



sOS Research Lab 2026-07-01 · Barcelona

WP11 – Execution Roadmap & Budget

Series	sOS Execution
Status	Revised Draft – Anthropic Sonnet 4.6 review applied (Minimal Mode)
Date	2026-06-28
Priority	High – Phase 2
Review Mode	Minimal (Draft → Anthropic Sonnet review → Revisions → Steward)
Grounded in	WP8 (Technical Architecture), WP9 (Legal & Compliance), WP10 (Tokenomics), WP14 (Sandbox Design), Master Execution Backlog (08), Phase Budget Scenarios (04/04a), Executive Budget Summary (07), Joan's Q1–Q15 scope answers
Synthesizes	AD-SOS-12, AD-SOS-13, AD-SOS-14, AD-SOS-15, AD-01–22, AD-39–43
Redundant validation with S ²	(thesis §14.3.2) is sOS's most novel governance primitive: instead of token-weighted voting, multiple qualified validators (matched by label compatibility) independently score proposals. The machine domain computes variance to detect consensus – if S ² exceeds threshold, more validators are summoned. This replaces plutocracy with epistemic quality.

Abstract

This working paper presents the unified execution roadmap and budget for sOS Research Lab. It consolidates the technical architecture (WP8), legal framework (WP9), tokenomics (WP10), sandbox experimental protocol (WP14), master execution backlog, and phase budget scenarios into a single, actionable plan with phases, gates, dependencies, resource allocation, and decision points. The roadmap covers 36 months across five phases: Foundation (P0), Sandbox Preparation (P1), Sandbox Execution (P2), Architecture Expansion (P3), and Full Platform (P4). The primary scenario targets two milestones: (1) a functional technical prototype (UILL + smart contract test suite + Social Machine v0) at month 9, and (2) an experimentally validated system with 1,000 DAO members at month 27, at a total cost of €790K–€1,395K (P0–P2). The combined P0–P3 arc covers 36 months at €1.2M–€1.8M. Every phase includes explicit go/no-go gates, risk triggers, and pre-registered decision points.

All workstreams serve the thesis's core operational model: a **six-function decentralized bureaucracy** (thesis §14.3):

Propose	Task.sol	Individual proposes task with labels	W1.1 Smart Contracts
Validate	Labels.sol	Multiple humans score 0-10; machine computes S ² variance	W1.1 + W1.3 Social Machine
Delegate	Delegate.sol	Transfer governance power by label category	W1.1 + W2.4 DAO
Execute	Execute.sol	Execute with on-chain evidence	W1.1 + W2.4
Save/Compute	Save.sol / Compute.sol	Peer-provided storage/compute	W3.1 Infrastructure
Finance	TokenAllocation.sol	Automatic token allocation per validated contribution	W3.2 Tokenomics

Redundant validation with S² (thesis §14.3.2) is sOS's most novel governance primitive: instead of token-weighted voting, multiple qualified validators (matched by label compatibility) independently score proposals. The machine domain computes variance to detect consensus – if S² exceeds threshold, more validators are summoned. This replaces plutocracy with epistemic quality.

1. Executive Summary

1.1 What This Roadmap Delivers

sOS is not a product launch. It is a scientific research program that builds governance infrastructure through controlled experimentation. This roadmap defines:

- **What** gets built, in what order, and why that order.
- **Who** builds it – team composition, roles, and hiring sequence.
- **When** – two key milestones: functional prototype at month 9, validated system at month 27, full 36-month arc to P3 completion.
- **How much** – budget allocation per phase, per workstream, per scenario.
- **What decides continuation** – go/no-go criteria at every phase boundary.

1.2 The Core Logic: Build, Test, Prove, Scale

sOS advances through five phases, each with explicit go/no-go gates and evidence requirements:

P0: Foundation	Legal entity, team, infrastructure	Entity registered, team ≥ 3 , UB agreement signed
P1: Sandbox Prep	Architecture, contracts, ethics, recruitment	Smart contracts designed, ethics approved, 50 participants recruited
P2: Sandbox Execute	18-month experiment, data collection, evaluation	H1 confirmed or revised, publishable evidence
P3: Architecture Expand	Mainnet, scale UILL, autonomous Social Machine	Audit passed, 5,000 members, sustainable economics
P4: Full Platform	Multi-city, institutional adoption, self-sustaining	All prior gates passed, external funding secured

Every phase tests a specific hypothesis. Every gate requires evidence. Nothing proceeds without verification.

1.3 Three Scenarios

Duration	6–9 months	12–18 months	24–36 months
DAO members	20–50	1,000	5,000+
DLT	Design only	Testnet, audited	Mainnet L2
Social Machine	RAG + metrics	Metrics + recommendations	Autonomous functions
Total (low)	€303K	€790K	€1,268K
Total (high)	€452K	€1,395K	€2,250K

The primary recommendation is the Realistic MVP: it produces publishable scientific evidence, a functional technical prototype, and a governance community large enough to test the core coordination hypothesis.

