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Analysis System for GAthered Raw Data

ASGARD

Instrument: Research and Innovation Action proposal

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D4.3 Final Demonstrations Results

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Annexes

Tables

1. Introduction

1.1. Overview

The DoA describes this deliverable as:

D4.3: Final Demonstrations Results

Results and conclusions of the final demonstrations [M42]

The main objective of this document is to cover the results of all final demonstrations that have been conducted in theNetherlands, Belgium and Greece hosted by EUROPOL, NICC and KEMEA/ Hellenic Police Forensic Science Division, respectively. All the three demonstrations had a twofold scope:

- to demonstrate the ASGARD technologies to obtain stakeholder feedback, and,
- to disseminate the tools developed and the project results to the maximum extent.

1.2. Relation to other deliverables

This deliverable is related to the following other ASGARD deliverables:

Receives inputs from:

Deliv. #	Deliverable title	How the two deliverables are related
N/A		

Table 1 – Relation to other deliverables – receives inputs from

Provides outputs to:

Deliv. #	Deliverable title	How the two deliverables are related
D4.4	Final Evaluation Report	D4.3 will provide input regarding the evaluation of the three demonstrations

Table 2 – Relation to other deliverables – provides outputs to

1.3. Structure of the deliverable

This document includes the following sections:

- Section 2: In this section, information regarding the overall framework of the three final demonstrations are described
- Section 3: In this section the 1st demonstration is described, and the results and feedback is presented
- Section 4: In this section the 2nd demonstration is described and the results and feedback is presented

- Section 5: In this section the 3rd demonstration is described and the results and feedback is presented
- Section 6: In this section, an overall assessment of the final demonstrations is provided, including a comparative analysis between the results of the demonstrations
- Section 7: This section concludes the report presenting a summary of the work done and of the main results produced

2. Framework of the final demonstrations

This section will present the framework of the final demonstrations of the ASGARD project. Specifically, the objectives, the three final demonstrations' description and the evaluation questionnaire are presented forward on.

2.1. Objectives

All three final demonstrations have the same two main objectives; they aim to present the ASGARD technologies and capabilities in an effort to obtain stakeholder feedback and to disseminate the project results to the maximum extent. Along with the main objectives, it is also desired to:

- Orchestrate system trials in order to enable validation for users/operators within a realistic environment accommodating a number of key scenarios in the context of ASGARD
- Define, test and perform selected trial scenarios, in circumstances as close as possible to operational conditions, presenting the system capabilities.
- Evaluate the integration process, operational concepts, and interoperability elements.
- Define a method for collecting, analysing and presenting the validation results. Furthermore, to validate the impact of the project with external end-users, present and report analysis results, findings, recommendations, lessons learnt and conclusions.,
- To assess the ASGARD Technology Readiness Level (TRL).

2.2. Demonstrations

Three final demonstrations were implemented withing the ASGARD project. The first demonstration has occurred in the Netherlands (TNO or EUROPOL) and lasted for about seven hours. One hundred security professionals participated and three interactive sessions that occurred and thirty-four ASGARD tools were available to be tested. The second demonstration occurred in Belgium (NICC). Twenty-seven (27) security professionals participated and three (3) ASGARD tools were available to be tested. The third demonstration took place in Athens, Greece and it was hosted by the Hellenic Police Forensics Science Department. Each one of the final demonstrations is described in detail in the following sections.

2.3. Evaluation questionnaire

For the evaluation purposes of the final demonstrations in ASGARD, a short questionnaire was designed. It consists of two parts. The first part is made up of six (6) questions and it intends to assess the general organization of the demonstration. The second part is made up of eleven (11) statements and questions that rate the content of the demonstration more specifically. The rating scale applied in this specific questionnaire is from one (1) to five (5), one being the lowest and five the highest score.

Onwards, a list with all the questions and statements involved in the questionnaire are presented and in ANNEX III the original questionnaire can be found as distributed.

1. How do you rate the demonstration overall?
2. How do you evaluate the demonstration interaction format?
3. How do you evaluate the facilitation during the demonstration?

4. I have learned about the variety of tools developed during the ASGARD project.
5. I have gained a better understanding on the ASGARD tools.
6. I have learned about the last insights and practices on the ASGARD technologies and results.
7. I take insights or practices back home to my work.
8. The expectations I had regarding the maturity of the tools, before attending the event were met.
9. The expectations I had regarding the maturity of the tools, after the presentations that took place during the event were met.
10. The demonstration has inspired me on disseminating the ASGARD technologies and the project results.
11. I am interested to continue the dialogue after this demonstration.
12. What did you like/dislike about the demonstration?
13. Do you have any suggestions to the ASGARD project in general?
14. Any other observation/input?

3. 1st Final Demonstration – Europol, Netherlands

Provided that ASGARD aims at improving both the effectiveness and efficiency of Law Enforcement Agents (LEAs), as well as the industry and researchers collaboration in Security Research related projects by delivering an active, long-lasting and sustainable community of practitioners in the field, it is obvious that the planning and implementation of three final demonstrations constitutes undoubtedly an integral part of the project for the accomplishment of its overall goal. The first final demonstration was implemented in the context of the 6th Hackathon, which took place in The Hague, Netherlands, from the 19th until the 22nd of November 2019. Thus, this demonstration met the primary goal to disseminate the tools developed and the project results to the maximum extent, at National and European Level.

3.1. Demonstration Setup

The first final demonstration took place in Europol's premises on November 22, 2019 having an approximate duration of seven (7) hours.

3.2. Participants

The audience of the demonstration day comprised by approximately one hundred (100) professionals in the field of security. Representatives of all ASGARD's beneficiaries, other members of the Stakeholders Advisory Group (SAG) - including Strategic Group (SG), Operational Group (OG), Industry Group (IG) and Research & Academia Group (RAG), as well as non-members of the project (observers), had the opportunity to gain useful information for the ASGARD project, the progress made so far, the maturity level of the tools developed and the way ahead.

In particular, the demonstration was performed by a team consisted of the project coordinator as well as the presenters coming from the institutions that developed the special tools (ASGARD's beneficiaries).

Approximately fifty (50) attendees had the chance to explore some of the tools developed through their active involvement in the Capture the Flag competition session. Representatives of Law Enforcement Agencies, the European Union, industry, research and academia composed ten (10) teams that competed through the real use of ASGARD tools, giving a pan-European identity in the overall demonstration.

3.3. Implementation method

The demonstration which took place in Europol's premises was implemented on the basis of three interactive sessions: an introductory presentation of the ASGARD project, a Capture the flag (CtF) competition among different teams and a showroom of ASGARD tools available to all participants.

Mr. Juan Arraiza, ASGARD's coordinator, opened the first final demonstration day by presenting the project and the agenda to be followed to both European and national level representatives of LEAs, industry and research community. The presentation aimed at communicating the scope of the project and the innovative character of the technological interventions made along with the special tools developed so far to a wide range of stakeholders.

The Capture the Flag (CtF) session gave participants the opportunity to use some of the ASGARD tools available. This exercise required the establishment of 10 multidisciplinary teams, each one consisting of up to 5 or 6 members, that initially went through an illustrative challenge resolution so as to get used to the

specially developed framework of activities. Subsequently, the formed teams were presented a set of challenges that had to be solved using the provided tools and data, within a given timeframe of 4 hours The team members could use a CtF platform, while a special CtF support team was ready to provide them with assistance if needed. The competition team members were also encouraged to spend a few minutes in order to fill-in an evaluation form which serves as an evaluation method for the final ASGARD demonstration.

It is worth mentioning that in parallel to the CtF event competition, the participants could pass by a "showroom" to review several other project results that were not included in the CtF session. The showroom included a list of thirteen (13) ASGARD tools, while participants had the chance to choose one or more of them to be demonstrated and further explained by specific presenters according to their personal needs and interests.

3.4. Tools presented

Prior to the official beginning of the Capture the Flag competition session, the participants were given a supporting document in which ASGARD tools were organized by tool-type categories. The document contained the list of available tools to be tested along with a brief description for each one. In particular, the following list of thirty-four (34) ASGARD tools were available to team members during the CtF session:

1. Main User Interface and Orchestration Framework including the Main User Inteface (MUI); (aka: INOV-001) and the Integrated OF and MUI (aka: Integration of ENG-ORS-001 and INOV-001)
2. Data acquisition tools consisting of the EXIF Extractor (document processor - aka: DCU-002), the Video Converter (aka: CERTH 001) and the Video super resolution (aka: CERTH 003).
3. Data processing tools category (Text, Audio, Image, Video, Biometrics, Digital forensic) which integrated the following sub-categories of available tools:

3.1 Text Processing tools including the NERC tagger (aka: VICOM-T-002), the Text classification (hate-speech classifier and custom text classification model training - aka: VICOM-T-001), the Location Geotagger from Documents, the Text analysis (POS tagging, Named entity recognition) with the CEA tool named LIMA (aka: CEA-001-A) and the Detect Language From Text (aka: DCU-003)

3.2 Audio Processing tools including the Speaker Identification – Audio (aka: VICOM_A_005), the Language Identification – Audio (aka: VICOM_A-003) and the Gender Age Accent Classification from Audio (aka: TNO-002-F ASYNC)

3.3 Image Processing tools including the License plate detection (aka: TNO-002-D), the Face detection (aka: TNO-002-C), the Low-light image enhancement (aka: UU_NFI_002), the Clothes Identifier (aka: DCU-008) and the Image OCR (aka: DCU-007).

3.4 Video Processing tools including the Video Scenery Classification (aka: CERTH 004), People and vehicle detection and tracking (aka: CERTH 005), the Video background scenery detection (aka: CERTH 006) and the Video Summariser (aka: DCU-006).

3.5 Biometric Processing tools, in particular the Face Verification Likelihood Ratio aka: NFI_003).

4. Knowledge extraction tools including the Graph building plugin (on Stormfront - aka: CERTH 007), the Binary hashing on images and videos (aka: CERTH 009), the Location Visualizer, the Topic Extraction from Discussion Forums (aka: UvA003), the Communication Analyzer (aka: UKON 003), the Profiler (aka: FOI-003) and the Term Set Expander (aka: FOI-004).

5. Knowledge exploitation tools including the Metalastic Dataflow Tool (Data navigation, filtering, subsetting& reporting - aka: PDM-MK-003), the Metadon (Searching and Augmenting Large Datasets - aka: PDM-MK-005), the Smart Folder Indexer (Metadon loader for filesystems - aka: PDM-MK-006) and the Cellebrite Dump Parser & Indexer (Metadon loader for cellebrite - aka: PDM-MK-007).

In parallel to the CtF event, participants had the chance to visit a specifically designed "showroom" so as to be informed by highly skilled presenters for fifteen (15) ASGARD tools. The list of tools and the category each one belongs to as well as the names of the appointed presenters and the institutions they represent can be found in the annex below:

No	Tool Name	Organisation	Category
1	Acoustic Event Detection	ADITESS	Audio/CSV
2	Age, Gender &Accent Classification	TNO	Audio
3	ASGARD Foresight Application	AIT	Integration
4	Author Profiling	FOI	Text
5	Authorship Attribution	FOI	Text
6	Clothes Identifier	DCU	Image
7	Communication Analyzer	UKON	Text
8	Geospatial Event Detection	IBM	CSV/Image
9	Intelligence Application	ENG	Integration
10	Internet Forum Profile Text Analyser	BSC-CNS	Text
11	Low Light Enhancement	UU & NFI	Image
12	Messaging Analyzis	CEA	Text
13	Technological readiness level (trl) calculator	KEMEA	Evaluation
14	Term Set Expander	FOI	Text
15	Visualizing behavior patterns of users in discussion forums	University of Amsterdam & UKON	Text

4. 2nd Final Demonstration – NICC, Belgium

4.1. Demonstration Setup

The second final demonstration occurred in Brussels, Belgium, in Belgium Federal Police premises (in collaboration with NICC) on January 13, 2020 and it lasted for two and a half hours.

4.2. Participants

The audience of the second final demonstration comprised by twenty-seven (27) LEAs. More specifically, strategic analysts from the management of regional units, people from administrative policing, judicial policing, computer crime units, police information units, central judicial unit, audio/video specialists (DJT), special Ops/techniques, internet investigations and international police cooperation participated during this demonstration.

