

# THE OUTPOST

U.S. ARMY YUMA PROVING GROUND, YUMA, ARIZONA 85365 | VOLUME 68 NO. 2 JANUARY 21, 2019

# **Mortars away**



Whether carried by a Solider or attached to a combat vehicle, virtually every type and variant of mortar in the ground combat arsenal goes through rigorous developmental testing at YPG. The proving ground also performs acceptance testing on random lot samples of existing mortars on virtually a daily basis. For the full story, please turn to page 6. (US Army photo)

# The power of a word

#### By Casey Garcia

Nine out of 10 people will fail with their New Year resolutions. 50% of resolution makers will fail by the end of January.

But one word sticks! If YPG has a word for 2019, I think it would be 'intentional.' Why? Army Futures Command is tasked with driving the Army into the future to achieve clear overmatch in future conflicts Who better to assist this Command and follow that vision than Yuma Proving Ground? The YPG team is competitive, comprehensive, and accurate; valued and respected by our customers and decision makers; and ensuring the utmost Warfighter success to deploy, fight and win. When Army Futures Command published the Army's six modernization priorities it was the clear intention of YPG and its state-of-the art instrumentation and equipment to support.

YPG is intentionally looking to fire further, with more precision and in extreme climates. We are taking lessons learned from history and improving and building next generation combat vehicles for intentional target detection. Within assured positioning, navigation, and timing the capabilities are showing intentional improvement in GPS support and communication and positioning systems. We are intentionally working weapon accuracy on future vertical lifts and within air and missile defense various groups are intentional with the mission to detect, locate, track, identify, and neutralize/ defeat assessments in realistic environments. The bottom line is YPG is intentional.

Countless people, schools, sports teams and big name companies have adopted the policy of a word. They put their word on shirts, inside locker rooms, on company swag, on posters and even on company automobiles. NFL and NBA teams choose their words for the season and talk about them before games.

You may not have any idea what your word is going to be this New Year, but there is a word that is meant for you to help you become all that you are meant to be. To help you get started, ask yourself a few questions. What do you want to focus on this year? What's in the way? What do you need more or less of? What needs to change?

Heavy equipment mechanic served at home, abroad /Page 2



Captain returns to YPG after five decades /Page 3



YPG's first walk/run of the New Year was fantastic! /Page 11



# Like a rock: heavy equipment mechanic served at home, abroad

#### By Mark Schauer

Testing in YPG's extreme environment is meant to push the most powerful military equipment to its breaking point.

When that happens to any mechanical facet of the hull of a massive tracked vehicle, it is Ben Bendele's job to get it up and running again.

The most common vehicles Bendele and his crew work on are M1 tanks, Bradley Fighting Vehicles, and Paladin self propelled howitzers, but the shop is also responsible for maintaining the proving ground's M88 armored recovery vehicles.

"It could be annual preventative maintenance, it could be corrective maintenance and troubleshooting," explained Bendele. "Throughout the whole day as one goes out, I get another one in."

Bendle has worked at YPG since retiring from the Marine Corps as a Master Sgt. in 1993. He began working on tire tests, but the large tracked vehicles under test at the proving ground caught his eye.

"I was working with wheels all the time and saw tanks go by and thought, 'I'd like to work on one of those,'" Bendele recalls. "They were short of personnel over here, so I transferred over."

He has been there ever since, seeing the tracked vehicle workload increase dramatically over the years. His excellence in the job resulted in Bendele being named YPG's civilian of the quarter several years ago, among other accolades.

A native of Santa Maria, California, Bendele and his brothers grew up on a dairy farm, milking cows and fixing tractors from a young age.

"I had a cousin who during Vietnam was in the Marine Corps and I decided to go the same way," he recalled. "Something caught me about the uniform."

Since he was only 17, Bendele needed his parents' permission to join, and his father, a Korean War veteran, tried to talk him out of enlisting.

"He finally got mad and signed it, and I've never been back since."

Marine Corps basic training was rigorous and demanding, but Bendele thrived.

"I went in weighing 139 pounds



Testing in YPG's extreme environment is meant to push the most powerful military equipment to its breaking point. When that happens to any mechanical facet of the hull of a massive tracked vehicle, it is Ben Bendele's job to get it up and running again. "It could be annual preventative maintenance, it could be corrective maintenance and troubleshooting," he said. "Throughout the whole day as one goes out, I get another one in." (Photo by Mark Schauer)

and came out of boot camp weighing 159 pounds. I gained that much weight in muscle."

