corpuls.digital

corpuls®

FOCUS - ON - PATIENTS

TELEMEDICINE

Communication platform with video conference, real-time values and curves and remote diagnostics

corpuls.mission

BIG DATA

After the mission is before the mission: Simple data management, debriefing and analysis

corpuls.manager

corpuls®

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Art.-Nr. 76144.01020 Vers. 2.0 (05/2024)

DEAR READER,

Telemedicine is no longer just a trend for some time now, it is becoming an established part of health care. One important component is the tele-EMS physician system for which the necessary infrastructure is now being installed everywhere in Germany, Austria and Switzerland. Its main purpose is to save resources and bridge gaps in EMS care. But telemedicine can do so much more. As a tool for communication between patients and medical personnel on the one hand and as a link between different medical institutions on the other hand, there are countless possibilities for networking. They allow for a more efficient use of medical resources, independent of time and space. So, as a result, the quality of health care is improved. We should use this chance!

And: The more flexible the infrastructure is designed, the more areas of application and specialists can be involved and the more patients can benefit. Whether it is relocation transports, doctor's house calls, intensive care institutions, psycho-social services or remote areas - telemedicine can be used any place, wherever medical help is needed. Borders - whether between different fields of medicine, different care sectors or due to distances - need no longer play a role.

corpuls.mission is the answer to all conceivable areas of use in telemedicine. Our flexible communication platform can be adapted individually to all kinds of needs. No matter which circumstances or to what extent - from the live transmission of all medical readings and values, to video conferences via smartphone or fully connected rescue vehicles. **corpuls.mission** offers a homogeneous overall concept of remote diagnostics, video conference system and documentation.

But an integrated system solution should not end with the patient handover. Those who learn from yesterday and today can be prepared for tomorrow. It is precisely this gathering of knowledge and learning from all the mission information that is collected in **corpuls.manager**. From device management, mission archiving and debriefing to Dashboards for statistical evaluation, our Data Analytics Platform is the basis for your decisions. Generate new knowledge and keep track of and control over your data. With **corpuls.mission** and **corpuls.manager** you have the tools to master the challenges in today's health care system. Equip your staff with well thought out, innovative medical technology and optimise the quality of health care. On the following pages you will learn how to integrate **corpuls.mission** and **corpuls.manager** seamlessly into your workflows and how to already use today a piece of future technology.

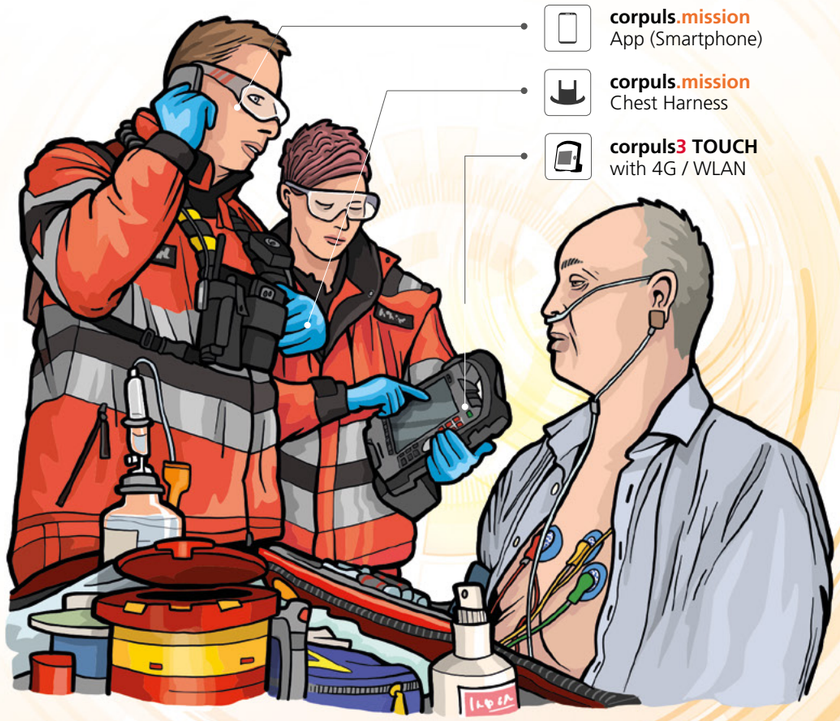
Sincerely,

Dr. Christian Klimmer
CEO

Klaus Stemple
CTO

Christoph Graumann
VP Application Software

CONTENT

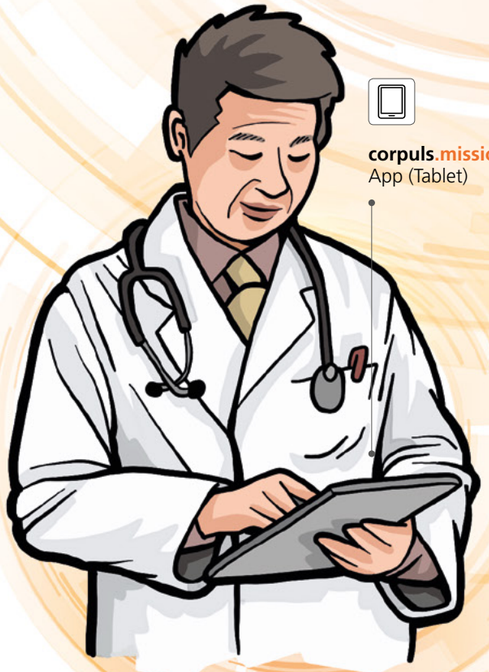


corpuls.mission
App (Smartphone)

corpuls.mission
Chest Harness

corpuls3 TOUCH
with 4G / WLAN

Rescue Service



corpuls.mission
App (Tablet)

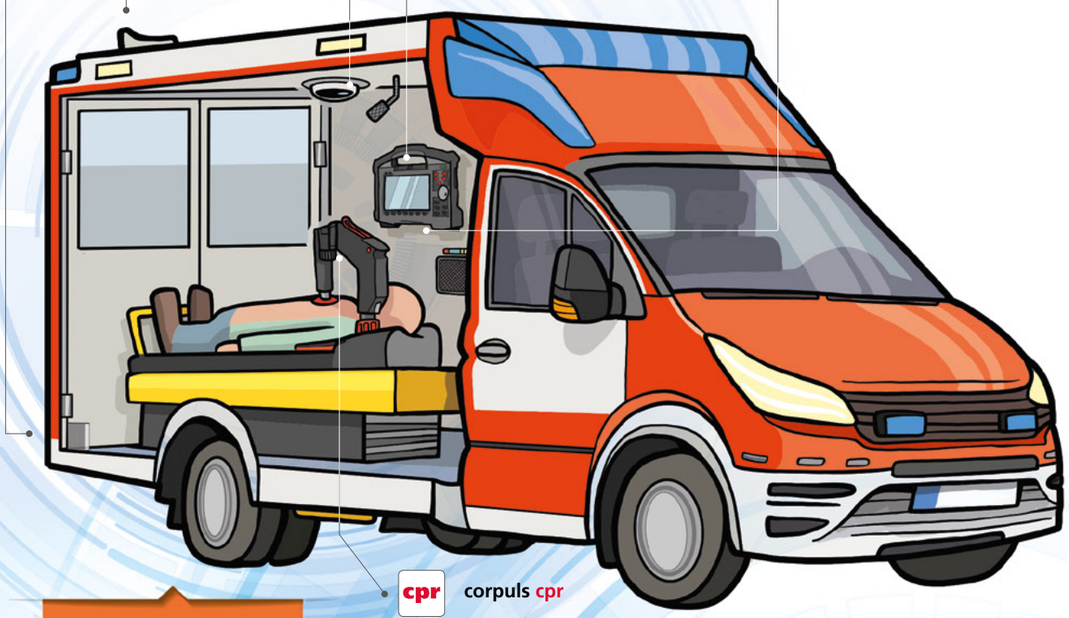
Specialists & Experts

SYSTEM SOLUTION
TELEMEDICINE

The world of emergency rescue is as diverse as the people working in it. There is no guaranteed telemedicine formula that works in every region and every country.

At **corpuls**, we have always considered medical technology as a system in which the focus is on the user and the patient. In our opinion, emergency treatment is much more complex than just a linear rescue chain, because in a good system all components are networked with one another in order to achieve a common goal. This rescue network is perfectly supported and supplemented by the **corpuls system**.

At the center of telemedicine is **corpuls**.mission – from the live transmission of all parameters and curves, to video conferencing via smartphone, to fully networked rescue equipment: No matter which configuration level you are running in your area – **corpuls** supports you with a system solution tailored to your needs.



Network Technology

Cellular Antenna

360° Camera (optional)

corpuls3 TOUCH
with 4G / WLAN

Hands-free System

cpr corpuls cpr

Ambulance

Headset

corpuls.mission
Web Application

Tele-Medic

corpuls.mission

THE COMPLETE TELEMEDICAL SOLUTION

corpuls.mission is a medical communication platform that puts the patient at the centre. **corpuls** brings knowledge together where you need it most: on the mission.
Adequate patient treatment requires, above all, specific knowledge. However, the complexity of medicine cannot rest on the shoulders of a single specialist. With the help of **corpuls**.mission, you get the knowledge required and technical expertise at the mission site – by combining medical data, chat, video and documentation, you can find all the relevant information in one place.
corpuls.mission is designed for the special requirements of preclinical missions, but it stands out from classic communication solutions in important areas. View resting ECGs and photos of medication plans next to the live curves from the **corpuls3**. And all this with the usual **corpuls** quality and data protection "**Made in Germany**".

corpuls.mission LIVE

LIVE

- **Smart telemedicine** with live connection
- **Vital parameters and curves** in real time
- **Measurement** and **interpretation of 12-lead resting ECG**
- Embedding of **ECGmax**: 22 leads from 10 electrodes, vectorloops and **CEB®** – can be used directly in the application
- **Automated forwarding** and flexible interfaces for data export
- **Multiple patient monitoring** and **visual highlighting** of events

corpuls.mission CONFERENCE

CONFERENCE

- **Patient orientated communication**
- **Video consult**: Live consultation from physicians or specialists via (video) telephony and chat
- **Picture, video** and **voice messaging**
- **Available** for **Web, iOS** and **Android**
- **Tactical units** (e.g. control centre, ambulance service) rather than individuals allows easy selection of the communication partners that are required

corpuls.mission REPORT

REPORT

- **Legally secure documentation of the telemedical treatment measures taken**
- **Collaborative mission documentation**
- From **anamneses to handover**
- **A single report from all participants** (e.g. ambulance and tele-medic)
- **Interfaces for archiving** and **transferring data**

corpuls.manager

THE DATA MANAGEMENT SOLUTION FOR CONTINUED QUALITY

The mission does not end when the case is closed. The data collected helps you to continually improve. This not only benefits future patients, but also the profitability of your organisation. With **corpuls.manager** you bring this 'loose' data together and obtain new knowledge from it. Thus, you can keep track of and control over your data.

Immerse yourself in the details of a single mission or look at all missions as a whole. Automatic mission upload provides you with the most up-to-date information, displayed in clear illustrations and diagrams. Supported by artificial intelligence, you can discover new correlations and save time evaluating.

corpuls.manager ANALYSE

ANALYSE

- **All mission data from your corpuls** devices in one safe place
- New insights through **business intelligence**
- Extensive **search and filter functions**
- Organisation-wide **quality management**
- Support for **research and training**
- Powerful **dashboards**

corpuls.manager ADMIN

ADMIN

- **Connected device management** via **WLAN** or **SMS**
- **Over-the-air-updates**
- **Automatic status reports**
- **Notifications** via **E-Mail**

corpuls.manager REVIEW

REVIEW

- **Detailed mission evaluation**
- Display of all **curves and parameters**
- Mission **debriefing**
- Evaluation of training **requirements**
- **Free cross-device tool** for all **corpuls** customers

FROM ALARM TO QUALITY IMPROVEMENT

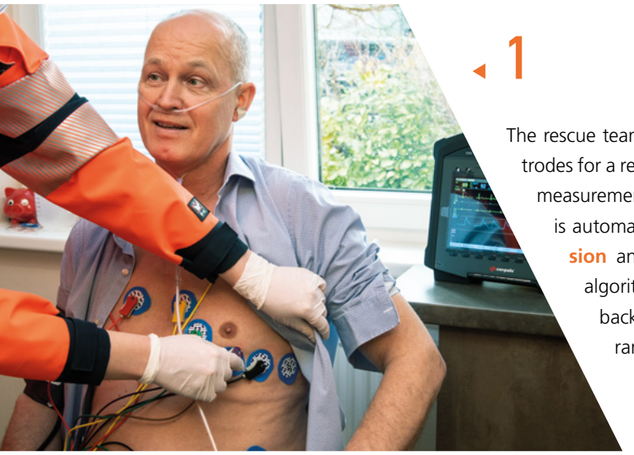
For both rescue service personnel and those at **corpuls**, the focus is always on the patient. Together we pursue the same goal: to ensure the quality of treatment in the long term and continuously improve it. During the mission – and after it. With **corpuls**.mission and **corpuls**.manager we support you throughout the entire course of treatment, from the alarm to the debriefing and beyond.

