



WHITE PAPER

EFFECTIVE MANAGEMENT OF ATHLETE PREPARATION

**A COMPREHENSIVE APPROACH TO MONITORING
THE ATHLETE'S INDIVIDUAL READINESS**

Roman Fomin & Valerie Nasedkin

The portable, non-invasive Omegawave technology allows for a comprehensive assessment of the professional and recreational athletes' individual Readiness for upcoming training loads.

The Omegawave solution is based on an 'integrated systemic approach' to the assessment of short- and long-term adaptational changes in the body. Monitoring these changes makes it possible to efficiently manage the athlete's preparation, as well as to individualize and optimize training loads, leading to optimal results with lower adaptational costs.

As the solution provides immediate physiological feedback, the athlete can improve his or her stress resistance and work capacity, avoid overreaching that leads to overtraining, reduce the risk of illness and injury, and enhance their quality of life.

DISCLAIMER

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PREFACE

The white paper seeks to answer the question that even experienced coaches frequently ask: “How can I prepare the athletes to achieve maximum performance with minimal time and physiological cost, reduce the risk of injury and prolong their competitive career?”

With this white paper, the authors contend that in order to create and manage a truly effective training process, coaches need immediate, comprehensive feedback on athlete’s current Readiness for upcoming training loads or competition. However, obtaining this feedback by using current methods is often time consuming, cost prohibitive, inconvenient for both the coach and the athlete, and logistically impractical for frequent use.

As a solution, the white paper presents Omegawave’s technology as the means to overcome the challenges; it is easy and simple and can be used whenever and wherever. With this solution, the coach will be able to correctly determine the type and direction of training, optimize the volume and intensity of loads, and ultimately maximize the athlete’s performance with minimal risk.

The authors also explain the concept of readiness in detail, along with its scientific foundations and its practical implementation in the training environment. Readiness and other relevant methodological terms are clearly defined and explained in the paper’s glossary. In addition, current popular approaches to managing an athlete’s preparation process are analysed and reviewed, focusing on their key limitations.

The white paper is written for audiences with a keen interest or expertise in coaching and the preparation of athletes, sports science and sports medicine, and other relevant fields.

GLOSSARY

Systemic Approach to athlete preparation	The combination of all processes and factors applied to the athlete which leads to positive functional changes that ensure continuous improvement of performance and results.
Management of athlete preparation	Optimization of the athlete's overall state through training and recovery activities, ensuring the achievement of best possible results.
Training process	The main component of the wider system of athlete preparation. Encompasses all training related means and methods the coach uses to improve the athlete's preparedness.
Comprehensive assessment approach	An integrated assessment of the preparedness and Readiness of the athlete, using a set of various scientific methods including pedagogical, psychological, physiological, medical, and others.
Functional state	An organism's physiological state, the fundamental base from which functionality is derived. Functional state describes the specifics of an organism's regulation processes and determines the subsequent behaviour and capacity.
Preparedness	The multi-faceted cumulative state of an athlete, composed of a certain developmental level of physical, technical, tactical, mental, and intellectual factors.
Readiness	The current functional state of an athlete that determines the ability of an individual to effectively achieve their performance potential.
Adaptation	The process of adapting to training-related and non-training-related changes in the environment.
Short-term adaptation	The organism's response to a single training load.
Long-term adaptation	The cumulative structural and functional changes taking place in the athlete's organism as a result of repeated short-term adaptations.
Cost of adaptation	The physiological cost the athlete's organism pays for adapting to training and non-training-related changes in the environment.
Trainability	The ability to receive training loads and effectively adapt to them, thereby producing a positive training effect. Increasing trainability leads to an improved capacity to resist training-related and non training-related changes in the environment and decreases in the costs of adaptation.

INTRODUCTION

For an athlete to achieve peak performance, an effective, *integrated systemic approach* to athlete preparation is required. This approach should ensure that the athlete's levels of *trainability* and *preparedness* are continuously developed so that he or she can perform at their highest possible ability. Creating a proper methodology of training is a vital part of this complicated and multi-faceted approach, and it should be the primary task of any coach.

If the principles of the integrated systemic approach are misapplied or misunderstood, the result is often chronic stress, overreaching/overtraining, illness or injury, leading to progressively poor or sub-par performance. This will eventually have a negative impact on the athlete's health and career. The risk of harm is exacerbated when the preparation process is not managed at all, no objective monitoring system is used, or the training load is arbitrarily selected using the "more is better" principle.

Often, coaches use the following popular methods to help them effectively manage the *training process*: the "template method", the "trial and error method", and the "dogmatic method". These methods fail to take into account one of the most important laws of managing the training process — obtaining *feedback* from the object under control (the athlete's organism). In addition, many coaches fail to use an interdisciplinary approach, further limiting their ability to implement an effective and comprehensive preparation process.

An athlete is a living system and therefore subject to the laws of biology. The coach applies training loads to this system to change its physiological state with the aim of enhancing the athlete's performance. This development of performance is the product of *adaptational changes* in the organism. As the training process is a process of adaptation, managing the training process means managing the adaptational changes in the athlete's organism.

Without objective feedback on the changes taking place in the functional state of the athlete's organism in response to training sessions, a coach cannot properly evaluate the athlete's **Readiness** for training and to place training sessions accordingly. Hence, the *knowledge and understanding* of the adaptational changes that take place in the athlete's organism during and after training are key to enhancing the approach to the athlete preparation process. The coach also needs to be able to manage these changes *when and as required* in order for performance objectives to be realised.

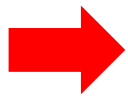


This paper introduces the *concept of Readiness* as well as the importance of developing a systemic integrated approach to managing the athlete preparation process through frequent comprehensive assessments of the athlete's physiological functional state.

OPTIMIZING THE APPROACH TO ATHLETE PREPARATION

At present, each coach or athlete has their own approach to the management of the training process. Such approaches include various training components, means, and methods. However, not all of these approaches will produce Olympic champions. The key to success is the athlete's **individual functional state**, a factor that has received minimal attention within the preparation process to date.

There is a common tendency to use narrow segments of sports science theory, or only field experience, when planning the training sessions. In addition, the athlete's physiology receives inadequate attention – there is a lack of objective monitoring of the current functional state of the organism as a whole as well as its individual systems. Finally, without frequent tracking of adaptational changes, the athlete will be unable to achieve planned performance objectives.



*The correct use of the feedback obtained from the **comprehensive monitoring** and assessment of the athlete's functional state, preparedness, and Readiness is the crucial factor that will allow the coach to improve their ability to manage the preparation of an athlete, thereby achieving **optimal results at a minimal cost**.*

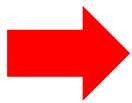
Each *athlete is unique*, so the approach to the athlete's preparation must also be individually specific. Only by using principles of individualization and optimization of the training process will coaches be able to manage the quality of the athletes' reactions to training sessions and the preparation of the athlete as a whole. In addition, without specific **physiological feedback** on the athlete's functional state, coaches will be unable to select the optimal amount of volume and intensity of training, to effectively manage and correct training loads, or to organize recovery and recuperation activities in a timely manner.

Therefore, comprehensive, integrated, and frequent assessment of the athlete's functional state and Readiness for training loads makes it possible to:

- significantly increase the effectiveness of training process management
- fully realize individual potential of the athlete
- create the conditions necessary to achieve optimal preparedness
- guide athlete to highest achievement

CONSEQUENCES OF NOT MONITORING THE ATHLETE'S INDIVIDUAL READINESS

Without the critical element of monitoring the athlete's functional state, the quality of interaction between the coach and athlete will be insufficient for the proper management of the athlete's preparation. *The functional state* is a highly sensitive and accurate physiological indicator, which objectively describes individual *short- and long-term adaptations* of the athlete's body to various stressors, including training loads. The goal of every coach should be to improve the management of the athlete's functional state, and its most important marker, **Readiness**.



