



[HERO21]

CLEANEST GERMAN ENGINEERING

Discover the most efficient **UV-C disinfection robot**:
Pioneering disinfection technology for the hygiene requirements of our time.

ICA GROUP

A COMPANY ON THE PATH OF INNOVATION

We at the ICA Group are an owner-managed and independent medium-sized company with highly respected engineering expertise. Founded in 1986 by Dipl.-Ing. Heinz Sander, we have had excellent expertise in the field of technology for more than three decades and have dedicated ourselves to the independent development of innovative and forward-looking technologies and system

integrations. Across Germany, ICA is the market leader in the field of ticketing systems and is also active in the healthcare sector since 2019.

We offer our customers individual consultation and develop tailored solutions for them. Even after the installation of the products, we are there for you and support you beyond different services.

HERO21

Developed in 2019, the HERO21 is a scientifically grounded UV-C disinfection robot that has been developed, validated and tested together with the Ruhr University Bochum.

With the HERO21, we are meeting the hygiene challenges of our time with the most modern technology. The management of a global pandemic, the shortage of skilled workers and the need for comprehensive digitalisation. With the HERO21, ICA presents a disinfection robot with which users can overcome all these challenges.

Autonomous, reproducible and efficient, the HERO21 provides sustainable disinfection performance.

The robot is convincing in everyday practice at the customer's site as well as in the laboratory.



HERO21:

The UV-C disinfection robot: the answer to the disinfection challenges of the future, today!

UV-C VS. HOSPITAL GERMS

DISINFECTION IS MORE IMPORTANT THAN EVER

In hospitals, viruses and bacteria have always posed a serious threat to patients and staff. It is estimated that **400,000 to 600,000 people** are infected with **multi-resistant germs** every year **throughout Germany**. 20,000 patients die from them every year. Hospitals have therefore been

looking for more effective disinfection solutions not just since the coronavirus pandemic.

Now this topic has become even more the focus of public interest.

CONVENTIONAL PROCEDURES PROVIDE INADEQUATE SOLUTIONS TO THE PROBLEM

A lack of or inadequate disinfection can lead to long-lasting damage within a hospital. In addition, **manual disinfection** sometimes **only reaches half of the surfaces to be disinfected**. Consequently, **sufficient disinfection of room air or sealed-off surfaces cannot be guaranteed**.

The expanded disinfection area of the HERO21 ensures that not only the objects in the application environment are disinfected, but also the walls, ceilings, floors, and ambient air within a radius of 1-3 meters. Disinfecting with hydrogen peroxide, however, requires considerable preparation and post-processing efforts, resulting in extended downtimes for cleanrooms.

For more information on the topic of efficiency and service, see page 10.



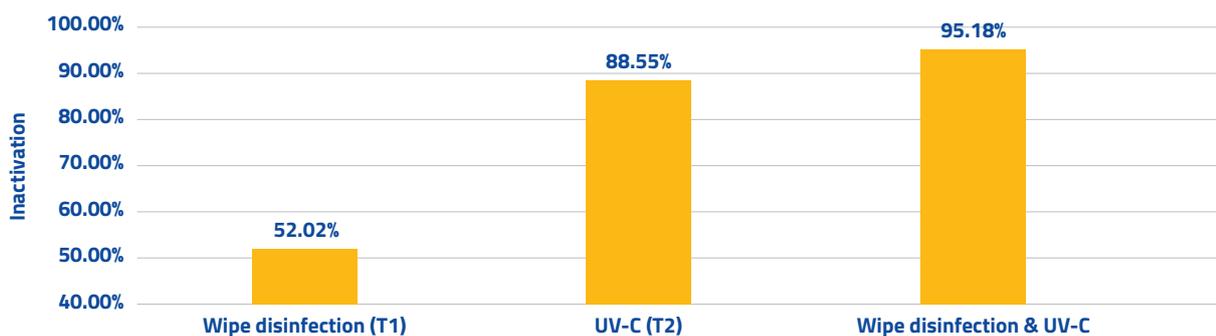
THE MOST EFFECTIVE DISINFECTION METHOD

UV-C radiation has been used successfully for several decades in drinking water treatment and industrial food production. This method has decisive advantages in the fight against viruses and bacteria: UV-C radiation penetrates to the genetic material of bacteria, fungi or viruses and

prevents reproduction by damaging DNA or RNA, as the germs have no protection against UV-C radiation. A large number of studies prove the effectiveness and the necessary radiation doses for inactivating viruses such as the current SARS-CoV-2 pathogen.