His first duty station was Hawaii, but he was deployed for all but 13 months of his three year tour there. Though American combat in Vietnam had ended, Bendele participated in Operation Eagle Pull and Operation Frequent Wind, the harrowing evacuations of American, Cambodian, and South Vietnamese personnel from the capitol cities of Phnom Pen, Cambodia and Saigon, South Vietnam over the course of weeks in April 1975.

"We were there up to 24 hours. There was no time to sleep or do anything but get it done. When it came time for the last chopper, we had to throw our flight jackets and helmets over to get everybody in the chopper. We were receiving fire and you could see the tanks rolling in."

After being stationed in Oklahoma, Bendle first came to Marine Corps Air Station Yuma in the early 1980s.

"When I first got here to Yuma, I liked it. Everbody was telling me, 'You don't want to go to Yuma, it's too hot!' I was tired of cold weather: this is good for my bones."

He would ultimately return to a different squadron at MCAS-Yuma, but not before receiving orders to embassy duty. He went through the rigorous training course at Quantico, Virginia and served for three years as a detachment commander, first in Costa Rica, where he met then-American Secretary of State George Schultz, then in Stuttgart, Germany, where he was stationed when the Berlin Wall fell.

"I almost got to Morocco, but they sent me to Costa Rica, probably because I speak Spanish. I don't speak it fluently like my parents, though: I understand more than I can speak."

After one more stint on Okinawa, Bendele returned to Yuma and retired from the Marines, starting his career at YPG.

# **THEOUTPOST**

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# Captain returns to YPG after five decades

#### By Mark Schauer

It's said that the past is prologue, and seven decades of history have made U.S. Army Yuma Proving Ground the Army's busiest test center.

For many who served at YPG in uniform, the distant past doesn't seem all that distant. Memories of life here are preserved more surely than the detritus of camp life scattered by General Patton's men during World War II, rusty but still plainly recognizable on YPG's vast ranges.

When Larry Edens left YPG in 1965, "The Sound of Music" was a popular movie, Lyndon Johnson was president, and the United States' troop strength in Vietnam was escalating dramatically. After wanting to return for many years, Edens and his wife recently took a detour from a southwestern vacation to see what had become of the place he had served at so many years before.

A graduate of the Georgia Institute of Technology, Edens served in the Reserve Officers Training Corps during his college years while earning his chemical engineering degree and received a commission as a second lieutenant upon graduation. He underwent basic officer training at Fort McLellan in Alabama, and then awaited his permanent duty station.

"I asked to come out West because I had grown up in the Southeast and really wanted to see this part of the country. I asked for places like Fort Ord: I hadn't heard of Yuma before I got my orders."

Many of the buildings of the era still stand today, albeit remodeled

and with different uses. The house he lived in with his then-wife and infant son is still here, as is the building his office was in. The atrium in the Range Operations Center features studio portraits of all of YPG's past commanders: during Edens' time it was Col. James D. Taylor, and he recalls him as a figure held in high esteem by uniformed personnel.

"He had been to Vietnam: That's what impressed us, because in the early '60s, almost no one in the military had been to Vietnam. People who wanted to make a career in the Army were very interested in what Taylor had to say."

While here, Edens was a test officer dealing primarily with wheeled vehicles. YPG's demographics were considerably different at that time, with uniformed and civilian personnel represented in roughly equal numbers.

"In the mobility group there might have been slightly more military than civilian, but not a whole lot," he said. "There were a number of recent ROTC graduates coming out here."

Likewise, there were drafted privates with engineering degrees who were serving as test officers.

"They were the hardest people a young officer had to supervise. Up until being commissioned, they had the same background you had. It took a little more diplomacy."

Edens recalls durability tests of M151 Jeeps and other wheeled vehicles, as well as the occasional tracked armored personnel carrier in the blazing summer heat. Like modern day testers, Edens wrote co-



When Capt. Larry Edens (above) left U.S. Army Yuma Proving Ground in 1965, "The Sound of Music" was a popular movie Lyndon Johnson was president, and the United States' troop strength in Vietnam was escalating dramatically. It was a different time, but the proving ground's mission-- ensuring Soldiers' equipment works every time, wherever in the world they serve-- remains the same today, albeit on a much larger scale. Here, Edens appears with a M151 Jeep he tested at YPG during his long-ago tenure. (US Army photo)

pious reports and sometimes worked extremely long days if a given vehicle was falling behind schedule during mileage tests. In his second year at YPG he led 15 men to what was then called Artic Test Center at Fort Greely, Alaska, for a nearly five month test that saw temperatures that dipped below -70 degrees Fahrenheit. He was promoted to first lieutenant upon his return.

