# Project plan

Christian Lyzell

Version 1.0

## Status

| | | |
|---|---|---|
| Examined | | |
| Approved | | 060315 |

# Project identity

Spring 2006

Department of Electrical Engineering
Linköping Institute of Technology

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**Customer contact:** Jan-Erik Strömberg, 013–211080, janerik@dst.se
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**Tutor:** Janne Harju, 013–282804, harju@isy.liu.se

# Contents

# Document history

| Version | Date | Changes | Sign | Reviewed |
|---|---|---|---|---|
| 0.1 | 060222 | First draw | CL | – |
| 0.2 | 060224 | Activity list added | CL,VG | – |
| 0.3 | 060227 | Sections 7,10–12 developed | CL | AL,AJ |
| 0.4 | 060228 | Corrections and milestones added | CL | All |
| 1.0 | 060315 | Approved as version 1.0 | J. Hol | |

# 1 Supervisor

The supervisor of this project is *Jeroen Hol* at the Department of Electrical Engineering, Linköping Institute of Technology.

# 2 Project overview

Micro EFIS is, as the name implies, a small EFIS (*Electronic Flight Information System*) targeted for the *General Aviation* (GA) market. It is intended as a backup system for the mechanical flight instruments.

## 2.1 Purpose

The aircraft fleet has become very old (40+ years old aircraft is now very common) thanks to reliable air frames and rapidly increasing prices of new light aircraft. A vast majority of these GA aircrafts are equipped with old-fashioned mechanical flight instruments, now reaching the end of their lifetime as the air frames become older. Instead of performing a complete upgrade of the entire instrument panel, which can result in costs often exceeding the value of the entire aircraft, one can complete the system with a much more affordable Micro EFIS.

## 2.2 Goal

The goal of this project is to design a stripped down version of a Micro EFIS and to evaluate the implementation based on state-of-the art *organic graphical display*; a so called OLED display. The system shall be implemented on one single FPGA of type Xilinx Spartan 3 (model XC3S1000) to meet the need to be *small in size* and have a *low cost*. Since it is intented as a backup system it must have a *high reliability*, be *independent of external systems* and *simple to use*. To increase the ease of upgrading the system and to *incrementally add functions*, it shall be built in modules.

## 2.3 Deliveries

The *project requirements, system outline, project plan* and *time plan* shall be delivered in the end of week 9, 2006. The *design specification* shall be delivered at the end of Mars, *user manual* and *testing protocol* in the beginning of May, *technology documentation* and *after study* will be presented in the middle of May. Alongside will a project website be developed, which shall

stand ready at the project closure. For a more specific delivery table, see section 7.

### 2.4 Restrictions

The group does not hold with support after project closure. No guaranties except fulfillment of the requirements will be given.

## 3 Stages

In the ©Lips project model, there are three different stages: *before, during* and *after*. The decision to leave a stage is taken at different specific dates, see section 7.

### 3.1 Before

In this stage project guidelines are developed. Activities are identified and resources are allocated, which emerges in a project plan. The problem is defined in a project requirement document, which need customer approval. The system is later roughly specified, which results in a system outline document (also need customer approval).

### 3.2 During

During the project the group works according to the project plan. A design specification is developed, which defines the construction of the system and the work that lies ahead. Concurrently, a test plan is designed to ensure that the system fulfills the requirements that has been given. When the testing is complete a report is written, some technical documentation and a user manual is produced. The result of the project is presented orally and on a project website

### 3.3 After

In this last phase the results are handed to the comissioner. The project is evaluated and documented to ensure that the experience is fully captured. This means the end of the project.

# 4 Project organization

This section will describe the organization during the project and the responsibilities will be defined.

## 4.1 Responsibilities

To ease the control of the project different areas of responsibilities have been created. Every project member has its own responsibility. Nevertheless will the members take part in most of the different project elements and not only in its own area of responsibility.

