

## 6.0 Use Case Development

### 6.1 Introduction

This section provides an overview of the use case development process, a summary of the design and development process that would follow, and the conventions used for documentation of the use cases.

### 6.2 Use Case Development Process

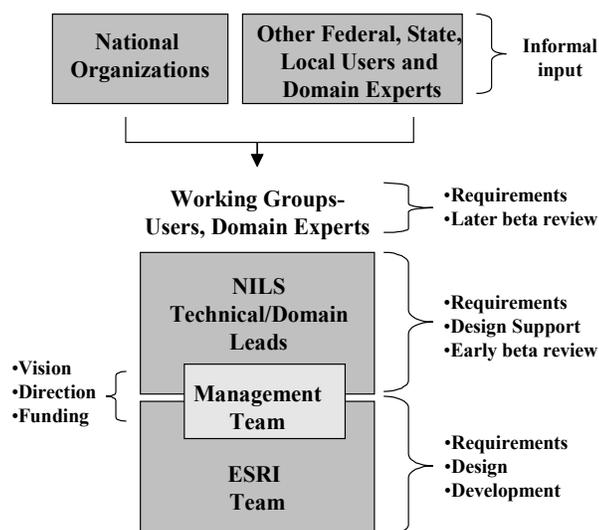
#### 6.2.1 Team Organization and Management

The vision of NILS is to support the core functionality in a 'Field-to-Fabric' cadastral-land records management system. The overall range of functionality was captured in the following four business process areas:

- **Survey Management (SM)**—Field data collection and reduction
- **Measurement Management (MM)**—Land survey calculations and parcel geometry creation
- **Parcel Management (PM)**—Joining data and attributes to respective parcels
- **GeoCommunicator (GC)**—Communicating results to interested parties

A team of domain experts, system analysts, and experienced users was formed to support the use case development process for each of these business process areas. The technical team was supported by a small management group. The NILS team interacted with a broader group of domain experts and users to solicit informal input and comments (Figure 6.1).

**Figure 6.1. NILS Team Organization**



The BLM is managing all phases of the NILS project using the proven guidelines of **Managed Evolutionary Development (MED)**. MED is a process to manage a project throughout its entire lifecycle by adhering to the initial vision, developing the design around how end-users perform the work, preparing an investment analysis, describing what the system must do, defining its components and strictly following a master plan and schedule. The most important points to be noted here are adhering to the vision and following a prescribed schedule.

The NILS project schedule was developed using project management tools such as Work Breakdown Structure (WBS) and Gantt Charts. The WBS is a deliverable oriented grouping of project elements that organizes and defines the total scope of the project.(PMBOK 1996<sup>1</sup>) It drives planning efforts and identifies low-level work tasks to be performed. Gantt Charts show project tasks, the task schedule, and allows identification of resources for those tasks.

### 6.2.2 Use Case Development

Use cases are meant to capture idealized business processes, and they are purposefully generic rather than platform- or software-specific, because the NILS applications are intended as a core framework that may be configured to support operations as needed at any given user agency (i.e. users would build on the common elements provided by the NILS applications to support their specific business operations). The NILS applications are intended to focus on tools for the integration of spatial and tabular data within a common data model - in this sense, NILS may serve as a foundation that indirectly supports the larger context of land records management and land management per se.

The teams focused on an optimal workflow process, and tried to avoid re-capturing processes as found in existing software packages. The teams did review and perform preliminary **gap analyses** on existing software (ALP, Cadastral Electronic Field Book [CEFB], Cadastral Measurement Management [CMM], Geographic Coordinate Data Base [GCDB] Measurement Management [GMM], etc.) to generate ideas and identify the areas where current functionality was lacking. Use cases emerged as simplified, core concepts to describe the 'what' of the NILS business processes. The use cases are not meant to capture the 'how' of implementation—*how* the system works is a design issue.

Domain experts, system analysts and experienced users from the BLM, the U.S. Forest Service, and the Parcel Consortium gathered for a series of use case development workshops. The workshop participants represented a broad range of Federal, state, local, and private specialists from the surveying and cadastral community. Appendix B includes a list of workshop participants. Three- to five-day workshops were held for each of the following business process areas:

- Survey Management
- Measurement Management
- Parcel Management
- GeoCommunicator

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<sup>1</sup> PMBOK 1996 – PMI Standards Committee, 1996, [A guide to the Project Management Body of Knowledge \(PMBOK\)](#), Upper Darby, Pa: Project Management Institute.