The state of Readiness is the result of many different stimuli applied to the athlete (both training- and non-training related). It is the most accurate indicator of that athlete's ability to realize their capacity/potential in training or competition.

Therefore, the coach should regard negative deviations from optimal Readiness as warning signs of the body's inability to bear the planned training load. Readiness serves as a **correcting signal** informing the coach that he or she should make prompt changes to the training plan.

Readiness is a critical component of the comprehensive approach to successfully managing the athlete's preparation. As a result, the managing of the training process results in a more organized and integrated system, as it takes into account both the training stimuli (volume and intensity) and the physiological and adaptive responses of the athlete's organism to these stimuli.

In summary, if the valuable physiological information about the athlete's state of Readiness is ignored or unavailable the chances of training in a state of **poor Readiness** increase significantly. Doing so may have a serious adverse outcome and even negatively affect the whole career of the athlete. The **main risks** associated with training when in a state of non-Readiness are:

- **chronic stress** – prolonged application of excessive training loads and other stimuli during a state of non-Readiness can result in the onset of chronic stress
- **overreaching that leads to overtraining** – an excessive increase in the volume and intensity of training loads, imbalance between exercise and rest, insufficient recovery, and poor management of the athlete's daily routine can all result in overtraining
- **decrease of work capacity and performance results** – demanding training sessions when the body is not ready can lead to a considerable decrease in athletic performance, achievements and training effect
- **illness or injury** – training during the state of non-Readiness increases the risk of illness or injury

EFFECTIVE MANAGEMENT OF THE PREPARATION PROCESS

DIFFERENT APPROACHES

By analyzing scientific literature and relying on practical coaching experience, the most successful coaches employ three successive steps for the efficient management of the training process:

1. **collecting information** about the athlete's state, including the parameters and characteristics indicative of physical, technical, tactical, mental, and intellectual preparedness
2. **analyzing information** about the athlete's state, which implies the comparison and correlation between the measured and planned parameter values
3. **making and implementing decisions** regarding training management-creating and implementing training plans and programs, and selecting means and methods of training in order to achieve optimal performance

The coach obtains information about the athlete's state and preparedness through the following **main feedback channels**. This information can be analyzed and used for decision making concerning both the management of the training process and athlete development:

1. **subjective assessment** – verbal information supplied by the athlete to the coach about his or her psycho-physiological state (well-being, activity levels, mood, training attitude, etc.)
2. **observation of training stimuli and reactions** – information about characteristics obtained through observing the athlete's performance (volume, intensity, quality of performance, errors, etc.)
3. **performance analysis** - the athlete's preparedness information obtained from specific athletic tests or competition
4. **medical and biological testing** - information about the athlete's state and possible level of preparedness, obtained through testing in research laboratories
5. **field technologies** - information regarding the organism's functionality measured in the natural training environment

At first glance, it appears that the number of feedback channels and the information provided about the athlete's functional state is more than sufficient for the proper creation of training plans. On closer inspection, however, it is clear that the number of feedback channels is actually insufficient, and the information obtained through them does not provide a complete and accurate representation of the athlete's functional state and preparedness.

The principal limitations of each feedback channel are now presented:

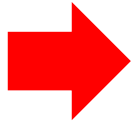
1. **subjective assessment** by the athlete of his or her state is often misleading and can lead to undesirable results. Without the aid of objective information, the athlete may select a training load that is too high or too low. In both cases, the athlete will not be able to achieve a positive outcome
2. **observation of training stimuli and reactions** reflects only the external component of the athlete's work capacity and does not take into consideration the key internal component responsible for the improvement of the athlete's performance – the **cost of adaptation** (the measure of resources the body spends in the process of achieving the performance objective)
3. **performance analysis** of the outcomes of specific athletic tests or competition measures the athlete's preparedness through the following components: physical, technical, tactical, psychological, and intellectual. However, this information reflects only *externally* observed outcomes and does not take into consideration the specific *internal* adaptational processes that produced the observed performance outcomes. These adaptational processes include information about changes in the current functional state and the acute reactions to training loads.
4. **medical and biological testing** provide the most objective scientific information about the athlete's functional state, work capacity, and preparedness. However, such methods require the use of a laboratory, are restricted to a specific location, and demand time and effort. These methods can also be invasive and physically taxing, and are too narrow in scope. They are not conducive to everyday dynamic monitoring, intervals between testing sessions may be long (testing may only be conducted two or three times a year) and the wait-time for test results can take days or weeks. These factors, in addition to others that will not be mentioned for purposes of brevity, can significantly impair the efficiency and practicality of utilizing these methods in sports practice.
5. **field technologies**, including mobile applications and portable non-invasive devices employ isolated and narrowly focused methods. They are therefore limited in their ability to provide an integrated and comprehensive assessment of the athlete's functional state and level of preparedness.

An example of such a method is heart rate variability (HRV) analysis. A popular and widely-used scientific method, HRV analysis has recently received acceptance in the fields of physiology and medicine as an informative yet simple indicator of the Autonomic Nervous System's (ANS) regulatory actions that influence heart activity. Many companies and independent professionals have adopted the HRV analysis method, considering this single method to be the only technology necessary to develop and manage the athlete's preparation.

However, a single scientific method, even a very informative and reliable one, should not be used as the sole basis for managing the training process.

Doing so will result in misinterpretations of the organism's actual physiological responses to training loads, and subsequently misguide the management of the athlete's preparation. A single scientific method is very restricted in scope and, when utilized in isolation, fails to fulfill the complex tasks of assessing the athlete's current functional state and preparedness. Training loads stress the athlete's

organism *as a whole*, rather than impacting only individual organs or systems. Therefore, any approach to the assessment of the organism's functional state should be comprehensive and integrated, rather than fragmentary.



The previously mentioned list of feedback channels lacks the most important source of information – **objective daily feedback concerning the athlete's current functional state informing the coach about the athlete's Readiness for upcoming training loads.**

The unique physiological data obtained through this *Readiness channel* provides a description of the short-term training effect, the nature and scope of changes in the functional systems of the organism, and the direction of load-induced adaptational changes taking place at the macro level.

In addition to this, the Readiness channel informs the coach about cumulative long-term training effects (adaptational changes), which reflect the true level of the athlete's preparedness. The trends of adaptation responses can also be tracked, enabling efficient individualization and optimization of the training process and improvement in the management of the athlete's preparations as a whole.



OMEGAWAVE'S COMPREHENSIVE ASSESSMENT OF READINESS ENHANCES MANAGEMENT OF THE TRAINING PROCESS

THE THEORETICAL CONCEPT OF READINESS

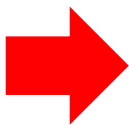
To help achieve optimal athletic performance without associated health risks, Omegawave developed a unique technological solution for the most effective *management of the athlete's preparation*. The technology is based on a comprehensive, **systematic, integrated approach** to the assessment of the athlete's Readiness for training loads. A fundamental element of the approach is the modern scientific perspective that the *adaptation* processes that occur in various systems should not be viewed in isolation, but rather as a single *systemic and integrated process*.

The Omegawave technology was developed using research by distinguished international scientists. They are credited with making an invaluable contribution to the development of this area of science, notably the human body's adaptation to the application of stress - including training loads. The following *schools* of thought form the foundation of the Readiness concept:

- the general adaptation syndrome theory¹ and the nonspecific adaptation organism response theory²
- the functional system theory³ and biological cybernetics^{4,5}
- the theory of cardiac system adaptation to stress⁶
- the Ukhtomsky's dominant concept⁷ and the neurophysiology of human brain states^{8,9}

The preparation of an athlete is a process of adaptation, the physiological essence of which involves continuous functional development of the organism in response to externally induced interaction with the environment (training session). Therefore, in order to be effective in the management of the training process, it is vital for the coach to track and understand the trends of the adaptational changes taking place in the athlete's body on a daily basis.

