

GROUND SUPPORT WORLDWIDE

GAT HOLDS AN AGILE STANCE

The ground handler remains on a path of growth

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International:

Fix-it Team in Sydney

C&L Sales provides maintenance for
major fuel suppliers at the airport

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GAT Airline Ground Support's operations
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A Minnesota Perspective

I recently had the opportunity to spend some time in the Twin Cities area and make visits to a few operations. One stop was at Signature Flight Support at St. Paul Downtown



Editor Lisa Haddican takes a ride on a tug at Signature Flight Support at St. Paul Downtown Airport.

Airport. I toured the facility and spoke with team members to learn more about day-to-day operations.

I had the pleasure of meeting some of the line operations technicians, including Bob Schaeppi, a line operations supervisor at Signature. He has been with the company for about 30 years. "I was going to take flying lessons, and then I heard about this job," he says, adding that he stayed with it ever since.

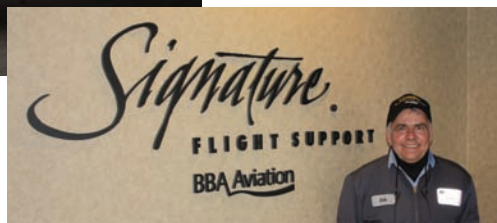
At Signature Flight Support, Schaeppi assists in turning an average of 25 to 30 flights per day, which requires a keen eye on scheduling. "Every day is a challenge,"



he says. "You have to stay a couple steps ahead."

Bob Schaeppi was recently voted as the "Best FBO Line Tech" in the United States by readers of *Professional Pilot* magazine. The votes were compiled by the magazine as part of its annual Preferences Regarding Aviation Services and Equipment (PRASE) survey.

When asked about the recognition, Schaeppi credited



Bob Schaeppi, line operations supervisor at Signature Flight Support in St. Paul

his colleagues at Signature, saying, "I just couldn't do it without the team." He adds, "It made my career to get that. I've strived for that from day one."

Signature Flight Support at St. Paul Downtown Airport also received accolades for "Best FBO CSR," which went to Sandy Tachovsky, and the operation was ranked No. 1 in the "Top 10 USA FBOs" category in the survey.

Congratulations to the crew at Signature Flight Support.

Earth Day at MSP

While spending time in Minnesota, I also made my way to MSP airport for Earth Day. The airport displayed two electric utility vehicles that it uses to reduce emissions.

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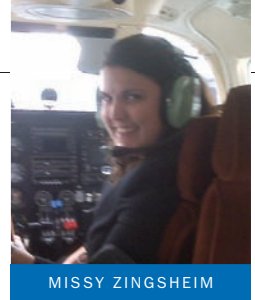


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Basics of Advertising

In continuing the discussion on marketing and advertising, I would like to dig into basics. When it comes to advertising, one needs to remember the “who, why, what, where, and when.” Remember that the audience reads a specific magazine, because it addresses issues that they are interested in and offers information about products and services that they need to do their business on a daily basis.

THE ‘WHO’ AND THE ‘WHY’

The “who” is the audience or target market. Are the ads reaching the people who are buying your products and services? Do they know about the product or service? What has the company done to let them know about its product or service?

There are two main types of advertising: brand and product. The American Marketing Association (AMA) defines a brand as a “name, term, sign, symbol or design, or a combination of them intended to identify the goods and services of one seller or group of sellers and to differentiate them from those of other sellers.”

“Brand Advertising: Branding your company, product or service is a long-term commitment that brings awareness of your product, service, or company over time. When doing a branding campaign you may not see immediate results, this type of advertising is meant to consistently stay in front of your audience with a regular message. The more that they see you the more likely they will remember you come their next buying cycle.”

“Product Advertising: Promoting a product or service is a short term commitment where you would be looking for a quick or immediate response from doing a special offer type ad, i.e. 20% off next purchase.

When running this type of advertising make sure to have plenty of contact information in the ad, website address, phone number, and email where your target audience can quickly gather the information they need to make a quick purchase.”

THE ‘WHAT’

When advertising there are several things to consider, including size and color. The message and budget, will determine what is best for a company.

Bigger is not always better. Depending on the budget, a company may want to try different sizes to see what works best. Consider consistency when planning to advertise: i.e., five quarter-page ads in five different months vs. one full-page ad one time.

Color stands out more than black and white. Remember the body or copy of the article is in black and white and an ad should stand out, not blend in. Colors can also determine how people feel, so keep that in mind when choosing colors. Here are some common emotional attributes of colors:

- **White:** pure, clean, youthful.
- **Black:** power, elegant, secretive
- **Red:** passion, excitement, danger
- **Orange:** vibrant, energy, play
- **Yellow:** happy, warm, alert
- **Green:** natural healthy, plentiful
- **Purple:** royalty, wise, celebration
- **Blue:** loyal peaceful, trustworthy

THE ‘WHERE’

Placement of the ad is just as important as the ad itself. The two sections of magazine advertising

are “display” and “classified.” The display advertising runs throughout all the pages of the magazine and can be seen by all the readers, potentially exposing your product or service to a larger portion of the audience. Classified advertising is in the back of the magazine and grouped with other classified ads on the same page. Classified ads are meant to target readers who are looking for a specific product or service, i.e., used equipment.

THE ‘WHEN’

When to advertise depends on the company. Advertising can act as an extra sales person to promote and sell a product, increasing sales by reaching a large audience. Things to consider:

1) During slow sales months, keeping advertising in front of readers will give them a sense of stability when purchasing your product or service, reassuring them of your company’s presence in the industry.

2) There is no such thing as magic advertising that will guarantee sales. While advertising is a great way to bring awareness to your product or service, there is no guarantee that someone will purchase from you because of advertisements.

3) Last but not least, keeping a clear and precise message will keep readers’ attention, giving more opportunity to be seen and making the advertising more effective.

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Calendar of Events:

June 20-26, 2011

Paris Air Show

Paris, France
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July 25-31, 2011

EAA AirVenture

Oshkosh, Wisconsin
 920.426.4800
<http://www.airventure.org>

July 31-Aug. 2, 2011

AAAE/Northeast Chapter AAAE Large Hub Winter Operations & Deicing Conference

Seattle, Washington
 703.824.0500, ext. 132
<http://events.aaae.org/sites/110705/index.cfm>

and CTOP are used for servicing the B787 environmental control systems. Both the CSC and CTOP are designed in accordance with B787 system and equipment engineering specifications to meet the special servicing requirements of the Boeing aircraft environmental control systems.

Shell's Goal Zero Awards scheme. In 2010, ASIG received four awards for their 2009 performance. The criteria for Shell's Goal Zero program are compliance to HSSE and operating standards, competence and training, corrective actions and maintaining zero injuries, spills and accidents.

IATA announces March traffic results:

The International Air Transport Association announced scheduled international traffic results for March 2011, showing that year-on-year growth in passenger demand had slowed to 3.8% from the 5.8% recorded in February. Conversely, year-on-year growth in freight markets rebounded to 3.7% in March from the 1.8% recorded in February. Compared to February, global passenger demand fell by 0.3% in March, while cargo demand expanded by 4.5%. The impact of the events in Japan on global international traffic was a 1% loss of traffic in March. Looked at regionally, Asia-Pacific carriers saw a traffic loss of more than 2%. North American carriers had a 1% drop, and Europe's carriers saw a 0.5% decline. Japan's domestic market was the most severely impacted with a 22% fall in demand.