2. Phase 0: Foundation (Months 1–3)

Goal: Legal entity active, core team assembled, infrastructure initialized, ethics framework drafted.

Gate at month 3: Association registered, UB agreement signed, ethics framework drafted, bank account open, ≥ 3 core team members contracted. **Go/no-go.**

2.1 Workstreams

W0.1 – LEGAL ENTITY (0.9 PM)

Draft association statutes (ES)	C3 Legal Counsel	0.3
Notary appointment + deed signing	P1 Research Lead	0.1
Register association (Catalonia registry)	C3 Legal Counsel	0.2
Obtain NIF (tax ID)	C3 Legal Counsel	0.1
Open association bank account	P1 Research Lead	0.1
Register trademark (OEPM)	C3 Legal Counsel	0.1

W0.2 – UNIVERSITY & SPACE (0.7 PM)

Formalize UB agreement (space, affiliation)	P1 Research Lead	0.3
Secure supplementary coworking space	P1 Research Lead	0.2
Set up insurance (liability + cyber)	P1 Research Lead	0.2

W0.3 – GOVERNANCE & ETHICS (2.2 PM)

Draft Scientific Board charter	P1 Research Lead	0.5
Recruit initial Scientific Board (3–5 members)	P1 Research Lead	0.5
Draft Founding Council charter	P1 Research Lead	0.3
Draft ethics framework (UB-aligned)	P1 Research Lead	0.5
Submit ethics review	P1 Research Lead	0.2
Establish decision log + operating procedures	P1 + Pi	0.2

W0.4 – TEAM RECRUITMENT (2.9 PM)

P2 (Sr Full-Stack Eng): JD + publish + screen + interview + contract	P1 Research Lead	1.1
P3 (AI/ML + Data Eng): JD + publish + screen + interview + contract	P1 Research Lead	1.1
P4 (Governance Researcher): JD + publish + screen + interview + contract	P1 Research Lead	1.1
Engage C3 Legal Counsel (retainer)	P1 Research Lead	0.1
Engage C2 UX/UI Designer (contract)	P1 Research Lead	0.1

Hiring sequence: P2 first (infrastructure dependency), then P3 and P4 in parallel. C3 and C2 engaged as needed.

W0.5 – INFRASTRUCTURE & TOOLS (1.5 PM)

Set up GitHub organization + repositories	P2	0.2
Configure CI/CD (GitHub Actions)	P2	0.2
Set up cloud account (Hetzner/OVH)	P2	0.2
Apply for cloud startup credits	P2	0.1
Set up monitoring + logging	P2	0.2
Set up secrets management	P2	0.1
Set up internal docs/wiki	P2	0.1
Set up Pi control plane for task orchestration	P1	0.2
Configure domain + DNS	P2	0.1
Set up email + Email Steward agent	P1	0.1

W0.6 – ACCOUNTING & PROCUREMENT (0.4 PM)

Engage gestoría/accounting (monthly retainer)	P1	0.1
Set up procurement process + approval workflow	P1	0.1
Create budget tracking sheet (Pi-managed)	P1 + Pi	0.1
Open vendor accounts (domain, cloud, tools)	P2	0.1

W0.7 – RISK REGISTER INIT (0.4 PM)

Review + customize risk register	P1	0.2
Assign risk owners for all critical risks	P1	0.1
Set up monthly risk review cadence	P1 + Pi	0.1

2.2 PO Budget

Personnel (P1 + hiring costs)	€25,000	€35,000
Legal (statutes, notary, registration, trademark)	€6,000	€10,000
UB/coworking deposit + setup	€3,000	€8,000
Insurance (annual)	€2,000	€5,000
Infrastructure (domain, cloud credits, tools)	€1,000	€3,000
Accounting (setup + 3mo retainer)	€1,500	€3,000
PO total	€38,500	€64,000

2.3 PO Go/No-Go Gate

Association registered	Yes
NIF obtained	Yes
Bank account open	Yes
UB agreement signed	Yes
Ethics framework drafted	Yes
Core team ≥ 3 contracted	Yes (P2 minimum)
Scientific Board ≥ 3 committed	Yes
Trademark filed	Yes
GitHub org + CI/CD operational	Yes

If gate fails: pause, resolve blockers, re-evaluate at month 4. Do not proceed to P1 without registered entity, bank account, and minimum team.

3. Phase 1: Sandbox Preparation (Months 4–9)

Goal: All components designed, validated, and ready for experimental deployment. Participants recruited. Ethics approved.

