

Life is in the air

Disruptive technology to inactivate respiratory viruses

eu-life



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01. Introduction to e4life



01.1 about e4life

Elettronica and Lendlease join forces in e4life to launch e4shield™, an innovative biodefense technology. e4life has been founded as JV between Elettronica and LendLease in May 2023 with an initial capital of 3,5MEuro. e4life Mission: leverage and develop technology patented by Elettronica to launch new products.



PROMOTERS/SHAREHOLDERS



51%



49%

KEY CAPABILITIES PROVIDED

- Specific expertise in electromagnetic spectrum
- Tested proficiency in developing innovative technologies
- Long-lasting expertise in property investments
- Extensive expertise in business development
Renowned know-how in sales management operating in 8 countries across 4 continents

e4life technology is effective in destroying aerosol respiratory viruses through electromagnetic waves:

- Works real time
- Unique in the world
- Harmless to humans
- CE and SAR certified
- Based on military technology
- Laboratory Tested
- Programmable in the future in case of new threads

01.2 e4life patented technology

e4life patented technology (pct/it 2021/00036 20/07/2021 and pct/ib 2023/051661 23/02/2023) is based on a phenomenology discovered by a group of Taiwanese physicians and related technology development



DISCOVERY OF THE PHENOMENON

The **phenomenon** was first discovered and theorized by a Taiwanese medical equipe, then published on **Nature**:



- testing on spherical viruses, they showed effective structured-resonant energy transfers from microwaves to acoustic vibration modes of particles;
- particles' frequency is indeed capable of entering into resonance with electromagnetic fields through dipolar coupling of waves with its dipolar vibration modes;
- periodic mechanical deformation is exercised on the particle by means of the Lorentz Force at the same frequency of the electromagnetic signal, amplifying the effect when calibrated with Resonant Frequencies;
- resonant microwave absorption process (RMA) phenomenon is able to break the capsid (outer shell) of the viroid, fully inhibiting its vira load; rupture of the capsid means that the virion is unable to infect despite genetic material (RNA) remains.

e4life TECHNOLOGY

e4life leverages this phenomenology as a physical principle for its technology given the effectiveness of inactivation mechanisms by electromagnetic signal for aerosol treatment

Main enablers and investments:

- More than 2 years of R&D
- Patents achievement
- POC with tests in third parties laboratories Set Up test development and building
- Product industrialization
- NewCo foundation and new resources hiring






02. The Biotechnological solution



02.1 e4shield™ technology distinguishing features

KEY FEATURES

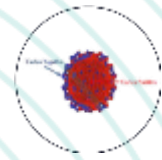
-  Electromagnetic radiation propagates **instantaneously** and without a medium of propagation
-  Technology is **non-invasive** as it works real time and in presence of people. Developed from military technology
-  Resonance frequency allows for high specification levels, calibrating the device for **specific** pathogens

e4life VS COMPETITIVE TECH

- ✓ **Seconds** vs. Minutes, Hours
- ✓ **In presence activation** vs. evacuated environment. No need to recirculate air
- ✓ **Specific target** vs. general intervention

02.2 the electromagnetic field

The electromagnetic field generated by e4life technology is able to neutralize the viral load in aerosol

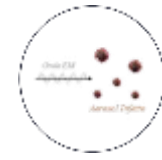


PARTICLES COMPOSITION

Particles are electrostatically schematized as having a **positive internal charge** and a **negative external charge**



INPUT

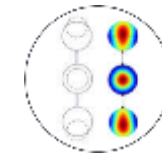


ELECTROMAGNETIC FIELD PROPAGATION

Particles' charge distribution **deforms their physical structure** when frequency is appropriately calibrated

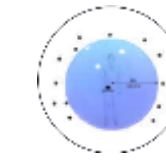


AIR PURIFICATION PROCESS



RESONANCE EFFECT ON PARTICLES

Inhibition of pathogens happens at light speed through resonant microwave absorption, process able to break the capsid of the viroid making it non-infectious