It is impossible to objectively assess the actual functional state of the whole organism without knowing in which specific body system the adaptational processes are on-going and in which systems the changes have been completed. Because different systems' adaptational processes occur at different times and follow different patterns, traditional approaches to the assessment of the athlete's state fail to provide a solution.

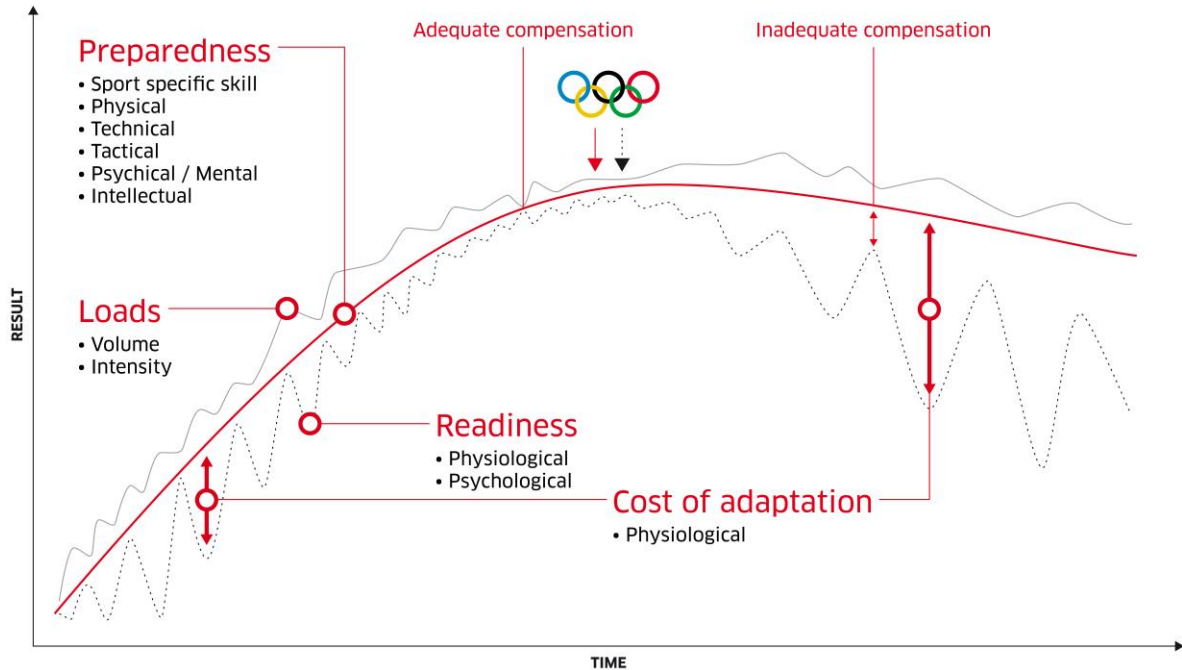


*This situation highlights the importance of obtaining a frequent assessment of the athlete's **Readiness for loads**, which indicates the athlete's current functional state. In addition, it shows their ability to realize their potential in the course of a planned training session or competition due to completed adaptational changes.*

Readiness also takes into account the impact of the full range of factors affecting the athlete and reflects the body's current response to this impact, without ignoring the individual characteristics of the athlete.

The Concept of Readiness in Managing the Training Process of Athletes

Nasedkin V., Fomin R., 2013



Based on this concept of Readiness and using the latest developments in physiology, medical science, cognitive neurobiology, sports science, and computer-aided modelling, Omegawave has developed a portable non-invasive technology, making it possible to perform quick, frequent and comprehensive assessments of the athlete's Readiness in the field. This solution enables the coach to individualize and optimize the athlete's training using objective and immediate feedback, thereby increasing the quality of the athlete preparation process at all stages.

THE OMEGAWAVE TECHNOLOGY IS THE PRACTICAL IMPLEMENTATION OF THE SCIENTIFICALLY JUSTIFIED READINESS CONCEPT

The practical implementation of Omegawave technology is based on the assessment of the Readiness of the following physiological systems and the organism as a whole.

- Overall Readiness
- Readiness of the Central Nervous System
- Readiness of the Cardiac & Autonomic Nervous System
- Readiness of the Energy Supply Systems
- Readiness of the Neuromuscular System
- Readiness of the Sensorimotor System
- Overall Readiness during a stress-test

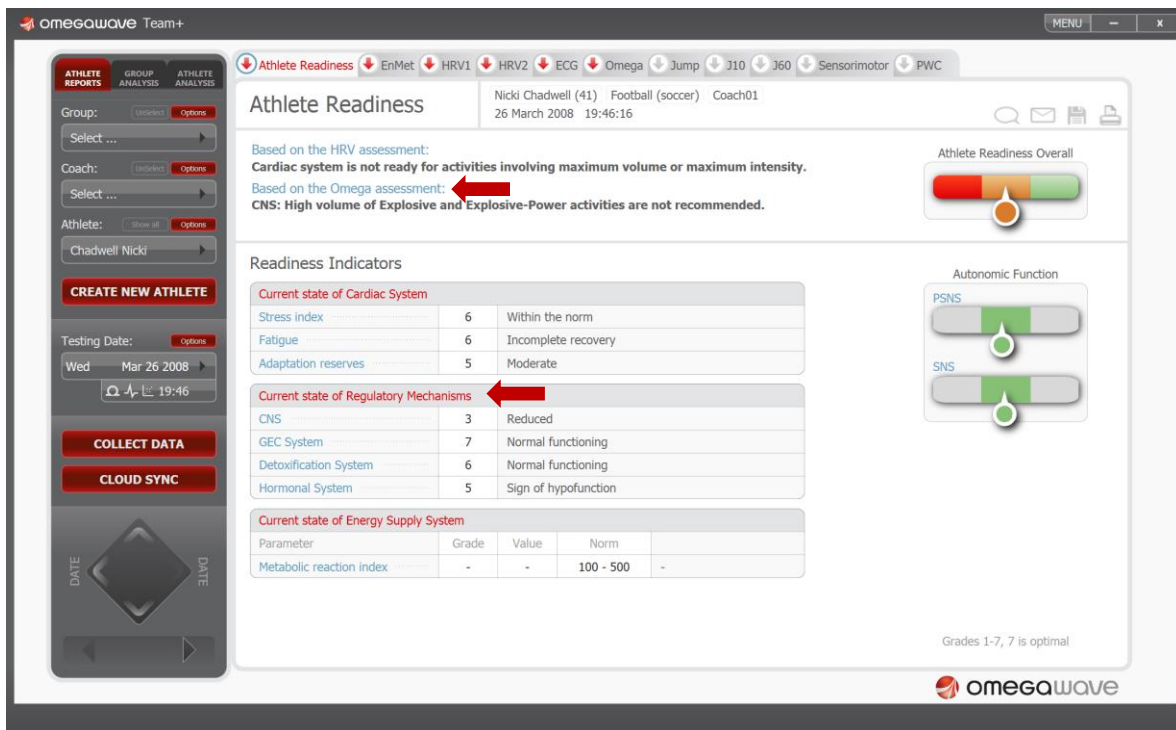
These systems are measured by scientific methods that have been repeatedly tested for a number of years, and comply with accepted industry requirements of scientific methods (including validity, reliability, reproducibility, sensitivity, specificity, accuracy, stability, etc).



READINESS OF THE CENTRAL NERVOUS SYSTEM

Omegawave utilizes the method of analyzing **direct current (DC¹) potentials of the brain**¹⁰— a reliable and sensitive method for the assessment of the functional state of the CNS and the organism' overall Readiness for planned activities. This method has been investigated in fundamental physiology research and medical science for over seventy years and has been used in sports practice for over ten years. It is a universal, integrated basic indicator of the stress level and resistance, adaptational changes, compensation abilities, cost of adaptation and adaptability in general.

