

Eastern Cincinnati Aviation Web Site

By

Brian Merz

**Submitted to
the Faculty of the Information Engineering Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Engineering Technology**

**University of Cincinnati
College of Applied Science**

June 2006

Eastern Cincinnati Aviation Web Site

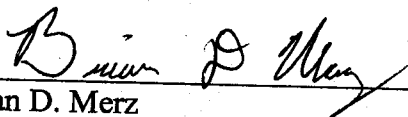
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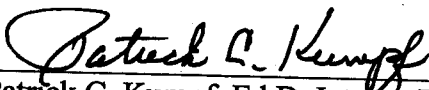
Brian D. Merz

6-8-06
Date



Annu Prabhakar

6/8/06
Date



Patrick C. Kumpf, Ed.D. Interim Department Head

June 8, 2006
Date

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Eastern Cincinnati Aviation Web Site

1. Statement of Need

The managers at Sportsman's Market, Inc., felt that the old Eastern Cincinnati Aviation (ECA) Web site – www.flyeca.com had become dated and should be redesigned. The current site has remained unchanged since it was first created in 2001. The managers wanted an up-to-date Web site that would better allow ECA to reach out to its pilots, students, and potential customers. They felt that redesigning the old site was necessary in order to catch it up with the current Web standards, which in turn will allow it to function correctly in newer web browsers. I used Web development, database, and multimedia technologies to accomplish this task.

2. Supporting Resources

One of the issues that Eric Ratke, the president of ECA, wanted resolved was the inconsistencies that existed in the old Web site. For example there is a section called "New Cessna Sales", when a visitor clicks on this link it looks as if they have been taken to a totally different website. The managers also wanted this section to have more features. In the old site, there was just one paragraph describing each plane. They wanted a user to be able to click on a plane and be taken to a special page dedicated to nothing but that plane. That page should contain tables with specifications and additional pictures that can be loaded into a flash application so the user can zoom in on details.

There are only three employees that work in the Web department at Sportsman's Market, Inc. and most of their attention is focused on designing new features and

maintaining the catalog Web sites located at www.sportys.com. For this reason, the managers also wanted a new ECA Web site that is easy to maintain and grow.

3 Project Description and Intended Use

3.1 Project Description

The main purpose of this project was to create a Web site for ECA that would fulfill its need to communicate better with its visitors. It is meant to provide information on how to get enrolled in flight training, purchase an aircraft, and get work performed on your existing aircraft.

3.2 User Profile

There will be two different roles using this Web Application. The first one will be the visitors who come to the site. This group contains pilots, students, and potential customers looking to purchase an airplane. These people will be coming to the site looking for information that they can find quickly and easily. The second role will be that of an administrator. This group will add new features as well as maintain the Web site. After they provide authentication they have access to a secured directory that allows them to interact with the database used to display content. Administrators will also handle any programming or layout changes that need to be made.

3.3 Use Case Diagram

The following Use-Case diagram (Figure 1) shows the basic functions of the Web site.

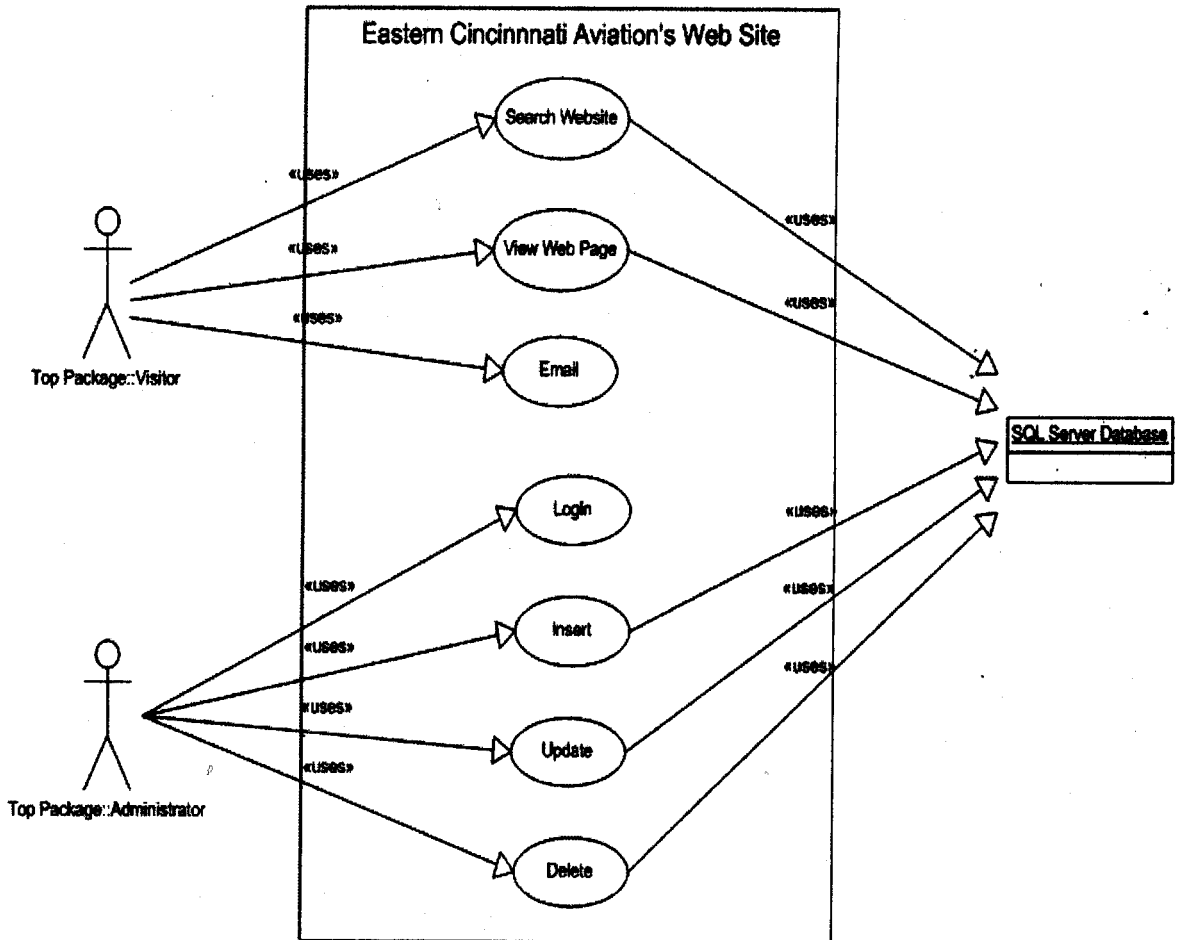


Figure 1. Use-Case Diagram

3.4 Design Protocols

The Web site diagram can be seen in Figure 2. This shows the site structure and traffic flow and is was used as a reference while the site was being developed.