SAFE AREA

Exposed environment is sanitized instantaneously and without harmful effects thanks to real time activation and low irradiation power



OUTPUT

02.3 scientific tests and certifications

Our current Scientific Partners - Multidisciplinary integration

MILITARY POLYCLINIC OF ROME | CELIO

“Proof of concept” tests in the laboratories of the Scientific Department of the Military Polyclinic in Rome (between 2020 and early 2021 in their BSL3 class laboratories) identifying the operating range for the inactivation of the SARS-CoV-2 virus. In addition, Celio’s scientific staff viewed the results from the Virostatics laboratories, verifying the scientific validity of the protocols used. The tests were conducted in the class laboratories, by illuminating viral samples contained in small drops with microwave signals at different frequencies.

To check the inactivation ratio, the illuminated viruses were analyzed by plaque assay to measure the residual infectivity of the viruses, the titer of the illuminated viruses was then compared with the titer of the non-illuminated control sets to calculate the inactivation ratio at different frequencies.

UNIVERSITY OF MILAN – DEPT. OF BIOMEDICAL AND CLINICAL SCIENCES

Validation of e4shield™ technology efficacy for virus inactivation within infected bioaerosol:

- production of bioaerosol with a high viral titre inside a case within a Biosafety Level 3 (BSL3) ;
- microwave treatment;
- bioaerosol recovery through ‘impingement’ (vacuum pump).

VIROSTATICS

An innovative method for the spread of the virus in aerosol has been implemented by ELT, in cooperation with ViroStatics, in a controlled and safe way within a Biosafety Level 3 (BSL3) laboratory in Alghero, Italy. Aerosol tests were carried to validate the efficacy of the e4shield™ technology for virus inactivation within infected bioaerosol:

- production of bioaerosol with a high viral titre inside a case;
- microwave treatment;
- bioaerosol recovery through ‘impingement’ (vacuum pump).

POLITECNICO OF TURIN

Project managed in collaboration with the Department of Energy “Galileo Ferraris” (Prof. Marco Simonetti) – Experimental analysis to study the influence and interaction of the e4shield™ device vs different situations in a close ambient. Development of a forecasting risk model in coherence with ambient characteristics.

02.4 scientific test results

All the laboratory tests done, have confirmed an effectiveness against viruses higher than 90%

Representative results against SARS-CoV-2 and variants

Virucidal effect of microwaves

Viral titre Control Sample (average TCID ₅₀ /mL)	Viral titre Treated Sample (average TCID ₅₀ /mL)	% Inactivation
9.87E+04	9.18E+03	> 90

Representative results against the H1N1 influenza virus

Virucidal effect of microwaves

Viral titre Control Sample (average TCID ₅₀ /mL)	Viral titre Treated Sample (average TCID ₅₀ /mL)	% Inactivation
2.37E+03	< 100	> 90

02.5 scientific publications

“Viruses” 27 June 2023

Article title: SARS-CoV-2 Inactivation in Aerosol by Means of Radiated Microwaves



Abstract:

Coronaviruses are a family of viruses that cause disease in mammals and birds. In humans, coronaviruses cause infections on the respiratory tract that can be fatal. These viruses can cause both mild illnesses such as the common cold and lethal illnesses such as SARS, MERS, and COVID-19. Air transmission represents the principal mode by which people become infected by SARS-CoV-2. **To reduce the risks of air transmission of this powerful pathogen, we devised a method of inactivation based on the propagation of electromagnetic waves in the area to be sanitized.** We optimized the conditions in a controlled laboratory environment mimicking a natural airborne virus transmission and consistently achieved a 90% (tenfold) reduction of infectivity after a short treatment using a Radio Frequency (RF) wave emission with a power level that is safe for people according to most regulatory agencies, including those in Europe, USA, and Japan. To the best of our knowledge, this is the first time that SARS-CoV-2 has been shown to be inactivated through RF wave emission under conditions compatible with the presence of human beings and animals.

