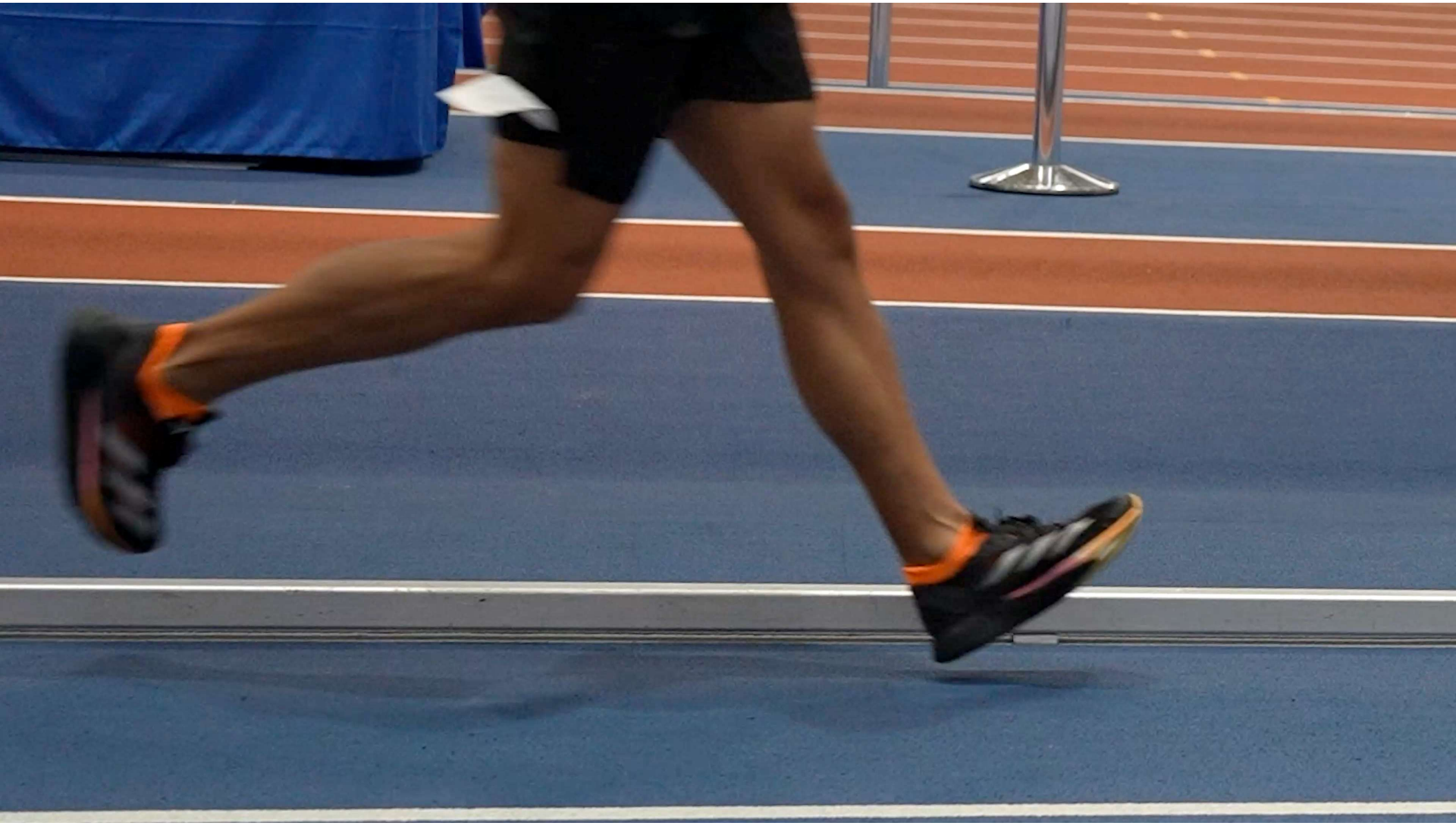
THE RACE WALK CHIP™

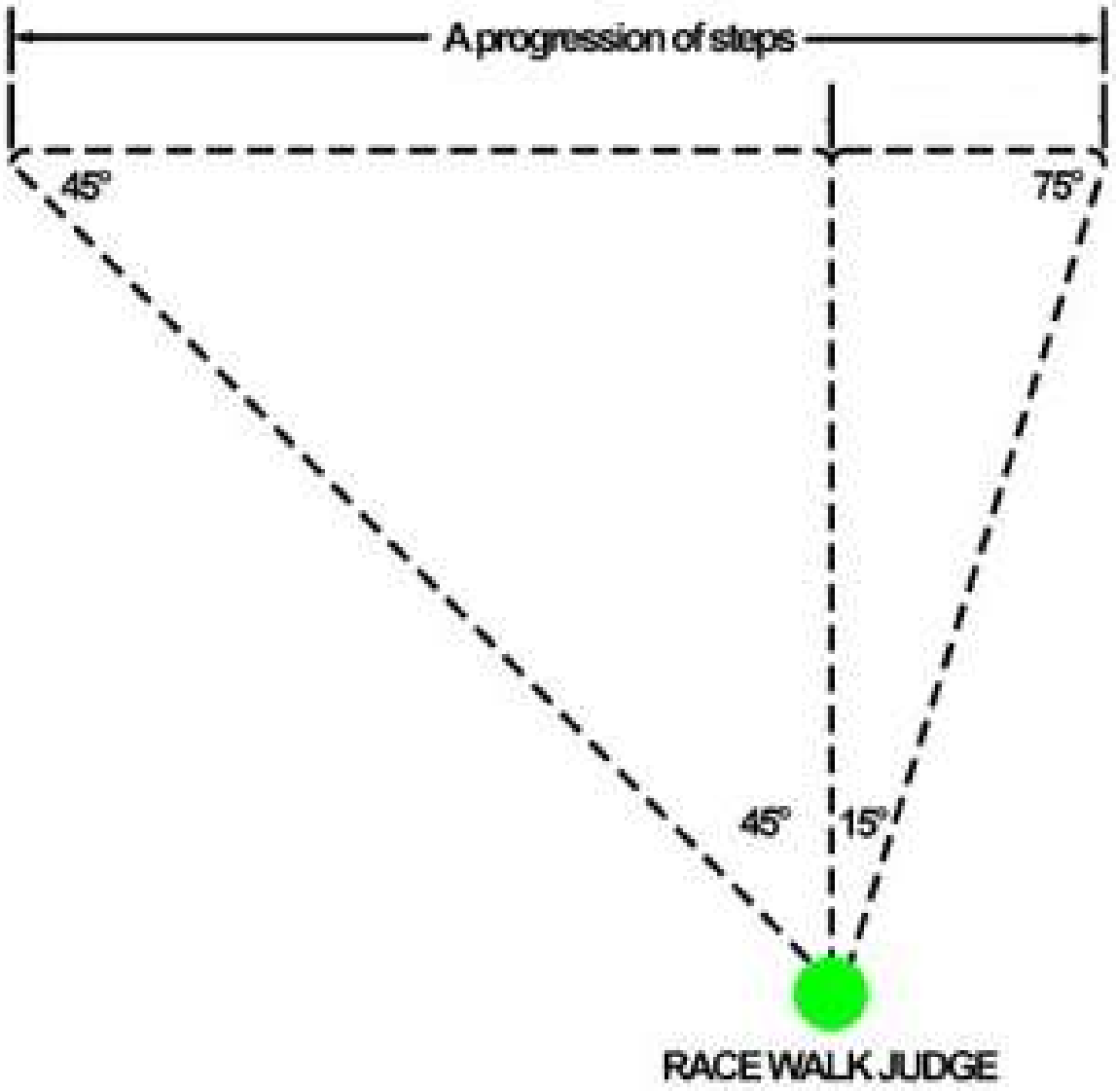
