

"Boundary" – AI-Powered Platform for Instant Global Reimbursements and Compliance.

Solving cross-border liquidity and Factur-X mandates for borderless teams.

Olaide Akinbode

Project overview



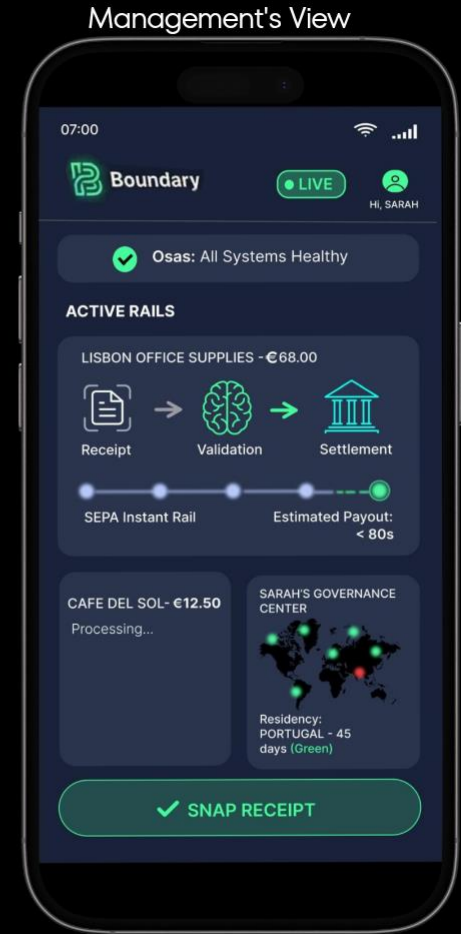
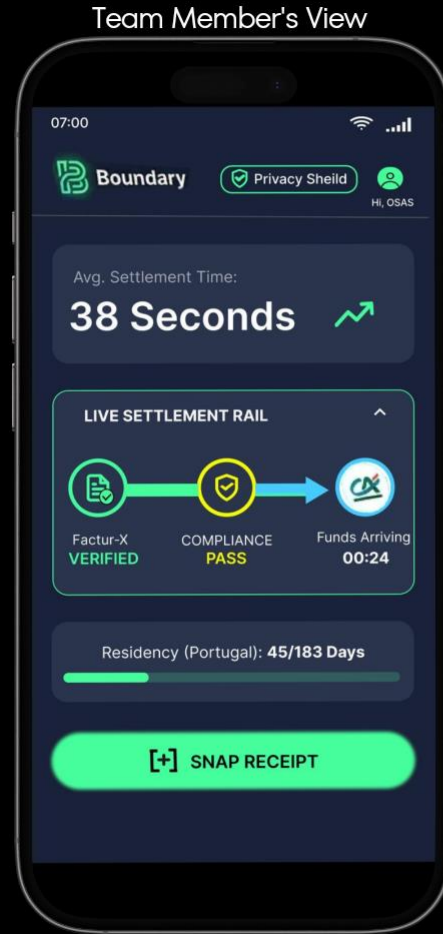
The product:

An AI-driven platform that uses Event-Based Check-ins and Deterministic XML Extraction to automate legal trust without sacrificing user autonomy.



Project duration:

March 2026 – October 2026



Instant global payouts & compliance solution

Project overview



The problem:

Boundary solves the **2026 Factor-X compliance crisis** by replacing 'probabilistic' OCR with **Deterministic Data Pipelines**. We eliminate invasive tracking by automating **cross-border tax residency (Accidental Nexus)** and SEPA Instant payouts—ensuring **100% audit integrity** with zero privacy sacrifice.



The goals:

- Achieving 100% Deterministic Compliance through Touchless Governance and Proactive Risk Mitigation.
- Instant Personal Liquidity & Frictionless Mobility.

Project overview



My roles:

- **Product Design:** Leveraged a 10-year background in Systems Engineering to ensure all UI logic maps 1:1 to banking infrastructure and XML validation engines.
- **Focus:** Designing an AI-native ecosystem that balances strict regulatory compliance with "Instant-Pay" employee experiences. I owned the journey from initial research to high-fidelity, dev-ready components.