Many researchers¹¹⁻¹³ emphasize that the method of DC potential is highly informative and sensitive to short- and long-term adaptational changes that take place in the athlete's body in response to any stressors. It has been proven to be a reliable marker to describe the characteristics of the individual organism's reaction to loads. The goal of utilizing this method is to achieve the highest level of trainability and preparedness at the minimum physiological cost of adaptation.



¹ In Team+ and Omegawave System V.4, DC Potential of the Brain is called Omega.

The brain's DC potential is recorded during a short test (duration two-seven minutes), at rest and/or in response to brief physical exertion. Analysis of the results is used to calculate the most important parameters (*levels of activation, wakefulness, functionality, excitation, and tonus of CNS*) which indicate the CNS's Readiness for the efficient regulation of the organism's functions.

Additionally, this method allows the activation levels of the following systems to be assessed: *gas exchange and cardiopulmonary, detoxification* (excretory), and *hormonal* (hypothalamic-hypophysal-adrenal).

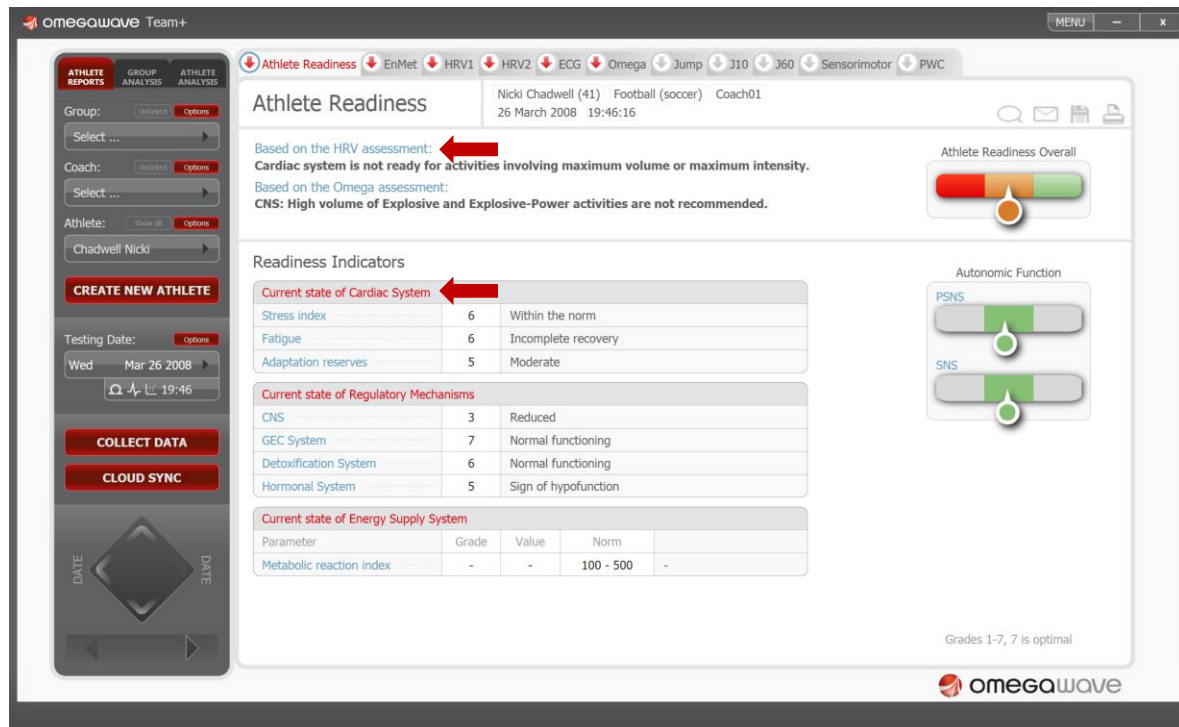


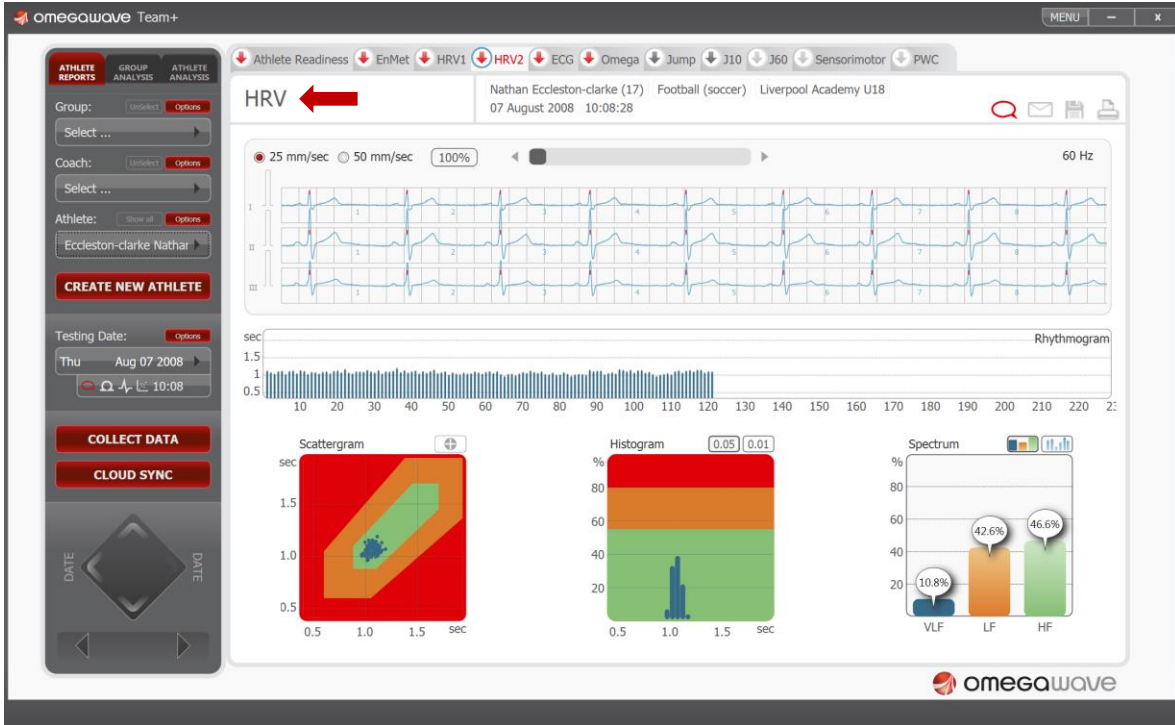
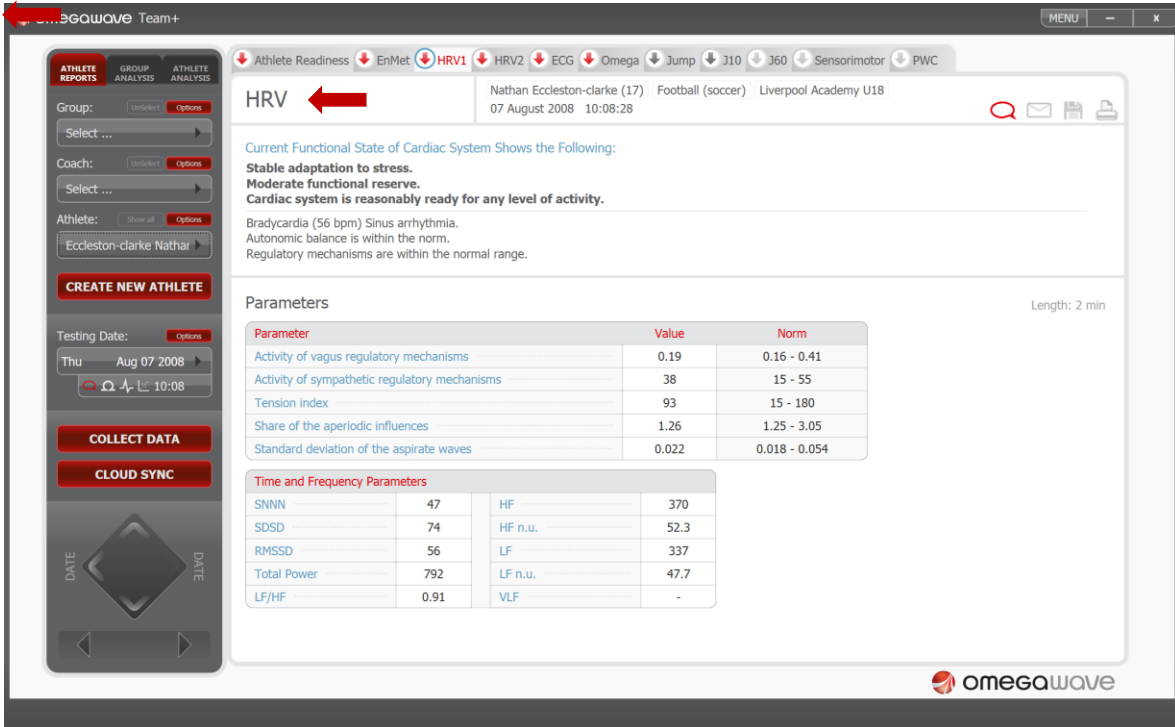
READINESS OF THE CARDIAC SYSTEM & THE AUTONOMIC NERVOUS SYSTEM