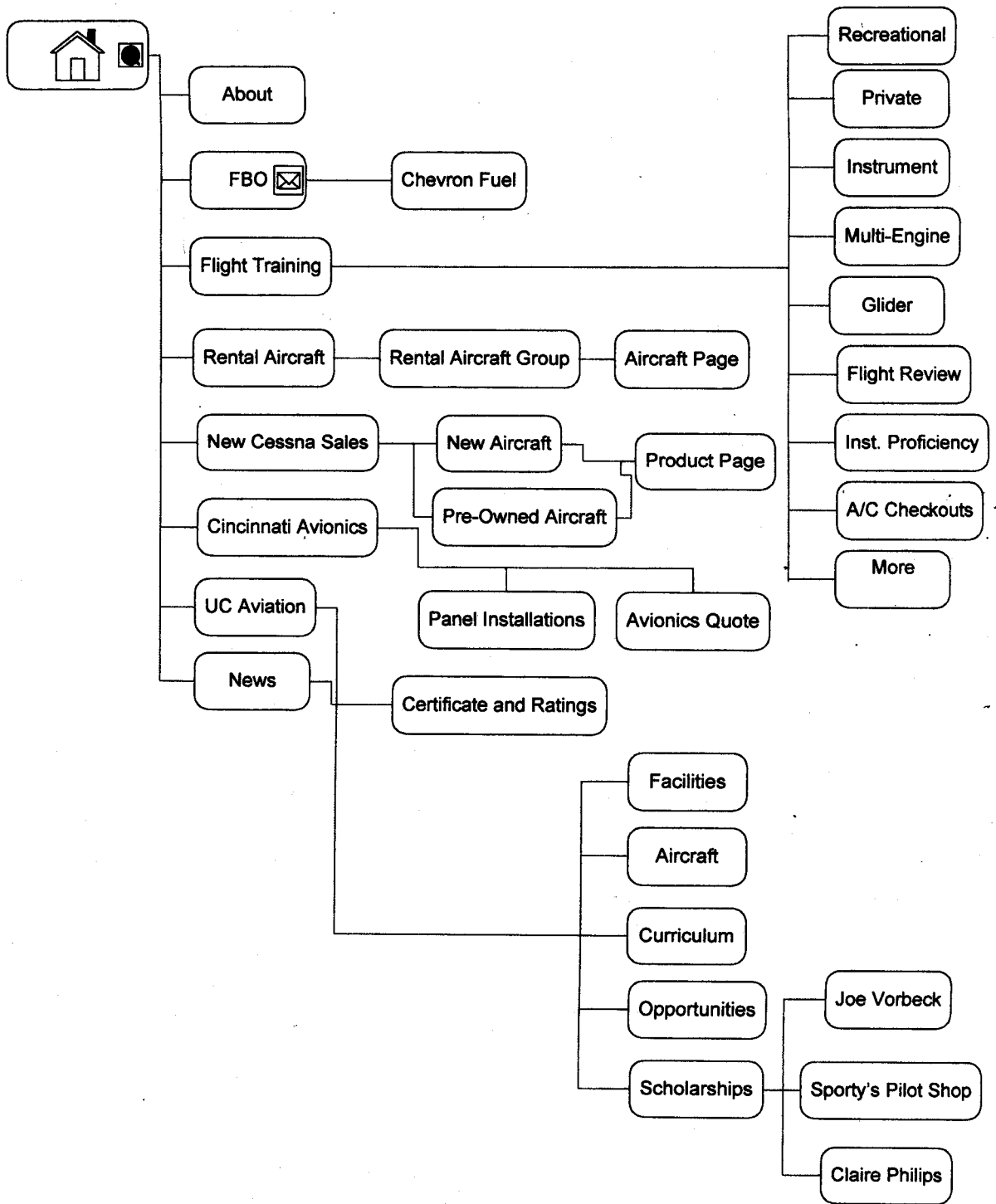


Figure 2. Web Site Diagram

4. Deliverables

1. Using ASP.NET 2.0, master pages were used to create a consistent page layout for the Web site.
 - a. Easy to navigate – It will use a Menu control that displays a consistent set of links on the left side of each page to help users maneuver through the site.
 - b. The site is ADA compliant. I loaded Web pages into WebXACT; witch is an online service that tests single pages of web content. This service was used to see if therewere any quality, accessibility, or privacy issues that existed.
2. The Web site has a back-end database management system using SQL Server 2000. Stored procedures where to achieve improved performance and scalability.
3. There is a feature that allows users to perform a search to find information.
4. Authentication for administrators.
5. Authenticated administrators can use administrative pages that allow them to add, edit, or delete content as needed. The site was designed to grow with little maintenance.
6. A Flash application that will load a high resolution picture and let the user move it around and zoom in and out to view details. This application is used on the “New Cessna Sales” section of the Web site.
7. This site uses a n-tier architecture in order to create a better organized and more maintainable Web site.
8. Web site security was implemented. Form validation was used and there is no in line SQL in the site.

5. Development

5.1 Project Schedule

The following figures show the intended project schedule(Figure 3).

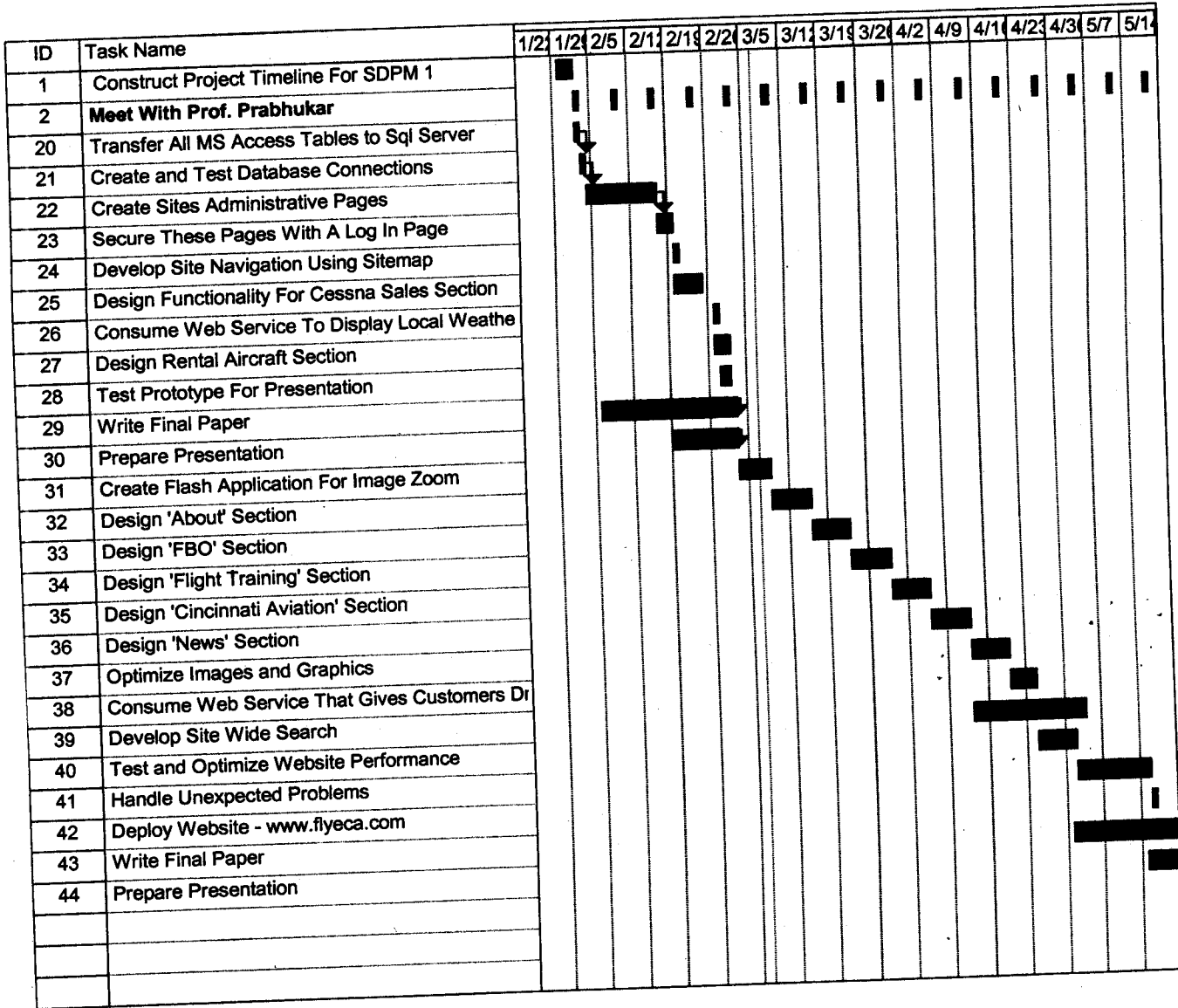


Figure 3. Project Timeline

5.2 Project Budget

The budget for the project can be seen in Figure 4. In the table I show the item and how much it cost. Sportsman's Market, Inc. already owned all of the software and hardware shown so there were no extra items they needed to purchase in order for me to complete the project.

