Chapter 6
GD&S in USACE's Corporate Information Plan or Information Technology Investment and Life Cycle Management of Geospatial Data and Systems (GD&S)

6-1. Introduction

a. According to ER 25-1-2, an Automated Information System (AIS) is a combination of computer hardware and software, data, or telecommunicaitons that performs functions such as collecting, processing, transmitting, and displaying information. Excluded are computer resources, both hardware and sofware, that are: physically part of, dedicated to, or essential in real time to the mission performance of weapon systems. Using this definition, GD&S are considered AIS's.

Life Cycle Management of Information Systems (LCMIS) is an analyis and control process which is applied throughout all phases of the life of an AIS or AIS modernization. It bases all programmatic decisions on the anticipated mission-related and economic benefits derived over the operating life of an AIS.

b. The purpose of this chapter is to address GD&S investments/activities that need to be entered into Information Technology Investment Portfolio (ITIPS) and go through the LCMIS process.

c. Table 1 summarizes GIS Activity and whether ITIPS and LCMIS is required.

Activity	**ITIPS Data Entry**	**LCMIS Process**
GD&S Software Purchase	Yes – Code AET	For COTS, No
Customization and Application Development	Yes, if > 75K	Yes, if > 75K
Enterprise GIS Data Development	Licensed/Purchased Data - AET	Yes – if being done for EGIS
Surveying and Mapping Data Collection	No	No

6.2 The Information Technology Investment Portfolio System (ITIPS)

a. Background. The Information Technology Investment Portfolio System (ITIPS) provides an automated tool for producing the Corps' IT investment portfolio as required by the Clinger-Cohen Act. The purpose of the portfolio is to identify the agency's IT investment initiatives in their planning, development, and/or operations phases. The agency's decision authority to determine what IT initiatives should be funded, continued, or terminated uses information from ITIPS.

Information in the portfolio is arrayed to make it usable vertically and horizontally at every organizational level through out the Corps. IT investments are characterized into broad categories that includes Automated Information Systems (AISs), Programs, WANs/LANs, Office Automation and Automated Engineering Tools. ITIPS provides the functionality to enter detailed budget information and generate an IT investment portfolio budget report for all Corps organizations. It supports the decision process for selecting, evaluating, and controlling IT investments. ITIPS serves as an integral component in developing the USACE IT budget.

All IT acquired and maintained by USACE activities, regardless of costs, must be entered and kept current in

ITIPS. This includes IT for all Corps functional areas, including business, scientific, technical administrative and engineering applications. The only exceptions are as follows:

- Systems being developed or maintained or IT being acquired on a reimbursable basis for the sole use of customers outside of the Corps.
- Systems developed as an integral part of internal Research and Development (R&D) projects, when the system is not targeted for a production environment. However, IT being acquired in support of R&D projects must be included, i.e., office automation hardware and software in support of the mission and functions of the organization is not R&D.

b. ITIPS Categories for GD&S

There are three types of GD&S development activities that need to be tracked in ITIPS.

1) GD&S Software Purchases - GD&S software purchases; such as, ArcView, ArcInfo, MGE, etc. need to be entered into the ITIPS system. GD&S software shall be classified as an Automated Engineering Tool (AET).

2) Customization and/or application development of GD&S software – All major (over 50K) customization and/or application development shall be tracked in ITIPS and use the LCMIS process (see section 6-3). Software customization shall be classified as an Automated Information System (AIS). A customization under 50K is considered just using COTS GIS software and falls under type 1.

3) Geospatial Data Development – Traditional survey and mapping and contracting for surveying and mapping services do not need to be entered in ITIPS. Geospatial Data being purchased from a third party vendor or being developed as part of an Enterprise GIS database shall be entered in ITIPS. Purchasing Geospatial data from a third party shall be classified as an AET. Developmental activities; such as, developing Enterprise GIS Programt Management Plans, database standardization activities, etc. shall be classified in ITIPS as an AIS.

6-3 Life Cycle Management of Automated Information Systems (LCMIS)

a. Life Cycle Management of Information Systems

The Life Cycle Management of Information Systems, or LCMIS, is a management process applied throughout the life of an Information Systems (IS), that bases all programmatic decision on the anticipated mission-related and economic benefits derived over the life of the IS. Significant investments in information technology (IT) are preceded by mission analysis and an appropriate degree of work process revision to maximize anticipated benefits. In the US Army Corps of Engineers, the levels of oversight for LCMIS rest upon the Chief Information Officer (CIO), the Regional CIO, and the local Chief of Information Management. The level of oversight is driven by estimated cost of the effort.

According to ER 25-1-2, LCMIS does not apply to:

1) IS development for non-Corps custormers
2) IS specifically designed as integral parts of Corps-owned Facility Support Systems (see Appendix B of Regulation 25-1-2)
3) Systems developed as an integral part of internal Research and Development (R&D) projects, when the system is not targeted for a production environment.

b. LCMIS and GD&S

While Geospatial Data and Systems (GD&S) are Information Systems, USACE relies heavily on Commercial

Off-The-Shelf (COTS) software in order to perform geospatial information analysis. COTS products being used without customization or application development do not need to go through the Corps LCMIS process.

There are two areas where GD&S development need to go through LCMIS:

1) Customization and/or Application Software Development for internal USACE use. Customization and application development of commercial GIS that costs more than 75K shall go through the LCMIS process. Since the customization or application will be based on COTS software, many of the LCMIS milestones are not necessary or can be minimized.

2) USACE Enterprise GIS Development. Developing an EGIS solution shall go through the LCMIS process.