Additional in-depth studies are warranted to extend the results to other viruses and to explore the potential implementation of this technology in different environmental conditions.

02.5 scientific publications

“Medical Research Archives – European Society of Medicine” – November 2023

Article title: Endemic respiratory virus inactivation in aerosol by means of radiated microwaves



Abstract:

Background. Airborne transmission of endemic respiratory viruses, such as SARS-CoV-2 and influenza viruses, poses significant public health challenges.

Aims. This manuscript investigates the efficacy of electromagnetic waves as a novel approach for airborne virus inactivation in bioaerosol suspension, that is their natural route of transmission.

Methods. Using a bioaerosol system in a controlled laboratory environment, different variants of SARS-CoV-2 and the human influenza virus were exposed to resonant radiated microwaves within safe power levels.

Results. Radiated microwaves exposure led to a substantial reduction in the infectivity of highly transmissible SARS-CoV-2 variants, including the delta and omicron variants, achieving 80-90% reduction in infectivity. These variants exhibited susceptibility to the resonant radiated microwaves similar to the original Wuhan variant of SARS-CoV-2, confirming the effectiveness of this approach against a range of SARS-CoV-2 strains. Furthermore, the H1N1 human influenza virus displayed a 90% reduction in infectivity when exposed to microwave waves [.....]

Conclusions: These findings highlight the potential of radiated microwaves as a strategy for inactivating SARS-CoV-2 and influenza viruses. Further, they contribute to determining the optimal frequencies, exposure times, and power levels required for effective virus inactivation. This innovative approach could provide valuable insights for developing sanitization strategies and public health interventions to mitigate the airborne transmission of respiratory viruses.

02.5 scientific certification

RINA has validated the inactivation protocol of SARS-COV-2 in its variants and of the seasonal flu virus (H1N1 virus) through MRA approach



DICHIARAZIONE DI VALIDAZIONE VALIDATION STATEMENT

N° IPC-VAL-11

RINA SERVICES S.p.A., dichiara che il documento/ declares that the document

"RAPPORTO TECNICO: VALIDAZIONE DEL PROTOCOLLO DI INATTIVAZIONE DEL SARS-COV-2 NELLE SUE VARIANTI E DEL VIRUS H1N1 MEDIANTE FENOMENOLOGIA SRET/MRA"
"TECHNICAL REPORT: VALIDATION OF THE INACTIVATION PROTOCOL OF SARS-COV-2 IN ITS VARIANTS AND OF THE H1N1 VIRUS THROUGH SRET/MRA PHENOMENOLOGY"

(Rev. 1 del/of 14.01.2024)

Predisposto dall'organizzazione
Prepared by the organization

ELETTRONICA S.P.A

Via Tiburtina Valeria, km 13.700 00131 Roma (RM), Italia

dopo le valutazioni e le verifiche effettuate, risulta idoneo per la definizione delle modalità di attuazione, controllo e verifica dei risultati del:
after the assessments and verifications carried out, it is suitable for the definition of the implementation methods, the monitoring and the results verification for the:

PROCESSO DI SANIFICAZIONE DI AMBIENTI ESEGUITO ATTRAVERSO LA TECNOLOGIA E4SHIELD MEDIANTE L'UTILIZZO DI RADIAZIONI ELETTROMAGNETICHE (FENOMENOLOGIA SRET/MRA) VALIDATO AI FINI DELL'OTTENIMENTO DI UN EFFETTO ANTIVIRALE (SarsCoV-2 e H1N1) NELLE CONDIZIONI STABILITE DAL RAPPORTO TECNICO