Task and Item Names	COST
Construct Project Timeline For SDPM 1	\$0.00
Meet With Prof. Prabhakar 1	13.60
Meet With Prof. Prabhakar 2	13.60
Meet With Prof. Prabhakar 3	13.60
Meet With Prof. Prabhakar 4	13.60
Meet With Prof. Prabhakar 5	13.60
Meet With Prof. Prabhakar 6	13.60
Meet With Prof. Prabhakar 7	13.60
Meet With Prof. Prabhakar 8	13.60
Meet With Prof. Prabhakar 9	13.60
Meet With Prof. Prabhakar 10	13.60
Meet With Prof. Prabhakar 11	13.60
Meet With Prof. Prabhakar 12	13.60
Meet With Prof. Prabhakar 13	13.60
Meet With Prof. Prabhakar 14	13.60
Meet With Prof. Prabhakar 15	13.60
Meet With Prof. Prabhakar 16	13.60
Meet With Prof. Prabhakar 17	13.60
Transfer All MS Access Tables to SQL Server	39.00
Create and Test Database Connections	52.00
Create Sites Administrative Pages	195.00
Secure These Pages With A Log In Page	39.00
Develop Site Navigation Using Sitemap	104.00
Design Functionality For Cessna Sales Section	195.00
Consume Web Service To Display Local Weather	52.00
Design Rental Aircraft Section	78.00
Test Prototype For Presentation	65.00
Write Final Paper	0.00
Prepare Presentation	0.00
Create Flash Application For Image Zoom	130.00
Design 'About' Section	104.00
Design 'FBO' Section	104.00
Design 'Flight Training' Section	104.00
Design 'Cincinnati Aviation' Section	104.00
Design 'News' Section	104.00
Optimize Images and Graphics	104.00
Consume Web Service That Gives Customers Driving Directions	52.00
Develop Site Wide Search	260.00
Test and Optimize Website Performance	130.00
Handle Unexpected Problems	195.00
Deploy Website - www.flyeca.com	104.00
Write Final Paper	0.00
Prepare Presentation	0.00
SQL Server	7,000.00
Windows Server 2000	4,000.00
Windows XP Professional	299.00
Adobe Photoshop 7.1	600.00
Visual Studio .NET 2005	704.00
Macromedia Flash MX	500.00
HP NetServer LC 2000	12,000.00
HP Proliant ML 370 GH	5,140.00
HP Compaq dc7600	849.00
Total	\$33,637.00

Figure 4. Project Budget

5.3 Software and Hardware

The old ECA Web site used Coldfusion 5.0 as the server side programming language. I used ASP.NET with C# in the redesign of ECA's Web site. In his article about migrating from Coldfusion to ASP.NET, Joel Mueller states, "Rather than being linear and page-oriented, ASP.NET code is strongly typed, object oriented and event based. Basically, ASP.NET development is a blending of traditional Web development and traditional fat-client GUI development" (1). The reasons mentioned above are the major reasons why ASP.NET 2.0 was used in the redesign. The object oriented aspect of ASP.NET increases the ability for code reuse and provides enhanced features as well as reduced development time. When a bug is discovered or when a change needs to be made, the code can be modified in one spot and every instance that it is used on the Web site will be corrected. This method also encourages the programmer to write code that is more maintainable. Instead of going through the old Web site and converting the Coldfusion code to C# line by line, I performed a complete rewrite of the site in order to take full advantage of ASP.NET's advanced features.

In order to achieve faster and simpler development, I used Visual Studio .NET 2005 to create the Web site. The following is a list of reasons why I will choose to use Visual Studio .NET 2005 to design the Web site.

- A customizable Integrated Development Environment (IDE).
- Drag-and drop development using the Server, Tool, and Data explorers.
- Strong XML support.
- Web services with dramatically easier cross-platform application integration.
- Dynamic help.

We are currently using IIS 5 as our Web server. In order to deploy a .NET application on this platform I will need to download and install the .NET Framework 2.0 on the server. Kyle Newcomb, our IT manager has told me that we are going to upgrade to Windows Server 2003, which comes with IIS 6 and gives the option of installing the ASP.NET component, at some point this year. While discussing the Windows Server 2003 operating system in his book, IIS 6 Administration, Mitch Tulloch states "installing IIS means adding a whole new role called Application Server that can leverage the powerful features of ASP.NET for creating dynamic Web applications with greater ease than ever before" (2, p. 17).

ECA's old Web site stored data in a Microsoft Access 2000 Database. In his book on SQL Server programming Robin Dewson praised Access but also stated "unfortunately, it does have its limitations around scalability, speed, and flexibility" (3, p. 8). For this project I converted the Access database to SQL Server 2000. I also used stored procedures which are compiled SQL commands that are accessible by SQL Server. While explaining the benefits of stored procedures, Robin Dewson stated, "compiled code runs a lot faster than waiting for each line of SQL to be interpreted and then compiled each time it is processed" (3, p. 522). I discussed this with Kyle Newcomb, and he agreed with me and said that converting to SQL server would be a good idea and that he would like to phase out all instances of Access used on our Web sites (4).

I used Adobe Photoshop and Imageready 7.1 to create and edit the graphics and images for the site. Photoshop allowed me to give the Web site a more up to date and professional feel. "Web site graphics, such as buttons, banners or product images, define the user experience and distinguish a company's site from its competition" (5, p. 46).

6. Proof of Design

The project can be seen at <http://media.sportys.com/eca/>. In order to create a consistent layout have taken advantage ASP.NET 2.0's master page feature which allows you to create a template for the site and place a content holder where the children pages can insert their custom content. When users request the page, ASP.NET merges the two, so the Web pages will always have the layout and style of the master page layout with the output of the child page. The current homepage can be seen in Figure 5.

