

TF: Optimization and Adaptation of 3D Image and Video Coding

Caroline Conti

Rome, February 5th, 2015

Objectives

- To identify the **current challenges on 3D media coding**, taking into account emerging types of 3D content, namely super-multiview and light-field content
- To define at least one **STSM collaboration** in order to explore enhancement methods for robust delivery of 3D media
- To promote **joint publications** on 3D image and video coding

Members and Researching Areas

Carl Debono
Eduardo Silva
Luís Lucas
Nuno Rodrigues
Sérgio Faria

Marek Domanski
Péter Kovács
Tomasz Grajek

Caroline Conti
Cristian Perra
Mårten Sjöström
Luís Ducla Soares
Paulo Nunes
Pedro Assunção
Pedro Correia

3D Video plus Depth

Light Field Super-Multiview (SMV)

Light Field with Microlens Array

Initial Work Plan

- STSM aiming at producing joint papers
- A joint paper on “Trends and challenges on 3D visual coding”

Meeting Agenda

- Update schedule to finalize the three book chapters
- Plans for the final 3D-ConTourNet Meeting (March 21st - 23rd)
 - Gathering information (STSMs and joint publications)
 - WG / Task Force presentation
- Discuss about possible new STSMs and joint publications
- Discuss about our participation in the forthcoming “ICME Grand Challenge on Light-Field Image Compression”

Outcomes – STSMs

- 1. Ricardo Monteiro** (ISCTE – Instituto Universitário de Lisboa, Portugal)
Host Institution: Poznan University of Technology, Poland
Title: ""
Period: (Plan to 2016)
- 2. Tomasz Grajek** (Poznan University of Technology, Poland)
Host Institution: Instituto de Telecomunicações, Leiria, Portugal
Title: "Compression of Light Field Images with help of 3D-HEVC"
Period: September 20th – 26th, 2015
- 3. Krzysztof Wegner**(Poznan University of Technology, Poland)
Host Institution: Instituto de Telecomunicações, Leiria, Portugal
Title: "Compression of Light Field Images with help of 3D-HEVC"
Period: September 20th – 26th, 2015
- 4. Krzysztof Wegner** (Poznan University of Technology, Poland)
Host Institution: Holografika Kft, Budapest, Hungary
Title: "Processing and displaying of natural content on super multiview / light field displays"
Period: August 23rd – 29th, 2015
- 5. Pradip Paudyal** (Università degli Studi Toma TRE, Rome, Italy)
Host Institution: ISCTE – University Institute of Lisbon, Portugal
Title: "Watermarking in Light Field Images"
Period: July 13rd – 24th, 2015
- 6. Cristian Perra** (University of Cagliari, Italy)
Host Institution: Instituto de Telecomunicações, Leiria, Portugal
Title: "Robust coding of holoscopic video for heterogeneous networks"
Period: February 16th – 27th, 2015

Outcomes – Joint Publications

1. C.J. Debono , P.A. Assunção , 3D Video Coding and Transmission , *Xjenza Online - Journal of The Malta Chamber of Scientists* , Vol. 3 , No. 2 , pp. 183 - 188 , December, 2015.
2. L. Lucas , KW Wegner , Nuno M. M. Rodrigues , C.L.P. Pagliari , E. Silva , S.M.M. Faria , Intra Predictive Depth Map Coding using Flexible Block Partitioning , *IEEE Trans. on Image Processing* , Vol. 24 , No. 11 , pp. 4055 - 4068 , November, 2015.
3. A. Vieira, H. Duarte, C. Perra, L. Tavora, and P. Assuncao, “Data formats for high efficiency coding of Lytro-Illum light fields,” in *2015 International Conference on Image Processing Theory, Tools and Applications (IPTA)*, 2015, pp. 494–497.
4. R. Monteiro , C. Conti , P. Nunes , Nuno M. M. Rodrigues , S.M.M. Faria , L. D. Soares , HEVC Compatible 3D Holoscopic Image Coding using Multiple Partitions ,in *10th Conference on Telecommunications Conftele* , Aveiro , Portugal , Vol. 1 , pp. 1 - 4 , September, 2015.

Outcomes – Book Chapter 1

- **Title:** “Emerging Imaging Technologies: Trends and Challenges”

TABLE OF CONTENTS

STATUS

1 Introduction	-
1.1 Context And Motivation	-
1.2 MV-HEVC and 3D-HEVC standards	-
1.3 Current Activities of Standardization Bodies	1st Draft
2 3D Video plus Depth	1st Draft
3 Lightfield Super-Multiview with Camera Array	1st Draft
4 Lightfield with Microlens Array	1st Draft
5 Conclusions	-

Outcomes – Book Chapter 2

- **Title:** “Efficient Depth-based 3d Video Representation and Coding”

