Project Acronym:
FUSVET (SEED/1221/0080)

Focused Ultrasound System for Veterinary Chemotherapeutic Applications for Oncology

Deliverable number: 4.2

Title: Report of branding material (logo, flyers, promotional video, demo product, and social networks).

Prepared by:

Nikolas Evripidou (CUT)
Anastasia Antoniou (CUT)
Antria Filippou (VET-EX MACHINA)
Kyriakos Spanoudes (VET-EX MACHINA)
Christakis Damianou (CUT)

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Funded by the European Union NextGenerationEU
Cyprus tomorrow RECOVERY AND RESILIENCE PLAN
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The FUSVET project is funded by the Recovery and Resilience Facility of the NextGenerationEU instrument, through the Research and Innovation Foundation (RIF) of Cyprus.

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Executive Summary

This deliverable presents all activities undertaken to generate appropriate branding material in order for the host organisation (VET-EX MACHINA) to effectively promote the product developed during the framework of the FUSVET project to potential investors to acquire the necessary funding for commercial product launch. In this sense, a range of digital and printed branding material was created marketing both the product and the company (VET-EX MACHINA).

In order to build a unique "brand", a logo for FUSVET was initially created. The created logo was employed alongside the logo of VET-EX MACHINA in the produced branding material to achieve a visual identity for the project and the related technology and associate the product with the corporate identity of the company. A video about the project was created presenting information about the developed technology and the benefits offered by its non-invasive nature, acquired key results that validated the efficacy of the system for veterinary oncological applications as well as an overview of the participants responsible for developing, evaluating, and advancing the technical maturity of the corresponding product. Consequently, the created video served as an important audiovisual tool providing enough information to spark the interest of potential investors. Furthermore, to disseminate the project and its associated technology to the public, profiles on social media networks were created. Particularly, business-focused platforms were chosen in order to attract investors through the creation of a LinkedIn profile for the project where key activities and results were regularly communicated during the project's lifecycle. Printed branding material such as a flyer presenting the company, the technology created during the project and expressing the need for funding were created, while newsletters communicating important project results and milestones were issued periodically (every 6 months) throughout the project. Furthermore, a pitch deck presenting the host organisation (VET-EX MACHINA) and the system developed during the FUSVET project was prepared, while an easily transportable demo product of the robotic device was fabricated with additive manufacturing. Consequently, the created presentation could be pitched to potential investors at various events with the 3D-printed demo product providing visual support.

The various branding materials produced during the project were utilised by the host organisation to introduce and pitch the technology to potential investors in order to attract funding for commercial exploitation. The produced branding materials are presented in this report depending on their type (i.e., logo, audiovisual material, social networks, printed branding material, etc.).

Logo & “brand”

From the start of the project, the consortium undertook activities to create a unique brand for the project and its’ associated technology. Visual elements are a powerful form of grabbing attention and communicating any brand identity. As such, one of the initial actions performed at the early stages of the project (November 2022), was the creation of a logo which shaped the visual identity of the project. The logo was designed with the following criteria:

1) Unique and simple design.
2) Visually appealing and easy on the eye.
3) Memorable.
4) Adequately reflect the brand identity of FUSVET.

The created logo, as shown in Figure 1, includes the name of the project and a schematic of a dog, thus visually communicating FUSVET and shaping perceptions of the indicative applications of the associated technology. The logo was included on every branding material that was created throughout the project (flyers, social networks, etc.), easily grabbing attention, and serving as a strong foundation for achieving a unique brand.

Figure 1: Created logo of the project.

Nevertheless, since the host organisation (VET-EX MACHINA) is the interested party in the potential commercial exploitation of the device developed throughout the framework of the FUSVET project, the existing logo of the company was also included in many of the project’s produced branding material. Specifically, the logo of VET-EX MACHINA as shown in Figure 2, was incorporated, alongside the project’s logo (Figure 1), in all branding material produced to promote the device to potential investors. In this sense, the logo of VET-EX MACHINA was placed on flyers, newsletters and any other material that was presented at various conferences, fairs and fund-raising events throughout the project. Consequently, this provided potential investors who attended such events, with the ability to easily remember the name of the company in case they were interested in potentially contacting the host organisation and provide the necessary funds required for commercial exploitation of the FUSVET project’s resulting product.

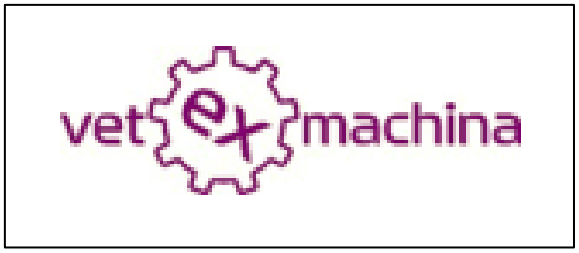

Figure 2: Logo of VET-EX MACHINA.

Audio-visual material

Pitch video

As part of the fund-raising activities that were performed by the host organisation and which are explicitly described in Deliverable 4.3, a pitch video for FUSVET was produced. The video was prepared in the context of the application submitted by VET-EX MACHINA to the European Innovation Council (EIC) Accelerator programme (details found in Deliverable 4.3). The pitch video had a total duration of 2 minutes and 59 seconds and included audio-visual material relating to the device developed during the FUSVET project and its potential application in veterinary oncology, the associated hardware and software, the team involved in the project and their role in the device's development and evaluation, as well as some preliminary results acquired during proof-of-concept experiments. Specifically, the video included the following sections:

1) Introduction to the FUSVET device and its intended application in veterinary oncology.
2) Speech from the Chief Executive Officer (CEO) of VET-EX MACHINA about the vision of the company as a manufacturer of focused ultrasound (FUS) systems for veterinary applications and the benefits offered to animals by potential commercial exploitation of FUSVET as a non-invasive cancer therapeutic.
3) Description of the operating principles of the FUSVET device, including its motion and the integrated FUS technology.
4) Role of a key researcher from the partner organisation (Anastasia Antoniou) in the evaluation of FUSVET in pets (dogs and cats).
5) Design, development, and assembly of the FUSVET device.
6) Role of a member from the host organisation (Antria Filippou) on preparing associated documents required for potential commercial exploitation of FUSVET (business plan and regulatory documents).
7) Presentation of the software that controls the FUSVET system and its associated treatment planning, motion and therapeutic ultrasound control and real-time treatment monitoring functionalities that achieve effective tumour treatments.
8) Preclinical validation of FUSVET for MRI compatibility and efficient thermal heating abilities.
9) Execution of preclinical veterinary trials on dogs and cats with natural tumours for effectively assessing the safety and efficacy of FUSVET for the intended application.
10) Team members involved in the development and preclinical evaluation of the FUSVET system.

Indicative captures obtained at certain timestamps of the video are shown in Figure 3 for each of the abovementioned video sections.

