephony

I am hopeless with technology. How do I know if the person is not at home?

This technology issue extends to the area not covered by REACH112 – the Broadband/Internet provision, as the Swedish report points out

It is frustrating with bad network connection and/or poor 3G coverage and disturbed/broken calls. Especially when waiting in queue for half an hour at some instance and then losing connection with VRS, it drives people crazy.

Swedish participants offered some comparison with other non-TC service – eg SMS emergency service

"I haven't even registered myself for SMS112. It is unfair, hearing people doesn't need to sign up for using the emergency number. Why do we deaf need to do that?"

"Once I was stuck in an elevator for one hour without mobile network. Could not use TC or SMS. Should I call 112 by voice [using the only possible choice displayed on the mobile, 'emergency call only'] and scream?"

The responses indicate that there are continued issues in what hearing people have set up as the core service offering and patching in text messaging for example, would still be inadequate.
Adjustment of the message and language form to suit the characteristics of the caller was a topic discussed in the French groups, with a hearing perception that language form may need to be adjusted for different callers. It is not obvious how the adjustment can be made consistently nor indeed that all deaf people wish to have (usually) downgraded content. Nevertheless, it does indicate that hearing call takers and agents are thinking about the issue here.

End users expressed views about the relay service.

> I love TC. Even if I am calling authorities and others using technical terms, the VRS and sign language make me being able to communicate and understand the issues in the conversation. With text only that would be impossible.

> It was at ten o’clock at night and VRS was closed. I was really disappointed not to be able to call VRS. So I used text relay, but my writing skills are poor and I had trouble expressing myself and explain the situation. I got a sense of disharmony in the conversation.

There were also some concerns in Sweden about the inflexibility of the relay agent. Some concerns and reports have been expressed also in the UK and both these emphasise the need to have a complaints procedure which is properly accessible.

> "(...) was really awful. The VRS operator did not take care of my lack of skills in Swedish and Sign language. I asked them to sign slowly, but they didn't listen. I was in dis-communication and got very disappointed and sad afterwards. Long after I was nervous and afraid to use VRS. I only use it for short and simple errands. But I am still not fully comfortable."

Users in Sweden appeared not to be using an enum system and wanted to have a more direct call back systems than at present.

> call-direct function (calling by destination number and automatically invoking VRS). Often hearing people do not call me back because de are unsure or lazy about the two-steps progress to call deaf people.

The enum system which allows any hearing person’s call to be directed through the relay agent is available but was an unforeseen cost in the original project. As result, many users do not have a direct call facility (in their case, hearing people have to call the interpreting service first and then ask for the Deaf person’s number).

However, the absolute over-riding concern from all end users contributing to the discussion was that the service must continue. It was presented as almost unethical for the service (particularly the 112 service) to be discontinued when expectations had been raised and its viability demonstrated.
The service cannot terminate (Sweden)

I am not prepared to compromise: 24 hours that is it. Full stop…… The demand is 24 hours not less. Equal to hearing people and no waiting too long – I expect it to happen soon. (UK)

This creates an enormous problem for project partners not only now, but in any future enterprise where it asks for cooperation from these user groups.

1. **Relay Operators**

Discussion with relay agents centred on the user interface and conditions of working. Various suggestions for improvement were made to the software or to the ergonomics of the situation. These appear to be part of an ongoing discussion which would take place in any service operation and would be a matter for internal attention. However, there were no suggestions that the software did not work or that the relay itself was compromised. The problems with Internet service provision re-appeared as a topic but was not considered to be a show-stopper.

UK interpreters who were contracted specifically for the relay services were concerned with rates of pay and conditions of service. Clearly this is an ongoing management negotiation and again it is internal and specific to each pilot implementation.

One important point raised by UK relay agents was the need for Deaf users of the relay service, to be trained more thoroughly. This arose from the fact that Deaf people may not understand fully what happens in a relay and may be puzzled by the pauses introduced when waiting for the hearing person to answer or to respond to questions. They may also not be able to take control of the call and expect the relay agent to manage the interaction for them. Similar points were raised concerning the Deaf people in France (see Appendix 8).

One aspect of control in the call was discussed in the French data related to the use of a Smartphone to convey visual evidence of what is happening.

…with a 3G phone, the user naturally shows what it is happening. Thus, he breaks the communication link, making it difficult for the agent to regain control of the conversation as he is no longer watching him. The agent must be the one that manages these camera movements by telling the user what to show and when to show it.

