University Information Technology Systems Operational Plan 2005 - 2007

Part 1

Governance and Operational Framework

September 2005

Submitted by
Brian Stewart CIO

Executive Summary

The growth in demand for online education and web enabled services has raised the importance of the role of Information Technology Systems (ITS) to the strategic level. What was a support system has grown to become a critical capability to achieving the University's mission. In response to this need the ITS plan was developed to ensure congruency, cost-effectiveness and coordination of ITS activities across the institution.

This first part of the Information Technology Systems Operational Plan builds upon and completes what was formerly termed the Systems Development Plan (SDP). It differs in emphasis as it focuses on the framework and processes necessary to create an effective and efficient capability. The second part of the plan will focus on the formulation and delivery of projects. University wide input was sought and received throughout the formation of the plan and it has been endorsed by the community.

To provide direction and focus vision and mission statements have been created, in addition an operating strategy and initial key objectives have been developed.

Information Technology Systems Vision
The University's ITS will strive to provide a user-friendly, intuitive, and flexible networked environment that meets the needs of students, educators, researchers, and staff. The System will provide access to and foster the development of world-class digital resources and will be responsive to teaching and research initiatives that promise to enrich and improve the learning environment.

Information Technology Systems Mission
Once established, the ITS's governance structure will provide a basis for technology design and selection, technical support and training, systems management and administration, technology acquisition, the formulation and review of ITS policies and standards, and strategic planning services for AU students, staff, faculty, and tutors.

Following a strategy of ***Security, interoperability, usability, and innovation*** the plan outlines specific objectives under four headings:

Governance Systems

- Establish an effective and workable governance structure:
- Develop and implement an ITS planning, budgeting and reporting system; and
- Develop and implement a project portfolio management system.

Learning and Research Systems

- Implement a single, System-wide Learning/Course Management System;
- Implement and adapt one Course Content Management System;

- Expand the functionality and user value of MyAU Student and Staff Portals;
- Operationalise AdLib and the Learning Object Repository (LOR);
- Continue to develop the Digital Reading Room (DRR);
- Integrate course development and Library services into a seamless system; and
- Develop a robust and sustainable ITS environment that offers timely academic support and provides optimal conditions for collaboration, experimentation, and the pursuit of innovative research.

Administrative Systems

- Resolve (through the implementation of middleware or an integrated Enterprise Resource Planning System), the problem of isolated applications and systems;
- Implement the Information Content and Document Management System;
- Deploy a single instance of Banner 7.x with a reduction of customised requirements; and
- Research and implement collaborative software (Group Ware) to support the networked working environment.

Computing Systems

- Implement a Systems Continuity Plan;
- Introduce project management methodology;
- Develop ITS standards, policies and procedures;
- Develop an ITS information system; and
- Establish strategic vendor relationships.

Governance is a key element of the plan as it will ensure that ITS activities are coordinated, coherent and supportive of the University's strategic objectives.
The governance structure outlined is based on a federal model that is comprised of centralized and decentralized functions. This devolved structure is seen as being more responsive to the culture of the University which seeks to experiment and learn in its core academic functions while providing excellent student support and cost effective services in its administration. The federal structure is governed by three steering committees which address different constituencies within the University:

- ITS Computing Committee
- ITS Administration Committee
- ITS Learning and Research Committee

Each Steering Committee is formed around a cluster of common interests, to ensure the issues under discussion are of relevance, but each Committee is also tasked with **remaining informed on the interrelated nature of IT development**. The Steering Committees will first be tasked with two immediate concerns: the maturity of AU's ITS structures and processes, and the crucial absence of procedures, protocols, and reporting mechanisms to coordinate IT-related projects.

To make sure the Committees are acting in a coherent manner and that an Institution-wide perspective is being represented within each Committee, permanent representatives are assigned seats on each Committee and will generally comprise the Associate Vice President Academic, the CIO, and a Director from within Computing Services.

The CIO will work through the governance structure to provide vision and direction for all information systems that serve the internal and external needs of the University; to consult in the planning, advise in the implementation, and facilitate the advancement and support of leading-edge IT initiatives designed to facilitate the learning, teaching, and research goals of the academic Centres and the service goals of the administrative Centres.

Critical success factors are articulated to help guide and act as a reference for ensuring correct actions are followed. In addition the document suggests a number of key performance indicators to monitor ITS activities at all levels. The use of such metrics will enable ongoing continuous improvement of ITS services and projects.

Project Management methodology is being introduced to provide both a valid framework and viable performance evaluation to initiate and complete projects in a timely and economic manner. In addition Project portfolio management will be used to aggregate project data providing an overall view of project activity within the university.

While the plan does outline specific projects that have been determined as the priority projects it remains for the next part of the planning process to articulate more clearly the scope, cost and timelines for the completion of these objectives. With the completion and adoption of the framework provided in this document the development of the next stage becomes achievable.

Preface

The Information Technology Systems Operational Plan builds upon and completes what was formerly termed the Systems Development Plan (SDP). Taking the work done on the SDP as a starting point, I consulted widely across the University and received much advice, learned of many concerns, listened to many opinions, and noted a host of requirements. I have sought to merge the aforesaid into a coherent set of objectives within an achievable plan. As with any undertaking of this kind trade-offs are necessary, particularly as the list of outstanding projects surpasses the hundred mark. Even the shortened and prioritised list outlined in the Plan will prove very taxing on the Organisation and will require significant additional resources.

The recognition of "the increasing demand from students for electronic access to the University's courses and services," and the University's consequent commitment to become "a leader in the application of digital communication systems to… distance education" (§3.2, Electronic, Multi-Modal, Learning Systems, *AU Strategic University Plan*) will require a significant expansion of the role and scope of the Information Technology System (ITS). The shift is from a System that was primarily supportive to one that is increasingly strategic, and this shift will necessitate an unprecedented degree of planning, management, and tracking. Moreover, given the expanded role and scope of the ITS, it is imperative that all sectors of the University (Academic, Administrative, and Computing Services) be involved in the establishment of a transparent and efficient planning, management, tracking, and evaluation process.

The Plan is operational in nature, set to achieve specific goals and to establish a structure for the effective administration and deployment of the ITS within the current Strategic University Plan (SUP). The establishment of an effective planning, management, tracking, and evaluation framework will also greatly facilitate the attainment of ITS goals established during the next strategic planning process. In this sense, the Plan is a critical first step toward ensuring the University's ITS is planned, developed, managed, and evaluated from a comprehensive, University-wide perspective

Brian Stewart
CIO

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Introduction

> *The term of this SUP will be characterized by the use of technology to improve access and to remove barriers to learning; significant expansion of online infrastructures in support of e-learning throughout North America; expanded broadband infrastructure; increased presence and usability of e-books and related technology; and expanded involvement of the commercial publishing industry in interactive, multimedia learning resources.*[1]

Information Technology has, and will continue to play, an increasingly significant role in the achievement of the University's objectives as outlined in the Strategic University Plan (SUP)[2]. The ability to determine, source, develop and deploy leading-edge learning, teaching, research, and administrative technologies is central to the ongoing advancement of AU's performance and position as a leader in the field of distance education.

Since learning, teaching, and research are the *raison d'etre* of Athabasca University, activities related to these areas will be given highest priority. Research, creativity and inquiry will be supported and encouraged in an action-oriented culture. Academics involved in creative activities will have the right to pursue their enquiries in a supportive and responsive environment, one free of unnecessary administrative or technical constraints. This includes research related to the scholarship of teaching, to distance, open and e-Learning (which are research priorities set for AU) as well as disciplinary-, professional-, and multidisciplinary-based research.

The goals outlined in the SUP and the e-Learning Plan[3] clearly indicate the broad use of Information Technology to support the total range of the University's activities. In essence, the Information Technology System (ITS) will create a virtual university experience, one wherein all core processes are ITS enabled and dependent, unlike the majority of post-secondary institutions that use ITS merely to supplement a face-to-face experience. This places a considerable burden upon the University to provide a secure and robust ITS.

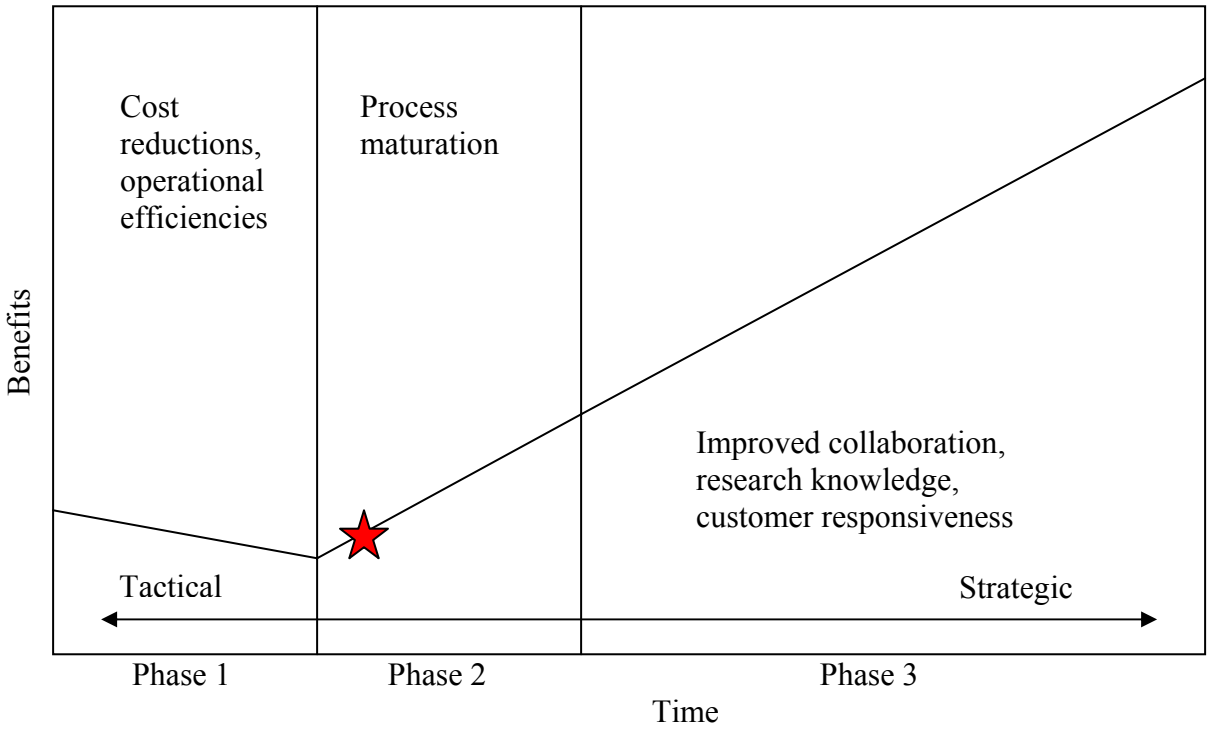
This Plan's purpose is to articulate a vision of AU as a virtual university and to lay down a structure for its attainment. The goals, strategies, and action plans outlined herein are formed with the intent of providing a secure and solid foundation upon which to base the University's future strategic plan. In this sense the document bridges the current and anticipated SUP.

