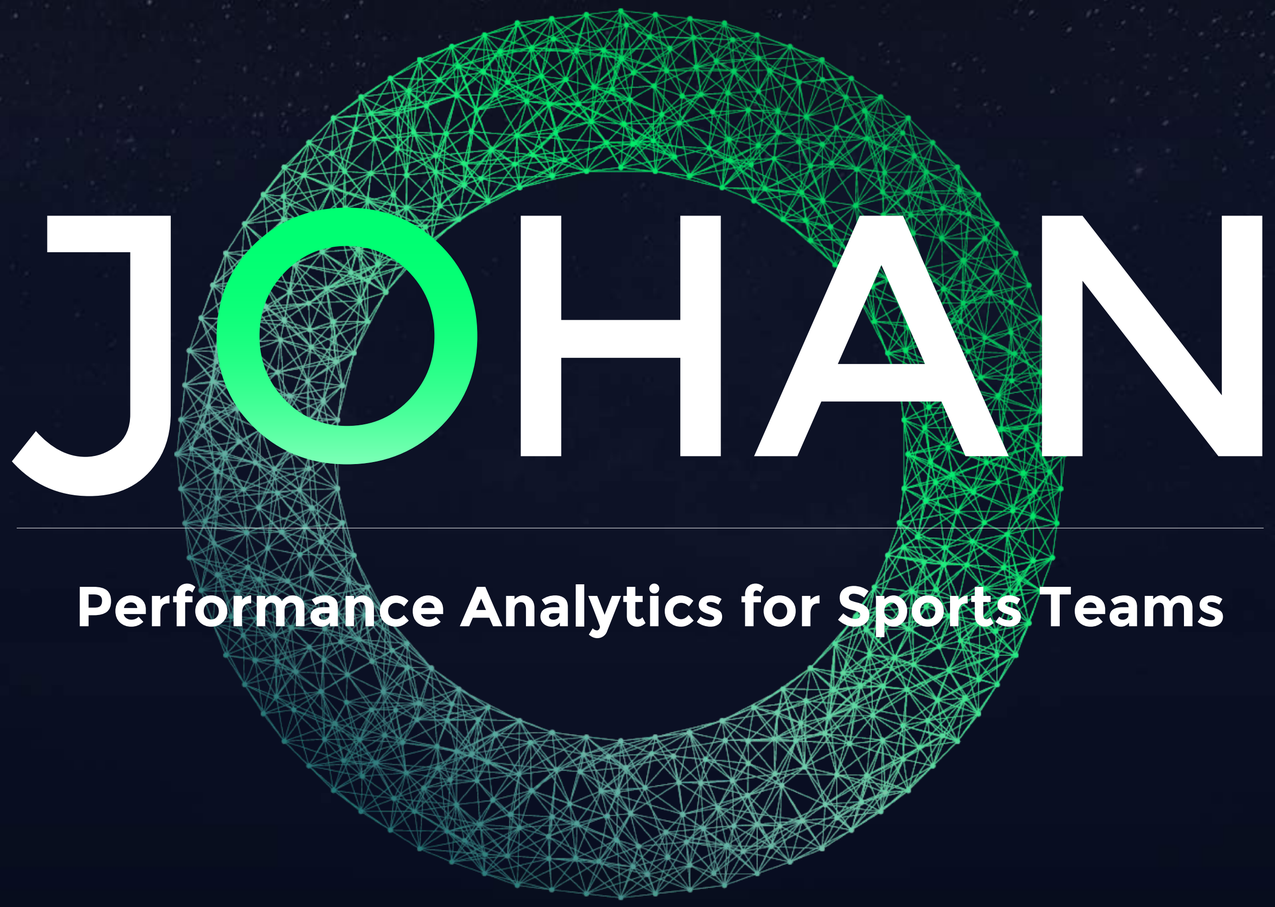


# JOHAN

## Performance Analytics for Sports Teams

esa
space solutions

EU Japan Cooperation towards Tokyo 2020
7 Mar 2017

## The Start of JOHAN

# Winner ESNC GSA's Special Prize 2013

**Now:**

- State-of-the-art system
- 7 employees
- 20 clients
- Investment to grow

# What is JOHAN?

## Total Ecosystem

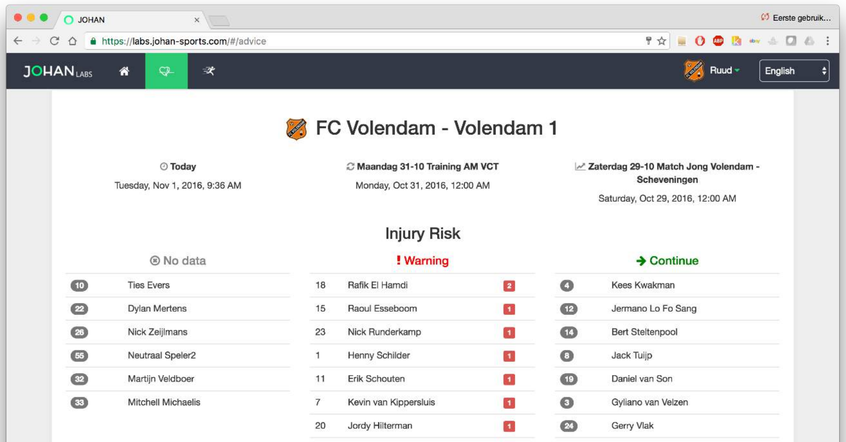
### Wearable

**Most accurate, yet affordable**

esa space solutions

### Intelligent Platform

**Automated Sports Analytics**



Problem

# No Individual Attention

Trainers lack **information** to monitor and steer players' performance

## Injury Stats (Eredivisie):

- Each player 6 matches not playing per season