Business Buzz

■ Malabar introduces new B787 service equipment:

Malabar International announced that it has developed, produced and delivered B787 Coolant Service Carts (CSC) and accompanying B787 Coolant Top-Off Packs (CTOP). Malabar's CSC

■ ASIG receives awards from Shell

Aviation in UK: ASIG announced that Shell Aviation has awarded the company five HSSE (Health, Safety, Security & Environmental) Awards for the management and operation of Shell's airport fuel operations within the United Kingdom as part of

ASIG provides aircraft refueling and fuel facility management services for Shell Aviation's airline customers at numerous airports in the United Kingdom.

■ TaxiBot completes test runs in Frankfurt:

Lufthansa LEOS



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announced that before the year's end, French manufacturer TLD will build a genuine prototype of TaxiBot to replace the present research vehicle. This is the result of the final test runs carried out in Frankfurt on March 25, 2011. For the March tests, engineers had incorporated all the adjustments and necessary programming derived from Frankfurt's tests in December 2010. The consortium of Israel

Aerospace Industries, TLD, Airbus, and Lufthansa LEOS were satisfied with the results.

■ **Hawthorne Services receives 2010 API award:** Hawthorne Services Inc., a government service provider located in Charleston, South Carolina, announced the receipt of the 2010 American Petroleum Institute Award (API AWARD) for excellence as the

sustaining base for U.S. Army petroleum operations. This is the second time Hawthorne has received the award, the last being in 2008. The award was given for the Hawthorne fuel operation at Fort Bragg, North Carolina. The Hawthorne team at Fort Bragg, led by Daniel Lawson, provides all aviation fuel services at both Simmons Army Airfield and Camp Mackall Army Airfield. Services include aviation fuel storage, testing, rapid refueling, cold refueling, bulk operations and inventory management at the busy military airports.

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■ **SATS launches mobile app for air cargo agents and airlines:**

SATS has launched a free mobile application developed specially for air cargo agents and airlines. Called "SATS Cargo Mobile," the application is the first of its kind in Asia, providing users with pertinent information on their shipment status anywhere, anytime. SATS is the first independent ground handler in the region to introduce such an application to its customers. With SATS Cargo Mobile, airlines and cargo agents now have an added option to get updates on their shipments through their mobile devices. The application is currently available on iPhone and iPad platforms.

■ **ASIG receives safety and compliance award from Atlas Air:**

ASIG announced that it is the recipient of the Atlas Air Worldwide Holding Safety & Compliance Award for superior standards compliance and safety performance. Atlas Air is a leading global provider of air cargo assets and outsourced aircraft operating services and solutions. ASIG provides daily ground handling services for Atlas's subsidiary, Polar Air Cargo, at Los Angeles International Airport (LAX). The award was presented to ASIG based on their reliability, on-time performance and safety record of zero damages and incidents.

■ **Celebi opens cargo warehouse at Frankfurt Airport:**

Complementing

cargo handling operations in Hungary, India and Turkey, it is Çelebi's fourth large-scale cargo handling operation. In keeping with its strategy to provide ground handling and cargo handling services on a larger international scale, Çelebi has opened the modern and state-of-the-art facility in Cargo City South at Frankfurt Airport by offering full-range cargo warehousing and documentary services.

■ **SATS wins 'Best Air Cargo Terminal in Asia' award:**

SATS has been conferred the "Best Air Cargo Terminal – Asia" at this year's Asian Freight & Supply Chain Awards (AFSCA) held at the Shangri-La Hotel, Singapore. It marks the 13th time that SATS has received this prestigious title given to the air cargo terminal that received the most number of votes cast by professionals in the logistics and cargo industry.

Partnerships/ Acquisitions/ Contracts

■ **Curtiss-Wright acquires Douglas Equipment Ltd.:** Curtiss-Wright

Corporation announced that it has acquired the assets of Douglas Equipment Ltd., a supplier of ground support vehicles for the defense and commercial aviation markets, for approximately \$20 million in cash. The business will become

ICV Partners acquires Cargo Airport Services:

ICV Partners, a private investment firm focused on investments in smaller middle market companies, announced the acquisition of Cargo Airport Services, a provider of cargo handling solutions, from MidMark Capital, the Weinberg Bell Group and other shareholders. Chief Executive Officer Michael Duffy and the CAS executive team have also invested in the transaction. Founded in 1998, CAS has grown rapidly and today handles 1 million tons of cargo, making it the second largest independent handling company in North America. The company operates 21 facilities in 12 airports. CAS is the largest cargo handler at John F. Kennedy International Airport in New York and George Bush Intercontinental in Houston, and is the second largest at Newark International, Dulles International in Washington, D.C., and Toronto Pearson International.



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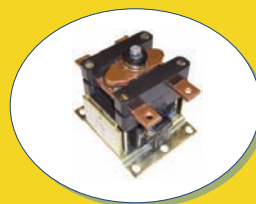
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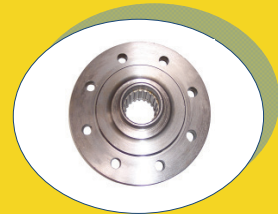
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part of Curtiss-Wright's Flow Control segment.

■ **Menzies Aviation announces contract with Spring Airlines:**

Menzies Aviation announced the win of Spring Airlines' ground handling contract for Macau International Airport. Spring Airlines, China's only low-cost carrier, is the aviation

subsidiary of Shanghai Spring International Travel Service, serving at their Shanghai base. The airline now operates a total of 22 A320 aircraft, mainly to domestic destinations as well as Hong Kong, Japan and now Macau. The carrier has contracted Menzies Macau to provide full ground handling services, ranging from ramp, cargo,

line maintenance, load control, passenger as well as ticketing services. Initially, the carrier will operate one flight daily between Macau and Shanghai. The inaugural flight took place on April 8, 2011.

■ **ASIG renews agreements with Virgin Atlantic at JFK and Newark:**

ASIG announced that it has renewed two key ground handling agreements with Virgin Atlantic Airways at John F. Kennedy International Airport (JFK) and Newark International Airport (EWR). ASIG provides complete ramp-side services, aircraft deicing, cabin cleaning and cargo transportation services at both locations. Virgin Atlantic has partnered with ASIG at JFK since they began operating at the airport in 2004. ASIG has been Virgin Atlantic's ground handler at EWR for the past five years.

■ **Cargo Airport Services awarded contract at JFK with Nippon Cargo Airlines:**

NCA is a cargo airline operating a modern fleet of Boeing 747 freighter aircraft whose operational base is in Narita, Japan. The NCA on-line network includes 15 major cities in eight countries in Asia, America and Europe.

■ **SATS acquires 40% stake in Adel Abuljadayel Flight Catering in Saudi:**

SATS Ltd. announced that it has, through its wholly-owned subsidiary SATS Investments Pte Ltd, completed the acquisition of a 40% equity stake in Adel Abuljadayel Flight Catering Company Limited for US\$18.5 million (approximately S\$23.1 million). Established in 1982, AAFC is a niche inflight caterer, serving mainly private jets and Hajj charters. It also serves international airlines such as Cathay Pacific Airways and Malaysia Airlines. AAFC has two catering facilities located at King Abdulaziz International Airport in Jeddah and King Khalid International Airport in Riyadh, with a total production capacity of



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8,000 meals per day. In 2010, AAFC reported a revenue of about US\$11 million.