Back in Yuma, post life was languid. Edens recalls playing center in intramural flag football on Cox Field in the evenings. Hail and farewells were held on a monthly basis at the officer's club. There were few television stations, and reception on post was poor despite a receiver on a hill near main post.

"The station that came in best was from Mexicali. I remember watching bull fights."

Like the rest of the country, YPG was stunned by the assassination of President Kennedy. Edens recalls

driving down Barranca Road on November 22, 1963.

"I was on that road when I heard President Kennedy had been shot. For some reason, that day I was running home during lunch in my '62 Corvair and heard the announcement on the radio."

YPG was Edens' only permanent duty station during his time in uniform. After two years of active duty and three years in the reserves, Edens spent three years in the Tennessee National Guard and was promoted to captain on his last day. He returned to his job at DuPont in Tennessee, and later worked for his alma matter, Georgia Tech, for a number of years before retiring. Through it all, he considered his time at YPG as a formative experience, personally and professionally.

"I was around a lot of older, seasoned engineers, so it was a really great experience for me to be thrown among them. I learned a lot."

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### Shootin' the Breeze

# Wait 'til next year!

By David J. Horn

Well, time expired for the Arizona Cardinals on another season. The team definitely had a few ups and a lot of downs. Especially fourth downs.

Oh well, when I first came to Arizona in the early 1980s, Arizona didn't have an NFL football team. As a result of Tex Schramm of the Dallas Cowboys cutting deals with Arizona radio stations to broadcast their games for many years, most of the local folks working out here at YPG were Dallas Cowboy fans. Then in 1988, after all those years spent standing on the sidelines, Arizona got the Cardinals!

So as you enjoy your YPG halftime coffee break, here are some other Cardinal "replays" of mine:

• Did you know that the Cardinals are the oldest continuously run football club in the US? They were

organized in Chicago in 1898, later to join the NFL in 1920. They won two championships, one in 1925, and another in 1947. On the reverse side, they own the longest "currently active" drought, of over 70 consecutive seasons.

• The Cardinal Logo dates back to 1947. The original bird design on the helmets was sacked in 2005, and supposedly updated to look what was described as more "sleeker and meaner." Sleeker and Meaner? Between you and me...I think they need to just call another time out, go back to the scrimmage line, and run that play again.

• Illegal shift or not, the Cardinals moved from Chicago to St. Louis in 1960. While there, they were called the "Football Cardinals" so people wouldn't confuse them with the Baseball Cardinals. I don't know about

you, but it looks to me like the people living in St. Louis spend way too much time thinking about those little red birds.

- As I mentioned earlier, the team again went in motion and moved, to become the Phoenix Cardinals in 1988. At the time, lots of folks wondered why they didn't change their name to something more sleeker and meaner and more desert-like, such as the Scorpions, or Miners, or Mustangs. I mean, if it would have been another team...don't you think that the name "Phoenix Dolphins" would have sounded a little odd?
- For several seasons after that move to Phoenix, every game was an "away" game. When the Cardinals played the Chicago Bears at their first home stadium in Tempe, the stadium was full of fans wearing black. When the Vikings came to town, Tempe stadium was purple. The only real fans the Cardinals had during those early years, were all under the age of five.
- During the Tempe years, for the first couple of games early in the

- season, people didn't buy water as refreshment. They bought water as to not die.
- Possibly to widen the appeal of the Cardinals beyond the Phoenix metro area, to include anybody here in Yuma that may have been a Charger fan, the team changed its name to the "Arizona Cardinals" in 1994. I don't know if the new name moved the chains any or not, but I do know it was another missed opportunity to call themselves something other than Cardinals.
- In 2006, they moved into their new stadium in Glendale. I'm told that the designers specifically went into the huddle to come up with something that would look like a big barrel cactus. Until someone shared with me the cactus part of the story, I had missed that.

Anyway, I've hit the two-minute warning on this rant of probably unnecessary roughness. Let's all cheer that fact that the Cardinals are first... in line for next year's best draft picks, and hope that they don't drop the ball on that one.