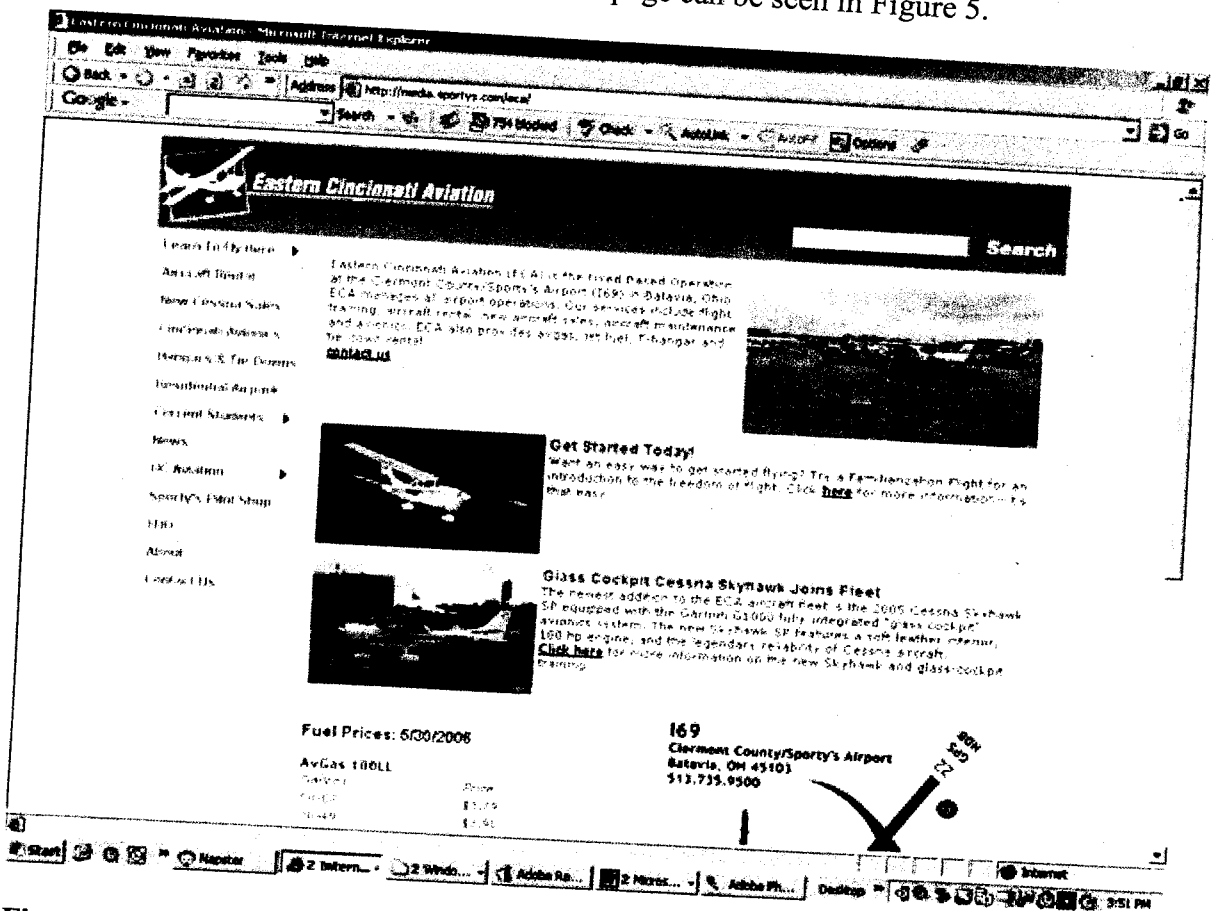


Figure 5. ECA's Homepage

If a user knows what they are looking for they can use the search box located on the top right of every page and perform a site wide search. Figure 6 shows how the search results are returned to a user.

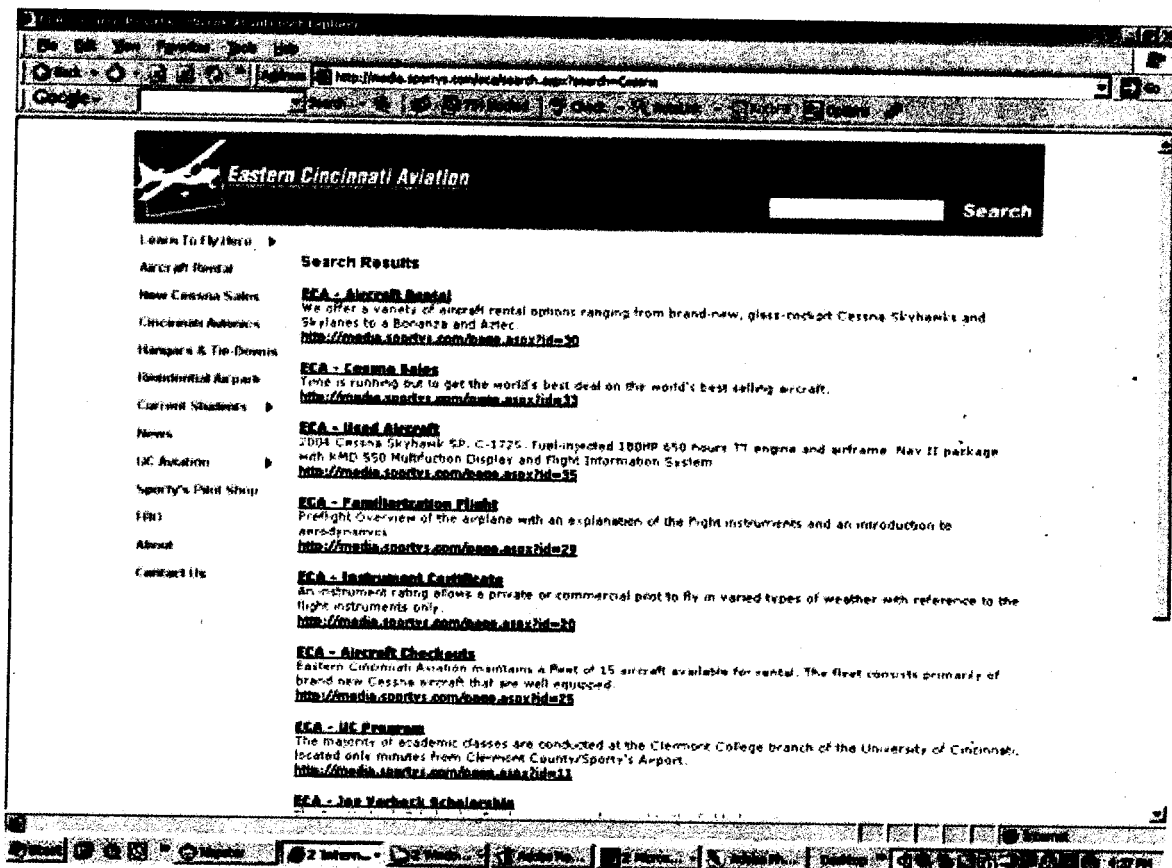


Figure 6. Search Results.

A screen shot of the UC Aviation Program page can be seen in Figure 7. This section provide detailed information to a visitor who is interested in enrolling in the UC Flight program.

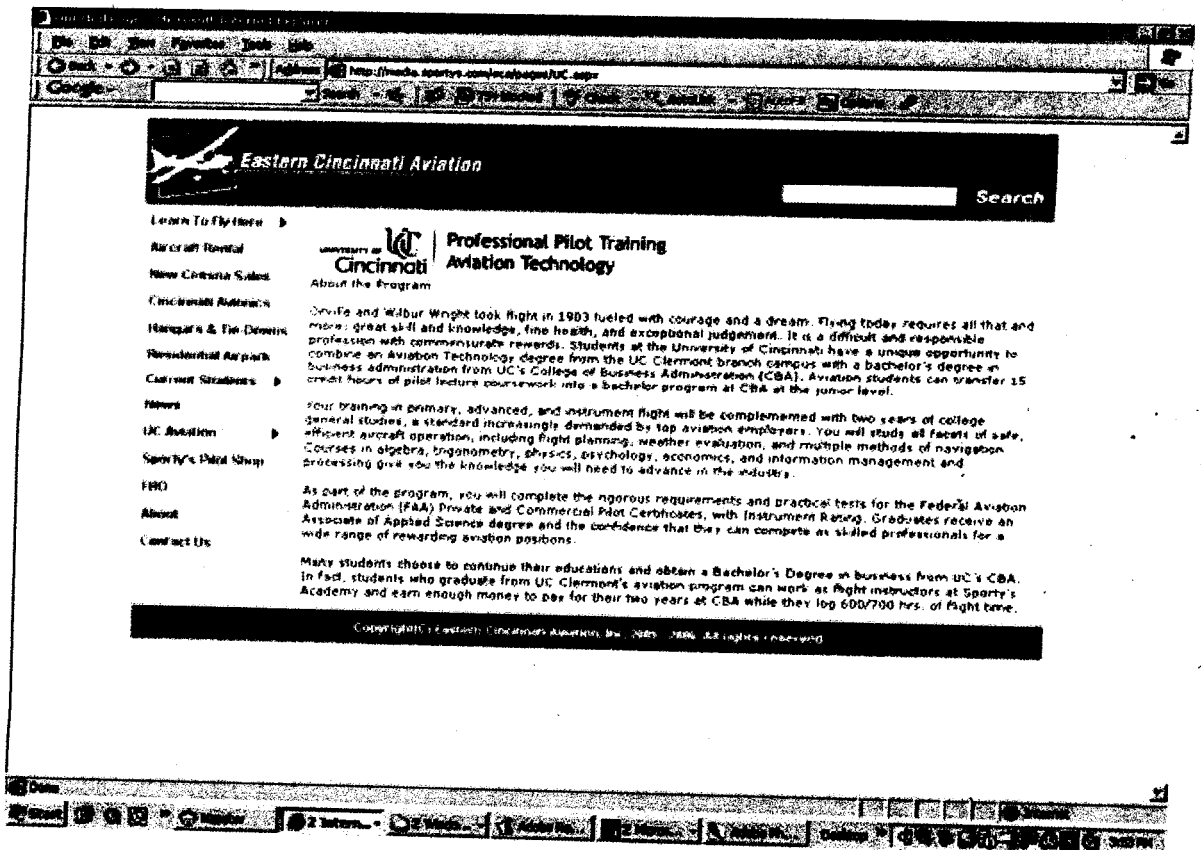


Figure 7. UC Flight Training Section

The Cincinnati Avionics Section can be seen in Figure 8. This section contains information for users who are interested in having work done on the GPS systems or instrument panels of their aircraft.



