

Atomic XR Elements: a look back

Pablo Cesar

CWI and TU Delft



CWI: Centrum Wiskunde & Informatica

- National Research Institute for Mathematics and Computer Science (founded in 1946)
- Staff: 55 permanent, 40 postdocs, 70 PhDs
- CWI registered the '.nl' domain (1986)
- 1st connection between Europe and the Internet (17 November 1988)
- Topics examples:
 - Holland's first computer
 - Height/Strength dykes
 - Algol-68, Python and SMIL



DIS@CWI



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Intermission

Immersive Video Technologies



Edited by
Giuseppe Valenzise
Martin Alain
Emin Zerman
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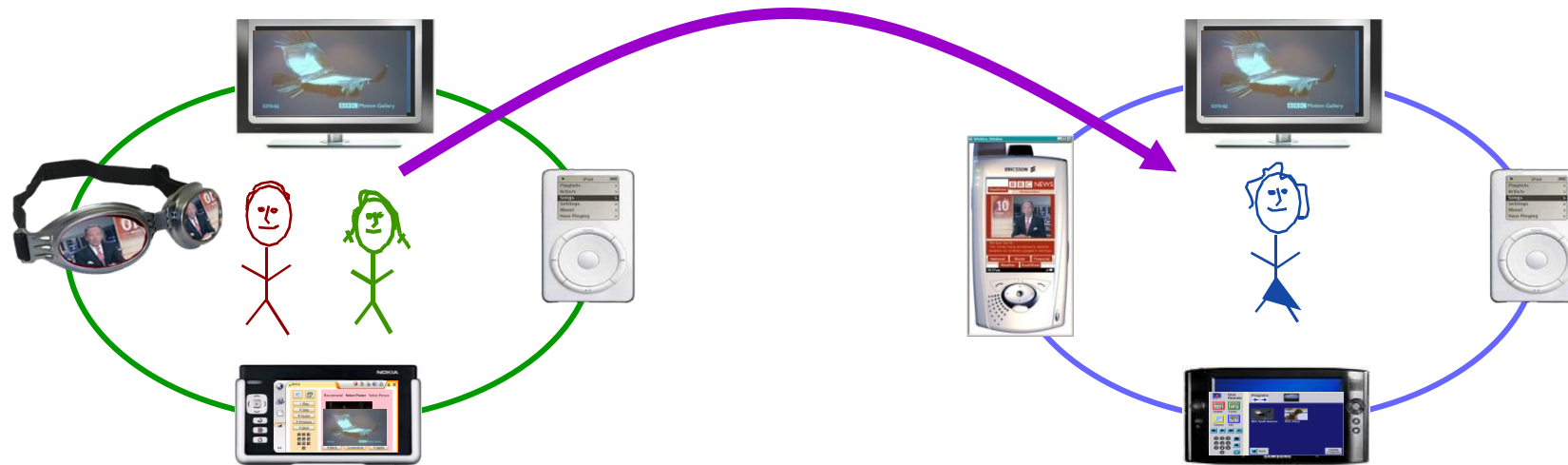
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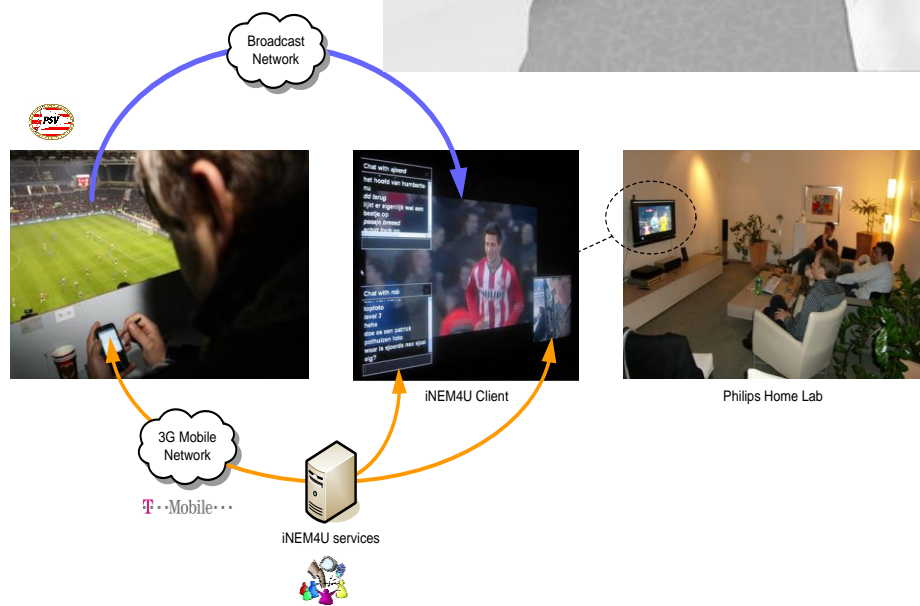
socialXR
SPRING SCHOOL

The 3rd edition of the Spring School on Social XR will take place from April 7th to 10th 2025 at CWI in Amsterdam! [Apply now!](https://www.dis.cwi.nl/spring-school/)

<https://www.dis.cwi.nl/spring-school/>

Connecting People





Future Media Internet Architecture Think Tank European Commission (2010)

4.1.5 FMIA – Think Tank - T1.2 Organization of the Future Media Internet Architecture Think Tank

During this period the FMIA-TT completed the white paper: “Future Media Internet Architecture Reference Model (v1.0)”. This white paper concludes the first phase of the FMIA-TT group by proposing a Future Media Internet Architecture reference model.

