Skyral

Service Definition Document: Skyral Modelling and Simulation Development as a Service for Mobility and Infrastructure

Service Name: Skyral Modelling and Simulation Development as a Service for Mobility and Infrastructure
Supplier Name: Skyral Defence Ltd
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1. Introduction to Skyral

Skyral is a UK modelling, simulation and digital twin company that originated from Improbable, a technology “unicorn” known for large-scale virtual worlds and metaverse platforms. In June 2023, Skyral was spun out as a focused, sovereign business to apply this large-scale simulation capability to complex real-world systems including urban mobility, national transport corridors and critical infrastructure.

Skyral’s platforms and services are engineered to operate securely across cloud, enterprise and sovereign environments, with Secure by Design and DevSecOps practices and architectures that integrate with existing systems such as TMS, WMS, traffic management, SCADA, asset management, telematics, and network-management platforms. Delivery is underpinned by robust security controls, ISO-aligned governance and interoperable data pipelines that respect safety, regulatory, commercial and data-protection requirements across road, rail, air, maritime and critical national infrastructure.

2. Service Overview

Description and purpose

Skyral Synthetics Development as a Service (Mobility and Infrastructure Edition) is a 3- or 6-month fixed-term engagement that rapidly stands up or extends trusted synthetic environments, models and digital twins on top of Skyral CORE for mobility, transport and infrastructure customers. The service turns planning and operational questions into validated digital twins that can be reused for corridor and network design, service and timetable planning, infrastructure evaluation, resilience testing and continuous optimisation—rather than one-off pilots or slideware.

The engagement combines secure engineering, domain-aware modelling and data integration to deliver credible, explainable simulations that support high-stakes operational, investment and policy decisions. It is typically delivered as a follow-on to Skyral’s Decision Support and Problem Solving as a Service discovery phase, which defines problems, decision levers (e.g. network topology, service design, hub footprint, capacity, maintenance and resilience measures) and success metrics; it can also operate as a standalone build phase where these are already understood. Throughout, the service is delivered using Secure by Design principles, rigorous data-handling processes and deployment patterns suitable for regulated transport, mobility and infrastructure environments.

Intended users and use cases

Primary users include:

- Urban and regional mobility planners and smart-city teams.
- Road, rail, metro, aviation and port authorities and operators.
- Freight, logistics and corridor-management organisations.
- Infrastructure owners, asset managers and national infrastructure bodies.

Typical use cases include:

- **Network and corridor design**: Testing multimodal network designs, hub and interchange locations, route structures and service footprints across regions before committing to investment.

- **Operational decision support and mobility digital twins**: Exploring how demand, traffic, weather, disruptions, capacity constraints and infrastructure interact across complex mobility and infrastructure networks.

- **Capacity planning and resilience**: Stress-testing performance under peak periods, timetable changes, infrastructure failures, extreme weather events, strikes, maintenance windows or new service introductions.

- **Migration and change planning**: De-risking large changes—such as new lines, junction or interchange redesigns, traffic-management schemes, technology upgrades or regulatory changes—by simulating dependencies and sequencing before rollout.

- **Continuous optimisation**: Supporting ongoing decisions about routing, frequencies, asset utilisation, maintenance strategies, priority rules and service-level commitments.

These capabilities also support:

- **Government & public sector**: Strategic mobility and infrastructure planning, congestion and emissions policy, accessibility and spatial planning, and resilience of passenger and freight corridors.

- **Critical national infrastructure**: Modelling how failures or upgrades in energy, telecoms or key routes affect mobility, logistics and infrastructure service continuity.



3. Method and Activities

This service enables the rapid definition, creation and prioritisation of strategic levers essential for solving mobility and infrastructure problems, and the development of Skyral CORE-based solutions aligned to customer needs.

It builds on **Skyral CORE**, an ecosystem of tooling that transforms how next-generation modelling and simulation solutions are engineered and sustained. CORE is a suite of tools, technologies and APIs used by Skyral engineers that forms the foundation for building, running and analysing complex synthetic environments, enabling rapid delivery and operational support of mobility and infrastructure digital twins.

CORE encapsulates accumulated knowledge from tackling large-scale network and agent-based modelling challenges, including multi-million-agent simulations of people, vehicles, freight, hubs, infrastructure assets and control systems. Its uniform approach delivers insights quickly, ensures a consistent user experience and significantly reduces long-term operational costs through common tooling, APIs and reusable components.