Some of the anticipated issues did not materialise – eg that different Deaf people would have different sign language dialects which could make it difficult to understand. The interpreter’s
view is that they are expected to deal with a wide range of sign language varieties and this was not a problem arising only in relay.

2. **Emergency Service Call Takers**

The general view was that this was a valuable service but the call numbers were (and would be) few in number. This was likely to require ongoing and updating training. The user endpoints and the emergency centre clients were seen as good developments and produced acceptable quality.

There was considerable interest from these emergency service call takers who had taken calls from the end users. However, they did not naturally embrace the concept of using video even though they saw the inevitability of telecoms moving towards visual contact.

> "... seeing a person by a tractor with his legs chopped off, could cause significant problems for the call taker..."

There were quite different responses from the different services where for example fire service call takers did not see the absolute priority in “seeing” the caller or seeing the incident. Their instructions are almost always for the person to leave the scene and wait for the fire service personnel to arrive. In some cases they felt that having the person onscreen (when it was a non-emergency, by the service definition) would make it more difficult to terminate the call as the face to face contact makes it more difficult to put people off.

Their concern seemed to be with the impact on the relay agent if the call was being handled through the relay centre and not direct to the emergency call centre or PSAP. That is, it would be only the relay agent who would see the problem; the call taker would have a voice link only. This is likely to be the case in the majority of PSAPs across the UK; until a new generation of IP-based call systems were in place.

Police responses were not dissimilar but emphasised the absolute need to have a relay agent on call at all times and to be sure that the response time is very short, as close to the response times required of the police ie 10 seconds. The same view was expressed in Sweden.

> The reasonable answering time for the relay operator should be in seconds, one minute is too long when someone is in emergency
French respondents suggested that the call taker should see the Deaf person AND the interpreter throughout the call. This would be possible if all PSAPs were equipped with TC software/hardware.

The Swedish response did indicate that they had come around to seeing the value of TC.

Better comprehension of person in emergency when seeing the user and his/her condition. In a car accident one get a better understanding of the situation and location in TC.

In the beginning we were doubtful toward the service, numbers of calls and the usage of camera. Now it feels disappointing that the service is about to end when we are used and positive.

There was also a sense that the existing voice call system was not experiencing problems and Deaf people would be using text (although it was agreed that this was a very rare occurrence), so why would there be a need to learn a new skill or provide new equipment? It came as a surprise to most that Deaf community members would not be able to use text since they could not read. The difficulty in discussing then is managing the notion that Deaf people are simply denied access at the present time, and so there is no real measure of the volume of calls which might arise if there were an appropriate system in place. From the call takers point of view these Deaf callers had not existed until this time.

Even so, discussion kept coming back around to the use of text, for example to be able to determine the postcode of the person – the absolute priority being to determine where the person was located.

Swedish call takers had good experiences of using real time text.

Once a call arrived 03:30, I understand that the relay agent was sleeping by then and it took some time before the agent answered. Meanwhile I used text to communicate

I typed with the caller to receive data, I got the address by text. It was great because the relay operator may misinterpret the address.

Relay agents may not be so happy with the last point, but the quote as a whole emphasises the flexibility in use of Total Conversation.

At the same time, sign language communication may be best.

Person in emergency has received help faster thanks to sign relay. Sometimes the text is hard to understand, the relay have helped to understand the text if needed
French call takers suggested the idea of having pre-written sentences, questions or phrases which could be selected and displayed to the user (faster than they could be typed).

Although it had been thought (in the UK particularly) that the emergency call takers would need little training about Deaf people and their language choices, it turned out that lack of information on this detracted from their performance and led them to consider solutions which might be inappropriate. It would seem that more consideration needs to be given to providing learning resource materials (perhaps online) for emergency call takers to examine. This is also pointed out in the feedback from Deaf users in France.

3. **Emergency Service relay agents**

There was a fourth group in the focus groups which was set up only in Sweden. This was a select group of agents prepared to take calls out of hours. The arrangements for this group were varied and instructive. It seems likely that an out of hours in future, might take into account the issues raised here.

In Sweden, the emergency REACH112 interpreter was able to work from home and this raised a number of practical issues.