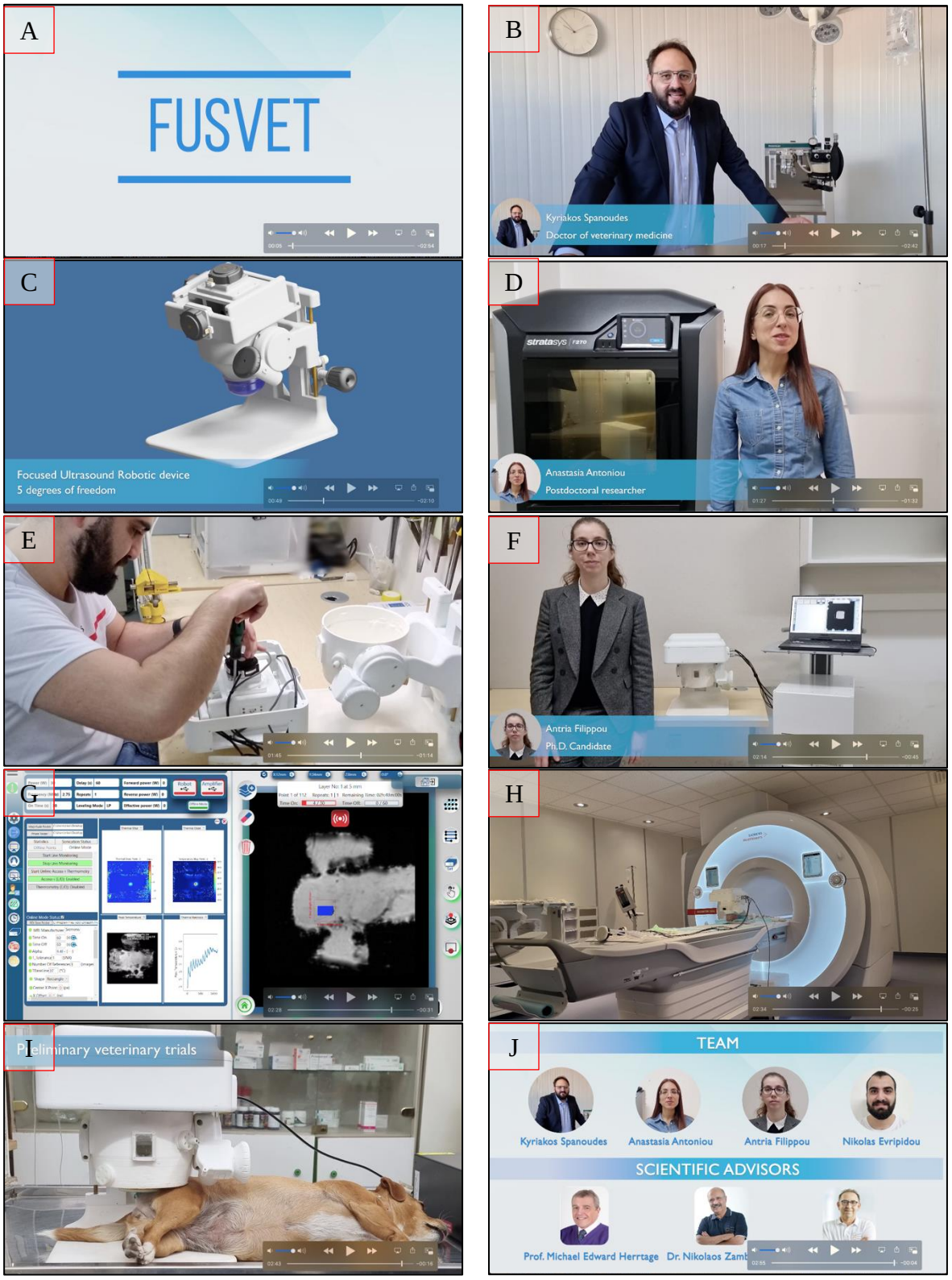

Figure 3: Screenshots acquired at different timestamps of the pitch video that was prepared for the submitted EIC Accelerator programme application showing A) Introduction to FUSVET, B) the CEO of VET-EX MACHINA, C) the FUSVET device, D) a researcher from the partner organisation, E) development of the FUSVET device, F), a researcher from the host organisation, G) the associated control/treatment planning software, H) experiments for MRI compatibility, I) preclinical veterinary trials on pets, and J) team members and scientific advisors involved in FUSVET.

Social networks

LinkedIn profile

To further disseminate the FUSVET project to the public, promote its unique "brand" to the business world, and built a strong professional and business network, a LinkedIn profile for the project was created as shown in Figure 4. The LinkedIn profile of the FUSVET project was affiliated to the corresponding LinkedIn page of VET-EX MACHINA (as seen in the right top corner of Figure 4) to generate awareness to followers and possible visitors about this venture from the host organisation. Consequently, this affiliation provides interested investors with an opportunity to gather as much publicly available information relating to the FUSVET project and the company they will potentially make an agreement with. Moreover, in case additional information is needed, this signposts users to the affiliated organisation, providing them with an opportunity to message both the FUSVET project and the host organisation's LinkedIn pages.

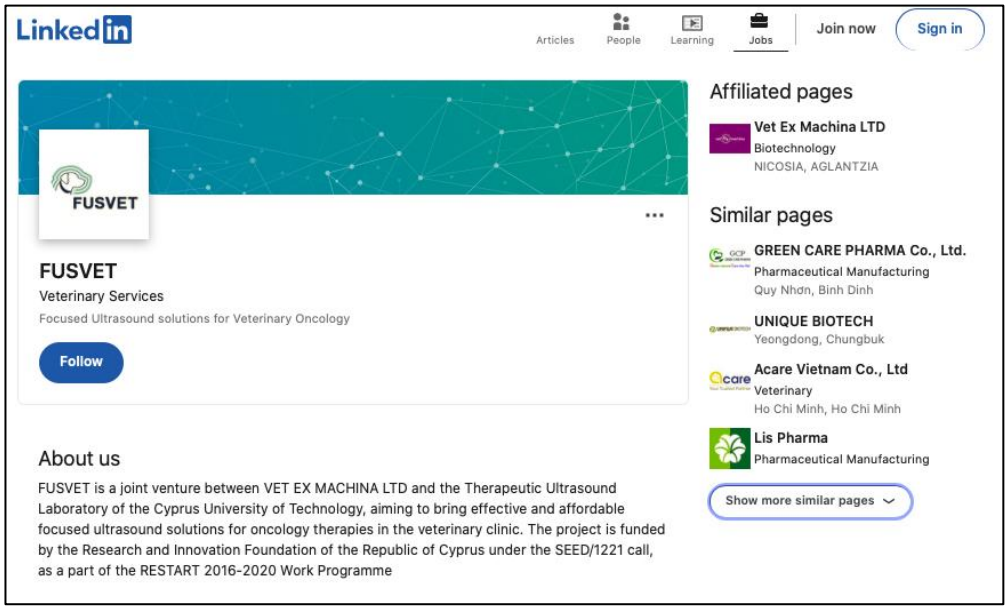

Figure 4: Screenshot of the FUSVET project LinkedIn profile and its affiliated pages (VET-EX MACHINA).

Throughout the project, FUSVET's LinkedIn page served as a valuable social media tool for communicating key project outcomes as well as any important events that project stakeholders attended as indicatively shown in Figure 5. Announcements were frequently posted on the LinkedIn page through the framework of the FUSVET project to ensure that the relevant content was disseminated as soon as possible after its generation.

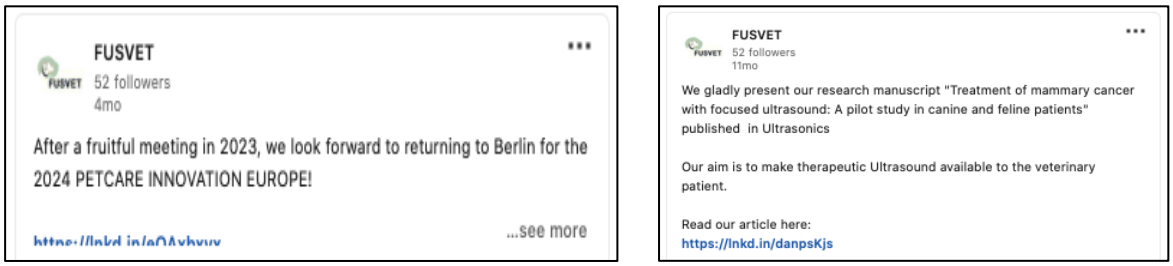

Figure 5: Screenshots of indicative posts made on the LinkedIn profile of the FUSVET project disseminating events attended (left), and project outcomes (right).

Printed branding material

Flyers

A flyer for the FUSVET project was prepared to externally communicate information about the end-product of the project and indicate the need of VET-EX MACHINA for attracting investment from venture capitalists in the veterinary therapeutics market for commercial product exploitation. The produced flyer, entitled "FUSVET: Investment opportunity in Veterinary Therapeutics sector", was designed to be eye-catching and included essential information relating to the device and the company. Specifically, a brief overview of VET-EX MACHINA and the need for funding was provided, followed by a succinct description of the applications of the device in the veterinary sector and the strengths associated with the employed FUS technology. Additionally, information relating to the partner organisation that participated in the project, as well as the organisation that financially supported the project were also included. Moreover, fundamental information relating to the regulatory procedures required for introducing the device to the market, as well as the expected income from potential commercial exploitation were also added on the flyer. Furthermore, the logos of the project (Figure 1) and VET-EX MACHINA (Figure 2) were added on the flyer to achieve a unique brand. Moreover, in line with corporate identities and signed grant agreements of the project, the logo of the partner organisation (CUT) and organisations that funded the project were also included on the lower end of the flyer. The produced flyer, as shown in Appendix 1, was printed, and handed out to potential investors during one-to-one meetings and business events that stakeholders attended.

Newsletters

Newsletters were created biannually during the framework of the FUSVET project, presenting important information and disseminating news relating to the project and its progress. A total of 4 newsletter issues were produced as shown in Appendix 2. Newsletter issue 1 was created to inform the public about the FUSVET project. As such, an overview of the project including key objectives, financial support as well as partners involved in the consortium, and project participants were presented. As for subsequent newsletter issues, these predominantly focused on the veterinary trials that were executed on pets (dogs and cats) with naturally occurring tumours for evaluation of the developed robotic system. Specifically, in newsletter issue 2, the launch of veterinary trials on dogs and cats presenting with spontaneous tumours was described. Preliminary *in-vivo* results, obtained during the first 9 months of trials (until July 2023), indicating the efficacy of the proposed device in inducing local tumour necrosis with FUS were reported, suggesting its suitability for veterinary oncological applications. Similarly, newsletter issue 3 reported on field trials that were performed on the subsequent 9 months (until April 2024), describing the additional recruitment of dogs with various types of tumours and the promising histological results of the FUS-treated tumour regions that further demonstrated the ability of the robotic system in inflicting targeted tumour necrosis. Finally, newsletter issue 4 acted as a synopsis of all veterinary trials that were executed during the framework of the project. Specifically, the number of pets that were eventually enrolled in the trials and the types of the tumours that were treated with the robotic system were described. A final overview of trial outcomes that validated the safety and therapeutic efficacy of the system was included,

indicating the promising potential of the developed technology as a non-invasive therapeutic option in veterinary oncology.

