NASA SimLabs News

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TABLE OF CONTENTS

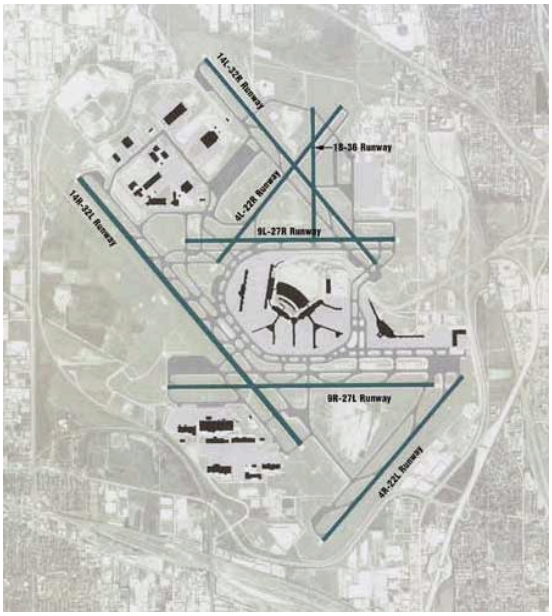
Welcome New Subscribers!
If you are receiving this newsletter for the first time, SimLabs News is a quarterly publication reviewing current projects at the NASA Ames Simulation Laboratories (SimLabs). NASA SimLabs is comprised of three unique Flight Simulators, an Air Traffic Control radar simulator and a high fidelity Air Traffic Control Tower simulator. The facilities support government as well as private industry in a wide array of applications. To find out more, read on!

1. An Extreme Makeover

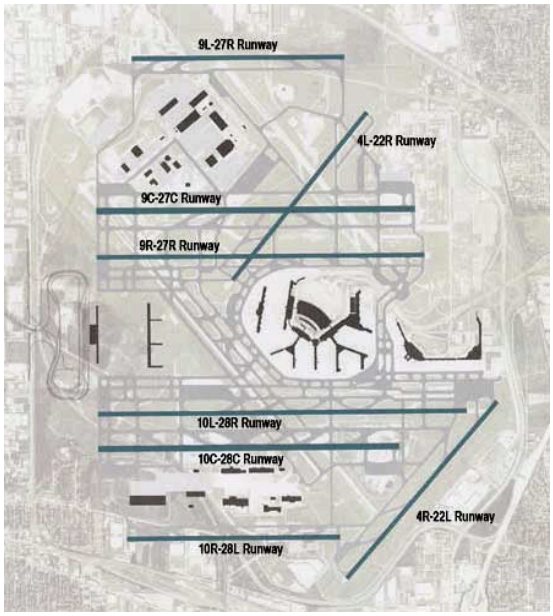
O'Hare needs a makeover and the SimLabs is here to help. Chicago O'Hare International Airport is one of the world's busiest airports, serving about 70 million passengers annually. It also encounters the most delays of any airport in the world.

O'Hare is a major domestic and international hub for two of the world's largest airlines, therefore delays at O'Hare impact schedules across North America and the world. The turbulent Midwestern weather is a major cause of delays and the runway layout compounds the problem. All but one of the seven runways at O'Hare intersect. During certain weather conditions, runway use must be restricted, and the airport's capacity decreases by about one-third.

The O'Hare Modernization Program (OMP) proposes to reconfigure O'Hare's intersecting runways into a more modern, parallel layout. The Federal Aviation Administration (FAA) estimates that a parallel runway operation at O'Hare will reduce weather-related delays by 68%, and overall delays by 66%, cutting airlines' costs by hundreds of millions of dollars annually. The extreme makeover would eliminate three existing runways, extend two runways, and add four new runways. The new runway layout would dramatically improve airport efficiency, particularly during bad weather conditions.



Current O'Hare Airport Layout



Proposed O'Hare Airport Layout

The FAA conducted real-time, human-in-the-loop simulations of the proposed airport layout in SimLabs' FutureFlight Central (FFC) in September 2005. The real-time simulations enabled air traffic controllers from O'Hare to operate the future airport with traffic levels envisioned for 2018.

The objectives of the simulation were to better define ground control operations, to develop mitigation strategies for potential problems, and to evaluate the impact of the new airport configuration on the manageability of controller workload. The real-time simulations will play an important role in the refinement of procedures for the new airport layout. The good news is thanks to real-time simulation, with this makeover, there should be no surprises!

