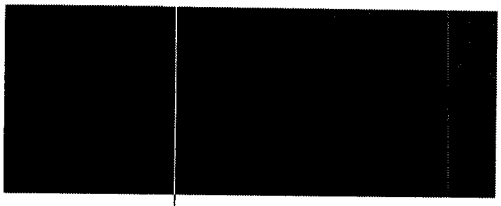

Monica Singh
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[AIRPORT COMMUNICATOR SOFTWARE]

An essential link in safe, effective, efficient, and on-demand airport operations

Section 1

Executive Summary

Currently, airports do not have an effective communication system to gather and transfer information between other airports and airlines. Current communication software suites and online directories are slow and inefficient, leaving airport users unable to retrieve important information that affect their operations.

San Jose State University (SJSU) students are proposing the usage of Passive Secondary Surveillance Radar (PASSUR) Portal Software as a template to develop a replacement, deemed Airport Communicator Software (ACS). This software will display field conditions, arrival and departure information, security information, and provide a bulletin board with instant messaging. The bulletin board with instant messaging feature was suggested by SJSU students in order to allow users to post pertinent and vital information, and also to instant message each other time-critical information that must dispersed effectively and quickly. Our team is focused on designing a system that will be beneficial to all users of the airport system.

In addition, ACS will allow for better coordination and connectivity between airlines, airport, and Air Traffic Control (ATC) by allowing them to coordinate their delay programs. Currently, all delay programs are handled by ATC, which keeps non-FAA airport personnel and users out of the loop, leaving them unaware of diverted flights until the last minute. ACS will streamline the communication process and will allow airport users to have access to diversion information immediately, ultimately resulting in better traffic flow management at all participating airports in the National Airspace System (NAS).

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Section 2

Problem Statement and Background

As air traffic demand increases at an exponential rate, the current communications system between airports and airports, between airports and airlines, and between Air Traffic Control (ATC) and airport/airlines is becoming increasingly obsolete in meeting future air demands. In the Institute of Electrical and Electronics Engineer (IEEE-USA) position statement from 2002, IEEE-USA warned that "capacity limits are being reached in both airports and airspace, with congestion delays in departure and arrival schedules becoming commonplace," and that the problem still exists in the current National Airspace System (NAS). Even though technological breakthroughs and improvements such as Automatic Dependent Surveillance – Broadcast (ADS-B), Automated Radar Terminal System (ARTS), and Automatic Dependent Surveillance – Feed (ADS-F) have been incorporated to improve the flow of traffic through the NAS, their capabilities are still insufficient.

According to Bureau of Transportation Statistics (BTS), air carrier delays, weather delays, NAS delays, security delays, arrival delays, cancellations, and diversions fluctuate at an increasing rate (Appendix G, Fig. 1). One of the major contributing factors is the existence of vastly different organizational infrastructures that prohibit the viability of an effective and efficient communication system because the current communication method still relies heavily upon verbal communications and lacks sufficient distribution ability of pertinent information to users.

Our group has focused on how the current system may be improved by breaking the barriers of communications through implementation of software design into one

integrated system. Most of our research has led us to PASSUR since some airports have already begun using some of its options. According to Kevin Wu, Manager On-Duty (MOD) of Norman Y. Mineta San Jose International Airport, the old version of PASSUR software in place does not provide mobile access. For instance, when he is out in the field he does not have the capabilities of real-time information like he would have in his desktop (i.e. blackberry or PDA capability.) Also, he finds that search tools are too limited to aircraft type, destination, arrival /departure of the airline.

After 9/11, the implementation of the Transportation Security Agency (TSA) in our nation's airports creates additional burden on flow of communication. We often hear about security threats causing extended delays to air traffic that, in the worst case, could lead to airports being shutdown. Our group was astonished when we heard from an airport representative that at least six flights have already departed for their destinations before TSA informed the host airport that some type of chemical was detected that could possibly lead to a catastrophic event. This would lead to the possibility of shutting down the entire airport system. Our group addressed this problem by adding a bulletin board feature to allow users to share important information. In addition, an Instant Messenger (IM) feature can be used to contact other users in the portal. Airport operators could use the bulletin board to relay information in an instant, which reduces the time it takes to find a MOD and have the situation resolved. Current systems do not have real-time bulletin board announcements that relay information concerning affected parties, this becomes more of a problem especially when the information between parties is vital and time-critical.

Section 3

Summary of Literature Review

The PASSUR in the classroom slides give a great introduction into some of the major features that the PASSUR system has. They give a great layout of how PASSUR works and then some insight into the things it is capable of doing. We used this information to see what companies had already invented and how they were using it, this allowed our team to expand on their ideas to fit the needs that we saw fit. The slides come straight from their company, so their validity is of the utmost highest respect.

Kevin Smith, Air Traffic Controller at Norman Y. Mineta Airport, provides weather briefing to flights arriving and departing from San Jose Airport. He stated that a better flow of communication is much needed between ATC, Airport and Airlines.

Kevin Wu, Manager on Duty at Norman Y. Mineta San Jose Airport, stated that portable devices would be very helpful in conducting his job duties. His job duties require him to response to emergency situations at the airport. He is the final in command regarding operation issues.

Peter Massella, a sales agent from Passur, helped with understanding constraints of implementing software like Passur portal in the airport environment. He reported that time and cost of implementing the software might discourage airports initially, however, the long term benefits might out weigh the disadvantages.

Malaly Popal, Senior Operation Specialist at San Jose Airport, reported that communication between airport and airlines needs to be streamlined. Also, gate share is

a program that SJC is planning to implement after the new terminal is constructed. Gate share will allow efficient use of space and allocation of more slots for departures and arrivals.

Section 4

Team's Problem Solving Approach to the Design Challenge

4.1 Problem Solving Approach Overview

In this portion of the paper, we will discuss how the team approached the design challenge in order to solve the aforementioned issues with current communications systems at airports. Sections of the proposal were created in order to provide clear-cut categories of research. These categories were then divided amongst the group according to knowledge and experience in order to effectively specialize in various aspects of the proposal.

In order to properly determine the requirements for a suitable universal replacement, issues with the current system needed to be cited and analyzed for their scope and impact, and then needed to be assigned a priority. Potential solutions for each issue were proposed in order to determine the requirements for a new system, which allowed the team to conceptualize an "ideal package" that was then compared to available products on the market in a search for the most effective package at the lowest possible cost. The solution which was found to fit those criteria was then dissected to thoroughly analyze its abilities and to suggest modifications for its shortcomings.

4.2 Division of Labor and Specialization of Research

To effectively the labor amongst the team members, the backgrounds of each team member was thoroughly examined in order to determine their areas of expertise. Monica Singh has a considerable amount of experience in the aviation industry, with her employment at San Jose International Airport under Alaska Airlines and her internship under Airport Operations. She specializes in the interactions with industry and airport

experts section of this proposal. Leo Tang has interned at the FAA headquarters in Washington, D.C. under the Acquisitions and Business Services section of the ATO-A organization and is familiar with technology acquisitions and the creation of technological interfaces. He currently interns at San Jose International Airport under the Security Compliance and Terminal Management section, where he regularly interacts with airlines and the airside section during daily operations. He specializes in this section of the proposal. David Ozoa is an U.S. Air Force veteran and has been studying Aviation for the duration of his schooling at SJSU. His background is primarily in the mechanical aspects of the aviation. He specializes in the general research of PASSUR systems. Gilbert Giang is an intern at San Jose International Airport under the Business Development section, where he regularly interacts with passengers in order to promote quality customer service. He assists Monica Singh in researching interactions. Matt McGinnis is studying Aviation at SJSU and is currently in the Air Force Junior Reserve Officers Training Corps. He specializes in the technical aspects of the proposal. Sean McCarthy is studying Aviation at SJSU and aspires to be a pilot. He has logged numerous flight hours in light aircraft and specializes in the cost aspect of the proposal.

After each section was assigned, team members researched their individual sections and coordinated with other team members during weekly team meetings. At these meetings, the proposal saw many changes, including a complete overhaul of the direction of the proposal and the reorganization of research categories. This proposal reflects all alterations and is a final representation of our research and conceptualization.

4.3 Interdisciplinary and Systems Engineering Approaches

When the analysis of all potential solutions was complete, a decision was made by

the team to use PASSUR software. This decision came about due to the capabilities that fit our requirements, due to the fact that PASSUR software was already in use at airports in the United States, and lastly due to the potential for lower design and implementation costs when using an available software package as a template.

