TOTAL SYSTEM DEVELOPMENT
STRATEGY OPTIONS

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1. GENERAL

1.01 ***Purpose:*** This Bell System Practice (BSP) describes strategy options in the Total System Development (TSD) approach to information system development. The TSD process has always included the flexibility for modifications to phase structures and documentation packages at the discretion of project management. This flexibility has not been utilized effectively in many development groups. An "all or nothing" approach has often been taken to TSD usage. This BSP restates the concept of TSD strategy options and presents a ***sample*** customization of the TSD process for projects of moderate impact.

1.02 Whenever this section is reissued, the reason(s) for reissue will be given in this paragraph.

1.03 ***Applicability:*** This BSP is a guideline. Use of the approach described in the BSP is at the option of each information system development organization. The BSP is designed for use by the project manager responsible for selecting the system development strategy as part of the overall system development project plan (see Section 007-208-310, *Project Management*). This BSP does not present the only way to customize the TSD process. The example shown in Part 3 is given to illustrate how the project manager can use the inherent flexibility of TSD to fit the requirements of a particular project.

1.04 ***Related BSPs:*** The followng BSPs are referenced in this document:

SECTION	TITLE
007-220-300	Total System Development—Milestones
007-208-310	Project Management
007-227-310	Developmental Documentation Specifications
007-230-210	System Deliverable Documentation

2. DEVELOPMENT OPTION CONSIDERATIONS

2.01 The normal TSD process consists of eight phases with a full set of developmental documentation and frequent formal review points. The TSD modifications could involve a combination of phases or a combination of activities within or across TSD phases, with consolidation of developmental documentation and fewer review points. The decision to use a full TSD approach versus a modified version of TSD should be based on the following premise:

(a) The greater the impact of a project/system failure, the more thorough, methodical, and iterative the development process should be.

(b) The more shortcutting that is done during development, the greater the risk for inadequate identification of requirements and constraints, inappropriate system design, and future operational problems.

2.02 In deciding to use full TSD or a modified version you should consider the impact factors listed below. For some projects, additional factors

may also need to be considered. Specific values for these impact factors should be assigned locally, based on company policy and the development/operations environment. All impact factors should be considered based on the premise cited in paragraph 2.01.

A. Impact Factors

- Cost (system development and operation)
- Number of Interfaces (other systems impacted)
- Number of Development/Maintenance People
- Number of User Groups Impacted
- Extent of Information Systems Organization (ISO) Groups Impacted
- Number of Internal Functions Mechanized (complexity)
- Potential for System Enhancements (volatility)
- Duration of Development (calendar months/years)
- Imposed Due Date (external to corporation) Federal Communications Commission (FCC), Security and Exchange Commission (SEC), Vendor, Legal, Regulatory
- Project Priority
- Vendor Involvement in Development (partial or total)
- Use of New Technology
- Projected Life of System.

2.03 An analysis of project/system specific impact factors will provide a basis for making the decision about what development strategy will be most appropriate. The project manager must determine which impact factors are relevant for the project. The example in Fig. 1 represents a way of examining impact factors to support the decision process.

2.04 A modified TSD strategy provides a controlled approach to the system development effort while reducing the documentation and project management effort. Although fewer review and approval points will be needed, it still provides a structure to exercise project control, to identify problems early, and to provide a system that meets corporate business objectives.

2.05 An important part of utilizing a TSO strategy option is the ability to shift from a modified approach back to full TSD, or vice versa, at any point during the development effort. For example, a modified approach might be selected by the project manager based on the initial project proposal. As system analysis proceeds, the business objectives and user needs could cause the scope of the project to be enlarged. An examination of the impact factors at this point could dictate the need to shift to a full TSD. The project manager must then determine the most efficient and beneficial point to make the transition.

2.06 If a modified approach is selected, adjustments must be made to the project review and approval milestones and the developmental information which will be available at the adjusted milestones (See Section 007-220-300, *Total System Development—Milestones).*

2.07 A modified TSD approach will not change the requirements for the deliverable information as described in *System Deliverable Documentation* (Section 007-230-210). That standard, however, does discuss flexibility in packaging the deliverable information, eg, by combining documents.

3. SAMPLE TSD OPTION

3.01 The sample TSD modification that follows is an option that could be used for projects with moderate impact. It assumes that some type of project request, similar to a proposal phase document, has been initiated. The Feasibility and Definition Phases are combined into a single Anaylsis Phase. The extent to which the project request includes information on user needs, business and system objectives, and the existing environment will influence the scope of data collection during the Analysis Phase. The Preliminary and Detail Design Phases are also combined into one Design Phase. The Implementation Phase remains as in full TSD but with condensed developmental documentation. The Conversion Phase incorporates activities from the Performance Review Phase. Paragraphs 3.02 and 3.03 show these modified phases and the condensed developmental information sets recommended for each phase.

