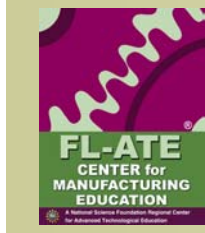


DRAFT 11/3/05



# Manufacturing Challenge # 3

## Flight Simulation

WWW.FL-ATE.ORG



E X E R C I S E S   I N   M O D E R N   M A N U F A C T U R I N G

### Introduction

The A380 is the biggest civilian jetliner ever built. The A380 is designed to carry 555 passengers and its wing span is almost as long as a football field! This “superjumbo” combines the very latest technologies for materials, systems and industrial processes. Many airports will have to increase their runway length to receive this giant, when it starts flying in 2006. The price for a single plane is listed at **\$285 million!**

Designing and building the plane was quite a challenge. The company that makes them spent an estimated 13 million dollars on the development.

Now here is one more challenge. If **you** were responsible for training new pilots all over the world, how would you do it? No, you can not borrow a \$285 million dollar plane for practice training. Yes, your only option is to design the ultimate flight

### The Task

1. Make a list of the major design characteristics of your simulator. Remember, it has to be so real that you should not feel you are just in your living room playing a video game.
2. Draw a sketch of what your simulator may look like.

### The Process

When you are ready, click on **SOLUTION** and complete the information requested. You may then compare you proposed solution to how a real manufacturing company in Florida responded to this challenge. You will be able to see a virtual tour of the plant.

### Evaluation

1. Compare your own ideas against a case study of how a real manufacturing company responded to the same challenge.
2. If you complete this exercise in class, compare you responses with your peers and ask for your teacher’s input.

