

GROUND SUPPORT

WORLDWIDE

US Airways builds a new green GSE maintenance facility and steps up its electric GSE at PHL

ECO-FRIENDLY

Building, Eco-Friendly GSE

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**International:
'Fly In/Fly Out' Service
Fuels Perth Airport**
Global demand for Western
Australia's mineral and
energy deposits puts the
airport in the right spot to
cater to regional aviation
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As part of its ongoing Green Airport initiative, the Philadelphia International Airport partnered with US Airways to invest in new electric GSE.



Product Focus:
Tractors/Pushbacks/
Utility Vehicles

GROUND SUPPORT WORLDWIDE

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What Keeps You Up At Night?

I'm sure you'd agree with what we decided. But I'd rather get the ball rolling and hear more from *Ground Support Worldwide* readers.



STEVE SMITH

It's a great question. Certainly not an easy one to hear. But it's a question that's been on my mind following a day-long meeting we had to discuss long-range planning for *Ground Support Worldwide*.

Of course, everybody's bound to toss and turn over the uncertainty of the economic times we've all been enduring for several years. Just when it looks like things are picking up, it all comes to an abrupt end with news of a potential national collapse in Greece. Or was it Italy? Or maybe it was Portugal. For us in the U.S., a recent headline in USA Today put it well: "Consumers Won't Spend Until Economy Improves, Which It Won't Until Consumers Spend."

If we had some degree of certainty, we could make plans – buy equipment, hire more people, build an addition. But the uncertain make no plans.

Let's be more certain about our uncertainty. Only then can we think about how to confront problems that we do have more control over than we might think. Afterward, we can all go to bed with solutions on our minds rather than worries.

We did identify a few major issues that are keeping *Ground Support Worldwide* readers up at night. The cost of equipment, for one. And not just the price tag of a brand-new tug, but the cost of maintaining a 20-year-old model. What options do you have when it turns 25? Or 30? Buy new? Buy reconditioned? What's new in financing a GSE fleet? What about electric? Can you count on it through three shifts?

Another cause for insomnia was employee retention or, rather, employee training. I understand ground service can mean low pay, but how much does it really cost if the new guy, who doesn't know any better because no one told him any better, plows the belt loader into the side of the plane? I know that plane's not going anywhere, but why did it have to happen at all? Are there any outside training consultants who you may not know about who could help set up a training program? What have you tried for training?

The work of ground service sounds straightforward, but since I've walked around planes at gates over the past few months, it's easy to see how razor thin the margin of error is for such "simple" work.

I'm sure you'd agree with some of our further discussions, but I'd rather get the ball rolling and hear more from GSW readers. You can email me at steve.smith@cygnus.com or call (920) 563-1644. Or join our LinkedIn group. We're also less than 30 days away from revamping how we communicate on the Web. So stay tuned online.

So what does keep you up at night? Ask yourself. Ask others. And let me know what you decide. ■

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BUSINESS BUZZ

■ **News agency Bloomberg** reported last month a sharp decline in cargo shipments in the belly of passenger jets. United's cargo traffic, for example, plunged 17 percent in August for the fourth straight drop that exceeded 10 percent, while Delta's cargo was little changed for three months in a row. Meanwhile, American Airlines extended a streak of decreases that began in May.

■ **The U.S. government's** effort to eliminate longer delays on airport tarmacs has made it more likely that airlines will cancel flights, according to a study by the Government Accountability Office. U.S. airlines were 24 percent more likely to cancel a flight in 2010 after the three-hour tarmac delay rule went into effect compared with the previous year, according to the GAO report.

■ **Shares in FedEx**, operator of the world's biggest cargo airline, dropped the most in 2 1/2 years after the company cut its full-year profit forecast amid declining demand in the United States and Asia. Per-share earnings for the year will be \$6.25 to \$6.75, 10 cents lower than the previous range.

■ **SG Biofuels**, a San Diego-based company backed by Airbus, said it will plant 75,000 acres of jatropha in Brazil to power aircraft for about \$50 a barrel less than traditional jet fuel. SG Biofuels says it will produce unrefined jatropha oil that will sell for \$75 a barrel. Refined jet fuel costs about \$126 a barrel in New York Harbor spot market last month.

■ **Denver will become Icelandair's** ninth North American gateway next May. The airline will operate four nonstop flights between Denver and Reykjavik.

■ **Vector Aerospace Corporation** held a grand opening last month for its newly relocated and expanded engine service center. Vector Aerospace Engine Services

and Neumeister Hydraulik. For more information, log on to www.ktski.com.

■ **At last month's Deutsche Bank Aviation and Transportation Conference**, American Airlines did not rule out the possibility of seeking bankruptcy protection to reorganize its labor agreements.

The International Air Transport Assoc.

...reiterated the aviation industry's commitment to reducing CO2 emissions and urged the European Union to abandon its plans to include aviation in the EU's Emissions Trading Scheme to begin next year. IATA invited governments to join industry as committed partners in a global approach to reducing aviation's carbon emissions that could also include a global ETS or other compensation measures. In related news, The International Air Cargo Association also wants to suspend ETS. TIACA says ETS is inefficient and will drive up air freight costs. TIACA is instead trying to get the EU to go after a carbon emissions agreement with the International Civil Aviation Organization.

Atlantic-Dallas, Grapevine, TX, will offer a variety of specialized services including engine and engine accessory repair and overhaul, hot section inspections, boroscope inspections and field service support for the Pratt & Whitney Canada PT6A, JT15D and PW100 series engines.

■ **KTSDI** has opened a new parts and repair shop in Youngstown, OH. Servicing both towbar and towbarless tractors with Kessler axles and Transfer cases, Mobil Elektronik Steer-X-Wire and complete controls, Alfred Heyd tie rods

■ **U.S. Senators John Thune** (R-S.D.), ranking member of the Commerce Committee's Subcommittee on Aviation Operations, Safety, and Security, and subcommittee member Mark Begich (D-AK) last month led a bipartisan group of 27 senators sending a letter to the EPA and FAA urging all to work together to find a safe, viable, readily available, and cost-efficient alternative to leaded avgas used by the general aviation community before taking steps to ban the fuel. Leaded avgas is currently used

IATA Raises 2011 Profit Projection, But Expects A Tougher 2012

The International Air Transport Association announced an upgrading of its industry profit expectations to \$6.9 billion up from \$4 billion projected in June. IATA emphasized, however, that despite the improvements, profitability at these levels is still exceptionally weak.

"Airlines are going to make a little more money in 2011 than we thought," said Tony Tyler, IATA's Director General and CEO. "That is good news. Given the strong headwinds of high oil prices and economic uncertainty, remaining in the black is a great achievement. But we should keep the improvement in perspective. The \$2.9 billion bottom line improvement is equal to about a half a percent of revenue. And the margin is a paltry 1.2 percent. Airlines are competing in a very tough environment. And 2012 will be even more difficult."

In its first look at 2012, IATA is projecting profits to fall to \$4.9 billion on revenues of \$632 billion for a net margin of just 0.8 percent.

In other 2011 news, IATA included the following forecasts:

Passenger: Passenger demand has been stronger than anticipated given the gloomy economic outlook. The forecast for the year stands at 5.9 percent growth.

Freight: Air freight has stagnated since the start of the year. IATA slashed its full-year volume growth projection to 1.4 percent from 5.5 percent.

Fuel: Oil prices have remained consistent with the previous forecast of \$110 a barrel. This is 39 percent higher than the average 2010 price. A total fuel bill of \$176 billion is expected to account for 30 percent of industry costs.

to fuel approximately 150,000 piston-engine aircraft across the nation. Despite ongoing research and testing, there is currently no safe or affordable alternative fuel to leaded avgas that can meet the needs of the GA aircraft fleet and FAA flight safety standards

BUSINESS DEALS

■ **Industrial Energy Products, Inc.** has named Ship It AOG as its exclusive national distributor of the HOT-STOP 'L'

At last count, 27 aviation industry

...groups signed letters to both U.S. House of Representatives Speaker John Boehner (R-OH) and U.S. Senate Majority Leader Harry Reid (D-NV) opposing the \$100-per-flight user fee as part of the Obama administration's deficit reduction proposal. The letter encourages Congress to "focus on increasing U.S. international competitiveness rather than viewing the industry as a national piggybank," and states, "Furthermore, we need to increase jobs while ensuring that tax and infrastructure policy are strengthening U.S. aviation and furthering the safety and modernization of the aviation system."