SANITIZATION PROCESS OF ENVIRONMENTS CARRIED OUT THROUGH E4SHIELD TECHNOLOGY THROUGH THE USE OF ELECTROMAGNETIC RADIATIONS (SRET/MRA PHENOMENOLOGY) VALIDATED FOR THE PURPOSE OF OBTAINING AN ANTIVIRAL EFFECT (SarsCoV-2 and H1N1) UNDER THE CONDITIONS ESTABLISHED BY THE TECHNICAL REPORT

e che pertanto si ritiene validato / and which is, therefore, considered validated

AI FINI DELL'OTTENIMENTO DI UN EFFETTO ANTIVIRALE NELLE CONDIZIONI STABILITE DALLA SPECIFICA FOR THE PURPOSE OF ACHIEVING AN ANTIVIRAL EFFECT UNDER THE CONDITIONS ESTABLISHED BY THE SPECIFICATION

Nel rapporto di validazione è riportata una sintesi delle attività svolte e delle evidenze oggettive acquisite.
The validation report contains a summary of the activities carried out and of the objective evidence acquired.

La presente dichiarazione di validazione non è intesa né appropriata per scopi di certificazione.
This declaration of validation is neither intended nor appropriate for certification purposes

Data di rilascio: 15/01/2024/ Date of issue: 15/01/2024
Emissione corrente: 15/01/2024/Current emission: 15/01/2024

Amilcare RINI
Manager, Roma Certification

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03.
**The current
market offer**



Life is in the air

03.1 our current market solutions to defend our lifestyle

e4shield™ is actually deployed in two devices, one portable and one for wall installations

e4you





e4ambient



e4life

03.2 products features

NAME	e4you	e4ambient
		
COVERAGE	Generates a safe area within a diameter of about 6 meters	Ensures extensive sanitation coverage of about 50 square meters
BATTERY	Guarantees 8 hours durability with USB rechargeable batteries	Relies on USB rechargeable batteries with 4 hours of autonomy
DESIGN	Ensures ease of use thanks to its pocket size (8x8x2cm) Exhibits plastic cover transparent to electromagnetic radiation	Displays a non-cumbersome design (15x15x3cm) Presents manageable hanging components to be easily moved on the wall
LED	Uses coloured led lights for status communication	Uses coloured led lights for status communication
RECOMMENDED FOR	Risk categories members Families and home Young people Workers Elders	Transport Offices and schools Hospitals HORECA Gym and leisure Supermarkets, Shops and retail stores

A group of people are laughing and eating at a restaurant. The scene is lively and social, with warm lighting and a blurred background of other diners. In the foreground, a woman is smiling broadly while holding a plate of food. To her left, a man is also laughing. The overall atmosphere is one of joy and companionship.