Mission Scenario

corpuls.mission

MISSION SCENARIO

The alarm sounds in the ambulance station – a new mission for Ambulance 2. The digital messenger shows the keywords "unconscious collapse", the address is a single-family house. The rescue team finds a 47-year-old patient on site. He dialled the emergency number himself as he suddenly became short of breath and generally did not feel well. In the initial anamnesis, the patient mentions COPD and diabetes mellitus as previous illnesses.



1

The rescue team applies the 10 electrodes for a resting ECG and starts the measurement on the **C3T**. The ECG is automatically sent to **corpuls.mission** and analysed by the **ECGmax** algorithm. A webMessage comes back: The **CEB®** is in the abnormal range at 259.

3

Thanks to the live data transmission of the **C3T**, the tele-medic immediately has a good overview of the patient's condition.

The paramedics summarize their findings so far via video.

ALARM FOR THE AMBULANCE

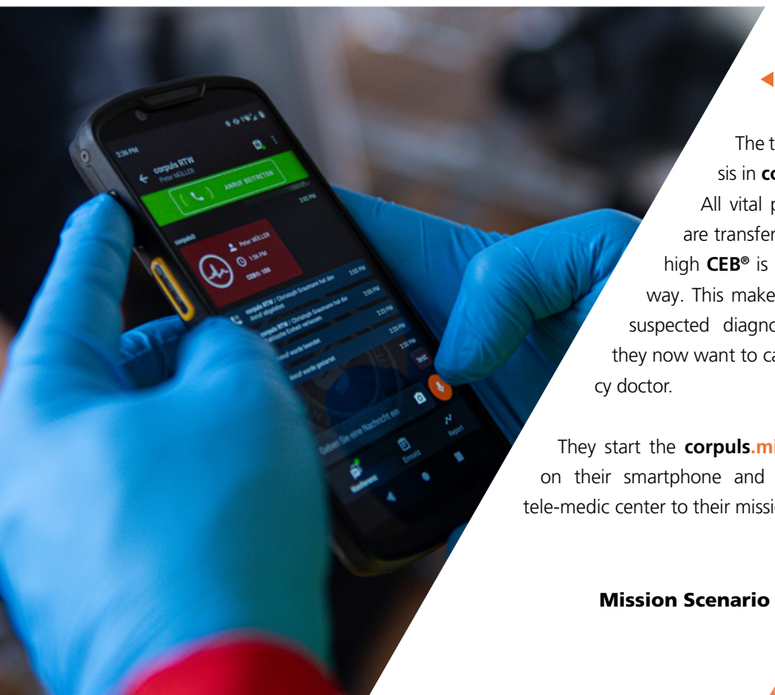
ARRIVAL AT PATIENT

ECG RECORDING

TELE-MEDIC CALL

BREATHING SOUNDS RECORDED

PHOTO OF MEDICATION PLAN



2

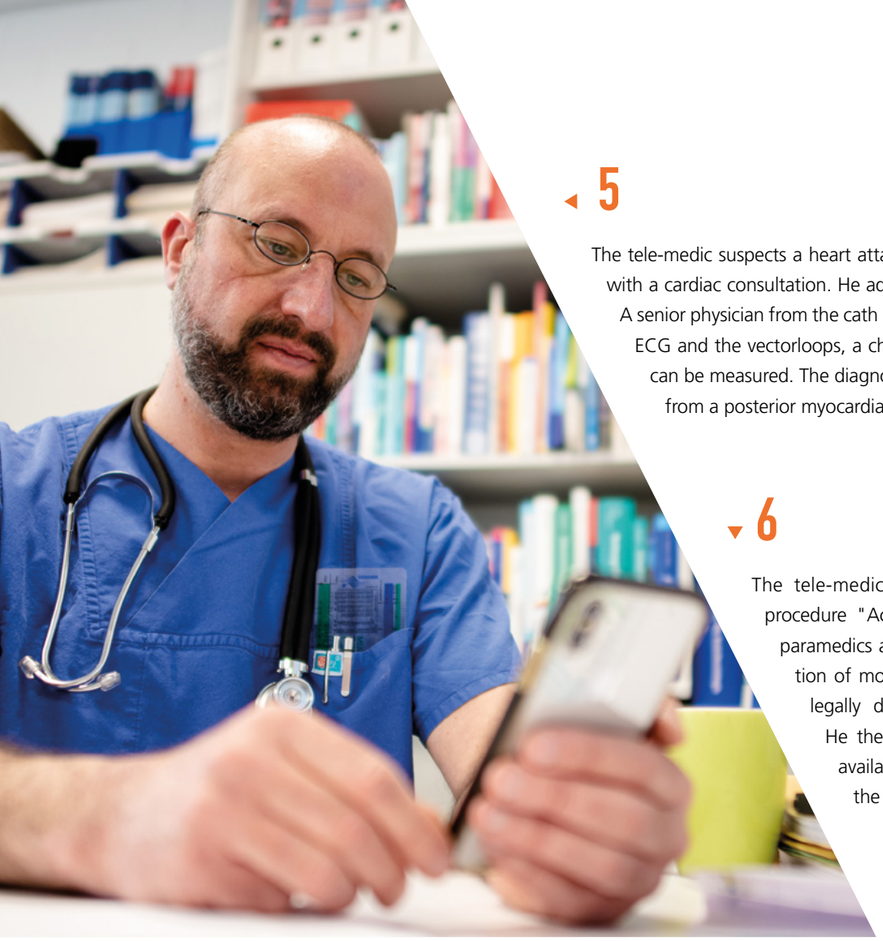
The team documents the initial diagnosis in **corpuls.mission REPORT**.

All vital parameters and patient data are transferred directly and easily. The high **CEB®** is also documented in this way. This makes the team doubt the suspected diagnosis, which is why they now want to call in an emergency doctor.

They start the **corpuls.mission** app on their smartphone and add the tele-medic center to their mission.

4

In order to be able to better assess the shortness of breath, the paramedics transmit an audio recording of the breathing sounds. In addition, the patient's medication plan is photographed and sent via the **corpuls.mission** chat.



5

The tele-medic suspects a heart attack and would like to confirm this with a cardiac consultation. He adds the hospital to the conference. A senior physician from the cath lab joins the call. Using the 22-lead ECG and the vectorloops, a change in the ST-segment in V7–V9 can be measured. The diagnosis is clear: the patient is suffering from a posterior myocardial infarction.

6

The tele-medic sends the standard operating procedure "Acute Coronary Syndrome" to the paramedics and also delegates the administration of morphine. The treatment measure is legally documented in **corpuls**.mission. He then ends the video call, but is still available to the team via the chat during the entire patient transport.

CARDIOLOGICAL CONSULTATION | MORPHINE DELEGATION | HANDOVER | MISSION END | RETURN TO BASE | DATA TRANSMISSION

7

On arrival at the hospital, the emergency department is already informed and send the patient directly to the cath lab. Thanks to the early transmission of the 22-lead ECG, the procedure is already prepared and the patient can receive the life-saving stent quickly.

8

After the patient has been handed over to the hospital, the team prepares the ambulance for the next mission and makes its way back to base. In the meantime, the mission data is automatically transferred from the **C3T** to **corpuls**.manager.

corpuls.manager

9

After returning to base, the instructor talks through the mission with his trainees. He can directly access the mission in **corpuls**.manager **ANALYSE** using his tablet and see the progress of the mission as well as the 22-lead ECG in detail. This mission is now complete for the team and all events are clearly shown in the timeline.

10

At the same time – due to the increased **CEB®** – the Medical Director of Emergency Services receives an automatic notification. He can open and analyse the mission in **corpuls**.manager with just a few clicks.

13

As part of their regular training, the rescue personnel is instructed on the new operating procedure. The statistical analysis and graphics, which can be copied directly from **corpuls**.manager with just a few clicks, makes the presentation clear and comprehensible for all participants.

MISSION DEBRIEFING | NOTIFICATION TO MEDICAL DIRECTOR | MISSION ANALYSIS | STATISTICAL EVALUATION | ADJUSTMENT OF SOP | PRESENTATION OF SOP

11

In the **corpuls**.manager dashboards, the Medical Director compares this mission with all the others, and can see that 73.7% of all cardiac related missions did not use the **CEB®** at all.

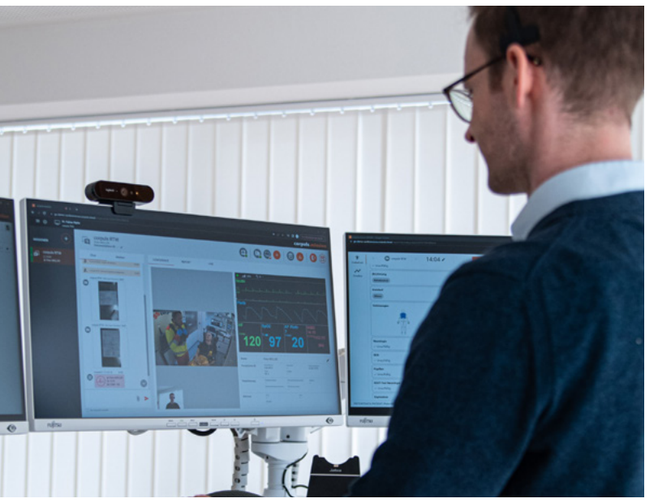
12

On the basis of his findings, the Medical Director comes to the conclusion that the "Acute Coronary Syndrome" operating procedure should be revised in order to improve treatment quality in the future. He exports the relevant mission data as a PDF. Thanks to the data protection settings in **corpuls**.manager, data is automatically and completely anonymised. With the help of this data, he and his team work out the new operating procedure.

THE CORPULS TELEMEDICAL SOLUTION: CASE EXAMPLES

corpuls.mission is a fully developed and individually adaptable telemedical solution: From the live transmission of all medical readings and values, to video conferences via smartphone or fully connected rescue vehicles.

Paramedics and nursing staff get telemedical support to the emergency site and specialists confer with other experts or request further expert's opinions.

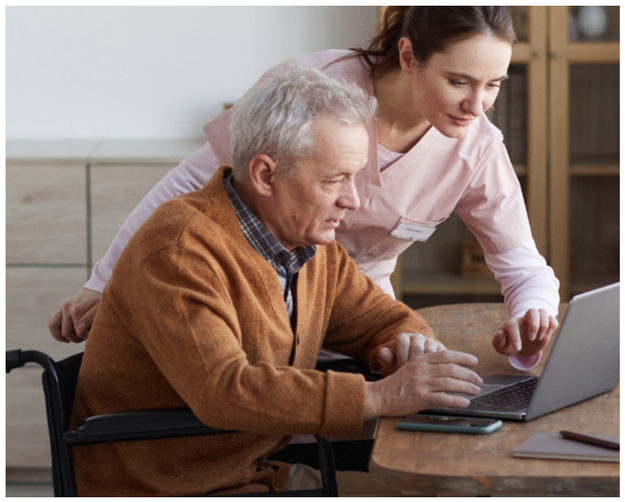


TELEMEDICINE IN RESCUE SERVICES

Paramedics start the **corpuls**.mission App on their smartphone and request support of a tele-medic.
This one has all the data available on the screen thanks to the live data transmission from the **corpuls**3, gets consulted via video telephony from the emergency site and then adds a cardiac catheterisation lab to the conference.
After the patient is diagnosed, the tele-medic gives further instructions.

OFFSHORE RESCUE VIA TELE-MEDIC

A paramedic flown in connects with a tele-medic via **corpuls**.mission and examines the patient under their guidance or performs further care measures. The tele-medic then requests the dispatch of a rescue helicopter, whose crew is also connected to **corpuls**.mission – as well as the clinic to which the patient is brought.



RELOCATION OF PATIENTS

Patients needs to be relocated to a specialised clinic. For the transport, they are connected to the **corpuls**3 of the rescue service and telemedical consultation via **corpuls**.mission is started. The clinic physicians familiar with the case start the patient conference with the tele-medic and also connect with the target clinic, so that the doctors there can optimally prepare for the patient's arrival.

TELEMEDICINE IN CARE FACILITIES & RESIDENTIAL FACILITIES

A resident requiring care is suddenly feeling unwell. A caregiver connects them to the **corpuls**3 and starts a telemedical consultation via **corpuls**.mission. The tele-medic views all parameters and curves in real time, talk to the caregiver and the patient and admit the patient to a hospital. The receiving hospitals is - as well as the dispatched ambulance - connected to the **corpuls**.mission **conference**.