Figure 8. Cincinnati Avionics Section

A user can click on a Request Quote link on the Avionics page and then fill out the form shown in Figure 9. Once they submit this form, the information they entered in submitted into the database and from that point someone from the Avionics department goes to the admin section of our Web site and prints out the requested quotes every morning.

The screenshot shows a web browser window with the URL <http://made.sportys.com/ezpages/avionicsform.asp>. The page header features the logo for Eastern Cincinnati Aviation and a search bar. A navigation menu on the left lists various links such as 'Learn To Fly Here', 'Aircraft Rental', 'New Cessna Sales', 'Cincinnati Avionics', 'Hangars & Tie Downs', 'Residential Airpark', 'Current Students', 'News', 'E-C Aviation', 'Sporty's Pilot Shop', 'FAQ', 'About', and 'Contact Us'. The main content area contains a form with two primary sections: 'Customer Information' and 'Aircraft Information'. The 'Customer Information' section includes fields for Name, Address Line 1, Address Line 2, City, State (a dropdown menu currently showing 'ALABAMA'), and Zip. Below these are fields for Home Phone, Home Fax, Work Phone, Work Fax, Other, and E-Mail. The 'Aircraft Information' section includes fields for Manufacturer, Registration Number, Serial Number, Model, and Year. The browser's status bar at the bottom shows the time as 4:26 PM.

Figure 9. Avionics Quote

The Cessna Sales Section can be seen in Figure 10. When a visitor comes to this section they can view the New Cessna Aircraft, Pre-owned Aircraft, or contact the sales department.

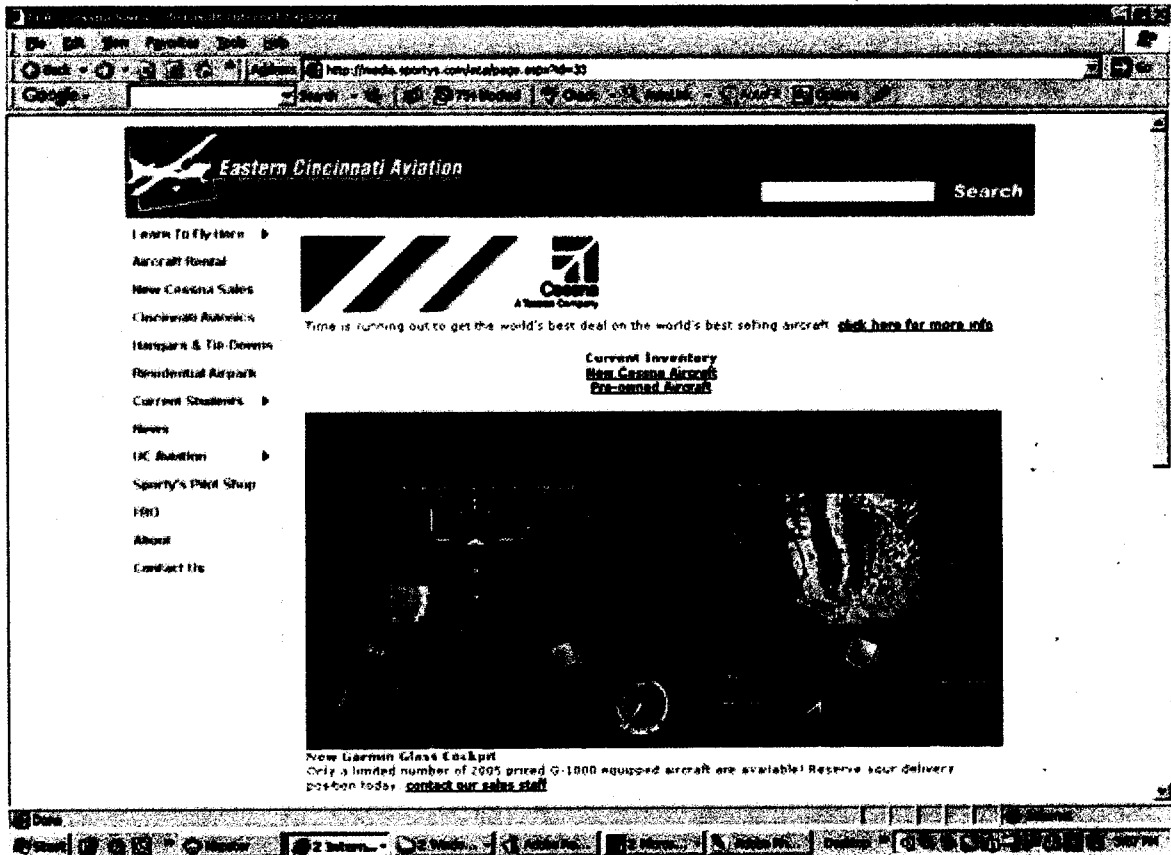


Figure 10. New Cessna Sales Section

If a user clicks on the Contact Sales line they are taken to the page see in Figure 11. A user can fill out this form and then this information is immediately emailed to the sales department.