The **HRV** analysis method allows assessment of the Readiness of the Cardiac System and the regulatory influences of the ANS on cardiac function. During its over fifty-year history, the HRV method has become widely used and has been approbated for use in physiology, clinical and space medicine, and physiology of sports and labour⁴. In each field, it has proved its effectiveness for the assessment of adaptational responses of the cardiovascular system to loads.

Omegawave regards HRV as an indicator of the current integrated response of the multi-circuit and multilevel regulatory system for cardio-pulmonary function to the training process.

Omegawave uses the HRV analysis method to register and analyze ten parameters, which are in accordance with the Standard of Registration and Physiological Interpretation for Clinical Use, as defined by the European Society of Cardiology and the North American Society of Pacing and Electrophysiology¹⁴. In conjunction with these standards, Omegawave also measures five additional parameters used in Russian space medicine and sports, that are in accordance with the extended national guidelines⁴ on the practical use of the HRV method and data comparison.







Omegawave utilizes not only statistical and spectral methods of HRV analysis, but also geometrical (variation pulsometry), nonlinear, and integral methods as additional sources of information about the cardiac system's Readiness. Omegawave has a fourteen-year experience of utilizing the HRV method in the assessment of over ten thousand elite athletes, allowing for the development of unique models and algorithms.

Using comprehensive HRV analysis results, Omegawave presents an immediate conclusion on the levels of *stress*, *fatigue*, and *recovery*, as well as on potential *adaptational reserves* of the organism.

It should be noted that five articles on HRV research using the Omegawave technology in athletes¹⁵⁻¹⁸ and in clinical patients¹⁹ have been published in international peer-reviewed journals.

For additional in-depth analysis, Omegawave provides a 12-lead ECG (in accordance with international standards) for assessing the Readiness of the athlete's cardiovascular system.

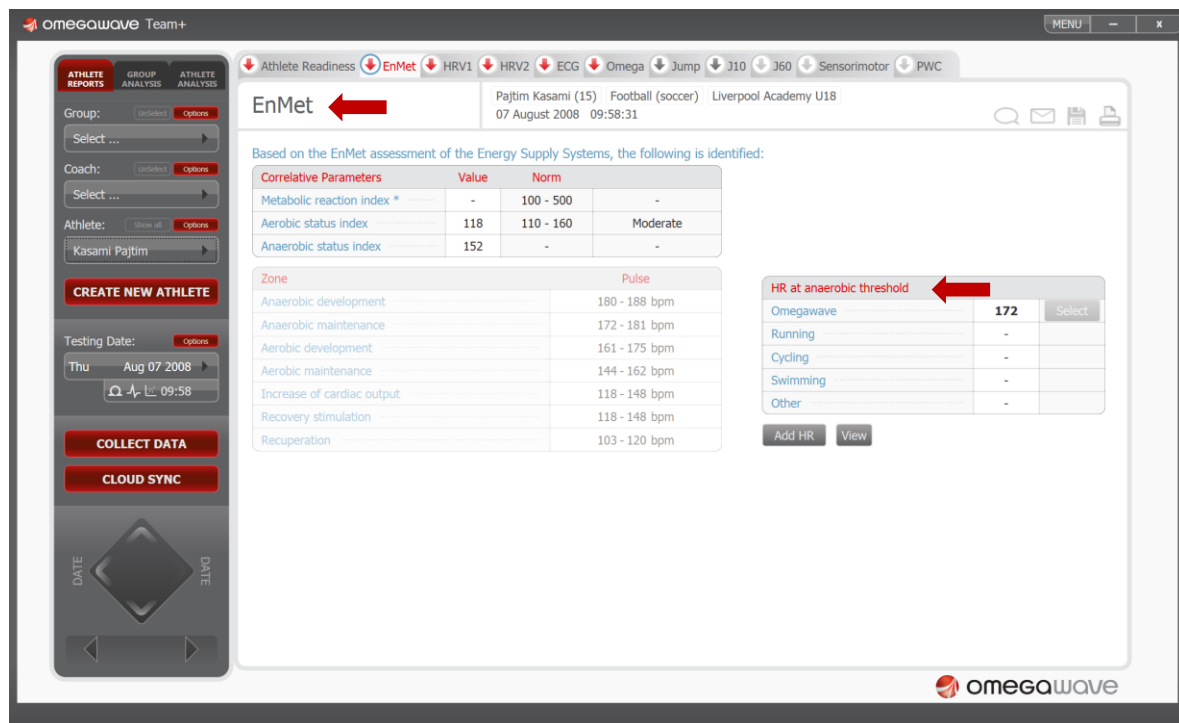
READINESS OF THE ENERGY SUPPLY SYSTEMS

Readiness of the Energy Supply System (ESS) is assessed using a multi-faceted approach, consisting of an amplitude-frequency analysis of all components of each ECG complex over two minutes. This approach is based on the relationship between resting electrical processes in the heart and the Readiness of the ESS.

Using a large database of elite athletes and scientific sources, Omegawave has significantly enhanced the accuracy of evaluating the Readiness of the ESS in the field.

Omegawave uses the following **indexes** to assess the Readiness of the ESS:

- *aerobic index* – indicative of the current state of the aerobic ESS and the athlete's Readiness for aerobic loads
- *anaerobic index* – indicative of the state of the anaerobic ESS
- *metabolic index* – indicative of the overall effectiveness and coordination of the ESS



The screenshot displays the Omegawave Team+ software interface. The main window shows the 'EnMet' assessment for Pajtim Kasami (15) on 07 August 2008 at 09:58:31. The interface includes a sidebar with navigation options like 'ATHLETE REPORTS', 'GROUP ANALYSIS', and 'ATHLETE ANALYSIS'. The main content area displays the 'EnMet' assessment for Pajtim Kasami (15) on 07 August 2008 at 09:58:31. It shows a table of Correlative Parameters with values and norms, and a table of HR zones for various activities. A red arrow points to the 'HR at anaerobic threshold' section, which shows a value of 172 bpm for Omegawave.