An important aspect of systems engineering is that there are no tangible products created. While PASSUR may develop the technology if requested to do so by means of creating a software package through computer engineering and science, the systems engineering aspect of the project relies on other engineering disciplines to actually create and deliver the tangible products. Through systems engineering, the team focus on synthesizing the design of the concept by considering these aspects of it:

- Cost
- Environment
- Design and Development
- Information Assurance
- Operations
- Performance and capabilities

With the specialization of each research category by individual team members, the interactions with industry experts and information gathered produce a complete system when combined as a whole. Specifically, the technical capabilities provided are matched with industry interactions, requirements, and cost in order to determine the feasibility of features within the software package. In essence, the systems engineering process provided a holistic perspective of the system and from this perspective ensures that the system each aspect will work with one another.

4.3.1 Scope of Systems Engineering Process

While all decisions and assumptions have been made concerning the deficiencies of the current communications methods and the necessary characteristics of a successor

method, there is a clear understanding that emergent properties may appear during an actual implementation of this concept. The team believed that the decisions and assumptions made concerning benefits and interactions between airport users and the technical aspects of the software needed to be kept on a general level, such that a system with potentially huge impacts could still be universalized amongst all airport users. This decision lead to our main proponent behind the advocacy of the PASSUR portal systems, which allows differentiated user interfaces, while being able to record and transmit a universally agreed upon set of information that may prove vital to other users, regardless of whether or not a subject user chose to prioritize such information.

The importance of modeling the proposed concept upon the PASSUR systems relied upon its presence in the aviation industry. Already well known for its radar systems which provide useful information for dispatchers and determining on-time performance, PASSUR also offers software suites that provide sufficient, if not excellent, opportunities that streamline airside, landside, terminal, and various other operations under the authority of airport management. Our assumption here is that modeling upon a system that has already been created and providing inputs for improvement will limit, if not eliminate, potential bugs within the system. After all, such a system could prove to be a costly investment, and such behavior allows final end users to reduce the expense and difficulty of debugging the system while in use, especially during emergencies.

Section 5

Description of how the Technical Aspects of the Design Challenge will be Presented

5.1 Technical Aspects Overview

In this portion of the paper, our team will discuss how the PASSUR system will be improved and applied in the airport environment to effectively make all operations run smoother by getting the right information to the right people at the right time. Using the PASSUR system as a basis for an intranet-type network, we can bring all operations of the airport—airport operations, the airlines, and Air Traffic Control (ATC)—together in order to be more easily managed and monitored. This system has the potential to perform many such operations and functions, but our team will show the capabilities a few of its more major applications, such as using the PASSUR to aid operators in accessing the vital signs of airport operations at anytime, from anyplace. Also, the system will link together not just the airport an operator is currently working at, but any airport the operator would like to share information with. Now all this information compiled together will be a great resource, but we have to consider the idea of information overload. So, our group has decided to add a feature to this network that takes the form of a kind of bulletin board where the user can send and receive messages, and also filter incoming information in a variety of different ways to include information that is only pertinent to a particular person or any aspect of an operation.

5.1 Application

The first major application of this system that we will discuss in detail is to use the PASSUR to track inbound and outbound flights from any airport location. PASSUR

utilizes their own PASSUR to receive transponder codes from aircraft to paint a live radar picture. Using this would allow any operator to get an easily read, ATC-type view of the real time airspace situation. Using this data, operators would be able to more efficiently plan for passenger traffic flow and be prepared for an excess or shortage of capacity. At any time, an operator can access the system to check the vital signs of any airport operation such as current runway configurations and utilization, estimated time of arrivals/departures, live weather, and delay information.

The next major application of the system would be in its ability to share information abroad. Each airport operator would have access to this system and be able to look up and input data. Once this data is in the system, other operators can access it from anywhere. More importantly, if there is some sort of event that can potentially cause a flight delay of even the slightest amount, an operator can send up a flag that warns anyone who could be affected, so time can be better used while awaiting those delays to be overcome. Say there is a piece of ground handling equipment that stalls out and blocks a plane for a couple minutes, an operator from that area can instantly alert maintenance to get it cleared up ASAP and then alert the ATC facilities so they can plan to possibly speed up its departure, once its is released in order to keep it on time, or that information can be sent to the planes arrival destination to instantly alert them of a possible delay in order to make appropriate accommodations.

5.3 Users

To better understand the potential of the system, it is important to know what kind of data *should* be inputted into the system and what kind of data *can* be inputted. Any authorized operator *can* be able to input whatever data they feel would be important or

helpful to other operators. This is mainly why we have decided to add in the feature of a bulletin board where instant updates can be found on a variety of different subjects in order to keep the flow of information going and keep operators informed of current operations happening around them. Some other information *should* be mandated for operators to keep updated in the system. This is data that would immediately affect current operations, such as delay information, security information including emergencies, weather updates, traffic data, ETA's, baggage data, etc.

In order to make this system operate most effectively, only authorized airport operators will have full, unrestricted access to the system via access codes and passwords. Once they are logged in, they will have the ability to add information wherever needed and update current information. Other airport personnel will still have access to the system, but not as an administrative-type user. They can log in to monitor operations and gather data, but their ability to post information will be limited. Any user will be able to use the bulletin feature to send out messages to whomever they deem necessary. Those messages can be sent out to the whole system on a common miscellaneous page or they can choose to send a text message or alert to a particular user. To access the system, all you would need to have is a computer terminal with Internet access. Then the user just needs to open the PASSUR Intranet and input their access codes. Since it is an Internet accessible network, it allows any operator to access the system, at any time, from any place.

One way to further increase efficiency of operations while using this system is make it available on handheld devices. That way, no matter where an operator is in the airport, they can receive updates or urgent messages. A common complaint among airport

personnel today, is that when an unexpected situation arises, no one seems to know what is going on or how to handle it. They must wait for guidance by their supervisor or wait for instructions from someone that they cannot get a hold of over the phone. Using this system, the situation can quickly, clearly, and efficiently be communicated all over the airport and the appropriate action can be taken. Operators will receive the data in an alert type pop-up, then they can quickly analyze all the information that will be assembled conveniently for them and use it to make the most informed, educated decision to increase efficiency in all operations.

As airports begin to consider the use of this system they will obviously be concerned about cost as they would with the application of any new resource or product. Our team believes that the costs will truly be minimal and they are greatly outweighed by the benefits of operation. The software is already there with the program that PASSUR has designed. Although, their program is meant more as an FBO tool, we believe it can be easily transformed into a super network that can be globally integrated into the entire ATC, airport, and airline system. Our class recently had a guest speaker, Bob Swensen, who is a representative of San Jose International Airport. He came to talk to our class about their airport operations and the future of their airport. He told us that they would soon be moving to a 'shared use' style of airport management where the airport will be in charge of most operations instead of there being separate departments that are self governed. This presents a very big opportunity for our PASSUR system to make their lives much easier with minimal associated costs. The PASSUR system fits in perfectly to aid in the 'shared use' environment that many airports seem to be switching over to.

The biggest cost for the systems application would probably not be in implementing

this program into the system, but in training operators to use it efficiently. The system should be easy enough to just be picked up right away and be self-explanatory, but high access-level operators should be trained on when and where to look for important information and also on what information is required to be disseminated and when. Some information may be regulated to make sure that operators share certain information so that everyone is getting accurate data. With proper training, operators will be able to get the most out of the system and be able to use it to effectively communicate orders and supplemental information.

When this system is applied properly and fully integrated into the airport management system, it will become a greatly valued tool that will be essential to handling the heavy increase of capacity that lays ahead for air travel. The spread of information and getting it to the right people, when they need it, is what this system is all about, but it will take the cooperation of the operators to make it work effectively and to make the entire process more efficient. The next couple of pictures illustrates what the current PASSUR system looks like and shows a bit of what kind of potential it has for the airline and airport industry.

Section 6

Description of the interactions with Airport Operators and Industry Experts

6.1 Overview of Interactions

Currently, airlines have there own software programs to communicate to their dispatch regarding operational information at their airport. This software is not linked to the airport side or Air Traffic Controllers. According to the Air Traffic Controllers at SJC, they are not immediately advised of any mechanical or delay information until the pilot radios them or airline operations contacts them via phone. Unfortunately, this system is slow and ineffective. Usually, the flight plan expires within 1.5 hrs, and airlines wait till 30 minutes prior to update their plan, giving ATC insufficient notice.

Furthermore, the communication between the airlines and airport is much slower. At least the pilots are pretty thorough in communicating with ATC regarding mechanical delays and so forth. However, the only way to communicate between airlines and airport is via the phone, which is a very slow and ineffective process. Unfortunately, it's sometimes hard for the airport system to contact an airline representative immediately.

6.1.1 Overview of the Current System

Unfortunately, the current system is outdated, slow and ineffective. Airlines and airport communication is an important factor in running a smooth operation at the airport. Currently, SJC is implementing the FIDS display, which displays flight information for all airlines. This display is connected directly to the airline operation agent to input

revised data information on scheduled departures and arrivals. [1]

6.1.2 Emergencies

During emergencies airline personnel communicate with their airline operations agent who then sends out messages to various departments to respond to their emergency, e.g. Fire Department, Police and Immigration, etc. This process could take up to 2-5 minutes because all communication needs to route through the correct people. Using software that displays security information, system wide, will result in quicker response time. In addition, the message will be displayed to other airlines operations so that they can advise their personnel who might be affected by the emergency. This system will increase the system wide awareness at airport to allow each participant to respond in timely and effective manner.