Gate at month 9: Smart contracts designed with test suite, ethics approved, 50 participants recruited, UILL prototype deployed, sandbox infrastructure operational. **Go/no-go.**

3.1 Workstreams

W1.1 – SMART CONTRACT DESIGN & TESTING (WP8 §3–§5)

Design Identity contracts (UILL binding, key recovery)	C1 Blockchain Dev	P0 complete	0.8
Design Governance contracts (proposal, vote, delegate)	C1 Blockchain Dev	Identity contracts	1.0
Design Token contract (non-transferable SBT)	C1 Blockchain Dev	Governance contracts	0.5
Design Validation contracts (PoY, redundancy, quorum)	C1 Blockchain Dev	–	0.8
Design Finance contracts (treasury, allocation)	C1 Blockchain Dev	Token contract	0.5
Implement full test suite (unit + integration + scenario)	C1 + P2	All contracts designed	1.0
Internal security review	C1 + P2	Test suite passing	0.3
Subtotal			4.9
			PM

Technical decisions to finalize before coding:

- Blockchain platform (Ethereum L2 vs. alternative L1 – Optimism/Arbitrum as default)
- Smart contract language (Solidity as default)
- Identity binding mechanism (ERC-725/735 vs. custom)
- Key recovery protocol (social recovery vs. institutional vs. hybrid)

W1.2 – UILL PROTOTYPE (WP8 §4)

Deploy Solid Community Server (CSS) instance	P2	P0 complete	0.5
Configure pod provisioning (automated per participant)	P2	CSS deployed	0.3
Implement consent dashboard (grant/revoke/audit)	P2 + C2 UX	CSS deployed	1.0
Implement data schema for streetlight domain	P2 + P3	Consent dashboard	0.5
Integrate with Identity smart contract (binding)	P2 + C1	Both components ready	0.5
Security review (pod isolation, consent enforcement)	P2	Integration done	0.3
Subtotal			3.1 PM

W1.3 – SOCIAL MACHINE V0 (WP8 §5)

Design label ontology for streetlight domain	P3 + P4	–	0.5
Implement corpus RAG on sOS documents	P3	P0 complete	0.5
Implement trace collection pipeline (UILL → labels)	P3	UILL deployed	1.0
Implement metrics display dashboard (5 metrics)	P3 + C2 UX	Labels flowing	1.0
Implement basic recommendation engine (rule-based v0)	P3	Metrics defined	0.5
Subtotal			3.5 PM

W1.4 – PARTICIPANT RECRUITMENT & ETHICS (WP14 §7, §10)

Finalize ethics submission (UB committee)	P1 + P4	Framework drafted (P0)	0.5
Design recruitment materials (trilingual)	P4 + C2 UX	–	0.3
Community outreach (Eixample residents, associations)	P4	Materials ready	1.0
Screen + consent participants (target: 50)	P4	Ethics approved	0.5
Baseline data collection (12mo historical streetlight)	P3 + P4	Data access confirmed	1.0
Subtotal			3.3 PM

W1.5 – WEB & PUBLIC PRESENCE

Deploy manifesto page on socialbigdata.io	P2	P0 complete	0.2
Implement trilingual routing (EN/ES/CA)	P2	Manifesto content ready	0.3
Create public dashboard wireframe	C2 UX	Metrics defined (W1.3)	0.3
Implement public dashboard v0	P2	Wireframe approved	0.5
Set up X/Twitter + Substack + LinkedIn presence	P1 + Community Mgr	–	0.2
Draft + publish initial content (3 posts, 1 newsletter)	P1 + Community Mgr	Channels active	0.3
Subtotal			1.8 PM

W1.6 – DATA PRIVACY & COMPLIANCE (GDPR)

Conduct Data Protection Impact Assessment (DPIA)	C3 Legal Counsel + P4	Ethics framework (P0)	0.5
Draft data management plan (collection, storage, retention, deletion)	P3 + C3	DPIA complete	0.3
Draft Data Processing Agreement (DPA) with UB/municipality	C3 Legal Counsel	DPIA complete	0.3
Implement data subject rights workflow (access, rectification, erasure)	P2 + C3	DPA signed	0.3
Privacy review of trace pipeline (anonymization, pseudonymization)	P3 + C3	Trace pipeline designed (W1.3)	0.2
Subtotal			1.6 PM

3.2 P1 Budget

Personnel (P1–P4, 6 months)	€170,000	€240,000
C1 Blockchain Dev (80 days)	€48,000	€64,000
C2 UX/UI Designer (30 days)	€10,500	€15,000
C3 Legal Counsel (ethics, DPIA, data protection, 20 days)	€8,000	€12,000
Infrastructure (CSS hosting, cloud, domain)	€6,000	€12,000
Community outreach + recruitment	€3,000	€6,000
Public growth (initial content, tools)	€2,000	€5,000
P1 total	€248,500	€357,000

