Report on Interim Demonstration

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1 Executive Summary

The objective of WP6 in the FascinatE project is to organise a series of convincing demonstrations that raise awareness of the project both in the popular and technical media, and amongst the industry itself, as well as providing focal points for the technical work of the project.

This document reports on the second public demonstration of FascinatE technology, at the concert hall Arena in Berlin in May 2012, during the production of a dance project by the Compagnie Sasha Waltz & Guests and the Education Programme by the Berlin Philharmonic Orchestra conducted by Sir Simon Rattle performing a choreography of the Carmen-Suite by Rodion Schtschedrin. Invited journalists and other guests were able to see live stitching of a panorama from the new OMNICAM equipped with ALEXA-M cameras at the Arena, as well as audio capture using two Eigenmike® microphones. Some of the latest results from other parts of the project were shown in a demonstration room at HHI’s premises nearby. These demonstrations resulted in several press publications, which are also listed in this deliverable.

The audio and video data captured at the Arena will provide material to support technical work and other demonstrations during the remainder of the project.
# Introduction

## 2.1 Purpose of this Document

The objective of WP6 in the FascinatE project is to organise a series of convincing demonstrations that raise awareness of the project both in the popular and technical media, and amongst the industry itself, as well as providing focal points for the technical work of the project. A series of successful demonstrations is key to getting the technology and standards developed by the project widely adopted.

The first public demonstration, held at IBC 2011 [D6.1.1] showed initial versions of some of the components that the project developed in its first year, but mainly as isolated elements, and not being used ‘in anger’ for a real production.

This document reports on the second public demonstration of FascinatE technology, at Arena concert hall in Berlin, during the production of a dance project by the Compagnie Sasha Waltz & Guests and the Education Programme by the Berlin Philharmonic Orchestra conducted by Sir Simon Rattle performing a choreography of the Carmen-Suite by Rodion Schtschedrin in May 2012. Supporting demonstrations were shown at HHI’s premises nearby.

In contrast to the first public demonstration, the second demo allowed the project to show its technology being used to capture a live event, allowing it to be seen in an operational context. It was also the debut for a new version of the OMNICAM panoramic camera developed by HHI, equipped with six Alexa-M cameras produced by ARRI. The supporting demonstrations showed further developments and integration of some key project components, including the first version of the Production Scripting Engine being used to automate the selection of regions-of-interest from within the panoramic image, and developments in the gesture-control interface and streaming delivery methods.

The Press Release issued for the demonstrations is included in the Appendix.

## 2.2 Scope of this Document

This document is related to Task 6.2: Interim demonstration.

## 2.3 Status of this Document

This is the final version of D6.2.1.
3 Demonstration and Test Shoot at the Arena, Berlin

Thanks to a collaboration between Fraunhofer HHI and Berlin Philharmonic Orchestra, the FascinatE consortium got the opportunity to perform another test shoot of a dance performance with classical music. It was a dance project by the Compagnie Sasha Waltz & Guests and the Education Programme by the Berlin Philharmonic Orchestra conducted by Sir Simon Rattle performing a choreography of the Carmen-Suite by Rodion Schtschedrin. The major reason for selection of this event was the new genre, compared to the first test shoot, which happened in the sports domain. A second important aspect was the new version of the OMNICAM that has now been equipped with the new Alexa M, offering higher dynamic range and higher frame rate.

Together with the film production company KUK, Munich, Germany [KUK, 2012] and the video equipment manufacturer DVS, Germany, [DVS, 2012] a professional test production has been performed to achieve high quality content. The decision to go ahead with this test shoot was made at the end of January 2012. Hence, the complete acquisition and data storage setup had to be prepared in a very short time. In parallel, intensive discussions with the artists of the dance performance were held to agree on good positions of the different cameras and microphones at all the shootings, i.e. one general rehearsal and two shows. In Figure 1, the model of the concert hall and the stage is shown, which was used during discussions between colleagues from Fraunhofer HHI, the Sasha Waltz Dance Compagnie, representatives from Berlin Philharmonic Orchestra and KUK film productions.

Figure 1: Model of the Arena concert hall and the stage
The resulting camera and microphone positions are shown in Figure 2 below.