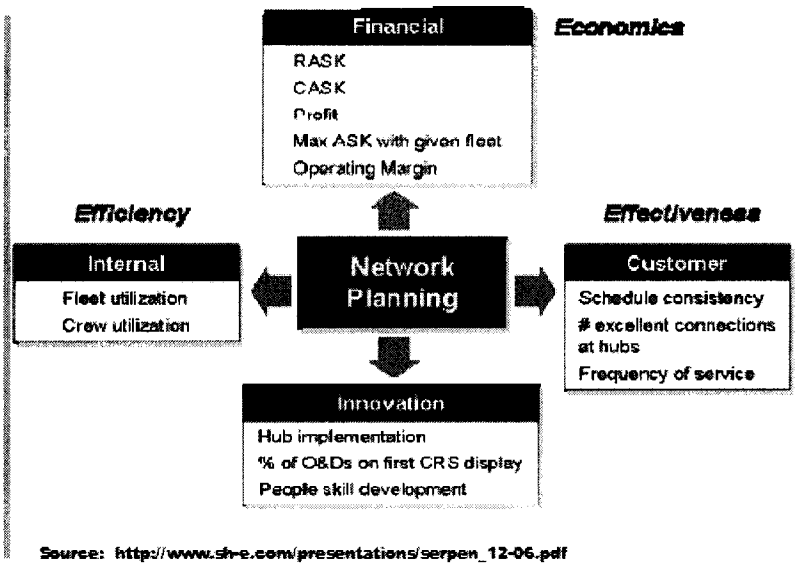
According to the Manager on Duty at SJC, the airport side only communicates with the airline side in case of emergencies. For example, couple months ago, an airline captain activated emergency protocols due to a passenger's suspicious behavior while boarding the aircraft. The captain asked the aircraft to be dumped, which means all on-board passengers and luggage off loaded, and the plane thoroughly checked. This operation required close coordination between the Manager on Duty, police, and airline personnel. However, the situation could have been resolved faster if the tapes could have been reviewed while the passenger was boarding the aircraft. Without a central system, not all parties at the airport where aware of the situation and the information that the pilot was seeking. With a central communication bulletin board, information will flash pertaining to the incident. In another incident, a TSA agent detected some hazardous

[1] Popal, Malaly, Senior Operations Specialists, March 8, 2007.

residue on a passenger, but failed to advise proper authority. The passenger boarded the aircraft to his destination without being secondary screened. The TSA agent did advise his supervisor 30 minutes later, however, the situation was out of control. The TSA supervisor did not advise the MOD of the situation till 1.5 hrs later. In this situation, the MOD would have been able to communicate with the airlines and airport operations to secondary screen the passengers of this aircraft when it touched down. This would have reduced the likelihood of that same passenger boarding another aircraft and causing an incident.

6.2 Benefits for the Airlines

Figure 1

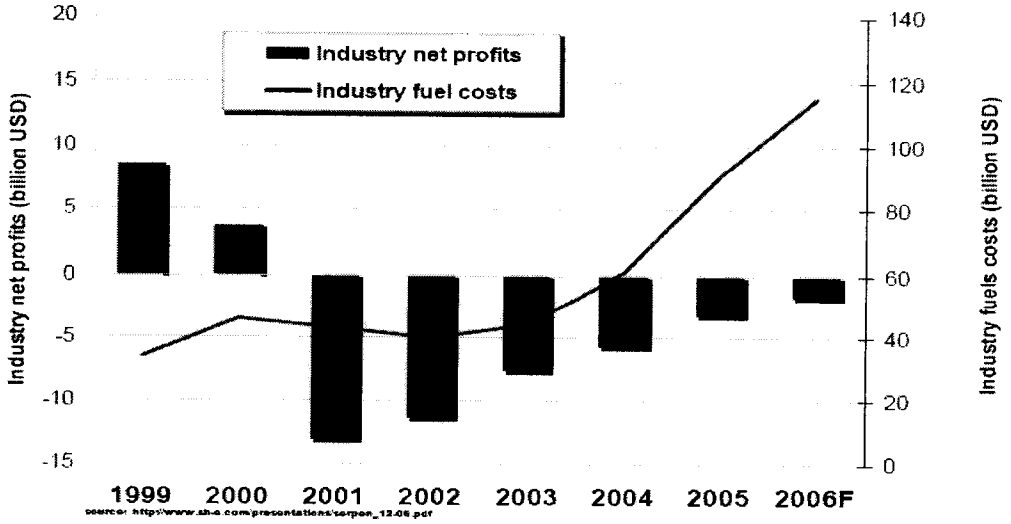


According a report published by SH&A International Air Transport Consultancy, airlines need to evaluate the commercial and operational aspects to formulate their key

performance measures. [2]The above diagram states that network and fleet is critical for airlines profitability. It reiterates the point that airlines needs to take a holistic approach when trying to reduce the overall cost.

One of the many benefits of using Airport Communicator software is that it will reduce ground hold time for aircrafts. The software will be better able to coordinate aircraft to gates. Expediting existing aircrafts on the ground to gates will allow allocation of more slots for other aircrafts. Currently, the airlines are trying to recover their cost of operation by reducing their fleet to minimal aircrafts necessary to sustain operations. Just recently, airlines have become stable enough to purchase more fleet for new routes. This system will enable airlines to turn more aircrafts around in shorter time thus effectively using their fleet.

Figure 2



Another benefit of expediting aircrafts on the ground will result in fuel cost

[2] SH&E Consultancy. Retrieved on March 8, 2007 from http://www.sh-e.com/

saving for the airlines. Allocating aircrafts to proper gate will allow more departures and arrivals. Aircrafts spacing could be reduced to the minimum requirements since the facilities can handle more aircrafts at gates. This will allow more arrivals of aircrafts, reducing circling, therefore, saving fuel cost for airlines. As shown on Figure 2, increasing fuel cost has significantly decreased the profit margin of many airlines.

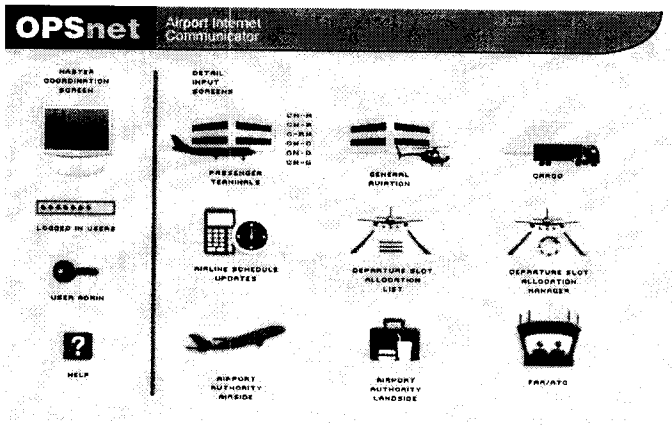
Furthermore, better fleet coordination will benefit airlines customers. Airlines will be allowed to operate more flights thus increasing flight choices for passengers. This will allow more passengers to travel across the nation quickly even on the non-direct flights. Connecting passengers will be able to get to their destination quicker due to increase in flight availability. The result would be increase in quality of customer service, and increase in their trust in the aviation industry. Passengers became very frustrated post 911 due to airlines cutting down their services and pulling all together out of certain markets to reduce cost. This system will encourage airlines to expand their markets by adding more scheduled flights.

Again, the overall operating cost will be reduced for the airlines due to the implementation of this software. As seen in the above model, the companies will able to save labor and other operational cost.

One of the major significance of designing such software is the sharing of expertise knowledge. Situations can be deciphered quickly and effectively if the correct person is reachable within the critical hour. This system will allow proper authorized users to connect with other airline and airport personnel quickly. The relevant information needs to be dispersed quickly and accurately.