4.3. Implementation method

The Second Final Demonstration took place in two different locations. The Belgian Final Trial was held in BFP premises and the Tool Maturity Model demo in DG HOME premises. The first started at 10:00 with welcoming, registration and introductions of all who were present, as well as the European Commission (EC) representatives, followed by a general introduction on ASGARD from the Project Coordinator. After the short question session and the coffee break that took place, there was a slot for the selected tool discussion, the demonstrations and questions, during which project members from BFP and NICC presented an overview, few slides/tool, each tool/pipeline that lasted for approximately twenty (20) minutes. Right after the lunch break, the participants moved to the location of the Tool Maturity Model demo. This session started at 14:30 and once again with a welcoming, registration and introductions of all who were present, as well as the EC representatives, followed by a general introduction on ASGARD and how the need for the Tool Maturity Evaluation Model was identified. Followed by a session related to the Tool Maturity Evaluation Model (including the TRL Calculator) presentation and demonstration. Ending the day, a short question and answer slot occurred.

4.4. Tools presented

During the second final demonstration three (3) ASGARD tools were tested. These tools are the NERC tool, the Speaker Identification tool and the File Recovery System.

1. Data Processing
    a. Text Processing
        i. NERC tagger (document language sorting / Named Entity Recognition)
    b. Audio Processing
        i. Speaker Identification
2. Digital Forensic Processing
    a. File Recovery System: The demonstration was focused in the recovery and carving of PNG and JPEG file

Furthermore, the Pipelines between the following tools were demonstrated

- Video file summarization
- Face detection in images (from video)
- Face verification / likelihood

5. 3rd Final Demonstration – Hellenic Police, Greece

5.1. Demonstration Setup

The third final demonstration took place in the premises of the Hellenic Police Forensics Science Division in Athens, Greece on Thursday 27th February 2020 and it lasted for 3 hours.

5.2. Participants

The audience of the third Final Demonstration consisted of 13 LEAs of eight (8) different departments, such as the Police Forensics Science Division, the Financial Police Directorate, the Special Violent Crime Squad, the Cyber Crime Division and the Directorate for Foreigners.

5.3. Implementation method

The third Final Demonstration was held in the Hellenic Police Forensics Science Division premises, in Athens, Greece. The demonstration started at 10:30 with a welcoming speech from the hosts and a detailed description of the ASGARD project and its evolution since the project's initiation. Following, there was a thorough description of ten (10) ASGARD tools which seemed to capture the audience interest and attention. The day ended at 13:30 with the distribution, completion and collection of the evaluation questionnaire of the Demonstration.

5.4. Tools presented

During the third final demonstration ten (10) ASGARD tools were presented, through videos created focused at the final demo. These tools are the ASGARD Main User Interface –MUI (In all demo videos), the Super resolution + Face Verification Likelihood Ratio, the Background scenery detection, the License Plate Detection, the Video converter + Video Scenery Classification, the People / vehicle detection and tracking, the Acoustic event detection, the Clothes Identifier the Binary Hashing –Weapon Identification and the Graph building plugins -Stormfront graph.

Super resolution: This tool enhances the resolution of low-resolution videos and images. It performs well only on bicubic downscaled images or videos, not on any random media. Bicubic interpolation is the most common media downscaling method.

Face Verification Likelihood Ratio: This tool takes a reference image of a face and another image of directory of images of faces and returns the similarity score between the face and the reference face. This project is based on face net.

Background scenery detection: This tool detects the background scenery of videos and images and classifies It in one of 365 predefined categories. It is based on the [placesdatabase] (http://places.csail.mit.edu/).

License Plate Detection: This tool detects car license plates in images and reads them through OCR. This is an ASGARD wrapper around the open source version of OPENALPR.

Video converter: This tool converts and extracts content out of video, audio and image files. It is a pre-processing step for many subsequent tools that need a specific format and/or part of the multimedia content as input.

Video Scenery Classification: This tool performs binary classification of video files. The current implementation performs binary classification in jihad-related and non-related videos.

People / vehicle detection and tracking: This tool detects and tracks persons and vehicles in videos.

Acoustic event detection: This tool consists of processing acoustic signals and converting them into symbolic descriptions corresponding to a listener's perception of the different sound events presenting the signals and their sources. Events can be: Gunshots, Explosions, Sirens, Screams or any other type of characteristic sound.

Clothes Identifier: This tool takes an image of a person or a folder of images of people and returns what item of clothing the person is wearing. The model in this project is training on the Deep Fashion Dataset.

Binary Hashing: This tool performs binary hashing on images and videos. It is used mainly to demonstrate the capabilities of the Mongo binary hash indexing. In our case Detects weapons.

Graph building plugins -Stormfront graph: A graph building plugin is a tool that maps social network data (crawled data, database logs, logfiles, user interaction history, etc.) from a social network or an internet forum to a specific social network ontology. Currently, a plugin mapping the Storm front dataset to the USNO ontology is implemented. The resulting data is stored in a Neo4j instance, accessible through a Neo4j browser and a REST interface. In our case it is used on Storm front nationalist forum.

6. Assessment of the final demonstrations

An overall assessment of the final demonstrations is provided, including an analysis of the questionnaires provided to the participants during the demonstrations.

6.1. 1st Final Demonstration – Questionnaire Analysis

During the capture the flag (CtF) session that took place in Europol's premises on November 22, 2019, thirty-eight (38) team members filled-in an evaluation form which serves as an evaluation method for the ASGARD final demonstrations. As shown below in Figure 1, the vast majority of the participants represented Law

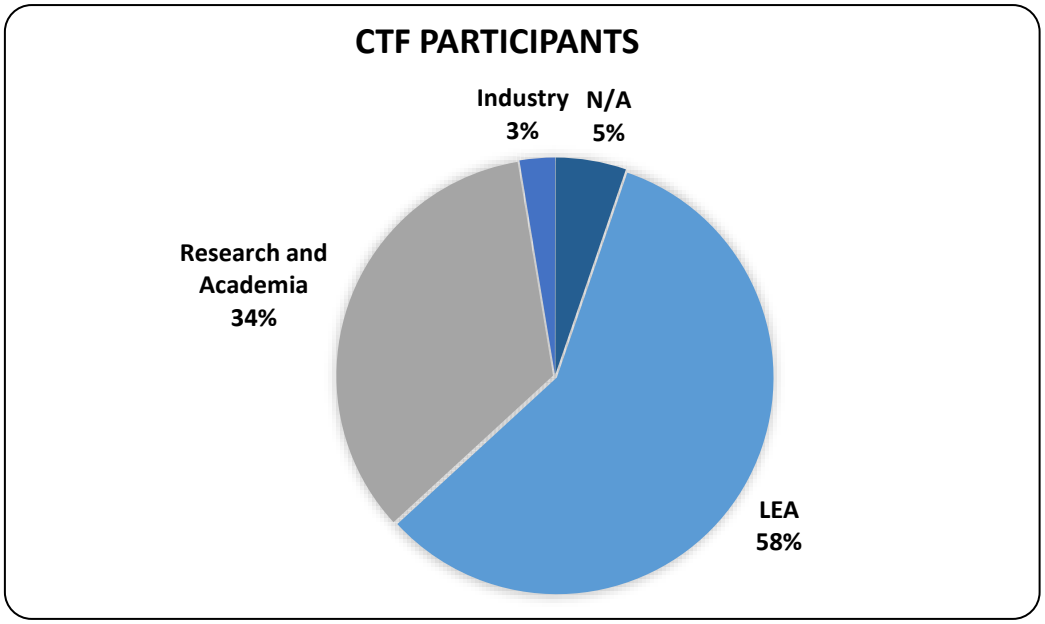


Figure 1: CTF Participants

Enforcement Authorities as well as Research and Academia (58% and 34% respectively), while there was a small contribution made by industry experts.

In particular, the "Demonstration Assessment Questionnaire" comprised two groups of targeted questions; the first part aims at assessing the organization of the demonstration in general, while the second part focuses on the content of the demonstration more specifically. Some interesting findings are listed below:

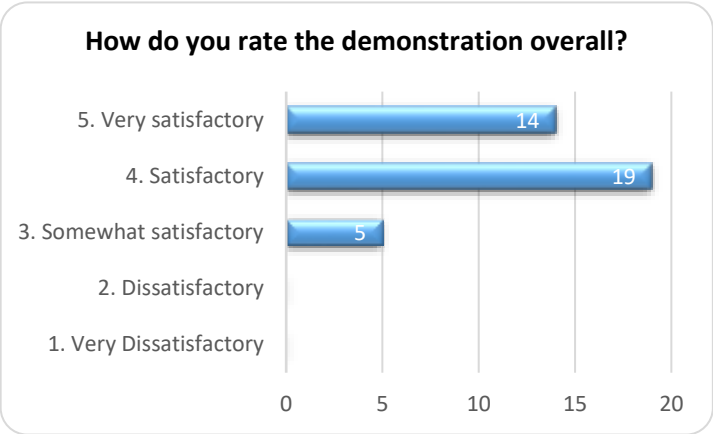


Figure 2: How do you rate the demonstration overall

Data from the survey concluded that the vast majority of the respondents reported a high level of satisfaction for the demonstration made, while only 5 out of 38 participants reported that the demonstration overall was somewhat satisfactory.

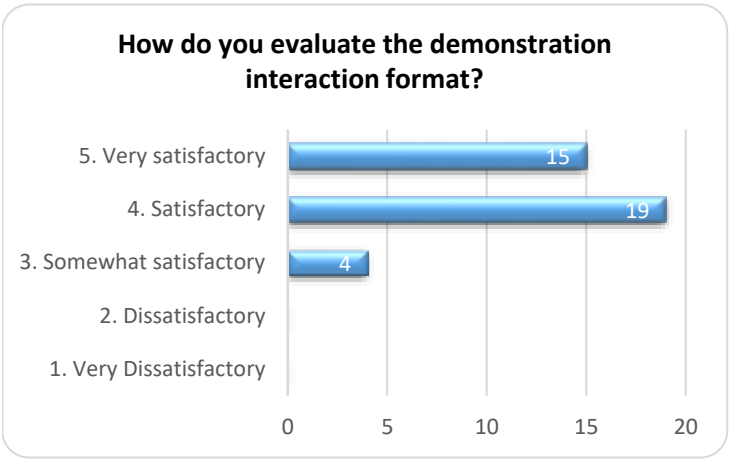


Figure 3: How do you evaluate the demonstration interaction format

As far as the interaction format (e.g. presentations, demonstration format etc.) is concerned, once again a high percentage of participants reported that were mainly satisfied with the content and the method adopted for the implementation of the demonstration.

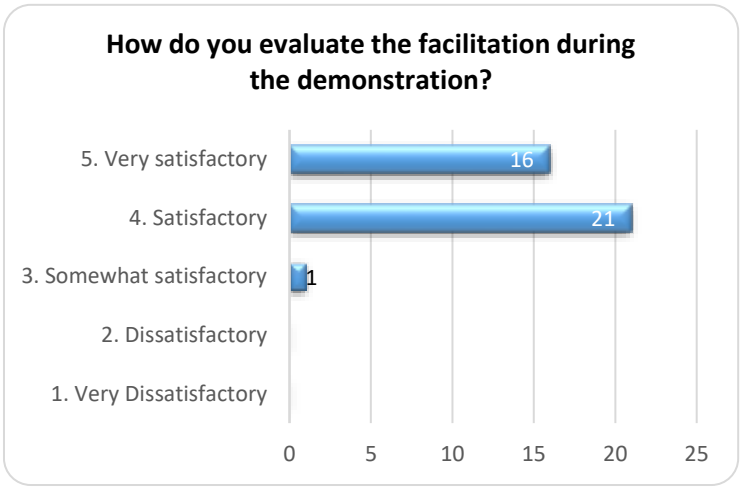


Figure 4: How do you evaluate the facilitation during the demonstration

Regarding the facilitation during the demonstration, such as the overall planning, setup etc., 55% and 42% of the participants reported that were satisfied and very satisfied respectively, while only a small percentage of the respondents (approximately 2.6%) indicated a low level of satisfaction.

Moving towards the second part of the questionnaire, as presented in Figures 5, 6 and 7, the vast majority of the respondents reported that they gained deep understanding on the tools and the technology developed within ASGRD project.

In particular, part 2 question 1 asked participants whether they have learned about the various tools developed during the ASGARD project. In response, 33 out of 38 respondents (approximately 87%) reported a high level of satisfaction, while only one participant remained dissatisfied.

As illustrated in Figure 5, once again, all participants reported their positive level of satisfaction towards gaining a better understanding on the ASGARD tools. Approximately 47% of the respondents reported that were very satisfied, 45% of the participants were satisfied and only a small group of the respondents (3 out of 38) were somewhat satisfied.

