



Mustang RCR* Project

by David G. Powers

Unless otherwise noted, all photographs are courtesy of the G.V. Collection.

The 17 May 1974, issue of the “NWC Rocketeer” – the base newspaper for the Naval Weapons Center (NWC), China Lake, California – ran a front page article announcing the upcoming Armed Forces Day open house, to be held that following Saturday. Listed in the article were a number of aircraft to be on public display, including many birds then current in the Navy/Marine Corps inventory - Douglas A-4 Skyhawks, Grumman A-6 Intruders, McDonnell F-4 Phantom IIs and Bell AH-1J Cobra gunships, among several others. The article also noted, with an accompanying photo, a U.S. Army P-51 Mustang (although the designation F-51 would have been more appropriate). This aircraft was not a pampered hangar pet of some wealthy civilian owner, but rather an active duty military aircraft still in operation long after the type had been retired from front line squadron service. If this wasn't unusual enough, as the photo in the article shows, this Mustang also packed an unusual punch, as

A fine in-flight image of 68-15796 - the airworthy Cavalier Mustang equipped with two M40 106mm recoilless rifles. The RCRs replaced the Cavalier-supplied wing tip tanks.

it sported a pair of 106mm recoilless rifles mounted one on each wingtip.

Over its long history there have been many strange things seen in the high desert skies over the U.S. Navy's NWC. And no, not some otherworldly machine from a distant planet (that's Area 51, Air Force stuff, over in Nevada), but military aircraft festooned with all manner of weaponry. If it could be fired, launched or dropped from an airplane, one could usually find it being tested at China Lake. Back in the early 1970s, the casual observer who lived in the area around Ridgecrest, California, would be quite familiar with the aircraft to be displayed at the 1974 Armed Forces Day open house. But, an F-51 Mustang? Again, this was not some civilian thoroughbred trotted out for the open house, but a machine still on active duty, and earning military pay.

Mounting a large caliber weapon on an aircraft is nothing really new, the idea being that a single hit from a big gun could bring down an aircraft, or alternatively,

*ReCoilless Rifle

do considerable damage to a ground target, like a vessel, tank or a bunker. An early example of this concept was the French "High Sea Flying Boat," circa 1918. Although it never advanced to the operational stage, the idea here was to mount a 75mm cannon on a flying boat, to be used against German submarines. The rate of fire was a bit slow, but this was considered acceptable, as one hit from a 75mm shell would certainly do the trick against a submarine. World War Two saw

several aircraft equipped with large bore weapons. Examples that actually saw service include the North American Aviation B-25G/H Mitchell – fitted with a single U.S. Army 75mm cannon, and the de Havilland Mosquito FB XVIII "TseTse Fly" – fitted with a 57mm Molins anti-shipping gun. Other aircraft were tested, such as the Italian Piaggio P.108A, one of which reportedly flew with a 105mm howitzer on board, but never saw any action. Developments both during and after World War Two indicated that while the big gun toting aircraft could certainly be an effective weapon, the advent of rockets, both guided and unguided, as well as other guided ordnance, such as early smart bombs, could also do the job. For example, the 5-inch Zuni rocket, fitted with a high explosive warhead, had an effective casualty radius similar to a 155mm artillery round.

When it comes to buying stuff, one concept that has been around since almost the beginning of military procurement is the idea of "off-the-shelf." In its most basic terms, off-the-shelf can mean taking an existing item, and using it for alternative purposes, thus fulfilling an operational need. For example, the B-25C Mitchell airframe already existed, as did the 75mm M4 cannon, and since both items were thoroughly tested and operational, they could be considered off-the-shelf. The operational need was for an accurate ground attack aircraft that could deliver an incredible wallop, and as history shows, combining these two off-the-shelf components resulted in the B-25G, and follow-on B-25H. Using off-the-shelf items