At the conclusion of each workshop the use cases for a business process area were documented, reviewed and edited. When use cases for all business process areas were completed the leads for each area met and reviewed all use cases for missing and/or overlapping processes and functionality, and consistency in concepts and terminology.



Preliminary use cases were organized and informally presented to groups of end users around the country. The use case review tour made stops at the following locations:

- BLM Washington/Oregon State Office in Portland, OR
- U.S. Forest Service Office in Portland, OR
- Polk County in Dallas, OR
- State of Washington Department of Natural Resources in Olympia, WA
- Thurston County in Olympia, WA
- Fulton County in Atlanta, GA
- Tennessee Valley Authority in Chattanooga, TN
- U.S. Forest Service Regional Office in Atlanta, GA
- State of Florida Department of Environmental Protection in Tallahassee, FL



Several NILS advisory committees participated in the informal use case review, including the following:

- The Geographic Coordinate Data Base (GCDB) Technical Advisory Committee (GTAG)
- The BLM and US Forest Service Lands Program Staff
- The FGDC Cadastral Data Subcommittee

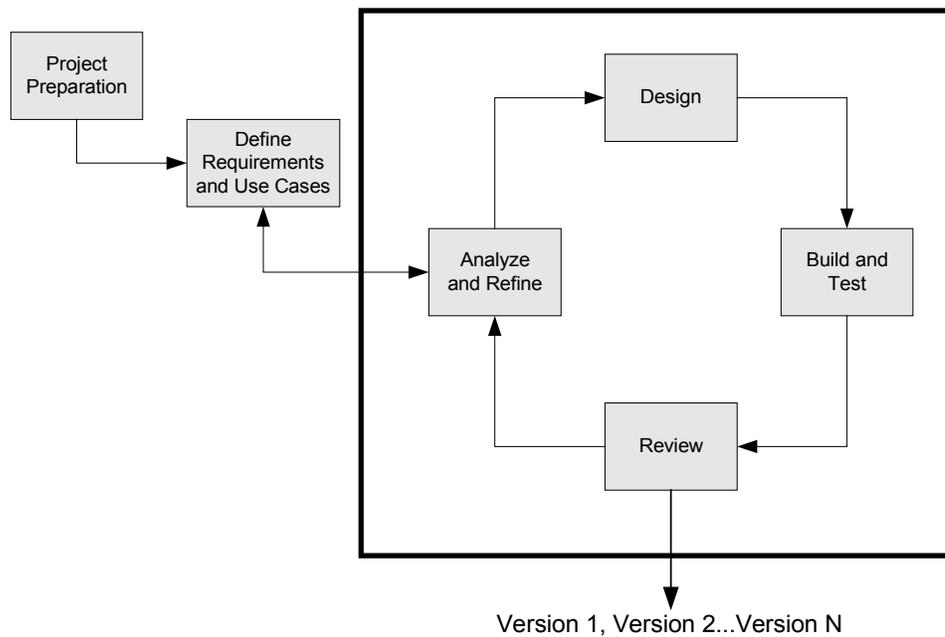


After receiving good validation and feedback from the review groups and tour site hosts, the NILS teams met to document the draft the requirements and use cases presented in this document.

### 6.2.3 Next Steps in the Development Process

The requirements and use cases documented in this report are only the first step in the overall NILS development process. The next steps in the NILS project will involve an iterative series of analysis, design, build, and test tasks (Figure 6.2).

