

## ATHLETIC PERFORMANCE EVALUATION SYSTEM

Silva, H.<sup>[1]</sup>, Martins, G.<sup>[1]</sup>, Mil-Homens, P.<sup>[2]</sup>, Valamatos, M.<sup>[2]</sup>

<sup>[1]</sup> PLUX, Biosensor Engineering, Portugal

<sup>[2]</sup> Faculty of Human Kinetics, Portugal

Athletic performance is evaluated by measuring specific variables which provide information about the physical condition of a given athlete<sup>[1]</sup>.

In order to design an athlete's follow-up or training program, an objective quantitative knowledge of the physical condition being evaluated is needed. Nowadays, the use of technology in this kind of tasks<sup>[2]</sup> is becoming more and more usual, introducing automation and a new insight to the evaluation process and results.

In this paper we present a pilot installation for an integrated, athlete-focused system for athletic performance monitoring and evaluation, especially designed for application in high performance training centers, health clubs or sports clubs. This system comprehends the: (a) wireless measurement sensors and data acquisition hardware; (b) data analysis and reporting software modules; and (c) integrated athlete and protocol management software modules. Each workstation is instrumented with a wireless measurement unit which collects the signals from the corresponding measurement sensors. The acquired data is transmitted in real time to a central base station via Bluetooth, where they are processed and represented.

The system works on a workstation/protocol basis. Each wireless measurement unit can be configured to assess multiple specific athletic parameters, and the associated workstation is instrumented with the appropriate sensor kit. Given the wireless connectivity between the workstations and the base station, the coach can easily follow-up the athlete's work, according to the motto: (a) connect: communicate wirelessly with the workstation; (b) acquire: automatically access the main performance indicators in real-time; and (c) visualize: session and historic reporting and analysis, with graphical curves representation and gain indicators.

Simultaneously the athlete has real-time feedback about his/her performance during the evaluations, with automated visual and acoustic aids to support the protocol execution. Besides the automated data acquisition, processing, and analysis, the software also has a management module which includes a database to store relevant information for each athlete, each evaluation session, and corresponding final reports.

The historic performance progress of the athlete can be easily accessed, allowing the follow-up as well as performance gains comparison throughout different evaluation sessions. The software consists of 5 modules: (a) sensor control; (b) acquisition and display; (c) automatic signal processing; (d) reporting; and (e) database. These modules are applied to the signals collected at the different workstations. For the moment three workstations are predefined: (a) leg-press: with a force sensor for evaluation force production characteristics of the lower extremities; (b) jumping: with a force platform for evaluation of reactive force and related parameters in squat, countermovement and drop jumps; and (c) multi-power device: with a displacement sensor and a force platform for evaluation dynamic parameters, such as power and velocity<sup>[3,4]</sup>.

Each evaluation session is defined by a protocol that is specifically created by the coach for the athlete, in which he chooses what workstations and evaluations he or she will execute as well as their sequence. In this way, a comprehensive athletic evaluation is made, which objectively shows the weaknesses and strengths of the athlete, allowing the design of a specific<sup>[5]</sup> and optimized training program.

## References

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