

21st Century Rivet Joint



By Marcus Weisgerber

Photos by Jim Haseltine

The RC-135V/W Rivet Joint is far from attractive. The RJ features a bulbous nose, two jowls on each side of the fuselage extending from the rear of the cockpit to the wings, and bumps and lumps just about everywhere, with pointy antennas jutting from its roof and belly.

The aircraft is not winning any beauty contests. But what it lacks in looks, it makes up for in capabilities.

Don't let the nearly 50-year-old heavily modified airframe fool you. Inside, the RJ is packed with some of the most sophisticated and sensitive surveillance equipment in the Air Force's inventory, providing a great deal of vital intelligence. And today, perhaps more than ever, the Boeing 707-based RJ is doing more than just listening; it's helping to save lives on the battlefield.

The aircraft and its crews—which spent decades flying near the Soviet Union gathering intelligence that commanders hoped would give the United States a leg up on its rival during the Cold War—have spent much of the last

decade adapting to a new mission. The mission is more tactical in nature, and has a more immediate use for the critical battle information from the front lines in Southwest Asia.

“It's not that the Cold War-like missions have gone away, ... but ... we've adapted to this fight that we're in today,” Brig. Gen. John N. T. Shanahan, commander of the 55th Wing at Offutt AFB, Neb., said in an interview.

The 55th Wing oversees all of the Air Force RC-135 signals intelligence (Sig-int) aircraft, although the full complement of the wing's airplanes is rarely there. Rivet Joint reconnaissance squadrons are based at locations around the world, including RAF Mildenhall in the United Kingdom and Kadena AB, Japan.

The wing has continuously deployed to the Middle East since 1990 when it began flying missions in the days following Iraq's invasion of Kuwait. Today, the deployed Rivet Joint aircraft routinely fly missions in support of

operations in Iraq and Afghanistan from a forward operating base in the Persian Gulf region. With only 17 Rivet Joints in the inventory, they are all in high demand.

RC-135s have evolved into key battlefield intelligence aircraft, and the UK will soon fly its own.

“It has always been a low-density, high-demand asset, which translates to crews being on the road,” said Maj. Gen. Thomas K. Andersen, director of requirements at Air Combat Command.

Over the last decade, the Air Force has changed the way it employs the Rivet Joint, specifically in irregular combat in Afghanistan and Iraq. Today's wars are, needless to say, far different from the Strategic Air Command days.

At left, a Rivet Joint displays its antennae and sensors. Below, an RC-135S Cobra Ball in flight passes an RC-135W on the flight line at Offutt AFB, Neb.

“The world has changed [and] the kind of fight that we’re fighting has changed quite a bit, and with that, we have changed,” Lt. Col. Richard M. Rosa, commander of the 763rd Expeditionary Reconnaissance Squadron, based in Southeast Asia, said in an interview.

“We’ve adapted over time, ... from a predominantly strategic asset that is able to bring a tremendous amount of capability to bear in the tactical environment,” said Rosa, who has been part of the RC-135 community since 1999.

The shift from the strategic to tactical means RJ aircrew are now protecting ground troops from deadly roadside bombs. While the details of these tactics are classified, service officials say Rivet Joint crews are responsible for helping identify improvised explosive devices, and in turn, saving lives.

In addition to its traditional signals intelligence mission, Rivet Joint aircrews have adapted in four key areas, making the aircraft increasingly relevant on the battlefield today. Airmen on board frequently provide imminent threat warning, support for troops in contact, and support for personnel recovery. Crews are also cross-cueing, a tactic that allows the RC-135 to electronically connect to other airplanes (such as the F-15E, A-10, U-2, EC-130 Compass Call, and MQ-1 Predator) and with other assets in the air and on the ground.

It was during the first Gulf War that the aircraft and crews began integrating into more of a tactical role, providing

near real-time threat warning and enemy indications, directly supporting troops on the ground.

Shanahan attributes much of the mission success in this new tactical irregular warfare environment to the crews and linguists, who have proved to be innovative in the shifting, unpredictable environment of IW.

“We’ve done it through tremendous innovation, whether it’s technological or if it’s really personnel, just people doing innovative things, trying new things, doing great things, each and every day,” Rosa said. The information obtained is pushed in real time to ground units through a variety of means, said Shanahan. Data are also collected and made available for further worldwide processing, analysis, and dissemination via the Real-Time Regional Gateway.

The Best of Both Worlds

Despite the shift to the tactical mission, crews still must remain proficient for strategic intelligence-gathering duties.

The stand-up of the 338th Combat Training Squadron at Offutt in 1999, to train aircrews for operations in 12 different types of reconnaissance aircraft including the Rivet Joint, has helped better prepare aircrews for shifting between strategic and tactical missions. In the past much of the training was “farmed out” to other entities, according to Rosa. For example, Rivet Joint pilots and navigators trained with KC-135 tanker crews while electronic warfare officers and other operators were trained “in house,” within individual units to which they were assigned.

“The evolution of the training unit allows the foundation to be built on both that strategic-type mission, as well as that tactical-type mission,” Rosa said.

As the Air Force’s Rivet Joint mission evolves, the United Kingdom’s Royal Air Force is poised to become the first foreign nation to fly the RC-135.

The Air Force planned to start training the first British RC-135 aircrews at Offutt this past fall, with the 338th CTS overseeing the task. The initial cadre will consist of about 100 RAF officers from the electronic warfare and linguist career fields, and training will take about a year. Maintainers will start learning how to take care of the aircraft once the first aircrew classes conclude.

