LA INCOSE

NEWSLETTER

Los Angeles Chapter of INCOSE
www.incose-la.org

Issue No. 7 November, 2002

COMING EVENTS

Tuesday November 12th
Dinner Meeting

Systems Engineering
for Disney Imagineering

Speaker
Ken Salter

Location
JPL
von Karman Auditorium

Saturday, December 14th
6:00 pm
LA Chapter
Christmas Party
Location to be announced

Tuesday, January 14th
Dinner Meeting

Speaker
Tom Mincer

Location
Aerospace

Installation of the 2003 Board

February 2-5
INCOSE International Workshop

Tuesday, February 11th
Academia and Industry
Panel

Saturday, March 15th
Tutorial

SPECIAL REQUEST:
Systems Engineer in the Multi-Media Industry Needed

Heinz Stoewer, the President-Elect of INCOSE International, has asked if there is anyone in the LA chapter who can provide information about systems engineering in the Multi-Media industry (movies, television, digital technology, etc). If you fit the bill or if you know someone who does, you can contact Scott Jackson (scott.jackson@boeing.com) or Heinz himself (HeinzStoewer@compuserve.com).

From the President
Example of the use of Intelligent Transportation Systems
Michael E. Krueger

Intelligent Transportation Systems (ITS) is the application of computers, communications and software to increase the efficiency of our highway system. The following is an example of how ITS can help with congestion for freeways, just one of several challenges that transportation agencies face.

How can ITS and the application of technology help freeway congestion?

In the language of traffic engineers, there are two types of congestion recurring and non-recurring.

Recurring congestion is that traffic congestion we face each day on our commute to work. With finite space and the fact that most need to be at work at about the same time, our highways become saturated and grid lock occurs during peak hours of the day. This stop and go on the freeways creates a shockwave and sometime causes fender benders. The growth of recurring congestion is estimated at about 4-6% per year doubling approximately every 10 years.

ITS technologies can help in the prediction of travel times, giving the motorist an accurate view of the congestion on specific routes and providing alternative routes and travel times. This requires that the information gathered by sensors on the highways through inductive loops in the road combined with video surveillance camera that is collected at Traffic Management centers then be sent out to various forms of media, e.g. internet, palm and in-vehicle devices. The key to this type of information is that it must be accurate and be delivered to the motorist in time for trip or route decisions. This is also called "Demand Management" in traffic terms. Other solutions are ramp metering, transit incentives, car pooling, staggered work hours etc. Unfortunately, these techniques only work to limited extent in Los Angeles since the "Peak hours" are continuing to expand. However, even a very small percentage improvement has returned a great benefit to the public.

The second type is ***non-recurring congestion***. This type of congestion is caused by incidents. These include stalled vehicle in a traffic lane, fender bender or major events like the recent 200 car pile up on the 710 fwy, or a hazardous chemical spill. Studies show that incidents contribute to approximately 50% of the congestion that we see on the freeways. Incidents are often intermingled with recurring congestion exacerbating the problem of congestion. Intelligent Transportation Systems have made a significant positive impact on this type of congestion.

To deal with this type of congestion, traffic engineers use the term incident management (IM). IM integrates a number of ITS elements to help in the following phases of IM; detection, verification, response, clearing and finally restoration of the flow of traffic to normal. The goal of IM is to minimize the time of an incident (this is the most significant metric). The following is the description of each of the phases and some of the technologies used to support the traffic engineer and Highway Patrol in dealing with an incident.

Detection:

Detection is the initial notification that an incident occurred. In the Traffic Management Center, operators have large screen maps and workstations that show a color coded map of the freeway system. The color coding on the freeway links indicate the average speed, if the speed display dips below a certain speed threshold for example 25 mph, the color changes to red indicating a very congested link. If downstream of the very congested link the next segment is green, indicating a "free flow" situation, the system will alert the operator that a possible incident has occurred. Because the data providing this indication is generated by inductive loops on the freeway spaced approximately ¼ mile apart, the indication is dependent on congestion; the less congestion, the more time it takes to build up a queue to provide the indication. There will also be ambiguity as to where the incident actually is located. But usually before the system alerts the operator (if there was an actual incident) Highway Patrol operators have probably received several cell phone calls from motorists that an incident has in fact happened. Hence, primary technology used for incident detection is the cell phone. Calls are received and used to identify the location (lane, and direction as well as location) and if possible the nature of the incident. This is not an easy process, motorist usually do not know precisely where the incident occurred, and can only provide an approximate location and vague discription of the incident. Also, when an incident occurs usually a flood of calls are received with conflicting information, and if more then one incident has occurred (secondary incidents) it is difficult to sort out which incident the motorist is referring too. This creates a correlation challenge. The cell phone information is correlated with the inductive loops and algorithms as described above.

