Hello reviewer! We recognize that our documentation is substantial and complex. In order to help guide you, we provide here a series of links and explanations in response to your requests and comments.

Please feel free to reach out if you have any questions!

Submission #1

Review 1.1

Approved

all the expectede evidence is provided. Interesting to note that on the website they also share their partnerships which seem to align with security concerns, for example, in the need for partnering and integrating with multiple wallets and exchanges.

For the amount of money requested it still feels like very little was done, but I hope the shared material is distilled information of lots of team meetings and prototype designs.

Based on shared information about Architecutre they prolly already have some test system running as it seems quite detailed in the data structures

Submitted at: **September 1, 2025 at 12:00 PM**

No Changes Required

Review 1.2

Not Approved

While the team has delivered a great "Risk Assessment & Security Planning" document and has successfully met all the evidence requirements (approvals, AMA, security review) this milestone is not approved.

The deliverables that do not meet the SoM criteria and must be provided for milestone completion are:

1. Technical Requirements Document. It contains high-level concepts, not detailed specifications with the required parameters and algorithms.
2. System Architecture Blueprint. This is a good start for a high-level project overview, but it does not constitute a System Architecture Blueprint. For example, the github docs state the team is still "exploring the use of several bridges," which proves they are still in a research phase, and do not have a complete bridge architecture with all the all specific mechanisms outlined in the SoM.

Submitted at: **September 2, 2025 at 7:33 AM**

1. **Technical Requirements Document. It contains high-level concepts, not detailed specifications with the required parameters and algorithms.**
    a. *We have expanded the documentation to provide greater technical detail. Specifically, the User Action API has been formally defined, the operator CLI specification includes more parameters, and the System Architecture Blueprint has been reworked. Additionally, the tokenomics framework is now well defined.*

2. **System Architecture Blueprint. This is a good start for a high-level project overview, but it does not constitute a System Architecture Blueprint. For example, the github docs state the team is still "exploring the use of several bridges," which proves they are still in a research phase, and do not have a complete bridge architecture with all the all specific mechanisms outlined in the SoM.**
    a. *We have added further details to the overview document and expanded the descriptions of bridge operator roles. In particular, requirements for both the Cardinal Operator and the Charms Operator have been defined with greater depth.*

Review 1.3

Not Approved

Sundial has good documentation and planning, but PoA can't be fully authorized yet because it doesn't have any performance validation (no quantitative benchmarks like TPS statistics or latency tests). Specifications are descriptive, not based on real-world evidence. Bridge operator responsibilities are not well defined (the bridge operator position is still to be determined, which is very important for Bitcoin and Cardano security). There is no backup plan in case of collusion or disruption.

Submitted at: **September 2, 2025 at 10:32 PM**

3. **Sundial has good documentation and planning, but PoA can't be fully authorized yet because it doesn't have any performance validation (no quantitative benchmarks like TPS statistics or latency tests)**
    a. *We have documented incentive mechanisms and preliminary scaling expectations, including watcher incentives, operator incentives, TPS ceiling estimates, and latency/finality breakdowns (Finality, Latency). These provide the framework for upcoming performance testing in future milestones.*

4. **Specifications are descriptive, not based on real-world evidence.**
    a. *Component design is scheduled for Milestone 3, where the core functionality will be defined concretely. Performance validation and real-world testing is scheduled for Milestone 4, where benchmarking and stress test reports will be delivered.*

5. **Bridge operator responsibilities are not well defined (the bridge operator position is still to be determined, which is very important for Bitcoin and Cardano security).**
    a. *We have expanded the documentation of bridge operator roles, including detailed requirements for the Cardinal Operator and the Charms Operator.*

6. **There is no backup plan in case of collusion or disruption.**
    a. *A Disaster Plan has been added to outline fallback measures and contingency handling in the event of collusion, operator failure, or other disruptions.*

Review 1.4

Not Approved

Technical Requirements Document - Not Approved:

Update to the milestone pushbacks is still open and not approved by the core team yet. https://github.com/sundial-protocol/internal-docs/pull/7

Architecture Blueprint Completed + Feasibility Research - Not Approved:

In the current document, we are currently missing the "Bitcoin ecosystem partners" and most of the provided information is not "well-defined" and relatively high level. Instead of just mentioning building blocks, like the "babel fee provider" we would like to see the name of the actual partner or technology. Rollback handeling on L1 has not been mentioned yet. Please include these details to the updated milestone resubmission.