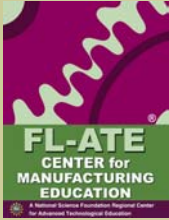


**HILLSBOROUGH**  
Community College



**St. Petersburg**  
College

DRAFT 11/3/05



## Manufacturing Challenge # 2 A Solution

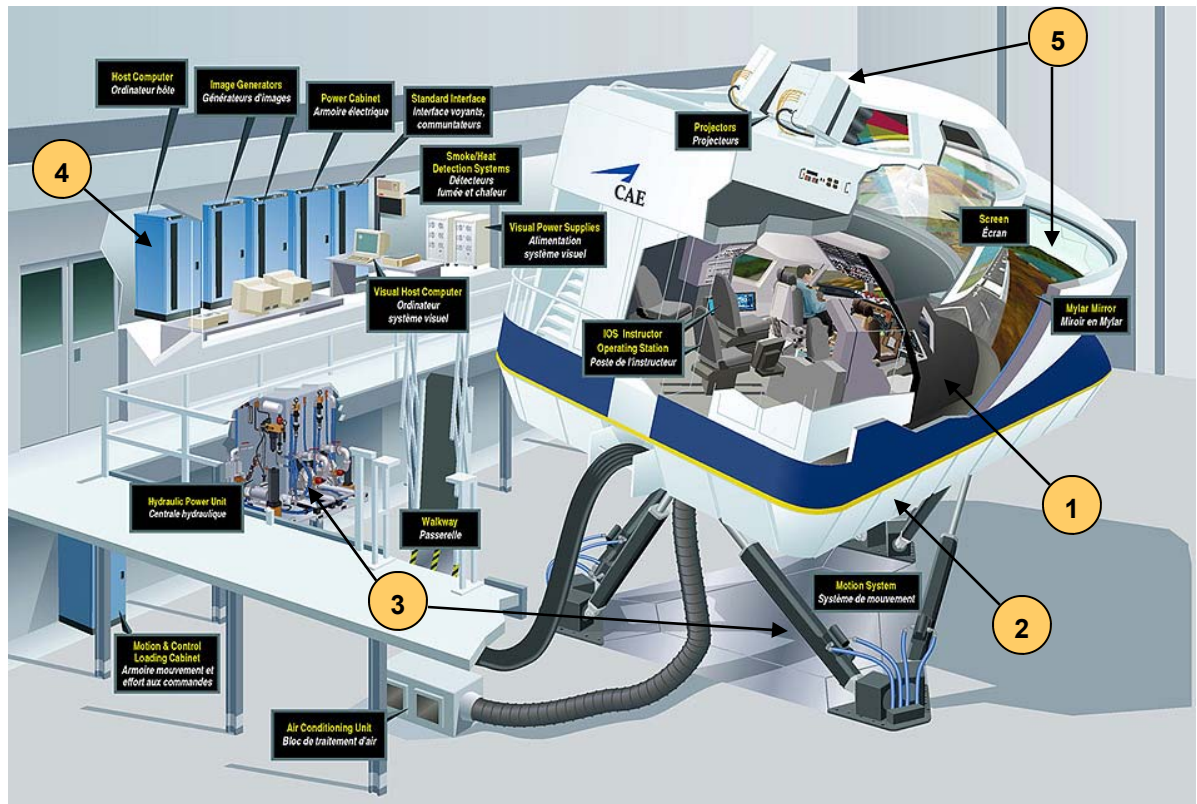
WWW.FL-ATE.ORG



EXERCISES IN MODERN MANUFACTURING

### Solution from an actual manufacturer

We visited a flight simulation manufacturer in Tampa, Florida, [CAE](#), to learn how they design and manufacture the ultimate flight [training simulation](#) (see definition) for the Airbus 380.



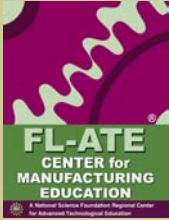
HILLSBOROUGH  
Community College



St. Petersburg  
College

Some of the key elements of this ultimate flight simulator for the Airbus 380 include: (1) a front section of the real cockpit of the airplane, including seats and instrumentation; (2) an external shell that sits on (3) hydraulic mechanisms. This provide high-fidelity movements of the simulated plane. (4) A set of very powerful computers and image generators, capable of simulating sounds, airplane response, ground and flight conditions, as well as projecting realistic images though multiple projectors (5) on a mirror-like surface, giving pilots 190° field of vision. All elements combined, allows pilots to experience what is like to fly an A380. Isn't this cool?

DRAFT 11/3/05



## Manufacturing Challenge # 2

### A Solution

WWW.FL-ATE.ORG



EXERCISES IN MODERN MANUFACTURING

### Solution from an actual manufacturer

Here are some images of how the simulator looks on the outside and the inside.



Outside the simulator.

Visit [www.cae.com](http://www.cae.com) website to see some amazing images and streaming video from these simulators. Also check out the **Careers** section for examples of current openings.

Inside the simulator.



HILLSBOROUGH  
Community College



St. Petersburg  
College

### Conclusion

You have completed a simulated exercise in modern manufacturing decision-making. Did you enjoy this? Is manufacturing an area you may be interested in pursuing a career? Check out additional challenges and resources in our website.

# MAKE YOUR OWN A380

## Some tips for a better flight

You may get better results by adjusting slightly the wings and the tail.

Hold the plane behind the wings, and throw it horizontally.

The plane will fly further if you place a paper clip on its nose.

1. Cut out the plane's fuselage and tail carefully following the outer black lines. Also cut out the slits that are located on the rear and on the sides of the fuselage (they appear as thick black lines).