Revolutionizing Race Walking



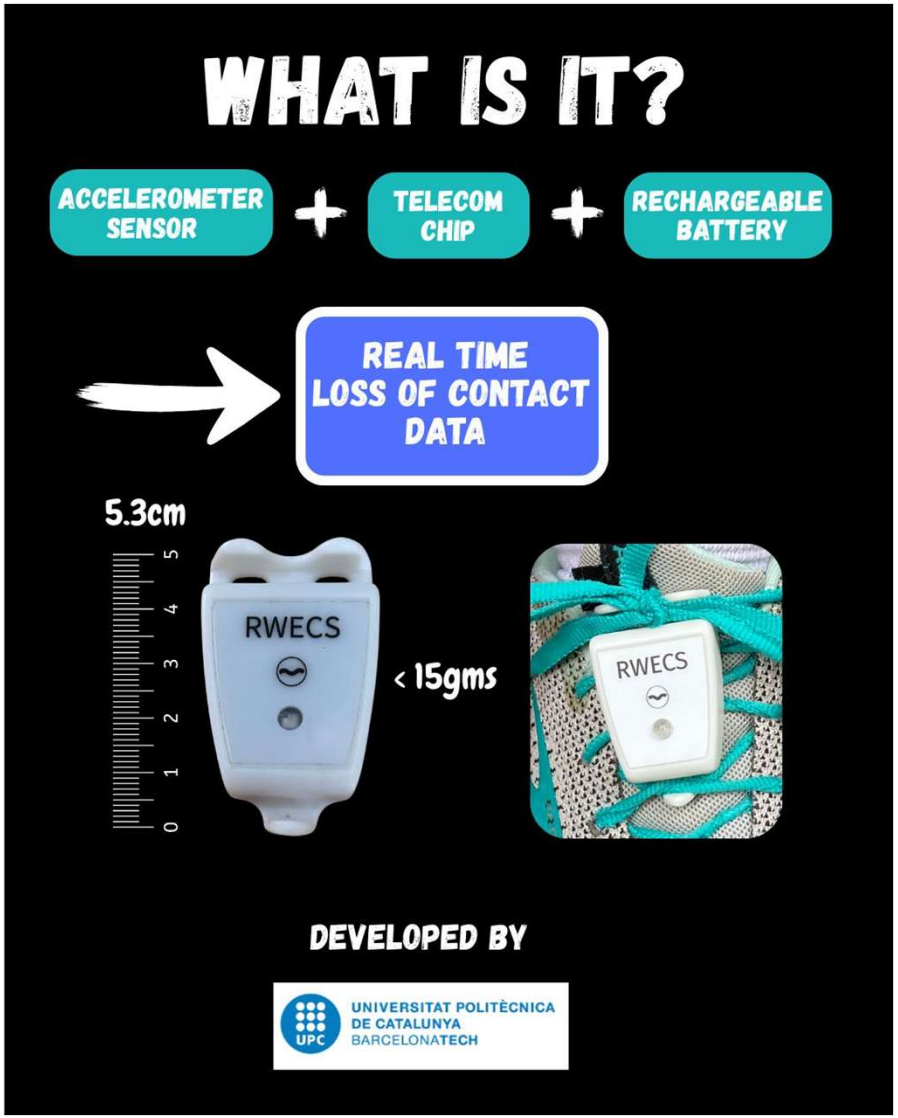
JUDGING BY THE HUMAN EYE IS NOT SUFFICIENT IN MODERN SPORTS