[1] Athabasca University Business Plan, p4. http://www.athabascau.ca/sup/sup_19_06.pdf
[2] http://www.athabascau.ca/sup/sup_19_06.pdf
[3] http://intra.athabascau.ca/planning/

Situational Analysis

Athabasca University's ITS infrastructure is secure and robust and has successfully supported the Organisation's core activities of learning, research and administration since its inception. But that infrastructure now requires a significant upgrade if the goals of the SUP are to be met, the University's increasing commitment to e-learning is to be supported, and if the University's academic and administrative functions are to be advanced.

Enterprise Resource Planning Cumulative Benefits Curve[4]



The above diagram represents a normalised curve of Enterprise Resource Planning (ERP) and illustrates the benefits of effective resource planning to any organisation. If the star indicates the current position of AU, the goal of the ITS strategy is to move the University along the benefits curve within the resources and capability constraints of the Institution. In the past, a focus on providing strategic solutions to problems within Units or Centres, combined with the absence of a University-wide IT strategy, has resulted in an uneven and uncoordinated development of technologies across the University. This failure to adopt a strategic approach to systems development has led to a relative decline in performance. An increased requirement for real-time transaction and data access has further revealed a lack of integration and interoperability across the University's disparate systems. In *"light of the University's goals and the integrated IT system required to achieve them,"* an enterprise-wide perspective on technology planning and deployment is now essential. A more rational and integrated solution can be achieved through an analysis that

[4] **Making IT Happen: Critical Issues in IT Management (John Wiley Series in Information Systems)** by James D. McKeen, Heather A. Smith – John Wiley and Sons Inc, Chichester, 2003.

identifies dependencies across all three spheres of the University's core academic, administrative and CS functions. Interoperability across all three spheres of activity is critical for AU because our students' experiences of the University are, almost exclusively, virtual (via computer or the telephone); we have little ability to "fill in the gaps" that face-to-face communication affords. This places an increased responsibility on AU to provide systems that are designed, developed and maintained from a student's perspective.

Structure

The majority of ITS-related activity is currently undertaken by the Computing Services (CS) unit. This unit experienced several leadership changes over the past few years. Prior to coming under the CIO's leadership in November 2004, CS reported to the VP Finance for a seventeen-month period; prior to this, CS reported to the VP Student Services. There has been a decentralising of IT resources, however, led mainly by Centres and departments wishing to adopt learning and administrative technologies not adequately supported by CS. This has resulted in IT funding being distributed to Centres and departments at the expense of the core CS unit, which, at the same time, has been burdened with many of the routine maintenance and service issues required to support Centre- and department-funded IT initiatives.

Table 1.

ITS Staffing Analysis by Focus and Area of Employment (Budget 2004-5)		
	Area of Focus	Area of Employment
Learning Systems	28	15
Administrative Systems	27	11
Computing Systems	17	46
Total	**72**	**72**

Table 1. shows the breakdown of staff currently assigned to the ITS, by purpose and area of employment. For example, 28 staff have their work focused on learning systems, although only 15 are directly employed by Centres. Over a third of those currently involved in ITS duties are currently employed outside of CS, reflecting the distribution of ITS activity throughout the University. The Centres, in the main, have adopted their technological solutions very adroitly and have seen little reason for reliance on CS. Indeed, an undercurrent of conflict has arisen because of autonomous system development: many academic Centres feel under-serviced, while CS feels it is not given voice but is expected to service and maintain IT initiatives it has no ability to influence. The causes that have spawned this conflict can be attributed in no small part to the lack of a coherent IT governance structure and an officer with sufficient responsibility to ensure congruence and concordance across the Organisation. The appointment of the CIO addresses the latter; this document attempts to address the former.

Business Processes

If the University is to continue to grow and operate effectively, ITS practices must be codified and systematised in order to support IT developments in the areas of academics (learning, teaching,

and research), administration (Finance and Registry) and CS (security and student services). The following deficiencies were pointed out by the Auditor General:

- No formal quality assurance plan.
- No enterprise wide change management process.
- No routine review of user profiles and access.
- No formal intrusion detection and incident handling capabilities.
- No regular review of and update to the 2000 Disaster Recovery Plan (DRP).
- No formal implementation, testing, or maintenances of the DRP.
- No identification of potential external requirements beyond those of FOIP.

While some of these deficiencies have been addressed, the development of a coherent ITS with standardised operating procedures remains to be completed. In particular, the following processes need to be established:

- A system recovery procedure and practice;
- A maintenance policy and procedure;
- A change management methodology and procedure;
- A project management procedure and practice;
- A testing policy, procedure and practice;
- A resource planning and scheduling procedure;
- A research support and operationalising procedure; and
- A data mapping and information lifecycle management process and procedure.

The challenge is to find ways to formalise these procedures without discouraging initiative and responsiveness. The goal is to create a network of communication that facilitates simplified work practices while eliminating errors and potential points of failure. Without such communication systems, the acquisition and deployment of technology, as is currently the case, will remain subject to wide variation, incomplete information, and poor quality control, leading to significant performance impairments.

Information Systems Audit[5]

The University's CS department has conducted its core activities—the provision of essential ITS services—effectively. However, a recent audit provided an opportunity to review and reflect on broader infrastructure requirements.

Physical Security: the provision of appropriate physical controls to secure technology assets (servers, networking and telecommunications equipment), and to prevent unauthorized access—the server room is being upgraded to improve access control, and although overall security of the servers is not strong (a determined intruder could inflict severe damage on the hardware), security is sufficient to the current need set and further enhancements are unlikely to show significant benefit.

[5] The audit framework used here is based on the ITtoolkit, http://www.ittoolkit.com

Logical Security: the provision of appropriate security controls to prevent viruses and unauthorized data access—this measure is currently underway; the firewall, mail scanning and virus protection services are currently in good condition and are operating at industry-leading levels; there have been no serious instances of intrusion, but a few mild viruses have been contracted.

Logistical and Environmental Controls: the provision of appropriate housing for systems, networking, and telecommunications equipment—facilities designed to provide proper environmental conditions (temperature and dust regulation, appropriate furniture, suitable racks, and physical equipment organization); again, these measures are currently underway; existing infrastructure is currently housed in controlled environments separate from office space; and there has only been one environmental-control related failure in the past year

Configuration Management: the establishment of installation and configuration procedures in accordance with established requirements and standards. This is an ongoing practice as updates to systems components force such reviews. Given the lack of extensive customisation, the system configuration is determined to be optimal. The mapping of configuration must be completed for the whole infrastructure; several major components have been mapped and inventoried as to critical information and services provided.

Systems Administration Procedures: the establishment of procedures that ensure security and systems administration are properly defined and assigned to staff—although effective system administration is in operation, the articulation of said procedures requires discussion and documentation, and the development of documented, standardised operating procedures remains to be tackled in a coherent and enterprise-wide manner.

Hardware Inventory Management: the establishment of accurate and reliable hardware (and other assets) inventory, warranty, and maintenance procedures—an inventory of computer assets is currently underway, and a complete inventory of assets (crucial to the University's "Evergreening" objectives) will be completed by December, 2005.

Software Licensing Compliance: the establishment of accurate and reliable procedures to ensure that software is used in compliance with licensing agreements and that licensing records are maintained—AU has been vigilant in this regard, and an ongoing review of licenses has ensured compliance, but the recent deployment of an Altiris network application to remotely inventory PC-users' software will further ensure compliance, in keeping with AU policies .

Data Backup and Disaster Recovery Procedures: the establishment of regimens to ensure backups (sufficient to recover in the event of a systems failure, data loss, or other disaster) are made and tested on a regularly scheduled basis—such procedures are currently in place and operating effectively, and a complete disaster plan will be in effect by the fourth quarter of 2005.

Documentation: the establishment of regimens to ensure that all systems, procedures, and policies are properly documented, and all reports and logs (error, help desk, and related) are appropriately retained—currently, such practices are weak, but the establishment of formal procedures will greatly improve consistency and reliability.

Performance and Capacity Planning: the establishment of standards (in terms of up-time, availability, bandwidth, data storage, and archiving capabilities) to ensure the System is performing at optimum levels—a lack of system-performance monitoring tools has severely hindered attempts to evaluate and forecast System performance. The absence of such tools is a significant weakness of the existing System.

Change Management: the establishment of procedures to ensure that all major changes to System hardware and software are properly documented, tested, and verified prior to implementation, and that appropriate contingency plans are in place—although there have been notable failures in the past, CS has effectively handled many changes without the benefit of a structured methodology. Enterprise-wide changes, however, have not been as effectively handled, primarily due to the absence of a comprehensive communication and governance structure that initiates and monitors Organisational change. Toward this end, a communication and reporting procedure, as well as a project approval strategy, is being implemented. This will ensure a more coherent and transparent approach with clearly defined steps, procedures, parameters, reporting, and evaluation mechanisms, but one that remains flexible enough to accommodate changing academic, administrative, and CS needs.

Human Resources: the provision of training and the careful recruitment of new personnel will ensure that ITS staff are competent, motivated, and possess a broad base of skill sets that equip them to work with a wide range of hardware and software—unfortunately, Organisational growth and the concomitant expansion of the System has increased the demand for ITS-related services to such a degree that even though technical training is available and the University's performance management procedures encourage personal development, increased labour demands have forced staff to forego systematic training and development. As a result, ITS personnel typically lack project management skills, and this serious deficiency is mirrored across the University's core services (academic, administrative, and CS); immediate training is required to address this deficiency. An absence of project management skills has resulted in poorly formulated, executed, tracked, and evaluated projects in all three domains, exacerbated by the lack of a University-wide ITS management structure and methodology.

Conclusion

Overall, the University's ITS is stable and functioning. Its performance has been sufficient to support the key activities of the University and the CS unit has an excellent record of responsiveness to spontaneous computer and network problems, and CS employees have ensured key processes are constantly reviewed and upgraded. Nonetheless, there remain some major weaknesses that demand improvement, in particular project and resource management, and the initiation and successful implementation of Organisation-wide change. Housekeeping has been neglected also, and such things as system-performance reports and the documentation of policies has been incomplete. These reporting and documenting procedures must be addressed to ensure performance levels are maintained and can be improved. Another major drawback to ongoing IT-

development has been the reactive nature of its application. Planned progression has not been a consistent feature of the University, and this has resulted in the sub-optimal acquisition and deployment of technology.

Financial Analysis

In relation to IT activities, the University's fiscal and contract management has been mostly good. However, the accepted methodology of concentrating on initial or "event" costing has undervalued the downstream costs of maintenance and replacement, creating a "gap" in the costs attributed to ITS activities.

The importance of such costs becomes increasingly evident as System expansion is fuelled by the geometric growth of cumulative complexity. Such complexity is not simply a function of diverse hardware and software, but more importantly of interoperability issues, support functions, and the increased training requirements of a "fast adopter" user base comprising students, staff, faculty, tutors, and administrators. The escalating range of applications and required System subcomponents increases support activity exponentially. This is attributable to user expectations that demand increased functionality and a greater integration of existing systems. It is imperative, therefore, that every System development be evaluated in terms of its total environment use-cost and not just its acquisition or direct implementation cost.