■ **Menzies Aviation announces contract awards:**

The ground handling company announced it has won several new contracts. In Melbourne, it started up Royal Brunei with four B777 flights per week and Strategic Airlines with two A330s per week. In Sydney and Melbourne, the company won the contract to provide training/GSE and operational support to Virgin Blue's new A330 operations for 22 flights per week to Perth. In Brisbane, the company won the Strategic Airlines contract for both international and domestic operations — 12 A320s and four A330s per week — which were all up and running in mid-April. In Auckland, it won the contract to provide in-flight cleaning for Jetstar's long-haul product.

People in the News

■ **ASIG appoints senior VP, sales and marketing:**

ASIG announced that it has named **Tim Ramsey** as senior vice president, sales & marketing, reporting directly to Keith P. Ryan, president. Tim is currently group information technology director for BBA Aviation, ASIG's parent company. In his new role at ASIG, Ramsey will provide strategic direction for the company's global sales and marketing strategies.

■ **Swissport announces management changes:**

Swissport International has announced three top management changes, which took effect May 2, 2011. **Philipp Joeinig** took up the role as EVP central Europe, the newly established region Switzerland, Germany, & Austria. **Erich Bodenmann** became EVP group services, and **Adrian Melliger** became CEO of Swissport Zurich, the hub of Swiss International Air Lines. The company says a new EVP business development will be announced shortly. ■

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GAT services JetBlue
at nine locations.

GAT Holds an Agile Stance

The ground handler remains on a path of growth.

Lisa Haddican

The industry, as is widely known, is in a state of contraction — large mergers the past few years have strained some third-party suppliers, spurring uncertain outlooks for business. The current market requires companies to examine their business models, and puts pressure on them to remain agile in an environment with unpredictable lulls and high demands.

One ground handling company, GAT Airline Ground Support, has managed to grow about 10 percent over recent years. It has implemented a strategy of watchful

growth to remain responsive to the changing market.

COMPANY HISTORY

GAT began in 1968 and performs a range of services, including ramp handling, GSE maintenance, cargo management, and passenger assistance services.

The company has since grown to 29 locations throughout the United States. The company's biggest customers have been Delta and JetBlue, among others.

In recent years, GAT, like many service suppliers, felt the effects of

an industry in flux during challenging economic times. The airlines suffered large revenue losses, and some combined. One such defining event was the Delta/Northwest merger. "We lost quite a bit of business through Delta Air Lines in-sourcing supply-chain product," says Cory Howell, director of contracts and sales at GAT. "Three years ago when it went through, through no fault of our own, we lost a large amount of business — because of supply chains, negotiations, and putting everything back on the table for bid. On a couple occasions, we got the business right back."

*The company has grown about
10 percent in recent years.*



The company took a hard look at its model and how it responds to the changing marketplace. "We've seen our fair share of successes over the last year or two," he says. "The recession has hit us all; we certainly felt our fair share for 2007 and 2009. We had to take a brand new look at the way we do business."

NEW BUSINESS

And business, despite the challenging times, has continually grown over the past couple years. The company still retains Delta as a large customer and has recently picked up new contracts with the carrier. In August 2010, the company picked up contracts to provide cabin cleaning services for some Delta flights in New Orleans. In 2011, it was also granted a contract extension with Delta in Atlanta for lavatory service. It also received new business with the carrier in the form of ramp handling, skycap services



and passenger assistance services in Providence, Rhode Island.

The company also grew its business with UPS, picking up contracts for ground handling and parcel sort services in Greenville, South Carolina and Greensboro, North Carolina. "We've developed quite a relationship with UPS," Howell says. "Four years ago, we had one contract. In our current day, we have three contracts with them."

The company also picked up new business with JetBlue in November at Ronald Reagan Washington National Airport. "We are currently in negotiations for a couple more locations," he says. "We continue to prosper with JetBlue. We started with them in San Diego as the first operation, and now we are up to nine."

In January, the company was awarded ground handling and cabin

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cleaning services for AirTran Airways in Jacksonville, Florida. In March, Vision Airlines granted the company services for passenger and ramp handling at its location in Baton Rouge, Louisiana.

The company also picked up contracts with Continental for services in Burlington, Vermont and Portland, Maine.

And as of June 1, the company will provide ramp handling services in Atlanta for US Airways.

With the new business, the company will be at about 1200 employees, according to Richard Thiel, president of GAT.

NEW STATIONS

The contracts have represented station openings at several locations,

including New Orleans, Portland, Maine and Washington, D.C. The contract with Delta in Providence also marked the opening of a new location for the company, which became official May 17.

And when it comes to responding to a contract that demands starting operations at a new location, the company remains ready to respond. "We do have a footprint or map that we utilize on every station opening," Howell says. "It roughly runs 35 days in length from the announcement of business to the implementation. Hiring, training, and badging to on-the-job training, etc., is all a part of that and is about a 35- to 40-day process."

Within that strict timeframe is training for employees. "The training that is being provided by GAT and the airlines is roughly a 40-hour course, depending on the complexity of the operation," Howell says. "Cargo requires additional training."

He adds, "From our human resources, to operations, to the safety group to training, we are all meeting every week to find out what timelines have been met and to make sure that the start-up runs absolutely seamlessly. In Providence, we were notified on April 3, made announcements on the 5th, with a May 17 transition date."

EQUIPMENT

And the other side, of course, associated with preparing a new station or taking on additional customers at an existing location — equipment. "We have a handful of vendors that we have the trust in and relationships with to go back and work with repeatedly," Thiel says.

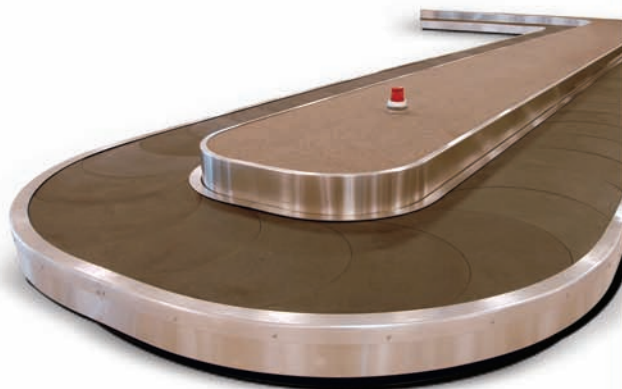
"When it comes to purchases, so much of it is predicated on delivery timelines," he explains. "In most contract award situations, we're given as little as 30 days, and on the high end, 60 days for transition time. We have to align ourselves with ground service equipment providers that can meet those aggressive delivery timelines. We aren't necessarily tied to one vendor, but we do try to the best of our ability to

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keep our inventory consistent for maintenance purposes and so forth.”

On the maintenance side, regular meetings are scheduled to stay on top of fleet demands. “We hold a weekly equipment call with all our locations, in which case we are updated on completion of PMIs, any recurring issues with equipment and then, of course, we make decisions on the call to remedy the problem,” Thiel says. “Most of our activities are real-time. We don’t let a situation sit out there and become onerous.”

RISK ASSESSMENT

A start-up operation presents risk for a company that must make the investment in equipment and personnel. “We take a hard look at what our customer base is,” he says. “Each and every airline customer has a different level of expectations. We try to cover that in our contract reviews. If we end up spending a sizeable amount of capital to support a contract transition, it will be more desirable to have longer terms so we can cost recover the investment.”

Thiel adds, “Honestly, there are times that we have taken risk with shorter-term times, just because we feel like our service reputation, reliability and safety product is on the premier side of the industry, and that it would be very difficult to transition us out based on those deliverables. It’s more or less a risk/reward assessment we go through.”

And for existing contracts with airlines currently in the merger process, the company remains uncertain of their future. “It’s interesting,” Howell says. “We do have quite a bit of business with AirTran Airways in Atlanta. We’re uncertain about the future of those contracts. A large part of that is the union contracts with Southwest. There are really no vendor assignments, except for a few services.”

