



REACT

Reaction to Emergency Alerts using voice and Clustering Technologies

Project IST-2005-033607

Report on Impact Assessment

WP5 - Deliverable D5.5

Version 1.0

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Abstract: REACT aims to reduce risks to citizens and the environment by enhancing the interactivity of citizens with Emergency Services, and by providing added value to integrated information from disparate sources. It aims to normalise warnings from various sources, allowing their aggregation and analysis so that additional knowledge can be extracted and presented to PSAP operators. This knowledge can be used as an aid to situational awareness, pattern detection and the dispatching of resources.

This deliverable presents the REACT Impact Assessment report provided on the basis of the plan proposed in section 5 of D5.1. It includes the analysis of the coverage of the user requirements and, based on such evidence, the assessment of the expected impact of the project on the user community, the citizens in general and the project partners future activities.

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Executive Summary

This provides an assessment of the expected project impact on the basis of the plan proposed in section 5 of deliverable 5.1. It includes the analysis of the coverage of the user requirements and, based on such evidence, the assessment of the expected impact of the project on the user community, the citizens in general and the project partners future activities.

Section 1 of this report includes a detailed analysis of the project results in terms of coverage of the user requirements defined in WP1. The complete list of requirements with user evaluations are included in APPENDIX A to the report.

Based on the achieved results and on the knowledge developed by the consortium, Section 2 reports on the following categories of impact:

1. Impact on the users community (PSAPs)
2. Impact on citizens' safety
3. Impact on the project partners (industrial)
4. Impact on the project partners (users)



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1 Quantitative results of the project compared to the original User Requirements

Further to the trial in Venice and the demonstration events, the project users, together with developers, have undertaken a review of the project results to assess to what extent the original REACT User Requirements (as set out in Work Package 1.1) had been met.

In the project deliverable D1.1 (REACT User requirements), an extensive list of requirements were identified, commented and prioritised as “Must have”, “Should have” and “Nice to have”.

A total of 170 Requirements were presented to the developers by the project users. Some of them were very challenging and demanding, sometimes beyond the scope of a Research and Development project. They were used as a wish list for a “perfect” systems and analysed within WP2 and WP3 to convert them into components that could be implemented as a proof of concept of such “perfect” system.

At the end of WP3 (deliverable D3.1 – Global architecture), 23 User requirements were classified as “Not foreseen” and excluded by the technical goals of the project. The reason for excluding a/some requirement(s) was for being:

- (i) not in line with project description of work or
- (ii) in contrast with other requirements or
- (iii) of interest for one single end user (i.e. more suitable for further customisation)

The remaining 147 requirements were further broken into the main REACT technological goals:

- Voice
- Interoperability
- Clustering
- Security
- GIS
- All (i.e. covering more aspects)

They kept the original prioritisation as:

- Must have requirements
- Should have requirements
- Nice to have requirements

A tabular view of the results of the described process is shown in Figure 1.

	VOICE	INTER	CLUSTER	SECURITY	GIS	ALL	TOTAL
MUST HAVE	9	25	16	8	8	35	101
SHOULD HAVE	5	11	7	0	9	5	37
NICE TO HAVE	3	0	1	0	4	1	9
NOT FORESEEN	1	3	13	0	1	5	23
TOTAL	18	39	37	8	22	46	170

Figure 1 – Classification of REACT User requirements

A graphical view is shown in Figure 2.

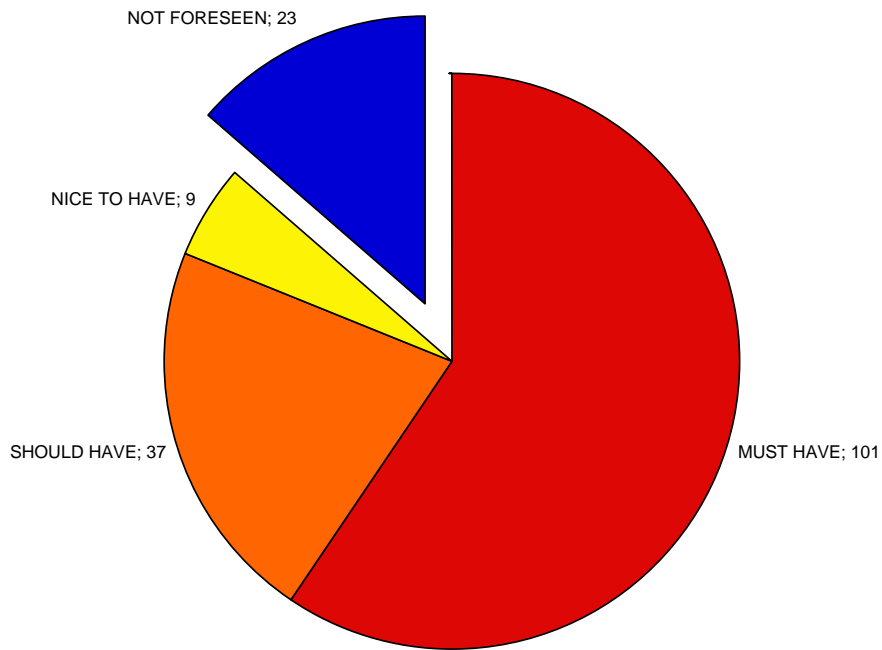


Figure 2 – Prioritisation of REACT User requirements

The classification of the requirements on technologies is shown in the following Figures.

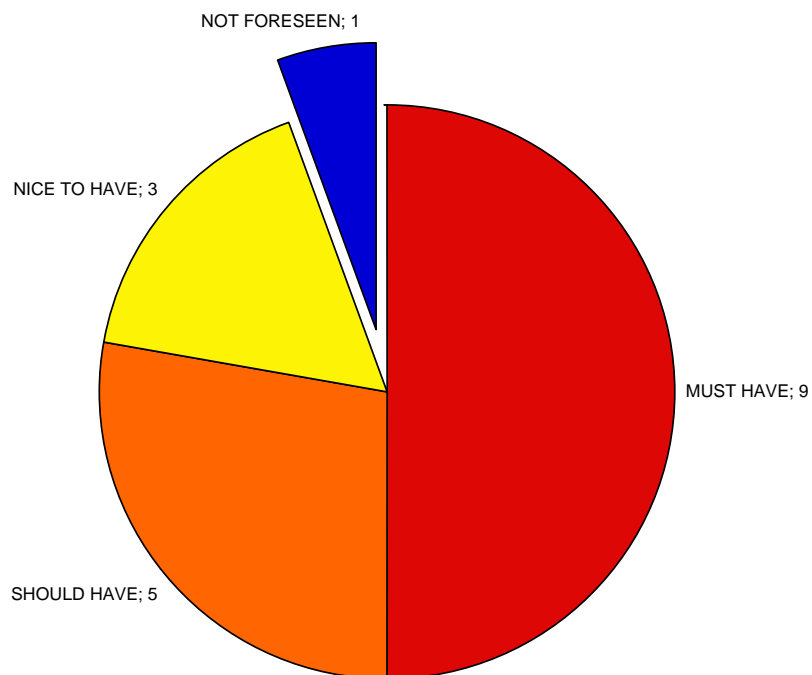


Figure 3 – Prioritisation of REACT User requirements (VOICE component)

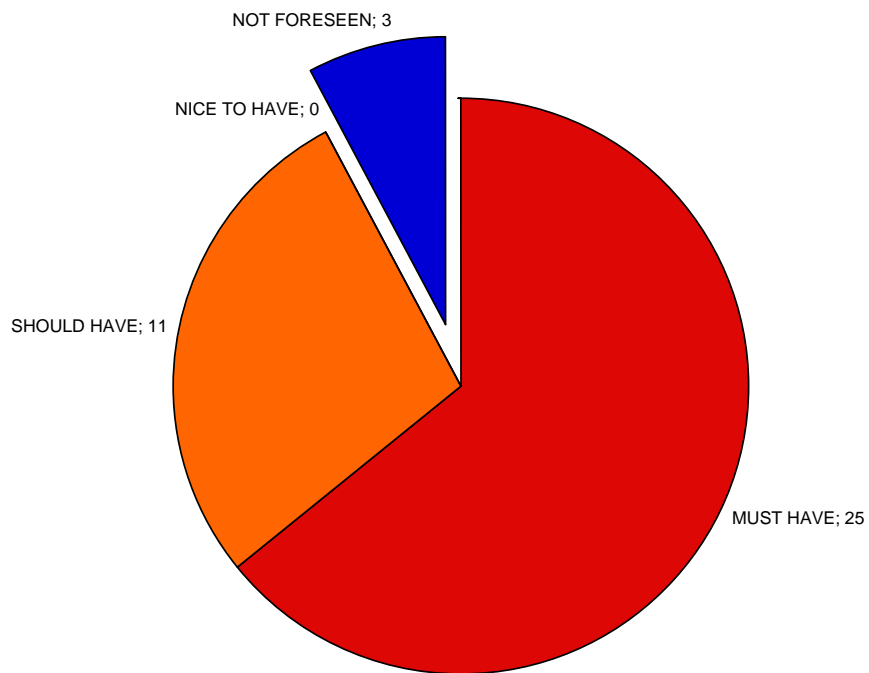


Figure 4 – Prioritisation of REACT User requirements (INTEROPERABILITY component)

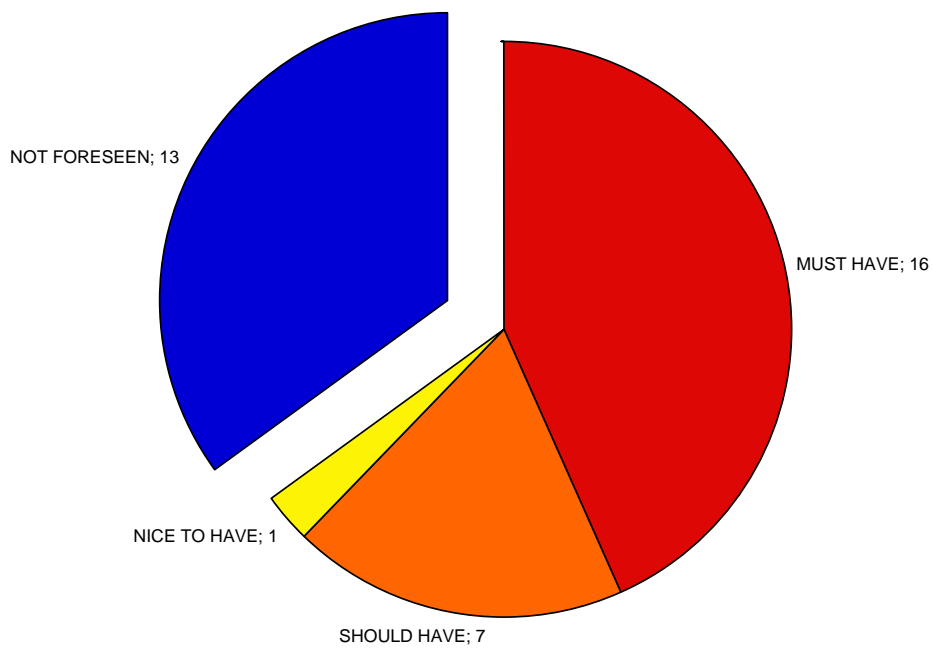


Figure 5 – Prioritisation of REACT User requirements (CLUSTERING component)

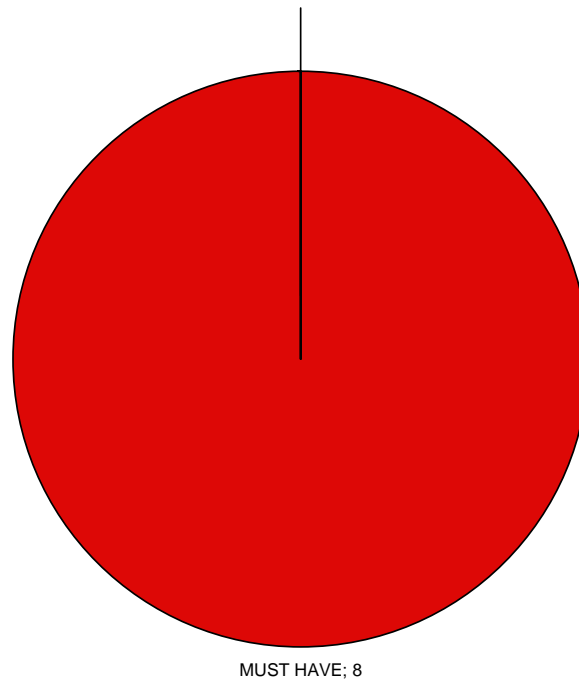


Figure 6 – Prioritisation of REACT User requirements (SECURITY component)

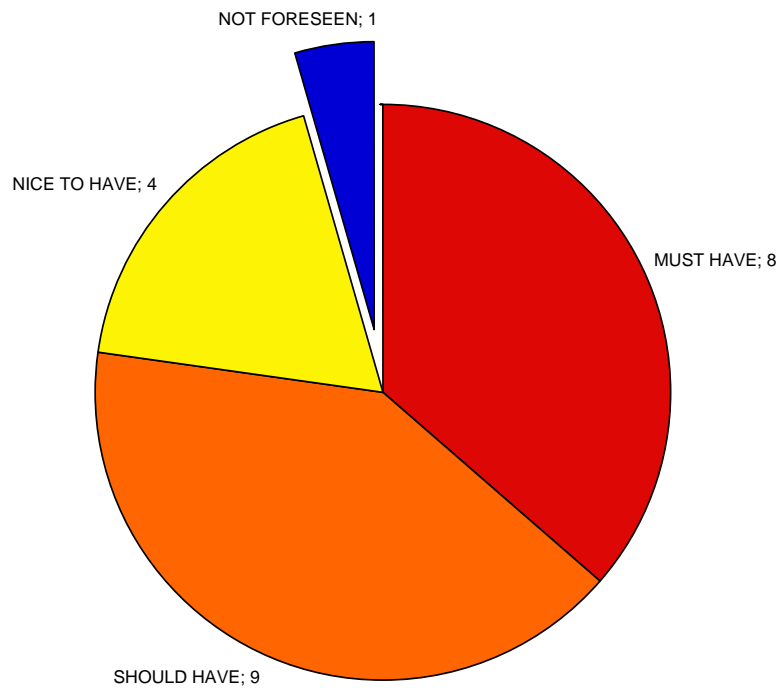


Figure 7 – Prioritisation of REACT User requirements (GIS component)

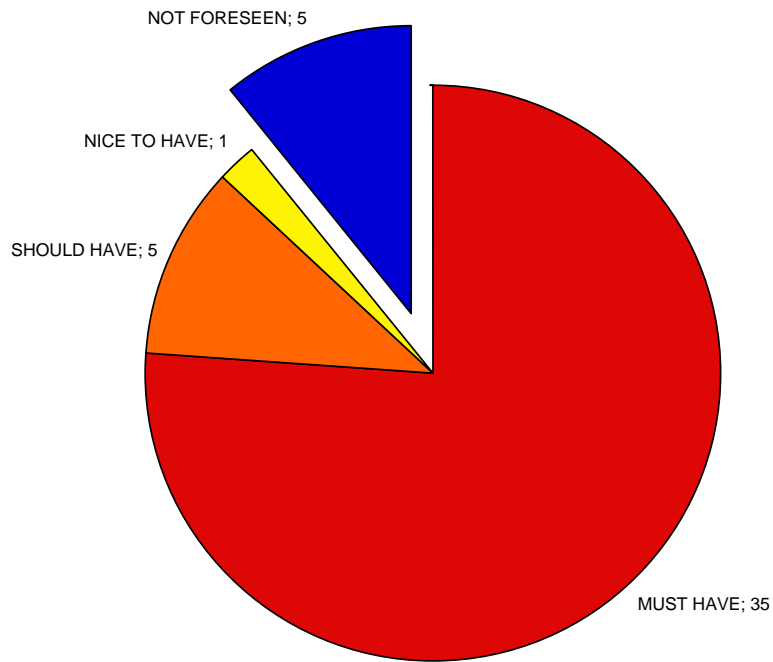


Figure 8 – Prioritisation of REACT User requirements (more than one component)

The same data, grouped according to the technologies, give the following results.