Correlative Parameters	Value	Norm
Metabolic reaction index *	-	100 - 500
Aerobic status index	118	110 - 160
Anaerobic status index	152	-

Zone	Pulse
Anaerobic development	180 - 188 bpm
Anaerobic maintenance	172 - 181 bpm
Aerobic development	161 - 175 bpm
Aerobic maintenance	144 - 162 bpm
Increase of cardiac output	118 - 148 bpm
Recovery stimulation	118 - 148 bpm
Recuperation	103 - 120 bpm

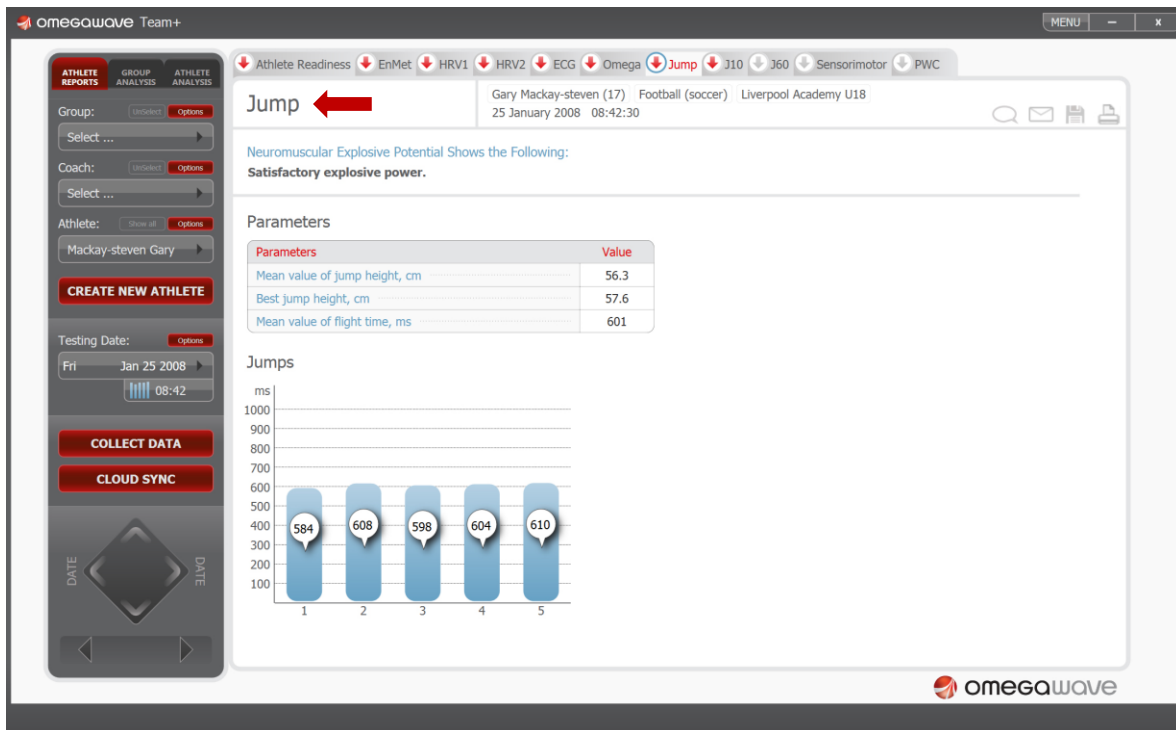
HR at anaerobic threshold		
Omegawave	172	Select
Running	-	
Cycling	-	
Swimming	-	
Other	-	

Based on the multi-faceted analysis of ECG, Omegawave calculates the most important parameter for managing the intensity of training loads – *individual heart rate at anaerobic threshold*. Specifically, Omegawave recommends customized optimal *heart rate zones*, enabling the athlete to appropriately manage training loads based on individual physiological and adaptational responses.

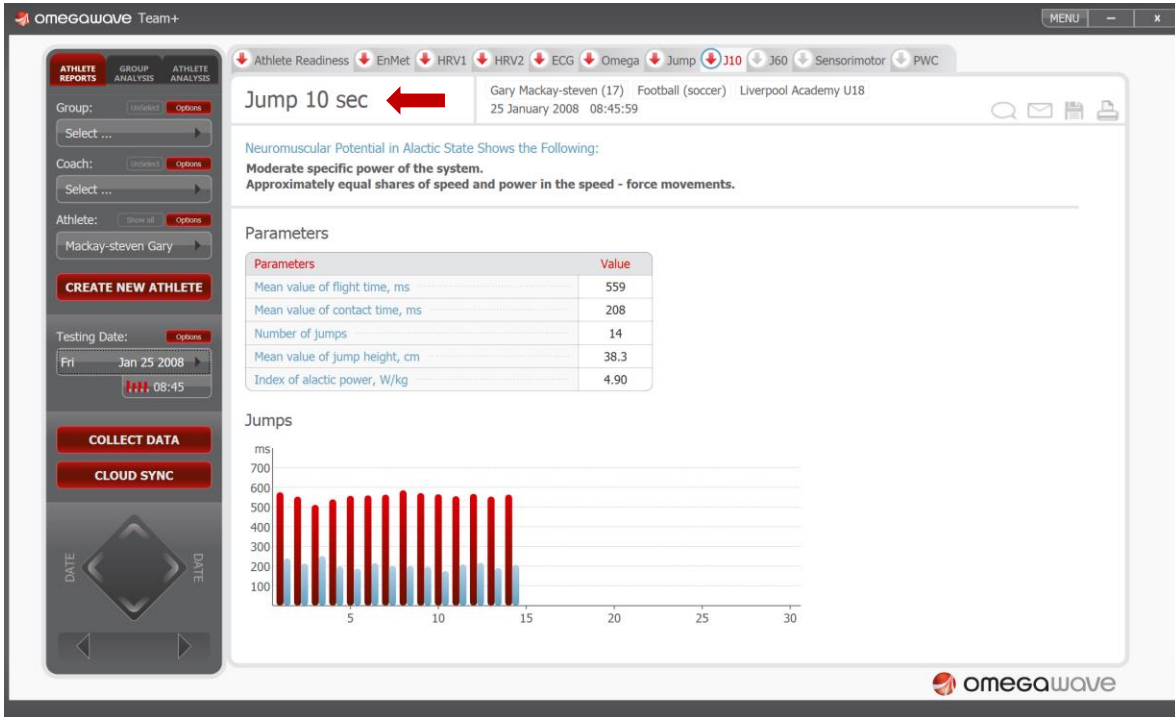
READINESS OF THE NEUROMUSCULAR SYSTEM

The Readiness of the Neuromuscular System is assessed by performing three specific science-based jump tests using a force plate.

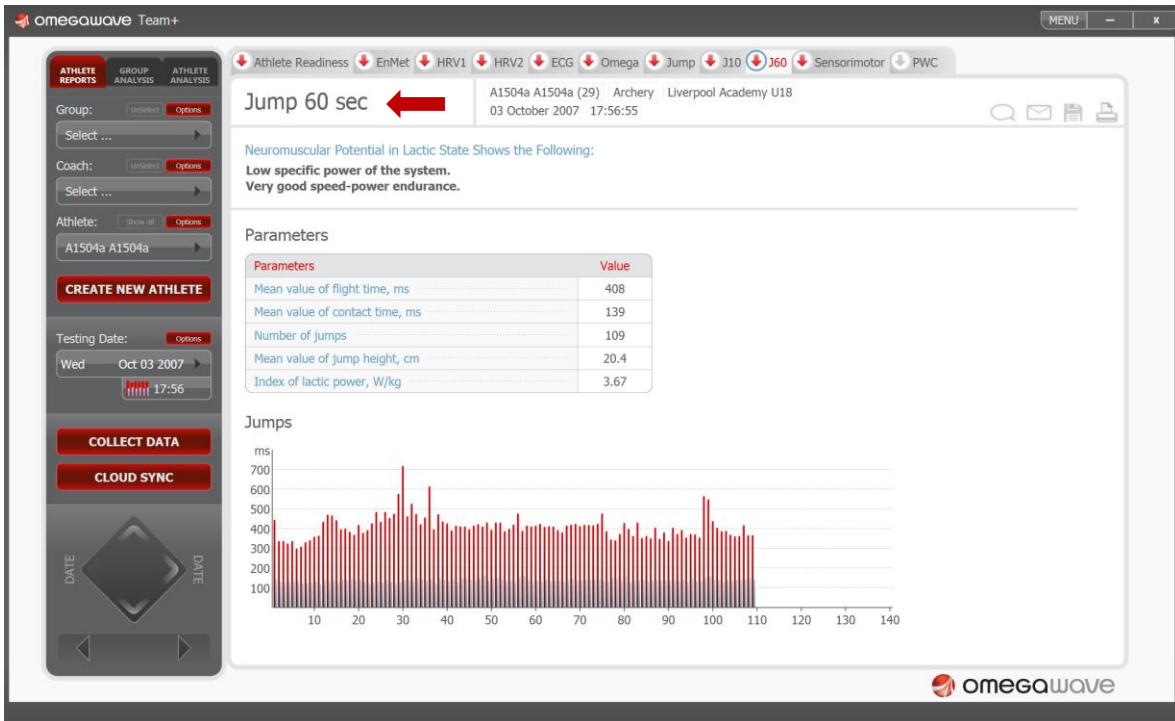
- The first test involves the analysis of five separate jumps, which depicts the Readiness for rapid manifestation of muscle strength (explosive power) through the utilization of the *creatine phosphate energy supply system*.