ELITE RACE WALKERS WANT A SYSTEM WHERE EVERYONE IS JUDGED OBJECTIVELY AND CONSISTENTLY

HUMAN VS RWECS JUDGING



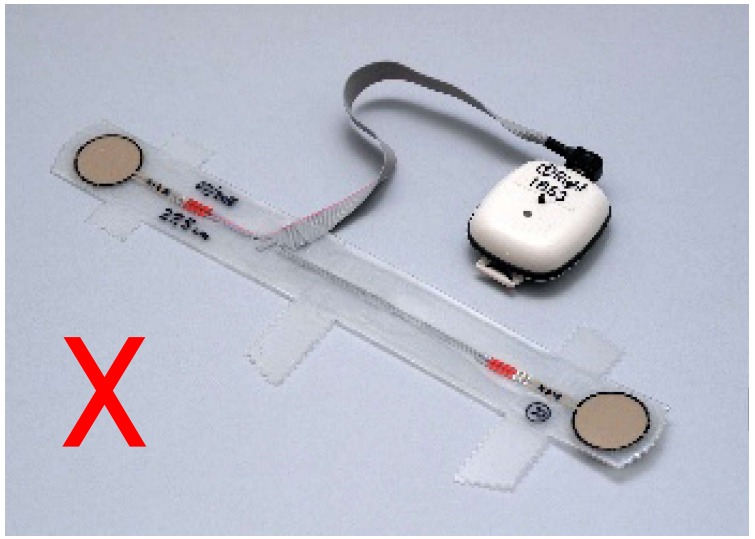
RWECS IS READY FOR COMPETITION



A breakthrough technology for race walking

Accurate, reliable, and objective measurement of loss of contact

Lightweight, portable, & easy to use



IAAF funded pressure-based sensor

RWECS:
THE FUTURE OF RACE WALKING

KEY FEATURES

Dimensions: 5.3 cm high x 3.3 cm wide

Weight: <15 grams

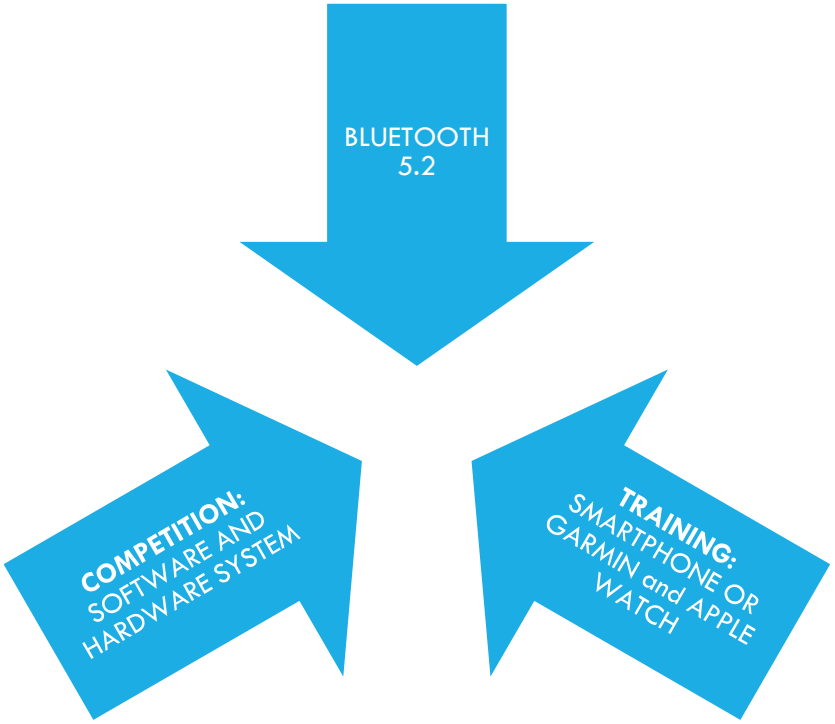
Waterproof

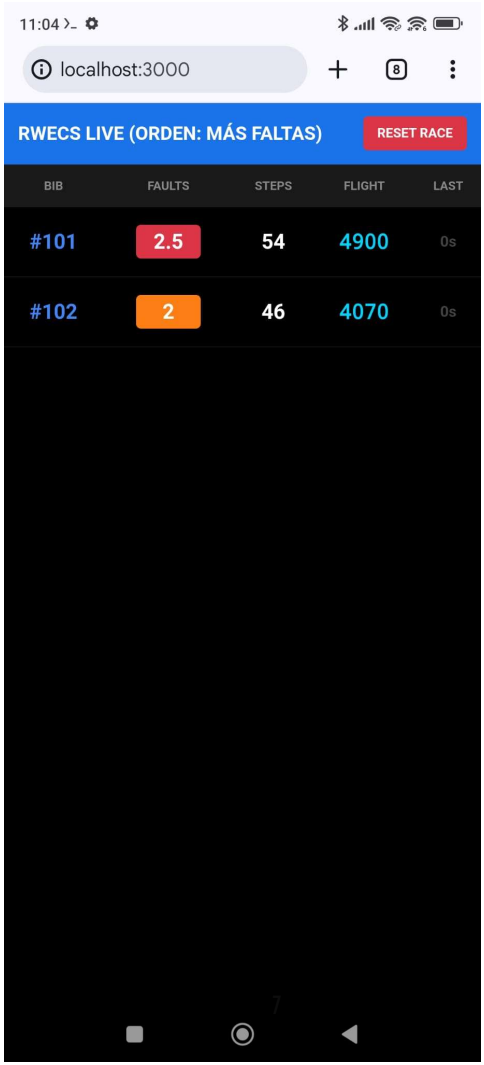
EASY TO ATTACH AND REMOVE FROM SHOES

RWECS:

THE FUTURE OF RACE WALKING

REAL TIME FEEDBACK





RWECS:

THE FUTURE OF RACE WALKING