Risk Assessment & Security Measures: Approved with a note

The provided PDF demonstrates the level of technical depth that would be great to see in all submitted documents. From the perspective of the original features, We think it's quite complete. However, it has been recently mentioned that Sundial will also support a "babble fee" mechanism, allowing transaction fees to be paid in assets other than (w)BTC. We believe this introduces a potential risk that is not addressed in the document. If Sundial relies on a provider or service, which has not been referenced in the other design documents, it is likely being handled by a third party. Please address this risk in the subsequent resubmission.

Submitted at: **September 10, 2025 at 7:30 AM**

7. **Architecture Blueprint Completed + Feasibility Research - Not Approved:**
    a. **In the current document, we are currently missing the "Bitcoin ecosystem partners" and**
        i. *We have defined bridge operator roles in detail, including the Cardinal Operator and the Charms Operator.*
    b. **most of the provided information is not "well-defined" and relatively high level.**
        i. *To provide more specificity, we have included detailed incentive models (watcher incentives, operator incentives), performance estimates (TPS ceiling, latency/finality), and expanded definitions of operator responsibilities. We have also refined the User Action API and added more detail to the operator CLI specification.*

    c. **Instead of just mentioning building blocks, like the "babel fee provider" we would like to see the name of the actual partner or technology.**
        i. *We have clarified the specific partners and tools referenced in the design, including Midgard, Charms, Cardinal, Fluid Tokens, and a comprehensive risk assessment with security partners such as Check Point, Elliptic, Chainalysis, Merkle Science, Trail of Bits, and others.*
    d. **Rollback handling on L1 has not been mentioned yet.**
        i. *None of the L1 operations are greatly time-sensitive, meaning that they can easily be resubmitted in the case of a L1 rollback. Rollbacks of longer than 1 minute are extremely rare, and any onchain window will be many*

times longer than the longest fork ever recorded. Rollback on L1 is not addressed because it's not a concern.

8. **Risk Assessment & Security Measures: it has been recently mentioned that Sundial will also support a "babble fee" mechanism, allowing transaction fees to be paid in assets other than (w)BTC. We believe this introduces a potential risk that is not addressed in the document.**
    a. *Updates have been made to Milestone 2.7, with a new section added: [6.3 Babel Fee Mechanism.]*

Submission #2

Review 2.1

Not Approved

This second submission made stuff a bit more cofusing for me.

When I am reading other reviewers expectations I don't see how they has been addressed.

1. There are slight changes to existing .md files that do not include new specifications or references to source of paramters and algorhytms (There are some for scaling, but not for tokenomics https://github.com/sundial-protocol/internal-docs/blob/main/architecture/scaling.md unless this is your tokenomics? https://github.com/sundial-protocol/internal-docs/blob/faece9e59d45ab155e77828c6a304e12b493345a/architecture/roles/incentives.md?plain=1#L44)
2. there are no answers to open internal GitHub issues.
3. What kind of system architecture standard is your team striving for? Currently, there is no structure for documentation
4. Missing Demonstration of performance expectations
5. Define Bridge Operator activities (https://github.com/sundial-protocol/internal-docs/blob/faece9e59d45ab155e77828c6a304e12b493345a/architecture/roles/operators.md)

Submitted at: **September 19, 2025 at 1:35 AM**

9. **There are slight changes to existing .md files that do not include new specifications or references to source of parameters and algorithms (There are some for scaling, but not for tokenomics https://github.com/sundial-protocol/internal-docs/blob/main/architecture/scaling.md unless this is your tokenomics? [https://github.com/sundial-protocol/internal-docs/blob/faece9e59d45ab155e77828c6a304e12b493345a/architecture/roles/incentives.md?plain=1#L44])**
    a. *Tokenomics was added under [https://github.com/sundial-protocol/internal-docs/blob/final/architecture/tokenomics.md] and [https://github.com/sundial-protocol/internal-docs/blob/final/reports/Sundial%20Tokenomics%20v3.pdf].*

10. **There are no answers to open internal GitHub issues.**
    a. *The Sundial protocol is under active development, with both the core team and the community using GitHub to log feature requests, enhancements, and questions. The presence of open issues in the repository is a normal and expected part of the development cycle, serving as a transparent record for feedback, prioritization, and future optimizations. Importantly, these open issues are not tied to the milestone submission requirements. Even reported bugs, when logged, do not contradict delivery commitments; rather, they reflect standard software development practices of tracking both high- a*nd low-priority items for continuous improvement, as outlined in Milestone 5.

