

Honeywell: Bolsters India's Aerospace and Defence Capabilities

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Honeywell is a leading provider of technology solutions for the global aerospace and defence industry. Honeywell has had operations in India for more than two decades and its contributions to Indian engineering, research and development, and manufacturing capabilities continue to expand.

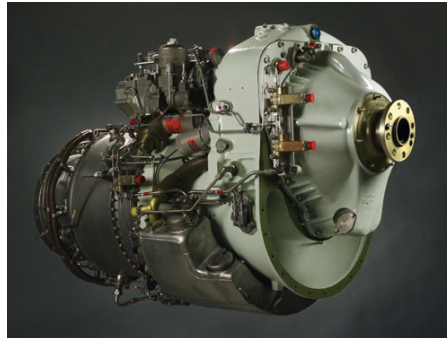
Superior technology, products, solutions expertise and customer relationships make Honeywell one of the most valued names in aerospace. With its nose-to-tail and gate-to-gate integration capabilities, Honeywell consistently delivers innovation that meets the needs of its customers for higher performance, enhanced reliability and safety, and reduced costs.

The company develops and delivers leading-edge technologies, systems, products and services for commercial and military platforms, ranging from unmanned aircraft and jet fighters to commercial airliners, rotorcraft and the International Space Station. The company is a leading provider of aircraft and vehicle engines, integrated avionics systems, navigation and safety systems, and a diverse range of other technologies.

For almost half a century, Honeywell has produced turbofan, turboprop and turboshaft propulsion engines for military and commercial aircraft. With more than 120,000 fielded propulsion systems around the world and more than 1.6 billion service hours its engines have a long history of proven performance – and of providing operators with technologies for higher performance, enhanced reliability and reduced operating costs.

“Made in India” Honeywell Engines Used Worldwide

This year, Honeywell signed a landmark agreement with Hindustan Aeronautics Limited (HAL) to manufacture the TPE331-10 engine in India.



The new agreement extends the long relationship between Honeywell and HAL, which dates back to 1984 when HAL began manufacturing an earlier version of the TPE331 engine for Indian Air Force and Coast Guard Dornier-228 aircraft. Honeywell also provides technology and components for HAL aircraft including the Dhruv Advanced Light Helicopter, Light Combat Aircraft, Intermediate Jet Trainer and Advanced Jet Trainer, IAF Hawk, Light Combat Helicopter.

Honeywell Engine Considered for Jaguar Update

Honeywell also is working with the Indian Air Force on a potential program to re-engine the IAF's Jaguar strike aircraft with the F125IN turbofan engine. This specially designed model of the service-proven F125 engine was successfully demonstrated for the IAF in 2007. If chosen by the IAF, the F125IN will have significant content produced in India.

The new engine will provide the IAF Jaguar fleet with a modern, reliable and safe propulsion system that will transform the capabilities, performance and safety of the aircraft. The F125IN is projected to save more than USD \$1.5 billion (or the equivalent

approximately Rs 7000 Crore) in life-cycle costs compared to the existing Jaguar engine.

The F125IN engine will be significantly lighter and more powerful than aircraft's current engine. It features an advanced dual full-authority digital engine control (FADEC) system, modular construction, integrated engine health monitoring system and outstanding power-to-weight ratio.

A Leader in Rotorcraft Flight Safety Technology

Honeywell has been in the forefront of flight safety for more than 50 years. The company believes that aviation accidents are avoidable, especially those that involve a degraded situational awareness of flight crews and information available to the flight crew. Honeywell has taken these enhancements for aviation safety to focus on all flight regimes and mission profiles.

Pilots flying aircraft equipped with the Enhanced Ground Proximity Warning System (EGPWS), Traffic Collision Avoidance System (TCAS), Runway Awareness and Advisory System (RAAS) and severe-weather avoidance systems receive accurate real-time information about their section of airspace.



Rotorcraft pilots fly unique and challenging flight regimes. Honeywell's rotorcraft safety solutions help prevent avoidable collisions with ground, water, and obstacles such as towers and other aircraft - even when flying in adverse weather with poor visibility, rough terrain, or at low altitudes. Environmental awareness and hazard avoidance systems minimize risks and maximize reaction time by continually monitoring terrain, obstacles and traffic within 40 nautical miles, and providing visual and oral warnings to the flight crews. The warnings are based on database technology, aircraft system inputs, closure rates and proximity to the threat. The solution includes EGPWS designed specifically for rotorcraft operations, which helps prevent avoidable collisions with the ground, water and manmade obstacles. Honeywell pioneered EGPWS technology and it flies in the airline, regional, business aircraft, general aviation, and rotorcraft segments.