### A View Without A Point

## A Farewell to YPG

#### By Teri Womack

As many long time Yuma Proving Ground employees have retired in the past few months, it's typical that I have been preparing farewell presentations providing a photo documentation of their accomplishments some spanning over the past 30+ years.

What's not typical, is reviewing my own 33 years on that same career journey.

While preparing for my own impending "Celebration of Civil Service" just a few short weeks away, I have been cleaning out my office, finding long-ago printed and digital photos that I've hoarded since the day computers arrived on our desks at the proving ground. And yes, I do remember when we didn't have computers, and cut and paste was the real thing.

Although I am not preparing my own farewell presentation (because

that would be weird, right), I have been struggling to sum up my own significance during my time on the job. Many people say, 'It's just a job,' but doesn't that job make up a big part of your life?

Looking back, I really couldn't pinpoint one specific individual contribution I had made and it really started to bother me.

Then, in late December, I had the opportunity and privilege to meet a family with multiple generations of contributions to the proving ground. During our conversation, I found out that both of their significant others had also worked at YPG and that wasn't even including the two that are currently employed here now. I'm not a fan of math after I run out of fingers and toes to count on, but collectively, it was a lot of years – and it is still going. That really made an impact on me.

For most of my tenure at the proving ground, I have not had my own specific team - I've had many of them. Every project, visit, and event that is carried out at YPG typically includes coordination and collaboration with many folks across all spectrums of job fields. If I've worked with you, whether at YPG or in the Yuma community, I've been grateful to be part of your team. Even if you didn't know it, or I wasn't specially invited and crashed your party, I considered you my teammate-- including Jim, the custodian who has emptied my trash and cleaned an immeasurable amounts of spilled coffee off of my carpet.

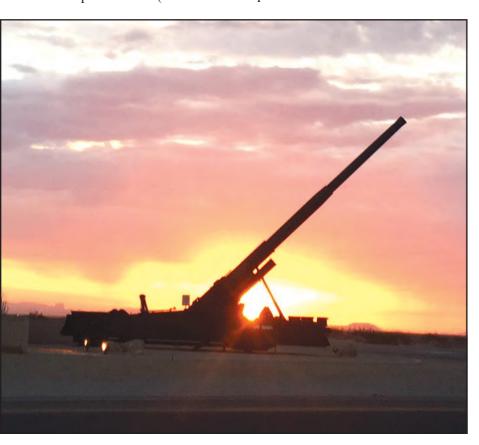
There have been days where I swore the clock on my office wall was broken as what seemed like hours were only minutes. Some days

may seem to go by slowly, but really the years go by fast.

One aspect of my job was to write this column, but you were never obliged to read it. I was privileged to have a vehicle to express my view without a point and am thankful to those who took the time to take the ride along with me.

I don't remember many of the projects I worked ON, but it's easy to recall who I worked WITH – so, thank you for allowing me to part of the YPG family and what I now see as a much bigger picture of the impact of the people who pass through and the teams that work together to make it a better place.

As I start a new life journey, I find that the importance is not on what I am leaving behind, it's what I'm taking with me...





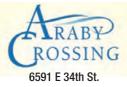
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# Mortar testing a specialty at U.S. Army Yuma Proving Ground

#### By Mark Schauer

For versatility and power, the humble mortar has been a key indirect fire weapon for generations, and is likely to become even more important as technology makes mortars more accurate and maneuverable.

Hard-to-traverse mountain terrain, urban areas, and a rapidly-moving enemy are all situations that call for the mortar as a weapon of choice. In addition to their firepower, American forces commonly rely on mortar teams to fire illumination rounds to light up areas at night or white phosphorous rounds to provide smoke screens that obscure troop movements during daytime operations.

Whether carried by a Solider or attached to a combat vehicle, virtually every type and variant of mortar in the ground combat arsenal goes through rigorous developmental testing at YPG. The proving ground also performs acceptance testing on lots of existing mortars on virtually a daily basis.

American forces use mortars in three calibers: 60mm, 81mm, and 120mm. The typical mortar consists of a ballistic tube attached to a base plate by a movable breach ball and propped up by a bipod. The base plate is typically the heaviest component: for a 120 mm mortar, it can weigh over 150 pounds. Mortar projectiles, which ignite when their firing pins hit the bottom of the tube, are propelled by explosive nitrocellulose charges of various sizes attached to the round, with larger charges providing greater distance. Mortars come with sight units for aiming and 60 mm versions can be fired in a hand-held mode.