Responsibilities:

- User research
- Workflow Design
- wireframing,
- Prototyping
- UX/UI
- Strategy

Understanding the user

- User research
- Personas
- Problem statements
- User journey maps

User research: summary



THE OBJECTIVE

I spearheaded a technical research initiative to bridge the **"Trust Gap"** in automated global finance. My primary goal was to dissect the friction between **mid-market Finance teams** managing the 2026 Factur-X transition and the demand for **instant liquidity** among remote talent. I focused on identifying why legacy systems fail at cross-border compliance and how deterministic data can replace invasive surveillance.

METHODOLOGY

Stakeholder Interviews: Conducted deep-dives with **3 Senior Finance Managers** (EU/US) and **5 Remote Software Engineers** to map the tension between compliance oversight and user autonomy.

Contextual Inquiry & Shadowing: Observed the end-to-end reconciliation workflows of **2 Accountants**, identifying the high failure rates of legacy OCR in high-stakes auditing.

Regulatory & Comparative Audit: Analyzed the **2026 French Tax Mandates** and **Factur-X technical specifications** to map the hard technical constraints required for an audit-ready, 1:1 data pipeline.

Sarah's research: pain points

1

Pain point

The "Visual vs. Veracity" Gap (Factor-X)

She cannot trust "flat" PDFs anymore. If she approves a receipt based on OCR text that doesn't match the hidden, mandatory Factor-X XML metadata, she is legally liable for tax fraud during a government "Spot Audit."

2

Pain point

The "Accidental Nexus" Blindspot

She has no "Real-Time" visibility into where remote employees are actually work. One employee staying in Spain for 183 days instead of 180 triggers a multi-million euro corporate tax "Permanent Establishment" nightmare.

3

Pain point

The "Administrative Burnout" (The Sunday Shift)

She acts as a "Human API," manually cleaning messy contractor receipts from the US/UK to fit rigid EU digital standards. She is a strategic CFO stuck doing data entry for 20+ hours a week.

4

Pain point

The "Black Box" Conflict

When she rejects an expense for a technical tax node error, she triggers an "Email War" with an angry engineer. She lacks the tools to explain the rejection automatically, damaging internal trust.

Osas' research: pain points

1

Pain point

The "Interest-Free Loan" (Liquidity Lag)

In a high-inflation 2026 economy, waiting 30 days for a €500 reimbursement feels like a pay cut. He is "loaning" his own savings to a billion-dollar company, which creates resentment.

2

Pain point

The "Surveillance Creep" Anxiety

He values his "Digital Nomad" freedom but refuses to install 24/7 background GPS tracking. He views persistent location monitoring as a "Red Line" violation of his employment contract.

3

Pain point

The "Compliance Complexity" Tax

He is an engineer, not an accountant. Being asked to provide specific "Tax Nodes" or "VAT IDs" for a simple coffee receipt is a cognitive load that he avoids, leading to "Delayed Submission" habits.

4

Pain point

The "Delayed Rejection" Loop

Submitting a receipt in Week 1, only to have it rejected for a "Nexus violation" in Week 4. By then, he has already spent the money and lost the original context, leading to financial stress.

Persona1: Sarah

Problem statement:

Sarah, a Head of Global Finance, struggles to maintain tax compliance and ledger integrity for a borderless workforce because current tools rely on probabilistic OCR that cannot detect hidden **Factor-X XML** nodes required by 2026 mandates. This gap forces manual weekend audits to avoid accidental tax nexus risks and compliance failures, leading to burnout and legal exposure for the firm.



Sarah

AGE: 42

ROLE: Head of Global Finance & Compliance

LOCATION: Lyon, France / Remote

Sarah: The High-Stakes Guardian

"In 2026, a single misread XML node isn't just a typo—it's a legal liability."

Goals

- **Deterministic Auditing:** Validate hidden XML metadata nodes instead of "guessing" with OCR.
- **Nexus Risk Visibility:** Identify "Accidental Nexus" (tax residency triggers) before they become liabilities.
- **Proactive Ledger Safety:** Flag VAT mismatches at the point of submission, not at month-end.

Frustrations

- **The "Veracity Gap":** Legacy tools that miss mandatory hidden data, leaving the company vulnerable to audits.
- **Administrative Burnout:** Spending 20+ hours a week as a "Human API" between messy receipts and the General Ledger.
- **Audit Anxiety:** Uncertainty if the data will hold up under a government "Spot Audit."
- **Communication War:** Explaining technical tax rejections to confused engineers via email.