Determining the extent of ITS costs across the University is not a straightforward matter. Because the IT budget is distributed across many Centres, and because jurisdictional lines cross, ITS developments take the shape of pockets of activity within and across Centres. We have attempted to audit these expenditures to provide an overall impression of total ITS costs and establish a method for future University-wide ITS budgetary planning[6].

Table 2.

IT Budget Analysis by Proportion of Expenditure on Area of Focus- (Budget 2004-5, dollar value)							
	Staffing	Operations	Projects	PC and workstations	Strategic Systems	Other SW and central systems	**Total by Focus**
Learning Systems	$ 1,259,952	$ 576,640	$ 934,000	$ 208,331	$ -	$ 78,386	**$ 3,057,309**
Administrative Systems	$ 2,020,912	$ 310,574	$ 227,991	$ 75,621	$ 2,836,000	$ 259,000	**$ 5,730,098**
Computing Systems	$ 1,515,063	$ 357,694	$ 83,498	$ 110,369	$ -	$ 434,773	**$ 2,501,397**
Total	**$ 4,795,926**	**$ 1,244,908**	**$ 1,245,489**	**$ 394,321**	**$ 2,836,000**	**$ 772,159**	**$ 11,288,803**

Table 2 is the first approximation of an ITS budget, showing the absolute dollar budget of ITS-related expenditures. The values are derived from the CS budget and ITS-related expenditures in other departmental and Centre budgets. The expenditures are broken down by area of focus rather than place of employment.

[6] The information here was provided from the 2004-5 budget by the Financial Services Department

Table 3.

IT Budget Analysis by Proportion of Expenditure on Area of Focus - (Budget 2004-5, percentage value)							
	Staffing	Operations	Projects	PC and workstations	Strategic Systems	Other SW and central systems	**Total by Focus**
Learning Systems	11.2%	5.1%	8.3%	1.8%	0.0%	2.5%	**28.9%**
Administrative Systems	17.9%	2.8%	2.0%	0.7%	25.1%	2.3%	**50.8%**
Computing Systems	13.4%	3.2%	0.7%	1.0%	0.0%	4.8%	**23.1%**
Total	**42.5%**	**11.0%**	**11.0%**	**3.5%**	**25.1%**	**9.7%**	

Table 3 shows the proportionate breakdown of IT-related expenditures. The tables reveal several interesting factors, the preponderance of expenditure on staffing and operations, in particular, with two thirds of expenditure being spent on these day-to-day activities. Such expenditures levels are not out of the ordinary and we should expect future System development expenditures to be in similar proportions, which will have significant implications for the base funding of staff positions. Also worthy of note is that the CS budget of $4.27 million, which has been long considered equivalent to the total ITS budget, is *less than forty percent* of total ITS-related expenditures[7].

Capital expenditures represent a small proportion of ITS expenditures; indeed when the budget allocation for the document management system is factored out, the capital expenditure is only twenty percent of total ITS expenditure. This is insufficient, as a quick rule of thumb demonstrates that a constant annual replenishment rate is twenty five percent of capital stock to keep technology current. When the projected growth of AU, both in absolute numbers of users served and the relative expansion into a greater online capability, are factored in the scarcity of investment in ITS systems becomes very evident.

In addition, the paucity of strategic System investment, due to the current ad hoc, Centre-driven approach to ITS deployment, has created a segregated architecture with significant barriers to integration and systems alignment. This presents a considerable barrier to development. Outside of Banner, little systems integration has taken place, resulting in a proliferation of "best of breed" systems that maximize benefits to implementers but create major hurdles to the integration of information and workflow systems.

ITS-related costs constitute approximately 15 percent of the University's total operating budget, or $11,000 per staff member. It is difficult to find external comparitors because other post secondary institutions do not gather activity-based ITS data. The University of Alberta, however, reportedly expends approximately 6.5 percent of its total operating budget on ITS-related activities[8]. Athabasca University's own Centre for Innovative Management (CIM), an almost totally self-contained unit taxed with very similar online provision responsibilities, also spends proportionately less (13 percent of total operating budget) on ITS-related activities than does AU. This is of particular concern because the University's scaled infrastructure should reduce the proportion of the total operating budget allotted to IT-related activities. This disparity in expenditure is directly attributable to AU's failure to plan and coordinate a systems-integration

[7] The CS departmental budget is included in the total of $11,288,803. It has, however, been distributed across the matrix by area of focus leaving only $2,501,397 of the their budget dedicated to departmental activities..

[8] From a conversation with Nazim Merali CFO and Associate Vice-President University of Alberta, November 23, 2004.

approach to ITS development. This failure can be partly explained by the relatively rapid growth of the Institution over the last five years, and the University's strategic shift from print-based to online delivery. Nevertheless, the identified disparity in expenditure raises two questions: what is the appropriate percentage of total budget expenditure AU should invest in ITS-related activities? What should be expected for this level of expenditure? Satisfactory answers to these questions will require not only rates of expenditure but also capabilities and service levels to be tracked in any future analyses.

Information Technology Systems Operational Plan

Information Technology Systems Vision

The University's ITS will strive to provide a user-friendly, intuitive, and flexible networked environment that meets the needs of students, educators, researchers, and staff. The System will provide access to and foster the development of world-class digital resources and will be responsive to teaching and research initiatives that promise to enrich and improve the learning environment.

Information Technology Systems Mission

Once established, the ITS's governance structure will provide a basis for technology design and selection, technical support and training, systems management and administration, technology acquisition, the formulation and review of ITS policies and standards, and strategic planning services for AU students, staff, faculty, and tutors.

To ensure that these services are provided in an effective, efficient and timely manner the ITS's governance structure will provide leadership and direction in the following areas:

- the planning, support, and productive use of technology throughout the University;
- the security, reliability, and adequate performance of all ITS-related information and technology;
- the timely and effective resolution of end-user problems, including the provision of assistance;
- the selection, design, and installation of cost-effective, quality technology solutions tailored to meet AU's organisational needs;
- the management of service contracts and review of vendor relations to ensure highest value;
- the use of effective ITS policies and practices to ensure AU's interests and technology investments are well protected;

- the integration of business processes through the careful design, management, tracking, and evaluation of application of information systems;

- the establishment of open communication channels to ensure changing user needs are tracked and any problems are appropriately resolved;

- the effective management, tracking, and evaluation of IT projects initiated in response to changing/evolving user needs;

- the continuous training of IT personnel, including the recruitment of appropriately qualified new staff;

- the ongoing monitoring of the ITS to ensure user experiences are optimized and needs fully met; and

- the provision of accurate and current IT-related information that will facilitate the more effective operation of the System and ongoing improvement of student services, based on the continuous observation of activities users have identified as of critical value.

Information Technology Systems Objectives

The idea of imposing a list of objectives on supposed decision-making bodies (the Administration, CS, and Learning and Research Steering Committees proposed below) is anathema to many; it smacks of a usurpation of authority. AU's predicament is such, however, that the only way to advance promptly the long-delayed Systems Development Plan, and initiate the upgrades essential to the establishment of an effective ITS, is to task the Steering Committees with objectives previously identified through a poll of University supervisors, staff, and faculty engaged in the delivery of core University services.

This is in no way intended to denigrate or usurp the authority of the Steering Committees. The establishment of an effective governance structure that places decision-making authority in the hands of user groups (academic, administrative, and CS) is essential to the effective and successful management of a University-wide ITS initiative. Once established, the Steering Committees will have full authority to pursue the listed objectives, and may set their own objectives and priorities to that end.

As previously noted, the objectives listed in the Information Technology Systems Mission, above, were gleaned from a CIO-initiated, University-wide poll conducted to identify pressing IT issues that require immediate attention. The range of identified issues is such that a single committee comprising all potentially affected parties would be unwieldy, suggesting they will be most profitably pursued under the auspices of three distinct yet closely collaborative committees. Initially, each committee will be tasked to address the objectives deemed to be in its sphere of operation (as below) but, ultimately, the listed objectives remain subject to review and confirmation by the respective committees and do not preclude the addition of other priorities as identified by the committees. To maximize communication, consultation, and collaboration among

Steering Committees, reporting procedures and protocols have been proposed but, ultimately, such procedures and protocols remain subject to review and confirmation by the respective Steering Committees.

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- Establish an effective and workable governance structure:
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Learning and Research Systems

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Administrative Systems

- Resolve (through the implementation of middleware or an integrated Enterprise Resource Planning System), the problem of isolated applications and systems;
- Implement the Information Content and Document Management System;
- Deploy a single instance of Banner 7.x with a reduction of customised requirements; and
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Computing Systems

- Implement a Systems Continuity Plan;
- Introduce project management methodology;
- Develop ITS standards, policies and procedures;
- Develop an ITS information system; and
- Establish strategic vendor relationships.

Information Systems Operating Strategy

The following strategy will inform the pursuit of the stated objectives:

Security, interoperability, usability, and innovation

System and information security is paramount for the University. Failure to provide an environment free of intrusion and information pirating is essential to eliminating users' concerns regarding intellectual property and identity theft. The University's information systems must also be protected from computer viruses, trojans, worms, and other debilitating networked-based attacks if user access and appropriate levels of availability are to be maintained. This need not entail the curtailment or denial of user access; authorized users will not be denied ready access to their digital information. Security systems can operate at different levels, and every effort will be made to ensure that security issues neither compromise nor impede the learning and research activities of faculty, staff, and students.

The ability to provide user-valued information in real time is key to user satisfaction, and interoperability is key to the provision of such information—poorly integrated systems are ineffective and result in redundancies and inaccuracies that, in turn, result in user frustration and confusion. Consequently, it is imperative that technologies be examined and adopted from an Enterprise-wide perspective, and that priority be given to technologies that facilitate System-wide improvements. Normally, Organisational optimisation will prevail over local maximisation.

Users are deterred by and reluctant to use information systems that are not user friendly. The issue of usability, then, places the user at the heart of information systems development. A constant focus on users is required to ensure that system modifications are to their benefit. Consequently, the ready availability of information via intuitive and functional interfaces will serve as a guiding principle of ITS development.

AU will pursue IT development on two levels. In the realm of learning and research, the University will strive to be in the vanguard of innovation and at the leading edge of ITS development—situating AU in the early adopter category. In the administrative sphere, a more prudent approach will be followed—the low risk adoption of proven software will situate the University in the early majority. Through this blended approach AU can pursue activities germane to its mandate in an ITS environment that maximizes opportunities for innovation in learning and research but minimizes risk.

Critical Success Factors

If the University is to successfully employ the priorities of **security, interoperability, usability, and innovation** to shape ITS development, a number of critical success factors must be achieved:

- Existing resources must be maximized and leveraged;
- The complexity of internal systems, processes, and operations must be minimized;
- A Web-centric approach to systems architecture and service provision must be adopted;
- A baseline technology must be deployed and internal processes adapted;
- External technologies must only be incrementally customized when strategically imperative;
-
- Performance in technical, and financial activities must be continuously improved;
- User needs must be the focus of System development;
- Innovation in learning, teaching, and research must be encouraged and supported;
- Investment to ensure the System's compliance with technological and legal requirements must be consistent; and
- Systems must be configured and managed to ensure continuous integrated services.