### 4.1.1 Project leader

The project leader shall ensure that the goals of the project is fulfilled. The project leader shall plan the work and arouse enthusiasm in the group to work effectively. The project leader must have power of initiative and be able to make decisions.

### 4.1.2 Responsible for the Documentation

The responsible shall co-ordinate document writing, to ensure that the documents have a similar structure. The responsible shall also select the documentation standard that shall be used, and ensure that this standard is followed.

### 4.1.3 Responsible for the Testing

The responsible shall plan the testing. Which tests shall be made, how it shall be performed and when testing is approved.

### 4.1.4 Responsible for the Customer relations

The responsible shall keep the dialog between the group and the customer open. Straight out indistinctivnesses in requirements and trying to understand a potential user of the system.

### 4.1.5 Responsible for the Design

Responsible for the choices of design language, tools and principals.

#### 4.1.6 Responsible for the Implementation

Responsible for the implementation of the product.

# 5 Documentation

All documents will follow the ©Lips document format and will be written in LaTeX.

- **Requirement specification**
  The requirement specification is the foundation of the project. The requirements are negotiated between the project group, customer and supervisor. **Responsible:** Mikael Lord; **Delivery:** 2006-02-16.
- **System outline**
  The system outline is a simple description of how the requirements shall be met and how the system shall be constructed. **Responsible:** Ville Grandin; **Delivery:** 2006-03-01.
- **Project plan with activity list**
  The project plan describes the conditions of the project and a plan to carry it through. Activities are identified and the time consumption is estimated. **Responsible:** Christian Lyzell; **Delivery:** 2006-03-01.
- **Time plan**
  The time plan is a part of the project plan. The time plan states the project activities and the time they consume. Milestones and tollgates are also planned. **Responsible:** Christian Lyzell; **Delivery:** 2006-03-01.
- **Design specification**
  The design specification describes the system in detail. Subsystems, components and construction is described in detail. **Responsible:** Anders Jonasson **Delivery:** 2006-03-24.
- **Test plan**
  The test plan describes which test that shall be done, how they shall be performed and when a test is passed. **Responsible:** Anna Lindefelt; **Delivery:** 2006-03-24.
- **Test protocols**
  The test protocols shows the results of the tests and are produced in connection with these. **Responsible:** Anna Lindefelt; **Delivery:** 2006-05-19.

- **Technical documentation**
  The technical documentation presents the result of the project. It shows how the system is constructed and why. **Responsible:** Christian Lyzell; **Delivery:** 2006-05-19.

- **User manual**
  The user manual describes the how to use the product and its features. **Responsible:** Mikael Johansson; **Delivery:** 2006-05-19.

- **Meeting protocols**
  The meeting protocols will describe the decisions taken at group and customer meetings. **Responsible:** Mikael Lord.

- **Tollgates protocols**
  The tollgates protocols will show that the group has fulfilled each tollgates respectively. **Responsible:** Mikael Lord.

- **Homepage**
  The homepage will introduce the members and the project. Documents will be available for certain members. **Responsible:** Anders Jonasson.

# 6 Resources

## 6.1 People

The project group consists of six students at Linköpings Institute of Technology (LiTH). Furthermore, the group have a tutor at the Department of Electrical Engineering (ISY) at LiTH. DST Control provides with expertise in project related areas.

## 6.2 Material

LiTH provides a laptop and DST Control provides a laptop and produkt components. The group also have access to computers at LiTH.

## 6.3 Premises

DST Control provides with workspace.

## 6.4 Economy

Each project member provides 200 hours, in total 1200 project hours. The project group have 40 tutor hours available.

# 7 Milestones and tollgates

## 7.1 Milestones

A milestone is an important event in the project.

### 7.1.1 MS 1 – 1 Mars 2006

The requirement specification ready.

### 7.1.2 MS 2 – 1 Mars 2006

The project plan with time plan and system outline ready.