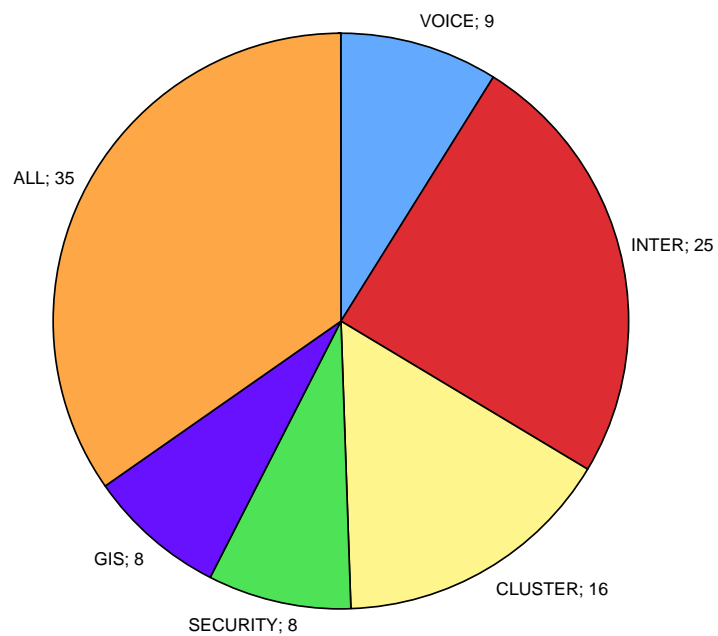


Figure 9 – Prioritisation of REACT User requirements (MUST HAVE)

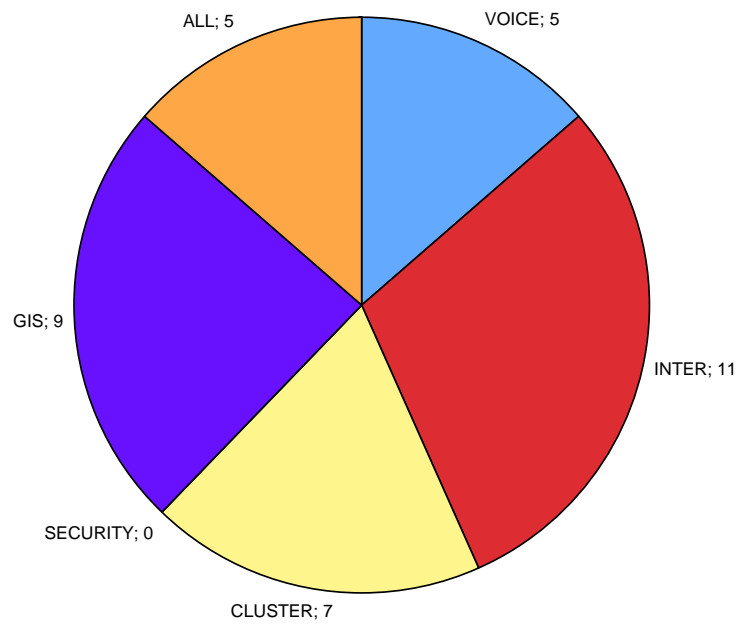


Figure 10 – Prioritisation of REACT User requirements (SHOULD HAVE)

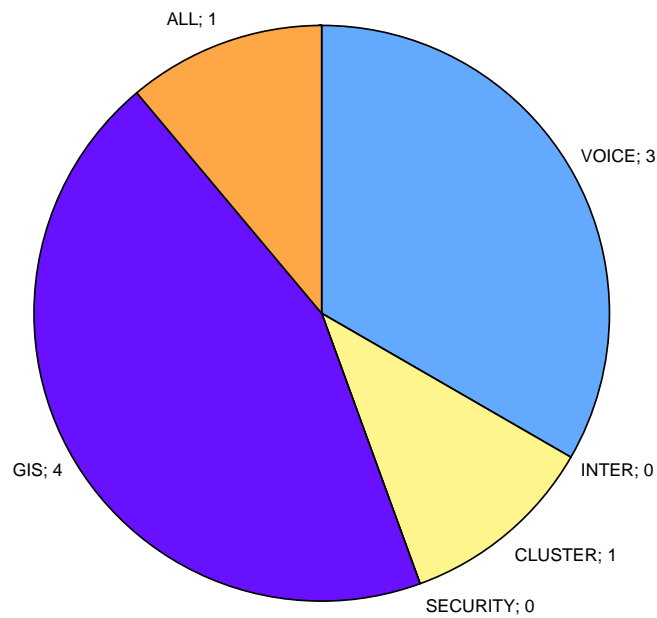


Figure 11 – Prioritisation of REACT User requirements (NICE TO HAVE)

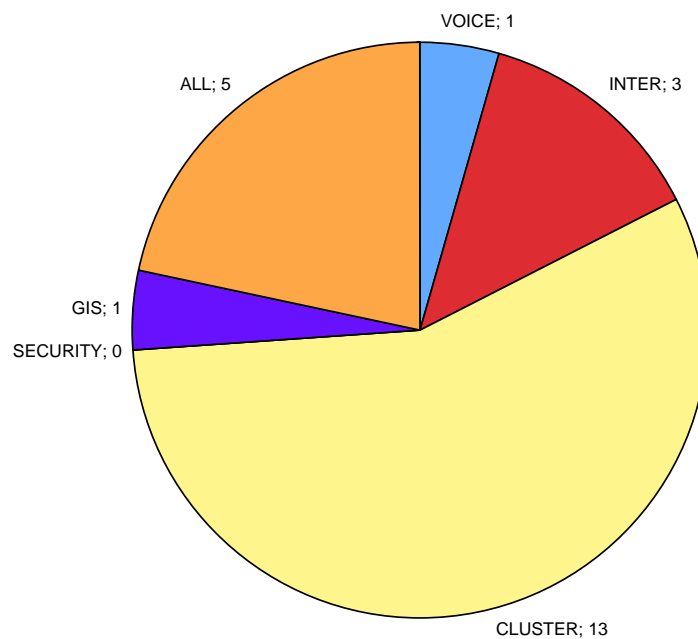


Figure 12 – Prioritisation of REACT User requirements (NOT FORESEEN)

The method of assessing these User Requirements was whether each User Requirement was:

- MET – the requirement has been fully met
- PART MET – the requirements has been partially met
- NOT MET – the requirement has NOT been met
- NOT TESTED – the requirements, mainly of physical “real-time-life” nature (i.e. the system should be able to work in large emergency) has not been tested during the pilots
- NOT FORESEEN – the requirements has been dropped during design since (i) not in line with project description of work (ii) in contrast with other requirements (iii) of interest for one single end user installation

In the following tables, the results of the assessment of the users are reported in both absolute figures and as percentage of categories.



Type	Goal	MET	PART MET	NOT MET	NOT TESTED	NOT FORESEEN	Grand Total
MUST	ALL	15	17		3	1	36
	CLUSTER	10	6			7	23
	GIS	5	3				8
	INTER SECURITY	19	6			2	27
	VOICE	8					8
	VOICE	5	4				9
MUST Total		62	36		3	10	111
SHOULD	ALL	3	2			2	7
	CLUSTER	2	2	3		5	12
	GIS	5	4				9
	INTER SECURITY	10		1			11
	VOICE	3	1	1		1	6
SHOULD Total		23	9	5		8	45
NICE	ALL	1				2	3
	CLUSTER	1				1	2
	GIS	2	2			1	5
	INTER SECURITY					1	1
	VOICE		1	1	1		3
NICE Total		4	3	1	1	5	14
Grand Total		89	48	6	4	23	170

Figure 13 – Achieved results vs. user requirements (absolute numbers)

Type	Goal	MET	PART MET	NOT MET	NOT TESTED	NOT FORESEEN	Grand Total
MUST	ALL	14%	15%	-	3%	1%	32%
	CLUSTER	9%	5%	-	-	6%	21%
	GIS	5%	3%	-	-	-	7%
	INTER SECURITY	17%	5%	-	-	2%	24%
	VOICE	7%	-	-	-	-	7%
	VOICE	5%	4%	-	-	-	8%
MUST Total		56%	32%	-	3%	9%	100%
SHOULD	ALL	7%	4%	-	-	4%	16%
	CLUSTER	4%	4%	7%	-	11%	27%
	GIS	11%	9%	-	-	-	20%
	INTER SECURITY	22%	-	2%	-	-	24%
	VOICE	-	-	-	-	-	-
	VOICE	7%	2%	2%	-	2%	13%
SHOULD Total		51%	20%	11%	-	18%	100%
NICE	ALL	7%	-	-	-	14%	21%
	CLUSTER	7%	-	-	-	7%	14%
	GIS	14%	14%	-	-	7%	36%
	INTER SECURITY	-	-	-	-	7%	7%
	VOICE	-	-	-	-	-	-
	VOICE	-	7%	7%	7%	-	21%
NICE Total		29%	21%	7%	7%	36%	100%
Grand Total		52%	28%	4%	2%	14%	100%

Figure 14 – Achieved results vs. user requirements (percentage)

Excluding the NOT FORESEEN requirements, the resulting figures represent the actual achievement of the project vs. the targeted results.



Type	Goal	MET	PART MET	NOT MET	NOT TESTED	Grand Total
MUST	ALL	15	17		3	35
	CLUSTER	10	6			16
	GIS	5	3			8
	INTER	19	6			25
	SECURITY	8				8
	VOICE	5	4			9
MUST Total		62	36	0	3	101
SHOULD	ALL	3	2			5
	CLUSTER	2	2	3		7
	GIS	5	4			9
	INTER	10		1		11
	SECURITY					0
	VOICE	3	1	1		5
SHOULD Total		23	9	5	0	37
NICE	ALL	1				1
	CLUSTER	1				1
	GIS	2	2			4
	INTER					0
	SECURITY					0
	VOICE		1	1	1	3
NICE Total		4	3	1	1	9
Grand Total		89	48	6	4	147

Figure 15 – Achieved results vs. selected user requirements (absolute numbers)

Type	Goal	MET	PART MET	NOT MET	NOT TESTED	Grand Total
MUST	ALL	15%	17%	-	3%	35%
	CLUSTER	10%	6%	-	-	16%
	GIS	5%	3%	-	-	8%
	INTER	19%	6%	-	-	25%
	SECURITY	8%	-	-	-	8%
	VOICE	5%	4%	-	-	9%
MUST Total		61%	36%	-	3%	100%
SHOULD	ALL	8%	5%	-	-	14%
	CLUSTER	5%	5%	8%	-	19%
	GIS	14%	11%	-	-	24%
	INTER	27%	-	3%	-	30%
	SECURITY	-	-	-	-	-
	VOICE	8%	3%	3%	-	14%
SHOULD Total		62%	24%	14%	-	100%
NICE	ALL	11%	-	-	-	11%
	CLUSTER	11%	-	-	-	11%
	GIS	22%	22%	-	-	44%
	INTER	-	-	-	-	-
	SECURITY	-	-	-	-	-
	VOICE	-	11%	11%	11%	33%
NICE Total		44%	33%	11%	11%	100%
Grand Total		61%	33%	4%	3%	100%

Figure 16 – Achieved results vs. selected user requirements (percentage)



The noteworthy result is that 94% of the user requirements were fully or partly met by the final platform deployed and tested in Venice or demonstrated in Sussex and Aachen.

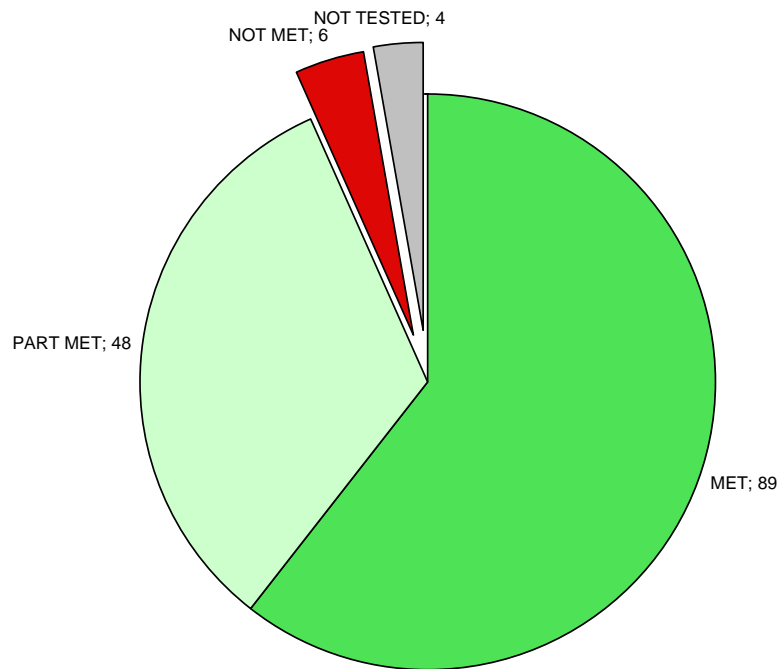


Figure 17 – Coverage of user requirements (percentage)

The classification of the requirements on technologies is shown in the following Figures.

