

Honeywell Fuel Efficiency Solutions



Optimize Your Fuel Investment

Honeywell



THE PROBLEM

Fossil fuel.

Yesterday's quintessential energy source.

Today's quandary.

Soaring costs and increasing environmental concerns weigh heavily on the minds of CEOs and consumers alike.

Once claiming about 25% of total operating costs, aviation fuel can now demand more than 45% of operating costs--eclipsing all others. Moreover, while carbon dioxide regulations and costs reflect efforts to protect our atmosphere, they are adding even further overwhelming stress to the airline industry's bottom line.



THE PROMISE

With an eye on today and tomorrow, Honeywell offers technologies that help airlines dramatically reduce their dependency on fossil fuel.

By immediately focusing on solutions that offer greater efficiency—whether through weight reduction or operational advancements—airlines may upgrade to significant fuel savings.

Even better, alternatives to fossil fuel—like biofuel and electric aircraft—are being developed for considerable benefit.



THE PRODUCTS

New aircraft are 70% more fuel efficient than 40 years ago and 20% more efficient than 10 years ago. Aiming for further improvement, airlines have pledged to increase fuel efficiency by another 25% by the year 2020.

With our range of short-term and long-term solutions, Honeywell offers practical innovations that help airlines steadily progress towards their goals and beyond.

IMMEDIATE FUEL SAVINGS

Honeywell's avionics, electrical and mechanical solutions help maximize airline route efficiencies, decrease aircraft weight and space requirements, and reduce pilot workload to enhance energy output and ultimately can help to lower total cost of ownership.

By creating ways to make airplanes more technologically advanced, Honeywell is empowering airlines with direct answers to today's fuel-related challenges.

Here are just a few suggestions to notably impact fuel efficiency:

Auxiliary Power Units

Burn less. With a superior 5.1% fuel-burn reduction advantage over the competition, Honeywell's 131-9[A] Auxiliary Power Unit (APU) offers operational savings of more than \$10,000 USD per aircraft, per year.

Moreover, the 131-9[A] APU provides Airbus aircraft enhanced power generation, exceptional main engine start performance and world-class reliability.

Flight Management Systems

Get smarter. Honeywell's Flight Management System (FMS), the brains of an aircraft, calculates the most efficient altitude for fuel savings, and time savings. Upon the pilot's

request, Honeywell's FMS automatically updates to take advantage of step-climb optimization, and ultimately reduces delays, turnbacks and diversions while increasing cockpit efficiency.

Traffic Alert and Collision Avoidance Systems

Prevent problems. Honeywell's Traffic Alert and Collision Avoidance Systems (TCAS/ACAS) with Mode S transponders provide advanced collision avoidance protection and airspace situational awareness using the latest in processing technology such as Airborne Traffic Situational Awareness (ATSAW) and Automatic Dependent Surveillance Broadcast (ADS-B) functionality.

This design improves aircraft surveillance and flight safety, and reduces operating costs through flexible upgrades, promoting more efficient flight.

Air Data and Inertial Reference Systems

Lose weight. Honeywell's Air Data and Inertial Reference Systems (ADIRS) provide highly accurate and reliable aircraft information with more than a 50% reduction in system weight and more than a 70% decrease in maintenance costs over the competition.

Honeywell Inertial GPS Hybrid (HIGH) software provides 100% availability

of RNP 0.1 navigation for improved aircraft route efficiencies to maximize time and fuel efficiencies.

IntuVue Weather Radars

See better. With advanced turbulence detection and predictive wind shear capability, our IntuVue Weather Radar provides a 3-D volumetric view at a longer range to find the safest and most efficient routes. Along with its ten-pound weight advantage over the competition, our long-range radar offers fuel cost savings of up to 2.4% from weather diversions.

Multi-Mode Receivers

Reduce delays. Scheduled for certification in 2010, Honeywell's Multi-Mode Receivers (MMR) enable highly repeatable parallel and complex approaches, reduce holds and are more environmentally friendly helping to avoid noise violations. In addition to better diagnostics and maintenance savings, the GPS Landing System MMR can save up to \$250 USD per approach over existing models.



LONG-TERM SOLUTIONS

For nearly a century, Honeywell has been leading the way in avionics technology, enabling milestones like Charles Lindbergh's first solo flight across the Atlantic in 1927 and Amelia Earhart's landmark flight in 1932.

So it's no surprise that Honeywell continues to set exceptional and exciting industry standards regarding fuel efficiency, fuel alternatives and low emissions for commercial aircraft.

Here are a few areas that highlight our plans for the future.

Hybrid Power Potential

Start fresh. In addition to developments in propulsion that support turbofan and turbo shaft, Honeywell's Aerospace Advanced Technology team is focusing on "green" and hybrid Auxiliary Power Unit (APU) technologies for fuel burn reduction, emissions reduction and noise reduction. Additionally, hybrid fuel cell systems are being considered to advance secondary power systems of the future.