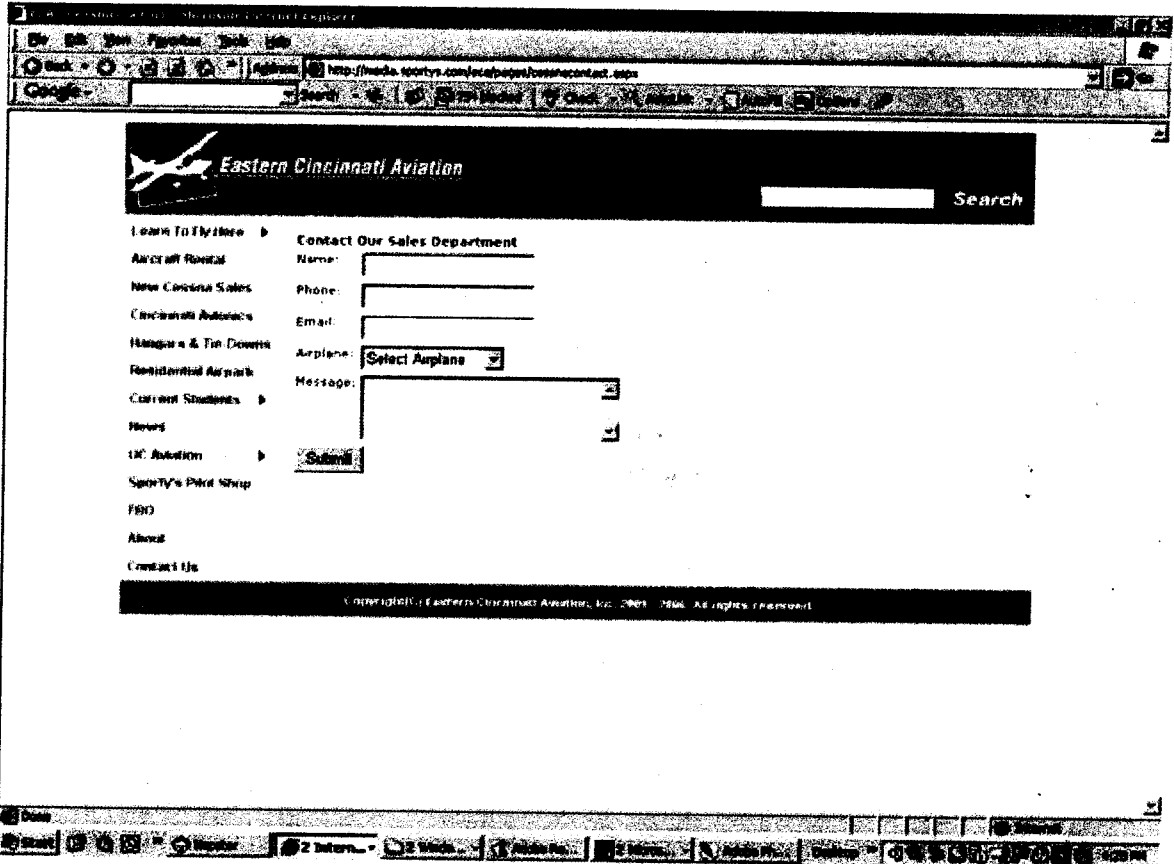


Figure 11. Sales Contact Form

If a user clicks on the New Cessna Sales Section they are taken to the page seen in Figure 12. This page lists all of the new aircraft that are currently for sale and it gives a brief description for each of them.

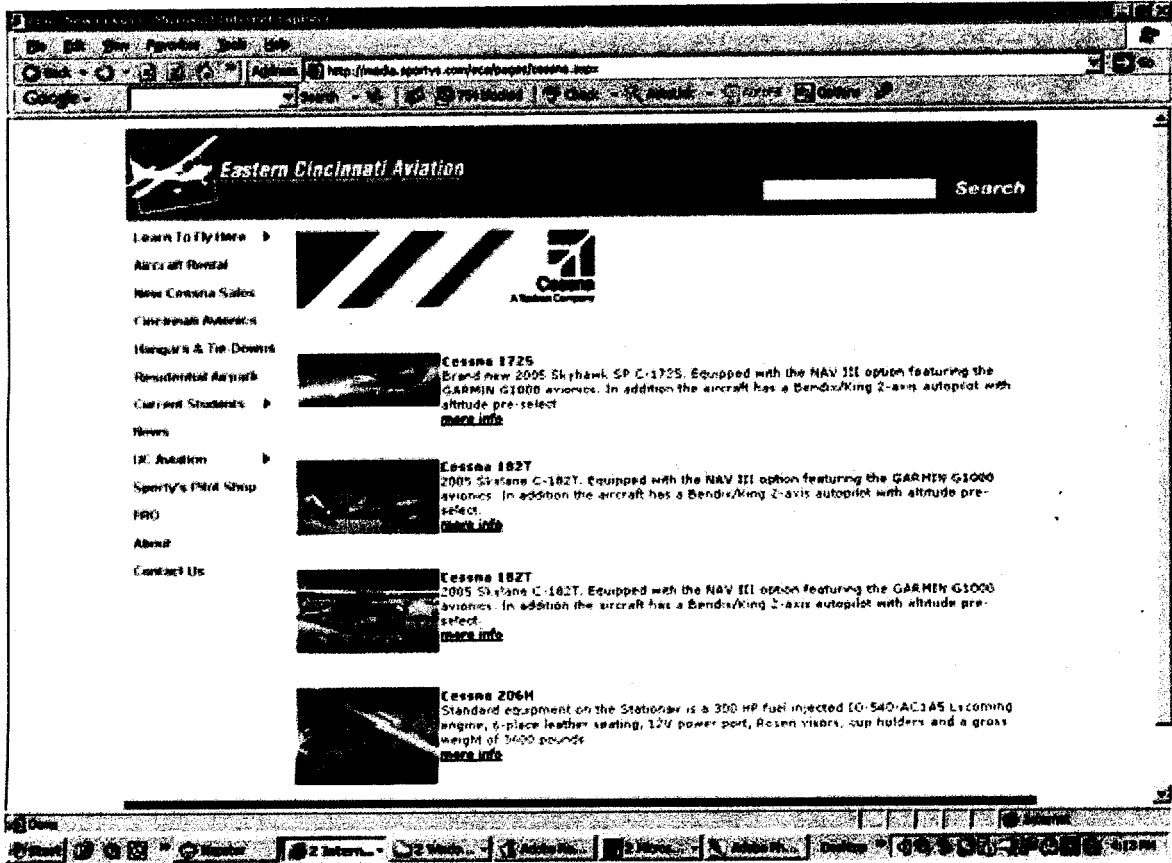


Figure 12. New Cessna Sales Section

Once a user selects a plane they are taken to its product page which can be seen in Figure 13. This page contains a large image of the aircraft, a long description and tables that include information on its dimensions and capacities.

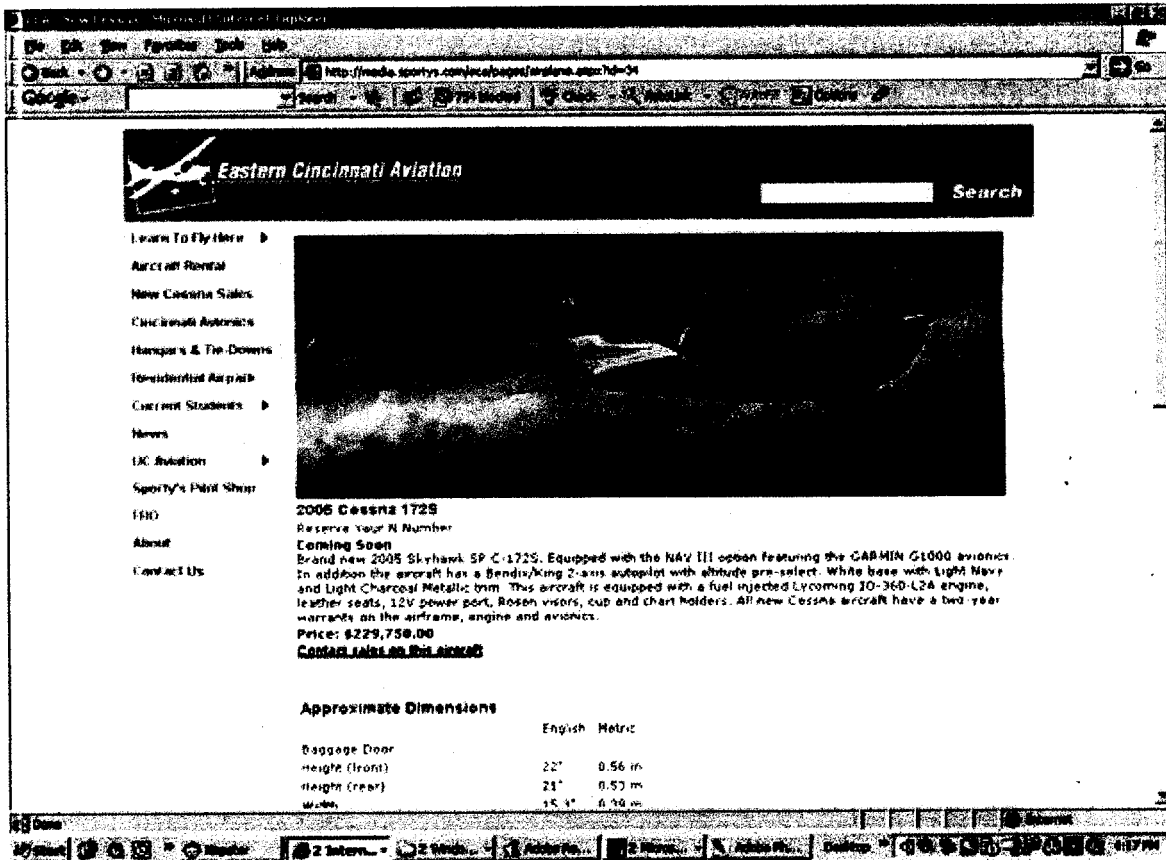


Figure 13. Aircraft Page

The Flash application used to show images can be seen in Figure 14. This uses Action script to dynamically load the image the user select and from there it lets them zoom in and out and move the image around by dragging it with the mouse or by clicking the directional arrows located at the bottom right.