3.3 P1 Go/No-Go Gate

All 5 smart contract families spec-complete (interfaces defined, deployed to testnet)	Yes
Test suite passing ($\geq 90\%$ coverage)	Yes
Internal security review: no critical findings	Yes
DPIA completed + DPA signed with data controllers	Yes
UILL prototype deployed (≥ 20 pods)	Yes
Consent dashboard functional	Yes
Label ontology defined + trace pipeline working	Yes
5-metric dashboard rendering live data	Yes
Ethics approved by UB committee	Yes
≥ 50 participants recruited + consented	Yes
Baseline data (12mo) collected + validated	Yes
Public website with manifesto live	Yes

If gate fails: identify blocking workstream, extend P1 by ≤ 3 months. If still failing at month 12, re-scope to Lean Pilot or pause for architectural revision.

4. Phase 2: Sandbox Execution (Months 10–27)

Goal: Run the 18-month controlled experiment. Collect data. Evaluate the core hypothesis. Produce publishable evidence.

Gate at month 27: Experiment complete, data analyzed, H1 evaluated, evaluation report drafted, at least 1 paper submitted. **Go/no-go for architecture expansion.**

4.1 Workstreams

W2.1 – EXPERIMENT OPERATIONS (WP14 §4–§9)

Deploy intervention group (n=25): full sOS tooling	P2 + P3	P1 gate passed	0.5
Deploy app-only group (n=25): dashboard, no stigmergy	P2 + P3	P1 gate passed	0.5
Maintain control group: municipal mechanism (n=50)	P4	Baseline collected	–
Monitor system health (uptime, data quality, errors)	P2 + P3	Continuous	3.0
Participant support (trilingual)	P4	Continuous	3.0
Quarterly data quality audits	P3	Continuous	1.0
Midpoint review (month 18: month 9 of experiment)	P1–P4	9mo data collected	0.5
Subtotal			8.5 PM

W2.2 – DATA COLLECTION & ANALYSIS (WP14 §8)

Continuous metric collection (MTTR, precision@k, Gini, NPS, emergence ratio)	P3	Experiment live	2.0
Quarterly statistical reports	P3 + P4	Data flowing	2.0
Midpoint analysis (month 18)	P3 + P4	9mo data	0.5
Final analysis (month 27)	P3 + P4	18mo data	1.0
Statistical significance testing (all 5 metrics)	P3 + P4	Final analysis	0.3
Subgroup analysis (demographics, digital literacy)	P4	Final analysis	0.3
Subtotal			6.1 PM

W2.3 – ITERATION & REFINEMENT

Monthly UX feedback collection from participants	C2 UX + P4	Continuous	2.0
Quarterly UI/UX improvements based on feedback	C2 UX + P2	Feedback collected	1.5
Smart contract parameter tuning (quorum, redundancy thresholds)	C1	Midpoint data	0.5
Label ontology refinement based on trace patterns	P3 + P4	Trace data	0.5
Social Machine recommendation quality improvement	P3	Usage data	1.0
Subtotal			5.5 PM

W2.4 – COMMUNITY & GOVERNANCE

Scale DAO membership (50 → 1,000)	P4 + Community Mgr	Continuous	3.0
Facilitate first DAO proposal cycle	P4	DAO live	0.5
Facilitate first DAO vote (parameter change)	P4	Proposals submitted	0.3
Monthly governance health reports	P4 + Pi	DAO active	2.0
Community events (quarterly, Barcelona)	P4 + P1	–	1.0
Subtotal			6.8 PM

W2.5 – RESEARCH OUTPUT

Draft methodology paper (sandbox design)	P1 + P4	Experiment started	1.0
Submit methodology paper (target: Governance journal)	P1	Draft complete	0.2
Conference presentations (2–3, year 1)	P1 + P4	Data available	0.5
Draft evaluation paper (results)	P1 + P3 + P4	Final analysis	1.5
Submit evaluation paper	P1	Draft complete	0.2
Public-facing results report (trilingual)	P1 + P4	Evaluation done	0.5
Subtotal			3.9 PM

W2.6 – PUBLIC GROWTH (DIFFUSION PLAN §4)

Weekly short-form content (X/Twitter, LinkedIn)	Community Mgr	Continuous	3.0
Monthly YouTube video (experiment updates)	Community Mgr + P1	Continuous	3.0
Biweekly newsletter (EN, with ES/CA summaries)	Community Mgr + P1	Continuous	2.0
Podcast appearances (6–8 in 18 months)	P1	Booking	0.5
Microinfluencer campaign #1 (months 22–25, €5K cap)	Community Mgr	Content library ready	0.5
Ambassador recruitment (months 26–30)	Community Mgr + P1	Community established	0.5
Subtotal			9.5
			PM

