

Advances In Athlete Performance Monitoring

Presentation to PENZ Conference 2009

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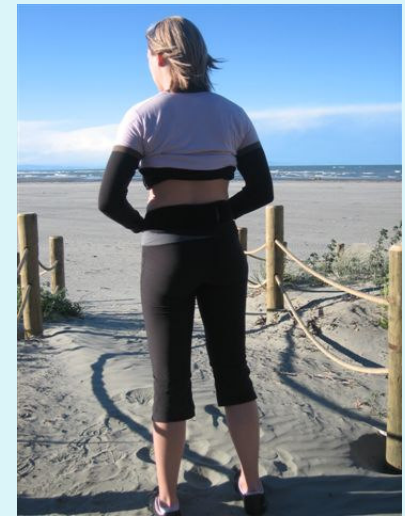
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Elements of an Athlete Monitoring System 1

- **Sensing** – what, when, how often, how long?
- **Data Capture** – time required, convenience?
- **Data Management** – paper records, spreadsheet, database?
- **Ease of set up** – time, size of gear, prior training?
- **Flexibility** – one athlete, many, one sport or many?

Elements of an Athlete Monitoring System 2

- **Sensing** – what, when, how often, how long?



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Elements of an Athlete Monitoring System 3

- **Data Capture**

- PAST: manually (pen and paper) – OK for small groups
- PRESENT: semi-digital – record results and enter into a spreadsheet (Excel) – the way you do it now?
- FUTURE: fully digital (the equipment transfers results to a database on request) – video software & latest monitoring systems do this now.

Elements of an Athlete Monitoring System 4

- **Data Management**
- Good data management requires:
 - structure (logical relationships between the “fields”)
 - input templates that are easy to use
 - reports that make sense: clear, simple, do the work for you.
 - access for all (with security restrictions to suit).
- Why do databases go badly?
 - failure of the designers to understand the users needs
 - failure of the users and designers to jointly analyse their needs
 - organisations vest information in separate systems that don't link
 - needs of the users change over time

Elements of an Athlete Monitoring System 5

- **Ease of set up** – time, size of gear, prior training?
- **Flexibility** – one athlete, many, one sport or many?
- **Latest Advances To Save Time = Cables Are Gone For Good!**
 - RFID identification of athlete (tag on wrist or leg is read by scanner – e.g. Cycle races in NZ monitored by Times-7)
 - RFID wrist tag and scanner released by FusionSport (Australia)
 - Wireless timing gates & multi-gate systems by FusionSport and SwiftSports (Australia)
 - Athlete monitoring direct to body – GPSports (Australia), VX Sport (NZ) etc
 - Video analysis – SiliconCoach (NZ) and others.
 - Gym bar and jump tests – Myotest (Canada)