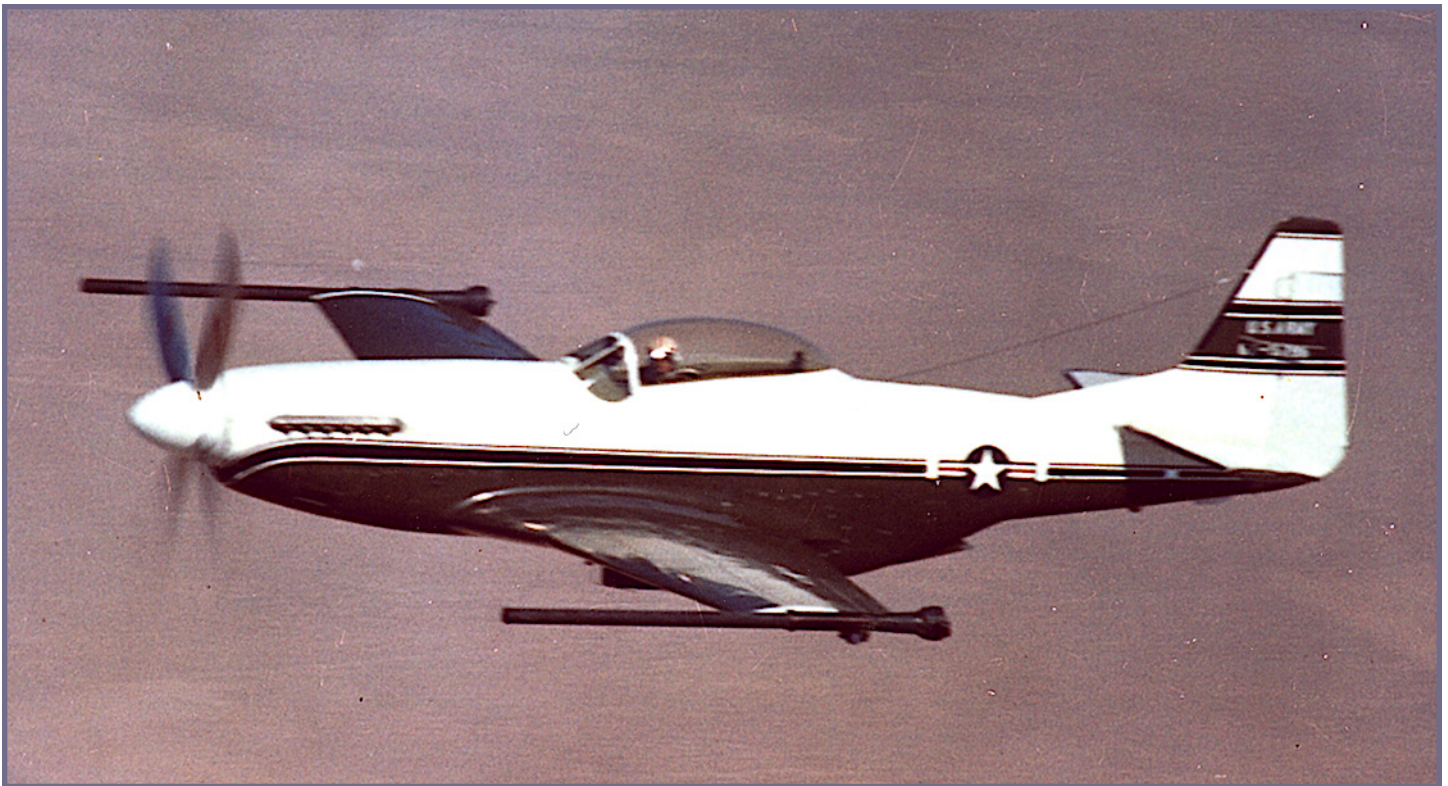


A photo of the Mustang used to test the recoilless rifle installation that appeared in the 17 May 1974 issue of the NWC Rocketeer, the base newspaper for the Naval Weapons Center, China Lake, California.