11. **What kind of system architecture standard is your team striving for? Currently, there is no structure for documentation**
    a. *Our team recognizes the importance of adhering to robust system architecture standards. Rather than committing to a single rigid framework at this stage, we are focusing on aligning with broadly accepted best practices such as modular design, scalability, and interoperability.*
        i. *As the project progresses, we intend to apply the most appropriate architectural approaches based on milestone deliverables, stakeholder input, and resource availability. This ensures flexibility while still adhering to industry-aligned standards and practices.*
        ii. *In short, we are striving for an adaptable, best-practice-driven architecture that evolves responsibly with the project, instead of locking ourselves prematurely into one specific standard.*

12. **Missing Demonstration of performance expectations**
    a. *Performance expectations are detailed in the Scaling Sundial documentation. In preliminary testing, the L2 has achieved ~800 TPS, with an anticipated capacity of ~24,985 TPS under current conditions. Latency is typically near-instant, with a worst-case of ~20 seconds, and finality is achieved within seconds through offchain verification, with true finality governed by a configurable challenge window. These metrics demonstrate Sundial's ability to deliver high throughput, low latency, and reliable settlement.*

13. **Define Bridge Operator activities (https://github.com/sundial-protocol/internal-docs/blob/faece9e59d45ab155e77828c6a304e12b493345a/architecture/roles/operators.md)**
    a. *Bridge Operators in the Sundial protocol are responsible for enabling secure cross-chain asset transfers, as outlined in the internal documentation. Their duties include overseeing asset lock/mint/burn/release flows, maintaining high availability, and enforcing security through mechanisms such as MuSig2, HTLCs, and fraud proofs. Specific requirements will depend on the bridging solution*

selected (e.g., Cardinal, Charms, or FluidTokens), but in all cases operators ensure integrity, resilience, and trust-minimized interoperability.

Review 2.2

Not Approved

The PoA has been significantly improved in addressing many of the issues from the previous review, specifically, the creation of a new **Disaster Recovery Plan** and a detailed **Tokenomics document**.

However, despite these great improvements, the milestone is not approved because two deliverables are still incomplete.

1. The Core Bridge Architecture Blueprint is missing. While the operator roles and incentives are now being defined, the end-to-end System Architecture Blueprint for the bridge itself remains absent. The required documentation detailing the data flow, custody/release mechanisms, and proof validation process has not been provided.
2. The Risk Assessment for Babel Fees is incomplete, it has still not been updated to include the analysis of the now well-defined Babel fee mechanism.

Submitted at: **September 21, 2025 at 1:37 AM**

14. **The Core Bridge Architecture Blueprint is missing. While the operator roles and incentives are now being defined, the end-to-end System Architecture Blueprint for the bridge itself remains absent. The required documentation detailing the data flow, custody/release mechanisms, and proof validation process has not been provided.**
    a. *Sundial is not a bridge. It makes use of bridges developed by partners. We are not designing the core architecture of any of these bridges - instead we will evaluate the bridges in development and ensure the Bridging Service already detailed in the architecture documentation is ready to interoperate with the satisfactory solutions produced. While we are in communication with these teams, it would be inappropriate for us to impose our own architectural designs on their products.*

15. **The Risk Assessment for Babel Fees is incomplete, it has still not been updated to include the analysis of the now well-defined Babel fee mechanism.**
    a. *Updates have been made to Milestone 2.7, with a new section added: 6.3 Babel Fee Mechanism.*

Review 2.3

Not Approved

The new PoA submission shows meaningful improvements: a **disaster recovery plan** has been added, operator and incentive roles are more defined, and tokenomics has been clarified. However, several earlier concerns remain only partially addressed.

- **Performance validation** is still missing, while scaling targets are documented, there are no benchmark results or latency/TPS demonstrations.
- **Bridge operator responsibilities** are outlined, but the milestone lacks a **Core Bridge Architecture Blueprint** that demonstrates custody, release, and proof validation workflows.

Submitted at: **September 21, 2025 at 3:11 AM**

16. **Performance validation is still missing, while scaling targets are documented, there are no benchmark results or latency/TPS demonstrations.**
    a. *We have done some benchmarking already - reaching ~800 TPS. This is mentioned briefly here.*
    b. *Performance validation is scheduled for Milestone 4, where benchmarking and stress test reports will be delivered. These will include TPS and latency demonstrations to validate the scaling targets already documented.*
17. **Bridge operator responsibilities are outlined, but the milestone lacks a Core Bridge Architecture Blueprint that demonstrates custody, release, and proof validation workflows.**
    a. *Sundial is not a bridge. It makes use of bridges developed by partners. We are not designing the core architecture of any of these bridges - instead we will evaluate the bridges in development and ensure the Bridging Service already detailed in the architecture documentation is ready to interoperate with the satisfactory solutions produced. While we are in communication with these teams, it would be inappropriate for us to impose our own architectural designs on their products.*