The FMIA-TT concluded its activities with the Future Media Internet Architecture White Paper. The paper has been the result of extensive discussions between the FMIA-TT members and external experts.

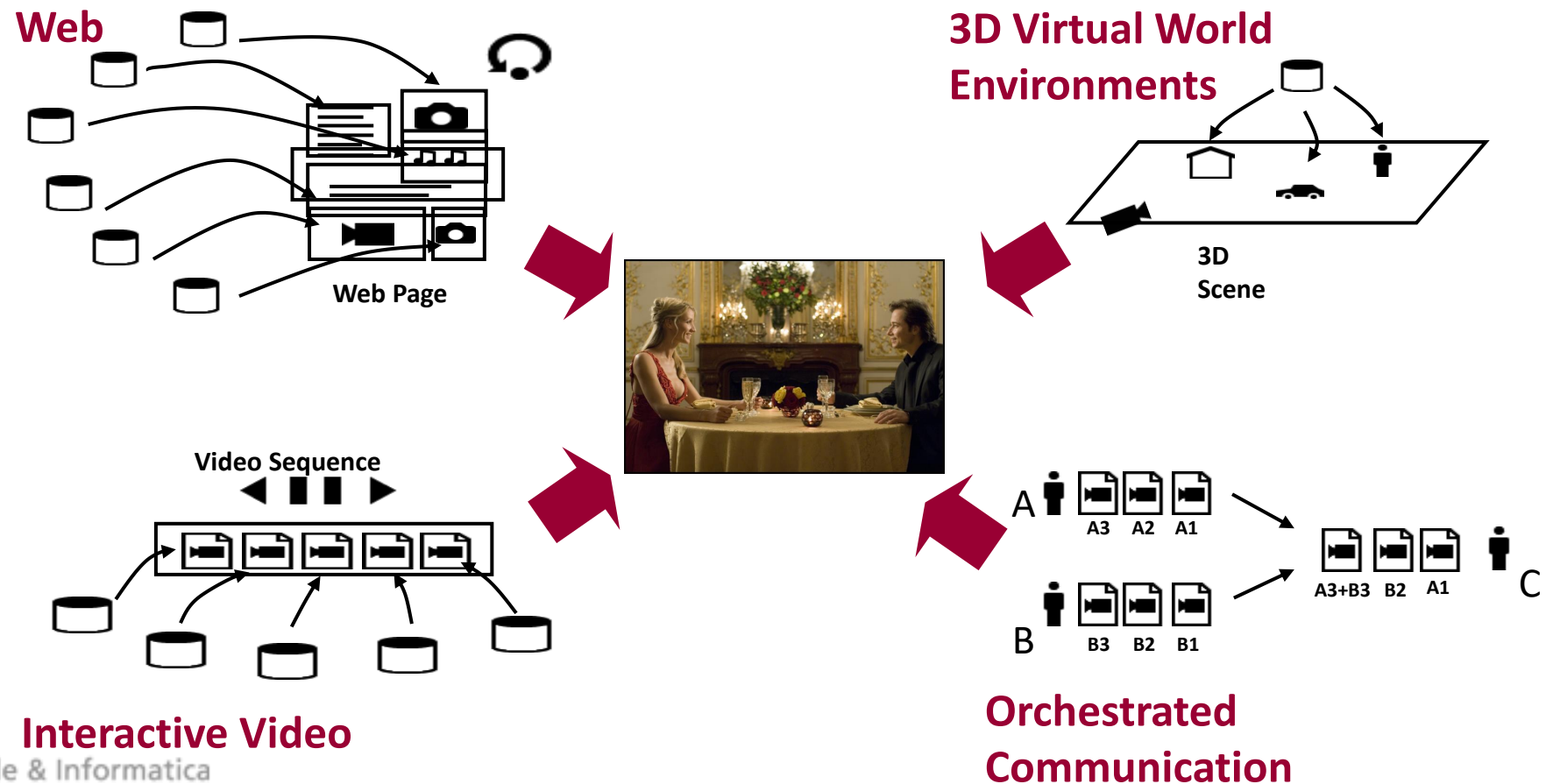
The FMIA_TT consists of the following members:

Name	Affiliation	Contributor
Jan Bouwen	Alcatel-Lucent	X
Pablo Cesar	CWI: Centrum Wiskunde & Informatica	X
Van Jacobson	Palo Alto Research Centre (PARC)	
George Pavlou	University College London (UCL)	X
Pablo Rodriguez	Telefonica R&D	
Nikos Laoutaris	Telefonica R&D	X
Gerardo Garcia	Telefonica R&D	