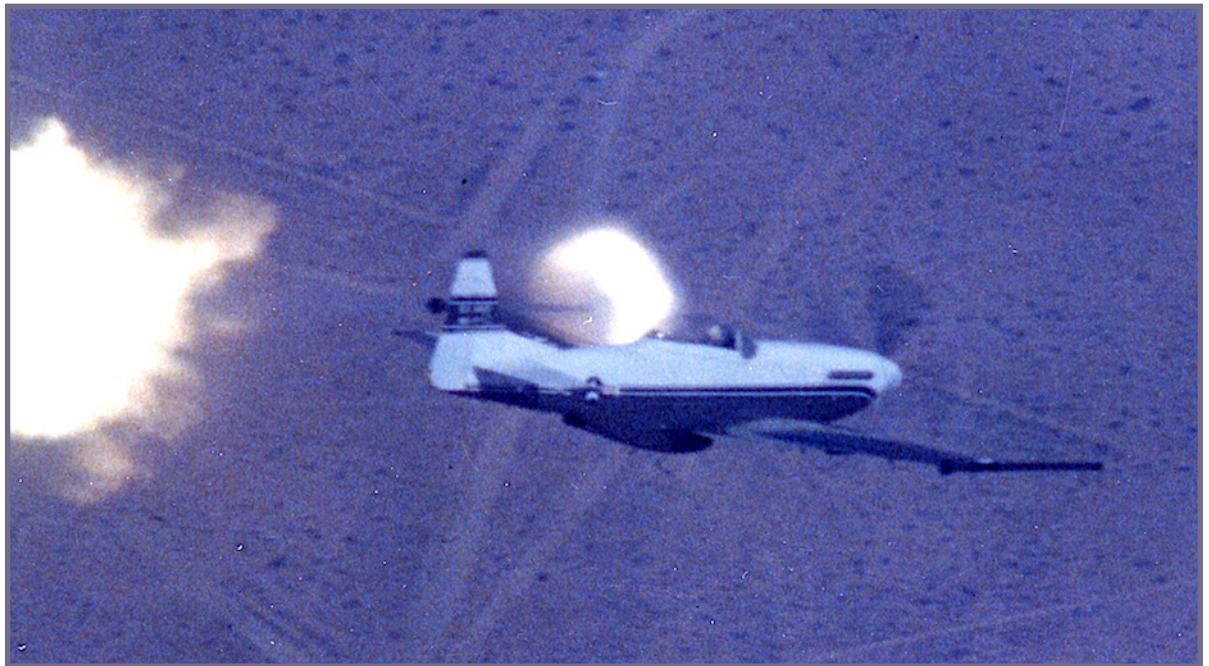
usually means the time from the initial idea to first service introduction is kept to a minimum.

In the late 1960s, the United States was involved in numerous conflicts, both overtly and covertly, in hot spots the world over, and as such various military minds were ever active in the pursuit of interesting ideas for new weapons systems. Money, of course, was usually tight, so "cheap" and "off-the-shelf" were buzz words of the day. The big shooting match in Southeast Asia got the largest chunk of the money, but there were also smaller, but nonetheless equally important disputes, that needed support. The U. S. did not always deploy troops to these areas, instead supporting its friends with war fighting equipment. Perhaps there were a few off-the-shelf items – like the 106mm recoilless rifle – that could be inexpensively put to alternate uses.

The M40 106mm recoilless rifle (RCR) was originally fielded back in the mid-1950s as an anti-tank weapon issued to dedicated anti-tank platoons of larger infantry units. As the name suggests, the idea behind any recoilless rifle is the fact that there is little, if any, recoil when the weapon is fired. This is accomplished by venting as much of the propellant force out of the back of the barrel as gets vented out the front pushing the round down



range. While this may seem like a rather inefficient use of the charge, it meant that the barrel and breach assemblies could be built relatively light, and thus more easily transported on the backs of an anti-tank platoon soldier. A simple weapon, the M40 RCR, its accuracy enhanced by a rifled barrel, proved



to be effective against not only tanks, but also bunkers and other entrenched positions. The M40 106mm RCR was found to be economical and was built in large numbers, finding its way into the arsenals of several countries around the world. Replaced by the TOW (Tactical, Optically tracked, Wire guided) missile, there have been reports that later versions of the venerable M40 have shown up in the more recent conflicts in Southwest Asia.

