GPU-WEAR

Ultra-low power heterogeneous GPUs for Wearable/IoT devices

Deliverable D7.4

Final Project Periodic Report

WP 7 : "Management"

This project has received funding from the European Union's Horizon 2020
research and innovation program under grant agreement No 717850

Document Information

Title:	Final Project Periodic Report
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Doc ID:	D7.4
Work Package:	WP 7 - "Management"
Dissemination Level:	Public

Amendment History

Version	Date	Description/Comments	Author/Contributors
0.1	19/11/2018	Document structure, and template	Georgios Keramidas
0.2	20/11/2018	First version of Executive Summary section	Georgia Protogerou
0.3	22/11/2018	First version of Work Progress section	Georgia Protogerou
0.4	23/11/2018	Feedback section	Georgios Keramidas
0.5	23/11/2018	Exploitation and Dissemination section	Georgia Protogerou
0.6	26/11/2018	Project Management section	Georgia Protogerou
0.61	28/11/2018	Review	George Sidiropoulos
0.62	28/11/2018	Review	Georgios Keramidas
0.63	28/11/2018	Review	Iakovos Stamoulis
0.64	28/11/2018	Review	Ulli Mueller
0.7	30/11/2018	Address various review comments	Adamadia Patelaki
0.71	30/11/2018	Address various review comments	Georgios Protogerou
0.72	03/12/2018	Updates in various sections	Georgios Keramidas
0.8	04/12/2018	First complete version	Georgios Keramidas
1.0	04/12/2018	Final version generated	Georgios Keramidas

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1 Introduction

This report summarizes the activities and the progress of GPU-WEAR project within the third reporting period (M25-M30). An overview of the resource usage during the given period is also provided.

Important note: During the amendment process, this deliverable (Final Project Periodic Report) classified erroneously as "PUBLIC". However, various parts of deliverable D7.4 contain confidential information. After consulting the Project Officer about this issue, her suggestion was to include the confidential information in another deliverable that is classified as "Confidential, only for members of the consortium (including the Commission Services)". Thereupon, the confidential information of D7.4 is included in the Appendix A of Deliverable D6.12. In all cases and in order to ease the reviewer(s), appropriate references between the two deliverables are provided.

2 Executive Summary

2.1 Project Objectives

2.1.1 Project Objectives Addressed During the period

Reaching the level of power consumption, required by Wearables/IoT devices, represents a technological challenge demanding a multidisciplinary design methodology spanning circuits, architectural, compiler, and API-level power efficient techniques to work in a seamless fashion. In the rest of this section, we provide the definition of these objectives (as presented in the DoW) and we present the final state of these objectives.

2.1.1.1 Objective 1: Realize a family of novel heterogeneous embedded GPUs referred to as NEMA®|tS

See Section 2.1.1.1 in Appendix A of Deliverable D6.12.

2.1.1.2 Objective 2: Investigate and establish effectiveness of power reduction techniques in a holistic way

See Section 2.1.1.2 in Appendix A of Deliverable D6.12.

2.1.1.3 Objective 3: Develop a transparent to the programmer, display-aware, QoS-aware graphics library referred to as GPU-WEAR-LIB

See Section 2.1.1.3 in Appendix A of Deliverable D6.12.

2.1.1.4 Objective 4: Optimize NEMA®|tS GPU for GPGPU soft real-time applications

See Section 2.1.1.4 in Appendix A of Deliverable D6.12.

2.1.1.5 Objective 5: Release GPU-WEAR-SDK to the Open Community and support its adoption

See Section 2.1.1.5 in Appendix A of Deliverable D6.12.

2.1.1.6 Objective 6: Set foundations for commercial exploitation

See Section 2.1.1.6 in Appendix A of Deliverable D6.12.