### 7.1.3 MS 3 – 24 Mars 2006

The design specification and the test plan ready.

### 7.1.4 MS 4 – 28 April 2006

All subsystems ready and tested.

### 7.1.5 MS 5 – 4 May 2006

Full system functionality and test results ready.

### 7.1.6 MS 6 – 19 May 2006

User manual, technical documentation, after study, poster and website approved and delivered.

## 7.2 Tollgates

At a tollgate one control that the specified requirements are met. The supervisor decides whether the work is done and the project can move on.

#### 7.2.1 TG 2 – 1 Mars 2006

At this tollgate the following will be delivered:

- Requirement specification
- Project plan with time plan
- System outline

#### 7.2.2 TG 3 – 24 Mars 2006

At this tollgate the following will be delivered:

- Design specification
- Test plan

#### 7.2.3 TG 5 – 12 May 2006

At this tollgate the following will be delivered:

- Full system functionality
- Test protocols
- User manual
- A presentation that shows that the system requirements are met.

#### 7.2.4 TG 6 – 19 maj 2006

At this tollgate the following will be delivered:

- Technical documentation
- After study
- Poster presentation
- Website describing the project

# 8 Activities

| No | Activity | Responsible | Time |
|---|---|---|---|
| 1 | Project start phase | All | 10 |
| 2 | Requirement specification | ML | 60 |
| 3 | System outline | VG | 40 |
| 4 | Project plan | CL | 20 |
| 5 | Identify activities | All | 8 |
| 6 | Estimate time of activities | All | 4 |
| 7 | Make a time plan | VG | 8 |
| 8 | Write a design specification | VG | 100 |
| 9 | Make a test plan | AL | 30 |
| 10 | Learn DXP/Althium software | All | 120 |
| 11 | Make button interface | ML, VG | 40 |
| 12 | Make main unit + setup mode | ML, VG | 60 |
| 13 | Learn RTC | ML, VG | 20 |
| 14 | Make sensor unit | CL, AL | 30 |
| 15 | Make ADI mode | CL, AL | 30 |
| 16 | Make HSI mode | CL, AL | 30 |
| 17 | Make ESI mode | CL, AL | 30 |
| 18 | Learn OLED display | MJ, AJ | 30 |
| 19 | Implement OLED display | MJ, AJ | 120 |
| 20 | Integrate | AJ | 80 |
| 21 | Test | AL | 20 |
| 22 | Write test results documentation | AL | 20 |
| 23 | Write a user manual | MJ | 20 |
| 24 | Write technical documentation | CL | 60 |
| 25 | Make a project evaluation | AJ | 30 |
| 26 | Prepare presentation | MJ | 20 |
| 27 | Make a project website | AJ | 16 |
| 28 | Make a poster | AJ | 10 |
| 29 | Weekly meetings | All | 40 |

# 9 Time plan

See time plan document.

# 10 Quality plan

## 10.1 Inspections

### 10.1.1 Documents

To ensure the documentation quality every document will be inspected by *two* project members at each version update. This does not include meeting reports which will only be inspected by a *single* project member. The supervisor will also be used to ensure the quality of the documentation.

### 10.1.2 Implementation code

To ensure quality in the implemented code the responsible for the subsystem will follow the structure set by the design responsible, and continually check the code.

## 10.2 Test plan

Tests for each subsystem and for the entire system will be designed. These will be specified later in the test plan.

# 11 Priorities

The biggest priority is to deliver the project in stated time. If big problems occur, re-negotiation of requirements might occur. The May 19th is the absolute deadline of the project delivery.

# 12 Project finalization

The project is finalized at TG 6, customer and supervisor approves project delivery at May 19 th 2006.

# References

[1] Tomas Svensson & Christian Krysander, *Projektmodellen Lips*, kompendium, Linköpings Tekniska Högskola, Version 1.2.

[2] George Grätzer, *Math into LaTeX*, Birkhäuser, 1996.