2. Fold the plane's fuselage all along the central dotted line.

3. First fold down the tail along the central dotted line, then fold it up along the dotted lines of the sides.

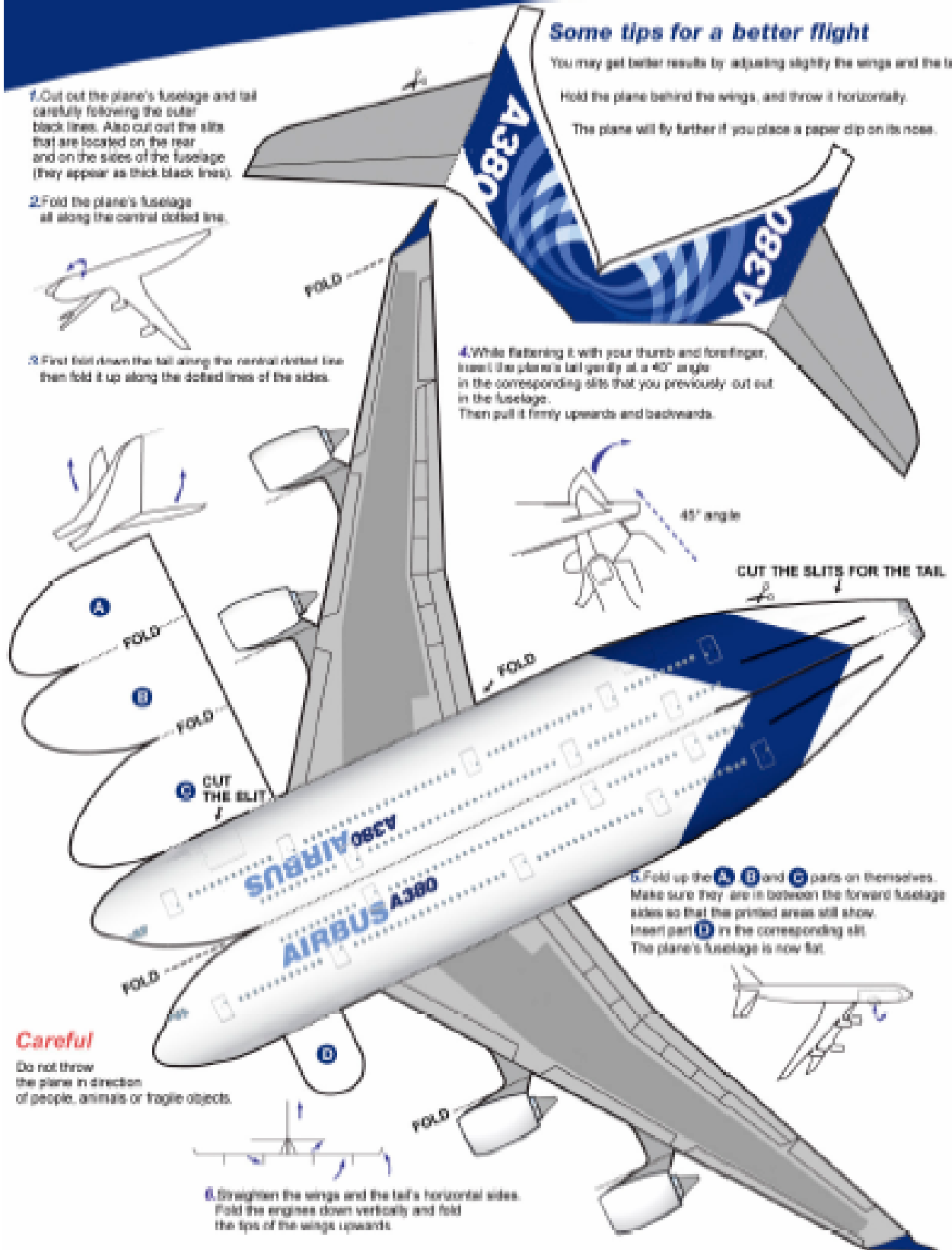
4. While flattening it with your thumb and forefinger, insert the plane's tail gently at a 40° angle in the corresponding slits that you previously cut out in the fuselage. Then pull it firmly upwards and backwards.

5. Fold up the **A**, **B** and **C** parts on themselves. Make sure they are in between the forward fuselage sides so that the printed areas still show. Insert part **B** in the corresponding slit. The plane's fuselage is now flat.

### Careful

Do not throw the plane in direction of people, animals or fragile objects.

6. Straighten the wings and the tail's horizontal sides. Fold the engines down vertically and fold the tips of the wings upwards.

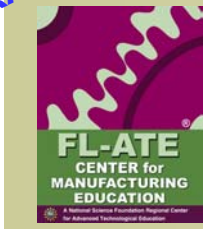


Visit [www.airbus.com](http://www.airbus.com) for this and many other resources and information about the Airbus 380.





DRAFT 11/3/05



## Manufacturing Challenges *Notes for Instructors*

WWW.FL-ATE.ORG



E X E R C I S E S I N M O D E R N M A N U F A C T U R I N G

### Introduction

We are pleased that you are reviewing this educational resource. The activities presented are intended to increase your student's awareness and interests in the field of manufacturing and all the careers it represents. As Florida's Advanced Technological Education Center, a National Science Foundation sponsored project, we are charged to focus on manufacturing education in our state. We welcome you to take advantage of your services and resources. To find more about us, visit our website at [WWW.FL-ATE.ORG](http://WWW.FL-ATE.ORG).

### Learning Options

This activity can be completed in several ways: (a) as a class exercise prior to a physical tour to manufacturing plants in your area, (b) as a class exercise prior to sending your learners to explore our virtual tours or (c) as independent study. If interested in a physical tour to a manufacturing plant, please contact us and we would be glad to facilitate the activity. During 2004-2005, almost 600 students have already participated in our physical tours!



