



TRAINING IS MISSION CRITICAL

Zephyr™ Performance Systems for Defense

Medtronic



ALL THE DATA YOU NEED FOR PEAK PERFORMANCE

While performance monitoring for the military can be broken down into a myriad of elements, at its highest level it answers a fundamental question:

Is a soldier training at a peak level — exercise after exercise, deployment after deployment?

Performance monitoring gives you the tools and data you need to answer this with confidence. It lets you supplement your subjective review of a soldier's performance with objective measurements of vital signs and physiological and biomechanical movements.

This scientifically based approach can help take the guesswork out of training. It generates valuable insights that can help you cultivate soldiers who are better conditioned and ready to perform at their best.

CONSIDER THE BENEFITS

Here are some of the ways strength and conditioning coaches, trainers, squad leaders, and human performance scientists use performance monitoring:

Measure the effectiveness of training regimes and programs overtime

- Use standard programs such as the Fitness or Jump Test to develop a soldier's baseline measurements
- Track results of regimes from PT to in-field exercises, candidate selection, deployment, and post-deployment conditioning
- Analyze unit data to fine-tune specific protocols such as CASEVAC or fire and maneuver drills

Optimize rehabilitation programs

- Quantify intensities and loads during training sessions
- Simulate mission situations while monitoring workloads to reduce the risk of further injury
- Measure vital signs to help determine whether personnel are fatigued, dehydrated, injured, helping them return to the field quicker

Objectively quantify subjective measurements

- Measure when a soldier thinks they are giving their maximum effort to see who is maxing out and who is hiding out
- Determine who is giving 100% and who isn't, and who is able to push through the wall
- Gain insight into when to push a soldier into their max zone and when it's time to back down



A SINGLE SOLUTION. A RANGE OF APPLICATIONS.

An inside look at what most thought the human body couldn't do

Zephyr™ Performance Systems provides a single solution that measures, streams, and logs a wide variety of physiological and biomechanical data. Measure and analyze both units and individuals — up to 100 personnel at a time — using the market-leading BioModule technology and OmniSense software.

A customized and tailored approach to training leads to optimal results. So you can consistently achieve maximum performance.

OmniSense Live software

Real-time data on personnel lets you:

- Monitor multiple personnel to facilitate better Command & Control and Combat Casualty Care decisions
- Duty of Care with Google™ Maps or FalconView™ mapping
- View intensities and loads
- Track specific individuals vs. units deployed
- Record and analyze conditioning, effort, stress, and exertion

OmniSense Analysis software

Create reports and comparisons of personnel so you can:

- Help fine-tune training regimens to achieve individual and team goals
- Customize reports in summary spreadsheets, radar blots, and bar graphs
- Export data in .csv and DADiSP formats for export to MatLab™ and LabView™
- Develop customized fitness testing utilities, vertical jump tests, speed and training zones, and peak acceleration to fine-tune your personnel on mission specific exercises