TABLE OF CONTENTS

STATUS

1 Introduction	-
2 Scalable Depth Image Coding Using Depth Edges and Diffusion	0%
3 Predictive Depth Map Coding for Efficient Virtual View Synthesis	1 st Draft
4 Depth Compression Using Standard Coding Techniques	1 st Draft
5 Multiview Video Compression for Arbitrary Camera Locations	1 st Draft
6 Conclusions	-

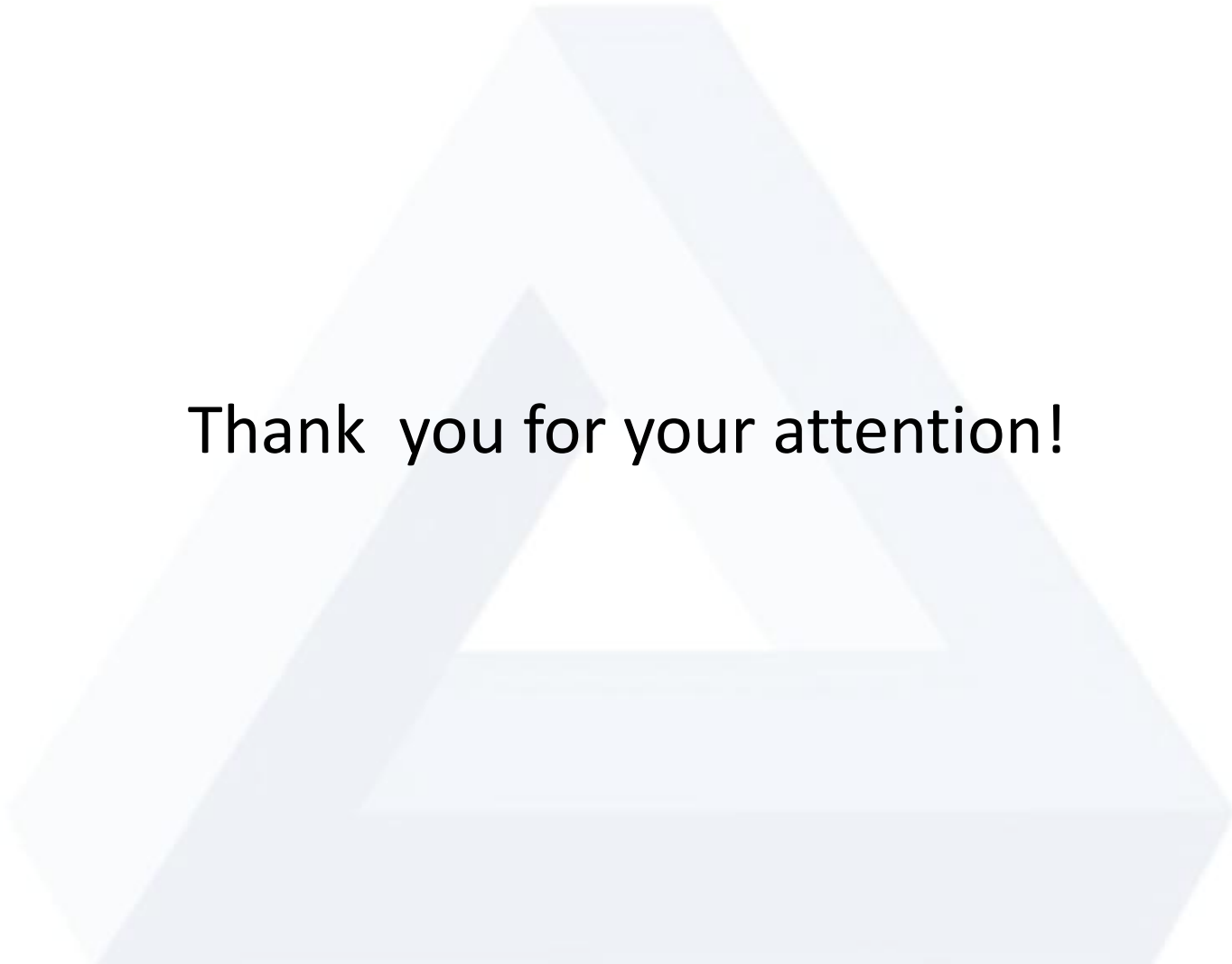
Outcomes – Book Chapter 3

- **Title:** “Lightfield Image and Video Compression”

TABLE OF CONTENTS

STATUS

1 Introduction	-
2 Image Coding Formats for Lightfield Photography	1 st Draft
3 Lightfield Image Coding using Multiple Hypothesis Displacement Intra Prediction	0%
4 HEVC-Compliant Scalable Lightfield Coding using Inter-Layer and Displacement Intra Prediction	1 st Draft
5 Sparse Set of Elementary Images and Disparities for an Efficient Scalable Coding of Lightfield Images	0%
6 Lightfield Video Coding for Efficient Random Access	Canceled
7 Conclusions	-



Thank you for your attention!