![Diagram showing camera and microphone positions](image)

**Figure 2: Hall layout including positions of the OMNICAM, the satellite Alexa and the Eigenmike during the whole production**

At the second test shoot the following equipment was installed:

- the OMNICAM equipped with six Alexa M cameras
- a satellite Alexa camera
- two Eigenmike® microphones
- 62 microphones installed in the orchestra
- 1 SoundField® microphone
- 4 DPA 4066 boundary microphones

In the figures below, the installation of the various items of equipment is shown. More details of the second test shoot and the capture test bed used there can be found in deliverable D2.2.2.
Figure 3: OMNICAM on western dolly (left) and in close-up view (right)

Figure 4: OMNICAM together with satellite Alexa

Figure 5: Eigenmike® (left), Alexa M camera bodies in the director’s room (right)
At the demonstration at Arena, Berlin, the visitors were able to see the complete acquisition setup for

- ultra-high resolution panoramic video
- HDR HD broadcast capture
- 3D sound recording with Eigenmike®

All the components have been in action and a live panoramic video has been presented that has been produced by the real-time stitching engine.

The dance performance by the Compagnie Sasha Waltz & Guests and the Education Programme by the Berlin Philharmonic Orchestra conducted by Sir Simon Rattle performing a choreography of the Carmen-Suite by Rodion Schtschedrin was captured at three different times:

- the general rehearsal on 24 May, 2012
- the first show on 25 May, 2012
- the second show on 26 May, 2012
In Figure 8, the output from the real-time stitching engine is shown. The full version is approximately 6K x 2K resolution.

![Figure 8: Panorama from the dance performance](image)

![Figure 9: Visitors inspecting the OMNICAM at the Arena Hall, Berlin](image)
4 Demonstrations at HHI, Berlin

The project also demonstrated some other developments from the project at HHI’s buildings in Berlin on 24th May, shortly before the demonstration at the Arena. The main demonstrations are summarised below.

- Replay of a football match captured using the first-generation OMNICAM, with interactive navigation allowing users to pan and zoom around the panorama. This included rendering of audio using 3rd order ambisonics, with the sound field and audio objects rotating to match the viewing direction as the user navigated around the panorama (Figure 10).

![Figure 10: Demonstration of interactive navigation around a video panorama, with accompanying 3D audio](image)

- Gesture-based interaction for panorama navigation, region-of-interest selection and audio control. UPC demonstrated the current implementation of the User Control Node (UCN) responsible of allowing the user to interact with the video and audio renderer. The demo shown supported these functionalities (further details of these can be found in [D5.3.1]):
  - **Menu selection:** A menu is overlaid on the current screen and the user can select any button of the menus by pointing at it (Figure 11).

![Figure 11: Detail of the displayed content and the user feedback](image)
- **Navigation**: The user is able to navigate through the panorama scene by panning, tilting and zooming in the content. Panning and tilting is performed by the user using a single hand to point-and-grab in the direction of the pan or tilt. The zooming is performed using both hands.

- **ROI Selection / Change channel**: The system informs the user of the available regions of interest in the current view and the user is able to change between these ROIs or different related video channels by a swipe from right to left.

- **Pause / Continue**: The user is able to pause / play the content at any time simply by holding their hands vertical and parallel (replicating the symbol often found on a ‘pause’ button).

- **Increase volume**: The user touches an ear with his/her hand (Figure 12).

- **Decrease volume**: The user is able to decrease the volume by moving a finger to his/her lips.

- **Mute volume**: The user can mute the volume completely by crossing fingers of both hands.

- **Commentary tracks**: Using the menu selection, the user is presented with a possible list of commentators that can be selected.

- **Multi-user**: The system is able to detect several people and only react to the gestures of a single individual. The control can also be passed between users.

![Figure 12 - Use of gestures for interaction: hand held to the ear means turn up the volume](image-url)
Automatic Scripting: the Production Scripting Engine automatically extracts a video stream based on regions of interest from the panorama. JRS showed a demo of the first version of the Production Scripting Engine (PSE) developed in Work Package 3.

Based on manually created annotations (type and locations of events and ball position) and results from content analysis (player tracking) several regions of interest are suggested for different types of event. These regions are shown by coloured boxes on the screen in Figure 12, one region is following the ball, and others are showing the goal areas or the coaching zone.

The manual annotation of events was used to intelligently switch between these suggested regions of interest, thus enabling the functionality of a Virtual Director.

Figure 13: Automatic Scripting based on ROIs from content analysis and manual annotation
- Methods for delivery of panoramic content that allow the user to navigate around the panorama using a tablet device (Figure 14).
  - One extends the standard HTTP-Adaptive Streaming (HAS) technique (as used today for web-based/unmanaged video delivery) to support spatial segmentation of the Layered Scene Representation into tiles. This tiled streaming testbed permits interactive navigation of the video. It is possible to perform region-of-interest (ROI) selection with a second screen control device and show its output on a dedicated primary screen.
  - Another technique has been developed in a clean-slate approach and targets longer-term deployments (e.g. for future resource-optimized interactive TV services). It aims at optimizing the interactive delivery of segments by combining different types of transport modes (e.g. unicast vs. multicast). The delivery of segments is handled by a unified Publisher/Subscriber (PUB/SUB) mechanism that can handle the multiple transport modes. This part of the testbed has also been integrated to the in-network rendering proxy, that was demonstrated as reported in [D6.1.1].