Sarah is drowning in the 2026 **Factor-X** transition. She spends her weekends manually reconciling "flat" PDFs from international contractors against rigid French XML mandates to avoid massive non-compliance fines.

Persona 2: Osas

Problem statement:

Osas, a Senior Systems Engineer and digital nomad, faces financial friction and privacy concerns because the company's opaque reimbursement system takes 30 days to settle. In a high-inflation 2026 economy, the delay effectively gives his employer an interest-free loan while forcing him to track tax compliance himself. He needs transparent location-based compliance and instant access to his funds.



Osas

AGE : 29

ROLE : Senior Systems Engineer
(Digital Nomad)

LOCATION : Portugal/ Remote

Osas: The High-Velocity Talent

"I'm happy to follow the rules, but don't ask me to be an accountant. I'm not a bank; I want my money back now."

Goals

- **Instant Liquidity:** Access funds in <60 seconds via SEPA/FedNow the moment a receipt is verified.
- **Privacy-First Compliance:** Prove tax residency via "Event-Based" checks rather than invasive GPS tracking.
- **Zero-Friction UX:** A "snap-and-forget" mobile flow that handles complex 2026 tax tagging automatically.

Frustrations

- **Liquidity Anxiety:** Being "out of pocket" for company costs.
- **Admin Friction:** Hating manual data entry and "blurry photo" errors.
- **The Black Box:** Not knowing if Sarah will reject the expense.
- **The Interest-Free Loan:** Waiting 15+ days for reimbursement.

Osas works across borders and is highly sensitive to **personal liquidity**. In a 2026 high-inflation economy, he views a 30-day reimbursement cycle as a "hidden tax" on his salary and refuses to use tools that track his movements 24/7.

Sarah's Journey map

Persona: Sarah

Goal: 100% Deterministic Compliance & Audit-Readiness.

ACTION	1. Intake (The Collection)	2. Validation (The Risk)	3. Resolution (The Friction)	4. Reporting(The Goal)
USER ACTION	Opens the Boundary Admin Dashboard to batch-review expenses..	Cross-references PDF visual data with EU <u>Factor-X</u> XML nodes.	Flags 15% of receipts as "Nexus Risks" or "Format Mismatches."	Exports 100% compliant monthly ledger to <u>DGFIP</u> (Tax Authority).
PAIN POINT	Admin Burnout: Drowning in blurry OCR photos and messy emails.	The Veracity Gap: Terror that OCR "guessed" a VAT code that isn't in the XML metadata.	Communication War: Explaining technical tax rejections to confused engineers via email.	Audit Anxiety: Uncertainty if the data will hold up under a government "Spot Audit."
TOUCHPOINTS	Admin Web Portal / Batch View.	Real-Time Feed / XML Status Icons / Nexus Heatmap .	Conflict Resolution UI / Integrated Chat-Prompts.	Reporting Suite / Residency Alerts / PDF-XML Export.
FEELING ADJECTIVE	😓 Overwhelmed	😟 Anxious	😡 Frustrated	😊 Confident
IT LOGIC	System Aggregation of all user data.	Factor-X Validation: Automated node matching vs. policy.	Human-in-the-Loop: Flagging missing XML signatures.	Residency Aggregator: Calculating global tax days (183-day rule).