- The second test analyses the results of the maximum number of jumps within ten seconds, which describes the Readiness for speed-power training through the utilization of the *alactic energy supply system*.

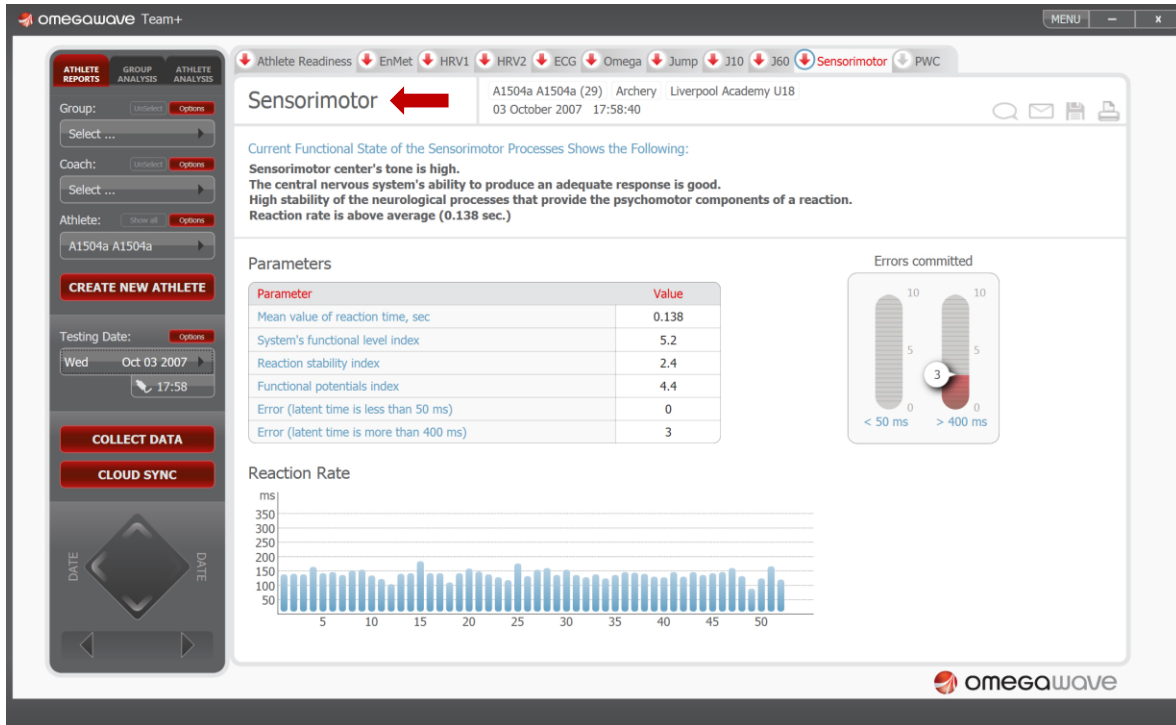


- The third test analyses the results of the maximum number of jumps within sixty seconds, which characterizes the Readiness for speed-power endurance through the utilization of the *lactate energy supply system*.



READINESS OF THE SENSORIMOTOR SYSTEM

The Omegawave technology uses a test that measures the athlete's *sensorimotor response to acoustic stimulation*. This test assesses the athlete's psychophysiological state and the Readiness of the upper areas of the cerebral cortex for the collection, analysis, and processing of information supplied to the CNS and the subsequent motor response.

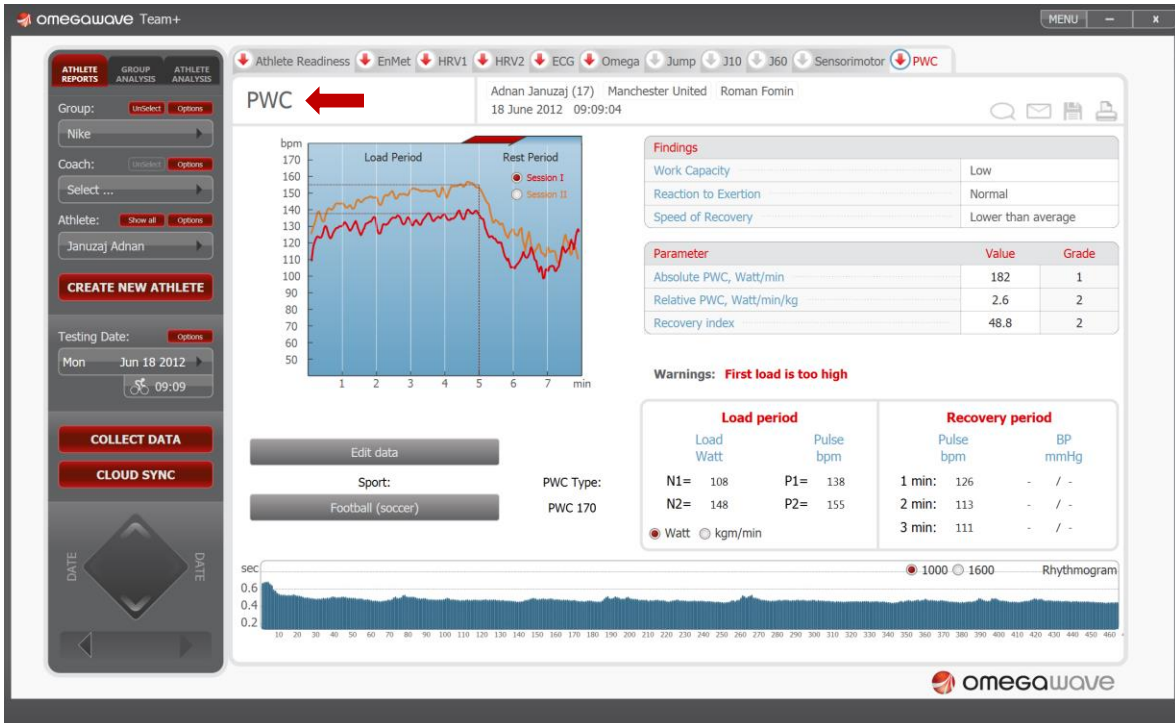


The following parameters and characteristics of the athlete's psychophysiological state are measured and evaluated: nervous center tonus; excitability; processes of nervous reactivity, lability, and stability; and finally, the capability of the nervous system to generate quick responses adequate to the task.

A OVERALL READINESS DURING STRESS TEST

It is periodically necessary to compare the results of the assessment of Readiness at rest to the results of an assessment of Readiness under test conditions of a standard load. The Omegawave technology accomplishes this by the application of a *submaximal Physical Working Capacity* test (PWC₁₇₀).