Key Performance Indicators

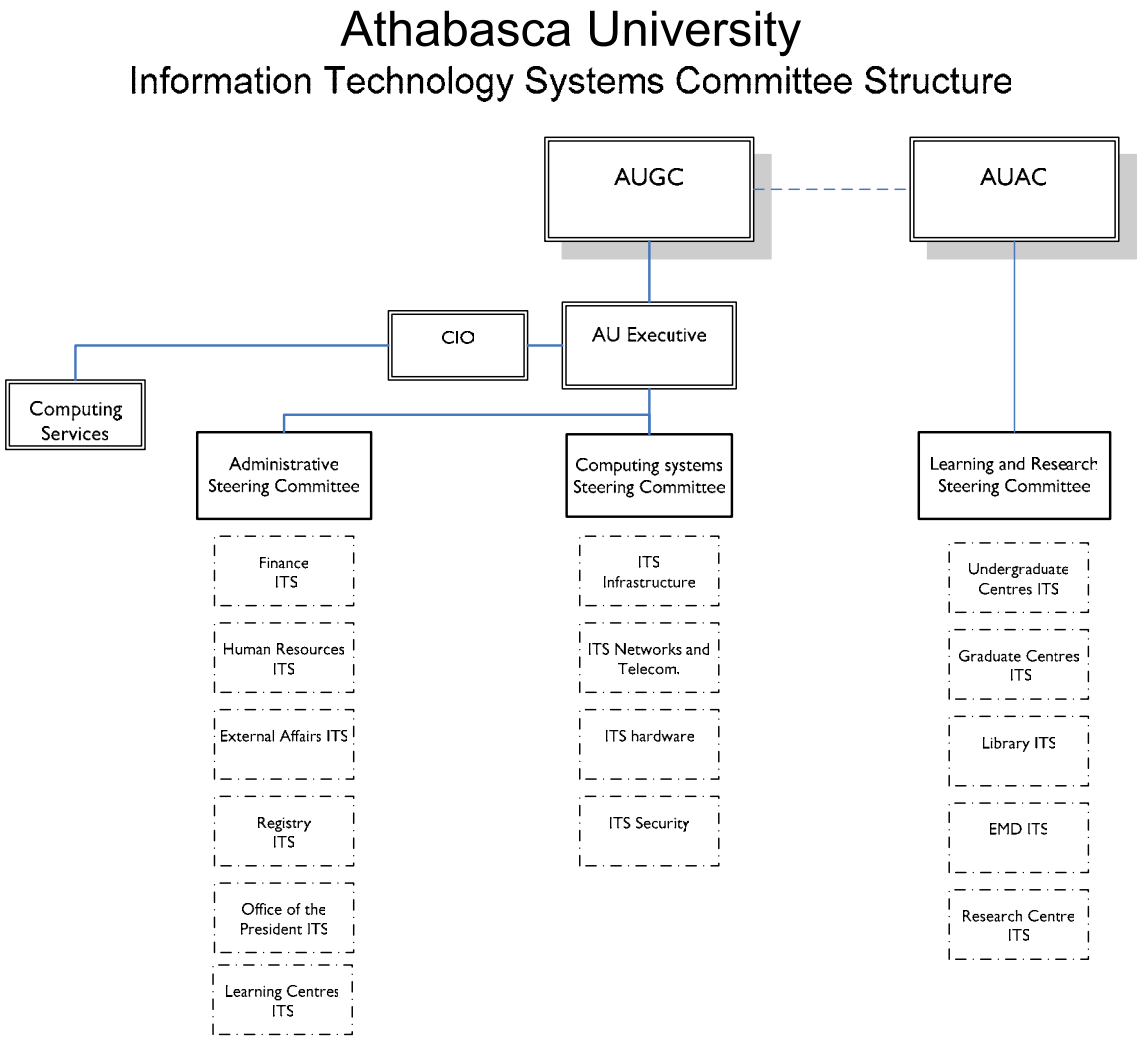
Key performance indicators will be used to monitor ITS activities at all levels. The first step will be to establish baselines for the key indicators and then to implement effective monitoring of the key processes. Results can then be used to direct actions to ensure continuous improvement of ITS services. The following is a list of higher level indicators and appropriate levels of operation:

- Systems must be operational 99.7% yearly;
- Cost effectiveness of ITS - yet to be established;
- User satisfaction index of ITS services 80 percent minimum;
- ITS to staff ratio - yet to be established;
- ITS to student ratio - yet to be established;
- Software currency index will be equal to or less than two major release versions, (providing version support is obtainable and version is compatible with stakeholder requirements);
- Hardware currency index - hardware assets will be equal to or less than five years old;
- Staff development index - yet to be established;
- User training index - yet to be established;
- Student e-Services use - yet to be established;
- Zero loss of essential data;
- Bandwidth - average spike, capacity use - yet to be established;
- User's understanding of system - yet to be established;
- Documentation index - yet to be established;
- Data security and privacy index - yet to be established;
- Quality and timeliness of system responses - yet to be established;
- Quality and timeliness of support staff response;
- Project success index - yet to be established;
- Increase research initiatives; and
- Improved teaching and learning outcomes - yet to be established.

ITS Governance Structure

Information technology plays an increasingly central role in all AU activities; therefore, it is imperative that an informed and continuous dialogue on the effective use of technology take place across the University. This presents several challenges—not the least of which is the need to render the discussions comprehensible to all, which is no small feat, given that the nature of the subject matter leans toward the esoteric and borders on the obscure for the non technically-inclined. For the technically inclined of CS, however, the challenge is one of a different sort: how to coordinate IT initiatives across the full spectrum of University activities—something essential to System efficiency and congruency. To address these two central challenges, this Plan proposes an ITS Steering Group comprising three Steering Committees (Diagram 1). Each Steering Committee is formed around a cluster of common interests, to ensure the issues under discussion are of relevance, but each Committee is also tasked with **remaining informed on the interrelated nature of IT development**. The Steering Committees will first be tasked with two immediate concerns: the maturity of AU's ITS structures and processes, and the crucial absence of procedures, protocols, and reporting mechanisms to coordinate a plethora of IT-related projects. Eventually, the need for three distinct Steering Committees may wane, and a single Committee (Learning and Research), perhaps with representation from the former Administration and CS Committees, may be sufficient to govern ITS-related activities.

Diagram 1. ITS Governance and Operational Structure



The proposed structure comprises three Steering Committees: the first, academic in focus; the second, administrative in focus; and the third CS in focus. The purview of the respective Committees is as follows:

- Learning and Research Steering Committee
  - Research
  - Course Creation
  - Course Delivery
  - Library
  - Tutors
  - Faculty

- Administrative Steering Committee
  - Registry
  - Student Services
  - Finance
  - Human Resources
  - External Relations
  - Course Materials Production
  - Materials Management

- Computing Services Steering Committee
  - Helpdesk
  - Infrastructure
  - Hardware
  - Software
  - Networks
  - Security
  - Systems Administration
  - Business Continuity Planning

It is proposed that representatives from the respective spheres of activity comprise the majority of the respective committees. But given that AU is an academic institution and that the focus of its activities is to provide a superior academic environment, it is also suggested that there be academic representation on each Committee. Appendix 1 contains the terms of reference for each of the Steering Committees. Finally, it is recommended, in the interests of timeliness and efficiency, that Committee members be invested with the authority to make decisions on behalf of their constituency, but decisions of the Learning and Research committee will require AUAC approval.

ITS Steering Committees' Operation

Purpose of the Steering Committees
The Committees will act as advisory and decision-making bodies that also provide direction for the management and development of ITS-related activities at the operational and strategic level. The Committees will oversee IT development plans in their respective jurisdictions. An overview of the Committee decision-making process is charted in Diagram 2, below. The Committees are responsible for establishing the evaluation criteria that inform their decisions/choices. In addition to their decision-making and directive functions, the Committees will also provide a focal point for debate and the sharing of information pertaining to the University's ITS. The absence of a forum within which to develop a University-wide perspective and comprehensive knowledge IT-related issues has severely hindered the development of a fully integrated ITS in the past.

Authority of the Steering Committees
Each committee has the ability to prioritise initiatives under its purview and to recommend projects for funding. Each will also have the authority to review project charters and plans and to advise on change orders.

Coordination Across Steering Committees
To ensure the Committees are acting in a coherent manner and that an Institution-wide perspective is being represented within each Committee, permanent representatives are assigned seats on each Committee. Such representatives constitute only a minority of each Committee and will generally comprise the Associate Vice President Academic, the CIO, and a Director from within Computing Services.

Operation of the Steering Committees
Initially, the Committees will be chaired by the CIO, much as the Director of the Library chairs the Library Standing Committee. The Chair of the Learning and Research Committee will be selected in accordance with AUAC sub-committee by-laws. Meetings shall take place no less than four times a year and no more than twelve times a year. Ad hoc or extraordinary meetings can be called when deemed appropriate. Committee procedures will be as per normal, accepted committee operating procedures. Decision making will be by open majority, with the chair only voting in the event of a tie. A quorum will consist of two thirds of the voting members[9].

Diagrams 2 and 3, illustrate the Steering Committees' decision-making process. The process for developing and submitting an ITS proposal is in accordance with the IT project proposal policy. The role of the sponsor is to ensure that the proposal has the support of a decision-making body with the ability to either sanction funding and/or approval for the development and adoption of the project's deliverables—normally a Steering Committee. The proposed governance structure ensures that a focused, informed discussion around the relative merits of a proposal will take place at the Steering Committee level, ensuring the effective use of time and expertise as well as the efficient coordination of IT-related activities across the University.

[9] Appendix 1 contains the terms of reference for each of the steering committees.