Pitch deck presentations

A 10-slide pitch deck presentation was also prepared to attract financial support from potential investors for commercial exploitation of the FUSVET system. The pitch deck presentation included important information about the product and the company, enabling investors to decide on whether the proposed device constitutes a profitable investment. The prepared pitch deck as shown in Appendix 3, primarily described the MRI-guided FUS device that VET-EX MACHINA intends to introduce in the veterinary market in terms of hardware and software components, including the motion principle of the robotic system, integration with the MRI scanner as well as the advanced treatment planning and monitoring functionalities of the accompanying software. The benefits offered by the proposed system in terms of performance and employed technology as well as product design and manufacturing were described so that investors can clearly identify the value proposition of the FUSVET system compared to conventional therapeutic approaches. Any evaluation experiments that were performed throughout the project to advance the technology readiness level (TRL) of the proposed product resulting in a fully validated system primed for potential commercial deployment were also included. A brief overview of the size of the market in which VET-EX MACHINA intends to introduce the FUSVET system (veterinary oncology market) was included, while the advantages of the device compared to similar systems from existing companies in the field were described showcasing the competitive position that VET-EX MACHINA will have from potential commercial product launch. Considering the size of the veterinary oncology market, the opportunities offered by the corresponding market for penetration of new companies and products and the competitive position of VET-EX MACHINA, expected estimates of the market share of the company were incorporated. The business model for offering the proposed device to customers was displayed, while a 5-year profit-and-loss analysis was presented outlining the expected financial viability of the company. Moreover, the added value of the product for pets and their owners, vets, as well as investors was presented outlining the benefits offered by commercial exploitation of the device in the field of veterinary medicine as well as for advancing human medicine. Finally, to provide potential investors with an overview of the company, information about the premises of VET-EX MACHINA, previous experience as well as the expertise of the team members and scientific advisors involved in the development of the company's product were included.

Demo product

Demo product development

A demo product of the device developed during the framework of the FUSVET project was produced with 3D manufacturing, resulting in a physical object that could be easily transported to various national and international events to be showcased to attendees and potential investors. The demo product was produced following the 3D computer aided design (CAD) of the manufactured robotic device (described in Deliverable 3.1). Specifically, the 3D CAD

model of the assembled robotic system including all individual hardware components (i.e., brass rods, motors, knobs, etc.) was substantially scaled down, and extracted from the Inventor software (Autodesk, San Rafael, California, USA) as a stereolithography (STL) model of the demo product. The STL model of the demo robotic system was then printed with VeroWhite resin using a dedicated 3D resin printer (Objet30 Pro, Stratasys, Minnesota, USA). The 3D-printed demo product was fabricated with a scale of 1:7 compared to the actual robotic system, having final dimensions of 4.5 cm (width) × 4.5 cm (length) × 5.5 cm (height). Figure 6 shows photos of the produced 3D-printed demo product taken at different perspectives. The 3D-printed demo product was a comprehensive small-scale representation of the FUSVET robotic system, depicting all mechanical compartments of the system in a highly detailed manner. Consequently, this demo product effectively translated the operating principles of the FUSVET system and showcased all product-related characteristics, thus providing visual support when pitching the product to potential investors.

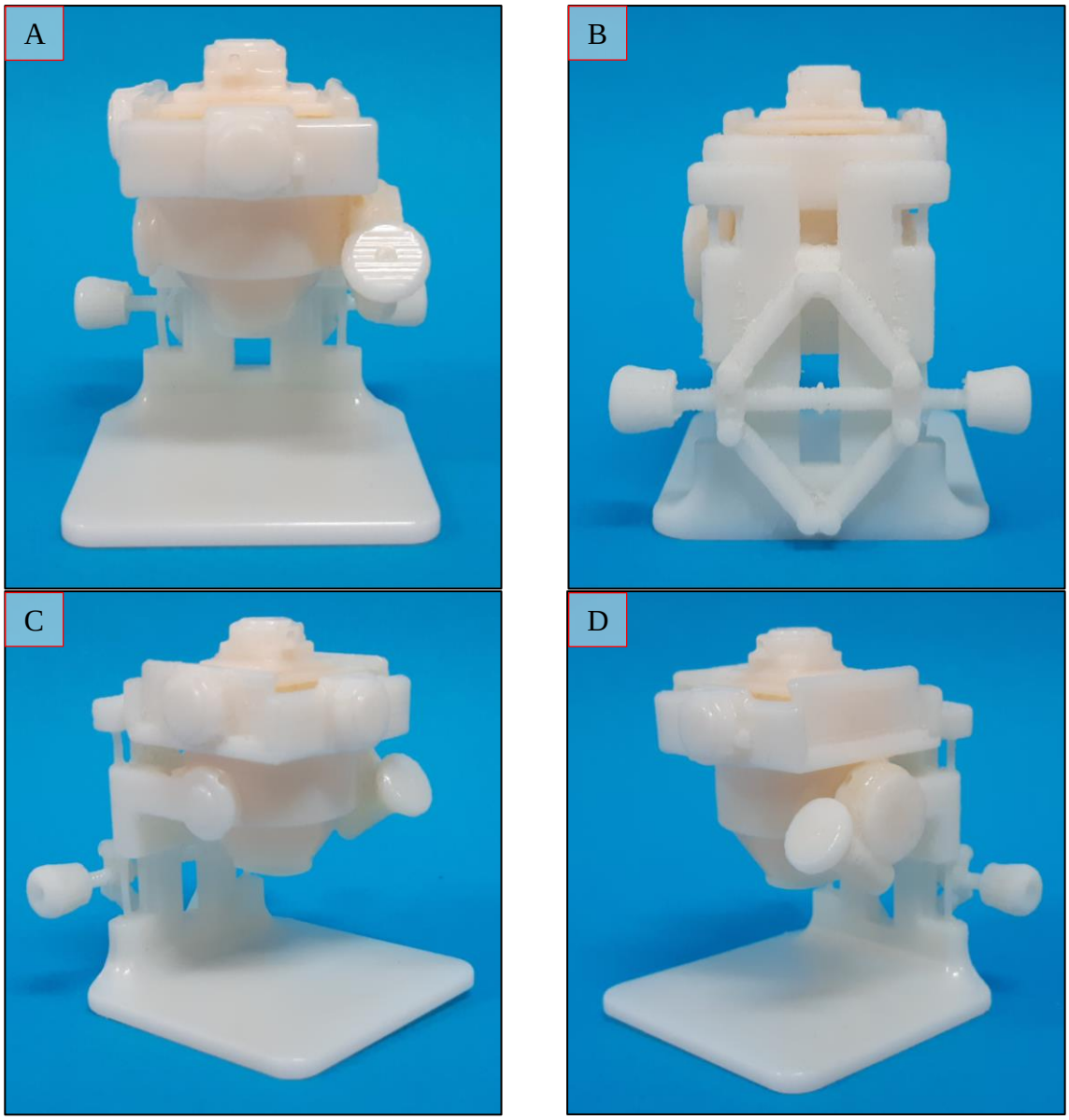

Figure 6: Photos of the 3D-printed demo product of the FUSVET device. A) Front-view, B) Rear-view, C) Front-Left view, and D) Front-right view.

Appendix 1: Flyer

FUSVET

FUSVET: Investment opportunity in Veterinary Therapeutics sector

Introduction

VET EX MACHINA LTD, a contract research organisation in the biomedical sector is seeking for a investment to develop a teaching and testing facility for novel cardiovascular devices.

Who can use the device?

Our device can be used in a veterinary hospital with pet patients treated by qualified veterinarians. Pets undergoing focused ultrasound ablation, need to be under the supervision of a qualified veterinary professional at all times

Strengths of the technology

1. Non invasive
2. Cost effective
3. Minimal side effects

Who we are:

VET EX MACHINA LTD is a contract research company based in Cyprus, established in 2018 aiming to bring novel solutions in the medical and veterinary healthcare market through the design and execution of advanced preclinical studies and veterinary clinical trials.
The THERAPEUTIC ULTRASOUND LABORARORY (Cyprus University of Technology) has 3-decade history in the field of design and assembly of therapeutic ultrasound devices.

Regulatory Background

Medical devices intended for veterinary use, have a simplified regulatory path to the market. Therefore, income from sales is shortened in comparison to the medical devices intended for human use.

Investor characteristics

We are seeking to gain funding from VCs in the veterinary therapeutics market

Acknowledgments:

-FUSVET is funded by the Research and Innovation Foundation (SEED/1221/ 0080).

vet ex machina

Cyprus University of Technology

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Appendix 2: Newsletters

Newsletter – Issue 1

DECEMBER 2nd, 2022

FUSVET

SEED/1221/0080

FUSVET NEWSLETTER

ISSUE 1

News on the Focused Ultrasound technology for veterinary chemotherapeutic applications for oncology in the context of the FUSVET project!