Our Challenges are based on a discovery learning model that encourages students to assume roles, research information, propose ideas and compare their proposals to real case studies of manufacturing industries in the State of Florida. For its ease of use and wide-spread adoption, we have followed the structure of a Web-Quest, an inquiry-oriented methodology proposed by Dr. Bernie Dodge at San Diego State University (for additional information visit <http://webquest.sdsu.edu>)

### Alignments with Science and Technology Standards

*Exercises in Modern Manufacturing* are aligned with the Florida's Sunshine State Standards for Science and the Curriculum Framework for Technology Education. The Standards being addressed are listed in the following page.



HILLSBOROUGH  
Community College



St. Petersburg  
College

DRAFT 11/3/05



# Manufacturing Challenges Notes for Instructors

WWW.FL-ATE.ORG



## EXERCISES IN MODERN MANUFACTURING

### SCIENCE STANDARDS ADDRESSED

#### Standard 3:

The student understands that science, technology and society are interwoven and interdependent. (SC.H.3.4)

2. knows that technological problems often create a demand for new scientific knowledge and that new technologies make it possible for scientists to extend their research in a way that advances science.

6. knows that scientific knowledge is used by those who engage in design and technology to solve practical problems, taking human values and limitations into account.

### TECHNOLOGICAL LITERACY STANDARDS ADDRESSED

01.0 Demonstrate an understanding of the characteristics and scope of technology.

02.0 Demonstrate an understanding of the core concepts of technology.

03.0 Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study.

04.0 Demonstrate an understanding of the cultural, social, economic, and political effects of technology.

09.0 Demonstrate an understanding of engineering design.

11.0 Demonstrate the abilities to apply the design process.

14.0 Demonstrate an understanding of and be able to select and use medical technologies.

17.0 Demonstrate an understanding of and be able to select and use information and communications technologies.

19.0 Demonstrate an understanding of and be able to select and

23.0 Discuss individual interests, aptitudes, and opportunities as they relate to a career.

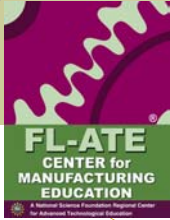


HILLSBOROUGH  
Community College



St. Petersburg  
College

DRAFT 11/3/05



# Manufacturing Challenges *Tutorials*

WWW.FL-ATE.ORG

EXERCISES IN MODERN MANUFACTURING



## Tell me about...

### Training Simulation

#### Definition

A **simulation** is an imitation of some real device or situation. As a participant, you experience some of the consequences of your actions, whether you are piloting simulated airplanes, growing plants or selling burgers. Simulations are best used when it is too expensive or too dangerous to do something in the real world. Like in a flight simulator, you will not hurt yourself, others or damage real planes while you are still learning.

#### Examples



A board game of Monopoly could be considered a simulation of financial decision-making.



Computer programs, like *Virtual Frog*, allow you to see what it is like to dissect a frog, without actually sacrificing one.



See [Manufacturing Challenge # 3 \(Flight simulation\)](#).



HILLSBOROUGH  
Community College



St. Petersburg  
College



## Manufacturing Challenge # 3

### Flight Simulation

WWW.FL-ATE.ORG



E X E R C I S E S   I N   M O D E R N   M A N U F A C T U R I N G

## Company Information Sheet

### CAE Inc.

(Canadian Aviation Electronics Ltd. USA Division)

4908 Tampa West Blvd

Tampa, FL 33634

Tel: (813) 885-7481

Fax: (813) 887-1439

[www.cae.com](http://www.cae.com)



### Manufacturing

CAE is a leading provider of simulation and modeling technologies and integrated training services for civil aviation, and defense customers worldwide.

Founded in 1947 and headquartered in Canada, CAE has manufacturing operations and training facilities in 17 countries on five continents.

The simulators are manufactured in Montreal, disassembled and sent here (Tampa). They are reassembled and the software is installed which can take several months. After complete testing, the simulators are disassembled again, sent to the purchasing company where they are (you guessed it) reassembled, tested and certified for final service.

### Number of Employees:

CAE employs approximately 325 people in Tampa , 4,000+ globally with the majority at the headquarters in Montreal, Canada. There is also a small technical service crew at several simulators in Orlando.

### Career Opportunities:

Job descriptions with responsibilities, experience and educational requirements are posted for the entire global operation.

### Education Level Required:

In Tampa, 75% of the (325) jobs require an engineering degree (software, IE, ME) while others require some technical school background for the manufacturing positions (20) .

### Recommended Courses of Study:

For the manufacturing positions, a 2 year technical degree or the equivalent.