



Coachtech – Smarter Way to Train

-

Universal Tool for Analysis and Feedback

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RDI director, National Olympic Training Center Vuokatti-Ruka



- RDI work in Finnish snow sports



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- Coachtech – background, what and why



- Coachtech - Case examples



RDI work in Finnish snow sports



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JYU-Vuokatti

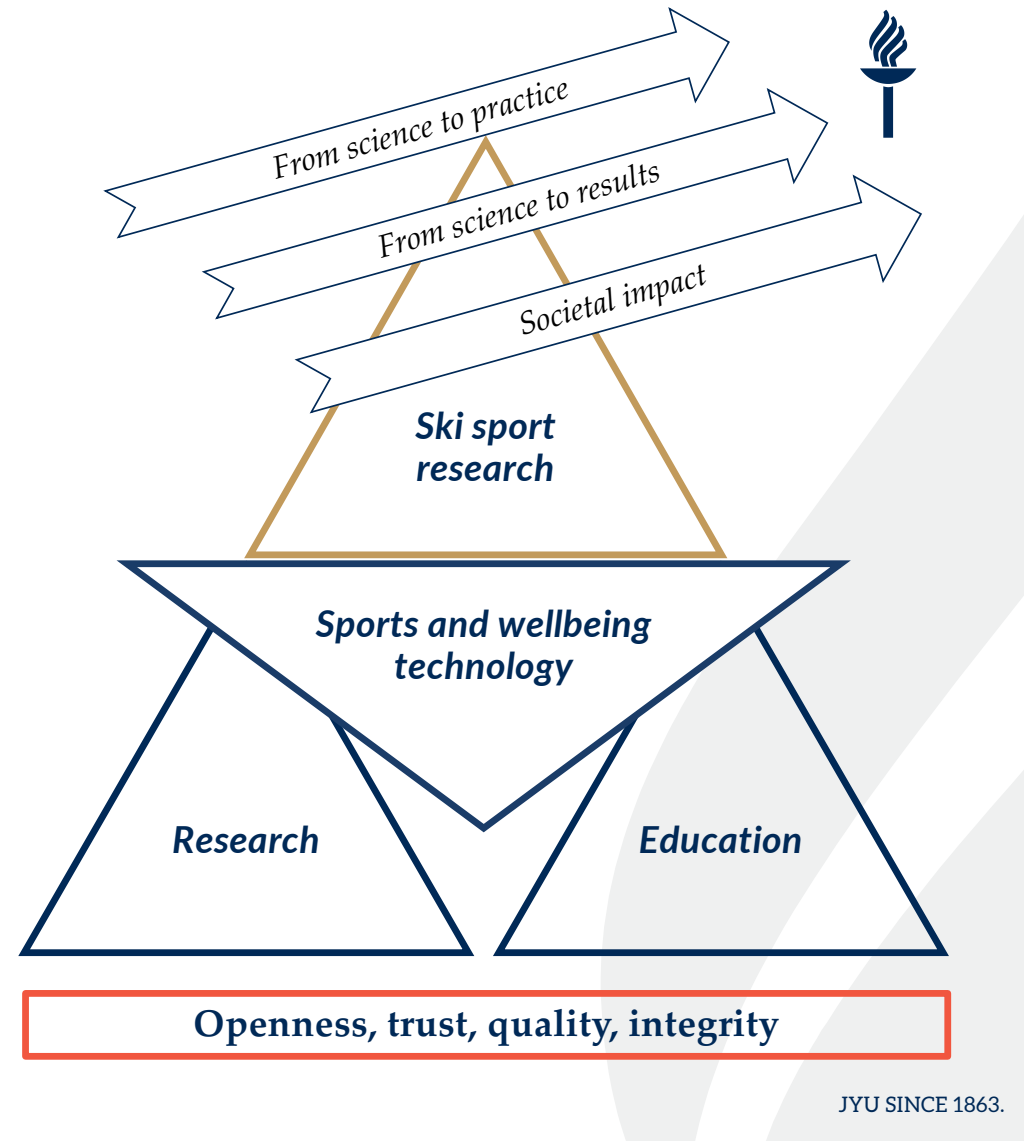
- Sports Technology Unit in Vuokatti
- An education, research and development unit within **The Faculty of Sport and Health Sciences**
- In Vuokatti since 2004
- Head of JYU-Vuokatti: Professor **Vesa Linnamo**
- Staff: **23 employees**
- Located: Technology Park **Snowpolis**, Vuokatti