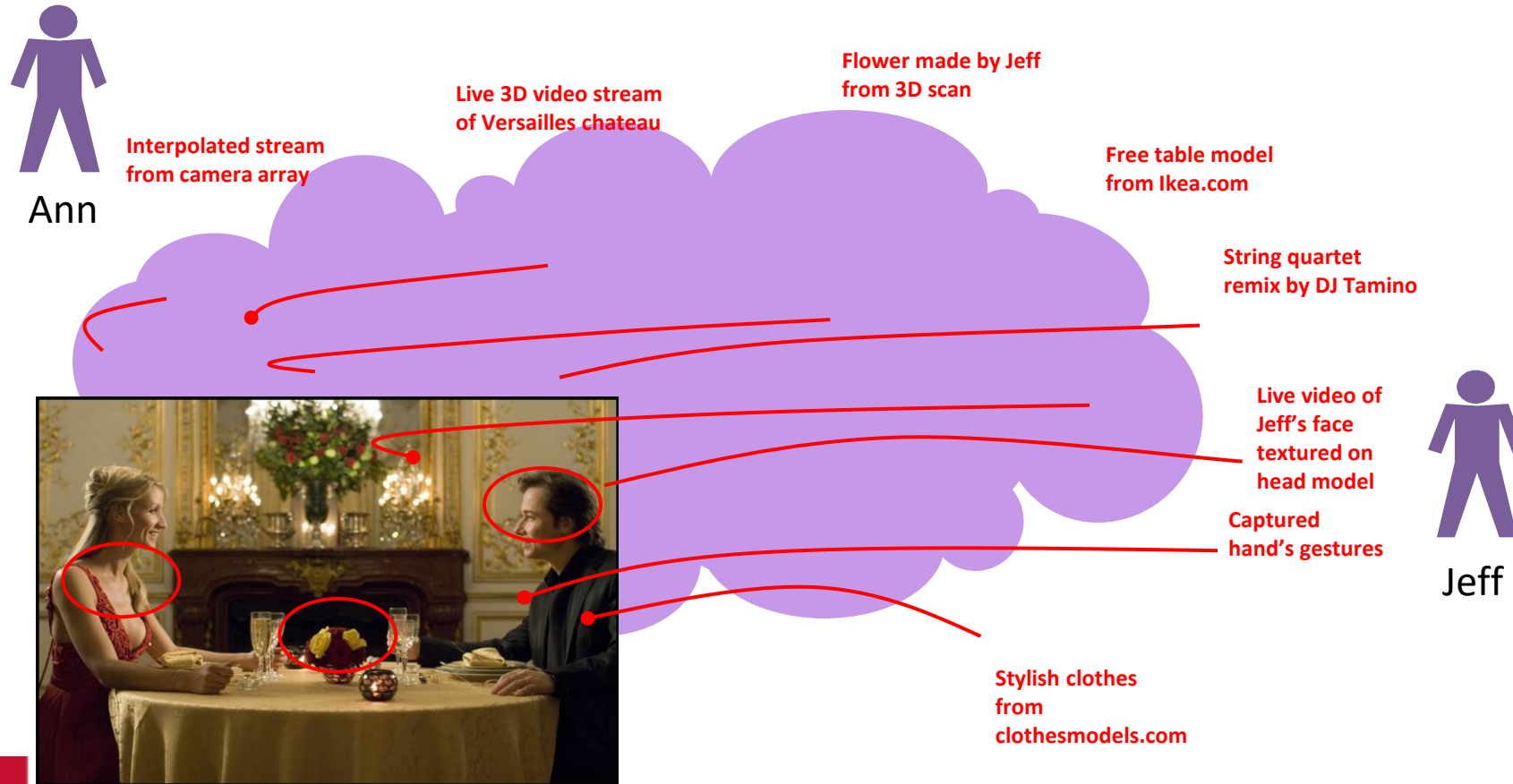
Giovanni Pau	University of California, Los Angeles	X
Christian Timmerer	Klagenfurt University	X
Olivier Festor	INRIA	X
Gonzalo Camarillo	Ericsson Research	X
Marcelo Bagnulo	Carlos III University	
Thomas Steiner	Google	X
Amar-Djalil Mezaour	Exalead	X
Sergios Soursos	Intracom Telecom	X
Theodore Zahariadis (Editor)	Synelixis	X
Thanasis Tsiodras	Synelixis	X
Petros Daras	CERTH	X
Paul Moore	Atos Origin	X
Ebroul Izquierdo	Queen Mary University London	X
Tomas Piatrik	Queen Mary University London	X
Federico Alvarez	Technical University of Madrid	X
Maria Alduan	Technical University of Madrid	X
Isidro Laso	European Commission	