Its business with Continental is also unpredictable due to the merger with United. “We provide services with Continental contracts in five locations,”

Howell says. “Some of that is up in the air, because of unions in the merger.”

The company is intent on remaining in step with changes in the industry, which happen almost daily, to remain competitive. “All the airlines are changing the business models from week to week,” Howell says. “We are constantly evolving based on customer needs and requests. Every operation is unique.”

On the subject of further growth, Thiel says the company will be careful in its expansion plans to remain nimble in the marketplace. “We’re posturing ourselves for progressive growth. We want to be strategic in our thought process,” Thiel says. “We definitely want to grow the company, but we want to be smart in the way we go about that.” ■

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Fix-it Team Keeps it Running in Sydney

C&L Sales provides maintenance service to all the major fuel suppliers at Sydney Airport.

By Steve Bowman

Fixing all the large equipment at an airport is pretty well organized. There are databases and software that track what maintenance is required and when. If something needs repair, it gets a fault tag attached and put into the workshop for attention.

Around every airport skilled maintenance technicians and engineers work away in their hangers, workshops and test rigs to keep things working and safe for everyone.

by Jeff Langtip and John Cora. They are based at Sydney Airport, providing a specialist maintenance service to all the major fuel suppliers at Sydney International Airport, Kingsford Smith.

Langtip has the experience when it comes to the vehicle side of fuel supply — the trucks and all the fuel delivery systems on board. Cora is the fixed facility expert: pipes, pumps, valves, hydrants, and the maze of monitoring and safety gear that gets the product from the fuel farm to the aircraft.

C&L a bit different is that these guys have known each other since they were 15-year-olds. They worked together and learned their trades together, did the hard yards together and then started their own business back in 1988.

All these years later, they still enjoy each other's company and are best friends.

The business has grown over the years, along with Sydney Airport. Sydney is a busy airport, handling about 300,000 aircraft movements a year. Much of that long-haul traffic is led by Qantas. Sydney is the hub for Qantas and Jetstar operations.

It is also the international gateway for carriers from every corner of the aviation globe. For most of these carriers, this is long haul, and they need to refuel before they go anywhere. In fuel supply terms, large volumes are ordered.

C&L has a permanent staff of 10 on site. This is augmented by additional help and assistance provided from the ranks of the fuel suppliers, equipment manufacturers and Qantas engineers who all provide input where necessary. All have worked together over the years on the problems to find the solutions, and a strong and healthy mutual respect has been built up.

The staff all have their trade qualifications as electricians, mechanics, fitters and engineers.

The work, however, is so specialized that it's "real experience" that equips the team for the work involved.

"It usually comes down to knowing the equipment, knowing the history of



Cora's Pertamina Aviation class gets down for a hydrant pit inspection.



Above and inset: Langtip takes a class through a hose pressure test rig.

What everyone is looking for is hands-on experience and a commitment not to let anything back into the system without being tested and signed off as right.

MEET C&L SALES

One group of maintenance service providers is C&L Sales, which is led



HISTORY

Most airports will have similar businesses doing the same type of work tucked away out of sight. What makes



John Cora, left, and Jeff Langtip, right, on home ground at the Sydney JUHI.

each part and where it has been used. We keep our own detailed records, as well as relying on our customer's own database. It is good to be able to source that background on any modifications and idiosyncrasy of a particular part," says Cora, making this observation while working at the bench to replace a set of rings on a coupling that looks like it has seen better days on the outside. Internally, the unit looks as good as the day it left the factory. He has maintained it across its life and knows the backstory.

"While the parts manufacturers and suppliers are able to pick up very useful information from us on their own gear, and we talk regularly

and give them feedback, the costs of making serious design changes are just too high so the basic units remain much the same over the years," Langtip observes, while he checks the computer for what he hopes will be a manufacturer's Product Bulletin update.

Changes have mainly been in the introduction of new technology, and C&L now have a specialist IT technician who they call on for computer-based systems.

Cora explains it this way, "On the one hand, we have to keep some aging infrastructure up to spec and pass all the audit inspections. On the other side of the equation, we have a new plant that is superior in most

respects but is often over-engineered and can create problems for us — more things to go wrong in what is a harsh work environment for any sensitive equipment. Ask around the workshop and the longer-serving staff will vote for pneumatic solutions as being more robust and reliable than computerized systems, where dust, dirt and weather can quickly take a toll on performance."

C&L acts as regional agents for several products. That makes for a business stream, as well as keeping them in the information loop. They have a sales person who handles this side of the business. Avery Hardoll, Whittaker, Gammon and Alfons-Haar are some of the companies represented.

Other maintenance providers in the Australian and New Zealand area appreciate that they are being looked after by a business that is doing the hands-on work like them and not just a passive importer.

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Cora shows how fuel filters are given a scrub and wash in Surabaya, Indonesia.

TRAINING

At C&L the mix of customers require service on a variety of equipment, some are modified and have ancillary safety fixtures incorporated, but they do all operate under the same broad industry benchmark as set out in the JIG [Joint Industry Guidelines]. IATA also publishes the standards which the airlines follow, so the general parameters are universal.

C&L's reputation for getting the job done and their commitment to quality workmanship has brought

them into several consulting projects. In recent months, training workshops in Indonesia for Pertamina, in conjunction with the ARCS (Aviation Refueling Compliance Solutions) group, is one example. Maintenance supervisors across the Pertamina Aviation business were brought into Surabaya for a hands-on "master class" run by ARCS CEO Richmond Hannah, alongside Langtip and Cora. All the training was recorded on video and will become a part of the Indonesian companies' training packages.

Despite some language differences, the learning message certainly got through. These Australian guys know their stuff and after 20 years, they remain enthusiastic and determined to get it right.

We end the interview and suggest dinner, but that will have to wait till next time. Tonight there is an urgent job that has to be done at the fuel depot that will take most of the night. Sydney Airport night curfew means they can get in and finish while the JUHI is shut down between 11 p.m. and 6 a.m.

C&L may be well in the background, but it is just the sort of small-business enterprise that keeps so many parts of the bigger ground support picture running all over the global aviation network. ■

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Components and Customer Service

Ground Support Worldwide takes a look at the practices that have guided J&B Aviation through 20 years of business.

By Aaron Amundson

J&B Aviation Services concentrates on the supply of GSE components and 400Hz equipment, with a strong focus on customer service. The company has reason for celebration, marking the 20th year of its business — which happens to be booming. Looking back on its history, the company discusses its business model and strategy for the future.

HISTORY

J&B Aviation opened in 1991 in Fairfield, California. It quickly established a place in the North American GSE component market, steadily expanding both services and customer base since. In 2002, the company became a member of the ITW

(Illinois Tool Works) GSE group, which includes other industry names such as Hobart Ground Power, Trilectron Industries, AXA Power, Air-A-Plane, ITW Military GSE, and Houchin Aerospace. This has allowed J&B to work hand-in-hand with other group members to enhance services, while remaining an independent business unit with its own offerings and capabilities.

COMPONENT SALES

While J&B provides several services to the ground support industry, the company's largest focus is the distribution of components. The company provides a variety of components, including 400Hz power cables, PCAir ducts, potable water

and lavatory hoses and couplers, and various other accessory products.

According to David Janis, controller at J&B, these products are the center of the business. "The day-to-day sales of all the cables and connectors and hoses — those consumable products are the main, original driver that started the company and continue to be the mainstay of our sales today." While grasping opportunities to expand services, the company remains firmly focused on this market.