Verification:

It is the verification process that provides more precise information on the location and nature of the incident. It is important to determine the nature of the incident to apply the correct resources to deal with the incident. For example, a vehicle fire in a lane would require a different set of resources then a stalled vehicle only and knowing the difference will enable the Traffic Management Center to initiate the appropriate response plan as early as possible. The technologies that are used are the surveillance cameras that are on the freeway, information from the motorist and finally the freeway service patrols or California Highway Patrol that arrives on the scene.

Response:

Response plans are usually pre-planned based on the type of incident. Also, knowledge of location helps identify the location of the nearest resources that can be applied. The CHP officer on site usually becomes the scene commander and is responsible in dealing with the incident. The Transportation agency is supporting this activity. In addition to the scene commander, there is a CHP officer at the Traffic Management Center who coordinates with the on scene commander and Caltrans. As part of the response plans, information is sent to the public in the form of news reports "Sig Alerts" messages posted on Changeable Message Signs that are located along the freeway, Highway Advisory Radio (HAR) and the internet. Some companies, for example Tele Alas, are taking this information and broadcasting it to pagers, palm devices, cell phones and in-vehicle devices. It is important to notify the motorists upstream of the incident so they will slow down to reduce secondary incidents that occur due the shockwave that develops behind an incident. Response plans include the notification information for emergency services such as fire, medical and towing that can be used in the area as well as interagency contacts if a local city must adapt their signals to accommodate the additional flow of traffic on surface streets.

Technologies that assist in the response to an incident are Expert Systems for response plan generation, incident monitoring and tracking, communications, changeable message sign and video surveillance systems.

Incident Clearing:

This is dependent on the type of incident involved. CHP controls the incident scene and if accident measurements are needed then special equipment has been developed to aid the CHP in all the necessary photographs and measurements. Although not classified as ITS this special equipment has reduced the scene time significantly. Also, special facilities have been set up so that in minor accidents the motorists involved can pull off the freeway and wait for the CHP- these are call Accident Investigation Sites (AIS). These are more popular in other states than in California. Caltrans supports the clearing of accidents if debris needs to be cleaned up.

Restoring the Flow:

The above steps takes time, and if you have been caught behind an incident you would like nothing better then to have incident cleared quickly and continue on your way. But, even after an accident has been removed, it will take some time to restore the flow of traffic to normal. For example, data showed that an overturned truck blocking two lanes of a freeway took 45 minutes to clear (removed) but the residual delay continued for over an hour after the incident was cleared. Astonishingly, the residual delay take longer dissipate then it took to detect, respond and clear the incident. The key is to minimize the number of motorists trapped behind the accident by notifying them using the changeable message signs at viable decision points upstream of the incident and provide alternate routing.

In summary, this is just an example of how ITS can help deal with a situations that we face each day on the highways. As can be seen, a number of ITS elements integrated together into an Incident Management System to provide a comprehensive capability to detect, verify, respond and clear an incident and to restore the flow of traffic. There are many challenges to the deployment of Intelligent Transportation Systems, including the translation and tailoring of a set of systems engineering tools and mindset that is common to the Aerospace and Defense industry to this new domain. To deploy Intelligent Transportation Systems, a good systems engineering process will be essential and it is just now becoming a part of the ITS tool kit in the development of these systems.

November Dinner Meeting

Speaker: Mr. Ken Salter

Walt Disney Imagineering, Executive Director of Systems Engineering

Bio:
Ken has a BS in Mechanical Engineering from UC Berkeley and a MS in Mechanical Engineering from UCLA. He began his career at Hughes Aircraft Company, Space and Communications Group where he worked in the Systems Engineering Laboratory. In 1990, Ken moved to Imagineering where he works in the Show-Ride Engineering directorate. Ken has worked as a project engineer, a principal engineer for advanced ride concepts, technical director for location-based entertainment, and technical director for a new theme park in Paris. In July 1999, Ken began developing a systems engineering process, based on EIA-632, which is tailored for development of Disney attractions.

Abstract:
The development of theme parks requires systems thinking and can benefit from systems engineering methods. This paper identifies some myths and truths about traditional systems engineering methods and their applicability to theme park development. This paper is an editorial, based on the experiences of the author in applying systems engineering for a developer of large theme parks. The paper discusses methods that are effective and those that are not. The paper then describes problems with traditional systems engineering and suggests some improvements using concepts from complexity science. Lastly, a systems engineering process model is presented, which is currently in use.