Skyral embeds a **secure-by-design** philosophy across CORE and products, using DevSecOps, automated testing and governance to ensure reliability and security are engineered from the outset. Skyral's modular, cloud-native architecture and iterative delivery model enable agile implementation—reusing proven components, integrating rapidly with existing environments, and iterating with stakeholders so new capabilities can be fielded in weeks.

4. Service Outputs

Service outputs are customer-driven and agreed at the outset of the engagement, then refined through delivery to ensure they remain aligned to priority questions and constraints.

Typical outputs (tailored per engagement) could include:

- A configured synthetic environment and associated models, implemented on Skyral CORE to represent the agreed system of interest (e.g. missions, organisations, networks, assets, populations, processes) at the required level of fidelity.
- A set of validated configurations and scenarios reflecting the agreed use cases, with documented assumptions, limitations and—where data permits—calibration and validation evidence to support assurance and future enhancement.
- User-facing views and interfaces, plus any in-scope integrations, designed to make the synthetic environment usable by the customer's planners, analysts, trainers or decision-makers in their own workflows.

- Documentation, handover and a roadmap, proportional to the engagement, describing what has been built, how to operate and extend it, and how it can be developed or scaled further within Skyral CORE and the customer's wider programmes.

Key benefits for mobility and infrastructure

- **Credible digital twins**: Rapidly develop validated models to test service designs, layout and infrastructure changes, and operational interventions safely.

- **Reduced complexity**: Use the unified Skyral CORE platform and reusable components to lower development cost, integration risk and vendor lock-in.

- **Increased understanding**: Reveal cascading effects across routes, corridors, hubs, fleets, users, schedules, assets and dependent infrastructure.

- **Experimentation**: Enable cross-stakeholder experimentation (operators, authorities, infrastructure owners, developers) while protecting commercial and operationally sensitive data.

- **Transparent results**: Produce mathematically grounded, explainable outcomes that avoid "black-box" AI for safety-, contract- and policy-critical decisions.

- **Scalable foundation**: Provide a modular roadmap for long-term modelling and simulation capability across a city, corridor, enterprise or national network.

5. Service Description and Scope

Service functionality

The service utilises Skyral CORE, a modular platform for building and operating simulations as a long-lived capability:

- **Model implementation**: Construction of large-scale agent-based models representing millions of travellers, vehicles, consignments, assets, sites and behaviours across multimodal mobility and infrastructure networks.

- **Validation and calibration**: Applied scientists use statistical and empirical methods to ensure simulations reflect observed performance, demand patterns and operational constraints.

- **Integration and visualisation**: Engineering of map-centred visualisations (Lens) and Data Plane integrations into existing analytics, traffic and transport-control systems, asset systems and BI tools.

- **Scenario testing**: Use of Orchestrator and Scenario Service to run thousands of "what-if" simulations in parallel—for example, alternative corridor and route structures, maintenance plans, build sequences, outage scenarios, demand patterns or capacity options.

Scope of delivery

The engagement provides a multi-disciplinary technical team:

- **Leadership**: Mobility and infrastructure Subject Matter Expert and Product Owner.

- **Science & engineering**: Applied scientists, modelling engineers, solutions architects and full-stack/test engineers.

Roles and Responsibilities

Skyral offer this service based on 3 configurations of team size:

- **Small** - able to take on small development projects or augment existing development teams
- **Medium** - able to take on medium complexity projects and/or augment existing development teams
- **Large** - able to take on complex development activities with wider scope and/or augment existing development teams.

Large Team (complex development activities with wider scope and/or augment existing development teams)

Role	SFIA Level	Days (3-month)	Days (6-month)	Indicative activity focus
SME	5	32	63	Lead problem framing, domain assumptions, and validation of models and scenarios.
Solution Architect	5	16	32	Define overall solution architecture, integration patterns and non-functional constraints.
Modelling Engineer 1	4	63	126	Implement core model components, data structures and simulation logic.
Modelling Engineer 2	3	63	126	Build and maintain model features, parameter sets and supporting utilities.

Applied Scientist	5	63	126	Design experiments, calibration and analysis methods; interpret results with SME.
Back End Engineer	4	16	32	Develop and optimise services, APIs and back-end orchestration for the solution.
Front End Engineer	4	63	126	Build and refine user interfaces, visualisations and mission/operator views.
Production Engineer	4	16	32	Set up environments, pipelines, observability and deployment/operational tooling.
Product Owner	4	16	32	Own backlog, scope and prioritisation; align delivery with agreed outcomes.
Project Manager	4	16	32	Coordinate delivery, risks, dependencies and reporting across the engagement.