7.10.2025



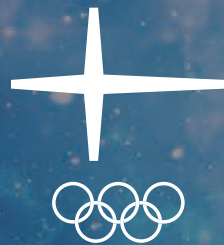
Vision of JYU-Vuokatti:

By 2033 we aim to be the world's
leading research, development,
innovation, and education unit
specializing in Nordic Skiing
disciplines and sports technology





OLYMPIAVALMENNUSKESKUS
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4 Federation and 8 Sports
Biathlon, Cross-Country, Nordic Combined and Ski Jumping
Alpine, Freeski, Moguls and Snowboard

SCIENCE



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PRACTICE

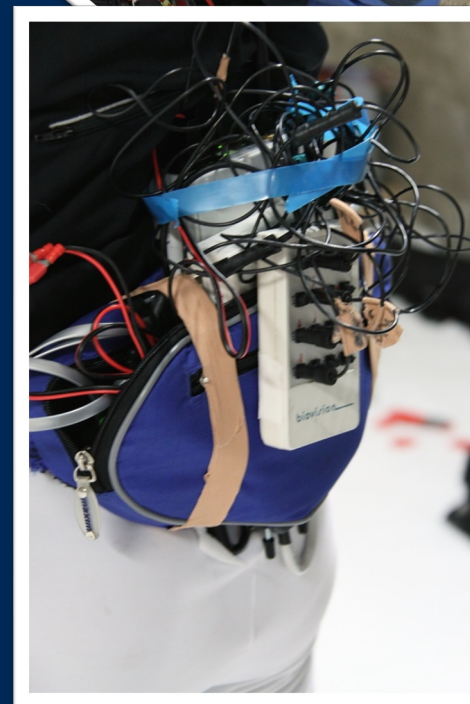
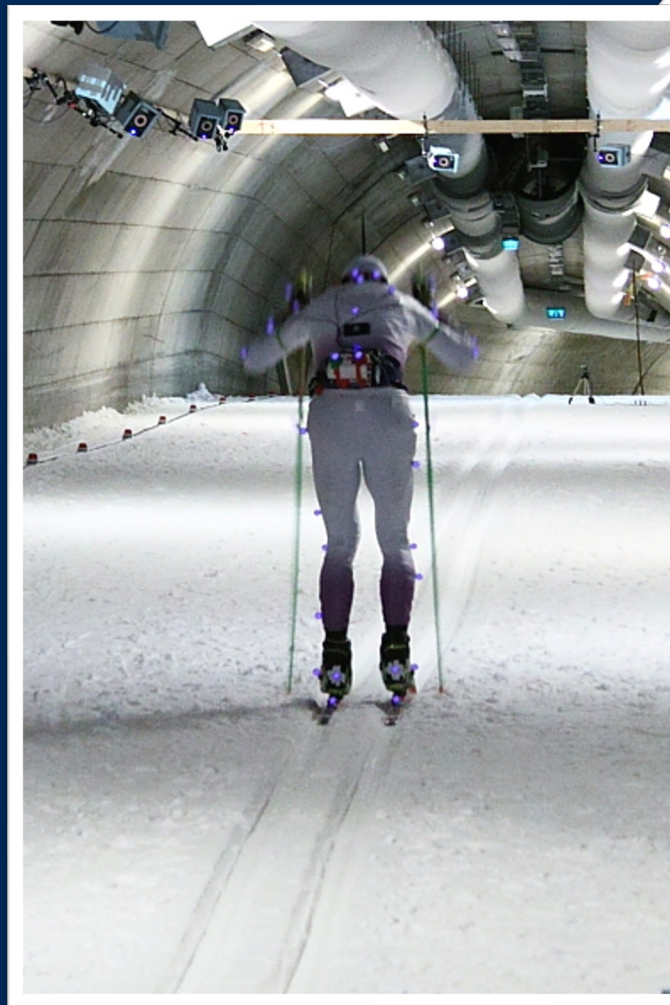


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Coachtech Background, what and why??



