UTx - Product Requirements Document

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Executive Summary

UTx is a mobile app that turns photos of Concept2 erg screens into structured training data. Rowers snap their screens, AI extracts the workout data, and UTx builds a personal training log with insights, PBs, coaching feedback, and social features. Think Whoop meets Strava for indoor rowing - without the faff of Bluetooth pairing.

Problem Statement

Millions of rowers train on Concept2 ergs worldwide. The erg has Bluetooth connectivity, but in practice most squad rowers don't connect their phones during sessions. Instead they take photos of their screens when they finish - and those photos sit in camera rolls, never analysed, never tracked.

This means rowers miss out on tracking progress over time, recognising PBs, spotting trends, and comparing performance with teammates. Coaches have no visibility into squad training data unless they manually collect it.

The Concept2 ecosystem (ErgData, Logbook) requires Bluetooth connection at time of workout - it doesn't solve the "photo in camera roll" problem.

Solution

UTx uses computer vision and AI to extract workout data from photos of erg screens. The rower takes a photo, UTx reads it, and the data flows into their training log automatically. AI coaching analyses their data over time and provides personalised feedback.

Core value prop: Take a photo. That's it. Your training is logged.

Target Users

Primary: Club and squad rowers (university, national programmes, rowing clubs) who train in groups and don't connect phones during sessions.

Secondary: Coaches who want visibility into squad training without manual data collection.

Tertiary: Individual rowers who want a simpler logging experience than Bluetooth pairing.

Authentication

Auth Options (in UI order)

1. **Continue with Apple** - Required for iOS App Store

2. **Continue with Google** - Easy for students

3. **Continue with Phone** - SMS verification via Firebase Phone Auth

No email login - keeps it simple, students prefer phone-based auth.

Why Firebase Phone Auth

- Free tier: 10,000 verifications/month

- Handles SMS delivery, retry logic, international numbers, abuse prevention

- After free tier: ~£0.01-0.03 per verification

- Simple SDK integration

Most users (80%+) will use Apple/Google, so phone auth is an edge case that Firebase free tier easily covers.

Onboarding Flow

Screen 1: Welcome

- UTx logo

- Tagline: "Every metre counts"

- Two buttons: **Sign Up** / **Log In**

Screen 2: Auth

- Continue with Apple

- Continue with Google

- Continue with Phone

Apple/Google: One tap, account created from their profile data.

Phone flow:

1. Enter phone number

2. Receive SMS code (Firebase)

3. Enter code

4. Account created

Screen 3: Profile - Identity

- **Display name** (pre-filled if from Apple/Google)

- **Profile photo** (optional, skip available)

Screen 4: Profile - Physical Stats (Required)

These fields are mandatory - AI coaching is meaningless without them.

Field	Input Type	Notes
Height	Number + unit toggle (cm/ft-in)	Required
Weight	Number + unit toggle (kg/lbs)	Required
Birth date	Date picker	Required - for age groups and HR zone estimation
Gender	Male / Female / Prefer not to say	Required - for leaderboard categories

Screen 5: HR Setup

- "Do you know your maximum heart rate?"

- **Yes** → Enter max HR field

- **No / Not sure** → "No problem - we'll estimate from your age and refine as you train"

Default: 220 - age. System updates estimate when we observe higher readings.

Screen 6: Connect Strava (Optional)

- "Connect to Strava to auto-sync your workouts"

- **Connect Strava** button → OAuth flow → returns to app

- **Skip for now** link

Screen 7: Join or Create Club (Optional)

- Search for existing Club

- Or "Create a Club" (goes to request flow)

- Or **Skip for now**

Screen 8: Quick Tutorial (3 swipeable cards)

1. **"Snap your screen"** - Image showing phone camera pointed at erg PM5

2. **"We do the rest"** - Image showing extracted data appearing in app

3. **"Track your progress"** - Image showing PB notification and coaching insight

Get Started button on final card.