Medium Team (medium complexity development activities and/or augment existing development teams)

Role	SFIA Level	Days (3-month)	Days (6-month)	Indicative activity focus
Solution Architect	5	16	32	Define overall solution architecture, integration patterns and non-functional constraints.
Modelling Engineer 1	4	63	126	Implement core model components, data structures and simulation logic.
Modelling Engineer 2	3	63	126	Build and maintain model features, parameter sets and supporting utilities.
Applied Scientist	5	63	126	Design experiments, calibration and analysis methods; interpret results with SME.
Back End Engineer	4	16	32	Develop and optimise services, APIs and back-end orchestration for the solution.
Front End Engineer	4	63	126	Build and refine user interfaces, visualisations and mission/operator views.

Small Team (small development projects or augment existing development teams)

Role	SFIA Level	Days (3-month)	Days (6-month)	Indicative activity focus
Modelling Engineer 1	4	63	126	Implement core model components, data structures and simulation logic.
Applied Scientist	5	63	126	Design experiments, calibration and analysis methods; interpret results with SME.
Front End Engineer	4	63	126	Build and refine user interfaces, visualisations and mission/operator views.

Typical deliverables:

- Implemented models and scenarios for the agreed business and risk questions.
- Hosted environments and integrations into the customer's chosen hosting context.
- A final insights report summarising key findings, sensitivities and recommended actions or decision options.
- Where required a six-month Skyral CORE trial licence can be obtained through Skyral CORE provision.

Deployment models

Using Skyral SPORE, the service supports diverse hosting environments:

- Public cloud (e.g. Microsoft Azure) in the customer's tenant.
- Private, hybrid and community clouds used by operators, authorities and infrastructure owners.
- Sovereign and constrained environments where data residency, safety or regulatory constraints apply.

6. Benefits and Features

Service Features include:

- Builds validated synthetic models of transport networks and infrastructure systems.
- Supports multimodal demand, capacity, disruption, and investment scenario analysis.



- Uses Skyral Core for rapid mobility modelling and system integration.
- Workshops with planners, engineers, and infrastructure stakeholders.
- Calibrated models using mobility, network, environmental, and asset data.
- Models land-use interactions, modal shift, and system-wide dependencies.
- Scenario interface enabling exploration of strategic planning options.
- Hosted decision-support environment for multi-agency collaboration.
- Insights report summarising impacts, trade-offs, and recommended strategies.
- One-month post-delivery support for embedding findings operationally.

Service Benefits include:

- Test infrastructure and mobility strategies before committing capital investment.
- Understand system-wide impacts of demand growth, modal shift, or disruptions.
- Identify high-impact interventions improving network performance and reliability.
- Quantify resilience under climate, operational, or asset-failure scenarios.
- Support long-term spatial planning with integrated mobility-land-use modelling.
- Reveal unintended consequences of timetable, routing, or capacity changes.
- Strengthen business cases with validated modelling and economic evidence.
- Align agencies using a shared, transparent modelling environment.
- Evaluate emissions, congestion, and environmental outcomes holistically.
- Enable iterative, adaptive mobility planning using reusable synthetic models.

7. Dependencies and prerequisites (including customer responsibilities)

These services are delivered against a customer-defined **north-star** outcome, with required inputs and outputs specified upfront and then managed through an agile backlog.

Key prerequisites (customer side):

- Clear articulation of desired outcomes, priority questions, success metrics and non-functional constraints, agreed at initiation and used to shape the initial backlog (epics, features and acceptance criteria).

- Provision, at the start of the engagement, of requisite inputs such as domain knowledge, architectural or process views, key datasets, reference models and relevant policies or standards.

- Access to empowered product-owner and SME stakeholders who can attend ceremonies, review increments, re-prioritise the backlog and formally accept

completed work.

- Confirmation of any platform, security, regulatory or interoperability constraints that affect how Skyral platforms are used or how Skyral assets are integrated into other systems.

This work assumes:

- Development on a Skyral platform (e.g. CORE and associated components) and/or

- Integration of Skyral assets into other customer or partner systems, with third-party dependencies identified and agreed at the outset.

8. Onboarding and agile delivery approach

Onboarding establishes the north star, guardrails and initial backlog; delivery then proceeds in an agile way towards the customer-defined requirement.