2.2 Summary of Deliverables and Milestones for the Period

2.2.1 Deliverables

The main achievements of the third reporting period are published in the deliverables submitted within the third period of the project:

- D1.4 "Third Version of Nema|tS ISA & Nema|tS LLVM Data Sheets"
- D2.4 "Third Report on Architectural-level Energy Optimization Techniques"
- D3.4 "Final Version of GPU-WEAR-LIB and Runtime Data Sheet with support for GPGPU computing"
- D4.4 "Report on HW & SW Components for GPGPU Acceleration in NEMA® GPUs"
- D5.6 "Second Report on GPU-WEAR-SDK Adoption by Open Community"
- D5.7 "Final Version on GPU-WEAR Hardware (FPGA) Integration"
- D5.8 "Final Version of GPU-WEAR-SDK Demonstrator and GPU-WEAR-SDK Data Sheet"
- D6.9 "Third Collateral Supporting Product Soft launch"
- D6.10 "Final Press Release"
- D6.11 "Fourth Version of Updated Business Plan"
- D6.12 "Final Report on Exploitation, Communications, and IPR Management Activities"
- D7.3 "Final Project Report"
- D7.4 "Final Project Periodic Report"

2.2.2 Milestones

See Section 2.2.2 in Appendix A of Deliverable D6.12.

2.3 Organization changes and Employment Creation

2.3.1 Project Management Structure

The existing management organization of the company is used to run the project. Given the fact that new senior engineers joint the company, the updated structure of the GPU-WEAR management is depicted in Table 6.

Project Coordinator	George Sidiropoulos
Scientific & Quality Manager	Georgios Keramidas
Technical Manager	Iakovos Stamoulis
Business Developing Manager	Ulli Mueller
TSi Advisory Board	Gideon Intrater Stefanos Sidiropoulos
GPU Advisory Board	Christos Kozyrakis Andrew Richards Costis Kompis
WP1 Manager	Nick Stavropoulos
WP2 Manager	Chrysa Kokkala
WP3 Manager	Dimitrios Georgakakis
WP4 Manager	Georgios Keramidas
WP5 Manager	Iakovos Stamoulis
WP6 Manager	Ulli Mueller
WP7 Manager	George Sidiropoulos

Table 6: Updated governance structure

2.3.2 Employment Creation

Table 7 illustrates the current employees of the company and their position.

Position	Before GPU-WEAR		1st Reporting Period		2nd Reporting Period		3rd Reporting Period	
	Number of Employees	Percentage	Number of Employees	Percentage	Number of Employees	Percentage	Number of Employees	Percentage
Software Engineers	6	42.86%	9	42.86%	11	37.93%	11	37.93%
Hardware Engineers	4	28.57%	6	28.57%	7	24.14%	7	24.14%
IT Administrator	1	7.14%	1	4.76%	1	3.45%	1	3.45%
Technical Writer		0.00%	1	4.76%	1	3.45%	1	3.45%
Marketing Managers	2	14.29%	2	9.52%	3	10.34%	3	10.34%
Sales Representatives		0.00%		0.00%	4	13.79%	4	13.79%
Administrative Assistants	1	7.14%	2	9.52%	2	6.9%	2	6.9%
Total	**14**	**100%**	**21**	**100%**	**29**	**100%**	**29**	**100%**

Table 7: Think Silicon's employees

A detailed list of the company's number of employees since the start of the project can be found in deliverable D6.12.

2.3.2.1 Gender Breakdown

As far as the gender breakdown of the company employees is concerned, Figure 1 illustrates the evolution of the percentage of employees by gender from the beginning of the project.

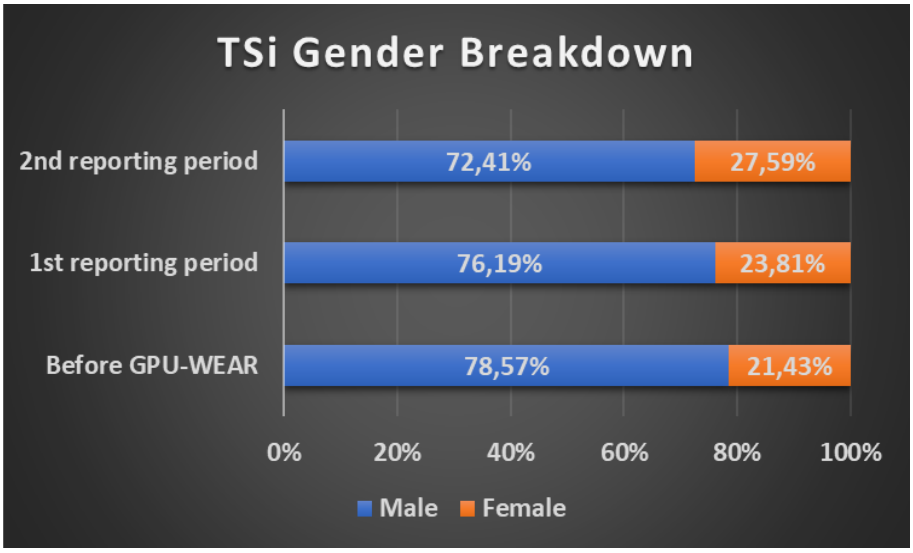

Figure 1: TSi gender breakdown from the beginning of the GPU-WEAR project

As it is obvious the number of female employees of the company from the beginning of the project is

constantly increasing. In particular, the number of female employees has increased by 28.74% compared to the beginning of the project. According to data from Eurostat, the share of ICT employment that was accounted for by women stood at 16.7% in 2016, hence the related figures for Think Silicon are well above the industry's average.