Once trained, the Brits will join their American counterparts on USAF Rivet Joint missions until RAF RC-135s finish undergoing extensive modifications. Three Eisenhower-era KC-135 aerial tanker airframes will be transformed into high-tech, intelligence-gathering aircraft. A co-manning arrangement between Air Force officials and their British counterparts allows for joint crew operations.

“Now we have the best of both worlds,” Shanahan said. “They’re going to preserve their renowned [signals intelligence] capability; ... we are going to take advantage of the capabilities that they bring through an enduring partnership, which will include flying with each other over the next decade and beyond.”

The RAF is in the process of transitioning its Sigint missions to the RC-135 from the Nimrod R1, which the Ministry of Defense intends to retire in the coming





Brig. Gen. John Shanahan (l) tours a security forces facility with TSgt. Anthony Pevestorf at Offutt. Shanahan has seen the RC-135's shift to a more tactical role.

months. The RAF originally planned to upgrade its Nimrod fleet—which began flying in the late 1960s—through the Helix program.

However in 2006, a Nimrod exploded in the sky above Afghanistan, killing all 14 crew members on board. Soon after, the British military asked the Air Force about the potential of acquiring Rivet Joints to replace its Nimrods. The Pentagon subsequently offered London one RC-135 aircraft. A foreign military sale was officially announced in October 2008, and the British government has since signed a letter of offer and acceptance to receive three aircraft.

The RC-135 “allows the UK to preserve an incredibly good Sigint capability in their country that they’ve had for decades and would be losing if they were not to get into another program,” Shanahan said.

Last fall, the British Rivet Joint program survived a major scrub of military programs in the United Kingdom, which calls for cutting the country’s defense budget by eight percent over the next four years. The addition of RC-135 signals intelligence aircraft into the RAF inventory will give the British the ability “to provide global independent strategic intelligence gathering,” according to the defense white paper released by the government this past October.

The future of British signals intelligence operations rests on the RAF’s acquisition of Rivet Joint aircraft. L-3 Communications in Greenville, Tex.—

which maintains and upgrades Air Force RC-135s under the guidance of USAF’s Big Safari program office, the service’s rapid acquisition directorate—will convert the KC-135Rs into Rivet Joint configuration, which essentially involves gutting the airplane. This includes the installation of additional cooling units, removing the tanker boom, and installing the Rivet Joint’s signature “hog nose” radome.

A Force Multiplier

British crews from 51 Squadron at RAF Waddington—home to the Nimrod R1—are expected to receive their first RC-135 in 2013. While US officials are working through security clearance issues, indications show the British RC-135s should be largely the same as Air Force Rivet Joints.

“I think this is one that does wonderful things for both the UK and the US because we take advantage of strengths in both countries,” Shanahan said.

Just how long the Rivet Joint will continue to fly is anyone’s guess.

Some Air Force estimates have the RC-135 in the inventory for another 30 years. Over time, the wing’s RC-135s have received numerous upgrades, including glass cockpits, radios, more powerful engines, and a tactical display for pilots. Every four years, each RC-135 goes through an 18-month overhaul at an L-3 facility in Greenville. “The jets are holding up well,” Rosa said, noting the work done by maintainers in theater helps keep the aircraft flying.

Now aircrews are hoping for new tools some service officials say could revolutionize the way they gather and process information. The installation of new satellite communications equipment linking the aircraft with the Wideband Global Satellite Communications (WGS) system could allow aircrews to share the information they gather with intelligence processing centers on the ground, including the Air Force Distributed Common Ground System.

“It’s going to be a true force multiplier,” Shanahan said of WGS. “I look [at] it as an exponential leap in our capabilities in terms of bandwidth both to the airplane and off the airplane.”

WGS would allow the Rivet Joint to share more information with other aircraft and ground crews in real time, thus allowing more exploitation to

occur simultaneously. When WGS bandwidth is combined with ground processing, exploitation, and dissemination improvements such as Service Oriented Architecture, “we’re going to be able to blow past this idea of reachback and turn it into something that we’ll call ‘reach anywhere,’” Shanahan said.

The installation of the capability is like adding “three to four crews of manpower, being able to collect against a target in real time to do processing, exploitation, and dissemination on a massive scale,” according to Shanahan. “We’ll have a whole lot of capability against a target set with our airplane, and of course, others will be out there collecting on the same target set.”

This all sets the stage for full integration into the Air Force’s DCGS, meaning the information will not just be available to intel analysts, but to other service members in real time. “We’ve started down that path, but WGS lets us sprint instead of just crawling or walking,” Shanahan said.

As the crews and aircraft continue adapting to irregular warfare missions, officials are also considering the addition of a new command and control oversight position in the back of the aircraft, as well as the new equipment.

Dubbed the nonkinetic effects package commander, the concept is much like the airborne strike package commanders, who have been part of all US conflicts since World War II. “We now need a similar position for a one-stop tactical-level boss to plan, direct, execute, and—to some extent—assess nonkinetic effects as part of air tasking order execution,” Shanahan said.

The concept calls for this new commander to work closely with the air and space operations center “to ensure operational-to-tactical integration,” according to Shanahan. Officials are currently building tactics, techniques, and procedures for the airborne commander slot and plan to test the use of the position during a major electronic attack and intelligence-surveillance-reconnaissance-focused Red Flag exercise this spring.

“We are well-positioned to take on this role in the RC-135 Rivet Joint and the EC-130H Compass Call,” Shanahan said. “I like what I see so far and I like the fact that we’re moving out on it.” ■

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