FULLY TESTED

INDEPENDENTLY in the

LABORATORY and on the

TRACK / ROAD in race conditions

RWECS:

THE FUTURE OF RACE WALKING

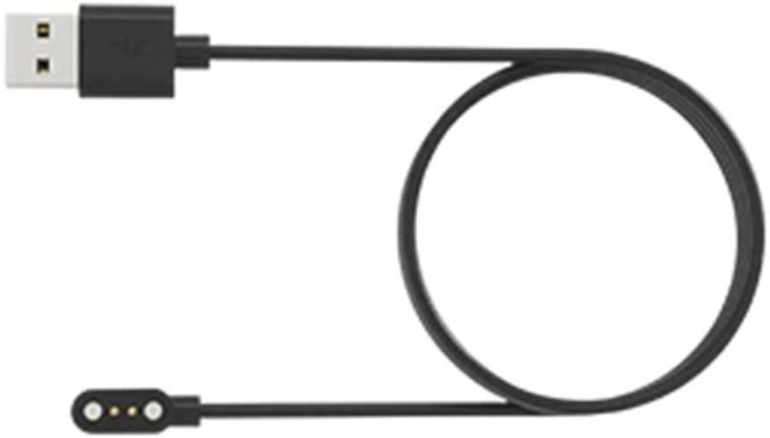
RECHARGEABLE

USB MAGNETIC 2 PRONG CABLE TO CHARGE

BATTERY: > **6 HOURS**

TRAINING/COMP MODE

> **30 DAYS** STANDBY MODE



HOW RWECS WORKS

RWECS is a 3-axis accelerometer-based system.
RWECS is more accurate than video:

RWECS records the moment the foot makes/loses contact with the ground, which may be in between frames of a video camera

Foot Makes Contact

Foot Loses Contact

RWECS uses these data points to compute the flight time in milliseconds

HOW RWECS WORKS

Measurements are performed on each leg independently.

