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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

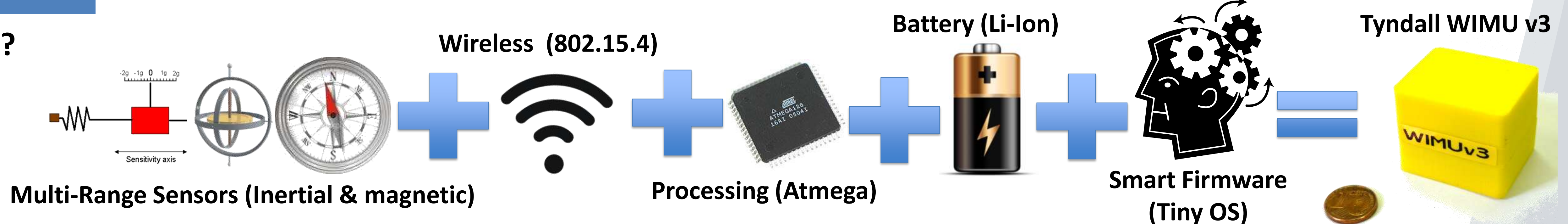
### Collaborative Project

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

## Implementation

### What’s a WIMU?

Wireless  
Inertial  
Measurement  
Unit



### 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

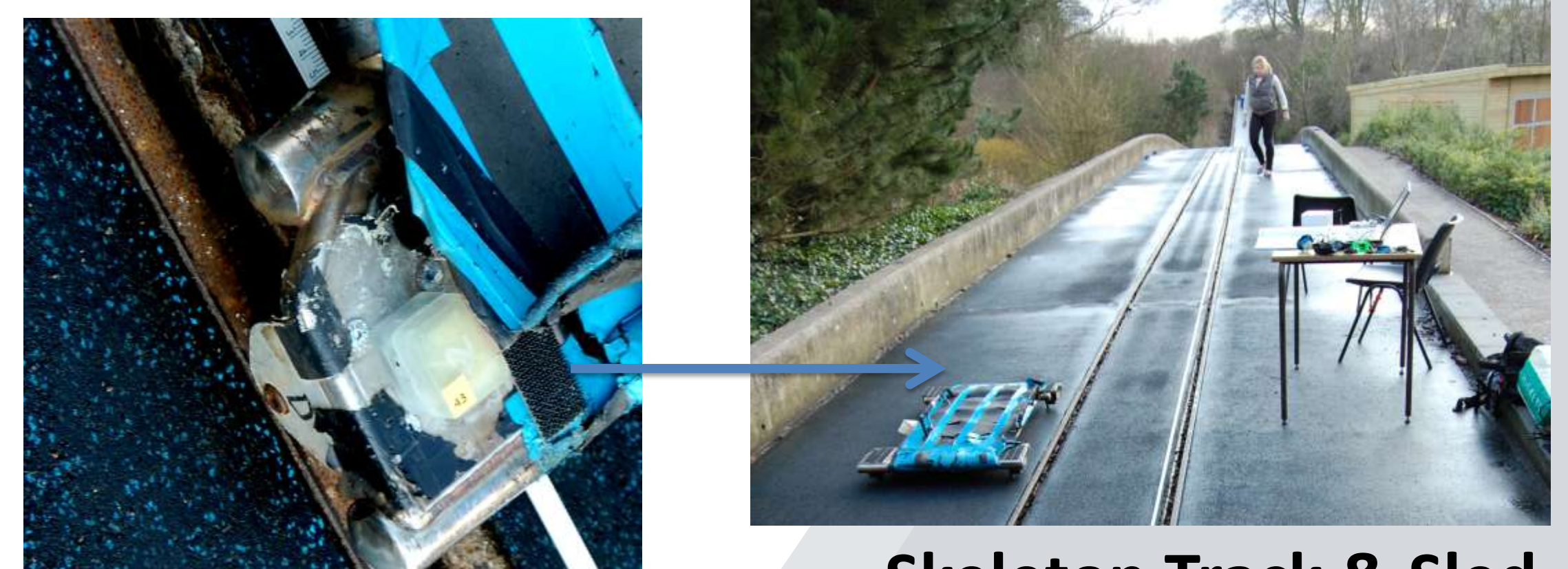
Practice Track for Sled Start  
Concrete with Wheeled Sled on Metal Rails  
Attach WIMUs to Plates on Sled Corners  
Base-station Near Loading Point  
Detailed Timing Data - 13 Embedded Light-Gates  
Multiple Runs - Different Step Count & Push Style