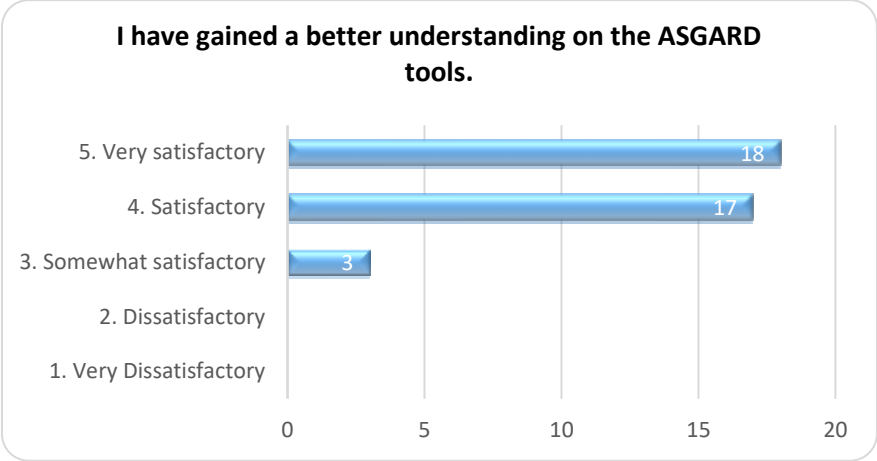


Figure 5: I have gained better understanding on the ASGARD tools

Of 38 respondents, 23 reported that they have sufficiently learned about the last insights and practices on the ASGARD technologies and results, while 10 participants indicated that they gained the best possible view. Towards achieving such a goal, only 5 out of 38 respondents reported a moderate level of satisfaction.

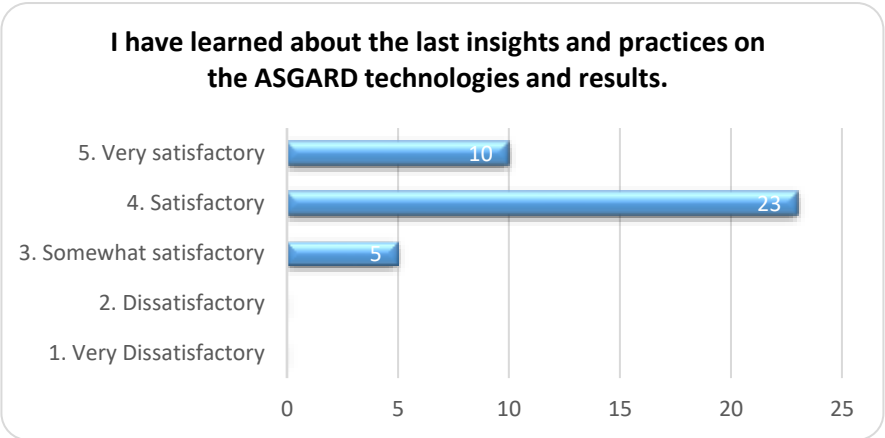
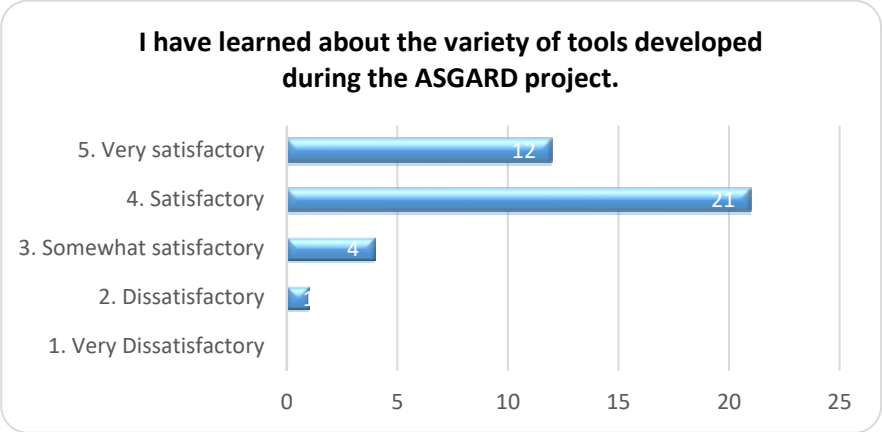


Figure 6: I have learned about the last insights and practices on the ASGARD technologies and results



Of 38 respondents, 21 reported that they have sufficiently learned about the tools developed during ASGARD, while 12 participants indicated that they gained the best possible view. Towards achieving such a goal, only 4 out of 38 respondents reported a moderate level of satisfaction and 1 reported dissatisfaction.

Figure 7: I have learned about the variety of tools developed during the ASGARD project

Furthermore, it is mentioned that as it is illustrated in Figure 8 below, once again, the vast majority of the participants reported a positive level of satisfaction regarding insights and practices that can be effectively transferred back home to work right after the end of the demonstration. According to the questionnaire results, 14 out of 38 respondents reported that they were very satisfied towards achieving such a goal, while 16 out of 38 respondents reported that they were satisfied.

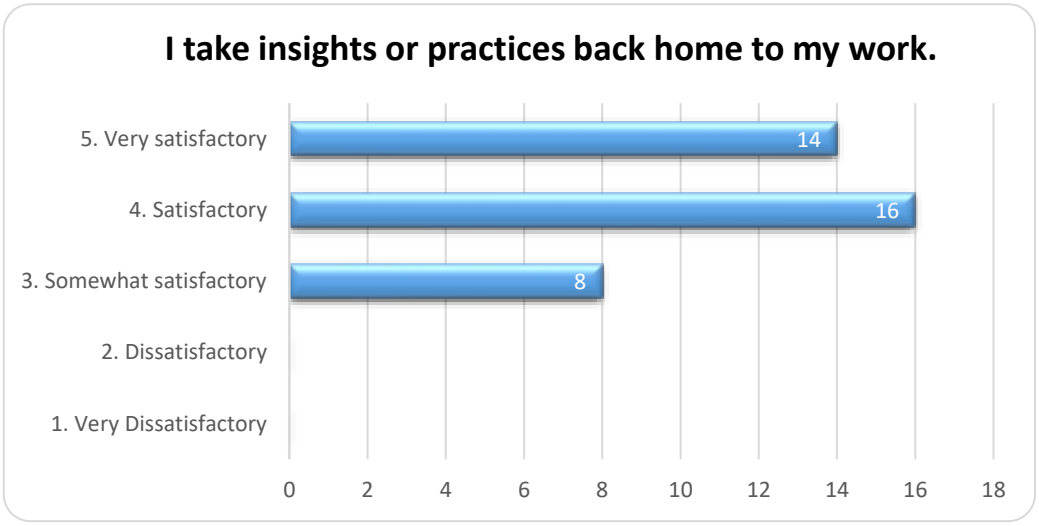


Figure 8: I take insights or practices back home to my work

It is worth mentioning that participants reported low levels of satisfaction mainly in expectations related questions. It should nevertheless be pointed out that the answers indicate that the expectation gap was significantly reduced right after the end of the presentations that took place during the event. As it is illustrated in Figures 9. and 10., 3 out of 38 participants expected to see a higher level of maturity regarding the tools developed within the ASGARD project not only before attending the event but also right after the presentation that took place during the demonstration.

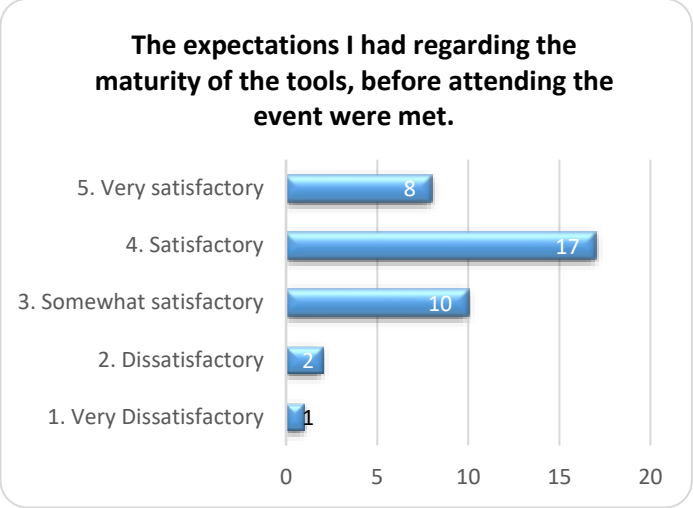


Figure 9: The expectations I had regarding the maturity of the tools, before attending the event were met

The expectations related questions found 8 out of 38 respondents reporting that they were very satisfied that their expectations regarding the maturity of the tools were met both before attending the event and after the presentation that took place. However, 17 out of 38 participants reported that their expectations before the event were met, while an increased number, reaching the 21 out of 38 participants indicated that their expectations were met right after the demonstration. This indicates that the expectations gap has been reduced, after the demonstration for the 13% of the participants

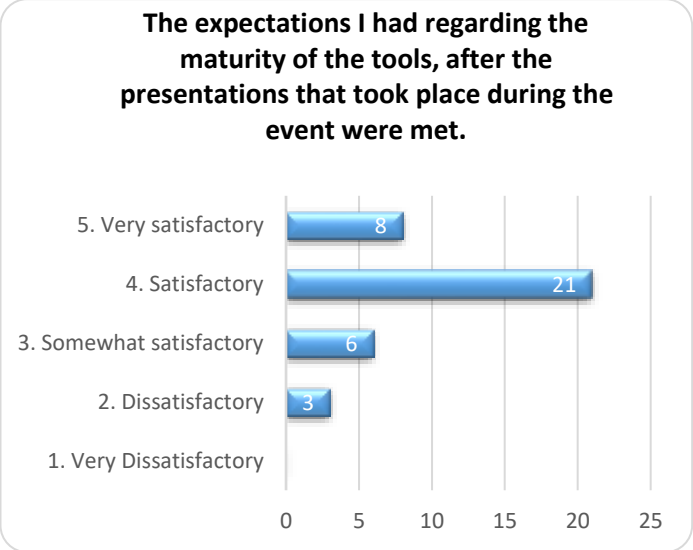


Figure 10: The expectations I had regarding the maturity of the tools, after the presentations that took place during the event were met

Referring to dissemination purposes and as it can be shown from the graph below, the vast majority of participants, shaping a percentage of 95% approximately, reported that they have been inspired so as to spread the ASGARD tools and adopted technological interventions, as well as the project results to other professionals acting in the field and to the public in general. Only a small percentage of respondents reported a negative attitude towards sharing such information with others implying a relatively low level of inspiration and impact that the event made on them.

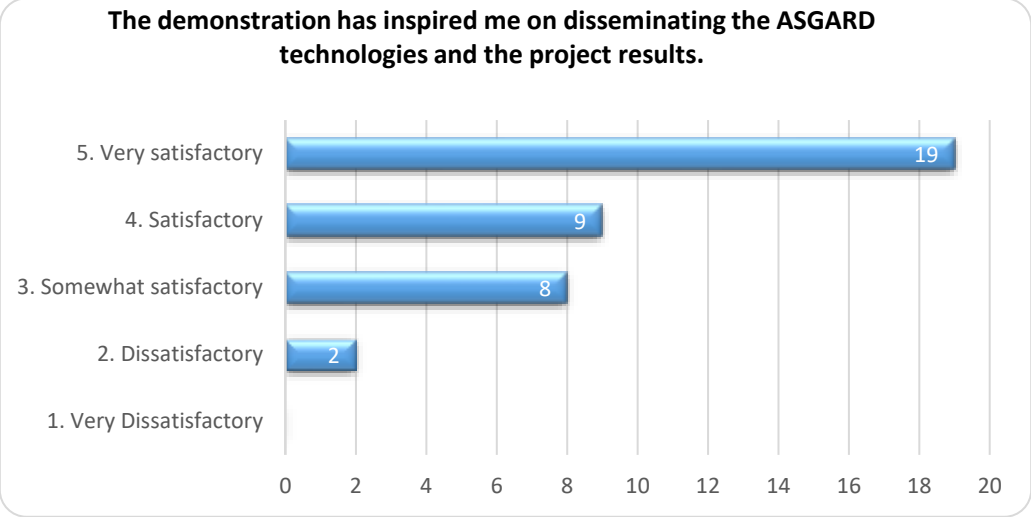


Figure 11: The demonstration has inspired me on disseminating the ASGARD technologies and the project results

One of the most interesting parts of the questionnaire refers to the categories of tools that managed to gain the interest of the demonstration's participants. As it is illustrated in the graph below (Figure 12.), data processing tools were reported as the most interesting category of tools presented. Knowledge extraction