OPTIMUM TREATMENT USING INTERDISCIPLINARY COMMUNICATION

The success of a patient's treatment does not depend on individuals alone, but on the interaction of multiple specialists. **corpuls.mission CONFERENCE** brings the exact expertise required to the treatment location – any time. Within seconds – regional, national, interdisciplinary and inter-sectoral.

corpuls.mission CONFERENCE

COMMUNICATION FOR RESCUERS
WITH THE FOCUS ON PATIENTS

CONFERENCE

Successful telemedicine is more than just transferring medical data. The focus is the patient. All treatment-relevant information must flow together so that the optimum treatment can be initiated. This requires communication between various specialists within the rescue chain.

corpuls.mission **CONFERENCE** stands out from conventional means of communication through a revolutionary philosophy: The on-site rescuer must no longer contact individuals when in need of support, but rather "tactical units". Instead of the rescuer phoning "Dr Smith" Cardiologist from "Any City Hospital" for example, they simply request a cardiologist via **corpuls**.mission **CONFERENCE**. Further specialist can be added if required. Thus, **corpuls**.mission **CONFERENCE** offers optimal and patient-oriented live advice from physicians or specialists via video, audio calls and chat. The first real communication solution for rescuers is made complete with the ability to send pictures, videos and voice messages.

The system really runs at peak performance in combination with **corpuls**.mission **LIVE**. Tele-medics and specialists providing further treatment can analyse all vital parameters, ECG data and trends. Fully integrated in a single, easy-to-use user interface. Whether as an App for smartphones and tablets or as a web application on large screens – the system adapts to the criteria of the user and not the other way around. The focus is on patient safety: only with such an integrated solution can patient mix-ups be completely ruled out.

Resting ECGs, voice messages, chat and pictures of the mission site can be viewed at any time by all those involved in the conference – even if they join later.

To download the **corpuls**.mission **App:**

Download on the App Store

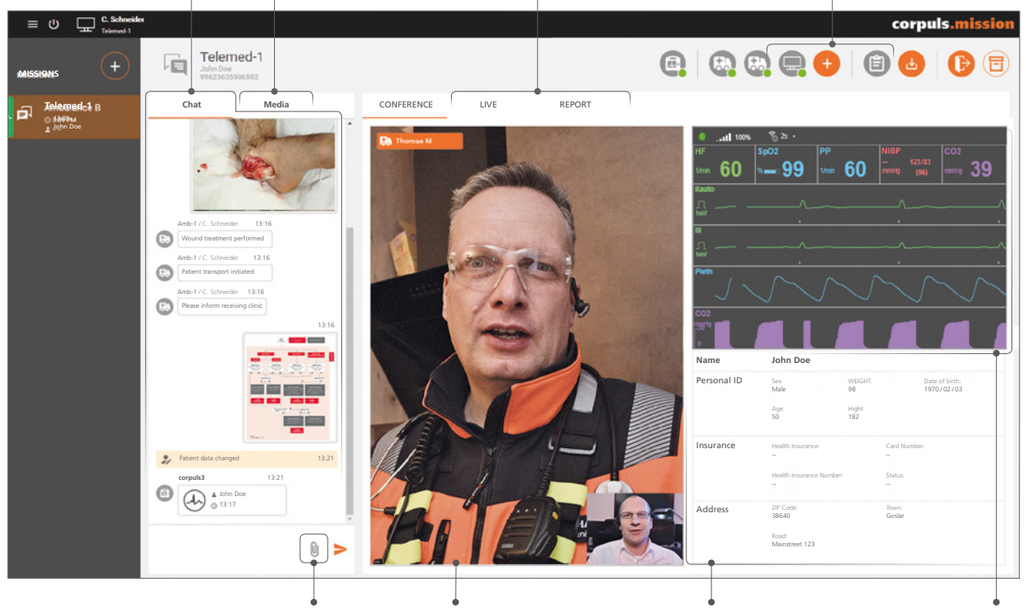
GET IT ON Google Play

Chat

Overview of all shared media

Direct access to all functions of **corpuls**.mission **LIVE** and **REPORT**

Tactical units within the current conference



Send attachments

Video conference with multiple participants

Patient data

Live view of **corpuls3**

corpuls.mission CONFERENCE SPECIFICATIONS

- **Audio/video conferencing between** multiple **tactical units**
- **Transfer** of photos, videos, documents and audio recordings
- **Automatic transfer** of **ECGs as PDF** to all end devices (with **corpuls**.mission **LIVE**)
- Embedded live data of **corpuls3** (with **corpuls**.mission **LIVE**)
- **Reverse synchronisation** of the chat for participants added later.
- **Multi-directional chat**
- **App** for **iOS** and **Android**
- **Browser application** available everywhere **without installation**
- **Parallel handling** of several telemedical missions at the same time
- **PDF report** with all content and medical data
- **Optional storage** of the **audio/video conference** for legal purposes

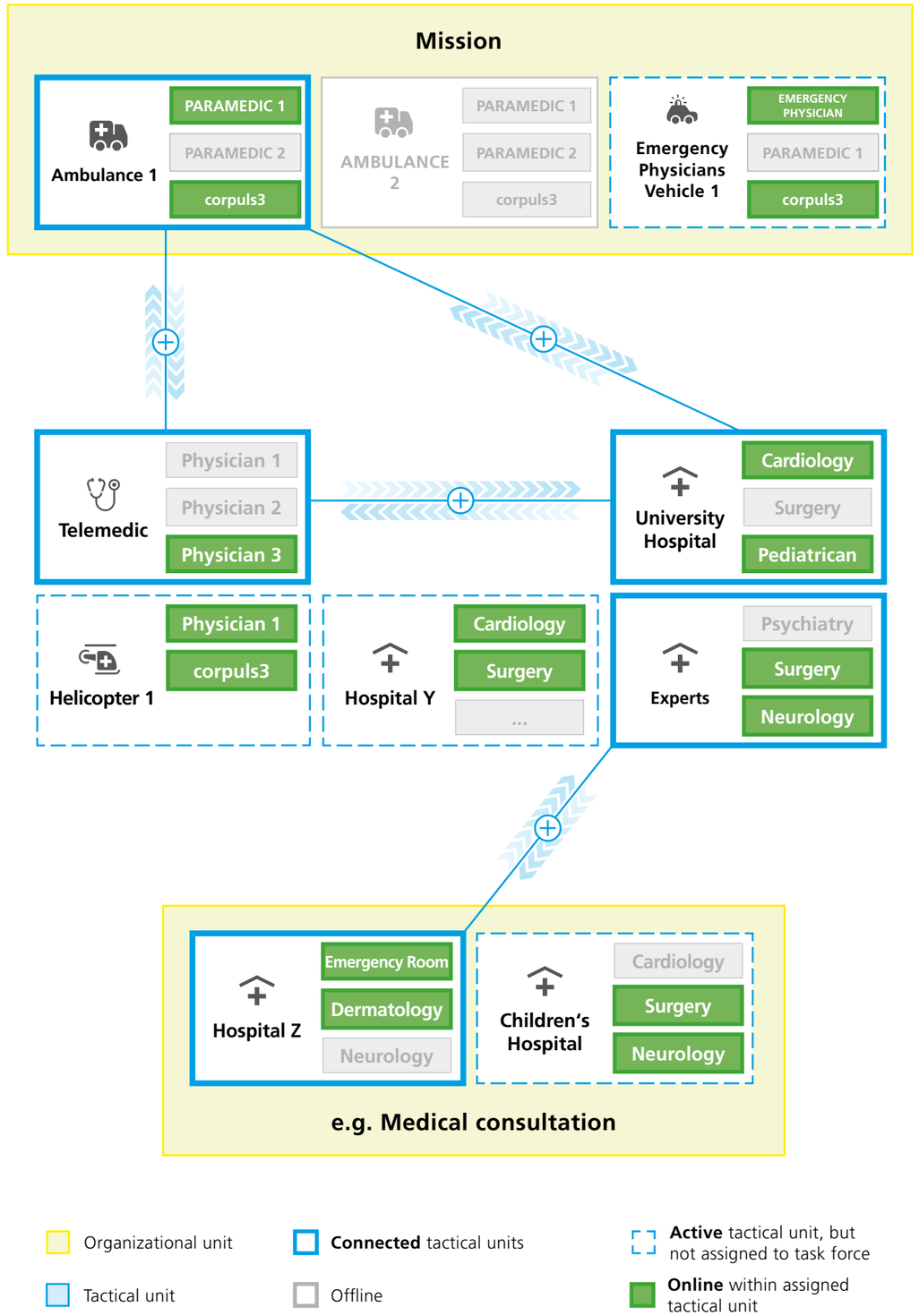
TACTICAL UNITS
FOR THE EASY ORGANISATION OF MISSIONS

The rescue service is structured differently in different regions. However, medical emergencies do not stop at city limits, and inter-regional communication is essential, especially when it comes to telemedicine. With the tactical units concept, **corpuls**.mission can flexibly adapt to your circumstances.

A tactical unit is an organizational group of people involved in patient care. This could be an ambulance service, a telemedical dispatch centre, a hospital or a poison control centre. Tactical units can be added to conferences and can communicate with each other. For this purpose, each user is assigned to a tactical unit and opts in it at the start of their shift. Several users can be assigned to a tactical unit at the same time, e.g. the EMT and paramedic in an ambulance. This means, missions can also be distributed between several tele-medics by a dispatch centre.

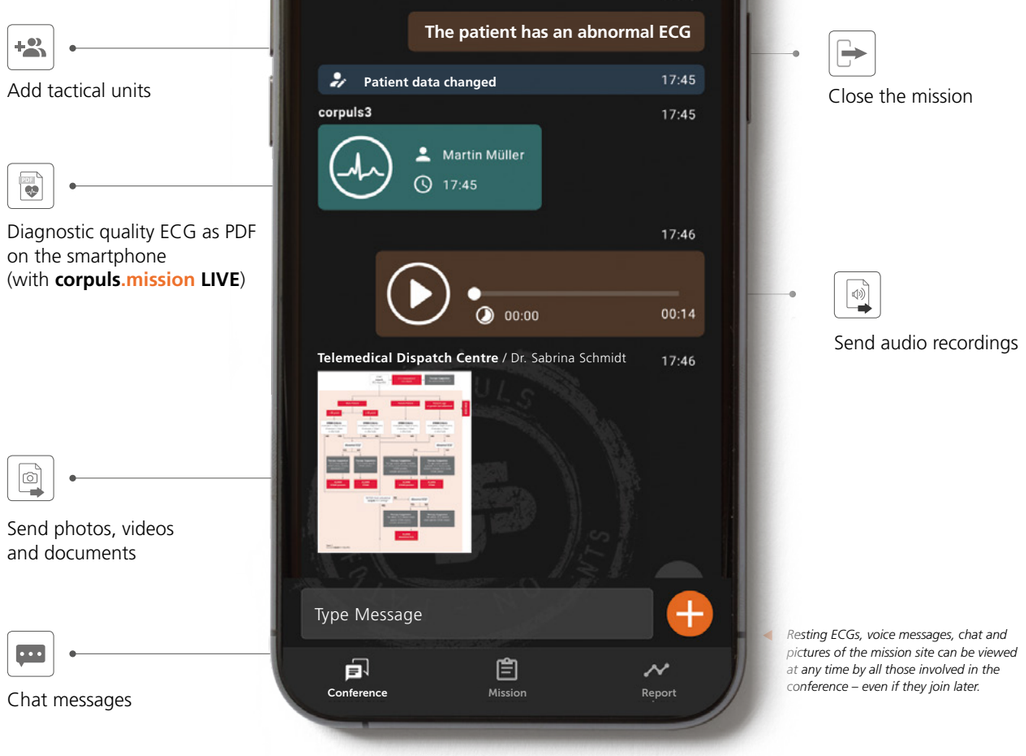
In order that users only log into the tactical units they are authorized for, several tactical units can be combined in one organizational unit. For example, a critical care paramedic only has access to the ambulances from his own station. If users change organizational units frequently, this can be easily administered.

With this simple but ingenious concept, the possibilities of **corpuls**.mission **CONFERENCE** are almost limitless.



INTERLINKING
TELEMEDICINE AND COMMUNICATION

The prerequisite for successful telemedicine is the interlinking of all aspects: medical data, communication and documentation. With **corpuls**.mission you get a multimedia platform in which all information flows together.
Right next to the chat and video conference, the **corpuls3** live data is displayed in full. Patient data is continuously synchronized between the device and all the components of **corpuls**.mission. Resting ECGs automatically end up in the chat and can be opened and evaluated directly from there – on all end devices. When **ECGmax** is used, all 22 leads, the vectorloops and the **CEB®** are also included. The complete process is always available to all conference participants. This means that specialists who are added later can get a complete overview. And if medical delegations are transmitted in the chat, these are also sent to **corpuls3** as web messages – and are therefore documented in a legally secure manner.



Resting ECGs, voice messages, chat and pictures of the mission site can be viewed at any time by all those involved in the conference – even if they join later.