The Three U.S. Army Mustangs

In March 1966, the U.S. Army selected the Lockheed

Rather blurry images but interesting all the same. Cavalier Mustang - 68-15796 - on one of the ranges at China Lake. The blast effects - both the muzzle and exhaust gases - of the RCR caused damage the empennage of the Mustang.

AH- 56 Cheyenne to fulfill the role as the Advanced Aerial Fire Support System (AAFSS). The Cheyenne was one hot ship - very fast (220+ knots max) for a helicopter and incredibly maneuverable - which put the Army Research & Development folks in a bit of a bind. What was needed was a chase plane that could keep



up with the Cheyenne (first flight September 1967) during its flight test program. Aircraft like the North American Aviation T-28B Trojan, and the Beechcraft U-21 Ute, were evaluated and rejected, as neither could keep up with the Cheyenne during rapid acceleration phases, as well as during abrupt maneuvering. Jets were considered, but also rejected as not having the required on station time, as well as being quite expensive to operate. Ultimately, Army officials opted for a North American F-51D, of which there were still a few in the U.S. Air Force inventory. This particular Mustang - Serial Number (S/N) 44-72990 - was transferred from the Air Force to the Army in 1967. While this airframe had been refurbished and modernized by the Cavalier Aircraft Corporation, of Sarasota, Florida, it was not considered a Cavalier-branded airframe. The actual change of ownership of this airframe is somewhat obscure, as it had spent many years on the civil register. It is surmised that this airframe had been from a batch of F-51 airframes gathered from various sources by the Air Force, who in turn contracted with Cavalier for refurbishment and upgrade, preparatory to the Air Force issuing the airframes to foreign military assistance programs.

The Army was so impressed with the capabilities of the F-51 that in 1968, procurement officials placed an order for two additional Mustangs for the Cheyenne program.

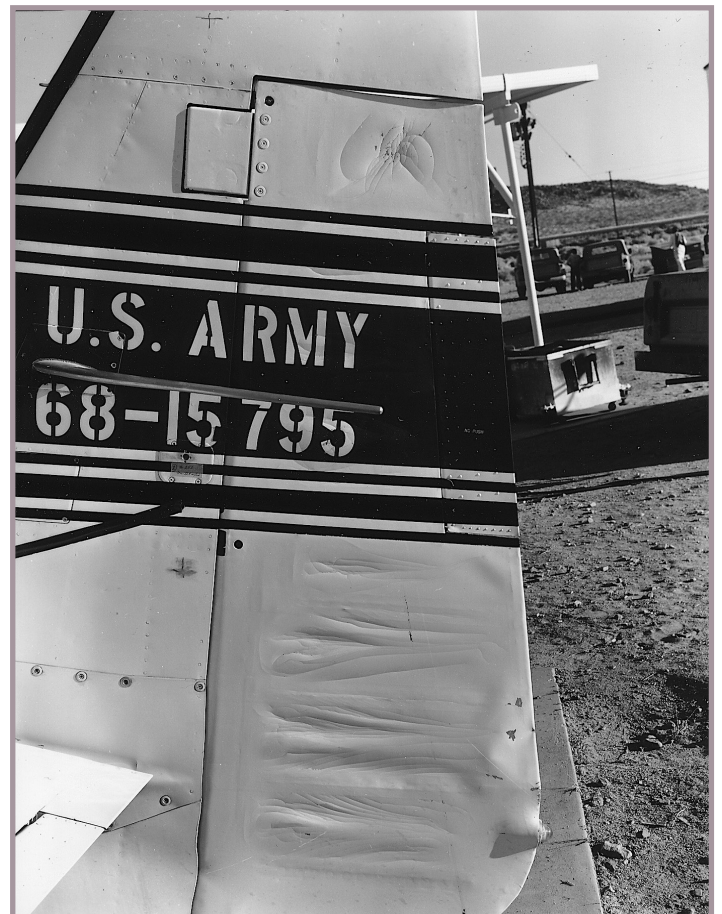
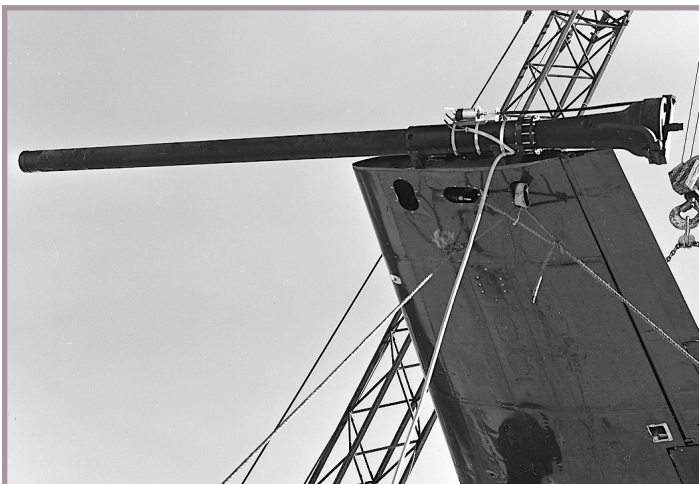
Cavalier Mustang - 68-15796 - on the ramp at China Lake. It was a very popular aircraft at the time, and many of the aviators stationed there wanted to take it for a flight, but this was not allowed. Note, the two-seat cockpit.