Indicative approach:

- **Kick-off and north-star definition**
    - Confirm target outcomes, users, use cases and scope across domains such as defence, healthcare, mobility and infrastructure, or business optimisation.
    - Define requisite inputs and outputs (e.g. environments, models, integrations, documentation, insights), capturing them as backlog items with clear acceptance criteria.
- **Backlog creation and refinement**
    - Translate the north star into an initial, prioritised backlog covering model features, data pipelines, UX/views, integrations, validation and documentation.
    - Agree iteration cadence, ceremonies (backlog reviews, showcases, retros) and decision forums with the customer product owner.
- **Iterative build and validation**
    - Deliver increments of capability on Skyral platforms or integrated environments, demonstrating value early and adjusting priorities via



backlog reviews rather than changing the overall north star.

    - Incorporate feedback, test results and data learnings into backlog refinement so the solution converges on the agreed requirement within the fixed 3- or 6-month window.

- **Closure and transition**

    - Stabilise and document the most valuable capabilities in final iterations; prepare for handover and any follow-on phases.

    - Confirm that agreed outputs and acceptance criteria are met, and capture a forward backlog/roadmap for future development where appropriate.

9. Configuration, customisation and integration

Configuration, customisation and integration are driven by the customer-defined requirement, with Skyral providing the agile engineering, modelling and data work to reach it.

Configuration and customisation:

- Configure Skyral assets (CORE components, models, UX, data structures) or integration patterns to reflect domain specifics, data schemas, KPIs and non-functional requirements expressed in the initial scope and refined backlog.

- Evolve fidelity (e.g. level of detail, time resolution, geography), scenario sets, visualisations and user interactions iteratively, guided by backlog priorities and customer-owned acceptance criteria.

Integration (Skyral platform or hybrid deployments):

- Where development is on Skyral platforms, configure environments, access controls and operational practices to align with customer architecture, security and governance.

- Where Skyral assets are integrated into other systems, define and implement required data, API or workflow integrations as backlog items, respecting third-party constraints and patterns agreed at the start.

10. Service levels and performance (including availability targets)

Service levels focus on predictable, high-quality agile delivery towards the agreed north star, not on 24×7 operational SLAs.

- **Delivery cadence and governance**
    - A 3- or 6-month delivery plan agreed at initiation, with iteration boundaries, backlog-review cycles and key decision points aligned with customer governance and planning cycles.
    - Regular showcases to demonstrate increments against the north star, manage trade-offs between scope, time and fidelity, and confirm ongoing alignment to priorities.
- **Responsiveness and platform behaviour**
    - Target response to engagement-related questions and backlog changes within agreed working hours and timeframes, with escalation routes for issues that could affect critical milestones.
    - For work delivered on Skyral platforms or Skyral-hosted environments, operational behaviour (e.g. performance, availability) follows Skyral CORE/SPORE practices for the chosen hosting model; formal numerical availability SLAs are normally defined in separate managed-service or platform agreements, not this build-focused engagement.

11. Support model and service desk (hours, channels, response/resolve targets)

Support during the engagement is focused on agile delivery and collaboration rather than a generic, ticket-based helpdesk.

- Primary support is provided by the named Skyral team (Product Owner, SME, Applied Scientist, Engineers), through agreed channels such as email, collaboration tools and scheduled ceremonies/workshops.
- Coverage is typically during UK business hours, with response and resolution expectations aligned to iteration cadence and key milestones, and defined in the engagement plan.



- Any issues affecting temporary Skyral-hosted environments used during development are triaged and resolved by the Skyral team using CORE/SPORE operational practices; formal incident and SLA frameworks, if required, are handled under separate platform/managed-service agreements.

12. Security model and accreditations (including any ISO, Cyber Essentials, data protection)

Security is engineered into the work from the outset, whether building on Skyral platforms or integrating Skyral assets into other systems.

- Development follows secure-by-design and DevSecOps practices, including controlled environments, access management, automated testing and monitoring appropriate to the sensitivity of each deployment.

- Skyral platforms support deployment into secure cloud, on-premises, sovereign and air-gapped environments, up to SECRET in defence contexts, with consistent SPORE-based controls.

- Skyral holds Cyber Essentials, Cyber Essentials Plus, ISO 9001 and ISO 27001 certifications, with evidence available on request.

- Any processing of personal, operational or commercially sensitive data follows applicable data-protection law and customer policies, with roles and responsibilities defined in contracts and data-processing agreements.

13. Data management (location, retention, backup, restore, portability)

Data management is aligned to the customer's regulatory and governance needs and the chosen hosting model.

- **Location** – Environments can run in cloud, on-premises or sovereign infrastructures via SPORE, allowing data residency and classification requirements to be met.

- **Retention and backup** – Working data and artefacts are typically retained for the duration of the engagement plus an agreed period to support handover and follow-on work, unless customer policies require otherwise; backup and restore characteristics follow the underlying hosting platform's capabilities.