INACTIVATION PERFORMANCE: AVERAGE VALUES

Samples taken: over 1000 samples



Source: Ruhr University "Hero2021 Validation" report, 10.02.2021

FROM THE LABORATORY TO THE FIELD

In extensive validations, the HERO21 was prepared for the fight against germs and bacteria. In **four different certified S1 and S2 genetic laboratories, the robot's disinfection performance was convincing**. In addition to the extensive tests in the laboratories, the HERO21 was also tested in everyday practice. The results of the test phase

at the Catholic Hospital Bochum are clear. The HERO21 **disinfects more reliably and sustainably than the conventional disinfection methods used today**. The evaluations of the Ruhr University Bochum show that by using the HERO21 as a supporting disinfection measure, **over 40% more germs are disinfected than before**.

TECHNOLOGY MEETS SCIENCE

In the certified genetic laboratory, basic physical investigations were carried out by means of spectroscopy in order to accompany the optimal development of the UV-C lamps used and their control and to define the ideal working points.

The selected UV-C lamps performed convincingly the efficiency test in the laboratory against six alternative lamps. The strongest germicidal effect of the radiation is in the range between

250-270 nm. UV-C radiation with a wavelength of 254 nm, as used in HERO21, is therefore ideal for disinfection and effectively combats all viruses and bacteria. Microbiologist Dr Felix Fuchs also provided evidence of efficacy with very resistant endo-spore-forming bacteria (*B. subtilis*). Here it could be shown that thanks to the autonomous movement of the robot, a reduction of germs could be achieved even in hard-to-reach places such as undercuts.

» **The robot can take on all germs and viruses – including MRSA – everywhere: in the air and on surfaces.** «

Dr. Prof. Awakowicz,
Chair of electrical engineering and
plasma technology at the Ruhr University in Bochum.

MICROBIOLOGICAL EXAMINATIONS

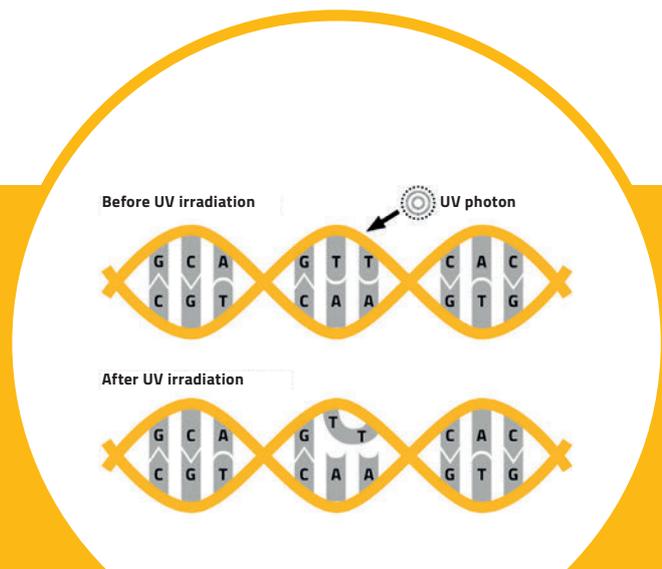
Ruhr University Bochum determined the following results for *B. subtilis* in the basic investigations (distance between lamps and germ carrier = 1m):

Logstages / reduction in %	Disinfection time (in s)
Log 1 / 90%	5.9 s
Log 3 / 99.9%	17.7 s
Log 5 / 99.999%	29.5 s

Determination for other germs
(based on the fundamental investigations):

Germ	Disinfection time (reduction by 5 logos)
<i>E. coli</i>	7.5 s
<i>S. aureus</i>	12 s
<i>B. tuberculia</i>	24.5 s