4.2 P2 Budget

Personnel (P1–P4, 18 months)	€335,000	€470,000
C1 Blockchain Dev (10 days retainer)	€6,000	€8,000
C2 UX/UI Designer (50 days)	€17,500	€25,000
C3 Legal Counsel (20 days: GDPR, DPA, participant agreements)	€8,000	€12,000
Community Manager (part-time, 18 months)	€30,000	€45,000
Infrastructure (CSS hosting, cloud, nodes)	€18,000	€36,000
Participant compensation (structured honorarium €150/participant)	€15,000	€20,000
Community events (quarterly, venue + catering)	€6,000	€12,000
Public growth (tools, microinfluencer campaign €5K, content)	€12,000	€25,000
Conference travel (2–3 conferences)	€6,000	€12,000
Publication fees (open access)	€3,000	€6,000
Contingency (10%)	€46,500	€67,000
P2 total	€512,000	€738,000

4.3 P2 Experiment Design Summary (from WP14)

Design	Three-arm controlled: control (n=50) / app-only (n=25) / full sOS (n=25)
Domain	Streetlight maintenance, Eixample district, Barcelona
Duration	18 months intervention + 3 months analysis
Primary outcome	Composite score of 5 metrics
Primary hypothesis (H1)	≥15% improvement over municipal mechanism
Falsification threshold	<5% difference
Key metric 1	Mean Time To Resolution (MTTR) – streetlight faults
Key metric 2	Precision@k – priority alignment between citizen labels and repair outcomes
Key metric 3	Gini coefficient – equity of repair response time across census tracts
Key metric 4	Net Promoter Score (NPS) – participant satisfaction
Key metric 5	Emergence ratio – % of actions coordinated stigmergically
Pre-registration	OSF or AsPredicted before experiment start
Phase 0 verification gate	€5K, 2-month mini-test before full P2 commitment

4.4 P2 Go/No-Go Gate (Month 27)

Experiment completed (18 months of data)	Yes
H1 evaluated with statistical significance ($p < 0.05$)	Confirmed / Rejected / Inconclusive
Composite score difference quantified	Measured
Evaluation report drafted	Yes
≥1 paper submitted to peer-reviewed journal (or submission-ready draft if journal review cycle exceeds gate timeline)	Yes
≥1,000 DAO members with ≥1 on-chain governance action in preceding 90 days	Yes
Smart contracts stable (no critical bugs in 6 months)	Yes
Public results report published (trilingual)	Yes

Note on paper submission timing: The 18-month experiment ends at month 27. Paper writing begins at month 24 (see W2.5), producing a submission-ready draft by month 27. If journal submission cycles delay formal acceptance, a submission-ready draft suffices for the gate; formal submission must follow within 3 months.

Gate outcomes:

- **H1 confirmed ($\geq 15\%$ improvement):** Proceed to P3 Architecture Expansion. Strongest possible signal for funding and adoption.
- **H1 partial (5–15%):** Proceed to P3 with revised architecture. Adjust coordination mechanisms based on data.
- **H1 rejected ($< 5\%$ or negative):** Pause. P3 scope reduced to architectural revision. Do not scale. Publish negative result – scientifically valuable.
- **Inconclusive (data quality issues, attrition $> 30\%$):** Extend experiment or redesign. Do not proceed to P3 without clear signal.

5. Phase 3: Architecture Expansion (Months 28–36)

Goal: Scale from testnet to mainnet. Expand UILL to 5,000 pods. Deploy autonomous Social Machine functions. Achieve economic sustainability.

Gate at month 36: Mainnet deployment audited (zero critical findings), 5,000 members, fiat reserve ≥ 9 months opex. **Go/no-go for multi-city expansion.**

5.1 Workstreams

W3.1 – MAINNET MIGRATION

External smart contract audit (full, firm)	C1 + External Auditor	P2 gate passed	0.5
Remediate audit findings	C1 + P2	Audit report	1.0
Deploy to mainnet L2 (Optimism/Arbitrum)	C1 + P2	Audit cleared	0.5
Migration script (testnet state → mainnet)	P2	Mainnet deployed	0.5
Mainnet monitoring + alerting	P2	Migration done	0.3
Bug bounty program (3 months)	P2 + Community Mgr	Mainnet live	0.3
Subtotal			3.1 PM

W3.2 – UILL SCALE

Migrate to production Solid infrastructure (CSS/Inrupt)	P2	Mainnet stable	1.0
Implement DID/VC integration (eIDAS 2.0 alignment)	P2 + C3	UILL scaled	1.0
Pod provisioning automation at scale (5,000)	P2	DID integrated	0.5
Performance testing (5,000 concurrent pods)	P2	Automation done	0.5
Subtotal			3.0 PM