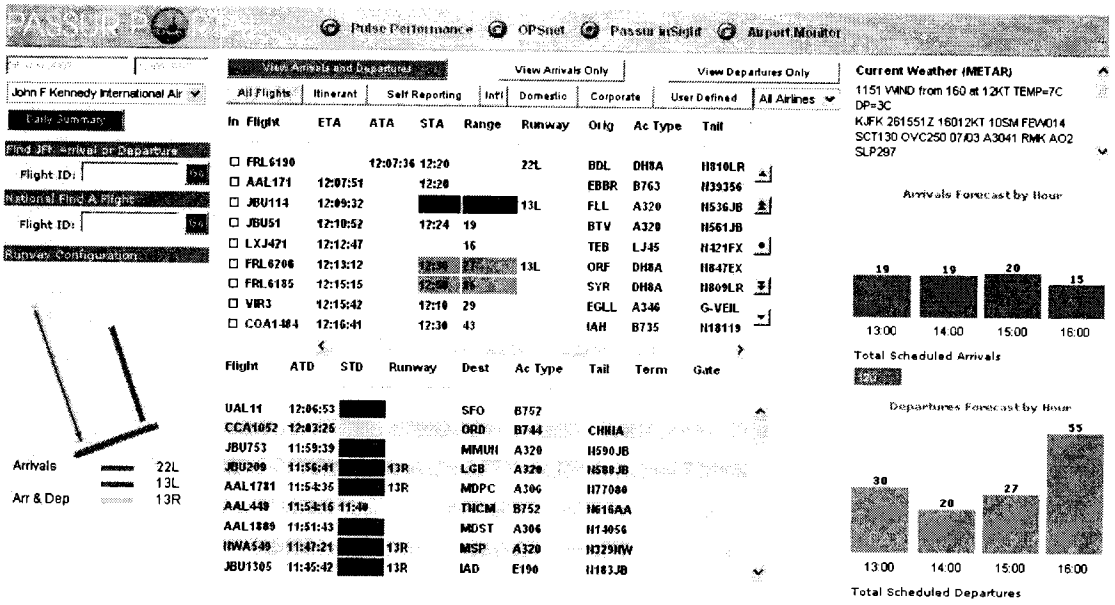
6.3 Airport Benefits

Airport Communicator, a system for airports and airlines to more effectively communicate with each other, provides many benefits to airports which implement the system. The communicator will allow instant and secured information sharing with all airports and airlines throughout the nation, and even worldwide. This system lowers operational and administrative costs by allowing users to use the available resources more effectively. In aviation industry, operations are codependent on each other, therefore, improving one department could benefit another department. With all airlines being connected to different airports in the nations and the world, having delays in the east coast might affect operations on the west coast. Airport Communicator will make the overall performance increase throughout the globe. Safety and security is a main concern in the aviation industry today, but with this software, the level of safety remains high while increasing effective airport operations and customer satisfaction at the airports.



The PASSUR software is user-friendly and is a very useful tool to airport management. The airport operations screen can be used to show all real time vital signs at an airport. That is, current runway configuration and utilization, estimated times of arrival, live weather information, delay information. See how airport operations workers manage daily operations by using a web based portal screen.[3]

[3] PASSUR in the classroom PPT



6.3.1 Airport Revenue

The Airport Communicator will increase the efficiency of aircraft takeoffs and landings, which will ultimately result in increased revenue for the airport. More efficient traffic flow could mean the airport collects more landing and gate usage fees. It can generate and take advantage of more revenue by utilizing the airports to full capacity and increase arrival demand at the airport. With some airports, especially in the east coast, weather plays a huge factor in airport operations. Bad weather can limit the amount of runway that can be used, which has an effect on the arrival and departures of the airport and ultimately reducing the potential revenue at airports. The added efficiency of Airport Communicator, which generates accurate landing reports based on the PASSUR system, helps make aircraft landings more manageable and also the capability to increase landing revenue as a result of more efficient landings at the airport. An article stating that Denver International Airport (DEN) is now using the PASSUR Pulse Landing Fee Management Program similar to Airport Communicator says, "this new, enhanced capability increases the efficiency, and reduces the costs, of collecting and reporting landing fees for airports

and their airlines, by eliminating carriers "self reporting" in favor of airport-generated landing fee reports and invoices." Stan Koniz, Deputy Manager of Aviation and Chief Financial Officer of Denver International Airport mentions how this program is "the logical next step in the evolution of their landing fee program" and how "it will give us greater control over this important revenue stream, streamlining the whole process."[4]

In addition to airports increasing revenue, Airport Communicator will also lower operational, communication, and administrative costs of the existing system that is not as effective as it can and should be. The new software would provide more efficiency and improve communication, which results in better overall operations at the airport. It will be more cost-effective for the airports, which will help increase revenue and eventually improve the airport in other areas such as baggage delays or traffic flow at airports.

6.3.2 Airport Information

The initial reaction of airports and airlines towards implementing the Airport Communicator system may be defensive in regard to sharing information. But when it comes down to it, sharing useful information such as flight delays, security issues, mechanical problems, technical difficulties, or any other problems that can have an affect on overall airport operations will be beneficial for everyone. Sharing useful information will provide better communication between all organizations and will benefit everyone for the purpose of overall performance for airports, airlines, and other aviation related agencies. The information that is shared is not "personal", meaning the company will not risk giving out information that can affect the organization in a negative way. All information is gathered and used collectively to make airports, airlines, FAA, ATC, FBO

[4] http://www.sys-con.com/read/348438_p.htm

and other entities communicate more effectively. The shared information makes operation at airports run more smoothly.

6.3.3 Effective Airport/Airline Communication

Communication is crucial between airports and airlines, especially with the increased security measures in today's aviation industry. For airport operations to be successful, communication between airport, airlines, and even ATC needs to improve. Given the amount of activity that is going on throughout the day, and with all the different groups and entities at the airport, each individual needs to work collaboratively together. Since communication plays such an important role at the airports and in the aviation industry, making communication easier and more effective is a huge gain for everyone. The Airport Communicator provides instant communication, sharing of information and collaborative decision making between airlines and airports all electronically via secured intranet. The communication between airport and airlines is a real concern because it does not always exist, and when it does, there is often a slow delay between the two airport and airlines. Some examples of important communication problems existing in today's airports are the failures of communicating airfield conditions or safety concerns efficiently or effectively to all airlines, FBOs, FAA, and others. The communication is sometimes non-existent and often slow, which affects airport operations, and can cause further problems such as the trickle effect in delays throughout the day. Examples such as runway closures or weather problems, can affect the airport by all the delays. By communicating efficiently and more effectively, delays can be significantly reduced. According to airline study and other surveys, PASSUR enables airline ATC coordinators to immediately see when runways are re-opened. A call from

the airline to the ATC Command Center as soon as the increased flow rate is detected can cause removal of the restrictions up to an hour sooner than using normal internal FAA communications.[5] With Airport Communicator, communication and information is distributed in real-time throughout the system instantly, which results in coordinated decision making and effective use of resources. Any problems that come up are relayed and viewable instantly for any corrections or solved.

6.3.4 Airport Information Access

Often times there are delays caused by weather or various other reasons, which can cause chaos at airports. The Airport Communicator would make operations at the airport more efficient and cost-effective by providing real-time accurate information. Information such as gates, federal services, and terminal staffing is important information for each aircraft landing. This system will display all this information quickly and automatically, which reduces labor and cost of the usual manual labor getting this information. The flow of the airfield will run more smoothly, especially during busy travel times.

Information of what is going on at airports and/or airlines are very useful and can help increase knowledge of workers so that everyone would be on the same page for the purpose of working more effectively. Airport employees, including airline personnel, will have access to information that the PASSUR software provides. The software can provide information to identify the names of employees and where they are supposed to be working, a vast improvement on the current system which often allows for confusion of who should be working where. This information can be useful when trying to

[5] http://www.passur.com/pst/report_findings05.htm

communicate with different airport and airline employees working in different areas of the airport. Other information that can be available are alerts or messages to let workers know what is going on throughout the day. There would be less need for managers or employees to explain and repeat messages multiple times to each other. Any messages would be conveniently displayed by the Airport Communicator software and report history would be available for better understanding of any emergency or non-emergency situation.

Many airports currently use PASSUR AirportMonitor to track aircrafts around each airport. By having the system available to the public via internet, people in the community would have access to what aircraft is flying over their neighborhoods and what flight paths that are being taken. This also benefits everyone by giving information to the community and letting them know what is going on, and also reduces work load of having to answer questions regarding noise from the community. San Jose Mineta International Airport noise abatement manager, Jaime Locquiao, states that "Mineta San Jose International Airport strives to be a good neighbor to the community. Providing immediate access to flight information through the Airport's web site at any time of the day is an invaluable resource. This service is an example of our use of innovative technology to improve customer service and strengthen the Airport's relationship with our neighbors."[6]

6.4 **Air Traffic Control**

The Airport Communicator Software can be utilized to connect ATC with airport and airlines. Currently, ATC usually contacts airline operations regarding mechanical

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[6] http://www.passur.com/testimonials_airports.htm

or other types of ground delays. The crew updates ATC periodically or during taxiing. This software will enable the controllers to effectively space aircraft and reassign unused slots to other aircrafts. This system will make the airport management system more effective. According to Kevin Smith, SJC Air Traffic Controller, the communication between airlines and ATC is really ineffective. [7] In addition, airlines have created a separate department, which files flight plan and does weather briefing for them. There is no direct communication regarding weather briefing and delays with the ATC. This setup does ease the ATC controllers workload, however, it makes harder for them to establish rapport with the flight crew when it is required.

