DELIVERABLE REPORT D3.6

DELIVERABLE

SUBMISSION DATE	NAME OF THE DELIVERABLE	WORK PACKAGE
28.6.2019	Updated Quality Management Plan	WP3
NATURE	AUTHOR(S)	LEAD BENEFICIARY
Public	Božena Čechalová (BUT)	BUT

PROJECT DETAILS

PROJECT ACRONYM	PETER	GRANT AGREEMENT	767227
CALL IDENTIFIER	H2020-FETOPEN-1-2016-2017	PROJECT DURATION	1.1.2018 – 31.12.2020
PROJECT OFFICER	Maciej Lopatka	PROJECT COORDINATOR	Tomáš Šikola (BUT)
CONSORTIUM PARTNERS	Brno University of Technology	COUNTRY	Czech Republic
	Universität Stuttgart		Germany
	CIC nanoGUNE		Spain
	Thomas Keating Ltd.		United Kingdom

QUALITY CONTROL ASSESSMENT SHEET

VERSION	DATE	DESCRIPTION	NAME
v0.1	31. 5. 2019	Draft	Božena Čechalová
v0.2	16. 6. 2019	Review	Consortium meeting
v1.0	28. 6. 2019	Submission	Božena Čechalová

DISCLAIMER

ACKNOWLEDGEMENT

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LIST OF ABBREVIATIONS

BUT	Brno University of Technology
EPR	Electron Paramagnetic Resonance
MS	Milestone
NGU	CIC NanoGUNE
PETER	Plasmon Enhanced Terahertz Electron Paramagnetic Resonance
PM	Project Manager
PS	Plasmonic structures
PSC	Project Steering Committee
QMP	Quality Management Plan
REA	Research Executive Agency (EU)
TK	Thomas Keating Ltd.
THz	Terahertz
USTUTT	University of Stuttgart
WP	Work Package

1. SUMMARY

The purpose of this document is to update the Initial Quality Management Plan of the PETER project, submitted to the REA in M3 (29. 3. 2018) and approved after the 1st Review meeting (17. 5. 2019). The report outlines the up-to-date schedule of milestones and deliverables, an update on the Quality Assurance Activities, a summary of the results of the 1st Review meeting, an overview of the Risk Management for the 1st reporting period of the project (M1 – M12) and an outlook of the Risk Assessment for the 2nd project period (M13 – M36).

2. INTRODUCTION

2.1 Objectives and tasks of the Quality Management

The Quality Management of the PETER project falls under the umbrella of the Work Package 3 "Management, Communication, Dissemination and Exploitation" and it consist in part of the task T3.1 (Management).

The specific objectives of the task T3.1 are:

- Quality management
  - Defining and updating the Quality Management Plan (QMP)
  - Introducing formal processes for the project life-cycle, its evaluation and control according to the quality standards
- Risk management – identification, evaluation and management of problems and risks to secure a timely execution of the project
- Coordination and day-to-day management
- Organisation of meetings (kick-off, mid-term, and final)

The workload within this task is distributed over the whole duration of the project (M1–M36).

The risk management process consists of the following steps:

- Risk identification and characterization
- Risk evaluation (qualitative and quantitative)
- Risk prioritization
- Risk response planning – mitigation strategies and contingency planning
- Risk controlling, monitoring and reporting

The outcomes of the risk management are summarised within the Periodic reports (interim and final). The Project Manager is responsible for risk analysis.

2.2 Report structure

The Updated QMP of the PETER project includes the following sections:

- Update on Quality Control Activities – an overview of the submitted deliverables and reached milestones, together with an adjusted schedule of the next deliverables and milestones. An overview of results of the 1st Review Meeting is included.
- Update on Quality Assurance Activities - description of the tools used for collaboration in the project and the updated results of the Risk Assessment and Risk Management.

3. UPDATE ON QUALITY CONTROL ACTIVITIES

3.1 Responsibilities

The project management structure of PETER as described in the D3.2 (Initial QMP), has not changed during the 1st reporting period. The structure of Work Packages and tasks remains the same as outlined in the Description of Action (Annex 1 of the Grant Agreement).