PHYSICAL PRINCIPLE OF ACTION



HIGHEST SAFETY

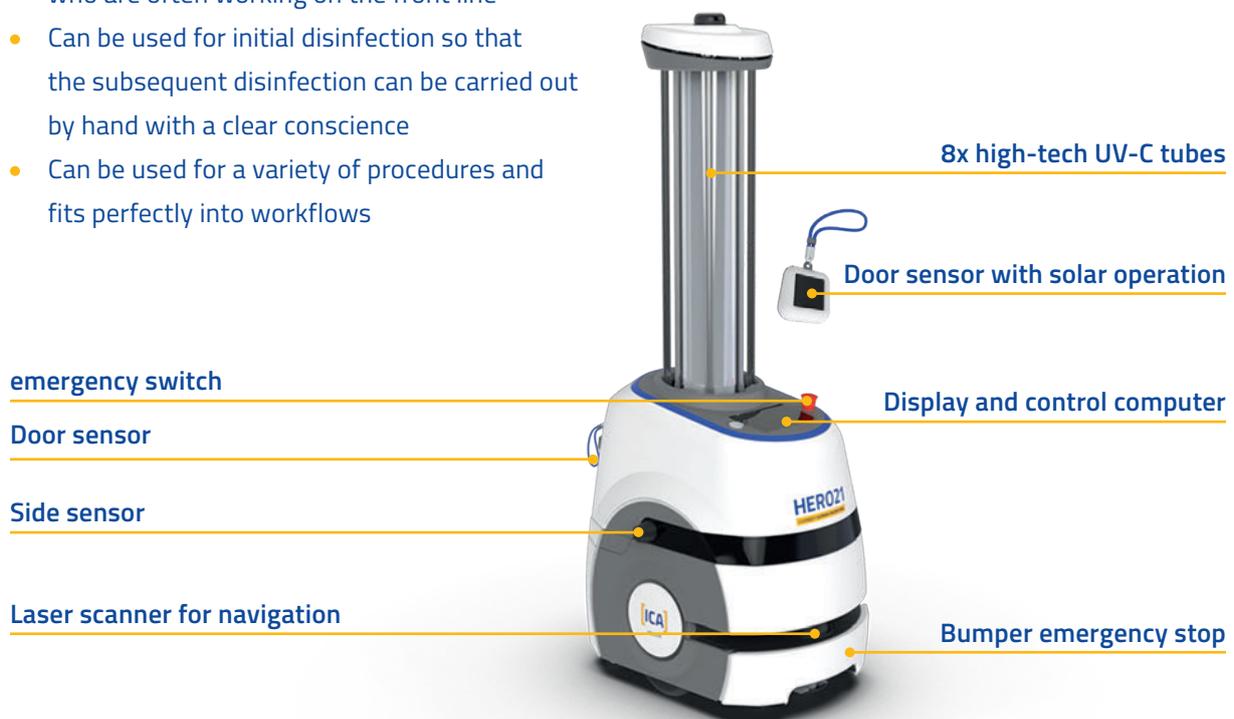
QUALITY MADE IN GERMANY

The HERO21 stands for Health Robot of the 21st century and features state-of-the-art technology:

- Moves completely autonomously and can be used anywhere
- Controlled via app
- Independently scans premises and saves the data
- Protects especially the cleaning staff who are often working on the front line
- Can be used for initial disinfection so that the subsequent disinfection can be carried out by hand with a clear conscience
- Can be used for a variety of procedures and fits perfectly into workflows

multi-level safety concept

- 1 Safe by design and FMEA
- 2 Safe through app log-in
- 3 Safe through queries in the app
- 4 Safe through door sensors
- 5 Safe by lidar front (intrinsic safety)
- 5.1 Safe through lidar side (intrinsic safety)
- 6 Safe through emergency stop



GLOBALLY UNIQUE, MULTI-LEVEL SAFETY SYSTEM

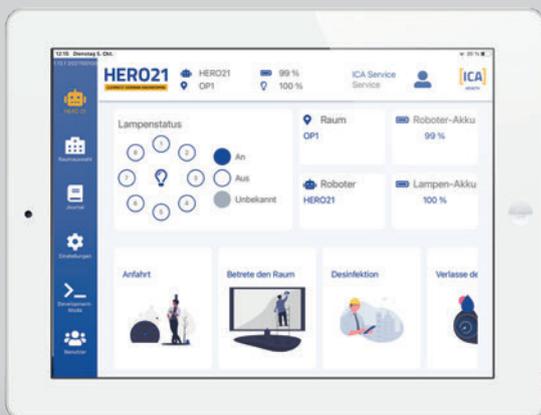
The multi-level safety system has thought of everything. Specially developed door sensors ensure automatic shutdown when the door is

opened. In addition, the HERO21 has an emergency switch.

EASE OF USE / SERVICE (APP)

The HERO21 is controlled using its own specially developed app. It has a simple and intuitive operating concept that is designed to be user-friendly and thus optimally supports the operators in their work. With the help of the HERO21 app, all disinfection processes are documented automatically. The comprehensive documen-

tation enables you to better plan and reproduce your disinfection processes. Due to the complete, automated verification possibility, errors caused by human action are prevented, which provides even more safety. The system is flexibly designed and can therefore be optimally integrated into your workflow.



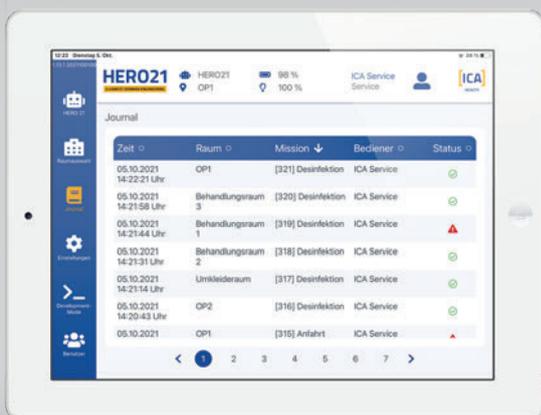
1.