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■ **Menzies Aviation LAX** has contracted with A&V Rebuilding to remanufacture its existing baggage/cargo tractor fleet. The noncompliant Ford 300 engines are being replaced with New CARB/EPA Certified Ford DSG-423, 2.3L LPG fueled engines.

■ **JetStream Ground Services** has been awarded the ground handling services contract for Delta Air Lines at Jackson-Evers International Airport (JAN), Jackson, MS. Providing full below-the-wing support for Delta's 12 daily departures, this represents JetStream's first contract award with the airline.

■ **Avfuel Corporation** has expanded its branded dealer network to include Monterey Jet Center at Monterey Peninsula Airport (MRJ), providing the FBO with fuel and service solutions as well as marketing and branding support.

■ **Delta Air Lines'** maintenance division, Delta TechOps, has signed a five-year, agreement with Air Canada to provide repair and overhaul services to the airline's entire fleet of Pratt & Whitney 4060 engines.

■ **Lufthansa Consulting** helped the Republic of the Congo launch a new airline. Equatorial Congo took off on its premiere flight Sept. 24 between the country's capital Brazzaville and the port city of Pointe-Noire. Lufthansa Consulting managed the complete startup process and continues to consult with the Congolese government.

■ **ASIG** announced in September it was awarded a 20-year license to provide aviation fuel service at Panama's Tocumen International Airport (PTY). Under the agreement, ASIG will manage

and operate the airport's sole jet fuel facility as well as provide aircraft refueling service to all airlines serving PTY. The company expects to fuel approximately 3,900 flights a month.

■ **Poland's Chopin Airport (WAW)**

issued an invitation to tender for the construction, funding and operation of a centralized fuel infrastructure. Currently, only one fuel supplier has the infrastructure needed to provide aircraft refueling. The winning bidder will design, construct, finance and operate the project for a fixed time period in return for fees from service users.

■ **Chorus Aviation Inc.** announced a quarterly dividend of \$0.15 per Class A and Class B share. Chorus owns Jazz Aviation LP, among other aviation operations.

■ **Swiss WorldCargo** is the first airline to partner with a new International Air Transport Association initiative to deploy key IATA managers to airline headquarters. The organization will be the "seconding" staff to Swiss WorldCargo in a development program to enhance IATA's capabilities in the cargo

China Cargo Airlines Launches Service to St. Louis

Awards Ground Handling Contract to ATS and WFS

Airport Terminal Services in partnership with Worldwide Flight Services has won the aircraft ground handling and cargo warehouse handling contract for China Cargo Airlines' launch of direct cargo services between Lambert-St. Louis International Airport (STL) and its main base at Shanghai Hongqiao International Airport (SHA).

The new contract commenced with the launch of air services on Sept. 23. The cargo service represents the first phase in an economic development program planned by the Midwest-China Hub Commission, a group of prominent Missouri-based associations dedicated to regional growth through international trade opportunities.

China Cargo Airlines is based in Shanghai and was established in 1998 as China's first all-cargo airline.

"We are immensely excited to be a part of this pioneering opportunity with St. Louis to stimulate a new global trade lane with China," said ATS President and COO Sally Leible. "We have created a dynamic partnership by combining our 35-plus-year history of operating at STL with Worldwide Flight Services' specific knowledge of China Cargo Airlines to produce a winning result."

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field and ensure even closer alignment on the key issues facing global cargo. During the placement period, the “seconded” will be exposed to key management functions including revenue management, tracking and tracing, e-commerce activities, operations, security and network management.

■ **Airbus** will deliver more than 110 new airplanes to airlines in China this year, accounting for 20 per cent of its total global deliveries. At the end of 2001,

Chinese airlines operated only 88 Airbus airplanes. By August 2010, however, Chinese airlines operated 717 Airbus aircraft, including models that account for 46 per cent of the total aircraft in China with more than 100 seats.

■ **Embraer S/A expects** to deliver 975 new regional jets to China between 2011 and 2030. In its outlook for China’s regional aviation market, Embraer forecasts that deliveries to China over the next 20 years will include 15 jets

2/3rds Of Russian Airports Need Renovation

About two-thirds of Russia’s civil aviation airports need urgent rebuilding and modernization, Transport Minister Igor Levitin said last month. Only 62 percent of the country’s 332 airports have runways with an artificial surface, according to his report to the State Duma, the country’s lower house of parliament.

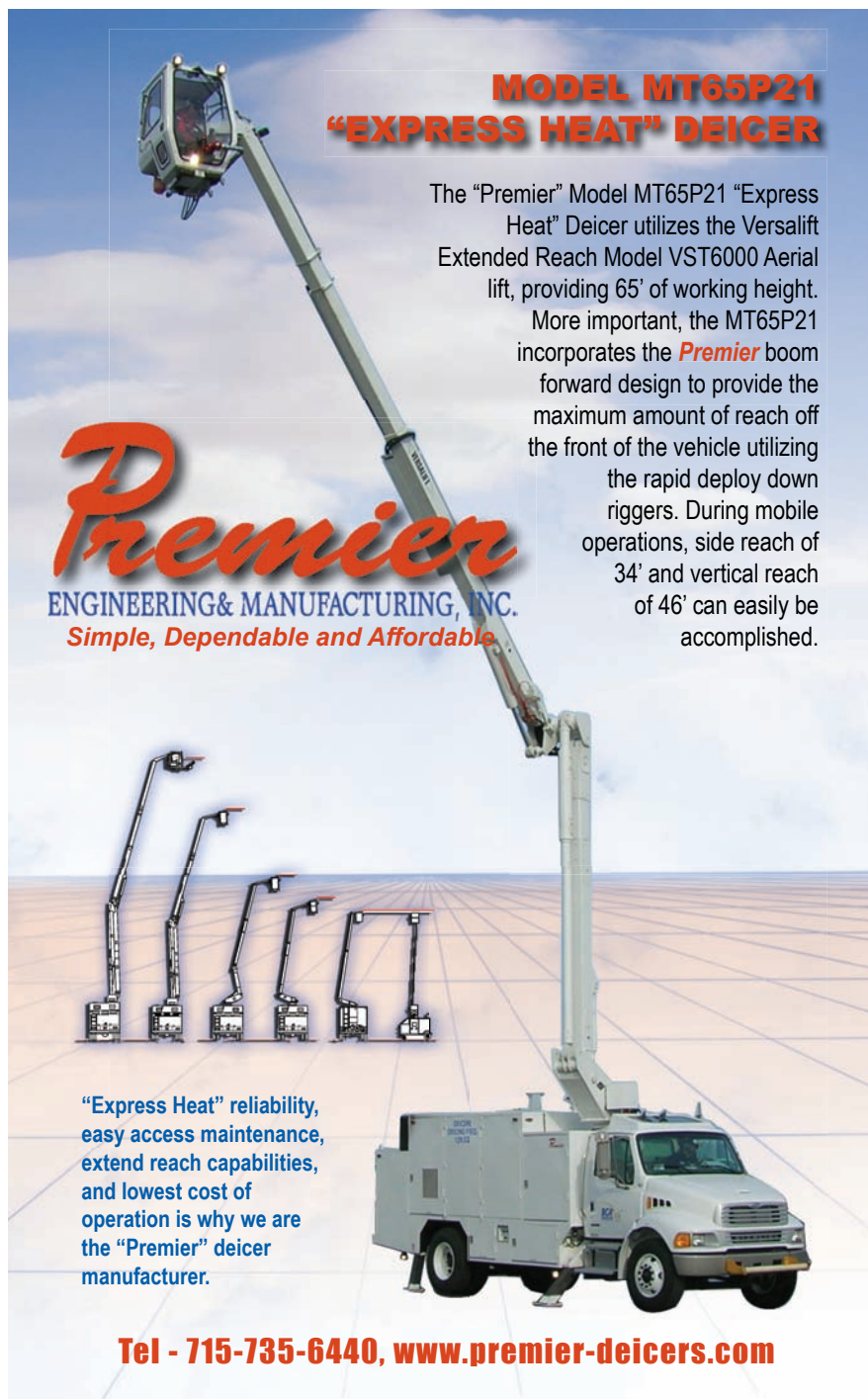
Most of the country’s airports were built 40 years ago. Some 160 billion rubles (\$5 billion) was planned to be spent on developing airport ground infrastructure between now and 2015, which would be enough to modernize 70 airports.