Both airframes - S/Ns 68-15795 and 68-15796 - had been extensively modified by the Cavalier Aircraft Corporation, and were considered genuine Cavalier T Mk2 Mustangs. The three Mustangs proved to be quite handy, and could keep up with the Cheyenne in most all of the prototype attack helicopter's flight regimes, except maybe in a hover. Used mostly as camera ships, the Mustangs were also used as adversary aircraft, going head-to-head with the Cheyenne. As capable as the Cheyenne was, the program was plagued with problems, along with the ever-present budget tribulations, and in 1972 was canceled. Although the trio of Mustangs were retained by the Army, and reassigned various test and evaluation duties, both as chase planes and as airborne test platforms, by early 1973 the Mustangs were spending much of the time in the hangar.

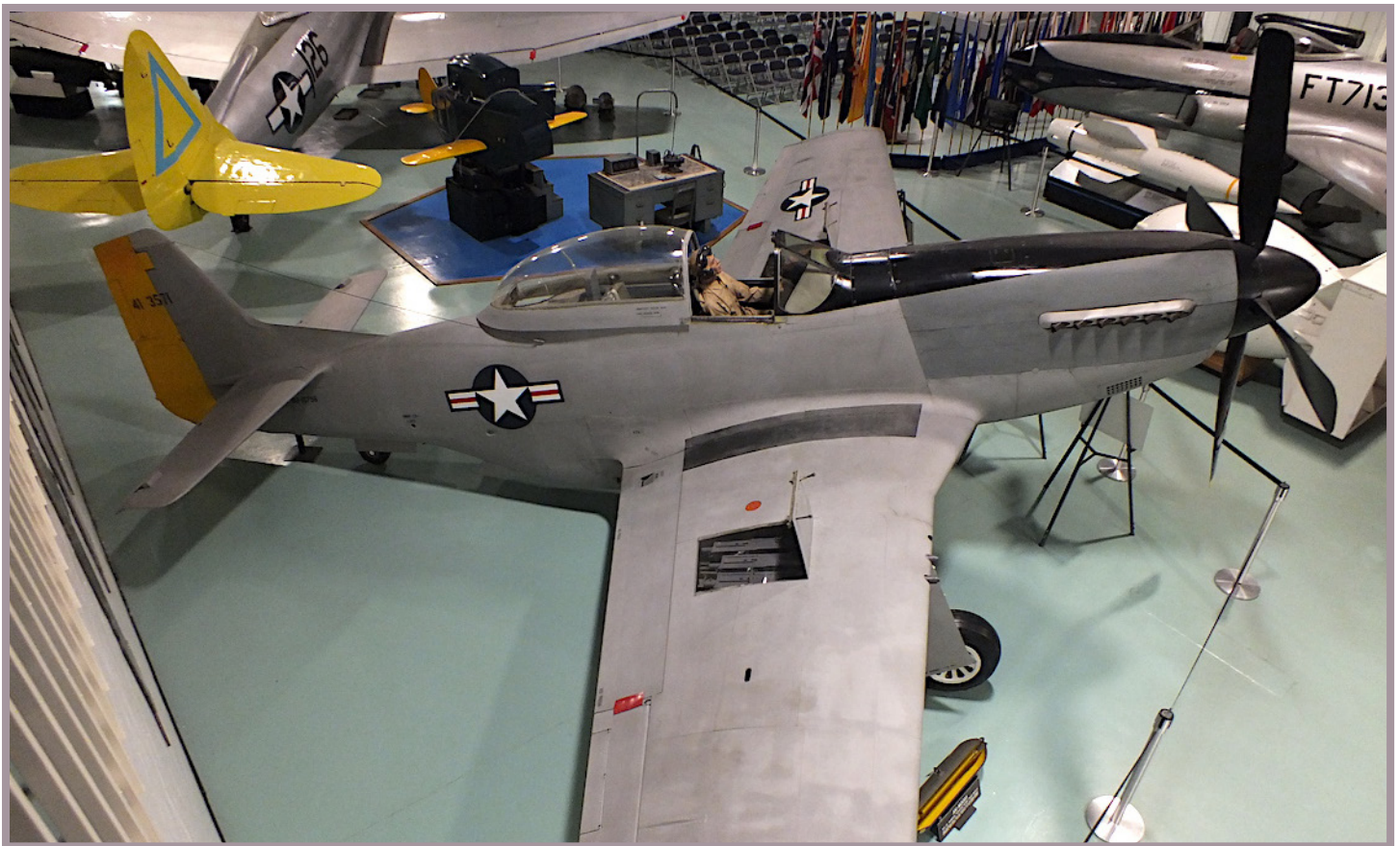
The Mustang RR Project

In the early 1970s, while the Army's Mustangs were still chasing the Cheyenne around the skies, other officials, particularly within the Army and the

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This Page: The second Cavalier Mustang to be used during the RCR project - 68-15795 - was not airworthy, and was used only for ground testing. Seen here - clockwise from the top - the airframe being hoisted on to the test stand. Note the lack of a propeller, as well as the stock wingtip tank still on the starboard wing. Also note the undamaged empennage. Although the RCR project was generally successful it did cause quite a bit of damage to the empennage. Other aircraft test during the program - for example, the North American Aviation OV-10 Bronco - also received such damage. Finally, a close-up of the 106mm recoilless rifle. It was a single shot weapon.