3.2 Deliverables and milestones

Deliverable	Title	Submitted/Due	Status
D1.1	Concept of PS	28. 6. 2018	Request for revision
D1.2	PS design for plasmon enhanced EPR	29. 12. 2018	Approved
D1.3	PS with enhanced magnetic field	M18	Submitted
D1.4	PS for PE EPR experiments in THz	M18	Submitted
D1.5	Proof-of-concept samples of PE EPR spectroscopy	M18	Delayed (expected M19)
D1.6	Plasmon-enhanced EPR experiments	M27	Not yet commenced
D1.7	Proof-of-concept samples for PE EPR microscopy	M30	Not yet commenced
D2.1	Specifications of PE EPR microscope	23. 6. 2018	Approved
D2.2	SPM unit for PE EPR microscopy: progress report	29. 12. 2018	Request for revision
D2.3	PSM unit for PE EPR microscopy: prototype	M18	Delayed (expected M20)
D2.4	Cantilever tips for PE EPR microscopy	M24	Ongoing
D2.5	Platform for PE EPR microscopy	M26	Ongoing
D2.6	Optimized cantilever tips for PE EPR microscopy	M30	Not yet commenced
D2.7	Applications of PE EPR	M36	Not yet commenced
D3.1	Project website and visual identity	16. 2. 2018	Approved
D3.2	Initial Quality Management Plan	29. 3. 2018	Approved
D3.3	Interim CDE Plan	27. 4. 2018	Request for revision
D3.4	Data Management Plan	23. 6. 2018	Approved
D3.5	Review meeting 1 (report)	25. 3. 2019	Submitted
D3.6	Updated Quality Management Plan	M18	Submitted
D3.7	Interim Project Report	M24	Not yet commenced
D3.8	Final CDE Plan	M36	Ongoing
D3.9	Scientific Communications	M36	Not yet commenced
D3.10	Open Research Data Pilot	M36	Ongoing
D3.11	Review Meeting 2 (report)	M36	Not yet commenced

The deliverables requesting revision by the REA based on the recommendations of experts participating on the 1st Review meeting are expected to be re-submitted within M19-M20. The details on the revisions are as follows:

Deliverable	Title	Requested revision
D1.1	Concept of PS	A more detailed and completed version is needed.
D2.2	SPM unit for PE EPR microscopy: progress report	It should be better highlighted the innovation part of the SPM unit and of the EPR microscope.
D3.3	Interim CDE Plan	The CDE plan is well described. For the dissemination to the scientific community it would be good to have the list of the papers and presentation to conferences achieved so far.

The deliverable D3.5 was delivered late (in M15 instead of M14) due to the actual date of the Review meeting which couldn't be organized in M14 due to unavailability of the meeting participants. In the same vein, we can reasonably expect the actual date of the 2nd Review meeting to fall behind the M36, thus causing a late delivery of D3.11.

Milestone	Title	Met/Due	Additional info
MS1	PS fabrication technology adopted	M18	See D1.3
MS2	Optimized PE THz EPR spectroscopy	M27	
MS3	SPM unit for PE THz EPR microscopy	M18	Delayed (Expected in M20)
MS4	Platform for PE THz EPR microscopy	M26	

MS5	PE THz EPR microscopy proved	M36	
MS6	Kick-off steering meeting	29. 1. 2018	https://www.peter-instruments.eu/inpage/kick-off-meeting/
MS7	First progress steering meeting	11. 12. 2018	https://www.peter-instruments.eu/inpage/progress-meeting-in-stuttgart-de/
MS8	Second progress steering meeting	M24	
MS9	Final steering meeting	M36	
MS10	Summer school	5. 10. 2018	https://www.peter-instruments.eu/inpage/summer-school/
MS11	Workshop for scientific community 1	16. – 20. 6. 2019	https://www.peter-instruments.eu/inpage/international-workshop-i/
MS12	Workshop for scientific community 2	M30	
MS13	Workshop for industrial partners	M32	
MS14	Concept of PS	13. 6. 2018	https://www.peter-instruments.eu/inpage/progress-meeting-in-billingshurst-uk/
MS15	Specifications of PE EPR microscope	13. 6. 2018	

3.3 Results of the 1st Review Meeting

The 1st Review meeting on the PETER project took place in Brno and was attended by the project Steering Committee, the Project Manager, project-related researchers and principle investigators, the Project Officer Maciej Lopatka, three external experts – Maria Losurdo, Daniela Grasso and Rüdiger Klingeler. The Innovation Radar expert Katalin Gallyas attended remotely via Skype.