Screen 9: Home - Empty State

Main feed view, empty. Clear CTA:

- Big **+ Add Workout** button

- Helper text: "Take a photo of your erg screen to log your first workout"

Total onboarding time: Under 3 minutes

Club & Squad Structure

Hierarchy

Two-tier system reflecting how rowing actually works:

- **Club** = The organisation (Kingston RC, Cambridge University BC, Leander)

- **Squad** = Groups within the club (Women's Senior, Men's U23, Lightweights, Development Squad)

Preventing Duplicate Clubs

Claim & Verify Model:

1. User searches for Club by name

2. If Club exists → prompted to join

3. If Club doesn't exist → can request to create

4. Creation requests are verified before going live (manual check for duplicates, legitimacy)

5. Fuzzy matching catches variations ("Kingston Rowing Club" vs "Kingston RC")

6. First verified creator becomes Club Admin

Squad Privacy

- Squads have their own private feed by default

- Women's squad only sees Women's squad workouts

- Club-wide feed is opt-in ("Show my workouts to whole club" toggle in settings)

- Leaderboards can be filtered: Squad-level or Club-level

Roles & Permissions

Role	Permissions
Club Admin	Create/delete squads, approve club join requests, manage club settings, assign Squad Captains, view all squad data
Squad Captain	Invite to their squad, remove from their squad, approve squad join requests
Member	Post workouts, view own squad feed, participate in leaderboards

Join Flow

Via Search:

1. User searches for Club by name

2. Finds "Kingston RC" → taps Join

3. Selects Squad from list (or requests new squad if not listed)

4. Request goes to Squad Captain or Club Admin

5. Approved → they're in

Via Invite:

- Squad Captain or Club Admin generates invite link / QR code

- Link goes directly to specific squad

- No approval needed if using invite link (trusted invite)

Create Club Flow

1. User taps "Create a Club"

2. Enters: Club name, location/affiliation, their role (e.g., "Head Coach", "Club Captain")

3. Request submitted for verification

4. Verified within 24-48 hours

5. User notified, becomes Club Admin

6. Can then create Squads within the Club

Core Features

1. Photo Capture & OCR

What it does: User takes or uploads a photo of their erg screen. AI extracts all visible data.

Data points to extract:

Field	Description
Total time	Overall workout duration
Total distance	Metres rowed
Average split	/500m pace
Average stroke rate	SPM
Average watts	Power output

Calories	If displayed
Heart rate (avg)	If displayed (PM5 with HR strap)
Heart rate (max)	If displayed
Interval data	Individual split times, distances, rates for interval workouts
Drag factor	If visible

AI inference: The system intelligently determines workout type:

- Steady state (e.g., 10km at rate 18)

- Time-based intervals (e.g., 8x500m with rest)

- Standard test distances (2k, 5k, 6k, 10k, half marathon, marathon)

Edge cases to handle: Blurry photos, angled shots, partial screens, different PM versions (PM3, PM4, PM5), photos with fingers/reflections, multiple ergs in shot.

Technical approach: Vision LLM (GPT-4V or Claude) with structured prompt returning JSON. Handles edge cases well, understands context, minimal parsing logic required.

UX flow:

1. User taps **+ Add Workout**

2. Camera opens (or choose from gallery)

3. Photo taken

4. Processing spinner (2-3 seconds)

5. Results shown with edit capability

6. User confirms or adjusts any errors

7. Optional: Add notes, tag squad

8. Workout saved

2. Feed

One unified feed, filtered by context.

Single feed with tab/toggle filter:

View	Content

All	Your workouts + people you follow + your squad
Squad	Just your squad members
Following	Just people you follow

Feed Card - Per Workout

Each workout appears as a card:

Element	Description
Header	Avatar + Name + Time ("Tom H. • 2 hours ago")
Workout Badge	Type indicator (2K Test / Steady State / Intervals)
Key Metrics	3-4 big numbers: Distance, Time, Avg Split, Avg HR
Effort Score	UTx Effort Score (0-10) - see below
PB Badge	🏆 if new PB
HR Sparkline	Mini graph showing HR across the piece
Engagement	Reaction count + Comment count

Tap card → opens full Workout Report.

Reactions: Single reaction type (🔥) - keep it simple, one tap.

Comments: Threaded comments on workouts.

3. Effort Score (Whoop-style)

Raw HR numbers are meaningless to most athletes. A single score makes training load tangible.

UTx Effort Score: 0-10 scale

Calculated from:

Factor	Weight
Time in HR Zone 4-5	High
Total duration	Medium

Workout type context	Medium
Average HR as % of max	Medium

Why it matters:

- Compare effort across different workout types

- "That felt hard" now has a number

- Coaches spot overtraining (5 sessions at 8+ in a week)

- AI coaching can reference it

Display: Big number with colour indicator (green 1-4, amber 5-7, red 8-10)

4. Workout Report Screen

Full detail view when tapping into a workout.