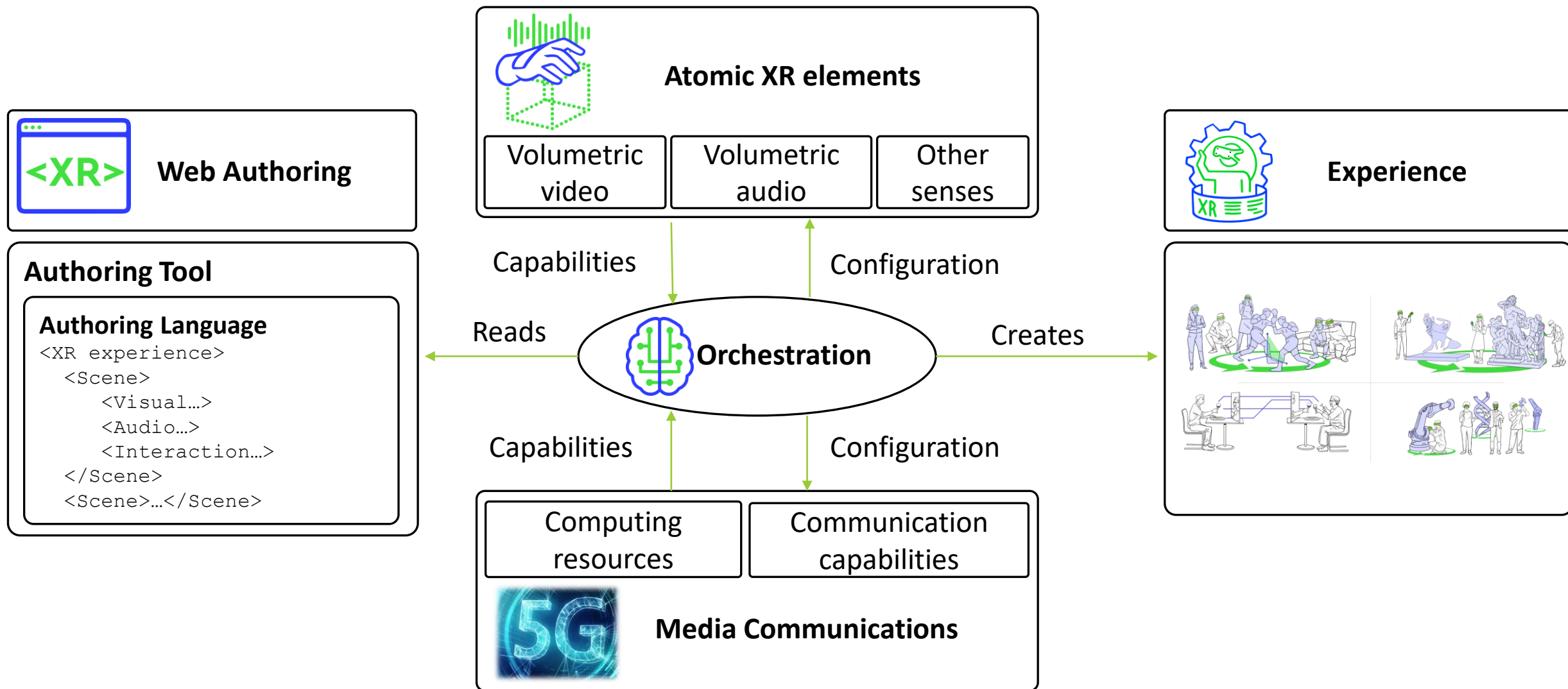
Table 1. Future Media Internet Architecture Think Tank - Members list

Future Media Internet Architecture Think Tank European Commission (2010)

