

Project Acronym: FUSROBOT(ENTERPRISES/0618/0016)

MRI-guided Focused UltraSound ROBOTic system for
preclinical research

Deliverable: 1.3

Title: Minutes of all group meetings.

Prepared by:

Theocharis Drakos (MEDSONIC)
Christakis Damianou (CUT)
Leonidas Ioannou (POLYCLINIC YGIA)

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Ευρωπαϊκή Ένωση
Ευρωπαϊκά Διαρθρωτικά
και Επενδυτικά Ταμεία



Κυπριακή Δημοκρατία



Διαρθρωτικά Ταμεία
της Ευρωπαϊκής Ένωσης στην Κύπρο

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Executive Summary

This deliverable (D1.3) includes all the minutes of all group meetings. The date, place, participants, agenda and minutes of each meeting are mentioned.

Minutes of all group meeting 1

Name of grant: FUSROBOT

Date: 18/06/2019 (5:00 pm – 7:00 pm)

Place: Therapeutic Ultrasound Lab, Cyprus University of Technology

Participants:

M. Giannakou (MEDSONIC),
T. Drakos (MEDSONIC),
C. Damianou (CUT),
A. Filippou (CUT),
C. Ioannides (POLYCLINIC YGIA).

Agenda:

- 1) Introduction of participants
- 2) Overview of proposal (C. Damianou)
- 3) Management (M. Giannakou)

Minutes:

1) All the participants have been introduced by the coordinator.

2) The scientific coordinator (C. Damianou) presented the aims of the proposal, the workpackages, and deliverables.

He asked the participants to pay attention to the deadlines and set procedure for reporting of deliverables.

He presented the template of the deliverables.

He explained the details of all workpackages.

Technical tasks were assigned based on the recommendation of the scientific coordinator.

3) M. Giannakou presented the WP1 (management).

He presented the timesheets of the project and emphasized all the approaching deadlines.

He announced the new researchers to be hired.

He analyzed the budget allocation and the payment procedures.

The next meeting will take place roughly in 3 months from this meeting.

Minutes of all group meeting 2

Name of grant: FUSROBOT

Date: 02/09/2019 (10:00 am – 12:00 pm)

Place: Therapeutic Ultrasound Lab, Cyprus University of Technology

Participants:

M. Giannakou (MEDSONIC),
T. Drakos (MEDSONIC),
C. Damianou (CUT).

Agenda:

- 1) FUSROBOT version 1 (M. Giannakou)
- 2) Agar phantom development (T. Drakos)

Minutes:

- 1) M. Giannakou presented the FUSROBOT version 1.
He explained the designed parts of the robot and the details of each part.
He introduced the robot's version 1 free movements.
- 2) T. Drakos presented the development of agar-based gel phantom.
He explained in detail the materials and the procedure to develop the phantom.
He explained the first experiments of the thermal conductivity estimation of the agar-based gel phantom.
He informed the participants for the upcoming experiments to observe any effect of the phantom materials on thermal conductivity and propagation speed.
He informed the participants for the upcoming phantom X-ray images that will be acquired.

The next meeting will take place roughly in 3 months from this meeting.

Minutes of all group meeting 3

Name of grant: FUSROBOT

Date: 10/12/2019 (11:00 am – 1:00 pm)

Place: Therapeutic Ultrasound Lab, Cyprus University of Technology

Participants:

M. Giannakou (MEDSONIC),
T. Drakos (MEDSONIC),
A. Filippou (CUT),
C. Damianou (CUT).

Agenda:

Every participant explained the stage of each deliverable for which he/she is responsible, the deliverables which have already been completed and the future work for each deliverable that has remained.

Minutes:

- 1) Project Coordinator (M. Giannakou) presented in general lines the work already done and future work.
- 2) M. Giannakou explained that the Interim report (D1.1) will be finished by July.
- 3) T. Drakos and C. Damianou informed the other members about the creation of social media (Facebook, LinkedIn, Twitter) for the Communication and outreach strategy plan (D1.4) and the material that has been posted so far. They were also informed about the creation of a newsletter.
- 4) C. Damianou informed the participants that a publication in a scientific journal (D2.1) is under preparation and a presentation at a scientific conference (D2.2) is also under preparation.
- 5) A. Filippou explained that the commercialization plan of the project (D2.5) is at an advanced stage and is under preparation. So far, a plan has been made for brain and pancreatic cancer.
- 6) M. Giannakou did a general overview of the 4 DOF robotic system (D3.1) and explained that the robotic device has been already designed and prepared for printing, assembling and wiring.
- 7) M. Giannakou presented the completed 2 DOF robotic system (D3.2) and explained the designed parts of the robot as well as the details of each part and its degrees of freedom.