A **LEG CYCLE** is the elapsed time from the foot strike of one leg to the next foot strike of the same leg.

Example: Left Leg, One Leg Cycle

First Left Foot Strike @ 217 ms
Second Left Foot Strike @ 808 ms

Leg Cycle: 808 ms – 217 ms = 591 ms

HOW RWECS WORKS

GROUND TIME: of one leg cycle is the number of milliseconds a foot is in contact with the ground.
Ground Time = time @ toe off – time @ foot strike

SWING TIME: of one leg cycle is the number of milliseconds a foot is not in contact with the ground.
Swing Time = time @ 2nd foot strike – time @ toe off

LOSS OF CONTACT TIME (LOC)= (Swing Time - Ground Time) / 2

Ground Time = 479 ms – 217 ms = 262 ms
Swing Time = 808 ms – 479 ms = 329 ms

Validation:
Ground Time + Swing Time = Leg Cycle
262 ms + 329 ms = 591 ms

LOC = (329 ms – 262 ms) / 2 = 33.5 ms

HOW RWECS WORKS

Calculating LOC with RWECS

LOC = (329 ms – 262 ms) / 2 = 33.5 ms

Is this correct?

Let's see!

YES!!

TRAINING SYSTEM
&
COMPETITION SYSTEM

TRAINING SYSTEM

Multiple platforms pair with 1 or 2 chips to provide real-time feedback via threshold alarms

The user sets a contact limit and receives instant alerts

Records the session data for later review (depending on the systems used)

TRAINING SYSTEM

Platform	Single Chip	2 Chips	Real Time Feedback	Session Recording	Status
Garmin Watch	Yes	On high end models	Yes	No	In Store
Android Phone	Yes	Yes	Yes	Yes	Under Development
iOS Phone	Yes	Yes	Yes	Yes	In Store
Apple Watch	Yes	Yes	Yes	Yes	In Store

COMPETITION SYSTEM

Requires 2 chips per athlete (1 per shoe)

Connects via Bluetooth to antennas

Antennas transmit data to the competition software system

Option for hard-wired data transmission (similar to Seiko timing system)

Multiple successful real-world tests

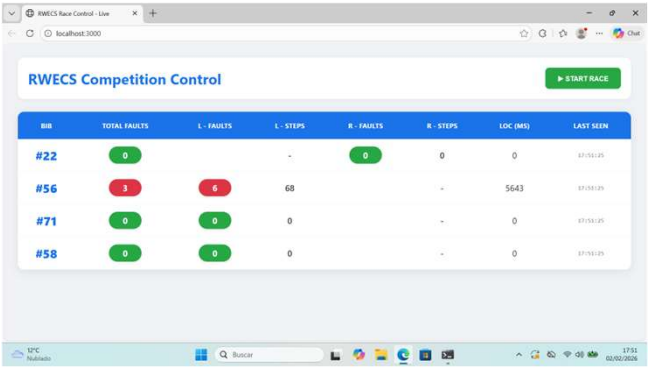
COMPETITION SYSTEM

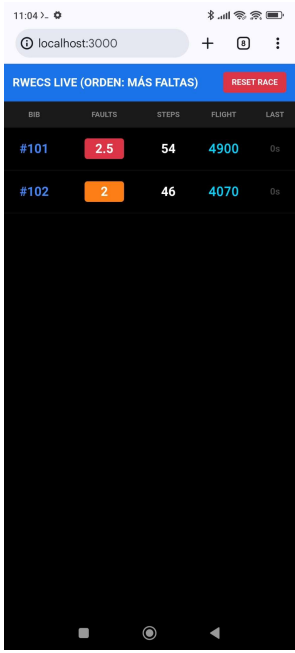
Proposed Loss of Contact Threshold = 10 ms over 10 leg cycles

½ a foul is issued when a walker averages over 10ms ~ for 10 leg cycles on either leg.

1 foul = red card

COMPETITION SYSTEM





Platform	Support for 2 chips	# of athletes	Encryption	Status
PC / LINUX	Yes	100+	Yes	Developed
Android Phone	Yes	6	No	Developed

Note, these systems are currently developed, but not publicly distributed

Leg	1	2	3	4	5	6	7	8	9	10	Average ~	Legality
Left	0	0	0	15	18	16	18	12	10	28	11.7	½ Foul
Right	0	0	0	19	13	16	17	18	20	32	13.5	½ Foul

COMPETITION SYSTEM — 10MS THRESHOLD

ATHLETE RECEIVES 1 FULL FOUL = 1 RED CARD

Leg	1	2	3	4	5	6	7	8	9	10	Average ~	Legality
Left	5	6	5	7	5	8	9	5	4	0	5.4	-
Right	2	5	2	4	4	8	8	8	16	8	6.5	-