Diagram 2 – ITS Decision Making Process – Administrative and Computing Steering Committees

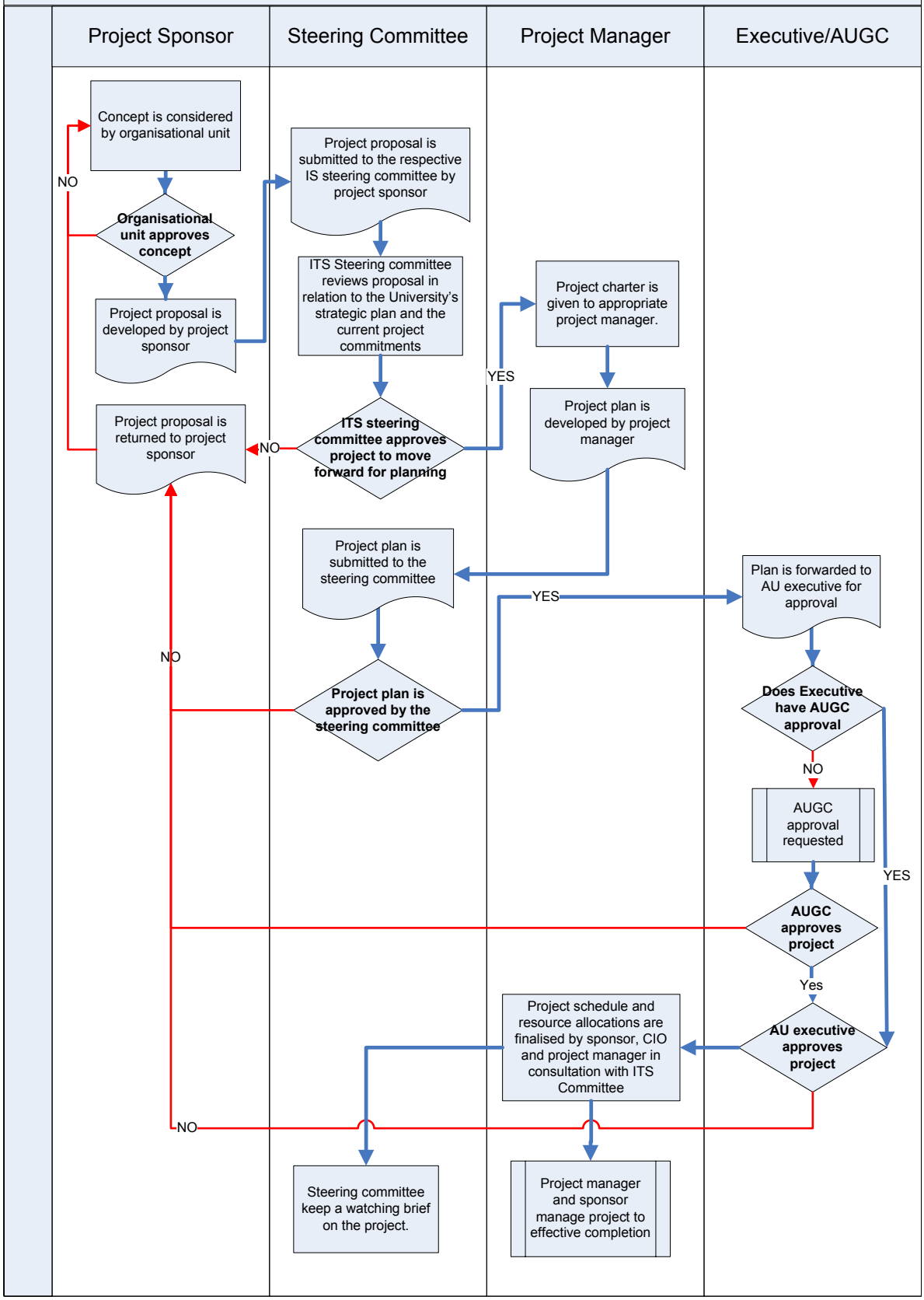
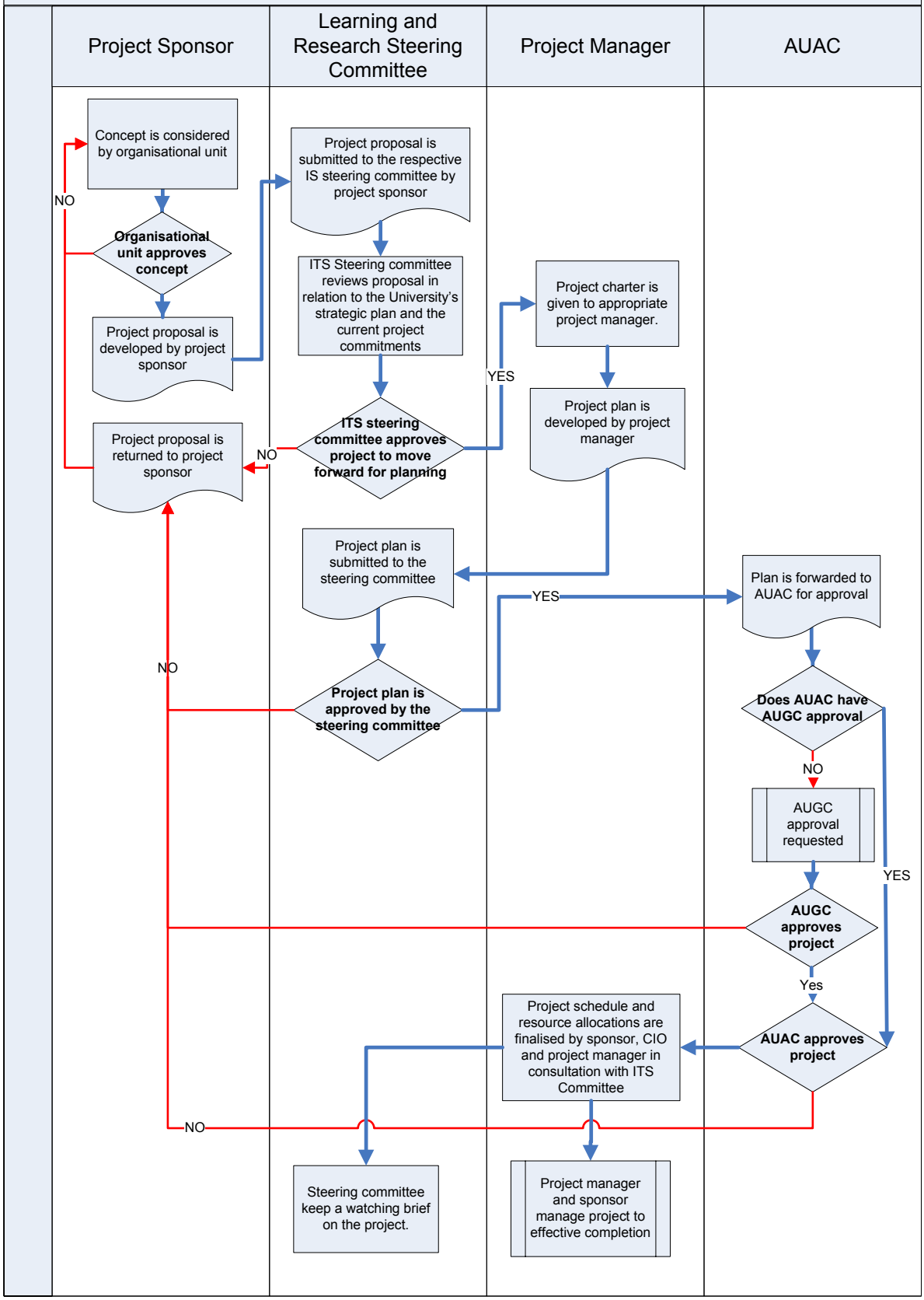


Diagram 3 – ITS Decision Making Process – Learning and Research Steering Committee



ITS Operational Structure

The "ITS Department" will be a virtual unit with members distributed across the University. It's operating structure will be decentralized (Diagram 1) to improve responsiveness and sensitivity to the various academic, administrative, and CS contexts within which IT initiatives are formulated and proposed. This will demand increased organizational effort and coordination, but these challenges must be overcome if innovation is to be fostered and supported. In other words, the ITS Department is not an independent unit with its own organizational structure but rather a virtual unit comprising an amalgam of IT-related activities. In the case of CS, IT-related activities will be reported directly to the CIO. In the case of academic and administrative units, the CIO will be closely consulted and regularly updated on all IT initiatives

The Role of the Chief Information Officer (CIO)

The CIO will provide vision and direction for all information systems that serve the internal and external needs of the University. The role is strategic in the sense that the CIO will consult in the planning, advise in the implementation, and facilitate the advancement and support of leading-edge IT initiatives designed to facilitate the learning, teaching, and research goals of the academic Centres and the service goals of the administrative Centres.

The CIO will contribute knowledge, expertise, and leadership to the development of robust academic and administrative information systems that are fully integrated but whose architecture can accommodate emergent needs and innovative developments. The CIO will also develop partnerships and alliances within the public and private sector that further this initiative.

As a member of the Executive, the CIO will provide information and advice on technologies that can help the University achieve its strategic objectives. The CIO will ensure that ITS resources are employed effectively to this end, that ITS strategic-initiatives are coherent and congruent with the University's values and goals, and that the ITS effectively facilitates the day-to-day operations of the University.

Authority of the CIO

In order for the CIO to effectively complete the responsibilities of the position, the following authority is appropriate:

Approval of ITS-Related[10] Budgets – Capital and Operating: In the budgetary planning process, ITS-related budgets must be sanctioned by the CIO, in the event that the CIO withholds sanction the matter can, by decision of a Steering Committee, be referred to AUAC and AU Executive for consideration.

[10] It is difficult to be definitive about what constitutes an ITS activity and can vary at different times and under different structures. For the purposes of this plan ITS activities are seen as "Work related to developing a software system or developing a network or computing hardware system".

Approval of ITS-Related Positions and Personnel Development: IT staff are the most crucial aspect of the System. It is essential that IT staffing be coordinated across the University to ensure that capable and knowledgeable staff are in place to help plan, develop, and maintain IT initiatives. To this end, new IT-positions must be sanctioned by the CIO, in coordination with Human Resources. Should sanction from the CIO be withheld a Steering Committee can, at its discretion, refer the issue to the Executive for their consideration and final decision. By centralising this function, a coordinated approach, in conjunction with the HR Department, can be taken to achieve a balanced skills inventory and a strategic learning plan for the University and its employees.

Approval and Prioritisation of ITS Projects: As with budgetary and staffing approval, project approval must be sanctioned by the CIO in the interest of ensuring congruence and avoiding integration conflicts. Should sanction from the CIO be withheld a Steering Committee can, at its discretion, refer the project to the Executive for their consideration and final decision.

Consultation in the Formulation of Research Proposals: To ensure potential research projects are viable and supportable within the parameters of the ITS, the CIO or a designated alternative must be consulted during the proposal planning-stage of such initiatives. The intent of such consultation is not to police development but avoid duplication and redundancy as well as ensure future success and the University-wide application of successful initiatives

CIO Reporting within the federal structure
The CIO in conjunction with the three steering committees will be responsible for collecting and coordinating information related to IT so the various governing bodies can fulfill their mandates.

The following shows the breakdown of responsibilities between centralised and decentralised functions.

Centralised Functions

- Technology architecture and integration;
- Infrastructure planning and design;
- Network configuration and administration;
- Logical access and security;
- Technology policy formulation and implementation;
- Technology budget approval;
- Technology standards, policies and procedures formulation and implementation;
- Technology "evergreening";
- Technology support;
- Supplier agreements and vendor relationship management;
- Strategic partnership management;
- Major project coordination, prioritisation and management;
- Business continuity planning and implementation;
- Resource planning and development; and
- Resource Management – staffing and development.

Decentralised Functions

- Local system maintenance, administration and support;
- Personnel supervision;
- Budget formulation and administration;
- Purchasing transactions; and
- Departmental project initiation and management.

ITS Management Process

Objective

The goal is to introduce communication procedures, protocols, and reporting mechanisms that enable the coordination and management of ITS-related activities/expenditures and provide a greater degree of order and predictability. Nonetheless the management system must remain sensitive to the academic nature of the institution. The procedures outlined below are an attempt to navigate deftly between the Scylla of academic innovation and the Charybdis of administrative security.