2.3.2.2 Sales Team

Think Silicon's world-wide sales network consists of highly experienced IP sales people with a successful track record in companies like MIPS, Synopsys, Infineon. A highly experienced Solution Architect is collaborating with the sales forces securing the successful pre-sales process as long as orchestrating the successful integration of Think Silicon IP in to customer chip after the sale. In what follows brief information about our sales representatives and solution architect is provided.

- **Solution Architect**: Chris Berg, experience: Solution Architect at MIPS
- **US, North America Sales Representative**: Roger Milton. former VP of sales, N. America at MIPS. Roger has 25+ years of achieving superior results in revenue generation, design wins, business strategies and building partnerships for semiconductor, embedded technology and IP licensing companies. Founded and managed a $6 million early stage investment fund. Adept at orchestrating complex technical sales campaigns, analyzing ROI and structuring deals. Excellent communications skills with C level through individual contributor level.
- **Germany, EMEA Sales Representative**: Stefan Buchmann. Former VP of Sales Europe, Israel and India at MIPS. Stefan has 25+ years of experience in semiconductor software and intellectual property sales and licensing.
- **Sales Representative in Taiwan**: Grace Lin, former Taiwan Country Manager at MIPS. Grace has 16 years of experience in semiconductor software, networking SoC and IP including CPU, GPU and Analog IP sales and licensing, proven experiences in operating high-tech and Semiconductor IP business units and international sales organizations, proven records for closing various and complex business deals and deep understanding of Taiwan IC design house with global views of industry.
- **Sales Representative in Japan**: Christos Makiyama is the founder and president of Silicon Planet, a marketing and business development firm, he founded in 2001 to help technology companies transform the way they innovate and market their products to succeed in the new globalization paradigm. Since then, he has been advisor to corporations such as NTT, Oki Electric, ImageOne, Paltek refer technology strategy, new business development and international partnerships. As also, he has been helping emerging technology companies in the areas of semiconductor, networking, mobile, internet services and clean tech to develop their business in Japan and raise funds from strategic investors. Christos is a member of the Japan Semiconductor Venture Association, Seiwajyuku among others.

3 Work Progress and Achievements

3.1 Explanation of the Work Carried out per Work Package

3.1.1 WP 1: GPU ISA Optimizations & Compiler Development

See Section 3.1.1 in Appendix A of Deliverable D6.12.

3.1.2 WP 2: Hardware-level Energy Efficiency Enhancements

See Section 3.1.2 in Appendix A of Deliverable D6.12.

3.1.3 WP 3: GPU-WEAR-LIB with QoS & GPU-WEAR Runtime System

See Section 3.1.3 in Appendix A of Deliverable D6.12.

3.1.4 WP 4: GPU Extensions for Emerging Application Domains & GPU Virtualization

See Section 3.1.4 in Appendix A of Deliverable D6.12.

3.1.5 WP 5: Integration, Validation & SDK Contribution to Open Community

See Section 3.1.5 in Appendix A of Deliverable D6.12.

3.1.6 WP 6: Commercialization & Communication

See Section 3.1.6 in Appendix A of Deliverable D6.12.

3.1.7 WP 7: Management

See Section 3.1.7 in Appendix A of Deliverable D6.12.

3.2 Impact

See Section 3.2 in Appendix A of Deliverable D6.12.

4 Follow-up of Recommendations and Comments from Previous Review

See Section 4 in Appendix A of Deliverable D6.12.

5 Update of the Plan for Exploitation and Dissemination of Results

See Section 5 in Appendix A of Deliverable D6.12.

6 Data Management Plan

The GPU-WEAR project does not participate to the research data pilot.

7 Project Management During the Period

See Section 7 in Appendix A of Deliverable D6.12.