



## FUTURE POSSIBILITIES: A PRESENTATION OF THE CHU-SAM MISSILE DEFENSE SYSTEM

Article by 2<sup>nd</sup> Lt. Patrick Cooney, 1-1 ADA

*A Japan Ground Self Defense Force (JGSDF) reload team stands at attention shortly before beginning a demonstration of the Chu-SAM (surface-to-air missile) Medium-Range Air Defense System's reload capabilities to the 1st Battalion, 1st Air Defense Artillery (1-1 ADA) Regiment on 13 May 2013.*

*(Photo by Chip Steitz, 10th Regional Support Group)*

**OKINAWA, Japan** – Monday, May 13<sup>th</sup> was a rainy, muddy day that is typical of this time of year in Okinawa. However, a dedicated group of soldiers were hard at work preparing their missile defense system for operation. Despite the rain, the equipment was in pristine condition, and anyone who saw the unit could tell that the soldiers took exceptional pride in the appearance and maintenance of their system. Even though they were working in the Fire Training Area on Kadena Air Force Base, these were not American soldiers. Rather, they were members of the Japan Ground Self Defense Force (JGSDF), 6th Air Defense Artillery Group (ADAG), a sister unit of the U.S. Army's 1st Battalion, 1st Air Defense Artillery (1-1 ADA) Regiment.

The soldiers were preparing a display of the Japanese Chu-SAM (surface-to-air missile) Medium-Range Air Defense System. The Chu-SAM is designed to engage medium-range tactical ballistic missile threats, and contains a total of six missiles per launching station. The display provided an opportunity for visitors from the U.S. Army and U.S. Air Force to receive an up close view of each component of the system. Each piece of equipment had an English speaking JGSDF representative who was welcoming and quick to answer questions about the missile system.

The JGSDF appear to have taken the basic components of the Patriot Missile System while they were designing the Chu-SAM and improved upon aspects of efficiency and portability. Similar to Patriot, the Chu-SAM has individual vehicles for its radar, electronic power plant (EPP), and engagement control station (ECS). The system also includes a combined battery command post with an antenna mast group.



*At left, a JGSDF Chu-SAM reload crew operates the crane from a safe distance by use of a remote control station. (Photo by Chip Steitz, 10th Regional Support Group)*

However similar the Chu-SAM is to the Patriot System, it also contains several significant changes that would better adapt it to the needs of the JGSDF. One notable difference is that all of the vehicles are smaller and more compact than their Patriot counterpart. For

example the Chu-SAM ECS was about the size of a High-Mobility Multipurpose Wheeled Vehicle (HMMWV), compared to the Patriot ECS that sits on the larger M1096 frame. The smaller size allows many of the vehicles to be self powered, with the exception of the radar. This allows the EPP to provide power to the radar only, with cables that are noticeably thinner than those on a Patriot EPP.

Another modification that seems to have a great effect on the maneuverability of the Chu-SAM is the lack of any vehicle trailers for its radar or launching stations. Combined with the smaller size of the vehicles the entire system would be more maneuverable for islands with narrow roads and vegetation such as those here on Okinawa. A benefit Patriot has over a trailer-less system is flexibility. If a Patriot truck were to break down, another could be substituted to relocate the trailer.

Perhaps a highlight of the day's display was the demonstration of the Chu-SAM's reload capability. The entire reload drill was conducted by a crew of five soldiers. One soldier would operate the crane, while receiving directions from another soldier in the form of verbal cues and hand signals. For most of the drill the other soldiers operated as safeties, who could warn the rest of the crew if a potentially dangerous situation arose.

*At right, a Chu-SAM Missile Defense System that holds up to six missile canisters at a time, and is capable of a vertical launch. (Photo by Chip Steitz, 10th Regional Support Group)*

The drill began with both the launching station and the reload vehicles parked end to end with the crane positioned closest to the empty missile canisters on the launcher. Using controls operated from a remote device, the crane's boom was swung 180 degrees and then lowered to pick up two



new missile canisters at the same time. The crane's boom was able to latch onto the canisters without the need for soldiers to climb onto the launcher. The crane then quickly moved the new canisters to the launching station, and automatically latched them in place. The entire process of loading the two missile canisters lasted approximately 10 minutes. In comparison, Spc. Tyler Williamson of Charlie Battery, who has been on the fastest reload crew in 1-1 ADA three times in a row, said, "Unless you are an experienced crew, it would be difficult to reload four canisters in less than 40 minutes."



*At left, members of the JGSDF demonstration team pose with visitors to include (seated, far left) former 1-1 ADA Commander, Lt. Col. Joseph McCallion Jr., and (seated, second from left) former Commander U.S. Army Forces Command Japan, Maj. Gen. Michael T. Harrison. (Photo by Sgt. 1<sup>st</sup> Class Kannetaka, Japan Ground Self Defense Force)*

Perhaps what was most striking during the reload was how quiet the equipment and operators were during the drill. The vehicles operated with only a slight electric hum, compared to the loud gasoline generators of a Patriot

launching station. The only other sounds were the commands of the signal and the occasional alert from a safety that they were ready to proceed to the next step in the drill. It was in stark contrast to the shouts heard from the signal, crew safety, and two guide tags during a Patriot guided-missile transport reload. The lack of noise could have safety benefits as all crew members would be less likely to be distracted or mishear a command.

The day's demonstration continued with an emplacement of a Chu-SAM launcher station. A Chu-SAM launcher station consists of a single truck with no trailer. This configuration sacrifices some of the flexibility of the Patriot's trailer based setup. The benefit of having no trailer was that the two man mobility crew was able to utilize a computerized leveling system which was able to level the entire truck automatically. The emplacement drill ended with the missile canisters positioned vertically with a blast shield lowered beneath them. The emplacement drill took approximately 7 minutes compared to an average time of 15 minutes to complete a Patriot mobility drill.

There were a number of features of the Chu-SAM system that if adapted for Patriot could affect the ease of use, and more importantly, the safety of its operators. For instance the Chu-SAM radar is able to search for and engage targets in a 360 degree radius. This adds a valuable battle capability to the system, and the launchers and radar would never require rotation during operation. This eliminates the risk of a soldier being injured while the equipment is being moved.

By seeing a relatively new missile defense system, it also gave those in attendance a glimpse of what improvements Patriot can possibly expect to see in the future. Upgrades like the automated components used in the Chu-SAM's emplacement drill could potentially increase the speed of our own drills. Other improvements may result in increased safety and a reduction in injuries to the force.

However, before we could see these upgrades, the United States must consider the substantial costs of upgrading all of the Patriot battalions that are operating throughout the world. Improvements that may seem like a simple fix for a battery could require significant funding if it were applied to the entire air defense branch. The cost of maintenance and replacement must also be considered since many batteries are forward deployed, or deploy frequently.

The display of the Chu-SAM was a great opportunity to learn about the weapon systems of our sister unit and to continue building esprit de corps with them. 1<sup>st</sup> Lt. Brett Holtzman who was in attendance during the display said, "I left with a better understanding of our allied and future capabilities in the defense of Okinawa."