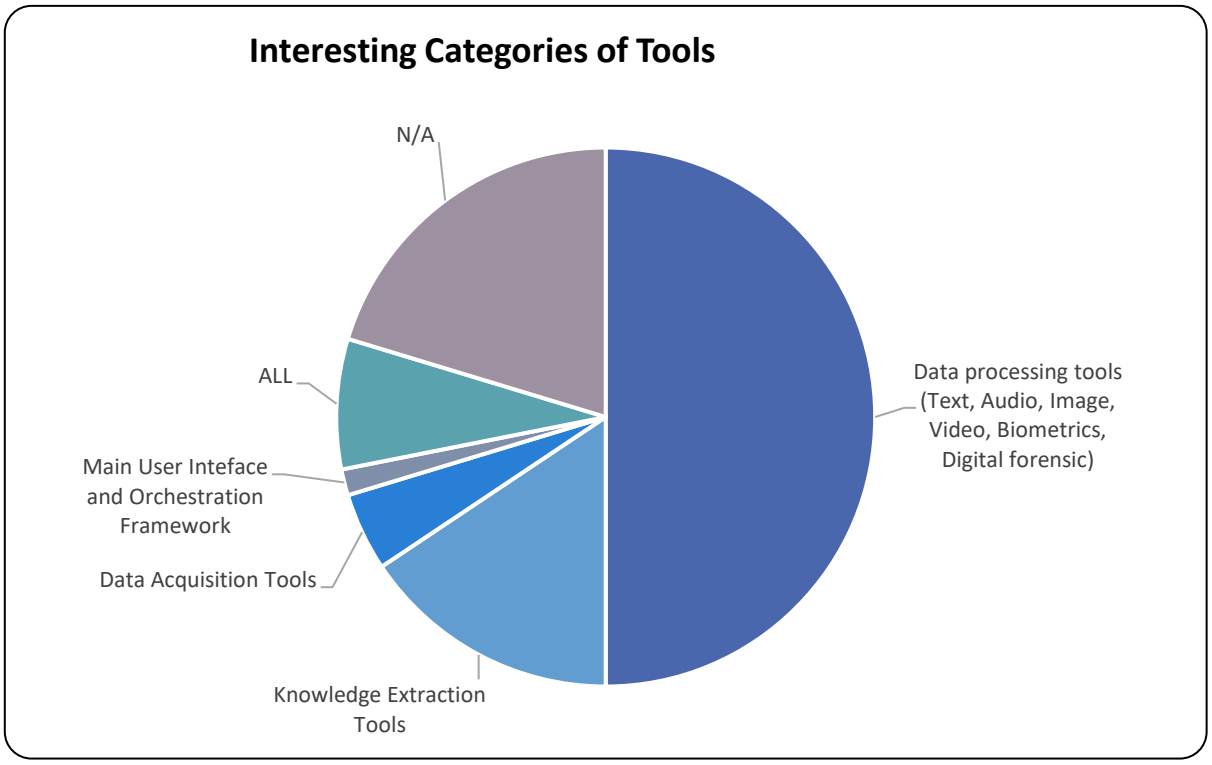


Figure 12: Interesting Categories of Tools

tools were ranked as the second interesting category of tools, making data acquisition tools and Main User Interface and Orchestration framework the least interesting tools according to participants' answers. It is worth mentioning that none of the respondents reported a knowledge exploitation tool.

The admittedly high percentage of responses indicating that Data processing tools constitute the most popular category of tools provided an impetus for further analysis of the results available. In particular, among the different sub-categories of Data processing tools (Text, Audio, Image, Video, Biometrics, Digital forensic), participants reported video processing tools as their favorite tools (please see Figure 13.).

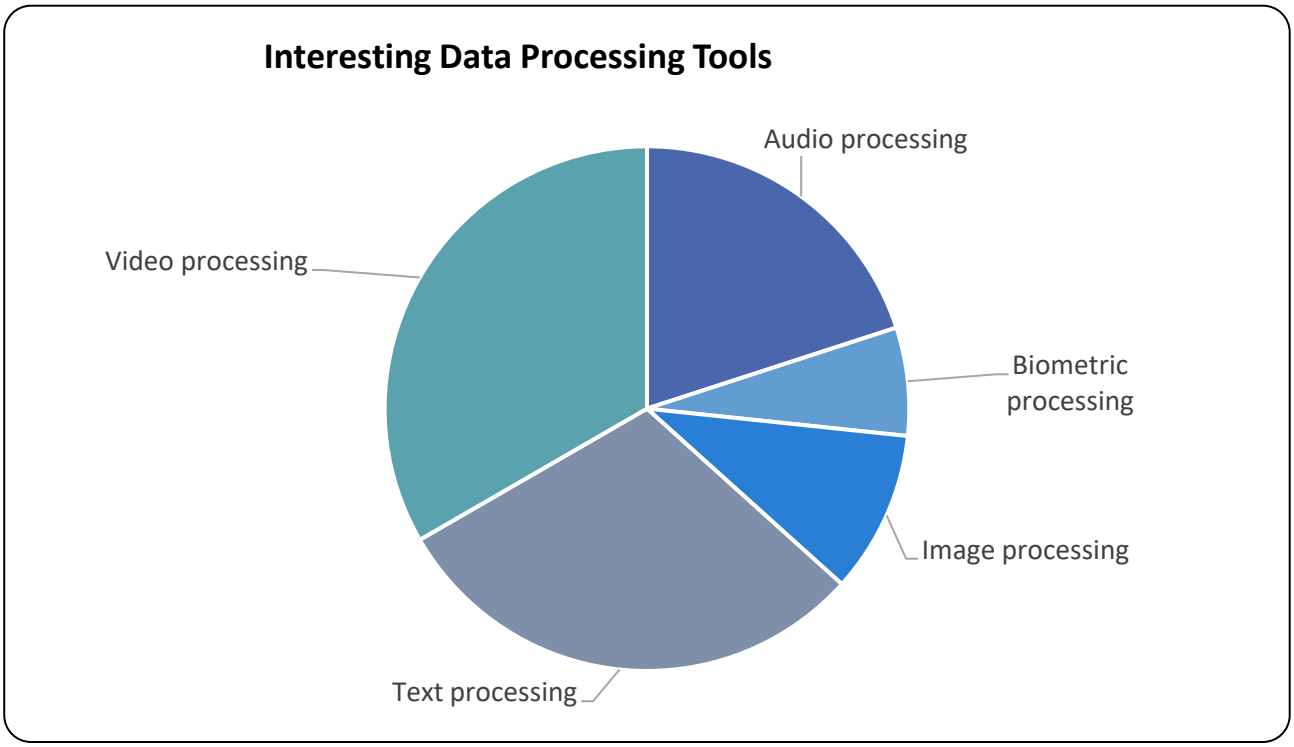


Figure 13: Interesting Data Processing Tools

Last but not least and purely for statistical purposes, it should be mentioned that of the respondents approximately 13% reported that they found interesting all tools presented, while 34% of the participants did not report their preference.

The overall positive impact of the demonstration is reflected on the last question results. In particular, of 38 responses to the question "Are you interested in continuing the dialogue after this demonstration?", 36 participants (approximately 95%) answered "Yes", while only two (2) people answered "No", as it is illustrated in the graph below.

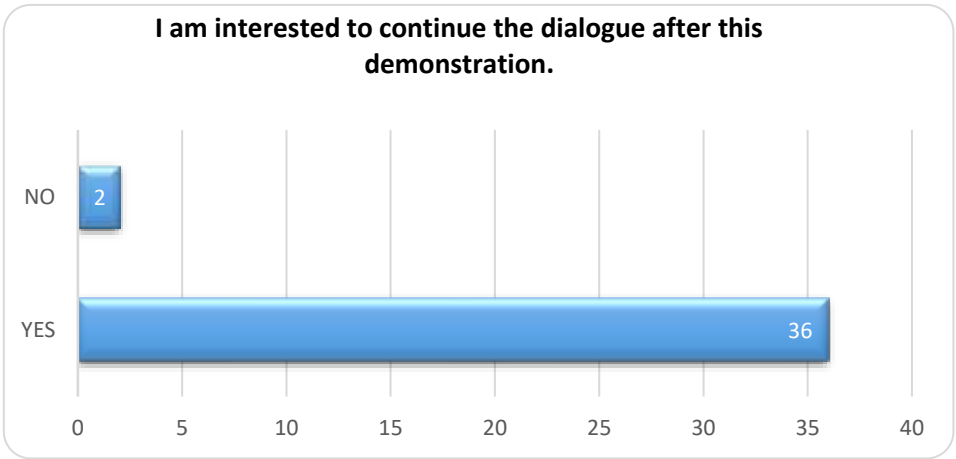


Figure 14: I am interested to continue the dialogue after this demonstration

6.2. 2nd Final Demonstration – Questionnaire Analysis

Officers of the Belgian Federal Police participated in the second (2nd) final demonstration of the tools and the technological interventions developed within ASGARD project which took place in Belgium (NICC). As it is illustrated in the graph below, 47% of the participants represent the operational level of the Belgian Police, 40% of the officers participated are responsible for executing strategic-related tasks, while the rest have both roles within the organization.

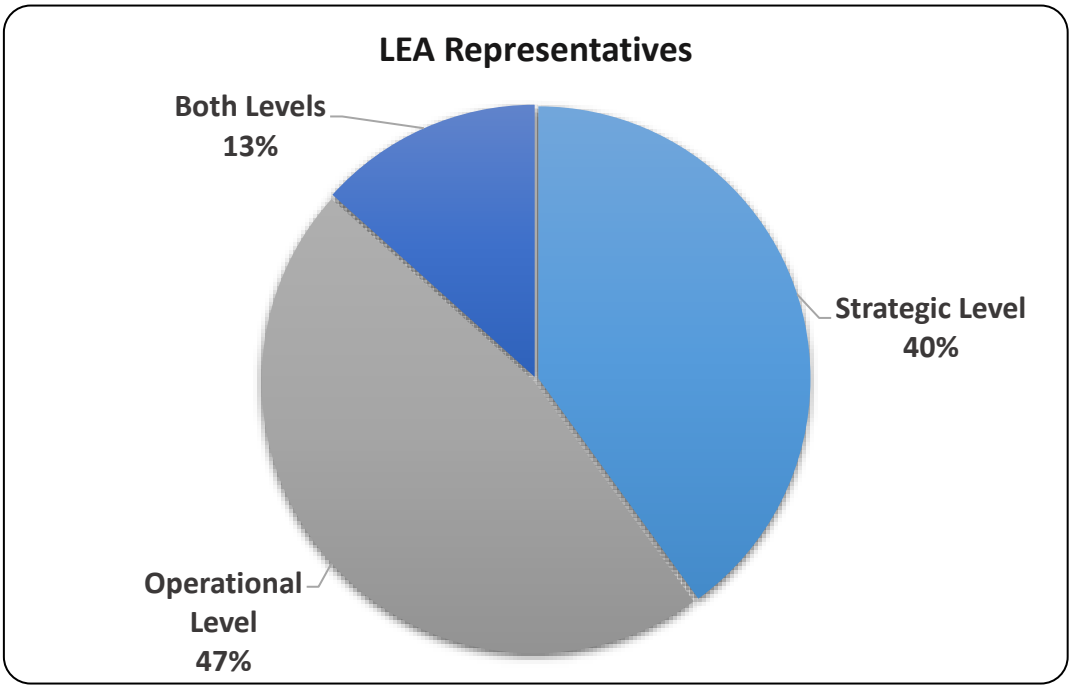


Figure 15: LEA Representatives

Within the first part of the questionnaire, participants were supposed to indicate the level of satisfaction regarding the general organization of the demonstration including both the interaction format used and the facilitation during the event.

In particular, Part 1 question 1 asked participants how do they rate the demonstration overall. In response, more than 86% of the participants reported a moderate level of satisfaction, while only two (2) out of fifteen (15) participants remained dissatisfied. As it can be shown through the Figures 17 and 18 below, the same trend was followed in the next two questions of the first part of the questionnaire.