- Costs €20M (>€1M per club in NL)

# A selection of our clients

Different sports and levels

Eredivisie football
Large staff
€8M turnover

**NEC**

**Benfica Youth**

Primeira Liga Portugal
Large staff (not specialised)
€185M turnover

Silver @ Olympics
Large staff
€7M turnover

**Dutch Hockey Union**

**VV Noordwijk**

Amateur football
Small staff
€0.5M turnover

Dutch national hockey team

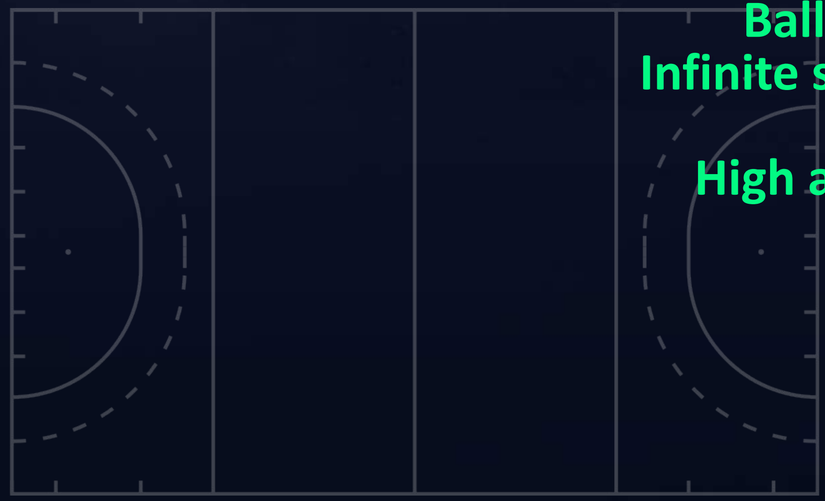
# Silver in Rio

- Physical Demands of Field Hockey
- What do we measure?
- Three Use Cases
  - Substitution scheme (based on fatigue)
  - Injury risk
  - Tactical validation

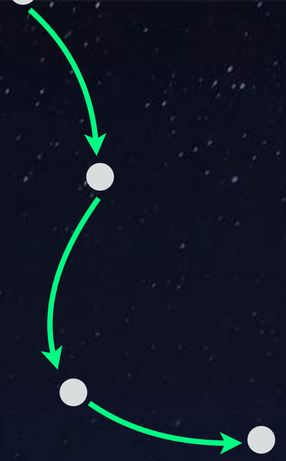
More intensive than football!

