Business Plan — LifeLine Sentinel

1) Executive summary

LifeLine Sentinel is an AI safety & performance coach for extreme-sports athletes (ultramarathons, expeditions, ski mountaineering, rally raid). It fuses wearables (HR/HRV, temp, SpO_2) and IMU/baro with **Galileo/EGNOS GNSS** and **satellite fallback** to deliver early warnings for heat stress, overexertion, and falls—**off-grid, in real time**. Crews and organizers see a live map with **Risk Scores (0–100)**, integrity flags, and recommended actions.

- **Business model:** Hybrid **hardware (€199 tracker) + subscription (€20/mo)**.

- **Why now:** Dual-frequency GNSS handsets, Copernicus data access, and affordable satellite IoT enable safety-grade off-grid telemetry without bulky gear.

- **Secret sauce:** Safety-grade UX + space-augmented context (EGNOS integrity, Copernicus DEM/atmosphere) + privacy-by-design on-device inference.

2) Problem

Remote endurance events face **poor coverage, heat, altitude, and sleep deprivation**. Crews lack continuous vitals and integrity-aware positioning; athletes miss subtle physiological warnings until it's too late. Existing wearables don't personalize risk or work reliably beyond cellular coverage.

3) Solution

- **Athlete app (edge AI):** Computes a personalized **Risk Score** from HR/HRV, skin temp, SpO_2, motion, and terrain/ambient context. Uses Galileo/EGNOS; dual-frequency when available.

- **Connectivity:** Cellular primary; **satellite "burst mode" (60–120 s)** when off-grid.

- **Dashboard:** Live positions, risk state & trend, alert queue with **actionable tips** (cooling, hydration, pacing), course elevation and heat overlays.

- **Privacy-by-design:** On-device inference by default; minimal data uplink (risk + last fix).

4) Product & architecture (MVP → V1)

Mobile (athlete)

- Inputs: BLE HR/HRV/SpO_2/skin temp; phone IMU/baro; raw/fused GNSS

- Models (30 s windows): heat stress, overexertion, fall/SOS; fusion with hysteresis

- GNSS: prioritize Galileo; validate EGNOS integrity in Europe

- Uplink: HTTPS/WebSocket; satellite SBD-class bursts when offline

- UX: one-tap start; **Green/Amber/Red**; manual SOS; "satellite mode" toggle

Backend (lean)

- Ingest + session store (rolling 60–120 min)

- Integrity validation (EGNOS), DEM enrichment (COP-DEM GLO-30), GPX route join

- Eventing: crew/organizer alerts + audit trail

Dashboard (web)

- Map with accuracy/age badges

- Risk timeline & last alert reason

- Elevation profile; preloaded heat overlays

- Team & event admin; export incident report

5) Space components

- **Galileo + EGNOS:** accuracy + integrity message for reliability in Europe

- **Copernicus:** COP-DEM GLO-30 (grade/elevation), atmosphere/temperature (CAMS/C3S) for planning and post-race analytics

- **Satellite IoT:** SBD-class bursts for off-grid alerting (low duty cycle)

6) Target customers & value

- **Athletes:** personalized coaching, automatic fall/SOS

- **Crews:** live Risk Score, last alert, action tips

- **Organizers/medics:** situational awareness, faster triage, incident heat map

- **Insurers/venues:** documented risk mitigation, safety posture

7) Go-to-market

1. **Hackathon demo → pilots** with 2 trail clubs (free hardware, paid subs after trial)

2. **Event organizers** (per-athlete fee) + **team/crew packs**

3. Partnerships: satellite provider, handset OEMs, race series, insurers

4. Community flywheel: live event maps and highlights shared on social

8) Business model & pricing

- **Hardware:** €199 tracker (target COGS falling from €181 → €167 with scale)

- **Subscription:** €20/mo list; **€6/mo satellite pass-through → €14/mo gross**

- Bundles: team packs (5–20 seats), event day-passes, seasonal plans

- Optional rentals via organizers to reduce upfront friction

9) Regulatory, security, ethics

- **Not a medical device**; advisory only; conservative thresholds + hysteresis

- Consent & opt-in sharing; on-device inference; minimal data retention

- Security: signed payloads, TLS everywhere, least-privilege services

10) Competitive landscape (abridged)

- **Garmin / COROS / Polar:** strong wearables, limited off-grid crew-facing risk coaching and satellite fallback integration at event scale

- **Spot / inReach:** great SOS & messaging; limited vitals-driven coaching

- **Race platforms:** event logistics, not physiological risk fusion
Our edge: integrated vitals-+-GNSS risk engine, EGNOS integrity, Copernicus context, and safety-grade UX for crews.

11) Financial plan (5-year) — based on your inputs

Key inputs

- **Units sold (trackers):** 600, 1,500, 4,000, 15,000, 50,000

- **Subscription users:** 720, 1,800, 4,800, 18,000, 60,000

- **Months billed:** 10, 11, 11, 12, 12

- **Tracker price / cost:** €199; COGS €181 → €167 over 5 years

- **Subscription price / sat cost:** €20/mo; €6/mo pass-through sat cost

P&L summary (all figures €)

Note: Rows labeled below reflect **gross profit** contributions (hardware & subscription **after** satellite pass-through), per your table.

Metric	Y1	Y2	Y3	Y4	Y5
Hardware gross profit	10,800	32,430	100,960	432,900	1,624,000
Subscription gross profit (after sat cost)	100,800	264,600	739,200	2,898,000	9,660,000
Total gross profit	**111,600**	**297,030**	**840,160**	**3,330,900**	**11,284,000**
Operating expenses (salaries, overheads, cloud, mktg, other)	205,000	215,250	235,750	276,750	328,000
EBIT	**–93,400**	**81,780**	**604,410**	**3,054,150**	**10,956,000**

Observations

- Break-even **Year 2** (EBIT €81.8k).

- EBIT scales with subscription base; hardware acts as paid acquisition and margin kicker as COGS improves.

- OPEX is intentionally lean for the first 24 months.

12) Risks & mitigations

- **Sensor variability / bad data:** multi-device support; robust baselines; confidence flags; "data quality" score in UI.

- **Multipath & canopy:** dual-frequency readiness, map-matching, EGNOS integrity gating for medical alerts.

- **Connectivity cost:** satellite only in exception mode; burst compression; adaptive cadence.

- **Perception/regulatory:** clear **non-medical** positioning; external medical advisory review.