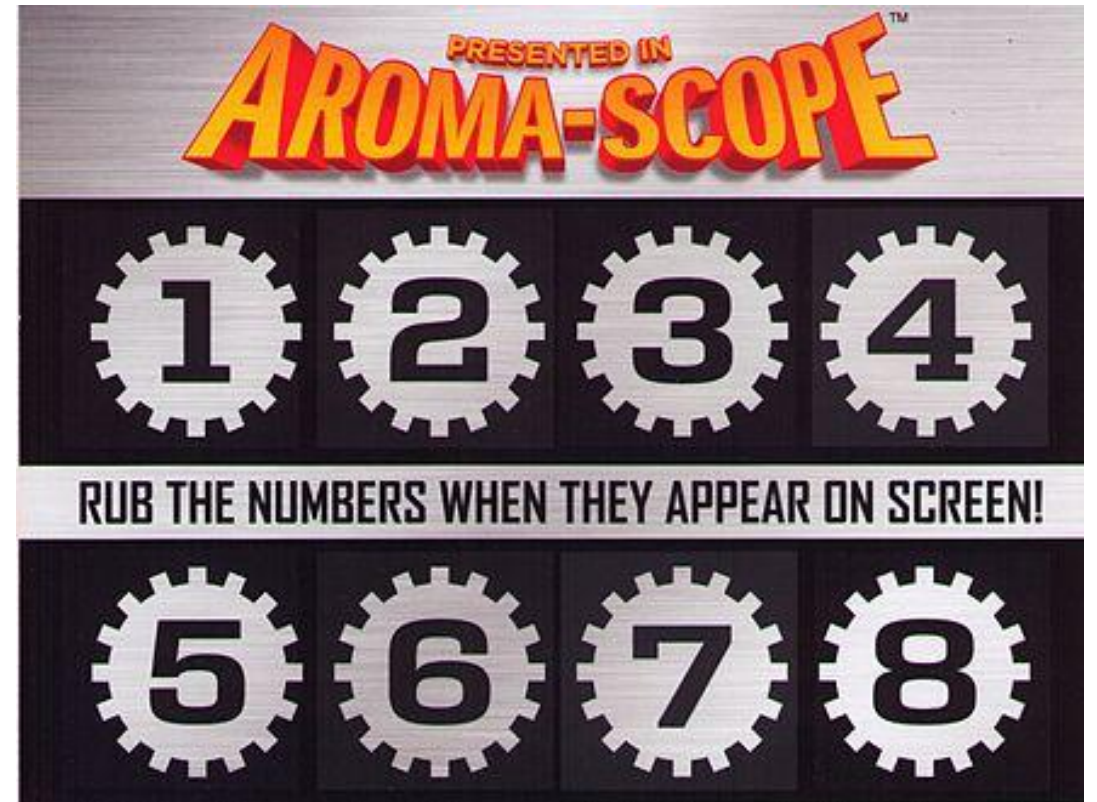


Future Media Internet Architecture Think Tank European Commission (2010)





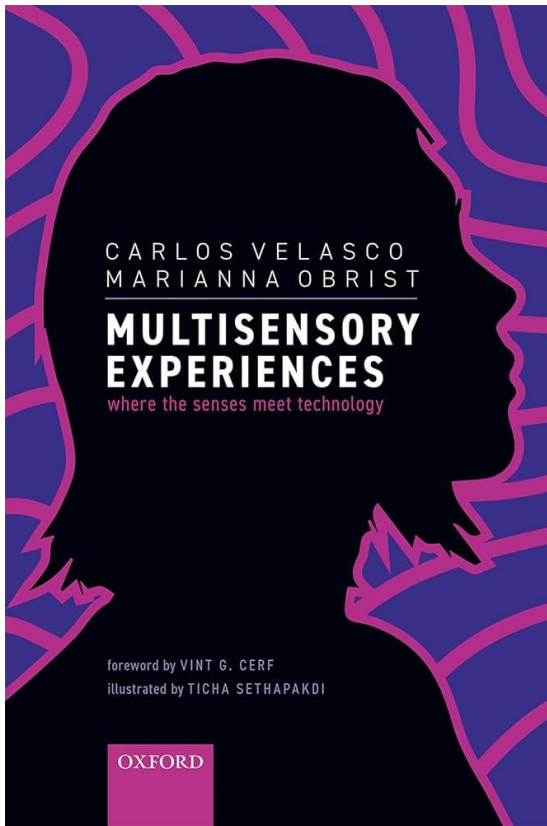
Multi-Sensory



Multi-Sensory



Multi-Sensory



Volumetric Audiovisual Content

Immersive enough?



<https://www.dailydot.com/parsec/star-wars-jedi-telecommuting-holograms-fan-theory/>

Volumetric Audiovisual Content: avatars



Realistic enough?

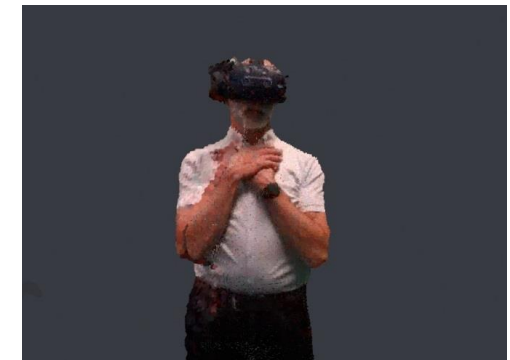
Volumetric Audiovisual Content: inspiration



Renata M. Sheppard, Mahsa Kamali, Raoul Rivas, Morihiko Tamai, Zhenyu Yang, Wanmin Wu, and Klara Nahrstedt. Advancing interactive collaborative mediums through tele-immersive dance (TED): a symbiotic creativity and design environment for art and computer science. ACM Multimedia 2008

Volumetric Audiovisual Content

Point clouds as a capture format, which can be later being rendered in other formats (meshes, point clouds...)