# Physical Demands in Field Hockey

- Same size field as football
- Ball much faster
- Infinite substitutions
- Long sprints
- High accelerations



# What do we measure?



**Movement**
- Distance
- Speed
- Accelerations
- Orientation

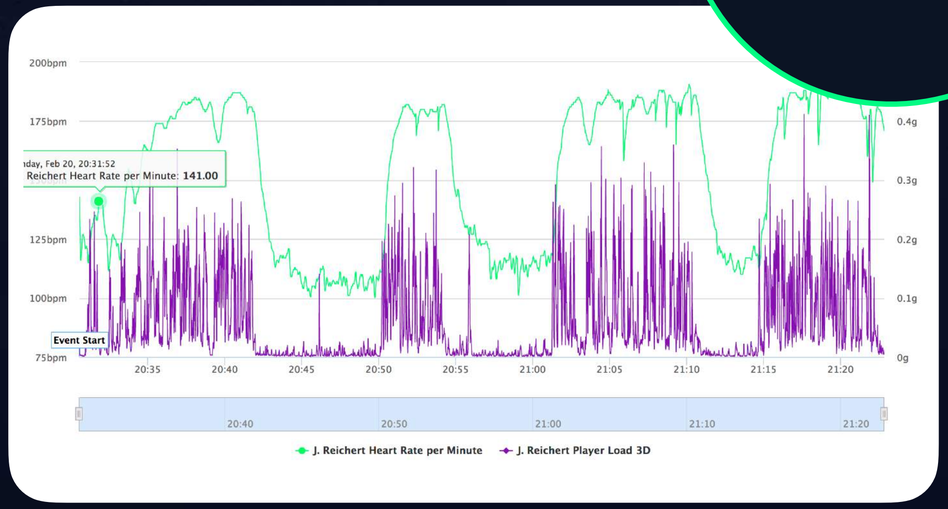
**Heart rate**
- Beats per minute

**Forms**
- Recovery forms

# Substitution scheme

## Parameters
- Speed
- Accelerations
- Heart rate

## Fatigue detection
based on decay in parameters




## Other inputs
- Player prio
- Coach tactics

## Substitution Scheme

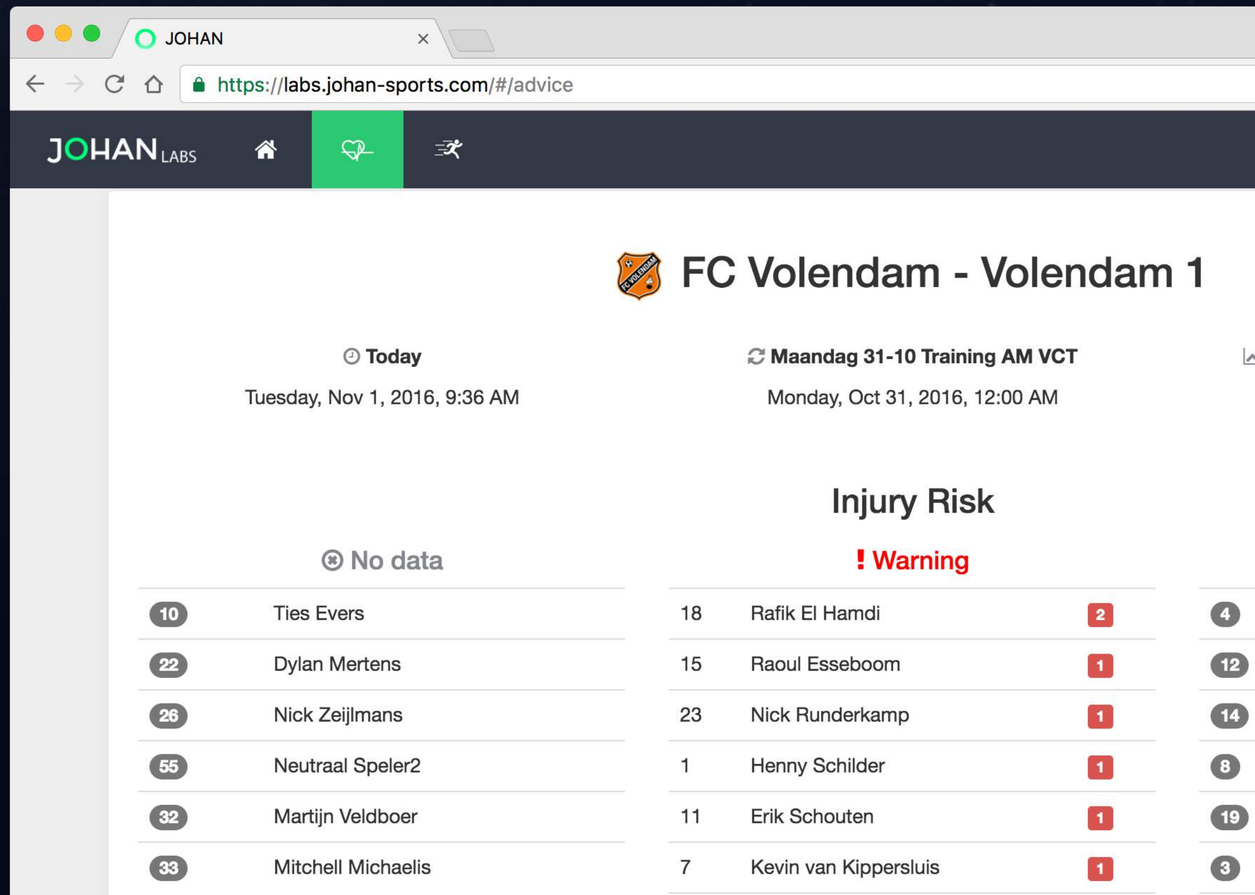
| | VERDEDIGERS | | | | CENTERS | |
|---|---|---|---|---|---|---|
| MIN. | Willemijn | Caia | Margot | Laura | Paumen | Jacky |
| 15 | 1 | 1 | 1 | | 1 | |
| 14 | 1 | 1 | 1 | | 1 | |
| 13 | 1 | 1 | 1 | | 1 | |
| 12 | 1 | 1 | | 1 (Margot) | 1 | 1 (Marloes) |
| 11 | 1 | 1 | | 1 | 1 | 1 |
| 10 | 1 | 1 | | 1 | 1 | 1 |
| 9 | 1 | | 1 (Caia) | 1 | | 1 |
| 8 | 1 | | 1 | 1 | | 1 |
| 7 | 1 | | 1 | 1 | | 1 |
| 6 | | 1 (Willemijn) | 1 | 1 | 1 (Jacky) | |
| 5 | | 1 | 1 | 1 | 1 | |
| 4 | | 1 | 1 | 1 | 1 | |
| 3 | 1 (Laura) | 1 | 1 | | 1 | 1 (Marloes) |
| 2 | 1 | 1 | 1 | | 1 | 1 |
| 1 | 1 | 1 | 1 | | 1 | 1 |
| | START Q2 | | | | | START Q2 |