New technologies have already improved APU power-to-weight ratio in advanced disk alloys, advanced turbine, aerodynamics and cooling.

More Electric Architecture

Go electric. A variety of More Electric aircraft technologies are being developed at Honeywell. More Electric Architecture will drive reduced weight and fuel consumption, and will require less maintenance, resulting in a more efficient and cost-effective aircraft.

Electric solutions increase efficiency of overall aircraft performance and energy use. They synchronize, balance and match energy usage with utility loads like vapor cycle packs, electric sources and loads.

Biofuel and Alternative Fuels

Pure power. Partnering with global airlines, Honeywell is developing and testing renewable energy technology to convert biofeedstocks to commercial aviation fuels, with specific focus on "second-generation" feedstocks such as algae, which do not compete with food or water resources.

UOP, a Honeywell company, has already developed process technology to convert natural oils and greases to military jet fuel as part of a project funded by the U.S. Defense Advanced Research Projects Agency (DARPA). The process technology produces "green" jet fuel that is a drop-in replacement for traditional kerosene based jet fuel and meets all the critical performance specifications for flight.

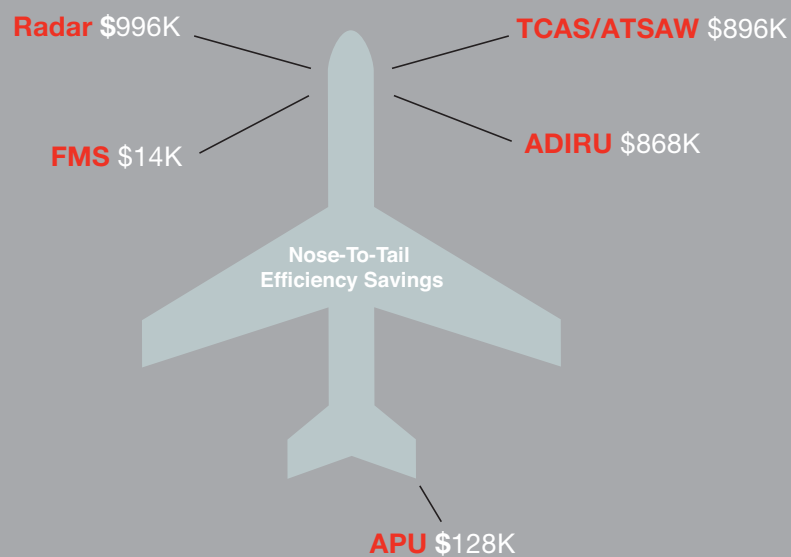
This technology will also be viable for use in the production of jet fuel for commercial airliners



THE PROOF

Take a look at the big picture, and see how Honeywell's technological advancements may add up to significant nose-to-tail efficiency savings for you.

Total Fuel Savings Opportunities for a Full Honeywell A320



THE PROSPERITY

Let Honeywell help you succeed. Compared to the competition, Honeywell offers a wealth of products for both new and existing aircraft.

Annual Forward-fit Aircraft Efficiency Savings with Honeywell Equipment and Technologies

For every fifteen A320 aircraft (flying 3,600 hours/year at 850 gallons/hour at a cost of \$3.10 USD/gallon), airlines can save up to \$2,900,000 USD or 2.05% of total fuel costs.

Upgrade technology on older aircraft, and your savings are even greater.

Annual Retrofit Aircraft Efficiency Savings with Honeywell Equipment and Technologies

For every fifteen A320 aircraft (flying 3,600 hours/year at 850 gallons/hour at a cost of \$3.10 USD/gallon), airlines can save up to \$3,260,000 USD or 2.31% of total fuel costs.



THE PROGRESS

Honeywell is committed to continuously helping you find competitive and creative ways to move forward with confidence.

We rely on customer feedback to keep us abreast of the changing business needs of airlines informing and inspiring the technologies we develop.

As we make our way through these fuel related challenges, expect Honeywell to offer proactive answers that are as practical, as they are innovative.

Honeywell Aerospace

Honeywell is a leading global provider of integrated avionics, engines, wheels and brakes systems and service solutions for aircraft manufacturers, airlines, business and general aviation, military, space and airport operations.

For more information on Honeywell Aerospace, visit us online at www.honeywell.com/aero

Global Network of Support Services

Honeywell's worldwide resources span the Americas, Europe, Middle East, Africa, Asia and the South Pacific to deliver dedicated 24/7 service support. As a world leader in aviation aftermarket services, our global repair centers, logistics network and field services engineering teams are able to quickly repair, supply, and warranty equipment whenever and wherever it is needed.

Honeywell Aerospace

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