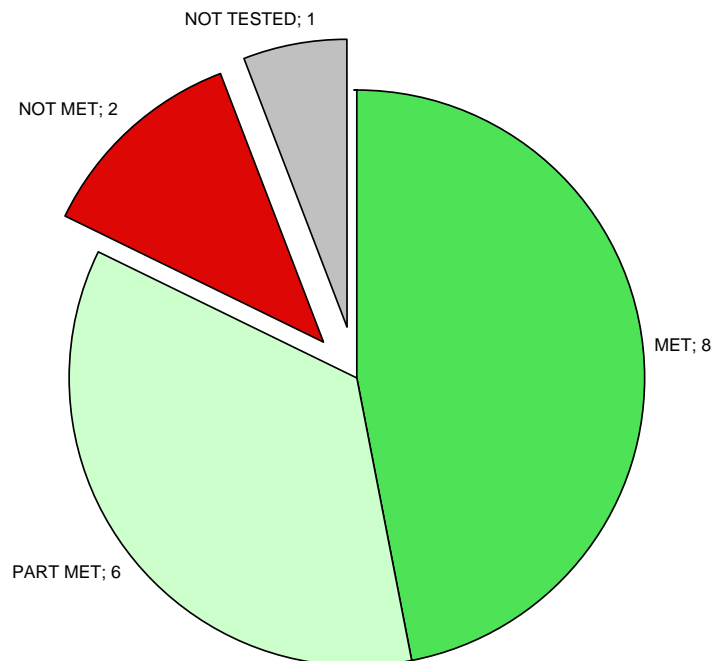


Figure 18 – Coverage of user requirements (VOICE component)

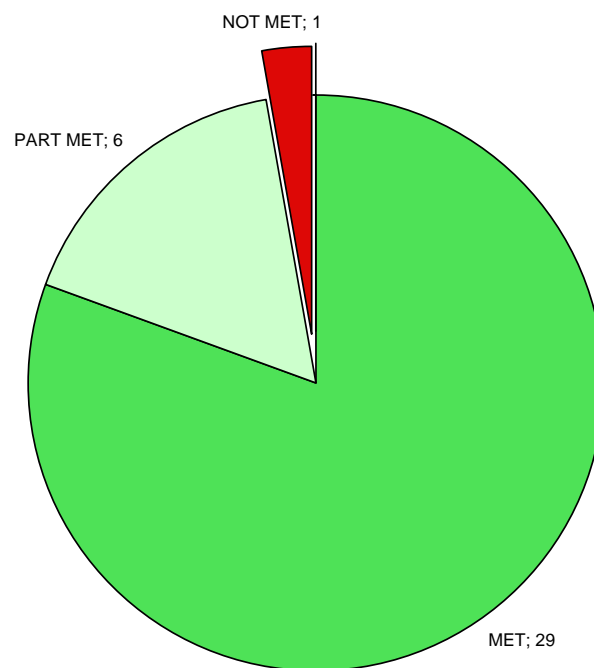


Figure 19 – Coverage of user requirements (INTEROPERABILITY component)

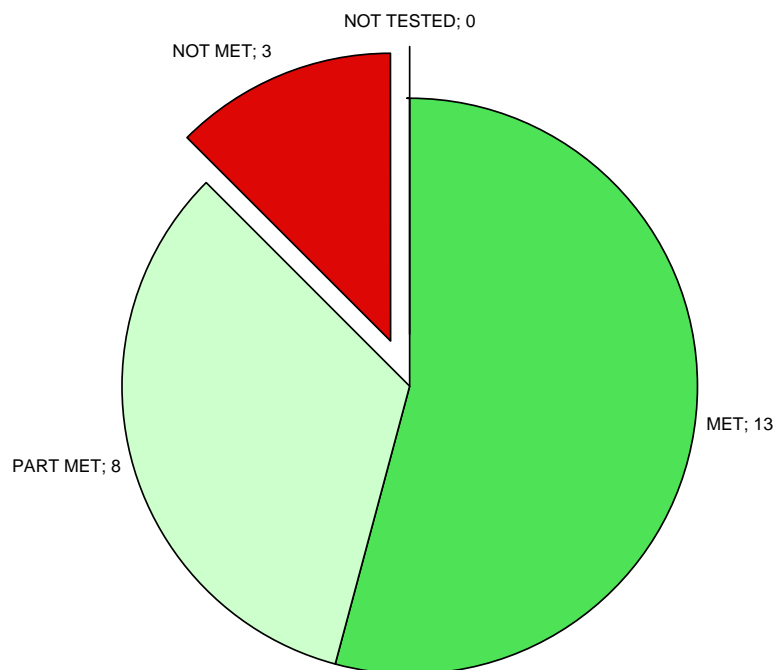


Figure 20 – Coverage of user requirements (CLUSTERING component)

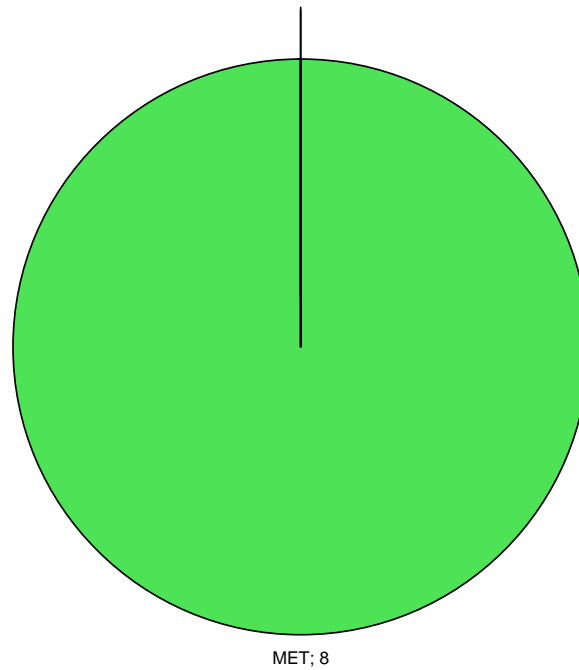


Figure 21 – Coverage of user requirements (SECURITY component)

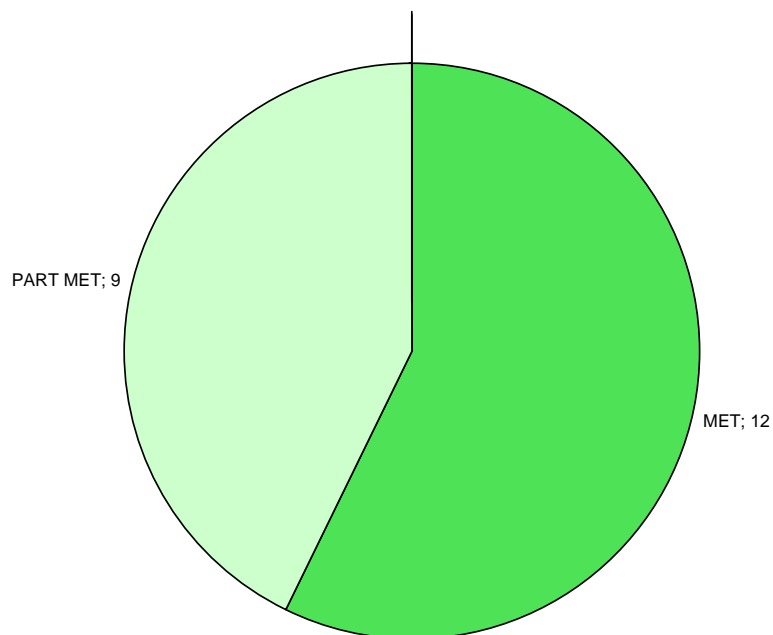


Figure 22 – Coverage of user requirements (GIS component)

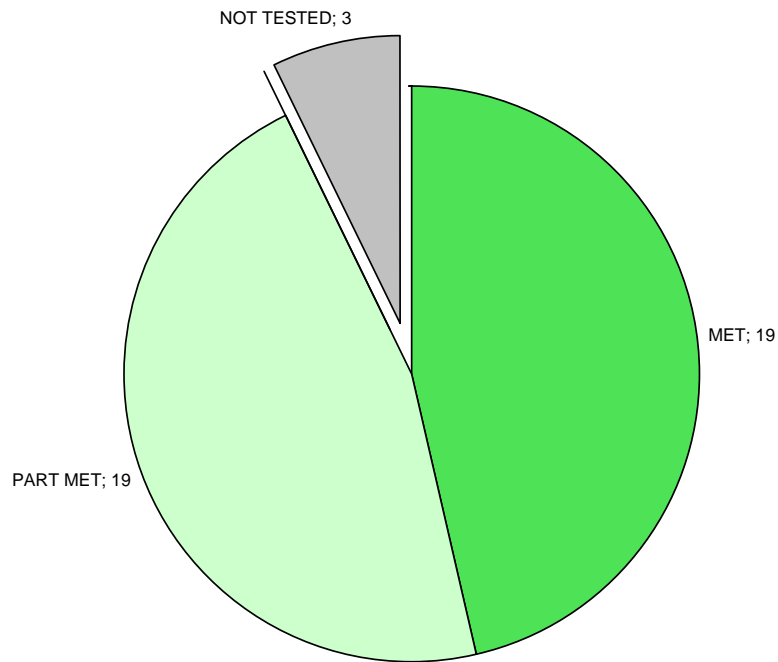


Figure 23 – Coverage of user requirements (more than one component)

The same data, grouped according to the priorities, give the following results.

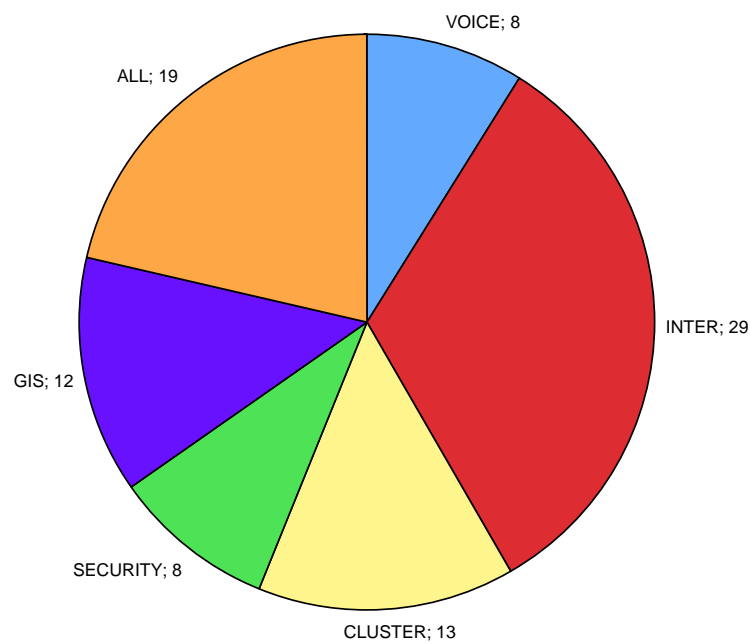


Figure 24 – User requirements MET

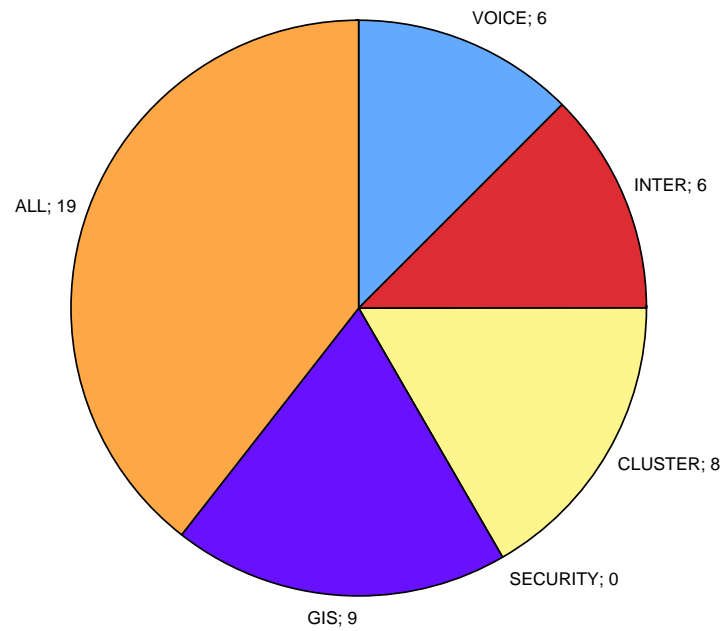


Figure 25 – User requirements PARTLY MET

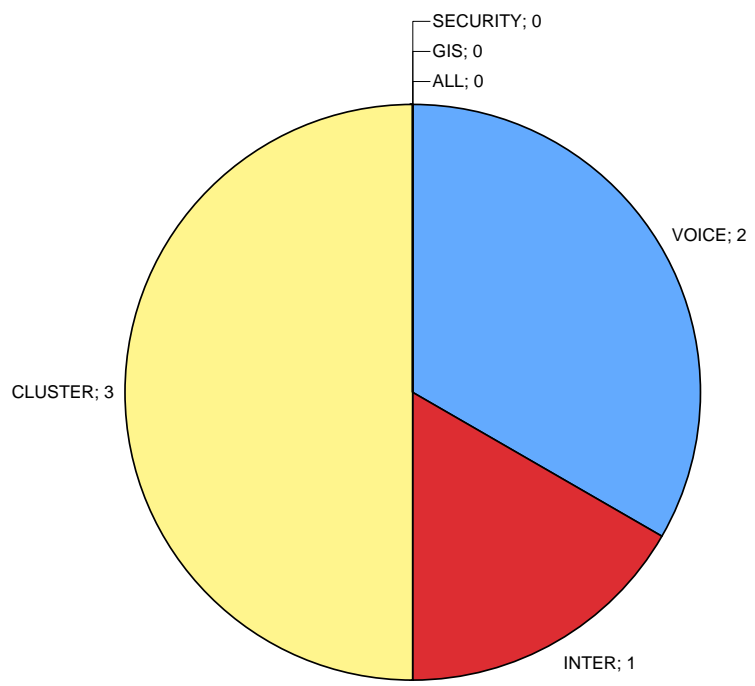


Figure 26 – User requirements NOT MET

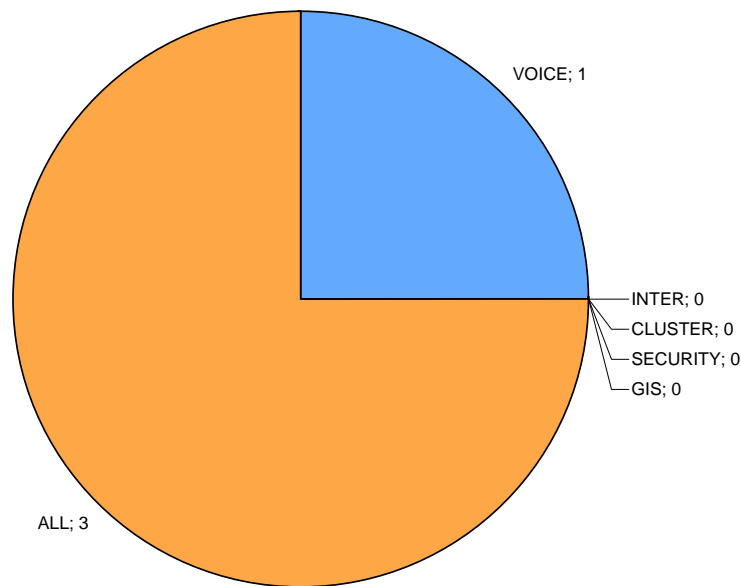


Figure 27 – User requirements NOT TESTED

In addition to the overall coverage of the requirements, it is worth noticing that all the tested **MUST HAVE** requirements (98 out of the agreed 101 requirements) were fully or partly met (see figure at next page).