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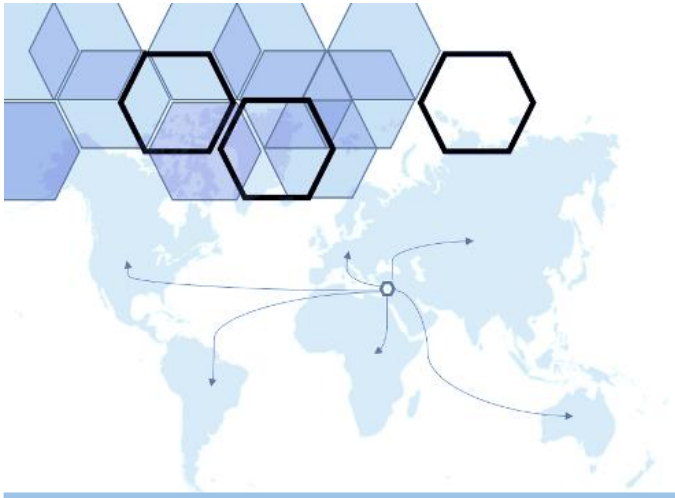

FUSVET PROJECT - OVERVIEW

FUSVET (**F**ocused **U**ltra**S**ound system for **VET**erinary chemotherapeutic application for oncology) is a project co-funded by the Recovery and Resilience Plan of the European Union and the Republic of Cyprus through the Research & Innovation Foundation, that started in November 2022 and is scheduled to end in January 2025. The project is a collaboration between VET-EX MACHINA and Cyprus University of Technology. The primary goal of the project is the development of a Magnetic Resonance Image guided Focused Ultrasound (MRgFUS) robotic system for veterinary cancer applications. A propotype robotic system integrated with a focused ultrasonic transducer as well as an electronic system and software for controlling the MRgFUS device will be developed. The functionality, reliability and safety of the developed system wil be extensively evaluated in phantoms, freshly excised tissue and animals. After preclinical proof-of-concept experiments, the final product will be applied in pets (dogs and cats) with naturally occurring tumours to exploit the benefits of the focused ultrasound (FUS) technology. The main advantage of FUS is that the procedure is non-invasive, thus reducing the side effects associated with conventional veterinary oncological treatments. Moreover, the proposed fast robotics and algorithms will reduce treatment time, thus requiring less anesthesia and possibly enabling veterinarians to treat larger tumours, while this may also work favourably to alleviate the animal's stress thus making this treatment more attractive. The aim is to convert the proposed prototype technology into a commercial product for veterinary FUS oncological applications. The developed system has the potential of future use in humans for treatment of brain, thyroid, breast, liver, kidney, fibroids, and bone tumours.

PARTNERS

VET-EX MACHINA (host)**:** VET EX MACHINA LTD is the first and sole contract research company based in Cyprus, established in 2018 aiming to bring novel solutions in the medical and veterinary healthcare market through the design and execution of advanced preclinical studies and veterinary clinical trials. VET EX MACHINA has amassed expertise in the field of medical devices, biomaterials, tissue engineering and cell-based therapies. VET EX MACHINA is capable of undertaking projects murine, lagomorphs, swine, canine, feline and equine patients and models. The vision of VET EX MACHINA is to collaborate with academic and industry partners and work as an in-vivo research entity in the European environment for the development and preclinical in-vivo assessment of medical device products. VET EX MACHINA has licensed state-of-the-art premises for in-vivo testing of medical devices including all equipment and facilities for housing, imaging, surgery, recovery, monitoring and post-mortem assessment.

Cyprus University of Technology (CUT) (partner)**:** CUT is a public university founded in 2003 with the first students accepted in 2007. In this project, CUT participates through the Therapeutic Ultrasound laboratory headed by Professor Christakis Damianou which belongs to the department of Electrical Engineering, Computer Engineering, and Informatics. The therapeutic ultrasound laboratory occupies a 130 m^2 area and has complete infrastructure of therapeutic ultrasound equipment.

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PROJECT PARTICIPANTS

Kyriakos Spanoudes (VET-EX MACHINA, Project Coordinator) is a registered Veterinary Surgeon, graduate of Aristotle University of Thessaloniki, Greece with major in companion animals (dogs, cats and horses). He has 5-year experience in experimental surgery, microsurgery, and laboratory animal science, obtained during his PhD (Biomedical Engineering and Regenerative Medicine) at CÚRAM Centre for Research in Medical Devices at the National University of Ireland Galway (NUIG). In addition to his PhD research, he was the project manager and surgeon in preclinical studies requiring implantation of biomaterial-based advanced therapeutic medicinal products in rodent and rabbit models. His postgraduate studies have been funded by the Irish Research Council the NUIG College of Engineering and the EU FP7/2007-2013, Marie Curie, Industry-Academia Partnerships and Pathways (IAPP) award (Tendon Regeneration Project). He has co-authored 12 published peer-reviewed articles, 1 book chapter and 45 conference abstracts in key conferences. In addition, he has worked in industry-driven projects with some of the key biomedical companies with activity in the Republic of Ireland (Olympus Biotech, Medtronic, Aran Biomedical, and Tissue Regenix). He in is an active member of the European society of Laboratory Animal Veterinarians (ESLAV), the European Society for Biomaterials (ESB), the EU Chapter of the Tissue Engineering and Regenerative Medicine Society (TERMIS). He is also the elected treasurer of the Cyprus Veterinary Association. In 2018, he was awarded a start-up grant from the ministry of Energy, Commerce and Industry of the Republic of Cyprus to set up VET-EX MACHINA.

Christakis Damianou (CUT, Scientific Coordinator) received a B.Sc., M.Sc., and Ph.D. from the University of Arizona in Electrical Engineering in 1988, 1990 and 1993 respectively. His research interests include MRI guided therapeutic ultrasound and MRI compatible robotics. Betweem 1988 and 1993, during his master and doctoral studies he worked as a research assistant in the department of radiation oncology at the University of Arizona. Between 1993 and 1994 he worked as postdoctoral fellow in the department of radiology at Harvard University in Massachusetts. Between 1994 and 1995 he worked as a research scientist in the department of biophysics at Indiana University. He is currently a professor at CUT at the department of Electrical Engineering, Computer Engineering and Informatics. So far Dr. Damianou was involved in 40 research programs, having the coordination of 20 of them. He received so far 2 infrastructure grants from the research promotion foundation. Based on his research activities 180 publications were published and 3 book chapters. He is the inventor of the patent: 'MRI positioning system for ultrasound brain surgery' (WO/2007/082495). Another patent was issued by the European Patent Office ('Multi-purpose robotic system for MRI guided focused ultrasound treatment'). Currently 5 Ph.D. students are working under the supervision of Dr. Damianou. So far 7 Ph.D. students have graduated under his supervision.

Anastasia Antoniou (CUT) received a B.Sc. in Physics from the University of Cyprus in 2018. She also pursued a master's degree in Biomedical Engineering at CUT. In the framework of her master thesis, she studied the acoustical properties of 3D printed thermoplastics to assess their suitability to mimic skull bone. She has so far participated in seven research grants. Her primary research interests are in the area of therapeutic ultrasound. She is currently pursuing a Ph.D. at the Cyprus University of Technology, which relates to the therapeutic effects of ultrasound in brain tissue and has published as yet 20 scientific peer-reviewed articles.

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PROJECT PARTICIPANTS (cont.)

Nikolas Evripidou (CUT) received a B.Sc. in Electrical Engineering from CUT in 2018. He then pursued a master's degree in Biomedical Engineering at CUT. His primary research interests are in the area of therapeutic ultrasound. In the framework of his master thesis, he developed an advanced electronic system for driving MRgFUS robots. He is currently pursuing a Ph.D. at CUT, which relates to the therapeutic effects of ultrasound in brain tissue. He has already published 21 peer-reviewed research articles and 14 conference papers on the topic of therapeutic ultrasound. He has already been involved in 7 research grants (FUSROBOT, PROSTASONIC, SOUNDPET, ABLABREAST, MRBREASTBIO, FUSVET, and BRAINSONIC).

Antria Filippou (VET-EX MACHINA) graduated from the University of Bristol in 2017 with a B.Sc. in Science (Physics) and received an M.Sc. in Biomedical Engineering from the CUT in 2020. She is currently a Ph.D. student at CUT with an interest in HIFU systems guided by MRI. Her Ph.D. thesis focuses predominantly on an MRI guided focused ultrasound system for breast ablation. So far, she has participated as a research associate in 6 grants related to therapeutic ultrasound applications under the guidance of MRI and has published 10 peer-reviewed scientific papers related to therapeutic ultrasound. She has experience in evaluation of MRgFUS systems, in ultrasonic characterization of tissues, and in the design and development of phantoms.

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DECEMBER 2022

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Newsletter – Issue 2

JULY 30th, 2023

FUSVET

SEED/1221/0080

FUSVET NEWSLETTER

ISSUE 2

News on the Focused Ultrasound technology for veterinary chemotherapeutic applications for oncology in the context of the FUSVET project!

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Veterinary trials for focused ultrasound (FUS) ablation of canine and feline tumours

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Veterinary trials for FUS ablation of canine and feline tumours

Veterinary clinical trials have been launched to evaluate the performance of the developed robotic system on pets (dogs and cats) with naturally occurring tumours. **Until now, 7 dogs and 2 cats presenting with various malignancies have been enrolled in the study according to specific eligibility criteria following informed consent from owners**. All experiments were performed at the clinics of the veterinarians providing the pet cases.

Photo of project coordinator (left) and referring veterinarian (right) at the clinic premises of the latter

A standard treat-and-resect treatment approach was followed, with the tumours of recruited pets partially treated with FUS and surgically resected thereafter. Enrolled pets were anesthetised and accommodated under the transducer housing of the robotic system in a recumbent position that allowed direct contact of tumours with the acoustic window of the device. Precautions were taken to ensure that ultrasonic beam effectively reached the targeted tumour areas, thus avoiding unintended heating of normal tissue or infliction of skin burns. Superficial sonications of tumours were initially performed with low acoustic energy to evaluate the animal's endurance to ablation. Following safety validation, tumours were ablated using therapeutic protocols that were appropriately chosen based on tumour volume and location.