#### **Testing**

As the Department of Defense's fourth largest installation, YPG's immense size is often a major factor in attracting test customers. Since mortars are capable of ranges only a fraction of the distance of an artillery projectile, there are far more facili-

ties that theoretically could accommodate mortar tests. Though YPG's customers are mostly drawn to its institutional expertise and highly instrumented ranges, the proving ground's sheer size ensures that fired mortar rounds can be safely recovered for study. Its borders also contain a wide variety of terrain that simulate conditions in Southwest Asia, including mountains that are highly coveted in the testing of guided mortars, whose developers are especially keen to challenge these advanced systems with test firing from a low elevation into a higher elevation.

"Since 9/11, about two-thirds of our division workload has been mortars," said Wayne Schilders, chief of weapons operations. "That includes tests on the mortars themselves as well as mortar fire in support of tests of radar and counter-mortar technology."

While ammo surveillance tests of mortar rounds look at whether

a stored round can still function as intended under normal conditions, developmental tests of new systems or updated components on existing systems seek to improve the range, accuracy and reliability of the weapons, and are pushed to extreme limits.

"We usually test a new item by firing it 10,000 times," said Patty Jonez, a test officer in the munitions and weapons division. "Most mortars in operational units don't fire that many times. That's why we test—to find out at what point it breaks."

This type of testing aims to see whether a mortar conditioned to extremely hot or cold temperatures will still fire. Mortar tubes become extremely hot after continuous firing and a system under development is tested in a similarly scalding tube to ensure the round doesn't 'cook off', or explode in the tube, or in midair prior to reaching its target. The mortars are often fired under unusually high pressures, too, to determine



YPG gunners typically do not fire the test projectile by dropping it into the tube as a Soldier in combat would. In the rare instances where a test requires fire that replicates actual use, the gunners, many of whom are uniformed artillery veterans, wear Kevlar vests and helmets and follow other safety precautions. (Photo by Mark Schauer)



Though YPG's customers are mostly drawn to its institutional expertise and highly instrumented ranges, the proving ground's sheer size ensures that fired mortar rounds can be safely recovered for study. Its borders also contain a wide variety of terrain, including mountains that are highly coveted in the testing of guided mortars. (Photo by Mark Schauer)



With a mechanized mortar carrier, the scope of evaluation goes far beyond firing. The repeated shock produced by a 120mm mortar's recoil can adversely impact the vehicle's engine mounts and suspension system, requiring YPG testers to take a holistic view of a system. (Photo by Mark Schauer)

the extent of their abilities. The base plate, which will ultimately crack under the strain of repeated firings, always garners intense scrutiny from testers.

The ballistic tubes used by YPG mortar testers are outfitted with holes to accommodate pressure gauges and other instrumentation. For a conventional mortar, YPG testers gather information like chamber pressure and velocities, and measurements of the range and deflection of the projectile's point of impact, which is usually calculated by observers stationed in towers overlooking the test range. For guided mortars, testers also take high speed camera images at both the gun tube and the point of impact, track the round in mid-flight with massive camera mounts, and sometimes even attach telemetry devices to the round itself to measure flight characteristics and assure that it acquires its satellite signal at the proper time. The instrumentation that allows a guided mortar to have this capability must also be relatively small, for mortars need space for their explosive payload.

All of the expensive, specialized instrumentation for this type of evaluation is already in place at YPG as a result of its longstanding status as the premier facility for artillery testing. The artillery mission also means YPG has a deeply experienced staff at its ammunition plant that can assemble complex ignition or propellant charges, and a metrology division that can accurately measure the physical properties of a given projectile, be it a mortar or artillery. Rounds that have been recovered after firing can be dissected at YPG's water jet-cutting facility. Developmental testers usually want to see how their system can perform when conditioned to temperatures as low as -50 degrees and as high as 145 degrees, and YPG has conditioning chambers to accomplish this all year round. Some tests even call for rounds to be soaked in water prior to firing.

Testers also strive to consider how the rounds will fare under projected threat conditions: will the mortars detonate if a truck they are being transported on is struck by .50 caliber machine gun fire? Will rounds detonate if hit by shrapnel? Knowing what to expect in these types of events is crucial information for troops in the field.