Background and birth of Coachtech



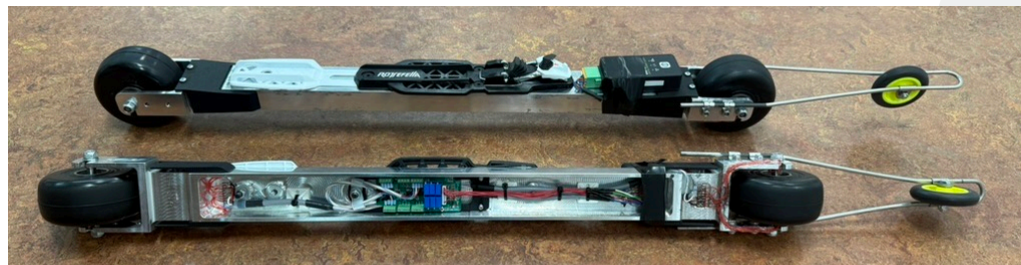
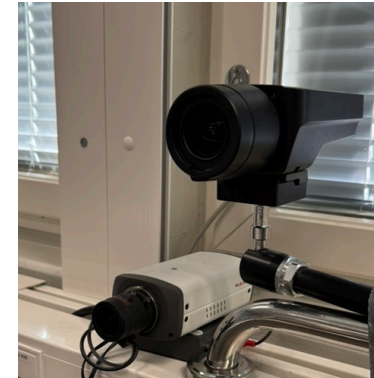
Coachtech is

A user-friendly coaching tool that integrates video and analog sensor data, analyzes performance in real time, and stores results securely online – bringing research-based insights directly into coaching practice.



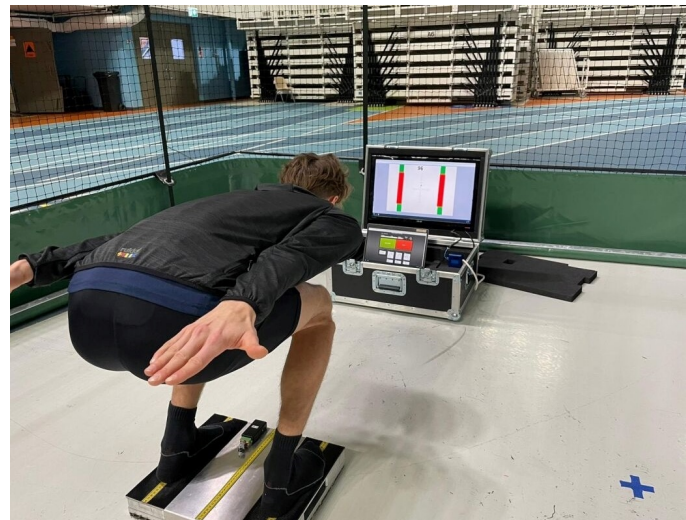
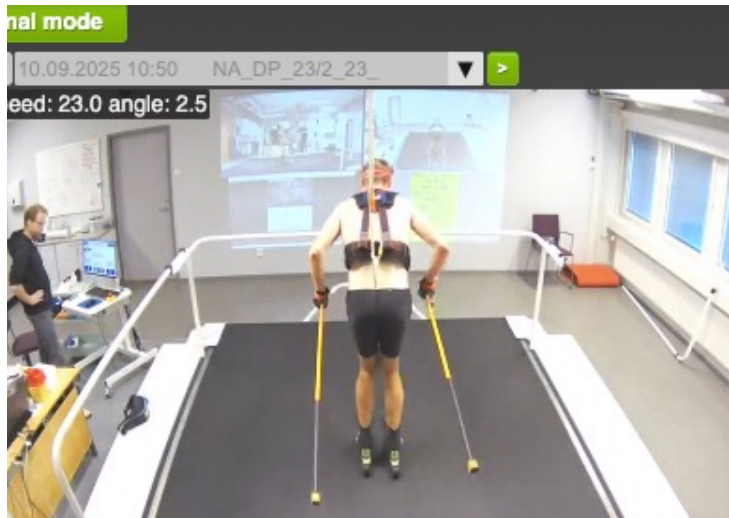
Coachtech – technical sheet

- System consists of:
 - Access points
 - Wireless measurement nodes
 - IP Cameras (100fps, full HD)
 - Coachtech measurement software
 - Web service
- Automatically synchronized data from multiple sources:
 - Video
 - Force sensors and force plates
 - Photocells
 - Heart rate,
 - Inertial sensors



Coachtech – technical sheet

- Features:
 - Instant feedback during and after performance
 - Comparison between two performances
 - Long term reports
 - Results stored at www.coachtech.fi