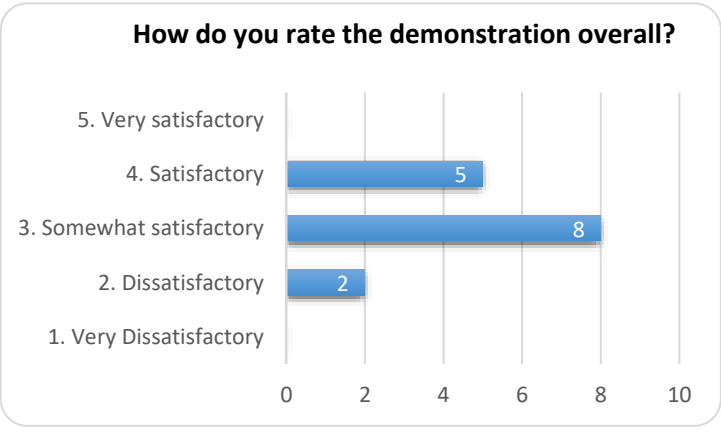


Figure 16: How do you rate the demonstration overall

As far as the interaction format (e.g. presentations, demonstration format etc.) is concerned, once again a high percentage of participants reported that were mainly satisfied with the content and the method adopted for the implementation of the demonstration. However, emphasis should be placed on the fact that approximately 27% of the respondents indicated that they were dissatisfied with the interaction format used.

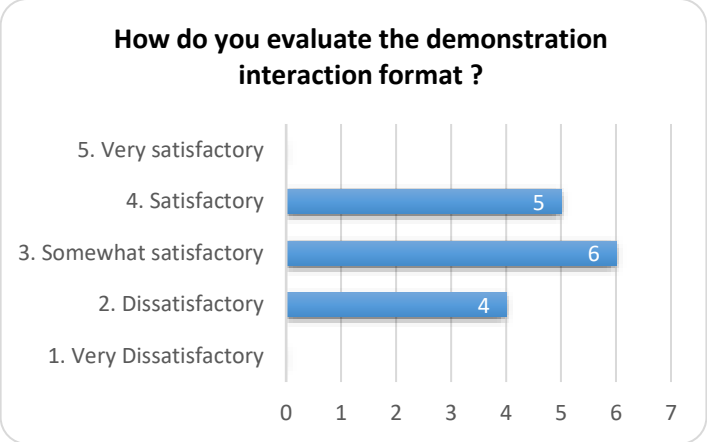


Figure 17: How do you evaluate the demonstration interaction format

Regarding the facilitation during the demonstration session, such as the overall planning, setup etc., 53% and 33% of the participants reported that were satisfied and somewhat satisfied respectively, while only a small percentage of the respondents (approximately 13%) indicated a low level of satisfaction.

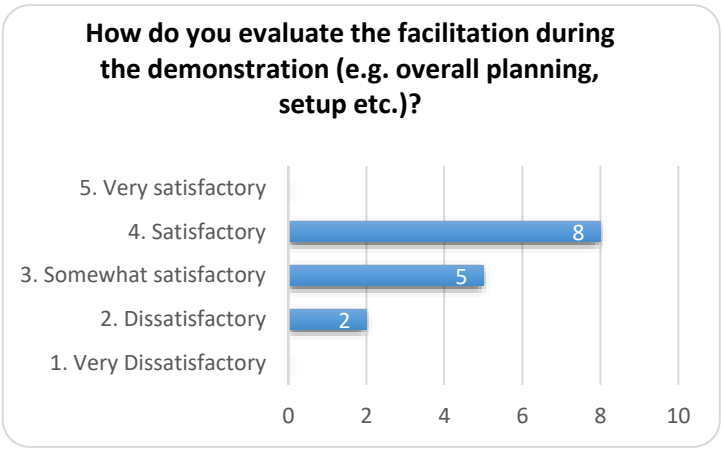


Figure 18: How do you evaluate the facilitation during the demonstration

Within the second part of the questionnaire, as presented in Figures 19, 20 and 21, the vast majority of the participants reported that they managed to shape a better understanding on the ASGARD tools while at the same time they updated their knowledge base regarding the latest insights and the technological practices developed within ASGRD project.

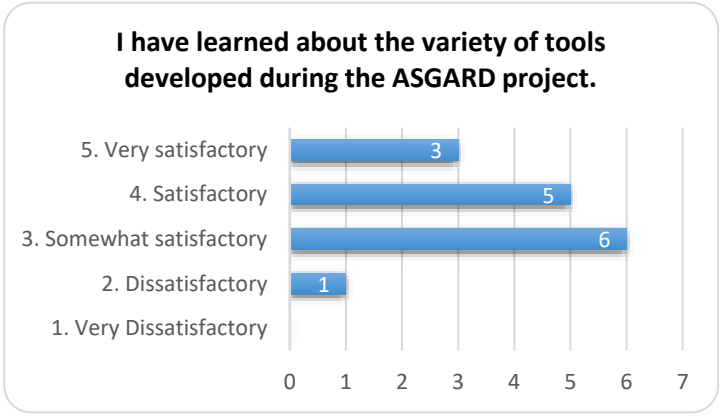


Figure 19: I have learned about the variety of tools developed during ASGARD

Data from the survey concluded that the vast majority of the respondents (approximately 93%) were satisfied learning about the variety of the tools developed during the ASGARD project during the demonstration process, while only one (1) out of the fifteen (15) participants remained dissatisfied towards achieving such a goal.

As illustrated in Figure 20, all participants reported their positive level of satisfaction towards gaining a better understanding on the ASGARD tools. In particular, 20% of the respondents reported that were very satisfied,

approximately half of the participants (seven out of fifteen) remained satisfied and only a small group of the respondents (5 out of 15) were somewhat satisfied. None of the police officers reported dissatisfaction.

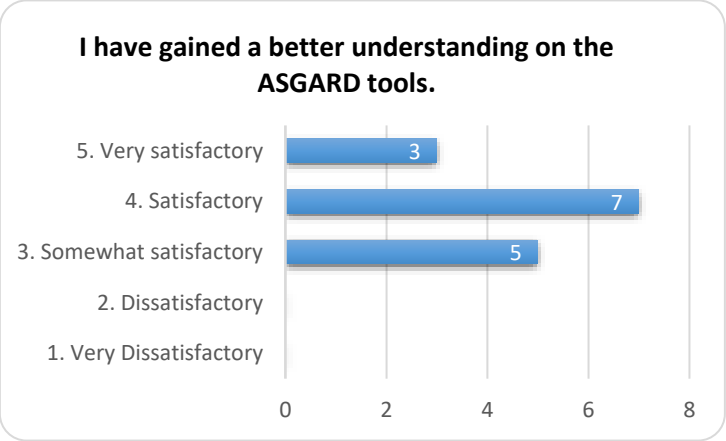


Figure 20: I have gained a better understanding on the ASGARD tools

Moreover, of 15 respondents, the highest percentage (approximately 67% - 10 participants) reported that they have sufficiently learned about the last insights and practices on the ASGARD technologies and results. As it is presented in Figure 21, four (4) out fifteen (15) participants reported a moderate level of satisfaction, while only one officer indicated dissatisfaction towards achieving such a goal.

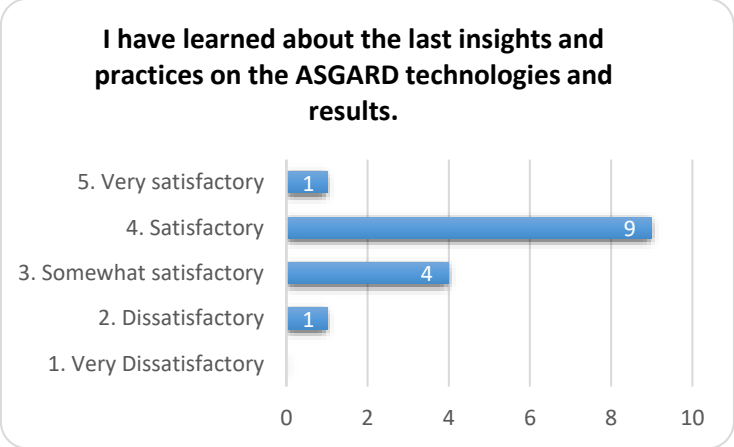


Figure 21: I have learned about the last insights and practices on the ASGARD technologies and results

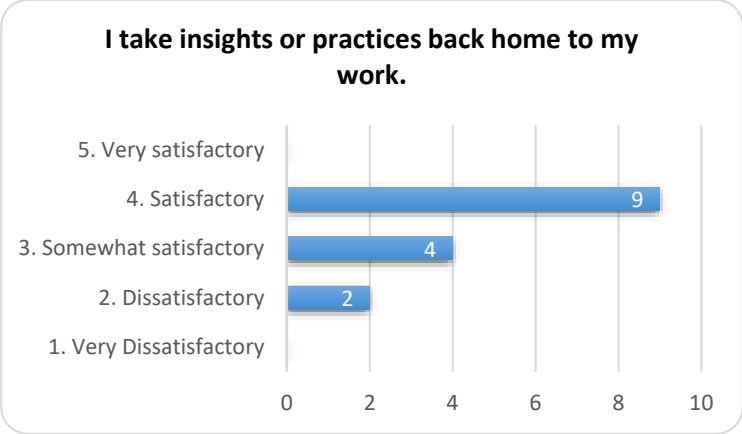


Figure 22: I take insights and practices back home to my work

Moreover, it is worth mentioning that as it is illustrated in Figure 22, the vast majority of the participants reported a positive level of satisfaction regarding insights and practices that can be effectively transferred back home to work right after the end of the demonstration. According to the questionnaire results, 13 out of 15 respondents reported that they were very satisfied towards achieving such a goal, while at the same time 2 officers reported that they were dissatisfied.

When it comes to motivation, as it can be shown from the Figure 23, the police officers reported that demonstration session has truly inspired them so as to disseminate the ASGARD technologies as well as the project results. Referring to dissemination initiatives, 9 out of 15 participants indicated that the whole demonstration event encouraged them so as to further communicate and share with other professionals acting in the field the tools developed within ASGARD project, while 40% of the respondents described the demonstration session as truly inspirational.

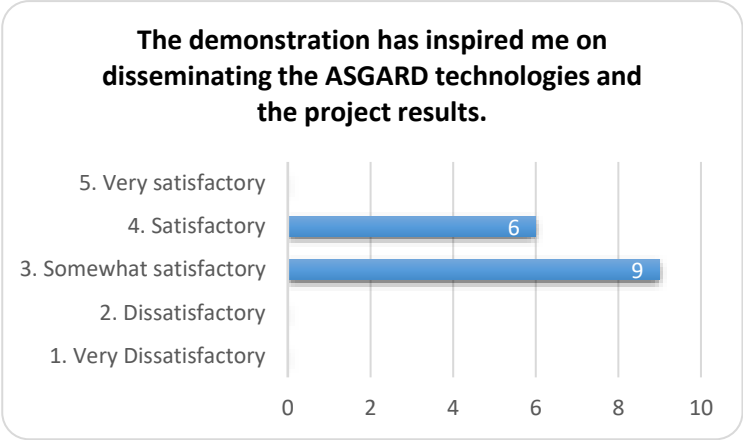


Figure 23: The demonstration has inspired me on disseminating the ASGARD technologies and the project results

Participants reported low levels of satisfaction in the expectations related part of the questionnaire. As it is illustrated in Figures 24 and 25, 6 out of 15 participants reported a moderate level of satisfaction regarding the maturity of the tools developed within the ASGARD project not only before attending the event but also right after the presentation that took place during the demonstration. The same number of participants reported that was satisfied with the maturity level of the tools before attending the demonstration. Furthermore, as it is illustrated in Figure 10, 3 out of 15 respondents reported that their expectations before attending the demonstration event in Brussels, did not met.

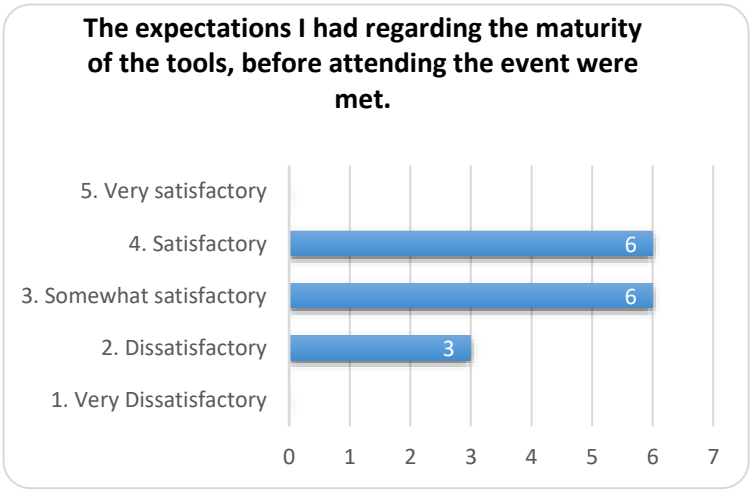


Figure 24: The expectations I had regarding the maturity of the tools, before attending the event were met

Such expectation trend continues to prevail when the participants were asked to provide the level of satisfaction that was eventually shaped regarding the maturity of the ASGARD tools right after the end of the demonstration session. In particular, approximately 47% of the participants reported that they were satisfied with the maturity level of the tools presented after the end of the demonstration session, while 2 out of 15 officers indicated that they were not satisfied with the maturity of the ASGARD tools demonstrated. In general, it should be placed emphasis on the fact that the number of the participants who reported low satisfaction level regarding the expected maturity of the tools decreased after the implementation of the demonstration session in Brussels.

