**Development Concept Template**

**1. Introduction**

* **Purpose**: Briefly state the purpose of this document—to outline the strategy, processes, and steps required to develop the preferred system concept into a fully realized system. It serves as the basis for planning, scheduling, and allocating resources for the system’s development.
* **Scope**: Define the boundaries of the development concept, specifying what aspects of the system's engineering, building, and maturation are covered, from architectural definition through initial delivery and verification.

**2. Background and Context**

* **Problem Statement/Opportunity**: Describe the strategic problem or opportunity that the system addresses, as identified during earlier concept exploration.
* **Mission/Business Objectives**: Summarize the overarching mission goals or business drivers motivating the system's development. These objectives are informed by upstream artifacts such as the Mission Concept and System Concept.
* **Selected System Concept**: Clearly identify the high-level system concept that has been chosen as the basis for development, acknowledging it as the outcome of selecting and validating the best system approach.

**3. Chosen System Configuration (High-Level)**

* **Major Subsystems and Architecture**: Provide a high-level overview of the selected system's major subsystems, its architectural framework, and key interfaces. This section directly builds upon the System Architecture.
* **Functional Allocation**: Describe how the system's primary functions are allocated to components or subsystems, establishing an initial functional baseline for detailed design.

**4. Development Strategy & Approach**

* **Implementation Methods**: Detail the overall engineering and build strategy, including the chosen development methodologies (e.g., iterative, spiral, agile, waterfall, model-based development, prototyping). This defines the technical and engineering processes for creating the system.
* **Tools and Processes**: Specify the key engineering tools, standards, and processes that will be utilized during development.
* **Performance Parameters & Validation Strategy**: Document the derived system performance parameters and outline how these will be validated and verified throughout the development process.

**5. Planning and Management**

* **Development Schedule**: Outline the high-level timeline, key milestones, and major activities for engineering, integration, testing, and initial delivery. This schedule is closely linked to the Cost and Schedule Concept.
* **Resource Allocation (Preliminary)**: Provide initial considerations for human resources, equipment, and facilities needed for development, informed by preliminary budget and schedule estimates from the concept stage.
* **Planning Documents**: Indicate how this concept informs the development of more detailed planning documents such as Project Management Plans (PMPs), Systems Engineering Management Plans (SEMPs), Work Breakdown Structures (WBS), and Product Breakdown Structures (PBS).

**6. Trade Study Results & Rationale**

* **Summary of Alternatives Considered**: Briefly describe the alternative development approaches or design options that were analyzed during the concept exploration phase.
* **Justification for Chosen Approach**: Provide the rationale for selecting the preferred development concept, explicitly summarizing the analysis and trade-offs that led to this decision, considering factors such as risk, cost, feasibility, and performance.

**7. Risk and Issue Management**

* **Identified Development Risks**: Identify potential technical and programmatic risks inherent to the chosen development approach (e.g., technology maturity, integration challenges, resource availability).
* **Mitigation Strategies**: Outline preliminary strategies for identifying, analyzing, and mitigating these risks. This section is informed by the broader Risk Management Concept.

**8. Lifecycle Considerations (High-Level Integration)**

* **Integration Approach**: Describe the high-level strategy for how system elements will be assembled and tested to form a cohesive whole, linking to the Integration Concept.
* **Test and Evaluation Approach**: Outline the strategy for verifying and validating the system during and after development, ensuring it meets requirements. This section directly links to the Test and Evaluation Concept.
* **Security Considerations**: Address how security will be built into the system during development to meet operational and regulatory requirements, informed by the Security Concept.
* **Training Implications**: Note any initial implications for training users and support personnel that arise from the development approach, linking to the Training Concept.

**9. Purpose and Value**

* **Translates Concept to Action**: Transforms a promising system idea into a practical, engineered solution.
* **Guides Engineering Activities**: Provides a clear roadmap for engineering, integration, and testing efforts, ensuring alignment with stakeholder needs and system requirements.
* **Supports Decision-Making**: Documents the rationale and chosen approaches, helping stakeholders and engineers understand the development path selected.
* **Lifecycle Alignment**: Ensures that the technical realization aligns with the broader Acquisition Concept, which governs how the system is procured and managed.

**10. Recommended Representations**

* **Narrative Text**: For detailed explanations of the development strategy, rationale, and key decisions.
* **Tables**: For summarizing functional allocations, performance parameters, and risk mappings.
* **Diagrams**: Visualizations such as block diagrams, functional flowcharts, and high-level architecture models to communicate the development approach. SysML diagrams like Block Definition Diagrams (BDD) and Use Case diagrams can capture the system context and functions.

**11. Integration with Other Systems Engineering Artifacts**

The Development Concept is a central artifact that builds upon and informs many others:

* **Acquisition Concept**: The Development Concept is governed by the Acquisition Concept, which defines how the system will be procured and managed.
* **System Concept**: The Development Concept builds directly on the System Concept, detailing how the system's architecture, components, and interfaces will be implemented.
* **Mission Concept / ConOps / OpsCon**: While the Development Concept focuses on "how" to build, it is driven by the "what" and "why" articulated in the Mission Concept, Concept of Operations (ConOps), and Operational Concept (OpsCon).
* **System Architecture Concept**: The Development Concept specifies the detailed design and engineering of the system architecture and its elements.
* **Cost and Schedule Concept**: Development activities are constrained by and must align with the project’s budget and timeline as defined in the Cost and Schedule Concept.
* **Risk Management Concept**: Development inherently involves technical and programmatic risks, which are identified and managed in conjunction with the Risk Management Concept.
* **Test and Evaluation Concept**: The Development Concept includes plans for validating and verifying the system during and after development to ensure it meets requirements.
* **Integration Concept**: It ensures that the system is developed in a way that supports seamless integration with other systems or subsystems.
* **Security Concept**: Security must be built into the system during development to meet operational and regulatory requirements, as informed by the Security Concept.
* **Training Concept**: The Development Concept may influence the design of training materials and simulators for users and operators.
* **Deployment Concept, Sustainment Concept, Disposal Concept**: The Development Concept leads into and lays the groundwork for these downstream lifecycle concepts, ensuring the system is designed for successful fielding, long-term support, and eventual retirement.

**12. Special Considerations and Best Practices**

* **Early Development**: Preliminary lifecycle concepts, including the Development Concept, are established early in the Business or Mission Analysis process (Concept Stage/Pre-Phase A).
* **Iterative Refinement**: Like all concepts, the Development Concept is refined through an iterative and recursive process as understanding of the system solution matures and expectations change.
* **Trade-Off Analysis**: Systematic trade-off analyses are crucial in this stage to balance cost, schedule, and technical performance when selecting the preferred development approach and design solutions.
* **Greenfield vs. Brownfield**: The rigor and specific details within the Development Concept may vary depending on whether it's a completely new system (greenfield) or a modification to an existing one (brownfield). Greenfield projects typically require more comprehensive definition across all lifecycle activities.
* **Avoiding Technical Debt**: Proper systems engineering practices in this phase, including early definition and addressing risks, help avoid technical debt, which represents accumulated risk due to deferred work.