Janis says J&B has found a successful niche in the market by offering a wide range of products that are immediately available. "A customer can know that they can come to J&B for one-stop shopping," he says. "They know the quality is there and that we have it ready to ship within 24 to 48 hours."

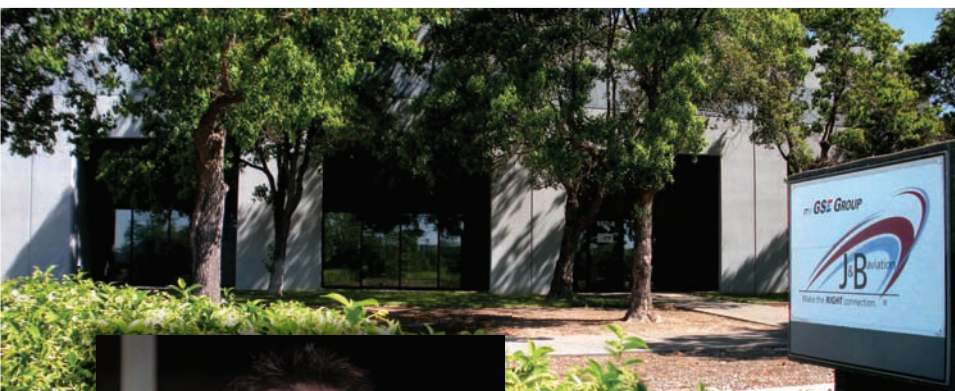
The company is able to offer short turn times on orders by keeping the necessary volumes in stock. "Our ability to hold larger quantities of the most-needed inventory has really helped out, because airlines have cut their purchasing departments and their holding of inventory," he explains.

400HZ AND PROJECT DESIGN

The company is also a large supplier of 400Hz equipment, including gate boxes, line drop compensators, cables and motorized cable reels, all of which are used in central 400Hz systems. In addition to providing system components, it also provides assistance with system design, as well



Inside the J&B Aviation warehouse



David Janis, controller at J&B Aviation



Dale Miller, military sales at J&B Aviation



Brian Piety, national sales manager at J&B Aviation

as engineering support and training on the systems. It has provided such services hundreds of times in the company's 20-year history, according to Brian Piety, the company's national sales manager.

When J&B provides systems designs for a customer, it is a comprehensive project plan. Janis explains that J&B will meet with the customer, design the necessary system in its entirety, lay out equipment needs from the units to the final component, installation verification, training and manuals. J&B has multiple resources and is able to provide the customer with comprehensive plans allowing them to foresee needs, and caters to whatever brand or style of unit the customer prefers, according to Janis.

"We basically run the full gamut of services with regard to the 400Hz ground support equipment side of the industry," he says, adding, "We will specify the equipment, and come up with the entire design for that process,



J&B's inventory facilitates quick turnaround of orders.

from end to end — everything from the main plant down to the final cable that's being connected up to the aircraft for that power distribution."

In a recent 400Hz central system development project, J&B assisted in the design of a system for Tucson Airport Authority. The old 400Hz system was replaced with a centrally located bank of three Hobart 180 KVA solid state 400Hz units. This power was then distributed to various gates through 17 J&B/PAGE compensated gate boxes, which had been ordered to further distribute this power to the aircraft.

In addition to the 400Hz equipment supplied, J&B also provided the airport with eight J&B/PAGE trailer-mounted transformer rectifiers, which allowed the airport to transform the 400Hz AC power into 28V DC power for use on smaller aircraft that operate on 28V DC power. In addition to the various gate boxes and rectifiers, J&B provided all incidental components.

J&B has also assisted the military to complete installations of 400Hz equipment. One such project was for the Navy's TACAMO facility at Tinker AFB in Oklahoma. "From the moment the Navy took custody of the facility back in the 90s, they were unable to

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successfully support the maintenance effort utilizing the hangar's fixed 400Hz system," says Dale Miller of J&B's military sales. "For many years, the Navy utilized large diesel-motor generator power carts to power up the EA-6B Mercury aircraft."

With a keen eye to the load demands of the aircraft, J&B worked closely with the Navy Facilities Engineering Command (NAVFAC) and tenant squadrons to find a solution. Once designed and load tested, J&B performed an "on-aircraft performance test," which proved successful. "The Navy was able to operate and test each and every system on the aircraft without the 400Hz system going offline," he says. Following the project's completion, the company was also contracted to update the squadron's flight line.

CONSULTING

In addition to this full system design, J&B also participates in system consultation. Janis explains, "Quite often we're approached to assist with reviewing specifications for particular 400Hz applications, whether it's a central systems design or a modification to existing hangars."

In this function, the company will assist engineers and architects in reviewing designs to ensure plans meet functional and industry regulation guidelines, and to map out the likely electrical and component needs of the project. If the consulting customer desires, the company is then able to assist in the actual system installation and training process further down the line.

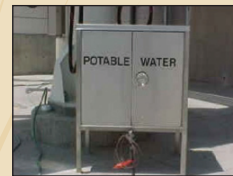
EXPANSION

With its range of services and the line of products which it carries, J&B is continuing to grow its share of the market. The company sees a consistent yearly sales increase, according to Janis, with much of the gain occurring in the international arena. The company has expanded its office and warehouse space to accommodate increased order volumes.

The reason for the company's success is twofold, according to Janis: the one-stop-shop convenience the operation provides and its service-oriented approach. "One of the reasons we're so successful in what we're doing is the level of customer service J&B provides," he says. "Our philosophy has been building customer relationships."

Though focused on maintaining those core values, J&B does not plan to remain idle. Among its strategies for the future, the company expects to continually grow in international markets while boosting its product offerings. "We're going to continue to excel in customer service and add to the line of products," Janis says. "We look forward to the next 20 years." ■

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Benefits of Regional Ground Safety Organizations

They encourage benchmarking and networking between peers.

Norman W. Hogwood, founding member, press officer and former chairman, Australasian Aviation Ground Safety Council

Across the whole aviation spectrum, there can be found a large number of organizations whose time and energy are devoted to improving and enhancing the vital element of safety within the industry. As to be expected, the majority of them have a pure focus on flight safety, for it is this issue which is constantly being raised by the world's general news media, thus thrusting it into the public arena. Unfortunately, the news media pay very little attention to, and appear to have a sparse knowledge of, the other side of the aviation safety coin, namely the hazards associated with the activities performed on the ground at every airport.

That side of the coin can carry a variety of names: ground safety, ramp safety, airside safety being typical examples. But regardless of its calling, the simple fact is that, as with all safety matters, unless it is managed properly, the outcome will be accidents and incidents, which have a costly effect both in human and productivity terms.

A COMMUNITY OF SAFETY

Airside activities are conducted by people from a variety of companies including airlines, aircraft handlers, caterers, airport companies, maintenance organizations, fuel companies, cargo operators, couriers, law enforcement agencies, and so on. Each of them has their own set of operating policies and procedures, which must dovetail into the overall requirements

of the state (federal or local) regularity authority. But also, within reason, the operating procedures of all organizations need to be in tune with those of others with whom they are required to

The extreme value of benchmarking and networking by parties operating similar ground support equipment and aircraft can never be overstated.

interact while carrying out their airside tasks. It is, therefore, very important that the line management and the staff of these operating companies work very closely together as a community to ensure safety standards and parameters are established, audited, and maintained. Overseeing these matters is where the respective company safety personnel have their part to play.