**Cross-country
skiing**



**Ski
jumping**



Biathlon



Sprint run



**Strength and
power tests**



**Vertical jump
tests**

Case examples

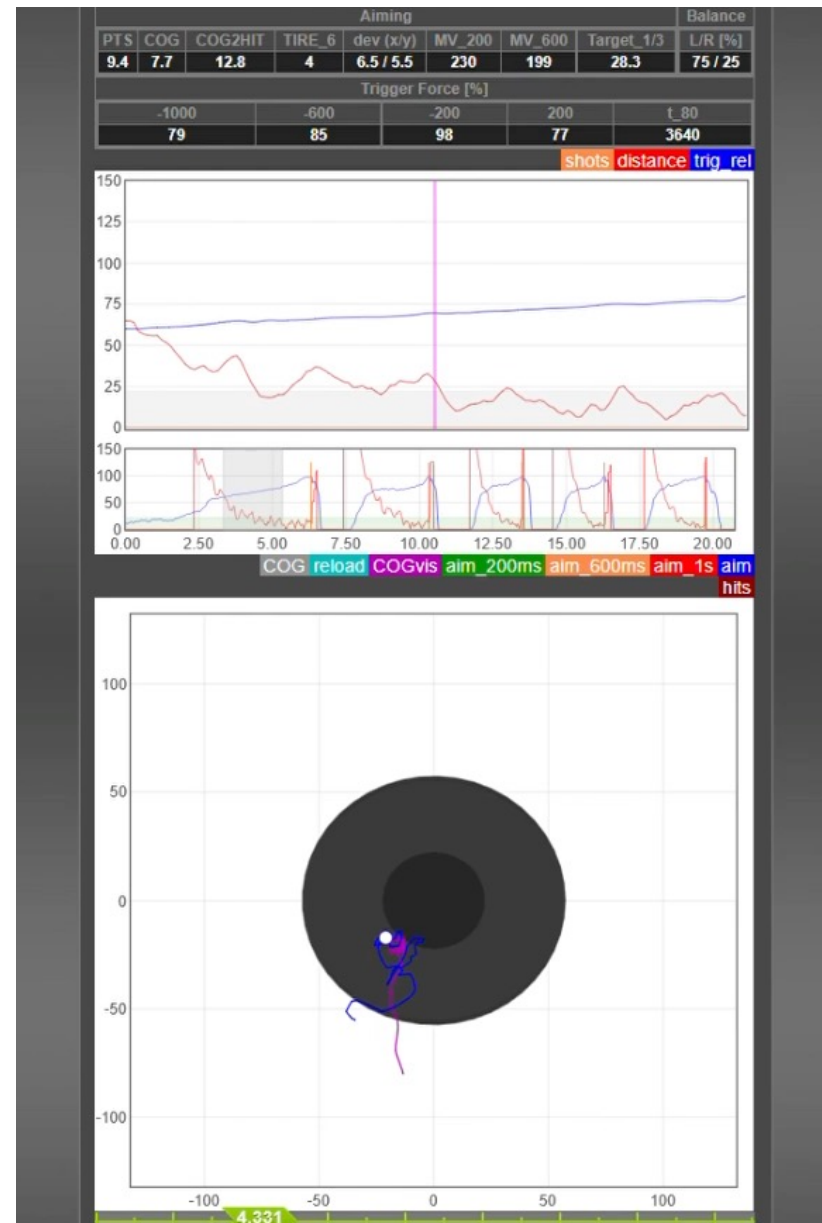
Biathlon

Biathlon – shooting analyses

- Lab measurements
 - Trigger force
 - Aiming tracking
 - Force plate - balance
 - Position



15



TYU SINCE 1863.

Biathlon – prone shooting approach training

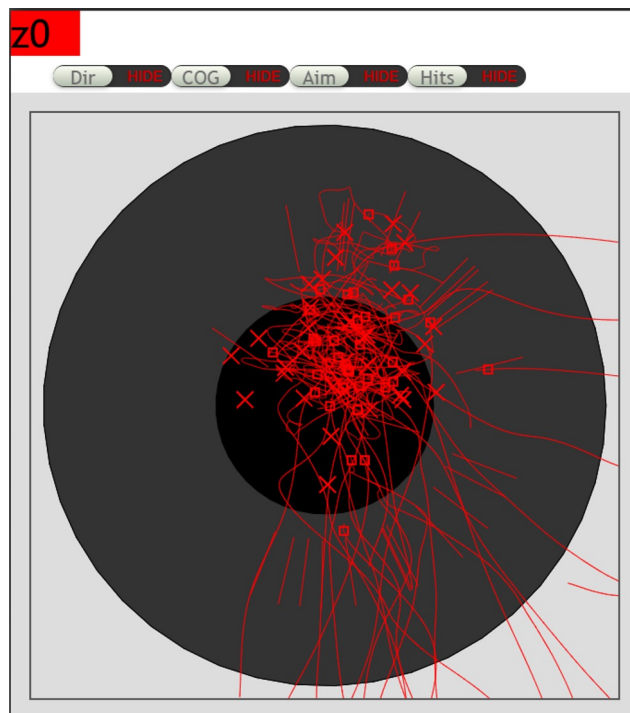


Start situaion:

Approach from right with hands

→ Approach from kl 13 – 19 hr

→ Training to approach with breath and from down

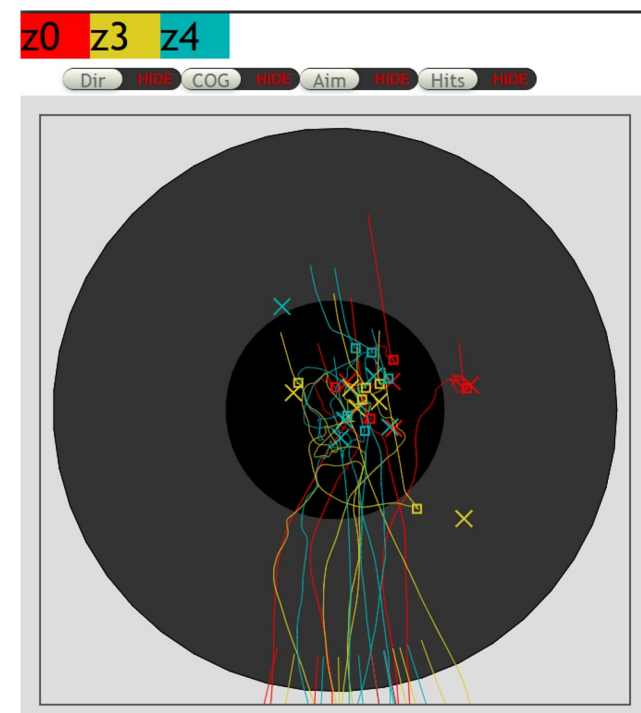


15 months later:

Approach from down with breath

→ No hand approach

→ Kl 17-19

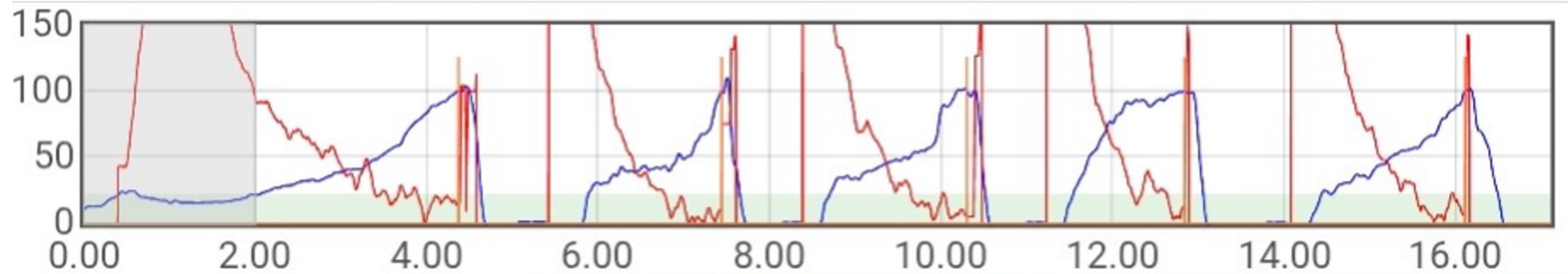


15 months of reps

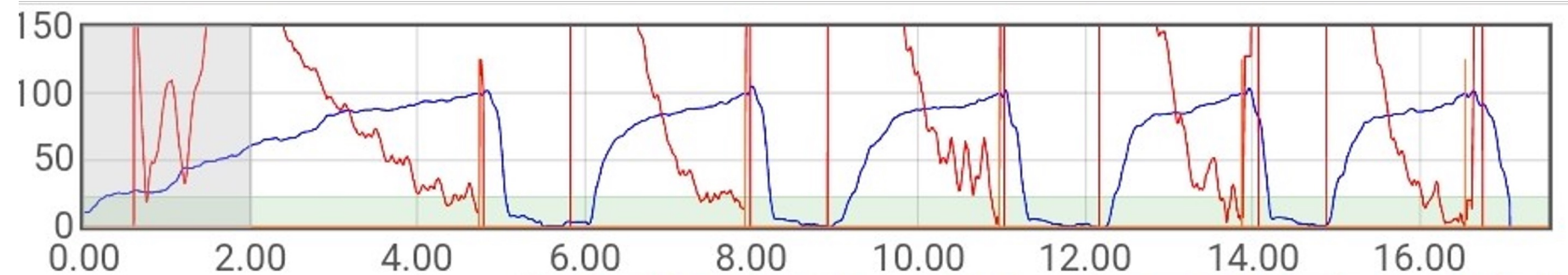
Biathlon – trigger control training



Before



After:



Instructions: Close the bolt → Finger to the trigger wall → Controlled trigger squeeze

Biathlon – shooting analyses



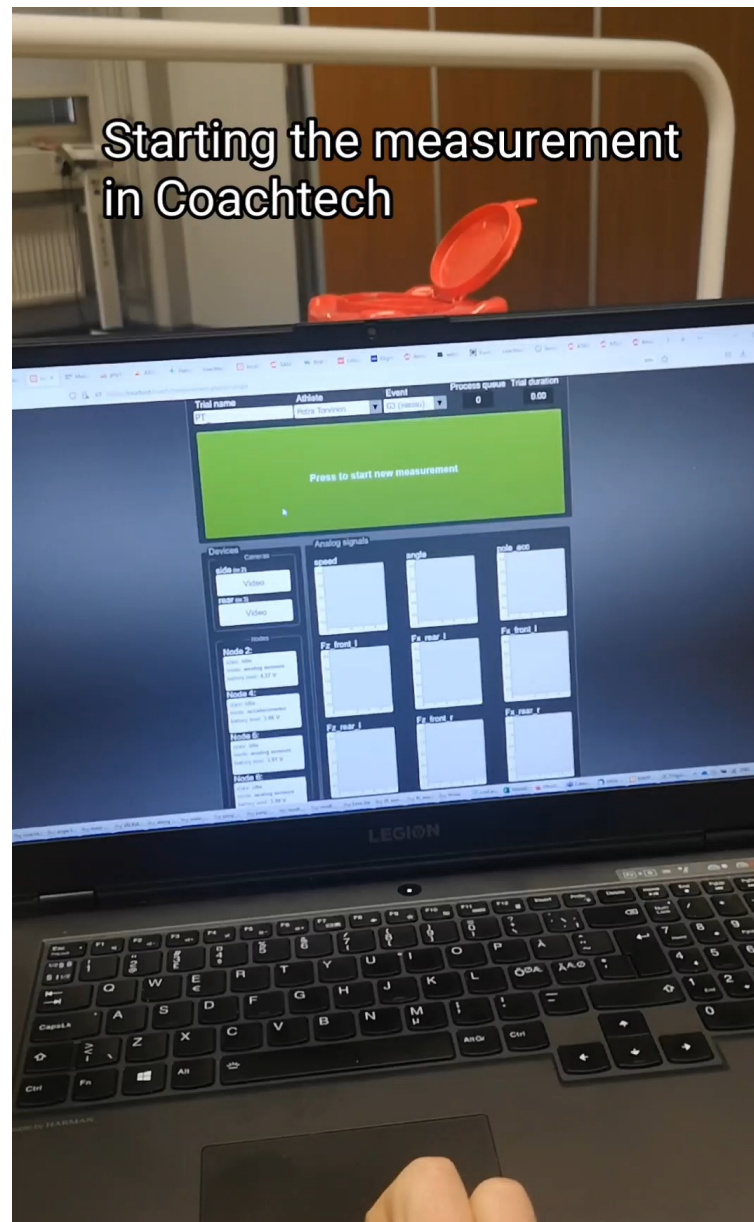
- Shooting container next to roller ski / ski track
- All the same parameters
- Recoil and training load included