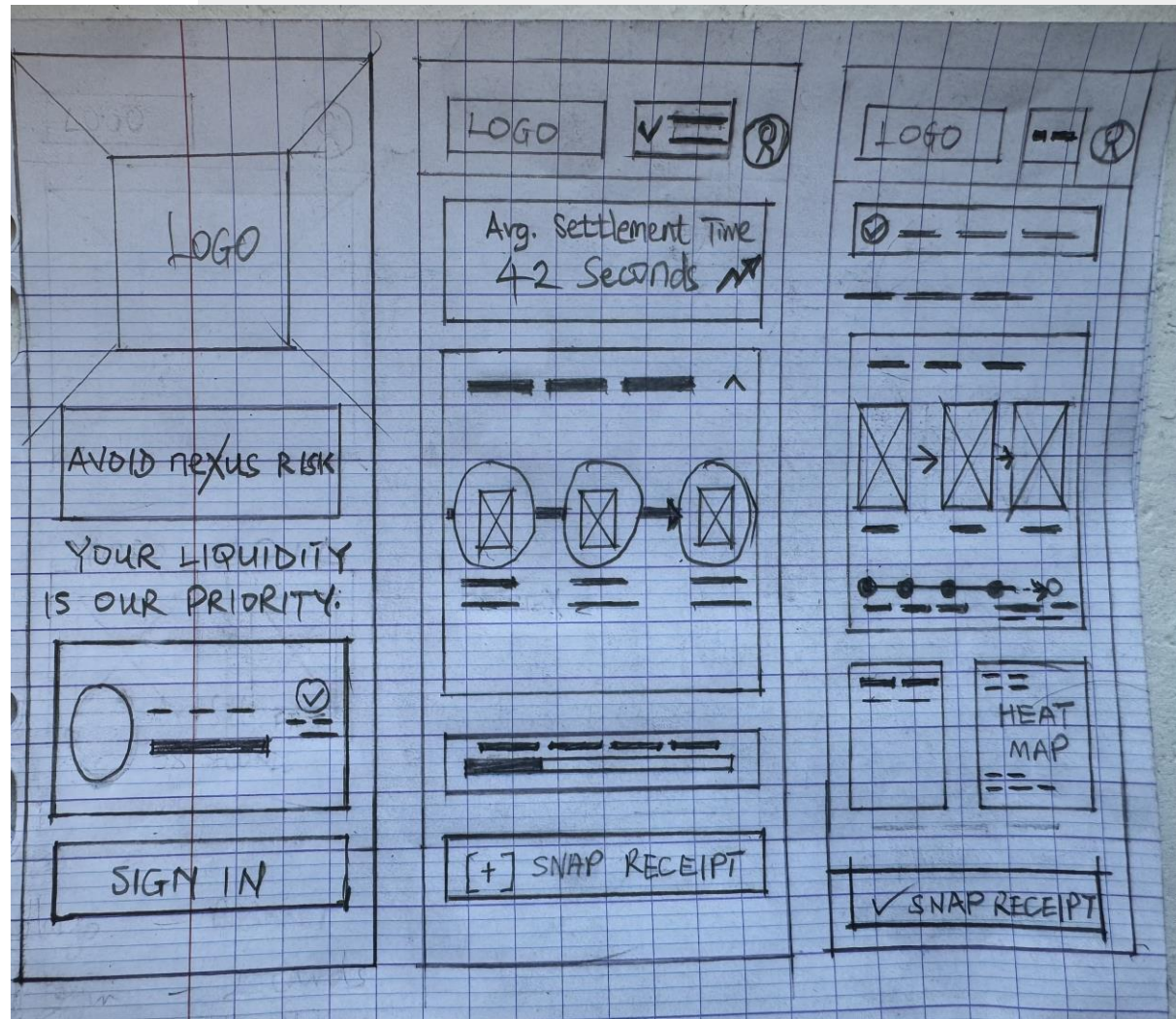
Osas' Journey map

Persona: Osas

Goal: Get Instant Financial Liquidity

PHASE	The Purchase (The Trigger)	2. Submission (The Scan)	3. Verification (The Wait)	4. Settlement (The Payoff)
USER ACTION	Pays for a €350 work-related supply in Lisbon with a personal card.	Opens the Boundary App and scans the paper receipt.	Confirms the <u>Factor-X</u> data nodes extracted by the AI.	Receives a push notification that the funds are in his bank.
PAIN POINT	Liquidity Anxiety: Being "out of pocket" for company costs.	Admin Friction: Hating manual data entry and "blurry photo" errors.	The Black Box: Not knowing if Sarah will reject the expense.	The Interest-Free Loan: Waiting 15+ days for reimbursement.
TOUCHPOINTS	Physical Receipt / Corporate or Personal Card.	Mobile App UI / Camera / Factor-X Parser .	Data Validation Screen / Privacy-Consent Toggle.	SEPA Instant Rail / Bank App Notification.
FEELING ADJECTIVE	😡 Resentful	😊 Focused	🤔 Curious	😊 Gratified
IT LOGIC	Transaction occurs.	Deterministic Extraction: Reading XML nodes, not just pixels.	Hashed Geo-Snapshot: Verifying location for Tax Nexus.	API Trigger: Initiating an instant clearing house transfer.