Having established good working relationships within each airport, the next step is to broaden the horizons within manageable geographic regions by making contact with people performing similar tasks at other airports. All it needs is for someone to take the initiative to communicate with his or her peers. The AAGSC started in just that way.

EVOLUTION OF AAGSC

For some time, the ground safety officers of Trans Australia Airlines (TAA) and Air New Zealand discussed various aspects of their day-to-day work in the hope of finding and exchanging safer operating

procedures. This was in the early 1980s, when communication was best achieved by letter, telex, and the relatively new fax method. Eventually, a personal meeting was arranged

and, while the two airlines had very little in common in respect to aircraft types operated, it was apparent that such cooperation was valuable and should be encouraged. As a result, it was decided to approach other airlines to form a group with whom to benchmark and create a working network.

A precedent for this had already been set up by the establishment of the Australasian Airline Flight Safety Council (AAFSC) and was, therefore, quite readily accepted and agreed upon by the management of the four airlines involved. In addition to TAA and Air NZ, Qantas Airways and Ansett-ANA had also been recruited and this led to the first meeting of ground safety personnel from all the carriers in March 1982 and the forming of the AAGSC.

One of the first things the council had to address was the scope of its activities. Ground safety covers a plethora of wide-ranging subjects, and it was agreed to limit the council's activities to those areas outside the hangars, thus placing its focus on the airport ramp and terminal operations.

From there, the next recruits were the Royal Australian Air Force and the Royal New Zealand Air Force. Both had already joined the AAFSC and their involvement with the AAGSC was simply a logical extension of that.

Due to the nature of the business and the identification of expanding issues, it soon became apparent that the council needed to expand its membership base to include other organizations with ramp and terminal responsibilities. This led to the fuel companies, catering companies, ground handling agencies and the like being offered membership of the council.

But In 1997, a major change was made. It had become a practice to allow representatives from some of the major airports in the region to attend meetings as guests, and it was the growing number of airport representatives attending meetings that led the council to make a very small, yet very significant, change to its title. The word "Aviation" was substituted for "Airline." The council was now to be known as the Australasian Aviation Ground Safety Council.

This was a very positive move. The evolution to the aviation industry and legislation changes led to wider responsibilities and accountabilities being placed on the airport authorities, and the dependency of the various parties on each other to ensure all legal requirements were met was becoming extremely important.

Over the years the membership of the AAGSC has changed considerably. Both TAA and Ansett-ANA are no longer in existence, but new airlines have emerged. The council now boasts members operating aircraft such as the A380, the Dash 8 and ATR 72, and nearly all Boeing and Airbus models. No less than 17 Australian and New Zealand airports are represented, as are airport support management and consultancy companies. Altogether, membership now numbers more than 50 and interest within the region is

strong with six new members joining over the last 12 months.

KEY BENEFITS

It is truly amazing what can be achieved with comparatively little effort. For example, recognizing that the state authorities play a large part in setting operating rules and working parameters, the regional safety organization has the opportunity to present a combined voice on the shaping of new rules and/or amendments to those already in existence, thus providing greater weight to arguments for or against changes. The group also has the capability of setting its own recommended procedures in order to assist its members in meeting those rules.

Sometimes the cost of producing safety training and promotional material can be very expensive, and this is where a regional group



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can pool financial resources for the benefit of all concerned. Recognizing the need for wide appeal, such material can consist of DVD or video training aids, task-specific posters, banners for display in major work areas and, probably most importantly, a dedicated website that is able to be accessed privately by group members and with more limited public access. By these

means, there is even the possibility of attracting sales of some products outside the region. (A considerable amount of information regarding the AAGSC can be found at its website, www.aagsc.org).

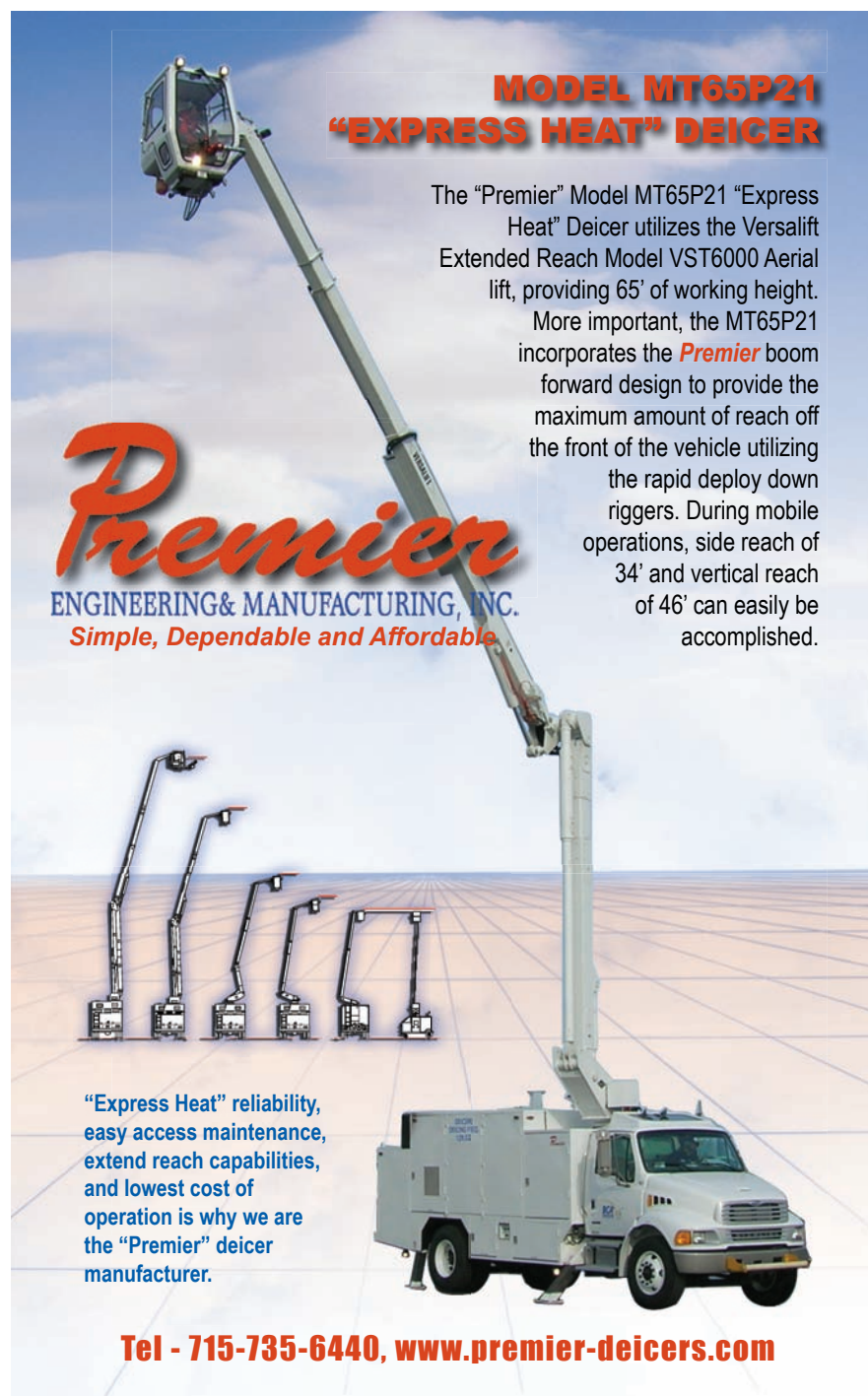
It is very important that these regional groups be set up on sound business principles, including a carefully worded charter or constitution overseen by an executive

led by a suitably qualified chairperson. Other members of the executive team should include the secretary, treasurer, and other officials as required to carry out the variety of tasks that may be undertaken. A meeting schedule should be set to a regular timetable, which should also provide for an Annual General Meeting to deal with administration matters.