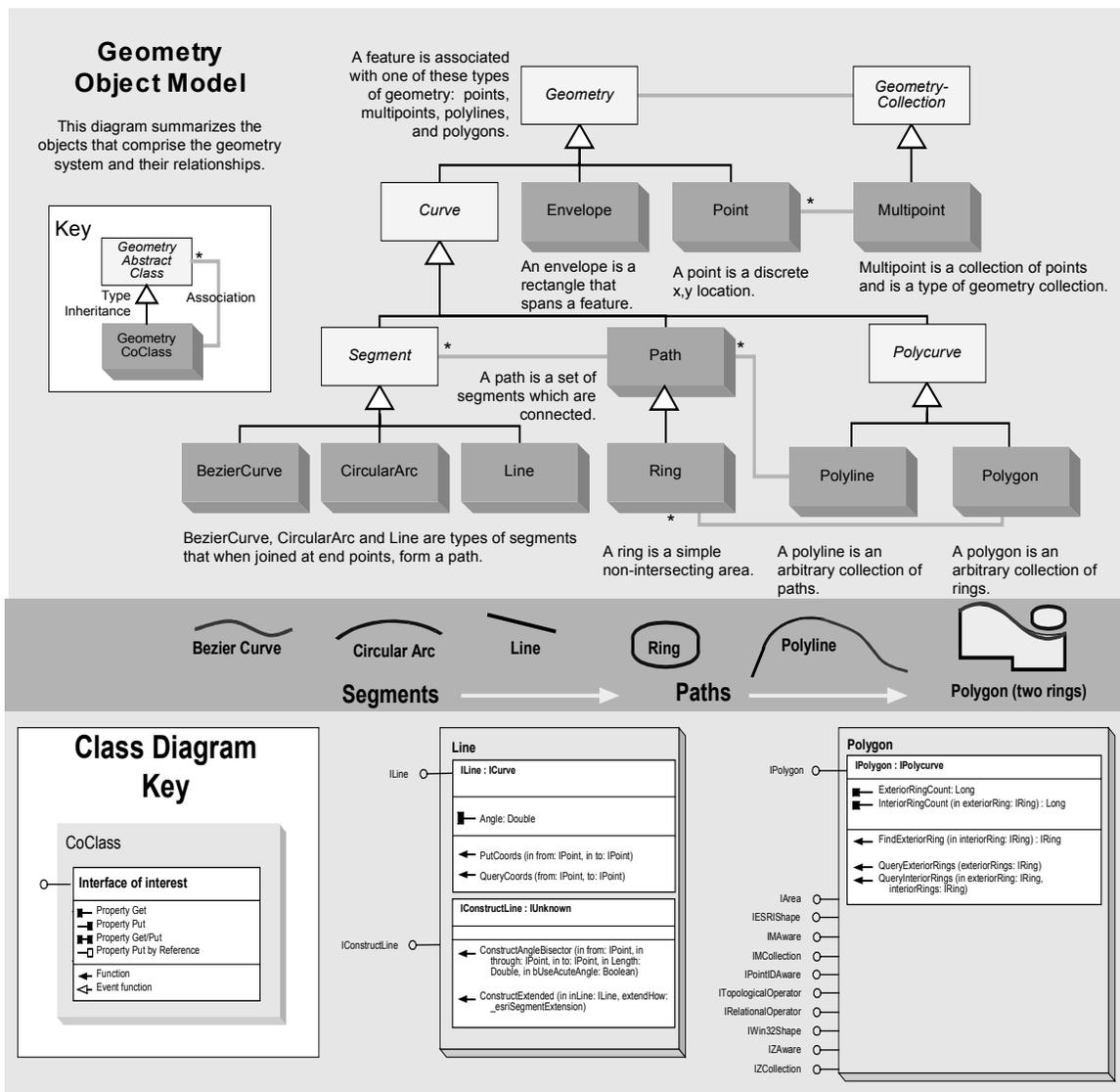
Figure 6.2. Iterative Development



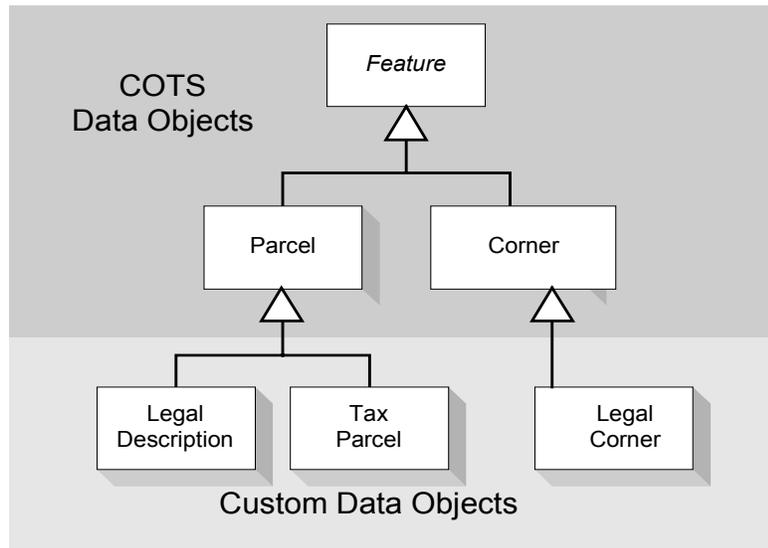
First, an analysis-level object model would be derived from the use cases. An object model is a graphic that shows the relationships, properties and behaviors of (potential) software objects. Through data flow modeling and robustness analysis, both the use cases and the object model would be refined until they are internally consistent and sufficient to meet the requirements. Next, the system's dynamic behavior would be modeled using sequence diagrams and the object model would be expanded and refined into a design-level class model (Figure 6.3).

