

## TOTAL SYSTEM DEVELOPMENT DEFINITION PHASE GUIDELINES

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**1. GENERAL**

**1.01** The purpose of the Definition Phase is to develop the detailed requirements and functions for the system model approved at the end of the Feasibility Phase. Some of these details may have been documented during feasibility if the details were uncovered during examination of the existing environment or user requirements. Usually, the input to the Definition Phase is a model of the new system containing high-level functions and data groups.

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

**1.03** This section is a guideline. It provides expanded information in support of the concepts of Total System Development specified in Section 007-220-300\*, Total System Development — Milestones.

\* Check Divisional Index 007 for availability.

**1.04** During the Definition Phase, informational requirements are defined in terms of the outputs to be provided by the system, the inputs required by the system, and the flow of data through the system. By defining the system inputs and outputs, the system boundaries are established. For that reason, it is necessary to examine the functions which provide input or utilize output so that the boundaries can be properly placed and all developmental requirements identified.

**1.05** Functions defined are those that must occur within the system in order to produce the system outputs specified. At the highest level, the system's function structure will define the basic data flow through the system. As more detailed functions are identified, the structure begins to reflect the user's specific requirements for how business is to be conducted utilizing the system (ie, how specific transactions are to be handled, what formulas and calculations must be applied, how legal and control requirements are to be satisfied, etc). Thus, the development of functional requirements usually demands a great deal of data collection, procedure verification, and user interaction.

**1.06** The thrust of analysis during the Definition Phase is to define requirements. Decisions concerning the specific means by which these requirements will be satisfied are deferred until Preliminary Design. However with the information produced during the Definition Phase, it is possible to reevaluate the boundaries, interfaces, and conceptual system models developed during feasibility. Necessary modification to the models or to the system objectives should be identified and reviewed, as necessary, with user and approval personnel before proceeding into the Preliminary Design phase.

**1.07** Toward the end of system definition, several additional scoping decisions will have to be made concerning:

- (a) The proper boundaries of the system to be developed

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- (b) Which portions of the system should be developed by the project team, and which portions by other groups (user, local installation teams, groups responsible for interfacing systems, etc)
- (c) Whether the entire system should be developed at one time or whether development should be phased.

System definition must address the entire system. However, the subsequent responsibilities of the project team are dependent upon these types of scoping decisions.

## 2. SYSTEM OUTPUT REQUIREMENTS

**2.01** The definition of output requirements is critical to the development of the total set of system requirements since the system's input and functional requirements are dictated or derived from the output requirements. Therefore to assure a complete and accurate system definition, all system outputs must be identified and fully described during the Definition Phase.

**2.02** The output data should be defined in terms of the information required by the users. While it is necessary at some point in the development effort to determine the form in which the output data will appear, the major activity during definition is to determine what data the system must produce. If options on output characteristics exist (ie, there is no user demand for a particular characteristic), the option should be noted. Optional design decisions should not be made at this point.

**2.03** For each output, the following characteristics should be defined:

- (a) Information content requirements
- (b) Information quality and control requirements
- (c) Output parameters such as volume, schedule, and volatility
- (d) Output distribution and users
- (e) Information usage requirements
- (f) Control requirements (eg, security, integrity of data, etc).

**2.04** Some of the outputs to be provided by the new system may be produced currently by an exist-

ing system. If so, the determination of those output requirements should be fairly straightforward. However, each existing output must be analyzed to determine if any changes are required to satisfy new interface requirements or to improve output effectiveness. Of particular importance (if the output is used by people), is an evaluation of how well the information is supporting actual work functions. Improvements may be possible by modifying output content, organization, accuracy, schedule, usage procedures, etc.

## 3. SYSTEM INPUT REQUIREMENTS

**3.01** For each output required by the system, the input data must be identified which will produce the output. The level of detail documented on the input is determined by the level of detail to which the output data has been defined. To aid in this analysis, it is useful to distinguish between **primary** and **derived** output. **Primary** data enters and leaves the system in identical form, with the exception of editing or format changes. **Derived** data, on the other hand, is created inside the system usually through the manipulation of input and/or stored data.

**3.02** Each output data element should be analyzed to determine whether the information is currently (or potentially) available to the system in the required form (ie, as primary data). The corporate data directory and/or data catalog should be utilized in making this determination. If an existing data source is found, data attributes such as quality, timeliness, security, and edit and update criteria should be evaluated to determine if the data will satisfy the requirements of the new system. Also, the feasibility of accessing the data must be analyzed, particularly in terms of operational and performance considerations. Though the data may reside in an existing data base, it may not be technically, economically, operationally feasible, or efficient to extract it from that source. If such a situation exists, steps should be taken to identify the options available — restructuring the source data base, use of alternative data sources, need for data redundancy, etc.

**3.03** For derived output data, all of the raw data required for computation of the output must be identified. In order to do this, the nature of the computation itself (formula, calculation, data manipulation, etc) must also be defined. Once the raw data requirements have been defined, available input

sources should be determined in the manner previously described.

**3.04** For existing input data, all potential data sources should be identified and evaluated, and the best source selected. If any modifications are required to the system or function that provides the input data, appropriate change specifications should be prepared and tentative work commitments obtained before the choice of the input source is finalized. If the selection of an input source is dependent upon the system architecture that is utilized, the final decision should be deferred until Preliminary Design.