It is a bit tricky with kids at home. It is not only about being contingent but really be on duty and be bound to home, not only me but the whole family. Even if I think the service is important, the question is how to arrange the work.

I felt a huge responsibility being part of the project compared with being a regular interpreter on duty. I don't know if it was the awareness of having responsibility for the whole country and that I was unsecure about the backup - am I left alone? Am I the only one able to take the call?

(…) equipment in my bedroom since I was afraid of missing calls. It does not feel professional to take the calls in bedroom in the midnight with a untidy bed and a girl with messy hair.

This arrangement of relay service was not allowed in the UK and the suggested training which this focus group brought up had to be put in place first of all.

Personally I would prefer to have a designated room, with good background and schedule arrangement. I also would like a visit to SOS Alarm to understand their working environment and how to co-operate better even if it have worked well so far. The PSAPs also could visit us.

The suggestion of spending time in an emergency call centre is of some importance and one that was a requirement in the UK.
The focus group viewed the whole experience very positively and wanted to disseminate it much more widely making sure that all Deaf people were confident in making 112 calls. They also expressed satisfaction at the professionalism of the emergency service call takers who reacted knowingly and calmly.

4. **Focus Groups in Focus**

As with much of the qualitative data in the evaluation, this material from the focus groups could bear further analysis. But there are clear conclusions that can be drawn from the reflections of those end users, agents and call takers who have directly experienced Total Conversation in action.

Firstly, we can say that the experience is positive and enthusiastic. Deaf people are especially glad to see the person to person communication, the use of relay and the access to 112. There is a sense of “at last, we are approaching equality”, even though there is still development work in the user endpoints, the broadband services and the extent of relay provision.

Secondly, despite this being a pilot and explained as such, Deaf people are not prepared to see it withdrawn. The notion that funding coming from another distant source (ie the EC) is not a factor; the withdrawal of the service is associated with the service providers – ie the partners in the project. The Deaf community have become used to removal of services, provision after it has been tried and after they have given their time. The pattern for REACH112 repeats that experience. Deaf people blame the supplier.

Thirdly, there is a general view of success among the relay agents and among the call takers in emergency service centres. The former have a different perspective as it opens up a new area of employment whereas the latter are concerned about changes in working practices for a small number of calls. The focus groups suggest we have to move forward on all three fronts of end user, relay agent and call takers but may have to adopt different approaches in each case.
11. Case Studies

In REACH112, case studies were originally expected to describe how the individuals who have come in contact with Total Conversation reacted to its use. Case studies are meant to describe the challenges faced as well as the successes and to offer a process view of the initiative. Typically we would expect to see a timeline showing movement towards a goal and a discussion of the factors which impede or support the progress. In the event most of the cases supplied were narrower in focus concerning individuals or incidents and offering mostly positive outcomes and praise for the services which were being developed.

Samples of the cases are provided in Appendix 8 and can be subjected to further analysis.

However, the report so far has a huge amount of rich content, designed to supplement and support the quantitative reporting of traffic and objectives. We will not therefore at this stage provide another chapter of quotations and comment. Rather what follows is a short reflection on the cases and their significance to the exploitation of Total Conversation.

1. Starting Off

It should be relatively clear by this stage that there is an enormous demand from the Deaf community to provide a solution for distance communication. The fact that the technology has advanced to allow mobile devices to communicate in video brings the whole development tantalisingly close. However, the Deaf community in many countries have already discovered opportunities with video applications which are freely available on the Internet and in many cases are already using them.

This creates two difficulties – the first is that the users are already creating their own micro-networks and are interacting with them with greater or lesser degrees of satisfaction. Beginning a new programme has to be able to displace the existing pattern of interaction.

The second is that by part solving this communication issue with incomplete tools and non-services, the Deaf community takes away the responsibility from the hearing community to offer and to support a solution which has a ‘design for all’ label.
We see this tension most clearly in the cases supplied by Action on Hearing Loss where the members of staff have already part solved their communication issues and a new entrant – ie Total Conversation is not necessarily embraced fully.

2. **Hard of hearing**

One aspect which REACH112 has found difficult is how to implement Total Conversation for hard of hearing users. On the one hand, the commitment is to any combination of video, voice and text but the reality has tended to be a focus on either video or text. The case notes from Action on Hearing Loss, highlight the difficulties faced by hard of hearing users, trying to determine the advantage of being able to see the other person in the call.