OPTIMUM ADAPTABILITY
FOR ALL MISSION TYPES

In medicine, we treat patients – not the devices. A telemedicine solution must therefore fit seamlessly into the workflow and must not be disruptive. For this reason, with **corpuls**.mission **CONFERENCE** you can always use the end devices that best suit the type of mission. For example, the smartphone in the ambulance, the tablet in the emergency physicians vehicle and the desktop PC in the telemedical dispatch centre.
The optional **corpuls**.mission chest harness can be used to keep your hands free to treat the patient. Adaptable and optimized for use with suitable smartphones, telemedicine is becoming standard in emergency rescue. Tucked away in the chest harness, the smartphone camera provides the tele-medic with a perfect overview of what is happening without restricting the wearer. All the functions of the app are within reach.

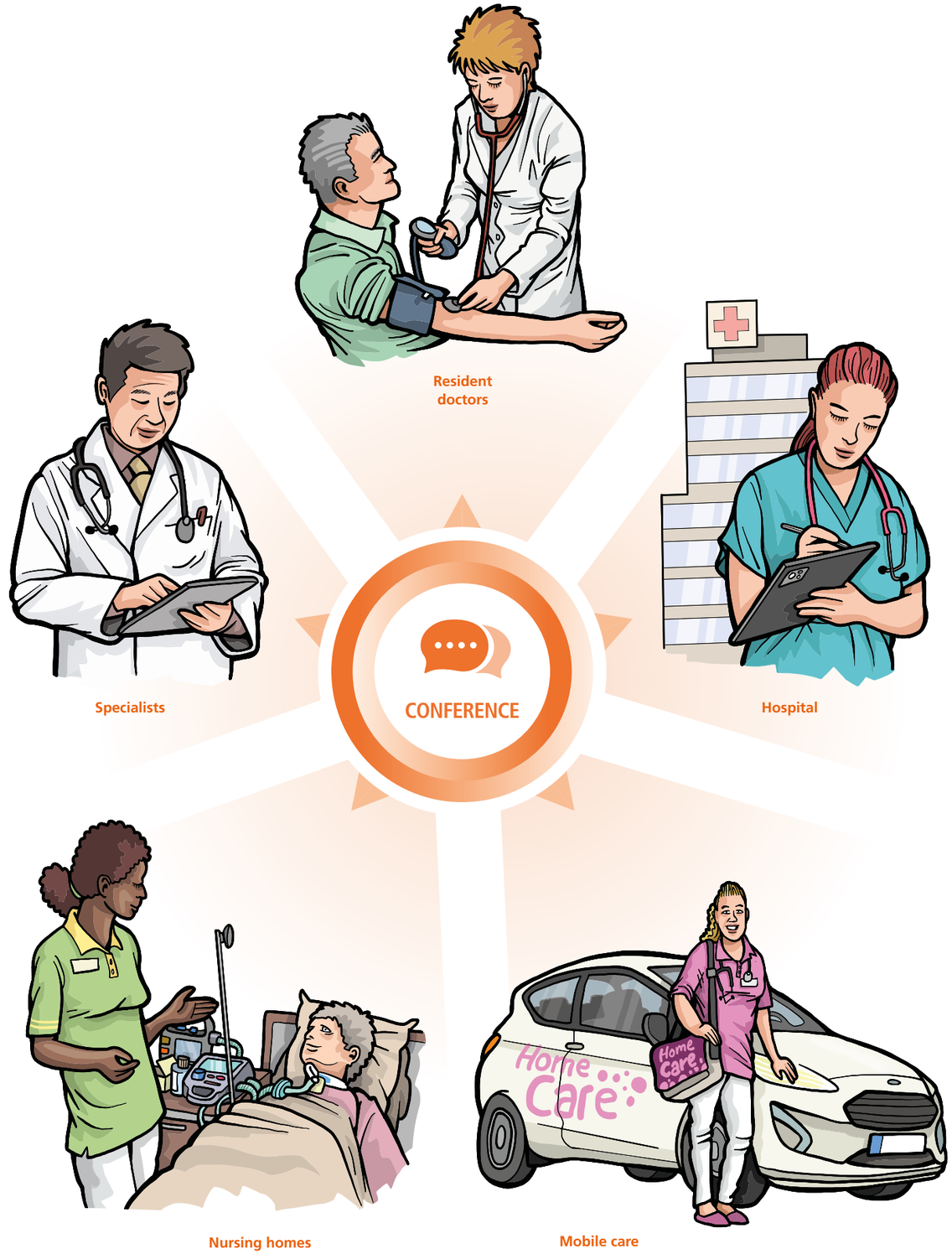
▲ *With the **corpuls**.mission chest harness from PAX®, the advantages of body cameras are combined with the flexibility of smartphones. Thus, optimally supporting telemedicine.*

*With **corpuls**.mission, primary care physicians and specialists who will provide further treatment can also be directly involved in the process.*

INTER-SECTOR COMMUNICATION

To optimally treat patients you may require not only one specialist, but multiple specialists whose cooperation is the key to successful treatment. The treatment can only be carried out in a target-oriented manner if everyone involved receives the necessary medical information at the right time. The patient's course of treatment must be viewed in its entirety – and that goes far beyond emergency rescue.

With **corpuls**.mission **CONFERENCE** you have an inter-sectoral communication platform at your disposal, with which further treatment specialists can be networked in. Mobile nursing staff, general practitioners, specialists, assisted living or aged care are just a few examples in which communication can be positively influenced with **corpuls**.mission **CONFERENCE**.



REMOTE DIAGNOSIS WITH MEDICAL DATA

Curves and vital parameters from the patient are the core of every telemedical solution. Remote therapy advice may only be given if the data is of diagnostic quality. For this reason, **corpuls**.mission **LIVE** is approved as an independent medical product.

corpuls.mission LIVE

corpuls.mission LIVE

EVALUATION OF MEDICAL DATA – BY SPECIALISTS – IN SECONDS

LIVE

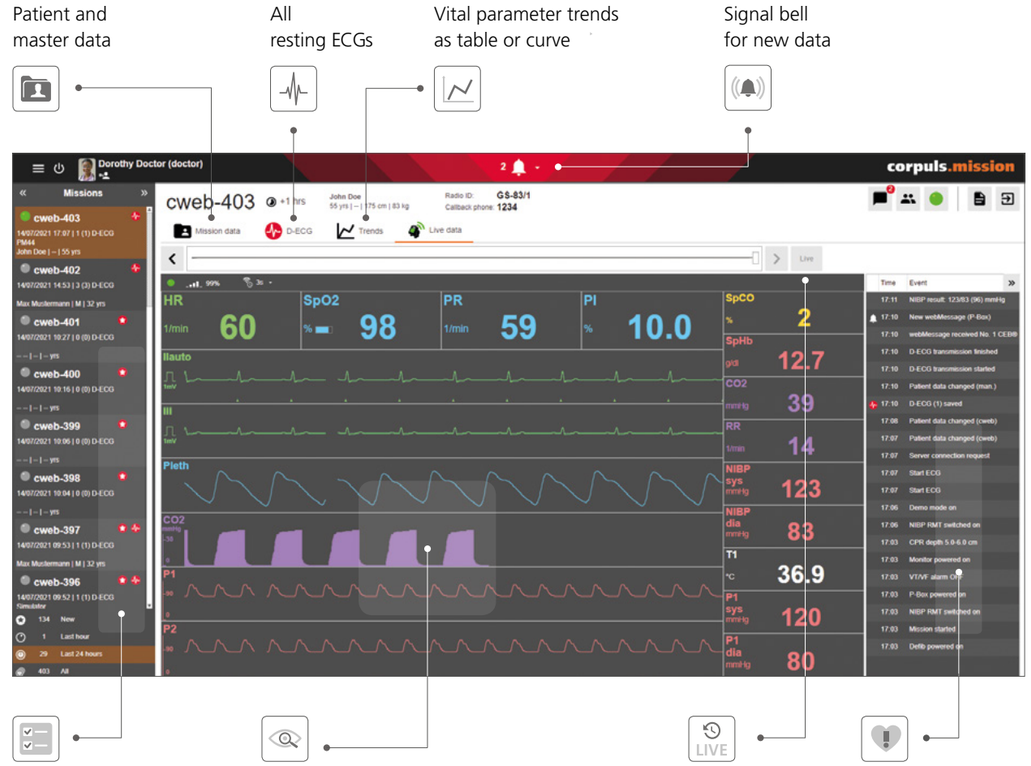
Diagnoses and therapy decisions are made on the basis of medical data and measured values.
With **corpuls**.mission **LIVE**, this information is available at both the site of the emergency and for any other specialist who is required for the patients care. It doesn't matter where in the world they are.
For example, the emergency physician who is called, knows the exact status of the patient before they arrive at the site of the emergency. Further treatment measures, such as surgical interventions, can be effectively prepared before the patient arrives at the clinic. Tele-medics can make therapy decisions based on the vital parameter values and delegate further treatment measures to the team on site. Also, during secondary transport, the crew always has an overview – even of several patients at the same time.

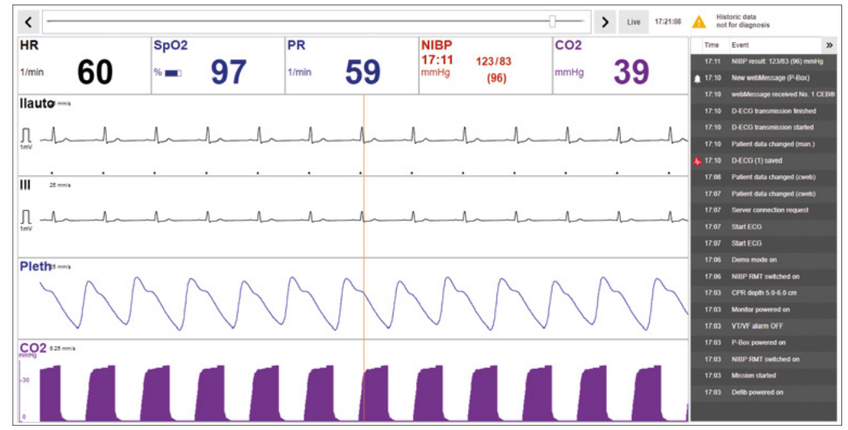
This is made possible by the interaction between corpuls3 and corpuls.mission LIVE:

- The screen of the **corpuls3** is remotely displayed, true to original, with all curves and parameters – practically in real time. Even screen view changes happen immediately. The Live History function enables you to jump back to an earlier point in time. Special events e.g. premature ventricular contractions, can be viewed again later.
- The patient data is synchronized in both directions and vital parameter trends allow an assessment of the complete patient history, even if the server connection was only established later.
- In addition, full diagnostic quality resting ECGs are available. The user can zoom in on every detail and measure the amplitude or duration between two points.
- With **ECGmax** this is possible with just 12-leads rather than 22.
- On the basis of this data, diagnoses and therapy decisions can be made with **corpuls**.mission **LIVE**, as the software is approved as an independent medical product for precisely this purpose.

corpuls.mission LIVE SPECIFICATIONS

- **Certified as a medical product** in accordance with regulation (EU) 745/2017 (Medical Device Regulation)
- Transmit **all curves, vital parameter values** and the **12-lead resting ECG in real time**
- **Display, measurement and forwarding of resting ECGs** in various formats (e.g. PDF, SCP, HL7 FHIR, GE MUSE, Cardiolex)
- **Embedding of ECGmax**: 22-leads from 10 electrodes, vectorloops and **CEB®** – can be used directly in the application
- **Browser based application**
- **Save scarce resources** through early advice and actions
- **Record curves and vital parameter values** for the current mission (Live History)
- **Communicate** between the emergency team and clinic via **webMessages**
- **Flexible monitoring** of several patients (Live Board)
- **Separate transmission** of patient data and medical data to the server
- **End-to-end encryption** of patient data
- **Secure data transmission** based on current TLS standards
- **Highest security standards** through certified cloud hosting **(including ISO 27001, ISO 27018)**
- **99.9% server reliability**
- Developed to **international standards** such as **ISO 13485, IEC 62304** and **ISO 14971**





*With Live History, you can jump to any earlier moment in the transmission. The screen of the **corpuls3** will be displayed in the layout selected with all curves and vital parameter values. Specific moments can be selected via the event list.*

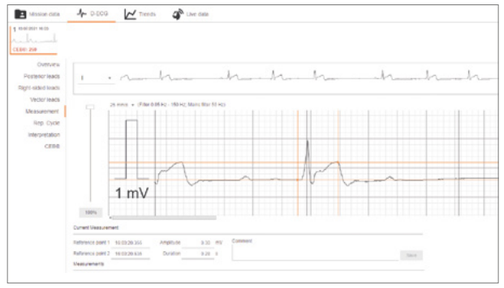
RESTING ECGS IN DIAGNOSTIC QUALITY

All measured resting ECGs can be transferred either automatically or manually to **corpuls**.mission **LIVE**. This is not shown as an image, but as the raw measurement data in full resolution. Therefore, in **corpuls**.mission **LIVE**, it is not only possible to select the sweep speed for each curve, but also to enlarge it without any loss of quality.

