**Team Iris**
Consulting Engineers

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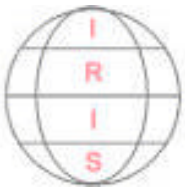



John. S. Zelek, Ph.D., P.Eng.
Coordinator
University Future Project Creation team
School of Engineering
University of Guelph
Guelph, ON, N1G 2W1

March 4, 2002

**Re: ENGG*3100 Call for Final Design Proposals**

Dear Dr. Zelek,

Please find attached our proposal to undertake a final on how to implement and intelligent video surveilance system for room 2313 in the Thornbrough Building. The proposal has been prepared in accordance to your request for proposals that was received by us on February 25, 2002.

Our company consists of four engineering students who have a large body of skills and experience draw upon. We are all senior engineering systems and computing students at the University of Guelph who have come together to form Team Iris (group ESC-10).

The attached proposal outlines our plan of approach for your unique problem, as well as outlining the proposed delierables, schedule of work and budget. It is our intention, if our proposal is accepted, to both deliver a final design report and to provide you with an oral presentation outlining the report.

Please feel free contact us at thermost@godiva.eos.uoguelph.ca if you require any further information. We look forward to hearing from you.

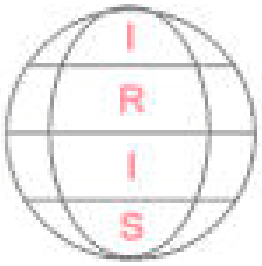
Sincerely,

Michael Gravis Daniel Kowalewski Graham Nasby James Stark

# Final Design Proposal

for an

Intelligent Video Surveillance System for Thornbrough 2313




***Prepared at the request of:***

Dr. John S. Zelek, Ph.D., P. Eng.
Coordinator
University Future Project Creation Team

Monday, March 4, 2002

Team Iris
Engineering Design II – Group ESC-10

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## Executive Summary

In response to the call from the University Future Project Team at the University of Guelph, directed by Dr. J. S. Zelek, P.Eng., to create an comprehensive video surveillance system from room 2313 of the Engineering Building, Team Iris (ES&C Group 10) has submitted the following proposal to undertake a Final Design Report. The proposal outlines the plan to develop a turn-key system that utilizes a set of cameras controlled by a centralized computer system.

The system will be intelligent, as it will only record from the cameras when either movement is detected and/or the door to the room is opened. It will record all image data internal on the hard disk of the computer, and will have a secure backup system in place to ensure no image data is lost. Administrative access to the system will be via secure network client software that can be run from computer on the SOE computer network.

Team Iris charges $50/hour for design fees, and has anticipated 30 hours of time to complete this Final Design Report. Thus, the total fees will be $1500.

This proposal outlines the justification and scope of the project, along with the assumptions, requirements and deliverables of the design. A proposed schedule and budget is outlined and information on how to accept the proposed work, with the requisite terms and conditions, is included

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## 1.0 Introduction

### 1.1 Problem Statement

Maintaining a safe and secure working environment is of paramount importance in shared facilities. A secure environment provides protection against unauthorized access, abuse of the said facilities and theft and/or damage to equipment in the secure facility. A safe and secure facility will prevent its occupants from coming to harm and will also protect the equipment contained inside.

Currently room 2313 of the Thornbrough building does not meet all of these requirements. A system needs to be designed to monitor the room to deter the abuse and theft of equipment, and to provide a means of detecting problems and notifying the proper authorities. This system will also need to be tamper-proof to keep a determined individual from disabling the system.

### 1.2 Justification

The current conditions in room 2313, with respect to the treatment of the room and the equipment that it houses, are in need of improvement. The current security system provides protection against unauthorized access via door lock system using magnetic access cards, but does nothing else beyond this. At present a person, once they gain access to the room, could vandalize or steal any of the equipment inside with no fear of consequences since their actions would not have been logged. This is a very undesirable situation, as the computing facilities in room 2313 are an important resource that must be protected.

Advances in image recognition and processing make it possible to automatically track an individual's activities in a given environment. With such a system it is possible to detect and record a persons actions within the monitored environment. Under these conditions it is possible for the authorities to quickly review the logs and determine the identity of an individual who is damaging and/or stealing equipment from the facility. This is the system that we are proposing to install.