Case examples

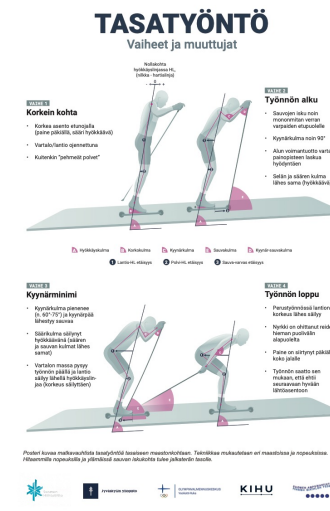
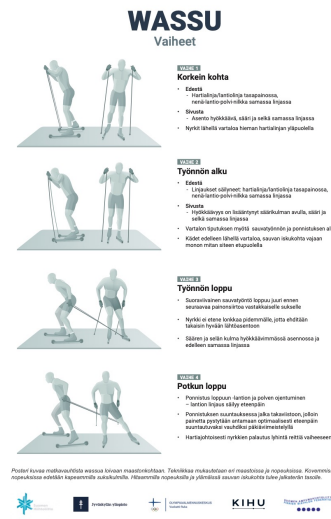
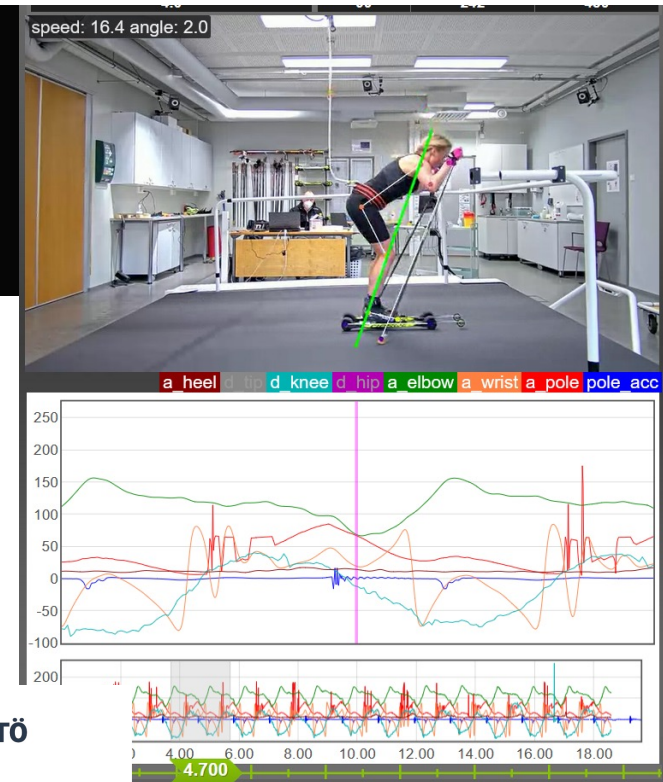
Movement analysis

Movement analysis



Movement analysis

- Markeless analyse
- 2D + equipments in use
- 3D on the way
- More precise analysis of the technique
- Integration with force data to propulsive calculations
- Use as base for technique work



Evaluation of 3D markerless motion capture system accuracy during skate skiing on a treadmill

P Torvinen, KS Ruotsalainen, S Zhao, N Cronin, O Ohtonen, V Linnamo
Bioengineering 11 (2), 136