Header Section

- Workout type badge (2K Test / 10K Steady State / 8x500m Intervals)

- Date and time

- Squad badge if tagged

- PB indicator if applicable (prominent, celebratory)

Key Metrics - The Big Numbers

Metric	Example Display
Total Distance	**10,000m**
Total Time	**42:15.6**
Avg Split	**2:06.7** /500m
Avg Stroke Rate	**20** spm
Avg Watts	**185** W

Avg HR	**156** bpm
Max HR	**182** bpm
Effort Score	**6.4** / 10
Calories	**812** kcal

HR Analysis Section

HR Graph

- X-axis: Time

- Y-axis: Heart rate (bpm)

- Line coloured by zone throughout the piece

- Zone legend below

Zone Breakdown Table

Zone	Name	Time	% of Workout
Z1	Recovery (<60% max)	2:15	5%
Z2	Easy Aerobic (60-70%)	18:30	44%
Z3	Aerobic (70-80%)	15:45	37%
Z4	Threshold (80-90%)	4:30	11%
Z5	Max (90%+)	1:15	3%

HR Summary Stats

- Max HR: 182 bpm

- Min HR: 112 bpm

- Avg HR: 156 bpm

- Recovery rate: Time to return to Z2 after effort (if intervals)

Splits / Intervals Section

For interval workouts or if PM recorded splits:

Split	Distance	Time	Pace	Rate	Avg HR
1	500m	1:42.3	1:42.3	28	175
2	500m	1:43.1	1:43.1	27	178
3	500m	1:44.8	1:44.8	26	180
4	500m	1:41.2	1:41.2	29	183

Split Consistency Graph

Visual showing pace across splits:

- Flat line = even pacing (good)

- Descending = negative split (strong finish)

- V-shape = died in middle

- Ascending = faded

Comparison Section

If they've done this workout type before:

Metric	Today	Last Time	Change
Time	42:15	43:02	**-47s** ✓
Avg Split	2:06.7	2:09.1	**-2.4s** ✓
Avg HR	156	161	**-5 bpm** ✓
Effort Score	6.4	7.1	**-0.7** ✓

Green checkmarks and arrows for improvements.

AI Coaching Insight

Personalised, contextual feedback. See AI Coaching section below for full detail.

Displayed as a card with coach icon:

> "Solid 10K. Your HR stayed in Zone 2-3 throughout - ideal for steady state. Avg split 2 seconds faster than your last 10K with similar HR - your aerobic base is improving."

Meta Section

- **Original photo** - Thumbnail, tap to expand

- **Strava status** - "Synced ✓" or "Sync to Strava" button

- **Share** - Share card to socials / messaging

- **Edit** - Correct any OCR errors

- **Delete** - Remove workout

5. Personal Bests

Automatic PB detection across standard distances:

Category
500m
1000m
2000m
5000m
6000m
10,000m
Half marathon
Marathon
1 minute (max metres)
Custom (user-defined)

PB Notifications: When logging a workout that's a new PB, surface prominently with celebratory UI and option to share.

PB History: Show progression over time with dates and graphs.

6. Strava Export

What it does: Push workouts to Strava as "Rowing (Indoor)" activities.

Data mapped:

- Activity type: Rowing (Indoor)

- Duration

- Distance

- Calories (if available)

- Heart rate data (if available)

- Description: Auto-generated summary with key metrics

Settings:

- Auto-export toggle (all workouts sync automatically)

- Manual per-workout sync button

Technical: Standard Strava OAuth 2.0, API v3 `/activities` endpoint.

7. Leaderboards

Leaderboard Scopes:

Scope	Who's included
Global	All UTx users (opt-in)
Club	All members of your club
Squad	Your squad only
Following	People you follow

Metrics:

- Total metres (weekly / monthly / all-time)

- Best 2K time

- Best 5K time

- Best 10K time

- Consistency streak (consecutive days/weeks with workouts)

- Workouts this month

Filters:

- Age group (based on birth date)

- Weight class (Lightweight <75kg men / <61.5kg women, Heavyweight)

- Gender

All filters based on self-reported profile data.

AI Coaching

Overview

AI coaching analyses workout data in context of the athlete's history, physical profile, and training patterns. Insights are personalised, actionable, and supportive - not prescriptive.

Tone: Like a knowledgeable training partner. Supportive, evidence-based, occasionally challenging. The athlete knows their programme - UTx helps them see patterns they might miss.