Russian Prime Minister Vladimir Putin ordered the government last week to draft proposals on how to solve the problem of Russia’s poor air safety records, including improving technical conditions for planes and airports, upgrading air traffic control systems and training crew.

for 30-60 seats, 440 jets for 61-90 seats, and 520 jets for 91-120 seats, accounting for around 13 percent of global market demands.

■ **The maker of China’s largest commercial aircraft** said it hopes to capture one-third of the country’s single-aisle aircraft market in 20 years. Following the first 100 orders for C919s announced last November, the Commercial Aircraft Corporation of China was expected to announce new orders last month at the Aviation Expo China 2011. The corporation says its 150-seat C919 and the 90-seat ARJ21 regional aircraft will be the “main force” for the country’s 55 new airports, which are expected to be built by 2015. China is expected to have a passenger plane fleet of 5,400 planes by 2030, including 3,800 single-aisle jetliners, according to the market outlook released by the corporation.

■ **NetJets** has signed a long-term lease with Van Nuys, CA.-based fixed-base operation Maguire Aviation to build a



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dedicated, private terminal at Van Nuys Airport (VNY). The private-use facility will be custom-designed and operated to NetJets' specifications and owner preferences. The project includes a new terminal with a range of amenities, conference and business center capabilities, crew lounge and rest areas, and flight planning facilities. Construction of the new facility is expected to be completed by next summer.

Executive Vice President & Chief People & Administrative Officer.

Ellen Torbert, Southwest's current Vice President of Customer Support & Services, has been promoted to Vice President of Diversity & Inclusion.

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PEOPLE IN THE NEWS

Martin Burdorf took over as head of the marketing department in Continental Tire's Industrial Tires Business Unit last August. In other personnel news, Ivonne Bierwirth will be responsible for the newly created marketing media role in the unit. Heike Hansmann also took over as head of the unit's ContiServiceCenter. She is now responsible for customer support in the German market.

West Star Aviation, Inc. appointed Jeff Messmer, Operations Manager at its newest facility at Spirit of St. Louis Airport (SUS) in Chesterfield, MO. In his new position at West Star Aviation, Messmer will be responsible for all maintenance, avionics and customer service and support operations at SUS.



Leighton "Lee" M. Yohannan Rampmaster

Leighton "Lee" M. Yohannan was named co-CEO of Rampmaster last month. Yohannan is currently director emeritus and founder of LiquidHub, a systems integrator and technology consultancy with revenues of more than \$60 million in

annual sales. Previously he was owner and CEO of The Reohr Group, Inc., a \$55 million global technology consultancy.

Southwest Airlines announced several executive changes at the company effective last month:

Bob Jordan, Southwest's current Executive Vice President Strategy & Planning, has been promoted to Executive Vice President & Chief Commercial Officer, and he maintains his role as President of AirTran Airways.



Jeff Lamb, Southwest's current Senior Vice President Administration & Chief People Officer, has been promoted to

Jeff Messmer West Star Aviation, Inc.



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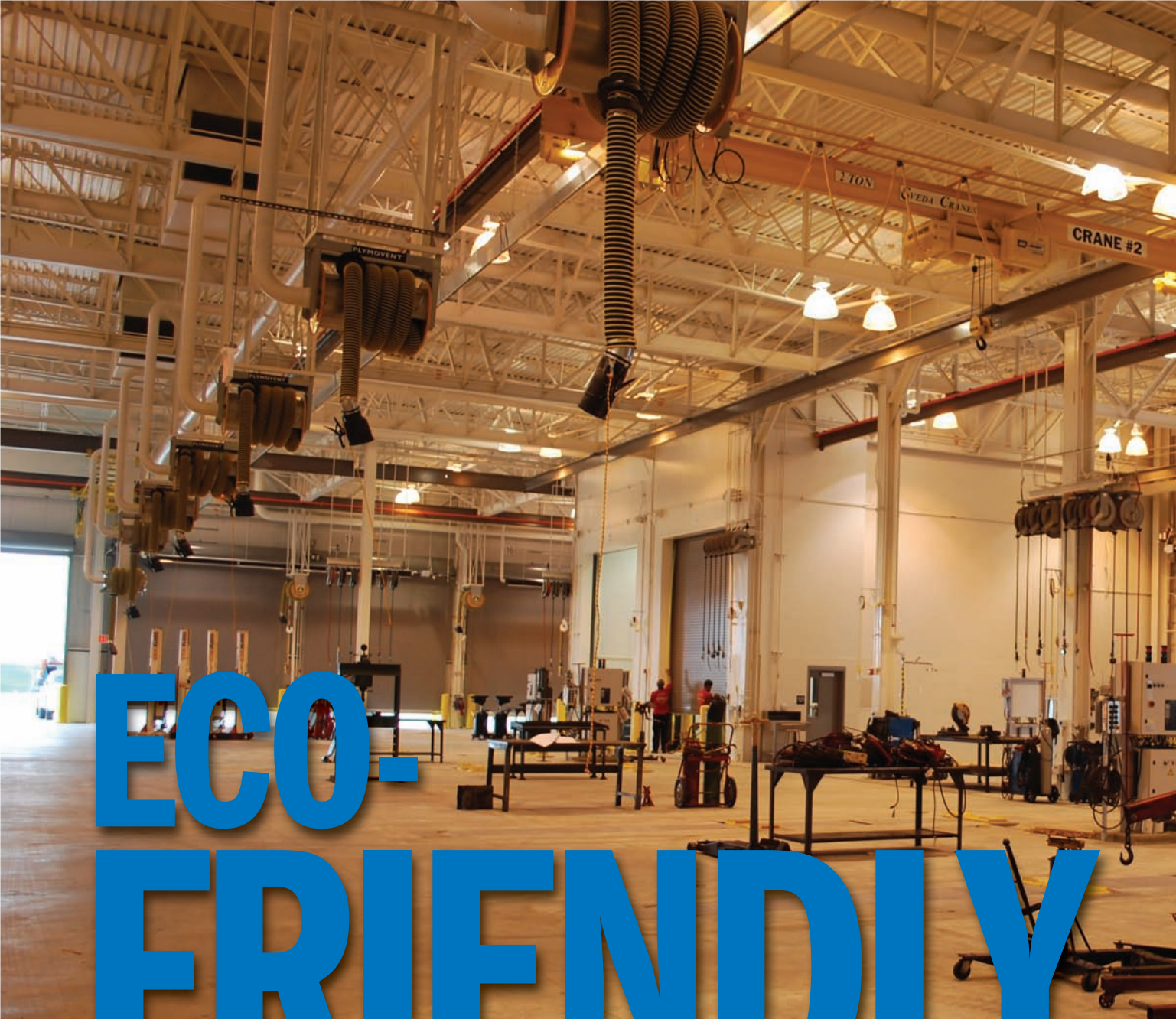


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ECO-FRIENDLY

Building, Eco-Friendly GSE

US Airways builds a new green GSE maintenance facility and steps up its electric GSE at PHL.

By Steve Smith

US Airways Inc. opened a new \$22 million GSE maintenance facility last month at the Philadelphia International Airport (PHL), the latest move in going green for both the airline and the airport.

The 57,000-square-foot building consolidates separate sites ground

support maintenance operations had used to keep the airline's 700 pieces of motorized equipment and 1,200 pieces of nonmotorized equipment in top shape to handle more than 400 flights a day.