COMPETITION SYSTEM — 10MS THRESHOLD

ATHLETE RECEIVES NO FOULS EVEN THOUGH SOME LEG CYCLES ARE OVER THE THRESHOLD

Leg	1	2	3	4	5	6	7	8	9	10	Average ~	Legality
Left	25	22	26	10	18	16	22	24	25	26	21.4	½ Foul
Right	6	10	10	10	8	4	4	5	6	5	6.8	-

COMPETITION SYSTEM — 10MS THRESHOLD

ATHLETE RECEIVES 1/2 A FOUL

RWECS DETAILED EXAMPLE

Acceptable loss of contact by RWECS <= 10 ms

First Left Foot Strike @ 75 ms
Left Toe Off @ 375 ms
Second Left Foot Strike @ 692 ms

Leg Cycle: 692 ms – 75 ms = 617 ms

Ground Time: 375 ms – 75 ms = 300 ms
Swing Time: 692 ms – 375 ms = 317 ms

LOC: (317 ms – 300 ms) / 2 = 8.5 ms

RWECS DETAILED EXAMPLE

FLIGHT TIME LEFT TO RIGHT

Left Toe Off @ 375 ms
Right Foot Strike @ 388 ms
LOC: 13 ms

RWECS DETAILED EXAMPLE

ACCEPTABLE LOSS OF CONTACT BY RWECS <= 10 MS

First Right Foot Strike @ 388 ms
Right Toe Off @ 671 ms
Second Right Foot Strike @ 983 ms

Leg Cycle: 983 ms – 388 ms = 595 ms

Ground Time: 671 ms – 388 ms = 283 ms
Swing Time: 983 ms – 671 ms = 312 ms

LOC: (312 ms – 283 ms) / 2 = 14.5 ms

RWECS DETAILED EXAMPLE

FLIGHT TIME RIGHT TO LEFT

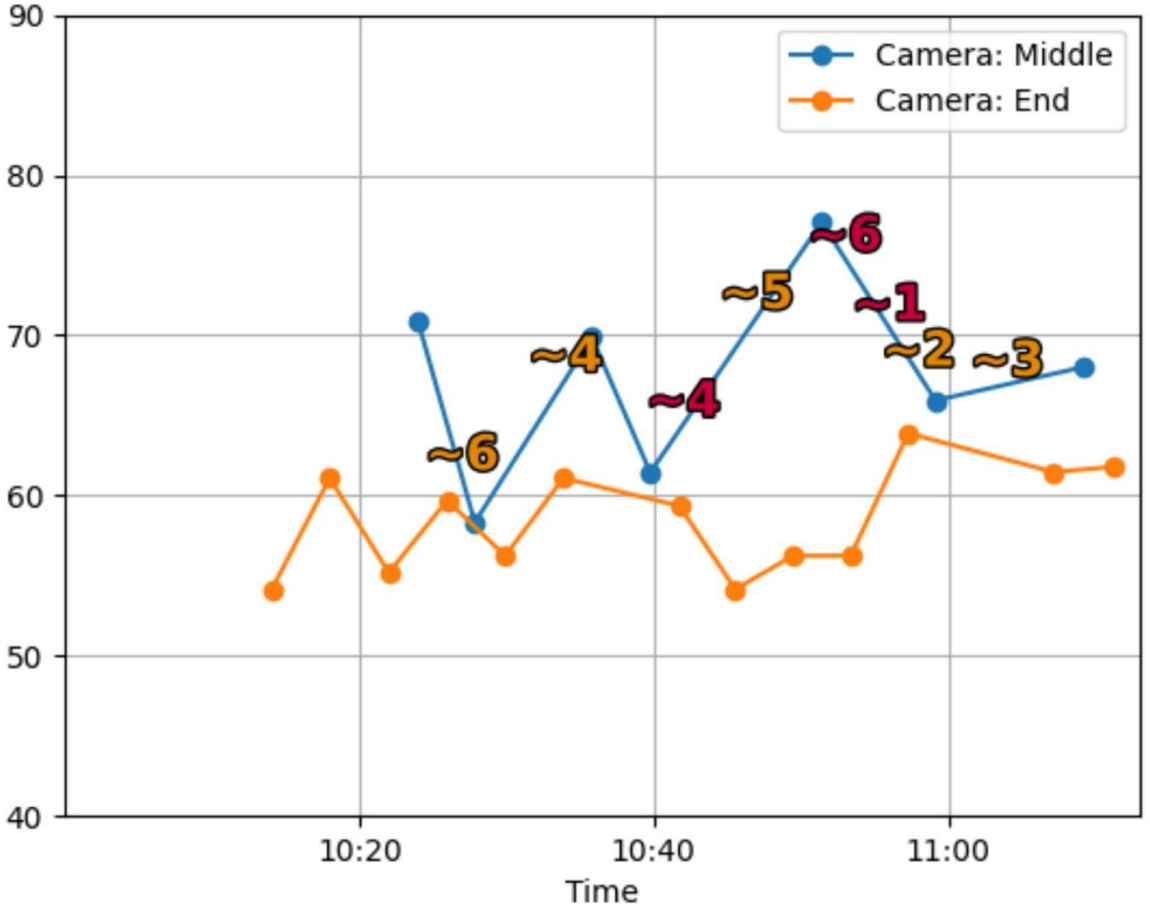
Right Toe Off @ 671 ms
Left Foot Strike @ 688 ms
LOC: 17 ms