Volumetric Audiovisual Content

Like Video delivery in the 1990s

Amount of data

- Compression techniques
- Synchronization and real-time

Adaptation

- Tiling, optimization

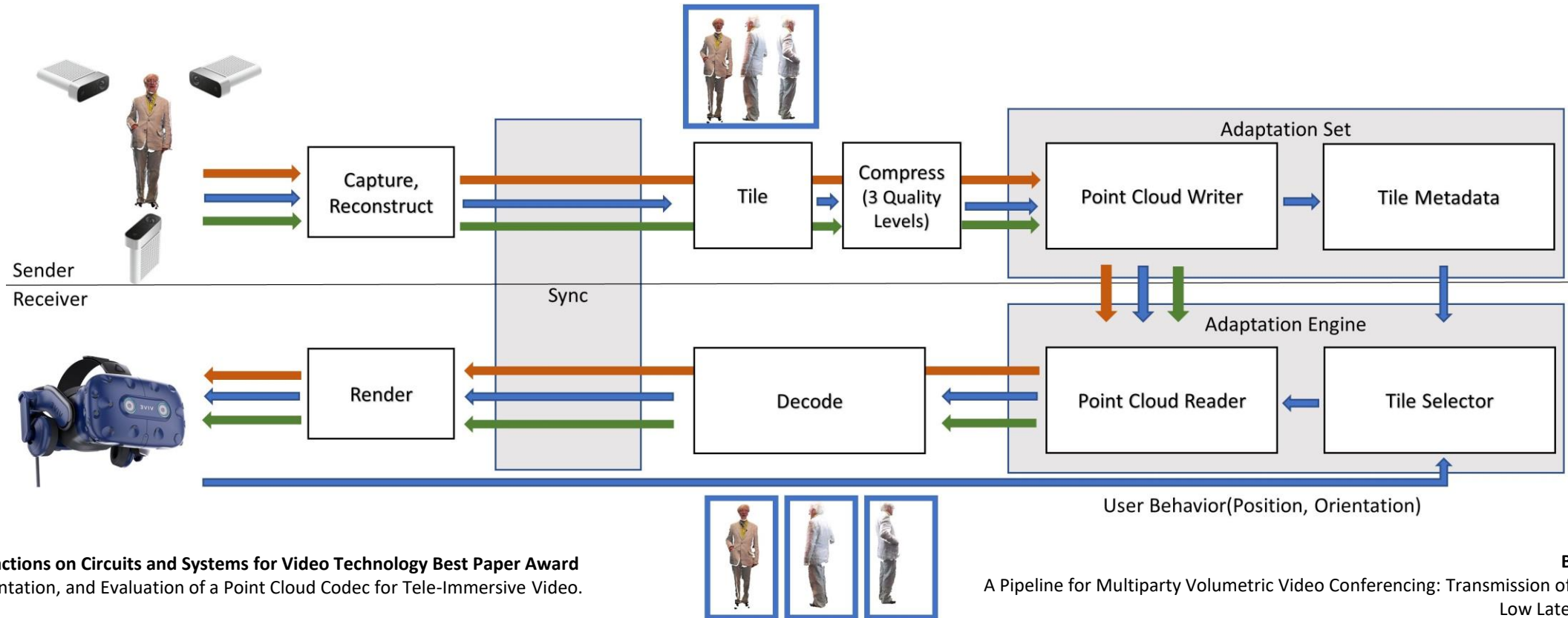
Perceived quality and evaluation

- Objective metrics

Datasets and integrated systems for comparison and benchmarking purposes



Volumetric Audiovisual Content: VR2Gather



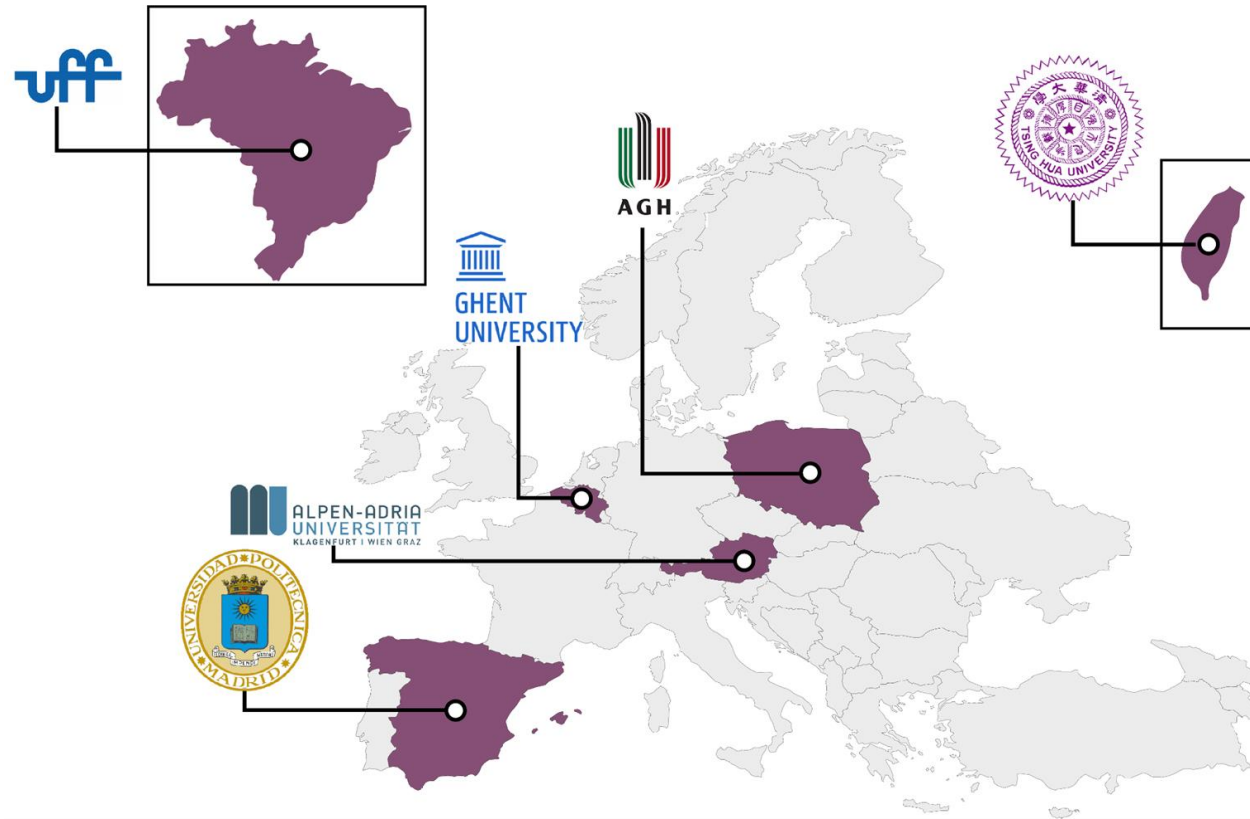
2020 IEEE Transactions on Circuits and Systems for Video Technology Best Paper Award
Design, Implementation, and Evaluation of a Point Cloud Codec for Tele-Immersive Video.