Simply, ATC is service provider to the airlines, therefore, needs to be in touch with their customers needs and requirements. The Airport Communicator is meant to bridge that gap of communication that exists between these two entities. ATC can provide feedback that might be necessary for airlines to improve their service, e.g. updating delay information. Also, they mutually will set standards of the level of service that they require from each other. Overall, the benefit would be a more effective communication system.

[7] Smith, Kevin. Air Traffic Controller at San Jose Airport, March 8, 2007.

Section 7

Description of the projected impact of Team's design and Findings

7.1 Cost

In this section of the paper we will be discussing the costs associated with our proposed system. Cost is of much importance because this program requires a long term commitment from its users. As mentioned already, it could be a while before enough airports are up and running with this system to realize all the benefits. Accordingly, the program should be offered in a way that is attractive to airports during the initial introduction period. And so we will look at the costs associated with this program as well as some cost diversion strategies. The costs for this program are divided up into two different sections: the direct cost for purchasing system components, and the ongoing costs. We will finish by discussing some cost diversion strategies that could be used to spark interest in the program and/or make it possible for airports to afford.

7.1.2 Direct Costs

The direct costs of purchasing the system components are further divided into two different sections. There is the software which runs on each terminal, and then there is the hardware that runs the software. Of course the software used in this program will have to be purchased for every terminal used, but a bulk discount is given for how much software is purchased. We do not have any numbers because the program is just a proposal, but an idea can be derived from the cost of current Passur software.

"We sell the software to airports directly through our own marketing staff. Each product is priced differently. Our pricing often depends on the size of an airport and

the actual product that they desire. Based on the number of operations, we will price accordingly. Airports usually consult their finance/budget department prior to making a decision to commit to a PASSUR product. They will pay us either a one-time fee or pay incrementally. We do have other products that go for a flat rate. For example, FBOs use PASSUR Portal/Pulse and PASSUR inSight for one fee."[8]

The hardware for this system is a little more complicated. There were a few different components to this system that were already mentioned and they are: the terminals used to input and look up data, handheld devices, and servers. Also the cost for this hardware will vary greatly because it depends on how large of an order is purchased, and how powerful the systems are. The software should have fairly low demands as it shouldn't be much more complicated than a traditional internet browser. Most airports should already have the computers in place that are capable of handling this software so there would be no extra cost for terminals unless they wanted to expand. For any airport that is already considering the need to upgrade their computer system, this will be another reason to do so. This means that the cost associated with upgrading the computer system should not be associated strictly with this program. Also, most of the features of this program will be intra-airport. And most airports have their own servers to connect all the terminals in the airport, and these servers should be able to host this software securely. However communication between airports needs to be hosted over a secure network. This could involve some additional costs. Also many airports already utilize handheld devices as already mentioned, and most of these devices should be capable of running this software.

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[8] Peter A. Masella, Sales Operations Coordinator, personal communication, April 7, 2007.

Also this program should only take minimal if any man-hours to run and maintain. As mentioned already, most airports will likely opt to run the software on their already existing terminals, which are already maintained and repaired regularly. One of the key selling points of this program is that it does allow for more efficient use of personnel. This should significantly reduce the amount of man-hours an airport needs in order to run their operation.

The cost of the network needed to host this software between multiple different airports still needs to be quoted.

7.2 Marketing Strategies

Finding the proper marketing strategy for this software is going to be of the utmost importance. Many airports operate with very high costs and so the program not only needs to be attractive to them design wise, but also price and payment wise. In this section we will be discussing different cost diversion strategies that can be used to get the airports into the program for little or no cost. We have decided on 3 different strategies that are time tested. They are: penetration pricing, cost savings payback program, and government subsidy.

The reason that we find penetration pricing to be so attractive is because it removes the largest hurdle facing this program, which is the fact that it will take time before the airports start seeing the benefits of its use. This will mean that many airports would rather wait until their neighbors get the program before they make the investment. If we can show airports that they are only hurting themselves by waiting, this should provide the rolling start needed. This strategy could be linked closely with a regional deployment of the program in order to show the rest of the industry how it

looks in action, while not having to cut profits as much as could result from under-pricing the software for the whole industry. This is because if the penetration pricing strategy works as it is supposed to we could see large numbers of some of the biggest customers buying in while it is cheap, which will not leave much market to pay the full price.

We think a cost savings payback program is the perfect remedy to the problem of the high initial cost vs. slow initial return on investment. Under this payback program the program is offered for little or no upfront cost and there is no money due until savings are realized. For example, Passur offers their Pulse software for a monthly subscription fee[9], so payments for the software can be made from the increased profit. And there are many other examples of this strategy being used successfully in the aviation industry.

Given the large costs faced by airports for improvement projects, the FAA subsidizes many of them for up to 95% of the cost. Eligible projects include those improvements related to enhancing airport safety, capacity, security, and environmental concerns[10]. Clearly this program qualifies under that description. However, projects involving airport operations are typically not funded under this program. Given that this program would probably not be funded under the AIP, a government grant of any kind is unlikely. This is because the AIP is by far the largest program for airport grants.

The aviation industry is highly regulated in everything from airplanes to the spaces they park in. It is important that regulatory obstacles are found and dealt with

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[9] Passur.com, 2007

[10] Neufville & Odoni, 2003

before any changes are proposed. The changes we are recommending are nothing new in themselves, but the program as a whole is. We have not found any regulations which would impede on this program, and it makes sense since each component is currently in use somewhere.

The largest obstacle standing in the way of this programs success is the early implementation. As mentioned already the benefits of this program will not be realized right away, and this can be a deterrent to getting the early sales. Since many airports will want to wait until their neighbors have the software, we need to find a way to get those "neighbors" in. We believe that the implementation strategies mentioned above should cover this; however we will consider an alternative strategy in order to keep our options open. The alternative strategy we recommend is to push the FAA to mandate participation in this program.

What would make the FAA even want to consider mandating this program is because it supports their main goal, to promote safety! That point has already been made clear. But this program also increases airport efficiency and effectiveness which is another goal of the FAA, to promote aviation.

A big benefit to the aviation industry, for mandating this program, would be a significant reduction in the delay before benefits are realized. Also there are many other information systems out there that attempt to accomplish many of these same goals, but we feel that they are lacking, as made evident already. Mandating this program would leave fewer airports in the dark trying out failing products, saving them time and money.

Section 8

Appendices

A. Appendix A

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B. Appendix B

A Brief Overview of SJSU

San Jose State University's location in the Silicon Valley makes it an exceptionally rewarding learning environment for students. Silicon Valley firms and agencies seek SJSU students for internships, summer work programs and for assistance with research and development projects. Silicon Valley firms employ more graduates from SJSU than from any other university in the nation.

Location on 154 acres in downtown San Jose, the university offers the excitement of studying at a large, metropolitan campus where many cultures meet. Yet students find personal attention from faculty members in the smaller setting of the university's eight colleges.

San Jose is a newly revitalized city which hosts major sports, the arts, museums and restaurants serving a wide variety of cuisines. The Santa Cruz coastline is less than an hour away; San Francisco is one hour north.

Mission

To enrich the lives of its students, to transmit knowledge to its students along with the necessary skills for applying it in the service of our society, and to expand the base of knowledge through research and scholarship.

History

Founded in 1857, San Jose State is the oldest public institution of higher education on the West Coast. From its beginning as a normal school to train teachers for the developing frontier, SJSU has matured into a metropolitan university offering more than 134 bachelor's and master's degrees with 110 concentrations.

C. Appendix C

Megadata Corporation and Subsidiary

Megadata Corporation (the "Company" or "we") is a provider of flight information, application software, and web-delivered collaborative decision tools to the aviation industry and organizations that serve, or are served by, the aviation industry.

The Company has what it believes is a unique database of flight information, powered by a network of company-owned passive radars and several other data sources, that when combined with the Company's suite of data products, web-based software, and web-based collaborative decision tools, provides airlines and airports services that we believe are otherwise unavailable in most cases. The Company now provides services to over 40 airports as well as over 30 airlines and continues to expand services to each in this traditional market. In addition, the Company has created and implemented collaborative web-based software that allows the Company's customers to instantly share information to improve individual and joint decision making, creating additional value for its customers.

Norman Y. Mineta International Airport

Located two miles north of downtown San Jose, Norman Y. Mineta San José International Airport (SJC) is a completely self-supporting enterprise, owned and operated by the City of San José. San Jose is Northern California's largest city...it's also the 3rd largest on the West Coast and the 10th largest city in the U.S.