Top of Page

2. SimLabs Hosts Industry Workshop

SimLabs hosted a very successful NASA/Industry Airport Planning Workshop at Ames Research on September 8-9, 2005. The workshop theme was "*How Can We Do Better?*" One goal was to introduce some of the NASA tools and technologies that could improve the process of airside planning. An equally important goal was to learn from the practitioners in airside planning, what is needed and what capabilities NASA could develop, to help do a better job of airport planning.

Approximately 100 attendees from airport consulting firms, airport management, and the FAA exchanged ideas with panels on airport planning challenges, technology needs, and safety. Speakers represented balanced mixed of those involved airport planning: consultants, FAA managers, air traffic controllers, airline pilot organizations

and NASA researchers.

As part of the scheduled workshop, SimLabs staff provided tours of the Crew Vehicle Systems Research Facility and a live FFC simulation of the O'Hare Modernization Program. All presentations as well as the outcomes of the panel discussions are posted to the Workshop web site at http://www.simlabs.arc.nasa.gov/airport_workshop.html.

Jim Crites and Berta Fernandez share a point

Evert Meyer addresses the panel

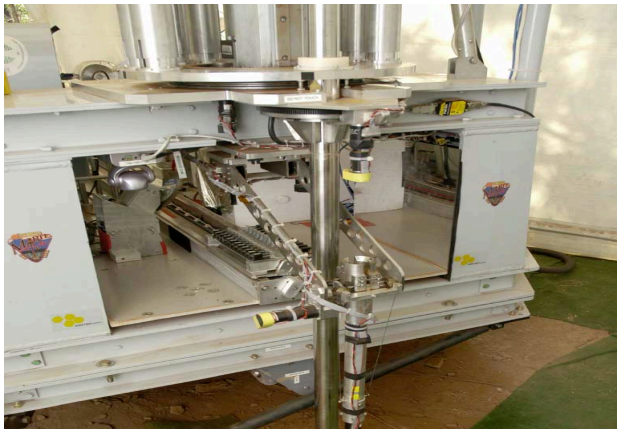
Hal Ludwig, Andres Garcia, and Chuck Dedmon converse at the break

Rosemarie Andolino discusses the O'Hare Modernization Program

Top of Page

3. Mars Driller Taps SimLabs' Expertise

The recent discovery of near surface ground ice by Mars orbiters has supported NASA scientists' theory of subsurface liquid water on Mars. Future search for life on Mars will require deep drilling to reach subsurface liquid water and analyzing samples. SimLabs recently assembled a Drill Core Service Module (DCSM) used in an experiment that took place near the Tinto River in Spain.



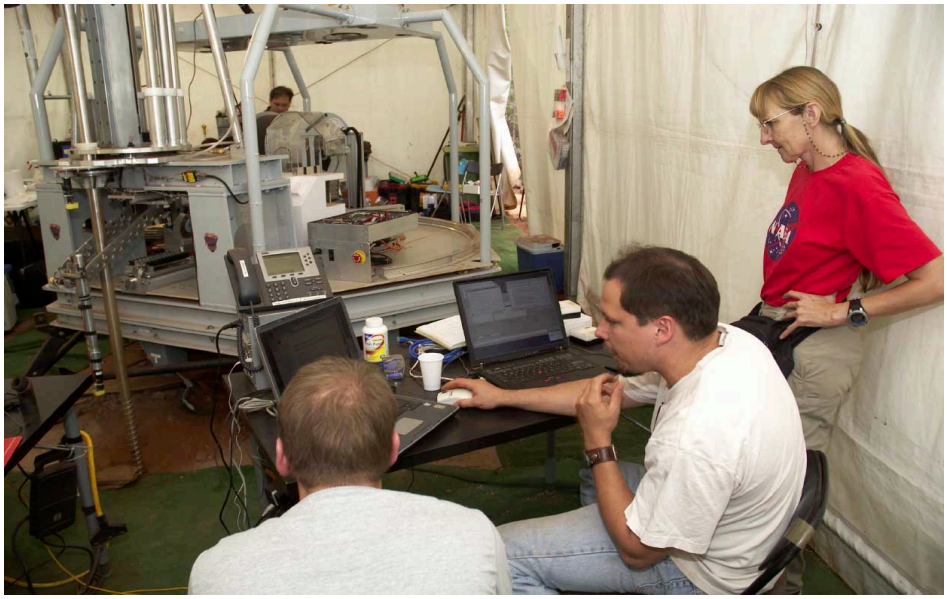
The DCSM is the main structure that supports a drill and several subsystems to be used in the field such as core sample handling, bore hole inspection, remote science instruments, and a signs of life detector.