### WIMU on Assassin

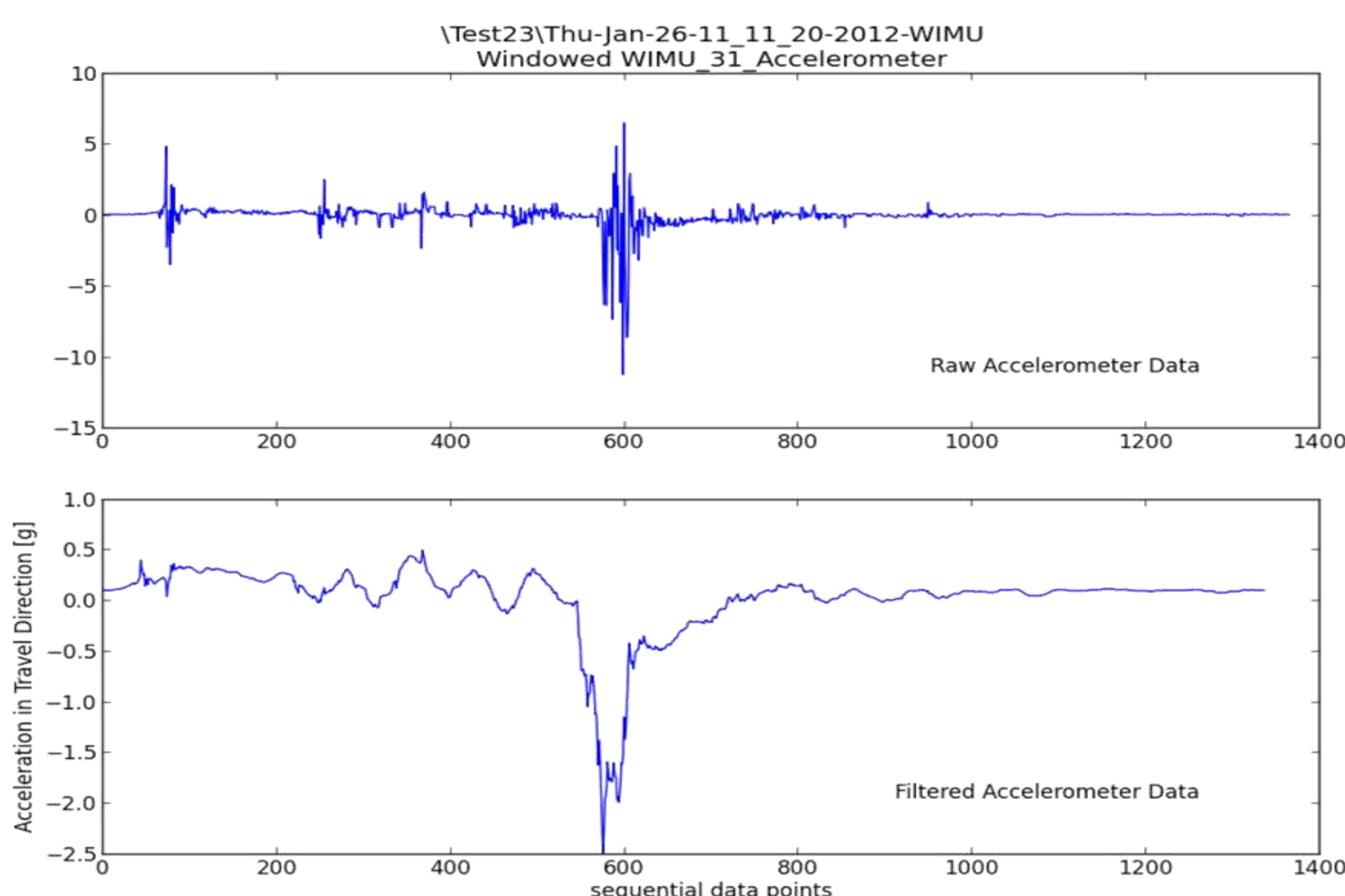


Instrumented Assassin Run

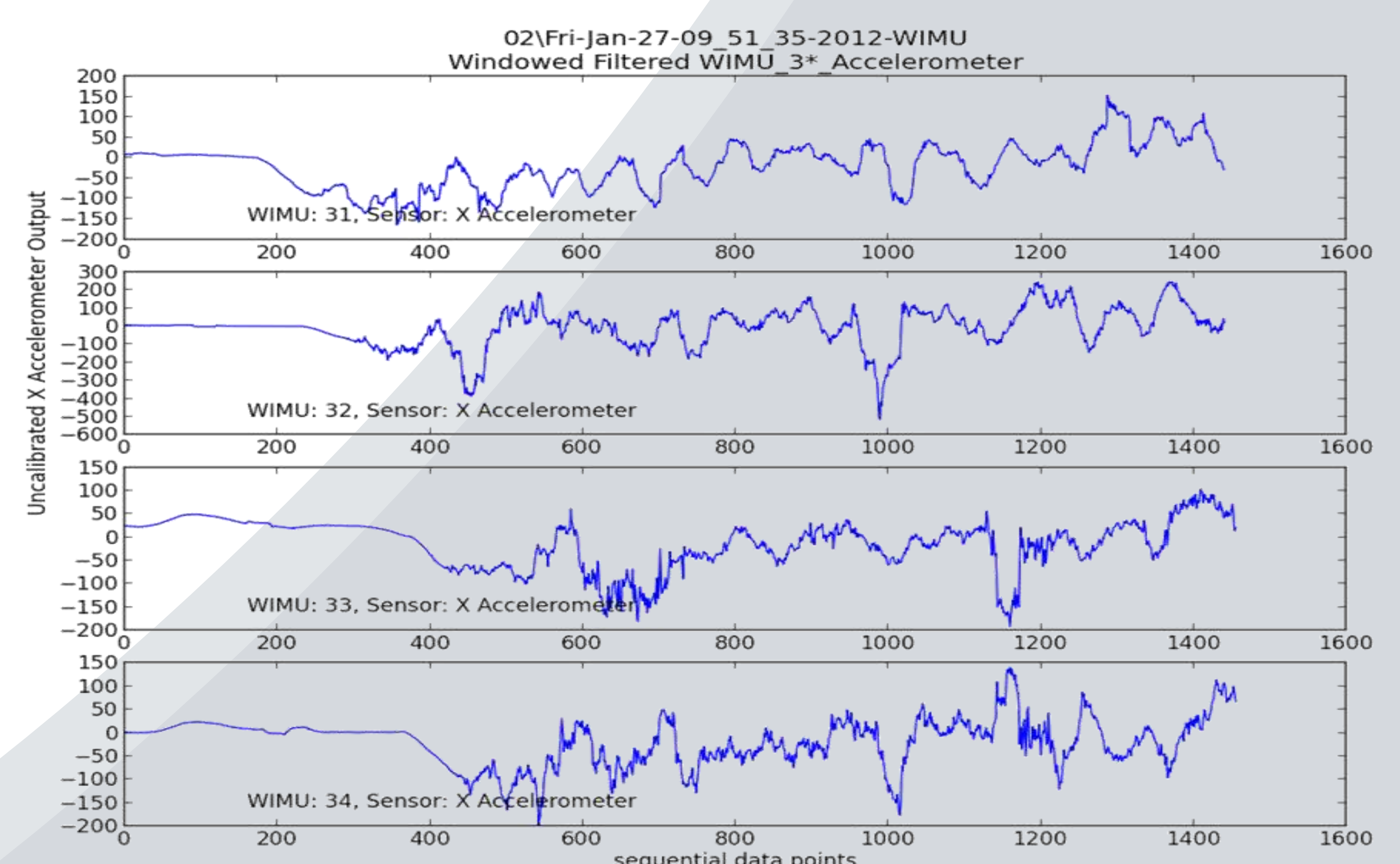
### WIMU on Skeleton



Skeleton Track & Sled



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



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