More details on the analysis of the requirements (including notes on the **NOT FORESEEN** or **NOT TESTED** ones) can be found in Appendix A.

Such excellent result paves the way for a very promising follow-up of the project for a future adoption by users in their incident management procedures.

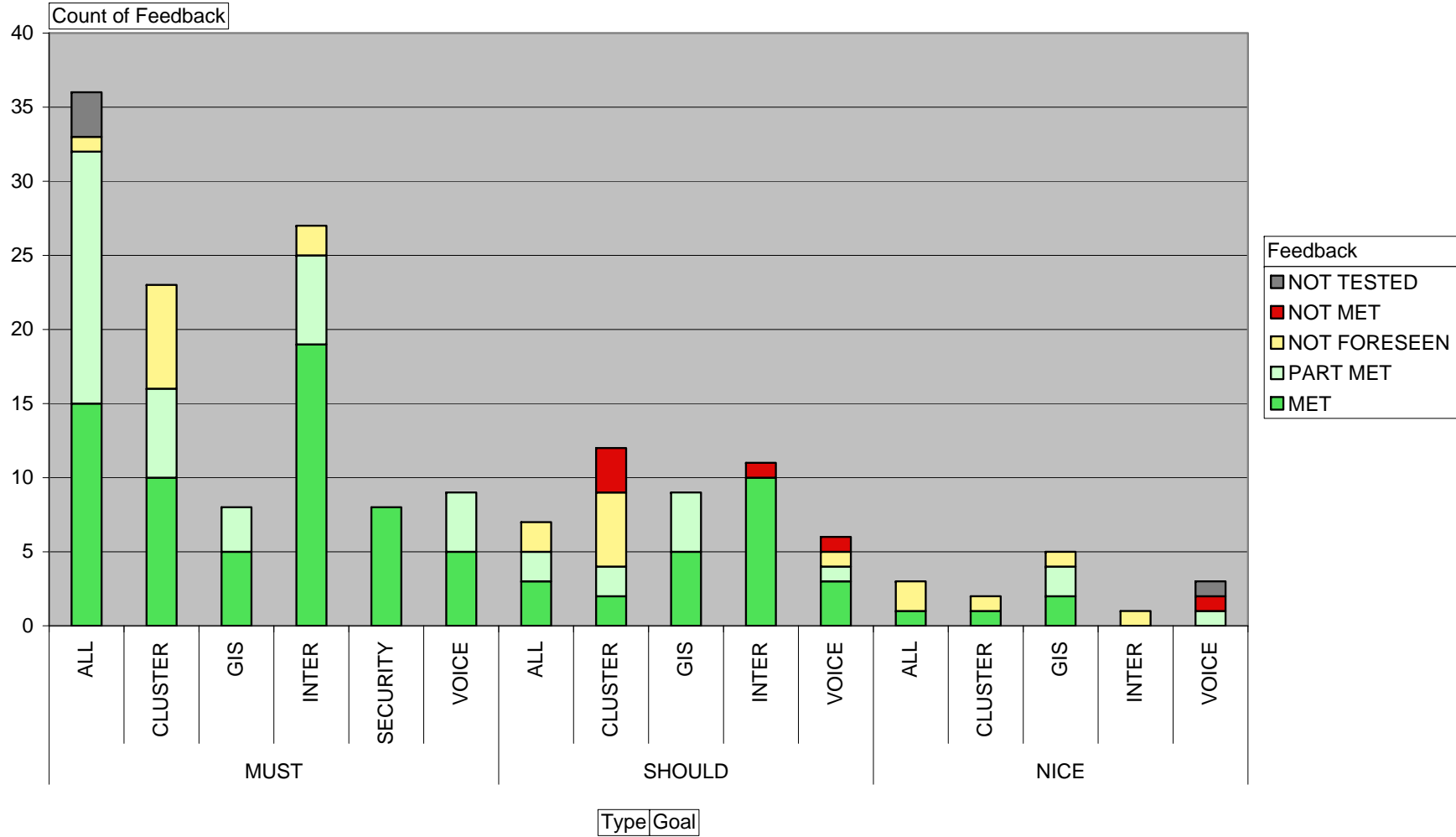


Figure 28 – Total mapping of achievements vs. requirements



2 Assessment of the project impact

Based on the REACT Evaluation plan (Deliverable D5.1), the project potential impacts have been assessed according to 4 different categories.

Part of the information related to the partners plans for future exploitation are included in the deliverable D8.4 (Exploitation Plan), which is a Restricted Report.

The expected impacts (as defined at the beginning of the project) were listed in tabular form, together with measurable indicators of their achievement.

The achieved results are shown in the following table.

REACT impact (from DoW)	Expected Measurable Impact	Assessed Impact
The use of the caller location and of the semantic clustering increases the efficiency of the evaluation of the meaningful content of each call, with a better provision of emergency services	- Capture of 100% of location provided by existing legacy systems	- This functionality has been fully met, even if legacy systems have not been integrated in the REACT chain. It has been tested off-line with the CNVVF C&C system (SO115) by using the program output log and inputting it into the REACT tools. - Moreover, it was successfully tested that location provided as addresses can be used via CAP Generator and get basically the same results independently from the gazetteers (geolocation functionality external to REACT)
	- Capture of 95% of location provided by actual or simulated e112/eCall alerts	- Simulated eCall were used for this. The Alerts were generated by a testing tool developed within the project. The location information embedded in the messages were captured with 100% rate of success.
	- Capture of 75% of major location (i.e. city names) if no other existing function is actually provided, by using PSAP operator text and speech.	- When location description was input as text into the system, the successful ratio was better than 90%. Some ambiguities could not be solved by the gazetteers when their description was not integrated with ZIP codes. - The Voice tool could identify only those locations included in the list of keywords, therefore the success rate is of little value. Nevertheless, for such locations, the success rate was assessed to be close to 50%
	- Presentation of the call location on the REACT local component GUI within 10 seconds since the call is input.	- This Impact was fully met by the system. The local displaying of the provided location usually takes less than 1 sec.

(to be continued)



(continued)

REACT impact (from DoW)	Expected Measurable Impact	Assessed Impact
<p>REACT will be a playground for network operators and emergency authorities to make trials on the viability of such systems</p>	<ul style="list-style-type: none"> - 100% of the provisions to data structures of the e112 standard are adopted by the REACT data structure 	<ul style="list-style-type: none"> - This functionality has been fully addressed by both the adopted standard for interoperability (CAP) and by the data store designed and implemented in REACT.
<p>REACT aims to normalize warnings from various sources, allowing their aggregation and analysis so that additional knowledge can be extracted and added as an aid to situational awareness and pattern detection. This application includes the harmonization of ontologies and metadata according to the standards and guidelines suggested by European initiatives, in order to realize data sharing among different platforms and applications.</p>	<ul style="list-style-type: none"> - 100% of the alert information that reach the REACT remote component are made available to an external (authorised) PSAP equipped with a REACT local component 	<ul style="list-style-type: none"> - This functionality was fully met. In addition to the expected impact, it was verified that alert information are NOT made available to other organisation than those authorised.
<p>REACT will show how to overcome these barriers making use of ICT solutions and data interoperability. The horizontal integration between districts and jurisdictions will improve efficiency and usage of resources in daily operations</p>	<ul style="list-style-type: none"> - 100% of the alert information that are input to the REACT local component are correctly passed to the REACT remote component 	<ul style="list-style-type: none"> - The adoption of the combined CAP standard allowed to achieve the expected impact. - In addition to that, the use of the TSO standard allowed a partial translation of codes and categories in other languages. - The encountered limitation are due to the impossibility to fully convey the specific (and local) terminology for the incident description between different organisation (regardless of the language)
<p>REACT will cluster applying ontological semantics to the call data. It will take natural language texts as inputs and generate machine-accessible representations of the underlying meanings that can then inform reasoning processes. This will allow a comprehension of alert in the natural language of each operator</p>	<ul style="list-style-type: none"> - Automatic preparation of selected job forms in different languages by using text input or speech recognition. - The PSAP operator may speak any of the addressed languages (Italian, German, English, French) without any impact on the speech recognition functionalities 	<ul style="list-style-type: none"> - This was not achieved by the project. The implemented functionality (as agreed with users) is limited to suggesting the call-taker the captured keywords, leaving to the operator the choice whether to use them for the job form filling or not. - This has been partly met by the implemented tool. The Voice tool is able to identify the caller of the language between the expected four ones, but the list of keywords and the implemented grammars differ between languages; this, therefore, results in different recognition performances according to the language

(to be continued)



(continued)

REACT impact (from DoW)	Expected Measurable Impact	Assessed Impact
REACT will foster the use of multimedia messages, coming as pictures or video, enabled by today’s handheld devices (and even more during the project life)	- If not available at PSAP, a dedicated input channel will allow to enter data sent by handheld devices in digital form	- This functionality was not tested, because of the unavailability of dedicated input channels. - The implemented protocol allows the integration of links to multimedia files in the message body and this was tested using the CAP Generator testing tool.
REACT will be open to accept calls/messages from surveillance systems and automatic sensors in general. This would be a real improvement on the current situation, with such calls/alerts directly input into the response chain.	- Capture of 95% of data provided by actual or simulated eCall alerts	- Simulated eCall were used for this. The Alerts were generated by a testing tool developed within the project. The location information embedded in the messages were captured with 100% rate of success. - No tests with other automatic alarm systems were carried out.

Table 1: Expected vs. achieved impacts

In addition to the listed achievements, concrete impacts on:

- Users community (PSAPs)
- Citizens
- Project partners (industrial)
- Project partners (users)

2.1 Impact on the users community (PSAPs)

As already discussed, the targeted users of REACT are those actors of the Emergency Management chain who deal with Alerts from Citizens and manage the first organisation of activities (dispatching).

These operators are usually working in the so-called Public Safety Answering Points (PSAPs), organised in Command and Control Centers. They are specific to each Rescue, Health or Security Organisation, with many difference between each other both in procedures and legacy systems. Moreover, many differences can be found when analysing those services across Europe.

Further to the REACT User Requirement phase, a number of common Requirements to PSAPs belonging to different organisations (Police, Fire Service) and countries (United Kingdom, Italy and Germany) were identified and translated into functional requirements.

Requirements could be mapped onto the main REACT technological components, namely:

- the Voice Tool
- the Interoperability Tool
- the GIS Tool
- the Clustering Tool

In addition to them, a Security component had to be added. There were also requirements crossing such categories.



Each of the main tool REACT has been researching on have a specific interest to PSAPs users and may have an impact on their Incident Management operations (increasing efficiency, saving money, improving the working conditions...). Further to the positive evaluation of the REACT prototype, some expected impact have been identified.

2.1.1 Improvements in Incident Management

The developed prototype had the target of assisting PSAP operators in:

- Manage incoming calls more efficiently
- Identify the potential recipient of the alert outside of their local organisation
- Share the alert with other organisation
- Extracting valuable information by logically grouping calls according to selected rules
- Give priority to calls

The interoperability component was found to be the most promising by the users from Fire Services PSAPs.

The most tangible impact is the reduction in the time needed for alerting other Emergency services about incidents. Albeit impossible to quantify in terms of seconds saved per alert (it depends on each specific incident), such reduction is evident when it comes to the description of the incident typology and position, that are immediately available to the other service(s).

During the project trials in Venice, the direct alert via voice call (that cannot be avoided for legal reasons) was very short since it was usually limited to have an explicit acknowledgment of receipt of the alert and a short discussion on the best way to manage the incident.

Major advantages were noted for those calls referring to alerts taking place outdoor (i.e. not in households but rather in the Venice lagoon or in the mountainside), where the position of the caller could not be transferred as an address but rather as lat-long coordinates: the immediate availability of such information through REACT gave a lot of confidence to the operators and save a huge amount of time.

This was particularly found important for two specific scenarios:

- A large event (e.g. flood) where a huge number of calls may keep all the 115 operators busy. In such frequent case, citizens try to reach other Emergency numbers (112 or 113 in Italy) but still the requests for help may not be passed to the 115 operators: with REACT in place, this problem is overcome because of the message received and displayed.
- A single event that needs to be shared with many organisations (e.g. a truck accident on the highway). In addition to dispatch their teams, operators have to alert via phone call as many organisation as foreseen by the procedures: such number may well be 10 organisation. This means 10 phone calls, each of them concerning the description of the incident, its position, description of the actions taken and the dispatched resources. With REACT, this information sharing is dramatically faster and the few tests carried out during the trials impressingly showed it.

Another relevant impact expected by the adoption of the REACT platform is a better management of calls in other languages than Italian. The problem of taking calls in different languages is currently not solved because no interpreting services are available and the call-taker has to rely on his/her personal language skills.

Since in Italy there are regions where two languages are currently spoken by citizens (Valle d'Aosta [Italian and French], Trentino-Alto Adige [Italian and German]), a possible way-out for managing calls in German and French would be the forwarding of the incoming call from



the call-taking place (e.g. Venezia) to a call-taker in Aosta (Valle d'Aosta) or Bolzano (Trentino-Alto Adige) so that the job form can be filled by a fireman speaking the same language of the caller. Thanks to the interoperability tool of REACT, such filled form would then be immediately available to the intended call-taker in Venezia for dispatching the resources.

Such experimental set-up has been arranged for the REACT trials and the results were so promising that it will be kept functioning at least for all 2009. Would such long test be successful, additional languages may be added by creating support teams for other languages (e.g. English or Romanian).

A tangible proof of the raised interest in the interoperability functionalities in Italy, is given by the decision to keep using REACT well beyond the end of the project.

During the demonstration in Aachen, the potentialities of the automatic translation of terms and categories in different languages were positively assessed by the users of the Maas-Rhine Region (that includes areas from Belgium [French language spoken], The Netherlands (Dutch language spoken) and Germany [German language spoken]).

A number of users were created for the workshop and the local configuration of their CAP Generator included different languages and different typologies/categories of alerts according to the local procedures.

Successful creation and sharing of alerts convinced such users to start a longer experiment with the REACT tools, that will be run in parallel with the on-going implementation of a common C&C infrastructure. Since, for the time being, no working interoperability tool is in place, it is expected that additional experience will be gathered on the most efficient way of sharing and presenting alerts to different operators.