| 15 | 1 | 1 | | 1 (Margot) | | 1 |
| 14 | 1 | 1 | | 1 | | 1 |
| 13 | 1 | 1 | | 1 | | 1 |
| 12 | 1 | | 1 (Caia) | 1 | 1 (Jacky) | |
| 11 | 1 | | 1 | 1 | 1 | |
| 10 | 1 | | 1 | 1 | 1 | |
| 9 | | 1 (Willemijn) | 1 | 1 | 1 | 1 (Marloes) |
| 8 | | 1 | 1 | 1 | 1 | 1 |
| 7 | | 1 | 1 | 1 | 1 | 1 |
| 6 | 1 (Laura) | 1 | 1 | | | 1 |
| 5 | 1 | 1 | 1 | | | 1 |
| 4 | 1 | 1 | 1 | | | 1 |
| 3 | 1 | 1 | | 1 (Margot) | 1 (Jacky) | |
| 2 | 1 | 1 | | 1 | 1 | |
| 1 | 1 | 1 | | 1 | 1 | |
| | START Q3 | | | | | START Q3 |
| 15 | 1 | | 1 (Caia) | 1 | 1 | 1 (Marloes) |
| 14 | 1 | | 1 | 1 | 1 | 1 |
| 13 | 1 | | 1 | 1 | 1 | 1 |
| 12 | | 1 (Willemijn) | 1 | 1 | | 1 |
| 11 | | 1 | 1 | 1 | | 1 |
| 10 | | 1 | 1 | 1 | | 1 |
| 9 | 1 (Laura) | 1 | 1 | | 1 (Jacky) | |
| 8 | 1 | 1 | 1 | | 1 | |
| 7 | 1 | 1 | 1 | | 1 | |
| 6 | 1 | 1 | | 1 (Margot) | 1 | 1 (Marloes) |
| 5 | 1 | 1 | | 1 | 1 | 1 |
| 4 | 1 | 1 | | 1 | 1 | 1 |
| 3 | 1 | | 1 (Caia) | 1 | | 1 |
| 2 | 1 | | 1 | 1 | | 1 |
| 1 | 1 | | 1 | 1 | | 1 |
| | START Q4 | | | | | START Q4 |
| 15 | | 1 (Willemijn) | 1 | 1 | 1 (Jacky) | |
| 14 | | 1 | 1 | 1 | 1 | |
| 13 | | 1 | 1 | 1 | 1 | |
| 12 | 1 (Laura) | 1 | 1 | | 1 | 1 (Marloes) |
| 11 | 1 | 1 | 1 | | 1 | 1 |