The total physical working capacity of the athlete is realized through the synchronization of a number of functional systems, rather than just a single system. The primary contributing sources are the nervous, muscular, cardiovascular, and respiratory systems, although others are involved as well. The Omegawave technology makes an indirect assessment based on the data received from the synchronised functional systems during the exertion test, providing a clear picture of the athletes' sport specific physical capacity at any given time.



CONCLUSION

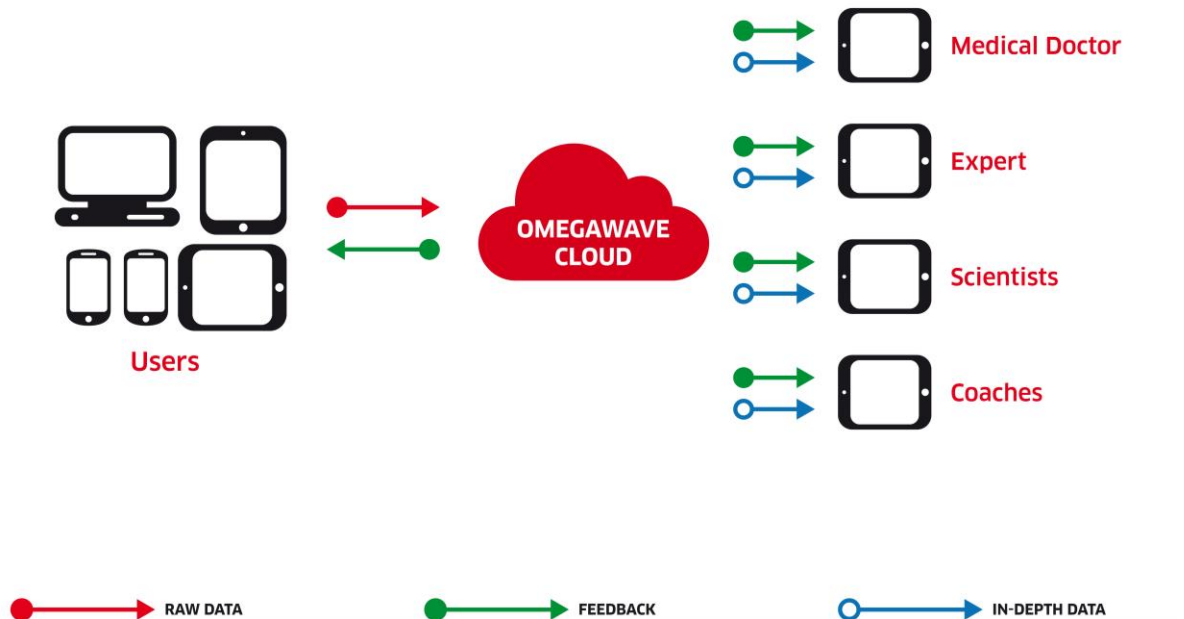
In conclusion, the Omegawave technology implements seven scientific methods to perform a comprehensive assessment of the athlete's individual functional state and Readiness, allowing for the optimal management of the athlete's preparedness and training process.

OMEGAWAVE CLOUD TECHNOLOGY IN THE MANAGEMENT OF ATHLETE PREPARATION

The Omegawave cloud technology offers new and unique opportunities for the fastest method of processing and assessing information, thereby allowing coaches and athletes to use it for optimal management of the training process.

THE STEPS INVOLVED IN THIS PROCESS ARE:

- The athlete measures his or her Readiness at rest, using one or two sensors (ECG and/or DC) and a mobile phone. This takes only two to five minutes.
- The primary/raw data are instantly sent to the Omegawave cloud.
- The Omegawave cloud immediately analyzes and processes the raw data, draws a conclusion as to the athlete's Readiness, and creates individual recommendations for corrections to the training loads.
- The Cloud technology offers user-specific reporting capability. For example, the athlete receives a simplified report, comprised of five to seven markers that formulate overall Readiness, whereas the doctor, coach, or researcher receives a more detailed report, comprised over twenty parameters.



Note: any experts working with the athlete can also obtain raw Readiness data from the Omegawave cloud for further independent processing and analysis.

Using the individual Readiness information immediately available the coach is able to make timely and appropriate changes to the daily training plan. Specifically the coach is able to select the type and focus of training for the session, determine the optimal volume and intensity of exercise, and ensure optimal performance with minimal cost and risk to the athlete.

Cloud technology offers short- and long-term monitoring of the adaptational changes taking place in response to training. Coaches and athletes are easily able to see the trends of the development of the athlete's overall functional state and preparedness.

In conclusion, Omegawave's Cloud technology uses the latest scientific and technological developments, placing the operational control of when, where and how often Readiness assessments are performed in the hands of the coach or athlete.



ADVANTAGES OF THE OMEGAWAVE APPROACH

Using the Omegawave technology gives coaches and athletes a distinct edge by providing *unique previously unavailable* information through *cost effective approach*. Intelligent use of this information allows the coach to solve the most important challenge – how to bring their athletes to the maximum level of performance with minimal exposure to risk.

WITH OMEGAWAVE THE COACH / ATHLETE CAN:

- build a customized and balanced training process taking into account the athlete's individual physiological characteristics
- significantly improve the quality of management of the training process at all stages
- ensure that the athlete peaks at the right stage of the competition schedule
- accurately predict athlete's achievements and results based on tracking the adaptational changes
- ensure full utilization of the athlete's functional reserves and capabilities without risk to his or her overall health
- increase the prospects of optimal performance in competition
- improve resistance to stress, and avoid chronic stress and overtraining
- reduce the incidence of illness and injury by avoiding training under fatigue
- enhance working capacity, preparedness and level of fitness
- develop an appropriate balance between training and recovery activities, improving the quality of the recovery process
- enhance his or her quality of life, and increase the duration of their athletic career



ADVANTAGES OF OMEGAWAVE VS. OTHER TECHNOLOGIES AND METHODS

- Pioneering mobile technology and cloud service that uses a patented combination of *specific* scientific methods to comprehensively assess the overall Functional State and Readiness
- Frequent, daily Readiness assessments can be measured in the field with minimal investment of time and exertion using non-invasive, safe, reliable, and easy to use technology
- Omegawave's methods for assessing Readiness are validated by solid science and assessment data from more than 10 thousand elite athletes
- A team of elite coaches and leading scientists provide timely, expert support to assist with Readiness analysis and the preparation of guidelines and training plans



PRACTICAL APPLICATION OF OMEGAWAVE TECHNOLOGY

The Omegawave technology customers include:

- five national Olympic Committees
- Sports Federations of the United States, Russia, Canada, China, Spain, the Netherlands, and other countries
- nineteen professional soccer clubs including AC Milan, Ajax Amsterdam, Barcelona, and Manchester United

In addition, both finalists of the 2012 European Football Championship used our products in their preparation for the competition. In addition, the technologies developed by Omegawave have been widely used by elite units of the U.S. Armed Forces as well as military forces of other countries.



"With Omegawave, I am able to actually see how the athlete is reacting to the stress of the workouts given. This gives me the ability to create an individualized, periodized, training program for each athlete. Exactly what I had known I was missing, but didn't have an answer for except for taking morning heart rates. I have found my metrics in the Omegawave Solution." - **Randy Huntingdon, Coach for U.S. Olympic Athletes in Track and Field.**



"Since we started using Omegawave at the Liverpool Academy, none of the players on our team have come down with muscle injuries. We went back to look at our records for comparable times in prior seasons and this absence of injuries has been unprecedented." - **Piet Hamberg, former Technical Manager, Liverpool FC.**

The Omegawave technology has been successfully used by Olympic Committees, Sports Federations and clubs for the efficient management of athlete training; dynamic monitoring of preparedness; individualization and optimization of training loads and recovery activities, in order to achieve the best level of performance.

Also in April 2013, Omegawave was proud to support the Triathlon community by being part of the International Triathlon World Series in San Diego, California.



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