Considering that currently information are shared via voice or faxes, the expected impacts will be

- the reduction in the alerting time,
- the limitation in ambiguities created by the language barrier and by the different terminologies used in the different regions and
- the increase of efficiency in passing the caller location to different organisations

The Voice tool was found of high potential value, but still uneasy to be integrated into the current call-taking/dispatching procedures. Further technical developments are needed: the impact of a full-fledge system for voice capturing would be huge.

The clustering component was found to be the most promising by the users from Police PSAPs. The different perception of potential impact from user working at Fire Services is due to the more stringent requirements and procedures about information sharing.

Even if the interoperability component was successfully tested, the local IT responsible found the REACT tools somehow competing with other data sharing projects between Emergency Services in the UK.

An invitation to meet and discussed the REACT approach was received by the people in charge of the "Gwent/Welsh Comms project", that is currently designing the future communication infrastructure per Emergency Services in Wales.

The clustering functionalities have been always of high interest to Police Services because of the additional investigating tool offered. In particular for post-incident analysis, the ability to



browse through a large number of alerts and to filter them according to non-intuitive and highly sophisticated algorithms is considered of high value. Being it basically a local tool, it can be run at every PSAPs or Police station on the available database (potentially enriched with calls coming from other PSAPs once the interoperability tool would be accepted), empowering both supervisors and inspectors to find information and relations between “facts” in a more efficient way.

2.1.2 Standards

All Emergency Operators agree that Standards are key to a successful implementation of an efficient Incident Management. Unfortunately, there are many “local standards” implemented and a lot of efforts at Governments level is made trying to overcome such artificial barriers to information sharing.

REACT has not entered such battlefield, but rather has implemented a method for data sharing by using the Internet as medium and CAP as data structure for organising and transferring alerts.

The rationale for this choice is to not to offer yet-another proprietary standard, but rather to make an open standard for exchanging data. Even if this should be complemented by strong security features, it offers a flexible and scalable method for arranging data in a interoperable way, also allowing an efficient browsing of data by intelligent searching tools (e.g. the REACT clustering component) and the addition of multimedia information (e.g. voice recording).

In addition to the CAP structure, the introduction of the TSO dictionary in the message body is an additional attempt to foster the adoption of an open glossary of terms that can be improved and enriched without requiring a re-design of the exchanging mechanism.

During the project, the Italian Ministry of Interiors (Dept. of Fire Rescue Services) formally adopted the protocol developed by REACT with formal Decree concerning the sharing of data with their Control Rooms.

Dated 17th June 2008 and published on the Italian Official Journal n.154 of 3rd July 2008, the Decree defines the communication protocol that has to be used to exchange data and information between the Fire Services Control Rooms and Controls Rooms managed by other Organisations. This is the first time in Italy that an Emergency Organisation makes its IT systems open to other similar organisations (of course provided that they adopt the defined communication protocol).

It is widely known that the most difficult step in the wide adoption of a standard is to have “first adopters”, that will show the supposed advantages of such standard and start an avalanche effect.

REACT has succeeded with this and a first impact is a rapidly increasing number of Italian stakeholders that are contacting CNVVF and IES to become part of the large-scale experiment with the REACT tools based on CAP and TSO.

CNVVF has also organised a major international workshop to be held in Roma on 28th April, 2009 about the first results of the adoption of such protocol and the next intended steps for having it adopted at Italian level. Although there is no guarantee that this will be extended at European level, it is a very promising start.



2.1.3 Best practices

As already mentioned, the initial trialling period in Venezia has brought both important feedbacks on the usability and usefulness of the REACT platform and created a playground for those stakeholders willing to efficiently exchange data and alerts.

The deployed system has been used by a large number of individual users (135) belonging to 9 different organisations (for a total of 12 PSAPs). In preparation for the REACT final workshop, a parallel set-up was implemented for the German site (4 PSAPs + FEU) in German language, showing how such “playground” approach can be considered an excellent way for having users and stakeholders experimenting the advantages (and the new challenges) of interoperability.

Just to give a first example, since interoperability is not implemented anywhere so far, there is no agreed procedure to prompt a call-taker with alerts coming from other organisations. Italian users have suggested a number of functionalities that will be implemented during the follow-up of REACT, so that they can be assessed and accepted or modified according to a live experience.

Such approach will be also pursued in Germany and the UK.

2.2 Impact on citizens' safety

Citizens are the final users of REACT, being them the real beneficiaries of the improvements of PSAP procedures.

During the project, only test calls or delayed alerts were used, therefore no tangible benefit was reached, with the exception of the language assisted call-taking in Venezia, where French-speaking and German-speaking could have benefited from REACT. No actual calls needing such support were received, however the functionality was tested with fake calls.

More important is the expected impact by the adoption of REACT on a larger scale and in a live environment.

As explained in Section 2.1.1, the most evident impact will be the reduction in the dispatching time of resources, particularly when combined actions are needed.

This holds true especially for frequent events like car crashes or home fires or floods, when the combined intervention of Fire and Health Services (not to say Police) is needed. Independently from the actual call-taker, the other services will be alerted and informed more rapidly, thus reducing the exposition of citizens to risks or the time to be rescued/assisted.

Such impact is even higher in those Countries where the implementation of an efficient 112 emergency number and procedures is lacking (like in Italy) and where cross-regional events can frequently happen.



2.3 Impact on the project partners (users)

In addition to the impact on the PSAP user community (Section 2.1), some specific impact are expected on the users that have participated to REACT.

In particular for Italian CNVVF, the formal adoption of the REACT interoperability protocol has launched a revision of their current C&C software and, at a lesser extent, of their call-taking procedures.

Their current C&C software (named SO115) is being upgraded with the needed functionalities to export CAP messages during the call-taking process. This will allow the call-taker to continue to work as usual (i.e. no additional typing will be requested), apart from the confirmation of the intention to share THAT specific alert with a pre-defined list of recipients (with the possibility to amend such list).

Before continuing with the upgrade of the GIS functionalities, a period of experimentation with the CAP Viewer Tool (see D6.1), will allow them to better identify the best approach to the management of alerts coming from other organisations (see also Section 2.1.3).

A clear impact on users way of creating alerts is the increased need for categorising incidents and alerts. This because the used codes had been decided to be understood only by operators of the same organisation: this is not enough to get the most benefits by interoperability. A careful exercise will be needed to first map their current categories on CAP and TSO terms and, eventually, create new descriptions to be used when exchanging information.

On the same topic, users recognised that the current version of TSO (v2.0) is not rich enough to describe the variety of events they are used to face daily. Although the free-text fields can be used for a better description of the event, by doing this a large part of the automatic management of calls would be lost.

An initiative at EC level will be launched by FWAC (through FEU) for creating a network of operators willing to work on continuous update of the TSO dictionary. EC funding for a Thematic Network or a supporting action will be sought.

All users will be analysing the best configurations for the Clustering Tool, aiming at including it as an add-on to their current C&C systems. This may or may be not integrated with the full REACT interoperability tool.



2.4 Impact on the project partners (industrial)

As better described in the REACT exploitation Plan (D8.4), the industrial partners of REACT will be exploiting the gained experience and knowledge improving their offer to customers.

IES Solutions is steadily increasing their market relations with Emergency Organisation across Europe. Building on the results of REACT and other Italian projects with CNVVF, a new contract is under negotiation for the follow-up of the interoperability tool.

The experience gained with the building of the datastore and of the testing tools (CAP Generator and CAP Viewer), is of immediate re-use with any Emergency Organisation that is willing to interoperate.

In addition to this, additional ancillary tools (e.g. a configurator for CAP-TSO mapping) will be developed and offered to the market.

As an additional follow-up at EC level, IES Solutions is coordinator of a funded CIP project (whose acronym is REACH112) that will start in April 2009. Such project will deploy a Total Conversation Solution in 5 Pilots across Europe (UK, Spain, France, the Netherlands and Sweden) for allowing people with disabilities to interact with Emergency Services (and PSAPs in particular). The chosen protocol that will be used for exchanging data between PSAPs will be the REACT one.

Additional market opportunities will be sought by the participation of IES Solutions to the EENA Advisory Board.

Northgate is a leading supplier to the emergency services in the United Kingdom with an installed base of over 80% of Police Forces and about 50% of Fire and Ambulance services with solutions including, but not limited to, Command & Control, Geographic Information Systems, Integrated Communication Control Systems, Demand Management and Crime and Intelligence systems..

Northgate contributed to REACT its expertise of the emergency service market and a number of components, which are part of its existing offering:

- The **Connect control room service bus** sits as the single point of contact in most Police control rooms in the UK providing a unique opportunity to forge a global link with external entities. Connect has been enhanced to support CAP messages and concentrate the data streams from REACT. This can facilitate the communication with most existing control rooms in the UK.
- XC is the Northgate GIS application. This provides mapping capability for users of linked Command & Control systems. It is used by call takers and dispatchers to help control operations and resources. It provides the user interface for REACT.

The components above are already part of Northgate current control room portfolio. The enhancements made in REACT will be incorporated into the core products and offered as optional features to Northgate's clients.

Oxford Computer Consultants contributed two key components to the REACT system:

- Input Analysis – identifying which organisations may be interested in a particular incident
- Semantic Clustering – identifying relationships between groups of incidents



Both of these components are highly innovative in the field of the emergency services, the concepts behind the Semantic Clustering in particular. As a result of successful demonstrations in Sussex there has been significant interest into taking these components further. The key areas that OCC will be pursuing in the short term are:

- To pilot the clustering and interoperability module as part of a national ‘new technologies’ project. The idea is to try and set up a funded project to demonstrate the potential of the clustering to forces throughout England with a suitable funding stream which could be as soon as July 2009.
- To run a pilot with the Welsh Emergency Services, who are already working on a ‘road map’ towards interoperability. OCC are hoping to demonstrate their work on clustering to the Welsh team and then participate in the trials.
- OCC is also exploring an extension of the processes used in Semantic Clustering to create a ‘Fact Finder’ that can be used in post incident analysis. Initial discussions with Sussex Police already suggest that there is further potential in short term intelligence gathering in the control room during major incidents. The fact finder would allow operators to quickly assimilate information regarding specific people, locations and past events. Ongoing discussions with the principal analyst at Sussex Police are helping to take this process forward.

In the longer term, following successful pilots in the UK, the work would then be extended to work alongside any CAP compliant C&C system in Europe.

Voice-Insight is a leader in the applicability of Voice Recognition (and interpretation) in the professional areas of GIS, GPS, Logistics and Inspection. The company flagship product VQL is mainly used with embedded ASR and TTS at high sampling rates (16KHz). A special note should be taken for voice enabling of web services from embedded ASR implementations (i.e. on Smartphones, PC ‘s and PDA’s).

The contribution of Voice-Insight to the REACT project related to their expertise in speech recognition applications especially combined with geographic data. The initial proposition of the project suggested allowing operators to directly request and manage information from their databases by voice through embedded solutions (16KHz)

Users have shown greater interest in automatically analyzing emergency calls and output keywords to the operator in his language and also foreign languages. The challenging task to be executed with networked ASR (operating at 8KHz) has allowed Voice-Insight to develop new technologies related to telephony applications which allows to analyze speech telephony input from 5 different languages, allowing also language identification.

Therefore, the know-how and methodology needed to develop such applications has been acquired along the project. However, in order to be able to deliver a product beyond the research carried out during this project, additional work would be needed to build appropriate specific language models that cover more exhaustively the domains and type of incidents likely for each user type. Indeed, the written data delivered by two of the users of the REACT project (SPA and CNVVF respectively) cover a part of the possible incidents and possible vocabulary needed. In order to productize the positive results encountered in this R&D project one should classify all possible source of incident and define exhaustive associated vocabulary.



