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WIMU Instrumentation of Assassin Trainer & Skeleton Sled – Initial Data Capture

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Motivation

Skeleton
- Winter Olympic Sled Sport
- 1km+ Downhill Ice Course
- High Speeds (140km/h)
- Large Accelerations (5g)
- Fractions of Second Crucial!



Pushing

Start period
- 20-30m Pushing & Loading
- Complex Explosive Movements
- Believed Critical to Performance
- Not Well Understood or Studied
- Room for Improvement?

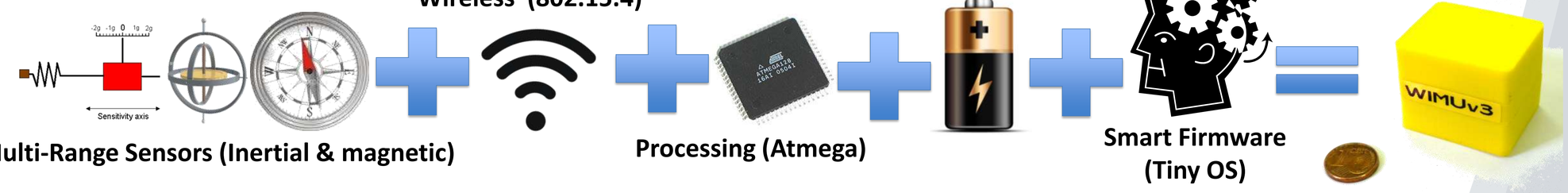


Loading

Collaborative Project
- University of Bath & UK Sport
- Tyndall's Sensor Expertise
- Instrument Athletes & Equipment
- Investigate Start Period & Training
- Improve Athlete Performance?

Implementation

What's a WIMU?
- **W**ireless
- **I**nertial
- **M**easurement
- **U**nit



Assassin Start Trainer
- Training System for Sled Starts
- Rolling Sled on Adjustable Incline
- Mounts for Resistance Bands & Weights
- Attach WIMUs to Sled Metal Spars
- Basic Timing Data - 2 Portable Light-Gates
- Multiple Runs - Different Weights & Inclines

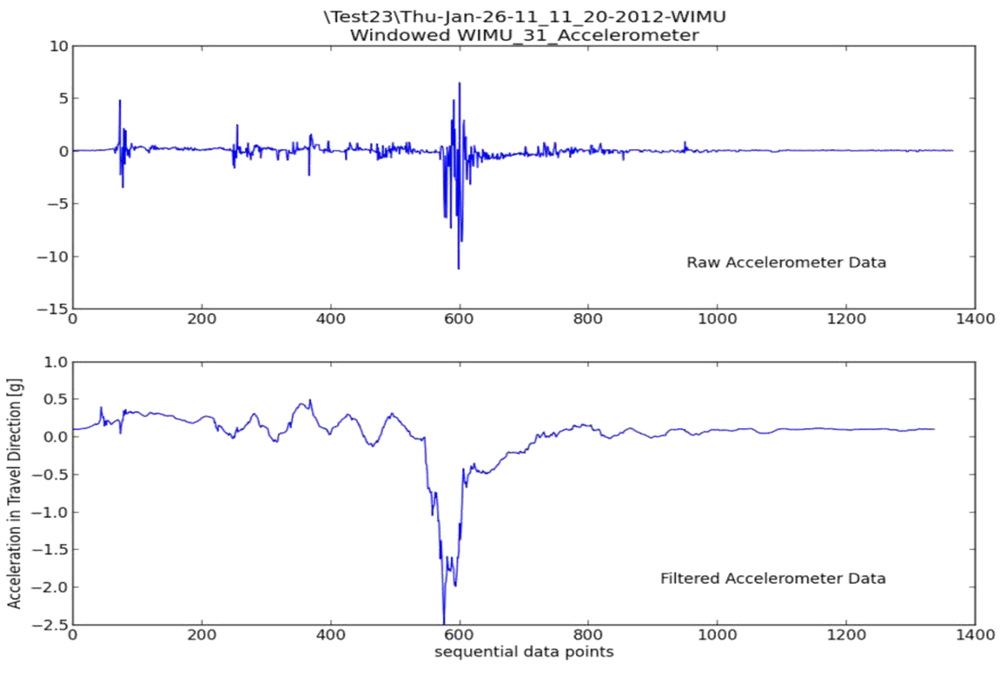
Skeleton Test Track
- Practice Track for Sled Start
- Concrete with Wheeled Sled on Metal Rails
- Attach WIMUs to Plates on Sled Corners
- Base-station Near Loading Point
- Detailed Timing Data -13 Embedded Light-Gates
- Multiple Runs - Different Step Count & Push Style