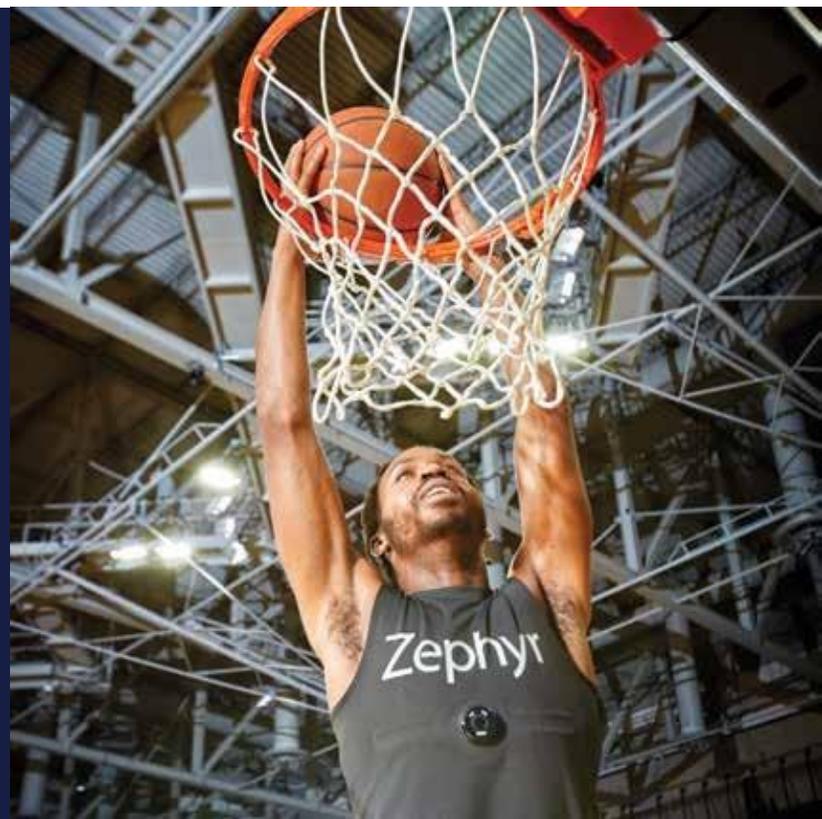


FROM SPORTS TO SPACE

Our performance monitoring has been used to measure subjects' vital signs in more than 500 published research papers — as well as by:

- Professional and collegiate sport teams
- Defense organizations
- Academics and researchers
- First Responders
- National Governing Bodies in countries including England, South Africa, Netherlands, Brazil, and the U.S.

To learn more about organizations that use Zephyr™ Performance Systems, visit zephyranywhere.com.



A CLOSER LOOK AT WHAT ZEPHYR™ PRODUCTS MEASURE

Zephyr™ Performance Systems report on more than two dozen physiological and biomechanical parameters based on six inputs. Collectively, this information yields insights into key biomarkers in the monitored personnel.

Here’s a look at the data the system gathers and reports on to provide insights into performance.

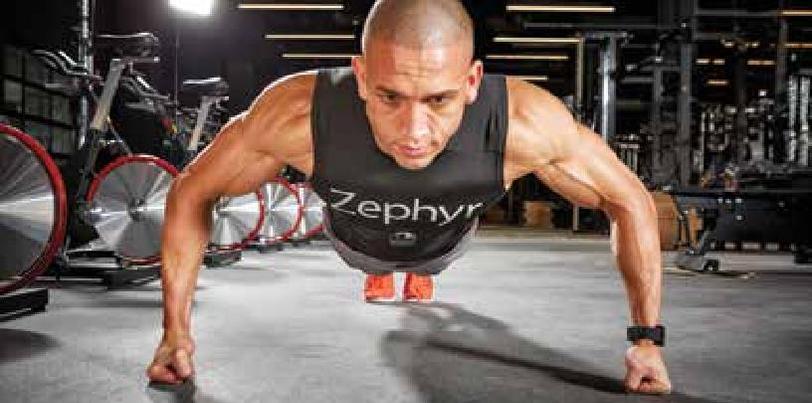
Six inputs	Physiological and biomechanical measurements		Biomarker indicators
Straps and shirts, BioModules and GPS units provide these six inputs:	Based on the six inputs, Zephyr™ OmniSense software reports thesebiometrics:		The combination of the biometrics yields insight into these biometric markers:
<ul style="list-style-type: none"> • ECG • Respiration • Estimated corebody temperature • Accelerometry • Time • Location 	<ul style="list-style-type: none"> • Heartrate (HR) • Breathing rate • HR variability (HRV) • HR confidence • Estimated corebody temperature • Impact • Activity • Posture • Caloric burn • % Heart rate (max) • % Heart rate anaerobic threshold (AT) • Accelerometry 	<ul style="list-style-type: none"> • Physiological and mechanical intensity and loads • Training loadsand intensity • Jump • Explosiveness • Peakforce • Peak acceleration • GPS speed • GPS distance • GPS elevation 	<ul style="list-style-type: none"> • Fatigue – HR recovery • Readiness – HR variability (HRV) • Safety – max HR, core body temperature, location • Over-training andunder-training evaluation — intensity and load • Fitness improvement— VO₂ max, HR @AT • Caloric expenditure and burn • Agility — accelerometry, speed, and distance • Athlete management— intensity and load • Stress – HRV

OmniSense Live Software

The dashboard enables the user to:

- Customize the view by name, unit, and exercise
- Display up to 100 live personnel at one time
- Set alerts for safety, mechanical loads, core temp, HRV, location, and other parameters





BENEFITS THAT ARE IMPOSSIBLE TO IGNORE.

Here's why the Zephyr™ family of performance products is the top choice for many elite units.