U.S. Marine Corps, were working on another project. The idea was to take an off-the-shelf 106mm RCR and mount it under the centerline of a North American Aviation OV-10 Bronco, thus giving an already scrappy aircraft an incredible punch. At the time, there were studies also underway to modify the single-shot 106mm RCR, which in its current configuration could not be reloaded in-flight, in order to make it a true multi-round weapon. For the time being, however, it had determined if firing the 106mm was even feasible in flight. While ground firing tests had already begun on a modified OV-10, it was decided in the interim to fit the RCR to an F-51 Mustang, just as an airborne proof of concept. Also, sort of in the background, the Air Force was showing some interest in the program, thinking the 106mm RCR would be a good fit for the Mustang-based, turboprop-powered Piper Enforcer. Indeed, the Air Force general in charge of the Enforcer project was sold all but on the 106mm RCR. So, with a multi-service interest in the airborne RCR, it was natural that aerial evaluation be conducted.

According to then Major Jack Pipa, USMC, the test pilot for evaluation, the program never really had an official name, simply and informally being called the Mustang RR Project. The program itself was rather convoluted - it was run by the Army, using a former Air Force, now Army aircraft, with Army weapons, assist-

ed by the Marine Corps with a Marine Corps Aviator as the sole test pilot, aircraft maintenance to be provided by the Air Force, and all this being based, supported, and flown out of China Lake NWC. All the time the Air Force brass was keeping an eye on the proceedings, and although the Air Force did not want the RCR-equipped Mustang, an RCR-equipped Piper Enforcer had a certain appeal. The Mustang RR Project began in mid-1973.