Inevitably, members of the executive team will from time to time need to be replaced — either through retirement, moving on to new positions internally or outside of their company, or through the regular rotation policy set out in the organization's charter or constitution. Invariably, the executive provides the "glue" to keep the organization on track so it is essential that senior members, such as past office holders, keep a watchful eye on executive succession planning.

Becoming involved in the activities of a regional safety organization can be a most rewarding experience. It encourages benchmarking and networking between peers and provides the opportunity to meet others from different cultures and backgrounds. The extreme value of benchmarking and networking by parties operating similar ground support equipment and aircraft can never be overstated. As with any organization, its success depends entirely on the efforts made by its members, and it is important to ensure that the work involved is spread across the entire membership.

Finally, a regional safety organization can develop the strength to become recognized within the industry, and the AAGSC is proud to have been involved in assisting in the establishment of a similar body within Europe, the European Aviation Group for Occupational Safety and Health, and also providing service to the IATA Airside Safety Group and the Flight Safety Foundation's Ground Accident Prevention program. ■



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EPA Mandate's Impact on PCA Design

Alternative refrigerants pose cost and performance-related issues.

Scott Leininger, environmental control systems product manager, Unitron LP

It has been a year since the Environmental Protection Agency instituted a number of changes to 40 CFR Part 82, Protection of Stratospheric Ozone. These changes are meant to sharply restrict the use of substances that allegedly harm the earth's protective ozone layer and contribute to climate change. The targeted chemicals are HCFCs primarily used as refrigerants, specifically R-22, -142b, -123, -124, -225ca, and -225cb. These chemicals, if leaked into the atmosphere, deplete the stratospheric ozone layer and are being phased out under the Montreal Protocol. According to scientists, by cutting the production and import of these chemicals and limiting how they can be used, the rules will help the ozone layer heal faster.

As of Jan. 1, 2010, R-22 — what had been the primary refrigerant used in aircraft ground support preconditioned air units, home air conditioners for the building trades, industrial and commercial air conditioners, and other applications — could not be incorporated in equipment for new installations. This was not a surprise; indeed, Europe had banned HCFCs in 2005. In the United States, manufacturers of industrial and commercial air conditioners and the construction industry were ready for the change. They had decided on a new “standard” refrigerant, designed the equipment, and had an inventory of units ready to meet the requirements of new projects as they came along. PCA acquisition documents, however, were still listing R-22 as recently as December 2010, and some PCA manufacturers were struggling with the reality that design work was a necessity and that components

for the “legal” refrigerants cost more than those for R-22.

The U.S. ground support industry stood and watched as 2009 passed and 2010 rolled in with new rules for preconditioned air equipment. Neither the airlines, nor the airport authorities, nor the PCA suppliers had come to any consensus as to what direction to take for an application that required economical, effective cooling. Unitron conducted a survey of airlines and airports in 2009. This survey asked which refrigerant their organization had selected to meet the requirements of

the new environmental law, or if they had made a selection. Most respondents had made no selection, and some did not realize that a “deadline” loomed. Part of the reason for this was past experience with projected EPA mandates, some that were delayed time and time again. The final guidelines for phasing out R-22 (and similar refrigerants) were not passed until Dec. 28, 2009, but they were passed and the start date remained Jan. 1, 2010. Manufacturers' PCA brochures and “cut-sheets” contributed to the airline and airport view that noth-

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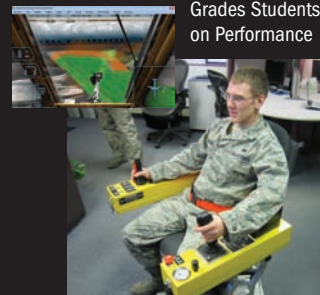
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ing needed to be done, because the existing designs could meet both the legislative requirements and also the performance issues.

R-22 PCA brochures and specification sheets have listed R-134a and R-407c as alternative refrigerants for years. What they have not said is that the 60-ton PCA shown on the R-22 data sheet will only provide 40 tons of cooling when operated on R-134a or that an R-134a unit that supplied 60 tons of cooling was about 30% larger and 20% to 30% more expensive. Refrigerants and performance issues related to an industry awakening to a new reality are detailed below.

UNDERSTANDING ALTERNATIVE REFRIGERANTS

What alternatives to R-22 are legally acceptable and available? The government's answer is: "Most are HFCs and include R-134a, R-404A, R-407C, and R-410A. In the United States, R-410A is the most popular choice for home air conditioners." (<http://www.epa.gov/>)

Each refrigerant listed above has characteristics that determine its economic impact and technical acceptability for the preconditioned air application, which has relied on R-22 for the past 40 years.

R-134a: The advantage to selecting R-134a is that as a single component refrigerant, it is not subject to any of the difficulties that arise with mixtures. However, R-134a has a 40% lower refrigeration capacity than R-22. In practical applications, using this refrigerant requires larger heat exchanger sizes and bigger compressors to provide the same capacity and efficiency attained with R-22. This requires more sheet metal, a larger equipment footprint, and higher manufacturing costs. This refrigerant cannot be used in existing R-22 systems as a "drop-in" replacement, but requires new, dedicated equipment. R-134a systems with the same cooling capacity as the R-22 equivalent cost about a third more.

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R-404a: This refrigerant is a "low-temperature" mixture (three parts, including R-134a) and is most commonly used in food storage reefers or freezers. Low temperature in this case means sub-zero (32°F down to 2°F or lower).

R-407c: The advantage in selecting R-407C is its ability to be used as an alternate refrigerant in systems designed for R-22 for some environments. When retrofitting equipment that is in use, the R-22 refrigerant and mineral oil must be carefully and thoroughly removed before charging, as R-407C is not miscible with the mineral oils typically used in R-22 systems, requiring instead a synthetic lubricant. When used in systems designed for R-22, R-407C performs with about a 5% reduction in efficiency. A primary disadvantage of R-407C is that, as a zeotropic refrigerant, it experiences fractionation (the mixture does not maintain a constant composition across phase changes). Saturation temperatures may vary up to 9°F (a phenomenon known as temperature glide) in the refrigeration cycle because at a given pressure, the blend boils/condenses at different temperatures. This can be a particularly serious issue if the system develops leaks and performance diminishes. When re-charging the system, refrigerant cannot simply be added because the leak rates of the individual components are not equal due to the fractionation effect. The system must be completely evacuated. The previous charge must be recovered and disposed of or recycled. A complete re-charge of unused refrigerant is required to ensure the proper mixture and desired performance.

R-410a: The refrigerant blend R-410A is a nearly azeotropic refrigerant blend and does not experience fractionation upon change of phase, and very little temperature glide (<0.3°F). This means that the concern over refrigerant composition with blends, such as R-407C, are eliminated, and a system may be serviced as with refrigerants of single molecular composition. System

efficiencies are comparable to or greater than R-22 for the same capacity due to the increased heat capacity and higher operating pressure, allowing for reduced flow rates, and smaller heat exchangers and compressors. Smaller equipment requires less sheet metal, smaller equipment footprints, and can reduce manufacturing costs, thereby, eliminating the larger building space and equipment requirements found in systems designed around R-134a. Recognize, however, that the new R-410a system is going to cost about 30% more than the R-22 air conditioner. PCA redesign and new component development explain the price difference, but the fact that R-410a has been selected as the primary refrigerant for commercial air conditioners mean that the cost of components will drop as production quantities increase to match R-22 quantities.