- 8) M. Giannakou informed the participants that the ultrasonic transducers (D3.3) of the project were completed in the 6th month. Two transducers were designed and developed with frequencies of 1.1 MHz and 2.6 MHz.
- 9) C. Damianou explained that the Electronic driving system (D3.4) has been completed.
- 10) C. Damianou explained that the Design of medical cart (D3.5) is under preparation.
- 11) T. Drakos informed the group that the MRI compatibility of the transducer (D4.1) has been finished while the MRI compatibility of the robotic system will be completed after the printing and wiring of the 4 DOF robotic system in January.
- 12) M. Giannakou explained that the Evaluation of the accuracy of the robotic system (D4.2) can be completed after the printing and wiring of the 4 DOF robotic system. It is expected to be finished in January.
- 13) A. Filippou has reported that the MRI evaluation of the thermal heating of the transducer (D4.3) is under preparation for phantom and excised tissue experiments and it still requires experiments in animals.
- 14) C. Damianou explained that the Evaluation of navigation algorithms for reducing the near-field heating and the treatment time (D4.4) is under preparation. He discussed the possible navigation algorithms.
- 15) C. Damianou informed the participants that the Evaluation of the system in performing treatment in rabbits and in pets with tumors (D4.5) will begin in January with experiments in rabbits using only the transducer with specific set-up (without the 4 DOF robotic system).

The next meeting will take place roughly in 3 months from this meeting.

Minutes of all group meeting 4

Name of grant: FUSROBOT

Date: 03/04/2020 (1:00 pm – 2:00 pm)

Place: Teleconference (due to coronavirus pandemic situation)

Participants:

M. Giannakou (MEDSONIC),
T. Drakos (MEDSONIC),
A. Filippou (CUT),
C. Damianou (CUT).

Agenda:

Every participant explained his/her progress within the project. The progress of the various work packages achieved in the first year of the project have also been discussed. The deliverables that have already been completed have been presented by the project coordinator. The work that has remained as well as the project plan of the second year have been discussed and shared accordingly to the participants.

Minutes:

1) Project Coordinator (M. Giannakou) presented the work-packages and deliverables of the first year of the project. He explained that the interim report has been almost prepared, and he presented the completed deliverables that will be submitted in the interim report. He also introduced the future work of the project and the project plan that will be followed during the second year.

2) M. Giannakou explained that the Interim report (D1.1) has been almost prepared and will be fully completed by the 12th month.

3) C. Damianou and T. Drakos explained that the minutes of all group meeting are prepared and the deliverable (D1.3) is up to date.

4) T. Drakos and C. Damianou informed the other members about the information, material and results that have been posted in social media (Facebook, LinkedIn, Twitter) for the Communication and outreach strategy plan (D1.4). Pictures of robotic devices, electronic system, evaluation results and other material have been posted so far as explained. They were also informed about the creation of the 2nd issue of the newsletter and the finalization of the project brochure.

5) C. Damianou informed the participants that a publication in a scientific journal (D2.1) has been already prepared and application for presentation at a scientific conference (D2.2) has been also submitted. Whether we will attend the meeting or not depends on the status of the coronavirus pandemic. The second year, a publication for the 4 DOF will be prepared and an application for presentation at a scientific conference will be submitted.