Indicative photos of various naturally occuring tumours (blue arrow and circles) on recruited dogs acquired before FUS treatment

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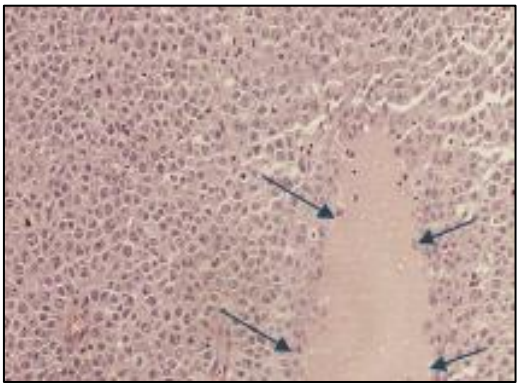
Veterinary trials for FUS ablation of canine and feline tumours (cont.)

Gross tumour examination after FUS ablations revealed the formation of visible coagulative lesions in one of the treated tumours (1/9), while in all other cases (8/9) no lesions were observed on tumour surface due to entrapped fluid. In all cases (9/9), histopathological examination of resected tumours revealed thermal coagulative necrosis of ablated tumour cells through haematoxylin and eosin (H&E) staining that demonstrated rupture of multifocal cysts (1/9) and disruption of cell architecture (8/9) at the targeted regions.

Lesion (blue arrow) inflicted on a pressure-point comedone canine tumour after FUS ablation (75 W acoustic power for 30 s)



H&E-stained slide indicating FUS-induced necrotic areas (blue arrows)

Results indicate that successful necrosis of targeted tumour cells can be achieved with the proposed system, with the FUS treatments well-tolerated since no unintended side effects were reported with the recruited pets remaining in good clinical state. **These preliminary findings suggest that the system can be used for veterinary oncological FUS applications.** Nevertheless, veterinary clinical trials are ongoing, with further experiments that will be executed until the end of the project required to establish the safety and efficacy of the system.

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JULY 2023

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Newsletter – Issue 3

APRIL 30th, 2024

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SEED/1221/0080

FUSVET NEWSLETTER

ISSUE 3

News on the Focused Ultrasound technology for veterinary chemotherapeutic applications for oncology in the context of the FUSVET project!

INDEX

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Cyprus tomorrow RECOVERY AND RESILIENCE PLAN

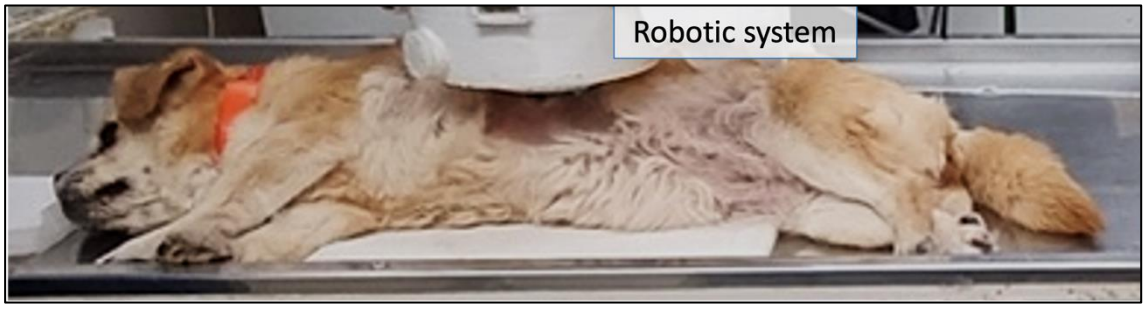
Republic of Cyprus

RESEARCH & INNOVATION FOUNDATION

The FUSVET project is funded by the Recovery and Resilience Facility of the NextGenerationEU instrument, through the Research and Innovation Foundation (RIF) of Cyprus.

Update on veterinary trials for FUS ablation of canine and feline tumours

Five more dogs were recruited in the currently active veterinary clinical field trials that aim to assess the efficacy of the fabricated Magnetic Resonance-compatible FUS robotic system. Recruited dogs presented with naturally occurring superficial sarcoma (n=3) or mammary (n=2) tumours that were mainly located at the belly (n=3), rump (n=1) and neck (n=1) of the pets.



Indicative photo from veterinary trials showing configuration of dog for treatment with the robotic system

All five trials were performed at the practices of the referring veterinarians. Based on the site of the tumour, anaesthetised dogs were positioned in a lateral or dorsal recumbency under the conical water container of the robotic system. The tumours were directly accommodated under the workspace of the integrated FUS transducer to ensure application of FUS solely on the tumour and protect nearby healthy tissue from unintentional thermal damages. The positioning mechanisms of the robotic system enabled precise placement of its acoustic window in contact with the tumour, with a thin layer of ultrasound gel applied in-between to ensure optimal transfer of ultrasonic energy to the targeted tumour area. **After successful assessment of treatment safety with low-energy sonications, all canine patients underwent partial tumour ablation using protocols that were adjusted depending on the tumour size and its proximity to sensitive bodily regions.**

Photo of a naturally occuring sarcoma tumour (blue circle) on one of the recruited dogs acquired before FUS

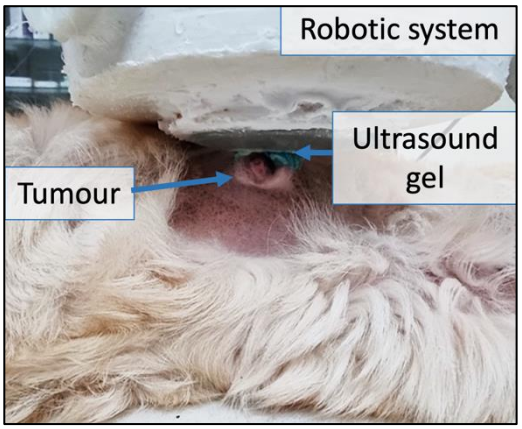


Photo showing tumour placement for treatment, being in contact with the acoustic window of the robotic system

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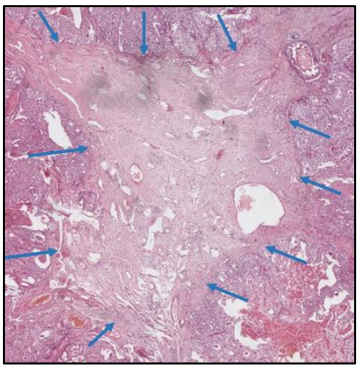
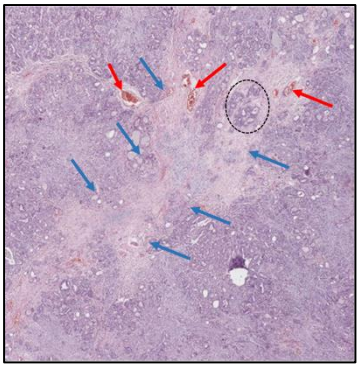
Update on veterinary trials for FUS ablation of canine and feline tumours (cont.)

Following successful execution of FUS treatments with no adverse events in all cases, the tumours were surgically resected by the referring veterinarians. In accordance with previous trial results, thermal necrosis of the 5 excised tumours was evidenced by histological examination, with the FUS-treated regions appearing on Haematoxyling and Eosin (H&E)-stained slides as well-defined areas of disrupted cell architecture. Occasionally (1/5), blood coagulation within the FUS-treated area was observed on magnified H&E-stained slides.



H&E-stained slide indicating FUS-induced necrotic areas (blue arrows)



Magnified H&E-stained slide indicating FUS-induced necrotic areas (blue arrows), blood coagulation (red arrows) and intact tumour nuclei (black circle)

Although few remaining tumour nuclei were also revealed on magnified H&E slides, from a histological standpoint, all tumours were considered completely destroyed by FUS in the sonicated regions. **These results further demonstrate the ability of the developed robotic system in ablating various types of spontaneous tumours along different anatomical locations in pets.** Additional recruitment of veterinary cancer patients until completion of the project will further elucidate the therapeutic abilities of the system.

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APRIL 2024

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Newsletter – Issue 4

JANUARY 31st, 2025

FUSVET

SEED/1221/0080

FUSVET NEWSLETTER

ISSUE 4

News on the Focused Ultrasound technology for veterinary chemotherapeutic applications for oncology in the context of the FUSVET project!

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Synopsis on veterinary trials for FUS ablation of canine and feline tumours

A total of 18 pets (16 dogs and 2 cats) with various types of natural neoplasms were enrolled in the veterinary trials which were conducted to evaluate the safety and therapeutic efficacy of the Magnetic Resonance Imaging guided FUS (MRgFUS) robotic system developed within the framework of the project. Pet dogs and cats were recruited through a targeted campaign and enrolled based on certain admission standards. The recruited pets had spontaneous superficial mammary (n=9), sarcoma (n=4), lipoma (n=4) and pressure-point comedone (n=1) neoplasms occurring at various anatomical locations (belly, shoulder, neck, chest, and rump).