The PO and the experts reviewed the Periodic report (submitted 18. 2. 2019) and the deliverables, and were presented with the latest overview of the project results (the presentations and agenda were submitted to the EC 25. 3. 2019).

The results of the Review Meeting were communicated to the Project Coordinator on the 3. 5. 2019, and were accepted with no further remarks from the Consortium. The overall project performance was deemed satisfactory, although few recommendations have been offered:

1. For the next reporting period (RP2) a clear definition of tasks and precise coordination of them between the partners/WPs is necessary to achieve the objectives of the project.

2. The consortium should ensure an equal and high quality of the project reporting (scientific/technical/other deliverables, Periodic Report) providing adequate level of detail/information to be reported.

3. The consortium should establish control points when important decisions are taken as e.g. related to the choice of approaches to be further developed for the antenna geometry, material selection and tip preparation or the choice of the substrate.

4. The consortium should increase collaboration between the consortium groups stimulating interdisciplinary knowledge exchange.

5. The deliverables D1.1, D2.2 and D3.3 need to be revised according to the comments provided in 'Annex 1 – Expert's opinion on deliverables'. They will be reviewed during next (RP2) project review.

5. The consortium should ensure Open Access and proper acknowledgement of EU funding in each publication resulting from the project.

4. UPDATE ON QUALITY ASSURANCE ACTIVITIES

4.1 Communication within the Project Consortium

A day-to-day communication within the Consortium is carried on as needed, with the minimum of monthly regular meetings organised via WebEx. The meeting results are summarised in minutes and distributed to participants via e-mail. Additionally, the project members take advantage of jointly attended conferences and workshops to discuss the project matters and review the progress.

Project Repository:

- A new **project internal repository** for sharing large files has been created by the TK on their servers allowing outside password-protected access. The paths into the PETER folder have been created for all main PETER participants. The link can be provided to relevant parties along with individually issued login info.
- Templates and **confidential presentations** from meetings – intranet section of the project website (password-protected)
- **Educational section of the project website with publicly-accessible materials** (presentations on the project-related topics aimed at students, young minds and interested public) – https://www.peter-instruments.eu/inpage/peter-education/
- PETER **ORDP repository**: https://www.researchgate.net/project/Plasmon-Enhanced-Terahertz-Electron-Paramagnetic-Resonance

Meetings:

Date (past)	Meeting (location)	Additional information
29. 1. 2018	Kick-off meeting (Brno, CZ)	https://www.peter-instruments.eu/inpage/kick-off-meeting/
12.-13. 6. 2018	Progress meeting (Billingshurst, UK)	https://www.peter-instruments.eu/inpage/progress-meeting-in-billingshurst-uk/
2. 10. 2018	Status meeting (Brno, CZ)	https://www.peter-instruments.eu/inpage/brno-october-2018-status-meeting/
11.–12. 12. 2018	1st Progress Steering Meeting (Stuttgart, DE)	https://www.peter-instruments.eu/inpage/progress-meeting-in-stuttgart-de/
25. 3. 2019	First Review Meeting (Brno, CZ)	https://www.peter-instruments.eu/inpage/peter-first-review-meeting/
16-20. 6. 2019	Status meeting (Kleinwalsertal, AT)	During the 1st PETER International Workshop for scientific community
Date (planned)	**Meeting (location)**	**Additional information**
1.-2. 10. 2019	Progress meeting (Stuttgart, DE)	-

Other regularly planned meetings (Progress Steering meetings and Review meetings) will follow the schedule as outlined in the Milestones table (see section 3.2).

4.2 Update on Risk Management

The risks both foreseen and arisen unexpectedly during the 1st reporting period (RP1) have been monitored, assessed and mitigated using measurements outlined in the Risk Management Log below (status at the submission date of this report):