Another innovation, IntuVue 3-D weather radar, provides flight crews with the most accurate, real-time information available to assess approaching weather systems and determine the safest, most efficient way to avoid thunderstorms, turbulence, windshear and other potentially hazardous weather-related conditions. The system is an all-new approach to weather detection and avoidance.

Task and data management is especially important in emergency medical, police and SAR operations. The Observer MkIII is a task-management mapping system that provides highly detailed raster mapping in the VFR environment. As a multi-workstation task management system, Observer can create a paperless cockpit by using databases that allow position, text and images to be stored and retrieved at the touch of a button.

Honeywell has not neglected aircraft safety around airports. The company has solutions, products and services that are designed to improve the safety and efficiency of airports, critical infrastructure protection and airfield solutions, including lighting. Honeywell helped modernize Delhi, Hyderabad and Bangalore airports and is looking for other opportunities to help India modernize its air transportation system.

Land Systems

Honeywell also provides systems for the development and upgrade on a wide variety of land systems. Honeywell's TALIN Inertial Navigation Units deliver outstanding position and pointing accuracy to infantry fighting vehicles, main battle tanks, self propelled and towed Howitzers, and rocket launch systems. Honeywell's Digital Magnetic Compasses and Dead Reckoning Modules have been selected by soldier modernization programs. Honeywell also offers the battle proven AGT1500 tank engine, auxiliary power units, environmental control systems, and the innovative CATOX NBC (Catalytic Oxidation) protection system.

UAV Expertise

Honeywell is well known for its UAV expertise. For example, the T-Hawk Micro Air Vehicle (MAV) is equipped with video cameras to let troops see threats on the ground as it hovers above the battlefield. At just 14 inches (.36 meters) in diameter and 17 pounds (7.7 kilos), the aircraft is small enough to be carried in a backpack. The vehicle can easily fly into hazardous areas without exposing soldiers to enemy fire.

The T-Hawk has the unique ability to take off and land vertically from complex desert and urban terrains without runways or helipads. It provides more than 40 minutes of flight endurance, more than 40 knots of airspeed and operates to altitudes of more than 7,000 feet.

Commercial Airlines

Honeywell provides mechanical systems and advanced cockpit avionics to all of India's major commercial airlines, as well as providing aftermarket maintenance support.

Safety systems include Enhanced Ground Proximity Warning System (EGPWS), which provides a terrain display and alerts the flight crew if the aircraft approaches too close to terrain. Honeywell's patented ACAS (i.e., TCAS - Traffic Collision Avoidance System) provides a display of surrounding aircraft and alerts the flight crew if another aircraft comes too close for safety. Honeywell's radar provides essential weather detection up to 320 nautical miles, turbulence detection up to 40 nautical miles, and forward-looking

windshear detection up to five nautical miles. Honeywell's flight data recorders and cockpit voice recorders record flight data parameters and cockpit voice conversation for analysis. Honeywell's auxiliary power unit is a small gas turbine engine that provides compressed air and electrical power for main-engine starting and operation of aircraft systems on the ground or in flight. The APU is designed to meet the power needs of the commercial aircraft with lower fuel burn and emissions.

Indian Scientists and Engineers Play Pivotal Role

Indian scientists and engineers play a key role in Honeywell's aerospace research and development efforts. Founded in the mid-1990s, the Honeywell Technology Solutions



lab (HTS) is headquartered in Bangalore, with locations in Madurai and . HTS staff members are performing pioneering work on the next generation of Honeywell avionics, navigation and safety systems, and mechanical products. In all, more than 8,000 people are employed by the company in India, and many are engineers and software developers. During the last few years Honeywell has developed its diverse engineering base in India, with engineers in India as well as staff who provide program management, quality assurance, systems engineering, technology, and market analytics.

HTS also serves the needs of Honeywell's other divisions, which include Automation & Control Solutions, Specialty Materials, and Transportation Systems. Honeywell is a \$38 billion (U.S.) global company with customers, employees and operations in more than 100 countries.

In India and throughout the world, Honeywell technology, products and services make people safer and more secure, more comfortable and energy efficient, and more innovative and productive.