# Injury risk

**Detections**
- Overload
- Recovery forms

**Parameters**
- Distance
- Speed
- Accelerations
- Recovery forms

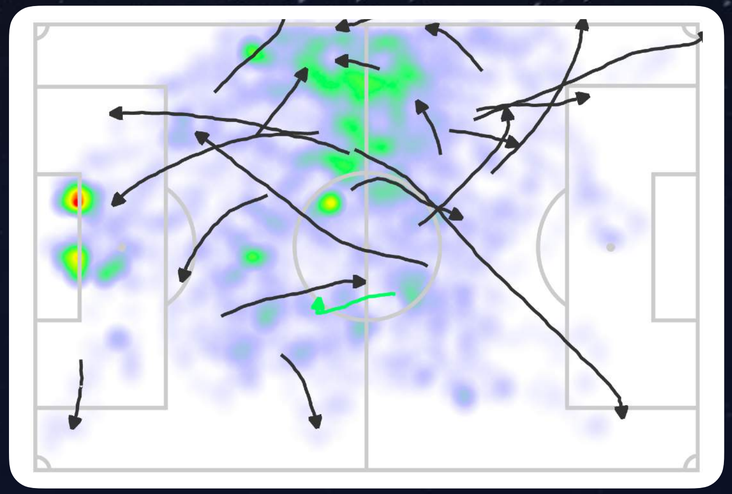
## Injury Risk Dashboard



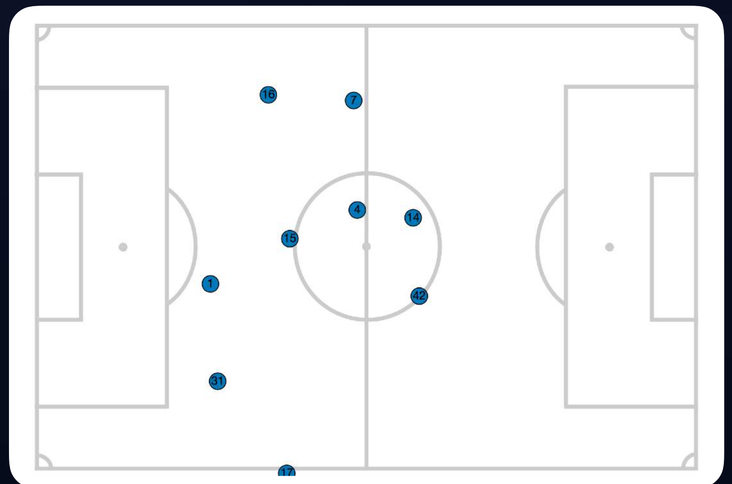
# Tactical validation

**Parameters**
- Position
- Speed
- Accelerations

**Heatmap and sprint lines**
to validate location of activity



**Position simulation**
to validate positions



# JOHAN

## Going for Gold in Tokyo 2020!

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