It may seem obvious that being able to see and read the emotions on the other person’s face is an advantage, yet with highly literate people, the use of text has become the most important aspect of communication. The cases presented seem to indicate a reluctance to alter behaviour and a common response is to displace the focus of the Total Conversation product to the more likely group of sign language users.

There are many reasons why REACH112 needs to examine very carefully the needs of this group. While the pilots in Spain and the Netherlands focused solely on text, various circumstances prevented the analysis of these counterbalancing cases.

Since hard of hearing people form a much larger group and would be the stronger case for change in central government funding then it is essential to examine in more detail the experiences of this group when visual communication is offered.

3. **Person to Person**

There is no doubt that there was great success for the Total Conversation concept among Deaf people. They have campaigned for a long time to have their needs met and the cases offered show clearly that the impact can be enormous. Cases tell of the liberation felt by the discovery of distance communication and interestingly also show us how service provision and contact with support professionals can be achieved.

The cases also indicate as have the focus groups and other feedback particularly in France and the UK, that the awareness of the value of Total Conversation does not by itself translate into action on the part of potential users. It requires a good deal of support and instruction, workshops and clinics, peer support and ultimately requires critical mass in producing a sustain-
able call network. The comments that ‘I tried to call people but no one answered’ and that ‘I never receive any calls or people do not call back’ are common in the mass of feedback data. This is partly social in that the community of users have not yet developed an etiquette in regard to call behaviour and partly technical in that end points are often not connected to the network – mainly because the user switches them off. The advent of Smartphone applications could make an enormous difference to this situation.

4. **Person to Relay**

What is most welcome in all the accounts is the possibility to have an on-demand relay service. It is this component more than any which leads to the comments of feeling equal. Cases indicate that being able to manage problems, make arrangements and have a readily available interface to society as a whole is perhaps the single most important factor in enabling the Deaf community. In pilots, this has typically been set up as a sign language relay service as in many places there is already 24/7 text relay. The value of this service is set out very clearly.

The possibility however, to have this combined with speech and text is also very important. Cases also refer to the use of text for particular purposes and in one case, the user makes connection and announces that she does not use sign language and demands lip-speaking from the relay agent (which in that case, is successful). Agents in Total conversation relay may need to move towards agent plus status where they are able to manage all three of the options of text relay, sign language relay and speech relay.

Feedback from relay agents who began to work on this as a result of REACH112 most of the time express their enthusiasm for this service as they perceive the obvious advantage of being able to support many more users in a shorter space of time than they can with on-site interpreting.

5. **Person to Emergency Services**

The case study in the Appendix which presents an account of an emergency call and provides some context to it, illustrates the conduct of the call and the users’ perceptions (both end user as caller and emergency call taker) which catches the theme of surprise that this interaction should work. There is a simple conclusion here that this will save lives. To do so effectively, it will need to be embedded in the mainstream telephony system and become part of the “normal” call patterns. End users, as indicated in the analysis for cost benefit, are still likely to reach for a hearing person in case of problem.
The value of REACH112 is in identifying the longer term issues for adequate mainstream technology, for end user support and training. It also indicates the challenge in regard to visual contact with the incidents for both the relay agent and the call taker. In nearly all the feedback from end users, the ability to be able to call for emergency help is the true aspiration which provides equality.

6. **Creating a service**

However, as can be gleaned from the component case studies, the creation of a new means of communicating within a community is not always easy. Even if the technology is proven without establishing the community engagement and influence on the project from the outset the achievements will be reduced. The very extensive qualitative data from the French pilot points to the enthusiasm of users when they feel they are contributing to the design of the service.

The other aspect which has provoked considerable discussion is the nature of a pilot which is not linked in at the other end to social policy – although in this particular situation, the overall economic climate in Europe works against any social policy initiatives which require an outlay to begin and a commitment to support into the future.

The cases and the feedback say clearly that the smart and evolving technology has to be supported at both ends by the community of users and by the decision-makers and policy-makers.

7. **Exploiting the service**

In the end, it is this part which worried most users – what happens at the end of the project?

At this point in time, it is unclear and it is not obvious what the report to end users, relay agents and call takers, should be. This uncertainty appears again and again as a pressure on the partnership that if the service is withdrawn

“…I would be frustrated and I would revert back to how I was before, when my mental health problems were worse.”