E. Appendix E

AVIA 190: Aviation Seminar, San Jose State University

Student assessment of the research process and teamwork for the FAA Airport Design Competition

Part 1. Research Process Evaluation

In the space below (use extra sheets if necessary) please reflect on the challenges and successes you faced during the research process for the FAA Airport Design Project as part of AVIA 190. Make reference to each of the categories below, but focus on those issues that are most relevant to you.

Planning: Reflect on the process of focusing your research. What challenges did you encounter in developing a question, hypothesis, or thesis?

The initial process of generating ideas was much easier then developing the thesis. It was harder to break our topic into smaller and relevant parts. Developing the question or the problem statement was much simpler than developing a thesis. The hypothesis actually was the answer to our problem statement.

Gathering: Describe any problems or successes you had as you searched. Did any particular search strategies work well or disappoint you? Which databases and search engines worked well? What were the major barriers to your search for balanced and credible resources?

Our design idea consists of constraints and problems that have not been identified yet. The software we used to define constraints has not been implemented at airports before, thus did not have any historical data. All our research and findings came from primary sources, e.g. interviews. We had to search for problems rather and then suggest solutions to resolve them. The engines and database that were helpful was the Passur website and AAAE. The major barrier was the lack of historical data.

Organizing: How did you ensure that your information comprehensively addressed the question, hypothesis, or thesis? How and why did you modify your original question, hypothesis, or thesis? What strategies did you use to reorganize the information? Did these strategies lead you to connections, patterns, etc.?

We ensured that the information comprehensively addressed the hypothesis by spending a considerable amount of time planning and refining the hypothesis. Instead of jumping right into the work, we made sure that everyone was given the right topics to research and that everyone understood exactly what should be covered. I have noticed that with a lot of group projects the sections are simply divided up amongst the group members and lumped together. This usually leads to a paper that doesn't flow together, has a lot of redundancy, and or is lacking information that develops other parts.

Documenting: Did any issues arise as you documented your sources?

No.

Part 2: Team Work Collaboration

Team Member Evaluating:

Team Member Being Evaluated:

Team Number: 5

Please circle the appropriate rating for each of your team members and provide any general comments you may have.

4 - Thorough Understanding

- Consistently and actively works toward group goals.
- Is sensitive to the feelings and learning needs of all group members.
- Willingly accepts and fulfills individual role within the group.
- Consistently and actively contributes knowledge, opinions, and skills.
- Values the knowledge, opinion and skills of all group members and encourages their contribution.
- Helps group identify necessary changes and encourages group action for change.

3 - Good Understanding

- Works toward group goals without prompting.
- Accepts and fulfills individual role within the group.
- Contributes knowledge, opinions, and skills without prompting.
- Shows sensitivity to the feelings of others.
- Willingly participates in needed changes.

2 - Satisfactory Understanding

- Works toward group goals with occasional prompting.
- Contributes to the group with occasional prompting.
- Shows sensitivity to the feelings of others.
- Participates in needed changes, with occasional prompting.

1 - Needs Improvement

- Works toward group goals only when prompted.
- Contributes to the group only when prompted.
- Needs occasional reminders to be sensitive to the feelings of others.
- Participates in needed changes when prompted and encouraged

General Comments

All my team members deserve a 4. It was hard to get us started, but everybody came through. They all worked hard to gather information and write their sections.

Part 3: Goals Evaluation of the Project

Please provide an answer to the following questions any briefly address any general comments you may have.

Did the FAA Airport Design Competition provide a meaningful learning experience for you? Why or Why not?

Yes, this competition helped me better understand how the airport operates. Also, it helped me gain confidence in approaching airport personnel for information.

Was the learning experience appropriate to the course level and its objectives? Why or Why not?

Yes, this project felt like a senior project. The objectives were clear and relevant to our course level.

Was the learning experienced balanced between academic and industry goals? Why or Why not?

Yes, it provided a valuable insight on how the airports operate, but also how changes are proposed and made.

Was participation by industry in the project appropriate, meaningful, and useful? Why or Why not?

Yes, we received a lot of good feedback from Peter Masella from Passur. Also, SJC airport staff provided us with valuable feedback and direction.

Did this project help you with skills and knowledge you need to be successful for entry in the workforce or to pursue further study? Why or Why not?

Yes, the project gave insightful information regarding airport operation. I am definitely placing this project on my resume. Also, it helped me meet other knowledgeable individuals within the aviation industry.

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Planning: Reflect on the process of focusing your research. What challenges did you encounter in developing a question, hypothesis, or thesis?

There was much disagreement over the direction of the project. Some of the team members strived to be able to work with PASSUR to develop a mockup of the interface while others chose to simply conceptualize the product. Due to time constraints, the latter option was chosen.

Gathering: Describe any problems or successes you had as you searched. Did any particular search strategies work well or disappoint you? Which databases and search engines worked well? What were the major barriers to your search for balanced and credible resources?

One of the major dilemmas we faced was being able to find people with useful input concerning PASSUR systems and its capabilities. While we did contact PASSUR staff, most of their explanations were vague, stating that they could practically fabricate anything to our specifications. Of course, this did not exactly fit well with a conceptualization rather than a fabrication, but we did manage to use the information that was passed on to the team. Also, there is very little experience with PASSUR portal systems on the west coast, as the only major user is the New York metropolitan terminal area and the limited amount of time prohibited us from gaining access to the facility and seeing it in operation.

Organizing: How did you ensure that your information comprehensively addressed the question, hypothesis, or thesis? How and why did you modify your original question, hypothesis, or thesis? What strategies did you use to reorganize the information? Did these strategies lead you to connections, patterns, etc.?

We held frequent meetings to continuously refine the topic and thesis. As time went on, our project scope changed drastically, as did our vision of the product. Nevertheless, the final conceptualization, I believe, is still a proposition worth considering. Universalizing such a network could lead to significant efficiency improvements.

Documenting: Did any issues arise as you documented your sources?

No.

Part 2: Team Work Collaboration

Team Member Evaluating:

Team Member Being Evaluated:

Team Number: 5

Please circle the appropriate rating for each of your team members and provide any general comments you may have.

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- Consistently and actively works toward group goals.
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- Contributes to the group only when prompted.
- Needs occasional reminders to be sensitive to the feelings of others.
- Participates in needed changes when prompted and encouraged

General Comments

The team definitely deserves a 4. I found myself in a group that was not afraid to endeavor into a more difficult proposition. If given more time, I believe our solution to this challenge could

have been even better.

Part 3: Goals Evaluation of the Project

Please provide an answer to the following questions any briefly address any general comments you may have.

Did the FAA Airport Design Competition provide a meaningful learning experience for you? Why or Why not?

I'll be honest and say I lie somewhere in the middle of yes and no. Most of us Aviation majors understand the shortcomings of the current airport environment, so the topic is nothing new, nor is the usage of PASSUR software. But proposing to universalize the software for the entire NAS is definitely new. How it could be mandated is just the next question.

Was the learning experience appropriate to the course level and its objectives? Why or Why not?

Definitely, as it provided a challenge with a massive scope that is more possible that many may think.

Was the learning experienced balanced between academic and industry goals? Why or Why not?

It was probably more industry oriented due to the nature of the product and the research is short of being academic, though an implementation could make a great case study.

Was participation by industry in the project appropriate, meaningful, and useful? Why or Why not?

We could not have done it without the industry. They provided the potential and we are merely advocates with some original ideas as well.

Did this project help you with skills and knowledge you need to be successful for entry in the workforce or to pursue further study? Why or Why not?

Not entirely. The work environment is much different from what was done. The decision making process with frequent meetings is quite familiar, but there was little done on the fiscal aspect of a product proposal.

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Planning: Reflect on the process of focusing your research. What challenges did you encounter in developing a question, hypothesis, or thesis?

At first, the challenges we faced were determining which project to choose. It was difficult because the team came up with two good proposals. The project that the team chose was the most difficult of the two.

The difficult part for me was determining how we'd approach the problem because we were first going to come up with a new software yet we had no software development expertise. While researching, our team leader found a company that was used by many airports and used that as a foundation for our project. We identified what it lacked and used that as our problem statement.

Gathering: Describe any problems or successes you had as you searched. Did any particular search strategies work well or disappoint you? Which databases and search engines worked well? What were the major barriers to your search for balanced and credible resources?

My part of the research was trying to develop a good problem statement. I could not find any quantitative analysis of how the communications in the airports lack the efficiency. Every time I tried looking at research databases such as EBSCO Host and InfoTrac but it showed mostly Air Traffic Control deficiencies or accidents related to ATC communications. This was the major barrier for my part of the project. It was also difficult because he did

Organizing: How did you ensure that your information comprehensively addressed the question, hypothesis, or thesis? How and why did you modify your original question, hypothesis, or thesis? What strategies did you use to reorganize the information? Did these strategies lead you to connections, patterns, etc.?