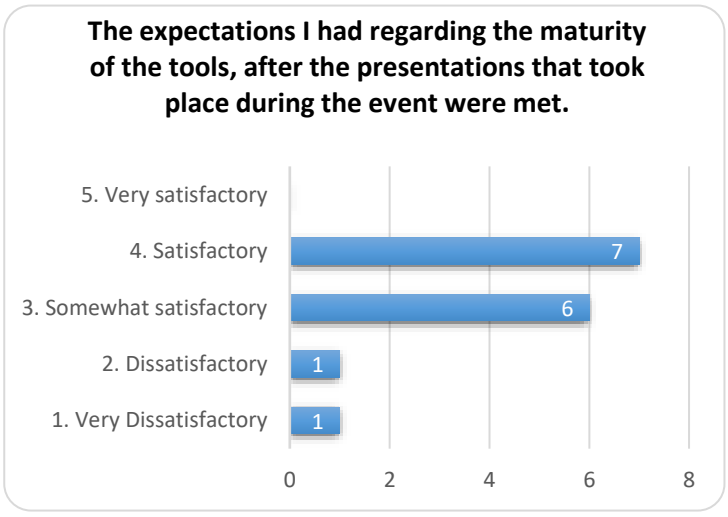


Figure 25: The expectations I had regarding the maturity of the tools, after the presentations that took place during the event were met

In one of the most interesting parts of the ASGARD Demonstration Assessment Questionnaire, participants were asked to report which of the Data processing tools found interesting.

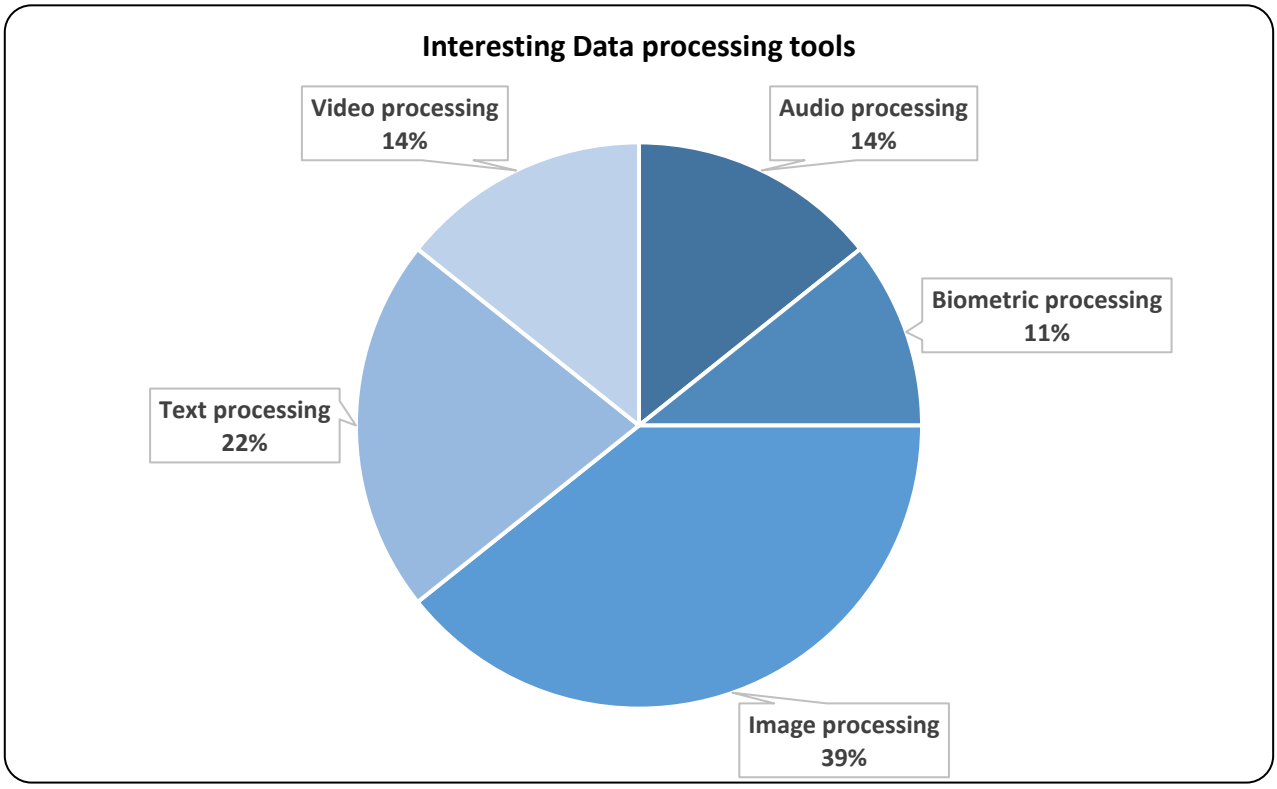


Figure 26: Interesting Data processing tools

As it is illustrated in the Figure 26 above, the vast majority of the Belgian police officers reported that image processing tools were the most interesting category of tools demonstrated. Approximately 22% of the respondents reported their preference on text processing tools, while video and audio processing tools were equally reported (14%) in terms of interest. The least popular tools belong to the sub-category of biometric processing tools. Last but not least, it should be mentioned that of the respondents approximately 13% reported that they found interesting all tools presented during the demonstration session, while 27% of the participants did not report their preference.

The effectiveness of the ASGARD tools demonstration is depicted in the last results presented. In particular, of 15 responses to the question "Are you interested in continuing the dialogue after this demonstration?", 13 participants (approximately 87%) answered "Yes", while only two (2) people answered "No", as it is illustrated in the Figure 27 below.

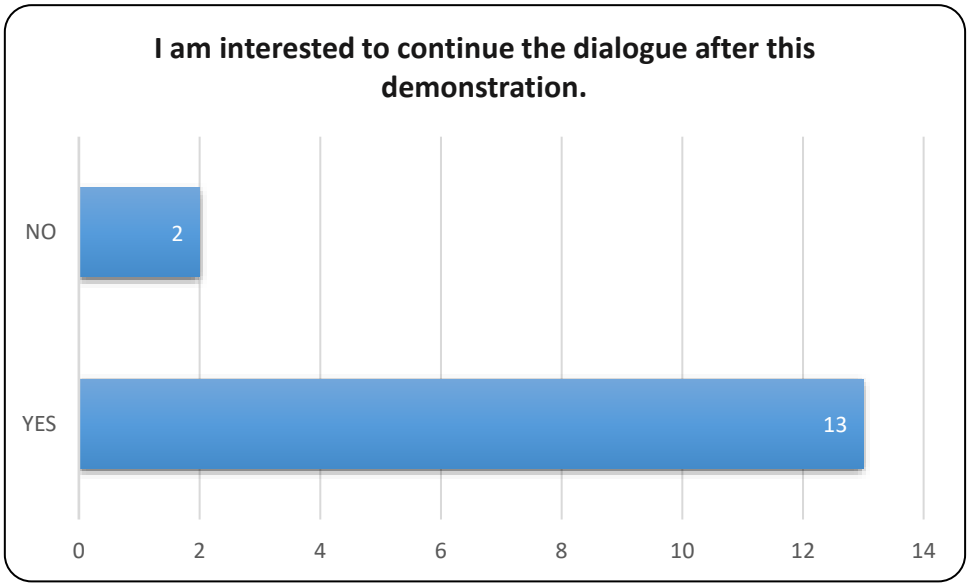


Figure 27: I am interested to continue the dialogue after this demonstration

6.3. 3rd Final Demonstration – Questionnaire Analysis

Hellenic Police officers participated in the third (3rd) final demonstration of the tools and the technological interventions developed within ASGARD project. The demonstration took place in Athens at the premises of the Forensic Science Division and all participants represented the operational level of Hellenic Police.

Within the first part of the questionnaire, participants were supposed to indicate the level of satisfaction regarding the general organization of the demonstration including both the interaction format used and the facilitation during the event.

In particular, Part 1, question 1, asked participants how do they rate the demonstration overall. In response, more than 60% of the participants reported a high level of satisfaction, while 31% of the participants reported a moderate level of satisfaction. As it is illustrated in Figure 28, only one (1) out of thirteen (13) participants remained somewhat satisfied. The same trend in the preferences was reported in Part 1 questions 2 and 3 as well.

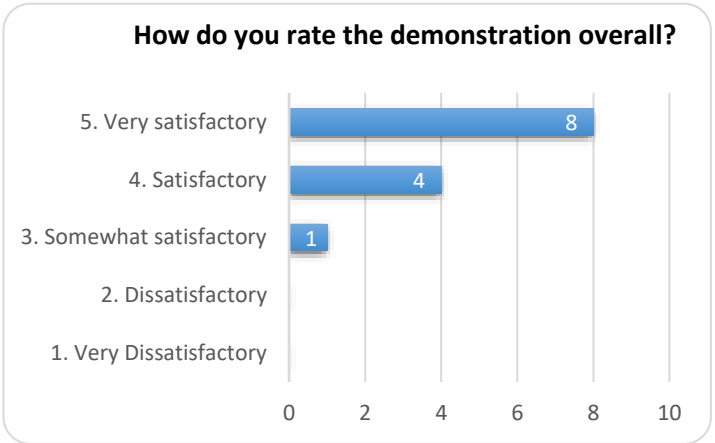


Figure 28: How do you rate the demonstration overall

In particular, as far as the interaction format (e.g. presentations, demonstration format etc.) is concerned, once again a high percentage of participants (approximately 70%) reported that were very satisfied with the content and the method adopted for the implementation of the demonstration. Approximately 23% of the respondents indicated that they were satisfied with the interaction format used, while only one (1) participant reported low level of satisfaction.

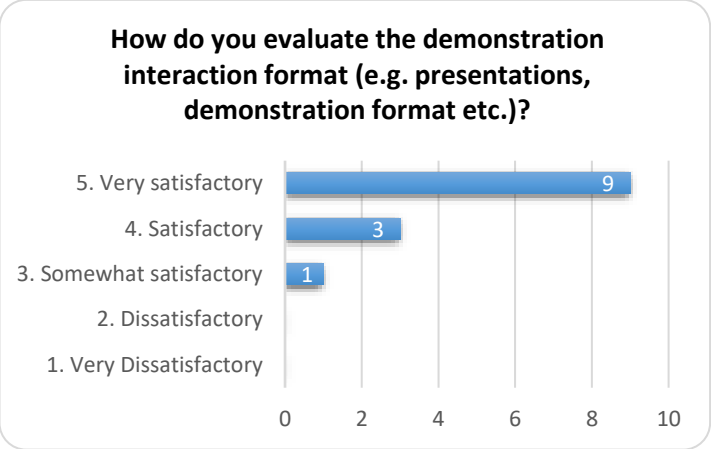


Figure 29: How do you evaluate the demonstration interaction format

Regarding the facilitation during the demonstration session, such as the overall planning, setup etc., the vast majority of the participants (approximately 70%) reported that were very satisfied, while only a small percentage of the respondents (approximately 15%) indicated moderate level of satisfaction. Two (2) out of thirteen (13) participants reported that they were somewhat satisfied with the facilitation during the 3rd final demonstration.