Data Inputs for AI Coaching

Data Type	Used For
Current workout metrics	Immediate feedback
Workout history	Trend analysis, comparisons
Physical profile (height, weight, age, gender)	Watts/kg calculations, age-appropriate feedback
HR data and zones	Effort analysis, recovery recommendations
PB history	Progress tracking

Training frequency	Load management

Types of Coaching Insights

Post-Workout Insights (shown on Workout Report)

Pacing Analysis:

> "Your first 500m was 4 seconds faster than your average. You went out hard and faded in splits 2-3. Try starting 2 seconds slower to maintain more even pace throughout."

> "Excellent negative split - your last 500m was your fastest. Strong mental game."

Effort Context:

> "Effort Score 7.2 for a steady state piece is high. Your HR averaged 78% of max - typically steady state should be 65-72%. Consider dropping the rate by 2 to keep this aerobic."

Comparison to History:

> "This is your fastest 5K since October. Split was 3.2 seconds faster at the same average HR - clear fitness gains."

Technique Indicators:

> "Your watts are strong (210W avg) but your split is slower than expected at that power. Your drag factor of 145 is quite high - try 125-130 to better match on-water feel."

Trend Insights (shown on dashboard/weekly summary)

Training Load:

> "You've logged 5 high-intensity sessions (Effort 7+) in the last 7 days. That's more than your usual 2-3. Consider scheduling recovery work."

> "Total volume this week: 62km. That's 40% more than your 4-week average. Nice push - make sure you recover."

Progress Tracking:

> "Your 2K splits have improved by 4.1 seconds over the past 8 weeks. At this rate, you're on track to hit sub-7:00 by March."

Consistency:

> "You've trained 4+ times per week for 6 consecutive weeks. Consistency like this drives

> real improvement."

Recovery Flags:

> "Your resting HR in the first 2 minutes of today's piece was 12bpm higher than usual. This can indicate incomplete recovery. How are you feeling?"

Comparison Insights (vs squad/similar athletes)

> "Your 2K time puts you in the top 15% of female lightweights in your age group on UTx."

> "Your squad's average weekly volume is 45km. You're at 52km - putting in the extra metres."

AI Coaching Technical Approach

Model: GPT-4 or Claude via API

Prompt structure:

```
You are a rowing coach analysing workout data.

Athlete profile:
- Height: {height}
- Weight: {weight}
- Age: {age}
- Gender: {gender}
- Max HR: {max_hr}

Current workout:
{workout_data}

Recent history (last 30 days):
{history_summary}

Personal bests:
{pb_data}

Provide 1-2 specific, actionable coaching insights about this workout. Be support
```

Caching/efficiency:

- Generate insights async after workout save

- Cache insights with workout record

- Batch trend analysis weekly

Coaching Insight Display

On Workout Report:

Card with coach icon, 2-3 sentences max. Expandable for more detail if available.

On Dashboard:

Weekly summary card with trend insights. Dismissable.

Push Notifications (opt-in):

- PB celebrations

- Milestone achievements (100 workouts, 1000km total, etc.)

- Recovery nudges (if high load detected)

Technical Architecture

Mobile App

Platforms: iOS and Android

Framework: React Native (shared codebase)

Key dependencies:

- React Navigation (navigation)

- React Native Camera (photo capture)

- SQLite / WatermelonDB (offline storage)

- Firebase SDK (auth, analytics, push notifications)

- Strava SDK (OAuth, activity sync)

Backend

API: Node.js with Fastify or Python with FastAPI

Database: PostgreSQL

Auth: Firebase Auth (Phone, Apple, Google providers)

File Storage: Cloudflare R2 or AWS S3 (workout photos)

AI Services:

- Vision LLM (GPT-4V or Claude) for photo extraction

- GPT-4 or Claude for coaching insights

Infrastructure: Start simple - single server or serverless (Vercel/Railway), scale when needed.

Data Model

Users

```
id
phone_number
apple_id
google_id
name
avatar_url
height_cm
weight_kg
birth_date
gender
max_hr
strava_connected
strava_refresh_token
created_at
```

Workouts

```
id
user_id
workout_type
total_time_seconds
total_distance_metres
average_split_seconds
average_rate
average_watts
calories
avg_heart_rate
max_heart_rate
drag_factor
effort_score
intervals_json
hr_data_json
photo_url
ai_insight
is_pb
```

```
pb_category
strava_activity_id
squad_id (optional)
created_at
```

Clubs

```
id
name
location
verified
invite_code
created_at
```

Squads

```
id
club_id
name
invite_code
created_at
```

ClubMemberships

```
id
club_id
user_id
role (admin/member)
joined_at
```

SquadMemberships

```
id
squad_id
user_id
role (captain/member)
joined_at
```

Follows

```
id
follower_id
following_id
```

```
created_at
```

PersonalBests

```
id
user_id
category
time_seconds
distance_metres
achieved_at
workout_id
```

WorkoutReactions

```
id
workout_id
user_id
created_at
```

WorkoutComments

```
id
workout_id
user_id
content
created_at
```

Monetisation Strategy

Phase 1: Build Audience (Year 1)

App is completely free. Focus on user acquisition and engagement.