W3.3 – SOCIAL MACHINE AUTONOMY

Replace rule-based recommendations with ML model	P3	18mo training data (P2)	1.5
Implement autonomous gate functions (WP8 §5.6)	P3	ML model validated	1.0
Implement anomaly detection for governance manipulation	P3	Autonomous gates live	0.5
Human oversight dashboard for autonomous functions	P3 + C2 UX	Gates implemented	0.5
Subtotal			3.5 PM

W3.4 – ECONOMIC SUSTAINABILITY (WP10)

Deploy token contract (non-transferable SBT on mainnet)	C1	Mainnet live	0.5
Implement contribution-based distribution mechanism	C1 + P3	Token deployed	0.8
Implement differentiated decay (research 4yr / governance 2yr)	C1	Distribution live	0.3
Deploy treasury management contracts	C1	Token deployed	0.5
Establish fiat reserve (target: 9 months opex)	P1	Treasury live	0.5
Grant application pipeline (EU Horizon, ERC, national)	P1 + P4	Results published	2.0
Subtotal			4.6 PM

W3.5 – INSTITUTIONAL ADOPTION

Publish full research results (papers, datasets, code)	P1 + P3 + P4	P2 evaluation done	1.0
Produce replication toolkit for other cities	P2 + P4	Architecture stable	0.5
Engage second city partner (identified during P2)	P1	Results published	0.5
EU policy engagement (position papers, consultations)	C9 EU Advisor + P1	Results published	1.0
Conference + institutional presentations (4–6)	P1 + P4	Results published	0.5
Subtotal			3.5 PM

5.2 P3 Budget

Personnel (P1–P4, 9 months)	€168,000	€235,000
P5 Smart Contract Engineer (FTE, 9 months)	€56,000	€72,000
C1 Blockchain Dev (30 days)	€18,000	€24,000
C2 UX/UI Designer (20 days)	€7,000	€10,000
C3 Legal Counsel (20 days: mainnet, DID, cross-border)	€8,000	€12,000
C9 EU Public Affairs Advisor (retainer, 9 months)	€27,000	€45,000
External smart contract audit	€30,000	€60,000
Bug bounty program (3 months)	€10,000	€20,000
Infrastructure (L2 nodes, production CSS, scaling)	€24,000	€48,000
Travel + conferences (4–6 events)	€12,000	€20,000
Publication + replication toolkit	€5,000	€10,000
Contingency (10%)	€36,500	€56,600
P3 total	€401,500	€612,600

5.3 P3 Go/No-Go Gate

External audit: zero critical, zero high findings	Yes
Mainnet deployed + stable (30 days no incidents)	Yes
UILL serving 5,000 active pods	Yes
Social Machine autonomous functions under human oversight	Yes
Token distribution mechanism operational	Yes
Fiat reserve ≥ 9 months opex	Yes
≥ 1 replication partner city identified	Yes
≥ 3 peer-reviewed publications	Yes

6. Phase 4: Full Platform (Months 37–60)

Goal: Multi-city deployment, self-sustaining economics, institutional recognition as governance infrastructure.

Not detailed here – P4 design depends on P2 and P3 outcomes. High-level scope:

- Multi-city sandboxes (3–5 cities, varied domains beyond streetlights)
- Full DAO self-governance (Scientific Board transitions to DAO-elected)
- Deep institutional partnerships (EU institutions, city networks, academic consortia)
- Revenue streams: EU research grants, city/government service contracts, philanthropic donations
- Team growth: 8–12 FTEs
- Open-source ecosystem: third-party dApps on sOS infrastructure
- Estimated budget: €1.2M–€2.3M (lean to full, 24 months)

7. Consolidated Budget: All Phases (Primary Scenario)

P0: Foundation	1–3	€38,500	€64,000	3.2%
P1: Sandbox Prep	4–9	€248,500	€357,000	21.8%
P2: Sandbox Execute	10–27	€512,000	€738,000	43.2%
P3: Architecture Expand	28–36	€401,500	€612,600	27.0%
P4: Full Platform	37–60	€1,200,000	€2,250,000	–
P0–P3 total	1–36	€1,200,500	€1,771,600	100%

Note on P3 figures: P3 budget includes operating expenditure. The fiat reserve (≥ 9 months opex, ~€100K–€150K) is a gate condition for P3 completion but is not funded from within the P3 expenditure envelope – it must be accumulated from grants, donations, or treasury operations across P2–P3. P3 budget figures represent costs, not reserves.