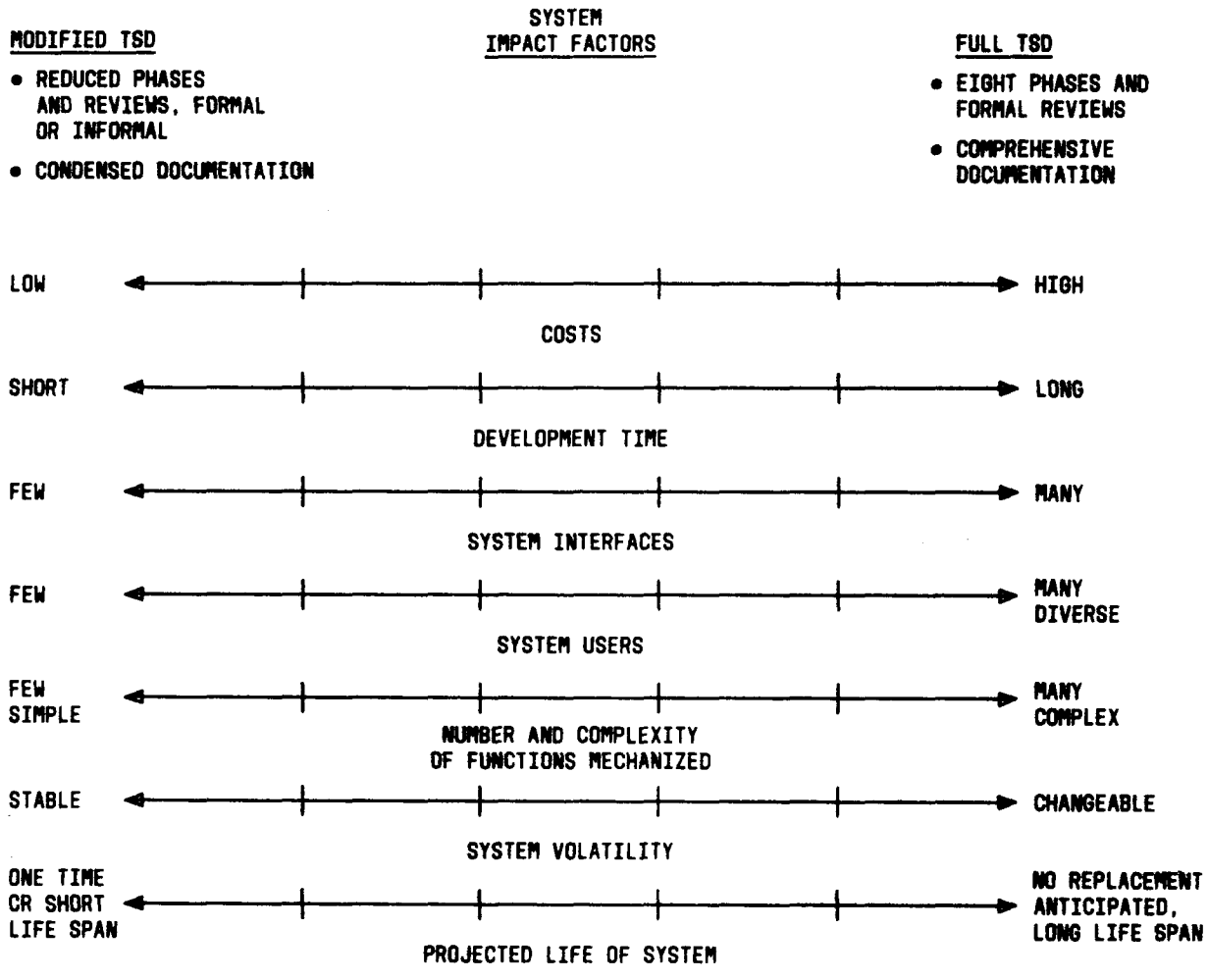

Fig. 1—System Impact Factors

3.02 The sample modified TSD phase structure and recommended information sets to be developed during each phase are as follows:

PHASE	INFORMATION DEVELOPED
I. Analysis	A. System Structure B. Conversion Information C. Control/Reliability Requirements D. Economic Data E. Analysis Summary
II. Design	A. System Level Specification B. PSS Specification C. CSS Specification D. Test Plans E. Conversion Specification F. Resource Requirements and Specifications G. Controls/Reliability Information H. Design Summary
III. Implementation	A. Test Instructions B. PSS Implementation C. CSS Implementation D. Test Results E. Operating/Service Agreements F. Implementation Summary
IV. Conversion	A. Acceptance Results B. Conversion Summary

3.03 The following paragraph provides a more detailed list of what each information set could contain with a cross-reference to development components in Section 007-227-310. These components can be referenced, as needed, to identify potential content details appropriate for a project using this modified approach. For a modified approach other than the one described here, a similar listing of developmental information should be prepared by the project manager.