REFRIGERANT SELECTION: ENVIRONMENTAL CONSIDERATIONS

Refrigerant selection goes beyond the legal aspects pointed out in the previous paragraphs. PCA manufacturers share the same environmental responsibilities that are being imposed on the construction and commercial air conditioner manufacturers, including power consumption and "Total Equivalent Warming Impact." Some European manufacturers are touting the advantage of R134a because of its low "Global Warming Potential." However, if one is concerned about the environment, then one needs to consider three attributes of any refrigerant. These are:

- 1) Ozone Depletion Potential: A material's ozone depletion potential (ODP) is a measure of its ability to destroy, compared to CFC-11 (R11), stratospheric ozone
- 2) Global Warming Potential: The global warming potential (GWP) of a greenhouse gas is an index of its ability, compared to CO₂ (which has a very long atmospheric lifespan), to trap radiant energy
- 3) Total Equivalent Warming Impact: An air conditioner's total equiv-

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alent warming impact (TEWI) is based on the refrigerant's direct warming potential and the indirect effect of the energy that the air conditioner uses.

Any new air conditioner design must employ a refrigerant that provides the cooling required for the application, and all three of the refrigerant attributes shown above in order to be both a legal and also a responsible design. For any refrigerant, the ozone depletion potential (ODP) is by definition a discrete number and must be zero for new designs as mandated by national and international law.

The global warming potential (GWP) is also a discrete number by definition. Its primary significance in refrigerant selection is the direct warming potential component of the total equivalent warming impact (TEWI).

The TEWI is the more important attribute to consider when selecting a refrigerant for a new design, even though the number varies with the

environment. The TEWI reflects the direct warming potential, and it also reflects the indirect effect of providing energy to achieve the cooling required. Therefore, a more efficient refrigerant requires less energy, which results in a lower

When legal acceptance, physical size, cooling performance, and cost are all considered, then R-410a is the logical choice for the PCA application.

TEWI. See the quote that follows: "Gopalnarayanan (1999) examined eight different refrigerants as possible substitutes for R-22. He found that for all eight refrigerants, the direct GWP effect of a refrigerant

represented less than 7.5% of the TEWI at performance rating conditions. This means that the indirect effect of a system's energy efficiency is more than 13 times more important than GWP. Therefore, TEWI, which considers both the direct and indirect global warming effects of a refrigeration system, is a much more accurate indicator.

In addition, Gopalnarayanan (1999) also found that of all eight refrigerants examined, Puron refrigerant (R-410A) had the best performance from the point of view of energy efficiency and TEWI." (PURON® REFRIGERANT R-410A)

AN ARGUMENT FOR R-410A

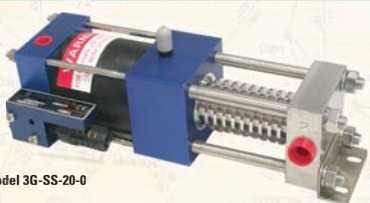
Some European manufacturers are saying that R-134a is the best refrigerant to select for the PCA due to its GWP (1300 as compared to 2000 for R-410a). I am saying that R-410a is a better refrigerant, because it is more efficient and has a lower TEWI despite its higher GWP. In addition, the coils of an R-410a system can be as much as 20% smaller than an R-134a system. Thus, the R-410a system is physically smaller, is more efficient, and requires less refrigerant for the same cooling.

When legal acceptance, physical size, cooling performance, and cost are all considered, then R-410a is the logical choice for the PCA application. Some may try to argue that components — expansion valves, for example — are available for R-407c but not R-410a, because R-410a is a newer refrigerant. However, components are available. Manufacturers have been developing them since the "worldwide" transition started 11 years ago.

When the acquisition cost for a given performance, the energy efficiency related to the cooling medium, and the environmental impact of the refrigerant are all considered, R-410a is the clear choice for the PCA application ■

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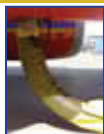
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PM Tips for PCAs

By Scott Strong, national manager, Global Aviation Services LLC

Well, we survived another cold season here in the north and the high temperatures of summer are right around the corner; for some of you, it is already in full swing. That means it is PM season for those PCA units around your airfield. As we get geared up to brave those high temperatures, we should all be sure we are ready to keep passengers cool while sitting on the tarmac.

Have you ever thought about why this is such a difficult thing to do, and why we require such large units to cool such relatively small spaces? Keep in mind those cabins are packed wall-to-wall with warm bodies heating up the interior space. That is a large thermal load to overcome. More importantly, we need to keep in mind that the plane's HVAC system is not

recirculated cool air blowing across the evaporator. Hence, the interior of an aircraft requires a large volume of very cool air to keep it comfortable.

This brings us to your preseason check. One of the most important measures of the ability of your unit to cool an aircraft is the outlet temperature. To measure the outlet temperature, hold a thermometer in the outlet stream of air at the aircraft coupler. Within 10 minutes, it should show a reading of no more than 50° Fahrenheit. If after 10 minutes the outlet temperature is higher than 50 degrees, this unit will most likely not have the cooling capacity to do its job and you need to take a closer look at why. Units equipped with outlet-temperature gauges make checking the operation of the unit throughout

the season efficient and easy. Remember to always check the accuracy of the temperature gauge before the season by comparing the actual outlet temperature to the gauge read-

ing. Remember that the longer the hose, the larger the difference will be between the two readings. On units with hoses over 50 feet, it is not uncommon to have a temperature difference of up to 12 degrees between them. This is perfectly acceptable as long as the outlet temperature is not over 50 degrees.

Remember to check the supply hose carefully. Many hoses that appear fine on the outside can have the interior lining torn, which can cause a flap that lowers the volume of air delivered and can allow torn pieces

of insulation to be blown into the planes HVAC system. Any hose with internal tears needs to be replaced.

Be sure to check the condition of the radiator, evaporator and condenser fins. Debris, oil and gunk can build up and clog these fins, dramatically lowering the efficiency of the unit and its ability to operate properly. Just because your dual heat/AC unit worked without overheating all winter does not mean that a blocked radiator will not cause a problem during the high temperatures of summer.

Remember, if the output is not what it should be, to check the top 5 causes of reduced unit efficiency:

TOP 5 CAUSES OF REDUCED UNIT EFFICIENCY

1. Low refrigerant: Remember that refrigerant does not just disappear. If the unit is low on refrigerant, there is a leak somewhere that should be identified and repaired. The use of ultraviolet dye in the system is a fantastic way to locate those small system leaks.

2. Torn or damaged outlet hose: Be sure to check the interior of the hose for damage as well.

3. Missing or damaged gasket on the aircraft coupler: This gasket is often overlooked but is an integral part of the air delivery system.

4. Plugged or fluid-soaked evaporator or condenser fins: A pressure washer is a fantastic tool for restoring the efficiency of these units.

5. Don't forget about damage: The condenser is often damaged when an accident occurs. The unit may not be leaking refrigerant, but crimped or restricted tubes in the condenser dramatically decrease its efficiency. ■

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built like the one in your automobile. There is no recirculate function. In your automobile, as cool air is blown into the interior, that slightly cooler air is drawn back into the evaporator and cooled again. This process continues until you end up with very low output temperatures from the vents and, hence, a cool interior. In the aircraft, all of the cold air is pumped into, through and then right back out of the cabin. Your PCA unit has to then pick up hot outside ambient air and cool it before pumping it into the aircraft. This unit does not have the benefit of

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