APPENDIX A Detailed analysis of requirements covering

Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA50	MUST	The user requires that the call taker in PSAP 2 on starting a call has the information relevant to his/her role displayed to them within 20 seconds of starting the call	As a call lasts for 30 seconds to one minute on average, helpful information should be displayed as soon as possible, to enable additional questions. In some countries there is a PSAP 1 (e. g. operated by the telecom operators) that provides the function of routing to the correct emergency organization and providing the emergency organization with the phone number and address of the caller. PSAP 2 is then the emergency organization handling the incident information in its own PSAP. In many continental European countries there is no PSAP 1. As a consequence the general term PSAP is used in these countries (e. g. ambulance and fire-brigade in Aachen or fire-brigade in Venice).	MET	VOICE	
MA92	MUST	The user requires that the voice recognition technology be activated once an operator picks up a call and provides recognition of all voice or key words in the operators own language, French, English, German, Dutch and other translations are required by that user.	As a lot of people call 112 and reach the PSAP2 it is important that particular keywords can be identified in a number of languages relevant to the user. Thereby enabling the operator to understand what type of emergency is going on and to take further actions appropriate to the needs of the person in distress.	PART MET	VOICE	
MC18	MUST	The user requires that where the React System uses voice recognition to scan messages, that it can be used to identify key or all words in a number of languages and translate them to the language of the user.	This could be vital in the 112 call from a visitor who cannot speak the language; a limited number of key words could be identified for recognition. Callers could then be informed of the key words to use to gain help. This requirement changed priority due to a proposal by the users.	PART MET	VOICE	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA99	MUST	Keywords to understand the type of the incident,	Words like car accident, pain in the chest, broken leg, fire, geography forest, river, lake, mountain, highway etc. shall be covered by the REACT system.	PART MET	VOICE	
MA106	MUST	Where Voice recognition is implemented to support the call taker, the voice recognition should be completed in close to real time and in any case within 5 seconds of the words being spoken	This speed is required if the recognition is to be useful, the average call taker time is 30 seconds, if not displayed immediately, the words could not be clarified if there are any misunderstandings or more than one possibility to understand.	MET	VOICE	
MA107	MUST	Where Voice recognition technology is used to support the call taker, the recognised words must be displayed in a form easy to identify for the call taker	e.g. in an extra window, as part of a form, easy to read for the call taker	MET	VOICE	
MB10	MUST	Be able to use keyboard, mouse or functional keys	The operator should be able to use his preferred mode to enter information. This requirement changed priority due to a proposal by SPA.	MET	ALL	
MB11	MUST	React must be able to display Accurate position of Location information provided by another organisation in the form required by that PSAP or user	REACT should be able to manage data regarding positioning and should be displayed automatically on the GIS at the PSAP. Different agencies use different Location standards	MET	INTER	
MB38	MUST	The user requires that where the React System uses voice recognition to scan messages that the system accurately scan all the voice messages and identify all or target words as required by the user, no matter the voice quality, dialect or speed of speech.	Identification of the words must be reliable. Priority changed due to proposal of SPA	PART MET	VOICE	
MB39	MUST	The user requires that where the React System uses voice recognition to scan messages that the scanned words are made available to the call taker to use, without the need to re-type them.	This will include a function for the call taker to select certain words or all words and if required correct or edit words. Priority changed due to proposal of SPA.	MET	VOICE	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MB40	MUST	When the React System is set to use voice recognition to scan messages and identify keywords. The system should identify the keywords used by the caller and highlight them using the appropriate HMI behaviour, as supported by the organisation, for the operator to see.	REACT should fit into the interface the user is familiar with, but flag words entered by the voice recognition. Priority changed due to proposal of SPA.	MET	VOICE	
MA06	MUST	Be able to handle eCall data / data from mobile phone triangulation	To maximise the advantages of eCall as the implementation increases the REACT system should be designed in a way that information provided via eCall can be handled by the REACT system i.e. information can be forwarded and received. Currently, the uptake of eCall is limited.	PART MET	INTER	Actually it was MET but the testing was made possible only thanks to the eCall simulator
MA48	MUST	The user requires that the data is captured and transferred to the React system within 5 seconds of it being available	The initial call to the PSAP and subsequent calls may take no longer than 30 seconds so data must be available as they are making the call for it to be relevant	MET	INTER	
MB09	MUST	React should provide information on another incident that took place at the same area some time (weeks) ago	After the shift has changed, some information could be lost. Moreover, operators might forget incidents after some days. So, there might take place an incident that is linked to another one which took place some weeks ago (e.g. someone discovers a leg at an area where a lethal accident took place some weeks ago).	PART MET	CLUSTER	
MA07	MUST	Make a the address of the caller available to REACT when keyed in by the operator	The REACT system has to be able to forward information regarding the address keyed in by the PSAP 2 operator, to enable other PSAP 2's to recognize that there is already an emergency going on.	MET	INTER	
MA08	MUST	Make available incident type	The REACT system has to be able to forward information regarding the type of incident indicated by the PSAP2 operator to enable other PSAP2's to recognize that there is already an emergency going on.	MET	INTER	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA09	MUST	Make available additional information from the Caller from the command and Control Log regarding type of incident	The REACT system has to be able to forward further comments to enable other PSAP to recognize that there is already an emergency going on.	MET	INTER	
MA10	MUST	Receive information regarding an incident location, type, date, time reference number handled by any other approved organisation	The REACT system should make available location of incidents going on that are handled by other emergency services or calls related to them. The PSAP should get information when another emergency service starts an intervention. So, they are able to know if this service already arrived at the incident site or not. The REACT system should be able to forward information on the incident number one service gave to a particular incident. This makes it easier for the emergency services to discuss issues related to this incident, since the number makes it clear to which incident the other is referring to.	MET	INTER	
MA104	MUST	The React system transfers the type and number of Resources deployed and confirmation they have been dispatched	The confirmation that the Emergency service f has dispatched resources is forwarded to the emergency service that send the information on the emergency via the REACT system also the type and number of resources deployed, critical for recognising a potential major incident.	NOT FORESEEN	INTER	The Project has been conceived not to handle resources - Not in line with Description of Work
MA105	MUST	Where a PSAP declares an incident a Major incident, the React System must recognise this and broadcast this change of status to all appropriate linked organisations	This is vital to give an early warning of the declaration of a major incident when all the agencies may not yet be involved	MET	INTER	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA19	MUST	The REACT system should where required by the users display the results as a symbol on the map for an ongoing incident of another organisation	The incidents handled by another emergency service are visualised on the GIS with a symbol.. The symbol might already indicate the emergency service handling the incident and with a code on it the type of incident. If the operator clicks on the symbol (e.g. a red cross) he receives further information on this incident. This information is the own received by an emergency call, including the time of the call as well as the time the resources where dispatched.	MET	GIS	
MA23	MUST	The REACT System will forward information on the priority of the call	Sussex police uses 4 levels: 1 immediate response, 2 response within 1 hour, 3 response within 1 week, 4 no further action.	MET	INTER	
MA40	MUST	The user requires that the React System present the data to the user in the form that they can understand and make use of it.	This means language independent or translated including into terms the user is familiar with. A fire engine in one country may be a fire pump in a another	PART MET	INTER	
MA46	MUST	The user requires that any data exchanged by the React System must include the time, date, location, unique reference number, host organisation and event type as a minimum information	This information is the minimum required to work on for the dispatcher. Not all of this information need be displayed but must be quickly available.	MET	INTER	
MA49	MUST	The user requires that the React system on receipt of the data from the donor organisation, process the data and make it available for searching within 5 seconds	The initial call to the PSAP and subsequent calls may take no longer than 30 seconds so data must be available as they are making the call for it to be relevant	MET	INTER	
MA51	MUST	The user requires that the React System will present to the Call taker relevant event information within a user defined distance from the location of the current.	First suggestion from users 250 – 500 metres or Street blocks; area with a radius of 300 meter, or 50 meter in urban areas, days in the case of pollution, medical emergencies 5 to 10 minutes, fires some hours, etc. These parameters should depend from the scenario (i.e. type of incident, of materials, of location/building)	MET	CLUSTER	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA52	MUST	The user requires that the React System will present to the Call taker relevant event information within a user defined time prior to the current event	First suggestion of users: 15 minutes before current event, all potential relevant events could be displayed.	MET	CLUSTER	
MA53	MUST	The user requires that the React System will present to the Call taker relevant event information within a user defined time after the current event	Current thinking is until the incident is closed or the facility is stopped by the operator	MET	CLUSTER	
MA54	MUST	The user requires that the React System should inform the user where relevant information is available in a way the complies with HMI for organisations	The balance is informing the user without being distracting, yet ensuring the user is aware of relevant information available. A flashing on a separate screen may not be sufficient. A warning message on the main input screen may be more appropriate	MET	GIS	
MA55	MUST	The user requires that the React System should inform the user when new/additional information is available in a way that complies with HMI for the organisations continuously until event closure.	This is required as new and potentially highly relevant information about calls received after the initial search may be missed in the background of incidents. New information could be shown with a different look, feel or colour	PART MET	GIS	Different icons are used. Method of displaying new features is not user-customizable
MA56	MUST	The user requires that the users of React System shall be able to customise the types of event displayed by priority, incident type or other differentiator as required by the user.	This will allow the users to filter out unwanted events that would otherwise clutter the screen. The lost property, loose dog calls are perhaps not relevant when dealing with a fire.	MET	CLUSTER	
MA62	MUST	The user requires that the React System inform the user when new information is available from a secondary or subsequent search in a way that is cognisant of the HMI requirements of the organisations	Additional information should fit into the HMI the user is familiar with.	MET	CLUSTER	
MA63	MUST	The user requires that the React System be capable of displaying the information at the control room, or at other user defined locations within their premises or where the infrastructure permits to their mobile resources.	There is a growing trend towards moving control back to Supervisors on the ground and out to the mobile environment. The React system will need to keep up with this trend by supporting the display of linked information to a variety of users, including those in cars and on foot as they be the ones facing the greatest risk and in the greatest need of the information	MET	ALL	Google earth allows for messages displaying even in places where no REACT GIS Client is installed



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA80	MUST	The user requires that where more detail is available, that this is capable of being displayed, printed as a report, plotted onto a map or GIS system, or transferred for use in another software application.	The detail may need mapping to make sense of the information – chemical spill along a river, or crime pattern analysis	PART MET	INTER	Displayed/Printed/Plotted OK - Transferred in other application yes if the application reads CAP Messages
MA81	MUST	The user requires that on the request of another organisation or for a given type of incident, the React system either automatically or on authority as defined by the data donor can release more information to a receiving organisation.	Normally the fire service would not need to know information about crimes or crimes in progress; however in a riot or other major incident, this information could be critical to the safety of crews. This could either be a user authorised function or an automatic one.	MET	INTER	
MA86	MUST	The user requires that the React System be able to differentiate between different types of data when it is displayed	112/999/ eCall/ Radio/ Sensor	PART MET	GIS	
MA87	MUST	The user requires that the React System be able to differentiate between different data donors when the data is displayed	Common colour or image for police, fire brigade etc.	MET	GIS	
MA91	MUST	The user requires that all agreed information entering PSAP 2 Command & Control system should be made available to REACT to allow display automatically to other the PSAP C&C operator or approved organisations	To include Location, Time, date, incident type, reference number, priority, resources allocated.	PART MET	INTER	
MB50	MUST	The user requires that the React system display the event in a way that is appropriate to the user's role. This will be customisable by the user	Controller minimum detail – Intelligence team more detail, depending on competences. Priority changed due to proposal of SPA.	MET	ALL	
MA101	MUST	Information on the incident can be forwarded from Belgian and Dutch CAD directly to the German PSAP	A window pops up on the CAD at the control room in Aachen.	MET	INTER	
MA104	MUST	The system transfers the dispatch confirmation	Confirmation that resources have been dispatched from the Aachen Fire Brigade, is forwarded to the emergency service that originally posted the emergency information via the REACT system	NOT FORESEEN	INTER	The Project has been conceived not to handle resources - Not in line with Description of Work



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA110	MUST	The system must provide a function to build, maintain and upgrade tables of comparison between the codes used by the different PSAPs.	Incident type, place, materials, ... coding differs between different PSAPs: tables of comparison are needed. Without it, when a PSAP change its system and coding, the other PSAPs could not be aware that the results of their search are no more valid.	MET	INTER	TSO Dictionary allows for codes interoperability
MA111	MUST	The system must be able to correlate different incidents on the basis of geographic features.	For some kind of incident the callers' location and/or the incidents location could be very afar, but linked by geographic features (rivers for pollution, motorway lanes for car accidents, mountain slopes for landslides, etc.)	MET	CLUSTER	
MA15	MUST	A REACT organisation will be able to decide which information is made available for other REACT organisations either automatically or manually	The PSAP operators have the opportunity to decide if information is shared or not – i.e. they can activate or deactivate the system. The ambulance service wants to control which information is shared and which not.	MET	INTER	
MA16	MUST	A REACT Organisation will be able to decide which information is received/accepted from other linked REACT organisations services	The PSAP operators have the opportunity to shut down the system to avoid an information overflow. If there is a major incident going on that is handled by linked emergency services, but if the incident is not of major importance to the ambulance they do not want to have the GIS covered by a lot of signs indicating an incident handled by another service.	MET	INTER	
MA57	MUST	The user requires that the User/call taker can switch the React System or elements of this on or off as required, and the system will record the fact that this has been completed.	The call taker may find the system distracting and would want to switch it off, however the organisation may require it to be switched on therefore the process of doing so should be recorded for audit purposes.	MET	GIS	
MA85	MUST	The user requires that where the React data is displayed on a map or GIS system, that the information is accurately located on that map.	Mapping layers are customisable by user to select appropriate viewing.	MET	GIS	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA88	MUST	The user requires that all information and menus presented to a user in relation to use of the React system shall be intuitive, and are capable of being customised to a particular user's requirement.	Call takers and dispatchers are experts in call handling, but do not have time and resources left during the call handling process to deal with HMI difficulties and do not want to invest a lot of time in training on REACT system	PART MET	ALL	
MA109	MUST	For security purposes, the operator could decide to make available selected information with selected users only for a limited period of time.	During some major events a user could decide to overcome the standard security procedure and make available restricted information to other selected users. In such a case limiting authorised users and time of availability could avoid that the information could spread wider.	PART MET	INTER	It is possible to force a message or to block a message. So, to some extent, the requirement is met
MA31	MUST	The user requires that the React system retain within its system or within a linked system an audit trail of all information that it has held, who has accessed this information, who it has been passed to and when.	This is required to ensure compliance with Data protection. It is also vital for post incident analysis to know who had access to what information at what time. This is critical for example in public enquiries	MET	SECURITY	The Audit components logs all information travelling inside the system and going to other REACT systems
MA34	MUST	The user requires that the React system when searching for data must bring back all the available relevant data in the performance times given with a high degree of accuracy. Where this accuracy is less than 100% the level of accuracy or confidence in the information will be stated	It is critical for the dispatcher to know how much he/she can rely on the information that he is being presented. The searches should be comprehensive and complete for all linked agencies. Where this is not possible, it is vital that the operator is informed of the level of confidence he/she can place in the information they have received	PART MET	ALL	
MA58	MUST	The user requires that the React System following the initial search of the user defined parameters for the call taker, the user can conduct a subsequent search over user defined wider parameters and produce those results back within no more than 1 minute of the request for a search being made.	This second search is to help the dispatcher or controller. This person has to dispatch resources to the event, and will be responsible for a wider geographic area. The dispatcher will want to know in more detail and for wider area event information for the other emergency services or linked organisations, to establish whether this is part of a more serious incident or if there is other information resources attending the scene will need to be aware of.	PART MET	CLUSTER	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA59	MUST	The user requires that the parameters of the second search by the React System are fully user definable either as a default or for customisation by the user.	This will be defined by the organisation and may include, location, time, which organisations, priorities of incident etc.	MET	CLUSTER	
MA60	MUST	The user requires that the second or subsequent search by the React system can either be automatic for all or user defined incidents or on request by either the call taker or dispatcher/controller or other approved user. These requests should all be held in the audit trail.	Whilst these searches may be required for the more urgent events, they may flood the system for low level events such as a simple crime report. Therefore the second or subsequent searches should be fully controllable and definable by the user or the user organisation	PART MET	CLUSTER	
MA61	MUST	The user requires that the React System where the user requests a second or additional search, that the system continues to conduct the search for new information, until it is told to stop by the user, or for a period of time defined by the user, or a predetermined period of time or one off search		NOT FORESEEN	CLUSTER	During Design, complex searches functionalities have been replaced by real-time clusters and filters. This has been accepted by end users
MA65	MUST	The user requires that the React System where a search has not been previously been cancelled, is cancelled once the event log (Command and control) generating the search is resulted, updated and closed.	This is to prevent searches being left running with no closure.	NOT FORESEEN	CLUSTER	During Design, complex searches functionalities have been replaced by real-time clusters and filters. This has been accepted by end users
MA66	MUST	The user requires that the React System only allow authorised users to conduct and view searches.	So, privacy concerns and privacy interests of the public could be satisfied by authorisation for searching	MET	SECURITY	
MA67	MUST	The user requires that the React System have a number of levels of authority that can be linked to functional access to the React system	Administrator, controller, search, specialist search, view only etc.	MET	ALL	
MA68	MUST	The user requires that the React System be capable of allowing another user with a suitable access level to modify the parameters of a second or subsequent search, and this will record the identity of the person making the amendment.	This is required for example when a call taker sets up a wider search as part of the initial call. This is modified by the dispatcher who now has responsibility for the event	NOT FORESEEN	CLUSTER	During Design, complex searches functionalities have been replaced by real-time clusters and filters. This has been accepted by end users