- 6) A. Filippou explained that the commercialization plan of the project (D2.5) is under preparation. She explained that the plan will be prepared during the second year.
- 7) M. Giannakou explained that the final version of the 4 DOF robotic system (D3.1) has been completed.
- 8) M. Giannakou explained that the 2 DOF robotic system (D3.2) has been completed.
- 9) M. Giannakou informed the participants that the ultrasonic transducers (D3.3) of the project were completed in the 6th month.
- 10) C. Damianou informed the participants that the Electronic driving system (D3.4) has been completed.
- 11) C. Damianou informed the participants that the Design of medical cart (D3.5) has been finished.
- 12) T. Drakos informed the group that the MRI compatibility of the transducer and robotic system (D4.1) has been completed.
- 13) M. Giannakou and T. Drakos explained that the Evaluation of the accuracy of the robotic system (D4.2) has been completed for the X and Y axis. In the second year, the evaluation of the accuracy of the Θ and Z axis will be performed when specially designed parts will be designed, and 3D printed. These parts will be temporarily assembled in the robotic system for the Θ and Z motion measurements.
- 14) A. Filippou has reported that the MRI evaluation of the thermal heating of the transducer (D4.3) has been completed.
- 15) C. Damianou explained that the Evaluation of navigation algorithms for reducing the near-field heating and the treatment time (D4.4) is under preparation.
- 16) C. Damianou informed the participants that the Evaluation of the system in performing treatment in rabbits and in pets with tumors (D4.5) is under preparation. Experiments in 10 rabbits have already been performed and experiments will be performed in the next months for another 10 rabbits. Lesions in an array pattern on excised tissue using the developed software and the robotic device will be also performed in the second year.

The next meeting will take place roughly in 3 months from this meeting.

Minutes of all group meeting 5

Name of grant: FUSROBOT

Date: 14/09/2020 (9:00 am – 10:00 am)

Place: Therapeutic Ultrasound Lab, Cyprus University of Technology

Participants:

M. Giannakou (MEDSONIC),
T. Drakos (MEDSONIC),
A. Antoniou (CUT),
C. Damianou (CUT).

Agenda:

Every participant explained his/her progress within the project. The project coordinator introduced the work that has already finished and the remaining work. Some issues have been noticed in few deliverables to be addressed in the upcoming months.

Minutes:

1) Project Coordinator (M. Giannakou) explained that the completed deliverables of the first year with the interim report have been successfully submitted to the Research and Innovation Foundation. He presented the remaining tasks of the project. Some issues about the movement of the 4 DOF robotic device have been noticed. The issues will be addressed in the upcoming months.

2) M. Giannakou explained that the Interim report (D1.1) has been finished and submitted (12th month).

3) C. Damianou and T. Drakos explained that the minutes of all group meeting are prepared and the deliverable (D1.3) is up to date.

4) T. Drakos and C. Damianou informed the other members that evaluation results (on phantoms and excised tissues) have been posted in the social media. They were also informed about the creation of the 3rd issue of the newsletter.

5) C. Damianou informed the participants that a publication in a scientific journal (D2.1) has been already prepared and will be submitted to a scientific journal. A presentation at a scientific virtual conference (D2.2) has been submitted and accepted.

6) C. Damianou explained that the commercialization plan of the project (D2.5) is under preparation.

7) M. Giannakou explained that the final version of the 4 DOF robotic system (D3.1) has been completed. However, minor changes on the robotic device will be done in the second year in order to address some movement issues. M. Giannakou explained

that the below of the robotic device can be constructed and attached to the robotic device by our group.

8) M. Giannakou explained that the deliverables 3.2, 3.3, 3.4, and 3.5 have been completed in the first year and submitted.

9) T. Drakos informed the group that the deliverable D4.1 has been completed and submitted in the first year.

10) M. Giannakou and T. Drakos explained that the Evaluation of the accuracy of the robotic system (D4.2) has been completed. In the first year the evaluation of the X and Y axis was completed. In the second year, the evaluation of the accuracy of the Θ and Z axis has been completed.

11) T. Drakos reported that the MRI evaluation of the thermal heating of the transducer (D4.3) has been completed.

12) C. Damianou explained that the Evaluation of navigation algorithms for reducing the near-field heating and the treatment time (D4.4) has been completed.

13) C. Damianou informed the participants that the Evaluation of the system in excised tissues and rabbits has been completed. The license from veterinary services for cats and dogs' experiments is still pending. G. Evrpidou (does the animal recruitment for SOUNDPET) explained that he has met veterinarians to find cats and dogs with tumors for the experiments in order to complete deliverable 4.5.

The next meeting will take place roughly in 3-4 months from this meeting.