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Best Demo Awards
A Pipeline for Multiparty Volumetric Video Conferencing: Transmission of Point Clouds over Low Latency DASH. MMSys
Mediascape XR: A Cultural Heritage Experience in Social VR. ACM Multimedia

Volumetric Audiovisual Content: VR2Gather



Volumetric Audiovisual Content: VR2Gather



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BEELD EN GELUID

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Final Thoughts: volumetric video in real environments

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VR INSTALLATION: FASHION BENEATH THE SKIN

Would you like to discover what is hidden in the archives of museums?

In the social VR installation: Fashion Beneath the Skin we take you into the history of fashion. We show garments from the Central Museum, Kunstmuseum Den Haag and Zaans Museum archive. Amplified with archival material from the collection of Sound & Vision. A unique experience in which you can explore every detail down to the smallest detail!

VR INSTALLATIE

26 - 28 June
10:00 - 17:00

NB! The total number of people who can visit this VR installation is very limited, so reserve a time slot of your choice in advance. Are you planning to visit the installation together? Then reserve a spot for each person. You can reserve a maximum of two spots.

Beeld & Geluid, Hilversum



[Media Parkboulevard 1](#)
[1217 WE Hilversum](#)

MELD JE AAN!



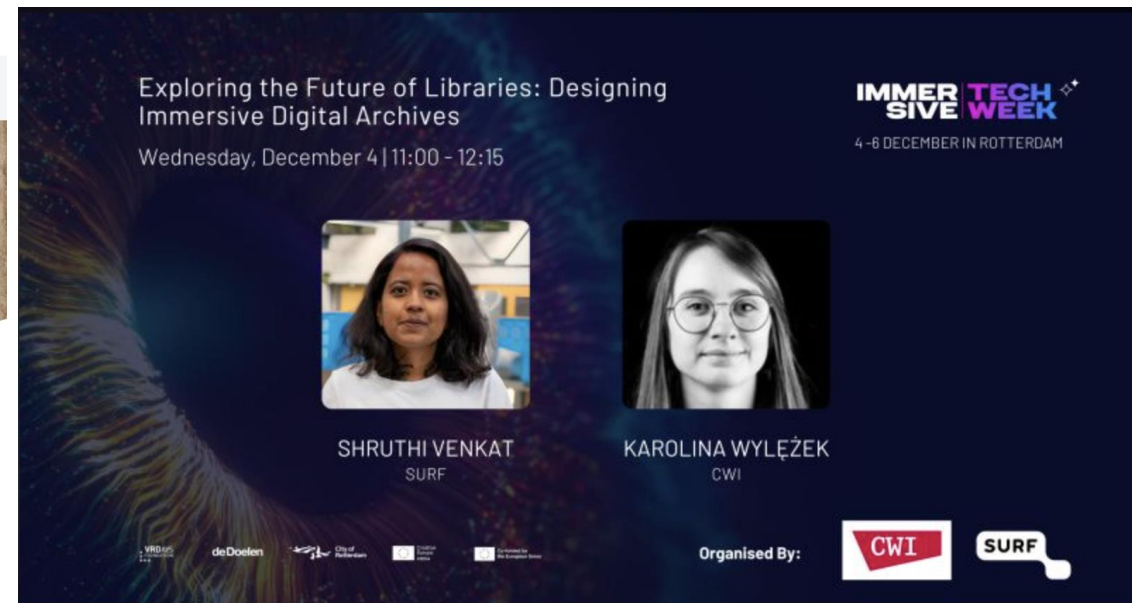
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Final Thoughts: volumetric video in real environments