FEATURE	BENEFIT
Live monitoring of large groups	<ul style="list-style-type: none"> • Provides configurable thresholds in real-time monitoring to allow concurrent management of training intensity and loads for each soldier • Allows real-time insight into the potential for conditions such as fatigue, over- or under-training, and heat stress
Team and individual training and fitness reports	<ul style="list-style-type: none"> • Shows baseline metrics such as anaerobic threshold, HR recovery, and VO₂ max • Lets human performance resources compare and contrast personnel, and ascertain improvements
Measurements of kinematic and physiological variables	<ul style="list-style-type: none"> • Measures explosiveness from a dash or sprint start • Supports customizable speed and training zones
Detection and monitoring of anaerobic threshold	<ul style="list-style-type: none"> • Provides a method of monitoring fitness • Allows breathing rate-triggered monitoring of anaerobic threshold for intensity-based training
Monitoring of personnel in situations for signs of heat stress or fatigue	<ul style="list-style-type: none"> • Uses estimated core body temperature, HR recovery, resting HR, and HR variability • Monitors training intensity and load over time to assist in training customization and ultimately improve athlete management
Comprehensive analysis capabilities	<ul style="list-style-type: none"> • Detailed analysis of an individual's training and performance • Trend analysis of individuals or teams over multiple practices or sub-sessions • Quick and easy comparisons between players
GPS and player positioning	<ul style="list-style-type: none"> • Provides GPS logging data that works with Google Maps™ and FalconView™
Eliminate artifact issues	<ul style="list-style-type: none"> • OmniSense software algorithms and mechanical design address noise and movement artifact issues that affect other systems
Transmission range	<ul style="list-style-type: none"> • Provides an ECHO transmission range suitable for in-arena use or outside use across multiple training fields
Extended range	<ul style="list-style-type: none"> • Offers available antenna repeaters to extend coverage to an area of approximately 4 million square feet with no dead zones

GARMENTS. SENSORS. DISPLAY. COMMUNICATION.

Details of the Zephyr™ Performance Systems workflow

The Zephyr™ Performance Systems include garments, sensors, display capabilities, and communication devices, along with robust software.

Spotlight on BioModule compact physiological monitoring module

The BioModule compact physiological monitoring module enables the capture and transmission of comprehensive physiological data on the wearer via mobile and fixed data networks. It enables genuine remote monitoring of human performance and condition in the real world.

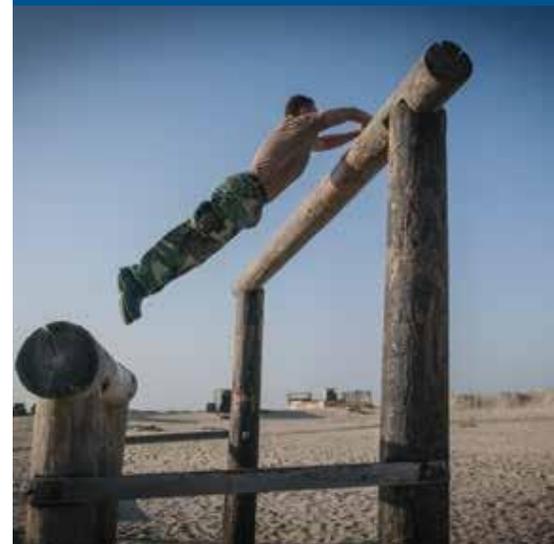
Here's a look at the key product features and specifications:

Connectivity	Uses ECHO to provide heart rate, RR interval, speed, and distance
Strap and shirt	Machine washable strap, compression and loose fit shirt offer both comfort and accuracy
Garment washes	80
Water resistance	Up to 1 meter
Data capacity	Logs and stores up to 20 days of data
Heart rate range	25-240 BPM
Breathing rate range	4-70 BPM
Accelerometry range	±16g, 100Hz
Battery type	Rechargeable lithium polymer
Battery life	24 hours per full charge
Charge cycles	300
Transmit range	Up to ~300 feet; extending to up to ~1000 feet with antenna and amplifier
Frequency	2.4-2.4835GHz
Operating limits	Temp: -10° C - 60° C Humidity: 5% - 95%

RADIO COMMUNICATIONS

Utilizing existing tactical radio communications for in-field personnel is a simple and cost effective deployment methodology. Short and long range connections to "local" or "over the horizon" command stations which can be easily set up and rapidly deployed.