Figure 14: Demonstrating delivery systems for streaming panoramic content over the internet
5 Coverage in the Press

In collaboration with the corporate communication department at Fraunhofer HHI, a press release was produced and distributed via a large variety of distribution channels (see Annex). Due to this, the FascinatE project received a lot of interest in the press and media.

- Blog of Nobert Bolewski [in German]: This web blog described the FascinatE system, the main concept of format-agnostic media production as well as initial results and the demonstration on two pages. It is illustrated with many pictures and diagrams to allow the reader a better understanding of the results achieved.

- An article in Shoot Online about the OMNICAM and the test shoot at Arena (see Figure 15) available at: [http://www.shootonline.com/go/index.php?name=Release&op=view&id=rs-web3-1644303-1338305704-2](http://www.shootonline.com/go/index.php?name=Release&op=view&id=rs-web3-1644303-1338305704-2)

![Figure 15 – First part of the article published at Shoot Online](image)
• Press release (by ARRI) at
• Interview by Thomas Gith, an independent journalist, with Georg Thallinger and Oliver Schreer about format-agnostic media production and interactive live broadcast. The radio feature was broadcast in several German radio stations such as Mitteldeutscher Rundfunk (MDR), Radio Berlin-Brandenburg (RBB) and Deutsche Welle. It will be broadcast as well in a science programme on Austrian radio Ö1, ORF.
• An article in TVBEurope referencing ARRI's press release at
• An invitation to G. Thallinger and O. Schreer to write an article in a German journal on photography, cinema, technology called “Fachzeitschrift Fernseh-, Kinotechnik – FKT” (English translation: Professional Journal of Television and Cinema Technology).
• Article at Pro Sound News written by Kevin Hilton:
6 Reflections and Outlook

This demonstration allowed the project to show some of the key developments that have occurred in the 8 months since the first demonstration at IBC in September 2011. These included:

- A new version of the OMNICAM, equipped with six Alexa-M cameras, providing a significant improvement in image quality over the first version (which was based on micro-HD cameras). This was the first time that the new OMNICAM was demonstrated in public and tested at a live event.
- The first version of the Production Scripting Engine, providing automated selection of regions-of-interest from within the panoramic image (a kind of “virtual director”)
- An improved gesture-based interaction system, capable of a wider range of control functionality (including pausing, volume adjustment, and selection of regions-of-interest) and capable of multi-user operation
- Rotation of the audio sound field and audio objects to match the viewing direction as the user navigated around the panorama
- Advances in methods of streaming delivery for the panoramic content, including an extension of HTTP Adaptive Streaming to support spatial segmentation of the panoramic image into tiles, and a Publisher/Subscriber (PUB/SUB) mechanism that can handle the multiple transport modes

The Interim demonstration not only provided a good opportunity to show elements of the project being used for a real production, but also provided the project with a wealth of useful captured material to support further demonstrations and tests. A music and dance event was deliberately chosen to contrast with the football match covered in the project’s first test shoot, in order to broaden the types of content available.

The demonstration showed a significant improvement in quality of the captured panoramic image compared to the first version based on micro-HD cameras, thanks to the use of the Alexa-M. In addition to much-improved image sharpness and colour rendition, the cameras were run at 50Hz progressive (compared to 25Hz progressive with the micro-HD cameras), providing significantly-improved motion portrayal. The higher dynamic range of the cameras, recorded in logC format, allows the brightness range to be adjusted in software rather than requiring frequent adjustment of the iris setting.

Further technical details of the FascinatE system as presented at this demo will be documented in [D1.5.2] (project internal).

The project is on track to complete the development of the system components and to integrate these ready for its final demonstration. This demonstration is likely to occur around May 2013, in conjunction with a public event that will allow the system to be shown operating in a practical TV production situation.

The project is very grateful to the Education Programme by Berlin Philharmonic Orchestra and Sasha Waltz & Guests for their permission to use the dance performance of the Carmen Suite as a test event, and for their help in making the demonstration a success.

The project also thanks KUK film production, namely Josef Kluger, who steered the satellite Alexa camera and Nils Malchow, who led the production. Matthias Metzger acted as Digital Imaging Technician (DIT) and was responsible for all the video acquisition equipment. DVS, Germany kindly provided their Venice stations for video acquisition and technical support.
7 References

[D1.5.2] FascinatE internal deliverable D1.5.2: Interim System Integration (not publicly available).