Budget Process

1. Budget holders submit ITS plans to the appropriate ITS Steering Committee for approval and inclusion in an ITS portfolio.

2. The budget holder, upon approval of the Committee may submit the approved plan and attached budget to her/his Executive Officer.

3. The Executive Officer reviews and approves the plan and moves it forward.

4. Executive budget approval is based on whether the proposed budget can be accommodated within the appropriate ITS portfolio.

5. The budgets of all approved ITS plans will be placed in the ITS portfolio fund.

The above budget process acknowledges that proposals are formulated with specific interests in mind, but gives precedence to proposals whose aims are sensitive to the strategic ITS priorities of the Organisation.

ITS Project Budgeting

1. The Steering Committees will prioritise and seek funding for prioritised projects through Executive, AUAC and AUGC.

2. Approved projects will have specifically assigned, non-transferable budgets. Budgets constitute expenditures approved to achieve a project's goals within a designated timeframe, as outlined in the Project Plan. Changes to projected costs and exactly when expenditures take place must be recalculated annually.

ITS Project Allocation

1. Projects must be formally approved, as per ITS Project Policy, before allocated funds can be accessed.

2. Project budgets are managed by assigned project managers who report through the CIO to the appropriate Steering Committee.

3. Project budgets will be transferred from the reserved surplus account to an account reserved for project budgets.

4. Project expenditures can only be incurred for the purposes specified in the Project Charter. Additional funding or surplus funds must be approved by the Executive, following approval by the appropriate Steering Committee and AUAC.

ITS Project Management

Once a project is approved, the accurate and effective planning, management, tracking, and evaluation of that project demands well-established project management practices. Just as the Steering Group provides a governance structure for ITS policy, a project management methodology is required to govern project planning, implementation, and evaluation.

In accordance with the ITS Project Policy, all projects must have an approved project plan. As a working rule, a full plan is required for projects requiring more than 20 person-days of activity. A small project plan is required for projects of shorter duration. Diagram 2 outlines the project approval process.

1. Not unlike a typical research proposal, a project proposal will list project objectives, dated milestones, forecasted costs and benefits, and an estimate of resource requirements and time to complete.
2. The project sponsor must approve project proposals prior to submission to the appropriate Steering Committee .
3. One of the three Steering Committees (Learning and Research, Administrative, or CS) will approve the project and establish its priority. At this point, the Project becomes a Charter.
4. The project charter will be assigned a project manager, who will develop a project plan. All projects will have, or will be assigned, a project manager.
5. The project manager will, with the Sponsor's approval, submit the project plan to the appropriate Steering Committee for approval.
6. Upon Steering Committee approval, the plan is submitted to AU Executive with a recommendation that funding be allocated. Learning and Research plans will be submitted to AUAC for approval.
7. All major projects require AUGC approval prior to the approving of any funding. Such can be obtained in advance during the budgetary cycle, with specific plans initiating the commitment of budgeted funds.
8. Upon AU Executive or AUAC approval, the assigned project manager finalises the project plan and the project is initiated.
9. At this point, any changes to the initial scope of the project must ordinarily comply with the change management process.
10. All project activity and costs will be charged to the project to facilitate accurate monitoring and review.
11. Ongoing reviews will be conducted to monitor the project's progress and status.
12. A complete review and audit will be conducted upon completion of the project, and said review will be archived and made accessible to inform future practice.

Small Projects

Small projects are defined as one-time pilot projects or research projects that can be managed entirely within an organizational unit's operating budget with no additional institutional resources. The approval process for such projects is as follows: the organizational unit assumes the role of Steering Committee *and* project manager from diagram 2, and the appropriate Steering Committee assumes the role of the Executive. Organizational units will adhere to the spirit of project management methodology and develop a small project plan when small projects are submitted to the Steering Committees for approval. However, since project managers will generally not be involved in the development of small project plans, the Steering Committees will make allowances for small project plans and reports. The management and evaluation of small projects will initially be handled within the originating organizational unit, using techniques and criteria as appropriate and specified in the small project plan. It is expected, however, that as project management methodology matures at AU, organizational units will have improved access to project management resources/expertise and will adapt their own internal processes to bring them in line with institutional practice. Foreshortening the approval/reporting process for small projects while maintaining the essence of project management methodology will enable AU to meet short-term and small project objectives without jeopardising long-term and generally more strategic IT activities.

ITS Project Portfolio Management

The increase in project work across the University will require a project portfolio management system (PPM). Once established, this will facilitate the submission of project proposals and help track such things as Steering Committee decisions and the priority Committees assign to particular projects. The PPM will also allow project status to be tracked, enabling the status of all current projects to be updated in real-time. This will allow projects to be managed much more effectively and will greatly facilitate their successful conclusion.

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1. Projects submitted for approval will be entered into the PPM.

2. Resource allocations will be determined using the PPM.

3. Project scheduling will be determined using the PPM.

4. Project tracking will be updated on a timely basis within the PPM.

5. Projects will be closed within the PPM upon completion.

ITS Operating Guidelines

Prioritisation

It is proposed that the following rules be implemented in order to prioritize ITS activities and guide activity. Making the criteria explicit and transparent will provide a uniform measure for the evaluation of project work and will direct-ITS activities to the most urgent considerations.

1. **System Security:** Given our sensitivity to online security threats both in operational and strategic terms and the responsibility we bear to students and staff, security risks will take precedence over other activities. Examples of security problems include intrusion, denial of service, and attacks or exposure of private information.

2. **System Malfunction:** A system malfunction relates to a system that is compromised and is either underperforming relative to normal performance levels, has ceased performance entirely, or is corrupting data.

3. **Poor Practice Employed, Impacting Performance:** Systems can apparently be operating at the functional level, but nonetheless, have significant underlying points of failure. Many problems, such as running without adequate data backup or failover capabilities, are not revealed until an upgrade or system failure.

4. **Good Practice Requiring Deployment:** Most of the project work will fall into this category. New initiatives designed to improve performance or afford new capabilities are critical to our ongoing development.

It appears ironic that we should save the good until last. However, we must ensure that the day-to-day operations of the University are kept in good order and working effectively. Although innovation is critical, it is most important that users continue to have access to existing dependable and reliable services. It would be counterproductive to introduce new services into unstable or unproven environments, increasing the likelihood of continuous problems and adding more work to the first two categories noted above.

A caveat to the above prioritisation guidelines is that student serving systems will take precedence over internal systems.

System Compliance

Software programs can be understood to operate on three levels including the operating system, database and application levels. These three levels of architecture will be used to determine the compliance of any proposed system. The following table represents the guiding principles to ensuring system compatibility.

Determining Criteria	Strategic	Operational Organisation-wide	Operational Departmental
1.	Application	Database	Operating System
2.	Database	Application	Database
3.	Operating System	Operating system	Application

For example, Banner is a strategic system. It is the University's single student information system. Banner's operating system is Linux; its database is Oracle, and Banner is the application. For strategic systems, such as Banner, the application level would be the primary factor determining its implementation because the functionality of the software is critical to the effective operation of the institution. Following, consideration would be given to issues related to the compatibility of Banner with AU's other databases. Finally, the operating system would be assessed. As systems lessens in their importance to the university as a whole, compliance constraints are heightened. For example, a program designed to assist with project management would be considered an operational, organisation-wide application and it would therefore have to conform to work with Oracle in order to be considered for deployment. The adoption of the decision-making criteria, noted above, will also serve to reduce the potential for system proliferation.

System Commissioning Guidelines

By and large, ITS launch and upgrading (commissioning), have not followed a consistent approach at AU. While the results of this have not been catastrophic there have been localised and temporal failures of services. Further to this, system migration has been delayed by the inability to test scenarios in simulated environments. The increasing complexity, owing to interconnectivity and interoperability of system components, requires a greater concentration on potential incompatibilities prior to and during system operation.

In particular, for a system to be made operational under the best possible circumstances, the initial launch of a system must conform to strict quality assurance guidelines. These same guidelines will provide the basis for assessing the systems state at the time of change and can also be referenced to assess future performance. A deployment assurance procedure must be introduced to ensure optimal performance of operating systems. This will involve both initial testing as well as ongoing operational procedures.

Testing procedures will include:

- Unit testing
- Functional/System testing
- Environment testing
- Data conversion testing
- Actuarial certification testing
- User acceptance testing
- Volume/Stress testing
- Version upgrade testing

Ongoing operating procedures will include:

- Monitoring procedures
- Performance tracking
- Maintenance procedures
- Back-up and archiving
- Upgrade procedures – extending life of system

Test environment
A testing location will need to be developed in order to implement systems operating procedures. A four-tier testing environment would be the optimal design for the testing facility and would be organised as follows:

Tier 1 Isolated developer environment – for development only

Tier 2 Networked test environment – for networking test of developed systems

Tier 3 Practice/training test environment – for acceptance testing and training users on systems

Tier 4 Production environment – actual live instance of systems

Not only will the performance of AU's current systems be improved through the introduction of a testing environment, the environment will also provide a laboratory to research problems, upgrades, and integration scenarios with other AU systems.

Summary

The envisaged "federal structure" allows local operators greater autonomy and control over the working environment. Moreover, it provides for the incorporation of contextual tacit knowledge into the decision, development and deployment processes, that are fundamental to successful system automation and integration. The proposed structure also improves the efficiency of decision making and the responsiveness to individual concerns, without compromising core strategic requirements. It is recognised that a federal structure, with functions and responsibilities split between local and central control, is open to disagreements between central and distributed agents. Nonetheless, it is seen as optimal and it will be incumbent upon the CIO to resolve potential and real conflicts in a proactive manner.

The introduction of more rigorous operational management practices such as project management methods, the adoption of system standards and procedures, and the creation of an offline testing environment will significantly improve the performance of ITS assets, in both the short and longer-terms.

Information Systems Development Projects

Governance Systems

ITS Strategic Direction

1. Establish a Workable Governance Structure

Coherent, consistent and concrete direction is needed in order to progress towards instituting enterprise-wide ITS change initiatives. The establishment of a university-wide governance structure is essential to providing the direction for change. The governance structure proposed earlier in this document will address this need. The structure offers focus, flexibility, and promises to be responsive to the needs of the University. The governance structure, as proposed, will be instituted and made operational immediately upon acceptance of the ITS Operational Plan.

ITS Planning System

2. Develop and Implement an ITS Planning, Budgeting and Reporting System

In order that ITS activities are coordinated and controlled in an effective manner the activities need to be identified and grouped. Currently the budgeting structure does not view ITS activities from a functional perspective. Budget and planning is viewed as a Centre responsibility. This does not provide the necessary information to allow ITS projects to be planned, nor does it provide for resource projections. The development of a reporting structure will ensure that ITS activities are reported and audited on a functional basis.