At this point, the various systems would be partitioned and mapped to existing COTS, extensions to COTS, and new software components. The traditional task of database modeling is subsumed into the object modeling exercise, where the COTS object model would be extended to new classes of objects to support NLS requirements (Figure 6.4).

Figure 6.3. Example Object Model



**Figure 6.4. Extending COTS Data Objects**



## 6.3 Use Case Documentation Conventions

Each use case is documented in the following four subsections:

- Analysis
- Overview
- Primary Scenario
- Secondary Scenarios

### 6.3.1 Analysis

The Analysis subsection typically has five parts: (1) Context, (2) New Concepts, (3) Key Features and Functionality, (4) Application Integration, and (5) Development Issues.

The **Context** section provides a discussion of how the use case supports the subject business process. Context includes reference to issues of data flow and workflow within the overall system. **New Concepts** are the domain-specific business process terms, ideas and things that are managed or processed in the use case. Concepts often become candidates for new software classes. **Key Features and Functionality** discusses the types of tools and interfaces that the user might experience. Features and functionality will often translate into user-interface controls and properties or behaviors for software objects. **Application Integration** is a system-oriented discussion of how the business process relates to other business processes. **Development Issues** includes some potential challenges that may occur or be solved as software and applications are coded and integrated into a system.

### 6.3.2 Overview

The Overview subsection contains the use case name, description, actors (use case initiators), system pre-conditions, system post-conditions and any system cross-references. The Overview is documented in the table format explained in Table 6.1.

**Table 6.1. Information in the Use Case Overviews**

Use Case	Use Case Name
Description	A short English-version narrative describing the business process
Actors	The users or system events that may initiate the use case.
Pre-Condition	The state of the system prior to initiating the use case.
Post-Condition	The state of the system when the use case is complete
Cross-Reference	Other use cases or system components

### 6.3.3 Primary Scenario

The Primary Scenario (typical course of processing) is an ordered series of steps performed by the actor and the system to complete the business processing that the use case is defined to handle. The Primary Scenario is documented in table format. (See Table 6.2.)

**Table 6.2. Information in the Primary Scenario**

Actor Action	System Response
1. This use case begins when a user initiates a process	2. What the system does next.
3. What the actor does next.	4. Etc. [no data found] Inform user and display data browser.

Conditional processes are noted in brackets and interpreted as if preceded by the word 'if'. In the example above, **[no data found]** is read '**if no data found**', and is then followed by the proper action to take.

### 6.3.4 Secondary Scenarios

Secondary Scenarios (alternate courses) capture situations where processing may diverge to handle atypical events. The Secondary Scenario is documented in table format. (See Table 6.3.)

**Table 6.3. Information in Secondary Scenarios**

Name	Point of Occurrence/Overview
Atypical process	Step #2: Go do something else.

### 6.3.5 Other Conventions

- Use Case names are shown in *Title Case Bold Italics*.
- Key concepts are *italicized* and defined in the glossary.
- The term 'actor' (within the use case scenarios) refers to any of the actors identified for the use case.

## 6.4 Use Case Actors

Use cases are business processes, but they are implemented as applications in an integrated software system. These applications don't start themselves; they must be initiated by an actor. The teams authored a variety of actor names and roles. Where possible, names associated with staffing positions in an agency were generalized into role-based actors. So where the analysis teams thought of many types of surveyors (land surveyor, resource surveyor, etc.), the use cases simply refer to that class of actors as 'surveyor'.

**Table 6.4. List of Actors and Roles Found in Use Cases**

<b>Actor</b>	<b>Role</b>
Administrator	System Administrator
Administrator (GeoCommunicator)	Person or persons responsible for GeoCommunicator site maintenance, links to provider sites, account maintenance, data administration.
Browser	The anonymous visitor to the GeoCommunicator site.
Customer	External User (public)
Data Entry Technician	Enter preliminary <i>data</i> , produce maps and reports.
Data Provider	An individual or agency that has submitted data reference information for inclusion in the GeoCommunicator catalog.
Event Provider	An individual or agency that has submitted event reference information for inclusion in the GeoCommunicator catalog.
External Trigger	Something outside the system, such as a separate database application, that can initiate a use case.
Parcel Editor	Person who manages the <i>legal description</i> and <i>parcel fabrics</i> .
Subscriber	An individual or agency that has a GeoCommunicator account to control preferences, notification parameters, etc.
Supervisor	Manages Surveyors, Data Entry Technicians, Parcel Editors, etc.
Surveyor	Professional Land Surveyor
User	Any User