I grabbed bits and pieces of information that would relate to our subject—that was difficult in itself. Our team realized that we did not have the expertise to develop the software but would try to improvise the software used that could lead to a more effective and efficient communication system.

Documenting: Did any issues arise as you documented your sources?

No issues came up when I was documenting our sources.

Part 2: Team Work Collaboration

Team Member Evaluating:

Team Member Being Evaluated

Team Number 5

Please circle the appropriate rating for each of your team members and provide any general comments you may have.

4 - Thorough Understanding

- Consistently and actively works toward group goals.
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- Works toward group goals only when prompted.
- Contributes to the group only when prompted.
- Needs occasional reminders to be sensitive to the feelings of others.
- Participates in needed changes when prompted and encouraged

General Comments

I gave a 4 to all.

Part 3: Goals Evaluation of the Project

Please provide an answer to the following questions any briefly address any general comments you may have.

Did the FAA Airport Design Competition provide a meaningful learning experience for you? Why or Why not?

It provided a meaningful experience because it showed my weaknesses in airport operations.

Was the learning experience appropriate to the course level and its objectives? Why or Why not?

I do not think the course level was a problem. It was more the lack of experience in an airport that became a problem.

Was the learning experienced balanced between academic and industry goals? Why or Why not?

I do not think the academic and industry goals are balanced, because we did not learn what kind of software airports and airlines were using through the duration of my education. We either must have worked at an airport or an airline to really identify what the problem was in regards to our project. Although I learned about PASSUR and how it's being used at many airports, I still can't visualize how greatly it plays a role from day to day basis of operations. Because 50 % of the team worked at an airport or an airline it was noticeable that they knew what was going on where as the other 50% were just still trying to understand the system.

Was participation by industry in the project appropriate, meaningful, and useful? Why or Why not?

In reality, their participation was more helpful than the research databases because our project was consistently trying to find out what could be done to improve the communication system.

Did this project help you with skills and knowledge you need to be successful for entry in the workforce or to pursue further study? Why or Why not?

I do not think that the skill level has increased, because I had no hands on experience. I believe that my knowledge level has increased which is useful because I would at least know what software they are using.

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Planning: Reflect on the process of focusing your research. What challenges did you encounter in developing a question, hypothesis, or thesis?

Our group had a difficult time deciding on the topic to do research on. Our ideas were either too broad and not interesting enough for our senior project, or just plain difficult to do. We narrowed it down to two topics and we decided as a group to do the more difficult one after doing more research to find out it would be a great learning experience especially for our final senior project.

Gathering: Describe any problems or successes you had as you searched. Did any particular search strategies work well or disappoint you? Which databases and search engines worked well? What were the major barriers to your search for balanced and credible resources?

The information that I searched for was mainly on one website and not all over the search engines. The only thing I found helpful was using "google" to find a few news articles about our topic. My resource was credible because it came directly from the main website and new sources.

Organizing: How did you ensure that your information comprehensively addressed the question, hypothesis, or thesis? How and why did you modify your original question, hypothesis, or thesis? What strategies did you use to reorganize the information? Did these strategies lead you to connections, patterns, etc.?

We went through all the requirements of the research and what questions to address. Our group also assigned different sections to each group member to fulfill all the requirements which covered everything that needed to be addressed. An outline really helped us to break down certain sections to make the whole report more cohesive and organized.

Documenting: Did any issues arise as you documented your sources?

No.

Part 2: Team Work Collaboration

Team Member Evaluating:

Team Member Being Evaluated:

Team Number: 5

Please circle the appropriate rating for each of your team members and provide any general comments you may have.

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- Participates in needed changes when prompted and encouraged

General Comments

I rate our group "4", because we discussed everything and worked well as a group. Everyone's thoughts and ideas were included and each group member understood what their part was and

successfully completed their own assignment, which greatly contributes to the overall project.

Part 3: Goals Evaluation of the Project

Please provide an answer to the following questions any briefly address any general comments you may have.

Did the FAA Airport Design Competition provide a meaningful learning experience for you? Why or Why not?

Yes, because it taught me how to do thorough research on a specific topic while teaching me how to be creative and expand my thoughts thinking outside the box, following specific guidelines at the same time.

Was the learning experience appropriate to the course level and its objectives? Why or Why not?

Yes, it was challenging at times but our group took little steps throughout the whole process to help us reach our goals. This project is perfect for our course level because it involves our knowledge that we learned in school so far and sums up our education with one final project that we can be proud of.

Was the learning experienced balanced between academic and industry goals? Why or Why not?

Yes, because we learned how to research and find certain information to put together in our report that the whole group was interested in. The topic we chose relates to our industry goals by learning more of a certain aspect of aviation.

Was participation by industry in the project appropriate, meaningful, and useful? Why or Why not?

Very useful, because most of the information our group used was from actual people in the industry we interviewed or got in contact with. Some of the information that was used was given directly from people in the aviation industry dealing with the specific product we did research on, so they were a great resource.

Did this project help you with skills and knowledge you need to be successful for entry in the workforce or to pursue further study? Why or Why not?

Yes, this project gave us a basic understand of a small aspect of aviation technology. It helped us understand aviation in today's world and how technology is used not only in aviation but in every industry in today's world. It was a great experience for everyone and we gained the skills and knowledge to become more prepared for the real-world working industry.

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In the space below (use extra sheets if necessary) please reflect on the challenges and successes you faced during the research process for the FAA Airport Design Project as part of AVIA 190. Make reference to each of the categories below, but focus on those issues that are most relevant to you.

Planning: Reflect on the process of focusing your research. What challenges did you encounter in developing a question, hypothesis, or thesis?

It was difficult to narrow down a good topic to discuss. We had a couple main ideas, but they were very broad. We needed to bring them into a more particular scope before picking one. Once we did, it still took our group a while to fully understand the problem and become clear on how we were going to address it.

Gathering: Describe any problems or successes you had as you searched. Did any particular search strategies work well or disappoint you? Which databases and search engines worked well? What were the major barriers to your search for balanced and credible resources?

Our project was very much from our imaginations so there wasn't much factual information or previous research to base it on. We gathered some research just by running google or yahoo searches.

Organizing: How did you ensure that your information comprehensively addressed the question, hypothesis, or thesis? How and why did you modify your original question, hypothesis, or thesis? What strategies did you use to reorganize the information? Did these strategies lead you to connections, patterns, etc.?

We used the FAA guidelines as basis for what information needed to be included. Then as our research and discussion developed, we narrowed our scope and really got the problem understood.

Documenting: Did any issues arise as you documented your sources?

No.

Part 2: Team Work Collaboration

Team Member Evaluating:

Team Member Being Evaluated:

Team Number: 5

Please circle the appropriate rating for each of your team members and provide any general comments you may have.

4 - Thorough Understanding

- Consistently and actively works toward group goals.
- Is sensitive to the feelings and learning needs of all group members.
- Willingly accepts and fulfills individual role within the group.
- Consistently and actively contributes knowledge, opinions, and skills.
- Values the knowledge, opinion and skills of all group members and encourages their contribution.
- Helps group identify necessary changes and encourages group action for change.

3 - Good Understanding

- Works toward group goals without prompting.
- Accepts and fulfills individual role within the group.
- Contributes knowledge, opinions, and skills without prompting.
- Shows sensitivity to the feelings of others.
- Willingly participates in needed changes.

2 - Satisfactory Understanding

- Works toward group goals with occasional prompting.
- Contributes to the group with occasional prompting.
- Shows sensitivity to the feelings of others.
- Participates in needed changes, with occasional prompting.

1 - Needs Improvement

- Works toward group goals only when prompted.
- Contributes to the group only when prompted.
- Needs occasional reminders to be sensitive to the feelings of others.
- Participates in needed changes when prompted and encouraged

General Comments

All were 4

Part 3: Goals Evaluation of the Project

Please provide an answer to the following questions any briefly address any general comments you may have.

Did the FAA Airport Design Competition provide a meaningful learning experience for you? Why or Why not?

Yes, provided an opportunity to finally show some ideas we have to improve the airport system.

Was the learning experience appropriate to the course level and its objectives? Why or Why not?

Yes, we could use many areas of interest that we learned throughout our years in college and bring them all together.

Was the learning experienced balanced between academic and industry goals? Why or Why not?

Yes, as an aviation major, the academic and industry goals would obviously be similar since we share common interests.

Was participation by industry in the project appropriate, meaningful, and useful? Why or Why not?

Yes, we got decent help from the company that we based our project off. They guided us and allowed us to expand on their design.

Did this project help you with skills and knowledge you need to be successful for entry in the workforce or to pursue further study? Why or Why not?

Yes, I learned many things about airport operations, which will be helpful in my career.