ITS Portfolio System

3. Develop and Implement a Project Portfolio Management System

By introducing a project management methodology for the provision of ITS services, we must also have a capability to manage the project portfolio. The governance structure is seen as providing direction to systems development; however, the management of projects requires the establishment of a structure and methodology to balance competing priorities and resource administration. The development of a portfolio management system will provide the means to ensure that effective project management is maintained across the institution.

Learning and Research Systems

The learning and research initiatives outline below were identified as initial project development priorities. These priorities were established through research and discussions with a variety of academics throughout the institution. The list presented, however, does not seek to pre-empt further discussion nor restrict the creation of new priorities. Rather, the list is presented as a starting point for dialogue to address the ITS needs of faculty, tutors, and students. The items are not presented in any particular order of priority.

Learning Management Systems

Implement a single Learning Management System (LMS)

To achieve the goals of course quality, we must develop a unified approach to online course creation, development and deployment. This is not to infer that all courses are or will be the same; rather, it suggests that the technical and organizational (not pedagogical) approach to their production can be standardised. In so doing, we can institute quality and creation standards that allow for much better management of online courseware.

The adoption of a single delivery platform, compliant with emerging international standards, is critical to the long-term viability of providing world-class courses for students. The organisational diseconomies of providing for multiple platforms will result in an inability to integrate all student-facing systems in an efficient, effective and timely manner. The technology will not enable but obstruct advances in delivery methodologies because there will be no common standard for adoption or implementation of organisational learning. A cross-functional group was established to review learning platforms. The group has completed its evaluation and has recommended Moodle, an Open Source application to be the University's learning platform. Implementation of the recommendation will proceed upon approval. The ongoing initiative to upgrade TRIX will be continued and augmented, where necessary, to ensure interoperability with the selected LMS.

Content Management Systems

Implement and adapt a Course Content Management System (CCMS)

The efficient production of quality courseware requires a robust yet flexible content production system. The development of such is constituent on the adoption and implementation of a CCMS. A CCMS will allow for:

- the automation of many routine functions;
- consistency in the technical and organizational (not pedagogical) aspects of course design;
- application of quality standards;
- elimination of redundant activities;
- assurance of course version consistency;
- auditing of workflow;
- improved production efficiency;
- improved information accessibility; and
- improved interoperability, both within and outside the university system, through the implementation of international standards.

The success of any technical solution will depend on the development and implementation of workflow policies and procedures. The management of content and the accountability for its maintenance will have to be distributed along with the technical capability to create, store, edit and manipulate content. This development is a key requirement to moving to the creation and deployment of learning objects. Having codified methodologies will enable an efficient and effective production methodology to be adopted. The selection of a CCMS depends upon the adoption of the course management software, because the dovetailing of workflows must be determined prior to implementation.

Academic Support

Develop a robust and sustainable Academic ITS support capability, including the creation of a collaborative and experimenting environment for research, with new educational and subject matter technologies

Faculty require timely and responsive support for their technical needs. Technical help for research, especially research in teaching and learning and the operationalising of such research, should be available to all faculty. The failure to provide these services is resulting in faculty members spending large blocks of time dealing with technology issues.

Academic Computing requirements for Athabasca University faculty include the following:

- Capacity to easily create a home page, ePortfolios or portals for course delivery, academic community, publication, and research projects;
- Capacity to run and use, in a test environment, a variety of open source and commercial packages (it is assumed that the actual cost of these packages is supplied by the faculty member's Centre or research grant);
- A mechanism whereby test applications are migrated to full support, where they are incorporated into courses with significant numbers of student enrolments;
- An ePortfolio system to maintain and display home sites for all academics
- Support of major academic packages (server or micro-site license negotiation and control); and
- Training and active support for Learning Management Systems and other technologies.

MyAU Portal

Expand the functionality and user value of MyAU Portal

Athabasca University is currently implementing a web-enabled student portal to provide targeted communication and online services to students. This is seen as the first stage in the use of portal technology to improve user experience when accessing AU Web sites. The MyAU portal will continue to be developed to provide increased functionality and to be user-friendly.

Proposed second phase objectives include:

- Staff portal;
- Single sign-on to all courseware;
- Access to counselling services;
- Course scheduling capability;
- E-mail accounts;
- Electronic letters; and
- ePortfolios.

The content within the system will be delivered and managed through the administrative content management system (ACMS). When in full operation, each system will rely one upon another in order to provide full service value to current students and should not be considered as separate entities from a user’s standpoint.

Library

Continue to develop the Digital Reading Room (DRR) and the Integrated Library System (Innopac)

The AU Library system should continue to be upgraded as new products and services become available to enable Library staff to improve the quality of service to students, faculty, and other users.

Two key initiatives to achieving the above are the continued development of the Innopac circulation management system and the DRR. The Innopac system requires upgrading with particular emphasis on introducing and enhancing the functionality of a federated search mechanism, a link resolver, and electronic records management.

The success of the DRR demonstrates the ability of Library services to add significantly to the online value proposition. Access through a single point of entry to a broad range of course-related material is clearly an excellent fit between technology and user's needs. The development and continuing advancement of the DRR is seen as an essential capability and must be supported. It provides students with ready access to course-related materials in a convenient and intuitive interface. ITS will continue to support this groundbreaking initiative to ensure the project completes its objectives.

Operationalise AdLib and the learning object repository

The development of the AdLib database to act as the metatagging database for learning objects should be operationalised. This has been identified within the E-Learning Accelerator Plan for delivery by June 2005. The research work undertaken under EduSource has completed most of the specification work. Integration with the Library's DRR, course management, and other systems is now required. The existing architecture needs to be adapted to use an Oracle database as the current Postgres database will not scale effectively.

A further imperative for this development is the establishment of a course creation methodology that supports the development and adaptation of course materials as learning objects that conform to international standards, which are independent of any learning platform. This will provide a degree of independence that provides us with an exit path should any particular course management system that we adopt not be considered conducive to the University's longer-term goals.

Administrative Systems

System Integration

1. Seek to integrate existing application silos through the employment of middleware or the replacement with an integrated enterprise resource planning (ERP) system

The administrative systems consist of:

- Empath - HR
- Coda - Finance
- CMIS – Materials Management
- Cognos – Budgeting and Planning
- Purchasing and Contracts
- Banner
- OROS – formerly Banner Web

These systems were selected for their capabilities of serving the core user set, focusing on transaction capabilities rather than information provision into an integrated administrative system. To address this lack of integration, two avenues will be explored:

- Research and develop middleware solutions to integrate information flow between the systems; and
- Replace the existing "best of breed" systems with an integrated ERP.

At the time of authoring this plan, an Alberta-wide initiative to adopt PeopleSoft as a postsecondary institutional ERP was underway. This initiative could substantially reduce the costs of implementing such a solution at AU. However, to date little has been forthcoming regarding the status of the initiative and its specific impact on AU. Nonetheless, consideration will be given to this potential solution to address the significant difficulties within AU's administrative ITS structure.

The implementation of middleware is no small task. Substantial process and systems analysis will be required prior to its development. Regardless of whether PeopleSoft or another solution is adopted, a comprehensive process analysis will be necessary in order to determine users needs sets. While ITS capability exists in this area, it is insufficient for the task. Therefore, in all likelihood, development will require the employment of outside expertise to analyse and map existing processes.

Ongoing Situation
An immediate review of the EmPath system, in particular, is needed to address the inefficient handling of HR information. The system currently leads to high wait states and excessive manual handling of information. Until a comprehensive review of the system is undertaken, it would be perceptive to move ahead developing systems to deal with many of the problems facing HR. The

EmPath system will be evaluated in conjunction with a process review. This will serve to affect a short-term solution in anticipation of a mid- to longer-term solution.

Administrative Content Management System (ACMS)

2. Implement the Administrative Content Management System

We have begun implementation of a web content management system for administrative units using Zope/Plone, which is an open source system. This will provide many benefits to the coordination and publication of web information:

- Consistency;
- Currency;
- Simplicity;
- Accuracy;
- Efficiency; and
- Ease of use.

Workflow rules are being established to facilitate the usage of the system. The content management system will allow users to manage their own web content in a coordinated and consistent environment. The External Affairs' Web Integration Unit (WIU) will act as the coordinator of administrative content. Providing their stakeholders with a content management tool reduces the dependency of users on the unit, thereby eliminating redundant activity, reducing throughput time and enabling users to have greater control over their information publishing. Development of the system will continue with a focus on simplifying the interface and automating the more routine functions.

Banner

3. Deploy a single instance of Banner 7.x with a reduction of customised requirements

There will be no further version upgrade until the introduction of version 7.X in 2007.

The biggest concern with Banner is the manner in which it handles the assessment of student fees. This issue has consumed many years of resources in relation to the creation and maintenance of systems through many version upgrades. The Version 7 upgrade would prove to be a major challenge because SunGard SCT Banner has changed the method of fee assessment. This obstacle would require substantial modification to the registration form, one of the largest and most complicated forms in Banner. Serious challenges, in regards to assessing student tuition fees and granting proper refunds, are also posed by the prospect of charging US dollar fees and adding this new dimension to an already complex fee structure. There is also an existing need for greater integration of the course materials inventory (CMIS) with the Banner system. This project remains to be completed. The current situation is leading to service disruptions, processing errors and duplication.

The requirements to establish effective data capture have compromised the ability to analyse data and create and deliver high-level report functions. Real-time reporting is a key deliverable of integrated systems and it is essential for effective organisational decision making.

It is planned to forego the 6.x update in favour of moving to Banner 7.X by 2007. The critical reasoning here is that we need to ensure that our student support processes are optimised and integrated, and that any information system should be as standard as possible.

Of first importance is the requirement to review Student Service and related processes. By pushing ahead with an earlier installation we would lose the opportunity to revise processes and procedures which may be sub-optimal. The undertaking of a comprehensive review of student-facing processes with Banner 7 capability in mind will allow for an optimisation of process and system integration. This time will also allow for the development of a detailed plan to incorporate CIM's registration system into AU's, thus enabling considerable savings in both employee and system resources, while also improving effectiveness in student services.

Further to this, by introducing a more standardised version of Banner we would reduce the amount of customisation required in our student support system. This would enable us to install Banner without requiring that sub-routines and custom programming are compatible with new versions, thus yielding the following benefits:

- future upgrades completed on a more timely basis;
- reduce both the time and resource costs of future upgrades;
- enhance the quality and availability of service; and
- enable the development of improved reporting structures.

Ongoing Position
During the period prior to Banner 7.x being launched, it is proposed that short-term critical needs such as electronic letters, data transfer with partner institutions and the reduction in duplication of financial transaction processing will be addressed with sub-projects. The choice of such sub-projects will depend on, a) the payback for an immediate fix and, b) the ability of Banner 7.x to solve the problem. The applications developed to address these needs will, as much as practical, be congruent with the longer-term strategy. However, the immediate need will outweigh the requirement for long-term integration. The Banner 7.x upgrade will include the functions so developed in order that no loss of service occurs. This does create the potential for rework and redundant activity; nonetheless, if the function is deemed to have sufficient merit that its completion is essential, then the discussion is moot and we are forced to undertake it regardless of future direction.