Risk (foreseen)	Proposed mitigation measures	Reference reporting period/Work Package	State-of-the-play risk materialised	State-of-the-play mitigation applied	Comments
The visionary but challenging direction of research results in an only partial meeting of the main project goals. Medium risk, medium impact.	Inherent to a high-risk project. The measures consist of a careful project preparation. The members of the consortium have demonstrated the readiness and expertise to carry out the assigned tasks. Critical project assumptions are supported by a thorough analysis of feasibility and by theoretical simulations. Even a partial success would still result into a considerable impact of the project.	RP1 / WP1, 2, 3	No	Yes	/
Poor mechanical and electrical quality of fabricated PS. Low risk, medium impact.	Responsible partner has a long-time experience with PS fabrication. This issue could appear with novel materials – sufficient resources are allocated to its investigation and resolving. The project considers a broad range of materials to reduce the risk.	RP1 / WP1	Yes	Yes	Graphene was tested as one of the possible materials for PS; due to low carrier density (resulting in low electrical response) the project team decided to focus on gold as the material for PS.
Plasmonic enhancement of high frequency magnetic field lower than expected. Medium risk, medium impact.	Feasibility and sufficient magnitude of the enhancement is corroborated by the simulations. More plasmonic materials and PS geometries are considered in order to minimize the risk.	RP1 / WP1	No	Yes	/
Problems with SPM integration. Low risk, medium impact.	EPR design can be adjusted to provide enough space for the SPM.	RP1 / WP2	Yes	Yes	The need to modulate magnetic field arose during the implementation of the project; and already finalised design of SPM unit had to accommodate the modulation coil. The adjustment was done with no negative impact on functionality of the whole setup.
Crosstalk between the static magnetic field and the SPM part. Low risk, medium impact.	Non-magnetic materials will be used for the SPM construction to suppress the effect of the field and preserve its homogeneity.	RP1 / WP2	No	Yes	/

Only PE THz EPR spectroscopy without microscopic mode – the desired spatial resolution not achieved. Medium risk, medium impact.	Expected resolution is supported by the numerical simulations (bent PS on a SPM tip). The team is experienced and confident enough to fabricate the PSs on the tips. The SPM technique is properly mastered in the team.	RP1 / WP2	No	Yes	/
Risk (unforeseen)	**Proposed mitigation measures**	**Reference reporting period/Work Package**	**State-of-the-play risk materialised**	**State-of-the-play mitigation applied**	**Comments**
One of the PI's of the project moving their career elsewhere, resulting in the loss of expertise and/or access to infrastructure. Low risk, medium impact.	All senior researchers involved in the project are dedicated to see it fulfil the expected goals, and their area of project complementary expertise is their main research focus area likely to be continued.	RP1 / WP1, 2	Yes	Yes	Petr Neugebauer, originally a PI from USTUTT, moved to CEITEC Brno to carry out an ERC grant in synergic area to the project. The move was anticipated even before the project start and no loss in task force at USTUTT occurred.
During FIB milling of antennas observed an increase of conductivity of the substrate.	Use of Xe ion beams for FIB which does not cause the aforementioned problem.	RP1 / WP1	Yes	Yes	Problem observed and solved accordingly to proposed risk mitigation measures.
Standing waves modulate the detected amplitude as a function of frequency in addition to the frequency dependent power output from the source.	The reduction of standing waves can be achieved through the addition of optical isolators and absorbers in the system, phase cycling of the microwave/terahertz irradiation, and integration of an arbitrary waveform generator (AWG).	RP1 / WP1, 2	Yes	Yes	An implementation of AWG is considered to provide phase cycling and to modulate the microwave/terahertz irradiation to account for the standing waves and inherent source frequency dependent power output that will occur in the system.
Delay in manufacturing due to administrative/human error	Close monitoring of the administrative and procurement processes; setting up tasks with enough buffer time to accommodate unexpected delays.	RP2 / WP2	Yes	Yes	Delay in manufacturing of SPM unit - due to administrative issues with the parts procurement the task which should've been done at end of March 2019 was delayed by 5-6 weeks.
Unexpected delays in delivery by suppliers	Same as above	RP2 / WP1, 2	Yes	Yes	Delay in delivering LEMO connectors - twice as anticipated lead time, resulting in 1,5 months delay of the SPM setup completion. Delay in delivering of the cryostat for PE EPR setup at USTUTT – 1 month delay in measurements of the samples for PE EPR.

5. CONCLUSION

This deliverable report updates the initial report (D3.2) which has set the quality assurance procedures for the deliverables and communication activities in the frame of the PETER project during its three-year action. So far, the quality monitoring processes of the project brought forth satisfactory results, as concluded by the Review process carried out by the REA.

The continuous Risk Assessment and Management will be performed for the remaining time of the action. Any update on the communication procedures pertaining to the quality assurance processes will be given in the Final CDE Plan (D3.8, due in M36).