The new facility features 16 vehicle maintenance bays, each equipped with overhead lube racks and vehicle

exhaust systems, four overhead cranes that can move through the work space, a two-bay weld shop and nine in-ground lifts – two of which are rated at 150,000 pounds, the first such installation in the United States. If all this weren't enough, the stockroom delivers needed parts with just the touch of a button.

US Airways' new LEED-certified GSE maintenance facility at the Philadelphia International Airport includes 16 vehicle service bays, 11 vehicle lifts - including two rated at 150,000 pounds - four overhead cranes, a two-bay weld shop, wash rack and paint/body prep shop.



All photos provided by US Airways Inc.

"Every bay has what it needs, so we are already seeing an improvement in our turnaround time," says James Brewer, manager of the GSE maintenance facility, which employs 70 mechanics.

The airline also went the extra step in building the facility to LEED standards. Leadership in Energy and Environmental Design is an internationally recognized green building certification process providing third-party certification that a building will save on energy and water use, and is designed to take into account other environmental matters.

"It was a non-choice," says Allan Seaman, director of corporate real estate for the airline's construction divi-

sion, about the decision to build the facility to such high green building standards. Seaman added his company has gone green at other airports as well as for its own corporate purposes.

US Airways' Phoenix, AZ, headquarters, for example, received LEED Gold status. But that gold star was for renovating an existing building rather than building from scratch. The airline's GSE maintenance facility is also the first project at PHL to be in the running for LEED status.

To build to such a level of green specification the facility used, for example, recycled construction materials - accounting for almost 40 percent of the total building materials inventory. To cut down on pollution to deliver materials to the job site, about a third of all its construction materials were sourced nearby.

One of the LEED features, designed to cut down on electricity to light the work space, has already helped the technicians make needed repairs. Large windows set well above the floor provide ample natural light - something in short supply at one of the other sites the crew used before moving into the new building.

Before the move, GSE maintenance staff worked out of three sites. One building was the original US Airways' cargo facility. The building's lighting wasn't conducive to working on GSE, says Brewer.

A wash bay keeps US Airways' GSE looking clean. The new GSE maintenance facility also includes a body shop and paint booth.



"It was very dark on the late afternoon and midnight shifts," Brewer adds. "That made it very difficult to see what you were working on without bringing in drop lights, and then there were extension cords running all over the place. Just the lighting alone at the new building is a huge step up."



Tama Mohelnitzky, director, ground service equipment maintenance for US Airways Inc., and James Brewer, manager, ground service equipment maintenance for US Airways' Philadelphia operations.

The cargo facility had another drawback. Its floors couldn't handle the largest pushbacks so Brewer's crew had to take over a percentage of the airline's hangar space for the heavyweight work. Even then, mechanics could spend an hour setting up mobile lifts before the vehicle left the ground. With the new site, Brewer's workforce can simply drive into a service bay and make use of the lifts.

"Five minutes later," Brewer says, "they're making the repairs. That's great productivity."

The GSE maintenance crew also worked out of one more building simply because everyone needed the elbow room. Brewer helped design the new facility's floor plan and, after

being in ground support since 1976, stipulated all he needed to move personnel and equipment through one perfect building.

“We moved in on a Friday,” he adds, “and by the following Tuesday, we were up and running.”

Plus, the new building goes even one better, according to Tama Mohelnitzky, director of ground service maintenance.

“We actually have a wash bay,” she explains. “That’s a first. Plus, we also have a paint booth. So now we’re able to wash the equipment and paint it. Normally, if we wanted to paint, it meant sending it off to a vendor.”

ELECTRIC GSE

Some of the newest pieces of GSE parked at the new shop might be from a year-old fleet of 38 electric tugs. The air-

line’s investment in electric equipment goes hand-in-hand with PHL’s larger goal of reducing its carbon footprint.

As part of its ongoing Green Airport Initiative, PHL partnered with US Airways to purchase the electric equipment. Through funding from the FAA’s Voluntary Airport Low Emissions (VALE) program, PHL installed the needed recharging stations and related infrastructure. PHL was awarded \$15 million in VALE dollars to pay for this electrification project as well as fund other environmental programs.

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To date, PHL has installed 116 charging units with 232 charging ports throughout the airport. PHL figures that the chargers and the use of electric GSE will reduce fuel consumption by more than 225,000 gallons annually to say nothing of the elimination of tons of harmful emissions.



The Philadelphia International Airport used Voluntary Airport Low Emissions (VALE) program funds to install 116 charging units with 232 charging ports for airlines to use for electric GSE.

An electric baggage tractor gets charged up. With an overnight charge, Jim Brewer, manager of US Airways' new GSE maintenance facility at PHL, says the baggage tractors can last through two shifts.

In turn, US Airways also used the VALE funds to offset the difference in price between conventional and electric models. While the money certainly made the investment in electric GSE easier, Brewer says the new equipment means less maintenance and less downtime.



The only downside, of course, is that "you have to tie them up," Brewer adds, meaning he has to take the electric GSE out of service for charging.

"A good 8-hour charge overnight is what you need," he says, "but you can get by with 6 hours or try to fit in some 'opportunity' charges during the day when you can."

With a solid overnight charge, Brewer says "the baggage tractors can last through two shifts."

In the near-term, the airline plans to add to its eco-friendly GSE fleet.

"Between Express and Mainline, we have more than 70 pieces of electric GSE," Mohelnitzky says. Seventy-three pieces to be exact. US Airways runs 38 Charlotte T-137 baggage tractors. US Airways Express operates 20 Express HBLE belt loaders and 15 Charger baggage tractors from Harlan Global Manufacturing.

"The more electric equipment we add," Mohelnitzky says, "the more chargers we'll need. The airport will have to keep up with us." ■



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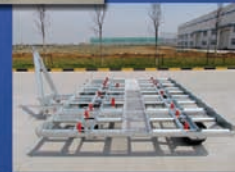
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'Fly In/Fly Out' Service Fuels Perth Airport

Global demand for Western Australia's mineral and energy deposits puts the airport in the right spot to cater to regional aviation.

By Steve Bowman

To better understand the Perth Airport (PER), a geography lesson is in order: PER is located 12 kilometers (7 miles) outside its namesake city, the capital of the state of Western Australia, which occupies a third of the Australian continent. It's the country's largest state covering 2.6 million square kilometers (1 million square miles), but only about 10 percent of the country's population lives there with 85 percent of these folks clustered in the southwest corner of the state.

Like most airports, traffic figures and development closely track the local economy. PER is a textbook example. PER currently handles 11.5 million passengers a year – double the number of passengers over the past six years. Its recent annual growth rate of passenger traffic has made it the fastest-growing capital city airport in the country.

How to explain the growth? Under all that sparsely populated land are some of the planet's richest caches of mineral and energy deposits.

Skywest is one of Perth Airport's 'fly in/fly out' carriers. This aircraft will turn around in 30 minutes before heading back north some 772 kilometers (480 miles).

The airport is the commercial hub for this natural resources sector that drives the whole Australian dynamic. In turn, these resources also help fuel the Chinese and Indian manufacturing spectacular.

All that business excitement has filled the International Terminal with a steady flow of premium passengers heading to do their deals, link into the financial growth and report on investments. Airlines such as Emirates; Qatar Airways; Royal Brunei Airlines; and China Eastern Airlines are lined up at international gates with Qantas, South African Airways, Singapore Airlines, Thai Airways International and Malaysia Airlines.

Meanwhile, Jetstar, the Qantas low-cost subsidiary, is also gearing up to win a slice of the traffic in both the international and domestic markets.

REGIONAL POWERHOUSE

But the more interesting story is how the aviation industry has stepped up to supply manpower, provisions and equipment to remote mining sites and ports throughout Western Australia.

What's referred to in Australia as "fly in/fly out" (FIFO) is big business for

PER. FIFO workers typically "fly in" to a work site for a long shift of five or 10 days and, then, "fly out" back to their homes and families for rest and relaxation before doing it over again.