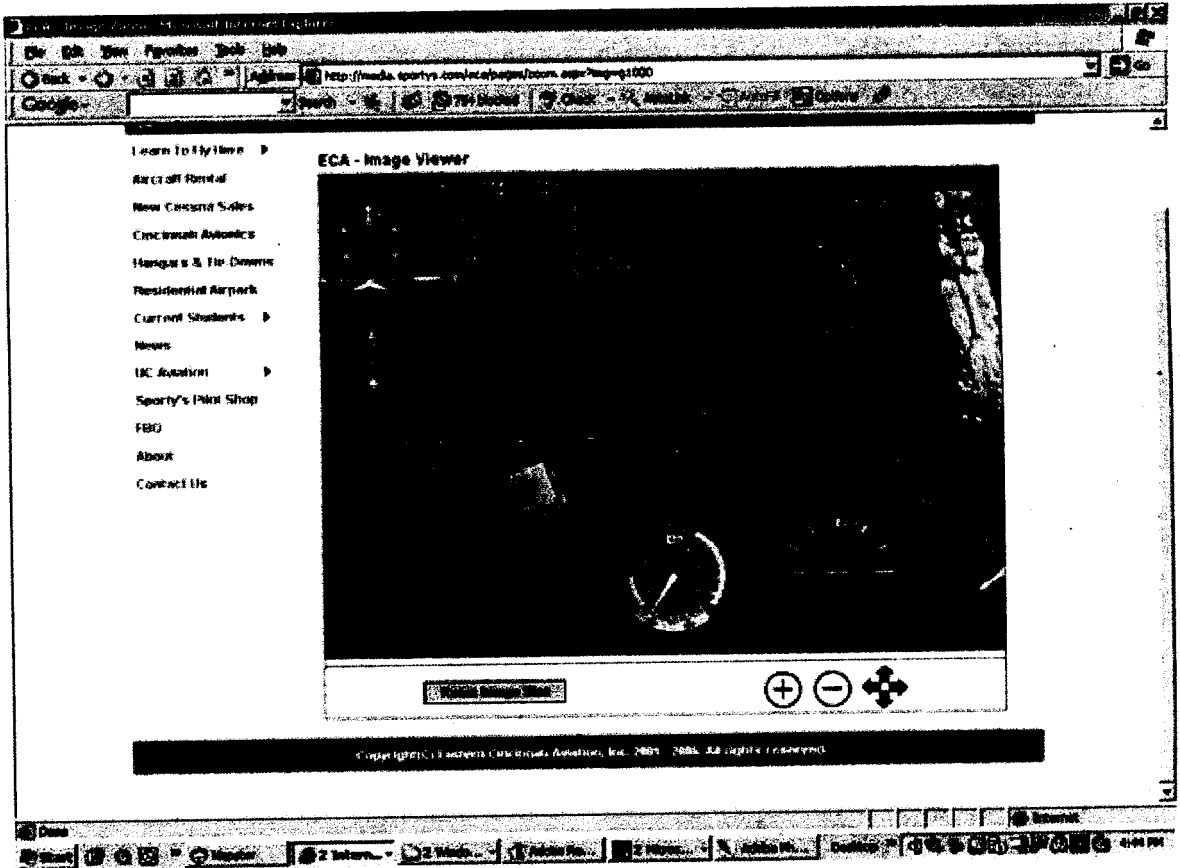


Figure 14. ECA – Image Viewer

The administrative pages for this Web site have been completed. There is a secured directory on the site that allows an authenticated user to insert, update, and delete records in any of the tables. It uses windows authentication, so the administrator must provide a user name and password that is valid on the server that the site is being developed on. The logon screen can be seen in Figure 15.

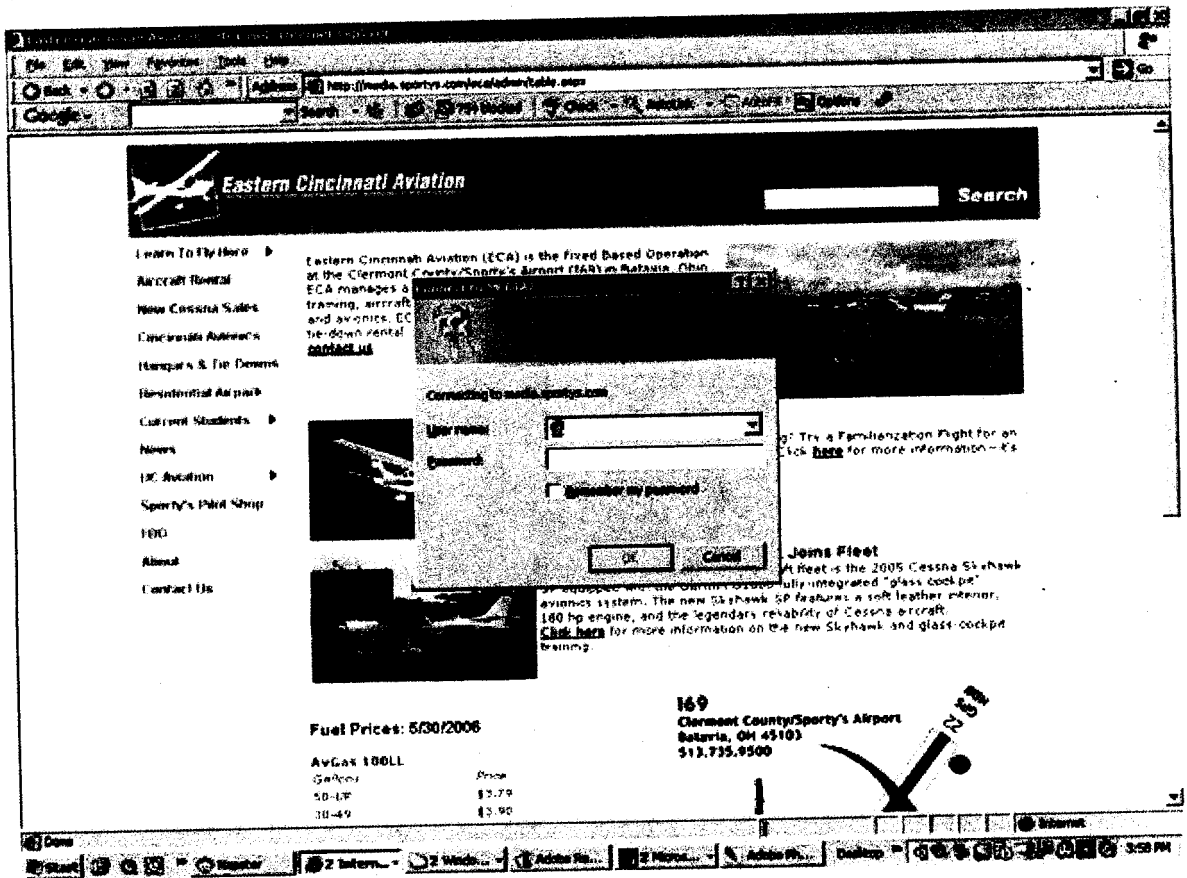


Figure 15. Logon Screen

All of the table names have been loaded into drop down box so an administrator can select witch table they want to modify, as shown in Figure 16. Once they select a table they are sent to a page, shown in Figure 17, that will allow them to insert, update, and delete records in the database. The FormView control is used to insert new items and the GridView control is used to update and delete records. Both of these controls use the ObjectDataSource control, witch set properties that specify which business class to instantiate and which method to use to select, insert, update, or delete the data.