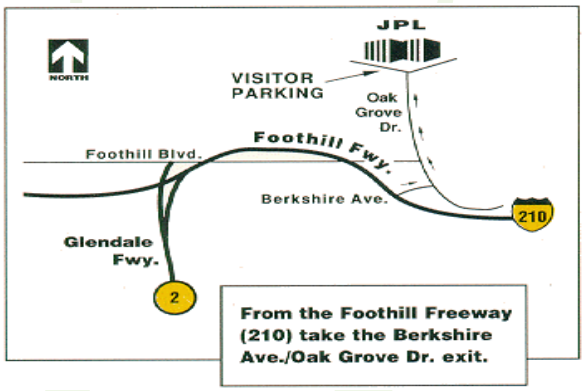
Date:
Tuesday, November 12, 2002

Location:
Jet Propulsion Laboratory
von Karman Auitorium
4800 Oak Grove
Pasendena, CA

Time:
5:30pm Social Hour (and viewing of the gallery of spacecraft)
6:30pm Welcome
6:40pm Presentation

Cost: (Free for LA INCOSE members)
$10 for non-members, pay at the door (includes substantial snacks and drinks)

Directions:
From the 210-134 Fwy junction in Pasadena go west on the 210. Exit at the Berkshire/Oak Grove (JPL) exit (about 3-4 exits past the junction). At the bottom of the offramp, turn right, then left at the signal (a "T" intersection) onto Oak Grove. Follow Oak Grove until it dead ends at JPL (you will pass the von Karman auditorium on your right). The visitor parking lot is to the left of the guard gate.



What's New!

The Los Angeles Chapter Website enhancements:

The Membership can now register for events and vote for the 2003 slate of officers on line!! Go to www.incose-la.org and follow the links to vote or to register for the monthly event.

Soon the Website will have a page for links to University System Engineering Programs. - Watch for it.

Vote for the new 2003 board!!

The voting period has been extended to November 22, 2002. If you have not voted please visit the Los Angeles chapter website and follow the link to vote. It is important that you have a chance to express your support to the leadership and it is important that we as your board and officers know that the membership is supporting the chapter's activities.

Make sure you have your INCOSE membership number!!

If you need to find out who is running for the board this coming year, the bio's of the candidates have been published in the October newsletter and can be downloaded off the website.

The Following is the slate of officers for the new 2003 board of directors and officers.

2003
Board of Directors and Officers

Officers	
President:	Mike Dickerson*
Vice President:	John Hsu*
Secretary:	Paul Cudney*
Treasurer:	Marsha Weiskopf*
Past President:	Michael Krueger
Board of Directors:	
Programs:	Gina Kostelecky-Shankle*
Education:	Saul Miller
Membership:	Susan Ruth
Communication:	Ron Williamson
Ways and Means:	Tom Kudlick

* positions for which you are voting. Board of Directors are 2 year term positions- one position is up for election this year. All Officers are 1 year terms. Past President is an automatic 1 year extention to the election of the President

INCOSE News

Issue #7
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Return Address:

2118 Colony Plaza
Newport Beach, CA
92660

The International Council on Systems Engineering (INCOSE) is an organization formed for the purpose of advancing the art and science of systems engineering in various areas of the public and private sectors. The Los Angeles Chapter meets several times per year for dinner meetings, and additionally sponsors tutorials and other activities of interest to those in the systems engineering field or related fields. L. A. Chapter Officers are as follows:

President:	Michael E. Krueger – michael.krueger@ase-consult.com
Vice-President:	Katy Kuey – katy.kuey@lmco.com
Past President:	Dave Beshore – David_G_Beshore@raytheon.com
Treasurer:	Marsha Weiskopf – marsha.weiskopf@aero.org
Secretary:	Scott Jackson – scott.jackson@boeing.com
Membership:	Susan Ruth – susan.c.ruth@aero.org
Programs/Speakers:	Michael L Dickerson – simimike@iname.com
Ways and Means:	Thomas Kudlick – synchrocubed@aol.com
Tutorials/Education:	Saul D. Miller – saul.miller@aero.org
Communications:	Ronald Williamson - ronald.w.williamson@aero.org

Those interested in INCOSE membership please contact contact Susan Ruth.
Those interested in working on a committee please contact the appropriate Director.