PER's most current 12-month total for domestic passenger traffic is 8.2 million compared to 3.6 million at the turn of the century. That number includes more than FIFO passengers, but around 60 percent of all aircraft movements through PER to and from destinations within Australia are to Western Australia. Just under half of these are scheduled flights and the remainder are charter and general aviation flights.

It's hard to imagine how the country's natural resources sector could have been fully developed without aviation service from PER:

- Approximately three-quarters of all PER's "intrastate" passenger movements are related to the natural resources sector. Intrastate aviation encompasses airline and general aviation activities within a state or territory.
- The number of intrastate passengers using PER during the past five years has jumped by 90 percent.



FORECASTS FOR GROWTH AT PER

- Annual international passenger numbers are anticipated to grow to 5.6 million by 2029 from 2.5 million in 2008.
 - Annual domestic passenger numbers are anticipated to grow to 13.3 million by 2029 from 6.7 million in 2008.
 - That means total passenger movements would more than double over the next 18 years.
 - Annual aircraft movements are anticipated to increase to 170,000 movements by 2029 from 107,000 in 2008.
- The Perth-Karratha route is PER's fourth busiest, with as many as 10 flights each day. (Karratha is a major source of iron ore and the site of the country's biggest natural gas operation.)
- PER now acts as a base for flights to more than 54 regional ports directly related to the natural resources sector across Western Australia.
- BHP Billiton, considered the world's largest mining company, and The Rio Tinto Group, a multinational mining and natural resources excavator, both have established training sites and other administrative functions directly at PER. Other natural resources sector companies are expected to follow suit.
- PER is clearly the region's go-to hub for FIFO. Although most of the workforce is based in Perth, with a population of 1.7 million people, an increasing percentage of skilled trades and service providers come in by air from other parts of the country on regular domestic flights and then transfer to FIFO flights. These flights are *not* short transfers; they are long, slow sectors of up to 1,000 kilometers (621 miles) up the West Coast or inland.
- There are currently seven airlines operating intrastate services from PER to points throughout Western Australia.

Qantas, for example, has 25 Bombardier Q400s, 16 Q300s and five Q200s in service alone. The existing B717 Qantas fleet is 11 aircraft with three more Q400s and another two B717s to be added in the near future. Qantas uses this fleet on more than 2,000 flights a week to 54 destinations in Western Australia.

Several other airlines combine FIFO contracts with their regional ser-

vices. For example, Skywest Airlines; Skippers Aviation; Alliance Airlines; and Maroomba Airlines are established names that have been around and grown with the natural resources boom.

In a couple of cases, these airlines helped create the boom providing survey and aerial services that brought in the exploration infrastructure to determine the extent of the area's buried treasure.

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Meanwhile, smaller airlines and air charter companies have long-term contracts with the mining industry, operating mixed fleets carrying 70-100 passengers with the range they need given the distances involved. Fokker 100s, 70s and 50s, for example, are well represented, and ATR 72s, the Bombardier Dash 8 series and Embraer Brasilia are all also about the right specifications.

GROUND SERVICES

All these airlines and charter companies require ground services at PER, which makes for a very busy operation. Currently, most of the FIFO carriers operate from a cluster of small satellite terminals around the airport.

Perth has an exceptional amount of vehicle traffic on the airside. It is a large site that requires the ground service operators to travel to and

from the Domestic and International terminals located miles apart and on opposite sides of the operational runways and taxiway system to a separate GA base, maintenance area and regional charter apron where most of the FIFO activity happens.


Traffic management is a real issue. With long days, sunrise and sunset are subject to extreme visual glare for the drivers and pilots. Driving into the sun accounts for the majority of near misses and incidents where situational awareness is compromised due to the angle of the sun.

There are four live taxiway crossings involved, which makes driver training a particularly important issue. Mixing aircraft and moving ground equipment is never ideal. Add to that equation, pedestrian passengers on the apron. Aerobridges work well on larger aircraft, but with the number of commuter aircraft involved, the streams of passengers making it to and from the terminals keep the workforce on high alert.

Airport Safety Manager Darren McKenzie and staff juggle the safety operations. McKenzie knows the problems and has the respect of the ground service operators, airlines and other service providers to make decisions and create a safe environment.

"I know it comes down to individual tasks," McKenzie says, "but the more connected everyone is on, say, a turnaround the better. If you know that it is essential that the caterers, for example, can get through and park at the aircraft door or that the fuel supplier has room to safely lay out a hose, then there is less stress on the apron. It comes down to communications and having the knowledge and the awareness of what the other team members are all about."

Plans are under way, however, to consolidate the whole regional and FIFO operations into a new dedicated terminal with its own ground support service facility. Just last August, PER broke ground on a new \$120 million Australian dollar (\$117 million) terminal designed to meet the needs of air ser-


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Jetstar, the Qantas low-cost subsidiary, has moved into the international market after establishing its domestic service. This flight is on a turnaround to Denpasar, Indonesia, a popular holiday destination.

services for Western Australia, particularly for the natural resources sector.

The new terminal will have the space to cater to up to 36 aircraft and include more check-in counters, a larger security screening zone, access to 14 gates via covered walkways and easier access to parking and transportation for arriving and departing passengers.

This development should make life a whole lot simpler for the ground support staff.

Construction of the new terminal is the first part of a \$700 million Australian dollar (\$684 million) expansion for PER. The first stage of the redevelopment will also include the following:

- Significantly expand the International Terminal, including facilities for A380 aircraft.
- Add a shared domestic/international pier to the International Terminal. The pier will allow airlines to swing aircraft between domestic and international markets.
- Provide more aircraft parking and taxiways.
- Invest in roads and parking to provide better access to and from the airport.

In addition, PER runs practically around the clock. Although PER operates under restrictions on the use of certain runways at night, a large proportion of PER's domestic and international air services occur during the night due to PER's location relative to the East Coast of Australia, as well as important overseas markets.

Many of PER's international services, for example, must connect to other

services into Europe via hub airports in Asia and the Middle East.

The improvements are expected to take three years to complete. Perth will feel a lot less isolated and more mainstream in the years ahead. ■

About the author: Steve Bowman heads a new media company producing online training products for the aviation and transportation industry. For more information, log on to showman@bigpond.net.au.

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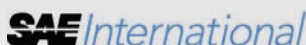
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How To Prove The Value Of Safety

Free ROI software from the FAA identifies the costs and forecasts the savings of improving hazardous ramp conditions.

By Dr. Bill Johnson

Your recent quality and performance data confirm an unacceptable trend. Last month you had damage to aircraft ... and ground equipment ... and people were injured. You identified the contributing factors to these three categories of challenges.

Now you must decide how to allocate resources to address the issues. And they are *all* important issues. How can you ensure a financial and safety return on the investments you make to fix the problems? The answer is a straightforward math problem that calculates return on investment (ROI).

Figure 2: Questions to estimate probability of success.

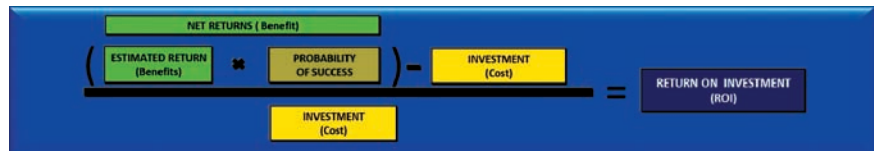


Figure 1: ROI made easy.

This article describes new ROI software developed under an FAA human factors project. Management consultant Booz Allen Hamilton Inc. developed the software under contract to the FAA Civil Aerospace Medical Institute.

The goal is to deliver an effective, yet easy-to-use ROI tool into the hands of mid-level management. It has the potential to justify a variety

of safety and efficiency interventions, including interventions related to human factors. This tool is provided at no cost to the industry.

FINANCIAL RETURN

ROI is merely comparing the money invested to the value returned. Figure 1, taken from the new FAA software, shows the data necessary to calculate ROI.