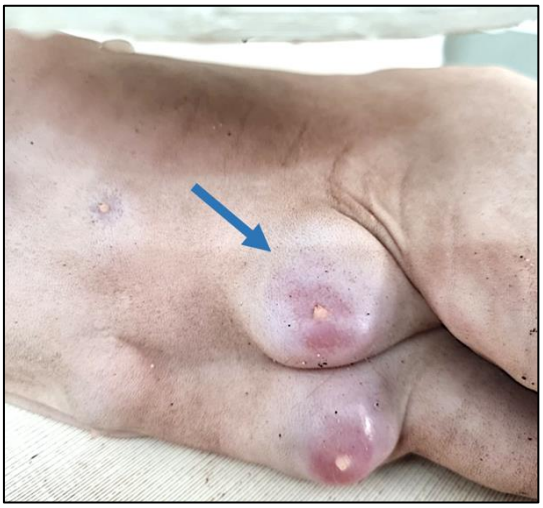


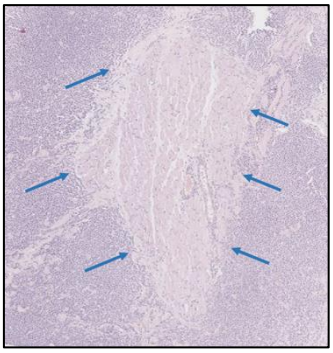
Photo of a naturally occuring mammary tumour (blue arrow) on one of the recruited cats acquired before FUS

Photo of a naturally occuring lipoma tumour (blue arrow) on one of the recruited dogs acquired before FUS

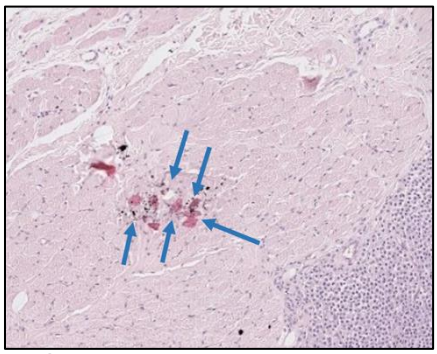
All pets were treated at the clinics of the referring veterinarians with an integrated protocol following acquisition of conscious consent from owners. Animals were appropriately accommodated below the conical water container of the robotic system for targeted treatment of the tumour with FUS, followed by surgical tumour removal. Both treatments were delivered with the pets under anaesthesia, while extensive safety measures were undertaken to validate the animal's tolerance to the FUS treatment, evaluate any treatment-related pain or discomfort, and ensure the delivery of FUS only on tumorous tissue, thus maintaining animal welfare and avoiding infliction of off-target damages. Following successful delivery of low-power sonications on all pets for treatment safety validation, FUS ablative treatments were applied using sonication protocols that were properly adjusted based on the size and location of the tumour under treatment.

Synopsis on veterinary trials for FUS ablation of canine and feline tumours (cont.)

All resected tumours were histologically examined to assess the FUS-related therapeutic effects. The Haematoxylin and Eosin (H&E) stained slides provided evidence of **thermal necrosis of the treated tumour cells in all cases (18/18),** with the ablated regions visualised as areas of disrupted cell architecture and destructed tumour cells. Some intact tumour cells were observed within the treated areas upon slide magnification, while occasionally entrapped blood coagulation was also visible.



H&E-stained slide indicating FUS-induced necrotic areas (blue arrows)



Magnified H&E-stained slide indicating blood coagulation (blue arrows) within necrotic area

Veterinary field trials proved that the robotic system can accurately deliver FUS to induce coagulative necrosis on various types of tumours on pets. Successful execution of FUS ablations on all pets without the occurrence of any treatment-related adverse events validated the therapeutic safety of the system. The ability of the system to treat small to large-sized animals was also verified, while it was additionally confirmed that the system is capable of treating tumours at various anatomical locations due to its precisely engineered positioning mechanisms. Furthermore, system portability facilitated its effortless integration in veterinary clinics without any impact on its therapeutic performance. **Overall, veterinary clinical trial results corroborated the potential of the developed technology as a non-invasive therapeutic option in veterinary oncology.**

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Appendix 3: Pitch deck presentation

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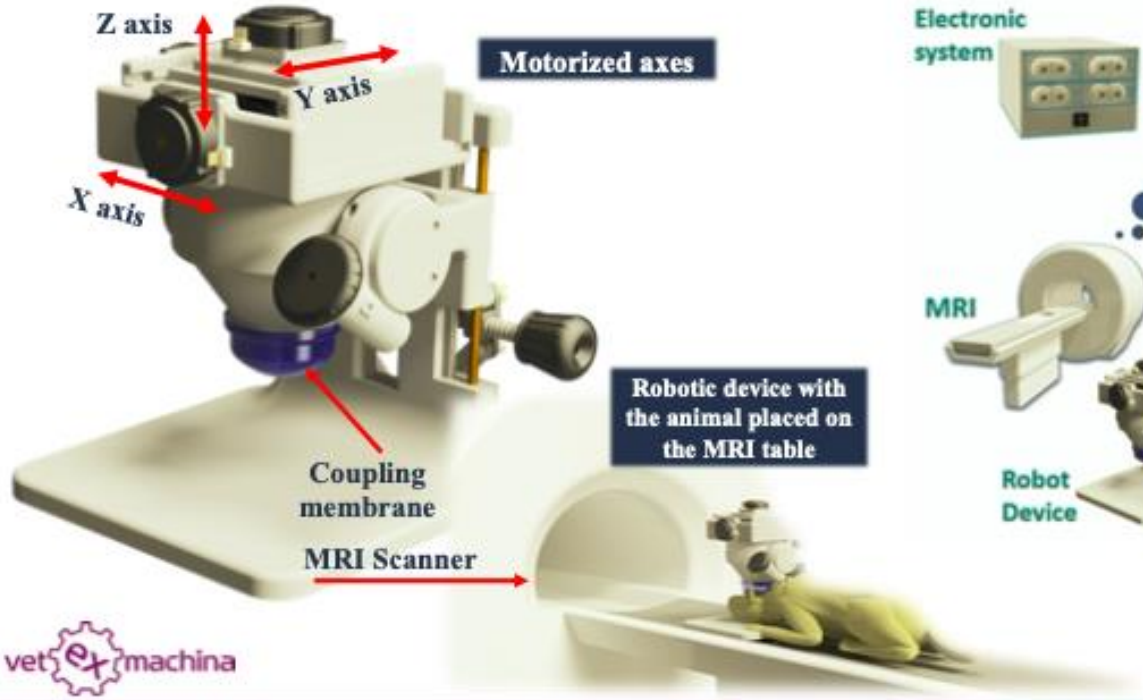
FOCUSED ULTRASOUND SYSTEM FOR VETERINARY CHEMOTHERAPEUTIC APPLICATIONS FOR ONCOLOGY

FUSVET

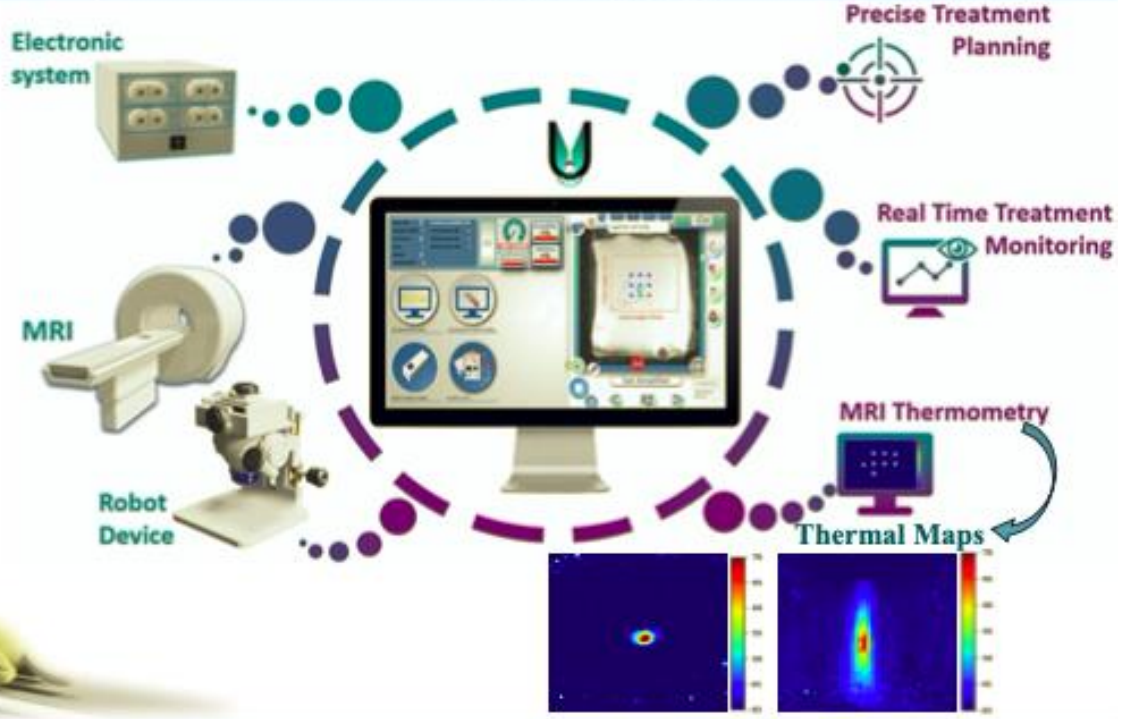
PROJECT OBJECTIVE

*Introducing to the **VETERINARY MARKET** an **MRI-guided focused ultrasound robotic system** for **veterinary cancer applications**.*