### 1.3 Scope

In response to the request from The School of Engineering at the University of Guelph, Team Iris will develop a solution for intelligently monitoring the activity in room 2313 of the Thornbrough building at the University of Guelph. This design will be concerned with monitoring the activity in room 2313, and integrating the equipment to the existing systems in that room, in isolation from the rest of the building.

## 2.0 Proposed Work

### 2.1 Solution to be Investigated

Our solution will use a multi-layer approach that will integrate camera technology with the existing magnetic door security system. Utilizing a centralized computer system with custom software that will be installed in a secure location remote to room 2313, the solution will be a turn-key system that will provide comprehensive 24-hour-day monitoring of the room.

The proposed system will have the following five key parts:

1. A set of carefully positioned cameras, using "USB web-cam technology" that will provide complete video coverage of the interior of room 2313 and the doorways leading to the room.
2. A USB network to connect the cameras to a secure standalone computer that will run the system
3. The central computer will use both custom build software and the provided *Innovative Vision Technology* software to ensure "turn key operation"
4. The central computer and its custom software/hardware will :
    (a) Interface with the existing magnetic door system in order to react to door opening/closing events
    (b) Only store video from the cameras, in the form of compressed image formats, when movement and/or door events are detected

(c) Attach to the School of Engineering Ethernet network, and administrative access will be done via a secure client program running on the network.
(d) Utilize an automatic backup system that will periodically dump image data to a secure backup device

5. Lastly, the system will be installed in a manner so that it prevents unauthorized access and/or tampering.

The system will be designed using a comprehensive and layered approach. At all times the design will strive for simplicity and ease of operation.

### 2.2 Requirements

The requirements to complete the final design are based upon the constraints, criteria, and assumptions of the problem statement. The design will cover the following necessary requirements to provide an intelligent video surveillance system for room 2313.

#### 2.2.1 Constraints

1. Must comply will all required codes, regulations and statutes, including but not limited to the Ontario Building Code and the Occupational Health and Safety Act.
2. Must be able to work unattended
3. The central computer must be compatible with and utilize the provided *Innovative Vision Technology* software
4. The system must routinely backup image data that is collected from the cameras
5. Must be able to attach to and utilize the School of Engineering computer network so administration can be done remotely

#### 2.2.2 Criteria

1. The cameras should provide as much coverage of the interior of room 2313 and the doorways as possible
2. A high level of security is important to prevent tampering, and to prevent unauthorized access to stored information
3. File size of the captured video needs to be minimized
4. The administration interface to the system should be easy to use
5. Have minimal impact on the usability of room 2313 from an occupants' perspective
6. System up-time must be maximized, which a high quality of service being delivered
7. Minimize installation costs
8. Minimize operational costs

#### 2.2.3 Assumptions

1. There exists secure location exists for a dedicated computer to be installed to run the system.
2. Both a reliable and consistent power source and network access point will be available for the dedicated computer

### 2.3 Methodology

Team Iris has access to a large selection of resources. These facilities are the network of libraries at the University of Guelph, individuals from the engineering faculty, and extensive lab facilities. These facilities include the ability to generate and test computer simulations. With these tools, Team Iris can simultaneously research and then simulate solutions.

The first step will be to determine the requirements of the software provided by Innovative Vision Technologies. From there, the next step is to select an appropriate computer to run the system and the best video cameras for our needs. Additionally an interface solution so we can integrate with the existing magnetic door security system will then be developed. Next, software will be written and debugged to integrate the different systems together. Finally, the system will be simulated and tested before the design is finalized. If deemed appropriate Team Iris may also launch a small pilot project to demonstrate our functionality of our system/.

Through this process Team Iris will arrive at what we will consider the best solution to the problem at hand. This optimum solution will be methodically outlined and coupled with complete specifications, within the Final Design Report.

### 2.4 Deliverables

Should this proposal be accepted, Team Iris will submit a Final Design Report which will detail our solution to problem at hand on the date of Monday, March 4, 2002. Only Dr. Zelek, acting on the behalf of the School of Engineering, may extend this deadline. Team Iris will present the final design to the School of Engineering in the form of a presentation, at which they can answer questions, at a date after March 4. During the duration of the project, a series of bi-weekly meetings have been arranged with the School of Engineering, in order to provide status reports and receive feedback on the project.