Let's use aircraft ground damage as an example. Assume that you

5 Probability of Success - "How likely will the Returns be realized?"

Part A: Enter a score based on your best assessment of how the project will be managed.

Success Categories		Select Score 1-5:
Prior Experience		
1	At least one person on the project team has a working knowledge and experience with Project Management processes	4
2	At least half of the project team has successfully completed more than two projects of similar size and function	4
3	The project sponsor has successfully led to completion more than two projects of similar size and function	3
4	The customer has signed off acceptance of more than two successfully delivered projects of similar size and function	5
5	The customer, leadership, and the project team have worked on a successful project of similar size and function in the past	5
Sub-section average score		4.2
Leadership and Customer		
6	The project has defined roles and responsibilities for customer, leadership, and project team members	4
7	The project has a sponsor with budget authority	3
8	The customer and project team have agreed to readily identifiable deliverables and success criteria	5
9	Leadership and the customer agree to participate in all milestone project review meetings	2
10	Leadership and the customer agree to sign-off deliverables according to the predefined success criteria	4
Sub-section average score		3.6
Resources		
11	Leadership and the project team agree there are sufficient resources available until the end of the project	4
12	The project team has matched the skills and abilities of the team members to the needs of the project	5
13	All materials required for the project are available, or have a committed delivery date in line with the project plan	4
14	The sponsor commits to support a request for additional resources, if required	5
15	The Safety and Quality departments are involved in the project planning, development and implementation	4
Sub-section average score		4.4
Planning		
16	Leadership and the project team have developed and approved a business case that aligns to organizational objectives	3
17	Leadership and the project team agree the project plan is SMART (Specific, Measurable, Achievable, Relevant, and Time-bound)	3
18	Leadership and the project team agree that appropriate milestones have been built into the project plan	4
19	Leadership and the project team have developed and approved a risk log with contingencies	4
20	A communications plan has been developed and will be implemented to inform stakeholders of progress	5
Sub-section average score		3.8
Probable returns - "How much of the estimated Returns will be realized?"		80%

Note: Overall probability of project success can be improved by addressing the project risks that are weakest in your assessment above

Check if Project is Complete

had 2.5 incidents of aircraft ground damage each month over the past 12 months. Counting repairs, delays, rescheduled flights, etc., the average cost per incident was \$200,000. (By the way, that's below International Air Transport Association estimates.) Once you conducted the investigations, including peer-to-peer assessments (See the September issue of *Ground Support Worldwide* for "Collecting 'Predictive' SMS Data"), you identified a number of contributing factors including:

- Poor ramp painting for clear zones,
- Inadequate maintenance of ground equipment,
- Improper adherence to company procedures, and
- Lack of availability of sufficiently trained personnel.

As with any analytic program, the quality of diligence and data accuracy provided will affect the accuracy of the ROI analysis.

Correcting each of these contributing factors has an associated investment cost. Of the 30 incidents in the past year, you decide you could reasonably address 25, since five of the incidents are outside your control. From a financial perspective, the return would be \$5 million (\$200,000 x 25) of reduced aircraft damage. From a safety perspective, you would be targeting 25 safety threats.

To calculate the investment you must estimate the following costs:

- Repainting safety zones on ramps (\$500,000).
- Refurbishing selected ground equipment (\$800,000).
- Developing improved procedures and training personnel to use the new procedures (\$200,000).

- Creating an incentive program to reward personnel for reduced ground damage (\$500,000).
- The total investment would be about \$2 million that would be spent over six quarters.

You cannot guarantee that your interventions will be 100 percent successful. Therefore, you must estimate the probability of success. The FAA

software offers guidelines to help make that judgment call. Questions, based on project management, help establish the probability of success. (See Figure 2.)

For this example, we will estimate the probability of success at 80 percent. In other words, the interventions will likely prevent 20 incidents in a six-month period, and the probability of success multiplied by the return provides a net return of \$4 million.

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6 Project Summary - What is the total cost and benefit of the project?

1. Project Cost Summary							
Cost Category	2011 Q4	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	Total Investment
Labor	\$ 172,140	\$ 212,800	\$ 48,680	\$ 33,680	\$ 33,680	\$ -	\$ 500,000
Facilities Technician	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Facilities Supervisor	\$ 4,875	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,875
Ground Equipment Technician	\$ 33,680	\$ 33,680	\$ 33,680	\$ 33,680	\$ 33,680	\$ -	\$ 168,438
Ramp Personnel Supervisor	\$ 7,500	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,500
Supervisor	\$ 3,800	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,800
Clerical Support	\$ 2,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,000
Ramp Personnel Supervisor	\$ -	\$ 60,000	\$ -	\$ -	\$ -	\$ -	\$ 60,000
Supervisor	\$ 1,500	\$ 13,300	\$ -	\$ -	\$ -	\$ -	\$ 15,000
Training Specialist	\$ 30,938	\$ 92,813	\$ -	\$ -	\$ -	\$ -	\$ 123,750
Management team	\$ 10,800	\$ 10,800	\$ -	\$ -	\$ -	\$ -	\$ 21,600
Supervisor	\$ -	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ 15,000
Misc	\$ 3,340	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,340
Non-Labor	\$ 487,500	\$ 200,000	\$ 250,000	\$ 250,000	\$ 212,500	\$ 100,000	\$ 1,500,000
Facilities	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 250,000
Tooling	\$ 187,500	\$ 150,000	\$ 150,000	\$ 150,000	\$ 112,500	\$ -	\$ 750,000
Incentive Program	\$ 50,000	\$ 50,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 600,000
Total	\$ 660,640	\$ 416,800	\$ 298,680	\$ 283,680	\$ 246,180	\$ 100,000	\$ 2,906,038

2. Project Benefits Summary							
100% RETURN: This is the amount of Return that is expected if the Safety Intervention is implemented as planned without any issues.							
Financial Return Category	2011 Q4	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	Total Benefit
Aircraft Damage	\$ -	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 500,000	\$ 5,000,000
Total	\$ -	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 500,000	\$ 5,000,000

Probable Return: This is the amount of Return that is expected because there are certain Project Planning risks identified in Step 5.							
Financial Return Category	2011 Q4	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	Total Benefit
Aircraft Damage	\$ -	\$ 800,000	\$ 1,300,000	\$ 800,000	\$ 800,000	\$ 400,000	\$ 4,000,000
Total	\$ -	\$ 800,000	\$ 1,300,000	\$ 800,000	\$ 800,000	\$ 400,000	\$ 4,000,000

Figure 3: Partial ROI summary.

With good estimations of return, probability of success and amount of investment, you are able to calculate the ROI. The FAA software helps schedule the quarterly investment as well as forecast the timing of the

expected incident reduction. Figure 3 is a partial summary of project costs, benefits and return based on assigned probability of success.

Figure 4 shows a graph representing an overview of the project. In this example, the payback is predicted within three quarters and the return

on investment continues to grow. The graphs and depictions are dedicated to the financial ROI.

The graph shows that the project achieves payback by the third quarter. Over the six-quarter period, the payback ranges from a low of \$4 million to a high of \$5 million. This is a very respectable return on investment.

ROI CAVEATS

Crunching the financials is straightforward. Safety ROI is another challenge for many reasons. It is difficult to show that the actions above improved safety. Safety is often intangible and, as a result, it is hard to quantify. Safety is based on an integration of many activities, not on just individual actions and programs. While difficult to show the safety return, the FAA research team continues to work on the issue. Safety ROI will be based on reducing events while financial ROI must be based on the money. The

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intricacies of the safety calculation are described in the embedded user documentation and will be discussed in the final technical report.

Our example of 30 ground damage events is clearly an indication of existing safety hazards. Reducing ground events would help improve and ensure safety. In this case, having 30 aircraft ground damage incidents over the past 12 months and expecting the interventions will likely prevent 20 incidents over the same period will result in an estimated 10 events a year in the future. This is a likely safety improvement.

provided will affect the accuracy of the ROI analysis.