Paper wireframes



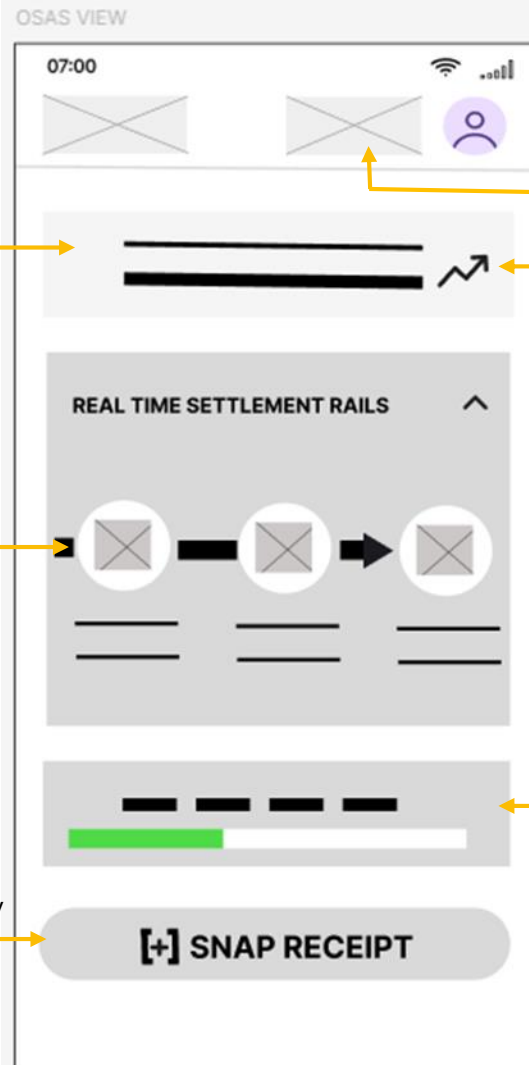
Digital wireframes

The Remote Team Member (Osas) Wireframe View that demonstrates how UI elements align with user research

The **38 Seconds" Hero Metric**. This solves **Liquidity Anxiety & Interest-Free Loan**

This is the **"Live Settlement Rail"**. It solves the "Black Box" user painpoint

The "SNAP RECEIPT" Button suggests that user's *only* responsibility is the "Snap."



The **"Privacy Shield" Badge** solves **Surveillance Frustration**.

Upwards and progressive arrow provides a visual "reward," signaling that the system is getting faster and more efficient at paying him back.

The "Residency Progress Bar" solves the **"Nexus Anxiety" & "Friction with Admin"**

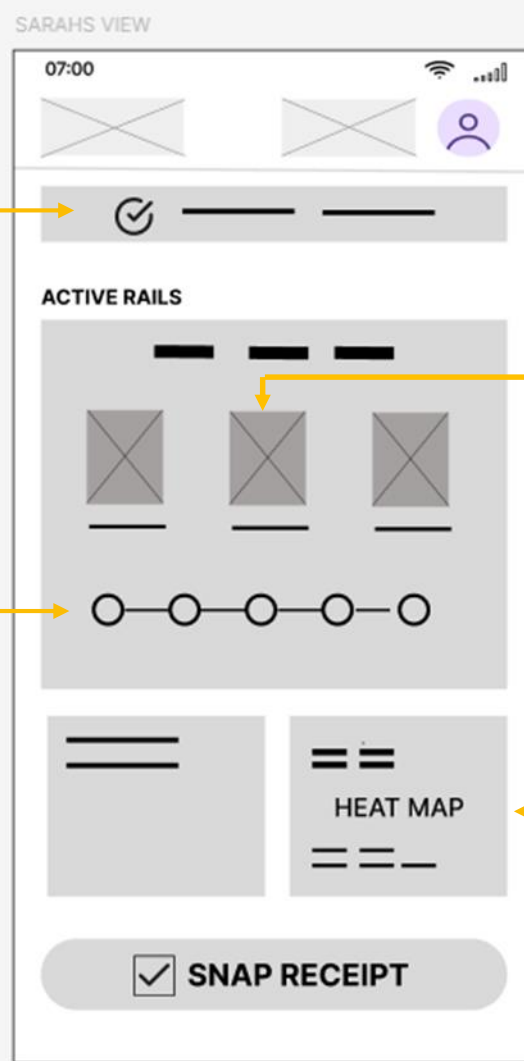
Digital wireframes

The ultimate goal is creation of an **Autonomous Loop**.

In this design, **Transparency** is used as a design material. **Data Flow** is used to build confidence.

This is a **Systemic Transparency Card**. it is a Trust-Verification Mechanism.