eatyou

Always with you

03.3 mobile device: e4you

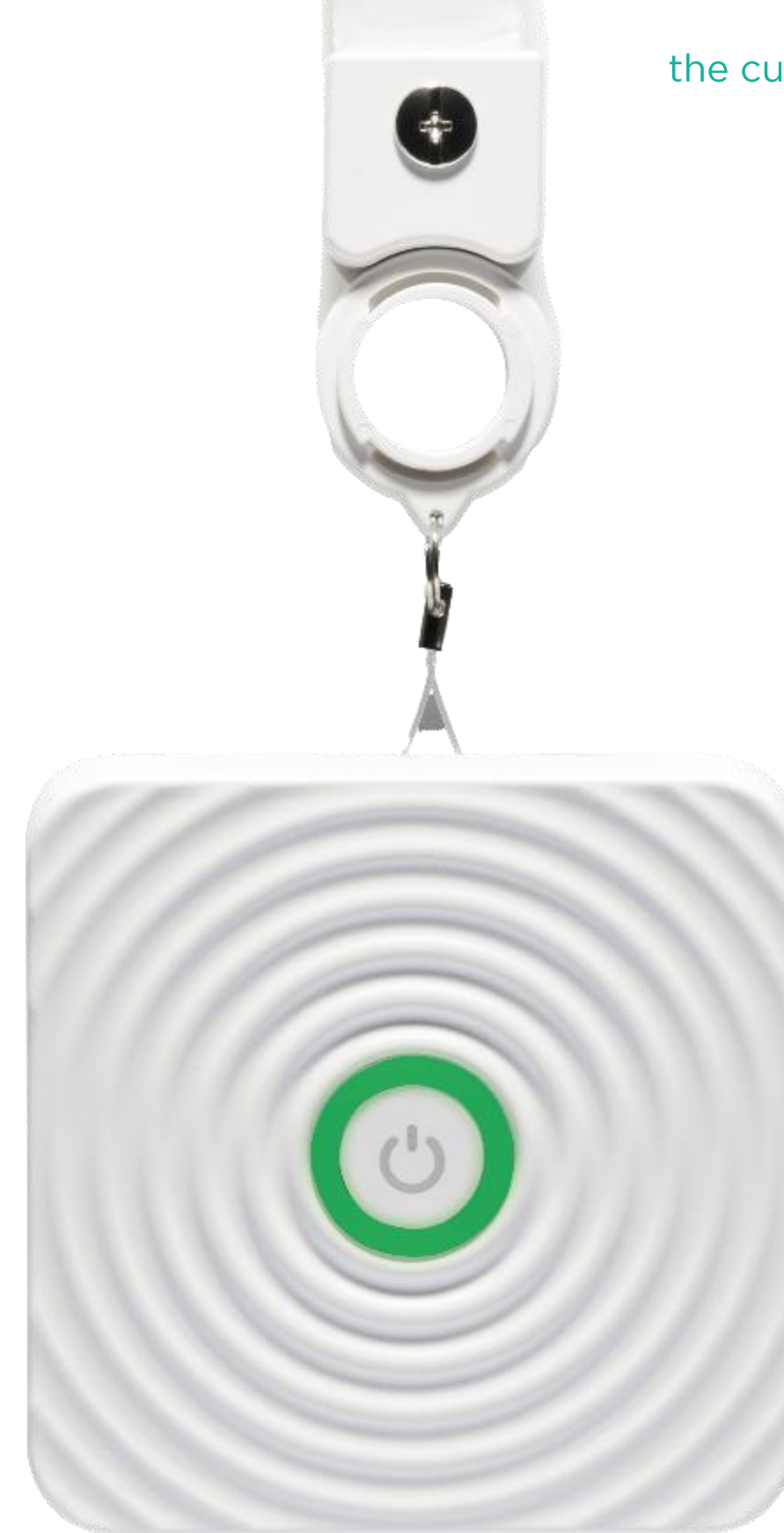
The logo for 'e4you' features the word 'e4you' in a bold, teal-colored font. The '4' is stylized with a white grid pattern. The logo is set against a background of concentric, light teal circles that resemble ripples in water.

PORTABLE DEVICE

- Safe, wherever you are
- “Very personal device” effective in the living space
- Stationary or in motion the device generates an effective inactivation of the virus up to about 3 meters around the individual.
- It’s simple and compact but with a technologically advanced processor to manage frequencies, times and battery status

HOW IT WORKS

- The electromagnetic signal, synthesized and amplified is emitted in all directions through an internal antenna with a specific shape, able to create a “defending bubble” all around the giver
- The electromagnetic wave instantly destroys the external shell of viruses
- Viruses are inactivated

The logo for 'e4life' features the word 'e4life' in a bold, teal-colored font. The '4' is stylized with a white grid pattern. The logo is set against a background of concentric, light teal circles that resemble ripples in water.

A teacher in a light blue blazer and pink top is smiling and giving a high-five to a young girl in a red shirt. The teacher is holding a stack of papers. In the background, other students are seated at desks in a bright classroom with large windows.

equambient

Your spaces in safety

03.4 wall device: e4ambient

e4ambient

WALL DEVICE

- Inactivation of the virus in every environment. Antenna shape in this case guarantees the front coverage
- Easily wall - fixable, plug and play utilization, removable if necessary, it generates broad coverage waves through indoor environments A device harmless for humans, which neither require people to leave while the device is active, nor the ventilation of the premises



03.5 e4life for B2B Customers

PRODUCTS



VALUE FOR THE CUSTOMER

- Disinfect spacious environments
- Maximize protection when combined with multiple devices
- Signal environment and battery status through color LED light

B2B CUSTOMER PROFILE EXAMPLE



Buyer Type (example)

Public and private companies that were obliged to remote working during lockdown.