7.1 Budget by Category (P0–P3, average of low/high)

Personnel (core team)	€778,000	52.3%
Contractors (blockchain, UX, legal, EU affairs)	€197,000	13.2%
Infrastructure & hosting	€85,000	5.7%
Smart contract audit + bug bounty	€60,000	4.1%
Public growth + community	€55,000	3.7%
Participant compensation	€17,500	1.2%
Conferences + travel + publications	€34,000	2.3%
Legal (entity, trademark, ethics, DPIA, DPAs, compliance)	€64,000	4.3%
Contingency (allocated within phases)	€197,000	13.3%
Total P0–P3	€1,486,050	100%

7.2 Funding Strategy

EU Horizon Europe (ERC Starting Grant or Pathfinder)	€1.5M–€2.5M	Application P2	Requires preliminary results
Spanish National Research Agency (AEI)	€100K–€300K	Application P1	Requires UB affiliation
Barcelona City Council (Barcelona Science Plan)	€50K–€150K	Application P1	Requires sandbox proposal
Private foundations (Sloan, Omidyar, Open Society)	€200K–€500K	Application P1	Requires track record
Philanthropic donations (individual)	€50K–€200K	Ongoing P0+	Tax-deductible via association
sOS token (non-transferable, non-speculative)	Governance only	P3	Not a funding mechanism

Critical path: P0 is bootstrapped by founding team resources. P1–P2 require first institutional grant or foundation support. P3 requires results from P2. The funding strategy is sequential, not parallel – each phase funds the next.

8. Team Evolution

P1 Research Lead / PI	1.0 FTE	1.0 FTE	1.0 FTE	1.0 FTE
P2 Sr Full-Stack Engineer	Hire → 1.0	1.0 FTE	1.0 FTE	1.0 FTE
P3 AI/ML + Data Engineer	Hire → 0.67	1.0 FTE	1.0 FTE	1.0 FTE
P4 Governance Researcher	Hire → 1.0	1.0 FTE	1.0 FTE	1.0 FTE
C1 Blockchain/Smart Contract Dev	–	80 days	10 days	30 days
C2 UX/UI Designer	–	30 days	50 days	20 days
C3 Legal & Privacy Counsel	Setup	15 days	20 days	20 days
Community Manager	–	–	0.5 FTE	–
C9 EU Public Affairs Advisor	–	–	–	Retainer
P5 Smart Contract Engineer	–	–	–	1.0 FTE

Hiring dependencies: P2 must be hired in P0 (infrastructure dependency). P3 and P4 follow. C1 is critical path for P1; start engagement early in P1. Community Manager joins at P2 start. C9 joins at P3 for institutional adoption.

9. Critical Path & Dependencies

The execution follows a phased dependency chain with parallel workstreams:

Sequential chain:

P0	Legal entity → Team hired → Infrastructure	—
P1	C1 engaged → Smart contracts → Test suite → Security review	P0 complete
P1	UILL deployed → Consent dashboard → Integration	P0 infrastructure
P1	Ethics → Recruitment → Baseline → 50 participants	UB CER approval
P1 → P2	ALL P1 GATES → P2 START	All P1 gates passed
P2	Experiment live (month 10) → Midpoint (month 18) → Final (month 27)	P2 start
P2	Data collection continuous → Analysis → Papers	Experiment live
P2 → P3	H1 EVALUATED → P3 START (if confirmed)	Publishable evidence
P3	Mainnet audit → Migration → Token → Sustainability	P3 start

Longest sequential chain: Legal entity (P0) → C1 engaged → Smart contracts → Test suite → Security review → P1 gate → Experiment → Analysis → Papers → Funding → P3. Estimated: 30 months minimum.

Parallelizable: UILL development, web/public presence, community building, research writing – all can proceed in parallel with the core technical chain.

10. Risk Integration

10.1 Top 5 Execution Risks (from WP9 risk register, adapted for execution)

R1: Funding gap P1 → P2	H	C	Submit grants during P1; lean burn rate; P0 self-funded	No grant confirmed + no alternative commitment by month 7 of P1	Pause P2 recruitment; activate bridge funding protocol; Joan decision within 14 days	P1
R2: SC audit critical flaw	M	H	Internal review + test suite before external audit; C1 quality	Critical finding in internal security review	Pause deployment; allocate 1 PM to fix; re-audit affected components	C1 + P2
R3: Participant recruitment < target	M	H	Over-recruit 20%; community partnerships; flexible timeline	<30 participants at month 8	Extend recruitment by 2 months; expand outreach channels; if <40 at month 10, reduce experiment arms	P4
R4: H1 rejected or inconclusive	M	E	Pre-register secondary hypotheses; publish negative result; architectural revision path	P2 gate evaluation	Publish negative result; revise architecture per data; do NOT proceed to P3; scope to architectural revision	P1 + Scientific Board
R5: Key person departure (P2 or C1)	M	H	Documentation standards; bus factor ≥2; contractor backup list	Resignation with <2 months notice	Freeze non-critical work; P1 covers infrastructure temporarily; expedite replacement hire (target: 6 weeks)	P1