Goals:

- 50,000 downloads

- 10,000 MAU

- 500 active clubs

Phase 2: Partnership Revenue (Year 2+)

Partner Type	Value Proposition
Concept2	Official integration, featured app, data sharing partnership
British Rowing / USRowing / national federations	Grassroots engagement, athlete pathway visibility
Kit brands (JL, Godfrey, Boathouse)	Sponsored challenges, branded content
Nutrition brands (SiS, MyProtein)	Targeted audience of serious athletes
University programmes	Squad management tools, recruitment visibility

Partnership models:

- Sponsored challenges ("Row 100km in January - presented by [brand]")

- Premium club features (advanced analytics, coach dashboard) as B2B SaaS

- Anonymised, aggregated data insights for equipment/apparel brands

- Affiliate revenue on equipment recommendations

Future Considerations (Not MVP)

- Coach subscription tier with squad analytics dashboard

- Premium individual tier with advanced AI coaching

- Hardware partnerships if Concept2 opens API

Success Metrics

Engagement (6-month targets)

Metric	Target
DAU/MAU ratio	>25%
Workouts logged per active user per week	>2
Photo-to-save conversion rate	>90%
Strava connection rate	>40%

Users in at least one club	>60%

Growth (6-month targets)

Metric	Target
Downloads	25,000
Registered users	15,000
Monthly active users	5,000
Clubs created	200

Retention

Metric	Target
D1 retention	>50%
D7 retention	>30%
D30 retention	>20%

MVP Scope

Must Have (Launch)

- Photo capture and AI data extraction

- Training log with workout history

- Workout Report with HR analysis

- Effort Score calculation

- PB tracking and notifications

- AI coaching insights (post-workout)

- User profiles with required physical stats

- Firebase auth (Apple, Google, Phone)

- Strava export

- Clubs and Squads with roles

- Squad feed

- Basic leaderboards

Should Have (Fast Follow - Week 4-8)

- Following/followers and social feed

- Reactions and comments

- Club-wide feed (opt-in)

- Weekly trend insights from AI

- Push notifications

Could Have (V2)

- Coach dashboard with squad overview

- Advanced AI coaching (training plan suggestions)

- Apple Watch / Garmin HR sync

- Widgets for home screen

- Web app for coaches

Won't Have (Out of Scope)

- Live workout tracking

- Bluetooth erg connection

- Video analysis

- Marketplace

- Hardware

Risks & Mitigations

Risk	Likelihood	Impact	Mitigation

OCR accuracy on poor photos	High	High	Robust Vision LLM prompting, manual edit fallback, user education
Concept2 competes/blocks	Low	High	Build audience fast, explore partnership early, add value they can't replicate
Low engagement off-season	Medium	Medium	Challenges, streak features, cross-training support
Club verification becomes bottleneck	Medium	Low	Semi-automate with fuzzy matching, prioritise large clubs
AI coaching costs at scale	Medium	Medium	Cache insights, batch processing, optimise prompts

Open Questions

1. **Offline support:** Photo capture and local storage works offline. AI processing requires connection. Acceptable?

2. **Photo retention:** Keep original photos for 30 days, user can choose to save permanently. Or keep all forever?

3. **Multi-language:** English MVP, add languages based on user geography data?

4. **HR strap integration:** MVP relies on PM5 displaying HR. Future: direct Garmin/Polar/Wahoo sync?

5. **Age restrictions:** 13+ minimum per app store requirements?

Next Steps

1. **Validate AI accuracy:** Test Vision LLM on 50+ diverse erg screen photos, measure extraction accuracy

2. **Design:** Wireframes for onboarding, feed, workout report

3. **Tech spike:** React Native setup, camera integration, Firebase auth

4. **Branding:** UTx visual identity (logo, colours, typography)

5. **Club seeding:** Get list of major rowing clubs for verification reference

6. **Build MVP:** 8-10 week development cycle

UTx – Every metre counts.