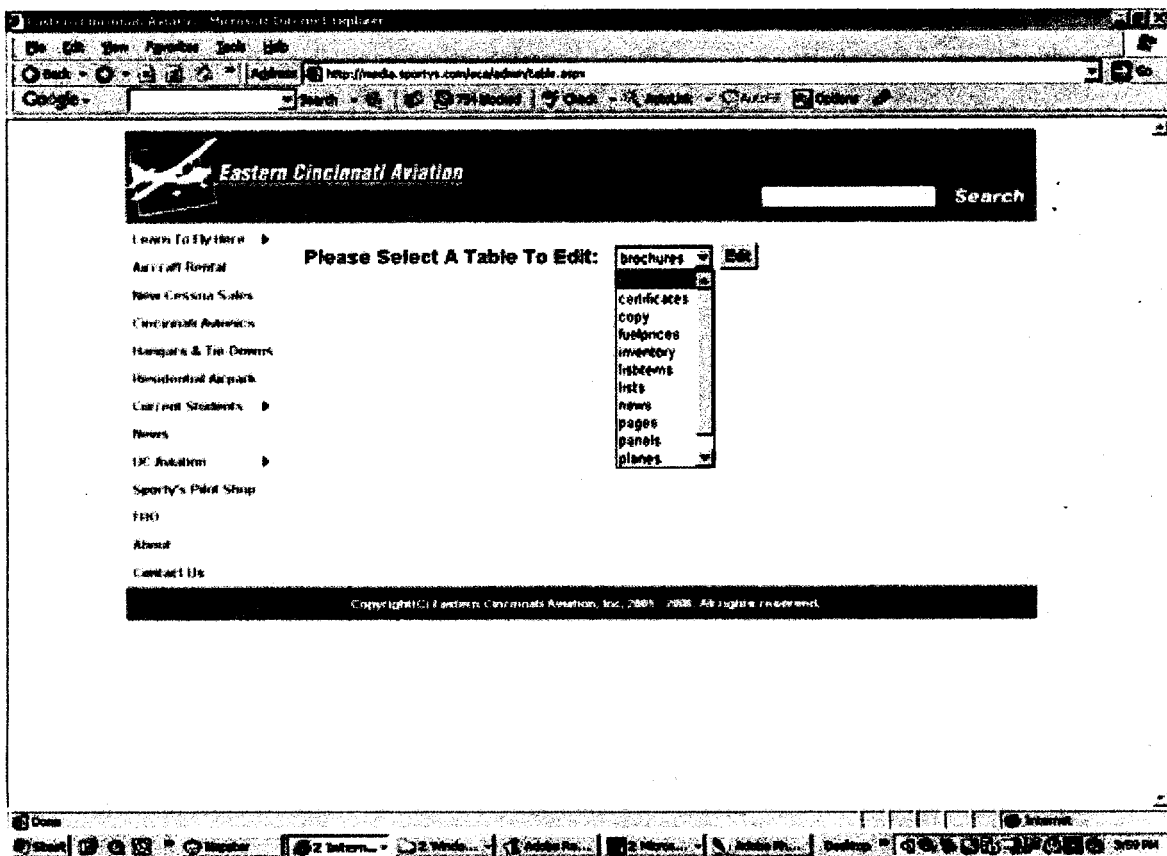


Figure 16. Table Selection

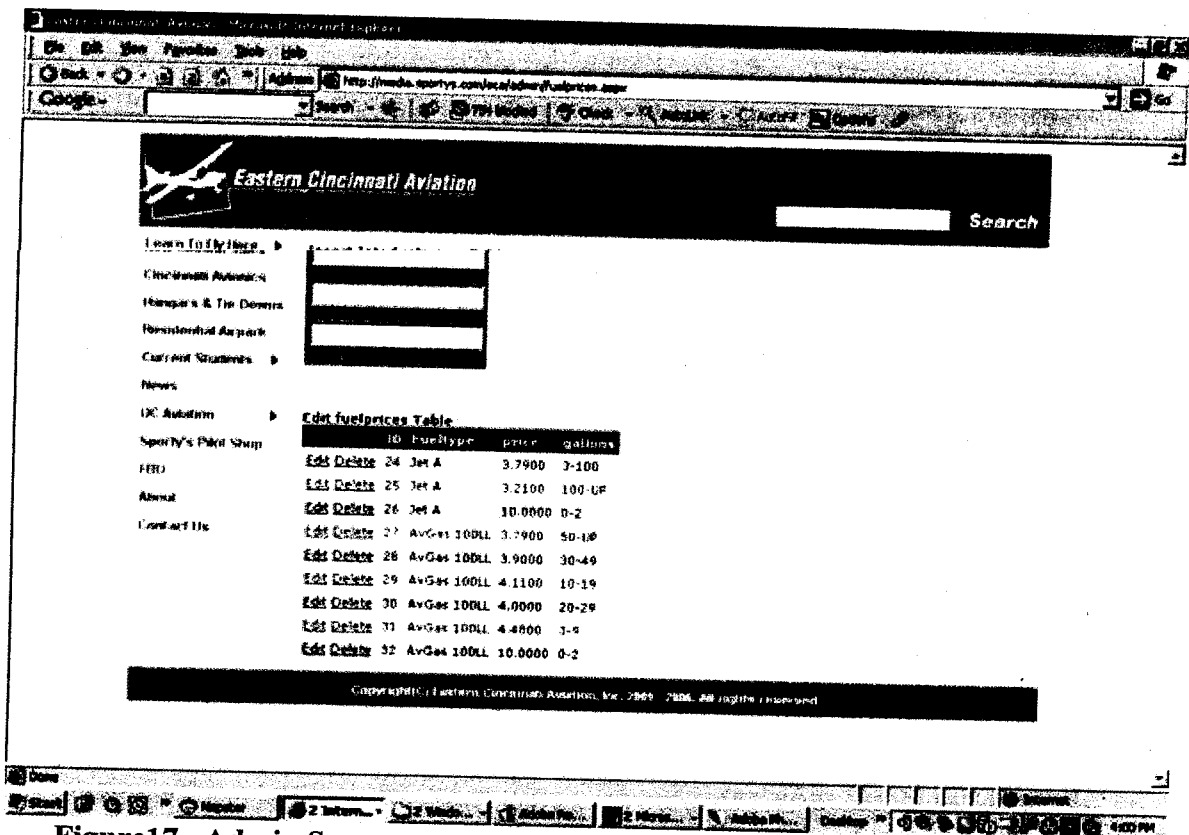


Figure 17. Admin Screen

7. Conclusions and Recommendations

7.1 Conclusions

This project was created in response to ECA's need for an updated Web site to better serve its pilots, students, and customers. The site offers consistent layout and navigation. All of the sections of the site are full of information that is easy to find and there are images and graphics used to enhance the users' experience. The following technologies were used in creating the project ASP.NET 2.0 with C#, Adobe Photoshop 7.0, Macromedia Flash MX, and MS SQL Server 2000. The project was completed in the three quarter Senior Design sequence and it meets all of the deliverables.

7.2 Recommendations

In the process of working on this project I had to start using ASP.NET 2.0 and Visual Studio 2005 for the first time. I found that the ASP.NET 2.0 offers some really nice improvements of the previous versions. In this project I took advantage of some of those improvements when I used the new Masterpage feature as well as the Menu, DataSource, and GridView.

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