PHASE	INFORMATION DEVELOPED
I. Analysis (Feasibility/ Definition)	A. System Structure 1. Function Structure (3.07*) 2. Function Description (3.08) 3. System Model (2.09) 4. System Output Requirements (3.02, 2.06) 5. System Input Requirements (3.03, 2.07) 6. System Data Requirements (3.04, 2.08) 7. Group/Element Definition (3.05) B. Conversion Information 1. Data Conversion Considerations (3.06) C. Controls/Reliability Needs 1. System Control Requirements (3.10) 2. System Reliability Requirements (3.11) D. Economic Data 1. System Resource Estimates (2.11) 2. Developmental Estimates (2.12) 3. Economic Analysis (2.13) E. Analysis Summary 1. System Overview (2.02 through 2.05, 2.10, 3.12) 2. Potential Problem Areas (3.09) 3. Findings and Recommendations (3.13, 2.14)

3.04 Information Set Content Reference (Source: Section 007-227-310):

PHASE	INFORMATION DEVELOPED
II. Design (Preliminary/ Detail Design)	A. System Level Specification 1. Function Allocation (4.01) 2. System Output Specification (4.02) 3. System Input Specification (4.03) 4. Subsystem Function Structure (4.04) 5. Subsystem Function Description (4.05) 6. PSS/CSS Interface Specification (4.14) 7. Group/Element Specification (5.14) B. PSS Specification 1. Task Description (4.06) 2. Position Specification (5.01, 4.07) 3. Support Position Specification (5.02, 4.08) 4. Position Grouping Into Jobs (5.03) 5. Training Specifications (5.23) 6. Training Overview (5.24) 7. Course Evaluation and Maintenance (5.25) 8. Form Specifications (5.07) 9. Manual File Specifications (5.08) C. CSS Specification 1. Module Specification (5.15, 4.09) 2. Program Specification (5.16, 4.10) 3. Physical Record Specification (5.09, 4.11) 4. CSS File Specification (5.10) 5. Physical Segment Specification (5.11, 4.12) 6. Physical Data Base Specification (5.13, 4.13) 7. Data Set Group Specification (5.12) 8. Messages and Codes (5.17) 9. CSS Job Specification (5.18) 10. CSS Job Flow (5.19) 11. CSS Flow (5.20) D. Test Plans 1. CSS Verification Test Plans (5.21) 2. PSS Verification Test Plans (5.06) 3. System Validation Test Plan (5.35) 4. System Certification Test Plan (5.36) E. Conversion Specifications 1. System Conversion Requirements (4.15) 2. System Conversion Plan (5.37) F. Resource Requirements and Specifications 1. Equipment Specifications (5.26, 4.18) 2. Facility Planning (5.31, 4.19) 3. Transportation Specifications (5.27, 4.20) 4. Data Processing Center Computer Hardware Specifications (5.29, 4.21) 5. Computer Hardware Sizing Guidelines (5.22) 6. Software Specifications (5.30, 4.22) 7. Communications Network Specifications (5.28, 4.23) 8. System Personnel Guidelines (5.04, 4.17) 9. Organizational Considerations (5.05)

*The paragraph numbers refer to comparable developmental components in Section 007-227-310 which may be used as source reference.

PHASE	INFORMATION DEVELOPED
II. Design Preliminary/ Detail Design (Contd)	G. Controls/Reliability Information 1. System Control Description (5.32) 2. System Reliability Measures Description (5.33) 3. System Performance Monitoring Capabilities (5.34) H. Design Summary 1. Status and Recommendations (5.39, 4.26) 2. System Overview (5.38, 4.24) 3. Refined Economic Analysis (4.35)
III. Implementation	A. Test Instructions 1. PSS and CSS Test Instructions (6.01, 6.02) 2. System Validation Test Instructions (6.03) 3. System Certification Test Instructions (6.04) B. PSS Implementation 1. Position Procedures (6.05) 2. Support Position Information (6.06) 3. Administrative Requirements (6.07) 4. Training Course Description (6.19) 5. Student Course Material (6.20) 6. Instructor Course Material (6.21) 7. Training Administration Requirements (6.22) C. CSS Implementation 1. Logic Flow (6.16) 2. Module Listing (6.17) 3. Executable Program (6.18) 4. DPC Job Preprocessing Requirements (6.09) 5. DPC Job Media Distribution (6.10) 6. DPC Job Setup Information (6.11) 7. DPC Job Restart Procedures (6.12) 8. DPC Job Output Control (6.13) 9. Job Control Language (6.14) 10. Recovery Procedures (6.15) D. Test Results 1. PSS and CSS Verification Test Results (6.23, 6.24) 2. System Validation Test Results (6.25) E. Operating/Service Agreements 1. DPC Scheduling Requirements (6.08) 2. Operating Agreements (6.26) F. Implementation Summary 1. Status and Recommendations (6.27)
IV. Conversion	A. Acceptance Results 1. System Certification Test Results (7.01) 2. Completion Agreements (7.02) B. Conversion Summary 1. Status and Recommendations (8.06, 7.03) 2. System Evaluation (8.01 through 8.05)