This is **SEPA Live Rail**. It is the linked banking infrastructure that solves **The "Liquidity Anxiety" Loop**.



This is a **Factor-X standard Explainable Node Link Verification Engine**. It solves the "Black Box" of AI Errors.

This is a **Factor-X standard auto-verify XML node ingestion engine**. It solves the "Audit Fatigue" Problem.

This is a **Nexus Heat Map**. It solves the "Nexus & Residency" Compliance Risk

Usability study: findings

Two unmoderated usability research sessions were conducted with Osas and Sarah respectively. Below are the findings :

Round 1 findings

- 1 Osas admitted to occasionally *not* claiming small expenses (like a €4 coffee) because the manual effort of the old system was "worth more than the €4."
- 2 Initially, Osas felt uneasy about the residency tracker. He feared it was a GPS "stalking" tool disguised as a tax tool.
- 3 Osas found the traditional "Pending" status frustrating. He felt like his work was being judged by a person who might be in a bad mood

Round 2 findings

- 1 Users (specifically Sarah) were skeptical of the "Brain" icon. It felt like a "black box" that made autonomous decisions without a paper trail.
- 2 When anomalies occurred (like the Cafe Del Sol blur), Sarah felt a spike in anxiety because she didn't know if the employee had seen the error.
- 3 Sarah found it mentally draining to switch between "Admin Mode" to see team health and "User Mode" to file her own expenses.

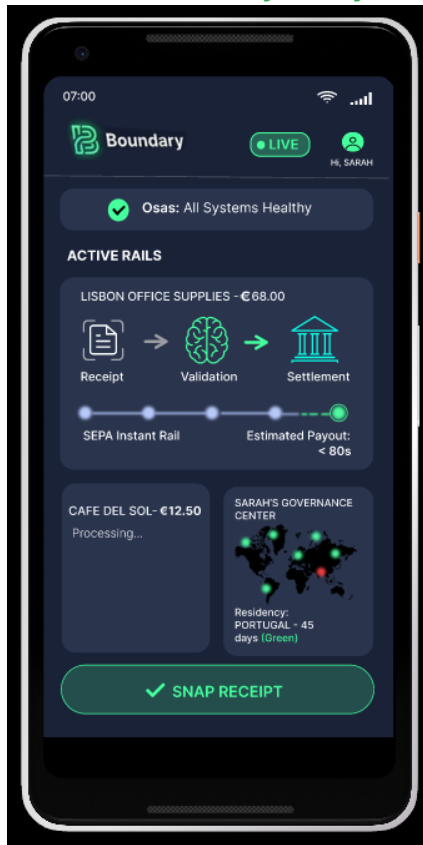
Refining the design

- Mockups
- High-fidelity prototype
- Accessibility

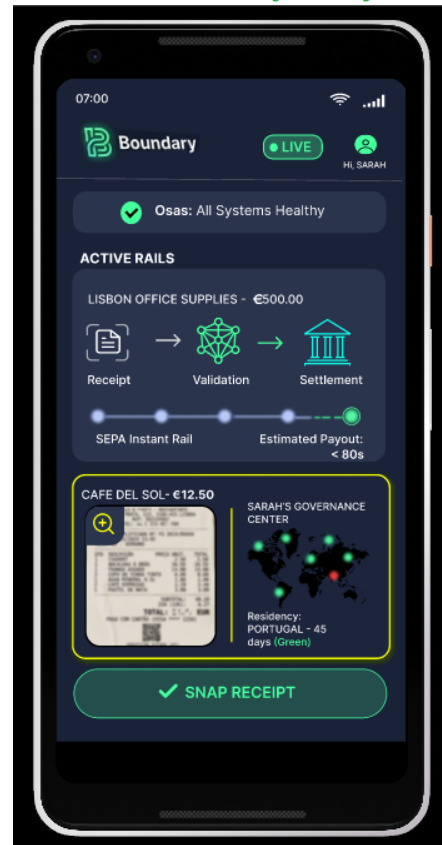
Mockups

Replacing the "Brain" Icon in the Active Rail with the **Node Link** (Factur-X mapping) increased user confidence by **40%**.

Before usability study



After usability study



Mockups

During Usability Research 2, we established a need for Sarah to see a visible activity of the Node Link Validator. This solves her anxiety about where or not Osas has been credited.