A simple and clear start screen directly displays the most important information about the HERO21.



2.

In the room overview, you can quickly and easily find and change the places where the HERO21 is used.



3.

The comprehensive documentation ensures better planning and a higher reproduction of the entire disinfection processes.

OTHER AREAS OF APPLICATION

The HERO21's disinfection performance is not only convincing in everyday hospital use. The HERO21 also impresses in other working areas, such as hotels or office buildings, with its fast

and unerring UV-C disinfection. The simple and very flexible integration enables use in almost any work area and protects your employees, guests or patients.



SUSTAINABILITY IN DISINFECTION

UV-C disinfection is the first step towards environmentally friendly and sustainable disinfection. Disinfection by means of light does not leave any residues. The extremely long-lasting lamps also save valuable resources. Regular use of the HERO21 also significantly reduces previous disinfectant consumption.



HERO21: TECHNICAL DATA

Size W*H*D	Approx. 55 cm x 155 cm x 70 cm
Operating locations	Clean room environments, laboratories, hospitals, pharmaceutical industry, food productions, hotels
Safety	Multi-level safety system, including shutdown when the door is opened; object detection using laser sensors
Speed	0,1 m/s
Disinfection time	10–15 minutes per 25 m ²
Disinfection cover	360°
Operating time	3.5 hours
Navigation	Free navigation; HERO21 scans the room independently and saves room data
Connectivity	LTE / 5G Wi-fi / LAN / RS-232
Configuration	8 UV-C lamps, 254 nm
Control	Via App



ADVANTAGES AT A GLANCE

- Effective against viruses, bacteria and fungi
- Accelerated disinfection process
- Increasing the quality of disinfection
- Expansion of the disinfection area including floors, walls, ceilings and ambient air
- Reproducible and documentable disinfection process
- Plug and play solution with intuitive operation via app
- Simple integration into existing workflows and environments without any additional adaptation effort
- Provides greater relief and protection for staff
- Significantly lower likelihood of resistance development compared to chemical methods

ECONOMIC EFFICIENCY & SERVICE

The HERO21 offers significantly more proven effectiveness, safety through German engineering, a nationwide service infrastructure - and all this at an unbeatable list price. Convince yourself and

test the HERO21 without obligation! We would be happy to provide you with a personalized offer and advise you on the possibilities of a trial based on your application area.

ECONOMIC EFFICIENCY

Due to the longevity of its components and the resulting low operating costs, the robot convinces with an optimal price-performance ratio and high economic efficiency throughout the entire

product lifecycle. The optimal integration into your work processes ensures a measurable increase in disinfection performance while simultaneously reducing disinfection costs.

SERVICE

ICA offers a comprehensive service package that can be tailored precisely to suit your needs. From regular maintenance and fast customer service to on-site support and a robot

replacement service in the event of a major defect, ICA provides operational reliability throughout the entire product life cycle.

RAYA AWARD

The UV-C disinfection robot HERO21 has been awarded the coveted RAYA Award, once again proving its superiority. The „Robotics Application Awards of the Year“ (RAYA) by the International Society for Pharmaceutical Engineering (ISPE) are a new annual awards program that recognizes innovative applications of robotics technologies in laboratories and production facilities. The RAYA Award serves as an outstanding platform for promoting the progressive use of modern robotics in the industry. The HERO21 impressed

the panel of experts from the pharmaceutical industry with its outstanding user-friendliness, simple integration into existing processes, and impressively fast Return on Investment (ROI). This recognition underscores the innovative power and performance of our UV-C disinfection robot, which not only sets the highest standards in disinfection but also significantly improves efficiency and safety in pharmaceutical environments.

CUSTOMERS TRUST IN OUR PERFORMANCE

Dr. Friederike Lemm,
Head of Hospital Hygiene
at KKB

» Especially for high disinfection areas or in places with a high disinfection effort, the robot is an excellent addition.«



Carsten Löhmer,
CEO Loewe Biosecurity

» The HERO21 is the optimal complement to existing disinfection processes in the hotel industry and on cruise ships to ensure the maximum possible hygiene safety and the greatest possible well-being of guests and staff. The HERO21 is particularly convincing thanks to its effectiveness, simple operation and very good navigation in confined spaces.«



Markus Hofherr,
Director V8 Hotel Motorworld
Stuttgart

» With the HERO21, we gain another strong protector of our guests and staff and disinfect in an environmentally friendly and sustainable way.«



Unsere Partner:





Federal Ministry
for Economic Affairs
and Climate Action



HERO21

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