Legend: L = Likelihood (L/M/H), I = Impact (L/M/H/C-critical/E-existential)

10.2 Risk Monitoring Cadence

Risk register review	Monthly	P1 + Pi	Updated risk status, new triggers fired
Experiment risk review	Quarterly	P1–P4	Data quality, attrition, safety events
Gate-specific risk review	At each gate	P1 + Scientific Board	Go/no-go recommendation with risk assessment
Ad-hoc review	On trigger fire	Risk owner + P1	Response activation, 48h max from trigger

11. Decision Points Requiring Joan

These are decisions the roadmap depends on but cannot make:

11.1 Immediate (P0, Month 1)

Association legal form	Scientific association vs. foundation	Association	Month 1
UB agreement scope	Space only vs. space + affiliation + research partnership	Space + affiliation	Month 2
Initial funding source	Self-funded vs. seed grant vs. angel philanthropy	Self-funded P0	Month 1

11.2 Short-term (P0–P1, Months 1–6)

Blockchain platform	Ethereum L2 (Optimism/Arbitrum) vs. alternative L1	Optimism	Month 4
Smart contract language	Solidity vs. Rust (for non-EVM)	Solidity	Month 4
Key recovery model	Social recovery vs. institutional vs. hybrid	Social recovery (WP8 §4.4)	Month 5
Podcast strategy	DIY vs. agency-booked	Agency	Month 6
Newsletter language	EN only vs. EN + ES/CA summaries vs. full trilingual	EN + summaries	Month 6
Short-form format	On-camera vs. voiceover/animation	Voiceover	Month 6
X/Twitter launch sequence	Single account vs. personal + lab accounts	Single lab account	Month 4

11.3 Medium-term (P2, Months 10–27)

Mainnet L2 selection	Optimism vs. Arbitrum vs. zkSync	Optimism	Month 25
Token genesis allocation	Equal vs. contribution-weighted vs. time-weighted	Contribution-weighted	Month 26
Replication city	Based on P2 outreach results	–	Month 27
Institutional fundraising target	EU Horizon vs. foundation vs. 混合	EU Horizon primary	Month 24

12. Pre-Registration

In the spirit of open science, the following are pre-registered before execution begins:

12.1 Experimental Pre-Registration (WP14)

- H1–H4 hypotheses with falsification conditions
- 5 operationalized metrics
- Statistical analysis plan

- Subgroup analysis plan
- Registered at OSF or AsPredicted before P2 start

12.2 Architectural Pre-Registration

- Smart contract families and their interfaces (WP8 §3–§5)
- Label ontology v1.0 (WP8 §5.3)
- Decision class typology C0–C4 (WP8 §5.6)
- Any deviation from these specifications during implementation must be documented as a design decision with rationale

12.3 Budget Pre-Registration

- Phase budgets as specified in §7
 - Funding strategy as specified in §7.2
 - Deviations >15% in any phase require a revised budget document and approval
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13. Governance of the Roadmap

This roadmap is a living document governed by the following rules:

1. **Amendments:** Any team member may propose an amendment via the DAO proposal mechanism (once active) or directly to P1 (before DAO).
 2. **Phase gate decisions:** Go/no-go at each gate is made by P1 with Scientific Board consultation. After DAO activation (P2), C2-class decisions (governed allocation) require token-weighted vote.
 3. **Budget revisions:** Deviations >15% in any phase require a revised budget annex approved by P1 + Scientific Board.
 4. **Architecture changes:** Changes to smart contract interfaces, label ontology, or decision class typology require a WP8 amendment.
 5. **Annual review:** Full roadmap review at month 12 and month 24, regardless of phase.
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14. Relationship to Other Working Papers

WP8 (Technical Architecture)	Phase 1–3 technical workstreams derived directly from WP8 §3–§5
WP9 (Legal & Compliance)	Legal tasks in P0 (entity), P1 (ethics, DPIA), P3 (mainnet, DID); risk register
WP10 (Tokenomics)	P3 economic sustainability workstreams; token deployment sequence
WP14 (Sandbox Design)	P2 experiment operations, data collection, evaluation criteria
Master Execution Backlog (08)	All task IDs mapped to phases; PM estimates verified
Phase Budget Scenarios (04/04a)	Budget figures consolidated into unified phase view
Executive Budget Summary (07)	Scenario definitions, funding strategy
Joan's Q1–Q15	Scope decisions shaping all phases (DLT from day 1, Solid in production, trilingual, etc.)
WP13 (Executive Summary)	Public-facing articulation of what this roadmap delivers

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