AVIA 190: Aviation Seminar, San Jose State University

Student assessment of the research process and teamwork for the FAA Airport Design Competition

Part 1. Research Process Evaluation

In the space below (use extra sheets if necessary) please reflect on the challenges and successes you faced during the research process for the FAA Airport Design Project as part of AVIA 190. Make reference to each of the categories below, but focus on those issues that are most relevant to you.

Planning: Reflect on the process of focusing your research. What challenges did you encounter in developing a question, hypothesis, or thesis?

The process of developing and deciding on a topic was arguably the most difficult part of this project. We had a few good ideas for a topic but it was hard to refine these ideas to the point where they were feasible.

Gathering: Describe any problems or successes you had as you searched. Did any particular search strategies work well or disappoint you? Which databases and search engines worked well? What were the major barriers to your search for balanced and credible resources?

This project drew mostly on the experience I have as an aviation major. Because our idea is strictly conceptual I was forced to use our own knowledge and creativity, but when I had to get outside information it was much easier to find credible information from scholarly journals like IEEE.

Organizing: How did you ensure that your information comprehensively addressed the question, hypothesis, or thesis? How and why did you modify your original question, hypothesis, or thesis? What strategies did you use to reorganize the information? Did these strategies lead you to connections, patterns, etc.?

We ensured that the information comprehensively addressed the hypothesis by spending a considerable amount of time planning and refining the hypothesis. Instead of jumping right into the work, we made sure that everyone was given the right topics to research and that everyone understood exactly what should be covered. I have noticed that with a lot of group projects the sections are simply divided up amongst the group members and lumped together. This usually leads to a paper that doesn't flow together, has a lot of redundancy, and or is lacking information that develops other parts.

Documenting: Did any issues arise as you documented your sources?

No.

Part 2: Team Work Collaboration

Team Member Evaluating:

Team Member Being Evaluated

Team Number 5

Please circle the appropriate rating for each of your team members and provide any general comments you may have.

4 - Thorough Understanding

- Consistently and actively works toward group goals.
- Is sensitive to the feelings and learning needs of all group members.
- Willingly accepts and fulfills individual role within the group.
- Consistently and actively contributes knowledge, opinions, and skills.
- Values the knowledge, opinion and skills of all group members and encourages their contribution.
- Helps group identify necessary changes and encourages group action for change.

3 - Good Understanding

- Works toward group goals without prompting.
- Accepts and fulfills individual role within the group.
- Contributes knowledge, opinions, and skills without prompting.
- Shows sensitivity to the feelings of others.
- Willingly participates in needed changes.

2 - Satisfactory Understanding

- Works toward group goals with occasional prompting.
- Contributes to the group with occasional prompting.
- Shows sensitivity to the feelings of others.
- Participates in needed changes, with occasional prompting.

1 - Needs Improvement

- Works toward group goals only when prompted.
- Contributes to the group only when prompted.
- Needs occasional reminders to be sensitive to the feelings of others.
- Participates in needed changes when prompted and encouraged

General Comments

All were a 4

Part 3: Goals Evaluation of the Project

Please provide an answer to the following questions any briefly address any general comments you may have.

Did the FAA Airport Design Competition provide a meaningful learning experience for you? Why or Why not?

Yes, this competition provided enough freedom to make something of our own, and to pull together everything we have learned in our education at San Jose State.

Was the learning experience appropriate to the course level and its objectives? Why or Why not?

Yes, for the reasons listed in the previous answer

Was the learning experienced balanced between academic and industry goals? Why or Why not?

Yes, it provided a valuable insight on how the airports operate, but also how changes are proposed and made.

Was participation by industry in the project appropriate, meaningful, and useful? Why or Why not?

Yes, we received a little bit of input from a representative at Passur. They provided us with some feedback and direction on this topic.

Did this project help you with skills and knowledge you need to be successful for entry in the workforce or to pursue further study? Why or Why not?

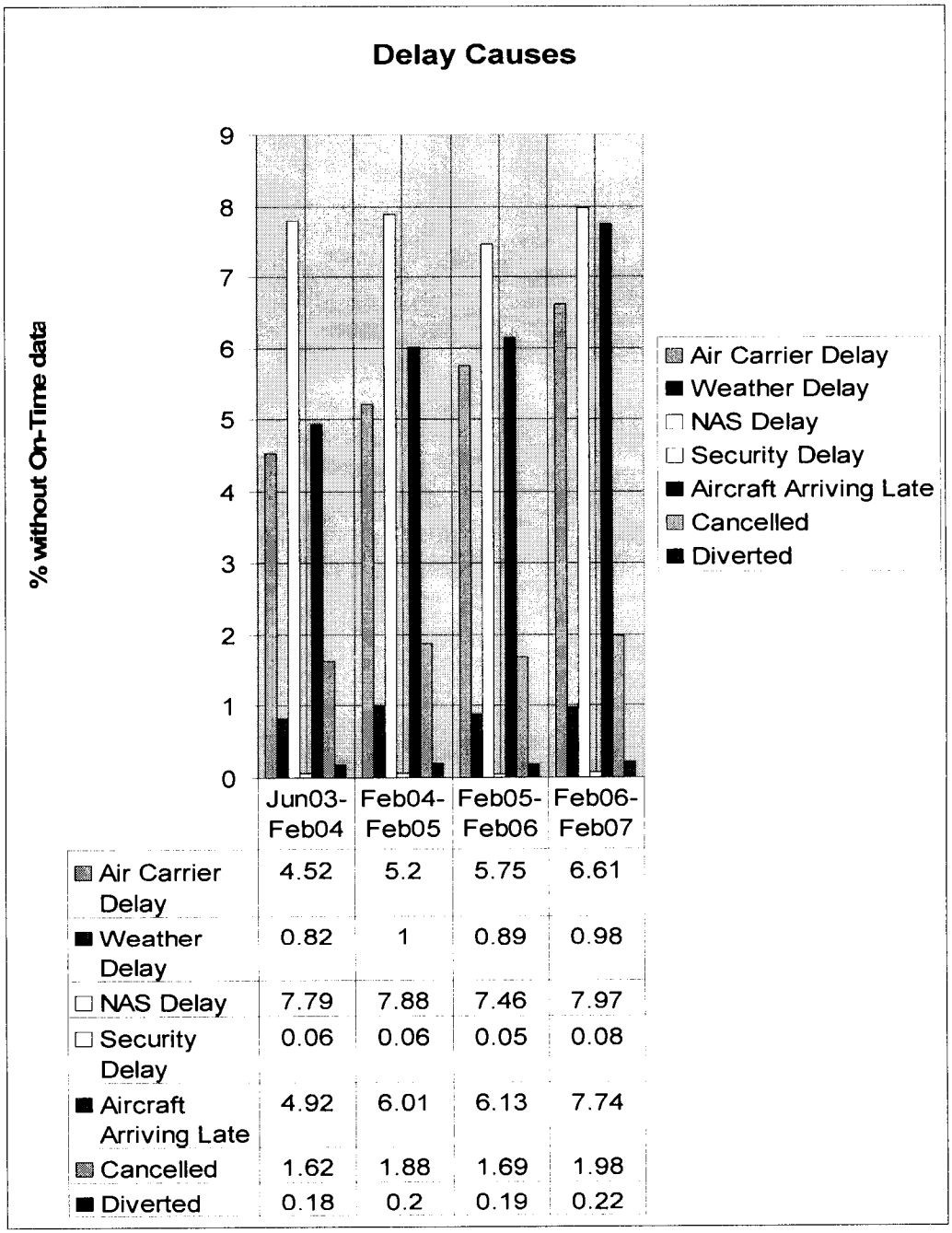
Yes, although I plan on being a pilot, this project helped me understand how planning is done and decisions are made in the aviation industry.

F. Appendix F

PASSUR, PASSUR in the classroom PPT, Retrieved on March 10, 2007.
Popal, Malaly, Senior Operations Specialists, March 8, 2007.
SH&E Consultancy. Retrieved on March 8, 2007 from http://www.sh-e.com/
http://www.sys-con.com/read/348438_p.htm
http://www.passur.com/pst/report_findings05.htm
http://www.passur.com/testimonials_airports.htm
Smith, Kevin. Air Traffic Controller at San Jose Airport, March 8, 2007.
Peter A. Masella, Sales Operations Coordinator, personal communication, April 7, 2007.

G. Appendix G

Figure 1



	Jun03-Feb04	Feb04-Feb05	Feb05-Feb06	Feb06-Feb07
Air Carrier Delay	4.52	5.2	5.75	6.61
Weather Delay	0.82	1	0.89	0.98
NAS Delay	7.79	7.88	7.46	7.97
Security Delay	0.06	0.06	0.05	0.08
Aircraft Arriving Late	4.92	6.01	6.13	7.74
Cancelled	1.62	1.88	1.69	1.98
Diverted	0.18	0.2	0.19	0.22

Data: www.bts.gov