



PARAMOUNT'S HS2 TECHNISEAL FLIES HIGH FOR DEFENSE



U.S. AIR FORCE

MISAWA AIR BASE, JAPAN

The United States Air Force stands on the front line of America's defense around the world. This tough job requires tough equipment, even for lighting. Paramount Industries made the grade by updating jet fighter shelters with new T5 fluorescent technology.



On Guard In Japan

Misawa Air Base is the Air Force's northernmost facility in Japan. The base is located approximately 400 miles north of Tokyo. Stationed at Misawa is the USAF 35th Fighter Wing. Its mission is to "help defend Japan and promote regional security in the Pacific by providing forward presence, deployable forces, and quality mission support." Misawa is also the only combined joint service installation in the Western Pacific. The 35th serves as host to a variety of associate units representing all four U.S. military services. Japanese Air Self Defense Forces also utilize the base.

The wing flies two squadrons of F-16 Fighting Falcons. These high-tech war machines are housed in hardened aircraft shelters, abbreviated HAS. This type of structure has some stiff lighting requirements, because the power of the jet engines generates such great vibrations even in a building that's made of reinforced steel and concrete. The presence of hazardous materials and explosives add to the concern.

New Lighting Required

The 35th fighter wing decided to investigate new lighting for the aircraft shelters because current lighting levels were ineffective and caused a huge safety concern for maintenance personnel. There was also interest in cutting energy consumption on base.

Captain Elizabeth Porter, Chief of Maintenance Engineering, headed the project. Her office is responsible for all base infrastructure and manages the energy program.

Original lighting in the shelters was 400W High Pressure Sodium High-bays. This offered marginal



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light levels (20 footcandles) of yellowish light with poor color rendering, making it difficult to service the multi-million dollar fighter jets. Local Japanese engineers who work with the Misawa staff recommended swapping Metal Halide for the HPS. This made the spaces brighter, but actually used more electrical power.

The Air Force contracted energy consultant Bart Wallace, president of Daystar Energy Systems in El Cerrito, California, to help them deploy the proper lighting system. He suspected that the advantages of new T5HO fluorescent lighting technology might offer the light levels, color rendering and energy efficiency that they were seeking. "But this was pretty radical because the Japanese were not familiar with T5HO. The new fluorescent technology has not been accepted as quickly in Japan as it has in Europe and North America."



Paramount's HS2, used in the jet hangers at Misawa Air Base

To demonstrate the lumen value and color of a T5 solution, Bart created a concept test sample using an off-the-shelf luminaire moved between gyms, warehouses and other large volume facilities on base and in Misawa City. The test was performed using an American-made 4 lamp open luminaire with a specular reflector. Final HAS lighting would require enclosed luminaires, with a UL Class I, Division 2 hazardous location classification. To develop product specifications for this project, Bart turned to Darrell Packard of Associated Lighting Reps in Oakland, CA.

Paramount Steps Forward

Darrell suggested Paramount Industries because of their custom design experience, their manufacturing capabilities for heavy-duty industrial luminaires, and their quick delivery. "Nobody else could offer a UL Listed multi-lamp hazardous location troffer."

Utilizing eight 54-watt T5HO lamps and a specular reflector in their hazardous location HS2 model Techniseal® troffer, Paramount created a new 2x4 luminaire. With eight lamps, it delivers up to 40% more mean lumens than a standard 400-watt metal halide luminaire. Even with only six lamps, it can still provide equivalent light levels while yielding up to 25% energy reduction (according to ballast manufacturers' statements). Other advantages over metal halide include instant start up, better lumen maintenance and excellent color rendering.

Physically, a prismatic acrylic lens on the luminaire helps distribute light more evenly, reducing the harsh, contrasty shadows generated by the original "point of light" HPS luminaires. The luminaire also has a 6.5" high profile, while many HID luminaires require a minimum 12" depth.

One key issue was the 200V/50Hz Japanese electrical system. Switching to an alternative universal voltage ballast eliminated the problem and added end-of-life sensing. Mounting was also an issue, since these units would be in an arched ceiling situation. But Paramount's custom capabilities made it easy to develop a mounting bracket that could be utilized with the existing structures.

The Air Force and local Japanese engineers reviewed drawings and product samples for six months



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before reaching a consensus. They opted for the six lamp version. 765 of the new luminaires were ordered for the 31 shelters on base.

Contractors began installing the new luminaires in March 2004. By July, 50% of the shelters were changed over. The project is scheduled to complete by December. Installation has been staggered among the buildings to keep disruption of defense work to a minimum.

Twenty-four units were installed in each 8,758 sq. ft. shelter. The HAS ceilings were also cleaned and repainted. The luminaires were mounted with a 20 x 18 ft. spacing layout. Because of the curved ceilings, mounting heights varied from 17 to 25 ft.

Capt. Porter also ordered 255 of Paramount's three lamp HT5 model Paramyd® luminaires. These will be installed at floor level to provide extra light underneath the aircraft. Four of these will be mounted along each side of the shelters and two by the back door.

Mission Complete: A Success

After installation, all involved parties were impressed. "All customers that I have talked to say the difference is 'night and day.' I've heard nothing but good things about these lights," said Capt. Porter.

New light levels averaged 50 footcandles in the first shelter. This was more than double the levels of the original HPS, but because of the whiter light it gave the visual impression of being even brighter. Master Sergeant Brohal reported "All the distracting shadows have disappeared and colors are more true. I feel we can do our job safer under this new white light."

Even with the dramatic improvement in light quality, energy consumption was reduced. Capt. Porter commented "They don't care that I'm saving 25% in energy, all they know is that they can see and they can do their job safely."

Paramount lighting is deployed at a number of US military bases across America, and now around the world.