Purchase rationale

Provide sanitized work environment for professionals and operators
 Protect personnel's health
 Ensure continuity of working activities
 Increase prestige of Company Brands through recognized safety certification



Type of use

Daily usage at set times
 Sporadic usage for public events and meetings

TARGET SEGMENTS



1. Public and private offices;

2. Hotel, restaurants and cafés;

3. Shops and minimarkets

03.6 e4life for B2C Customers

PRODUCTS



VALUE FOR THE CUSTOMER

- Prevent individuals infection through aerosol
- Carry protection everywhere
- Safe and effective for everyone
Easy to use

B2C CUSTOMER PROFILE EXAMPLE



Buyer Type (example)
Mother of family with children that commutes to work with public transportation everyday



Purchase rationale
Prevent respiratory infection through daily commute
Protect herself and her family from contagion



Type of use
Daily usage for public commute
Sporadic usage for travel and long-distance journeys

TARGET SEGMENTS



04. The evolution roadmap



04.1 evolution areas

The main evolution areas: e4life market solutions to defend our lifestyles

RESEARCH ACTIVITIES

NEW TECHNICAL APPROACH

NEW FACILITIES

PARTNERSHIPS

04.2 research activities

TESTS ON VIRUSES

- H1N1 and H3N2: continuous updating of the inactivation protocol in order to be effective on the new influenza viruses;
- H5N1: Aviaria;
- CCHF, Crimean-Congo Hemorrhagic fever virus;
- SARS, Severe acute respiratory syndrome;
- MERS: Middle East Respiratory Syndrome
- RSV, Respiratory Syncytial Virus.

TESTS ON BACTERIA

Subject to tests results, we will develop a new «dual mode» device to be able to inactivate both Virus and Bacteria (at least 1 year for POC and industrialization)

- Pneumococcus;
- Legionella.

SCIENTIFIC DISSEMINATION

- Planned at least 2 scientific publications per year in the next years.

**Focus on running
more than 300
annual tests**

04.3 new technical approach & new facilities

NEW TECHNICAL APPROACH

TEST SETUP FOR PATHOGEN INACTIVATION

- New Aerosol set up test to increase control on produced aerosol and on main KPI such as: pressure, droplets dimension;
- Aerosol setup to test inactivation for bacteria pathogens.

SENSING TECHNOLOGY

- Development of an air monitor, able to map virus presence in the air;
- System creation with the e4shield Device to tune the frequencies in coherence with the pathogen presence. At least 2 years required for tests and industrialization.

NEW ASSETS

ACQUISITION OF BIOTECH COMPANY ASSETS SHARES

- Goal: to have a direct access to the scientific laboratory and resources to guarantee a continuous capacity of tests and analysis.

04.4 partnerships

Continuous involvement of new partners to enrich competences and capabilities

- **New York University** - focus on developing new biosensor technology (sensing solution);
- **Campus Biomedico of Rome** - focus on Bacteria Aerosol setup to test inactivation for bacteria pathogens;
- **University of Milan** - to reinforce tests results on Covid and to extend tests on additional viruses;
- **Policlinico A. Gemelli** - to test inactivation for additional bacteria pathogens;
- **Virostatics** - focus on running recurrent tests on several viruses;
- **Politecnico di Torino** - Development of a forecasting risk model in coherence with ambient characteristics considering e4shieldtm and air fluid dynamics behaviour

**Multy years
agreements
and
collaboration
with several
institutes**

Thank you

eu-life