## 3.0 Schedule and Budget

Team Iris will create a Final Design Report for School of Engineering at the University of Guelph. This report will outline the full design, based on careful calculations and analysis. Table 1 breaks down the required tasks to complete the Final Design Report. It also indicates a general time line and an estimate of the time required in order to complete the individual tasks. (A GANTT chart of the scheduled tasks can be found in Appendix A.)

| Date | Estimated Hours | Task |
|---|---|---|
| 02/02/25 | 1 | Received Request for Proposal |
| 02/02/27 | 6 | Preliminary Research |
| 02/03/04 | 1 | Meeting with Dr. Zelek |
| 02/03/04 | 1 | Proposal Due |
| 02/03/06 | 4 | Develop Design Solutions |
| 02/03/18 | 1 | Meeting with Dr. Zelek |
| 02/03/20 | 11 | Analysis and Final Design report |
| 02/03/20 | 11 | Initial Design Sketches and Calculations |
| 02/03/28 | 1 | Final Design Due |
| 02/03/29 | 4 | Presentation |
| Total : 30 hours | | |

Table 1: Proposed Work Schedule

The hours indicated above are net for the team; they are not individual work hours. Team Iris charges $50/hour which includes all expenses and overhead. The estimated projected time required for the completion of the report totals 30 hours. Therefore, the anticipated cost is $1500.00

## 4.0 Terms and Conditions

### 4.1 Acceptance

Acceptance of this proposal must be made in writing to Team Iris, and must be accompanied with a non-non-refundable retainer equal to half of the total fees. As soon as this proposal is accepted work will begin. Any significant delays, being more than 4 days, by client to accept this proposal will be reflected by a revised schedule of deliverables.

### 4.2 Schedule of Payment

The School of Engineering at the University of Guelph will pay a non-refundable retainer fee of no less that one half of the total fees for Team Iris to proceed with the project . No work will begin until this retainer has been paid. The remainder of the fees are due in full upon receipt of the final design report. The amount and timing of the retainer fee are non-negotiable.

### 4.3 Penalties

In the event that Team Iris fails to deliver the final design report by 12:00 noon on Thursday March 28, 2002, Team Iris will forfeit one half of the remaining fees owed (excluding the retainer) for this Final Design Report. In the event that Team Iris fails to produce the final design report, it will forfeit all of the remaining fees owed (excluding the retainer).

If at any time the School of Engineering elects to break contract with Team Iris, work will stop immediately and the remaining fees owed must be paid in full in their entirety. The fees owing may not under any circumstance be discounted to reflect how much work has been done on the project by Team Iris at that point in time.

In the case of exceptional circumstances, Team Iris may be willing to negotiate an alternate schedule of payment.

### 4.4 Liability

By accepting this proposal the School of Engineering agrees to hold Team Iris and its associates free from all liability concerning the implementation of this project. Team Iris agrees to only accept liability for errors contained in the Final Design Report which lead to errors in the implementation.

### 4.5 Intellectual Property

Team Iris will retain full and exclusive rights to all intellectual property (including but not limited to patents, copyrights, and chip designs) produced during the development of this project. Acceptance of this proposal or any subsequent documents produced by Team Iris does not in any way grant the School of Engineering rights or license, other than to immediate application as outlined by this project, to any intellectual property owned by Team Iris.

## 5.0 References


Animation and Video on PCs. http://www.why-not.com/articles/vidapps.htm. "Personal Computer Services" corporate web site. Accessed March 2, 2002.

R. Dorf and R. Bishop. *Modern Control Systems, Nineth Edition*. Prentice Hall, Saddle River, New Jersey., 2001.

R. Boylestand and L. Nashelskey. *Electronic Devices and Circuit Theory. Canadian Edition.* Prentice Hall, Toronto, 2002.