TIMELINE – SPRING/SUMMER 2026

Truly test the system under competition conditions

Set the devices to 50ms to simulate human judges.

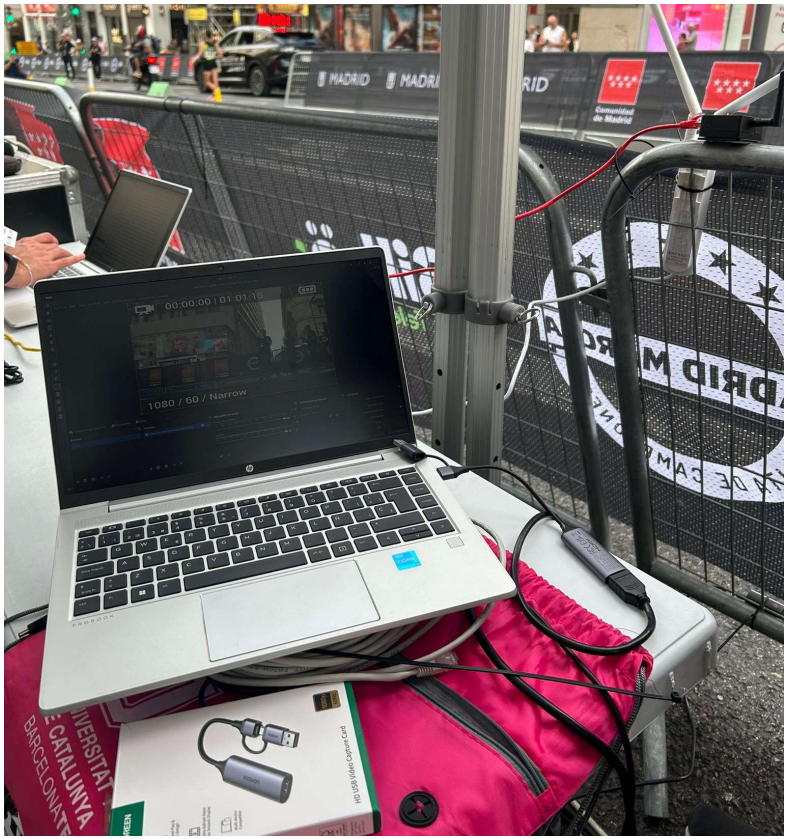
Athletes train with the chips.



TIMELINE – SPRING/SUMMER 2026

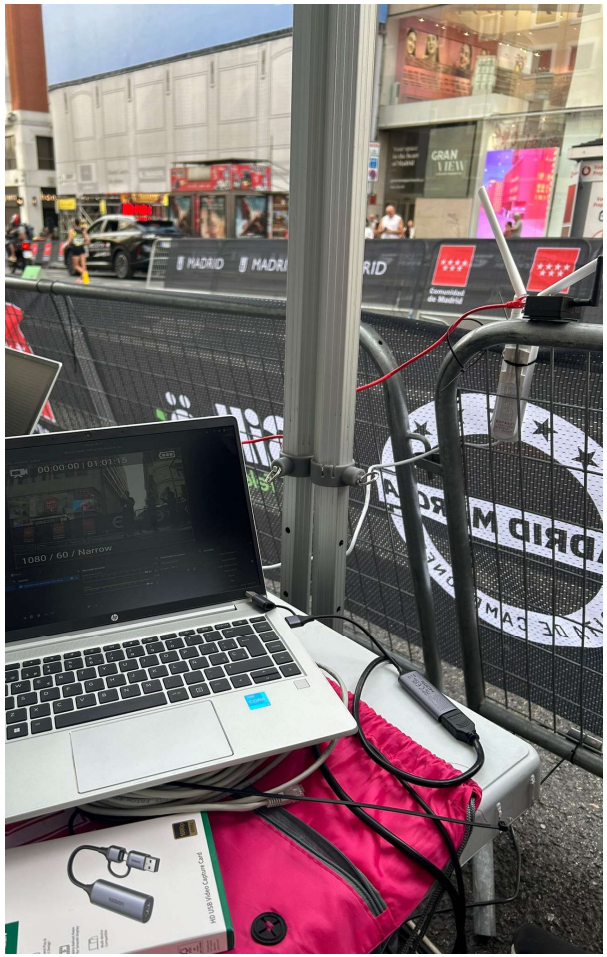
Evaluate and educate current judges

Show the community the direction we going



TIMELINE - 2027

Lower the threshold to 10ms



IMPLICATIONS

Athlete must strive to maintain constant contact with the ground

With the caveat that a 10 -15 ms margin gives the benefit of the doubt to the race walker