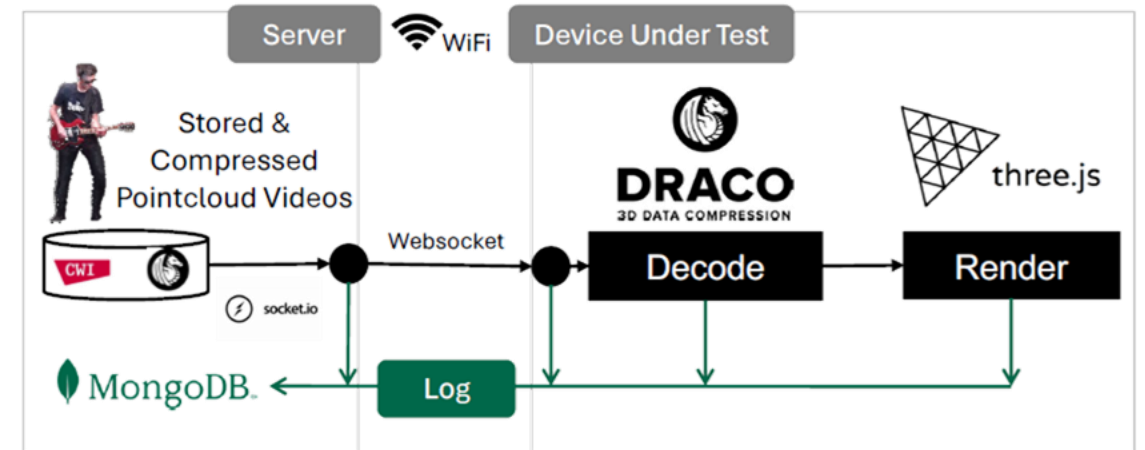
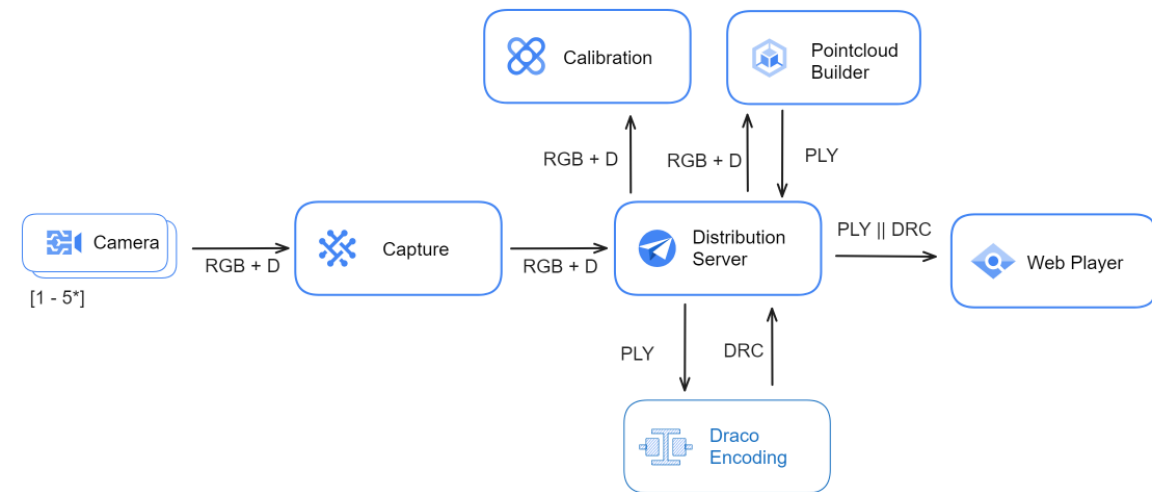
Alba amicorum



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Final Thoughts: volumetric video in the web



Final Thoughts: Dagstuhl

The screenshot shows the top navigation bar of the Dagstuhl Reports website with links for DROPS, SERIES, JOURNALS, CONFERENCES, and ABOUT DROPS. A search bar is on the right. Below the navigation bar, the document title is 'Social XR: The Future of Communication and Collaboration (Dagstuhl Seminar 23482)'. The authors listed are Mark Billingham, Pablo Cesar, Mar Gonzalez-Franco, Katherine Isbister, Julie Williamson, Alexandra Kitson, and all authors of the abstracts in this report. The article is part of Dagstuhl Reports, Volume 13, Issue 11. The license is Creative Commons Attribution 4.0 International license. The publication date is 2024-04-19. On the right side of the article preview, there is a PDF icon. Below the article preview, there is a 'Cite As' section with the citation text: 'Mark Billingham, Pablo Cesar, Mar Gonzalez-Franco, Katherine Isbister, Julie Williamson, and Alexandra Kitson. Social XR: The Future of Communication and Collaboration (Dagstuhl Seminar 23482). In Dagstuhl Reports, Volume 13, Issue 11, pp. 167-196, Schloss Dagstuhl – Leibniz-Zentrum für Informatik (2024) https://doi.org/10.4230/DagRep.13.11.167'. There is also an 'Abstract' section.

Mark Billingham, Pablo Cesar, Mar Gonzalez-Franco, Katherine Isbister, Julie Williamson, and Alexandra Kitson. 2024. Social XR: The Future of Communication and Collaboration. *Dagstuhl Reports*.

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1. Subjectivity of scientific evaluation of empathy
2. Ethical concerns of sharing physiological data and social XR relationships
3. Ethics of the growing digital divide
4. Blending realities, beyond visual and audio
5. Semantic understanding of the physical and social context
6. Social stitching to create a cohesive scene or world
7. Preserving privacy given the increasing fidelity of capture devices
8. Tension between transparency and social superpowers
9. Devising a shared platform that facilitates collaborative recording, replaying, and immersive experiences
10. New metrics and questionnaires for social XR

Contact Information



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