ROBOTIC SYSTEM



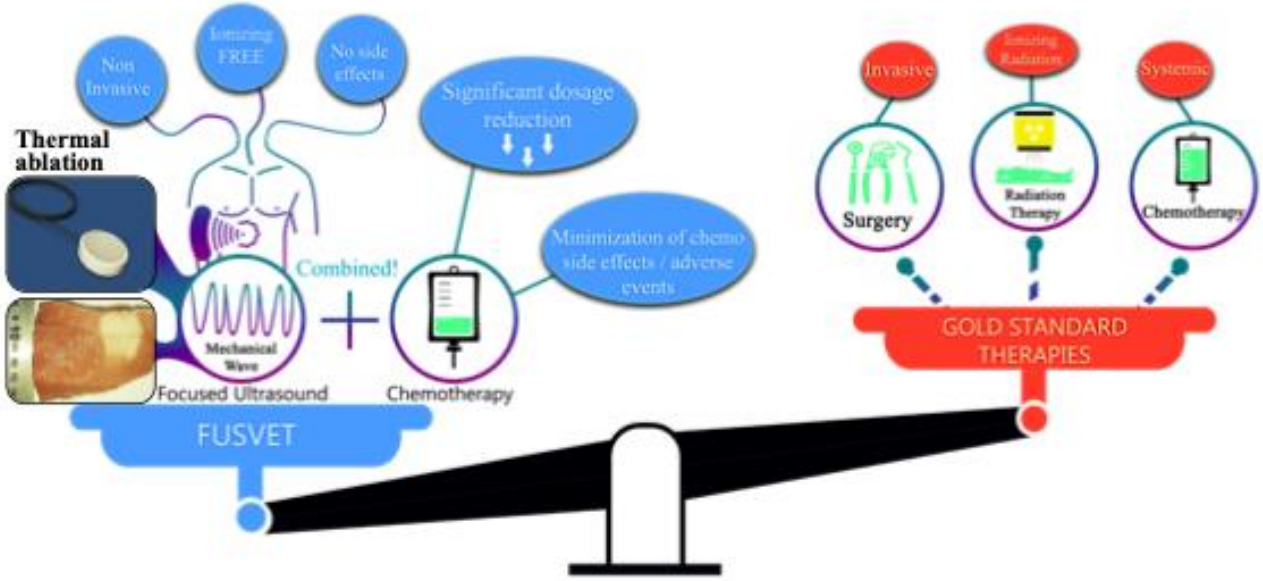
SOFTWARE



INNOVATION TYPE

Product Performance	*Benefits*
❖ Non-invasive, non-ionizing radiation	❖ No side effects. ❖ Therapy can be repeated.
❖ MR compatible	❖ Real time temperature monitoring. ❖ Ensures animal safety.
❖ Design	❖ Conformed to all tumour types.
❖ Single element transducer	❖ Easier use than phased arrays. ❖ Cheaper than phased arrays
Process	***Benefits***
❖ 3D printing, in-house manufacturing	❖ Cost-effective. ❖ Rapid commercial development.
❖ Easily sourced materials	

VALUE PROPOSITION



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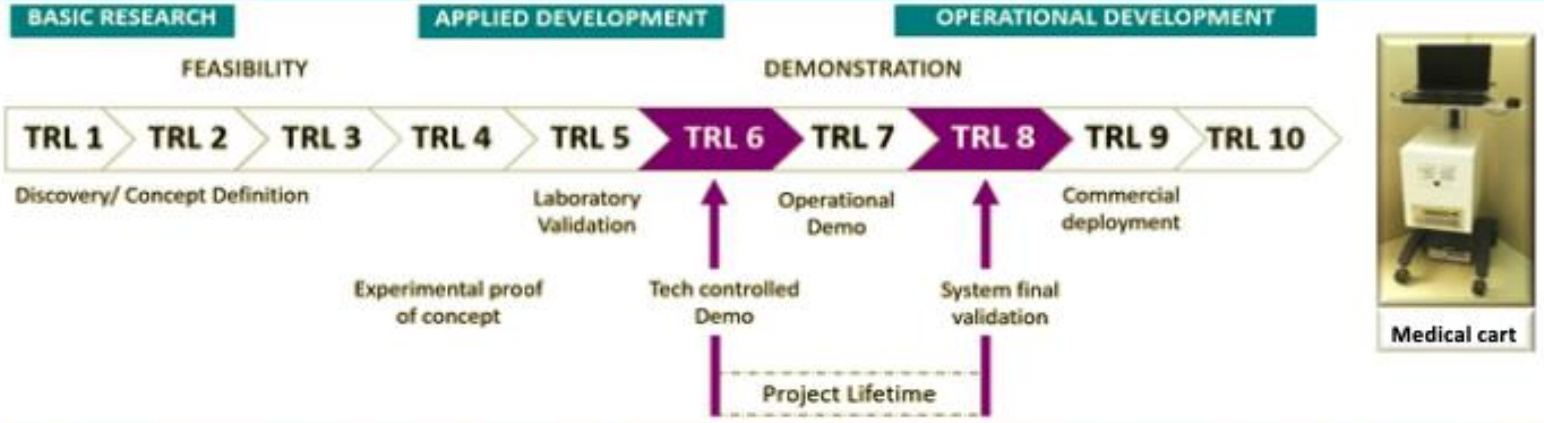
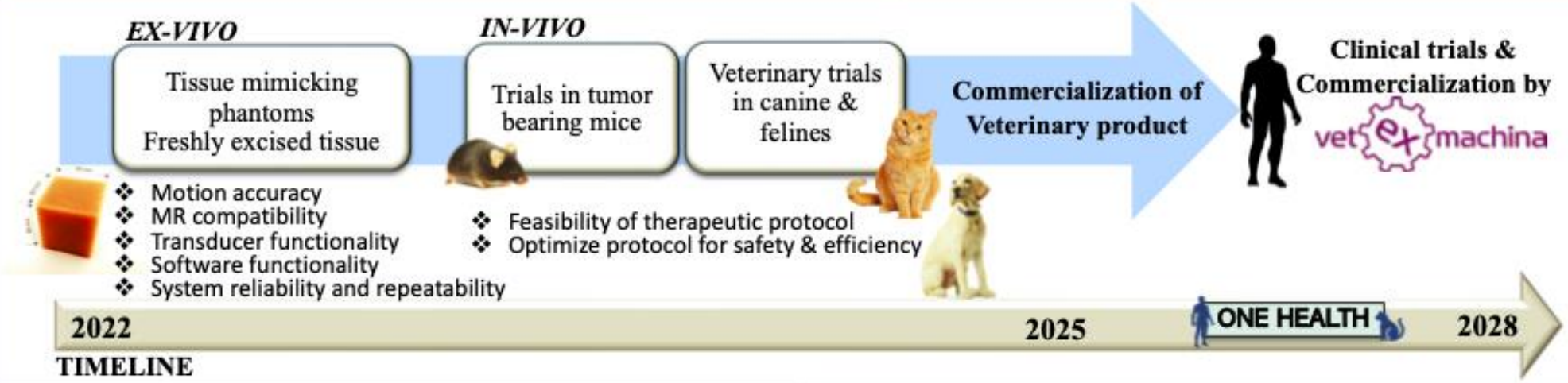
OUR PATHWAY TO THE MARKET



EVALUATION PERFORMED SO FAR

COMMERCILIZATION



VETERINARY MARKET

Global veterinary market size [1]

- **€ 110 B** in 2022
- **€ 180 B** by 2030 at Compound annual growth rate (CAGR) of 7.45%

VET clinics US & EU	~ 97, 000 [3][4]

CYPRUS [5]
Total number: 52
Nicosia: 22 | Limassol: 8 | Larnaca: 7 | Paphos: 10 | Protaras/Paralimni: 5

Cyprus clinics with MRI: 3
Paphos: 2 (CYVETS & ONLYVETS);
Larnaca: 1 (V3TS).

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VETERINARY ONCOLOGY MARKET

Global Veterinary Oncology Market [2]

- **€ 211 M** in 2022
- **€ 505 M** by 2030 at Compound annual growth rate (CAGR) of 12.1 %

- ❖ Market share of US/EU: ~ 65 %
- ❖ Number of pets per Veterinarian: 1200
- ❖ Average expenditure per pet: € 1500
- ❖ Surgery, Chemotherapy or radiation session (US/EU): € 2000 - 8000
- ❖ Insurance per month: € 20

1 in 4 dogs [9]

Estimated # of pets with cancer

	Dogs	Cats
US [6]	19, 3 M	11, 5 M
EU [7]	22, 4 M	22, 0 M
Cyprus [8]	12, 2 K	12, 2 K

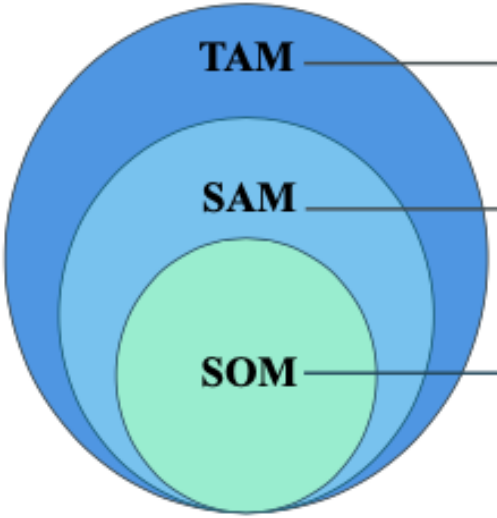
1st cause of death in dogs and cats !