Close-up of drill subsystem of DCSM

SimLabs was selected for the assembly and integration because of its experience with the design and integration of full motion flight simulation hardware and cockpit components. Additionally, SimLabs engineers designed numerous components on the DCSM all of which had to meet two critical requirements: structural rigidity under load and repeatability of positioning. All the designs satisfied required factors of safety while achieving extremely high strength-to-weight ratios. The driller features a rotatable platform and a special isolation platform made of honeycomb material that helps to alleviate vibration to sensitive equipment.

Engineers fabricated support structures for the subsystem components first. The isolation platform was fabricated and shipped to University of Oklahoma where the Core Sample Handling System was attached. The drill stand was shipped to Honeybee Robotics where the drill was attached. These were later shipped back to SimLabs for integration.

The DCSM was successfully field tested in Spain during the month of September 2005.

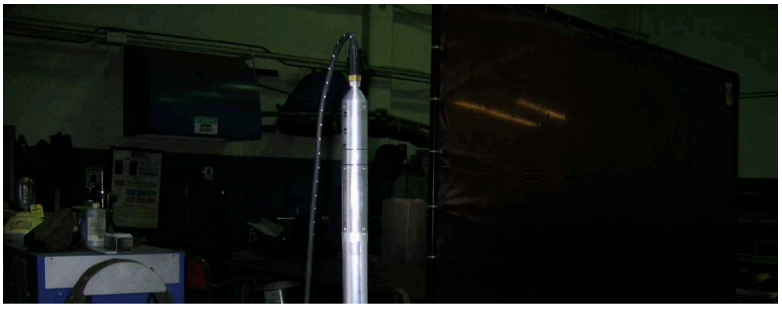


DCSM at field test at the Tinto River, Spain with researchers from left: Alois Winterholler, Howard Cannon, and Carol Stoker

Top of Page

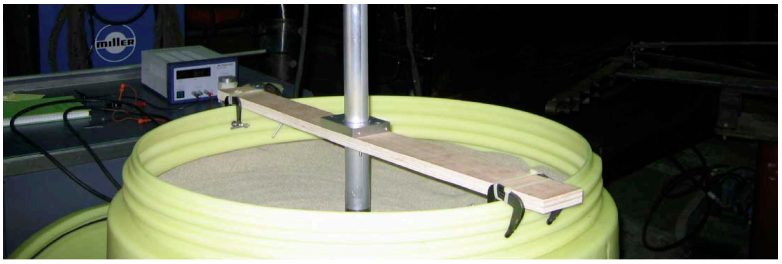
4. The Making of a Mole

SimLabs' engineers are assisting researchers at NASA Ames Research Center in adapting instrumentation for potential use during future Mars missions in the search for life beneath the soil on Mars. According to researchers, the subsurface of Mars is the most likely environment in which to find life or its organic remnants.



Called the Mars Underground Mole (MUM), the device will burrow underground like a mole to a depth of five meters. The MUM is capable of collecting a soil sample and analyzing the soil around it with a dual spectral sensor for water, ice, organics and minerals.

SimLabs' engineers redesigned several troublesome components in the propulsion



MUM Hammer Test Setup

system that literally hammers the Mole into the ground. They designed and fabricated an internal sliding weight that will drive the artillery shell-shaped Mole into the soil. Once dug in, the Mole communicates via a tether to a rover on the surface. The tether includes power wires and a fiber optic cable that transport light collected underground to a spectrometer on the surface above. When the mole has completed its task it will then hammer itself out of the soil so that it can be moved and used again.

SimLabs' engineers and fabricators have used the hammer mechanism concept to construct a working prototype that can hammer to the bottom of a 50-gallon drum of specially selected sand. A field test is scheduled for later in the year to see if the mole can hammer to the required depth of five meters, take a soil sample and return to the surface.

Top of Page

5. Thinking of Doing Business with NASA SimLabs?

For more information on what we can do for your needs, contact:

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Top of Page

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