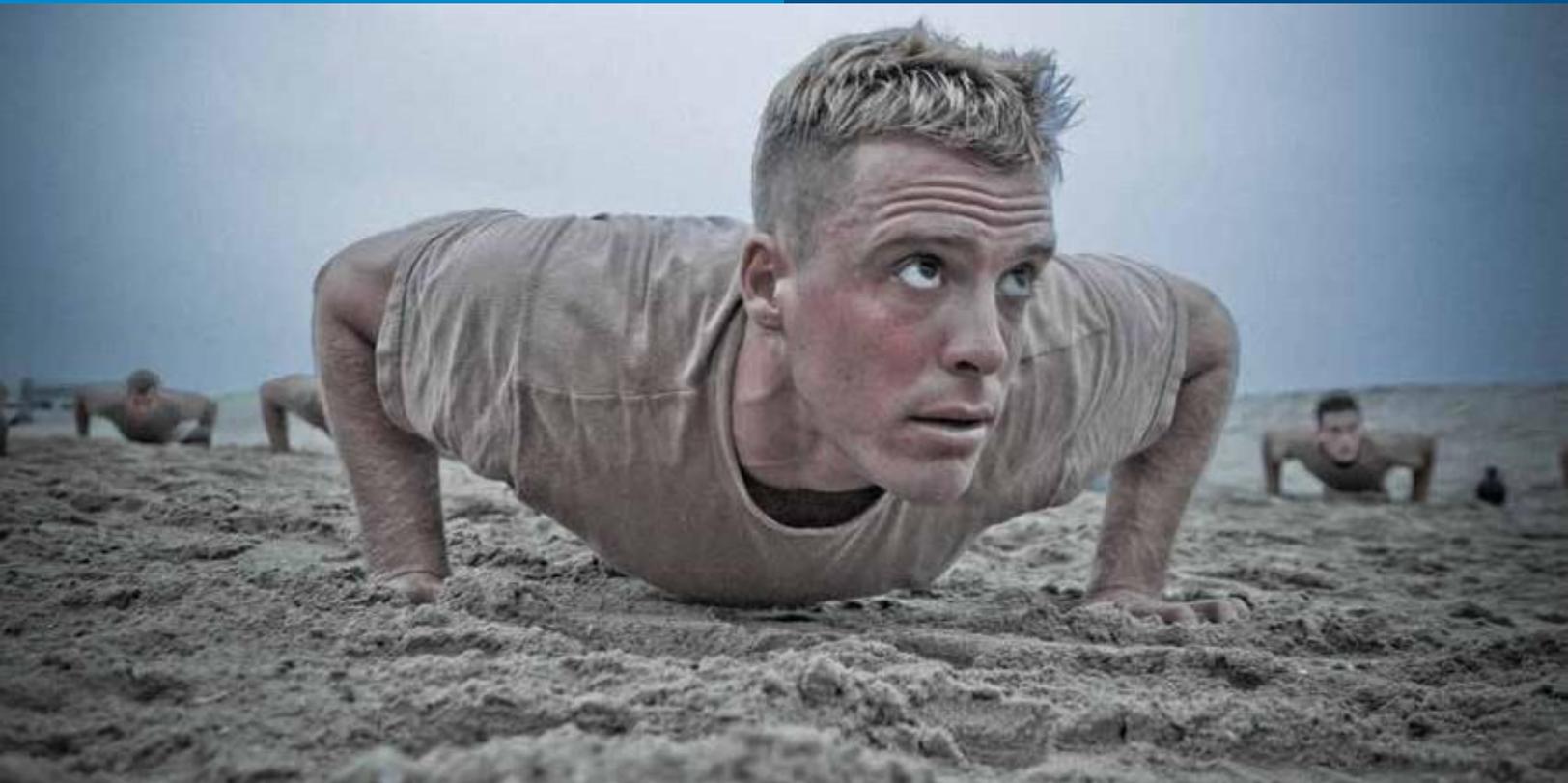
- Solutions for Thales MBITR, JEMS, Motorola XTS, Trellisware and other radiosystems
- Trunked APCO for base deployment and training
- Voice and data use utilize the same radio with voice priority



READY TO LEARN MORE?

For a closer look at performance monitoring and the products profiled here, visit zephyranywhere.com.

REINVENTING WHAT'S HUMANLY POSSIBLE



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