1 in 5 cats [10]

5

[1] https://www.grandviewresearch.com/industry-analysis/veterinary-services-market | [2] https://www.grandviewresearch.com/industry-analysis/veterinary-oncology-market| [3] https://televet.com/blog/veterinary-stats | [4] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Veterinary_services_statistics_-_NACE_Rev._2 | [5] https://cyprus-is. com/listings-categories/medical/veterinary-clinics [6] https://www.avma.org/resources-tools/reports-statistics/us-pet-ownership-statistics | [7] https://www.statista.com/statistics/453880/pet-population-europe-by-animal/ | [8] https://cooperpetcare.com/pet-statistics/ | [9] https://www.avma.org/resources/pet-owners/petcare/cancer-pets | [10] https://www.csuanimalcancercenter.org/2019/11/20/common-cancers-in-cats/ |

FUSVET MARKET



TAM — **€ 110 B**
Total Available Market
Veterinary Market

SAM — **€ 211 M**
Serviceable Available Market
Veterinary Oncology Market

SOM — **€ 10 M** → **~5 % share for FUSVET** → **€ 500 K annual revenue**
Serviceable Obtainable Market
~5 % share for Focused Ultrasound

TAM: Annual revenue (if 100 % of the market is earned).

MARKET OPPORTUNITY

- Increasing number of pets
- Increasing expenditure on pet insurance
- Technological advancements in veterinary imaging
- Follows human health developments
- Veterinary Specialisation
- Increasing owner expectations

*** FIRST TARGETED MARKETS**
UNITED STATES & EUROPE

COMPETITIVE POSITION

	VETERINARY USE	MRI GUIDANCE	COST-EFFECTIVE	COMPACT & ERGONOMIC	TOP TO BOTTOM TARGETING
VET EX MACHINA	✓	✓	✓	✓	✓
Image Guided Therapy	✗	✓	✗	✗	✗
FUS Instruments	✓	✓	✓	✗	✗
Alpinion	✓	✗	✓	✓	✓
Verasonics	✗	✗	✗	✗	✗

BUSINESS MODEL

ONE-TIME UP-FRONT CHARGE PLUS MAINTENANCE

One-time acquisition

Product Price: € 100, 000
Manufacturing cost: € 20, 000
Product lifetime: 10 years

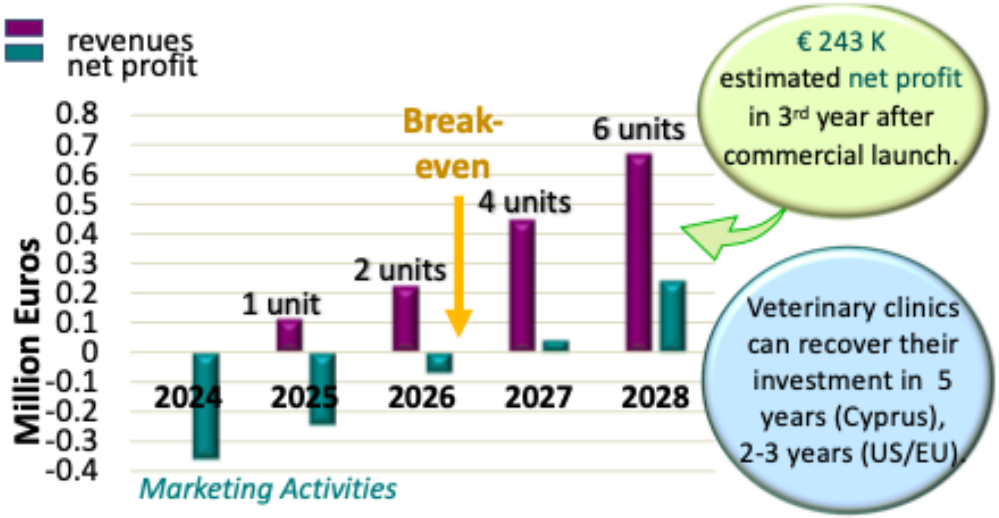
Maintenance Services

Yearly fee: € 12, 000

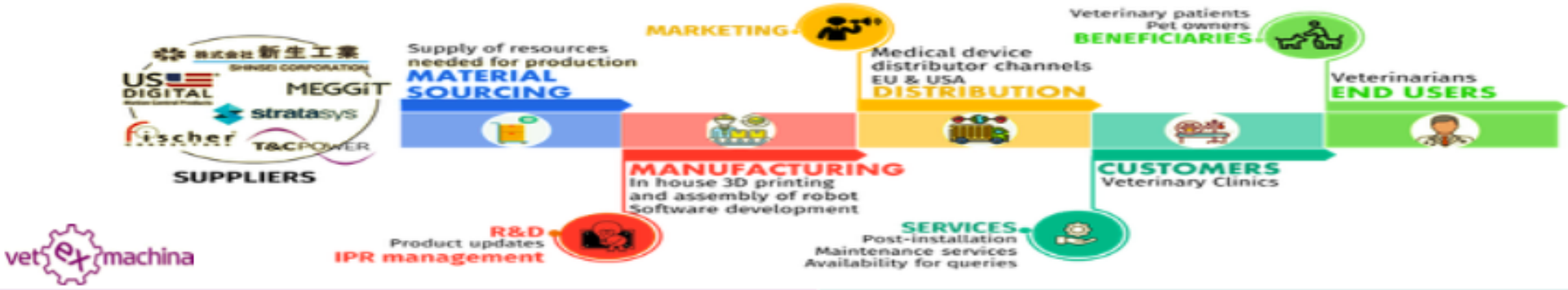
Price **low enough** compared to competitors

Price **high enough** for high-quality product

PROFIT AND LOSS ANALYSIS



SUPPLY CHAIN



ADDED VALUE

ONE HEALTH

Animals
- Longevity and quality of life

Humans
- Support human trials
- Increase translation success

Pet owners
- Improve outcomes
- Convenience
- Cost

Investors
- Rapid scale: Fewer regulatory and reimbursement challenges

Vets
- New revenue stream
- Increased patient throughput

Field of FUS
- Knowledge
- Technology
- Mechanisms
- Indications

Manufacturers
- Revenue
- Validation of technology

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PREVIOUS COLLABORATIVE WORK

PRECLINICAL WORK (HUMAN ORIENTED)

- **PROSTASONIC (2019-2021)**
  (Prostate cancer)
  Preclinical study on rabbits.
- **ABLASONIC (2019-2022)**
  (Pancreatic cancer)
  Preclinical study on rabbits.

VETERINARY APPLICATIONS

- **FUSROBOT (2019-2021)**
  Field trial on 10 dogs and cats.
- **SOUNDPET (2020-2023)**
  Field trial on 10 dogs and cats.

- Prof. Damianou: 1st scientist to obtain approval and conduct animal experiments in Cyprus.
- VET EX MACHINA and CUT have already obtained **14 approvals** for animal studies.

VET EX MACHINA PREMISES

ONLY APPROVED CENTER IN CYPRUS TO HOST RABBITS, DOGS AND CATS (MEDIUM TO LARGE ANIMALS).

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TEAM

Kyriakos Spanoudes (CEO)

- Veterinary Surgeon
- Long-term experience with FUS
- Areas of Expertise: Veterinary medicine, Veterinary surgery, Biomedical Engineering, Business

Anastasia Antoniou (CSO)

- Physicist, Biomedical Engineer
- Experience with MRgFUS for veterinary applications.
- Areas of Expertise: Biomedical Engineering, Medical Physics, Preclinical/Veterinary FUS.

Antria Filippou (CCO)

- Physicist, Biomedical Engineer
- Experience with business plan preparation (regulatory affairs).
- Areas of Expertise: Biomedical Engineering, Medical Physics, Medical devices.

Nikolas Evripidou (CTO)

- Electrical - Biomedical Engineer
- Experience with MRgFUS robotics engineering.
- Areas of Expertise: 3D design and manufacturing, MRI compatible robotics, computer programming

SCIENTIFIC ADVISORS

Prof. Michael Edward Herrtage

- Dean at School of Veterinary Medicine, University of Nicosia
- Veterinary surgeon
- Expertise in Small Animal Medicine.

Dr. Nikolaos Zamboglou

- Director of Medical Council German Oncology Center
- Long-term experience with FUS for oncological applications.

Dr. Cleanthis Ioannides

- Interventional Radiologist, German Oncology Center
- Long-term experience with MR guidance of FUS therapy.

STAKEHOLDERS

Cyprus University of Technology

German Oncology Center

CYVETS
Art in Veterinary Medicine

Vets

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