**3.05** If input data is not currently available and cannot be derived from available data, new data must be defined and a data source identified. In establishing requirements for new data, it is important that the need for such data be justified and that the feasibility of data capture and entry into the system be carefully analyzed. The collection of new data is often costly, and this expense must be offset by the benefits to be gained by the user of the data. If the cost/benefit relationship is not satisfactory, the informational requirements of the system should be reexamined and/or alternative outputs explored.

#### 4. SYSTEM DATA REQUIREMENTS

**4.01** Once the detailed input and output requirements have been specified, it may become apparent that certain data should be stored within the system. This may be input data which must be maintained throughout the life of the system or data which is used within the system to produce a terminal output. In this phase, a logical data base structure should be developed to show usage and/or relational characteristics of the data.

**4.02** The data should be identified without reference to how or at what point in the processing system it should be stored. During Preliminary Design, the decision will be made to store this data in a data base, master file, table, program, etc.

**4.03** As the system data is identified, the following information should be described:

- (a) Storage requirements (eg. accessibility requirements)
- (b) Volatility of the data
- (c) Accuracy requirement

(d) Range or actual values

(e) Volume

(f) Constraints (eg, restrictions imposed by company policy or outside sources, volume restrictions, interfaces with other systems, etc)

(g) Control requirements (eg, integrity, security, etc)

(h) Data conversion requirements.

#### 5. SYSTEM FUNCTIONS

**5.01** The input/output requirements dictate the nature and types of functions (or processes) that must be performed in the system and if they will be performed by mechanized or manual means. The key question is, "What must be done to transform the input into the output?" The answer to this question will describe the functions. At this point (Definition Phase) of the development process, functions would be described as **withhold taxes** or **order stock**. The functions should be free of qualifying remarks about how they are to be performed. The users, who will review the functional requirements, should be able to relate the functions described to their basic business activities.

**5.02** The technique of deriving the system functions from input/output requirements is called function analysis. The technique of function analysis will be used throughout the Definition, Preliminary Design, and Detail Design Phases. As more design decisions are made concerning the nature of the system output, function analysis can be performed to identify the more detailed system functions required.

**5.03** Function relationships should be specified at this point if they follow logically from the facts that have been established through investigation of the system environment and constraints. For example, it may have been possible for the system analysts to identify dependencies upon which the sequencing of the functions must be based. A few of the more common dependencies are:

- (a) **Input Dependency:** If function A has the capability of producing an output which function B requires as an input and there is no other way to acquire that input, then function B is

wholly dependent on function A and must be sequenced accordingly.

(b) **Time-Base Dependency:** Function B is performed daily; function A involves a weekly cumulation of data from function B. It follows that function A must be shown in the sequence following function B.

**5.04** Other factors must be identified which may impact function sequencing, such as similarities between function and organizational responsibilities that can constrain the way in which functions must be performed in the system. If no apparent sequencing constraints have been identified, the options open should be noted. No arbitrary decisions about sequence should be made at this point.

**5.05** To facilitate review of the system functions, a visual representation should be prepared. Such a representation could be in the form of a conventional flow chart, a HIPO diagram, or a data flow diagram. Selection of the appropriate media depends on what the development team will utilize in later phases, and what will facilitate the users' understanding of the function scheme during the end-of-phase review.

**6. SYSTEM CONTROLS AND RELIABILITY REQUIREMENTS**

**6.01** During identification of the input/output requirements and function analysis, certain critical products and potentially vulnerable system processes may have been identified. These critical items must be highlighted through specification of system control and reliability requirements.

**6.02** Basically, there are two types of controls:

- (a) Data handling and access controls (ie, edits, validations, output controls, etc)
- (b) Administrative controls (ie, system measurement tools, productivity reports, audit trails, etc).

**6.03** System reliability requirements relate to identified output needs in the areas of availability, recovery, etc.

**6.04** Specific mechanisms for implementing the controls and reliability requirements cannot

be defined until functional allocation has occurred during the Preliminary Design Phase.

**7. END-OF-PHASE ACTIVITIES**

**7.01** The systems analyst should prepare a recommendation at the end of the definition outlining the following points:

- (a) Any significant deviations from development requirements (schedule, costs, etc) recommended at the end of the Feasibility Phase
- (b) Any significant deviations from the system model recommended at the end of the Feasibility Phase (eg, constraints, objectives, major functions)
- (c) A recommendation as to the disposition of the system (eg, continue development, cancel, put on hold).

Each of these points should be described and justified.

**7.02** The definition should be reviewed with the users of the system to assure that their needs will be met if the system is developed to meet the requirements documented. A review should also be held with potential providers of the input data to gain their commitment for providing the data when it is required. Finally, the members of the Preliminary Design Team should have an opportunity to review the definition in order to identify points that need clarification before Preliminary Design actually begins.

**8. REFERENCES**

**8.01** The following sections will provide additional information relevant to the Definition Phase:

SECTION	TITLE
007-200-310	Functional Roles in a Systems Environment
007-208-310	Project Management
007-220-300	Total System Development — Milestones
007-227-310	Developmental Documentation Specifications
007-230-210	System Deliverable Documentation