All through these challenging tests, safety is a primary concern. As such, gunners typically do not fire the test projectile by dropping it into the tube as a Soldier in combat would. Instead, most rounds are suspended over the mortar tube with a metal clip attached to the fuse or muzzle, which is pulled away by a long lanyard to fire the round. In the rare instances where a test requires fire that replicates actual use, the gunners, many of whom are uniformed artillery veterans, wear Kevlar vests and helmets.

Mortar testing is a perpetual and cyclical component of YPG's test mission: Its presence in the developmental testing of a given mortar round offers valuable knowledge of



Though improvised explosive device (IED) attacks became an indelible image of the Iraq war in the popular consciousness, mortars were the primary weapon of choice for insurgents in the earliest days of the conflict. Today's commonly available technologies to combat mortar attack, such as Counter Rocket, Artillery, Mortar (C-RAM) systems, were rapidly and extensively tested at YPG. (Photo by Kurt Harrison)

the projectile's capabilities throughout its life cycle.

#### **Carriers and Self-Propelled Systems**

When American mechanized infantry transitioned into Stryker combat brigades, the mortar came along for the ride with the M1129 Stryker Mortar Carrier. YPG's combat automotive division has tested all variants of the Stryker and the munitions and weapons division worked night and day to ensure the performance of the mortar.

"For the Stryker test, we fired 24,000 rounds on two weapons," Jonez recalled. "We were running two shifts a day to accommodate this."

With a mechanized mortar carrier, the scope of evaluation goes far beyond firing. The repeated shock produced by a 120mm mortar's recoil can adversely impact the vehicle's engine mounts and suspension system, for example. This requires

SEE **MORTAR** page 11



The ballistic tubes used by YPG mortar testers are outfitted with holes to accommodate pressure gauges and other instrumentation. For a conventional mortar, YPG testers gather information like chamber pressure and velocities, and measurements of the range and deflection of the projectile's point of impact. (US Army photo)

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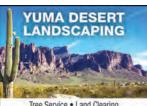
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# **MORTAR**

ROM PAGE 7

YPG testers to take a holistic view of a system.

"We have to test everything from being able to shoot accurately to ensuring its durability," said Schilders. "We also have to test system ergonomics, from misfire procedures and safely extracting rounds to exit procedures of personnel in the event of a misfire."

Self-propelled mortars have been a mainstay of allied European and Asian armies for a generation, and YPG has tested a variety of these systems through the years, including Germany's Wiesel Lightweight Armored Mortar.

#### Defense

YPG's expertise with mortars extends to testing sophisticated defensive measures against commonly-available, often low tech, weapons. Though improvised explosive device (IED) attacks became an indelible image of the Iraq war in the popular consciousness, mortars were the primary weapon of choice for insurgents in the earliest days of the

conflict. Today's commonly available technologies to combat mortar attack, such as Counter Rocket, Artillery, Mortar (C-RAM) systems, the Lightweight Counter-Mortar Radar, and the Fire Finder radar, were rapidly and extensively tested at YPG.

Since insurgents tend to use commonly available Soviet-era mortars of irregular calibers, YPG testers do likewise when putting defensive systems through their paces.

#### **Future**

YPG has conducted mortar testing since its inception in 1951 and all signs point to this important mission continuing to be a vital mission element.

"Our customers like working with YPG because we can get the job done quickly and without interruption," said Jonez. "We have relatively favorable weather year-round and provide enough space to test without having to worry about affecting populated areas. We have many repeat customers and get new business all the time. YPG is without a doubt the premier test facility in the nation."

# Resolved: YPG's first walk/run of the New Year was fantastic!



YPG personnel rang in the new year with a vigorous two-mile 'Resolution Run' that began outside the YPG Fitness Center on January 10. Though held at the end of the duty day, Sgt. Sean Gilchrist of the Airborne Test Force won the event with a 14:42 time. Gilchrist saw the event as a mere warm-up to the 50K run he intends to compete in in May. YPG's next run will be a Valentine's Day event. (Photo by Casey Garcia)

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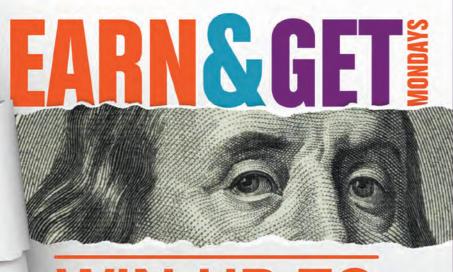
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