1) LCMIS Phases Applied to Customization of COTS GIS Software

It is not the intention to replace 25-1-2, but to provide guidance on what needs to be addressed specifically for GD&S as it applies to 25-1-2. This section outlines a tailored LCMIS processes for Customizing COTS GIS Software as indicated in ER25-1-2.

IT having developmental and deployment costs of less than 500K or total life cycle costs estimated to be less than 1,000K are classified as IV C systems and LCMIS oversight will be the responsibility of the local DIM/CIM. The majority of the application development that USACE is engaged in falls in the IV C category. If the customization effort is under 75K it should be considered an AET and the effort does not need to go through the LCMIS process, but does need to be entered into ITIPS (see Section 6-2. b.1).

For GIS applications being developed by ERDC for the Civil Works R&D Program, the oversight is not the responsibility of the local DIM/CIM, but the appropriate HQ technical monitor or area manager. R&D software is developed corporately; therefore, it must have corporate oversight. The HQ technical monitor or area manager can delegate to local DIM/CIM as needed.

For GD&S software development using COTS GIS software, the program strategy is to acquire COTS software and customize it either by using incremental or evolutionary process. This program strategy has a low software development risk and a relatively high return on investment (ROI). The ROI may include decrease in labor costs or increased productivity. However, more often the ROI includes things that are not as easily measured; such as, more accurate or comprehensive decisions being made, a better product, or a more consistent corporate approach to solving a problem

According to 25-1-2, ITIPS can and should be used as a tool to capture and meet the requirements of LCMIS.

a) Mission Need Justification. This phase is intended to primarily focus on functional business requirements, without specifically addressing technical solutions.
   - Can the need be satisfied by a streamlined or improved manual process?
   - Can the need be accommodated through an existing IS?
   - Is there an existing IS outside of the Command that has already been developed?
   - Is a new/modified IS cost-effective?

   As part of the Mission Need Justification, Command is required to check the project clearinghouse and send an email to ls-gds@usace.army.mil to see whether GIS application has already been developed.

   Mission Needs Statements can be entered into ITIPS using the description tab.

b) Phase 0 – Concept Exploration and Definition Phase. The goal of Phase 0 is the development of a valid and optimized system concept that supports the required business process (es) and defines alternative functional and technical solution for supporting those processes.

Milestones for Phase 0 include:

1) Brief concept to Commands Technical/Oversight GD&S Committees. If an Integrated Product Team (ITP) is needed, the GeoPMT can serve this purpose. If being developed through the Civil Works R&D program, briefing at the programs Field Review Group (FRG) meeting meets this milestone.
2) Identify Project Manager (PM), System Manager (SM) and Functional Proponent (FP). Since utilizing COTS heavily, these titles may all belong to one person.
3) Develop initial Systems Decision Paper (SDP) as outlined in Section IV of Appendix C in 25-1-2. ITIPS can be used for capturing the necessary information that goes into a SDP. Again, since COTS is heavily used, software and architecture issues only need to be addressed as they apply to interfacing with an overarching Enterprise architecture. Probably the most important part of the SDP is to identify geospaital data requirements and to address data generation standard issues. Is there existing geospatial data that the IS will be utilizing? Will the IS be generating geospatial data? If so, how does metadata get produced for the data and will the data be SDSFIE compliant?

   An IS being developed that requires geospatial data that is not already being collected or already exists is a high risk IS and these issues need to be addressed in the SDP. If the IS is generating geospatial data, the gespatial data must be documented (metadata) and SDSFIE compliant so that it can be used for multiple purposes for a longer period of time.

c) Phase I – Demonstration and Validation Phase. The purpose of this phase is to establish the basis and rationale for migrating from documented requirements and concepts to actual development and implementation of the IS.

   Activities for Phase I include:
   - Identify server requirements
   - Identify where the software and data will physically sit
   - Identify impacts of application to the network
   - Develop a test/demonstration approach
   - Develop the prototype application
   - If application is generating data, data integrity issues need to be addressed.
   - Further refine SDP

d) Phase II – Development Phase. The development phase is the LCM segment used to complete code generation and successfully conduct system tests and evaluation of the IS configuration. Since COTS is heavily used, software testing of the COTS is not necessary. Software testing is restricted to testing the application (user level testing) and network testing (how does running the application effect the network?).

   Activities for Phase II include:
   - Perform software customization
   - Conduct application/network testing
   - Modify based on test results
   - Modify/convert legacy systems as appropriate
   - Plan operational/deployment phase

- Plan training

e) Phase III – Production and Deployment Phase. The purpose of this phase is to complete deployment of the IS. In many cases, this entails establishing a web site where the Geospatial IS can be accessed or downloaded. If the deployment strategy is to load software, then a more rigorous deployment plan is needed.

f) Phase IV – Operations and Support Phase. The purpose of this phase to shift from development/deployment to operations/support. Again, because many geospatial applications are web enabled, this may only entail maintaining a web site with documentation and current executables.

2) *Enterprise GIS and LCMIS*. HQ (CECW-EE) is responsible for developing an overarching LCMIS documentation for Enterprise GIS and entry in ITIPS. At the time this EM is updated, LCMIS for Enterprise GIS does not exist. Until HQ has developed LCMIS for Enterprise GIS, Commands should focus their efforts on development of an Enterprise Geospatial Program Management Business Plan as outlined in Chapter 5.

6-4. Mandatory Elements

1) Each Command needs to execute ITIPS and LCMIS for geospatial data and technologies as outlined in this Chapter.