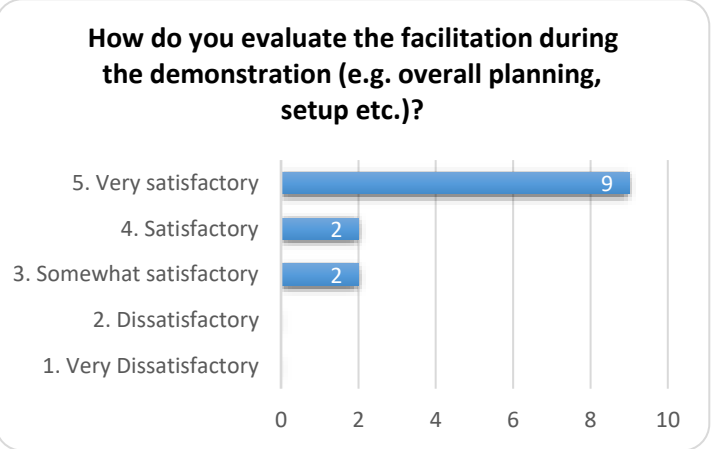


Figure 30: How do you evaluate the facilitation during the demonstration

Within the second part of the questionnaire, as presented in Figures 31, 32 and 33, the vast majority of the participants reported that they managed to shape a better understanding on the ASGARD tools while at the same time they updated their knowledge base regarding the latest insights and the technological practices developed within ASGRD project.

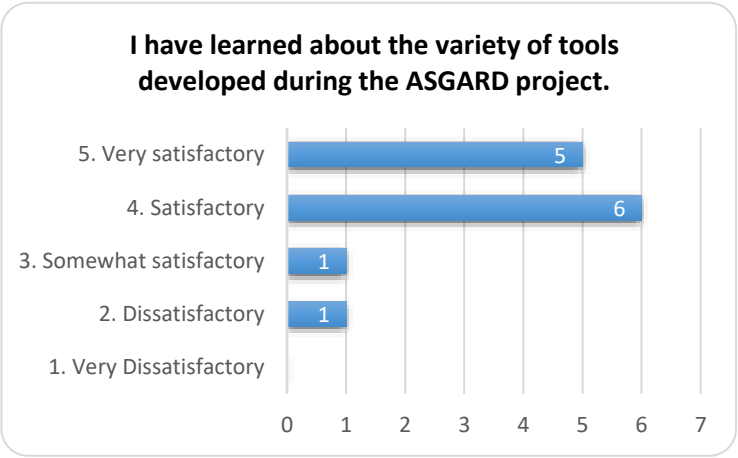


Figure 31: I have learned about the variety of tools developed during the ASGARD project

Data from the survey concluded that the vast majority of the respondents (approximately 85%) were satisfied learning about the variety of the tools developed during the ASGARD project during the demonstration process, while only one (1) out of the thirteen (13) participants reported that he/she remained somewhat satisfied. It is worth mentioning that only one (1) out of the thirteen (13) participants remained dissatisfied towards achieving such a goal.

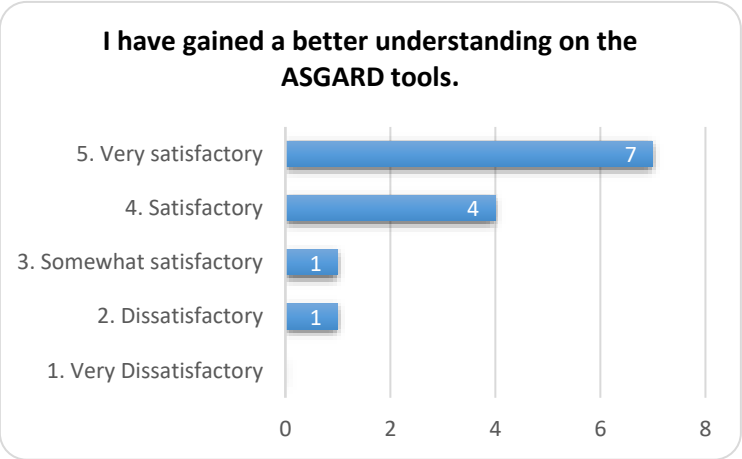


Figure 32: I have gained a better understanding on the ASGARD tools

As it illustrated in Figure 32, the vast majority of the respondents reported high level of satisfaction towards gaining a better understanding on the ASGARD tools. In particular, approximately 54% of the respondents reported that were very satisfied, approximately 31% of the participants (4 out of 13) remained satisfied and only one (1) respondent (1 out of 13) was somewhat satisfied. Only one (1) Hellenic Police officer reported dissatisfaction.

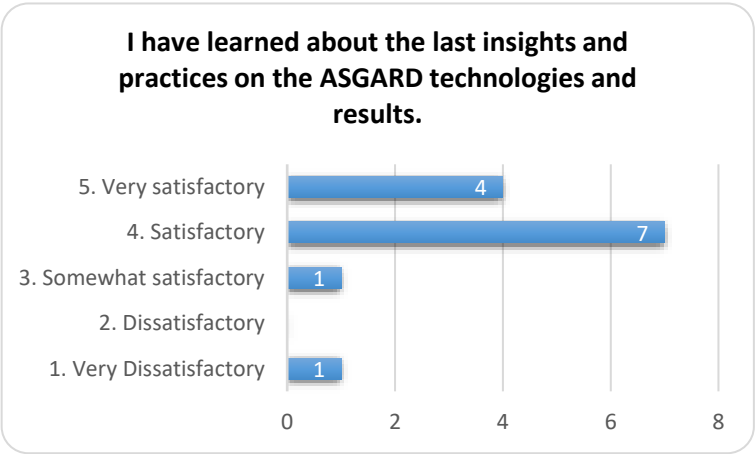


Figure 33: learned about the last insights and practices on the ASGARD technologies and results

Moreover, of 13 respondents, the highest percentage (approximately 85% - 11 participants) reported that they have sufficiently learned about the last insights and practices on the ASGARD technologies and results. As it is presented in Figure 33, one (1) out thirteen (13) participants reported low level of satisfaction (option 3. Somewhat satisfactory), while only one Hellenic Police officer indicated dissatisfaction towards achieving such a goal.

Moreover, it is worth mentioning that as it is illustrated in Figure 34 below, the vast majority of the participants reported a positive level of satisfaction regarding insights and practices that can be effectively transferred back home to work right after the end of the demonstration. According to the questionnaire results, 3 out of 13 respondents reported that they were very satisfied towards achieving such a goal, while at the same time two groups of four (4) officers reported that they were satisfied and somewhat satisfied. Emphasis should be placed on the fact that two (2) participants reported theis dissatifaction regarding such goal.

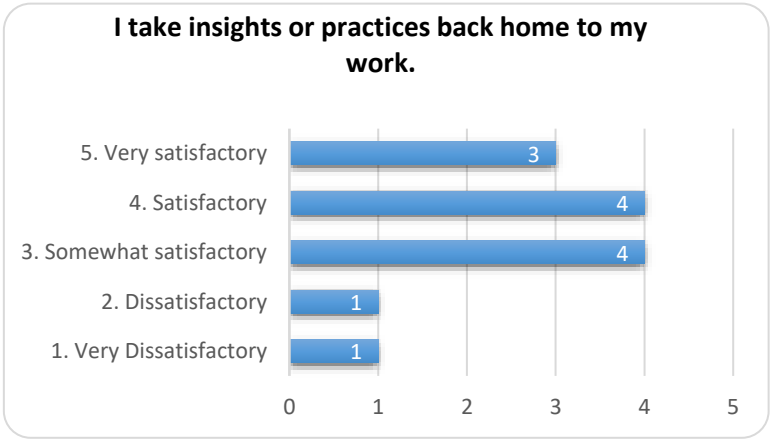


Figure 34: I take insights or practices back home to my work

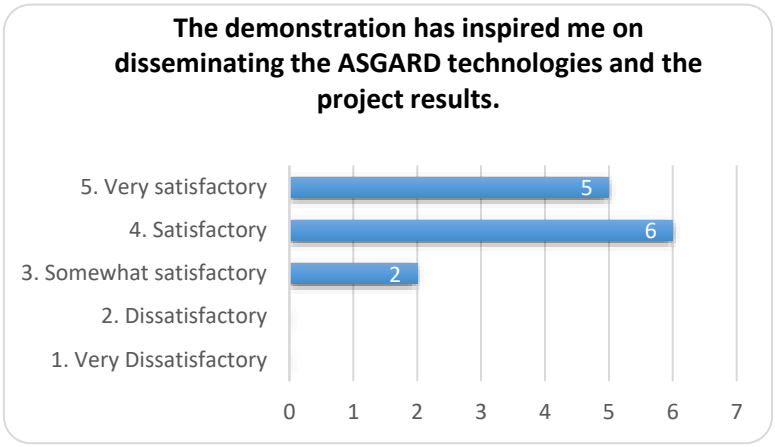


Figure 35: the demonstration has inspired me on disseminating the ASGARD technologies and the project results

Referring to dissemination initiatives, as it can be seen in Figure 35, all Hellenic Police officers reported that demonstration session has truly inspired them to disseminate the ASGARD technologies as well as the project results. In particular, 11 out of 13 participants indicated that the whole demonstration event encouraged them so as to further communicate and share with other professionals acting in the field the tools developed within ASGARD project, while only a small group of two (2) participants described the demonstration session as somewhat inspirational.

Participants reported low levels of satisfaction in the expectations related part of the questionnaire. As it is illustrated in Figures 36, 5 out of 13 participants reported low level of satisfaction regarding the maturity of the tools developed within the ASGARD project before attending the event. In addition, two groups of three (3) participants reported that they were satisfied and very satisfied, while at the same time approximately 15% of the respondents reported that their expectations before attending the demonstration event in Athens, did not met.

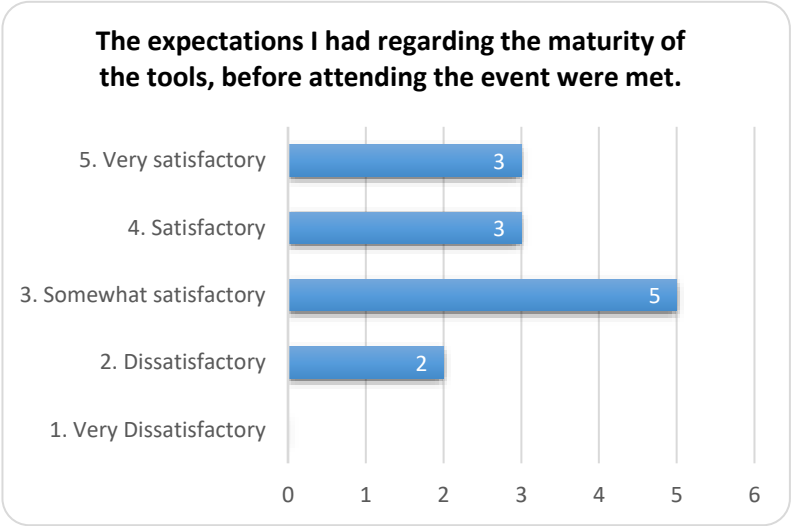


Figure 36: The expectations I had regarding the maturity of the tools, before attending the event were met

Participants reported a totally different approach when they were asked to provide the level of satisfaction that was eventually shaped regarding the maturity of the ASGARD tools right after the end of the demonstration session. In particular, approximately 61% of the participants reported that they were satisfied with the maturity level of the tools presented after the end of the demonstration session, 3 out of 13 respondents reported that they were very satisfied, while 2 out of 13 officers indicated that they were somewhat satisfied with the maturity of the ASGARD tools demonstrated.

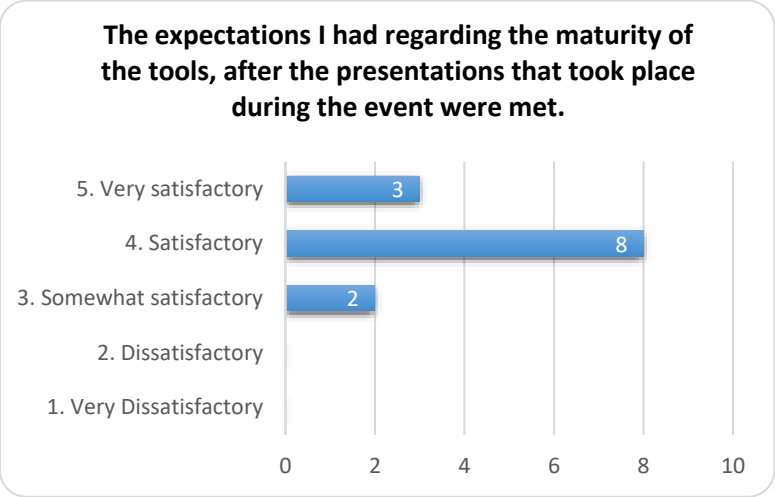


Figure 37: The expectations I had regarding the maturity of the tools, after the presentations that took place during the vent were met

In general, emphasis should be placed on the fact that the number of the participants who reported moderate satisfaction level regarding the expected maturity of the tools increased right after the implementation of the demonstration session in Athens.