[D5.3.1] FascinatE public deliverable D5.3.1: Requirements for the network interfaces and interactive systems usability, available via the project website http://www.fascinate-project.eu/index.php/publications/public-deliverables/


8 Glossary

Terms used within the FascinatE project, sorted alphabetically.

FascinatE Format-Agnostic Script-Based Interactive Experience
IBC International Broadcast Convention
ROI Region of Interest

Partner Acronyms
ALU Alcatel-Lucent Bell NV, BE
ARI Arnold & Richter Cine Technik GMBH & Co Betriebs KG, DE
BBC British Broadcasting Corporation
DTO Technicolor, DE
HHI Heinrich Hertz Institut, Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung e.V., DE
JRS JOANNEUM RESEARCH Forschungsgesellschaft mbH, AT
SES Softeco Sismat S.P.A., IT
TII The Interactive Institute, SE
TNO Nederlandse Organisatie voor Toegapast Natuurwetenschappelijk Onderzoek – TNO, NL
UOS The University of Salford, UK
UPC Universitat Politecnica de Catalunya, ES
9 Appendix – Press Release

Press Release

First Demonstration of Future Interactive and Immersive Live TV Services

FascinatE demonstrates first building blocks for acquisition and navigation in ultra-high resolution video panoramas – Press Demonstration at May 24, 2012 in Berlin

Berlin, May 24, 2012 – The European research project FascinatE is excited to announce its second public demonstration of components for real-time acquisition of and interactive navigation in an ultra-high resolution panorama. The demonstration is held in conjunction with a unique test shoot of a dance project by the Compagnie Sasha Waltz & Guests and the Education Program by the Berlin Philharmonic Orchestra conducted by Sir Simon Rattle performing a choreography of the Carmen Suite by Rodion Schtschedrin.

The FascinatE project is developing a prototype system that allows end-users to interactively view and navigate in an ultra-high resolution video panorama showing a live event, with the accompanying audio automatically changing to match the selected view. FascinatE covers the end-to-end chain, including advanced format-agnostic production of ultra-high resolution video and 3D audio, content analysis, automated scripting, intelligent networks for device adaptive media delivery, as well as interactive audio and video rendering.

Now almost entering its final year, FascinatE presents its latest results, in parallel to performing a unique test shot of the Berliner Philharmonic Orchestra. A large set of prototype systems will be demonstrated at Fraunhofer Heinrich-Hertz Institute in Berlin, Germany. The visitors will get a glimpse on the ultra-high resolution TV technology of the future and see demonstrations of concepts such as content analysis and scripting, dual-path segmented media delivery, and interactive audio-video rendering. A visit at the Arena concert hall will allow registered participants to see the complete set of sound and video acquisition technology such as ultra-high definition panoramic video capture and rendering, Eigenmike and Soundfield recording. The event is recorded on 25/26 May 2012 in Berlin in the Arena concert hall. More information about the event can be found at http://www.berliner-philharmoniker.de/en/education/education/pittel/musicantz-carmen/

Dates

Press demonstration: May 24, 2012: 10:00 -11:00, at Fraunhofer Heinrich Hertz Institute, Einsteinufer 37, Berlin, Germany.

Demonstration of the FascinatE acquisition system at Arena, Berlin for registered participants: May 24, 2012: 19:15-20:00; at main entrance of Arena, Kichenstr.4, Berlin-Treptow.

Bus shuttle to event place offered: Meeting point 18:30 at Fraunhofer Heinrich Hertz Institute, Einsteinufer 37, Berlin, Germany.

Please register until May 22, 2012 by sending an email to guadrun.quandel@hhi.fraunhofer.de.

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Facebook: Fascinate, Twitter: @Fascinate_Pjct, Vimeo: Fascinate Project

Notes to editors
FascinatE (Format-Agnostic Script-based INterAcTive Experience) is looking at technologies for producing and delivering ultra-high resolution content of live events, to give the viewer a more interactive experience no matter what device they are using to view the broadcast. The project receives 9.5 million Euro co-funding, under the EU FP7 ICT Programme, started in February 2010 and runs for 3.5 years. 11 partners are represented within the consortium. Project coordinator is JOANNEUM RESEARCH (AT), further partners are TECHNICOLOR S.A. (BE), Fraunhofer Heinrich Hertz Institute (DE), The British Broadcasting Corporation Research & Development (UK), Alcatel-Lucent Bell NV (BE), Arnold & Richter Cine Technik GmbH (DE), Universitat Politècnica de Catalunya (ES), The Interactive Institute (SE), University of Salford (UK), Softtec Simat S.p.A (IT), Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (NL).

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