- **Portability and export** – Final outputs and agreed artefacts (e.g. models at

suitable granularity, configuration sets, documentation) are provided in commonly used formats to support reuse by customer teams and partners; further export and documentation support can be provided subject to licensing and IP terms.

14. Business continuity and disaster recovery approach

For this build-focused service, continuity is about sustaining momentum towards the north star despite issues affecting people, tools or environments.

- Plans allow resequencing of work so that design, modelling, analysis or documentation can proceed while specific systems or datasets are restored.

- DR metrics and obligations for any enduring environments or platforms are normally covered under separate platform or managed-service agreements; they are not typically defined at the agile development engagement level.

15. Service usage limits and constraints

This is a scoped, fixed-term agile development service rather than an open-ended modelling or support arrangement.

Typical constraints:

- Duration: standard 3- or 6-month engagements, with scope planned to deliver the highest-value increments within that window; larger ambitions may be staged across multiple phases.

- Scope and fidelity: emphasis on delivering valuable, usable capabilities aligned to the north star, rather than exhaustive coverage of every scenario, system or feature in a single phase.

- Data availability: where data is limited or incomplete, some features or metrics may remain indicative; assumptions and limitations are documented so that later phases can refine or extend them.

16. Pricing model and units (linking to framework pricing rules)

Pricing reflects a fixed-term agile delivery engagement with a defined team mix and timeframe, aligned to framework rules.



- Core 3- or 6-month engagements are priced as fixed-scope work packages based on agreed outcomes, team composition and cadence.

- Additional phases or scope extensions (e.g. extra features, integrations, domains or environments) are handled through agreed change processes and may be priced as further fixed-price packages or time-and-materials under the relevant rate card.

- Any ongoing platform hosting, managed service or extended support is priced and contracted separately from this development engagement.

17. Change management (how changes to scope or volumes are handled)

Change is managed within an agile framework, preserving the north star while allowing backlog reprioritisation.

- The initial backlog and high-level scope are agreed at kick-off; within that, priorities and details are adjusted via regular backlog reviews with the customer product owner.

- Where new requirements would materially alter scope, cost or timelines (e.g. major additional integrations, domains, or fidelity changes), they are assessed jointly and, if accepted, incorporated via formal change notes or follow-on phases.

- Minor changes and refinements are handled through normal agile backlog management, making trade-offs within the fixed engagement duration.

18. Exit and offboarding (including data export and handover)

Exit ensures the customer can use, operate and extend what has been built, with clarity on data and IP.

- Final iterations focus on stabilisation, documentation and handover of agreed outputs (environments, models, configurations, integrations, documentation, insights).

- Handover sessions are run for nominated users and technical staff, covering operation, basic configuration and how to work within Skyral CORE governance or integration patterns.

- Customer data in Skyral-controlled environments is removed or anonymised in

line with contractual retention and security requirements, and access to temporary environments can be wound down or transitioned under separate arrangements.

- Background IP in Skyral platforms and generic components remains with Skyral; customer-specific code, configurations or models are owned and licensed as set out in the contract.

19. Key assumptions and exclusions

Key assumptions:

- The customer provides timely access to people and data, participates in agile ceremonies and is able to make prioritisation decisions to keep delivery on track.
- The engagement focuses on design, build, integration and validation of models and environments, not on long-term operations or full organisational change and implementation.

Key exclusions (unless explicitly added to scope):

- Ongoing 24×7 operational support and incident management for live environments (covered by separate managed-service or platform agreements).
- Large-scale re-engineering of legacy systems, extensive third-party product customisations or activities outside the agreed backlog and acceptance criteria.
- Formal regulatory or safety cases: outputs can inform them but do not replace formal assurance processes.

20. Related services and optional add-ons

These agile build services sit alongside other Skyral offerings that can be combined as needed across defence, healthcare, mobility and infrastructure, and business optimisation.

Typical related services:

- Problem Solving / Decision Support as a Service – upstream discovery and framing to define levers, metrics and scope for Synthetics Development phases.
- Domain-specific Synthetics Development or digital-twin programmes (e.g. defence and national security, health, mobility and infrastructure, networks, business optimisation) that extend or industrialise the capabilities created in this engagement.

Optional add-ons:

- Additional deep-dive modules, extra integrations or extended experimentation/analysis packages delivered as further agile phases.
- Transition and managed-service options for long-term hosting, operation, enhancement and support of Skyral-based capabilities.

21. Contacts

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