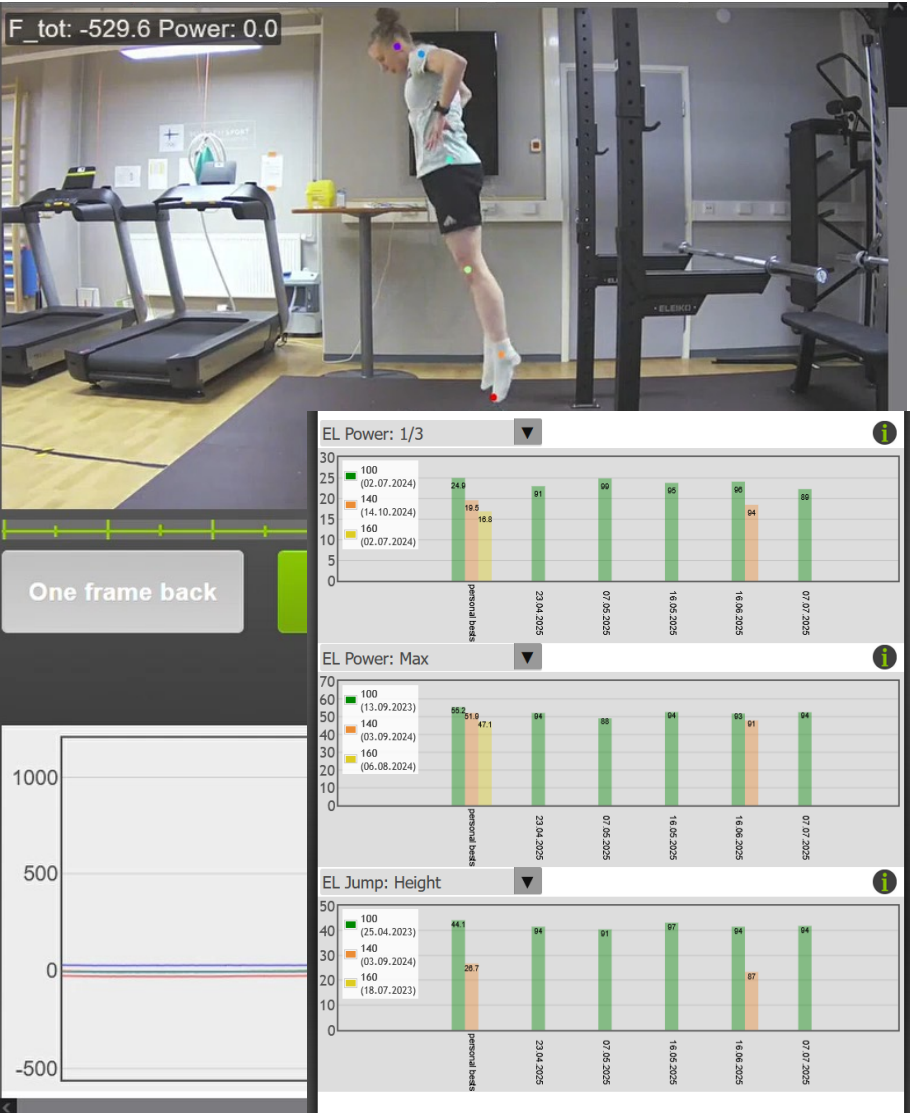
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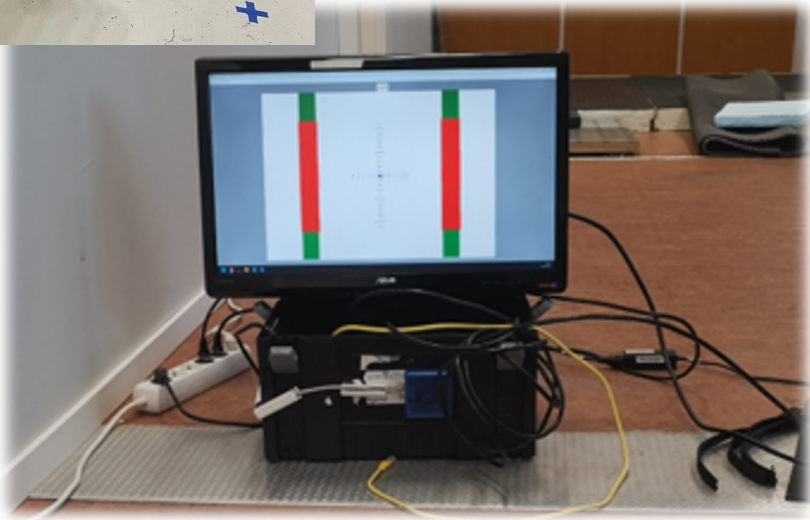
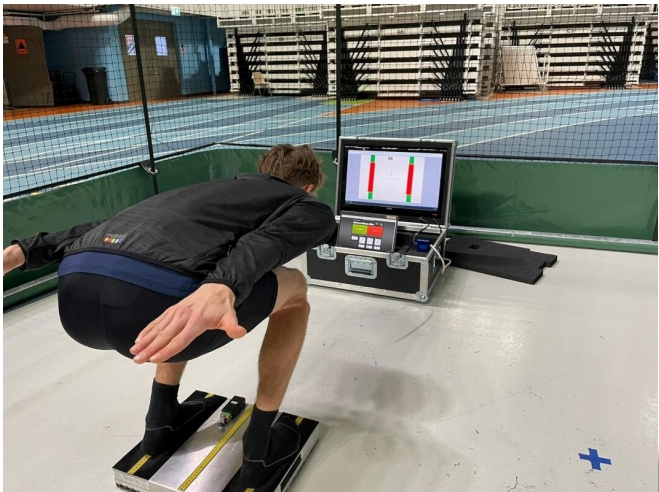
Case examples

Ski Jumping

Performace testing



Inrun technique training



Web feedback



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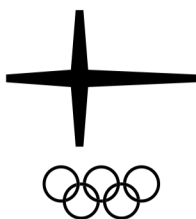
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Questions - Comments

Summary



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Measure
Analyse
Feedback

Universal



SCIENCE to PRACTICE



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VUOKATTISPORT.FI

KIHU



VUOKATTI **AREENA**

CEMIS



KAMK
Kajaani University
of Applied Sciences



VTT



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FINNISH BIATHLON FEDERATION



**Euroopan unionin
osarahoittama**



Elinkeino-, liikenne- ja
ympäristökeskus

KAINUUN LIITTO

**OPETUS- JA
KULTTUURIMINISTERIÖ**



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Thank You!

Olli Ohtonen, PhD

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RDI director, National Olympic Training Center Vuokatti-Ruka