Minutes of all group meeting 6

Name of grant: FUSROBOT

Date: 22/12/2020 (9:00 am – 10:00 am)

Place: Therapeutic Ultrasound Lab, Cyprus University of Technology

Participants:

M. Giannakou (MEDSONIC),
A. Antoniou (CUT),
C. Damianou (CUT).

Agenda:

Every participant explained his/her progress within the project. The project coordinator introduced the work that has already finished as well as the remaining tasks that were left until the completion of the project. The preparation of the final report has been also discussed.

Minutes:

1) Project Coordinator (M. Giannakou) presented the remaining tasks until the end of the project. He also informed the participants that the final report will be prepared by A. Antoniou, M. Giannakou, and C. Damianou. The issues that were noticed about the movement of the 4 DOF robotic device have been overcome.

2) M. Giannakou explained that the following deliverables have been finalized and submitted the first year of the project.

- D 1.1 (Interim report)
- D 2.1 (Publication in a scientific journal)
- D 2.2 (Presentation at a scientific conference)
- D 3.1 (Four DOF robotic system)
- D 3.2 (Two DOF robotic system)
- D 3.3 (Ultrasonic transducer)
- D 3.4 (Electronic driving system)
- D 3.5 (Design of medical cart)

3) M. Giannakou and C. Damianou explained that the minutes of all group meeting is prepared and that the deliverable (D1.3) is up to date. The deliverable will be submitted by the end of the project.

4) C. Damianou informed the other members that the updated communication and outreach strategy plan will be finalized by the 24th month.

5) C. Damianou informed the participants that a publication in a scientific journal (D2.3) has been already submitted to a scientific journal. A. Antoniou explained that a presentation at a scientific conference (D2.4) has been submitted and is under review.

6) A. Antoniou explained that the commercialization plan of the project (D2.5) is under preparation.

7) M. Giannakou explained that the Evaluation of the accuracy of the robotic system (D4.2) has been completed (The evaluation of the accuracy of the Θ and Z axis has been also included) by T. Drakos. The MR compatibility of the transducer and robotic system (D4.1) has been also finalized.

8) A. Antoniou and C. Damianou reported that the MRI evaluation of the thermal heating of the transducer (D4.3) has been completed.

9) C. Damianou explained that the Evaluation of navigation algorithms for reducing the near-field heating and the treatment time (D4.4) has been completed by T. Drakos.

10) C. Damianou and A. Antoniou informed the participants that the Evaluation of the system in excised tissues and rabbits (D4.5) has been completed. The evaluation of the system in cats and dogs is still pending. The approval to perform experiments in pets was given in December 2020.

The next meeting will take place roughly in 3-4 months from this meeting.

Minutes of all group meeting 7

Name of grant: FUSROBOT

Date: 19/03/2021 (02:00 pm – 03:00 pm)

Place: Virtual meeting

Participants:

M. Giannakou (MEDSONIC),
A. Antoniou (CUT),
C. Damianou (CUT).

Agenda:

The project coordinator informed the participants about the work that has already finished as well as the remaining tasks that were left until the completion of the project. He also informed about the creation of a closing event and the preparation of the final report.

Minutes:

- 1) Project Coordinator (M. Giannakou) presented the remaining tasks until the end of the project. He also informed the participants that the final report is under preparation.
- 2) M. Giannakou explained that the following deliverables are close to be finished:
 - D 1.2 (Final report)
 - D 1.3 (Minutes of all group meetings)
 - D 1.4 (Communication and outreach strategy plan)
 - D 4.5 (Evaluation of the system in performing treatment in rabbits and in pets with tumors)
- 3) M. Giannakou and C. Damianou explained that the minutes of all group meeting (D1.3) is up to date. The deliverable is completed with this last meeting.
- 4) C. Damianou informed the other members that the updated communication and outreach strategy plan will be finalized by the 24th month. A last newsletter will be created by the end of March. A closing event will be conducted.
- 5) C. Damianou explained that the experiments in pets (cats and dogs) have been completed. The deliverable is still under preparation. Histology analysis of the results are still pending and will be completed by the end of the project.
- 6) M. Giannakou mentioned that all the other deliverables have been completed successfully.

This is the last meeting of the project.