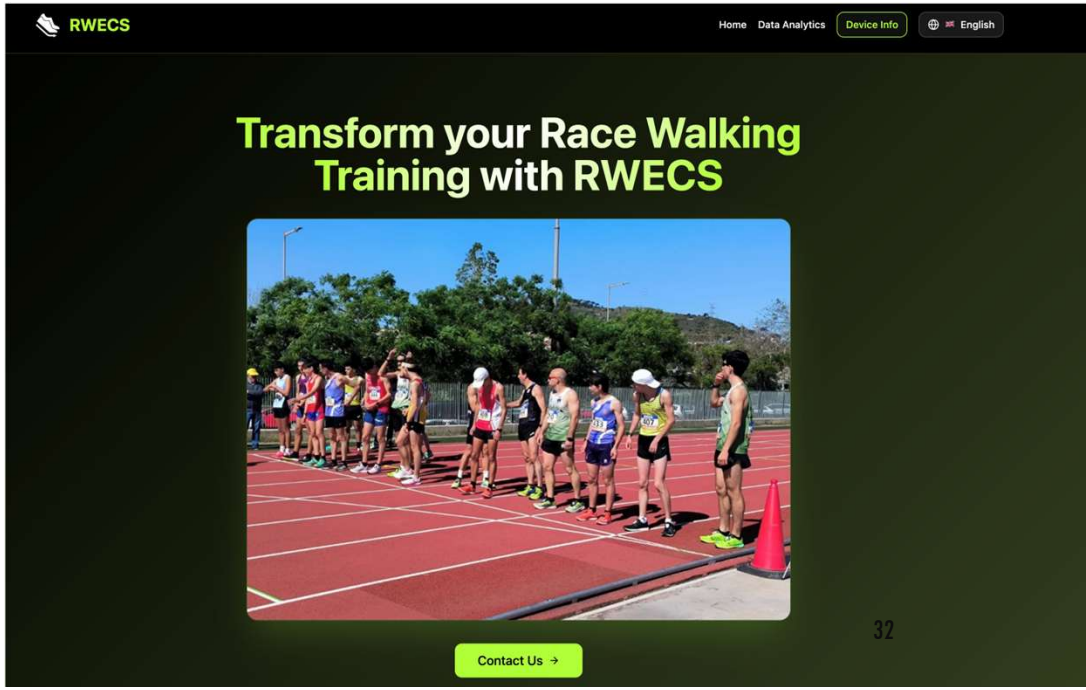
MOVING FORWARD

- February/March 2026: Sold and distributed 100 prototypes for testing and feedback
- Updated the chip design based on the feedback
- Refine long-term production and distribution plan
- May 2026: Take pre-orders for new training chips
- June/July 2026 distribute new training chips
- Collect & analyze feedback from purchasers using chips in training
- 2026: In-competition testing
- 2027: Propose the use of the chips in selected competitions

PRE ORDERS – LIMITED # AVAILABLE

- 1 Chip + 1 charging cable = 125€ + shipping
- 2 Chips + 2 charging cables = 250€ + shipping
- 10 Chips + 10 charging cables = 1250€ & FREE SHIPPING
- COMING SOON: Orders can be placed at *www.racewalk.com/chip* and are fulfilled by Lioness Global Group sent from Europe.

LIONESS



RWECS DEVELOPMENT & SUPPORT

Developed & Tested by:

- **Dr. Javier Rosell Ferrer,** UPC – Universitat Politècnica de Catalunya *(hardware, training, and competition system, Android app)*
- **Professor Jeff Salvage,** Drexel University *(Garmin app, Android app)*
- **Dmitri Babenko** *(iOS app and Apple Watch)*
- **Dr. Brian Hanley,** Leeds Beckett University *(independent testing)*

Additional Project Contributors:

- **Dr. Tim Berrett, OLY,** Edmonton International Athletics Committee *(Working Group Chair, organisational support)*
- **Jane Saville, OLY,** White-Saville Pty Ltd *(Communications Lead)*
- **Ian Whatley** *(Footwear industry consultant)*

Philanthropic Financing:

- **The FastWalker Group, LLC**
- **The International Athletics Foundation**

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