One of the most interesting parts of the questionnaire refers to the categories of tools that gained the interest of the demonstration's participants. As it is illustrated in the graph below (Figure 38), data processing tools were reported by the Hellenic Police officers as the most interesting category of tools presented, while the data acquisition tools were ranked as the second interesting category of tools.

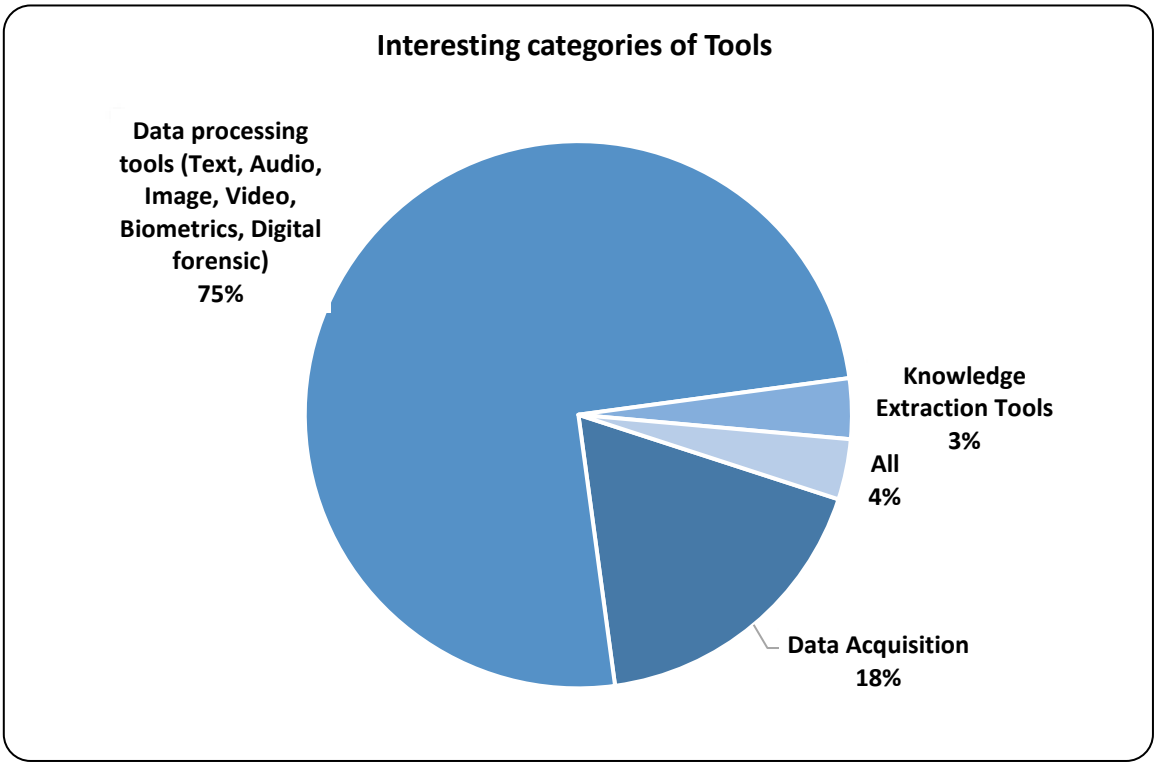


Figure 38: Interesting categories of Tools

The admittedly high percentage of responses indicating that Data processing tools constitute the most popular category of tools provided an impetus for further analysis of the results available. In particular, among the different sub-categories of Data processing tools (Text, Audio, Image, Video, Biometrics, Digital forensic), 43% of the participants reported biometric processing tools as their favorite tools (especially face recognition tool), while text processing tools remained the least popular (please see Figure 39). Image processing tools were reported as the second most favorite category of tools demonstrated during the session, while audio and video processing tools attracted the same number of interested participants.

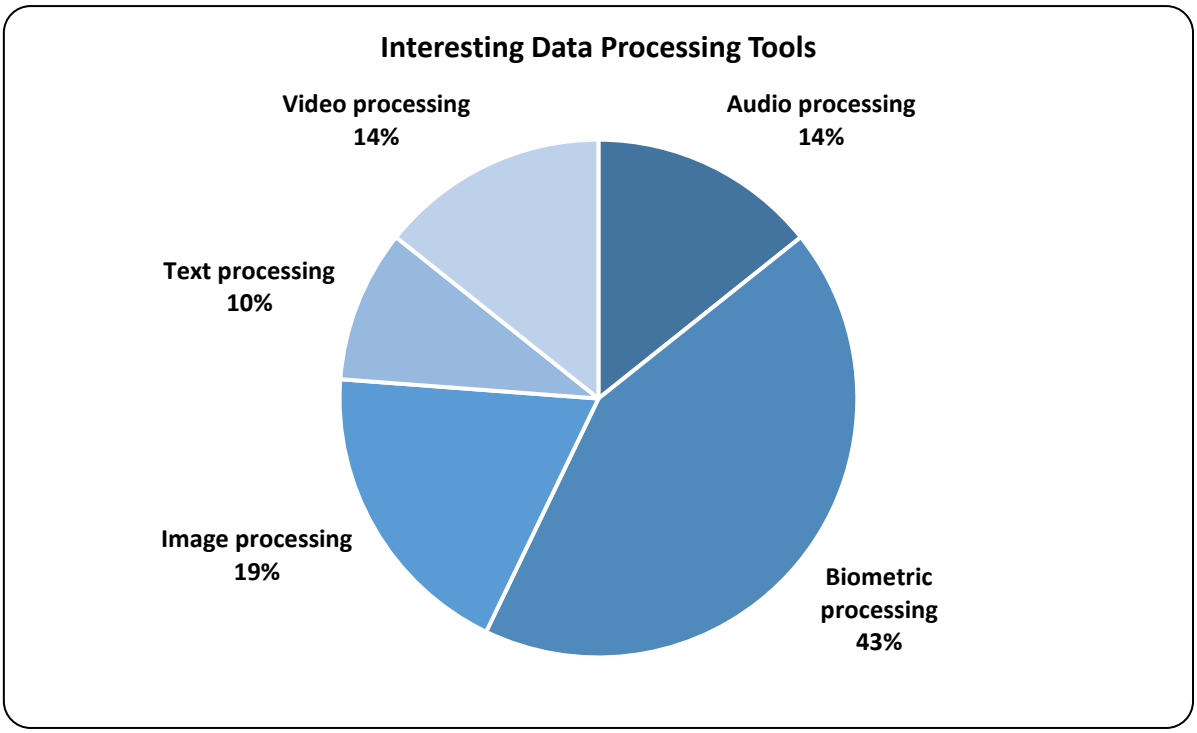


Figure 39: Interesting Data Processing Tools

The effectiveness of the ASGARD tools demonstration is depicted in the last results presented. In particular, of 13 responses to the question "Are you interested in continuing the dialogue after this demonstration?", 13 participants (100%) answered "Yes", as it is illustrated in the Figure 40 below. Such positive approach towards the tools and the technology developed within ASGARD project was similarly reported during the capture the flag (CtF) session that took place in Europol's premises (1st final demonstration), as well as in the 2nd final demonstration that took place in Belgium (NICC), implying the undeniable impact of the whole project on the professionals acting in the field.

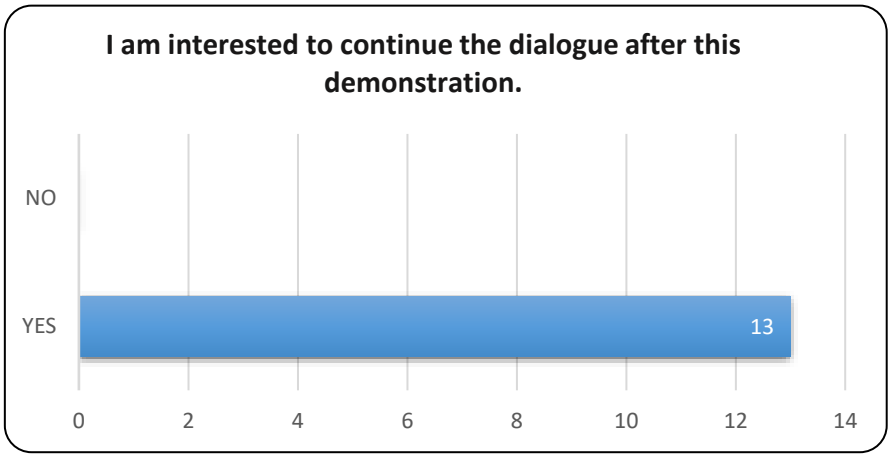


Figure 40: I am interesting to continue dialogue after this demonstration

7. Conclusion

7.1 Summary

In this document, we have provided reports from the three final demonstrations of the ASGARD project and evaluations of the demonstration. The three demonstration took place in the Hague, the Netherlands, Brussels, Belgium and in Athens, Greece. The goals of demonstrations were to demonstrate the technologies developed throughout the project, obtain feedback and input and finale to disseminate the overall results of the project.

Section 2 provided an overview of the final demonstrations.

The 1st demonstration took place in Europol, alongside with the 6th Hackathon. Section 3 depicts the overall information regarding the demonstration while Section 6.1 presents the assessment of the demonstration

The 2nd demonstration organized by BFP and NICC took place in Brussels. Section 4 depicts the overall information regarding the demonstration while Section 6.2 presents the assessment of the demonstration

The 3rd demonstration organized by KEMEA took place in Athens and it was hosted by the Forensics Science Division of the Hellenic Police. Section 5 depicts the overall information regarding the demonstration while Section 6.3 presents the assessment of the demonstration

7.2 Evaluation

As planned, this activity reports on ASGARD execution of the three final demonstrations. Through the questionnaires the demos were evaluated as depicted in the respective sections. Furthermore, through the demonstration of the developed tools, the philosophy and approach of ASGARD (e.g. full development cycle every 6 months) and the possibility that the end users can further test/use the tools, the feedback and the interaction with the participants was positive.

7.3 Future work

Nothing is pending from what was initially planned, nor additional future work has been identified and planned.

ANNEX I. GLOSSARY AND ACRONYMS

Term	Definition / Description
CtF	Capture the Flag
EC	European Commission
IG	Industry Group
LEA	Law Enforcement Agency/Agent(s)
OG	Operational Group
RAG	Research & Academia Group
SAG	Stakeholders Advisory Group
SG	Strategic Group
TRL	Technology Readiness Level

Table 3 – Glossary and Acronyms

ANNEX II. Questionnaires

Analysis System for GAthered Raw Data

ASGARD is a project that has received funding from the European Union's Horizon 2020 - Research and Innovation Framework Programme, H2020-FCT-2015, under grant agreement no 700381.

ASGARD Demonstration Assessment Questionnaire

Instructions

This questionnaire serves as an evaluation method for the final ASGARD demonstration. It consists of two parts. The first part is made up of 3 questions that will assess the general organization of the demonstration. The second part is made up of 6 questions that rate the content of the demonstration more specifically, as well as 3 open questions. Please rate the following statements by selecting one answer. The rating scale is from one (1) to five (5), one being the lowest and five the highest score.

ASGARD Demonstration Rating Scale	
1	Very Dissatisfactory
2	Dissatisfactory
3	Somewhat satisfactory
4	Satisfactory
5	Very satisfactory

Which of the following Stakeholders' Group do you represent:

☐ **LEA**

☐ Strategic level (as an individual representing your organisation)

☐ Operational level (as an individual representing your organisation)

☐ National LEA ☐ European LEA

☐ **Research and Academia**

☐ **Industry**

Part 1

1. How do you rate the demonstration overall?
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

2. How do you evaluate the demonstration interaction format (e.g. presentations, demonstration format etc.)?
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3. How do you evaluate the facilitation during the demonstration (e.g. overall planning, setup etc.)?
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Part 2

1. I have learned about the variety of tools developed during the ASGARD project.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

2. I have gained a better understanding on the ASGARD tools.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3. Please provide the name of the tools of interest

4. I have learned about the last insights and practices on the ASGARD technologies and results.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

5. I take insights or practices back home to my work.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

6. The expectations I had regarding the maturity of the tools, **before attending the event** were met.

   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

7. The expectations I had regarding the maturity of the tools, **after the presentations** that took place during the event were met.

   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

8. The demonstration has inspired me on disseminating the ASGARD technologies and the project results.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

9. I am interested to continue the dialogue after this demonstration.
   ☐ Yes ☐ No

10. What did you like/dislike about the demonstration?

11. Do you have any suggestions to the ASGARD project in general?

12. Any other observation/input?