Two of the Army Mustang airframes were selected for the test, one for in-flight firing and one for ground-based firing. The flying bird was Cavalier Mustang - S/N 68-15796, while the ground test airframe was the other Cavalier Mustang - S/N 68-15795. Both birds were then at Edwards Air Force base, and although 796 was flown over to China Lake by Major Pipa, 765 was found not to be airworthy, and had the inglorious honor of being sling loaded to China Lake under an Army CH-47 Chinook. The 106mm RCRs were essentially unmodified infantry units.

The results of the airborne and ground-based firings were both positive and negative. On the plus side, the airborne firings were a success. This was not really a test of accuracy, but just to see if the RCRs could be safely fired in the air. Major Pipa noted that the RCRs fired as planned, and that by using simple aiming techniques he could hit his intended

target. There was no gunsight used. On the negative side, both airborne and ground-based firing, revealed that the high pressure blast cloud produced by the RCR did do some damage to the tail of the Mustangs. Engineers on the project thought that a simple modification to the blast vents on the RCR tube would eliminate this effect.

As previously mentioned, there was only one pilot involved in this project - Marine Corps Major Jack Pipa, who recalls, "I was the only pilot who flew the Mustang at China Lake, and I was the envy of every jet jock on the base. You see, my rep was in helos and few knew that I also had extensive experience in fixed wing reciprocating engines and conventional landing gear, both of which were a prerequisite for flying the Mustang. It was a one of a kind opportunity which I consider one of the two or three biggest highlights of my career. I have many stories about the check-out at Edwards AFB, how I accepted custody of the bird, and the stir it caused when I taxied it onto the parking ramp at the Naval Weapons Center at China Lake for the first time. There were many doubters, but the Admiral had flown the Mustang in Korea as an exchange pilot with the Air Force, so I had the boss on my side. Another story is how I convinced him to allow me to get it into the air."

As a side note, the concept of mounting a 106mm RCR on an OV-10 Bronco, which as previously noted actually pre-dated the Mustang RR Project, never went very far. There was some ground-based testing, similar to the tests conducted with 68-15795. The Bronco was mounted on test stand and the RCR was fired. Again, damage, rather severe damage this time, to the tail feathers, as well as the underside of the fuselage, was noted, although modification to the blast vents was predicted to prevent this type of damage. Major Pipa was slated to do the airborne testing of the OV-10, but the program never went further than the ground testing phase. One other concept called for mounting the same 106mm RCR on a Douglas A-4 Skyhawk, which was not pursued. While generally successful the Mustang RR Project was shelved in August 1974.

The Mustangs Today

All three of the Mustangs involved in the AH-56



The Two Cavalier T Mk 2 Mustangs

Above: 68-15795, the non-flying ground test bird, now on display at the Minnesota Air National Guard Base, at St Paul, Minnesota.

Opposite Page: The flying test bird - 68-15796 - on display at the U.S. Air Force Armament Museum, Eglin AFB Florida. No vestige of the 106mm RCR can be seen on either airframe. Both Photos: A.A.S. Collection

Cheyenne project were essentially grounded by 1975, but they managed to dodge the breaker's torch, and are still extant today. Two are currently on public display. Of the Cavalier T Mk 2 Mustangs - S/N 68-15795 - the bird used for the ground-based Mustang RR Project - is now on display at the Minnesota Air National Guard Museum at St Paul, while S/N 68-15796 - the flying RCR bird - is on show at the U.S. Air Force Armament Museum, at Eglin AFB, Florida.

The North American F-51D Mustang - S/N 44-72990 - is part of the collection at the U.S. Army Aviation Museum at Fort Rucker, Alabama, and is not currently on display.



Author's Note: The career of these three Mustangs is a subject of a fair amount of discussion and debate. If you have any additional comments or corrections, please feel free to drop the author a note at:

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