Ontario Health and Safety Act (RSO 1980)

## Appendix A: GANTT Chart of Proposed Work Schedule

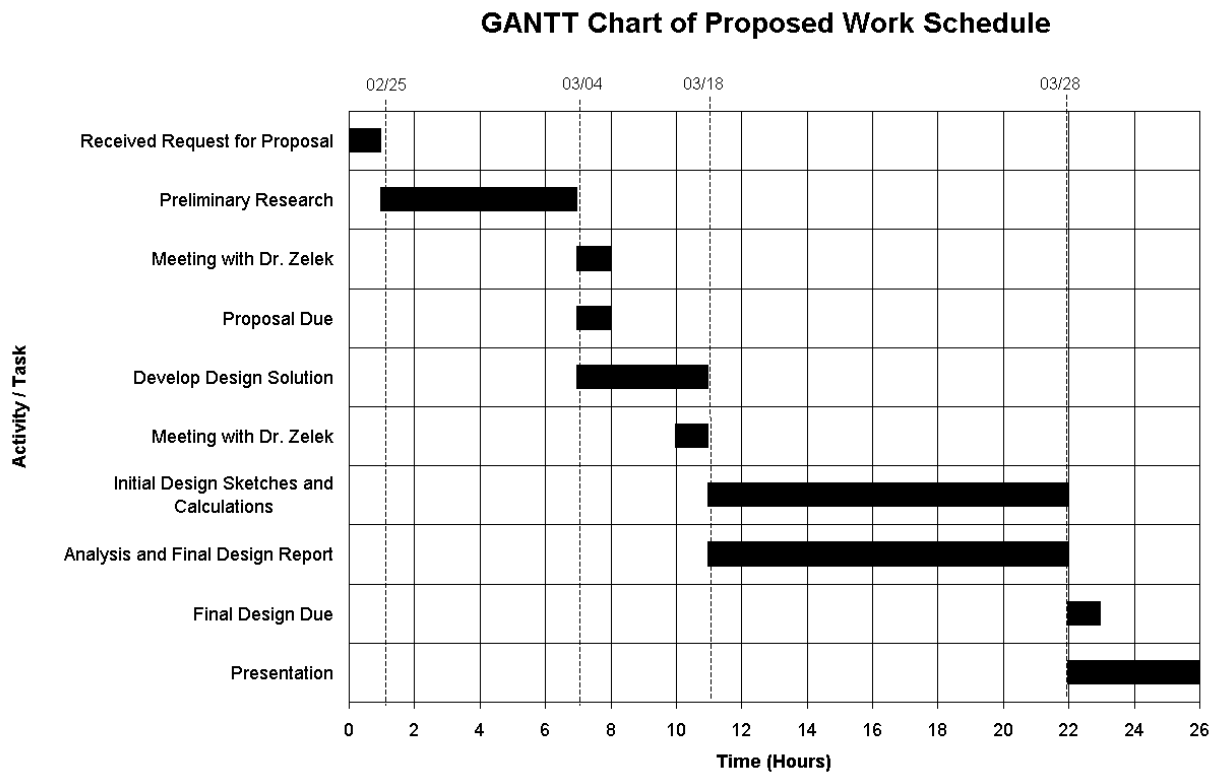


Figure A1: GANTT Chart of Proposed Work Schedule

## Appendix B: Engineering Personnel

**Michael Gravis**

A fourth year Engineering Systems and Computing student who just finished his fifth coop work term at ATS Automation, Canada's Largest Automation Provider. Michael is Proficient in multiple programming languages and on different software platforms. Before returning to school, he worked on a project involving embedded operating systems for IBM. To view an updated resume visit http://www.geocities.com/michael

**Daniel Kowalewski**

A third year Engineering Systems and Computing student who is currently a full time student at the University of Guelph. Past career related jobs include design of a web site for a small business, installation of network cards, and repair/installation of a stage lighting system. Other forms of employment were secretary for a medical office and maintenance for the Toronto Region Conservation Authority. Extra-curricular activities are playing the piano and being an active member of the University of Guelph Kendo Club

**Graham Nasby**

A third year Engineering Systems and Computing student who is currently studying full time at the University of Guelph. Past job experience includes technical support, web design/development, and marine electrical work for a private business he ran prior to studying to become a P.Eng.. In addition to his studies, which encompass computer system design, computer programming, system modeling and project management, he currently works part-time as both a support consultant at the University of Guelph and a teaching assistant for a second year computing course. In his spare time Graham is an avid mountain biker, and plays clarinet in a number of area orchestras, bands and other ensembles.

**James Stark**

James is a sixth year Engineering Systems and Computing Student, at the University of Guelph, with a strong background in computer science and software engineering. James has experience dealing with distributed information systems, and high performance computing. He is currently acting as the administrator for the high-performance computing cluster (SHARC-Net) at the University of Guelph.