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA69	MUST	The user requires that the React System allow an appropriately authorised user to cancel a secondary or subsequent search and this will record the identity of the person making the cancellation	For an audit later on, it is of vital interest to learn who decided not to investigate further	NOT FORESEEN	CLUSTER	During Design, complex searches functionalities have been replaced by real-time clusters and filters. This has been accepted by end users
MA70	MUST	The user requires that the React System allow the request for a secondary search to be generated by a suitably authorised person either from a fixed or a mobile location, and to record the identity of that person for the purpose of any audit trail.	There is a clear requirement for a supervisor on the ground to send a search request, which may take a long time to explain to a controller by radio or phone.	NOT FORESEEN	CLUSTER	During Design, complex searches functionalities have been replaced by real-time clusters and filters. This has been accepted by end users
MA71	MUST	The user requires that all parameters of the search request on the React System are easy for the user to use and require the minimum of training. These will include pre-formatted searches with variable parameters, and the users will only be shown the searches they are authorised to carry out.	Intuitive drop down menus and pre formatted searches. There is no point showing a user a search that they cannot carry out.	NOT FORESEEN	CLUSTER	During Design, complex searches functionalities have been replaced by real-time clusters and filters. This has been accepted by end users
MA72	MUST	The user requires that the React System search function can search by user defined geographic locations or areas, which can be identified by drawing geo-fences on a linked map or GIS system.		PART MET	GIS	
MA73	MUST	The user requires that the React System search function can be for all or some users on a linked system and where appropriate can be defined to be with a region, or across all or part of the linked systems.	The search could include all linked agencies in my area of operation, (My division, police operating area) My County – Sussex Police, My region neighbouring counties. My Country, neighbouring countries, all linked systems. The scale of the search would need to be proportionate to the type of event.	MET	CLUSTER	
MA74	MUST	The user requires that the authority to share searches can be switched on/off by the creator of the search and this fact is stored in the audit trail	There may be a requirement for a covert, confidential or secure search that others cannot access; this has to be legal, justified and auditable so that the searcher can be held accountable if required.	PART MET	CLUSTER	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA75	MUST	The user requires that the React System to be able to provide full management information on the systems use.	its use by, user, user defined role, organisation, incidents, incidents by type, appropriate events found, searches, costs performance, target time for responses by type, usage etc	PART MET	ALL	Data for providing this information are stored. But NO procedures to show them were implemented
MA76	MUST	The user requires the React System use data light communications.	Required to keep the costs down. Minimum data required to deliver the required functionality.	MET	ALL	
MA77	MUST	The user requires that when the React system identifies events that meet the search criteria in a linked organisation, that these are displayed to the person requesting the search.	This does not mean results being offered in a pop-up window, but in a form, the user wants it to be displayed.	NOT FORESEEN	CLUSTER	During Design, complex searches functionalities have been replaced by real-time clusters and filters. This has been accepted by end users
MA78	MUST	The user requires that the search criteria have a built and user defined level of tolerance to ensure likely linked events are not missed.	However, this should not lead to displaying all events in the area, tolerance should guarantee the acceptance of different wordings etc.	MET	CLUSTER	
MA79	MUST	The user requires that the React system have a function to show multiple linked events and where this exceeds a user defined threshold, warns the user so they can amend the search criteria if required.	Warns user of big search before search completed so can cancel search or amend so as not to waste time with unusable results	MET	CLUSTER	
MA89	MUST	The user requires that for each event type/code the user can set up a pre-formatted and defined search on the React system, the system will recognise and perform a search for the same or similar event types/codes occurring, within defined parameters.	This is required to search for similar events surrounding an incident. Some examples a call to domestic violence – run a search for calls at that location for all incidents. Assaults etc or firearms at the premise may indicate threat levels. Also run a search based on the name of offender and victim. Victim may have reported additional incidents to local authority, may change outcome from warning to arrest. Road accident – search on events on all databases for traffic build up, previous bad driving reported, weather. Also search previous history of road to show if site problem – etc ... Parameters of search are definable and can be customised by both a call taker or a controller. All event types for a road traffic crash or a fire call	PART MET	CLUSTER	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA90	MUST	The user requires that the Control Room Command can oversee, modify and change all searches being performed in the organisation area or by staff under their control as defined by the users.	This is required so that the Control room command can monitor and see the results of any search conducted by their teams. For example they may want to quickly view what is happening regarding a particular incident, or monitor change or cancel the parameters of a particular search to ensure the next information is available to support decision making	PART MET	CLUSTER	Criteria for automatic searches and clusters are defined by REACT Administrators. Procedure for allowing high-level users in performing this task have NOT been implemented
MB21	MUST	The user requires that the React system must have a secure audit facility so that independent inspection can be carried out to identify misuse, without the users being able to change the data	This inspection and secure audit is required for evidence, it also allows compliance with data Protection, security and crime inspection.	MET	SECURITY	
MA103	MUST	System itself is always in use and cannot be deactivated by one organisation	The system cannot be switched of by an emergency service or an operator. So, information exchange between different emergency services in the area of Aachen is enabled. Links to MA33.	NOT FORESEEN	ALL	During design it was evident that the organization wants still the freedom to turn off the system or NOT to use it
MA24	MUST	The React System should have the ability to restrict certain types of data both being sent or received	This information on internal actions or actions of detectives is not shared with other services. Do not share information that is limited to the supervisor today	MET	INTER	Security rules allows for this
MA27	MUST	The user requires that the React system can meet the highest levels of physical and IT security, communication security in place by the user , both current and in the future.	Ensure compatibility to any improved or up rated security systems as made available.	PART MET	ALL	Communication security has been implemented. Physical IT security (i.e. disallowing access to certain users) has been partially met
MA28	MUST	The user requires that where the react system connects to other data systems where lower security levels are used, that no risk is generated to those having higher security systems	This is required if the REACT system links to another data source where low levels of security are employed then no virus or access can be sent via React to another system	MET	SECURITY	



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MA29	MUST	The user requires that the React system must operate 24/7 and have high levels of operation and disaster recovery.	This is required as the system if successful will be required to operate all the time in mission critical situations. It must therefore operate reliably and have full disaster recovery	NOT TESTED	ALL	During the trials in Venezia there has been no major event. Nevertheless the system run without any service interruption during normal operational duties. Stress conditions have been tested at component level during implementation and integration
MA30	MUST	The user requires that the React system must be reliable, resilient and work consistently when under high demand from multiple users	The React system will be a key data source for Major incidents when it may be faced with high demand and multiple searches which may provide critical information on which resourcing decisions will be based. Therefore it must be scaled to operate under these peak loads.	NOT TESTED	ALL	See Above
MA32	MUST	The user requires that the React system must be capable of being remotely upgraded where at all possible, and all upgrades must either be completed simultaneously on all linked systems or upgrades must work with previous versions to ensure continuity	When upgrading software it must ensure that the system keeps functioning with different versions of software. Capable of expandable memory to allow future functionalities.	PART MET	ALL	Some system components can be remotely upgraded provided an Internet connectivity with static IP address. Some other should be installed and managed locally
MA33	MUST	The user requires that the React system must inform all linked systems when a function or the system has failed or is not functioning correctly, in a manner cognisant of HMI.	If a search or a link to fire is not available, another emergency service user may think no other events are occurring at the time, when in reality it is a system failure and they should either check for themselves or make the dispatch decision knowing they cannot rely on a part or all of the React system	PART MET	ALL	REACT check each condition status and can display messages to an administrator if something is going wrong. This messages, however, is not displayed to the end user
MA35	MUST	The user requires that the React system shall follow all best practice in HMI in the fields of organisation control rooms	These rooms are very busy and pressured, so they should have the possibility to stick to procedures they are used to	PART MET	ALL	



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MA36	MUST	The user requires that the React System can utilise the data from all the linked organisations and present it to the users in a way that they can understand and make use of it.	React will have to link to systems using different data structures, names, languages. These have to be handled and presented to the user in a simple form that they can make use of. Examples include, police, fire, ambulance, coastguard, social services, within regions and across borders. Links to MA20, MA25, MA26	PART MET	ALL	
MA37	MUST	The user requires that if one of the communication links to an organisation on the React system fails, it shall not impact on the other users of the system.	The React system should not stop as one link is broken	MET	ALL	
MA38	MUST	The user requires that all communication to and from the React system is secure	Definition of secure is that which applies to the linked users in that country or region	MET	SECURITY	
MA39	MUST	The user requires that all data held on or shared by or used React complies with all EU and National Data Protection and other relevant legislation or guidelines applicable to the area of that Network.	This includes compliance with Human Rights and in particular Rights to privacy	MET	ALL	System will handle security at CAP message level and at CAP fields level. Security rules are defined by administrators according to end-users needs
MA41	MUST	The user requires that the React System keep a record of which user has accessed which information and the information they have accessed	The level of record needs to uniquely identify an individual user and what information they have accessed	MET	SECURITY	Audit logs contains all information in the system
MA42	MUST	The user requires that the React System present data in an easy to understand format in a way that allows the various levels of user to make best use of it whilst conducting there current role	Some of the users such as call takers will require the minimum amount of data to be presented to advise them of other calls. Researchers or intelligence officers who have this as their sole role may require more information to be displayed	MET	ALL	
MA43	MUST	The user requires that the React System to allow one user to restrict or block the sending of data to one or more users either permanently or for a period of time	This is required for example to block the exchange of crime data from other users, where they have no need to view it; this may be permanent to one or more users. Or there may be a user who has joined the network that for example the police have no agreements with to share data. This could also be for a short period e.g. a security breach in one organisation or an investigation. Very similar to MA24, MA18, MA17,MA16,MA15,MA44	MET	SECURITY	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MA44	MUST	The user requires that the React system be capable of allowing one user to restrict or block the receiving of data from one or more users on the network.	Again this could be required for security breaches or where no authority is in existence. Links to MA43.	MET	ALL	
MA45	MUST	The user requires that the all data presented to the users shall be an accurate representation of the information from the host system	The react system must accurately represent the data from the originating system, any translation or interpretation must be accurate and relevant	MET	ALL	
MA47	MUST	The user requires that the React System only capture the data that it has been authorised to do by the owner of that system	Donor organisation always must have the possibility to decide which information they want to share and which should not be spread.	MET	SECURITY	
MA64	MUST	The user requires that where the React System has identified potential links, that a record of the link between the current event and React linked events is maintained in both the Command and control and React system	This is required for audit purposes, so that there is a permanent record of all possible links, whether they appear relevant or not at the time. The information held will as a minimum include the data donor reference number and organisation, location date time type of incident.	PART MET	ALL	
MA82	MUST	The user requires that the React system will not interfere with or compromise the functioning of any other organisation systems	So, it should work independently, not disturbing processes and people working.	PART MET	ALL	It is actually a new systems which means a new computer and another level of attention from end-user perspective. So it has an implication. But no implication on running command & control systems
MA83	MUST	The user requires the React System will comply with all legislation and regulations and criteria for the use of this functionality in the organisation environment to include worker and Health and Safety Requirements		NOT TESTED	ALL	Actually it is MET if all computers and monitor and working conditions are in line with regulation.
MA84	MUST	The User Requires that the React System will not impair the performance on any other organisation system	Should there be a delay on the return of a search, nothing will be allowed to stop the handling of that call	MET	ALL	No implications on running systems
MA97	MUST	System has to be implemented at neighbouring organisations or other appropriate organisations	The system has to be designed in way that it is possible that Belgian, Dutch and other German forces use the system as well, thereby not being forced to change their current CAD system.	MET	ALL	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MB19	MUST	The user requires that the react system can operate with all available command and control systems, both current and in the future.	Otherwise, it would not be implemented, as PSAP software could change rapidly and this might be a cost factor. Priority changed due to proposal of SPA.	PART MET	ALL	Current control system need to send their message in Text format or in CAP format. So there is a small implication from C&C vendor perspective
MB22	MUST	The user requires that the React System be very easy to use and require minimal training for the user	Key to uptake as training is costly. Priority changed due to proposal of SPA.	PART MET	ALL	
MB26	MUST	The user requires that the React system shall work on all the varying communication links between the organisations and linked organisations	The React system will have to utilise a range of communication systems, between organisations, regions and even countries. These could vary from dial up phone line, broadband and up to Private dedicated network and also mobile systems GSM, GPRS, 3G and satellite. Priority changed due to proposal of SPA.	MET	INTER	
MB27	MUST	The user requires that where a linked organisation is not available on the React system at any time, the other users are informed immediately	It should be possible to switch off even these function. If REACT is successful, the number of organisation could be high and an excessive number of malfunctioning messages by a minor organisation could be disturbing for the other PSAPs. The switch off action has to be recorded for audit purposes. Priority changed due to proposal of SPA.	PART MET	INTER	
MB28	MUST	The user requires that all organisations that link and use data for or From React have a legal basis for doing so.	REACT model for data exchange should fit into national legislation on privacy concerns. Priority changed due to proposal of SPA.	PART MET	ALL	
MB32	MUST	The user requires that the data on React be retained as long as is required by the users that are linked by the system	In the UK the data tends to be stored for 6 years for crime purposes, however for crime analysis may be several years this would need discussion and agreement and would be different for each country. For security purposes, some PSAP could agree to share data through REACT with some specific other PSAP but not to leave the data in the REACT Database. Though at least the statistical analysis will be permitted. Priority changed due to proposal of CNVVF.	MET	ALL	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MB46	MUST	The user requires that the React System to use existing user hardware	Keeps costs of IT down vital to Public services. Priority changed due to proposal of SPA.	PART MET	ALL	
MB47	MUST	The user requires the React System to integrate with existing software with no or minimal need for software changes to the users existing software.	PSAPs are running on their software very well and thus are not willing to change. Cost factor is also to mention. Priority changed due to proposal of SPA.	PART MET	ALL	
MC23	MUST	Usage of common emerging standards for incident codes	REACT should not only be able to handle existing codes, but enable a European dimension with consistent standards. Priority changed due to proposal of SPA.	MET	ALL	
MA108	MUST	Pre-defined search must be customisable not only from the logical side, but even from the different custom in classifying the information.	The same event (e.g. bad smell in the air) could be coded as gas release or pollution... So that the REACT should submit what is searching, the PSAP donor has define what type, place, ... codes have to be selected to find that information inside its database. This process has to be defined in advance between the involved actors. This highlights the importance of customizability of REACT to each users	PART MET	ALL	
MA112	MUST	The system should be able to interface the Venice CNVVF PSAP system with the Venice SUEM PSAP system.	Critical to demonstrate the interoperability features during the future test case in Venice. It is a MUST for the project exigencies, more than for the future system.	MET	INTER	
MB18	MUST	The user requires that the react system can be run as either a central or distributed system	This is required to ensure the flexibility for all country or e service models can be accommodated. There should be an option for the PSAP2 to send their data to REACT or to let REACT to search the needed data in part of their DB depending on i) the trust of the PSAP2 in REACT and ii) the internal constraint of their organisation. Priority changed due to proposal of CNVVF.	MET	INTER	System has been implemented with a Service Oriented Architecture. So it is a distributed system. No searches in other organization data is possible if the organization do not allow it
MB23	MUST	The user requires that the HMI for React should be customisable to the requirements of the user or the users organisation	Each user organisation or indeed user may wish to have customisable elements of the React system. This could be in searched, display, access levels etc. Priority changed due to proposal of CNVVF.	MET	ALL	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
MB24	MUST	The user requires that the React system should be capable of being developed with other functions added both by the user and the React system	A high degree of flexibility has to assured if we want the system to be adopted by an high percentage of PSAPs. Priority changed due to proposal of CNVVF.	PART MET	ALL	Some customization is possible. But the system in not fully flexible
SB02	SHOULD	React should be able to inform other users where Mobile Media Services, voice and video are available and how to access them	MMS can be used to visualise the incident site. This might help the PSAP operator to get a better impression where the incident site is and what is going on. Therefore, the ability to receive and forward MMS using the REACT system seems to be of value added to the user. Currently, the reception of MMS is not possible due to current regulation and infrastructure.	NOT FORESEEN	ALL	Capability dropped during design
SB03	SHOULD	Usage of SMS for handicapped callers	Person that cannot speak due to a handicap should have the opportunity to send an alert using SMS. This is the reason why the REACT system should enable data exchange based on information received by SMS. Currently, the reception of SMS is not possible due to current regulation and infrastructure.	NOT FORESEEN	ALL	Capability dropped during design
SB05	SHOULD	Redirecting calls to a local station if the user cannot explain his position to the PSAP operator.	For Venice island, the PSAP is located in Mestre. Therefore, a call taker might not be aware of local information the caller gives to the operator (e.g. I am next to Paolo's Café – Paolo being the owner), but the local fire fighters in Venice Island are aware of the café owner Paolo Brunetti.	MET	INTER	
SB08	SHOULD	Data prioritisation based on categories selected by the operator	The REACT system should be able to handle prioritisation levels indicated by the PSAP operator..	MET	INTER	Thanks to CAP
SB35	SHOULD	The user requires that where the React System uses voice recognition to scan messages, that the system does not require any additional actions by the call taker to activate it.	Otherwise, voice recognition would not be used in the most effective way, if it wasn't automatically activated.	MET	VOICE	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
SB67	SHOULD	Where Voice recognition is used to support the call taker, the recognised voice should be available for the call taker to transfer to the Command and Control log without the need for re-keying	Words displayed to call taker by voice recognition should be stored automatically.	MET	VOICE	
SC13	SHOULD	Speech recognition to identify caller	If a caller is calling several time he might be identified	NOT MET	VOICE	
SC14	SHOULD	Catch keywords and alert the supervisor on particular dangers within an incident	The system should catch and identify through voice recognition words like knife, gun or similar words and alert the supervisor of the PSAP	NOT FORESEEN	VOICE	
SB12	SHOULD	React should be able to search across other linked organisations to identify if that caller/person was involved in other incidents	i.e. was that person involved in a riot if there is a fire reported? Or was this person now talking about feeling sick involved in the chemical plant accident this morning? This may cause problems due to legislation and/or privacy concerns within different countries, so REACT must adjust to existing European law.	NOT MET	CLUSTER	
SB17	SHOULD	REACT should be able to Display incidents beyond the area the PSAP is responsible	To have an overview of the resources of neighbouring PSAPs in case of major incidents, information should not be limited to a certain area.	MET	GIS	
SB59	SHOULD	Unique or local identity numbers or names are provided for local features	The forest section numbers are made available to PSAP in Belgium and the Netherlands via this system.	PART MET	GIS	System is able to do it if maps are available. Google Earth maps are available worldwide
SB60	SHOULD	Meeting points for further guidance should be made available to other organisations	The point where foreign forces can meet a guide is forwarded to the other emergency services to avoid detouring.	PART MET	GIS	System is able to do it if maps are available. Google Earth maps are available worldwide
SB61	SHOULD	Information on major incidents in a neighbouring country are made available if force from other countries are requested.	The REACT system is used to provide information on Belgian incidents if German fire fighters are involved to handle the incident.	PART MET	GIS	System is able to do it if maps are available. Google Earth maps are available worldwide
SB14	SHOULD	The user requires that an organisation can prevent REACT generating pop ups on the command & control system if required	This pop ups may hide other information	MET	GIS	
SB15	SHOULD	Display symbols for 15 to 20 minutes	This is the average period an incident takes place, afterwards, they are no longer needed.	MET	INTER	CAP field EXPIRE is in use