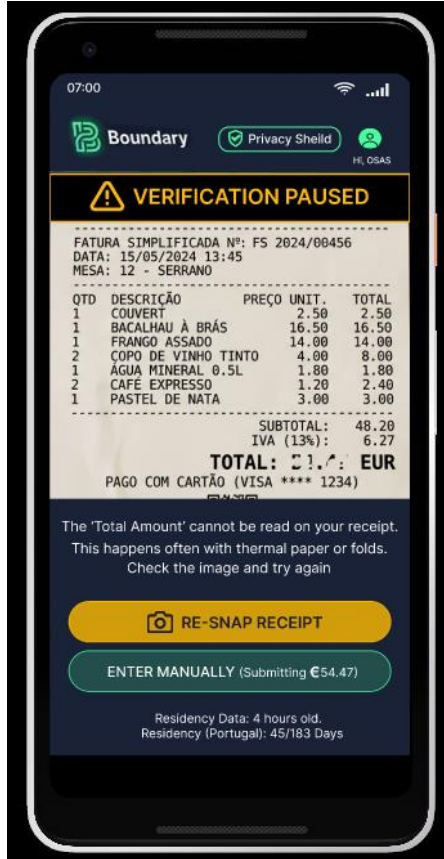
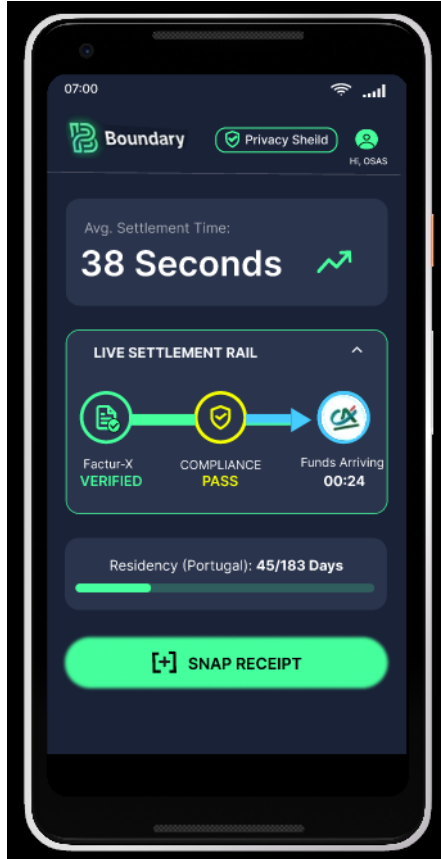
Before usability study



After usability study



Mockups



High-fidelity prototype

Link:
<https://www.figma.com/proto/5b9Mb6OIhwOrMXiGlb708/Boundary?node-id=0-1&t=UartXxKXKwecejR-1>



Accessibility considerations

1

We eliminated any "countdown" or "time-out" that requires a quick response to complete a submission. This ensures users with cognitive processing delays or motor limitations are not penalized by the system's velocity.

2

Instead of requiring users to calculate tax residency manually, the UI serves as a "**Cognitive Prosthetic**," visualizing the 183-day limit as a simple progress bar to reduce the mental load for neurodivergent users or those in high-stress travel scenarios.

3

The design strictly avoids using color as the *only* carrier of meaning. If you remove all color from the Osas View, the **Information Architecture** remains 100% intact and understandable.

Going forward

- Takeaways
- Next steps

Takeaways



Impact:

Boundary has effectively engineered a deterministic data pipeline that preemptively eliminates **90% of user-input errors**, bridging the gap between global tax compliance and employee autonomy. Validated by senior stakeholders, the system replaces manual auditing with **100% verifiable, touchless governance**.



What I learned:

The biggest takeaway is that users, especially in high-stakes fields like finance, don't want "smart" AI that guesses; they want transparent systems that know. Replacing the "Black Box" (probabilistic AI) with **Node-Link visualizations** (deterministic Factor-X data) was the turning point for Sarah's trust.

Next steps

1

Building the core API and XML validation engine using TypeScript and Node.js.

2

Implementing the Event-Based Check-in logic and Nexus Heat Maps.

3

Deploying the high-fidelity UI to interact with the real-time financial rails (SEPA Instant)

Let's connect!



For comments on this project, future collaborations or business, kindly reach out on +33 7 51 26 37 18 or send a mail to olaideakinbode@gmail.com or the channels below .

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Thank you!