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Technologies 1

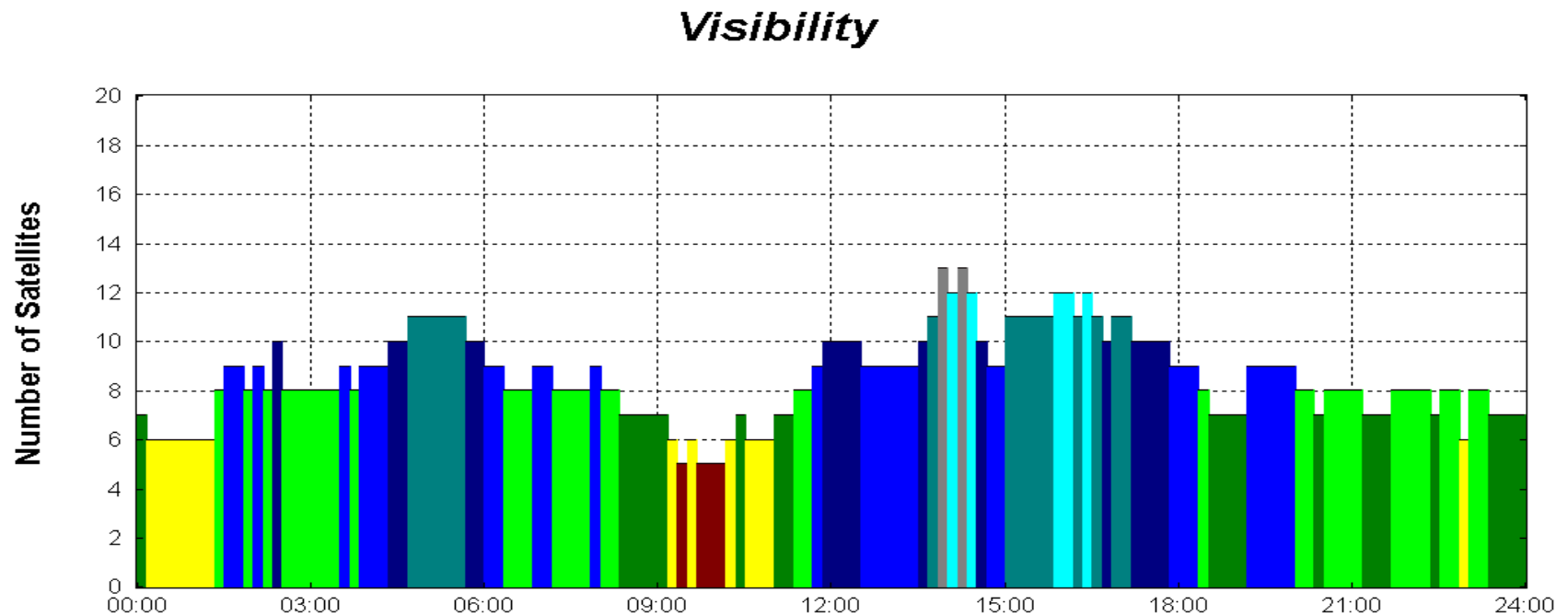
- **Sensors – Available On Systems Outside of The Lab**
- time
- distance
- heart rate
- ECG
- impact/force/acceleration/ jump height
- blood oxygen (near future)
- altitude
- video
- cycle cadence & crank power

Technologies 2.1

- **GPS** – speed, position, gross acceleration.
- Accuracy can be good, but varies with manufacturers – often position is +/- 2 metre, and speed to within 2.5 kph
- GPS satellite coverage varies throughout the day
- Chips are improving rapidly – best models now sample at 4 or 5 times a second.
- Indoor GPS systems are possible but still too expensive for mainstream use.

Technologies 2.2

- GPS Satellite Coverage – Auckland – 7 July 2009









Station Auckland, New Zealand South 36° 52' East 174° 45' Height 0m Elevation cutoff 10° Obstacles 0%
Satellites 31 GPS 31 [Almanac.alm (24/06/2008)]

Time 7/07/2009 00:00 - 8/07/2009 00:00 (UTC+13.0h)

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Technologies 3

- **Wireless Data Systems**

- Small Simple Devices - Bluetooth (3.0 released April 2009) 
 - Computers - Wi-Fi / WiMax (IEEE 802.11), 
 - Cellphones - GPRS (GSM), 3G (HSDPA, HSUPA), etc 
 - Low Power Portable Devices – Zigbee  /ANT  (IEEE 802.15.4),
 - Public Spectrum Radio (450 MHz, 900 MHz 2.4 GHz, 5 GHz). 
- The lesson here is **BEWARE**.....wireless data transfer is not as reliable as cables, but **there are some good sports systems using it**. Not all wireless systems suit sports applications.

Where Is Sport Monitoring Heading?

- **The Trends Are Clear Already**
- Live wireless monitoring of athletes and players (directly broadcast on TV)
- Live video coverage with further improvements to automate the analysis of movement (present analysis is not in real time).
- Results of games and training shared on social networking sites; YouTube, Twitter, Facebook, MySpace, and dedicated sports sites (e.g. RideStrong)
- Sharing of information through better linked databases (web based)
- Most of this technology is available in some way to PENZ members already?

Examples of Latest Sport Monitoring

- **The VX Field Training Unit – 2008 Development Project**
- Live wireless monitoring of high school students: 8 standardised exercises, including sprint, power, agility, endurance.
- Sharing of information through a linked databases (web based)
- Information available to teachers, health professionals and government, using anonymous reporting of statistics

- **The VX Log™ + VX View™ Athlete Monitoring**
- Sample slides from international soccer games

Discussion Forum

1. What Technologies Do PENZ Members Use?
2. What databases do you use – ENROL etc
3. Would it be useful to link MoH and MoE databases?
4. How much data does PENZ exchange with SPARC?
5. Would a standardised testing system with automatic linking to a national school fitness database be useful?

Thank You

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