Networked Work Environment

4. Research and implement collaborative software to support the networked working environment

The University's Strategic Plan specifies the development of a networked working environment with the ability to support communication across and collaboration among a geographically diverse workforce. The implementation of a single document management strategy is crucial if the notion of "any time, any place" is to be expanded to all University services, not just course delivery.

This transition will be greatly facilitated if the University sanctions a single collaborative software platform or groupware that provides at least the following services identified in the e-Learning plan and other services as they become required:

- e-mail, individual and group;
- calendar, individual and group;
- work flow management;
- document processing and management,
- e-portfolio;
- synchronous and asynchronous conferencing; and
- community support, etc.

The planning, management, and support of this University-wide collaborative groupware will be undertaken by CS, and may require additional staff and resources, or the reallocation of existing staff and resources. Every effort will be made to find collaborative groupware that is flexible and dynamic, in keeping with the ITP's commitment to fostering and supporting innovation in teaching, learning, and research.

That said, the nature of personal productivity software (an integral aspect of groupware) is such that those who wish to gain maximum benefit from its productivity-enhancing features must be prepared to modify their work habits. Those who do not wish to modify their work habits will, of course, still realize significant gains from its improved communication and scheduling features. (Not everyone uses all the productivity-enhancing features of Microsoft Office, but everyone at AU benefits from the communication and collaboration a single software package affords). The successful implementation of any groupware, however, requires effective communication, adequate training, and ongoing user support. This suggests a unit-by-unit roll-out is advisable, since a University-wide launch would likely prove unsupportable. This initiative will inevitably place greater demands on resources, but its successful deployment should outweigh any additional costs. Crucial to the success of this initiative, however, are the implementation of a single platform, staff thoroughly trained in its use, and prompt, knowledgeable support.

Computing Systems

Business Continuity Plan

1. Implement ITS Systems Continuity Plan

The implementation of the ITS Business Continuity Plan is essential to ensuring a high availability environment. The relocation of the proposed second site at the ELC has delayed the formation of a back-up site. Given the indeterminate position of the ELC, the CIM location at St. Albert has been selected for development. It is intended that the back-up site will act as a "hot" site providing infrastructure to enable system maintenance and upgrades without the concomitant absence of service. By moving in this direction we achieve the desired end of providing for disaster recovery without creating a redundant infrastructure. Further to this, by actively using the site we ensure its viable operation in the event of a major event at the AU site. A detailed specification must be developed and on completion, a project budget and plan can then be created and implemented.

Project Management

2. Introduce project management methodology

The failure to have a codified project management methodology has resulted in poor project completion rates. The initial step towards establishing good practice has been the creation of a project approval policy and a project submission worksheet. Project success rates are unlikely to improve without a capability to establish project deliverables in a comprehensive and methodical manner that bring contextual elements into the analysis. By introducing a project management methodology we will not only enable improved single project delivery but also provide far greater capability to manage the portfolio of projects that are routine with ITS. Improved auditing of projects will also result in the identification of resource conflict and development issues. These issues can then be addressed through training, performance management and investment.

Standard Operating Procedures

3. Develop ITS standards, policies and procedures

To ensure that ITS development continues in a coherent, congruent and correct manner the creation of standard operating procedures is essential. Failure in this regard will lead to a fissuring of activities, inefficient use of resources and the creation of excessive redundancy. ITS policies have been instituted within the past year to great effect, allowing for significant improvement in technology use throughout the University. Creating operating procedures will reduce the dependency on individual staff members as standardised methodologies will simplify the deploying of technology, while removing the idiosyncrasies of personal preference. This is not to leave the impression that there are no standards within the ITS management structure; rather, they are insufficient for the needs of a rapidly growing capability and for the attainment of the virtual University.

Of primary importance are:

- Commissioning of new and upgraded systems;
- "Evergreening";
- Maintenance;
- Testing;
- Information life-cycle;
- Quality Assurance; and
- Training and documentation.

ITS Information and Resource Planning System

4. Establish ITS Information System

To provide actionable information, ITS will need to establish a set of infrastructural metrics to measure service levels and use. The provision of such information will facilitate proactive management of resources, allowing for the accurate forecasting of systems use. The provision of this information is essential to effective ITS investment management, planning and budgeting. The establishment of an ITS information system will require the measurement and recording of activities.

Vendor Management

5. Establish strategic vendor relationships

Purchasing of ITS resources will be approached from a strategic standpoint. The goal here is to obtain increased value for AU through the attainment of improved services and/or cost reductions. The grouping of large purchase volumes will enable the creation of purchasing power. This strategy will provide a stronger negotiation position with interested vendors. By determining what services are of significant value to AU, the Institution can then effectively use its strengthened negotiating position in order to obtain higher value. The value of particular vendors can only be determined by a thorough determination of AU's needs, a partnering approach, an open and frank negotiations with selected vendors. The steps here include:

- Determine our ITS-related expenditures;
- Group expenditures into categories;
- Determine the gaps in the current provision of services related to the equipment;
- Form an ITS purchasing team;
- Develop an evaluative criteria for vendor selection;
- Develop an RFP;
- Select vendors and issue RFP;
- Evaluate RFP submissions;
- Select two or three vendors;
- Negotiate with vendors;
- Select a winning vendor;
- Finalise contract with vendor;
- Sign contract with vendor; and
- Maintain contract with vendor.

While large financial savings are not anticipated here significant value is expected which, in turn, will improve user service.

Action Plans

Action	Start Date	Target Completion	Accountability
1. Obtain plan approval	October 2004	September 2005	Executive Group/AUAC
2. Form committees	April 2005	July 2005	CIO/AUAC
3. Begin committee operation	May 2005	Ongoing	CIO
4. Establish ITS project priorities	May 2005	October 2005	Governance Committees
5. Develop projects charters for top five projects	April 2005	December 2005	CIO
6. Evaluate and select a single LMS for AU	October 2004	May 2005	AU Executive/AUAC
a. Implement a single LMS	May 2005	December 2007	CIO
b. Research and develop new LMS-workflow	August 2005	March 2006	CIO/CS Director
7. Research course content management system (CCMS) compatible with LMS	August 2005	June 2006	CIO/Director EMD
8. Research and develop Banner 7.x-based workflows	June 2005	December 2005	CIO/CS Director
9. Develop and implement AdLib metatagging database	March 2004	June 2006	CIO/Director EMD
10. Develop charter for second phase of MyAU	January 2005	September 2005	CIO/MyAU steering committee

11. Develop revised project plan for Newton (TRIX) in conjunction with LMS selection	September 2005	December 2005	CIO
12. Introduce HEAT as an organisation-wide call tracking system.	February 2005	March 2006	CIO/CS Director
13. Research collaborative groupware systems	October 2005	February 2006	CIO
14. Research COBIT governance framework	March 2005	March 2006	CIO/CS Director
15. Introduce Project Management capability into AU:			
a. Implement project management training for CS staff	March 2005	June 2005	CIO
b. Research and implement project portfolio system	June 2005	December 2005	CIO
c. Introduce activity tracking	March 2005	Ongoing	CS Director
16. Create ITS Business Continuance site in CIM	August 2005	December 2005	CIO/CS Director
17. Establish strategic vendor relationships.	September 2005	March 2006	CIO/CS Director
18. Establish research project to assess Finance and HR Systems' capabilities, to determine the optimal path to the desired level of system integration.	November 2005	July 2006	CIO/VPFA
19. Develop user training and certification program	September 2005	February 2006	CIO/HR
20. Obtain secure budget funding for ITS development: Staffing Capital Operational	November 2004	March 2005	CIO

21. Develop and implement ITS Commissioning procedures	January 2006	June 2006	CIO/Director CS
22. Complete a security audit			
a. Penetration audit to determine security vulnerability	September 2005	November 2005	Director CS
b. Review report and act on immediate vulnerabilities	November 2005	February 2006	CIO
c. Complete security policy and procedures audit	January 2006	June 2006	Director CS
d. Act on areas of immediate concern	June 2006	August 2006	CIO
23. Create a four-tier test environment	October 2005	March 2007	CIO/Director CS

Appendix 1: ITS Committees' Terms of Reference

Learning and Research ITS Committee Terms of Reference

The Membership and terms of reference of this AUAC sub-committee will be determined by AUAC in accordance with their by-laws and the Postsecondary Learning Act.

Administrative ITS Committee Terms of Reference

The terms of reference of this committee are as follows:

- Define strategic direction and provide advice to executive administration on Information Systems (ITS) and the use of technology in administration within the context of the Strategic University Plan (SUP) and the AU policy framework
- Monitor and provide advice regarding Administration Computing requirements and information systems development priorities.
- Recommend priorities for resource allocation on an annual basis to ensure ITS infrastructure and services support the core administrative mission of the University.
- Advise on the implementation of ITS policy.
- Refer academic matters to AUAC. Both academic and policy /regulation matters requiring Academic Council discussion and approval will be forwarded to the Agenda Committee and to Academic Council.

Composition
The committee will consist of a broad representation from a range of university constituents. Members of the committee will have decision making authority to approve proposals and course of action within the purview of the committee. It will include but not be limited to representation from:

- Office of the VPFA
- Finance
- Human Resources
- Course Materials Production
- Registry
- External Affairs
- Institutional studies
- Office of the VPA
- FOIP Officer
- Academic Centres

Committee Operations
The committee will meet a minimum of four times a year.
All committee meetings will have minutes recorded.
Normal committee rules will apply.

Governance
The committee will report to the Executive Group of AU.
The committee chair will be elected by the members of the committee.
The AVPA, CIO, and Director of Computing Services will be permanent members of all committees.

Computing ITS Committee Terms of Reference

The terms of reference of this committee are as follows:

- Define strategic direction and provide advice to executive administration on Information Systems (ITS) and the use of technology in providing a secure and high availability infrastructure within the context of the Strategic University Plan (SUP) and the AU policy framework
- Monitor and provide advice regarding Infrastructural Computing requirements and information systems development priorities.
- Recommend priorities for resource allocation on an annual basis to ensure ITS infrastructure and services support the core mission of the University.
- Advise on the implementation of ITS policy.
- Refer academic matters to AUAC. Both academic and policy /regulation matters requiring Academic Council discussion and approval will be forwarded to the Agenda Committee and thence to Academic Council.

Composition

The committee will consist of a broad representation from a range of university constituents. Members of the committee will have decision making authority to approve proposals and course of action within the purview of the committee. It will include but not be limited to representation from:

- Facilities
- Computing Services
- Academic Centres
- Finance

Committee Operations

The committee will meet a minimum of four times a year.
All committee meetings will have minutes recorded.
Normal committee rules will apply.

Governance

The committee will report to the Executive Group of AU.
The committee chair will be elected by the members of the committee.
The AVPA, CIO, and Director of Computing Services will be permanent members of all committees.

Appendix 2 Glossary Links

Glossary of Internet Terms
http://www.matisse.net/files/glossary.html

Federal Standard 1037C: Glossary of Telecommunications Terms
http://www.its.bldrdoc.gov/fs-1037/

Webopedia: Online Dictionary for Computer and Internet Terms
http://www.pcwebopedia.com/