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
SB51	SHOULD	The user requires that the React system can be used to provide real time management information on the numbers of incidents by type over a wide area by an appropriately authorised user.	How many flood calls are there in the region now, over the last hours etc. This could be critical for analysing whether a problem is getting better or worse in real time.	MET	GIS	Clustered information and filters possible on the user interface
SB52	SHOULD	The user requires the data displayed for the user will only be that required to undertake the role and extra data will be easily available but not displayed.	Easy to visualise and understand data is what is required, and appropriate to role. Call taker – is any relevant event going on in that narrow area Controller is there any event in the area that changes priority or the resource dispatched needs to know about.	MET	GIS	
SB54	SHOULD	The user requires that all information and menus presented to a user in relation to use of the React system shall be intuitive, and are capable of being customised to a particular user's requirement.	Users won't accept a system that is not easy to handle and customisable to their needs in a certain extend.	MET	GIS	
SB62	SHOULD	Information on the name of a patient is not forwarded	Data for which privacy is an issue since it is person related is not forwarded to other emergency services.	MET	INTER	Security Rules
SB66	SHOULD	Where a search has been activated, the REACT system should advise the operator how long the search will take to complete and warn the operator when it is completed so that it can be displayed on a screen	Time to complete is important as it prevents the operator wasting time. The results should not display directly on the screen as this may interfere with another activity	PART MET	CLUSTER	System works in real time and in the background. Search results and clusters are fast and no long search actually happens. Thus the information is not displayed to the user
SB37	SHOULD	The user requires that where the React System uses voice recognition to scan messages that the call taker can switch this facility on/off and that this is recorded in an audit trail against the operator's identity number.	The individual user should have to decide, which part of REACT he likes to use to assist him.	MET	ALL	
SB48	SHOULD	The user requires that where the React system warns of excessive results, it identifies the parameter or parameters that have generated the excess results	Helps user refine the search, and prioritise the search results.	MET	CLUSTER	
SB49	SHOULD	The user requires that where results exceeding a user pre determined threshold are reached, this may require a higher access level to continue with the search.	Stops excessive search and cost by lower level users	NOT MET	CLUSTER	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
SB53	SHOULD	The user requires that for every pre-formatted search of the React system within a given location or area, the system will always search for all other possible events occurring within that defined area.	As the pre-format is built by the user, all events fitting are the ones he wants to be displayed.	PART MET	CLUSTER	
SB55	SHOULD	The users that where a secondary of subsequent search is authorised, that the results can be directed back to one or more users as identified in the search criteria	Normally the search would come back to the person requesting it; however the person inputting the search may require the results to come back to a number of users including the controller PSAP Command or other authorised person.	NOT FORESEEN	CLUSTER	
SB65	SHOULD	All searches on the REACT database should require the legal basis and justification to be recorded	This is important to prevent unauthorised or illegal searches	MET	ALL	
SC19	SHOULD	The user requires that the React System be able to add the details of any second or subsequent search to the event command and control log by a single command	This is, to avoid complicated and long lasting procedures when quick decisions are required. Priority changed due to proposal of SPA.	NOT FORESEEN	CLUSTER	
SB20	SHOULD	The user requires that the React system be able to regularly self test to ensure that it is functioning correctly.		MET	ALL	
SB25	SHOULD	The user requires that the React system should be self learning and improve searches with experience	i.e. after repeated request for some criteria they should automatically be used.	NOT MET	CLUSTER	
SB29	SHOULD	The user requires that there is a process where new users to an existing React network gain agreement from existing users to share and access data.	This may require the setting up of an organisation or Network to manage the REACT process. This may be at Cluster, regional, National or Cross National level. Otherwise the system should be able to take on account the different terms of several bi-lateral agreements	MET	INTER	
SB30	SHOULD	The user requires that the React system can make use of any common terminology or data dictionary either in place or being developed, or where this is not possible cross referencing can be applied		MET	INTER	TSO / CAP



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
SB31	SHOULD	The user requires that the React System allow the user at organisational or individual level to be able to customise what data the user is able to see	This would include addressing issues such as various access levels depending on role of seniority, or personal preference	PART MET	GIS	
SB33	SHOULD	The user requires that the React system be able to capture the data from each input device used by the user, without the need for double keying or additional action by the user.	All effort that is necessary twice slows down call handling processes.	PART MET	ALL	This can be met when the complete integration with current C&C system is achieved
SB34	SHOULD	The user requires that the React System can process data in all the forms that are used by each data donor organisation.	This will include data text and numeric, voice, picture video, ECall, MSD as applicable now and in the future	PART MET	ALL	No video / mms
SB36	SHOULD	The user requires that where the React System uses voice recognition to scan messages that the call taker is able to know whether the function is currently switched on/off and whether it is working correctly	User needs to be able to easily see when the system is working	MET	Voice	Confidence level in keyword recognition is provided to the user
SB41	SHOULD	The user requires that where the React System uses voice recognition to scan messages that the users can customise the key words to suit their needs at a given time or for a particular location or incident type.	This kind of customisation should be easy to use (i.e. some suggestion should be made available to help making a complete and valid selection of key words)	PART MET	Voice	Can me done by administrators not by users
SB42	SHOULD	The user requires that the React System searches over a very wide area are restricted unless authorisation is given at a particular access level.	The widespread searches may require significant negotiation and system power to achieve and should be reserved for only those events that are appropriate for them to be used on, perhaps major incidents or major crimes.	MET	CLUSTER	
SB43	SHOULD	The user requires that the React System be able to support slower time background searches which may be over a longer time period or wider parameters.	These would be used for post event investigation, investigating crimes etc, where the 1 minute response to a request is less critical	NOT FORESEEN	CLUSTER	
SB44	SHOULD	The user requires that the React System be able to display which wider secondary searches are being performed by their own or other linked organisations to authorised users.	This will prevent during a large incident several agencies conducting the same search.	NOT FORESEEN	CLUSTER	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
SB45	SHOULD	The user requires that the react system is capable of sharing the results of secondary or subsequent searches with other users on there or linked organisations who are authorised to access them.		NOT FORESEEN	CLUSTER	
SB56	SHOULD	The user requires that the react system can be run as either a central or distributed system	This is required to ensure the flexibility for all country or e service models can be accommodated	MET	INTER	See MB18
SC17	SHOULD	The user requires that the React System will allow data from React to be added to the event on the users command and control by a single function	This is required as the linked events may hold relevant information that should be added to the event log and made available to others who may not be able to visualise React data. This should be by single command to prevent double keying	NOT MET	INTER	Integration of data coming from REACT has not been implemented since it is Command & Control system dependent
SB68	SHOULD	The user requires that the process which permit to new users to share and access data to an existing React network is light.	Taking on account the existing bi-lateral agreements or the laws in force, a user can permit to an external Agency or individual without prior agreement to accede on the fly to the REACT system. This kind of access should require minimal pre-existing HW and SW (i.e. internet browser and downloadable SW package). Links to SB29.	MET	INTER	
SB69	SHOULD	The user requires that the process which permit to new users to share and access data to an existing React network is easy to access.	Taking on account the existing bi-lateral agreements or the laws in force, a user can permit to an external Agency or individual without prior agreement to accede on the fly to the REACT system. This kind of access should not require specific training. Links to SB29.	MET	INTER	
SB70	SHOULD	The user requires that the process which permit to new users to share and access data to an existing React network is secure.	Taking on account the existing bi-lateral agreements or the laws in force, a user can permit to an external Agency or individual without prior agreement to accede on the fly to the REACT system. The security of the REACT system against this kind of access should be assured with easy-to-use solutions.	MET	INTER	



Nr.	Type	Requirement	Description and Comments	Feedback	Goal	Notes
NC02	NICE	Predefined SMS format for alert calls	The SMS should contain name, address, type of incident and free text. Currently, receiving SMS alerts is not possible due to technical and legislative barriers.	NOT FORESEEN	INTER	Ecall implemented. SMS/MMS warning not in use in emergency control rooms
NC03	NICE	Voice recognition of PSAP operator	The PSAP operator might have the opportunity to indicate information by voice instead of keying it in.	PART MET	VOICE	Info form voice can be sometime unreliable
NC11	NICE	Voice recognition for accepting queued emergency calls	To catch some keywords so that an answering machine could sample calls and prioritize them.	NOT TESTED	VOICE	No tests with automatic answering machines has been performed
NC21	NICE	Voice recognition covering Turkish keywords	As many people with Turkish origin live in Germany, it may help to extract information from an exhausted person. However, it is unclear if a speech machine exists for Turkish.	NOT MET	VOICE	
NC05	NICE	Clustering information	Information pop-up, if another emergency services takes an action next to own intervention, because of possible connections between both events	MET	CLUSTER	
NC06	NICE	Data transmission regarding POI	The data regarding POI collected by one emergency service (already included in their PSAP) should be made available for other emergency services.	PART MET	GIS	Depends on GEODATASETS
NC07	NICE	Data reception of POI	POI related data should be received and included in the own GIS.	PART MET	GIS	
NC10	NICE	Separate List for interventions handled by other service	List is shown in a pop up window or on an extra screen.	NOT FORESEEN	GIS	Dropped during design
NC01	NICE	Usage of video data generated by forces on site	i.e. pictures from a camera on the truck being linked to the PSAP showing what's going on at the incident site. Today, there are no cameras installed on the trucks	NOT FORESEEN	ALL	No interaction with forces on the field is supposed to happen in REACT
NC12	NICE	Possibility to decide how many layers are presented	I.e. the possibility to switch on and off symbols (see above)	MET	GIS	
NC09	NICE	Third screen for REACT if current GIS is not able to handle it	For the test version of REACT a separate third screen will be used in either case.	MET	GIS	



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NC16	NICE	The user requires that all linked organisations to the React Network undergo a certification process that ensures their competence to use the system	This may include vetting of users, training, quality standards	MET	ALL	
NC20	NICE	The user requires that the React System shall inform all other users when a secondary or subsequent search has been activated for a particular event, together with an ability to view the parameters of the search if authorised to do so.	This can be a key requirement for control room command to see or obtain an overview of what controllers or local command are doing and to see the results in order to identify potential major incidents or lack of a particular action	NOT FORESEEN	CLUSTER	
NC08	NICE	SMS free of charge and easy to remember number	e.g. 115115 Currently, usage of SMS is not possible due to legislative and infrastructural barriers	NOT FORESEEN	ALL	