The standard 12-leads are initially available in an overview. **ECGmax** can also be used to compare the posterior and right cardiac leads with their indirect opposites. The representative cycle of each lead allows a quick comparison of the average QRS complexes.

Depending on the license available on the connected **corpuls3**, all interpretation data from HES® or the Glasgow algorithm is also available.

All available leads can be measured with **corpuls**.mission **LIVE**. To do so, simply click on two points in the ECG and the exact duration and amplitude are displayed. This has an accuracy of up to 0.005 s or 0.0125 mV, depending on the sweep speed and measurement amplitude. These measurements can be commented on and saved directly. They are documented in a legally secure manner and included in the mission report.



All available resting ECG leads can be selected individually and viewed in detail. To do so, you can zoom, adjust the sweep speed and measure the amplitude and duration. This can be saved and findings can be commented on. Details are also included in exports and forwarding.

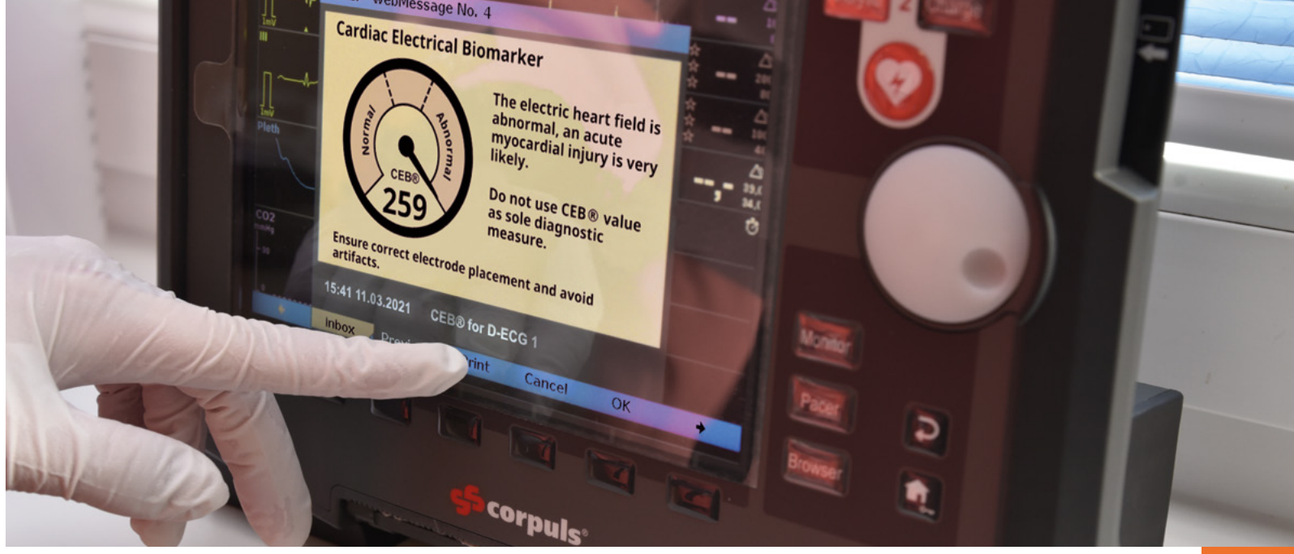
FORWARDING AND EXPORT

It is not always possible for specialists to access the user interface of **corpuls**.mission **LIVE** in the clinic or on the go. Automatic forwarding rules can be configured to support the medical processes as effectively as possible. Here, resting ECGs can be sent directly to the recipient as a PDF. Again, these are not just images, but complete vector data: The curves can be enlarged as required in any suitable PDF viewer without the quality decreasing.

Aside from human recipients, ECGs are often collected in central systems from third-party manufacturers. Therefore, other common formats are also available. Secure transmission on encrypted channels is guaranteed with FTPS.

FORMATS AVAILABLE:

- PDF
- SCP
- GE MUSE
- Cardiolex
- HL7 FHIR
- XML



corpuls.mission LIVE

ECGmax
THE CORPULS REVOLUTION OF THE ECG

With **ECGmax** you get not only the classic 12, but 22-leads and thus 10 additional perspectives on the course of electrical activity in the heart muscle. This allows for a more complete and detailed picture. The current European Society for Cardiology (ESC)[1] guidelines recommend examining the additional leads V7–V9 and the right cardiac leads V3r–V6r. No additional effort is required and no other electrodes have to be attached or positioned.

- Diagnostic support with **22-leads**
- **Posterior leads** V7–V9
- **Right cardiac leads** V3r–V6r
- **Orthogonal leads X, Y, Z** and **associated vectorloops**
- **Only 10 electrodes**, extremities and chest leads
- Display on every **corpuls3** with telemetry option
- Printout on the **corpuls3** (from REL-4.1.0)

[1] *2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. European Heart Journal (2020); doi:10.1093/eurheartj/ehaa575*

CEB® – CARDIAC ELECTRICAL BIOMARKER

In addition, **ECGmax** can calculate the **Cardiac Electrical Biomarker CEB®** from the same leads. The three colour-coded areas of the **CEB®** – normal, caution, abnormal – make interpretation particularly easy. The **CEB®** offers simple aid in the detection of myocardial ischemia – and with a sensitivity and specificity comparable to troponin.[2]

- **Simple interpretation** using the traffic light concept
- **Correlation of the CEB® with troponin**
- **Fast reaction** by measuring the electrical field
- **Non-invasive measurement**
- **High sensitivity** and s**pecificity**
- **No additional electrodes** required

[2] *Automated Analysis of the 12-lead ECG in the Emergency Department: Association between High-sensitivity Cardiac Troponin I and the Cardiac Electrical Biomarker. Tereshchenko et al., Critical Pathways in Cardiology, Volume 13, Number 1, March 2014*

LEGALLY SECURE TRANSMISSION OF DELEGATIONS VIA WEBMESSAGES

The communication between **corpuls3** and **corpuls.mission LIVE** is by no means just one-sided. **webMessages** provide a back channel that can be used to send text messages of up to 360 characters directly to the on-site team – without the need for any additional devices. An info alarm on the **corpuls3** indicates a new message. This can be displayed on the screen and printed out immediately.

webMessages are particularly suitable for clear, written transmission of medical delegations. A medication dosage mistake is almost impossible as opposed to delegation by telephone. And if a dispute does arise, everything is documented in a legally secure manner, three ways: in the **corpuls3** saved data, in the **corpuls.mission LIVE** mission report and as a printout on the paper log.

▶ ***webMessages*** *can be sent, displayed and printed out directly from* ***corpuls.mission LIVE*** *to the connected* ***corpuls3****.*

BI-DIRECTIONAL SYNCHRONISATION OF PATIENT DATA

The communication between **corpuls3** and **corpuls.mission LIVE** is also bi-directional for patient data. When information is entered on the **corpuls3** or a health insurance card is inserted, this data appears immediately in the interface of **corpuls.mission LIVE**. Here, further information can be added with the convenience of a complete keyboard, which in turn is transferred to the **corpuls3**. Both databases are continuously synchronized.

With Hospital Information Systems (HIS) interaction, the entire workflow can be mapped:
A barcode reader connected to the **corpuls3** via Bluetooth scans the patient's case number. The complete patient data set is compared with the HIS via HL7 FHIR and sent back to the device. Creating complete data management with secure patient identification.

CORPULS.MISSION LIVE IN SPECIAL SITUATIONS

corpuls.mission LIVE is used in a wide variety of ways around the world. Several patients can be monitored simultaneously on a central monitor using the Live Board.
The **corpuls3** is particularly suitable for military use due to its certifications and robustness. In combination with Live Board, entire intensive care units in crisis areas can be equipped with little effort.

But even for individual patients receiving intensive medical care, **corpuls.mission LIVE** adds value. A large-scale second monitor installed in mobile intensive care units can noticeably help the team on longer secondary transports.

▲ *With the low-energy PC,* ***corpuls*** *offers a complete solution that can be easily retrofitted. Second monitors in mobile intensive care units can continuously mirror the* ***corpuls3*** *screen, for example.*

▲ *With the Live Board function, several patients can be easily monitored at the same time with freely selectable views. Events such as patient alarms, are visually highlighted. Thanks to its flexible configuration, the system adapts perfectly to all conditions.*

corpuls.mission
REPORT

LEGALLY CERTAIN DOCUMENTATION FOR ALL EMERGENCY SERVICES

With **corpuls**.mission **REPORT** the digital emergency response is complete. As well as the exchange of medical data, telecommunication and the integration of medical devices, **corpuls**.mission offers a revolutionary type of mission documentation.

DOCUMENTATION AND TELEMEDICINE
FROM A SINGLE SOURCE

REPORT

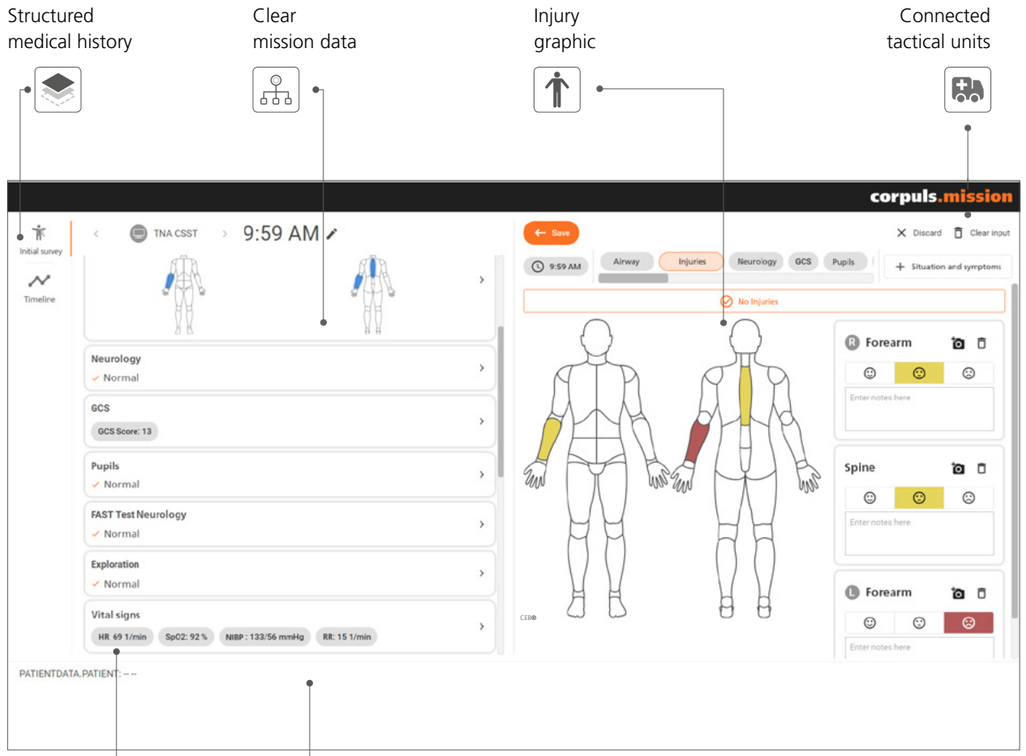
For us, patients are always at the centre of attention. For them to receive the best possible care, all gathered parameters, measures taken and all other information are documented at one place with **corpuls**.mission **REPORT**. So all involved in the mission have access to one documentation. This simplifies the workflow and prevents information from being lost or falsified. The application fits seamlessly into the telemedical functions of **corpuls**.mission and ensures that all documentation-relevant data ends up in the log - regardless of where and how the data was created. In addition to vital parameters and ECGs from the **corpuls3**, wound photos and medical delegations from **corpuls**.mission **CONFERENCE** are automatically stored in the appropriate section of the log. And by synchronising patient data across all corpuls products, you avoid mix-ups or typing errors. Manual copying of existing information is a thing of the past. Documentation is an integral part of every emergency response.

Not only to be protected legally, but also to generate knowledge and continually improve. In most cases where several emergency units are involved, separate protocols are filled out – in the case of tele-medic consultations – at least two.