The tool is designed for operational managers in ramp or maintenance organizations. The developers suggest that you use the model on small interventions before you tackle large complex ROI. If you work in a large company, your own finance team may want to add additional factors into the equation. The demonstration shown here was done in advance of the project's completion. The same model can be used after the fact, meaning that there is no need to estimate the probability of success.



Figure 4: A picture tells the story.

This reasonably straightforward solution may require a bit of training. By discussing these issues in a team setting, however, all employees can learn to understand the positive impact on safety derived from each intervention.

The FAA software provides more detail than this short explanation. It helps assign specific categories and values to returns and investments. As with any analytic program, the quality of diligence and data accuracy

To get started, go to www.mxfatigue.com. That will take you to the ROI software and associated additional guidance material. Once the software works for you, then you can write the next ROI article for *Ground Support Worldwide*.

About the Author: Dr. Bill Johnson is the chief scientific and technical advisor for Maintenance Human Factors at the FAA. He spent more than 25 years in the private sector as a scientist and engineering executive prior to joining the FAA.

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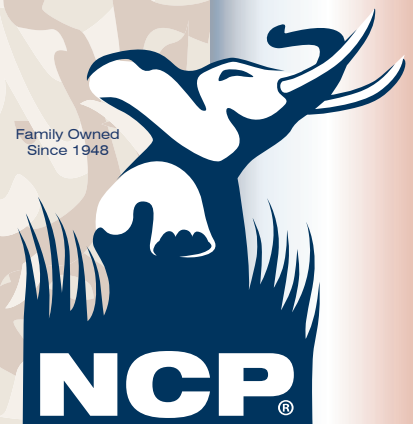
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New Technology Produces Different Breed Of Electric GSE

Corvus Energy develops lithium-ion-powered GSE.

By Steve Smith

You might not think a tugboat would have anything in common with a tug, but a Canadian lithium battery maker is using lessons learned in marine applications to potentially provide long-lasting power for electric GSE.

Corvus Energy, Richmond, British Columbia, is currently testing a new generation of GSE to run on lithium-ion batteries. Corvus has already developed a Tug Technologies MA series baggage tug retrofit, and is also working on retrofit kits for a 660 belt loader and GT35 pushback for its test project. Corvus also sells a factory-installed kit that allows OEMs to ship a fully electric unit directly to customers.

The company began developing its batteries in 2009 for use in hybridizing heavy commercial vessels such as tugboats. Tests on the first

long run times associated with commercial airport operations,” says Sean Puchalski, vice president of business development.



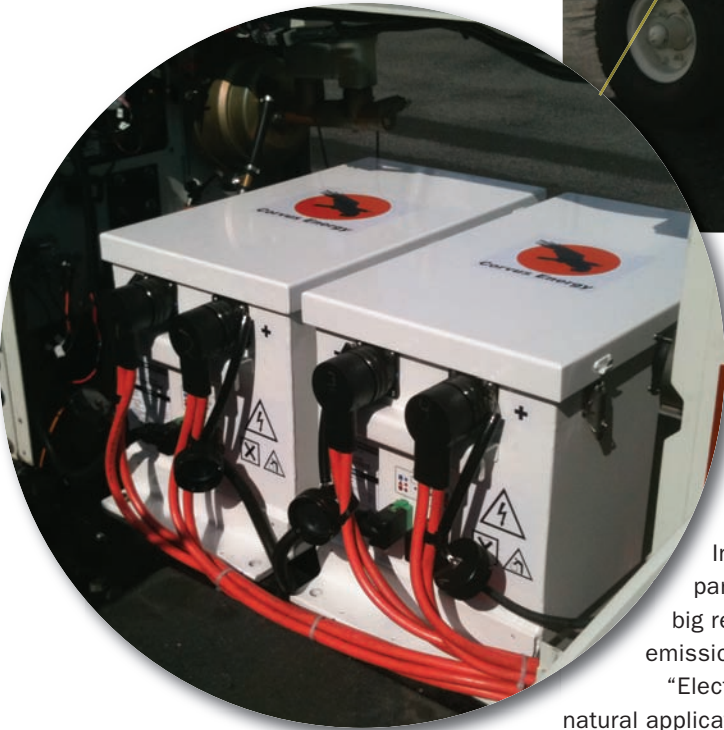
Corvus Energy plans to use this tug to test GSE powered with lithium-ion batteries. The tug uses two 48-volt, 150 amps/hour battery modules. Photo courtesy of Corvus Energy.

tugboat installation showed fuel costs fell 25 percent and maintenance bills dropped 30 percent. In addition, third-party testing showed big reductions in carbon emissions.

“Electrification of GSE is a natural application of our technology due to the heavy workload and

The company’s marine heritage is easier to understand considering Corvus got started after a professional boat builder and naval architect teamed up with a scientist who holds more than 70 patents in battery management systems.

Lithium-ion batteries are a common source of power for most mobile phones or laptop computers. Increases in power management technology, however, allow the



batteries to power electric cars currently coming on the market.

Most lithium-ion batteries are all built in similar ways. Individual cells are sandwiched together with two electrodes – positive and negative – separated by an electrolyte. Depending on whether the cell is charging or discharging, lithium ions flow back and forth between the electrodes. The generated current flows to an external circuit powered by the battery.

The big difference in Corvus lithium-ion batteries can be found in the makeup of the cell itself. The internal construction of the cells found in the batteries allows for virtually no internal resistance.

According to the company, 99.8 percent of electrical energy put into the battery comes back out as usable power – not heat. The lithium polymer construction makes for a completely stable product that is not susceptible to the thermal runaway issues that have plagued the types found in most consumer electronics.

“We don’t have any of the heat issues with traditional lithium-ion batteries because ours have a lower internal resistance,” Brown explains. He adds that they have “done all sorts of torture tests” on the batteries, even shooting them with a high-caliber rifle. “We can’t get them to catch on fire.”

These claims have been validated by several third-party organizations, such as Lloyd’s Register.

Most competing lithium-ion batteries are made with lithium iron phosphate. Corvus uses a proprietary blend of lithium, nickel, manganese and cobalt. The chemistry behind the blend puts more juice inside the batteries without sacrificing power to weight. The Corvus cells are manufactured by Dow Kokam (a subsidiary of Dow Chemical) at a Midland, MI, plant.

Brown says his lithium-ion batteries contain up to ten times the power and energy storage of lead-acid batteries and can last ten times

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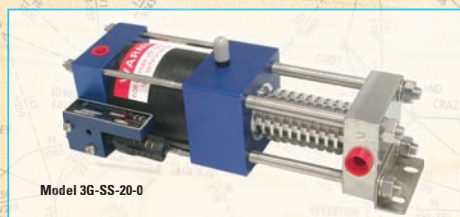
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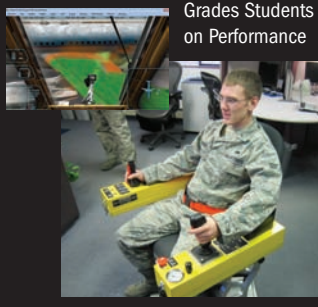
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"The result is more power in a smaller size," Brown adds. "Basically, the batteries increase power in terms of horsepower and capacity in terms of how far a vehicle can travel – a bigger gas tank so to speak."

The company also makes a patented power management system that keeps the utmost control on the charging and discharging rate of the cells. As a result, the company says a module can be charged completely from an empty state in as little as 30 minutes. Its CorPower™ tug retrofits kits are charged with the same chargers used by the automotive industry for electric vehicles. An off-the-shelf standardized plug is available from a wide variety of manufacturers.

The power management system also helps run diagnostics making easy work of routine checks and troubleshooting.

Each battery has an onboard computer that communicates with other batteries and stores data about usage. A GSE technician can download data via a hard link or wireless transmitter to a computer. The company says maintenance is reduced to tires, brakes and differential oil. The equipment may be used on a near-constant basis with virtually no downtime due to maintenance.

Retrofit kits are priced to be competitive with major rebuilds, and the subsequent savings are compelling.