WIMU on Assassin





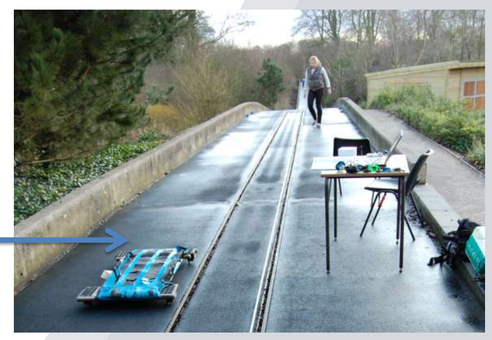
Instrumented Assassin Run



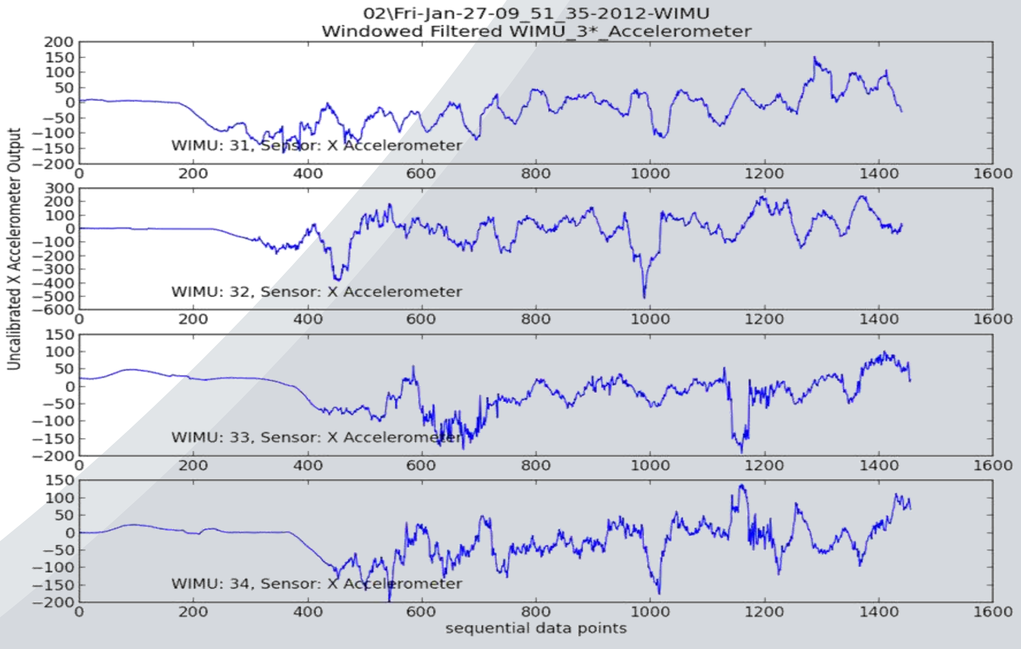
Sample Raw (top) and Filtered (bottom) Accelerometer Data from Assassin Run

WIMU on Skeleton





Skeleton Track & Sled



Sample Filtered Accelerometer Data from 4 WIMUs (31-34 top to bottom) on a Skeleton Run

Outcome

WIMU Data was successfully recorded for 35 Assassin and 11 Skeleton runs with average sensor sampling rates in the 100's of Hz per WIMU. Such WIMU based systems show great potential for skeleton performance analysis and possibly becoming part of elite athlete's strength and fitness training. Future work will involve getting more data, instrumenting the athlete and focusing on the stages of the skeleton run beyond the initial pushing and loading period

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