If a ground-based emergency physician vehicle is also involved, conventional methods result in three independent protocols that are rarely ever merged. Even though they are about the same patient treatment.

corpuls.mission REPORT SPECIFICATIONS

- **Digital tele-medic mission documentation**
- **Collaborative mission documentation** by all units involved
- **One protocol per patient**
- **Use of the documentation to prepare for the mission** on the journey
- **Offline capable**
- **Available** for **Web, iOS** and **Android App**
- Extremly **customizable**
- **User-friendly** from first use



*With the **corpuls**.mission **App** for iOS and Android, collaborative documentation is available to all emergency units in direct interaction with telemedicine and communication.*

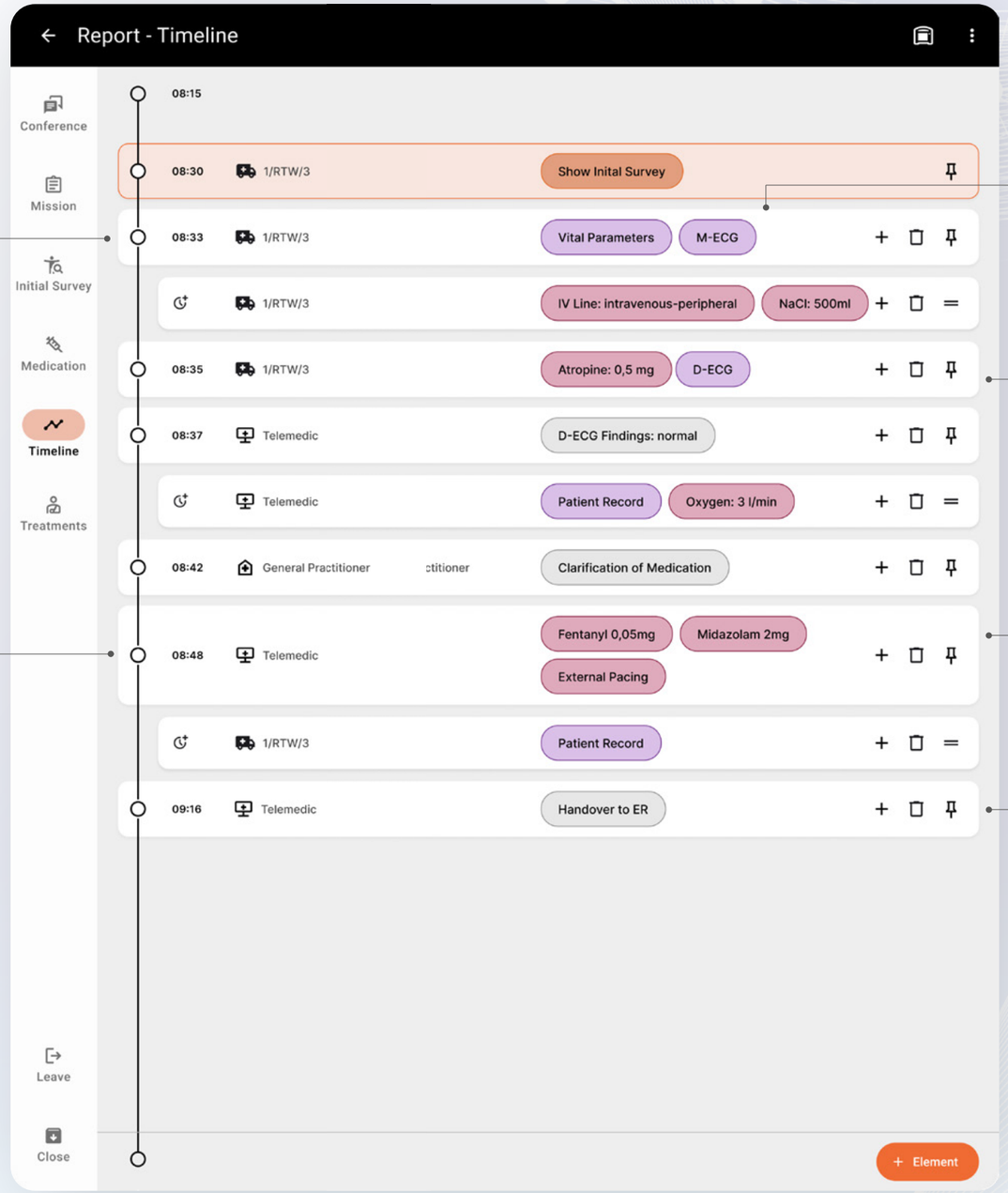
corpuls.mission REPORT

FULL, COLLABORATIVE DOCUMENTATION

With **corpuls**.mission **REPORT** all the rescue units involved keep a joint mission log. Thanks to innovative collaborative documentation, each specialist must only concentrate on the protocol content that is relevant for their respective work. Earlier data from other the emergency services does not have to be re-entered. Nonetheless, legal certainty is maintained: it is clear at all times who made which entries. The result is a complete summary of the mission progress, which greatly benefits the specialists in the hospital who carry out further treatment.

Automatic recording of vital parameters from **corpuls3**

Delegations from the telemedicine doctor



Standardised documentation – individually customizable

Documentation of medication

Involvement of admitting hospital and doctor-to-doctor handover

SUSTAINABLE QUALITY THROUGH DATA

Only those who have knowledge of the status quo, can use this knowledge to make improvements for the future. And this knowledge comes from information that is largely contained within medical and technical data. With **corpuls**.manager **ANALYSE** you will find in this data the targeted information you really need.

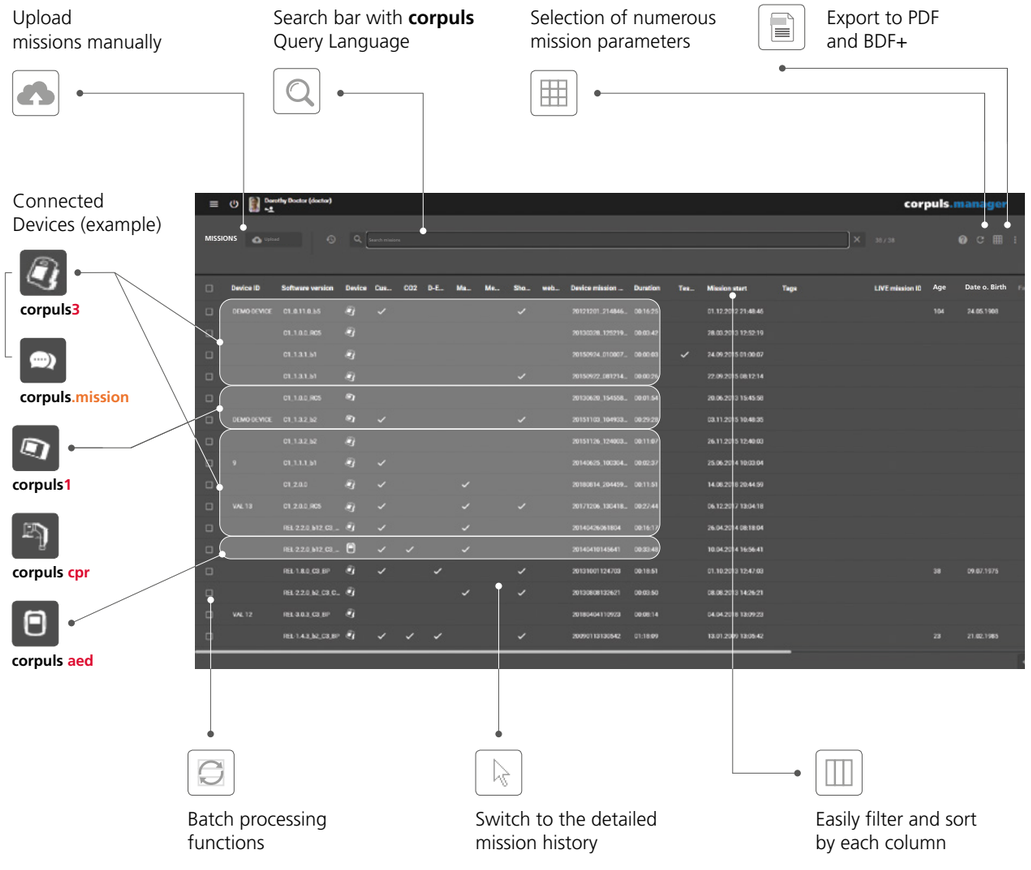
corpuls.manager ANALYSE

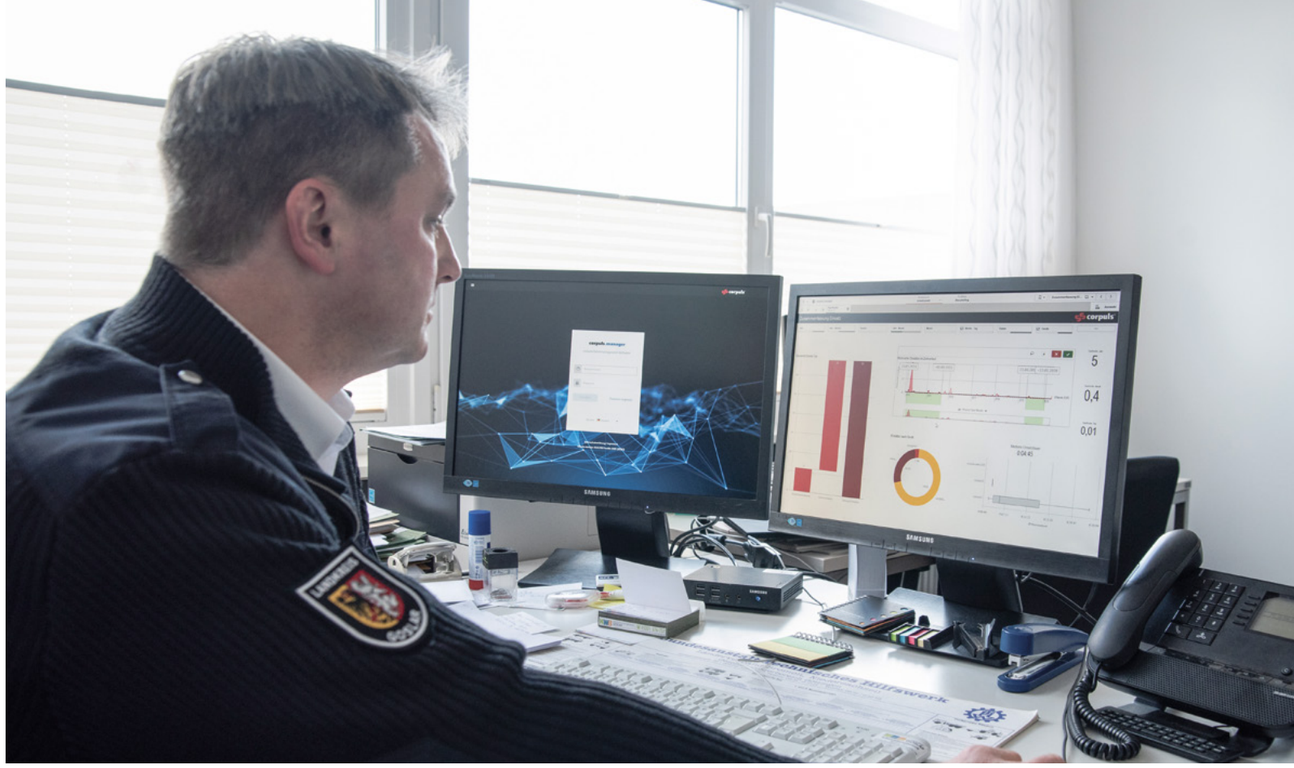
ALL MISSIONS
IN ONE PLACE

ANALYSE

All your mission data in one place, which can be filtered and analysed as required and anonymised if needed. **corpuls.manager ANALYSE** offers optimal management of your data. The server and data management solution centrally and automatically manages all data from your **corpuls** device fleet. Thus giving you the "big picture". All data from your **corpuls** devices is automatically uploaded and stored centrally. Giving you the possibility to easily collect and analyse data from all your missions.

In addition to quality management, **corpuls.manager ANALYSE** is also an ideal data collection tool for medical research projects.
A business intelligence solution is also available as an add-on to **corpuls.manager ANALYSE**. With preconfigured dashboards, the mission data from the entire database can be graphically analysed. Comprehensive and easy-to-use filter functions ensure that every user can answer questions and identify important points within the data.





