TRAX | User Journey
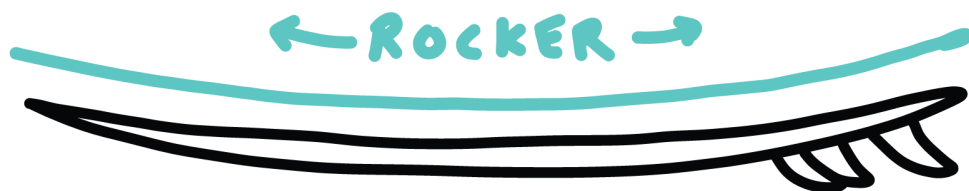
Products

- TRAX Sensor (IMU, GPS, Battery, etc.; small-form housing)
- TRAX Traction (Pressure Sensors; traction pad)
- Connector to attach TRAX Sensor to surfboard

Upon receiving TRAX Sensor and TRAX Traction.

- Unpack TRAX Sensor and TRAX Traction
- Glue TRAX Traction permanently to surfboard with adhesive
- Calibrate specific surfboard with TRAX Sensor attached
    - Surfboards differ in terms of length, so-called "rocker" (see below) and hence interact differently with a wave
    - To calibrate, surfboard could be placed on flat surface and TRAX Sensor gets put into "calibration" mode; the user then i) pushes down nose as far as possible until reading is completed, leaves it untouched until reading is completed, pushes down tail as far as possible until reading is completed
    - These three readings are parameters for the machine learning / feedback analysis
- Calibrate surfer on TRAX traction
    - Surfer places the board on a soft surface (e.g. a carpet) and places his back foot on the traction pad to calibrate the weight of the surfer; likely all weight on this one foot to have a baseline value
- Surfer and Surfboard(s) are saved in the TRAX App

HEAVY ROCKER

More Lift / More Drag / Later Takeoffs / Steep Waves

RELAXED ROCKER

Little Lift / Less Drag / Early Takeoffs / Mellower Waves

Before a Session.

- Surfer arrives at the surf spot i) on the beach or ii) on a boat already on the water
    - Surfer should select the current board from a list within the TRAX App
    - Before entering the water, the surfer should initiate a session on TRAX by interacting with either TRAX Sensor or TRAX Traction
        - If he enters on a boat, it would likely not be possible to re-calibrate the sensors here, as a boat is constantly moving (and there are often magnet interferences with metal frames of boats)
    - As the surfer enters the water, the water level should be used to calibrate the Z axis for the entirety of the session
        - This could be done by interacting with TRAX Sensor or TRAX Traction and should be confirmed by a [green] LED once ready
        - I wouldn't recommend relying on any sensor inputs during this phase as the water might be rough
- Phone will be left in car / boat and surfer has no access to phone once in the water

During a Session.

- During a session, a surfer spends the most time either i) paddling (to stay in position or to move into position or to return after finishing a wave) and ii) sitting and waiting for a wave; neither of those are completely static, but they're also not dynamic; paddling is typically slower than 6kph during this phase
    - Nonetheless, during this time the TRAX Sensor will still experience significant movement, also on the Z-axis (as unbroken waves that pass will lift up the surfer or as the surfer pushes their board down to dive underneath waves)
- Typical process of catching a wave

- A surfer will i) point his board towards the shore, ii) paddle faster / stronger, iii) be "caught" by the wave and moved upwards on the z-axis, iv) receive a push from the wave, v) "pop up" to his feet, vi) surf the wave for typically 5 – 30 seconds, vii) either a) fall off (board might move hectically and even upside down, also no input on the pressure sensor) or b) decide to stop surfing (little to no input on the pressure sensor, followed by paddling; typically also significant slowing down); at the end of the wave, the board will move in the opposite (not necessarily 180°, but more than 90°) direction relative to the paddle direction before the "pop up"
- Time between surfed waves can be up to 45min; during this time, to conserve battery, idling mechanisms could be established; there would be a need for a reliable "wake-up" event (strong paddling, getting lifted by a wave, etc.)
- All movements and sensor inputs while on the wave should be recorded; all data of a session (typically between 60 – 180min) should be stored locally
  - Ideally, it should be possible to send data to smartwatch during session to give live feedback to the surfer; calculations would need to be done on smartwatch, same for feedback generation
    - Feedback would be abbreviated versions of the app-generated feedback, e.g. "less weight on back foot during bottom turn"; especially relevant after a fall on a wave
    - 2-3 lines of feedback at most
- Reference Videos (only like the first minute of each)
  - BEST: Full Session incl. paddling: https://www.youtube.com/watch?v=i7DovR5PvcY
  - High-Performance: https://www.youtube.com/watch?v=deZ264ixKbY&list=PLNjJj8ODe3UU4PVXstwhX2yp99kU_yaOg&index=6
  - POV: https://youtu.be/eto_iaRuaaY?t=335
- Ideal times for re-calibration would be i) after completing a wave or ii) while sitting and waiting for a wave; issue while "sitting" is that the tail of the surfboard (i.e. where TRAX Sensor is placed) is submerged and might not have GPS signal
  - It would be possible to signal (red LED?) to a surfer when they need to sit still for 10 seconds to re-calibrate sensors
  - Alternatively, everything should re-set to the initially set (i.e. pre-session) stats after each wave
- Optional: surfers could "highlight" a wave they surfed in the water by interacting with one of the products; e.g. tap the pressure sensor 5x rapidly to highlight the wave during post-session review

After a Session.

- Surfer returns to the beach or boat
- TRAX Sensor can transfer information to smartphone via BLE
- Smartphone will analyze data and generate statistics, feedback, and recommendations
- TRAX will need to be able to differentiate between different types of maneuvers: bottom turn, pump, top turn, cutback, snap

Boundaries / Limitations

- No reliable recalibration on boats
- Unlikely to be truly stationary at any point during the session
- No phone use during session
- Boundaries for Pitch, Yaw, Roll:
    - Pitch: unlikely to be more than 90° in either direction; exception: potentially during very strong top turn (see example below); not relevant to most surfers, she's a pro… check reference videos.
    - Yaw: no boundaries
    - Roll: unlikely to be more than 90° in either direction