"We've worked out a comprehensive return on investment," Puchalski says. "Based on actual data from a half-dozen ground handlers at airports of various sizes, what we've found is that these kits will pay for themselves in fuel and maintenance savings in less than four years." ■

For more information, log on to www.corvus-energy.com or call Sean Puchalski, vice president of business development at (604) 277-0280 or email gse@corvus-energy.com.

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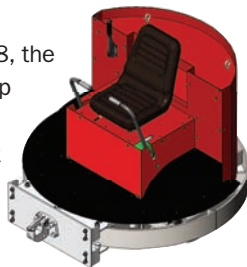
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Hammonds has announced the E-18, the company's latest model in the lineup of electric-powered ODVs. Omni-directional capability and a footprint of only a 50-inch diameter make the G-18 ideal for crowded ramps, hangers and production floors. The G-18 tows 18,000 pounds and like all ODVs is available in electric or hybrid configuration.



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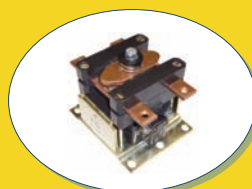
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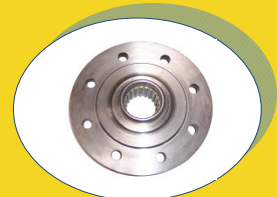
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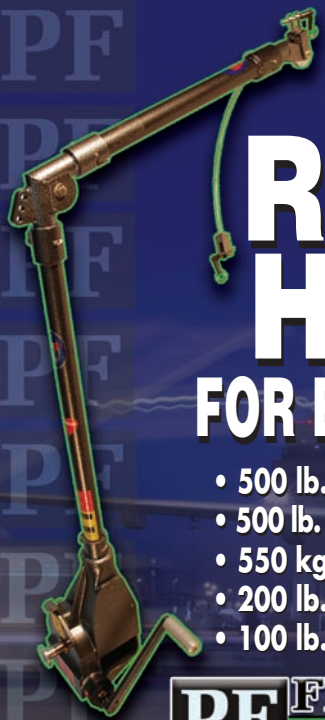
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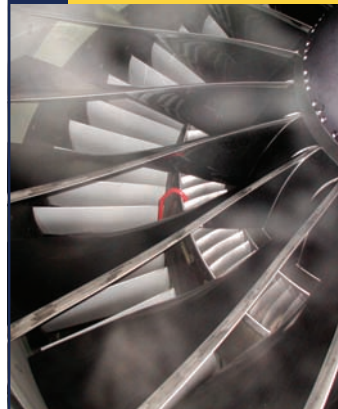
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Sensors Help Diagnose The Problem

To better understand how a 4.2L Ford engine works, first consider how its sensors operate.

By Scott Strong, national manager, Global Aviation Services LLC

In last month's column, I extolled the virtues, but also highlighted the problems of using the 4.2L Ford fuel-injected engine in GSE equipment. This month, I want to briefly explain how this fuel-injection system works, but also offer more advice on how the system's various sensors operate.

As with any subsystem on a piece of GSE equipment, understanding how the system is designed to operate goes a long way to efficiently diagnose and repair that system. Without that knowledge, we are often just "shooting in the dark."

The ECM is able to react in milliseconds to deliver the correct amount of fuel. To accomplish this, it needs input from its sensors.

The fuel-injection system is obviously designed to replace the carburetor. This system needs to perform several different functions. It needs to be able to provide cold enrichment (choke), cold start, high idle (high idle cam), consistent warm idle (base idle setting), and apply power based on throttle pedal position (accelerator linkage). In order to accomplish this, the sensors and fuel injectors replace the mechanical systems of the carburetor.

The amount of time that the injectors are turned on for each engine revo-

lution determines the amount of fuel delivered to the engine. This amount of time is very small. At idle, the injectors may open for only 8 milliseconds (0.008 seconds). Under heavy load at wide-open throttle, this time could be just 40 milliseconds (0.04 seconds).

ENGINE CONTROL MODULE

The Engine Control Module is able to react in milliseconds to varying circumstances, such as a change in throttle input or either an increase or decrease in engine load and engine temperature, to ensure it delivers the correct amount of fuel.

In order to accomplish this and make the calculations, the ECM needs input from its sensors:

The **Engine Coolant Temperature Sensor** tells the ECM the engine temperature so that it can provide the proper amount of cold enrichment. If this sensor does not work or is somehow inaccurate, the vehicle can run too rich or too lean.

The **Throttle Position Sensor** is built into the pedal and is actually two different sensors that work in conjunction with each other to tell the ECM what position the driver has the fuel pedal in as well as how rapidly the driver is changing the pedal position. A problem with one of the sensors in the pedal will usually result in a trouble code, and a vehicle that will only idle or barely creep along when the pedal is put to the floor.

The **Manifold Absolute Pressure Sensor** measures the amount of vacuum in the intake and is used as

a measure of engine load. Remember that when the unit is at wide-open throttle and is pulling a load, the engine vacuum is around 6 inches of Hg; when it is decelerating, it can be as high as 22 inches of Hg.

The **Oxygen Sensor** is part of the emission control system built into the engine. It monitors the amount of oxygen left over in the engine's exhaust system after combustion. The ECM uses it to determine if the engine is running rich or lean and adjust fuel delivery to fine-tune the air/fuel mixture and, hence, maintain the lowest emissions possible. Codes for the oxygen sensors are some of the most common. Much of the time, however, the code is not set because the sensor is bad. It is set because of a problem upstream that causes the engine to run too rich or lean, which causes the Oxygen Sensor to be stuck at a given voltage for an extended period of time.

Understanding the sensors is the first step in understanding how the system operates. Do not forget, however, that the trouble codes for these sensors are, in fact, trouble codes for these circuits. These trouble codes mean that the ECM is not seeing what it thinks it should from a given sensor.

This does not necessarily mean the sensor is bad, but it does mean there could be a problem with the circuit, such as a broken wire or poor connection. In future columns, I'll discuss how to diagnose the specific codes related to these sensors and the types of drivability problems they cause. ■

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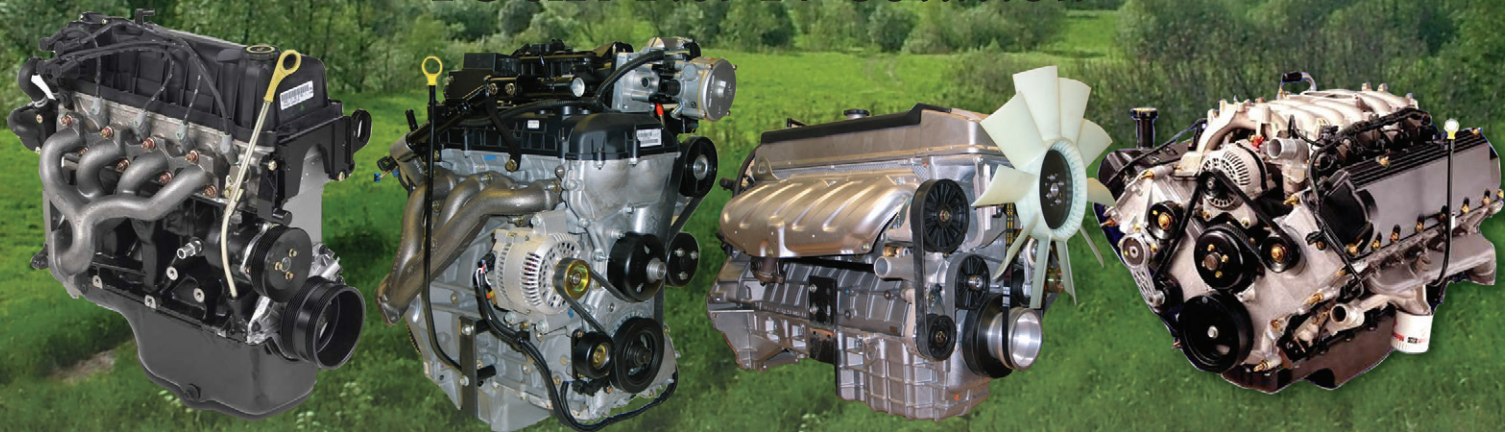
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