The statistical evaluation of aggregated data is particularly valuable for medical directors, e.g. the average quality of resuscitation in their area

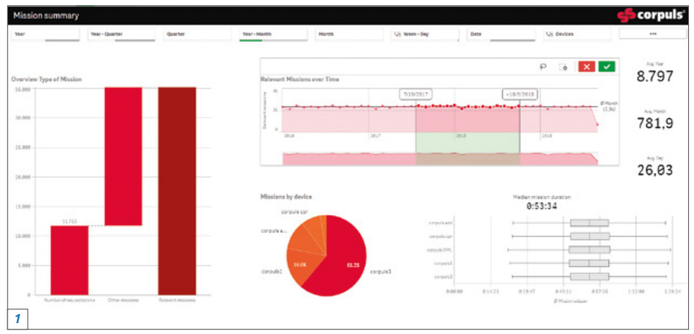
corpuls.manager ANALYSE SPECIFICATIONS

- **Device-independent, responsive browser-application**
- **Filter groups**: Configurable visibility
- Access to all data from any computer, smartphone or tablet – without installation
- **Automatic upload** of all data immediately after using **corpuls3** and **C3T**
- Automatic **upload of mission data** from **corpuls aed** via **corpuls.manager ADMIN**
- Easy **import of mission data** on the SD cards of **corpuls cpr** and **corpuls1**
- Combined evaluation of joint missions with **corpuls3**, **corpuls cpr** and **corpuls.mission**
- Simple **full-text search** and filtering for every column in the mission list
- Powerful **search language CQL** (**corpuls** Query Language) for complex questions
- Access to the **detailed history of all missions** incl. curves, vital parameter trends, ECGs and
- Visualization of aggregated key indicators in **informative dashboards**
  - **Drill Down**
    Drill down the database by simply clicking in the dashboards
  - **Insights**
    Formulate your own questions and generate **new charts**
  - **Alerts**
    Subscribe to any indicators in the dashboards and be automatically notified by email when threshold values have been reached
  - **Export**
    All values, charts and graphics are **adapted to your own needs** in various formats
- Access only by **authorized users** with secure authentication methods
- Detailed **adjustable anonymisation** rules

INSIGHTS THROUGH VISUALISATION

Mission data is a real "treasure trove" of information. Important values and key figures can be discerned and compared from each mission. But the most relevant findings are in the correlations between the data sets. What is the relationship between the duration of the mission and the day of the week? In how many resuscitations is end-tidal CO_2 measured?

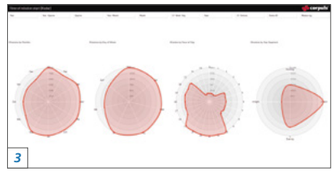
In the 15 pre-defined dashboards, **corpuls**.manager **ANALYSE** can be used to visualize the most important key figures and charts can be used to gain knowledge for continuous improvement. And if a question can not be adequately answered, customized dashboards or data sources can be included in the evaluation.



1

▶ *1. Comprehensive overview of all mission data according to device type, time, resuscitation and test missions*

2



3

▶ *2. Insightful statistics on the duration of the mission depending on the device type and any other factors*

▶ *3. Limit the dashboards according to the time of use based on month, day of the week, day segment or individual hours*

4

5

▶ *4. Evaluation of defibrillations according to mode, energy, synchronization and devices*

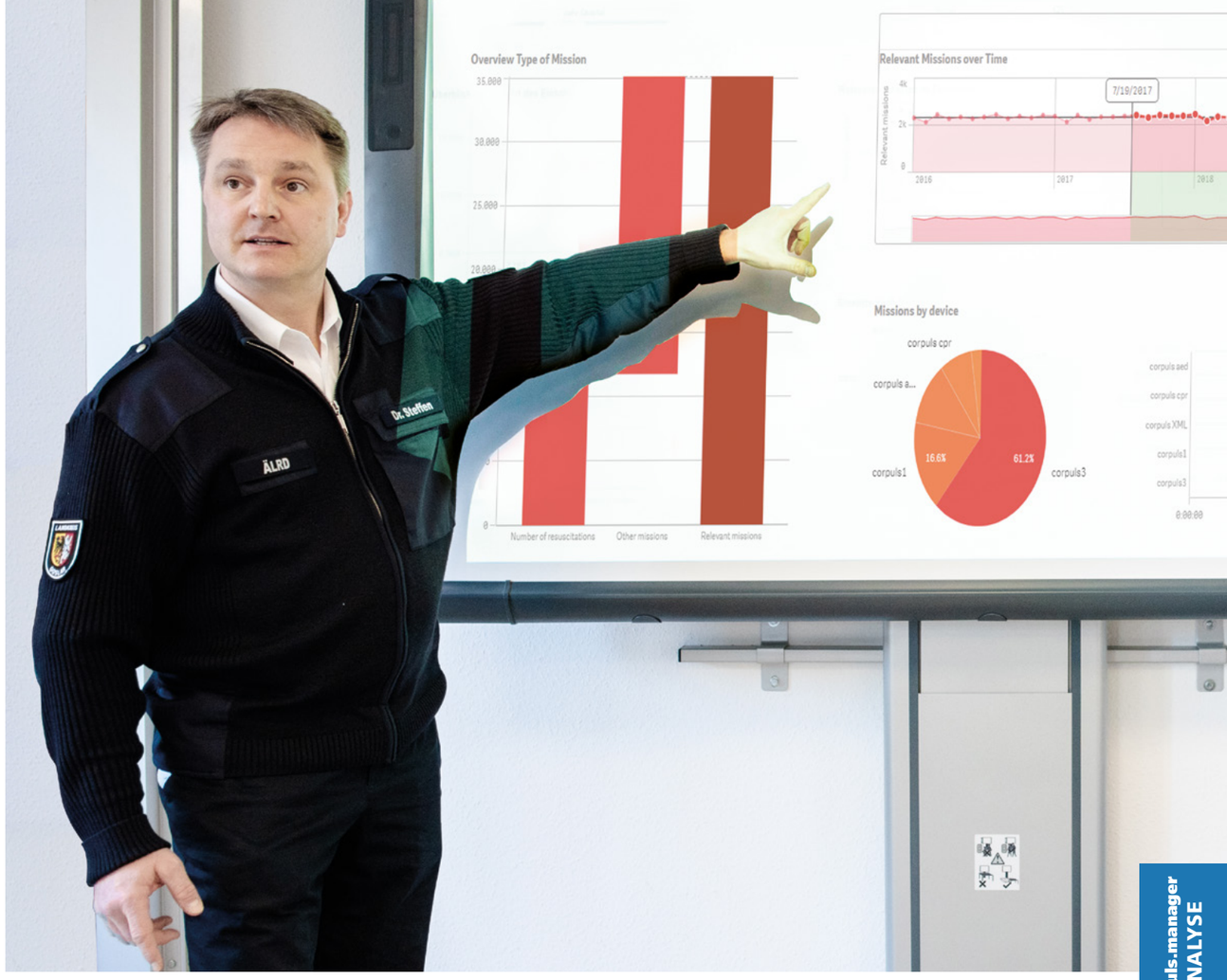
▶ *5. Conclusions about the use of the different sensors in the context of the selected operations*

6

7

▶ *6. Detection of user errors in non-invasive blood pressure measurement through precise progress analysis*

▶ *7. Your customized dashboard could be here*



▶ *Training and presentations can be supported by customized graphics and diagrams directly from* ***corpuls*****.manager *ANALYSE*.**

PRACTICAL SCIENCE

In the rescue service, it is essential to continuously ensure and improve quality. Standard operating procedures (SOPs) offer particular added value for quality assurance throughout medicine. They also offer non-medical staff additional legal certainty in emergency situations. Medical directors are therefore responsible for monitoring compliance with the locally applicable SOPs and maintaining them based on experience. **corpuls**.manager **ANALYSE** creates the prerequisites for fact-based quality management.

Medical research also requires facts and statistics from many patient cases in order to be able to develop new and innovative treatment methods. For scientific analysis, flexible interfaces and open export formats are particularly important in order to be able to process data in special third-party software. With its flexible interfaces, **corpuls**.manager **ANALYSE** contributes to the evidence-based medicine of the future.

MISSION DEBRIEFING

How did we work as a team during the mission? Did anything go wrong? Are there any training requirements? The free tool **corpuls**.manager **REVIEW** provides the answers to these questions and more. It allows you to review the mission down to the second, and identify potential weaknesses in the rescue chain.

corpuls.manager REVIEW

THE ENTIRE MISSION PROGRESS AT A GLANCE

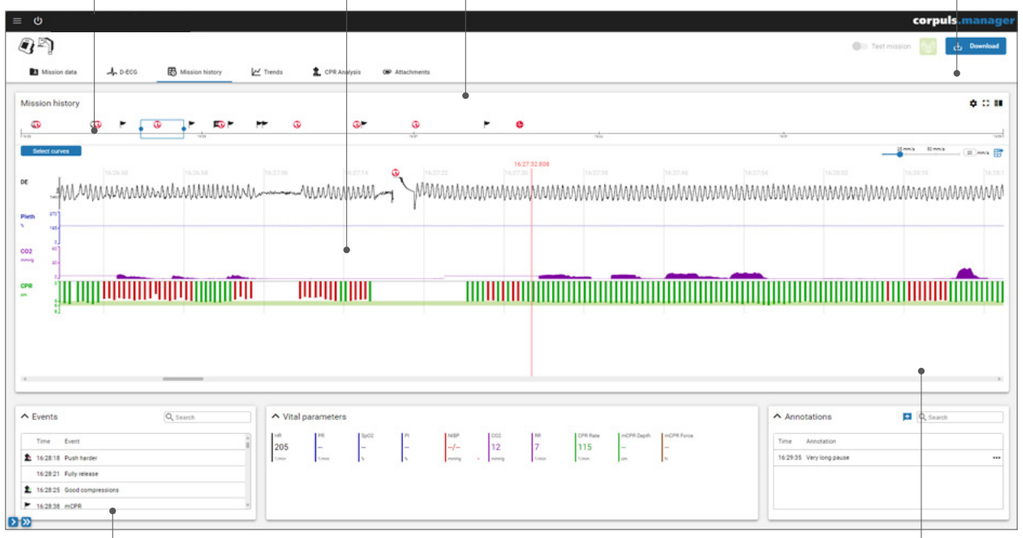
With **corpuls.manager REVIEW** you can easily get to any point of the mission with just one click. Alarms and important events, such as manual or mechanical resuscitation (also combined in one file) or shock delivery, are clearly highlighted by symbols. One section shows an exact evaluation of all values and curves, down to the second. If desired, individual curves can be shown or hidden. In addition, a mission report can be very quickly generated and exported according to your requirements.

Navigate quickly through the mission

Hide or show curves

Clear function tabs

Export the mission report



Vital parameters at the current time

Detailed view of the selected area

DATA-BASED RESUSCITATION TRAINING

Resuscitation is considered the supreme discipline of emergency medicine. It receives special attention in **corpuls.manager REVIEW**. CPR analysis shows you an exact evaluation of the chest compressions. In addition to clear representation of the course of the CPR pressure depth and frequency, the change between manual and mechanical chest compressions is also easily identifiable. Rhythm analysis and shock events performed are highlighted graphically. Statistical evaluation of the resuscitation provides a clear summary of the resuscitation course.

Display of manual and mechanical resuscitation

Shock events

Resuscitation history statistics

Highlighted target area

Graphical analysis of pressure depth and frequency

corpuls.manager REVIEW

corpuls.manager ADMIN

YOUR CORPULS AED
DEVICE MANAGEMENT MADE EASY

With the device administrator **corpuls.manager ADMIN** you always have an overview of your **corpuls aed** fleet. You benefit from monitoring through connected device management via WLAN or SMS. You can change or update your fleet of devices with over-the-air updates without having to be physically close to the devices. Automatic status reports as well as notifications via e-mail in case of device events, complete the service and make work easier.

DEVICE MANAGEMENT – MADE EASY

With **corpuls.manager ADMIN** all **corpuls aed** devices can be managed remotely without manual access being required. After the regular self-tests, the devices automatically establish a connection to **corpuls.manager ADMIN**.

BASIC

With the **Basic** variation, the devices are connected to a central **corpuls** service. If a problem arises (e.g. the therapy electrodes are about to expire), the operator will be notified immediately by email.

STANDARD

With the **Standard** variation, a dashboard is also available in a web browser that shows the status and configuration of the individual devices. Self-test and operating data are displayed as well as the status of the batteries, change of therapy electrode requirements or the next safety check. Email notifications can be customized. In addition, further details, such as location data or the like, can be stored.

PREMIUM

With the **Premium** variation, long maintenance phases or service appointments through software updates are a thing of the past. Every software update, language package or configuration change can be sent via WLAN to all, individual or selected devices with just the push of one button. Of course, all data is always securely encrypted.

corpuls.manager ADMIN SPECIFICATIONS

- **Central monitoring** of the entire device fleet via WLAN or SMS
- **Status and self-test reports** for every device
- Transfer of **updates/language packages** to any number of **corpuls aed** devices over-the-air via WLAN
- **Transfer of configuration profiles** to freely definable device groups
- **Notification by email** of device events

FEATURE SETS for corpuls.manager ADMIN

Basic: Simple, quick email notifications

Standard: Additional status dashboard, view of the configuration and access to missions

Premium: Additional fully automatic updates (via WLAN)

THE ENTIRE CONFIGURATION IN YOUR HAND

The **corpuls.manager App** easily connects locally to the **corpuls aed** via WLAN. Settings and parameters can be adjusted on site on the device very quickly.

Download the free **corpuls.manager App**:

Download on the App Store

GET IT ON Google Play

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DEVICE FLEET STATUS

corpuls.manager ADMIN organizes all of your **corpuls aed** devices (web-based) and shows you the status and configuration of the individual devices at a glance. Self-test and mission data, battery status, upcoming replacement of therapy electrodes and CPR feedback sensors, as well as the next safety check can be called up. If necessary, **corpuls.manager ADMIN** will also tell you immediately whether there is an error on the device. Notifications by email are also possible, so that you are always up-to-date without having to click on the user interface. In addition, you can save other information such as location data, instillation in vehicles and other device related details. When managing a large number of devices, it is helpful to divide the connected devices into groups.