The project addresses this aspect of exploitation and sustainability but the case studies make it a real personal and social issue.
8. **In summary**

Case study data presents in some detail the users’ enthusiasm for the service development and validates the approach. The analysis also teaches us about the process of implementation and the training and support needed for such a marginalised community. It also moves the agenda to the questions of sustainability and drives the debate forward into public planning and social policy.
12. Final Comments

REACH112 is a complex and ambitious programmatic activity. It is both European in its scope and in its aspiration for transnational compatibility and local in its need to satisfy local conditions and local economic circumstances.

We can say of the initiative that a step into the unknown has proved enormously successful, has overcome huge technical and user education problems and is now faced with a major ethical and economic problem – how to sustain the services in the light of huge cuts from central governments.

1. Scope

REACH112 was ambitious in every respect. It provided a technical solution to access for those who would not be able comfortably to use a voicephone. It had to adapt this technological development as the software and hardware and telecommunications evolved rapidly in the four years since the project was conceived.

It had to deal with five separate pilots set in quite different social and economic climates with significantly very different social policy in place. Not surprisingly the solutions in each country are different and have proceeded at different rates.

There was and continues to be, a large scale educational programme needed for all actors in the value chain. The technological concept is simple but the practical engagement requires a great deal of support and nurturing.

2. Outcomes

The advances made have been enormous in regard to the perceptions of end users concerning the move towards equality. Users have found themselves more in control, more able to influence daily lives and of course, can have greater aspirations.

Existing data services on the Internet are challenged by the developments in terms of providing resilience to Total Conversation services and ensuring capacity for time critical services.
Connections to relay centres and connections to emergency call centres may need to be improved in order to cope with this innovation.

Service practices at every stage are challenged with the most significant being the contact with emergency services. Although there was considerable enthusiasm from call takers and managers, moving the emergency services to the next generation will be a long term effort.

3. **In conclusion**

We see enormous demand, general acceptance of the concept of Total Conversation and the pathway to the human resource creation to support the development. We do not believe the cost is prohibitive and can show both, the cost effectiveness of the services as well as a clear pathway to reduction in costs as user registrations increase.

We believe this is the correct development, at an appropriate time in our social development. The data presented here and analysed, will contribute to that development and will be an appropriate support to the aspirations of the community.

**Key Learning Points and conclusions**

1. Total Conversation is a telecoms protocol *for all* and needs to be understood as a *Service* which serves both deaf, hard of hearing, elderly, speech-disabled and able communities – it is not a provision just to help disabled people.

2. Consequently, the Total Conversation service needs to be a mainstream service, offering greater efficiency in the workplace, in public sector provision and in professional practice. It offers simple advances in areas such as reduction in unnecessary travel to meetings, and also, creates the basis for inclusion for those who do not use voice phones.

3. The cost model has to be built from this point of view and cannot be financially sustained as a “catch-up, bolt-on” service “for the disabled”. At the same time, in the period of build-up of service, costs are likely to be much less than previously claimed by campaigns.
4. Total Conversation service evolves - it is not instantly adopted. In this respect, the value builds and the end user perception of value and expectation of cost will become embedded in lifestyle expenditure.

5. “Total Conversation-as-telecoms” introduces many new ethical and privacy issues (especially in regard to use of video), which need to be closely monitored through a Code of Practice and support to agencies and individuals who provide the service.

6. In all aspects, from end-users through relay agents to call takers in emergency and non-emergency roles, there is a need for training. Such training is needed to comply with an agreed code of practice and professional standardisation.

7. Direct access to Emergency Service is a key undertaking in European society. Yet current reliance on voice communication (at the control centres) and the inability of individual emergency service agencies to share data, ensure that inclusion for all cannot be provided. With no apparent central control or direction on protocol nor standardisation on systems, incorporation of Total Conversation in the Emergency Control Centres is a major challenge. Changes to this situation require central governance and monitoring.

8. REACH112 has provided a full scale pilot of an open access Total Conversation Service. There is overwhelming positive feedback on its functionality. User demand now aspires to implementation.

9. In aspiring to the mainstream service, based on a model of beneficiaries who are hearing and Deaf/hard of hearing, there is a need for pump priming to ensure a coordinated and fully networked service is in place; and is evaluated in a way which provides sufficient detail for commercialisation and provision of value added service by Communication Providers and ISPs. Such initial pump priming is likely to be needed from public funds.