CENTRALLY CONTROLLED SOFTWARE UPDATES

After running the regular self-tests, the devices connect automatically to their server. By means of a web browser you can view the current status in **corpuls.manager ADMIN** and easily identify devices to be serviced – without having to be near the devices.

Long maintenance phases or service appointments through software updates are also a thing of the past with **corpuls.manager ADMIN**. You only need WLAN and **corpuls.manager ADMIN**. You can send every software update, language package or configuration change via WLAN to all, individual or selected devices with just the push of one button. Of course, all data is always securely encrypted. If there is no WLAN available at the **corpuls aed** location, the self-test results can also be sent via SMS in the cellular network to **corpuls.manager ADMIN** and displayed there. You can obtain the necessary SIM card for this service directly from **corpuls**.

Interfaces

EFFECTIVE INTEGRATION THROUGH NETWORKING

In an emergency, the focus is on the patient, not the technology. Different systems have to work hand in hand for the workflow to function smoothly. Our software products **corpuls**.mission and **corpuls**.manager offer varied interfaces for seamless integration into your IT environment.

INTERFACES

corpuls.mission and **corpuls**.manager offer a wide range of different interfaces and possibilities. This ensures that our products can be integrated into your systems.

HL7 FHIR
This common interface provides a connection to third-party systems via HL7 FHIR.

SCP
Save or forward received resting ECGs from **corpuls**3 in the SCP format.

PDF
Save or forward resting ECGs or the complete mission with all details in a standard format.

OAuth2
Flexible integration of OIDC providers and user directories via LDAP.

FTP(S)
Send mission data from **corpuls** devices and **corpuls**.mission to be saved in **corpuls**.manager.

GE MUSE
Save or forward resting ECGs received from **corpuls**3 in the GE Muse or Cardiolex format.

REST
Use this interface to control your mission database separately from the user interface.

PDF
Save the data and history of all missions of **corpuls** devices easily as a document.

BDF+
Save signal data in a standard medical archive format.

In modern healthcare, many health professionals are involved in patient treatment. The right therapy decisions can only be made if the right information is available at the right time. Because of this, not only people are networked with **corpuls**.mission, but also different medical systems.

As the de facto standard for data exchange in the healthcare system, HL7 offers the optimal interface for connecting **corpuls**.mission directly to hospital information systems. With the latest version, HL7 FHIR, a flexible REST interface is also available to connect any additional third-party systems simply and easily. Many archiving systems are natively supported with GE MUSE and SCP. e.g. PACS. Diagnostic ECGs can be transferred directly to the patient record.

With flexible interfaces, **corpuls**.manager also offers the best connections to support your data management workflow. The open format BDF+ for medical curves and event data is particularly suitable for research purposes. This allows you to process all mission data in your own application. Metadata enriched PDF files provide a clear summary of your missions, which can still be processed automatically by machines.

IT systems in healthcare are often complicated and have grown over the years. For this reason, **corpuls** products rely on flexible interfaces to enable interoperability with a wide variety of systems. If a direct connection is not be possible, **corpuls** offers support in the development of middleware and tailored solutions.

▶ *All important data can also be exchanged directly with the **corpuls**3 or C3T via a bi-directional Bluetooth interface.*

EXAMPLES OF THIRD-PARTY SYSTEMS THAT ARE ALREADY CONNECTED

- **Dispatch centre systems**
- **Hospital Information Systems** (HIS)
- Emergency room **management systems**
- **Expert systems**
- **Medical data archive systems** (PACS)
- **Documentation systems** (ePCR)
- **User management systems** (AD/LDAP/OIDC)
- **Telecommunication systems** (SIP/VoIP)
- **National Resuscitation Registries**
- **Business Intelligence Software**
- **Specialized research systems**
- and many more ... **Talk to us!**

Data privacy & security

TRUST IS GOOD, ENCRYPTION IS BETTER.

In the case of medical devices, data security is now connected to patient safety.
Digitization creates completely new attack vectors in the healthcare sector.
It is no longer just about protecting personal information, but ultimately about protecting human life. With **corpuls** products you can rely on much more than just trust.

DATA SECURITY

The privacy of patient data is the top priority for **corpuls**.**mission** and **corpuls**.**manager**. By encrypting all patient data, compliance with the strict data privacy requirements is fully guaranteed at all times. Our servers are operated in accordance with current security standards, such as ISO 27001. In addition, the development of the entire product is subject to strict monitoring by an external control authority. It therefore complies with the latest IT security standards.
But data security means much more than just protection against unauthorized access. Throughout the complete product design, we focus on the four basic principles of IT security:

Confidentiality
Confidentiality covers the protection against unauthorized access:

- Data may only be read by people or programs if they are authorized to do so.

Integrity
Integrity goes beyond unauthorized access – to protect against modifications:

- Data may only be modified by people or programs if they are authorized to do so.

Availability
Particularly in medical applications, availability is a very important objective. It describes the protection against the failure of systems or components:

- Correct software functioning must be guaranteed when it is in use.

Non-repudiation
From a legal perspective, non-repudiation is another objective that describes protection against falsified identity and protection against deniability:

- The execution of actions and the origin of data can be clearly assigned to an identity (person, program). The term is often referred to as revision security.

DATA SECURITY MEASURES

It is not enough to take one-off measures to meet the security standards. In the constant battle between hackers and those protecting security, we constantly keep track of the latest findings and continuously update our systems. Therefore, only the current selection of security measures can be listed here, and these could be out of date tomorrow.

- **Secure server operation** in certified data centres
- **Encrypted data transmission** on all routes
- **Secure algorithms with TLS cipher suites** in accordance with the recommendations of the Federal Office for Information Security (BSI)
- **Additional encryption in cellular networks** with M2M SIM cards and VPN tunnel is an available option
- **End-to-end encryption** of personal data
- Exchangeable certificates for encryption restrict data access to the operator only
- **Secure user management according to current standards:**
  - Multi-factor authentication (TOTP/HOTP)
  - OAuth 2.0, OIDC, Kerberos, LDAP, WebAuthn, X.509
  - Single sign-on
  - Assignment of password guidelines
  - Role-based access and role authorization concept (RBAC)

corpuls.**mission LIVE**:

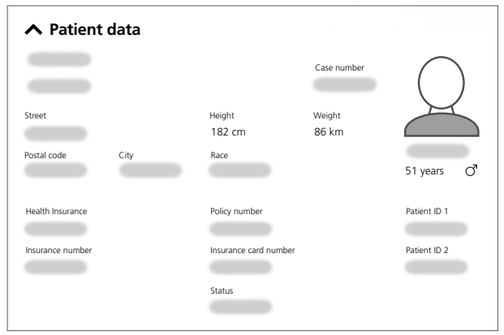
- **Separate transmission of patient data** and non-identifiable medical data to the server via separate channels
- **No data storage** in the app or in the browser
- **Reliable operation in high-availability cloud systems** with redundancy layers and backup strategies
- **Testing of product security** through independent external penetration tests
- **Our cloud hosting certificates:**
  - **ISO 27001**
  - **ISO 27017**
  - **ISO 27018**
  - **ISO 27701**
  - **ISO 9001**
  - **CSA STAR**

DATA PRIVACY

For **corpuls**, data privacy and data security form an integral unit. As a German manufacturer, we are subject to the strict requirements of the European General Data Protection Regulation (GDPR) and we align our entire development accordingly. Health data – paired with identifiable features – is considered to be specifically worthy of protection under law. We are constantly developing and updating our technical and organizational measures to prepare our products for this.

For example, a mission report can be created for the "right to information" (which patient data has been saved). The ability to delete information within the products guarantees the "right to be forgotten". A role rights concept ensures that the products can be adapted to the needs of the users. So users can only see what is allowed within their role.

As a rule, the operator of a medical health facility is responsible to patients and employees in terms of data privacy. As manufacturers and data processors, we support you with this, not only with secure products, but also with secure infrastructure and contract design. You benefit from our many years of experience in highly critical applications.



Patient data is automatically made unrecognisable based on the anonymisation rules set.

DATA PRIVACY MEASURES

corpuls is very aware of the handling of highly sensitive medical personal data. We set ourselves apart from classic consumer chat/video tools and public cloud storage.

- **Data privacy compliant server hosting** in a contractually defined region (e.g. Germany, Austria or Switzerland)
- Individualized and legally verified **data processing agreement**
- **Disclosure of the complete processing chain** from the user to the databank
- **Access by data processing companies** from third countries is excluded both cryptographically and contractually
- **Protection of personal data** through flexibly configurable anonymisation rules so that users only see the personal data that is permitted within their role
- **Automatic deletion of data** after configurable time periods
- **Audit logging** of data privacy relevant access by users
- Flexible configuration ensures **compliance with data privacy as well as other legal requirements**, such as retention periods in accordance with the patient rights act

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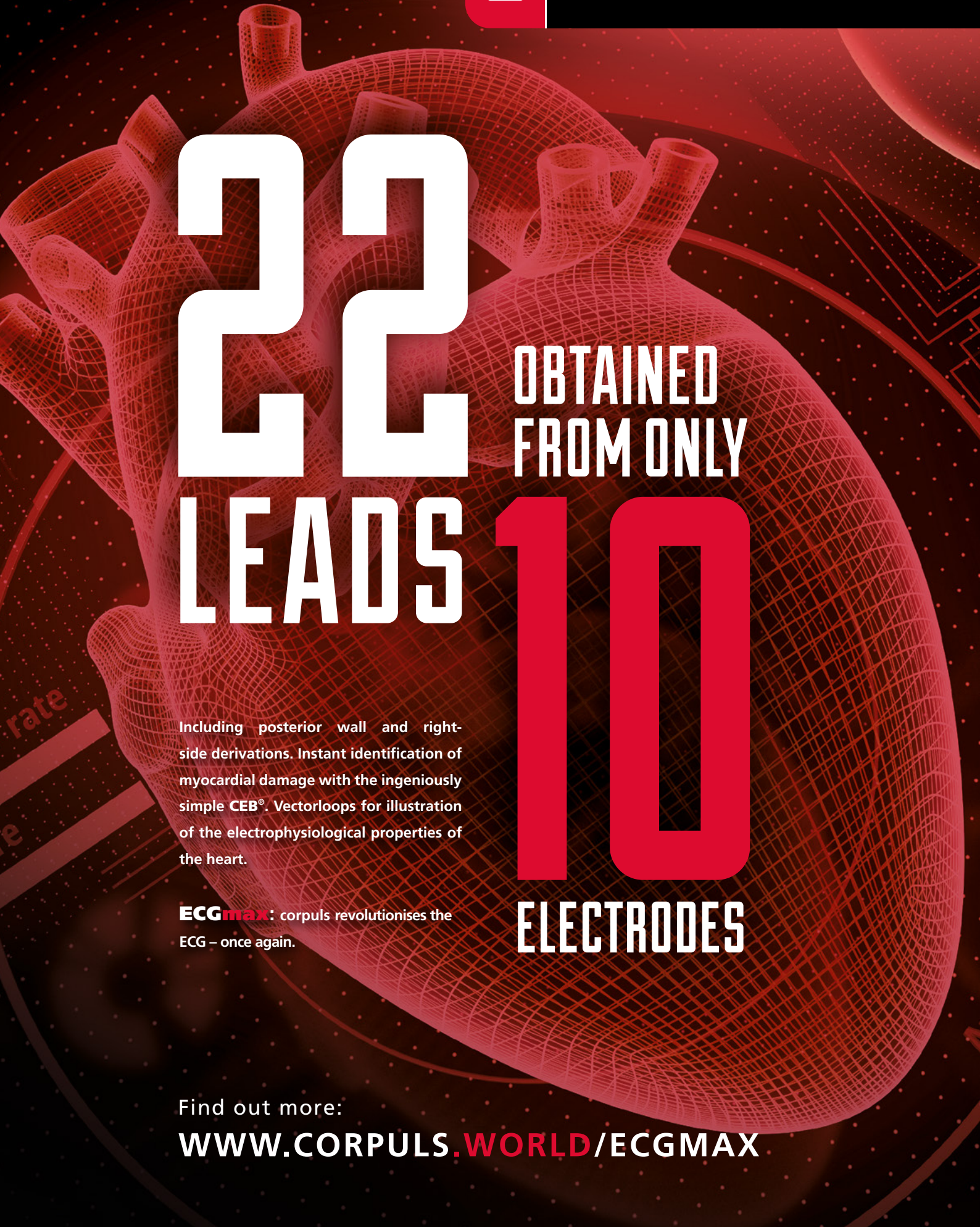

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